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Comparison of surface roughness after micro abrasion of enamel using two proprietary remineralization agents: An in-vitro study ●

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Epigenetics : Unveiling new secrets in periodontics ●

Life like denture esthetics ●

Management of invasive cervical resorption ●

Can bacteria prevent dental caries ●

Burning mouth syndrome ●



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Vision of Cancer therapy

Cancer arises by a multi-step, Darwinian process of variation and selection, involving the accumulation of activating mutations in proto-oncogenes and inactivating mutations in tumor suppressor genes. The process is accelerated by the genetic instability of cancer cells, which is believed to result from passage through "telomere crisis." Thus, cancer cells may contain many – perhaps hundreds – of genetic changes. One of the challenges we now face is to be able to develop a complete description of the genetic changes that have taken place in each individual tumor, so that therapies can be targeted that are specific for the tumors of each individual patient.

Current therapy for oral cancer is surgery and radiation treatment. Advances in molecular biology have explained the genetic alterations that lead to development of carcinomas. This provides hope that targeted therapy will be possible in the future. For each type of cancer, it is also important to learn which genes are used in self-renewing adult stem cells compared with cancer stem cells in that same tissue. While both of these cells are capable of self-renewing, only the cancer cells go on to grow indefinitely and spread to other organs through the blood stream.

Exciting challenges include improving success rates of current therapy, reducing the morbidity of treatment, and using molecular markers to predict tumor behavior and select the most appropriate treatment. The use of molecular markers in pre-malignant lesions will allow us to develop more specific diagnostic and preventive strategies. Today, our patients have a better quality of life and improved loco-regional control. Tomorrow, our focus should be on using the continuing scientific and technological innovations to ultimately defeat this disease.



President's Message	388
Editorial	389
Comparison of surface roughness after micro abrasion of enamel using two proprietary remineralization agents: An in-vitro study	Jones Mathias 390
Unusual presentation of late stage acute lymphocytic leukemia in a dental clinic; a diagnostic challenge	T. Isaac Joseph 394
Gingival de pigmentation using diode laser	Jagadish Pai B.S. 397
Teeth facts	Tony P. Paul 400
Life like denture esthetics	Saurav Banerjee 402
Enhancing Implant surface topography using nanotechnology	Anil Mathew 405
Lasers in Orthodontics	Roopesh R. 408
Bisphosphonates induced osteonecrosis-be aware	Sankar Vinod V 411
Non surgical endodontic management of a dilacerated, calcified permanent maxillary central incisor	Mridula Parameswaran 415
Reasons of permanent tooth loss among children and adults in a suburban area of Chennai	Benley George 419
Management of invasive cervical resorption	Elizabeth Prabha James 424
Can bacteria prevent dental caries	Jolly Mary Varughese 428
A study of patient record documentation practice of dentists in Kerala	Arun Narayanan 430
Management of vaginal atresia	Lylajam S. 433
Chemosis of the eye following management of displaced zygomatic complex fracture	Jomy Varghese 434
Coronal and midfacial degloving approach for panfacial trauma	Arun Babu 437
Long standing Chondroma of the midface - an unusual presentation	Mathew Jose 440
Esthetic rehabilitation of partially edentulous condition with FPD and tooth supported overdenture	Shajahan. P.A. 443
Orthodontic perspective	Naseem. KT. 445
The dark triangles- orthodontic solutions	Shobha Sundareswaran 449
Esthetic replacement of metal ceramic restoration with all ceramic restoration	Ranjith Kumar P. 452
Burning mouth syndrome	Giju Baby George 454
Complexities of vertical dimension & its effect on saggital corrections in Class II deepbite cases with gummy smile by camouflage treatment	Biju Sebastian 456
Plexiform ameloblastoma of mandible: current concept on the molecular pathogenesis	Jaiswal Rohit 459
The elusive MB2!- seek and thou shall find	Gibi Paul 462
Esthetic management of fused teeth	Jolly Mary Varughese 465
Juvenile oral erosive lichen planus in a 10 year old child	Omali P.M. 467
Squamous cell carcinoma of the maxilla	Vishnu Mohan 469
Paediatric laser dentistry - an introduction	Chintu S 472
Digital dentistry - the future is here	George P. John 474
Epigenetics : Unveiling new secrets in periodontics	Presanthila Janam 478
Probiotics in oral health & disease	Elizabeth Koshi 481
Treatment planning for post-radiation therapy patient	J. Srinivas Kumar 483
Diagnose	Rajitha AV 485
Quiz	Saakshi Gulati 486
Secretary's report and association news	487

President's Message



Dr. Santhosh Sreedhar

I have great pleasure to communicate with you at this fag end of this IDA year. My tenure as the President of IDA Kerala State has been a great learning process and an enriching experience. The lingering memories are so real and powerful which are never going to fade. The friendship I could build ,the love and affection showered on me, I will cherish them close to my heart for the rest of my life.

I place it on record, my profound gratitude to all the members of IDA Kerala State and IDA officials at the National level for their co-operation to make this IDA year fruitful and meaningful. I consider myself blessed to have an able and dedicated team of office bearers who were really capable and helpful to me in discharging my duties as the President. Let me extend my effusive thanks to Hon. Secretary Dr.Shibu Rajagopal, Hon. Editor Dr. K. Nanda Kumar, CDE Chairman Dr. Deebu Jacob Mathew, CDH Chairman Dr. Abdul Latheef, Constitution and Ethics Committee Chairman, Dr. V. Viswanath, all the State office bearers, E.C. and C.C. Members, Local Branch Presidents and Secretaries for their wholehearted support in all the IDA activities.

In this IDA year, we could do many worthy Projects and Programmes, both for the benefit of the members as well as for the public. To mention a few, President and Secretary Seminar, Observation of World Palliative Care Day and donation of Ambulance Van, Formation of Women's wing, Five State level CDE programmes, Dentist Day Celebrations, Observation of World Oral Health Day, Students Convention, Cultural Meet, International Tour, Career guidance programme, Photography Contest, Family Sports Meet, Action against unethical practice and advertisements, Observation of Black Day against the injustice of Government towards the welfare of Dental Surgeons, Inauguration of new IDA Branch, Six State EC meetings, Four regular and one supplementary issue of KDJ etc..etc... The main forthcoming events are FDI-IDA CDE Programme, Observation of World AIDS Day, IDA Kerala State and National Conferences.

Friends, let us give this year, a fitting finale by making our State Conference at Thiruvananthapuram, an outstanding success. I invite all the members with family to take part in the 44th KSDC on 6th, 7th and 8th January at Trivandrum, to make it a memorable one.

Let me conclude with a famous quote, "the future belongs to those who believe in the beauty of their dreams".

Thank you and Good bye.

Yours in IDA,

Dr. Santhosh Sreedhar
President, IDA Kerala State.

Three years ago Kerala Dental Journal has come to my care. By that time it has completed thirty one years and it was adjudged many times as the best journal of India by the IDA head office. It was a real challenge to maintain or further improve the quality of the journal. Many former editors have come out with valuable suggestions and many readers have expressed their opinion. The new format and direction in content was formulated and the last twelve issues of KDJ was very well received by the professionals all over the country and in particular the members of IDA.



Dr. K. Nandakumar

Publications have become an essential qualification for the teachers of dentistry in the recent times. Perhaps this rule of the Dental Council has compelled many teachers to publish articles in journals. But the number of journals was very meager. There was a rush for publications and we could not cope up with the demands. We at KDJ have tried our best to accommodate articles of good content and quality. In the last three years, we could include the following category of articles:

Original research	20
Review	28
Clinical reports	110
New information	38
Guest article	6
Editorial	13

This is no less an achievement for a state journal. KDJ could encourage many young authors and many of them got their first publication through KDJ. Our drive to improve the quality, edit the content and finishing with language improvement had a good response from authors. We were compelled to reject a few articles for reasons of standardization. The rejection should be considered as an opportunity to improve further. Our editorials were widely recognized for the timely directions they gave. Reintroduction of the house surgeency was a satisfying experience because we were demanding for it in the editorials.

Our finances were never lavish but we have tried our best to get good quality production in colour which many other journals cannot even dream of. This has been made possible by the contributions of our members and the advertisers. Even during the time of recession, many advertisers have contributed to meet the needs. The strength in the quality of production has been Shri. Sudhir of Suman graphix. I have no reservations in thanking him for his fine sense of artistry and the keenness in keeping the time.

I am happy that the Journal could continue its success story. I would like to thank the IDA state office, Presidents, Secretaries, Editorial Board, advertisers and many who prefer to remain anonymous.

Thanking you once again for the confidence you have reposed in me.

Dr. K. Nandakumar
Editor, KDJ

Comparison of surface roughness after micro abrasion of enamel using two proprietary remineralization agents: An in-vitro study

* Jones Mathias, ** S. Sathyakumar, *** S. Mahalaxmi

Abstract

Aim: The aim of this study was to compare the surface roughness of enamel after micro abrasion using two proprietary remineralization agents, 1] CPP-ACFP (Casein phosphopeptide with amorphous calcium phosphate with 900 ppm fluoride, GC Tooth Mousse Plus, GC Corporation, Japan) and 2] β TCP (β Tri calcium phosphate with 950 ppm fluoride, Clinpro Tooth Crème, 3M ESPE, U.S.A).

Materials & methods: Thirty freshly extracted anterior teeth were collected, roots decoronated and the crown portion embedded in acrylic resin. Micro abrasion was done in all samples and they were split vertically along the long axis of the crown. Samples were divided into two groups: 1] Group A (n=30) (CPP-ACFP) and Group B (n=30) (β TCP), which were treated with remineralization agents for a period of 30 days. Pretreatment surface roughness values were evaluated and compared with that after micro abrasion and after application of remineralization agents

Results: According to the results of the study, both Group A ($0.73 \pm 0.16 \mu\text{m}$) and Group B ($0.76 \pm 0.16 \mu\text{m}$) showed statistically significant mean surface roughness reduction compared to the micro abraded enamel group ($0.83 \pm 0.16 \mu\text{m}$) and untreated surface (Pretreatment) ($0.99 \pm 0.15 \mu\text{m}$).

Conclusion: The mean surface roughness of enamel samples of Group A was less compared to Group B, when applied for a period of thirty days after undergoing micro abrasion procedure in vitro.

Introduction

Survival of mutans streptococci in the oral environment depends on their ability to adhere to a surface.¹ Bacterial adherence to the smooth surfaces of human teeth has been shown by several investigators to be one of the primary mechanisms involved in the initiation of dental plaque development. According to Bollen et al (1997), he defined a critical roughness threshold beyond which bacteria were likely to adhere to the surface as $0.2 \mu\text{m}$.² so because of the adherence nature of the bacteria, it is sensible to apply the preventive strategies based on modification, suppression and elimination of mutans streptococci and thus prevent demineralization.

At present, great emphasis is placed on caries risk assessment, early diagnosis and caries control. Thus, the focus has shifted from surgical intervention to effective preventive strategies and minimal intervention. With the advent of newer improved materials and techniques, there has been a progressive evolution in preventive dentistry.

Enamel micro abrasion was developed to improve surface texture, remove superficial intrinsic stains, repair enamel decalcification and texture defects.³⁻⁵ Enamel

micro abrasion creates a highly polished prismless (abrasion effect) mineral rich surface, so that it takes a longer time for an acquired pellicle, and subsequently, *mutans streptococci* to colonize smooth surfaces.⁶ Micro abraded surface becomes smooth and lustrous and maintains a glass like sheen.⁶⁻⁷

The concept of “remineralization” with casein phospho peptide — amorphous calcium phosphate (CPP-ACP) has been observed by several studies on animals, in-vitro and in situ human studies.^{8,9} CPP-ACFP was recently introduced with the added advantage of the fluoride content in addition to the original ‘Recaldent’ based cream.¹⁰

β TCP, a unique form of partially insoluble calcium phosphate, is a known precursor to hydroxyapatite formation. In dentistry, the ability to combine calcium phosphates with fluoride (i.e., the clinically proven anticaries agent) in a simple dental format (e.g.toothpaste) is extremely appealing as research has shown this combination can produce higher levels of enamel remineralization (or repair) relative to fluoride or calcium phosphates alone.¹¹

Hence this study was undertaken to compare the surface roughness of enamel after micro abrasion and



Fig 1. Samples mounted in acrylic blocks



Fig 2 Mitutoyo SJ 400 Profilometer

treatment of this surface using two proprietary remineralization agents: 1] CPP-ACFP (Casein phosphopeptide with amorphous calcium phosphate with 900 ppm fluoride, GC Tooth Mousse Plus, GC Corporation, Japan) and 2] β -TCP (β Tri calcium phosphate with 950 ppm fluoride, Clinpro Tooth Crème, 3M ESPE, U.S.A).

Materials and Methods

Materials Used:

- ♦ Thirty extracted human anterior teeth
- ♦ 0.1% Thymol solution (Department of Biochemistry, S.R.M. Dental College, Chennai, India)
- ♦ Artificial saliva (Department of Biochemistry, S.R.M. Dental College, Chennai, India)
- ♦ 11% Hydrochloric acid (Nice Chemicals, Kochi, India)
- ♦ Pumice (Samit Products, New Delhi, India)
- ♦ CPP-ACFP (Casein phosphopeptide with amorphous calcium phosphate with 900 ppm fluoride, GC Tooth Mousse Plus, GC Corporation, Japan)
- ♦ β -TCP (β Tri calcium phosphate with 950 ppm fluoride, Clinpro Tooth Crème, 3M ESPE, U.S.A)

Armamentarium used:

- ♦ Micromotor (Arathon, Sae Yong Co., Korea)
- ♦ Contra angle handpiece (NAC, NSK, Japan)
- ♦ Carborundum disc (Samit Products, New Delhi, India)
- ♦ Rubber cup (Samit Products, New Delhi, India)
- ♦ Tooth brush (Colgate-Palmolive, Mumbai, India)
- ♦ Surface profilometer (Mitutoyo SJ 400, Japan)

Methodology

Thirty freshly extracted anterior teeth were collected. The teeth were thoroughly cleaned off its debris, calculus and soft tissue and stored in 0.1% thymol solution so as to avoid any microbial growth.

Roots were decoronated and the crown portion embedded in cold cure acrylic resin, with the labial surface levelled on top and lying flat and parallel to the

horizontal plane. The blocks were numbered from 1 to 30 (n=30) (Fig. 1). Surface roughness was evaluated using a profilometer.

Surface roughness measurement

The method used was to scan a diamond stylus across the surface (5mm) under a constant load and compute the numeric values representing the roughness of the profile as Ra. The Ra value describes the overall roughness of a surface and is defined as the arithmetic mean value of all absolute distances of the roughness profiles from the center line within the measuring length. In this study, Ra values were obtained using a Surface profilometer (Fig. 2).¹²

A diamond stylus with 2 μ m tip radius and a resolution of 0.01-0.04 μ m was used under a constant pressure of 3.9mN. This profilometer has a traversing speed of up to 0.135 mm/second. The non filtered direct profile was captured through computer software and the average profile height of the sampled profiles across the measurement lengths were recorded. All measurements were done in triplicate and the mean values were derived to represent the surface profile.^{12,13}

Microabrasion procedure

Custom made abrasive slurry was prepared with 11% HCl acid and fine powdered pumice.^{3,4,14,15} The prepared slurry was applied to the labial surface of the tooth sample using a rotating rubber cup for ten second applications. The slurry was rinsed away after each application.¹⁶

Surface roughness was again evaluated using profilometer for all the 30 samples.

The embedded tooth samples in acrylic resin were split vertically along the long axis of the crown using carborundum disc. Samples were kept under running water to rinse away the debris and blotted dry. The number of samples is now 60.

Samples were divided in to 2 groups:

GROUP- A (n=30) samples treated with paste of CPP-ACFP

GROUP- B (n=30) samples treated with paste of β -TCP

Table I: Comparison of mean surface roughness between before treatment and after micro abrasion

	Mean \pm S.D	Difference mean \pm s.d. [95% ci]	p – value ^s
Pre treatment	0.99 \pm 0.15	0.16 \pm 0.05 [0.14 – 0.18]	<0.0001 (Sig.)
After micro abrasion	0.83 \pm 0.16		

The mean surface roughness before treatment is 0.99 \pm 0.15, which is decreased to a mean surface roughness of 0.83 \pm 0.16 after the treatment. Thus, there is a mean difference of 0.16 \pm 0.05 [95% CI: 0.14 - 0.18], which is statistically significant (P<0.0001).

Application of CPP-ACFP

A paste of CPP-ACFP was applied directly with a clean finger on to the labial surface of the tooth samples and smeared over the surface for 3 minutes each.^{17,18} The samples were rinsed under running water for 30 seconds and stored in artificial saliva at room temperature.

Application of β -TCP

A paste containing β -TCP was applied on to the labial surface of the tooth samples using a tooth brush for 2 minutes each.¹¹ The samples were rinsed under running water for 30 seconds and stored in artificial saliva at room temperature.

The samples were stored in artificial saliva at room temperature during the experiment period of 30 days. Surface roughness was again evaluated using profilometer and compared with the pretreatment results.

Results

Mean and standard deviation were estimated for roughness at different time points. Mean values were compared between different time points by using Student's paired t-test followed by Bonferroni correction procedure. In the present study, p<0.05 was considered as the level of significance.

DISCUSSION

Enamel micro abrasion is a conservative esthetic treatment used for the selective removal of localized areas of intrinsically stained superficial enamel, usually caused by mild fluorosis and/or enamel hypoplasia (white spot lesion). Micro abrasion works best to remove unpleasant stains that are localized in the outermost part of the dental enamel. It also can be combined with tooth whitening to achieve an even more esthetic result.¹⁸ It is proven that the micro abrasion procedure produced a smooth, mineral rich enamel surface.^{16,17}

However, during the micro abrasion procedure, the acid used can penetrate the enamel and ions can be displaced.

Therefore, during micro abrasion, there is a possibility of increasing the level of porosity, thus facilitating acid

Table II: Comparison of mean surface roughness between group-a and group-B

	Mean \pm S.D	Difference mean \pm S.D. [95% ci]	p – value ^s
GROUP-A	0.73 \pm 0.16	-0.03 \pm 0.02 [-0.03 - -0.02]	<0.0001 (Sig.)
GROUP-B	0.76 \pm 0.16		

The mean surface roughness of GROUP-A is 0.73 \pm 0.16 and in GROUP-B is 0.76 \pm 0.16. Thus, there is a mean difference of -0.03 \pm 0.02 [95% CI : -0.03--0.02], which is statistically significant (P<0.0001).

transport and further demineralization.¹⁶ However, it is apparent that on the enamel surface, the opposite action is also possible, with the ions returning along the same pathways, so that enamel can remineralize.

The rationale behind surface roughness evaluation of enamel surfaces was that the roughness of intraoral surfaces influences initial bacterial adhesion and its stagnation. Retentive areas of solid tooth surfaces are the preferential colonization sites for *mutans streptococci* and their presence at high levels is an indicator of increased caries risk. It has been shown that the initial microbial colonization of the enamel surface starts in surface irregularities such as grooves, perikymata, cracks and abrasion defects and subsequently spreads out from these areas. *In vivo* data have shown that rough surfaces can significantly facilitate plaque retention and harbor bacteria twenty five times more than their smooth counterparts.² So because of the adherence nature of the bacteria, it is sensible to apply the preventive strategies based on modification, suppression and elimination of *mutans streptococci* and thus prevent demineralization.

Hence, in this study remineralizing agents, CPP-ACFP and β -TCP were used to evaluate the remineralization of micro abraded enamel.

Roughness parameters were assessed with a stylus profilometer. The mean surface roughness which describes the overall surface roughness was considered in this study because it is the most commonly used parameter in dental literature. All measurements were done in triplicate and the mean values were derived to represent the surface profile to reduce error.

The mean surface roughness of micro abraded enamel (0.83 \pm 0.16 μ m) was significantly reduced, compared to the untreated enamel surface (0.99 \pm 0.15 μ m). This is in accordance with the study done by Segura et al (1997). This may be because, the micro abrasion procedure creates a highly polished and prismless structure, 'the abrosion effect', thus creating a smooth surface.⁶

According to the results of this study, both Group A (0.73 \pm 0.16 μ m) and Group B (0.76 \pm 0.16 μ m) showed statistically significant mean surface roughness reduction compared to the micro abraded enamel group (0.83 \pm 0.16 μ m) and untreated surface (Pre treatment) (0.99 \pm 0.15 μ m).

A combination of micro abrasion and CPP-ACFP (Group A) has reduced further the surface roughness of micro abraded enamel group ($0.73 \pm 0.16 \mu\text{m}$), when compared to combination of micro abrasion and a paste of β -TCP (Group B) ($0.76 \pm 0.16 \mu\text{m}$).

Recent studies have indicated that the remineralization properties of CPP--ACP may be responsible for prevention of enamel wear. Given that wear is predominantly a surface phenomenon compared with carious lesions, remineralization of eroded lesions is likely to involve repair by deposition of mineral into the porous zone rather than growth of eroded crystals.¹⁰

Ranjitkar *et al* (2009) showed that intermittent application of CPP-ACP reduced dentine wear in both the acidic and relatively neutral environments; although the benefit was greater in the latter. He hypothesized that CPP-ACP nano complexes and glycerol of the CPP-ACP formulation provides lubrication at the wear interface and creates smooth, polished wear facets. This same mechanism can be attributed to the improved surface roughness shown by CPP-ACFP(Group A) on micro abraded enamel as the micro abrasion procedure creates a smooth, mineral rich enamel surface.¹⁹

Increased surface roughness of Group B compared to Group A could be due to the method of application of the paste. β -TCP was applied using a tooth brush whereas CPP-ACFP was only smeared over the surface. The tooth brushing of β -TCP was suggested by manufacturers to remove the sodium lauryl sulphate which protects β -Tricalcium Phosphate from prematurely interacting with ionic fluoride while coexisting in solution.¹¹ The hydrated silica present in the β -TCP formulation could also have contributed to the increased surface roughness compared to the CPP-ACFP group.

Further studies are needed to clarify the nature of lubricating and remineralizing properties of the agents, CPP-ACFP and β -TCP used in this study. Such information will be important in designing better strategies in minimally invasive dentistry. The findings of the present study also point to the need for clinical trials to investigate the effect of remineralizing agents in reducing surface roughness *in vivo*.

Conclusion

Within the limits of this study the following conclusions were made:

- The mean surface roughness of enamel of Group A (CPP-ACFP) was less (statistically significant) compared to Group B (β -TCP), when applied for a period of thirty days after undergoing micro abrasion procedure *in vitro*. But the difference in surface roughness between the two groups need not necessarily have any clinical implication.
- A combination of micro abrasion procedure and treatment with remineralizing agent reduced the mean surface roughness of enamel significantly

when compared to micro abrasion procedure done alone.

- Surface profilometric analysis (Mitutoyo SJ400) was found to be an efficient way to quantitatively assess the surface roughness of enamel *in vitro*.

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Case report

Unusual presentation of late stage acute lymphocytic leukemia in a dental clinic; a diagnostic challenge

* T. Isaac Joseph, ** Deepu George Mathew, ** Pradeesh Sathyan, *** P.M Sunil

Abstract

Leukemia is a hematological malignancy often with a fatal outcome. Oral manifestations of the disease can lead to its early diagnosis. We present a case of late stage acute lymphocytic leukemia presenting as a palatal swelling with generalized signs and symptoms of multiorgan involvement. The typical oral manifestations like gingival enlargement and bleeding, petechiae were absent for our patient. This report indicates that oral and systemic manifestations can be important in the early diagnosis of acute leukemias especially acute lymphocytic leukemia(ALL).

Introduction

Leukemia is hematological malignancy characterized by over production of WBC and presence of immature cells in the circulation.¹

We present a case of late stage acute lymphocytic leukemia (ALL) presenting as a palatal swelling with generalized signs and symptoms of multiorgan involvement. The common oral problems associated with leukemia are gingival enlargement and bleeding, petechiae, hematomas, or ecchymoses. Oral swelling is not a typical oral manifestation of leukaemia. This article is aimed at creating awareness among dental practitioners on early and accurate diagnosis of ALL taking into account the typical and atypical oral manifestations along with systemic manifestations for the proper patient management.

Case report

An 18 year old male patient reported to our clinic with a palatal swelling associated with fever and tiredness. (Fig. 1) History revealed that he had fever, malaise, head ache, vomiting and loss of appetite for past 5 days. He temporarily responded to antipyretics prescribed by a general physician. But later he developed a swelling on the palate.

Systemic examination showed that patient has pale yellow tained skin and bilateral ankle edema associated with hepatomegaly. Head and neck examination showed swelling on the right side of the face associated with bilateral palpable non fixed submandibular lymph nodes. Intraoral examination revealed soft tissue swellings on the posterior buccal alveolar mucosa and hard palate in the right maxilla. The swelling was nontender with slight bluish discoloration. He had no associated dental caries or periapical pathosis. Oral mucosa and gingiva appeared healthy. (Fig. 2 and 3)

CT revealed soft tissue masses on the buccal and palatal aspects of the right maxilla. There was no associated bony erosion. (Fig. 4)

Laboratory investigation revealed high total WBC count (95,400 cells /c.mm), drastically reduced platelet counts 56,000 cells /c.mn. Blood urea (61mg/dl; normal 13-45 mg/dl) and creatinin (5.69 mg/dl; normal range 3.5-7.2 mg/dl) was significantly high suggesting renal impairment leading to ankle edema. Liver function test showed increase in the SGOT (282 IU/L; normal range 5-34 IU/L), SGPT (45 IU/L; normal range up to 40 IU/L) and alkaline phosphatase (397 IU/L; normal range 65-260 IU/L) which suggested compromised hepatic function.

Peripheral smear showed an increase in leukocyte count and lymphoblast count (40%). The lymphoblasts showed large round nucleus, scanty cytoplasm and occasional nucleoli. The cells were variable in size and other normal leukocytes were very few. (Fig. 5 and 6)

The presence of immature and abnormal lymphocytes circulating in the peripheral blood with the systemic manifestations suggested a hematological malignancy of acute lymphocytic leukemia (ALL) subtype L2.

The patient was referred to a tertiary care centre for further management but he died in two months due to renal failure which occurred as a complication of leukemic infiltration.

Discussion

Leukemia is a fatal disease. Oral manifestations in leukemia can occur early in the course of the disease and these features can act as early diagnostic indicators. ALL is the most common malignancy of the childhood and can occur at any age.^{2,3}



Fig. 1 Clinical photograph showing swelling on the right side of face



Fig. 2 Intraoral photograph showing right palatal swelling



Fig. 3 Intraoral photograph showing swelling on right buccal alveolar mucosa with bluish discoloration



Fig. 4 White arrow indicates soft tissue shadow of the palatal swelling

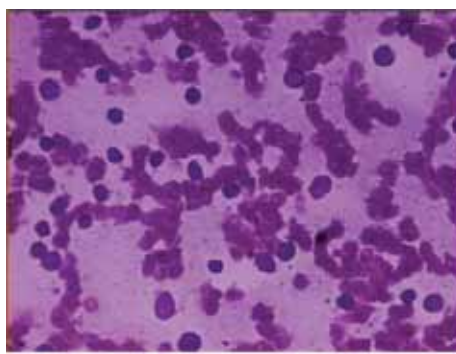


Fig. 5 Peripheral smear showing many large heterogenous lymphoblasts in a single field (25x)

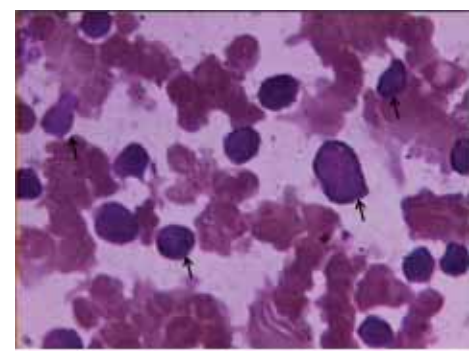


Fig. 6 Black arrow indicates large heterogenous lymphoblasts in a peripheral smear (50x)

The most common signs and symptoms of leukemia include fatigue, weight loss, fever, petechiae, ecchymosis and bone pain. Hepatosplenomegaly and lymphadenopathy may be also present.⁴ Acute leukemias typically follow a more aggressive clinical course than the chronic leukemias.⁵

Our case also reported with these common leukemoid signs and symptoms like fever, malaise, head ache, anemia, vomiting and loss of appetite. These symptoms could be easily associated with other common inflammatory or infectious etiologies. But in our patient, we ruled out all localized infectious etiologies by clinical and radiological examination. Systemic examination showed that our patient had other symptoms like hepatomegaly with jaundice and bilateral ankle edema suggestive of hepatic and renal impairment. The time of onset of the symptoms was of short duration (1week) suggestive of an acute episode.

The common oral problems associated with leukemia are gingival enlargement and bleeding, petechiae, hematomas, or ecchymoses. Lymphadenopathy is seen commonly in ALL, the other symptoms are more common in AML. 16% of the

patients with acute leukemias had oral problems but the frequency of head and neck pathoses as a secondary symptom was high in patients with ALL.^{1,6}

The only oral manifestation in our patient was soft tissue swellings on the posterior buccal alveolar mucosa and hard palate in the right maxilla. The swelling was firm, non tender with slight bluish discoloration but with no infectious pathologies. This manifestation in leukemia is quite rare. The other typical manifestations were absent for our patient. Lymphadenopathy which is a common manifestation for ALL was present for our patient.

The characteristic feature of acute leukemia is the presence increased number of blast cells upto 30% in the peripheral blood. Peripheral blood examination in acute leukemia typically shows elevated WBC count, increased blast cells to more than 30%, normocytic normochromic anemia and thrombocytopenia. The association of thrombocytopenia with the presence of blast cells in the peripheral blood are strongly suggestive of acute leukemia. Chronic leukaemias typically do not show any blast cells in the peripheral smear.^{2,7}

Our patient's peripheral smear showed blast cells with round nucleus and scanty cytoplasm. The blast cells comprised of more than 30% of the total cells in the

Table I FAB classification of acute lymphoblastic leukemia²

Morphology	L1	L2	L3
Cell size	Predominantly small	Large; heterogeneous	Large, uniform
Nuclear features Shape	Smooth contour;	occasional clefting or Irregular; clefting and indentation	Smooth contour; oval to round indentation common
Chromatin	Homogeneous in any one case	Variable; heterogeneous in any one case	Finely stippled and homogeneous
Nucleoli	Small and inconspicuous or not visible	One or more present; often large	Prominent; one or more
Cytoplasm	Scanty; slight or moderate basophilia	Moderate to abundant; variable basophilia	Moderately abundant; deeply basophilic
Cytoplasmic vacuoles	Variable	Variable	Often prominent

Table II Scoring system for fab l1 and l2 subclasses²

Criteria	Score
<i>Nuclear/cytoplasmic ratio</i>	
High $\geq 75\%$ of cells	+
Low $> 25\%$ of cells	-
<i>Nucleoli</i>	
0-1 (small) $\geq 75\%$ of cells	+
1 or more (prominent) $\geq 25\%$ of cells	-
Irregular nuclear membrane $\geq 25\%$ of cells	-
Large cells $\geq 50\%$ of cells	-

smear. There were no auer rods in the blast cells thereby excluding the possibility of a myeloid leukemia and was suggestive of lymphoblastic leukemia. The patient also showed reduced platelet count (56,000 cells /c.mm).

The acute clinical onset of leukemoid signs and symptoms, presence of high number of ($> 30\%$) blast cells in the peripheral smear associated with thrombocytopenia confirmed the diagnosis as ALL.

ALL is classified into subgroups based on their cellular features by the classification proposed by FAB cooperative group (Table I). They are classified based on their scores for the cellular features (Table II) as L1 if the score is between 1 to +2 which accounts for more than 80% of ALL cases in children, L2 if the score is -1 or less which are mostly seen in adults. L3 is Burkitt's type. Our patient was diagnosed as having ALL subtype L2. His age was also within a period where L2 subtype of ALL was more probable to manifest.²

Conclusion

Oral signs and symptoms frequently form the initial clinical manifestations of acute leukemias. This report

emphasizes on the awareness of dental practitioner to be alert of the oral and systemic manifestations which can prove to be important in the early diagnosis of acute leukemias especially ALL resulting in a prompt management and better prognosis for the patient.

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Gingival de pigmentation using diode laser

* Jagadish Pai B.S., ** Alex Mathews M., *** Srinivas M.

Abstract

Melanin pigmentation of gingival is a common feature and in patients with high smile line it may be esthetically unpleasant. This paper aims to present a report of two cases of depigmentation performed with a diode laser of wavelength 810nm (AMD, Picasso, 7W). First case was performed using continuous mode and the second case using pulsed mode. In both the cases gingival appeared normal in 15 days and the healing was uneventful.

Introduction

Periodontitis unfortunately results in the loss of the supporting structures around the teeth. Nevertheless, the ultimate goal of periodontal treatment is to restore and maintain the function, and integrity of these tissues. Likewise, aesthetics is also an important and integral aspect of periodontal treatment and various procedures which fall under this category are, crown lengthening, gingival de pigmentation, gingivoplasty etc. Gingival pigmentation, therefore, becomes a point of concern especially in patients with high smile line.

Traditionally, various techniques have been employed to remove the pigmentation from the gingiva namely, gingivo-abrasion techniques, conventional scalpel method, chemical method, cryosurgery, electrosurgery etc. Alloderm and the free gingival autograft, though rarely practiced, could also be used to mask the gingival depigmentation¹. Laser depigmentation is the latest technique which could be used for this purpose and various studies have shown that lasers cause very minimal pain and discomfort when compared to the other methods². Studies have also shown that the recurrence time after depigmentation is longer for laser depigmentation^{1,2}. The melanin in the skin and mucosa is produced by melanocytes which are found in the basal layer of the epidermis. It is the remigration of these melanocytes that cause a recurrence after depigmentation procedures. The very selective yet effective tissue specific absorption of lasers effects degranulation and complete removal of these melanocytes.

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. Dental Lasers of today are the result of decades of scientific research and are based on fundamental laws of optical physics. Albert Einstein's quantum theory of light forms the basis of laser technology and it was developed based on his theory of spontaneous emission. In 1960, Theodore Maiman, a scientist of Hughes Aircraft Corporation, developed the first working laser using a

ruby crystal. In 1961, Snitzer published a prototype for the Nd:YAG laser. Dr. Leon Goldman, in 1965 performed painless surface crazing of enamel. In 1970's and 1980's Carbon dioxide (CO₂) and Nd:YAG lasers were introduced in dentistry. Frame, Pecaro and Pick cited the benefits of CO₂ laser treatment of oral soft tissue lesions and periodontal procedures. In 1989, Meyers and Meyers received the FDA permission to sell the Nd:YAG laser, which was then used to remove dental caries³.

This paper aims to present a report of two cases of depigmentation performed with a diode laser of wavelength 810nm (AMD, Picasso, 7W).

Case 1

A 23 yr old female patient reported to the Department of Periodontics at Coorg Institute of Dental Sciences, Virajpet, Coorg, Karnataka with a complaint of dark gums in relation to the upper front teeth. On examination, generalized melanin pigmentation of the gingiva was found and a diagnosis of melanin hyperpigmentation of the gingival was made.

Laser depigmentation was planned using a diode laser of 810nm (AMD, Picasso, 7W). A power setting of 0.7 watts was used. A continuous mode was chosen for the procedure and ablation of the gingival epithelium was done in a contact mode after applying topical local anaesthetic gel (Precaine, 8% lidocaine). Periodontal pack was not placed and the post-operative healing was uneventful.

Case 2

A 22 yr old female patient reported to the Department of Periodontics at Coorg Institute of Dental Sciences, Virajpet, Coorg, Karnataka with a complaint of dark gums in relation to the upper front teeth. On examination localized melanin pigmentation of the gingiva was found and a diagnosis of melanin hyperpigmentation of the gingiva was made. The



Fig. 1 Pre op



Fig. 2 Immediate Post op



Fig. 3 15 days Post op

treatment plan was the same as the case no. 1, but in this patient a gated pulsed mode was used at 1.5 W, 1..5 sec. Pulse Duration, 1sec. Pulse interval.

Discussion

Lasers designed for surgery deliver concentrated and controllable energy to the tissue. For a laser to have a biological effect the energy must be absorbed by the tissue. The laser energy is absorbed by specific chromophores within the irradiated tissue. A chromophore refers to a substance or specific target tissue that serves as an attractant for a laser photon (Waynant R.W, Las.in Med.2002, Boca Raton). The degree of absorption in tissue will vary as a function of the wavelength and optical characteristics of the target tissue. If the peak emission of the laser matches the absorption spectrum of one or more components of the target tissue, a predictable and specific interactive effect will occur. Since tissues have more than one such component, the overall effect will be a combination of the effects on each tissue component¹. The pigmentation of the gingiva has been shown to be caused chiefly by five primary pigments such as, melanin, melanoid, oxyhaemoglobin, reduced haemoglobin and carotene⁴. Among which melanin is predominant and in itself consists of eumelanin and pheomelanin in the skin and mucosa and the rarer neuromelanin seen in brain nuclei. Diode Laser wavelengths, especially the 810nm, are strongly absorbed by all these chromophores⁵.

Thus when laser energy remains strongly collimated within the target tissue it results in its ablation. Laser ablation is the process of removing material from a surface by vaporisation on irradiating it with a laser beam^{3,5}.

The different lasers used in dentistry approved by FDA are Diode, Holmium:YAG, Erbium family, CO₂, Argon, and Nd:YAG. At present Diode, Erbium, CO₂ and Nd:YAG are the commonly used lasers in dentistry.

Advantages of lasers over the conventional therapy given by Wigdor et al in 1995 are as follows⁶ -

1. Dry and bloodless surgery
2. Instant sterilization of the site

3. Reduced bacteremia.
4. Reduced Mechanical trauma.
5. Minimal post operative swelling and scarring
6. Minimal post operative pain
7. Less wound contraction

Diode laser falls in the region of near infra red in the spectrum. The most commonly used diode wavelengths are 810, 940 and 980 nm. Diodes can be used in continuous wave and gated pulsed mode. Diode laser energy is highly absorbed in pigments like melanin, haemoglobin etc^{3,5}. Since almost all the soft tissues are made up of different pigments, diode laser can be used as an excellent tool for soft tissue surgeries. Diode lasers are poorly absorbed in water and dental hard tissues. The Diode laser of 810nm (AMD, Picasso, 7W) was used in our cases as it has a near optimal absorption in melanin and haemoglobin. We started with 0.7 watts as it is essential to work at the lowest power settings possible because a higher power setting can cause needless collateral damage to the adjacent and underlying tissues. This would manifest as discomfort and pain during the post-operative period and moreover can delay the healing time. So, as a rule a low power setting should be used during the start of the procedure.

This article demonstrates that in the first case continuous mode was used. This choice was dictated by the extensive and deep pigmentation in the patient that guaranteed an effective absorption of the laser energy owing to the richness of chromophores (melanin) at site^{7,8,9}. However, in the second case gated pulsed mode was used. The gingival pigmentation in this case was sporadic and in patches, and hence taking into account the undue heating that could be caused of surrounding normal and pink tissues where the melanin pigmentation was absent, a gated pulsed mode was hence necessitated to provide thermal relaxation. The healing of the tissues and the intra-operative and post-operative comfort in this patient was slightly better when compared to the first patient. Clinically, in both cases, the gingiva appeared normal within 15 days after the depigmentation procedure.



Fig. 4 Pre op



Fig. 5 Immediate post op



Fig. 6 15 days post op

In both the cases a periodontal pack was not placed because there is a formation of “laser bandage”, a layer of coagulated surface on the superficial layer of the surgical wound. Both patients also reported minimal discomfort and pain. This could be attributed to the ablation of the nerve endings beneath the wound. The healing was also better and faster because the laser also has a bactericidal effect on the surface and the incidence of the wound getting infected is therefore less^{10,11}. Furthermore, some amount of the scattered energy can act as Low Level Laser Energy and stimulate the underlying cells, reduce inflammation and expedite tissue repair.

The diode laser (810nm) used in this procedure was found to be trenchant and impressive in effecting depigmentation without causing any adverse effect or damage to the marginal gingiva or the underlying bone. Tal H reports in the literature that histologically the epithelium is completely removed in laser depigmentation without much impact on the connective tissue². However, Kesler et al, reported that there was a temporary alteration in the collagen, which reverses back to normal within 2 weeks without any clinical changes and at 3 weeks, continuous proliferation of squamous epithelial cells with complete healing of the tissue was observed¹³.

A remarkable feature in both cases is that this procedure did not necessitate a post-operative regimen of antibiotics or analgesics and yet the patients experienced considerable comfort and minimal pain intra-operatively and post-operatively. Clinically, the gingiva appeared normal within 6 days after the depigmentation procedure and can be a recommended procedure to effect gingival depigmentation over traditional methods.

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Information

Teeth facts

* Tony P. Paul, * Rishi Emmatty, ** Joseph Pulikottil, *** B. Sangeetha

Abstract

As always said, “Beauty lies in the eyes of the beholder”. There have been so many traditional practices, cultures and misbeliefs prevalent among people dwelling all over the world, from time immemorial and it has been substantiated on paleontological grounds. In this article, few of such interesting situations of social health practices pertaining to dentistry based on myths are presented here. Their related truths, historical perspectives and certain fascinating facts regarding them that make it still exist are also discussed. The article also briefs certain similar latest trends in dentistry.¹

Introduction

Traditional practices based on cultures, beliefs and even myths paved the foundation of human communal living. Ample historical evidences have substantiated even geographical separations based on these factors among similar civilizations. Influence of these factors had its effects on every discipline of health and medical practices, dentistry was no exception.^{2,3}

It's all teeth tales...⁴

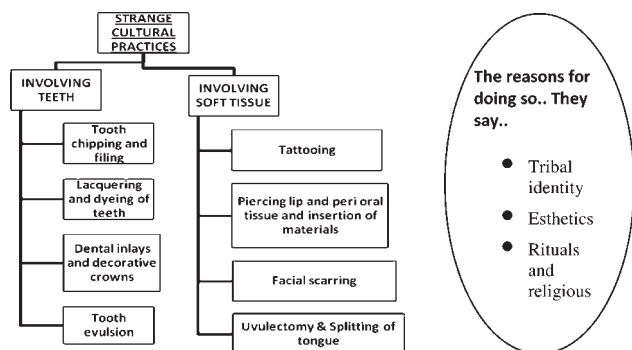
✓ The tooth fairy is a character in modern Western culture said to give children a small amount of money a gift in exchange for a deciduous tooth when it comes out of a child's mouth.

✓ Ever heard of the tooth mouse? Over 100 years ago in Europe, children and adults threw lost teeth in mouse holes, hoping they would grow sharp teeth.

✓ Children in Cambodia toss their lower teeth on the roof and bury their upper teeth in the ground. They hope that the new teeth will grow towards the old teeth and be straight.

Unbelievably strange, isn't it ???^{2,3,5}

Trendistry peeps in



Sparkling teeth, teeth tattooing, teeth rings and pendants, lip and tongue jewels, tongue tattooing etc have become a trend amongst modern youth (Figures 1 & 2). Many of these teeth and soft tissue mutilations cause dental caries, dento alveolar fractures, granuloma, cysts, abscess, osteomyelitis and allergic reactions.^{6,7}

Dent-o-myths (Taboos in dentistry)^{3,6,8,9}

Although modern dentistry has come a long way, most people have some preconceived false notions about dental care; here is the truth about some common dental misconceptions.

Myth - Going for regular checkups at the dentist is not important.

Fact -Regular dental checkups are absolutely crucial in making sure that you have good oral health. It helps to prevent cavities, gum disease, oral cancer, and other dental conditions. Get to your dentist before these problems get to you.

Myth - When the gums bleed, it is better not to brush the teeth.

Fact -Bleeding of gums is a sign that they are inflamed and are not healthy. This usually is a result of plaque accumulation around the teeth. Until this collection is removed, the gums continue to bleed. This is an indication that the individual needs to visit a dentist for opinion and treatment. Brushing the teeth with a soft toothbrush by the proper technique removes the plaque and helps the gums recover. Initial bleeding seen during brushing gradually reduces over a period of time.

Myth - Milk teeth need not be cared for because they last only for a few years, and these teeth will anyway be replaced by permanent teeth.

Fact - Early loss of milk teeth will interfere with chewing and affect the child's nutrition. It also leads to drifting of the adjacent teeth and closure of some of the space that is required for the succeeding permanent



Fig.1 Lip Piercing



Fig. 2 Jewellery Crowns

teeth to erupt into. Such a loss of space will cause the permanent teeth to erupt in irregular position and result in crowding. Therefore milk teeth need to be cared for as much as permanent teeth.

Myth - Professional cleaning/scaling loosens the teeth.

Fact - Teeth are held firmly by the supporting tissues of the periodontium including bone. Bad oral hygiene results in the deposition of tartar /calculus on the tooth surface. If the tartar is not removed, the gums may recede and the supporting bone around the teeth gets destroyed. Professional cleaning removes this tartar and arrests further destruction of supporting bone. However, patients may experience slight mobility of the teeth after tartar is removed. Removal of tartar deposits only helps to recover the health of supporting structures.

Myth - Removal of upper teeth affects vision.

Fact - Vision is not affected in any way by undertaking treatment of the upper teeth including its extraction.

Myth - Dental treatment should be avoided during pregnancy.

Fact - Many a times dental treatment is provided even during late pregnancy. Routine dental procedures can be carried out without any fear. However, major surgical procedure may require medical opinion before treatment. Dental X-rays are to be avoided in the first trimester.

Conclusion

Many decades ago unqualified dentists, the so called quacks provided certain dental treatment that was not based on scientific principles and along with this kind of assumption based treatment; myths developed which became imprinted in people's minds.^{10,11} Dentistry today

is an advanced specialized branch of medical science based on scientific facts. But this advancement in dental science has only reduced the myths and not completely eliminated it from the minds of the people. Every culture has its own customs; some of these have an influence on the incidence of many diseases. Creating awareness among these people is very important wherein we have to convince them about the harmful effects of these practices.^{12,13}

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Aesthetic denture fabrication

Life like denture esthetics

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Abstract

The normal contour of denture base aids in support of the orofacial musculature. Patients having a short upper lip would normally display gingival tissues in a broad smile. An unesthetic denture base can destroy an otherwise functionally successful denture. This report highlights the importance of reproducing the features found in the natural gingiva, root prominence and colour in a prosthesis.

Introduction

“Beauty is in the eyes of the beholder”, the edentulous patient is no exception. Creating a natural-appearing prosthesis for this patient is difficult. The triumph of a complete denture treatment can be traced in achieving optimum comfort, function, and esthetics. A denture can be functional and comfortable however, it can be repulsive in the eyes of the wearer.¹ Reconstruction of the natural features in removable prosthesis by characterization of denture base is one of the important factors in the success of the treatment. The basic shade of the gingiva and the color of pigmentation should be duplicated in dentures to make them look more natural.²

According to Frush “the environment of the teeth is as important as the tooth itself”³. Characterization can be achieved by proper tooth selection and arrangement, depth grinding, modification of incisal edges, incorporation of rotations and tinting of the denture base. The final goal for all these effects is to achieve a natural appearance of the denture.

Conventional laboratories methods of forming dentures involve the setting of artificial teeth, then flasking. After dewaxing, the mold is filled with a pink colour acrylic material to allow the soft tissue parts to take on a natural looking appearance. Unfortunately, human gums do not possess a uniform pink colour, which renders the basic process outlined above ineffective in creating a lifelike denture. The non Caucasians have pigmentation of the gingiva. The basic shade of the gingiva and the colour pigmentation should be duplicated in dentures to make them look natural.

Case report

A 50 year old patient reported to Dept of Prosthetic dentistry with the chief complain that his old denture doesn't look natural.

Clinical examination

Extra-oral examination of the patient revealed a

reduced vertical dimension of occlusion, unsupported lips, and mild distortion in speech articulation.

Intra-oral examination of maxillary and mandibular edentulous residual ridges (Fig 1 & 2) revealed that alveolar bone had a good height and width which is essential for good retention, support and stability. The mucosa is healthy, pigmented and of uniform thickness. Color photographs of the area to be characterized for future use to duplicate the patient's gingival color and pigmentation was taken (Fig1&2).

Treatment plan

Treatment plan included fabrication of conventional complete denture along with characterization of the denture base to give a more natural look to the prosthesis.

Procedures

Tooth selection and setting was done by following the basic principles. Stripling and festooning was done in the wax up to simulate a natural dentition, then followed by flasking. Buccal and labial core of the waxed denture was painted with die stone. After flasking, a complete dexawing was done.

Shade matching was done by mixing the different stain with the basic color, a pink colour acrylic powder. A small quantity of blanching-type acrylic resin powder was added around the necks of teeth. Application was done with a small camel's hairbrush wetted with monomer (preferably heat cured) or by dusting and wetting with dropper on the external contours of the denture base and the imprints of the ridge-lap portions of the teeth the artificial teeth. Various shades of acrylic resin powder can be added to the denture base acrylic resin to get blanching-type acrylic resin. Set the flask aside for 10 minutes and allow the monomer to evaporate.

A layer of a mixed coloured powder was then picked up and placed in the designated location against the mould adjacent to the blanching type acrylic resin



Fig. 1 Edentulous maxillary arch



Fig. 2 Edentulous mandibular arch



Fig. 3 Dewaxed mold



Fig. 4 First layer of stain added

(Fig 5). The monomer was applied to the mixed coloured acrylic to allow formation of the second outer layer. The mixed coloured was preferably of a brown shade and may consist of a mixture of a pink powder and a colouring brown tint agent.

After 10 minutes, a layer of deeper reddish brown color is dispensed against the mould adjacent to the previously dispensed layer and monomer was applied to form outer layer of gum (Fig 6).

Pack the rest of the flask with the appropriate color of acrylic resin.. The denture was then cured finished and polished. The characterized areas should receive a minimum amount of polishing. The transformation in the appearance of the new denture was noticeably seen.(Fig 7)

Discussion

Pound incorporated the racial and individual colour peculiarities of the gingiva in artificial denture. He suggested a method of tinting acrylic denture bases to simulate the gingival colour. Kemnitzner used a combination of blue and brown stain to reproduce the

melanotic pigmentation of the gingival.⁴

Gingival stippling is a characteristic of the healthy attached gingiva. Replicating these features in a denture contributes to the natural appearance of labial flanges in complete dentures by causing uneven reflection of light. A toothbrush having two or three tufts at the end can be used to produce strippling⁷.

Several methods have been used to tint denture, base resins to achieve a more natural appearance. Usually heat curing or auto-polymerizing resins are mixed with colors/stains and placed on to the mold during denture construction to obtain a tinted denture. Most widely used tints are the Kayon dental stains or tinting resins.

*Indication for characterization of denture base.*⁵

1. Patients with an active upper lip and a prominent pre-maxillary process.
2. People who may expose gum tissues areas during their performances like actors.
3. The psychological acceptance of the dentures by the patient.



Fig. 5 Second layer of stain added



Fig. 6 Third layer of stain added



Fig. 7 New denture with characterized base

Ideal requirements of denture base tinting materials⁶:

1. It should be readily miscible with methyl methacrylate resin.
2. It should be non-toxic, be stable and non-fading
3. It should not add appreciable bulk to denture bases.
4. It should be resistant to loss from abrasion in cleaning and in normal function and should not alter the properties of the denture base resins.

Summary & conclusion

Most patients value the fact that the entire denture, not just the teeth should look natural. So that, they will not hold back their smile. Immediate denture patient often

give esthetics higher priority than function. They are afraid that the denture will change their appearance completely. In these cases a good esthetic carving and gingival imitation with multicoloured acrylic is very important.

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Enhancing Implant surface topography using nanotechnology

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Introduction

The Goal of this review is to establish the role of nano topographic modification for improved osseointegration. Advantages of this topography are discussed and considering current implant surfaces that use nano technology are reviewed. Since late 1960's P I Branemark's efforts led to detailed microscopic characterization, and in 1982, histological effects of osseointegration was accepted worldwide. Bone formation from then on was considered a positive response as compared to fibrous encapsulation, which was once thought to be an inevitable aspect have been considered, a negative and undesired result. Challenging osseointegration with new protocols of immediate placement and loading require further control of bone formation and osseointegration¹

Implant Design

Failures in implant therapy have be attributed to implant design individually, local anatomic and biologic aspects and of course systemic or functional factors. Clinical control, for long term success of implants, with all these factors is a multidisciplinary treatment planning procedure² Implant surface character is one of the design factor which affects the rate and extend of osseointegration both histologically and at cellular level. Adhesion of fibrin clot and blood derived cells along with mesenchymal cells leads to osteoid formation and thus subsequent mineralization³

Character of implant surface has been implicated in the process of osseointegration in different ways such as the biocompatible nature of CpTitanium, cellular responses and improvements in bone formation at implant surface⁴. Earlier studies have proven that grit blasted and acid etched surface were capable of rapid and increased bone to implant contact. There has been a number of surface treatments, thus evolved like sand blasting, acid etching, plasma spraying, bio mimetic coating, Anodization etc., Therefore Ti can be modified to enhance bone to implant contact and can influence cellular activity or tissue responses⁵.

Bone implant interface

There have been 3 different philosophies, proposed, on the improved bone to implant contact which are the Biomechanical theory of Hansson and Norton, Concept of contact osseointegration and surface signaling hypothesis supported by cell culture studies⁶. Hansson

described the bone to implant contact, theoretically as well as mathematically, along with the role of surface roughness. According to him; implant surface should be densely covered with pits 1.5µm depth and 3-5 µm diameters. Mechanical interlocking of bone is a necessity for the initial stabilization and signaling of the bone forming tissue⁷. Principal role of fibrin clot stabilization on implant surface is an important factor, along with physical interlocking of fibrin fibers. This promotes the directed on growth of bone forming cells on implant surface. Enhanced surface topography effectively enhances extracellular matrix synthesis and, thus provides faster and reliable osseointegration⁸.

Many Micron level topographies are available today, which can improve bone to implant interface which has been supported by earlier clinical studies. Lately, studies on implant surfaces have proven to make osteoinduction of progenitor cells, by, immobilization or Nano scale surface engineering⁹

Nanotechnology

According National Aeronautics and Space Administration, nanotechnology and surface science is the creation of functional materials, devices and systems through the control of matter on the Nano length meter scale (1-100nm) and exploitation of novel phenomena and properties at that length scale. Nanotechnology involves, both one dimensional concepts involving nano dots and nano wires and self-assembly of more complex structures, nano tubes. Materials can be classified as nano structures, nano crystals, nano coatings, nano particles and nano fibers¹⁰. Application of nano technology to dental implants involves 2 dimensional association of surface features which are Isotropic, i.e., organized and Anisotropic which defines unorganized dimensional associations.

Albretsson and Wennerberg divided implant surface quality into mechanical properties, topographic properties and physicochemical properties¹¹. However, it is extremely difficult to isolate chemistry or charge effects induced by nano topography. Surface properties are influenced at atomic level by quantum phenomenon that does not govern traditional bulk material behavior¹².

Nanotechnology has been shown to influence cell adhesion, proliferation and cell specific adhesion. Related changes in chemistry and nanostructure impart important chemical changes and thereby bio mimetic relationships between alloplastic surfaces and tissues. An important

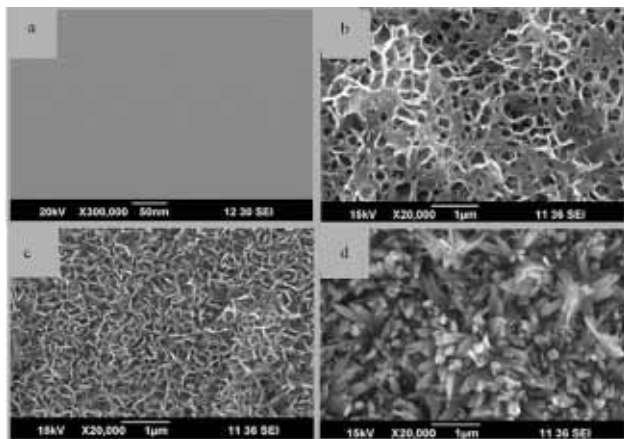


Fig 1. SEM images of: (a) polished Ti metal surface before hydrothermal treatment and nanostructures of titania formed at different processing conditions over the Ti metal scaffold (b) at 175 °C, 2 h; (c) leaves at 175 °C, 5 h; and (d) Nano needles at 250 °C, 5 h. (Courtesy- Amrita Centre for Nano sciences, Amrita Institute of Medical Science and Research Centre, Amrita Vishwa Vidyapeetham)

aspect of nano topography that has led to the interest of many investigators is that it mimics natural cellular environment¹³.

Methods for creating nano features in cpTitanium implants

There are different methods to impart Nano topography to implant surfaces, some of which are already being used to modify implants available commercially and a number of new techniques are still under trials. Some of these methods are, being discussed. By using a self-assembly monolayer, the exposed functional end group molecule could be one with different function. It could be osteoinductive or cell adhesive molecule. Various physical approaches have also been introduced, like compaction of nanoparticles, which is not very commonly used in dental implants and other is ion beam deposition, where Nano features are imparted to the surfaces based on the type of materials used. Various chemical methods like acid etching, peroxidation, alkali treatment (Na OH) and anodization have also been used to impart Nano topographies by either producing a Titania gel layer or creating an oxide layer. Additive methods of nanoparticle deposition have been used, by using sol – gel, colloidal particle adsorption, where atomic scale interactions display strong physical interaction. Other methods include discrete crystalline deposition and lithography and contact printing technique.

Cell interactions and nano surface treatments

Nano topography alters cellular responses, interactions and alters their behavior. It also has specific effects on cellular behavior. They can alter, cell – surface interactions and protein – surface interactions (Baraton MI FTIR study of nano structured alumina nitride

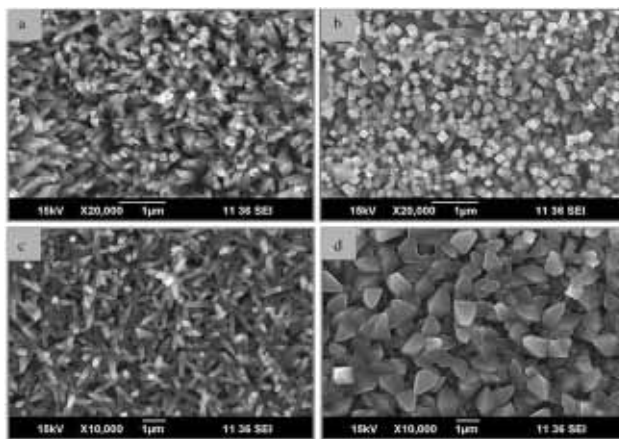


Fig 2. SEM images of the structures formed on titanium metal at 250 °C, 5 h by varying the hexamine to NaOH molar ratio: (a) 0.125, (b) 0.25, (c) 0.5 and (d) 1. (Courtesy- Amrita Centre for Nano sciences, Amrita Institute of Medical Science and Research Centre, Amrita Vishwa Vidyapeetham)

powder surface, determination of acid/basic sites by CO, CO₂ and acetic acid adsorptions, Nanostrumater 1997; 8:435). Protein surface interactions and surface wettability controls osteoblast adhesion and is therefore critical for osseointegration. Protein adsorption mediates subsequent cell attachment and proliferation. Cell binding to protein is mediated by integrin receptors, which are protein receptors that make the cells very social to the new surface¹⁴.

Bacterial adhesion

Another interesting finding that has been reported in the literature is that bacterial adhesion and proliferation is also diminished on nano phase surface modified materials. Decreased bacterial colonization, with promotion of osteoblast adhesion and differentiation is an ideal approach to implant therapy¹⁷. In the work by, Webster and his coworkers they reported an increase in the osteoclastic activity and thereby increase in resorption pits.

Surface wettability

Changing the wettability of a biomaterial also alters cell interactions. Extracellular matrix protein adsorption onto surfaces is affected by surface energy that can cause osteoblast adhesion. Cell adsorption and motility are also attributed to the function of integrin's. Anderson and colleagues, said a cell morphology and cytokine production with 15mm wide and 185 nm deep grooves versus substrates with 100nm high and 168nm diameter hemispherical nanopillars, and found cells on hemispherical pillars had smaller areas and more membrane projections and also reduced protein secretion- (70–100nm is considered the best).¹⁵

Zhao and Coworkers used 3 different approaches which are, namely Electrochemical machining,

Anodization and chemical etching and they found an inverse relationship between cell proliferation and cell differentiation with diminishing scale of surface roughness¹⁶. However, Webster and colleagues observed an increased osteoblast proliferation on the nano scale materials tested, thus proving nano surface treatments can improve osseointegration.

Surface Reactivity and mineralization

Nanotechnology is also proven to alter surface reactivity. Existing reports suggest that little bone bonding occurs at endosseous Ti implants, during early phases of bone formation. Bone bonding may be a benefit attributed to Ti implants through nano scale modifications. Initiation of mineralization by absorbed proteins is critical in success of implant therapy. Development of implant bone interface may be influenced by both nano and micron scale parameters.. Initial clinical stability requires additional consideration on micron surface topography and implant design. Many different methods are used to impart nano scale surfaces and many are commercially available. We have Dental literature that has proven to produce positive bone responses, both in vitro and in vivo. Recent investigations have shown high levels of IGF-2 and BMP2 and BMP6 in adherent human mesenchymal stem cells. In a study conducted in rabbit tibia model higher bone to implant contact was observed for nano scale as compared to micron scale. In studies conducted on canine mandible by means of gap osseointegration, Berglundh and colleagues concluded that healing was greater in Nano scale roughened implant as compared to micron scale¹⁸.

In spite of all the above mentioned aspects the use of nano scale topography and nanotechnology to enhance tissue – abutment interface remains largely unexplored. It may be difficult to derive specific conclusions from available data regarding nano scale surface topography. However current evidence proves nano scale surfaces provide incremental advantages to clinical problems when rapid bone to implant surface contact is required.

Conclusion

Nano scale modification have been proven to can alter the chemistry and topography of implant surface thus improving the cellular interaction, wettability, decreased bacterial adhesion, increased surface reactivity, mineralization and thus improved osseointegration.. Such changes alter the implant surface interaction also with ions; biomolecules and other cells. Nano scale alterations may provide bone bonding behavior and interfacial bone formation. However potential risks and benefits of manipulating biomaterial interfaces at the nano scale will be defined on by long term clinical evaluation.

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Lasers in Orthodontics

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Abstract

The use of lasers in medical field is very old. In dentistry, it was only during the last two decades, have lasers been used as an adjunctive in various treatment procedures. While it has a long list of use in general dentistry, its use in orthodontics, in particular is limited. A basic overview on lasers, their types, possible uses in clinical orthodontics and their harmful effects are discussed.

Introduction

'Laser' is an acronym for 'Light Amplification by Stimulated Emission of Radiation'. Light is a form of electromagnetic energy that behaves both as particle and wave and has basic unit of energy called a photon. Laser devices consists of a central optical cavity containing elements, molecules and compounds in active state surrounded by an excitation source, which provides energy into the active medium, and thus, increases the energy levels to a higher degree. In 1916, Albert Einstein theorized that addition of a quantum of energy to an excited atom would result in the release of two quanta, a process he termed stimulated emission. These released photons cause excitation of surrounding atoms that lead to generation of a beam of high energy.

Types of Laser

Argon Laser

Argon lasers have an active medium of argon gas. It is delivered in continuous wave and gated pulse mode via fiber optics. It has two wavelengths, 488 nm and 514 nm. Both wavelengths are poorly absorbed by dental hard tissues, so no damage is caused to the tooth surface.

Diode Laser

This is a solid state semi conductor laser that uses a combination of aluminium, gallium and arsenide to change electric energy into light energy. Wave lengths range from 800 to 980 nm. The main advantage of the diode laser is that it can be packaged in a small size instrument.

Nd:Yag Laser

This is the first laser designed exclusively for dentistry. The active medium is a crystal of Yttrium-aluminium-garnet doped with neodymium. It is commonly used in various periodontal procedures. In orthodontics, it is used for debonding of brackets after treatment.

Ho:YAG Laser

Ho:YAG laser has a crystal of Yttrium-aluminium-garnet doped with holmium as an active medium. It is

commonly used in arthroscopic surgery of the temporomandibular joint.

CO₂ Laser

The CO₂ laser is used for cutting dense fibrous tissues, used in orthodontics for bracket debonding.

Applications of Lasers in Orthodontics

Polymerization of Light cure adhesive

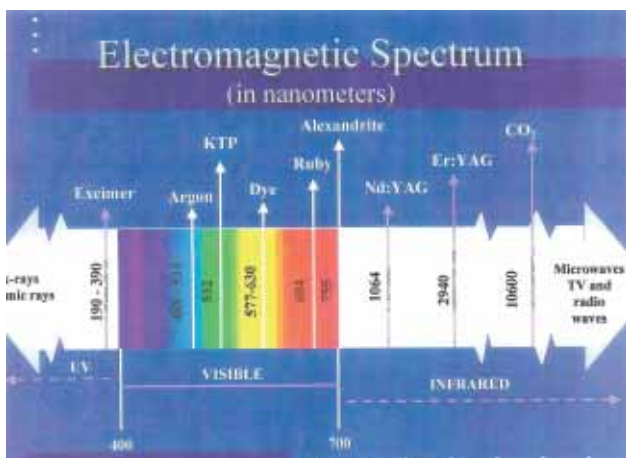
Minimal curing time for bonding orthodontic attachments is an important aspect of clinical success. Camphorquinone, the photo initiator in most visible light cured adhesives, is highly sensitive to light in the blue region of the visible light spectrum. Argon laser has been shown to enhance the physical properties of composite resins by achieving a more complete cure with up to 75% shorter time compared with conventional light curing units.¹ It has been further shown that laser energy required for polymerization of light cured materials had no detrimental effects on the pulp or enamel. Several studies confirm that use of argon laser significantly shortens curing times and achieved equal or higher shear bond strengths after curing the composite for 10 seconds as compared to curing the composite by conventional visible light for 40 seconds.²

Increasing orthodontic adhesive shear bond strength

It has been reported in the literature that laser irradiation removes the smear layer, and also that, after being exposed to laser, enamel underwent physical changes including melting and recrystalliation, similar to the type III etching pattern produced by orthophosphoric acid.³ With regard to bond strengths of restorative materials, some studies indicated that acid-etched teeth had significantly more bond strength than laser etched teeth,⁴ where as other studies demonstrated that laser etching could result in bond strength comparable with⁵ or even stronger than acid etching.

Prevention of enamel spots

Enamel demineralization is a common iatrogenic damage following orthodontic treatment. Sognaes and Stern in 1965⁶ reported that when enamel was



Electromagnetic-Spectrum

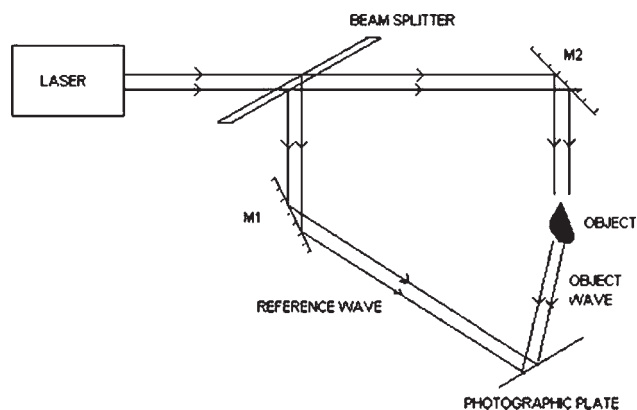
exposed to laser irradiation, the resistance to acid attack was improved. Yamamoto and Sato in 1980⁷ further confirmed the findings by Sognaes and Stern, by using argon laser on enamel surfaces and proved that there was a reduction by 30-50%.⁸ Fox, Duncan and Otsuka⁹ found that, in addition to decreasing enamel demineralization and loss of tooth structure, laser irradiation reduced the threshold pH at which dissolution occurred by about a factor of five.

Reducing pain during orthodontic treatment

Pain and discomfort following orthodontic treatment is very common.¹⁰ This discomfort appears immediately after the force application and may last several days after initiation of tooth movement.¹¹ Several studies have shown the analgesic effects of He:Ne,¹² and semiconductor laser.¹³ Nd:Yag,¹⁴ for reducing orthodontic pain. It has been shown that CO₂ laser has better analgesic effect than Nd:Yag laser.¹⁵ Fujiyama et al.¹⁶ concluded that local CO₂ laser irradiation would reduce pain associated with orthodontic force application without interfering with the tooth movement.

Debonding Ceramic brackets

It is a common knowledge that even though ceramic brackets offer better esthetics, during debonding procedures, enamel cracks and fractures are frequent.¹⁷ Electro thermal debonding devices (ETD),¹⁸ and lasers¹⁹ have been used to soften bonding adhesives by heat conduction through the ceramic bracket. Strob et al. (1992) found that laser aided debonding as a safe and easy method for debonding of ceramic brackets.²⁰ Hayakawa studied the debonding of monocrystalline and polycrystalline ceramic brackets with Nd:YAG laser and concluded that the application of Nd:YAG laser at 2 Joules or more was effective for debonding of ceramic brackets.²¹



Laser Holography

Laser Holography

3-dimensional digital imaging of the craniofacial region by using laser holography technique is the latest trend in image scanning.

Various applications of laser holography in orthodontics are:

Facial Soft tissue analysis

Baik, Jeon and Lee scanned sixty Korean adults having normal occlusion using 3D Vivid 900 laser scanner.²² They interpreted from the results that the data obtained could be the template for orthodontic diagnosis and treatment planning.

Digital Models

Kuroda and Motohashi proposed a three dimensional dental cast analyzing system with laser scanner.²³ This system also had the advantage that it makes easy the otherwise time consuming and complicated mock surgery needed for orthognathic surgery patients.

Gingival Contouring and Reshaping

A diode laser can be used to recontour and shape gingival tissues in the orthodontic clinic. The diode laser does not cut through hard tissues, making it the ideal candidate for gingival recontouring. The laser is small in size, and is least expensive of the lasers making it practical for use in orthodontic practice. It also coagulates, sterilizes and seals as it incises, creating a biological dressing.

The diode laser has also been used in experimental animals for controlling the excessive growth of the mandibular condyle.²⁴ The diode laser also has been found to be effective in regulating facial growth and may be used as a substitute for current conventional methods such as chin cup.

Harmful effects of Laser

Fire and explosion hazards

Fire explosion is commonly associated with class IV lasers,²⁵ so proper precautions like avoiding alcohol or other inflammable materials in the operating area and protection of healthy tissues adjacent to surgical area is required.

Eye protection

Lasers cause retinal injury, which may pass unnoticed, due to lack of pain receptors. Wearing correct protective eye wear is essential because different wavelengths cause damage to different parts of the unprotected eye.

Skin damage

Lasers cause skin damage by causing ablation of chromophores.²⁶

Pulpal damage

Curing of orthodontic adhesive with laser can increase intrapulpal temperature. For the pulp to be able to recover from thermal damage, the temperature increase should not exceed by 5.5°C. Argon lasers because it needs lesser time to cure than conventional halogen light, do not usually cause thermal damage to pulp.²⁷

Conclusion

With the advent of lasers, and their eventual introduction into dentistry, it was only a matter of time they were used in orthodontics. In modern times, with advancing technology making laser delivery systems smaller and more affordable, lasers might find a routine place in every day orthodontics.

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Bisphosphonates induced osteonecrosis-be aware

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Abstract

Osteonecrosis of the jaws has been identified as a potential adverse side effect of nitrogen-containing bisphosphonate (nBP) medications. The jaws are preferentially involved, likely related to the dynamics of bone-forming osteoblasts and bone-resorbing osteoclasts of the alveolar bone compartment leading to inhibition of bone remodeling. The primary indications for the use of nBPs are the treatment of osteoporosis and bone resorption related to metastatic tumors of the bone or the osteolytic lesions of multiple myeloma. Dental professionals should be aware of side the effects of the bisphosphonates and development of subsequent osteonecrosis brought by these drugs, for proper management of patients who had or has been receiving bisphosphonates.

Bisphosphonates were first considered for the treatment of human disease in 1960s. Fleisch et al¹ first reported on the ability of diphosphonates to inhibit hydroxyapatite dissolution in vitro and bone resorption in tissue culture and in vivo. Francis et al reported the ability of diphosphonates to inhibit the formation of calcium phosphate crystals in vitro and pathologic calcifications in vivo. These findings set the foundation for the future use of bisphosphonates for the treatment of a spectrum of disorders related to disturbances in bone remodeling and osteoclast function. In 2003, Marx² first described an association of exposed necrotic bone of the jaw with long-term application of bisphosphonates (BPh). Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is a common complication of intravenous bisphosphonates that seriously affects the quality of life of patients undergoing such treatment and produces significant morbidity.

To distinguish BRONJ from other delayed healing conditions, the following working definition of BRONJ has been adopted by the AAOMS (American Association of Oral and Maxillofacial Surgeons)³

Patients may be considered to have BRONJ if all of the following 3 characteristics are present:

1. Current or previous treatment with a bisphosphonate
2. Exposed bone in the maxillofacial region that has persisted for more than 8 weeks
3. No history of radiation therapy to the jaws

It is important to understand that patients at risk of, or with established, BRONJ can also present with other common clinical conditions not to be confused with BRONJ. Commonly misdiagnosed conditions can include, but are not limited to, alveolar osteitis, sinusitis, gingivitis/periodontitis, caries, periapical pathologic findings, and temporomandibular joint disorders

INDICATIONS FOR BISPHOSPHONATES:^{4,5}

- Prevention and treatment of osteoporosis in postmenopausal women
- Increase bone mass in men with osteoporosis
- Treatment of glucocorticoid-induced osteoporosis
- Treatment of Paget's disease of bone
- Hypercalcemia of malignancy
- Bone metastases of solid tumors (eg, breast and prostate carcinoma; other solid tumors)
- Osteolytic lesions of multiple myeloma
- Giant cell tumors of the jaw (previous therapy: intralesional steroid injection, subcutaneous or nasal application of calcitonin)
- Chronic osteomyelitis: chronic, recurrent, multifocal, and diffuse sclerosing osteomyelitis
- Fibrous dysplasia
- Orthopedic implants (to reduce bone loss after uncemented total hip and knee arthroplasty)
- Hypercalcemia caused by malignant diseases or bone metastases
- Chronic pain

PATHOGENESIS: Bisphosphonate-related osteonecrosis of the jaw (BRONJ) has generated great interest in the medical and research communities yet remains as an enigma. Effect of bisphosphonates on oral mucosa is still unknown as its primary effect lies on bone due to its high concentration in bone⁶. Physical disruption of bone during dental intervention or sufficient levels in saliva or GCF can lead to higher concentration of bisphosphonates to oral mucosa can lead to BRONJ

Bisphosphonates act mainly on the osteoclast and suppress the osteoclast mediated bone remodeling.

Osteoblasts are the least effected cells and effect on the osteocytes are less clear and controversial. Co morbidities {eg, diabetes, lifestyle factors (eg, smoking and obesity), interventions (eg, dental extraction), and concurrent medications (eg, corticosteroids)} have all been associated with BRONJ. The fact that dental manifestations similar to BRONJ have not been observed with any of these cofactors in the absence of bisphosphonates suggests either that these cofactors do not play a significant role or that it is the interaction between the cofactors and bisphosphonates that is the key to the pathophysiology

Classification of bisphosphonates⁷

Generation:	Relative Potency
First generation	
Etidronate (Dronate, Disonate, Etifem)	1
Tiludronate (Not Available In India)	10
Second Generation:	
Pamidronate (Aredia, Aredronet, Bonapam)	100
Aledronate (Osteophos, Denfos, Restofos, Dronal)	100-500
Ibandronate (Not Available In india)	500-1000
Third Generation: Risedronate (Restofos, Gemfos, Actonel)	1000
Zoledronate (Zobone, Zoldria)	5000

INCIDENCE⁸: incidence rate estimates varied, and were received from several sources including Web-based survey data (10%—IV bisphosphonates only) Industry-sponsored studies (0 to 1.8%—IV bisphosphonates, 0%—oral bisphosphonates) Population-based studies (0.8% to 1.5%—IV bisphosphonates, 0.01% to 0.04%—oral bisphosphonates) Institutional-based case series (1.5% to 7.7%—IV bisphosphonates)

Clinical features

Exposed devitalized bone is the hallmark of BRONJ. Vague pain or discomfort may be preceding the clinical finding. In most cases of BRONJ occurs after trauma to the bone like in dental interventions, however spontaneous bisphosphonate-related osteonecrosis have been recognized and documented. BRONJ is more common in the mandible (Fig 1), but the maxilla can be affected (Fig 2). Some patients have

multifocal osteonecrosis of the jaws. Spontaneous osteonecrosis of palatal and mandibular tori have been described in bisphosphonate users. Inflammation and infection, pathologic fracture, oral cutaneous fistula, oral antral fistula, or oral nasal fistula are noted in advanced cases of BRONJ. Bisphosphonate-related osteonecrosis is something that should be included in the clinical differential diagnosis of any patient with a history of bisphosphonate exposure presenting with pain in a tooth-bearing area or edentulous region of the jaw with no obvious clinical or radiographic evidence of a defined inflammatory, reactive, metabolic, cystic, or neoplastic pathologic entity.

Clinical stratification and staging guidelines of patients taking bisphosphonates and those with osteonecrosis of jaw 4

At risk	No apparent exposed/necrotic bone in asymptomatic patients treated with either intravenous, injectable, or oral bisphosphonates
Stage 0	No clinical evidence of exposed/necrotic bone but nonspecific symptoms or clinical and radiographic findings suspicious for possible BRONJ
Stage 1	Exposed, necrotic bone that is asymptomatic and no evidence of inflammation or infection
Stage 2	Exposed, necrotic bone that is associated with pain, erythema, and inflammation or infection with or without purulent drainage
Stage 3	Exposed, necrotic bone in patients with pain, inflammation or infection, and 1 or more of the following: exposed and necrotic bone extending beyond the region of the alveolar bone resulting in pathologic fracture, extra oral fistula, oral antral/oral nasal communication, osteolysis extending to the inferior border of the mandible or sinus floor

Radiographic features:

In the early phase of BRONJ no significant changes appear radiological, CT, MRI. Bone architecture will be affected uniformly as BRONJ is a systemic disease and thus there will be no focal change in bone architecture. As the disease progress and exposure occurs Mottled appearance can be seen (Fig 3). At that time BRONJ can be misdiagnosed as osteomyelitis, metastatic disease, primary lymphoma of the bone, and some other focal or diffuse mixed radiolucent and radio dense pathologic processes. Additional radiographic findings associated with bisphosphonate use include extraction sockets that do not fill with bone in the anticipated time frame; and prominent residual osteosclerotic lamina dura.



Fig. 1 Showing exposed bone in the lingual aspect of right mandibular third molar region.



Fig. 2 Showing exposed bone in the palatal aspect of maxilla



Fig. 3 Showing mixed radiolucent and radio opaque lesion in the right mandibular molar region

Risk factors:

I. Drug-related risk factors include

A. Bisphosphonate potency: zoledronate (Zometa-Novartis) is more potent than pamidronate {Aredronet-Sun (Inca), Bonapam (Alkam-(cytomed)),

Pamidria-(Cipla)}, and pamidronate is more potent than the oral bisphosphonates. The IV route of administration results in greater drug exposure than the oral route^{9,10}. Cancer patients receiving IV bisphosphonates have a 2.7- to 4.2-fold increased risk of BRONJ than cancer patients not exposed to IV bisphosphonates⁹.

B. Duration of therapy: A longer duration appears to be associated with increased risk¹⁰.

II. Local risk factors include

A. Dentoalveolar surgery⁹, includes

1. Extractions
2. Dental implant placement
3. Periapical surgery
4. Periodontal surgery involving osseous injury

B. Local anatomy

1. Mandible
 - a. Lingual tori
 - b. Mylohyoid ridge
2. Maxilla
 - a. Palatal tori

C. Concomitant oral disease: cancer patients exposed to IV bisphosphonates with a history of inflammatory dental disease (eg, periodontal and dental abscesses) are at a 7-fold increased risk of developing BRONJ.

III. Demographic and systemic factors

Studies reported increasing age as consistently associated with BRONJ¹⁰.

Sex was not significantly associated statistically with BRONJ¹⁰.

Race was reported in 1 study to be a risk factor, with whites having an increased risk of BRONJ compared with blacks.

IV. Genetic factors

Sarasquete et al demonstrated that genetic perturbations (ie, single nucleotide polymorphisms, in the cytochrome P450-2C gene [CYP2C8]) were associated with an increased risk of BRONJ among multiple myeloma patients treated with IV bisphosphonates.

V. Preventive factors

The AAOMS Taskforce on BRONJ recommended that patients should undergo dental evaluations and receive necessary treatment before initiating IV bisphosphonate therapy³. Due to the long-term biologic activity of IV bisphosphonates different dosing regimens might be equally effective and decrease the risk of BRONJ. Corso et al evaluated the BRONJ- and skeletal-related events (eg, pathologic fracture) in multiple myeloma patients using different dosing schedules for zoledronate. The findings suggested that alternative dosing schedules that reduce IV bisphosphonate exposure have comparable outcomes in terms of preventing skeletal-related events and a decreased risk of BRONJ.

Management:

In the management of BROJN different modalities have been put forward according to the staging of disease

Staging of and treatment strategies for BRONJ according to AAOMS¹¹ (Table I)

The current guidelines of the German Society of Dental and Oral Medicine (Deutsche Gesellschaft für Zahn-, Mund-und Kieferheilkunde [DGZMK]) are summarized as follows:

- Ø Patients undergoing bisphosphonate treatment should consult their dentist every 6 months.
- Ø Patients should be instructed to consult their dentist earlier than 6 months in case of problems, particularly pressure sores caused by dentures or progressive loosening of teeth.
- Ø Conservative treatment should be preferred to surgical interventions, especially when treating periodontitis.

Table I

At risk	No apparent exposed/necrotic bone in asymptomatic patients treated with either intravenous, injectable, or oral bisphosphonates	No treatment indicated patient education (oral hygiene)
Stage 0	No clinical evidence of exposed/necrotic bone but nonspecific symptoms or clinical and radiographic findings suspicious for possible BRONJ	Systemic management, including the use of pain medication and antibiotics
Stage 1	Exposed, necrotic bone that is asymptomatic and no evidence of inflammation or infection	Antibacterial mouth rinse Clinical follow-up every 3 months Patient education and review of indications for continued bisphosphonate therapy
Stage 2	Exposed, necrotic bone that is associated with pain, erythema, and inflammation or infection with or without purulent drainage	Symptomatic treatment with oral antibiotics Oral antibacterial mouth rinse Pain control Superficial debridement to relieve soft tissue irritation

- Ø Inevitable surgical treatment should not be delayed and should be performed under the same conditions used for high-risk patients who received radiation to the head and neck area.
- Ø Long-term recall of at least 3 months is recommended, especially before retreatment with bisphosphonates. In addition, the patients should receive detailed instructions and symptom sensitization, so that corresponding symptoms of BRONJ can be recognized and treated promptly.

Conclusion:

Accurate medical history of the patient by the dentist, oral surgeons and close monitoring of the dental status of the patient by general practitioner and physician can bring down the incidence of BRONJ. Although BRONJ is a rare complication of bisphosphonate treatment, its sequelae can be frustrating and devastating for the patient. Dentist should include BRONJ in differential diagnosis of patient having bisphosphonates and exposed devitalized bone and pain at the site after dental intervention. All patients should undergo the clinical examination and radiological tests that have been recommended by professional societies.

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Non surgical endodontic management of a dilacerated, calcified permanent maxillary central incisor

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Abstract

Establishing and maintaining adequate working length is critical for root canal treatment. Unfortunately, canal preparation is adversely affected by the highly variable nature of root canal anatomy. Dilacerations and calcifications are two major obstacles that can complicate or even alter endodontic treatment plan. Dilaceration is the result of a developmental anomaly in which there has been an abrupt change in the axial inclination between the crown and the root of a tooth. Calcifications completely or partially block and obscure the access into the root canal systems and can hamper preparation, disinfection and obturation. Most of us tend to go for a surgical management of the same without even giving it a try, particularly when both these complexities occur simultaneously. This case report describes the nonsurgical endodontic management of a symptomatic maxillary central incisor with dilacerated and calcified root and periapical pathology.

Introduction

A tooth with a straight root and a straight root canal is an exception rather than normal because most teeth show some curvature of the canals. In addition, most canals have multiple planes of curvature throughout their length. Many problems that occur during root canal preparation, such as missed canals, perforation of the pulpal floor, or canal transportation, result from poor knowledge of the root canal anatomy. A clear understanding of pulp anatomy and the variations that occur in instrumentation is essential if working length accessibility is to be achieved.

The term *dilaceration* was first used by Tomes in 1848, and it is defined as a deviation or bend in the linear relationship of a crown of a tooth to its root (Latin: *dilacero*-tear up)¹. The criteria for recognizing root dilaceration vary in the literature. According to some authors^{2,3}, a tooth is considered to have a dilaceration toward the mesial or distal direction if there is a 90-degree angle or greater along the axis of the tooth or root, whereas others defined dilaceration as a deviation from the normal axis of the tooth of 20 degrees or more in the apical part of the root⁴. If an erupted dilacerated tooth needs root canal treatment, then the presence of the dilaceration can severely complicate this treatment.

The prevalence of dilacerations ranges from 0.32% to 98%. Chohayeb⁴ has reported that the frequency of dilaceration in upper lateral incisors is 98%. Dilaceration can be seen in both the permanent and deciduous dentitions, but the incidence in the latter is very low^{5,6,7}. Some researchers reported that the prevalence is greater in posterior teeth and in the maxilla with fewer

occurrences among anterior teeth and in the mandible³, although one author noted that two thirds of the dilacerations in their study were in the mandible⁸. Bilaterally occurring dilacerations might be seen in many patients^{9,10}. There is no sex predilection for dilacerations of the teeth¹¹.

Periapical lesions of endodontic origin are always manifestations of a disease that develops from the presence of microorganisms in the root canal system (or, in rare cases, in the periapical region). Healing can take place only if these bacteria are removed as completely as possible. Therefore, root canal treatment is strongly indicated in a tooth with a partially (or apparently) calcified root canal system and apical periodontitis. However, only if all attempts still fail to result in complete exposure and instrumentation of the root canal system, the clinician should consider apicectomy and retrograde filling, root resection, hemisection or extraction.

This case report describes the non-surgical endodontic management of a symptomatic permanent maxillary right central incisor with dilacerated and calcified root canal and associated periapical pathology.

Case report

A healthy 18 year old female patient was referred to the Department Of Conservative Dentistry And Endodontics, Government Dental College, Calicut with a history of severe pain and swelling in relation to the upper front tooth region for the past one week. History revealed trauma to the maxillary right central incisor as a result of hit by stone at the age of around 8 years.



Fig. 1 Preoperative View



Fig. 2 Mesial Shift



Fig. 3 Root Canal Negotiated



Fig. 4 Master Cone Radiograph

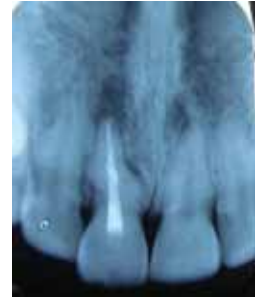


Fig. 5 Postoperative View

Clinical examination revealed mild discoloration and tenderness to palpation and percussion in relation to the maxillary right central incisor. Thermal and electric pulp test results were negative and suggested that the tooth is non vital. Cold test with Endofrost Cold Spray (Roeko; Coltene Whaledent, Langenau, Germany) elicited no response, whereas the left maxillary central incisor responded to cold without lingering suggestive of a positive response. Periodontal status was normal clinically (ie, probing depth <3 mm around the tooth), and tooth showed no mobility.

Radiographic examination revealed a calcified and dilacerated root with periapical as well as lateral periodontitis (Fig. 1). Similar root dilaceration was evident in the maxillary right lateral incisor as well, but it was asymptomatic and elicited a normal response to cold and electric pulp tests. The diagnostic radiograph revealed a periapical radiolucency in relation to the maxillary left central incisor as well, but a mesial shift radiograph was taken which revealed periapical as well as lateral pathology for the maxillary right central incisor alone (Fig. 2). The canal outline was completely obliterated till the apical third. At the apical third a thin root canal outline was visible. The dilaceration was in two different planes further complicating the treatment plan. The chances of root fracture also could not be ruled out. However conventional endodontic treatment was planned even though the radiographs suggested very thin chances of negotiating the root canal to the full working length.

After complete explanation of the treatment procedure, risks, and benefits, an informed consent was obtained from the patient.

After rubber dam isolation under local anesthesia, an access cavity was prepared by using a diamond-coated fissure bur. A precurved number 6 stainless steel K file was used along with chelating agent 17% EDTA gel (Glyde File Prep, Dentsply Maillefer) in between. The access cavity was slowly extended further apically alternatively using the no. 6 instrument and copious use of EDTA gel. Finally at around the middle third of the root a small 'pull' was felt suggestive of possibility of entry into the root canal. The no. 6 instrument was introduced very gently with a watch winding motion

until the approximate working length seen in the diagnostic IOPA radiograph was reached. A confirmatory radiograph was taken without removing the instrument from the canal. (Fig.3)

The confirmatory radiograph revealed successful negotiation of the root canal to the full working length. Shaping and cleaning was done at first by gentle movement of the no. 6 K file without removing it from the canal until the instrument was loose in the canal. Further instrumentation was done with sequentially larger instruments and periodic recapitulation with smaller instruments. Copious irrigation of the root canal was done with 5.25% NaOCl through out the procedure. The apex was enlarged to a no. 45 size ISO standard stainless steel K file and coronal flaring was done in a conventional step back technique with sequentially larger instruments. After final irrigation with 0.2% chlorhexidine solution, the root canal was dried with paper points and the canal walls were liberally coated with an intracanal medicament of calcium hydroxide paste (RC Cal, Prime Dental). The access cavity was sealed with IRM. Routine postoperative analgesics were prescribed.

The patient was recalled after 1 week. There was no postoperative pain or discomfort during the interappointment period and the involved tooth was asymptomatic. The access cavity was reopened, copious irrigation was done with 0.2 % chlorhexidine solution. A master cone radiograph was taken to confirm the fit of the no. 45 master cone to the correct working length (Fig:4). Since the radiograph suggested periapical as well as lateral periodontal pathology a sectional filling at the apical third followed by backfilling with thermoplasticized gutta percha (E & Q Plus, Meta Bio Med) was performed. Vertical condensation was carried out with a no. 40 size finger plugger in between the back filling procedure to ensure complete sealing of the lateral exits. The excess gutta percha was removed with a heated bunisher and the access cavity was sealed with direct composite resin restoration.

The postoperative radiograph revealed complete obturation of the root canal space to the full working length (Fig. 5). The patient is under follow up and is completely asymptomatic.

Discussion

When attempting to perform endodontic procedures, the clinician must use great care to avoid mishaps in teeth with significant dilacerations. In dilacerated teeth, the accepted basic endodontic techniques must be strictly followed, that is, good preoperative and working radiographs, unobstructed access to the root canal orifice, as direct access as possible to the apical third of the canal, precurvature of all files used, and thorough irrigation. Failure to recognize the multi-planar nature of the dilaceration is one of the factors that might contribute to the higher rate of unfavorable outcomes of endodontic treatment of dilacerated teeth. To overcome this problem, periapical radiographs that determine the direction of dilacerations are adequate.

The direction of root dilacerations should be considered in 2 planes, and they can be categorized as mesial, distal, labial/buccal, or palatal/lingual. If the roots bend mesially or distally, the dilaceration is clearly apparent on a periapical radiograph. However, when the dilaceration is toward the labial/buccal or palatal/lingual, the x-ray beam passes through the deflected portion of the root in an approximately parallel direction. The dilacerated portion then appears at the apical end of the unaltered root as a rounded opaque area with a dark "spot" in its center that is caused by the apical foramen of the root canal (this appearance has been likened to a bullseye or a target). The periodontal ligament space around the dilacerated portion of the root might be seen as a radiolucent halo, and the radiopacity of this segment of the root is usually greater than the rest of the root as a result of the increased thickness of tooth structure that the x-rays have to pass through. However, such diagnostic findings can be confirmed by a computed tomography scan, which can help to determine the exact position and angulation of the dilaceration¹⁴.

Direct access to the apical foramen, as much as possible, is an important benefit gained through the access cavity preparation. In extending only that portion of the wall needed to free the instrument, a cloverleaf appearance might evolve as the outline form. Luebke has termed this a "shamrock preparation". In fact, this is a modified outline form to accommodate the instrument unrestrained in the severely curved canals¹⁵.

In dilacerated teeth, it is often difficult to explore and negotiate the root canals, especially if the state of the pulp has caused apposition and/or resorption of the canal wall. Therefore, when an endodontic file is introduced into the root canal during treatment, it might be blocked by such irregularities, even if the file has been precurved, and this might prevent the operator from reaching the ideal working length. Hence, the use of a "scout file" can provide critical information regarding the extent and direction of a root canal dilaceration. Scout files are not just measuring wires;

rather, they provide critical information before initiating shaping procedures¹⁷.

Another problem in endodontic treatment of these cases is the inability to continuously follow the root canal curvature, and this might result in blocking of the canal, ledging, apical cavitation such as transportation and/or zipping, perforation, and instrument breakage. When using manual instrumentation techniques, the flexibility of the instruments with respect to their size must be considered. It is essential to precurve all instruments, and especially those larger than size 20, to allow the files to follow the curve and not just cut in a straight direction. In general, dilacerated root canals are not suitable for the use of NiTi rotary instruments because of the severe nature and extent of the curvatures that must be negotiated¹⁷.

The outcome of root canal treatment will depend largely on complete biomechanical debridement of the canals and the elimination of microorganisms from the root canal system. The use of copious irrigation, file recapitulation, and further irrigation should be repeated more frequently in these severely curved canals.¹⁷

A multi-visit approach should also be followed, with the use of interappointment intracanal medicaments to increase the predictability of the treatment. Intracanal medicaments are essential to help disinfect the root canal system, especially in areas that are inaccessible to mechanical instrumentation and irrigation, and to change the intracanal environment so microorganisms are not likely, or at least less likely, to be able to survive. Because the value of calcium hydroxide in endodontic treatment is now well-documented, it is proposed to use this material as a medicament in dilacerated teeth¹⁷. To overcome the complexity of reaching calcium hydroxide to the apical third of dilacerated teeth, it has been proposed to mix calcium hydroxide with glycerin rather than with sterile water. It has been shown that glycerin is significantly superior to water in regards to the length of filling and density in the apical third of curved canals¹⁸.

Although lateral compaction of curved canals can be very effective in most teeth, this technique might be difficult and sometimes impossible in dilacerated canals. If lateral compaction technique is chosen, then spreaders made from NiTi are highly recommended for the filling of severely curved root canal systems¹⁷ because they will penetrate to greater depths and distribute forces more evenly than stainless steel spreaders. In dilacerated canals, the arc of movement of spreader should be limited to 90 degrees or even less.¹⁷ The use of warm or thermoplasticized gutta-percha techniques might be more applicable in many cases.

The prognosis of dilacerated teeth that require endodontic treatment varies according to the severity of the deformity and the practitioner's skills. It will also depend on many other factors such as the reason why endodontic treatment was required, how much tooth structure remains, and the prognosis for any restoration

that is placed on the tooth. It is difficult to predict the prognosis before treatment, and in many cases, the prognosis will not become evident until the practitioner has undertaken initial endodontic treatment to determine whether the canal can be negotiated completely and then adequately disinfected and filled.

Initially, calcification is a process involving the reduction in size of the intradental cavities as a result of hard-tissue formation by the cells of the vital pulp; it ends in complete calcification as a result of dentin deposition inside the tooth. Calcification is worse coronally. Once the coronal obstruction is cleared the apical path is usually negotiable. A canal system can be usually negotiated when a lesion is seen radiographically.¹⁹

Radiographs are a useful adjunct in the diagnosis of calcified canals. Reducing the kVp and increasing the milli amperage accordingly increases the contrast and may make film interpretation easier. Multiple preoperative views may help the clinician locate root canals or establish the presence of additional root or canals. The use of buccal object rule and radiographic markers such as cotton pellet- stabilized burs/segments of foil/gutta percha can help determine the bucco- lingual orientation in posterior teeth.²⁰

Radiographs alone can never be used as a basis for determining whether complete calcification has taken place; these teeth always require clinical verification Pulp testing ceases to have any diagnostic value once the calcification has reached an advanced stage.²⁰

Coronal flaring in a crown- down fashion is preferred. Incremental instrumentation is achieved by creating new increments between the established widths by cutting off a portion of the file tip, thus making it slightly wider in diameter. Chelator preparations have been advocated frequently as adjuncts for root canal preparation, especially in narrow and calcified root canals, liquid EDTA solution may be introduced into pulp chamber (pipette, cotton pellet) to identify the entrance to calcified canals.

In the treatment of calcified canals it is common to find a total occlusion of the canal space at any level. If healing of pulpal and periapical disease is to be predictable, a proper diagnosis and treatment plan is essential.

Conclusion

The clinician should also utilize an evidence-based approach to treatment applying knowledge of anatomy and morphology, and endodontic techniques to the unique situations each case presents. It is crucial that all canals are located, cleaned, shaped, disinfected and sealed from the apical minor constriction of the root canal system to the orifice and the cavosurface margin. The endodontic management of calcified canals and root dilacerations is a challenge for the endodontist and require patience. In the end one should keep in mind that there

are no short cuts to solve these complexities. One can actually make it or spoil it in the first 10-15 minutes of beginning the case!

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Reasons of permanent tooth loss among children and adults in a suburban area of Chennai

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Abstract

Aim: To determine the reasons of permanent tooth loss among children and adults in a suburban area of Chennai.

Materials and Methods: A Cross sectional descriptive study was conducted in Tiruverkadu, a suburban area of Chennai. A house to house survey was done in Tiruverkadu. The study population consisted of 6, 12, 15 year old children, 35-44 and 65-74 year old adults. A Type III dental examination was carried out and the data was recorded in a pre-designed questionnaire.

Results: Among the total 679 subjects, 309 subjects had tooth loss. Of these, 42.9% constituted males and 47.9% constituted females. Dental caries was the most common reason of tooth loss for males (56%) and females (52%). Subjects of 6, 12, 15 and 35-44 years of age lost 4(100%), 13(72.2%), 20(71.4%), and 112(70%) of their teeth due to dental caries. Subjects of 65-74 years lost 75(75.8%) of their teeth as a result of periodontal reason.

Conclusion: This study indicates that tooth loss increases with age and differs for gender and socio-economic status. Most common reason for tooth loss among 6, 12, 15 and 35-44 years old subjects was dental caries while periodontal reason continued to be the main reason of tooth loss among 65-74 years old subjects.

Introduction

In spite of significant improvements in oral health among children, tooth loss remains a dental public health problem among adults.¹ Tooth loss is the ultimate barometer of failure or success in dentistry and dental health programmes.² Tooth loss diminishes the quality of life, often substantially, and tooth loss is also related to poor general health.³ Tooth loss is a terminal event in the life of a tooth and is a frequent episode in individuals with uncared and neglected oral cavity.⁴ It is necessary to understand the reasons of tooth loss, because it is a culmination of a variety of factors.

The retention of teeth is one of the goals of dental treatment. Success is measured by the declining rates of edentulism and an increase in the number of retained teeth.⁵ One of dental professional's most important functions is the treatment and prevention of dental caries and periodontal disease in order to prevent tooth loss. Its success in this regard is reflected in international data which show a continuing decline in rates of edentulism and an increase in the number of retained teeth.⁶

Studies on tooth loss have shown that although edentulism is on the decline, a substantial proportion of adults are still losing teeth. Known indications for extraction of teeth include dental caries and its sequelae (pulpitis and periapical infections), periodontal

diseases, fractured teeth, malpositioned teeth, impacted teeth, orthodontic treatment, retained deciduous teeth, prosthetic considerations, supernumerary teeth and preparation for radiotherapy.⁷ Surveys to determine the reasons for tooth loss have been carried out in many countries. Dental caries and its sequelae have been cited as the main cause for tooth loss in these studies.^{8,9} Ong et al. found that both dental caries and periodontal reasons were equally common causes of tooth loss in Asian population.¹⁰ Phipps et al. and Murray et al. have reported markedly higher numbers of teeth lost due to periodontal causes compared to dental caries in the United States and Canada, respectively.^{11,5} Dental caries was reported to be the most frequent reason for tooth extraction among Japanese⁹, Chinese¹² and Sri Lankan population.¹³

In developing countries like India, very few data were available pertaining to tooth loss. A survey conducted in south India among adults aged over 60 years showed a mean missing component of 10.98 teeth in the total DMFT.¹⁴ Hence, the purpose of the present study was to identify the reasons for tooth loss among children and adults in a suburban area of Chennai.

Materials and methods

The present study was a cross-sectional descriptive study conducted in Tiruverkadu, a suburban area of

Table 1 Distribution of study subjects with tooth loss by socio-demographic variables

Variables		Total subjects N	Subjects with tooth loss		Mean tooth loss±SD
			n	%	
Gender	Male	322	138	42.9	2.6±4.01
	Female	357	171	47.9	2.9±4.43
Age (Years)	6	70	4	5.7	0.4±0.76
	12	82	18	22	0.5±0.92
	15	99	28	28.3	0.6±1.2
	35-44	307	160	52.1	1.5±2.8
	65-74	121	99	81.8	10.5±9.7
Socio-economic status	Upper	32	10	31.3	0.3±0.52
	Upper middle	27	8	29.6	0.7±1.47
	Lower middle	117	43	36.8	0.8±1.68
	Upper lower	482	233	48.3	3.3±5.7
	Lower	21	15	71.4	6.8±8.2
Total		679	309	45.5	2.7±4.26

Table 2 Distribution of subjects with tooth loss by gender and reasons

Reasons for tooth loss	Male		Female		Total		χ ²	P value
	n	%	n	%	N	%		
Dental Caries reasons	77	55.8	89	52	166	53.7	0.007	0.932
Periodontal reasons	39	28.3	66	38.6	105	34	3.059	0.08
Orthodontic reasons	1	0.7	1	0.6	2	0.6	~	1 *
Trauma reasons	17	12.3	8	4.7	25	8.1	5.469	0.019
Pre-prosthetic reasons	0	0	3	1.8	3	1	~	0.251 *
Unknown reasons	4	2.9	4	2.3	8	2.6	~	1 *
Total	138	100	171	100	309	100	~	~

* Fischers exact test

Table 3 Distribution of subjects with tooth loss by age and reasons

Reasons for tooth loss	6 years		12 years		15 years		35-44 years		65-74 years		Total		χ ²	P value
	n	%	n	%	n	%	n	%	n	%	N	%		
Dental Caries reasons	4	100	13	72	20	71.4	112	70	17	17.2	166	53.7	57.703	0
Periodontal reasons	0	0	0	0	1	3.6	29	18.1	75	75.8	105	34	270.87	0
Orthodontic reasons	0	0	0	0	1	3.6	1	0.6	0	0	2	0.6	2.543	0.637
Trauma reasons	0	0	5	28	3	10.7	14	8.8	3	3	25	8.1	4.415	0.353
Pre-prosthetic reasons	0	0	0	0	0	0	0	0	3	3	3	1	13.896	0.008
Unknown reasons	0	0	0	0	3	10.7	4	2.5	1	1	8	2.6	4.899	0.298
Total	4	100	18	100	28	100	160	100	99	100	309	100	~	~

Chennai. The population of Tiruverkadu was 30,734 according to 2001 census.¹⁵ The study population consisted of 6, 12 and 15 year old children, 35-44 and 65-74 year old adults. Participants were enrolled by house-to-house survey. The study was conducted during the period of January - February 2009. The survey instrument was a pretested questionnaire which consisted of questions pertaining to general information, socio-demographic information and reasons for tooth loss. A modified Kuppaswamy's Socio-economic status scale was used in assessment of the socio-economic status. The Socio-economic status scale utilized information like Education of the head of the household, Occupation of the head of the household and Family income/month.¹⁶ The questionnaire was duly filled by a single investigator which was followed by a type III dental examination of the participants. Only permanent

dentition was included while third molars were excluded from the study. The intra-examiner variability was 0.96.

Statistical analysis: Data collected were entered in Windows Excel spreadsheet and analyzed using SPSS version 15.0 software. Cross tabulations, Chi-square statistics and Fischers exact test were computed. The level of significance was chosen as P<0.05.

Results:

Table 1 represents the distribution of study subjects with tooth loss by socio-demographic variables. The study population consisted of 679 subjects of which males constituted 322 and females constituted 357. Among these subjects, 42.9% males and 47.9% females had tooth loss. It was observed that the subjects in lower socio-economic status had the maximum tooth loss (71.4%).

Table 4 Distribution of subjects with tooth loss by socio-economic status and reasons

Socio-economic status	Subjects with tooth loss		Dental Caries reasons		Periodontal reasons		Orthodontic reasons		Trauma reasons		Pre-prosthetic reasons		Unknown reasons	
	N	n	%	n	%	n	%	n	%	n	%	n	%	
Upper	10	4	40	2	20	2	20	2	20	0	0	0	0	
Upper middle	8	3	37.5	3	37.5	0	0	2	25	0	0	0	0	
Lower middle	43	23	53.5	18	41.9	0	0	2	4.6	0	0	0	0	
Upper lower	233	126	54.1	77	33	0	0	19	8.2	3	1.3	8	3.4	
Lower	15	10	66.7	5	33.3	0	0	0	0	0	0	0	0	
Total	309	166	53.7	105	34	2	0.6	25	8.1	3	1	8	2.6	

Table 2 provides the distribution of subjects with tooth loss by gender and reasons. Dental caries is the leading cause for tooth loss being 55.8% among males and 52% among females, the difference being statistically not significant ($P=0.9$). Periodontal reason was the second common cause for tooth loss among males (28.3%) and females (38.6%). The difference was statistically not significant.

Table 3 illustrates the distribution of subjects with tooth loss by age and reasons. Subjects of 6, 12, 15, 35-44 and 65-74 years lost 100%, 72.2%, 71.4%, 70% and 17.2% of their teeth due to caries, respectively. The difference was found to be statistically significant ($P<0.001$). Subjects of 15, 35-44 and 65-74 years lost 3.6%, 18.1% and 75.8% of their teeth as a result of periodontal reasons, respectively. The difference was statistically significant ($P<0.001$).

Table 4 presents the distribution of subjects with tooth loss by socio-economic status and reasons. Among the subjects of all socio-economic status, caries was found to be the main cause of tooth loss followed by periodontal reason. Study subjects of the upper lower socio-economic status had greater proportion of teeth lost due to trauma compared to other subjects.

Table 5 presents the distribution of teeth lost by tooth type and reasons. Among the teeth lost due to caries, tooth type 46 was the most commonly missing tooth and tooth type 43 was the least commonly missing tooth. In the maxillary arch, tooth type 26 was the most commonly missing tooth and tooth type 22 was the least commonly missing tooth due to caries. In the mandibular arch, tooth type 46 was the most commonly

missing tooth and tooth type 43 was the least commonly missing tooth due to caries.

Discussion

In many developing countries, tooth loss constitutes to be a major public health problem. This study indicates that there are predisposing variables which are associated with tooth loss. The results revealed that study subjects with lower socio-economic status have greater tooth loss compared to their counterparts. Age is another predisposing variable associated with tooth loss. In the present study, it was observed that tooth loss increases as age progress which was similar to studies conducted in other parts of the world.^{1,17}

The present study reveals that 47.9% of females had tooth loss compared to 42.9% of their male counterparts. The findings were similar to a study conducted in an urban population of South Brazil.¹⁷ The reasons for females to have fewer teeth remain to be identified. It can be speculated that female subjects loose more teeth because they are more sensitive to their dental needs, experiencing more tooth loss from interventions and services.

From 6 years upto the age group 35-44 years dental caries was the most common reason for tooth loss. But from 35-44 years to 65-74 years, tooth loss was commonly due to periodontal reasons. Trauma was the third most common reason for tooth loss which occurred for 8.1% of the study population and was high among 12 and 15 year age groups. Dental caries was the principal cause of tooth loss among 15 years age group subjects and it was similar to a study

Table 5 Distribution of teeth lost by tooth type and reasons

Tooth type (FDI Code)	No: of teeth lost	Dental Caries reasons		Periodontal reasons		Orthodontic reasons		Trauma reasons		Pre- prosthetic reasons		Unknow n reasons		χ^2	P value
		n	%	n	%	n	%	n	%	n	%	n	%		
17	59	11	18.6	47	79.7	0	0	0	0	1	1.7	0	0	10.781	0.005
16	90	40	44.4	49	54.4	0	0	0	0	1	1.1	0	0	19.182	0
15	62	13	21	48	77.4	1	1.6	0	0	0	0	0	0	5.323	0.256
14	48	8	16.7	39	81.3	1	2	0	0	0	0	0	0	9.699	0.008
13	30	3	10	26	86.7	0	0	0	0	0	0	1	3.3	17.67	0.007
12	38	2	5.3	34	89.5	0	0	2	5.3	0	0	0	0	10.588	0.032
11	61	4	6.6	43	70.5	0	0	1 4	23	0	0	0	0	31.661	0
21	52	3	5.8	39	75	0	0	1 0	19.2	0	0	0	0	22.351	0.001
22	42	2	4.8	36	85.7	0	0	3	7.1	0	0	1	2.4	14.875	0.005
23	28	2	7.1	26	92.9	0	0	0	0	0	0	0	0	6.514	0.039
24	57	10	17.5	46	80.7	1	1.8	0	0	0	0	0	0	9.681	0.008
25	56	11	19.6	44	78.6	1	1.8	0	0	0	0	0	0	9.914	0.042
26	115	53	46.1	60	52.2	2	1.7	0	0	0	0	0	0	22.635	0
27	73	13	17.8	59	80.8	0	0	0	0	1	1.4	0	0	9.12	0.028
37	98	42	42.9	55	56.1	0	0	0	0	0	0	1	1	19.529	0.001
36	148	78	52.7	70	47.3	0	0	0	0	0	0	0	0	42.969	0
35	61	18	29.5	43	70.5	0	0	0	0	0	0	0	0	10.429	0.108
34	44	8	18.2	36	81.8	0	0	0	0	0	0	0	0	2.76	0.252
33	27	2	7.4	25	92.6	0	0	0	0	0	0	0	0	8.556	0.014
32	56	2	3.6	48	85.7	0	0	5	8.9	1	1.8	0	0	21.5	0.001
31	70	4	5.7	56	80	0	0	9	12.9	1	1.4	0	0	26.811	0.001
41	64	3	4.7	55	85.9	0	0	5	7.8	1	1.6	0	0	14.79	0.022
42	47	1	2.1	42	89.4	0	0	3	6.4	1	2.1	0	0	15.632	0.004
43	28	0	0	28	100	0	0	0	0	0	0	0	0	0*	~
44	57	15	26.3	41	71.9	0	0	0	0	1	1.8	0	0	9.16	0.01
45	72	22	30.6	49	68.1	0	0	0	0	1	1.4	0	0	7.998	0.092
46	170	92	54.1	76	44.7	0	0	0	0	1	0.6	1	0.6	37.993	0
47	84	31	36.9	52	61.9	0	0	0	0	1	1.2	0	0	19.789	0
Total	1837	493	26.8	1272	69.2	6	0.3	5 1	2.8	11	0.6	4	0.2	~	~

* No
difference

conducted in Saudi Arabia.¹ Our finding indicates that dental caries is the main cause of tooth loss similar to a study conducted in Chinese adults.¹² It was observed in the present study that periodontal reason was the main reason for tooth loss which is similar to studies conducted in elderly people.^{18,19} The result is in contrast to several other studies.^{9,20,21}

Conclusion

The present study reveals that tooth loss constituted a major public health problem among the study subjects of Tiruverkadu. Females had greater tooth loss compared to their counterparts. The study shows an increasing trend of tooth loss as age progresses. A trend of decreasing tooth loss was observed as socio-economic status increases. Dental caries was the common cause of tooth loss among children and adults while

periodontal reasons formed the main reason of tooth loss among the elderly. Dental caries was the main cause of tooth loss in the study subjects of different socio-economic status. In this modern era, preventive measures for dental caries such as topical fluoride application and dental fissure sealants should be encouraged by dental professionals. These preventive measures could preserve the natural dentition to a great extent.

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Case report

Management of invasive cervical resorption

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Abstract

External resorption is a sequelae of necrotic periodontal membrane over a large area of root following an injury to the tooth. Potential predisposing factors for invasive cervical root resorption are internal bleaching, orthodontic tooth movement, traumatic injuries, and periodontal treatment. This case report presents a clinical and radiographic treatment of inflammatory external root resorption on maxillary central incisor using MTA with a follow-up of 15 months. Gradual healing of resorption was observed radiographically with no tenderness or pathological mobility.

Introduction

Resorption is a condition associated with either a physiologic or pathologic process that results in the loss of substance or alveolar bone. Unlike bone, which undergoes resorption and apposition as part of continual remodeling process, the roots of permanent teeth are not normally resorbed.¹ However, under certain circumstances, root dentine may undergo resorption. Root resorption is conventionally divided into internal and external types. Internal resorption occurs when there is a loss of the internal wall of the root canal. External resorption is a process that leads to an irreversible loss of cementum, dentine and bone. It takes place in vital and nonvital teeth and the identification is most frequently made during routine radiographic examination as the majority of cases are asymptomatic. Invasive cervical resorption is a clinical term used to describe a relatively uncommon insidious and often aggressive form of external root resorption.² It usually occurs following damage to periodontal ligament and a necrotic pulp. This type of resorption is usually progressive until root canal treatment is instituted.

Different approaches have been suggested for the treatment of invasive cervical root resorption. Most effective therapy is to expose the resorption lacunae surgically, to remove the granulomatous tissue.³ Treating invasive cervical resorption lesions with a chemical agent, 90% trichloroacetic acid, after protective application of glycerol to adjacent soft tissues before the curettage of the lesion is advocated by Heithersay.⁴ After the chemomechanical debridement of the defect, glass ionomer, light cure resin composite, amalgam and MTA have been recommended to restore the resorption.⁵ If there is perforation into the canal, endodontic treatment must be performed.⁶

MTA -first described in literature by Lee, Mahmoud Torabinejad And Colleagues in 1993 when used as root end filling material compositionally formulated to have

physical properties, settings requirements and characteristics necessary for an ideal repair and medicament material. It contains small amounts of mineral oxides, which modify its chemical and physical properties. Electron probe micro analysis of the MTA powder showed that calcium and phosphorus are the main ions present. MTA is cement composed of tricalcium silicate, tricalcium aluminate, tricalcium oxide, silicate oxide and bismuth oxide. MTA also contains 5% calcium sulphate dehydrate and tetracalcium alumino ferrite. Off white coloured formula lacks tetracalcium alumino ferrite and lack of this iron containing compound accounts for off white appearance. Both the formula contains; 70% Portland cements, 20% bismuth oxide and 5% gypsum by weight Mineral Trioxide Aggregate has many favorable properties including a good sealing characteristic, biocompatibility, bacteriocidal effect, radioopacity, and ability to set even in the presence of blood.⁷ In addition, newly formed cementum coverage occurred with MTA is unique and has not been demonstrated with any other material.⁸

This case report presents the treatment of an invasive cervical resorption which resulted as a complication of trauma with MTA.

Case Report

A 15 –year old male patient presented to our Department of Conservative Dentistry and Endodontics, Govt. Dental College, Calicut with a complaint of persistent pus discharge from his upper front tooth. Medical history was noncontributory. Dental history revealed a history of root canal treatment done from a private clinic one year back following trauma. Clinical examination demonstrated that the maxillary right and left central incisors were sensitive to percussion with normal probing depth. Periapical radiographs showed an incomplete root canal filling in relation to right central incisor along with a periapical radiolucency extending to the root of maxillary right lateral and an



Fig. 1 Diagnostic



Fig. 2 After removal of old filling and treatment of 11 and 22 (after 6mths)



Fig. 3 After 15 months



Fig. 4 Resorptive defect

external root resorption on the cervical third of maxillary left central incisor. (fig 1) Electric pulp testing was done on right maxillary laterals. As the right lateral incisor was vital root canal treatment was not done on that tooth. It was decided to do re-RCT on maxillary right incisors, and to seal the resorptive area on left maxillary incisors with MTA, followed by obturation of the root canal.

The patient was informed of the treatment plan, possible discomforts and potential risks, before giving his consent to the treatment. On the first day after application of rubber dam the old root canal filling material was removed from right maxillary central incisors, working length was calculated on both the central incisors, the canals were biomechanically cleaned and shaped along with copious irrigation of 2% chlorhexidine and sterile saline. A calcium hydroxide dressing was given in both the teeth for two weeks, and the access cavity was sealed with IRM. After two weeks, the patient was recalled, the calcium hydroxide dressing was removed, and the canal of maxillary right central incisor was obturated with gutta percha using the lateral condensation method. (fig2) Following this, local anesthesia was infiltrated on both the vestibular and palatal mucosa of both the maxillary central incisor. A mucoperiosteal flap was elevated starting from the distal surface of right central incisor to the distal surface of left lateral incisor. (fig4) The granulomatous tissue within the defect was carefully removed using a curette and rinsed with sterile saline solution. The resorption site was subsequently sealed with MTA (Angelus, Londrina, Brazil), while the root canal of the left central incisor was kept patent by inserting a file. (fig5) A moist cotton pellet was kept inside the canal of left central incisor for 24hrs and the access was sealed with IRM to allow the hardening of MTA. The flap was repositioned without tension and sutured interproximally with nonabsorbable sutures. After the surgery the patient was prescribed amoxicillin 500mg thrice a day for one week and 0.2% chlorhexidine mouthwash 15ml twice a day

for two weeks. The next day, the canal was obturated with gutta-percha using the lateral condensation method. After one week, the sutures were removed because the healing was uneventful and the patient was symptom free. (fig6)

At 15 month follow up, the tooth was evaluated both clinically and radiographically. (fig2) There was no mobility, no gingival recession, and no loss of clinical attachment. In the radiographic examination the related tooth and the surrounding tissues showed no pathologic changes.

Discussion

Many different predisposing factors have been reported for invasive cervical resorption. In this case, history revealed trauma as the predisposing factor. According to the classification by Lindskog, resorption can be subdivided into (a) trauma induced tooth resorption (b) Infection induced tooth resorption (c) hyperplastic invasive tooth resorption.⁹ In trauma induced tooth resorption, some damage to the cementum / cementoid-periodontal membrane complex would have occurred which may stimulate clastic activity.¹⁰

It is hypothesized that an initial physical injury to the root surface¹¹ or the presence of natural cementum defects may predispose to resorption by altered host tissues modified by a bacterially driven stimulus of different origin.¹² Bacteria from the periodontal sulcus may penetrate patent dentinal tubules, coronal to epithelial attachment, and exit apical to the epithelial attachment without penetrating the pulpal space, thereby stimulating ICR¹³. However, bacteria from necrotic pulp because of trauma could have stimulated apical inflammatory resorption.¹³ The treatment for ICR is aimed at debridement and restoration of the resorptive defect by the placement of a suitable filling material so that the tooth may be healthy and esthetically retained. If a cone beam computed tomography scan has been taken,



Fig. 5 MTA placed at the defect



Fig. 6 Sutures placed.

the position, depth in relation to the root canal, the true extent of the defect onto the labial or palatal aspects of the tooth, and, ultimately, the restorability of the tooth can be assessed objectively before any treatment is performed. Because this extraoral three-dimensional imaging facility was not available in our department, the patient was informed that the final decision on treatment can only be objectively made once the full extent is assessed by surgical exposure of the ICR defect.

Root lesions caused by external root resorption have been treated with different techniques and materials. Here, after the resorptive lacuna was surgically exposed, the root canal treatment was subsequently performed because the resorption was in relation to the root canal. Calcium hydroxide was given as a dressing in this case, because it is an antibacterial agent and it has been reported to favorably influence the local environment at the resorption site promoting healing. It changes the environment in the dentine to a more alkaline pH which slows the action of resorptive cells.¹⁴ Other materials like Ledermix, Calcitonin and Vitapex have also been reported to be an effective medication in the treatment of inflammatory tooth resorption.

Although Heithersay, had recommended, 90% TCA for chemical debridement of the defect, it was not used in this present case as the isolation of the surrounding tissues in the surgical area was difficult to maintain.

Surgical treatment of varying degrees of invasive cervical resorption has involved periodontal flap reflection, curettage, restoration of the defect with amalgam, composite resin, or glass ionomer cement, and repositioning the flap to its original position. Periodontal reattachment cannot be expected with amalgam, or composite resin and is unlikely with glass ionomer cement, but there is experimental evidence to suggest that this might be possible if MTA is used in this situation. Studies have also demonstrated encouraging regeneration of periradicular tissues, such as periodontal

ligament, bone, and cementum when MTA was used. The encouraging outcomes from *invivo* and *invitro* studies reported with MTA, prompted us to consider the use of MTA as the material of choice to arrest resorption. The location of resorptive defect in this present case also favoured the use of MTA, as it was not exposed to oral environment due to the fact that MTA dissolves in an acidic pH.

Recently a new water-based and tooth-colored endodontic biomaterial, calcium enriched mixture (CEM) cement, has been introduced which can be used for external resorption.¹⁵ The major components of the CEM cement powder are CaO, SO₃, P₂O₅, and SiO₂, and the minor components are Al₂O₃, Na₂O, MgO, and Cl. This cement is alkaline (pH >10.5) and releases Ca(OH)₂ during and after setting¹⁵. An *in vitro* study revealed that because of its continuous Ca(OH)₂ release, antibacterial properties of CEM cement are the same as Ca(OH)₂¹⁶ however, unlike Ca(OH)₂, CEM cement is a nontoxic material. In comparison with Ca(OH)₂, CEM cement has shown more favorable biocompatibility and the potential to induce hard tissue formation in vital pulp therapies. Animal studies show that regeneration of PDL and cementogenesis can occur adjacent to CEM cement.¹⁷ Also, the sealing ability of CEM cement as a retrograde filling material is comparable with mineral trioxide aggregate (MTA) and improves by storage of the cement in phosphate-buffered saline solution.

Also a modified sandwich restoration (RSR) was proposed for ICR defects. Here one-step self-etch adhesive was applied and light cured for 10 seconds. The resorptive defects was restored with microfilled composite to a thickness of about 1 mm and light cured for 20 seconds. The rest of the defects were restored with RMGIC (Fuji II LC; GC Corporation, Tokyo, Japan) to a smooth finish with a cervical matrix and light cured for 20 seconds.¹⁸

Conclusion

Successful management of resorption in a dentally traumatized patient is of paramount importance as it has physical consequences and also a significant psychological impact on the patient. Although this case report presents a favorable clinical outcome, further studies are necessary to provide more information about the promising short term outcome of the use of MTA.

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4th Executive committee Meeting of IDA Kerala State Branch



Can bacteria prevent dental caries

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Abstract

Dental caries is a multi-faceted disease process and bacteria along with nutrients and a susceptible host are required for the initiation and progression of the disease. But certain specific strains of bacteria called “probiotics” have recently been introduced, which can be used successfully for various health benefits including treatment of dental caries. The mechanism of probiotic action is by inter-microbial species interaction together with their immune-stimulatory effects. This concept of bacteriotherapy and use of health-beneficial micro organisms for prevention of dental caries may soon become a reality in near future.

Introduction

Dental caries is a multifactorial disease requiring the presence of a susceptible host, cariogenic microflora and a diet conducive to enamel demineralization (Fitzgerald and Keyes model). These three factors together are required for disease initiation and progression. Removal of any one element ostensibly leads to interception of the disease process.

Approaches to caries management

There are three basic models or approaches in management of dental caries namely the traditional surgical model, antibiotic model, and the recent probiotic approach.¹

Surgical model involved removal of the nidus of infection which was thought to stop the disease process. But the major flaw in this approach was removal of the diseased tooth structure do not remove the causative infection.

Since the surgical model did not remove the causative bacteria from the Fitzgerald/Keyes model, the next logical progression is to treat the remaining infection with antimicrobials or antibiotics. Chlorhexidine, povidone iodine, fluoride, penicillin, or other antimicrobials/antibiotics that kill a broad spectrum of organisms are used. But, Broad spectrum antibiotics or antimicrobials are not effective long-term unless their application is periodically repeated.

To overcome the limitations of the traditional disease management strategies, researchers are developing “probiotic” methods to treat the caries causing infection.

The probiotic approach

The word “pro-biotics” derives from two Greek words meaning ‘for life’ and refers to organisms incorporated into foods or supplements for health benefit.

Definition - Live microorganisms which when administered in adequate amounts confer health benefits

on the host (Guarner et al., 2005)² and according to International Life Science Institute it is ‘Viable microbial food supplements which beneficially influence the health of human’.

Most commonly used probiotic bacterial strains belong to Genera *Lactobacillus* (fig-2) and *Bifidobacterium* (fig-3). Vehicles for administration of probiotics include dairy products (cheese, yogurt, fermented milk), raw milk, lozenges, ice-cream or in the form of tablets or capsules. The potential mechanism³ by which probiotic bacteria affect oral health is summarised in figure 1.

Mechanisms are employed to selectively remove pathogen alone leaving the remainder of the oral ecosystem intact.

Hillman and colleagues developed a *substitution strategy*⁴. They genetically modified a *Streptococcus mutans* organism so that it no longer produces acid while competing aggressively for the ecologic niche where the wild type *S mutans* is found. In theory and in laboratory animals, once this substitute organism is introduced, it entirely displaces the disease-causing wild type *S mutans*. Not only does this stop the disease process, it also precludes the re-emergence of the disease-causing organism and eliminates re-infection because the ecologic “inn is full.”

Genetically modified microbes were developed which reduce the harmful properties of pathogenic strains and enhance properties of a potentially beneficial strain. *S. oligofermentans*, isolated only from caries-free humans, metabolize lactic acid into hydrogen peroxide which inhibit growth of *S. mutans*. This property makes it a good candidate for probiotic application.

Disadvantages of traditional probiotic approaches.

- Difficult to develop commercially as toxicity studies are impossible due to complexity of live organisms.
- Instability of such products.
- Live organisms have short shelf-times.
- Require complex storage conditions.

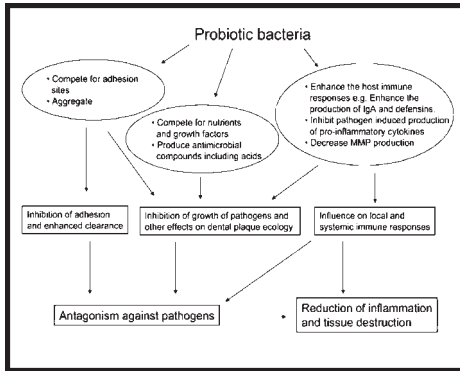


Fig. 1



Fig. 2



Fig. 3

New approaches to achieve probiotic effects

Inhibiting adherence with antagonists⁵ - Virulence of *S. Mutans* is strongly associated with its adherence. A cell-surface protein of *S. Mutans*, termed spap or Ag I/II, has been identified as an adhesin which interacts with the tooth pellicle. A synthetic dodecapeptide analogue of the active binding site of spap has been shown to inhibit attachment of *S. Mutans* to teeth both *in vivo* and *in vitro*. Such analogs are potential therapeutic agents that could be incorporated into toothpastes or mouth rinses.

Interference with signaling mechanisms⁵ - Pathogenicity of *S. mutans* is regulated by a quorum-sensing mechanism involving Competence Stimulating Peptide (CSP) as the signaling molecule. Addition of high concentration of CSP interfere with signaling events & induce its death which will prove beneficial against dental caries.

Targeted antimicrobial therapy via a novel STAMP technology⁶ - Currently available antimicrobials exhibit broad-spectrum killing properties and indiscriminate killing of all microbes disrupts the ecological balance of the indigenous microbiota, with unknown clinical consequences. So investigators formulated a new class of antimicrobials called 'Specifically Targeted antimicrobial Peptides' (STAMPs). A STAMP is a fusion peptide with two moieties: a killing moiety, made of a non-specific antimicrobial peptide; and a targeting moiety, containing a species specific binding peptide. The targeting moiety provides specific binding to a selected pathogen and facilitates the targeted delivery of an attached antimicrobial peptide.

The STAMPs eliminated *S. mutans* from multispecies biofilms and so are referred to as "probiotic" antimicrobials. These selectively eliminate pathogens while preserving the protective benefits of the normal flora.

Probiotics in India

In India, Sporolac, *Saccharomyces boulardii* and yogurt (*L. bulgaricus* + *L. thermophilus*) are the most common ones used. Sporolac is manufactured using *Sporolactobacilli*. *Lactobacilli* solution is usually given

to pediatric patients. The latest probiotic is made up of genetically modified *Bacillus mesentericus* which act as an alternate to B-complex capsules.

Future trends

Probiotics can be used as passive local immunization against dental caries. High titers of antibodies can also be directed against human cariogenic bacteria produced in bovine colostrum over the vehicle of fermented milk. Early mucosal colonization with *E.coli* bacteria in newborn stimulates mucosal immune system to produce specific antibodies as well nonspecific secretory immunoglobulins.

Conclusion

Probiotics are emerging as a fascinating field in dentistry. This concept prompts a new horizon on the relationship between diet and oral health. Daily intake of probiotic supplements may control common oral and dental infections. So let's hope that probiotic therapy may soon become a common treatment modality in caries management in the near future.

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A study of patient record documentation practice of dentists in Kerala

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Abstract

Good record keeping is as important as the providing of good dental services and is an integral part of the use of reasonable skill and care. The aim of this study was to assess the knowledge, attitude and behaviour regarding documentation of the patient record keeping among private dental practitioners in Kerala. The study was conducted at the 43rd state level Kerala IDA conference held at Manjeri in November 2010. Questionnaire was distributed among 510 dentists who attended the conference, out of whom 430 responded. 73% (318/430) of the dentists were aware of the importance of record keeping, but only 41.86% (180/430) had the habit of record keeping. There was significant difference in how the dental practitioners documented record based on their area of practice, clinical experience and college affiliation.

Introduction

Clinical records are fundamental to the process of the delivery of dental care, contributing to the diagnosis, planning and correct sequencing of treatment. They need to be legible, accurate, comprehensive and contemporaneous.¹ Maintenance of dental records is very important for the smooth functioning of the clinic and follow up of the patients. Dental records also play a key role in the research and knowledge development, as they maintain a link between the past and present and also provide accurate information and statistics for future discussion and research.²

Dental records are the sole property of dentists and should be preserved.³ Good record keeping is as important as the providing of good dental services and is an integral part of clinical practice.⁴ In addition to their contribution to patient care, clinical records also fulfil medicolegal, administrative and financial functions within general practice. They have also become essential tools for clinical audit and quality assurance.⁵ The importance of documenting record has compounded with the incorporation of evidence based dentistry in clinical practice. Inadequate and inappropriate record keeping effects patient care by impairing continuity of the care and creates the risk of treatment procedures being duplicated, omitted or inappropriately applied.⁶ Regulatory bodies have put forth regulations pertaining to accurate maintenance of patient records.⁷ The aim of this study was to assess the knowledge, attitude and behaviour regarding documentation of the patient record keeping among private dental practitioners in Kerala.

Materials and methods

The present study was conducted at the 43rd state level Kerala IDA conference held at Manjeri in November 2010. The dentists who attended the conference were clinical practitioners from all over Kerala.

Dentists were categorised on the basis of

- I. Academic qualification as B.D.S or M.D.S
- II. Area of practice as
 - a. Urban which included district headquarters
 - b. Semi-urban which included talukas
 - c. Rural which included villages
- III. Type of practitioners as the ones who work solely as clinical practitioners and the clinical practitioners who are also affiliated to dental colleges.
- IV. Clinical experience-
 - a. Practitioners of less than 5 years clinical experience
 - b. Practitioners of 5-10 years clinical experience
 - c. Practitioners of more than 10 years clinical experience

A self administered questionnaire pertaining to knowledge, attitude and behaviour was distributed among a total of 510 dentists who attended the conference. The questionnaire consisted of a battery of 6 questions. These were

1. Are you aware of documentation of patient's record?
2. Do you think there is a necessity for documenting patient's record?
3. Do you maintain your patient's record in clinical practice?

Table I: How dentists responded to the questions

Questions	Yes	%	No	%	Total
Q. No. 1	318	73.95	112	26.05	430
Q. No. 2	205	47.67	225	52.33	430
Q. No. 3	180	41.86	250	58.14	430
Q. No. 4	160	88.89	20	11.11	180

Table III: How dentists responded to question based on AREA OF PRACTICE

Questions	Urban				Semi-urban				Rural				Chi-square	p-value
	Yes	%	No	%	Yes	%	No	%	Yes	%	No	%		
Q. No. 1	153	77.27	45	22.73	107	73.29	39	26.71	58	67.44	28	32.56	3.0591	0.2171
Q. No. 2	106	53.54	92	46.46	68	46.58	78	53.42	31	36.05	55	63.95	7.4583	0.0240*
Q. No. 3	103	52.02	95	47.98	59	40.41	88	59.59	18	20.93	68	79.07	24.0042	0.0000*
Q. No. 4	94	47.47	104	52.53	50	34.25	99	65.75	16	18.60	70	81.40	22.2206	0.0000*

*p<0.05

- If yes, did you benefit by record keeping?
- How do you maintain your patient's records in clinic?
- How long do you preserve your patient's record?

For the first 4 questions, dentists were given an option of answering either 'yes' or 'no'. For the 5th question, dentists were given an option of files, computers and others (which included radiographs, casts e.t.c.). For the sixth question, they were given an option of 1 year or less, 1-2 years and more than 2 years.

The investigators were a group of 4 staff members from the Kannur Dental College, Kannur. The identities of all the studied participants were kept confidential by not depicting the questionnaire against the name, but only by reference numbers in serial order.

Statistical analysis

Chi-square test was used for statistical analysis. Statistical significance was set at p-value<0.05

Results

Out of the total 510 dentists who attended the conference, 430 dentists (84.5%) responded to the questionnaire of which 298 were BDS practitioners and 132 were MDS practitioners. The remaining dentists didn't participate in the study due to unknown reasons.

Table I shows how the dentists responded to the first four questions. 73% (318/430) of the dentists were aware of documentation of patient's record, but only 41.86% (180/430) had the habit of record keeping.

Table II shows the way dentists responded to first four questions based on academic qualification. There was no statistically significant difference between the response of BDS and MDS practitioners.

Table II: How dentists responded to question based on academic qualification

Questions	MDS				BDS				Chi-square	p-value
	Yes	%	No	%	Yes	%	No	%		
Q. No. 1	105	79.55	27	20.45	213	71.48	85	28.52	3.0921	0.0790
Q. No. 2	82	62.12	50	37.88	123	41.28	75	25.17	0.0001	0.9999
Q. No. 3	76	57.58	56	42.42	104	34.90	94	31.54	0.8152	0.3671
Q. No. 4	66	50.00	10	7.58	94	31.54	10	3.36	0.5580	0.4551

Table IV: How dentists responded to question based on college affiliation

Questions	College affiliation				Private practitioner				Chi-square	p-value
	Yes	%	No	%	Yes	%	No	%		
Q. No. 1	98	70.00	42	30.00	220	75.86	70	24.14	1.6841	0.1947
Q. No. 2	80	57.14	60	42.86	125	43.10	165	56.90	7.4602	0.0061*
Q. No. 3	84	60.00	56	40.00	96	33.10	194	66.90	28.0660	0.0000*
Q. No. 4	77	55.00	63	45.00	83	28.62	207	71.38	28.1211	0.0000*

*p<0.05

Table III shows how the dentists responded based on their area of practice. There was statistically significant difference between documentation of patient's record by dentists of urban, semi-urban and rural areas. The habit of record keeping was seen more common among practitioners in the urban area.

Table IV depicts the way dentists responded based on college affiliation. Record keeping was seen more among clinical practitioners who were associated with college.

Table V depicts the way dentists responded based on clinical experience. Clinical practitioners who are relatively new are better at keeping records compared to the older practitioners.

Figure I shows the different method adopted by clinical practitioners for documenting patient's record. 53% of them documented records in files, 37% of them documented records in computers and the remaining 10% of the practitioners documented other methods including casts, radiographs e.t.c.

Figure II shows the time period for which clinicians are keeping record. 57% of the practitioners kept records for a time period of 1 year or less. 32% of the dentists kept record for a period of 1-2 years. Only 11% of the dentist kept record for time period of more than 2 years.

Discussion

The basic idea behind documentation is to provide accurate current comprehensive and concise information concerning the diagnosis, treatment care of the patient and associated observations⁸. The present study included 430 dental practitioners who attended kerala dental conference, 2010 held in Manjeri.

Table V: How dentists responded to question based on clinical experience

Questions	0-5 years				5-10 years				More than 10 years				Chi-square	p-value
	Yes	%	No	%	Yes	%	No	%	Yes	%	No	%		
Q. No. 1	114	74.03	40	25.97	103	71.53	41	28.47	101	76.52	31	23.48	0.8905	0.6412
Q. No. 2	87	56.49	67	43.51	64	44.44	80	55.56	54	40.91	78	59.09	7.8262	0.0201*
Q. No. 3	80	51.95	74	48.05	58	40.28	86	59.72	42	31.82	90	68.18	12.0578	0.0024*
Q. No. 4	76	49.35	78	50.65	51	35.42	93	64.58	33	25.00	99	75.00	18.3362	0.0000*

Among the dental surgeons who participated, 74 % of the dentists were aware of the record keeping but only 47% felt the necessity of record keeping and 41.86 % had the habit of record keeping.

When the record keeping habit among MDS and BDS practitioners were analysed, it was seen that record keeping habit was seen more in MDS compared to BDS, but there was no statistically significant difference among them (p-value=0.3671). Our result was similar to the study done by Sari et al⁹, where they found specialists in dentists had a better knowledge about documentation compared to bachelor degree holders.

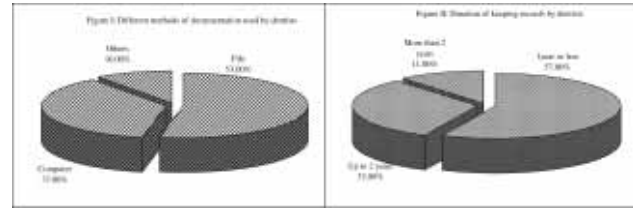
When record keeping habit among dental practitioners of rural, semi-urban and urban area were compared, a statistically significant difference was seen (chi-square=24.0042, p-value=0.0000). This may be because patients from urban area are more demanding and are aware of medico-legal implications compared to the patients in semi-urban and rural areas.

The habit of record keeping was seen more among clinical practitioners who are also affiliated to college compared to those who are non academic clinical practitioners (p-value=0.0000)

When record keeping habit was compared among dental practitioners of different clinical experience, there was a statistically significant difference (p-value=0.0024). It was seen that dentists who are relatively new to the clinical practice are better at keeping records. This may be due to increased awareness of newer methods of record keeping among newer dental practitioners.

Another significant finding of our study was that majority of the dental practitioners (57%), kept record for a period of 1 year or less. Only a small percentage (11%) of clinical practitioners kept record for a period for more than 2 years. According to Prinsloo et al, dental records should be preserved for a minimum of ten years and destroyed only after appropriate notification¹⁰.

The limitation of this study was that, this study was conducted only among the dental practitioners who have attended the kerala state dental conference. This does not clearly indicate the practices of entire dentists in kerala.



Conclusion

Our study concluded that, majority of dentists practicing in kerala are aware of the documentation of records, but only a few felt the necessity of record keeping and have a habit of record keeping. Definite steps have to be taken to educate the dentists regarding the importance of documentation of record and its medico-legal implications. Dentists should also be aware of the application of computers in documentation of records and also the rules and ethics in dental record maintenance^{10,11}.

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Management of vaginal atresia

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Abstract

A deformed or non-functional vagina is vaginal atresia. It is usually associated with Rockintesky Mayer Kuster House Syndrome (RMKH Syndrome).⁴ Treatment option is surgery or vaginoplasty². It facilitates normal utero vaginal flow. A mould should be placed in the space created immediately after the surgery to prevent contraction of the tissue.² Since the gynaecologist could not provide a comfortable mould, prosthodontist's service was utilized.

Introduction

Prosthodontist not only replace teeth and associated structures but also extends their valuable services to various specialities of medical field. The following case report is a good evidence of rendering such a service to gynaecology department.

Case report

A 14 year old girl was referred from the gynaecology department of Govt. Medical college, Trivandrum to the department of Prosthodontics, Govt. Dental college, Trivandrum for the fabrication of vaginal mould. The patient gave the history of vaginoplasty surgery done and that she was using a crude mould made of impression compound given by the gynaecologist (fig 1). The purpose of the mould is to keep the vaginal passage patent. Since the mould was having rough surface the patient had pain while using it and sometimes it used to break during insertion and removal. It was in this condition that the patient was referred to the prosthodontist.

After discussing with the gynaecologist, a wax pattern of the mould was designed. Special care was taken to make a patent central canal for drainage and a depression in the anterior region to avoid pressure on the urethra (Fig 2).¹ The wax pattern was acrylised using the same procedure used for the fabrication of a denture (Fig 3, fig 4).

Discussion

Vaginal agenesis is a congenital anomaly of the female genitourinary system. Treatment of such cases becomes urgent especially when the patient attains maturity. The

main aim of treatment is to create a vaginal space which is possible through a surgery³. To prevent closure of space during healing, a mould should be placed immediately after the surgery and it should be continued for a period of six to nine months¹. Since there was no provision for the fabrication of a comfortable mould by the gynaecologist, service of the prosthodontist was consulted. The mould was fabricated with acrylic and the same procedure for the fabrication of denture was used.

Conclusion

Vaginal moulds are used for treating various congenital and acquired problems of the vagina. Procedures used in the fabrication of the dentures were used for the fabrication of comfortable mould. Whenever needed, the prosthodontist extends his/her services to other specialities in the medical field.

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Fig. 1 Crude mould of Impression compound



Fig. 2 Wax pattern



Fig. 3 Acrylic vaginal mould showing anterior depression



Fig. 4 Central lumen to facilitate utero vaginal flow

Case report

Chemosis of the eye following management of displaced zygomatic complex fracture

* Jomy Varghese, ** Mathew Jose *** Sajesh S.

Abstract

Chemosis and subconjunctival haemorrhage is a common presentation in patients who had sustained zygomatic complex and orbital fractures. Post operative chemosis on the other hand is an uncommon entity and if noticed the possibility dangerous complications such as retrobulbar hematoma and orbital apex syndrome must be considered and immediate care must be instituted. In this article, we report a case of post operative chemosis that occurred on the 7th day following surgical management of zygomatic complex fractures. The pathogenesis and differential diagnosis of chemosis and the need for prompt diagnosis are discussed.

Introduction

Swelling of the conjunctiva classically known as chemosis is common in association with subconjunctival hemorrhage and resolves spontaneously¹. Chemosis also occurs as a result of infections, allergic reactions and also angioedema. Subconjunctival hemorrhages are common in the elderly, in whom they are most often associated with systemic diseases like primary hypertension. In patients under 40yrs, minor and major facial trauma with or without ocular involvement is the commonest². Amongst the facial trauma the zygomatic complex as well as orbital involvement are known to cause ocular involvement and most often presents with subconjunctival haemorrhage and chemosis. On the other hand chemosis following management of facial fractures is uncommon, and if noticed should be considered a emergency and the possibility of a carotid cavernous fistula, a retrobulbar hematoma or orbital apex syndrome should be ruled out³. Here we present a case of a young male patient with a history of zygomatic complex fracture following an alleged road traffic accident (R.T.A) and was managed with open reduction and internal fixation(ORIF) for the same, and on the 7th postoperative day he presented with chemosis and restricted eye movements.

Case report

A 20 year old male patient reported to our casualty with a history of fall from a motorcycle as a result of an alleged R.T.A. His GCS was 15/15 and was hemodynamically stable. He had multiple abrasions on the face and a flap like laceration of the upper lip for which primary closure was done. He presented with periobital oedema and subconjunctival hemorrhage in relation to the left eye but there was no diplopia, visual

disturbances or restriction in eye movements. There was flattening over the left malar region with limitation in mouth opening. A plain C.T study was done and was suggestive of minimally displaced left zygomatic complex fracture. After proper anesthetic preparation the patient was electively managed by open reduction and internal fixation through lateral brow and intraoral approaches under general anesthesia. He was put on routine regimen of antibiotics and analgesic/anti-inflammatory drugs and the immediate post operative period was uneventful. On the 7th postoperative day he presented with a diffuse swelling of the left upper eyelid with ecchymosis and diplopia at all gazes. A diagnosis of chemosis was made and an immediate ophthalmologic consultation was sought. There were no visual disturbances on visual acuity testing and fundoscopy revealed no anatomic disruption of central artery and central vein of retina, however there was restriction in eye movement. A C.T study of the orbit was done, which was suggestive of normal orbital volume with no optic nerve involvement. Tonometry was suggestive of normal intra ocular pressure, therefore a conservative approach was opted using oral administration of 20 mg prednisolone t.i.d, cefixime 200 mg b.i.d and topical application of Tobramycin eyedrops b.i.d. for 3days and was kept under observation. On 2nd day following drug intake he was symptom free and the oedema started subsiding, and on the 5th day there was complete resolution.

Discussion

Chemosis is defined as transudative edema of the bulbar and/or fornical conjunctiva and is characterized by visible swelling of the conjunctiva. Conjunctival inflammation is frequently present in many cases. Epiphora, irritation, a foreign-body sensation, and mild



Fig. 1. Pre operative frontal view

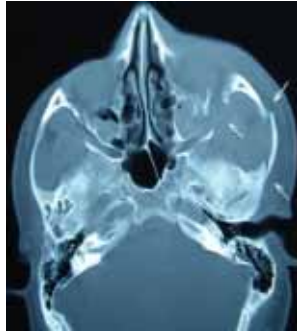


Fig. 2. pre operative C.T



Fig. 3. and 4. Post operative chemosis



Fig. 5. Complete resolution

visual alterations may also be experienced^{4,7}. The main etiologic factors associated with chemosis include exposure, edema, and lymphatic dysfunction⁸. Knowledge of three basic facts about the histology and anatomy of the conjunctiva will elucidate why this tissue is prone to the profound intraoperative and postoperative edema known as chemosis. First, the conjunctiva is a loosely adherent flexible protective covering over the pericorneal anterior surface of the globe⁹. The conjunctiva has several plicated folds in the fornix and many crypt-like invaginations, increasing its surface area^{4,10}. Thus, it is both unrestrained and has significant potential for expansion. Second, the stroma is a fibrovascular connective tissue that contains lymphatic channels, capillaries, and the episcleral venous plexus. The bulbar endothelial cell junctions are not entirely competent, thus permitting extravascular extravasation of fluid in states of inflammation. Third, the stroma contains a population of lymphocytes capable of providing proinflammatory chemotactic signals¹⁰. Exposure leads to desiccation. The conjunctiva is prone to desiccation because of its nonkeratinized mucosal epithelial surface⁴. Desiccation of conjunctival tissue results in endothelial dysfunction, fluid extravasation, and edema¹¹. There are no lymphatic channels in the orbit deep to the septum orbitale¹². The conjunctiva is drained ultimately by the deep division of the eyelid lymphatic system. This anatomy makes evident the fact that periorbital edema and facial edema

due to trauma or procedures around the area will cause regional lymphatic stasis that will both trigger and propagate chemosis. In essence, the presence of periorbital and facial edema prevents the conjunctiva from draining effectively¹³. Chemosis is common in association with subconjunctival hemorrhage and resolves spontaneously¹, and most commonly seen in association with orbital or zygomatic complex fractures in the maxillofacial perspective. Chemosis following management of facial fractures is uncommon, and if noticed should be considered an emergency and the possibility of a carotid cavernous fistula, a retrobulbar hematoma or orbital apex syndrome should be ruled out³. That is why When observing a patient postoperatively it is important to look out for severe orbital pain, reduced visual acuity, proptosis and ophthalmoplegia. These are the main clinical signs. Other features include subconjunctival oedema/ecchymosis, chemosis, dilated pupils and loss of direct pupillary light reflex. Periorbital angioedema is one other entity that is known to constitute chemosis frequently as a manifestation of NSAID cutaneous-mucosal intolerance¹⁴, sometimes affecting exclusively a single eyelid. However, local eye reactions such as conjunctivitis¹⁵ or conjunctival chemosis, as a sole manifestation of NSAID intolerance are exceptional. In our case chemosis was noticed on the 7th post operative day with associated diplopia and restriction in eye movements. Ophthalmologic as well as C.T imaging studies did not show any functional or anatomic disharmony, so the patient was managed conservatively by medications and was kept under observation. Though the actual etiologic factor was not known we believe that this type of late presentation was either due to post surgical lymphedema or infection.

Conclusion

Maxillofacial trauma involving the globe and its associated structures often require active intervention. Manipulation of facial bones around the globe should be done with care as to prevent dangerous complications such as retrobulbar hematoma and blindness postoperatively. A thorough understanding

regarding signs and symptoms of such complications should alarm the maxillofacial surgeon mandating an immediate ophthalmologic examination with radiographic investigations like C.T imaging to check for any alteration in orbital volume or pressure effect on the optic nerve that would determine and necessitate prompt diagnosis and early intervention as to prevent any untoward outcome.

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Coronal and midfacial degloving approach for panfacial trauma

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Abstract

Management of patients with severe midface fractures poses a surgical challenge to the maxillofacial surgeon. Despite the fact that numerous approaches are described to gain access to the midface skeleton for their reduction and fixation, the coronal approach or the bitemporal approach is considered to be the most versatile as excellent access is gained with less number of complications and resultant inconspicuous scarring. Here we present a case of severely splintered midface skeleton which was managed by open reduction and internal fixation accessing through coronal approach.

Introduction

Panfacial fractures are those involving the mandible, maxilla, and zygomatic complex at the same time and usually accompanying naso-orbito-ethmoid (NOE) and frontal bone fractures¹. They are often associated with soft tissue injuries and loss of bony structures that can lead to severe posttraumatic deformities and disabilities like malocclusion, “dish” face deformity, enophthalmos, etc. Because they are often accompanied

by complex trauma to other areas like the brain and body that threaten the life of the patient, the treatment of the facial injuries is often delayed. If treatment is not carried out soon after the injury, facial bone fractures often mal-unite, soft tissues shrink and contract, and scarring occurs, all of which makes delayed treatment very difficult. Although facial fracture treatment has evolved greatly since the introduction of computed tomography (CT) for diagnosis, craniofacial techniques, and rigid fixation for treatment, delayed panfacial fracture treatment is still one of the most challenging issues for maxillofacial surgeons².

Of the various approaches used in the treatment of facial lesions and panfacial injuries, the coronal approach, popularized by Tessier, is one of the most versatile of all. Many authors have recommended this approach for midface surgery³⁻⁸. Through this one surgical approach, it is possible to expose the zygoma, the zygomatic arch, the temporomandibular joint, the sub condylar region, the medial, superior lateral, and part of the inferior rim and walls, the nasal bones, the frontal bone and the calvaria⁹.

Case report

A 21 years old male patient was brought to our casualty within 20 minutes following a alleged head on

R.T.A between a motorcycle and a bus. The patient was driving the bike and was not wearing a helmet with no signs of alcohol intake. Upon reception of the patient, his GCS was 3/15 with signs of respiratory distress and decreased oxygen saturation as a result of airway compromise due to severe maxillofacial injury. An immediate endotracheal intubation via direct laryngoscopy was done to maintain patency of the airway. The patient was shifted to the operation theatre and his hemodynamic status was assessed and stabilized. A tracheostomy was performed, followed by stabilization of maxilla and mandible thus achieving hemostasis. The mid palatal split was stabilized by passing wires interdentally on either side through the posteriors and bicuspids and primary closure of soft tissue was done with 4-0vicryl. A CT brain was performed to rule out any evidence of intracranial hemorrhage or mass effect. He was taken up for surgery a week later after obtaining a CT scan of the facial skeleton which revealed multiple fractures of the maxillofacial skeleton which included fractures of the frontal, naso-orbito-ethmoid, maxilla, zygoma and mandible.

Definitive management was done under general anesthesia, to start with maxillomandibular fixation was performed using Erich arch bar and conventional wiring. The Mandibular fracture at the symphyseal region was addressed then after obtaining access through an intraoral vestibular approach and reduction and fixation was achieved through two 2mm 4 hole miniplate osteosynthesis. A coronal approach was planned for the midface and surgical site preparation was done for the same. Isotonic Saline with vasoconstrictor was injected into the subgaleal plane behind the hairline before making the incision which helped both in hydro-dissection and field control. A coronal flap was then

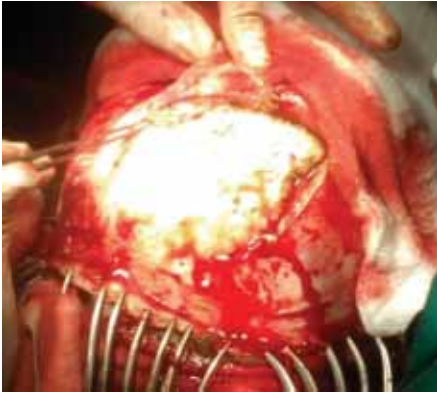


Fig. 1 Incision and exposure



Fig. 2 Closure



Fig. 3 Post operative x-ray

designed in short segments so as to minimize haemorrhage and hemostasis was maintained using Cushing's forceps followed by dividing the galea aponeurotica, thus reflecting the flap above the pericranium. A high incision on the pericranium was done to expose the frontal bone followed by a degloving incision through the maxillary vestibule and thus complete exposure of the maxilla, zygomatic bones and arches, naso-orbito-ethmoid except the infraorbital margin in the midface was achieved. All the fractured bones were reduced and fixed in their respective anatomic positions except the splintered bones at the region of the root of the nose. The medial canthal ligament was re-attached from either side using transfixation sutures. The surgical site was then thoroughly cleansed using copious amounts of isotonic saline and primary closure was done in layers after securing a suction drain.

Discussion

Management of patients with multiple displaced and comminuted fractures can be extremely challenging not only for the inexperienced but also for the experienced surgeons. There are many advantages to early treatment of panfacial fractures, it not only reduces the risks of postoperative infection but also maintains soft tissue expansion¹⁰. Unfortunately, patients who are medically unstable because of associated neurologic or systemic injuries, facial fracture repair may have to be delayed beyond a reasonable time. A delay of 2 weeks for definitive repair increases the difficulty in obtaining adequate reduction of fracture dislocations. Carr and Mathog¹⁰ believe bone healing beyond 3 weeks is in a "grey stage"—the edges of the fragment begin to absorb and remodel, which makes it very difficult to obtain anatomic reduction. This can lead to bone malunion, delayed union, nonunion, and bone defect¹¹. All facets of facial forms and functions are important and we should try to preserve them. The importance of proper occlusion, the patency of the upper airway, proper quality of speech, re-establishment of the orbital

volume, facial height, width and projection are mandatory for the psychological and social wellbeing of the patient. There is no accepted definition of panfacial fracture in the literature. Some authors define it as fracture patterns involving both midface and mandible. Others think it must involve the upper, middle, and lower face that means the NOE complex (and possibly frontal sinus), zygomatic complex, Le Fort midfacial area, and the mandible are fractured at the same time^{1,8,12}. Approaches to the facial skeleton in panfacial trauma should permit wide exposure of the fracture to allow for anatomic reduction. The location and extent of exposure are dependent on fracture severity and combination. The utilization of the coronal scalp flap in craniofacial trauma has proved indispensable in the management of severe craniofacial injuries. It provides vast exposure of such critical structures as the cranium, frontal sinus, orbit and upper midface, compared with that for previous techniques of facial fracture reduction. Although the flap has great utility, severe complications, such as facial nerve injury, diplopia, telecanthus, and scalp necrosis, can occur. Alvi and Carrau have reviewed the surgical anatomy, technique, and indications for the safe utilization of the bicoronal scalp flap approach in the management of craniofacial trauma¹³. One other parameter is soft tissue attachment over the mid face which is completely stripped for the exposure of the site may result in sagging of soft tissues. Soft tissue re-suspension after surgical exposure thus deemed a priority for long term facial aesthetics. Areas where periosteal reattachment should be considered are malar eminence, supra orbital rim, over the zygomatic arch, medial and lateral canthi⁹.

Conclusion

The coronal flap is a well recognized technique for exposing the skull and upper face. The coronal flap has recently become a preferred approach for access to the craniofacial skeleton and orbit. The variety of cases in which it has proven indispensable includes craniofacial reconstruction, facial trauma, and tumor resection. This

method of exposure has become particularly useful with increased indications for rigid internal fixation and primary bone grafting in the management of complex facial fractures. In our case we found the flap to be extremely beneficial in addressing the midface providing us with adequate access to all the fractured sites with minimal incidence of post operative complications and inconspicuous scarring.

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Case report

Long standing Chondroma of the midface - an unusual presentation

* Mathew Jose, ** Jomy Varghese, *** Achuthan Nair

Abstract

Cartilaginous tumors are common in the long bones of the body and relatively rare in the head and neck region. When they do occur in the head and neck, the most common site is the midface and the condyle of the mandible. In this article, we report a case of a massive chondroma arising from the anterior maxilla. We discuss the problems encountered in the clinical interpretation of this tumor, as well as the nature of the disease process and the importance of early detection.

Introduction

Chondromas are uncommon benign tumors of cartilaginous origin, usually of hyaline variety¹. Although chondromas of long bones and tubular bones are well established, the ones that occur in the jaw bones is extremely rare and the most commonly involved sites are the maxilla, condyle and the coronoid process². A chondroma is a painless slow growing tumor causing destruction of the surrounding structures and exfoliation of teeth. On the radiograph the tumor appears as a cyst like radiolucent lesion, while some others are sclerotic. If the borders are ill defined with irregular calcifications and radiolucencies then it is known as osteochondroma³. Since it is not very common in the maxillofacial region, a chondroma on the midface or the mandibular condyle region will not appear on ones differential list as odontogenic cysts and tumors at these sites are more likely⁴. Here we present a case of a huge mass of the midfacial region which created a diagnostic dilemma clinically, but histopathologic examination was suggestive of a benign lesion predominated by chondrocytes suggestive of chondroma.

Case report

A 68 year old female patient reported to our maxillofacial unit complaining of a huge mass on the midface present since 4 years and was asymptomatic. History suggested the lesion started off as a rather small mass at the upper lip and nasal region which over the years has attained the present size. On general systemic examination the patient appeared weak and malnourished with signs of pallor and her past medical history reveals she was suffering from a heart condition since 2 years and was under medication for the same. On definitive local examination there was gross facial asymmetry, the lesion was roughly 6x6cm extending from the root of the nose involving the entire right

zygomatico-naso-maxillary region crossing the midline and limiting at the nasolabial fold of the contralateral side. The skin over the lesion appeared stretched but with normal colour and no surface ulcerations or visual pulsations. The lesion was firm and diffuse with normal surface temperature. There was obvious nasal involvement as the lesion occupied the entire upper airway causing deviation of septum. Intra oral examination showed extension of the mass to the entire maxillary alveolus with mucosal denudation and involvement of the palate, also obliterating the upper vestibule completely and displacing teeth. Aspiration was negative and thus a clinical diagnosis of a benign odontogenic tumor was more likely. C.T study of the paranasal sinus region showed a mass measuring 6.2 x 5.3 x 4.2 cm of homogenous density in the right nasal cavity with gross expansion and destruction of the ipsilateral turbinates, also eroding the ethmoid sinuses with mucosal thickenings in the maxillary, sphenoidal and anterior ethmoidal sinuses. The extent of the lesion limited to the pterygoid plates with no extension into the nasopharynx. Following this an incisional biopsy was performed intraorally from multiple sites under local anesthesia and specimen was subjected for histopathology. Microscopic features showed scattered squamous epithelium with numerous islands of cartilage and edematous stromal cells with no evidence of inflammation or malignancy suggestive of a benign lesion predominated by cartilaginous tissue – chondroma. The tumor mass was planned for wide resection and primary reconstruction with loco-regional flap under general anesthesia but unfortunately the patient expired due to natural causes one week before the planned surgical intervention.

Discussion

Overall, the incidence of chondroma peaks during the sixth decade of life⁴. However, in the facial skeleton,



Fig. 1. Frontal view



Fig. 2. Lateral view



Fig. 3. Coronal C.T view

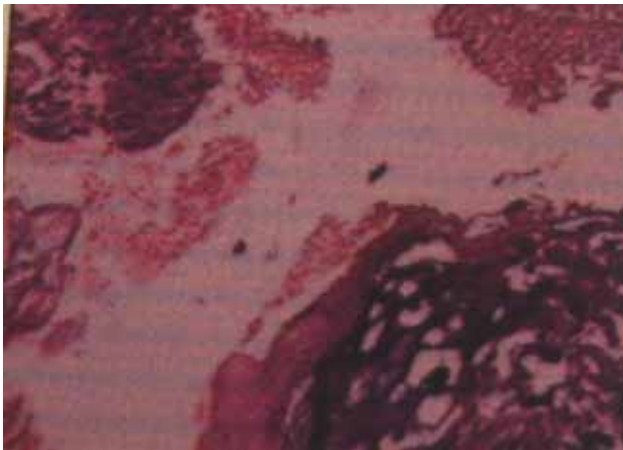


Fig. 4. Histopathology

chondroma generally occurs during adolescence and early adulthood⁵. Chondrogenic tumors of the head and neck region are rare and most often malignant. The sites of predilection in the head and neck region include ethmoid sinus (50%), maxilla (18%), nasal septum (17%), hard palate and nasopharynx (including sphenoid sinus) (6% each), and alar cartilage⁴(3%). These tumors probably arise from remnants of the embryonal cartilaginous skeleton that escape resorption during endochondral ossification⁵. The way in which cartilaginous tumors arise at some sites in the head and neck is puzzling⁶. These tumors may arise from the nasal septum and larynx because of their intrinsic cartilaginous nature. Cartilaginous tumors may also arise from bones that ossify in cartilage (e.g., sphenoid and nasal bones); these bones can harbor cartilaginous rests long after ossification is complete⁷. Chondromas and chondrosarcomas can also develop in tissues that do not normally contain cartilage at any stage of

development⁷. Aberrant embryonic cell rests have been suggested to explain the origin of cartilaginous tumors at these sites (e.g., the maxilla)⁸. Multidirectional differentiation of the mesenchymal cells has also been implicated in the origin of cartilaginous tumors at these sites⁷.

Macroscopically, benign chondromas are smooth, firm, and lobulated tumors with a gritty ripe pear feel⁵. On microscopy, cartilage cells are consistently small and contain pale, vacuolated cytoplasm and small, round, dark-stained nuclei. Some fields may show binucleate cartilage cells, indicating a process of amitotic division, but most are monocellular and mononucleate. Making a histologic distinction between a benign chondroma and a malignant chondrosarcoma may be difficult. In fact, many authors believe that a benign chondroma is actually a low-grade chondrosarcoma⁹. In 1943, Lichtenstein and Jaffe identified three histologic criteria for a diagnosis of malignant chondrosarcoma: (1) the presence of many cells with plump nuclei, (2) more than a few cells with two nuclei, and (3) the presence of giant cartilage cells with large single or multiple nuclei or with clumps of chromatin¹⁰. In brief, a chondroma duplicates normal cartilage despite increased cellularity, but a chondrosarcoma exhibits pronounced irregularity in the number and size of cells and in the degree of hyperchromatism. Although the final diagnosis is established by the histopathology report, a clinical differentiation between a benign and malignant lesion must be made so that the physician can plan the surgical management of the lesion. Surgery is the mainstay of treatment for both benign and malignant tumors. A wide excision should be performed when a presumptive diagnosis of a cartilaginous tumor of the facial skeleton is made because these tumors behave aggressively in the facial skeleton¹¹.

The differential diagnosis of nasal cavity mass lesions is extensive and includes many inflammatory and neoplastic entities. Fungal infections, rhinosporidiosis, tuberculosis, Wegener's granulomatosis, and lethal midline granuloma present as nasal cavity soft-tissue mass lesions with variable bone destruction¹². On the other hand epidermoid inclusion cyst, giant cell tumor, aneurismal bone cyst, simple bone cyst, fibrous dysplasia, chondromyxoid fibroma have also been reported³. Our case demonstrated an uncommon occurrence of chondroma in an old patient sited at the anterior maxillary region with nasal, pterygoid and paranasal sinus infiltration. The patient presented to us 4 years later after the initial onset of the disease, perhaps due to lack of motivation or other domestic reasons, by then the mass had expanded enormously breaching multiple anatomic barriers. Because of such a late presentation we were able visualize the natural course of such a lesion, which allowed us in understanding that tumors of non odontogenic origin though benign if missed in terms of early detection and definitive treatment can undergo massive volumetric expansion. Another interesting aspect is that such a long standing lesion did not undergo any malignant transformation but rather increased in size slowly extending into multiple anatomic sites which included the upper airway. The surgical prognosis of such tumors that are presented late are poor because the volume of resection and reconstruction required are large with associated morbidities.

Conclusion

In the diagnosis of a tumor pathology occurring in the maxillofacial region, it is important to distinguish between odontogenic and non odontogenic entities for optimal treatment planning. Specialized investigations like C.T and MR imaging determines the extent of the lesion and histopathology helps in identifying the disease process. Though the incidence of non-odontogenic lesions especially that of soft tissue nature is not very

common, one should always rule out its possibility by performing adequate clinical, advanced radiographic and histopathologic examination. Early detection and definitive treatment of such lesions are important to minimize the risk of natural as well as surgical morbidities.

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Esthetic rehabilitation of partially edentulous condition with FPD and tooth supported overdenture

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Abstract

Modern dentistry aims to return patients to normal oral health and function in predictable fashion. The selection of the available therapy has a substantial influence in the level of quality with which this objective can be met. Various treatment options for rehabilitation of the completely edentulous patient available are: conventional complete denture, implant supported overdenture, tooth supported overdenture and that of partial edentulous are: full arch fixed tooth/implant supported prostheses. The patient's function while wearing a complete denture may be reduced to 60% compared to that of previous experience with natural dentition; however, overdenture and FPD prostheses may return the function to near normal limits This clinical report describes a full mouth rehabilitation of a patient with completely ignored mouth, with long span fixed partial denture on upper arch and overdenture with special attachment provided with copings on lower arch. The final treatment result provides the patient with esthetically and functionally efficient prostheses.

Introduction

Function, esthetic and preservation of the remaining structure are three major factors to be considered in any of the mouth rehabilitation. Complete edentulousness should be avoided as far as possible. Any circumstances in rehabilitating lost multiple teeth structure, the primary choice must be a tooth supported or implant supported FPD. However, when both of above cannot be a choice, we can consider overdenture abutments with special retentive attachments.

A fixed restoration provides a psychological advantage of acting and feeling similar to natural teeth. Overdentures have been shown to improve the quality of life for edentulous patient and contribute to the psychological well being of the patient.

Case report

A 48 year old female reported with complaint of inability to chew hard food stuffs.

Intra oral examination

It revealed a mixed condition of mobile teeth, infected root stumps and some healthy teeth whose periodontal status was mixed. All healthy teeth with periodontal support were in strategically important areas.

Teeth which could be saved in upper arch were 12, 13, 14, 18, 22, 23, 24, 28 and in the lower arch all teeth except 33, 43, 45 were grossly decayed and beyond repair.

Extra oral examination

It showed severely proclined upper anterior teeth with grade III mobility :11, 12 and large spacing between them.

Radiographic examination

Revealed periapical changes in 12, 13, 22, 23 abutments and no other pathology were seen.

Treatment

The treatment plan was presented to the patient, the type of restoration, material, esthetic expectations, complication, limitations, oral hygiene requirements were discussed.

Root canal treatment had been carried out for 12, 22, 33, 43, and 45. Rests of the saved teeth were restored with composite fillings. The periodontal status of the abutments was improved by deep scaling and curettage. After a period of 3 weeks the patient had been called to make primary impression for the study model. Centric relation was recorded with occlusal rim prepared on both arch. Diagnostic wax up was done which was used to fabricate tooth preparation guides and provisional restoration.

Tooth preparation was carried out for 12, 13, 14, 18, 22, 23, 24, and 28 for metal ceramic bridge. The full mouth impression was then made with poly vinyl siloxane impression material (Express, 3m ESPE) after performing gingival retraction with plane braded cords.

In the lower Arch 33 and 35 were prepared for post space. Coronal portion of the overdenture abutments were reduced for short metal coping i.e. knife edge finish line. The impressions of root space and overdenture abutment were recorded with polyvinyl siloxane. The cast was poured in type IV die stone. Orientation jaw relation was recorded with the help of Hanau ear piece face bow. Centric relation and vertical



Fig. 1 Prepared teeth for FPD



Fig. 2 Prepared teeth for Over denture



Fig. 3 Copings Fixed



Fig. 4 Cemented FPD



Fig. 5 O-Ring attached



Fig. 6 After Insertion

dimension were recorded with the help of occlusal rims. The casts were then mounted on to a semi-adjustable articulator (Hanau H2).

The copings were prepared for overdenture abutment with radicular post extension and male portion of the ball and socket attachments were made over the copings on abutments 43 and 33. The abutment 43 was provided with plane coping as a stand by tooth in future without any auxillary retentive modes.

The long span metal framework was fabricated on the upper arch, which was tried and then sectioned in 2 areas and re-welded in order to reduce the rocking effect. The metal framework and the overdenture copings were then tried in patient's mouth and proper seating was confirmed.

The ceramic was built over the metal frame work and bisque trial was carried out before proceeding to the final build up of ceramic. Complete denture teeth setting done on wax rim and try-in was carried out with FPD on bisque stage. The occlusion was adjusted to the mutually protected one.

Denture acrylization and final add-up of incisal porcelain as well as glazing of the upper FPD was then done. The FPD and overdenture copings were luted with glass ionomer cement.

The insertion was done and selective grinding was carried out. The female component O ring for the overdenture was incorporated in the tissue surface of the lower denture at the time of insertion with cold cure acrylic. Post insertion instructions given. Patient was recalled after 2 weeks for assessing occlusion and soft tissue responses. She was placed on 6 months periodic recall for prophylaxis.

Discussions

Even though fixed restoration provides a psychological advantage of acting and feeling similar to natural teeth, overdenture concept can be a useful treatment modality in situations where tooth supported or implant supported FPD cannot be a choice. When a few remaining teeth are present in an arch, overdenture with attachments can provide greater acceptance because of presence of proprioception, increased retention and stability compared to conventional complete denture.

Scrupulous oral hygiene will be a key to long time success of long span FPDs and overdentures.

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Introduction

During active treatment, orthodontic anchorage aims to limit the extent of detrimental, unwanted tooth movement. Tooth borne anchorage is one of the greatest limitations of modern orthodontic treatment. While extra oral anchorage can be used to supplement tooth borne anchorage and to deliver forces in directions not possible with intra oral forces, extra oral anchorage has severe limitations because it requires excellent patient cooperation. The advent of Osseo integrated implants, due to the pioneering studies of Prof. Branemark has changed this scenario. The ability of implants to remain stable under occlusal loading has led orthodontists to use them as anchorage units without patient compliance.

Dental implant

A device specially designed to be placed surgically within or on the mandibular or maxillary bone as a means of providing resistance to displacement of a dental prosthesis.

It can be either:

1. Transgingival (with part of the implant emerging from gingiva for direct abutment); 2. Fully embedded under the gingival tissue.

Parts of an implant

The commonly used implant screw has 2 parts:

IMPLANT HEAD

It serves as the abutment and in the case of an orthodontic implant, could be the source of attachment for elastics/ coil springs.

IMPLANT BODY

Which is the part embedded inside bone. This may be screw type or a plate type.

Classification of implants

1 based on the configuration design

Blade implants

2 according to surface structure:

•Threaded or non-threaded; •Porous or non porous

3 depending on their reaction with bone:

Ability of the implant to stimulate bone formation

- Bio-active (hydroxyapatite)
- Bio-inert (Metals)

4 according to implant biomaterials

i. Metals and alloys:

- Commercially pure titanium •Ti- Al-Vanadium alloy
- Iron Ni-Cr (316L Stainless Steel)

ii. Ceramics:

- Hydroxyapatite •Alumina and sapphire
- Calcium aluminates •Tricalcium phosphates

iii. Carbons:

- Polycrystalline (vitreous) glassy carbon
- Carbon silicon

iv. Polymers:

- Silicone rubber
- Polymethylmethacrylate
- Polysulfone
- Polyethylene
- Polytetra fluoroethylene

5 based on implant morphology

i. IMPLANT DISC

- On plant

ii. SCREW DESIGNS

- Mini implant
- Micro implant
- Spider screw

iii. PLATE DESIGNS

- Skeletal anchorage system (SAS)
- Zygoma anchorage system

Indications of implants

- 1 Intrude or Extrude teeth
- 2 Close edentulous space
- 3 Reposition of mal-posed teeth
- 4 Reinforce anchorage
- 5 Correct undesirable occlusion
- 6 Orthopedic movement

Disadvantages of implants

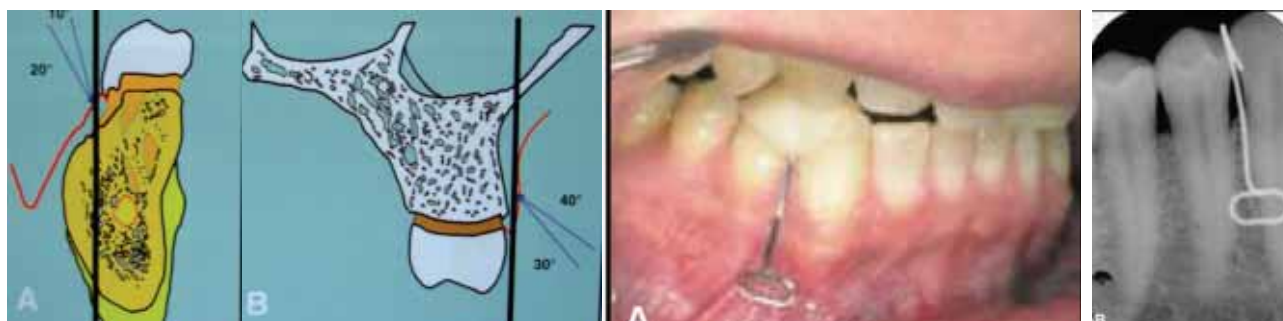
1. Expensive; 2. Cannot be used in medically compromised patients; 3. It requires patient cooperation; 4. It cannot be universally placed due to the presence of anatomical limitations; 5. Application of implants might be limited by the amount and quality of bone.

Absolute contraindications to implant placement

1. Active infections including AIDS; 2. Blood dyscrasias and coagulopathies; 3. Connective tissue disorders; 4. Drugs (immunosuppressants); 5. Uncontrolled Diabetes; 6. Metastatic diseases, Malignancies; 7. Radiation therapies; 8. Advanced cardiovascular, renal and hepatic diseases.

Relative contraindications to implant placement

1. Cardiac disease; 2. Endocrinopathies; 3. Hypersensitivity reactions; 4. Haematological



Brass separating wire

Radio graphed position

disorders; 5. Respiratory diseases; 6. Granulomatous diseases; 7. Bone, joint and skin diseases

Ideally an implant used to enhance orthodontic anchorage should be:

1. Small; 2. Inexpensive, affordable; 3. Biocompatible; 4. Easy to place; 5. Easily inserted or removed under local anesthesia; 6. Be small enough to locate in multiple sites in the mouth; 7. Osseointegrated in a few days; 8. Would be stable to orthodontic loading in all planes of space; 9. Routinely resistant to orthodontic forces; 10. Able to be immediately loaded; 11. Usable with familiar orthodontic mechanic

Implant criteria

Properties of ideal material:

1. Non-toxic; 2. Bio-compatible; 3. Posses excellent mechanical properties; 4. Provide resistance to stress, strain and corrosion

Commonly used materials can be divided into 3 categories:

1. Bio-tolerant (stainless steel, chromium cobalt alloy); 2. Bio-inert (titanium, carbon); 3. Bio-active (hydroxylapatite, ceramic oxidized aluminium)

Titanium and its alloy

➤ Because of titanium's characteristics:

1. No allergic and immunological reactions; 2. No neoplasm formation; 3. Osseointegration; 4. High corrosion resistance

Recent orthodontic implants

1. Mini implants
2. Microimplants
3. Miniscrew anchorage system (mas)
4. The spider screw for skeletal anchorage
5. Modular transitional implants (mti)
6. Bios: Bio-resorbable implant anchor for orthodontic system

1- mini implant

- Introduced by Kanomi in 1997.
- Conventional dental implants are 3.5-5.5 mm in diameter and 11-21mm long.
- The mini implant is only 1.2mm in diameter and 6mm long, making it much more useful in orthodontic applications

Advantages of mini implants

1. Mini implants are small enough to place in any area of alveolar bone, even apical bone.
2. Surgical procedure should be easy enough for an orthodontist or general dentist to perform.
3. Implant should be easily removable after orthodontic traction.
4. Smaller in size, have smooth surfaces and are designed to be loaded shortly after insertion.
5. Oral hygiene is easier to maintain.
6. Mini implants are too small to cause irreversible damage, and can be removed at any time either the orthodontist or general dentist.
7. Bone healing after removal should be uneventful.
8. Used in variety of applications like molar intrusion, molar distalization or in distraction osteogenesis.

Disadvantages

1. Potential for fracture, which is closely related to the diameter of screw.
2. As bone density increases, the resistance created by the stress surrounding the screw becomes more important in removal than in insertion of the screw. At removal, the stress is concentrated in the neck of the screw, which may lead to fracture.

2- micro implants (advantages of microimplants)

1. Inexpensive; 2. Small in diameter (1.2mm); 3. Comes in several lengths; 4. Inserted in any desired locations including interradicular space; 5. Can be loaded immediately; 6. Can withstand typical orthodontic forces of 200-300 gms for the entire length of treatment; 7. Do not need osseointegration; 8. Unlike restorative implants, micro implants can easily be removed by the orthodontist

3 -miniscrew anchorage system

Miniscrew design: -

- The conical screws used in the miniscrew Anchorage System (MAS), made of grade 5 titanium.

Are available in three sizes:

Type A; has a diameter of 1.3mm at the top of the neck and 1.1mm at the tip

Type B; is 1.5 mm in diameter at the neck and 1.3mm at the tip. Both types are 11mm long

Type C; that is 9mm long has a diameter of 1.5mm at the neck and 1.3mm at the tip.



Surgical guide or stent checked in mouth

4- bios: Bio-resorbable implant anchor for orthodontic system

•Bio-resorbable implant anchor for orthodontics system (BIOS) implant is designed to provide orthodontic anchoring functions in patients and then be resorbed without a foreign body reaction or signs of clinical inflammation.

•An implant consists of bio-degradable polylactide with a metal superstructure.

Diagnostic evaluation

•It involves the radiographic evaluation of bone.

Imaging modalities

1. Periapical radiograph; 2. Panoramic radiograph;
3. Occlusal radiograph; 4. Cephalometric radiograph;
5. Tomograph; 6. Computed tomograph; 7. MRI.

Optimal positioning of implants depends on;

1. Angle of insertion.
2. Path of insertion.
3. Rules for choosing proper size of implant.
 - According to the length of the implant
 - According to the diameter of the implant.
4. Clinical sites for implant placement.
 - Maxillary sites
 - Mandibular sites
5. Surgical guides.

Angle of insertion of microimplant

Recommended angles of implant insertion to the long axes of the teeth are 10-20° in the mandible and 30-40° in the maxilla.

Path of insertion

1. Diagonal or oblique insertion.
2. Perpendicular insertions.

Rule for choosing proper size of implant according to the length of microimplant

Usually, sizes more than 6mm in maxilla and 5mm in mandible are recommended.

According to the diameter of microimplant

i. 1.2mm diameter and 1.3mm in diameter can all withstand up to 450g of orthodontic force when patient has good quality of cortical bone.

ii. Using forces greater than 300g, clinicians should select 1.4mm in diameter.

iii. In the mandible the buccal surfaces and retro-molar areas offers adequate thickness and high quality cortex for the acceptance of microimplants.

iv. Usually, 4-5mm in length with 1.2- 1.3mm in diameter provide adequate retention.

v. Micro-implant with 1.4-1.6mm in diameter might improve retention when cortical bone is less dense or greater force is needed.

Clinical sites for microimplant placement

Maxillary sites

1. Infra zygomatic crest area.
2. Maxillary tuberosity area.
3. Between maxillary 1st molar and 2nd premolar buccally.
4. Between maxillary 1st molar and 2nd molar buccally.
5. Between maxillary canine and premolar buccally.
6. Between maxillary incisors facially.
7. Between maxillary 2nd premolar, 1st molar and 2nd molars palatally.
8. Mid palatal area.

Mandibular sites

1. Retromolar area
2. Between mandibular 1st and 2nd molars buccally
3. Between the mandibular 1st molar and 2nd premolar buccally
4. Between the mandibular canine and premolar buccally
5. Mandibular symphysis facially
6. Edentulous areas

Stents for accurate miniscrew insertion

•Improper positioning may result in interference with the required tooth movement and hence limit the effectiveness of the skeletal anchorage.

•Visual and instrument access can be difficult when mini screws are placed in posterior or palatal locations.

•Several manufacturers and authors currently recommend the use of a brass separating wire or custom-made wire guide, which is radiographed in place to show the relationship to the planned insertion site and the adjacent dental roots.

The ideal solution would be a stent that would transfer the planned three-dimensional implant position to the surgical placement procedure.

Stent:

•A surgical or a guiding stent is a prosthetic appliance, which helps to orient and position the implants.

•The term stent was coined after an English dentist Charles R. Stent.

Advantages of stent

1. The design and fabrication is simple.
2. It provides reliable guidance for either the pilot drill or the self- drilling miniscrew in terms of both location and angulation.
3. It allows access for both visual monitoring and saline irrigation.
4. Provides accurate three-dimensional positioning of

miniscrews so that bone support can be maximized and damage to adjacent structures can be avoided.

5. It reduces the need for direct visual access to posterior or palatal insertion sites.
6. It is particularly valuable when the operator is inexperienced
7. It is the safest means of ensuring accurate implant placement.
8. The patient's degree of comfort with the procedure is improved when the position and direction of the bur are not being constantly revised during surgery

Loading of implant

•Maximal loading of the implant depends upon:

1. Design of the fixtures.
2. Biomechanical requirements.
3. Anatomic requirements.
4. Degree of Osseo-integration.

•Immediate loading should be limited to about 50CN of force, otherwise excessive loading leads to screw loosening and failure of the implants

Failures in mini implants

Screw related problems:

1. A screw can fracture if it is too narrow or the neck area is not strong enough to withstand the stress of removal.
2. Infection can develop around the screw if the trans-mucosal portion is not entirely smooth.

Operator related problems:

1. Application of excessive pressure during insertion of a self-drilling screw can fracture the screw.
2. Over lengthening a screw can cause it to loosen. It is crucial to stop turning the screw as soon as the smooth part of the neck has reached the peri-osteum.
3. With a bracket-like screw head, the ligature should be placed on top of the screw in the slot perpendicular to the wire. Turning the ligature around the screw will make it impossible for the patient to keep the area free of inflammation.
4. It is important not to wiggle the screwdriver when removing it from the screw head. The screwdriver will not stick if the long extension is removed before the part surrounding the screw.

Patient related problems:

1. The prognosis for primary stability of a mini-implant is poor in cases where the cortex is thinner than 0.5mm and the density of the trabecular bone is low.
2. In patients with thick mucosa, the distance between the point of force application and the center of resistance of the screw will be greater than usual, thus generating a large moment when a force is applied.
3. Loosening can occur, even after primary stability has been achieved, if a screw is inserted in an area with considerable bone remodeling because of either the

resorption of a deciduous tooth or post- extraction healing.

4. Mini-implants are contraindicated in patients with systemic alterations in the bone metabolism due to disease, or heavy smoking.

Complications common to all implants

1. Damage to anatomic structures such as nerves, vessels, and roots.
2. Loss of screw during placement or loading.
3. Breakage of a screw within the bone during insertion or removal.
4. Inflammation around implants sites.
5. Breakage may be more likely with screws of small diameter.

Conclusion

- Implants for the purpose of conserving anchorage are welcome additions to the armamentarium of Orthodontist.
- They help the Orthodontist to overcome the challenge of unwanted reciprocal tooth movement.
- There is no ideal orthodontic implant design found till date. The presently available implant systems are bound to change and evolve into more patient friendly and operator convenient designs.
- Although initial results are encouraging, the risks and benefits must be thoroughly evaluated.

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The dark triangles- orthodontic solutions

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Introduction

Unraveling the mysteries of dark spaces has been a focus of interest among the scientific community be it the 'Black Hole' of the Universe or the 'Ozone Hole' above the Southern Hemisphere of the Earth. In Dentistry also, we have our own share of problems with dark spaces in the form of "Black Triangles". The open gingival embrasure, also called the "black triangle," is a visible triangular space caused by the lack of interdental gingival papilla filling this area. An embrasure is considered to be open whenever it is located in the cervical position above the proximal contact point and not completely filled in by gingiva.¹

A diastema differs from a black triangle in that it is a complete space between two teeth without any approximal contact. On the other hand, in the black triangle scenario there is proximal contact between the teeth with a triangular space in the cervical region.

Etiology^{1,2,3}

- 1) Most common causative factor is periodontal disease with attachment loss and gingival recession
- 2) Consequent to periodontal surgical therapy
- 3) Divergence of roots
- 4) Triangular shaped crowns
- 5) Excessive distance from alveolar bone to approximal contact
- 6) Following orthodontic alignment of crowding

Development in various fields of dentistry and increased patient awareness has led to more and more adults seeking orthodontic therapy. The high prevalence of periodontal disease (estimated at 78.6% among adults in the age range of 35 to 44 years — Kerala 2002-03 DCI) and very exacting demands of the present day patient brings within it's wake new perspectives in microesthetics. Due to the high incidence of occurrence of black triangles while undertaking periodontal therapy or orthodontic alignment after periodontal treatment, Burke et al suggests this problem needs to be discussed with the patient in detail.⁴

Orthodontic alignment of crowding especially in the incisor region leads to stretching of the interdental fibres even in adolescents leading to this problem. The mean

prevalence of black triangles in adolescent patients after the correction of malposed incisors is reported to be 41.9% and 38% in adult post orthodontic cases^{1,4}.

Triangular shaped incisor crowns have an incisally located point approximal contact with overlapping tendency. Once aligned, the black triangles formerly masked by the overlapping become apparent. The orthodontist should be able to diagnose and discuss this possibility with the patient before treatment.^{6,7}

Divergence of roots is yet another causative factor. It can occur during excessive tipping to close diastemas or improper bracket placements^{5,6,7}.

The vertical distance from the alveolar crest to the approximal contact is a determinant factor concerning the presence or absence of a papilla according to Tarnow et al⁸. When this distance is less than 5 mm, the papilla fills in the interdental space in 100% of the cases; when the distance equals 6 mm the papilla fills in 56% of the cases; when the distance is greater than 7 mm, the papilla is present in only 27% or less cases. Obviously, crestal bone loss will increase the tendency for appearance of dark spaces. The prevalence of open gingival embrasures is greater in orthodontic patients over 20 years of age, and more likely to occur due to resorption of alveolar crestal bone than extrusion. Also, greatest alveolar bone loss was seen in areas of closed extraction spaces, particularly in pressure side of retracted canines

According to Sarver⁹, approximal contact points are the exact places where teeth touch as they progress posteriorly and connector areas are places where teeth appear to touch. It is 50% of the tooth height between central incisors, 40% of the central incisor height between central and lateral incisors, and 30% of central incisor height between lateral incisor and canine. Embrasures are smallest between the central incisors and grow larger as they progress posteriorly in the dentition (Fig. 1). For maximum esthetics, care should be taken to preserve this ratio during treatment

Problems related to open gingival embrasures are

- 1) An esthetically unattractive smile
- 2) Speech problems
- 3) Food impaction and difficulty in maintaining oral hygiene

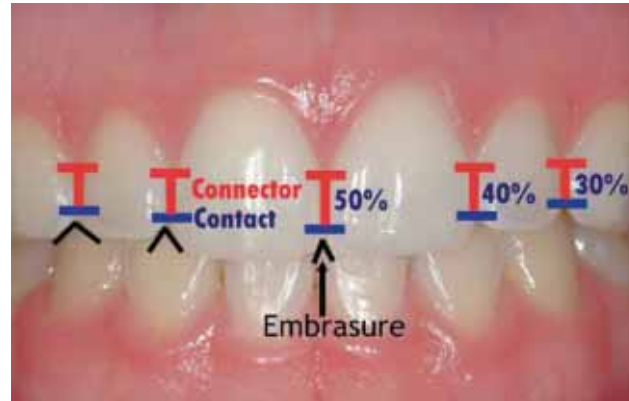


Fig 1 –Contact points, Connectors and Embrasures



Fig 2 – Proximal reduction of triangular crowns

Therapeutic solutions

Surgical reconstruction of interdental papilla using an interposed subepithelial connective tissue graft has been reported. However the outcome is unpredictable and may involve cicatricial contraction.¹⁰

Use of composites should be undertaken only after careful assessment.. Undue thickness can lead to plaque retention, inflammation, compression of papilla and subsequent esthetic problems⁴.

A removable prosthesis may be advocated in cases of markedly compromised dentitions, that too only as a last resort⁷.

Orthodontics has a lot to offer in this. The solution is case specific. Whenever crowns are triangular in shape, the contact points would have shifted incisally leading to overlapping tendencies. Orthodontic alignment in such cases leads to stretching of transseptal fibres and opening up of gingival embrasures. Recon touring the proximal surface to enlarge the contact point to contact areas followed by orthodontic space closure as advocated by Tuverson gives more stability and relocates the contact more apically⁶.(Fig. 2) The distance between the alveolar bone crest and contact point reduces. The connector areas can also be restored to original 50-40-30 relationship.

In cases where divergence of roots is a causative factor, and crowns converge towards one another,

treatment should be designed to create parallelism of the roots. In cases where incisors overlap, it is important to upright the roots. The cemento-enamel junctions will come closer together causing the stretched transseptal fibres to relax. The papilla will then fill in the gingival embrasure which would have become narrower (Fig. 3). In cases where proximal stripping is not feasible due to small size triangular crowns, altering the tip of brackets to shift the contact point apically is an effective solution

Another method is to use orthodontic extrusion to facilitate migration of gingival tissue incisally to restore interdental papilla and bring harmony in a black triangle patient's smile¹¹.

Conclusion

All etiological factors and treatment alternatives associated with an open gingival embrasure must be discussed with the patient before embarking on orthodontic treatment. A multidisciplinary approach must be considered mandatory if a successful clinical outcome is to be achieved.

In the past decade there has been a remarkable upswing in interdisciplinary collaboration between orthodontists, periodontists and restorative dentists in terms of smile enhancement. Through the interaction

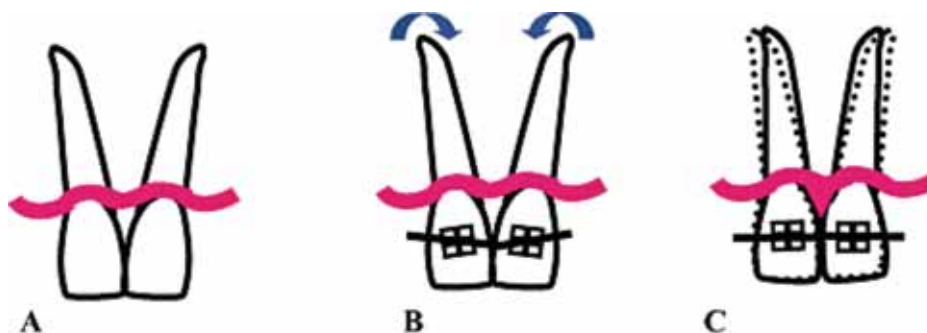


Fig 3 Uprighting mesially tipped incisors to close black triangles



between different clinical disciplines, the definition of a desirable smile has been refined with due consideration and respect for individual variations.

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Case report

Esthetic replacement of metal ceramic restoration with all ceramic restoration

* Ranjith Kumar P, * Shajahan. P.A

Abstract

Porcelain fused metal crowns and metallic posts were used extensively for restoration of endodontically treated anterior teeth for many years. With the advent of non metallic post materials /metal free crowns, interest is now shifted into these materials and techniques since these can give much better predictability in the results. This case report provides a predictable report achieved with the use of aesthetic fibre post, dual cure resin cement and all ceramic crowns after replacing an already existing metal ceramic crown.

Introduction

During the last few years, the technique for restoring broken down endodontically treated teeth which constitute either a cast metal post/core or pre fabricated metal posts with metal ceramic crown has changed drastically due to the introduction of new materials and technologies.

The invention of aesthetic fibre posts helped immensely to improve the aesthetic quality of all ceramic restorations. Together with resin cement it can give a monoco concept, which in turn gives predictability and durability to the restorations.

Case report

A 17 year old female patient reported the clinic with dissimilarity in the appearance of her natural and artificial

upper front teeth. On examination, patient was found to have a metal ceramic crown on upper right central incisor (11) gone elsewhere 2 years back.

Treatment plan

- ♦ Removal of old PFM crown
- ♦ Preparation of remaining tooth structure for accepting post and core
- ♦ Luting of fibre post with dual cure composite resin
- ♦ Core build up with composite resin
- ♦ Final tooth preparation for accepting metal free ceramic crown
- ♦ Luting of metal free ceramic crown



Fig. 1 Pre operative



Fig. 2 Pre operative unaesthetic Metal Ceramic Crown



Fig. 3 Remaining tooth after crown removal



Fig. 4 Esthetic post luted after preparation



Fig. 5 After final tooth preparation



Fig. 6 All ceramic crown cemented



Fig. 7 Post operative

Procedure

1. Existing crown was removed using API automatic crown remover after radiological assessment of existing root filling
2. Tooth, root and remaining crown were prepared using Gates Glieden and Pusso reamer for accepting a medium sized Ivoclar fibre post.
3. The fibre post was then luted into the post space with the help of dual cure resin cement (Variolink - Ivoclar)
4. The core was then built with composite resin (Ivoclar N Ceram)
5. The tooth was then prepared for accepting metal free ceramic (IPS Empress) for achieving maximum aesthetics.
6. The finished Empress crown was then luted with dual cure resin cement.

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Burning mouth syndrome

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Abstract

Burning mouth syndrome (BMS) is defined as a burning sensation of the oral mucosa in the absence of specific oral lesions. The underlying etiology remains unclear. Probably of multifactorial origin, with a still unknown etiopathogenesis in which local, systemic and psychological factors are implicated. Peripheral alterations may be related to the density or reactive capacity of the oral mucosal membrane receptors - these being largely influenced by BMS-related risk factors such as stress, anxiety, the female gender and advanced age. Unlike most other clinical conditions presenting in a dental office, burning mouth syndrome is poorly understood with few evidence based remedies. This paper presents an overview of etiology, signs and symptoms and treatment of BMS.

Introduction

Burning mouth syndrome (BMS) is a complex disease of unknown cause. It is characterized by a burning sensation in the oral mucosa, notwithstanding its clinical normal aspect. The "burning mouth syndrome" is today known under various names, stomatodynia, glossodynia, glossopyrosis, idiopathic orolingual pain, etc being some of them. BMS is particularly seen in postmenopausal women.¹⁻⁴

Etiology

There are various etiological factors influencing the emergence of BMS. The common causes include mucosal disturbances, xerostomia, candidiasis, diabetes mellitus and nutritional deficiencies. The less common causes include oral prosthesis, parafunctional habits, psychologic causes and Gastro esophageal reflux disease. Features suggestive of a causal association of diabetes mellitus and burning mouth include xerostomia, polyuria and paraesthesias. Nutritional deficiency states such as iron, folate or Vitamin B12 deficiencies usually result in an atrophic or bald tongue and mucosa which leads to burning sensation. Brooke and his colleagues have shown that over 50% of people with BMS suffer from iron deficiency.⁵

BMS commonly affects the adult population and a sex predilection for women (6:1) mostly of the peri or post menopausal age exists. The tongue is the most frequent site of the symptoms in the oral cavity. Typically the anterior two thirds of the dorsal surface is most commonly affected, followed by the lips. The palate, gingiva and the oropharynx are less commonly involved. The symptoms include unexplained, usually persistent, burning sensation of the oral soft tissues accompanied by oral dryness and taste abnormalities (dysgeusia) in at least 50% of cases.⁶⁻⁸

Diagnosis

In order to arrive at a diagnosis of this condition, baseline measures of salivary flow should be performed on patients who complain of oral burning. To be of value, collection must be performed precisely. Resting flow rates in healthy individuals are between 0.3 to 0.4ml/min. Stimulated flow rates range from 0.75 to 2ml/min. Tests of gustatory dysfunction such as measures of perception, intensity and location of four taste qualities on various surface of tongue can be done. Psychometric evaluations, although reported to be important, serve a limited role in the identification of etiologic factors associated with BMS. Psychometric evaluations have a greater significance when clinical or laboratory abnormalities cannot be identified and when the BMS patient's psychometric test values are more than two standard deviations above the standardized norm. Biopsy has a limited value in the clinical diagnosis of BMS and should be reserved for instances where a mucosal abnormality is detected.⁹

Management/Treatment

The goal of treatment of this disorder is to reduce oral burning symptoms by eliminating the causes of the disorder. Efforts should focus on identification of factors known to cause oral burning. Initial management should target the correction of identifiable systemic or local oral abnormalities. Secondary lines of treatment address potential neuropathologic mechanisms that may contribute to the oral burning symptoms. Iron and folate deficiency can be corrected by daily oral intake of a multivitamin. Vitamin B12 is given as an injection because of poor absorption of orally administered products due to atrophic gastritis or other gastrointestinal abnormalities associated with this deficiency. Diabetes should be managed by diet control and weight loss and if needed hypoglycemic drugs are provided Identifiable



Fig. 1. patient with erosive lichen planus who presented with a complaint of burning mouth



Fig. 2 Patient with anemia who presented with a complaint of burning mouth

allergens causing oral burning sensation should be eliminated from the diet or dental materials. Likewise, drugs that are xerostomic or associated with oral burning should be discontinued, if possible and an alternative medication used.⁷⁻⁹

In case of inflammatory mucosal conditions (ie, lichen planus, geographic tongue), topical corticosteroid agents such as 0.05% flucinonide, applied four times daily, combined with mild anesthetics or analgesics, may be used. Symptomatic geographic tongue often responds to topical corticosteroids. In severe cases, a favorable response may be observed with 50 to 100mg of dapsone after 6 to 16 weeks. If salivary flow is low, moisture and lubrication should be enhanced by providing salivary substitutes or Sialogogues (Bromhexine tablets 8-16mg three times daily, 25 mg urecholine three times daily, or 30mg cevimeline three times daily). Sialogogues are recommended in the absence of bronchial asthma or significant cardiovascular disease. Patients who have mucosal lesions and cultures positive for fungi should receive antifungal agents. Topical antifungal agents (100,000 units nystatin, 10 mg clotrimazole) are administered five times daily. Systemic antifungals (200 mg ketoconazole, 100 mg fluconazole, 100 mg itraconazole) are administered once daily for 10 days. A sucrose free diet speeds recovery. Parafunctional habits can be corrected with protective appliances, elimination of dental defects and/or psychologic awareness via physical self regulation training.⁸⁻¹⁰

Conclusion

Burning sensation in the oral cavity can be caused by a variety of factors. The key to successful management is a comprehensive diagnostic workup. This requires the co-ordination between the dentist and the appropriate physicians. Once the diagnosis is accurately made and the cause for the symptoms identified or discounted,

directed therapy should be instituted. The dentist can address the contributing local factors. Systemic underlying conditions require the management by the patient's physician. The clinician must also consider the potential for neurologic conditions that may accompany the complaint of oral burning. Diminished psychosocial functioning that may require psychologic management must also be considered.

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Case report

Complexities of vertical dimension & its effect on sagittal corrections in Class II deepbite cases with gummy smile by camouflage treatment

* Biju Sebastian

In a Class II skeletal case with gummy smile or vertical maxillary excess, the problem exists in two planes- antero- posterior and vertical. This manifests clinically in antero-posterior plane as Class II skeletal pattern with increased overjet usually with proclined upper anteriors. In the vertical plane, it manifests as excessive anterior gingival exposure or gummy smile due to the vertical maxillary skeletal excess. An associated issue is anterior deepbite very commonly seen in such cases¹. Other extreme combinations could even lead to skeletal openbite which is not within the purview of our topic and so not discussed here. So these types of cases require to be dealt by factoring in these clinical features.

There are several ways to deal with this problem depending on the age and severity of the condition like growth modification, camouflage orthodontic treatment or surgical option². The limitation of camouflage treatment is that it cannot be attempted in severe cases where only the other two options could be attempted. In effect, now our clinical parameter for cases which can be tackled with camouflage is now well defined – Class II deepbite vertical maxillary excess cases of mild to moderate severity.

Camouflage orthodontic treatment mechanics in Class II deepbite VME cases

In a Class II gummy smile patient, if the clinician is just concerned with the correction of A-P problem by retracting anteriors, it will further worsen the condition in vertical plane by increasing gingival exposure due to extrusion of anteriors during retraction and increasing deepbite². If the clinician attempts to correct deepbite with mechanics like anchor bend, reverse curve of Spee in archwires as in routine Class II cases, it will extrude the posterior teeth. This will lead to clockwise rotation of mandible in a downward and backward direction as posteriors extrude further worsening the profile or A-P discrepancy and increasing overjet³⁻⁵. How to get over this issue? Deepbite is usually corrected either by extrusion of posteriors, relative intrusion (leveling of arches) or by true intrusion of anterior teeth depending on the clinical features^{2, 6}. In a patient with excessive gingival exposure or gummy smile, the ideal mechanics to correct deep bite would be to intrude anteriors

instead of extruding posteriors⁶. Since the problem exists in two planes, any mechanics being attempted should lead to both retraction and intrusion of anteriors. This can be done either by intruding anteriors first and then retracting them or by simultaneously intruding and retracting anteriors⁷⁻⁹. A typical Class II deepbite VME case which has been treated by simultaneous intrusion and retraction is illustrated here to demonstrate the mechanics involved.

Case Report

John, a 15 year old male patient reported to the clinic complaining of forwardly placed upper front teeth and excessive gum visibility at rest position of lips (Fig. 1).

Clinical examination revealed a Class II molar relation on right side and an end on molar relation on left with 11mm overjet, 90 % deepbite, scissorbite with 27 along with excessive gingival display, lower lip trap and everted lower lip (Fig. 2).

Cephalometric analysis confirmed the Class II skeletal pattern with severely proclined upper anteriors and excessive maxillary anterior vertical height. Model analysis showed an overall Bolton discrepancy with mandibular tooth material excess. But there was no discrepancy in anterior Bolton ratio. Treatment plan decided was an orthognathic surgical procedure involving maxillary impaction and mandibular advancement with genioplasty.



Fig. 3 Intrusion – retraction utility arch

Since the patient did not prefer any surgical invasive procedure, orthognathic surgical option or the option of retracting upper anteriors after upper I premolar extraction with micro-implants was discarded. Finally, extraction of upper I premolars and retraction of upper anteriors with simultaneous intrusion –retraction utility arch (Fig. 3) was done.

Due to the high anchorage requirement, a Nance palatal button was added and individual canine retraction was carried out. Retraction of upper anteriors was first done by tipping and then they were torqued to conserve anchorage. A pleasing profile, an ideal overjet, overbite with Class I canine relation was achieved at the end of treatment (Fig. 4, 5 and 6). Due to the posterior Bolton



Fig. 2 Pre-treatment Intra oral photographs



Fig. 1 Pre-treatment extra oral photographs



Fig. 4 Post-treatment extra oral photographs



Fig. 5 Post-treatment intra oral photographs



Fig. 6 Superimposition of pre and post treatment cephalograms – Green line indicates tracing from pre-treatment cephalogram and black line indicates tracing from post-treatment cephalogram



Fig. 7 Micro-implant as orthodontic anchorage source for intrusion and retraction of maxillary anteriors

discrepancy, proper intercuspation in molar region was not achieved.

Conclusion

The attempt here has been to explain the pitfalls of correcting Class II deepbite vertical maxillary excess cases with routine mechanics and to illustrate an ideal way of treating them. Recent trend has been to use micro implants to correct this problem (Fig. 7).

This will simplify the mechanics involved. But the patient will have to undergo an invasive surgical procedure with additional financial expense.

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Plexiform ameloblastoma of mandible: current concept on the molecular pathogenesis

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Abstract

Ameloblastoma are locally destructive and invasive tumor that are capable of reaching large sizes. The ratio of mandibular to maxillary tumors is 2.2:1. Histologically they are composed of both ameloblastic epithelium and mesenchyme. This paper presents a case report of intra osseous ameloblastoma of the mandible with several new concepts in understanding the biology of this aggressive tumor.

Introduction

Ameloblastoma is a benign but potentially aggressive tumor. Excluding cysts, ameloblastoma represents 13%-54% of all jaw tumors.¹ It affects males and females somewhat equally, peaking in the third decade, ranging from first-to-ninth decade of life.¹ Microscopically, ameloblastomas are recognizable from their recapitulation of embryologic ameloblasts and stellate reticulum and arising from rests of outer and inner enamel epithelium and dental lamina.¹

Brief Embryologic Mechanism

During 6 weeks of gestation the mesenchyme of the developing tooth induces epithelial proliferation leading to formation of the dental lamina. Later on epithelium invaginate into the underlying mesenchyme known as the bud phase, which will give rise to the primary teeth. The mesenchyme proliferates and condenses around the bud, which then forms a cap shape, known as the cap stage, at 9-11 weeks. This phase marks the starting of the enamel organ. At week 14, the enamel organ further differentiates into an outer and inner epithelial layer, separated by a loose mesenchyme, the stellate reticulum, imparting a bell shape, known as the bell stage. Ameloblasts arise from the inner epithelium. Ameloblastomas express amelogenin, the precursor of enamel, which further supports this theory.² Ameloblastic epithelium shows nuclear polarization toward the underlying reticulum surface, known as the stratum intermedium. The stratum intermedium (embryologically sandwiched between the ameloblast and stellate reticulum), thought to aid enamel production, is not present in ameloblastomas and, therefore, no enamel is produced. This polarization is recapitulated in ameloblastic tumors and marks the formation of the preameloblast cell, which work in concert with odontoblast to induce further

differentiation of both cell lines and the eventual formation of enamel and dentin, respectively.²

Molecular Pathogenesis of ameloblastoma

Molecular pathogenesis of ameloblastoma has been explained by various studies such as clonality, cell cycle proliferation, apoptosis, tumour suppressor genes, ameloblastin and other enamel matrix proteins, osteoclastic mechanism and matrix metalloproteinase's (MMPs) and other signalling molecules. Clonal pattern determination is an important step in the pathogenesis of tumors.³ Gomes CC *et al* demonstrated mono clonality of Solid D multicystic ameloblastoma, which gave strength to the idea that an initial mutation D molecular alteration is the first event in the development of the tumour.⁴ Cellular proliferation index of ameloblastomas has been studied since 1995.⁵ Ki67 staining pattern indicated that the cellular proliferation and the ameloblastoma growth are concentrated in the peripheral areas composed by ameloblast-like cells.⁶ Demonstration of telomerase activity, which is linked to cell immortalization, is associated with the proliferative potential of ameloblastoma cells. According to recent study, the telomerase activity detected in ameloblastoma reflects tumor characteristics such as ability of local invasion and high recurrence rates.⁷ Studies that evaluated apoptosis demonstrated that the peripheral basal cell layer of ameloblastoma are responsible for the progression of ameloblastomas, as they express anti-apoptotic proteins (such as Bcl-2) together with cell proliferation markers (such as Ki67 D MIB1).³ Epigenetics may be an important event in the pathogenesis of ameloblastoma.⁸ Ameloblastin, enamelin and sheathlin proteins were not expressed in ameloblastoma, suggesting that the tumour cells do not attain functional maturation as secretory phase ameloblasts.⁹ Sandra *et al.* in his study observed that the



Fig 1. Photograph of patient showing swelling in lower left posterior region of jaw



Fig 2. Intraorally, diffuse swelling present in left mandibular tooth region extending from 31 tooth region to 37 tooth region

ameloblastoma could induce osteoclastogenesis by secreting RANKL and TNF α .¹⁰ This osteoclastogenesis, in turn, provides the space for ameloblastoma to expand in the bone. Matrix metalloproteinase-2 has an important function as it can degrade type IV collagen, resulting in the promotion of tumour invasion and metastasis.¹¹ Other signalling molecules also play a role in the pathogenesis of ameloblastoma. The Wnt signalling pathway involves Wnt a signaling molecule, binding to its receptor, leading to stabilization of cytoplasmic β -catenin and its translocation into the nucleus, where it accelerates the expression of genes related to cell cycle or proliferation.¹² Nuclear accumulation of β -catenin was demonstrated in ameloblastomas and it seemed to be associated with tumorigenesis and cell proliferation.¹³ According to studies regarding calretinin (calb2), showed that this protein may play a role in the transition of the dental lamina remnants to ameloblastoma.³

Case Report

A male patient 45 years of age reported to the Department of Oral Medicine and Radiology with a 6 month history of swelling in lower left posterior region of jaw (fig1). The contra lateral side was normal (fig 1). Patient's past dental history revealed that patient had under gone for multiple extractions for swelling. On extra oral examination the swelling was present in the lower one third region of the face on the left side. The swelling was diffuse, approximately oval in shape measuring 4cms X 2 cm, extending from the left corner of the lip anteriorly to the angle of the mouth posteriorly. Superiorly the swelling extended from the line joining the corner of the mouth to the ear lobule to 1cms below the lower border of the mandible. The skin over the swelling was intact with no secondary changes. On intra oral examination a diffuse swelling was present in left mandibular tooth region oval in shape measuring 5cm x3cm extending from 31 tooth region

to 37 tooth region with over lying mucosa pink in color had indentations of opposing teeth (fig 2). On palpation swelling was hard, non-tender, non-compressible fixed to the underlying bone with no bucco-cortical plate expansion with no secondary changes. Since the history revealed that the swelling increased to present size within 6 months, a provisional diagnosis of lesion of odontogenic origin was given. The ortho pantogram showed a well defined tear drop radiolucency in the ramus region with no sclerotic margins. Considering a favourable prognosis the entire lesion was excised and sent for histopathological examination Grossly the specimen was brownish in color soft to firm in consistency irregular in shape measuring 6cmx4cm (fig 3). Histopathologically tissue was processed and multiple sections were stained with Hematoxylin and Eosin. Microscopically sections revealed epithelium arranged in anatomizing cords bounded by layer of low cuboidal ameloblast like cells The epithelium enclosed a connective tissue stroma and was surrounded by a loose stellate reticulum like cells with giant cells in few areas hence a histopathological diagnosis of plexiform ameloblastoma was given (fig 4).

Discussion

Ameloblastomas are epithelium-derived odontogenic tumours that typically originate in jaw bones, primarily involving the mandible and less often the maxilla.¹⁴ The term ameloblastoma was coined by Churchill in 1933, the first detailed description of this lesion was given by Falkson in 1879. It is the most common odontogenic tumor although it represents only about 1% of tumors and cysts of the jaws. It is a benign epithelial odontogenic tumor but is often aggressive and destructive, with the capacity to attain great size, erode bone and invade adjacent structures. In the mandible (80% of ameloblastomas), 70% are located in the area of the molars or the ascending ramus, 20% in the premolar region, and 10% in the anterior region.¹⁵ In the present



Fig 3. Gross specimen appears brown in color, soft to firm in consistency, irregular in shape measuring 6cmx4cm

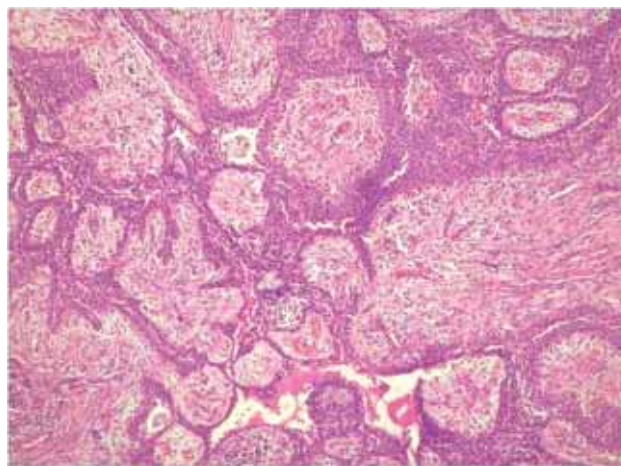


Fig 4. Photomicrograph showing epithelium arranged in anastomosing cords bounded by layer of low cuboidal ameloblast like cells surrounded by a loose stellate reticulum like cells (10X)

study, a ameloblastoma extended from the left corner of the lip anteriorly to the angle of the mandible posteriorly. Ameloblastoma appears in equal frequency between both sexes, although a higher frequency in females than in males has been described.¹⁵ Clinically, it frequently manifests as a painless swelling, which can be accompanied by facial deformity. Histologically, ameloblastoma is characterized by the epithelium arranged in anastomosing cords bounded back to back by layer of low cuboidal ameloblast like cells. The term “plexiform” refers to the appearance of anastomosing islands of odontogenic epithelium in contrast to a follicular pattern. The challenge in the management of ameloblastoma of the mandible is not only to excise the tumor completely in order to prevent recurrence but also to provide the best reconstruction method.¹⁶ Inadequate removal of this lesion may lead to a recurrence years later, with more aggressive behavior.

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The elusive MB2!- seek and thou shall find

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Abstract

There is a wide variation in the root canal anatomy, especially in maxillary molars, with extra roots and extra canals being routinely detected. The presence of a second canal in the mesiobuccal root - MB2 is now accepted as the norm rather than the exception. This canal is also referred to as the second mesiobuccal, mesiopalatal or mesiolingual canal. It is imperative that the clinician spend enough time and use all the available armamentarium to locate this canal. The aim of this article is to review the literature and to describe the step by step procedure for locating the MB2.

Introduction

The main objectives of root canal therapy are thorough cleaning and shaping of all pulp spaces and complete obturation of these spaces with an inert filling material¹. The presence of an untreated canal may be a reason for failure, the canal may be untreated because the clinician fails to detect it. Chronic draining sinus, sensitivity to temperature or apical soreness over the mesiobuccal root in an endodontically treated maxillary molar is most likely due to a missed MB2².

Studies of the canal configuration of the mesiobuccal root of the maxillary molar show that presence of MB2 may range from 33% to 95%³⁻¹¹ depending on the method used. In vitro studies included radiographic evaluation⁴, access and radiography⁷ canal clearing and root staining¹¹ or sectioning³. Enhanced vision in the form of dental loupes or operating microscope⁸⁻¹⁰, retrospective evaluation of patient records⁵ or radiography⁶ was used in vivo studies.

Procedure

A thorough knowledge of the complexity of the root canal system is an important prerequisite. The clinician must mentally visualise the 3 dimensional root canal anatomy before initiating endodontic treatment. Careful evaluation of two or more periapical radiographs taken at different angulations along with bitewing radiographs are invaluable in achieving this. For endodontic purposes paralleling technique produces the most accurate periradicular radiograph. 10-20° horizontally angled views taken with the cone pointed from the distal towards the mesial are recommended^{1,2}. Broader the mesiobuccal root, more are the chances of MB2 being present.

Good illumination plays an important part in enabling the clinician to visualise the pulpal anatomy. Lighting

may be enhanced by using surgical headlamps, fiberoptic illumination or operating microscopes.

The approximate depth of the pulp chamber can be determined by placing the bur mounted on the handpiece in front of the radiograph. The starting point of bur penetration is on the central groove midway between the mesial boundary (line joining the mesial cusps) and the distal boundary (oblique ridge). The traditional access preparation (Fig 1 a) has a triangular outline form with the base of the triangle towards the buccal and the apex towards the palatal with a canal positioned at each angle of the triangle. A rhomboidal shape (Fig 1 b) rather than triangular is recommended whenever a second canal is anticipated in the mesiobuccal root⁵. The shortest side is the palatal and the longest is the mesial (Fig 1c)

Round carbide burs ($\neq 4$ or $\neq 6$) are used to remove caries, create initial outline shape and deroof the pulp chamber. Fissure carbide burs and round end cutting tapered diamond bur may be preferred by some because of the additional advantage of being used for axial wall extensions. Safety tip or nonend cutting carbide bur and tapered diamond may be used by inexperienced clinicians to avoid gouging of the pulpal floor and axial walls. Surgical length burs provide improved visibility because the head of the handpiece is moved away from the tooth. The Mueller bur (Brasseler) (Fig 2a) and the LN bur (Caulk/ Dentsply)(2b) which are extended shank small round carbide burs are particularly useful.

The pulp chamber must be thoroughly cleaned before searching for the root canal orifices. The use of long bladed endodontic spoon excavator and copious irrigation with sodium hypochlorite is invaluable in proper visualisation of the pulpal floor. The supulpal grooves serve as a road map for orifice location¹². Subpulpal grooves are the dark colored dentin that line the pulpal floor connecting the root canal orifices (Fig 1c). Another advantage of removing coronal pulp is

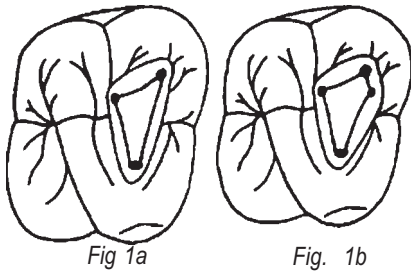


Fig 2a



Fig 2b



Fig 2c



Fig 2d

that radicular fragments may haemorrhage slightly aiding in the search.

Endodontic explorers like the Hu- Friedy DG 16 (Fig 2c) are an integral part of the armamentarium. The clinician's finger should blanch and the thumb from the off hand can assist in directing forces down the long axis of the explorer to punch through a thin roof of overlying dentin¹³. Positioning the explorer in an orifice also helps to determine the angle at which a canal departs the main chamber and hence the path of insertion of the endodontic instruments.

The orifice of the MB2 canal is located in or, more often, slightly mesial to the groove that joins the main mesiobuccal (MB1) and palatal canal. It lies within 3.5mm palatally and 2 mm mesially of the MB1¹. Cleaning and shaping of the MB1 should be done before initiating the search for the MB2. Bleeding emanating from the previously cleaned MB1 is a sign of pulp tissue remnant which may indicate the presence of a second canal.

Off-angled working films with a file in the MB1 canal will also either reveal equal amounts of tooth structure on each side of the file, i.e., symmetry, or the file skewed off the longitudinal central axis of the root, strongly suggesting the presence of a second canal¹³. The two mesiobuccal canals may join to exit at a single foramen or at separate foramina.

The mesial wall of the pulp chamber has a dentinal shelf that frequently hides the underlying MB2 orifice. The canal should be approached from a distopalatal angle. In the first 1-3 mm the root canal is sharply angled in the mesial direction which may prevent the tip of the file from progressing apically. Inclining the handpiece distally inclining the handpiece distally "troughing" 0.5

to 3 mm mesially and apically and can remove the mesial shelf of dentin. This "refining" procedure permits a more straightline access to the canal

Other aids to locate MB2

Ultrasonic tips (Fig 2d) like BUC(Spartan), Start X(Mailefer) may be used to refine the access. Absence of a handpiece improves vision and since the tips are smaller than the smallest burs, the dentin can be brushed off in smaller increments and with greater control. The cavitation also aids in removing the necrotic pulp remnants and producing a thoroughly washed out and clean appearance.

Several studies⁸⁻¹⁰ have demonstrated that use of magnification either dental loupes or operating microscope can greatly enhance the probability of locating the MB2. Microscopes afford unsurpassed lighting, magnification, optics, ergonomics and potential to add a variety of additional accessories including documentation packages¹³.

Use of 1% solution of methylene blue dye can help to road map the anatomy by penetrating into the orifice¹³. The champagne or bubble test consists of flooding the pulp chamber with warm 5% solution of sodium hypochlorite. The clinician can visualize bubbles coming from the organic tissue being digested in the extra canal and rising towards the occlusal.

Stropko⁹ suggested irrigating with 17% EDTA to remove the smear layer followed by rinsing with 95% alcohol and then air drying with a Stopko irrigator fitted with a 27 gauge notched endodontic irrigating needle. This device can direct a precise stream of air or water, as required, into the preparation.

Even with all the newer technologies available, the time and effort of the clinician may be the most important factor in locating the elusive MB2. In spite of a thorough search, if it is felt that further removal of tooth structure may lead to perforation, attempts to locate the canal should be aborted.

Conclusion

Thorough knowledge of the pulp anatomy, utilizing the available armamentarium and above all persistence of the clinician can yield predictable results in the search for even the not so easily visible MB2 canal in the maxillary molar.

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Esthetic management of fused teeth

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Abstract

Dental anomalies of number and forms may occur in the primary and permanent dentition. Double tooth is a term used to describe connate tooth and includes both dental fusion and gemination. The phenomenon of gemination occurs when two teeth develop from one single bud leading to a larger tooth. Fusion is a condition in which the crowns of two separate teeth have been joined together during the crown development. Fusion occurs infrequently but could cause esthetic, spacing and periodontal problems.

This case report presents esthetic management of fused max. right lateral incisor with a supernumerary tooth.

Introduction

Fusion is one of the most common anomalies in the primary dentition and has a familial tendency. Fusion has also been reported with congenital anomalies like cleft lip. It is also seen with X-linked congenital conditions.¹ Etiology of fusion is unclear but it is likely related to physical forces produced by close contact between two developing teeth. A genetic predisposition has been reported.²

Dental fusion has been defined as the partial or complete union, during development, of two or more adjacent teeth. Fusion can occur between two normal teeth or between a normal tooth and a supernumerary tooth. This developmental anomaly is most often confused with gemination. Clinically it is difficult to differentiate between fusion and gemination. However, a differential diagnosis can be made radiographically. In cases of fusion, the crowns are united by enamel and/or dentine, but there are two roots or two root canals in a single root. In contrast, in gemination, the structure most often presents two crowns, either totally or partially separated, with a single root and one root canal.³

Fusion may cause clinical problems related to esthetics, spacing and periodontal conditions. The degree of fusion depends on the stage of tooth development that has occurred at the time of fusion. Fused teeth may contain a single root canal or separate canals and may occur between two normal teeth or between a normal tooth and a supernumerary tooth.

A careful clinical and radiographic examination is beneficial for treatment planning.

This case report presents esthetic management of fused max. right lateral incisor with a supernumerary tooth.

Case report

A 22 yr old male patient reported to dept. of conservative and endodontics with complaint of displeasing esthetics in maxillary anterior region.

On clinical examination the maxillary right lateral incisor exhibited abnormal crown morphology.

There was no history of trauma; any associated hereditary conditions, medical history was not contributory.

All vital signs were found to be within normal limits.

On examination, mild crowding with maxillary anterior and normal set of dentition, tooth was not sensitive to percussion. (fig :1) On radiographic examination, the complex structure of the pulp was identified with no observable periapical pathology. (fig:2)

Management

Intentional root canal treatment followed by placement of full coverage restoration was planned.

Local anesthesia was administered.

Endodontic access cavity was done on the palatal surface by using a no. 2 round bur and EX 24 bur (non end cutting tapered fissure; Mani, Tochigi, Japan). The peculiar feature was that access cavity preparation was done separately on lateral incisor and supernumerary tooth. But on further instrumentation, the two canals were found to be merging into a single root canal.

Pulp extirpation was performed.

The canal was thoroughly debrided with copious irrigation of sodium hypochlorite (2.5%), followed by saline (0.9%).

Coronal flaring of the root canal was done by using Gates-Glidden drills no. 1 to 4 (Mani Inc).



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

The working length was confirmed radiographically. (fig:3)

Cleaning and shaping of the root canal system were completed by using a step-back technique.

The canal was dried with sterile paper points, calcium hydroxide was placed in the root canal, and the access cavity was filled with zinc oxide eugenol.

The patient was recalled after 1 week for obturation.

After a week, the tooth was asymptomatic, and the root canal was obturated. (fig:4)

The access cavity was then sealed with resin composite. As patient opted for metal ceramic crown, tooth preparation was done and impression was taken (fig: 5) Metal ceramic crown was luted with glass ionomer cement. (fig:6)

Discussion

A malformed tooth often is a challenge to the dentist. Fused teeth afford a striking clinical manifestation of the differentiable and morphogenetic processes of tooth development.

The incidence of unilateral occurrence is estimated in the literature to be 0.5% in the deciduous and 0.1% in the permanent dentition. The incidence of bilateral occurrence is estimated at around 0.02% for both types of dentition.³ The incidence of double tooth in worldwide populations ranges from 0.14 to 5.0% with no sex predilection, and unilateral expression is more common than bilateral expression. It has more predilection for anterior teeth.⁴

Generally, fused teeth are asymptomatic and do not require treatment, and if esthetically acceptable, the patient might even decide to retain the anomalous tooth.

However, double teeth can cause esthetic and functional problems, carious lesions in the grooves, particularly in the fusion zone.⁵ Periodontal problems associated with the grooves that extend subgingivally; asymmetries when fusion occurs in the anterior segment; malocclusions, especially when supernumeraries are involved, and endodontic complications such as perforation which are frequent because of the reduced thickness of enamel and dentin.

The morphology of fused teeth varies, and complex forms with separated or fused coronal pulp chambers are present. Even separated chambers can meet in the radicular area or can remain separated.

Radiographic examination is an essential component of the management of endodontic problems.

Conclusion

This case report demonstrates a predictable and successful solution toward the esthetic management of a fused maxillary lateral incisor with a supernumerary tooth adopting most conservative way.

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Juvenile oral erosive lichen planus in a 10 year old child

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Abstract

Lichen planus is a relatively common mucocutaneous disease frequently seen in adults. Oral lichen planus (OLP) is extremely rare in childhood and to date only few cases have been cited in the literature worldwide. Main intention of this paper is to contribute a clinically and histologically documented case of Juvenile oral erosive lichen planus to the literature and to highlight any differences and similarities with that of adult patients. We report a clinically and histologically proven case of juvenile oral erosive lichen planus in a 10 year old female patient of Indian origin residing in Dubai.

Introduction

Lichen planus is a mucocutaneous disease that predominantly affects the adult population¹. It is indeed rare to see a clinical case of oral erosive lichen planus in children. Available literature shows very few case reports of oral lichen planus in children^{1,2,3}. In this paper we report an extremely rare case of oral erosive lichen planus in a 10 year old girl.

Case Report

A 10 year old girl reported to the Department of Oral Medicine and Radiodiagnosis, Pushpagiri College of Dental sciences, Tiruvalla, Kerala, India with a complaint of red areas in the tongue since 1 year duration. She also gave a history of burning sensation in the mouth while taking spicy foods. Her parents consulted a Dental surgeon in Dubai and were prescribed some topical applicants as treatment, but no improvement was seen. So her parents decided to come to India to get better Dental care hence came to Pushpagiri college of Dental Sciences, Tiruvalla located near to her hometown Allepey situated in Kerala, India.

Her medical, dental and family histories were non contributory. On general examination patient had an average built with normal gait. Extra oral examination revealed no abnormalities (fig 01). Intra oral examination revealed an erosive area with loss of papilla seen on the dorsal surface of tongue more towards the left side with peripheral radiating white striae (fig 02). Lesion measured around 2 x 2.5 cm in diameter (approx) - anterior-posteriorly and mediolaterally. Other areas like buccal mucosa, labial mucosa, floor of mouth, soft palate and gingiva appeared to be normal. Hard tissue examination revealed decayed -36 and overall oral hygiene was fair. On the basis of clinical history and examination carried out a provisional diagnosis of oral erosive lichen planus on the dorsal surface of the tongue

was made with differential diagnosis given as geographic tongue, glossitis secondary to Vitamin B12 deficiency, Chronic atrophic candidiasis.

After routine blood investigations which were within the normal limits, an Incisional biopsy from the dorsal surface of the tongue was performed in the Department of Oral and Maxillofacial surgery. The biopsy specimen was sent for histopathological examination. Histopathology revealed the following features suggest of erosive lichen planus and thus confirming the earlier diagnosis of oral erosive lichen planus (fig 03, 04).

- a) Atrophic epithelium
- b) Basal cell degeneration
- c) Sub epithelial band of lymphocytic infiltration.

Patient was put up on topical steroid therapy (Topical Clobetasol proprionate 0.05% application, initially started 4 times a day and slowly tapered to the lowest maintenance dose). We observed a significant reduction in the appearance of the lesion within the 3rd week of treatment with reduction in erythematous area and also disappearance of white striae from the periphery. (fig 05)

Discussion

Lichen planus is a mucocutaneous disease reported worldwide and frequently encountered in adult population⁴. The disease most commonly affects middle-aged females. Even though very few cases have been cited in the literature of juvenile oral erosive lichen planus, in India at present there is paucity of data on lichen planus among children. Exact etiology of childhood lichen planus is still yet to be understood as only few cases have been reported in the literature. Reports from the literature shows possible probability of occurrence of OLP after anti hepatitis B vaccination in children⁵. Rybojad M, Moraillon I, Laglenne S, Vignon-Pennamen MD, Bonvalet D, Prigent F, et al⁵ have pointed out that



Fig. 1 Extra oral front view photograph of patient.



Fig. 2 Intra oral photograph showing erosive area with peripheral radiating white striae in the dorsal tongue.



Fig. 03 Photomicrograph showing Atrophic epithelium, Basal cell degeneration, Sub epithelial band of lymphocytic infiltration. (H & E, 10X).



Fig. 4 Photomicrograph showing Atrophic epithelium, Basal cell degeneration, Sub epithelial band of lymphocytic infiltration. (H & E, 40X).



Fig. 5 Intra oral photograph 3 weeks post treatment showing absence of erythema and radiating white striae.

an increased incidence of childhood lichen planus in tropical zones suggests ethnic, genetic and climatic factor involvement. They have also pointed out that from their 12 cases of OLP in children not even a single case was related to drugs or hepatitis B or C infection. Reported age group incidence of childhood lichen planus was in most cases below 12 yrs of age^{8,9}.

Clinical feature of OLP in adults is classic with a striking appearance of Wickhams striae seen in cases of reticular lichen planus and erosive areas with peripheral white striae in case of erosive lichen planus⁶. In adults these erosive areas are commonly seen in buccal mucosa followed by tongue and gingiva. Lichen planus not only affects the oral cavity but also affects the skin. Classic skin lesions as described in literature is of 3P'S-purple, pruritic, polygonal papules commonly seen on the flexor surface of the extremities^{6,7}. Other sites of extra oral involvement include the glans penis, the vulvar mucosa and the nails. Though reports in the literature^{6,7,8} shows great resemblance of skin lesions of childhood lichen planus with that of adult population, in our clinical case of 10 year old girl we couldn't observe any such skin changes, giving this case a slight deviation from those clinical reports of childhood lichen planus.

Certain authors emphasize the longer duration of the disease and resistant to treatment in cases of childhood lichen planus. Usually lichen planus in adults resolves better with topical corticosteroid therapy, however at times there appears to be a need of change in the treatment regimen. In our present case, the 10 year old girl easily responded to topical steroid therapy (Topical Clobetasol proprionate 0.05% application, initially started 4 times a day and slowly tapered to the lowest maintenance dose). We could observe a significant reduction in the appearance of the lesion within the 2nd week of treatment with reduction in erythematous area and also disappearance of white striae from the periphery (fig 05). Since the patient had to return back to Dubai as her school holidays were getting over, a long term follow up was not possible in our case. As the treatment part of childhood lichen planus remains to be defined, data in the literature are rather insufficient to finalize an optimal treatment in case of juvenile erosive oral lichen planus. This definitely puts a need for a prospective analysis with more clinical case reports

to acquire a better understanding of the real incidence of childhood lichen planus and better define the therapeutic strategy.

Conclusion

Oral lichen planus is extremely rare in childhood and only few cases have been reported in the literature so far. Although a rare occurrence, early recognition and diagnosis of this condition by dentist can have a significant impact on oral health of the child patient. To the best of our knowledge this is one among the rare case reports of juvenile oral erosive lichen planus in a 10 year old girl from India.

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Squamous cell carcinoma of the maxilla

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Abstract

Squamous cell carcinoma is the most common malignant tumour of the oral cavity. In this case report patient is a 65 year old female who reported to our college with swelling of gums & mobility of teeth in the upper right posterior region of the jaw. The clinical & histopathological examination revealed moderately differentiated squamous cell carcinoma. The treatment involved hemi-maxillectomy & supra-omohyoid neck dissection which is discussed here.

Introduction

Squamous cell carcinoma is defined as a malignant epithelial neoplasm exhibiting squamous differentiation as characterised by the formation of keratin or the presence of intercellular bridges. It can arise from oral epithelium itself & from the terminal portions of the ducts of the salivary glands (major & minor). It presents in the mouth in three ways:-

- 1) As a solitary malignant tumour usually with a background of clinically normal or near normal mucosa.
- 2) As multiple areas of malignancy, varying in number & usually representing malignant change in pre-existing areas of leukoerythroplakia.
- 3) As a verrucous carcinoma, representing malignant change in a pre-existing patch of verrucous leukoplakia, most often when there is a history of tobacco chewing.

This neoplasm has predilection for the area where saliva tends to pool, in the floor of the mouth & neighbouring sites such as the side of the tongue. The use of tobacco in its various forms including smokeless tobacco, is regarded as the main cause, particularly when associated with the use of excess alcohol. Diets with low level of vitamin A & C, or inadequate consumption of vegetables and fruits along with poor oral hygiene may also contribute to the risk of oral cancer. In the average patient clinical picture is dominated throughout by local disease with neighbouring structures being infiltrated by tumour. Metastasis to cervical lymph nodes is a significant finding and distant metastasis is rare.

Case report

A 65 year old female patient reported to the Department Of Oral & Maxillofacial Surgery Of Azezia Dental College with the chief complaint of swelling of gums & mobility of teeth in the upper right posterior region since 4-5 months. The patient gave

history of pan chewing for the past thirty years. On intra-oral examination, an exophytic lesion of size (4x3) cm, showing irregular and poorly defined margins with surface ulceration. Lesion extending anteriorly to the upper right canine region, posteriorly to the right maxillary tuberosity region & medially to the mid-palatine raphe. On palpation, the lesion was indurated & tender. Incisional biopsy was taken from the right upper molar region. The histopathological report revealed stratified squamous epithelium infiltrating into the connective tissue. The epithelium is in the form of sheets and islands exhibiting dysplastic features such as nuclear hyperchromatism, nuclear & cellular pleomorphism, increased nuclear to cytoplasmic ratio, few mitotic figures, some areas showing keratin pearl formation & individual cell keratinization of varying sizes and shape. The underlying stroma showed irregularly arranged collagen fibres admixed with diffuse chronic inflammatory infiltrate, predominantly of lymphocytes. Few areas of budding capillaries and haemorrhage were evident.

Investigations

Routine blood tests were done & results were found to be within normal limits. C.T of PNS & neck revealed a heterogeneously enhancing soft tissue lesion noted in the right maxilla & oral cavity. Superiorly it was eroding the right maxilla & the floor of the right maxillary sinus & invading into the sinus cavity. Posteriorly it was extending to lateral pterygoid plates & was closely related to right parotid gland with clear planes of separation. Anteriorly the lesion was seen extending to the anterior aspect of the right maxilla till the canine region. The lesion measures (39x25) mm with a density difference of 40HU, causing destruction of the right maxilla & the alveolar processes. No evidence of calcification or necrosis noted. Evidence of soft tissue / density noted in right maxillary sinus. Rest of the frontal sinuses, sphenoid sinuses & maxillary sinuses were normal. No evidence of DNS. Bone window revealed the



Fig. 1 pre-operative photographs



Fig. 2 Exposure of the tumour



Fig. 3 Surgical area after excision of the tumour



Fig. 4 Excised specimen



Fig. 5 Packing of the surgical site

destruction of the right maxilla with absorption of the alveolar processes & floor of maxillary sinus. There were evidence of multiple enlarged & small lymph nodes noted in the right submandibular cervical region along the jugular vessels. Features suggestive of a malignant process.

Treatment

To eradicate the primary lesion Hemi-Maxillectomy & to remove the affected lymph nodes Supra-Omohyoid Neck Dissection was planned. Access to the maxilla was obtained through Classic Weber-Ferguson Incision. The cheek flap was reflected superiorly, osteotomy was done below the infra-orbital nerve leaving about 2cm of good sound bone. The second osteotomy was done between the central incisors splitting the palatal bone at the midline. Finally lateral pterygoid plates were separated from the maxilla using a curved osteotome and the entire hemi-maxilla was downfractured & stripped out from the remaining attached pterygoid muscles. The maxillary sinus mucosa was extenterated and the sinus cavity was washed & cleansed with saline. Bleeding from pterygoid region was managed with temporary packing. The defect produced with maxillectomy was packed with ribbon gauze soaked in tincture benzoin & pre-fabricated obturator was placed. Then the cheek flap was turned back & closed in layers. Apron incision was given for the supra-omohyoid neck dissection. Incision was deepened to divide the platysma & flap was raised along the subplatysmal plane till the inferior border of the

mandible. The dissection begun in the submental region & the lymphatic fibro-fatty specimen was pulled inferiorly & laterally away from the digastric muscle & the mylohyoid. The submandibular gland with lymph nodes were dissected from the mandible. The fascia overlying the posterior belly of digastric & omohyoid was incised & dissection carried out in the area posterior to omohyoid preserving the hypoglossal & superior thyroid artery. The posterior dissection was begun from the anterior border of sternocleidomastoid muscle. The fascia was retracted anteriorly & dissection carried around the muscle upto the point where the spinal accessory nerve enters the sternocleidomastoid muscle. The nerve was clearly dissected, and above the level of the nerve, splenius capitis & levator scapulae, the dissection was completed. Dissected specimen in this region was brought forward & dissection carried along the carotid sheath. The inferior level of dissection was to the level where the omohyoid crosses the internal jugular vein. After the completion of the operation, only small amounts of lymph nodes were left behind in the postero-inferior aspect of the neck.

Conclusion

The clinical, histopathological & C.T.scan report reveals that this is a case of moderately differentiated squamous cell carcinoma. The main etiological factor here is the smokeless tobacco (chewing tobacco and snuff). Paan chewing (betel quid) is an important factor in our nation. It consists of betel nut and lime wrapped in a betel leaf, tobacco, catechu & spices. Nitrosamines,



Fig. 6 Supra-omohyoid neck dissection in progress



Fig. 7 Post- operative photograph

found in high concentrations in smokeless tobacco, are the main carcinogens implicated. Risk increases with increasing length of exposure, with risks greatest for anatomic sites where the product has been held in contact the longest time. Unless the tide of its use is stemmed, long-term use can be expected to produce an increase in oral cancers.

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Paediatric laser dentistry - an introduction

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Abstract

Dental lasers can revolutionize pediatric dental treatment as they can be used for painless caries removal, cavity preparation, pulpal treatment as well as soft tissue minor oral surgical procedures in children. This article reviews the basics of dental lasers, production of laser beam and the merits and demerits of various dental lasers. CO₂ and Nd: YAG lasers are mainly used for soft tissue oral surgical procedures. Erbium lasers are the best lasers for enamel or dentine cutting, as the hard tissues don't melt and are just ablated or dispersed without damage to the pulp.

Treating a child dental patient is a nightmare to many dentists. An understanding of the child's psychology, level of intelligence along with a compassionate and friendly approach can be helpful in many situations and can make the child co-operate with the dental procedure. But then, the painful injection, sound and vibrations of the dental hand piece can evoke fear and make the child unco-operative. The usage of dental lasers can address this problem to a great extent.

Lasers can eliminate the "Fear factor" associated with the child patient as they can be used for painless caries removal and cavity preparation. Lasers can also be used to carry out various soft tissue minor oral surgical procedures like excision of lingual frenum in ankyloglossia, maxillary labial frenectomy, surgical exposure of teeth for orthodontic care, gingivectomies in gingival hyperplasia and crown lengthening, removal of pericoronal inflamed tissues, biopsies as well as treatment of aphthous ulcers and herpetic lesions in children. These treatments do not require sedation or local anaesthetic and are painless.¹

Laser dentistry also allows the dentist to perform micro dentistry, removing only diseased dental tissue and preserving the remaining healthy tooth.

Laser physics

Laser is an acronym for light amplification by stimulated emission of radiation. Maiman in 1960 generated the first laser using a ruby rod. The first gas and continuously operating laser was described by JAVAN and others.² There are different types of lasers based on the medium used for their production like CO₂ laser, Argon laser, Nd:YAG laser, Erbium laser etc.

Production of a laser beam

A laser medium, which may be a gas as in the case of CO₂ and Argon laser or a crystal (Nd:YAG LASER) is kept in a sealed tube (fig: 1). When an excitation energy

(E) is passed on to the sealed tube, every atom in the medium gets excited by a photon of light, there is absorption of this energy and the excited atoms, spontaneously decay to their lower energy level by releasing a photon of light. These excited atoms get bombarded by another photon, the same atoms can decay releasing two photons of light that are exactly in phase with one another. These photons can bounce-off the fully reflective mirror(R) and can cause further spontaneous and stimulated emission. All these photons are exactly in phase with each other and forms a laser beam (L) that exits through the transmissive mirror (T) which can then be focused on to a point using a focusing lens (F).³ Lasers can be emitted either continuously or in a pulsed form.

When a Laser beam strikes tissue, it can be reflected, scattered, absorbed or transmitted.⁴ The wave length (λ) of a laser determines the type of reaction between a laser beam and the tissue, which in turn is determined by the composition of the active medium in the resonating chamber (see fig). Based on the active medium there are CO₂, argon, Nd: YAG and erbium lasers.

CO₂ lasers

This laser is highly absorbed by the oral mucosa and can be used for very rapid removal of oral soft tissues in various surgical procedures. However they can't be used for hard tissue procedures as they cause charring and can't be brought through a fiber optic carrier.

Nd: YAG laser (Neodymium: Yttrium-Aluminium- Garnet)

Here the active medium is a crystal and not a gas as in CO₂ and argon lasers. These lasers are in the infra-red range and like CO₂ lasers, are invisible. They can be brought to any part of the mouth through optic fibers. Nd: YAG works either in contact or non-contact mode and is mainly used for soft tissue surgeries. However Nd: YAG can be used for inhibiting incipient early caries

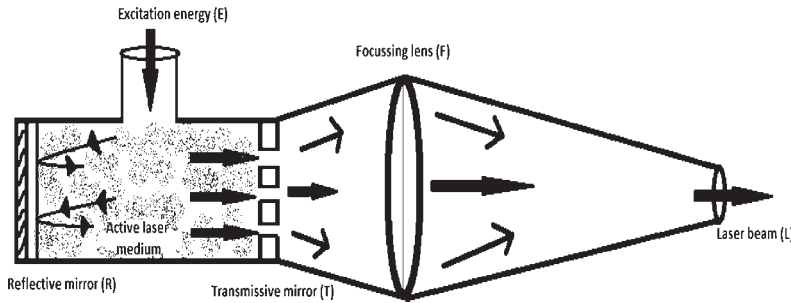


Fig. 1



Fig. 2

lesions.⁵ They can also be used for the removal of carious enamel and dentine without any damage to the pulp if parameters are properly controlled. If not properly controlled Nd:YAG laser can warm dentin to the level of 600-800°C causing charring and energy can be transmitted onto pulp.⁶ Another disadvantage is that pigmented and non-sclerotic dentine absorbs energy while sclerotic (translucent) dentine transmits energy leading to non-uniform absorption of laser energy.⁷

Erbium lasers

The erbium lasers Er:YAG at 2940nm and Er, Cr:YSGG (Erbium, Chromium : Yttrium-Scandium-Gallium-Garnet) at 2790nm are considered to be the best for oral hard and soft tissue treatment.⁸

Both these lasers are highly absorbed by water, hydroxyapatite and collagen. When the laser energy is focussed onto the tooth, the superficial layer of tooth structure along with the water contained there is heated rapidly. Water gets vaporized instantaneously and steam expands the tooth structure which surpasses the crystal strength, and finally the material breaks and gets dispersed. This explosive ablation starts shortly after the onset of laser irradiation and no heat gets transmitted to the pulp or periodontium. Erbium laser (fig:2) can be transferred to a handpiece from the laser unit by means of special optical fibers of zirconium aluminium fluoride with negligible water content such that it won't disintegrate when laser passes through.

Erbium lasers can remove caries completely, can perform cavity preparation effectively and does not compromise pulp vitality.⁹ The quality of cavity preparation is equivalent to that obtained with a dental handpiece.¹⁰ The pulpal response to accidental exposure of dental pulp using the Er:YAG is also quite favourable, in that dentine-bridges form frequently than while using slow speed handpieces and burs.

Conclusion

The advent of DENTAL LASERS is all set to revolutionize dentistry, especially pediatric dental treatment. Fear of the dental drill is bound to become a thing of the past. The scope of "LASER DENTISTRY"

seems to be endless. Erbium laser can be used for painless and safe removal of dental caries, conventional as well as minimal invasive cavity preparation in children and adult alike. Compared to other lasers melting and charring of dental tissue and pulpal inflammation is minimal while using Erbium lasers. Root canal treatment and minor oral surgeries involving soft tissue or bone removal can also be accomplished with very little discomfort. The time taken for cavity preparation is slightly greater than while using handpieces and burs, but the absence of sound, vibration, smell and pain seems to work out very well in favour of dental lasers being routinely used in pediatric dental practice in the near future.

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Review

Digital dentistry - the future is here

* George P. John

Abstract

Background. For more than 20 years, researchers have been making various attempts to introduce automation into the conventional bastion of manual processes in dentistry. Dental technology has advanced tremendously to incorporate this pace of change in a bid to produce materials of higher- and uniform-quality and to sustain this through the standardization of manufacturing processes and the reduction of production costs. Existing CAD/CAM systems applicable in dentistry today are variable in their capabilities, having distinct advantages and inherent limitations.

Clinical relevance. The current trend towards digitalization of manufacturing processes in dentistry would result in a not-too-distant future of automatically fabricated, fully esthetic restorations that have shorter production periods and longer lifetimes.

Conclusion. Emerging technologies may broaden dramatically our current perceptions and have a profound bearing on the future of restorative dentistry, from the way we practice it today.

Introduction

Dental prostheses have conventionally been produced from metal through the use of casting technology. Dental Casting alloys have played a prominent role in influencing the nature of restorative dental treatment for more than a century. Restorations commonly fabricated for fixed prosthetic treatment, such as inlays, onlays, crowns, and fixed partial dentures, are fabricated in the dental laboratory using the lost wax technique as suggested by Taggart in 1907¹.

Among the dental casting alloy alternatives available for metal–ceramic restorations, gold alloys were initially used to fabricate the metal substructure, because of their biocompatibility, ease of use and good mechanical properties. For clinical longevity, metal–ceramic prostheses must achieve satisfactory bond strength of the metal substructure to ceramic. Gold alloys could, in addition, achieve excellent metal–ceramic bond characteristics.

When the price of gold increased substantially, there was a gradual shift in the focus of the manufacturer to less expensive alternatives like gold–silver–palladium alloys and palladium–silver alloys. This was intended to decrease the unit metal cost². Though noble alloy alternatives for gold are less expensive compared to high–gold alloys, they may not be affordable in many countries, and base metal alloy alternatives, such as nickel–chromium and cobalt–chromium alloys^{1,2}, are used instead because of their more economical unit metal cost¹.

However, casting of base metal alloys is more technique sensitive as compared to noble alloys. This

can be attributed to their high melting range and potential for oxidation during casting^{1,2}. Moreover, the high hardness of many base metal alloys requires substantial time for finishing the castings in the dental laboratory. There is also the potential concern about nickel allergy arising with some patients¹.

To fabricate a restoration using the lost-wax technique, the dentist must first make an impression. The impression procedure may not be comfortable for the patient because of the retraction procedure involved and the possible need for anesthesia. Subsequently, time is required by the dental laboratory technician for careful pouring of the stone die or cast from the impression, preparation of the cast, and then the fabrication of the wax pattern, followed by the investing, and casting procedure. Considering the lower unit cost of base metal alloys, a more economical dental laboratory process would be helpful to replace this currently employed technique for preparing cast restorations.

Currently, though, dental technology is undergoing a revolutionary process of transformation. This radical shift is witnessing the rise of digital dental technology on an unprecedented scale through the automation of manufacturing processes. The CAD/CAM (computer-aided design/computer-aided manufacturing) process was introduced for dental applications over 20 years ago to prepare ceramic inlays and veneers³. Several research groups have presented favorable reports on CAD/CAM restorations in different dental applications⁴. This technology has evolved in two directions – one being the intra–operatory application for single–appointment restoration fabrication using prefabricated



ceramic monoblocks, for example, CEREC (Sirona Dental Systems LLC, Charlotte, NC)⁵ while the other being, emerging CAD/CAM systems for commercial production centers and dental laboratories, thus expanding the range of materials that could be used and the restoration types that could be produced⁶.

The automation achieved through the CAD/CAM technology, ushered in new hope and expectation towards furthering the objectives of

- ♦ Higher– and more uniform– quality of material utilized in the fabrication process;
- ♦ Standardization of fabrication processes;
- ♦ Reduction in the cost of production;
- ♦ Increased clinical longevity of restorations.

All CAD/CAM systems have three functional components:

- ♦ **CAP**ture of data (through scanning) – this is intended to capture and record data about the oral environment (tooth preparation, adjacent teeth and occluding tooth geometry);
- ♦ **CAD** – to design the restoration to fit the preparation and to achieve performance in accordance with conventional dental requirements; and
- ♦ **CAM** – to fabricate the restoration.

CAPturing the Data

The method of data capture differs remarkably between commercially available dental CAD/CAM systems. An intraoral digital 3-D scanning device (digitizer) is an integral component of the CEREC system (CEREC 3D, Sirona Dental Systems GmbH, Bensheim, Germany). Other commercially available CAD/CAM systems capture data from models, using various types of mechanical (for example, the PROCERA system from Nobel Biocare AB, Sweden) or optical (for example, the CERCON system from Degudent, Germany) digitizers. With few exceptions, these high-precision digitizers use technologies that prevent them from being used intra-orally.

Mechanical digitizers must map the entire surface of a prepared tooth while accurately maintaining the relative position of the device to the tooth. Many optical digitizers are exceptionally sensitive to any motion. Slight movement of a patient during data acquisition with either

one of these two types of scanner, would compromise the quality of the data, ultimately leading to a restoration that would not fit. In most cases, the scanner used to capture data is an integral part of the CAD/CAM system and operates only in combination with dedicated CAD software.

CAD - designing the restoration

Various CAD software programs are available commercially for designing virtual 3-D dental restorations on a computer screen. Some of these programs can design restorations nearly matching the excellence of restorations produced by well experienced dental technicians. The degree of interaction needed from the CAD/CAM system operator to design a restoration varies, ranging from substantial to no required user operations. Even in the most automated systems, the user generally has the option to modify the automatically designed restoration to fit individual preferences. Like the data acquisition systems, the software programs usually are proprietary to the CAD/CAM system and cannot be interchanged among systems.

When the design of the restoration is complete, the CAD software transforms the virtual model into a specific set of commands, which in turn, drives the CAM unit to fabricate the designed restoration.

CAM - fabricating the restoration

A diverse set of technologies have been used to create dental restorations through CAM, which utilizes a computer-generated path to shape an entity. Early systems relied almost exclusively on cutting the restoration from a prefabricated block with the use of burs, diamonds or diamond disks. This approach is termed as a “subtractive” CAM, since material is subtracted from a block to leave the desired shape for a part (for example, the dental restoration). Subtractive fabrication can create complete shapes effectively, but at the expense of material being wasted. Approximately 90 percent of a prefabricated block is removed to create a typical dental restoration.

Currently available CAD/CAM systems utilizing this approach include the CEREC system (Sirona Dental Systems LLC, Charlotte, NC) which is available for in-



office chairside use and was developed for manufacturing individualized dental restorations. Pallesen and van Dijken⁷ have evaluated ceramic inlays processed by the CEREC CAD/CAM system and found that ceramic inlays manufactured using the CAD/CAM system were successful.

The widely known CEREC^{TM8} and Procera^{TM9} systems have the general advantages of:

- (a) No need for making impressions of prepared teeth or the involvement of dental assistants;
- (b) Producing restorations free of the porosity found in fired ceramics and casting defects found in cast metals; and
- (c) Only a single appointment needed to place the restoration.

The ProceraTM system employs machine duplication (milling) and spark erosion to prepare dental copings from blocks of pure titanium and avoids the problems associated with dental casting of titanium, in which special casting machines and investments are needed¹⁰.

As an alternative, the “additive” CAM approach is like those used in rapid prototyping (also called “solid free-form fabrication”) technologies, which are beginning to be used in dental CAD/CAM systems. Selective laser sintering is one of the technologies that can be used to fabricate either ceramic or metal restorations (Medifactory, Bego Medical AG, Bremen, Germany; Hint ELs, Hint-ELs, Griesheim, Germany). In this method, the computer design of the part (for example, the dental restoration) generates a path much like a cutting tool path in existing CAD/CAM systems. However, instead of cutting, the system sinters material along the path, building a part from a “bath” of ceramic or metal powder and adding material continually until the complex part is complete. No excess material remains in the process.

Laser sintering¹¹ is a promising new technology which may replace casting of base metal alloys. A high-power laser (such as a carbon dioxide laser) can rapidly fuse small particles on the surface of a powder bed of the base metal alloy into a mass representing the desired three-dimensional object by scanning cross-sections

generated from a three dimensional digital description of the part. This can be done from a computer-aided design (CAD) file or another file created from scanned data. After each cross-section is scanned, the thickness of the powder bed of the base metal alloy is lowered by one layer, and a new layer of base metal alloy is applied on top. This process is repeated until the part is completed. The physical process involved with the laser sintering can be full melting, partial melting, or liquid-phase sintering, and up to essentially 100% density can be achieved¹².

PhenixTM Systems (Clermont-Ferrand, France) which markets the PM100 dental system¹³, is the first rapid manufacturing system that uses CAD/CAM technology for performing laser sintering of cobalt–chromium alloy powders, that is commercially available to dental laboratories for fabrication of dental prostheses. A 50 Watt Yb-fiber laser is the power source, and computer software is used to control the manufacturing cycle. The advantages of the system as claimed by the manufacturer are the reduction of unit production cost compared to the conventional lost wax casting technique, capability to manufacture up to 90 units in a single operation, ease of use, accuracy of the restorations produced, simplified post-processing procedures, and improved physicochemical characteristics. Further, there is no need for making impressions of prepared teeth, and the processed restorations are purported by the manufacturer to be free of the porosity normally found in cast prostheses.

The PhenixTM Systems approach has a major advantage over previous CAD/CAM systems in that gradient material compositions can be deposited by altering the metal powder fed into the nozzles. For example, Co–Cr alloy restorations could be prepared by directing the desired proportions of the individual elements into the melt pool. It is claimed by the manufacturer that fixed prostheses can be produced that contain up to 14 elements.

Through the conventional casting production process, a dental technician can currently produce about 20 dental frames per day. The process of laser sintering has made it possible to produce approximately 450 high-quality units of crowns and bridges in a span of 24 hours, which corresponds to an unbelievable production speed of approximately three minutes per unit on an average. EOS, founded in 1989, has revolutionized e-manufacturing through the EOSINT M 270 system¹⁴ – the only system of its kind that produces cost-effective, high-quality dental prostheses using Direct Metal Laser-Sintering (DMLS) [Illustration 1]. This “additive” CAM process of manufacturing dental prostheses utilizes 3D-CAD data slices from a model to produce the desired geometry in layers by selectively fusing a special cobalt chromium molybdenum-based super alloy powder at a temperature of 1400°C, using a 200 Watt Yb-fiber

laser. The system is capable of achieving a typical precision of ± 20 micrometers. It is interesting to note that the composition of the Co-Cr alloy used for laser-sintering does not contain tungsten and has lower molybdenum content, compared to a typical Co-Cr alloy used in the conventional casting process.

Laser sintering could result in the widespread clinical use of Co-Cr restorations due to their accurate fit, although their current use is limited¹⁵. A recent study by Akova et al¹⁶ showed that the shear bond strength between dental porcelain and laser-sintered Co-Cr alloy was not significantly different statistically from that observed between dental porcelain and conventionally cast Ni-Cr and Co-Cr alloys.

Conclusion

The Laser-sintering technique for manufacture of dental prostheses holds significant promise as a viable alternative to the conventional casting processes currently employed in dental laboratory practice. Future research should be focused on investigating the physical properties and surface characteristics of laser-sintered Co-Cr alloys, apart from further studies that would assess the biocompatibility of crowns fabricated using this technique.

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ISP TROPHY FOR IDA KERALA STATE IDA Kerala State Bagged ISP National Award For Best Oral Hygiene Day Celebrations

Indian Society of Periodontology observes Oral Hygiene Day on 1st August to commemorate the birth date of eminent Periodontist and academician, late Dr.G.B.Shankwalkar. The day is celebrated to bring awareness and stress the importance of oral hygiene to the public. ISP has instituted awards for the best Oral Hygiene Day Celebrations and, in this year 2011, IDA Kerala state has bagged the first prize in the Professional Organization Category. President, IDA Kerala State. Dr.Santhosh Sreedhar, received the award during the ISP National Conference held at Ahmedabad on 14 th October 2011.

Congratulations to the CDH Wing of IDA Kerala State.



Epigenetics : Unveiling new secrets in periodontics

* Presanthila Janam, ** Anila Jacob

Abstract

Periodontitis is a multifactorial infection characterized by inflammation and destruction of tooth supporting tissues, as a result of the response of a susceptible host to bacterial challenge. Studies have demonstrated that epigenetic events are able to influence the production of cytokines, the hyper and hypomethylation of cytokine genes ultimately contributing to the development of inflammatory diseases. Epigenetic events act through the remodeling of chromatin and can selectively activate or inactivate genes, determining their expression. The importance of epigenetics in the pathogenesis of diseases is likely to be as significant as that of traditional genetic mutations. Its an evolving new field in understanding the hidden aspects of periodontal destruction. Therefore, epigenetics may have future impact on diagnosis and/or therapeutics of periodontal disease.

Introduction

In biology, and specifically genetics, **epigenetics** is the study of changes produced in gene expression caused by mechanisms other than changes in the underlying DNA sequence—hence the name *epi-* (Greek: $\acute{\alpha}\delta\beta\acute{\alpha}$ - outer) *-genetics*^[1]. Hence non-genetic factors cause the organism's genes to behave (or “express themselves”) differently.^[2]

One example of epigenetic changes in eukaryotic biology is the process of cellular differentiation. A single fertilized egg cell – the zygote – changes into the many cell types including neurons, muscle cells, epithelium, blood vessels etc. as it continues to divide. It does so by activating some genes while inhibiting others.^[3]

Epigenetic mechanisms are affected by several factors and processes including development in utero and in childhood, environmental chemicals, drugs and pharmaceuticals, aging, and diet. **DNA methylation** is what occurs when methyl groups, an epigenetic factor found in some dietary sources, can tag DNA and activate or repress genes. Histones are proteins around which DNA can wind for compaction and gene regulation. **Histone modification** occurs when the binding of epigenetic factors to histone “tails” alters the extent to which DNA is wrapped around histones and the availability of genes in the DNA to be activated. All of these factors and processes can have an effect on people's health and influence their health possibly resulting in cancer, autoimmune disease, mental disorders, or diabetes . [FIG:1]

Definitions

Epigenetics (as in “epigenetic landscape”) was coined by C. H. Waddington in 1942.^[4] *Epigenesis* is an old word which has more recently been used to describe the differentiation of cells from their initial totipotent state in embryonic development.

Robin Holliday defined epigenetics as “the study of the mechanisms of temporal and spatial control of gene activity during the development of complex organisms.”^[4]

Molecular basis of epigenetics

Mechanisms

One way that genes are regulated is through the remodeling of chromatin. Chromatin is the complex of DNA and the histone proteins with which it associates. Histone proteins are little spheres that DNA wraps around. If the way that DNA is wrapped around the histones changes, gene expression can change as well. Chromatin remodeling is accomplished through two main mechanisms:

1. The first way is post translational modification of the amino acids that make up histone proteins. . If the amino acids that are in the chain are changed, the shape of the histone sphere might be modified. It is possible, then, that the modified histones may be carried into each new copy of the DNA. Once there, these histones may act as templates, initiating the surrounding new histones to be shaped in the new manner.

2. .The Second is by methylation of cytosine residues at 59-Cytosinephospho-Guanosine-39 (CpG) sites in DNA. Under normal physiologic conditions, methylation of CpG sites is maintained by DNA methyltransferases as a regulatory mechanism for silencing specific genes, as well as a protective mechanism for defense against viral sequences. Methylation of these CpG-rich stretches directly inhibits binding of transcriptional factors to the site, resulting in gene silencing. Hypermethylation at these sites is associated with the **development of several forms of human cancers**, such as through the focal **silencing of tumor suppressor genes**. . [FIG:2]

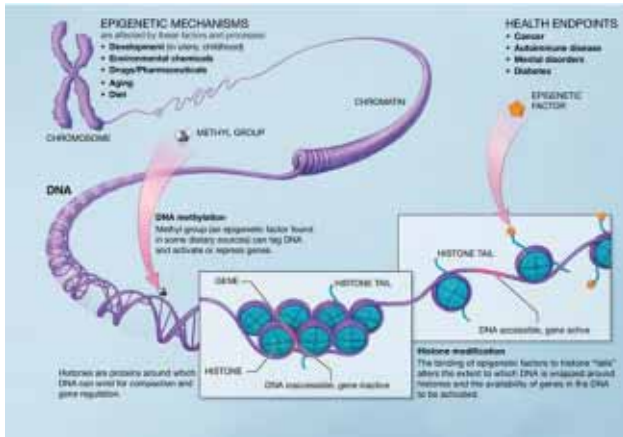


Fig. 1

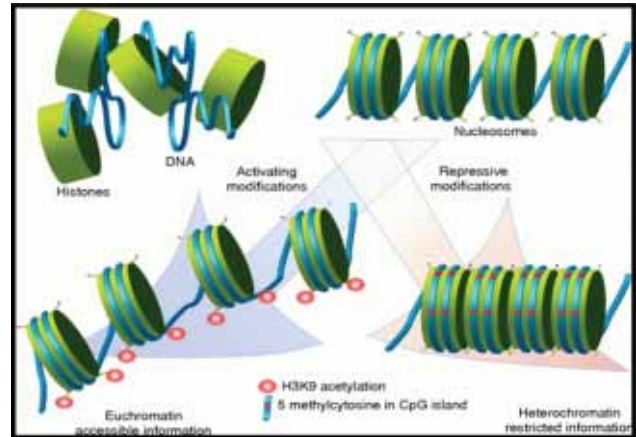


Fig. 2

Epigenetics in periodontics

Although genetic composition influences the biologic response by setting an inflammatory capacity for an individual, there is increasing evidence that epigenetics is critical for regulating the inflammatory response in a dynamic way^[5].

It was shown that even when a genotype is the same at a specific locus comparing two individuals, one may differ from the other due to epigenetic modifications induced by differences in exposures. Such changes are influenced by family history, as well as environmental exposures (e.g., in utero nutrition and toxins), and may have genomewide (global) effects in all cells or only in specific tissues or during certain developmental stages. However, more dynamic changes in epigenetic modulation may occur throughout the life of an individual. Plasticity in response to such factors as diet, aging, and toxins.

In addition, cigarette smoke is well known to induce global hypomethylation. Diabetes is another area to which epigenetic modulation has been linked. These types of epigenetic alterations tend to persist following cell division and, therefore, can impart transmissible, epigenetically modified phenotypes onto subsequent cells of the lineage.

In the case of biofilm bacteria, epigenetic changes in host tissue are often very specific for certain genes that are important for tissue resistance to colonization and breakdown. For infectious and inflammatory processes like periodontal disease, these changes often take the form of **shutting down host defenses** or lowering resistance to tissue breakdown. It is important to note that once epigenetic changes occur, they are conserved during cell division and the host tissue is permanently altered.

The oral biofilm is a unique structure that undergoes a maturational process characterized by early colonizers, intermediate colonizers (orange complex bacteria) and late colonizers (red complex bacteria). Recent evidence

indicates that certain orange and red complex bacteria (especially *C. rectus*) can cause epigenetic changes in cells and tissues^[6]. The organisms gain significant survival advantages as these changes shut down genes involved in local defenses and healing (facilitating colonization and dissemination), in the regulation of vascular endothelial function (decreasing tissue perfusion and increasing inflammatory damage), and in host metabolism (providing bacteria with more carbohydrates to fuel growth and reproduction).

We may need to consider a completely new paradigm based on individualized medicine that will take into consideration biofilm, persistence of orange or red complex bacteria, bleeding regardless of pocket depth (or lack of bleeding with deep pockets) and epigenetic modification of the periodontal tissues.

Epigenetic changes in periodontal tissues may facilitate the rapid reestablishment of a virulent biofilm and may help to explain **refractory cases** of periodontitis. In such cases, periodontal surgery might be justified if it is deemed beneficial to remove epigenetically modified tissues that may serve to maintain active disease. In addition to epigenetic modification of local periodontal tissues, biofilm bacteria (especially *C. rectus*) have also been shown to cause alterations in target tissues throughout the body^[6]. The most notable example involves the placenta, where epigenetic changes have been linked to adverse pregnancy outcomes. It appears that *C. rectus* causes changes in the developing placenta that impair perfusion, causing inflammation which leads to contraction of uterine smooth muscle, membrane rupture and neonatal inflammatory syndrome. In addition, *C. rectus* has been shown to reduce growth factor expression in utero, which may be a major factor in fetal growth restriction.

Technology is available to determine genomic-wide epigenetic changes that can be applied to study tissues at the biofilm interface to compare diseased tissue to healthy control tissue. Such microarray technology may

prove successful for identifying a number of hypermethylated and hypomethylated genes associated with periodontal infection . For example, preliminary findings suggested that the gene for IL-6, encoding a cytokine involved in the final differentiation of Bcells into immunoglobulin-secreting cells, undergoes a decrease in methylation (hypomethylation) in periodontal disease tissues compared to control samples . So IL-6 gene may be preferentially activated or upregulated in expression in periodontal disease compared to healthy control tissues, which is consistent with observed increases in GCF IL-6 levels^[5]. This results in increased B-cell activation, resulting in non-specific antibody production and IL-1 production. Also there is enhancement of bone resorption.

With the possibility of differential methylation patterns of many candidate genes remaining to be identified and confirmed, there is great potential for elucidating a variety of other genes whose expression may contribute to periodontal disease.

Conclusion

Epigenetics is perhaps the most exciting new field of biologic investigation , and it is starting to change the way we think about mechanisms of disease, individual susceptibility and response to treatment. Increasing evidence suggests that subject-level variables interact with an individual's genetic and epigenetic

composition to influence biologic phenotype and ultimately disease expression.

With advances in technology, our understanding of this area of biology is increasing rapidly, and emerging evidence suggests that epigenetic modification plays an important role in inflammatory diseases like periodontitis .Hence effectively developed and accurately directed treatment options modifying and controlling epigenetic factors may play the key role in periodontal disease management in the future.

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Probiotics in oral health & disease

* Elizabeth Koshi, **Koshi Philp, ***Gayathri S.

Abstract

Chemotherapeutics are widely used to prevent and treat infections. However, the development of resistance to antibiotics have encouraged researchers to develop alternative antimicrobial approaches. The application of health promoting bacteria is an emerging field and use of probiotics as preventive and therapeutic product for oral health care is reviewed.

Introduction

The term 'Probiotic, means 'for life' and it is currently used when referring to bacteria associated with beneficial effects on human and animals. Probiotics are live microorganisms administered in adequate amounts with beneficial effects on the host. Antibiotics not only destroy the harmful bacteria that can cause infection, but also the useful bacteria that help to fight infection. Probiotics, on the other hand, re-populate the beneficial bacteria which can kill pathogenic bacteria and fight against infection.¹

The term Probiotics was adopted in 2003. By definition Probiotics are live microorganism that when administered in adequate amounts confer health benefits upon the host. Probiotics play a crucial role in halting, altering or delaying periodontal diseases. It is mainly used in Periodontics in plaque modification, altering anerobic bacterial colonization, improvement of pocket depth, clinical attachment loss and in the management of halitosis.

Anticipated mechanism of probiotic activity

Direct interaction - Probiotics interact directly with the disease causing microbes, making it harder for them to cause the disease.²

Competitive Exclusion - Beneficial microbes directly compete with the disease developing microbes for nutrition or enterocyte adhesion sites.

Modulation of host immune response - Probiotics modulate host immunity both systemically and locally.³

Decrease in pro inflammatory cytokines by probiotic ingestion.

Probiotics in periodontal therapy

Various probiotic organism used in periodontal therapy are lacto bacillus species, Bifidobacterium species and Streptococcus species. Generally, probiotics are delivered in diary products mainly fermented milk, as food supplement in tablet form or in soft drinks. A lozenge form or a chewing gum serves better.

Probiotics can be used in the treatment of gingivitis, periodontitis and even halitosis.⁴

Probiotics in management of gingivitis

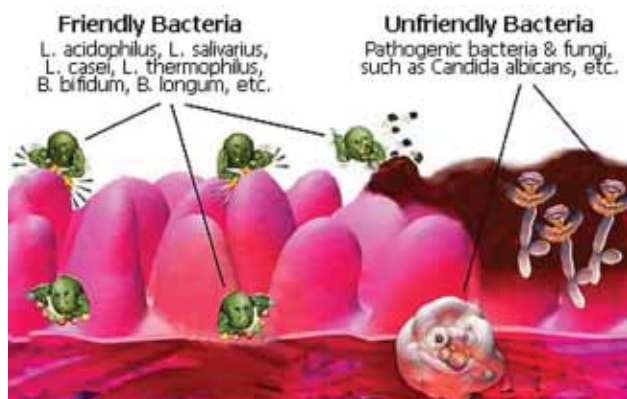
Krasse et al⁵ evaluated the effect of lactobacillus strain- L-reuteri in the treatment of recurrent gingivitis. The Selection of this strain was based on the generally claimed health effects of lactobacillus. A double blind, randomized placebo – controlled study with 59 patients with moderate to severe gingivitis was enrolled. The probiotic groups received L- reuteri strains delivered via chewing gum. The patients were instructed to use the chewing gum twice a day for 2 week. Gingivitis and plaque scores were recorded at baseline and end on 2 weeks. The gingival scores and plaque scores was reduced in both groups, but was more reduced in patients receiving probiotics than in the placebo group. This led the author to conclude that L-reuteri is efficient in reducing gingivitis and plaque scores. The possible mechanism involved is

- L- reuteri inhibit the growth of a wide variety of pathogens.
- It has the capacity to adhere to host tissues and competing with the pathogenic bacteria.
- It exhibits anti – inflammatory effects.

Probiotics and periodontitis

Studies has found that the bacteria causing periodontal diseases could be regulated by applying a probiotic which inhibited their growth and there was a decrease in inflammation of gingiva and bleeding on probing. Clinical studies on probiotics and periodontal disease have evaluated the efficacy of Lactobacillus reuteri and Lactobacillus brevis. It is found that it is able to affect gingivitis and plaque composition positively and are specific markers for periodontal disease.^{1,2}

Riccia et al⁶ studied the anti inflammatory effects of lactobacillus brevis in patients with chronic periodontitis and concluded that L- brevis has a anti inflammatory action and it can be attributed to its capacity to prevent



the production of nitric oxide and release of PGE2 and activation of MMPs induced by nitric oxide.

Halitosis

Halitosis or bad breath, is a condition where breath has an unpleasant odour. Volatile sulphur compounds (VSC) are responsible for halitosis. Bacteria responsible for VSC production are *Fusobacterium nucleatum*, *Prophyromonas gingivalis*, *Prevotella intermedia*, and *Treponema denticola*. Approximately 80 – 90 % of causes of bad breath originate in the mouth. The back of the tongue is thought to be the most common site in the mouth where bad odour is produced. Studies have found that by administering probiotic bacteria, it was possible to suppress the odour producing bacteria, resulting in decrease in the foul smell. *Streptococcus salivarius* produces bacteriocins, which inhibit bacteria producing VSC. It is shown that lozenges and gum containing *Streptococcus salivarius* decrease VSC in halitosis patients^{7,8}.

Dental caries

Studies using orally administered probiotics have found that certain strains can inhibit the growth *S. mutans*. A study done on children during their early childhood

reported a significant reduction in caries after seven months of daily consumption of probiotic milk. The conclusion was that probiotics seems to be a natural way to maintain dental health and that daily intake of probiotics in early childhood may result in less dental caries^{1,3}.

Conclusion

Probiotics play an important role in combating issues with overuse of antibiotics and antimicrobial resistance. Probiotics are promising, safe, natural, and its application in periodontal therapy needs to be explored further.

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Treatment planning for post-radiation therapy patient

* J. Srinivas Kumar, ** K Nagarjuna, ** Rahamtulla Syed

Abstract

Patients undergoing radiation therapy in head and neck region are critical for dental practitioners in caries control, long term restoration, xerostomia and prosthodontic difficulties. In many cases extraction may be option, but if radiation therapy was recently done and patient is young, then it may be inappropriate. This paper describes the management of a young patient with xerostomia, following radiation, preventive and restorative management are discussed for long-term stabilization, management and prevention of osteoradionecrosis.

Pre-treatment planning for patients likely to be affected by post-radiotherapy, xerostomia is always a challenge and good maintenance is difficult to achieve. This case study demonstrates the treatment and maintenance of young female patient who prior to radiation therapy had not undergone any oral prophylaxis, so it was challenging.

Case Study

A 35 years old female patient was referred from cancer hospital post radiation therapy who was unable to maintain oral hygiene. She had undergone radiation one month back for laryngeal carcinoma. No oral prophylaxis was done before radiation therapy. Post radiations and after one month of radiation therapy she complains of pain and bad odor. On examination, the patient displayed sign of severe xerostomia with shiny, dry, mucous membrane with very little saliva being evident. The dentition was grossly carious, loss of tooth structure in many teeth, several teeth were missing, presence of root stumps (fig. 1). She also reported difficulty in practicing oral hygiene procedures and extreme sensitivity, lacerated mucosa, restricted mouth opening were evident.

Diagnosis

Post radiation therapy xerostomia.
Chronic marginal gingivitis.
Grossly carious teeth with some teeth involved pulpally.
Reduced mouth opening.
Periradicular pathology.
Poor esthetics.
Traumatic laceration of mucosa.
Maxillary occlusal plane was irregular.(fig.2)
Supraerupted teeth (Maxillary teeth impinging on mandibular area).
Oral mucosa was lacerated due to broken sharp teeth.
Shortened dental arch.

Treatment objectives

Relief of pain, prevention of further progression of the disease, treatment of dental diseases, prevention of osteoradionecrosis, good functional occlusion, esthetic improvement, maintenance of a stable oral environment.

Treatment options

Extractions.
Crowns.
Restoration of key teeth and provision of partial denture.
SDA (Shortened dental arch).
Many treatment options would necessitate patient motivation, intensive preventive prognosis, patient skill. One requirement of shortened dental arch is to maintain remaining teeth for some considerable time.

In this case many teeth are grossly carious, carious broken, pulpally involved. It was decided to restore all remaining teeth, few with endodontics and restoratively, sharp cusps were smoothed (Enameloplasty).

It may also be possible that there will be increase in the salivary secretions and vascularity. In future more accurate prosthetic treatment may be possible like crowns, post and core crowns.

Treatment

Oral hygiene instructions with soft brush, and oral irrigation.
Restricted to refined sugar.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

Topical application of chlorhexidine – (Antiseptic 0.2% gel).

GC tooth mousse (GC Japan) Gel – (3% SnF₂) Topical fluoride.(fig.3)

Placentex gel → releases fibrotic bands obtained from placenta.

Cellulose water for stimulating saliva function.

Restorative treatment for 13, 14, 24, 25.

Endodontic treatment for 11, 12, 21, 22, 23, 26, 27, 44, 45.

RPD – (to prevent supra eruption and for mastication) for mandibular area.(fig.4)

Excavation of carious lesion and interior restoration was placed until definitive treatment is planned. Larger exposure were extirpated and endodontically treated to minimize patient discomfort. The risk of osteoradionecrosis in irradiated bone, increased risk of pulpal death and periradicular infection made elective vital extirpation to preferred option. All cavities were restored with GIC and composite resin (sandwich technique) because GIC has better adhesion and anticariogenic properties. Anterior teeth were restored with composite resin. Patient was recalled for weekly follow-up. Root stumps were not extracted. RPD was inserted over the remaining root stumps.(fig.5)

Patient was advised for continuing preventive care, regular visits for periodic check-up, Endodontically treated teeth was asymptomatic, gingiva was healthy, sensitivity was decreased, salivary secretion was increased, mucosal condition was treated with antifungal (Candid TV) and placentex gel for improving mouth opening.

Prognosis

Follow-up for 2 years is needed. Prognosis is dependent on endodontic treatment, ability to maintain hygiene, topical application measures, under this there will be marked recovery in salivary gland function. It is doubtful that RPD will be unfavorable and well retained. (Due to less no. of teeth for retention and support and improvement in mouth opening).

Conclusion

Careful evaluation and thorough examination of patient oral health undergoing radiotherapy should be done. Preventive, Restorative and Prosthodontic treatment should be planned to make patients systemic and oral health status in good condition for the sake of function (mastication, phonetics), esthetics, comfort, and prevention further deterioration of oral health.

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Diagnose

Diagnose the following case

* Rajitha AV, **Anita Balan, ***Sharafuddeen K.P, *** Nileena R Kumar, *** Haris P.S



Fig 1



Fig 2



Fig 3

A 48 year old man reported to the out-patient department of GDC Kozhikode with the complaint of toothache for the past 3 days. On examination the reason for toothache was found to be pulpally exposed 26. There was mild ptosis of the right eye (fig 1), which popped out on opening the mouth wide (fig 2) and during left lateral excursion(fig 3). This condition was present since childhood. There was no familial history. All other findings were within normal limits.

Diagnose this condition:

Treatment is usually unnecessary. In severe cases, surgery with a bilateral levator excision and frontalis brow suspension may be used.

In rare cases, synkinesis may be present between the medial pterygoid and levator muscles. In these cases, the eyelid elevates on closing the mouth and clenching the teeth.

In the case described above, mild ptosis of right eye was observed (fig 1) and the eyelid got retracted when the mouth was opened and moved laterally towards left. Here the connection appears to exist between the motor branches of the trigeminal nerve innervating the right lateral pterygoid muscle and the fibers of the superior division of the oculomotor nerve that innervate the levator superioris muscle of the right upper eyelid.

Marcus Gunn phenomenon (Marcus Gunn jaw-winking or Trigemino-oculomotor Synkinesis) is characterized by eyelid ptosis, of varying degrees and generally unilateral, which is reduced, or even transformed into eyelid retraction when the jaw is moved (during chewing, suction, lateral mandible movement, smiling, sternocleidomastoid contraction, protrusion of the tongue, the Valsalva maneuver or during breathing). It was first described by Marcus Gunn in 1883. This condition is attributed to a synkinesis: when two or more muscles that are independently innervated have either simultaneous or coordinated movements due to aberrant connection. It can be congenital (an autosomal-dominant condition with incomplete penetrance) or acquired due to trauma.

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ANSWERS

Quiz

* Saakshi Gulati, ** Anita Balan, *** Sharafuddeen K.P, *** Nileena R Kumar, *** Haris P.S

1. Identify the condition. It is usually associated with which syndrome –



- a) Talon's cusp, Proteus syndrome
 b) Talon's cusp, Rubinstein's – Taybi syndrome
 c) Taurodontism, Klinefelter syndrome
 d) Fusion, Oro-facial digital syndrome

2. A 22 year old patient came to the OPD with the complaint of sudden appearance of blood filled vesicle on left buccal mucosa. There was a history of mild trauma. Most probable diagnosis is-



- a) Hemangioma
 b) Ecchymosis
 c) Angina bullosa haemorrhagica
 d) Hematoma

3. A permanent tooth with a local hypoplastic deformity in a crown is called as –

- a) Turner's tooth b) Taurodontism
 c) Enameloma d) Ghost teeth

4. A lady came to the OPD with a complaint of a swelling over Submandibular region, which increased in size on eating. A radio opacity can be seen on panoramic radiograph. It is suggestive of-



- a) Sialolith
 b) Foreign body impaction
 c) Phlebolith d) Dystrophic calcification

5. Accessory cusped first premolar as seen in the colour plate and radiograph is known as except -



- a) Leong's premolar b) Eagles tooth
 c) Occlusal Tuberculated Premolar
 d) Evaginated Odontome

6. Small discrete swelling on the alveolar ridge of a new born is suggestive of –

- a) Bohn's nodules
 b) Dental lamina cyst of new born.
 c) Epstein's pearls
 d) Eruption cyst



7. Identify the condition –



- a) Internal Resorption b) External Resorption
 c) Mottled teeth d) Ghost teeth

8. The condition seen in the clinical picture is suggestive of –

- a) Macrodontia
 b) Fusion
 c) Concrescence
 d) Twinning



9. Dilated odontome is the most severe form of -

- a) Dens evaginatus
 b) Dentin dysplasia
 c) Dens in dente
 d) Odontodysplasia

10. A patient came to the OPD with a complaint of well demarcated area on his tongue which has been there for as long as he can remember. The most probable diagnosis is-

- a) Blacky hairy tongue
 b) Median rhomboid glossitis
 c) Mollers glossitis
 d) Geographic tongue



ANSWERS: 1-b, 2-c, 3-a, 4-a, 5-b, 6-b, 7-a, 8-b, 9 -c, 10-b

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Secretary's Report and Association News



My dear fellow Members,

Our profession today is witnessing a very turbulent scenario. The forthcoming years will see myriads of dental surgeons passing out from the 23 dental colleges in our state. We have already reached a saturation point in our profession, with little room for the new graduates to thrive. The government policy of sanctioning essentiality certificates to start new dental colleges will definitely add fuel to the fire. This is the time for us to protest strongly and stay united against this absurd policy of the government. So my friends let us all join hands in this struggle against the threat that will shake the very edifice of our fraternity.

Dr. Shibu Rajagopal
Hon. Secretary
IDA Kerala State.

Dr. Deebu. J. Mathew
CDE Convenor

CDE Report



Friends,

It is with pride that I present the report of the Continuing Education Wing of IDA Kerala State. Our branch is the most vibrant in the field of Continuing Education due to the massive participation of members. I must express my whole-hearted gratefulness to each one of you for making all the CDE programmes held a grand success. I request you to forgive any shortcomings which may have risen from my side.

For the chronological list of CDE events held in IDA Kerala State, please log on www.idakerala.com

Report of the 5th State level CDE programme

Indian Dental Association, Kerala State in association with Society of Periodontists and Implantologists of Kerala conducted a CDE programme on 28th August 2011 at Mahe Institute of Dental Sciences (MINDS), Mahe. It was a Live Surgical workshop on Periodontal Regenerative Procedures, Implants & Lasers.

The inaugural ceremony began with a welcome address by Dr. Harindranathan

(Principal, MINDS). The Chairman of MINDS Mr. Ramesh Kumar inaugurated the CDE programme. Dr. Santhosh Sreedhar (President IDA Kerala state & SPIK) presided over the function. Dr. Deebu J. Mathew (CDE Chairman, IDA Kerala), Dr. Anil Melath (Vice Principal, MINDS) Felicitated the occasion.

The President of IDA Kerala Dr. Santhosh Sreedhar honoured Dr. Rosamma Joseph for receiving the best doctor award from Govt. of Kerala.

Dr. Nandakumar (Editor, KDJ) released the 3rd issue of Kerala Dental Journal by giving a copy to Dr. C.K. Ashokan.

The first live demonstration was on Laser loc implant placement by

Dr. Sudhindra Kulkarni (Prof Of Implantology, SDM College of Dental Sciences, Dharwad) followed by a live demonstration on periodontal flap surgery with bone graft and GTR therapy by Dr. Nandini Manjunath (Prof & Head of Periodontics, A.J. Institute of Dental Sciences, Mangalore). The third live demonstration was on Laser treatment for gingival depigmentation with cutting edge technology by Dr. Jagdish Pai (Prof of Periodontics, Coorg Institute of Dental Sciences, Virajpet). The live telecast of the surgical demonstration was followed by a panel discussion and interactive session by the speakers & the moderators for the programme Dr. Nandakumar, Dr. Mathai Joseph and Dr. Anil Melath. More than 200 delegates from Kerala and Karnataka attended the CDE programme.



CDH Report

Dr Abdul Latheef K H
CDH Chairman



Kerala state IDA- World Oral Health day - Report

The Kerala state Indian Dental Association World Oral Health day celebrations hosted by IDA Kochi branch was held on 11th September 2011, 9 am at Lions Community Hall Kochi. Prof. K.V Thomas Honorable Union Minister for Consumer Affairs, Food and Public Distribution inaugurated the World Oral Health Day activities. IDA Kerala State President Dr.Santosh Sreedhar presided the function. IDA Kerala state charter president Dr.M.K James was the guest of honour for the event. Dr.Noorudheen A.M (President IDA Kochi) welcomed the gathering. Dr.Shibu Rajagopal (Secretary IDA Kerala state) , Dr.Abdul Latheef (CDH Chairman IDA Kerala state),Dr.Sunil Alexander (CDH Chairman Kochi), Dr.Arun Babu (Secretary IDA Kochi)extended there felicitations. Following this a Dental Awareness program was conducted by Dr.Civy Pulayath

(Asst.Professor of Community Dentistry, Al-Azhar Dental College,Thodupuzha). The function was well attended by large number of people. A painting competition was also conducted on the same day for the school children in and around Kochi and prizes were distributed to the winners . Award distribution for the Smile Photo competition was also held on that day. The function concluded with vote of thanks by Dr.Jayakumar.S (State Co-ordinator for IDA State Oral Health Day). On September 12th 2011, IDA conducted a Oral Hygiene interaction forum at Haggia Sofia Public School, Mattakuzhy, Kochi.



REPORT OF ANNUAL SPORTS MEET

The Annual Sports Meet of IDA Kerala State was held on 23rd Oct at Tellichery. This year in addition to the usual Shuttle Badminton tournament we had Outdoor

Sports for members, and their families. The events included Running Race for Gents Ladies and children, Shot Put for Gents and Ladies, Sack Race for Men, Lemon and Spoon for Ladies, Tug of War for Gents and Ladies and Musical Chairs for Ladies and Kids. In all 12 branches participated actively in all the events and there was tough competition in all of them.

An inaugural function was held at the venue of the Shuttle tournament. After the welcome address by the Sports Committee Chairman, Dr. Dinesh Nambiar the meet was inaugurated by the State president Dr. Santosh Sreedhar. This was followed by addresses by Dr. Shibu Rajagopal and Dr. Raveendranath. Felicitations were offered by Dr. Sreejith and Dr. Ranjith Krishnan. Sports Committee Convenor Dr. A V Sreekumar offered the Vote of thanks.

Shuttle Singles was won by Dr. Madhu of Kochi who defeated Dr. Sajith of Wynad.

Shuttle Doubles was won by Dr Madhu and Dr Bibin of Kochi who defeated Dr Shaheer and Dr Salim of North Malabar.

Ladies Singles was won by Dr Nisha Soumithran of Malabar who defeated Dr Leena Murali of North Malabar.

Veteran's Singles was won by Dr Mayan of North Malabar who defeated Dr Soumithran of Malabar.

An Overall Championship award was decided based on the points accrued in Shuttle and Outdoor Sports. This award was bagged by IDANMB after a very close tussle with IDA Coastal Malabar.

The exciting day concluded with a glittering Prize Distribution Ceremony.



ISP President Elect



President-IDA Kerala State Dr.Santhosh Sreedhar has been elected as the President Elect of Indian Society of Periodontology during the ISP National Conference held on 15 th October 2011 at Ahamedabad.

MAVELIKKARA

1. A family get together was held at Green Valley Park ,Adoor on 28th august. This was also an occasion to celebrate the 2nd consecutive triumph in the chilamboli 2011. The members who participated and won the 1st price in chilamboli were congratulated.
2. Onam Celebrations were held on 25th sept 2011 at The Rooyal Gardens, Harippad. More than 60 families attended and enjoyed the functions. There were some innovative games for kids and ladies. The programme was organised by lady's wing under Dr.Seethi Begum and Dr.Jayasree Anil.
3. A 2 day Family tour was organised to Thaneermukkom, Alappuzha on 22nd and 23rd october. Around 30 members participated in the tour.

ATTINGAL

BRANCH EXECUTIVE COMMITTEE MEETING

The 4th executive was held at Taj Gateway Hotel Varkala on 3rd July Sunday. The branch journal "IMPRESSIONS" was released by president Dr Alex Philip. Hon.Sec DrArunRoy.S presented half yearly report.All members were present.

The 5th executive meeting was held on Aug 27th at Attingal Club. Meeting decided to conduct Onam Celebration on Oct 2nd Also decided to conduct a CDE on Prosthodontics by Prof. Dr. K. Chandrasekharan Nair.

CDE

The 4th cde programme was held on July 24th Sunday at hotel Park Rajadhani, Ulloor. The faculty was Prof. Capt. Dr Vivek V, HOD, Oral medicine Dept P.M.S Dental college,Tvm.Topic-"Interpreting shades of gray". 50 members attended the class.

PALAKKAD

4th EC Meeting on 8th Aug. 2011 at KPM Residency, Palakkad
Onam Celebration on 11th Sept 2011 at Hotel Tripenta, Malampuzha, Palakkad. ten members were participated
CDE programme on 2nd October 2011 at KPM Residency, Palakkad. Advocate Shyam Padman was the faculty. Topic on Are You legally Aware? 15 members participated.

The inauguration of The VALLUVANAD Branch (28th branch) of Indian Dental Association, Kerala State

The inauguration of Valluvanad Branch of Indian Dental Association, Kerala State was conducted in a grand and befitting manner on 21st August 2011. The event was held in Hotel Nakshatra Regency, a 3 star hotel in Koppam, Pattambi. The program was started at 5.15 p.m with a grand master of ceremony leading the IDA stalwarts to the stage.

The Program was flagged off by the IDA, Kerala State President Dr.Santosh Sreedhar. Miss Malvika Deepak invoked the blessings of the almighty with a soulful prayer. Dr.Srikant, the member of the proposed Valluvanad branch welcomed the gathering.

Dr.Santosh Sreedhar, delivered his presidential address. He elaborated the need of strong IDA and detailed the programs being done by the State IDA. All those present were highly impressed with the activities of the State IDA under the dynamic leadership of Dr.Santosh. Dr.Seema Deepak, Introduced the Chief Guest our beloved National President Dr.George Thomas to the audience.

The branch was inaugurated by lighting the large lamp by our Chief Guest. Chief Guest and Our National IDA president Dr.George Thomas Addressed the gathering. His inspiring and informative speech left the audience spellbound. He spoke about the National Activities of the IDA and he was also happy to announce the inauguration of a Branch in Gangtok, Sikkim.

The Charter President of the Valluvanad branch Dr.C.Balasubramaniam was introduced by Dr.Thomas.

Dr.Balasubramaniam stated that he accepts the honor bestowed to him with humbleness. The office bearers of the new Branch were installed by Dr.C.Balasubramaniam. The Constitution and Bye laws of the IDA was handed over to the branch secretary Dr.Sanjay by the State Secretary Dr. Shibu Rajagopal. Dr. Shibu in his address stated the importance of the Valluvanad region to the crowd.

The Guest of Honor Dr.M.C.Mohan, the Past National President, IDA, addressed the gathering. He fondly remembered the days of travelling wide and large in those days when there very few branches.

The incoming State IDA President Dr.Raveendranath, District Officers Dr.Sanal, Dr.Latheef, Dr.Deebu felicitated the incoming team. Dr.Fahas from Kunnankulam branch and Dr.Anand from Palakkad branch offered their felicitations. Pleasantries were bestowed to the dignitaries.

The Charter secretary of the Valluvanad Branch Dr.Sanjay proposed the vote of Thanks. After the National anthem the meeting was adjourned for entertainments. Professional entertainments were excellent and the dinner and fellowship was sumptuous.

It was an excellent program organized by the IDA Kerala State under the dynamic leadership of Dr.Santosh and the Valluvanad branch is thankful to Dr.George Thomas our beloved National president, Dr.M.C.Mohan and others who made the evening eventful.



PATHANAMTHITTA

July – 2011

08-07-2011: 3rd Executive committee meeting was held at Dr. JacobKorah's residence

17-07-2011: Urgent state executive committee meeting held at Kollam was attended by Dr.Eugene Varghese Joseph, Dr. Rajesh V, Dr. Johnykutty Jacob, Dr.Thomas Varghese & Dr. Gigu Zachariah Philip.

August– 2011

07-08-2011: Chilamboli 2011-The branch had very actively participated in the State level cultural fest. There were practice sessions conducted for the programme .The branch presented 5 items in the competition. 1. Solo Song-master. Arjun B. Nair, 2.Solo Dance-Dr. Suku Koshy, 3. Fashion Show - Samyuktha Rajesh, Rohit T. Varghese, Josekutty Giboy, Senorita Suku, Issac Binu, Sachin Joseph Varghese, Reuben Binu, Neha Rajesh, Saurav Rajesh, Ken Giboy, Sherin Suku, Athulya Pramod & Anantha Krishnan . 4. Group Dance : Dr. Rincy Eugene, Dr. Hema Rajesh, Dr. Lekha binu, Dr. Anju Manoj, Dr. Shiby Giboy, Dr. Lekha,

Dr. Anitha pramod & Mrs. Biny Suku. 5. Group Song: - Dr. V.Rajesh, Dr. Biju U. Nair, Dr. Johnykutty Jacob, Dr. Eugene Varghese Joseph, Dr. Hema Rajesh, Dr. Anju Manoj, Dr. Anitha Pramod & Dr. Lekha. All members could perform very well and gain appreciation. master. Arjun b. Nair (s/o dr. binu G .Nair & dr. maya nair) won the 1st prize for solo song and the group song team won the 1st prize. Dr. rajesh V had co-ordinated the practice sessions.

14.08.2011: 3rd CDE Programme on the topic 'Practical Procedures to Intercept the Developing Malocclusions & Skeletal Deformities' by Dr. Reji Abraham MDS was conducted at aban arcade, Pathanamthitta. It was a very informative and useful programme for all those who have attended. The meeting congratulated Dr. Johnykutty Jacob for being nominated by the Kerala Government as the Member of Kerala Dental Council.

September- 2011

05-09-2011: 4TH Executive Committee Meeting was held at Jaycees Hall Pathanamthitta at 7.30 pm.



KUNNAMKULAM

3rd General Body Meeting: 29-07-2011

Venue: Hotel Liwa Tower, Kunnamkulam.

Time: 8.00 pm. 24 members were attended,

- Welcome by president Dr. Geo Joy, • Template Discussion.
- Onam and Eid Program Discussion. • Decided to conduct Inter branch CDE on November 20th.
- Decided to conduct Dental Camp in October 2nd week.
- Appointed Dr. Pradeep and Dr. Grigory as Internal Auditors.
- Decided to raise the membership fees.
- Decided to close our SB Account, from Catholic Syrian Bank.

EXECUTIVE MEETINGS:

EC Meeting No – 4 Date : 20-8-2011

Place : Hotel Sopanam Heritage, Guruvayoor.

13 members were attended, Minutes : Agenda discussed and passed unanimously.

3rd FAMILY GET- TOGETHER and ONAM AND EID CELEBRATION. Date : 19-6-2011

Place – Hotel Sopanam Heritage.

35 members were attended

Programmes:-

- Ona Sadhya, Pookkalam Matsaram, Mehendhi Competition, Arm Wrestling Competition, Tug of War, General Body Meeting, Releasing of Branch Journal- "Image" Cultural Programmes, Prizes distribution- to the winners, Vote of Thanks by secretary, followed by Eid Eve.

- Image Release. 3rd Edition.

- Actively Participated in Kunnamkulam Pouravali Onam Celebrations and won 3rd prize in Tug of War.



MALAPPURAM

Report of activity of IDA Malappuram from July 10th-Oct 9th 2011.

2nd interbranch CDE on 'ALL CERAMIC OPTIONS FOR SUCCESSFUL PATIENT RESTORATION' by Dr. Madhumani Kumra was held at Soorya Regency on 24th July 2011 9am-2pm 23 members attended the programme.

IDA Malappuram organized Eid & Onam celebrations on 18th September 2011, Sunday at CEEVEE LAND Water Theme park from 3p.m to 9.30p.m 21 members with their family attended the programme. Dr. Biju. J. Nair president welcomed the gathering, Dr. Rajan Mathews past president added lighter side of the day



with humorous message. A total of 53 members enjoyed the evening was filled with water sport, as Sun dawned to a evening filled with Korake, kid programmes & culminated with mouth watering sea food & Malappuram delicacies.

A Clinical club meeting was held at Silent valley resort, Pulamantole as part of 'World Photography day on Aug 19th, 8p.m Mr. Praveen ace photographer gave tips on photography. 8 members attended the program.

The 7th Executive Committee Meeting of the IDA, Malappuram Branch was held at Prasanth Residency, Malappuram on Wednesday, the 13th July, 2011 at 8.p.m. 16 members attended.

The 8th Executive Committee Meeting & ifthar meet of the IDA, Malappuram Branch was held at Prasanth Residency, Malappuram on Tuesday, the 9th Aug, 2011 at 6.45.p.m. 18 members attended

The 9th Executive Committee Meeting of the IDA, Malappuram Branch was held at Prasanth Residency, Malappuram on Tuesday, the 4th Oct, 2011 at 8.p.m. 9 members attended

CDH PROGRAM: Two posters for display at clinic reception as part of our 'NO TOBACCO' initiative & 'Muthuchippi' a combined women's wing & CDH program - oral hygiene awareness project for pregnant women were distributed among members.



THE DR. SHINY FRANCIS MEMORIAL TROPHY ESSAY COMPETITION

Indian Dental Association, Malappuram Branch & Woman's wing of IDA Malappuram is conducting The Dr. Shiny Francis Memorial Trophy Essay Competition (a memoir to the late Dr. Shiny Francis, who had been an active member of our branch). The trophy will be presented to the best Essay written by a female dentist/student of the Kerala dental fraternity. The subject is "THE CHANGING ROLE OF WOMAN PERTAINING TO DENTISTRY IN TODAY'S WORLD". The essay should be in English presented as printed matter in not more than 2000 words. Entries should reach the Honorary Secretary, Dr. Sameer.T.A's, office on or before the 7th of November, 2011 with copy of IDA membership card /Branch Secretary letter, for student members a letter from your principal with your membership number .

The address is as follows: **Dr. Sameer.T.A.**, Secretary, Indian Dental Association-Malappuram, Dental center, Moulana Hospital Perinthalmanna-679322, Malappuram, Ph:04933-307163, M:9037176457, e-mail:sameerta@gmail.com

CHALAKUDY

Third general body meeting was held at cosmos club, located at Chalakudy in which 26 members participated.

Dr: George Attokaran prosthodontist, was the faculty of the Day, and the topic was prosthetic managements in dental practice,

4th Executive meeting was held on 22nd August at pwd guest house, Chalakudy.

CAMP ACTIVITIES:- On 28th August Dr: Kiran Thaliyath and Dr:Deepthi kiran treated 16 mentally disabled childrens at our out reach clinic 2, which



is located at Madona school, Potta, Near chalakudy. On 2nd October dental treatment at our out reach clinic 2, was conducted by Dr. Sunner Mohan and Dr. Anjo Jimmy. 18 patients were treated on that day.

CORRECTION:- In July edition (vol.34, no. 3 July 2011) of Kerala Dental Journal, the cash amount donated by Chalakudy IDA Branch, towards old age home, as a part of Dentists day celebrations, was printed as 120,250/- This was a printing mistake. Actual amount contributed and donated was 12,250/-



KASARAGOD

On 31-7-2011, conducted a CDE programme on Composites by Dr. Feblin Lobo at J.K.Residency, Kasaragod. The programme was sponsored by 3M and was well conducted and attended in large number. (pic -1)



On 7-9-2011, conducted a CDE programme on the topic of Precision attachments by Dr. Niveditha, MDS (Prosthodontics) and Metal free ceramics by Dr. Justin George at IMA Hall, Ksararagod. (pic-2)



THIRUVALLA

Greetings from IDA-Thiruvalla. For the first time,IDA-Thiruvalla was able to conduct the COLGATE-PALMOLIVE ACADEMIA programme on 22.09.11 at the Pushpagiri college of dental sciences,Thiruvalla. Mr.Jacob Job.IPS(IG of Police) inaugurated the programme.

Our Onam celebrations & Gandhi jayanthi celebrations were held on 2.10.11 at the lush Green valley resorts,Adoor. Mr.Babu George,President of



Pathanamthitta district Panchayat inaugurated the programme. Mr Oommen Joseph,Chairman Adoor Municipality,DrShibu Rajagopal,Sec:IDA Kerela,DrSamuel.K.Ninan IPP IDA Kerela graced the occasion. The night was filled with pomp & show. Mr:Rajendran (SuryaTVfame) performed the traditional 'NADANPATTU' at the occasion.



CENTRAL KERALA KOTTAYAM

JULY 2011

Executive Committee - The Fifth Executive Committee Meeting of the IDA CKK was held on 4th July 2011 at Kottayam Club .24 members were present for the meeting.

EOGM - An EOGM of IDA Central Kerala Kottayam branch was held on 14th July 2011 at Hotel Pearl Regency , Kottayam at 7.30pm. 41 members attended this meeting

CDE - The Central Kerala Kottayam branch played host for the Fourth State level CDE. It was held on 31st July 2011 at Hotel Aida. Topic was "Success in Crown & Bridge" by Prof Chandrasekharan Nair. 165 participants attended the Full day Program.



AUGUST 2011

Executive Committee - The Sixth Executive Committee Meeting of the IDA CKK was held on 9th August 2011 at Kottayam Club .18 members were present for the meeting.

CDE - The Sixth CDE of IDA Central Kerala Kottayam was conducted on 21st August 2011 at Hotel Aida, Kottayam. It was an Inter branch Full day Program. Dr.Ushy Mohandas was the speaker and the Topic was Pedodontics. 60 participants came for the CDE.

SEPTEMBER 2011

Family Meet - 4th Family Meet of IDA CKK - Onam Get-together was held on 25th September 2011 at the High Ranges of Mundakayam Club. Various Onam Games were conducted . Grand prizes were awarded to all the winners . In the evening an Onam Sadya was the highlight. Around 70 members with their families attended this Gettogether.

NEDUMBASSERY

3rd July: We had an interbranch CDE program on Endodontics with Hands On in association with Sunrise Hospital Kakkanad. The faculty was Dr Madhu.

24th July: We had a family trip to Hinterland Mulamthuruthy. Nearly 40 members took part in the trip. Everyone enjoyed the swimming pool and the facilities at the resort.

29th July: A screening camp was conducted at Nayathod Govt School. 28th August: Ladies wing had arranged a talk on nutrition and health. It was followed by entertainment program by children

6th September: We had our executive meeting at Suburban Club Kalamassery

24th September: We had our General body meeting and Onam celebration at Hotel Grand Regency Angamaly. A pookalam was made by ladies wing. Dr Jose was dressed as Mahabali and addressed the audience. Dr santosh Thomas gave the Onam message. Dr Jeemol jaibin who won the Mrs india crown was given a momento . A skit was performed by our members. Dr logi had dressed as a female in the skit. There were games for ladies and children and gifts were given to best dressed male, female, couple and children.



QUILON

20/08/2011
General body meeting at Lions Hall, Kollam. A talk by Mr Santhosh Kumar, Chartered accountant, on Income Tax basics was also there .

21/08/2011
Treatment camp at Thankassery old age home. The camp was lead by Dr Biju Kumar. 36 inmates were benefited by the camp.

17/09/2011
General body meeting and CDE branch level programme. CDE faculty was Dr Gopu MDS, talks on Tips and tricks in SS crown adaptation .

16/10/2011
Family Get together at Trinity hall, Thankassery.



THALASSERY

Executive Meetings :- 5th Executive Meeting was held on 17/09/2011 decided to conduct CDE programmes and family get together. 20 executive members attended the same. 6th executive meeting was held on 21/10/2011. 17 executive members attended the same.

CDE Programmes:- 4th CDE programme was conducted on 31/07/2011. Topic was "Challenges Facing Dental Practitioners" Faculty members were Dr. Rathnakaran, Dr. A.K.Ghosh, Dr. Sreejith, Dr. Aneesh Sebastian. It was held at Gokulam Fort Thalassery at 10.00am. Altogether 25 members attended.

5th CDE programme was conducted on 30/09/2011 at IMA House, Thalassery at 7.30 pm. Faculty was Dr. Noushad.M.C, Reader Mahe Dental College. Topic was "Problem Solving in Endodontics". Total 25 members attended the same.

Family General Body Meeting was held on 02/10/2011 Deract Beach Lands, Dharmadam. There were several games for Ladies, Gents & Kids. Entertainment was by Asianet Valkannady Fames. Altogether 28 members and their family members attended the same. It was followed by lunch and fellowship.

CDH Programmes :- A dental awareness and Free Dental Checkup Camp was conducted on 13th September 2011 at Chodavoor HSS. Dr. Ali.K.P.M and Dr. Deepson attended the camp. Altogether 300 students were examined on 14th September 2011 a dental awareness and free dental checkup was conducted in JC Special School Dharmadam. Dr. Ali.K.P.M examined 120 mentally challenged students. Dental Camp was conducted in St. Therasa's Church, Chalil, Thalassery on 18/09/2011. Dr. Ali.K.P.M, Dr. Sreejith.V.P and Dr. Deepson examined 200 patients. Dental checkup camp was conducted at Valavilam U.P. School, Panoor on 16th October 2011. Dr. Sreejith, Dr. Deepson and Dr. Babitha examined 250 students. In all camps free tooth pastes and tooth brushes were given.

State level Family Sports Meet and Shuttle Badminton Tournament was hosted by Thalassery and North Malabar Branch on 23/10/2011 at Thalassery. Track and field sports were organised in Municipal Stadium, Thalassery and Shuttle Badminton Tournament was organised in Indoor Stadium, Venus Corner, Thalassery. There were members from 10 branches (1. Coastal Malabar Branch, 2. North Malabar Branch, 3. Malanad, 4. Wayanad, 5. Kollam, 6. Kochi, 7. Malabar, 8. Malappuram, 9. Thrissur, 10. Tellicherry) from all over Kerala. State President, State Secretary, President Elect were present to witness the great event. Formal inauguration of the sports meet was done by our State President, Dr. Santhosh Sreedharan by raising the cock and throwing short put. Track & field events went on till afternoon. The events like running race for Ladies, Gents & Kids. Relay for Gents, Short Put for Ladies and Gents, Sack Race for men, Lemon and spoon race for women, Tug of war for Ladies & Gents. Grand lunch was organised. In the after noon sessions musical chair for ladies and kids, Shuttle Badminton Tournament commenced immediately after inauguration which lasted till 5' clock in the evening. Prizes were distributed at the end and overall championship was bagged by North Malabar Branch. It was a grand success due to heart full co-operation from the members of all branches.

**MALABAR****July****BRANCH SPORTS**

Branch shuttle tournament&lunch : Date-17.7.2011

Place:OFFICERS CLUB, calicut

No. of Participants:30

WINNERS- Dr. BIJOSH (SINGLES),

Dr. Suhir & Dr. Santhosh (doubles)

AUGUST**CDE PROGRAMME**

Title:"perio esthetics"

Faculty:Dr.ARUN.S,Professor,Dept.of Periodontics

Status: (Intra branch CDE)

Date:14.8.2011 Venue:IDA HALL,Ashokapuram

Attendance:30

CDH PROGRAMMES

1)ORAL HYGIENE DAY CELEBRATION

DATE-1.8.2011; Event-Awareness class for teachers at mm jubilee up school,idiangara,calicut.

Participants-15; Association with-Rotaract club of calicut

2)PRATHYASHA screening programme(free denture delivery programme)

on going project of IDA malabar.

Date:7.8.2011 Place:IDA HALL,Ashokapuram

Attendance:230 patients were examined,100 were selected.

3)Dental check up camp

DATE-12.8.2011 VENUE- St.JOSEPHS JUNIOR SCHOOL, calicut

no.of.pts-750; Association with-Rotary club of calicut

OTHER ACTIVITIES-IFTAAR family get together&dinner

DATE-14.8.2011; VENUE-IDA HALL; ATTENDENCE-30-35

SEPTEMBER**CDE PROGRAMME**

Title:Tips&Tricks in FPD; Faculty:Dr.MUNIRATNAM NAIDU

Status: (Interbranch); Date:4.9.2011

Venue:IDA HALL,ashokapuram

Attendance:68

CDH PROGRAMME

Awareness programme,on Dentinal hypersensitivity

Date-15.9.2011; Place:Hotel westway,calicut

No. of Participants:25

Associated with any other organizations:colgate palmolive

EC Meeting No.4

Date:27.9.2011; Place:ida hall ; Attendance:18

OTHER ACTIVITIES-7thStudents programme

Topic-Prosthodontics; date-27.9.2011

Faculty-Dr.VINNI, DrJULIE (Govt dental college,calicut)

OCTOBER**CDHACTIVITIES**

Date-2.10.2011

event-Prathyasha free denture delivery programme.

Activity-formal delivery of dentures; attendance-100pts

Cheif guest-Dr.SANTOSH.SREEDHAR,PRESIDENT,IDA KERALA

Guest of honour-Mr.N.gopalakrishnan, Literary personality&former railway official.

TRIVANDRUM

1.CDE PROGRAMME

1.The Importance of Perio-Ortho interrelationship

Faculty: Dr Arun Sadasivan MDS, Dr Vinod Krishnan MDS

The inter branch CDE programme of IDA Trivandrum branch the importance of Perio-Ortho interrelationship was conducted on 17th July 2011 Sunday at Trivandrum Club Vazhutaclaud. The programme was attended by 37dentists. Attendance certificate was given to all the participants .

2.Changing The DNA of Endodontics

Faculty :Dr V S Mohan.MDS

The Branch level CDE programme and Hands on course of IDA Trivandrum Branch was conducted at Hotel Maurya Rajadhani onj Oct 2nd by DR V S Mohan. Hands on training on hyflex files were also conducted along the programme. 69 Dentists participated in the programme.

2.CDH activities

Camp No 6; A Dental awareness camp

Date : 18th Aug 2011.

Venue: Sree Sankara Vidyalayam, Vellarada, Trivandrum

No of students:70 students

Dr Kamala Lekshmy conducted the awareness programme and Dr Prasanth and DrAbraham John attended the programme. Oral hygiene aids are given to all.

Camp no 7 Dental screening camp

Date: Sep 2nd 2011, Venue : Shirdi Sai Higher Secondary school,Trivandrum. No: of Students : 370, Oral Hygiene aids are given. Members from IDA Trivandrum participate in the programme.

Camp no 8; Oral check up

Date :Oct 2nd 2011; Venue: NISH, Trivandrum

No of students :375; Oral Hygiene aids are given .

Dr MP Vinoth, Dr Prasanth S, Dr Gins Paul, Dr Joseph M Alencheril, Dr Sumesh Chandran, Dr Philip John, Dr Abraham John, DR Kamala Lekshmy, Dr Rajalakshmy, Dr Santosh and Dr Assem H participated in the programme.

3.Executive Committee Meetings

Executive meeting No 4

Date : Aug 31st 2011; Venue : IDA Hall, Innu apartments

Attendance :14

4.Cultural activities

The team of IDA Trivandrum branch participated in the cultural festival CHILAMBOLI conducted at Kollam on aug 7th. Our member Dr Sanal Kumar won the second best actor award in the event.



NORTH MALABAR

CDE Programme

1 Topic- Compromises in dentistry

Date- 19.7.11; Time-7.30pm-10pm; Venue-Mascot beach resorts ,Kannur Faculty- Dr CV Pradeep, Dr Mathai Joseph,Dr Arun Narayanan, Dr Faizal, Dr Soni Jacob, Dr Noushad

CDE programme on COMPROMISES IN DENTISTRY was conducted on 19.7.11. It was held as an interactive programme where selected clinical scenario were discussed among the audience with expert opinion from the faculty

2 Topic-Endodontic Mishaps

Date- 13.9.11; Time-7.30pm-10pm; Venue- Mascot Beach Resorts,Kannur.

Faculty- Dr Noushad MC

CDE programme was held on the topic ENDODONTIC MISHAPS and was attended by 19 members .

CDH Programmes

Check up camp: date: 14.8.11; Venue: Cherupazhassi LPschool,Mayyil No Patients Examined;40

Dr Rameshan, Dr Naveed Sait,Dr Ranjith Krishnan participated in the check up camp held at Cherupazhassi LP school.

Press meet Date : 30.7.11

A press meet was held at Kannur press club announcing the conduction of free denture screening camp& cleft lip, palate check up camp on 21.8.11. Dr Dinesh Nambiar, Dr Anil Kumar PK, DrRanjith Krishnan, DrJithesh Vasudev, Dr Mahesh participated in the press meet.

FREE DENTURE SCREENING CAMP

Date:21.8.11

Screening camp as part of PRATYASA-Free denture programme,was held atThavakkara LP school ,Kannur and Moothedath high school ,Taliparamba,34 members were selected from the camp. DR Dinesh Nambiar,Dr Arun Narayanan,Dr Valsalan, DrRanjith Krishnan, Dr Anil Thunoli,Dr Anil Kumar ,Dr Parveen Naveed.

ONAM CELEBRATION

Date: 18.9.11; Venue:Hotel Malabar Residency,Kannur.

Onam celebrations was held at Hotel Malabar Residency,with colourful entertainment programmes of the members . There was sumptuous onam sadya. After lunch there was the screening of a short film directed by Dr CV Ranjith,member IDA North Malabar branch.

Release of Journal

Date: 18.9.11

2nd issue of DENS INFO,journal of IDA North Malabar branch was released by President IDA NMB by handing over the first copy to Dr OV Sanal ,Vice President IDA Kerala state

Executive Meetings

7th Executive Meeting : Date:7.7.11; Venue:Malabar Residency

8thExecutive Meeting: Date:11.8.11; Venue:Malabar Residency

9th Executive Meeting: Venue:Hotel Bamboo Fresh,Taliparamba

