

KDJ

Kerala Dental Journal



Vol 42 | No. 2

April 2019

Quarterly Publication of Indian Dental Association, Kerala State Branch

kdj.idakerala.com



SIS Index ID 833



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Review of adverse reactions

of peroxide containing bleaching materials

Transmigration of maxillary canine - rare case reports

Ozone in periodontal disease management

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The Power of IgY in Oral Disease prevention

Passive immunity is the transfer of active humoral immunity in the form of ready-made antibodies from one individual to another. As such, passive immunotherapy by antigen-specific IgY acquires a special value as a tool for infection control and immunologic research with global commercial application as raw material for nutraceutical and pharmaceutical products and for applications in numerous medical and research fields since the 1980s. Studies have shown a positive effect of egg yolk IgY antibodies on bacterial intoxications in animals and humans. Research shows that orally applied IgY's isolated from egg yolks can passively cure or prevent diseases. Research shows that orally applied IgY's isolated from egg yolks can passively cure or prevent diseases. The mammalian IgG is analogous to IgY and is mainly present in serum and egg yolk and is similar in its function and concentration in the serum. Furthermore, recent studies describe the evolutionary relationship between avian IgY's and human IgE. Today IgY technology is a fast spreading field in life sciences. It may not be only a future vision anymore. IgY's in nose spray, cosmetics, body lotions, functional food e.g. yogurt, powder supplement may be able to prevent or cure human diseases. The use of IgY antibodies offers the possibility for reducing antibiotics in the treatment of bacterial infections of the digestive system. In addition, egg yolk antibodies provide a new approach for attending *Candida albicans* and intestinal parasites as well. Furthermore, IgY treatment promises passive immunization in newborns and immune compromised patients. Patients during chemotherapy do not produce sufficient amounts of antibodies in response to vaccines. In this case passive immunization has provided new opportunities and an alternative to current treatment strategies. It may also be a new approach in therapy for chronic inflammatory bowel diseases e.g. crohn's disease or ulcerative colitis. The local therapy with IgY antibodies in the digestive system could replace the current systemic treatment regime. Furthermore, IgY's promise a new field for all basic prophylactic treatment strategies. A reputed Pharma company markets streptococcus mutans specific IgY as chewable tablets designed for preventing the progression of tooth decay by suppressing the growth of *S. mutans* in India as Nodacay.



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Editorial



Dr. Anjana G.

Sterilization Protocols: A need of the hour

In the wake of infectious diseases doing their rounds, time has come to reassess our sterilization protocols to completely eliminate cross infections from the dental offices. Today's busy dental practices faces considerable challenge to maintain and increase the productivity while ensuring patient and personnel safety. In a small or medium-sized dental facility, the correct management of the sterilization and pre-sterilization phases plays a fundamental role in good management of instruments and safety of patients and personnel. However, advances in sterilization facilities and equipment have made it convenient to develop safer processes in a cost effective an efficient manner. Sterilization must be performed with a repeatable, standardisable, verifiable, and documentable method and should meet the CDC guidelines as well as the NABH standards. There are many stages for instrument sterilization: Presoaking; cleaning; corrosion control and lubrication; packaging; sterilization; handling sterile instruments; storage & distribution. All these stages need to be followed meticulously. According to the Centers for Disease Control; dental instruments are classified into three categories depending on the risk of transmitting infection, based on whether they penetrate skin, mucosa or bone, contact non intact skin or mucosa or contact only the non intact skin. All these instruments go into different disinfection and sterilization processes and a proper management of this cannot be achieved without efficient coordination and trained personnel. Hence it is imperative that all the personnel are trained and well aware of the sterilization protocols as well as the dental facility is equipped with appropriate gadgets and equipments. IDA has always been in the forefront to provide updated information and training on such matters. Alarming increase in serious transmissible diseases, over the last few years have created a lot of concern and hence, let us emphasize upon and demonstrate good infection control protocols and thus provide a safe environment for both patients and personnel.

Dr Anjana G.
Editor, KDJ

Message from the President

Dear members,

It gives me immense pleasure to pen down for our second issue of Kerala Dental Journal 2019. The first half of the current year is over and I am very much happy that we could conduct various activities both branch wise and state wise which were much beneficial for our members. CDE wing has come up with privilege CDE programs and we have finished two such kind of mega programs in Middle zone and south zone and we can expect some more privilege Educational programs from CDE wing. Dentistry is undergoing great changes hence we the dental professionals must try to keep abreast of the latest advances. CDH wing, IDA Hope and other subcommittees doing their job in an exemplary manner. As we enter the second half of the current year I hope IDA state office could rise up to the expectations of our members. We are planning some more useful programs and projects to make this IDA year an eventful one. I expect the whole hearted support from our members for the future endeavours.

As all of you know June 17th 2019 was a historic day as far as IDA Kerala is concerned. We could conduct a state wide strike by closing down our clinics and declared as a protest day along with IMA to protest Nationwide attacks against Doctors and health care Institutions. IDA branches through out Kerala has conducted various programs like march and *Dharna* to each District head quarters to support the protest day. IDA state office is very much thankful to each and every member who has participated in the strike. Although it was a short notice the strike became a huge success due to the unconditional support from our members. We gained much confidence that we can organize such kind of protest activities if we need it in future. IMA has appreciated the effort of IDA Kerala state for the successful conduction of the strike in a systematic manner. We should stand together like this to achieve our goals if new rules and regulation affect our profession badly. The newly formed District committees played a key role in the strike and I use this opportunity to congratulate them and the state office is extremely thankful to all District committees. We must assess the shortcomings of the event and must rectify it if any. IDA proved our strength and unity and I feel it was a trial run to our members for such kind of protest activities in future. Unity is our strength and together we can.

Regarding Clinical establishment bill we are still in regular followup with Govt. Bodies and we are trying our level best to include one member from IDA in District registering Authority. Let's hope for the best and we must fight until our demands fulfill by the Government. State office requests whole hearted support from all of our members to achieve a better result.

Advancements in cost effective technology have made dental practice somewhat smoother and much more comfortable in so far as the patients are concerned. Research has been the contributing factor if clinical practice is elevated to higher levels of excellence and thus offering better oral health

KDJ attempts to present articles drawing upon various clinical situations and solutions offered for use in clinical practice. Hence the publication offers an excellent platform for exchange of experience to attain clinical excellence. All members should make use of this excellent publication to improve your clinical skills and knowledge.

Our editorial board under brilliant leadership of our Editor Dr. Anjana G. is doing an excellent job to bring out our Journal by maintaining the quality and high standards. I congratulate the whole team for the dedication and hard work. Wish you all success

Jai Hind, Jai IDA



Dr Abhilash G S

Dr. G S Abhilash
President, IDA Kerala state

Message from the Secretary



Dr. Suresh Kumar G.

Dear Members,

As we are half way through the year, it's pleasing to note the involvement of members in the activities of the association in a large manner. It also reflects on the efforts and attitude of the local branch and its office bearers who are responsible for this.

The formation of District committees for IDA for streamlining and coordination of the local branches of a district seems to have been a success. The recently held protest expressing solidarity with IMA on attacks against the Medical fraternity by the public is an instance which would be remembered always in the annals of IDA history.

In a constantly changing environment that is throwing up challenges on a daily basis it is imperative that we as an association are alert to the evolving situations and act in a proactive manner. IDA Kerala State is launching a newsletter for the benefit of its members to keep abreast with the latest news and developments in the organisation and its activities, we see this as a solution to the long standing argument that we are not able to reach the ordinary members effectively.

With a wide array of activities as in free CDE's, Oral cancer intervention projects with CCC, WDC programmes, HOPE Schemes, IDA Mark initiatives we are surely on the right tract as far as member welfare activities are concerned.

Let me take this as an opportunity to thank the wonderful team of office bearers and the editor in particular for their efforts in fulfilling the objectives of this great organisation.

Thank you

Dr. Suresh Kumar G.
Secretary, IDA Kerala State

An in-vitro study to ascertain a substitute for Minocycline in Triple Antibiotic Paste, an intracanal medicament.

*Anjana G, **Saravanakumar MS, ***Muralikrishnan B., ****Amala P Mohan, *****Vidya Manoharan, *****Amrutha Joy

Abstract

Context: Elimination of the pathogens, especially *Enterococcus Faecalis* (*E. Faecalis*) from infected root canals is pivotal to achieve treatment success. The use of Triple antibiotic paste (TAP) (mixture of Ciprofloxacin, Metronidazole and Minocycline) as an intra-canal medicament have shown encouraging results. But minocycline present in TAP, causes tooth discoloration.

Aims: To test in-vitro, the susceptibility of *E. Faecalis* to Moxifloxacin, Amoxicillin and Amoxicillin potassium clavulonate. Then to compare it to minocycline, so as to substitute it and derive a superior and stain-free intra-canal medicament.

Settings and Design: Department of

Microbiology.

Methods and Material: *E. faecalis* ATCC 29212 strain, readymade antibiotic disks of Minocycline, Moxifloxacin, Amoxicillin, Amoxicillin clavulonate, prepared conventional 3M antibiotic disk, modified triple antibiotic disc (Amoxicillin potassium clavulonate, Metronidazole, Ciprofloxacin) are used and the study method implemented is Kirby-Bauer Disc diffusion test.

Statistical analysis used: Descriptive statistics.

Results: Minocycline, Moxifloxacin, Amoxicillin, Amoxicillin clavulonate showed mean zone of inhibitions of 19 mm, 22

mm, 27 mm and 31 mm respectively. On comparing, modified TAP showed mean zone of inhibition 34 mm, which is greater than that of the conventional TAP (28 mm of inhibition zone).

Conclusions: Modified triple antibiotic paste comprising of metronidazole, ciprofloxacin, amoxicillin potassium clavulonate in the ratio 1:1:1 shows superior antimicrobial properties, is cost effective and has reduced staining property than conventional triple antibiotic paste.

Key-words: *Enterococcus Faecalis*, Staining, Minocycline, Amoxicillin Potassium clavulonate.

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► Introduction:

Bacterial infection of the dental pulp may lead to periapical lesions.¹ A successful root canal therapy requires complete elimination of pathogens from the root canal followed by a good intact apical and coronal seal. The ultimate goal of endodontic therapy should be to return the involved teeth to a state of health and function without surgical intervention.² All inflammatory periapical lesions should be initially treated with conservative nonsurgical approaches.³ Surgical intervention is recommended only after nonsurgical techniques have failed.⁴ Besides, surgery has many drawbacks, which limit its use in the management of periapical lesions.⁵ A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical

endodontic therapy has also been reported.⁶⁻⁷

Sterilization of root canals is one of the most important factors for a successful Root canal therapy. The objectives of root canal treatment is to eliminate bacteria and other pulpal irritants from the root canal system by various chemo-mechanical procedures. These includes the usage of irrigants, intracanal medicaments, cleaning and shaping and finally obturation.⁸

E. Faecalis is associated with different forms of periradicular diseases including primary endodontic infections (4 to 40%) and persistent infections⁹. When there is caries progression into pulp, it remains in the canal with or without necrotic tissues,

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as well as in the dentinal tubules, accessory canals and lateral or apical delta area.

Failure to eliminate the harmful microflora from the root canal system can result in endodontic failure. To reduce the failure, various intracanal medicaments are recommended that could eliminate microorganisms.^{10, 11, and 12} Pinheiro et al suggested that *Enterococcus Faecalis* isolates were completely susceptible, in vitro, to amoxicillin, amoxicillin potassium clavulanic acid and moxifloxacin.⁹

Triple antibiotic paste (TAP) “metronidazole, ciprofloxacin and minocycline” is one such combination, which has shown positive outcome (85 -90 % success rate). Even though, this antibiotic combination shows promising results, the main drawback is greenish discolouration of the coronal tooth structure caused by Minocycline.¹³ The present study aims to find a suitable alternative for minocycline which has superior antimicrobial property and with reduced or no staining property.

► Method:

Pure strains of *E faecalis* are obtained and are individually inoculated into tubes containing 5 ml of sterile 0.85% saline solution. The suspensions are adjusted with the turbidity of a McFarland 0.5 tube. Five hundred (500) µl of each test microorganism suspension are inoculated into pre-set Mueller Hinton (MH) agar media.

The Readymade antibiotic disc of Minocycline, Moxifloxacin, Amoxicillin, Amoxicillin clavulonate are obtained. Each disk is 4 mm in diameter and has a thickness of Whatman number 3. The disks are sterilized in autoclave and dried in hot-air oven at 80°C for 30 minutes, then the discs are placed onto Mueller Hinton (MH) agar media. After 24 hours of incubation, the zone of inhibition within microbial growth of *E. Faecalis* around the disks is measured and the inhibition zone is considered to be the shortest diameter (in mm) of the outer margin of the zone of inhibition around the disk.

The sugar coats of metronidazole and ciprofloxacin tablets are removed with a scalpel. Each tablet is pulverized using mortar and pestle. Minocycline capsule powder is segregated. The 3 antibiotics are mixed together at the 1:1:1 ratio to prepare triple antibiotic paste. The powdered antibiotics are stored and sealed in air-tight containers. Then the 3-mix is mixed with MP (Macrogol and propylene glycol) as diluents to form a creamy consistency. Similarly the modified triple antibiotic disc is prepared by substituting Minocycline with Amoxicillin clavulonate. Both the discs are sterilised and placed onto Mueller Hinton agar media. After 24 hours of incubation, the zone of inhibition within microbial growth of *E. Faecalis* around the disks are recorded.

► Observations:

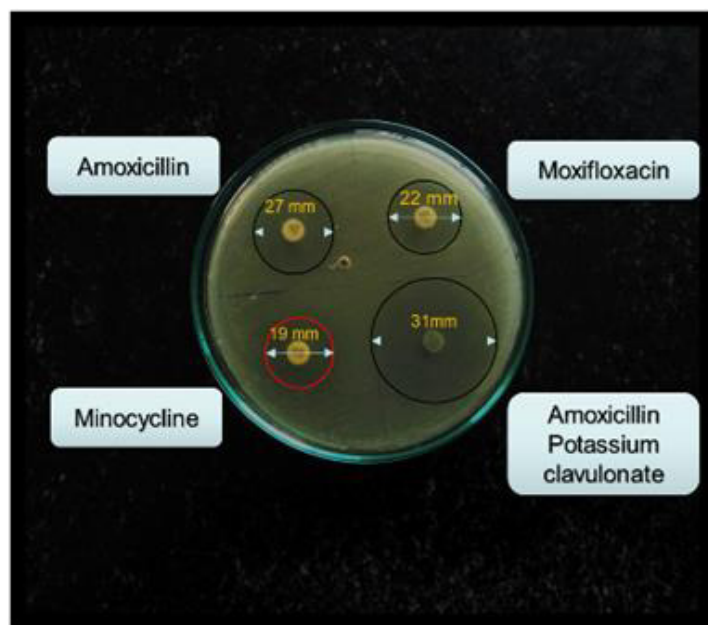


Image 1: Inhibition zones of Minocycline, Moxifloxacin, Amoxicillin and Amoxicillin potassium clavulonate

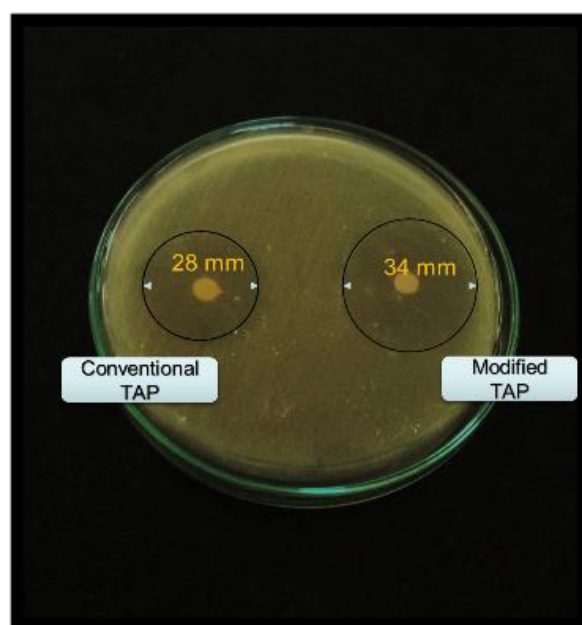


Image 2: Inhibition zones of Triple antibiotic paste (TAP) and modified triple antibiotic paste (MTAP)

► Results:

Presented the data of zone of inhibition of *E. faecalis*. The diameter of zone of inhibition in Minocycline, Moxifloxacin, Amoxicillin, Amoxicillin K clavulonate were 19 mm, 22 mm, 27 mm and 31 mm respectively [Table 1, Bar diagram 1]. Since the mean of Amoxicillin clavulonate was the largest among all zones of inhibition, meant that it provided the best result. When comparing, Conventional triple antibiotic paste (28 mm) and Modified triple antibiotic paste it was observed that Modified triple antibiotic paste (34 mm) had larger zone of inhibition [Table 2, Bar diagram 2] than that of conventional triple antibiotic paste.

► Discussion:

Endodontic infections have a polymicrobial nature, with obligate anaerobic bacteria conspicuously dominating the microbiota in primary infections. There are specific microorganisms related to intra-radicular, extra radicular infections and organisms involved in persistent infection. The endodontic pathogens that cause the primary intraradicular infections include *Bacteroides Melaninogenicus*, *Tannerella Forsythia*, *Fusobacterium*, *Spirochetes*, *Streptococcus Mitisi* and *Sanguinis*, *Enterococcus Faecalis*.¹⁴

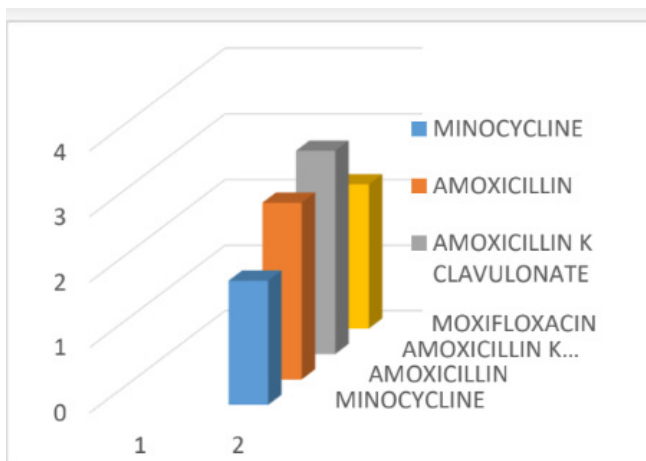
Enterococcus Faecalis, despite making up a small proportion of the micro flora, plays a major role in the etiology of persistent periradicular lesions after root canal therapy.¹⁵ Tamanna A et al. found that *E. Faecalis* often revealed both intrinsic and acquired types of antimicrobial resistance properties against various antibiotics.¹⁶

Failed root canal treatment (RCT) cases are more likely to harbour *E. Faecalis* than in primary endodontic infection.⁹ They are well adapted for survival and multiplication in a variety of adverse environments.^{9, 16, and 17}. The toxins released by these bacteria cause continuous pulpal insult and result in irreversible damage or necrosis of pulp.^{17, 18}

Intraradicular microorganisms usually confined themselves in the root canal due to the defense barrier. In specific circumstances, microorganisms can overcome this defense barrier and establish an extraradicular infection. This may lead to development of acute apical abscess with purulent

Antibiotic disc	Zone of Inhibition (diameter in mm)
Minocycline	19 mm
Moxifloxacin	22 mm
Amoxicillin	27 mm
Amoxicillin K Clavulonate	31 mm

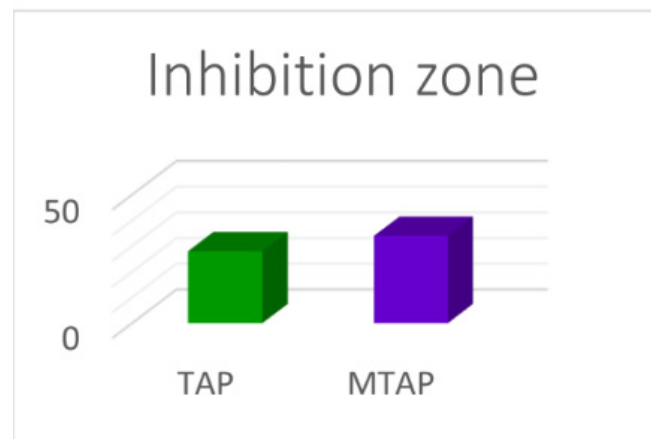
Table 1



Bar diagram 1

Antibiotic disc	Zone of inhibition (diameter in mm)
Combination Of Metronidazole, Ciprofloxacin, Minocycline (TAP)	28 mm
Combination of Metronidazole, Ciprofloxacin, Amoxicillin clavulonate (Modified TAP)	34 mm

Table 2



Bar diagram 2

inflammation in the periapical tissue. The extraradicular infections are dependent on or independent of an intraradicular infection. The dominant microorganisms present in these kind of infections are anaerobic bacteria.¹⁴ Various non-surgical methods have been used to treat periapical lesions which include conservative root canal treatment without adjunctive therapy, decompression technique,¹⁹ aspiration-irrigation technique,²⁰ Apexes procedure²¹ and Lesion sterilization and tissue repair (LSTR).¹⁸

Ideally, a nonsurgical method should initially be done especially in cases where lesions are in close proximity to important anatomical landmarks. The success of nonsurgical endodontic treatment method is based on appropriate cleaning, shaping, asepsis and filling of the root canal. It has been reported that the sterilization of the root canal and periradicular region results in good healing of periapical diseases.²² In order to sterilize the infected root dentine, especially the deep layers, antibacterial medicaments are useful. These compounds should reach the deeper layers of the infected dentine. Lesion sterilization and tissue repair (LSTR) therapy is a technique that allows disinfection of dentinal, pulpal, and periradicular lesions using a combination of antibacterial drugs.²³ LSTR concept was developed at the Cariology research unit, School of Dentistry, Niigata University, Japan, 2004.²⁴

It is reported that the resulting sterilization with antibiotics or antiseptics result in approximately 20-40% additional cleansing/augmenting the conventional root canal debridement. In this regard, various medicaments like antibiotics and antiseptics have been discussed.²⁵ Though each have their own advantages and disadvantages, the selection of antibacterial drugs should focus on providing the best sterilization of root canal systems.

Several combination of medicaments are tried over years. Some of the proven combinations are

- 1) Metronidazole and Ciprofloxacin plus Minocycline (3-mix paste/ Triple Antibiotic paste)
- 2) Metronidazole and Ciprofloxacin plus Cefaclor
- 3) Metronidazole and Ciprofloxacin plus Cefroxadine
- 4) Metronidazole and Ciprofloxacin plus Fosfomycin
- 5) Metronidazole and Ciprofloxacin plus Rokitamycin.
- 6) Metronidazole and Ciprofloxacin plus Amoxicillin
- 7) Penicillin, Bacitracin, or Chloramphenicol and Streptomycin (Grossman's polyantibiotic paste)
- 8) Metronidazole and Ciprofloxacin plus Amoxicillin
- 9) Ledermix paste (Triamcinolone-a corticosteroid and Demeclocycline-a tetracycline antibiotic)
- 10) Neomycin, Polymyxin, and Nystatin
- 11) Calcium hydroxide pastes.

12) Chlorhexidine paste

Triple Antibiotic Paste is used as the medicament for the non surgical endodontic therapy in the elimination of the microorganism from the root canal system. In vitro studies on TAP have demonstrated that 24-48 hr application is sufficient for effective disinfection of infected root dentin.^{12, 24}

Hoshino et al in their in-vitro study on the antibacterial efficacy of metronidazole, ciprofloxacin and minocycline alone and in combination against the bacteria of infected dentin, infected pulps and periapical lesions showed that they are incapable of complete elimination of bacteria, when used alone. However, in combination, these drugs were able to consistently sterilize all samples. Hence the concept of lesion sterilization and tissue repair; therapy. But one of the disadvantages of this LSTR mix is staining of the coronal tooth structure.¹²

Discoloration of the coronal tooth structure can be a major problem and the reason for the discoloration is found to be the minocycline present in the antibiotic mix¹³. It binds with the calcium of dentin forming insoluble complexes, resulting in discoloration. Removal of the smear layer before intra canal medicament placement and contact of the TAP in the coronal area during its placement could have also added to the severity of discoloration.²⁶

Some of the methods proposed to eliminate the staining with TAP is to substitute minocycline with are Minocycline in the TAP can be substituted with non discolouring medicaments, for example cefuroxime or Arestin.¹³ If at all the conventional LSTR medicaments are to be used, they should be confined to the root canal, apical to the gingival margin. The clinician should remove residual paste from the pulp chamber and wipe clean it with cotton pellets soaked in absolute alcohol.²⁶ Sealing of the coronal dentin with a bonding agent and use of different delivery systems for placement of the medicaments into the root canal without contacting the coronal pulp chamber have also been attempted to reduce the incidence of medicament related tooth discoloration.²⁷

The Kirby Bauer method is chosen for this study because it is widely used by clinical laboratories and best incorporates many of the features recommended by the World Health Organization. It is relatively simple from a technological standpoint and accurate and reproducible so long as the methodology is followed with care.²⁷

The present study shows that modified triple antibiotic (amoxicillin potassium clavulonate substituted for minocycline) paste has significant antibacterial effect on *E. faecalis* when compared to conventional triple antibiotic paste and more over has reduced staining properties. Hyon Beom Park et al,

also reported that amoxicillin-containing TAP shows reduced staining compared to conventional Triple antibiotic paste.²⁸

Even though, the local application of antibiotics within the root canal system is an effective mode for delivering the drug and the volume of the drugs used during this treatment is minimal, care should be taken if patients are sensitive these antibiotics.²⁹

► Conclusion:

TAP as an intra canal medicament can promote healing of large endodontic infections and to certain extent can help the patient bypass surgical intervention. Despite the biological success, antibiotic medicaments containing minocycline should be used with extra caution especially in teeth present in the aesthetic zone. Since Amoxicillin potassium clavulonate has superior antimicrobial property, reduced staining and is cost effective than minocycline, it can be readily substituted to minocycline in triple antibiotic paste so as to derive a modified triple antibiotic paste. However, a clinical study with long term follow up needs to be carried out so as to establish its clinical success.

► References:

- Möller AJ, Fabricius L, Dahlén G, Ohman AE, Heyden G. Influence on periapical tissues of indigenous oral bacteria and necrotic pulp tissue in monkeys. *Scand J Dent Res* 1981; 89:475-84.
- Salamat K, Rezai RF. Nonsurgical treatment of extra oral lesions caused by necrotic nonvital tooth. *Oral Surg Oral Med Oral Pathol* 1986; 61:618-23.
- Lin LM, Huang GT, Rosenberg PA. Proliferation of epithelial cell rests, formation of apical cysts, and regression of apical cysts after periapical wound healing. *J Endod* 2007; 33:908-16.
- Nicholls E. *Endodontics*. 3rd ed. Bristol: John Wright Sons Ltd., 1984.p. 206.
- Neaverth EJ, Burg HA. Decompression of large periapical cystic lesions. *J Endod* 1982; 8:175-82.
- Shah N. Nonsurgical management of periapical lesions: A prospective study. *Oral Surg Oral Med Oral Pathol* 1988; 66:365-71.
- Murphy WK, Kaugars GE, Collet WK, Dodds RN. Healing of periapical radiolucencies after nonsurgical endodontic therapy. *Oral Surg Oral Med Oral Pathol* 1991; 71:620-4.
- Hancock HH, Sigurdsson A, Trope M, et al. Bacteria isolated after unsuccessful endodontic treatment in a North Am population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2001; 91:579-86.
- Rocas IN, Siqueira JF, Santos KRN. Association of *Enterococcus faecalis* with different forms of periradicular diseases. *J Endod* 2004; 30:315-20.
- Shapiro LE, Knowles SR, Shear NH. Comparative safety of tetracycline, minocycline, and doxycycline. *Arch Dermatol* 1997; 133:1224-1230.
- Roche Y, Yoshimori RN. In vitro activity of spiramycin and metronidazole alone and in combination against clinical isolates from odontogenic abscesses. *Journal of Antimicrobial Chemotherapy* 1997; 40:353.
- Hoshino E, Takusige T. LSTR 3Mix-MP method. Better and (LSTR) therapy *Dental Review* 1998; 666:57-106.
- Kim JH, Kim Y, Shin SJ, Park JW, Jung IY. Tooth discoloration of immature permanent incisor associated with triple antibiotic therapy: A case report. *J Endod* 2010; 36:1086-91.
- Narayanan LL, Vaishnavi C. Endodontic microbiology. *Journal of conservative dentistry: JCD*. 2010 Oct; 13(4):233
- Love RM. *Enterococcus faecalis*—a mechanism for its role in endodontic failure. *International endodontic journal*. 2001 Jul; 34(5):399-405.
- Sedgley CM, Lennan SL, Clewell DB. Prevalence, phenotype and genotype of oral *Enterococci*. *Oral Microbiol Immunol* 2004; 19:95-101.
- Tamanna A, Hoshino E. "Susceptibility of *E. faecalis* to a combination of antibacterial drug (3 mix) in vitro" Niigata University, Japan. *J Oral Biosci* 2005; 47(4):315-320.
- Molander A, Reit C, Dahlen G, et al. Microbiological status of root-filled teeth with apical periodontitis. *Int Endod J* 1998; 31:1-7.
- Loushine RJ, Weller RN, Bellizzi R, Kulild JC. A 2-day decompression: A case report of a maxillary first molar. *J Endod* 1991; 17:85-7.
- Hoen MM, LaBounty GL, Strittmatter EJ. Conservative treatment of persistent periradicular lesions using aspiration and irrigation. *J Endod* 1990; 16:182-6.
- Metzger Z, Huber R, Slavescu D, Dragomirescu D, Tobis I, Better H. Healing kinetics of periapical lesions enhanced by the Apexum procedure: A clinical trial. *J Endod* 2009; 35:153-9.
- Soares J, Santos S, Silveira F, Nunes E. Nonsurgical treatment of extensive cyst-like periapical lesion of endodontic origin. *Int Endod J* 2006; 39:566-75.
- Vijayaraghavan R, Mathian VM, Sundaram AM, et al. Triple antibiotic paste in root canal therapy. *J Pharm Bioallied Sci*. 2012; 4:S230-3.
- Sato I, Ando-Kurihara N, Kota K, et al. Sterilization of infected root-canal dentine by topical application of a mixture of ciprofloxacin, metronidazole and minocycline in situ. *Int Endod J*. 1996; 29(2):118-24.
- Haapasalo M, Orstavik D. In vitro infection and disinfection of dentinal tubules. *J Dent Res*. 1987; 66(8):1375-9.
- Ahmed HM, Abbott PV. Discolouration potential of endodontic procedures and materials: A review. *Int Endod J* 2012; 45:883-97.
- Krastl G, Allgayer N, Lenherr P, Filippi A, Taneja P, Weiger R. Tooth discoloration induced by endodontic materials: A literature review. *Dent Traumatol* 2013; 29:2-7.
- Biemer JJ. Antimicrobial susceptibility testing by the Kirby-Bauer disc diffusion method. *Annals of Clinical & Laboratory Science*. 1973 Mar 1; 3(2):135-40.
- Park HB, Lee BN, Hwang YC, Hwang IN, Oh WM, Chang HS. Treatment of non-vital immature teeth with amoxicillin-containing triple antibiotic paste resulting in apexification. *Restorative dentistry & endodontics*. 2015 Nov 1; 40(4):322-7.
- Ozan U, Er K. Endodontic treatment of a large cyst-like periradicular lesion using a combination of antibiotic drugs: A case report. *J Endod* 2005; 31:898-900.

Identification of common periodontopathogenic bacteria in patients undergoing orthodontic treatment

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Abstract

Introduction: Periodontal health is usually essential to achieving the successful orthodontic therapy in short as well as the long term. The ability of the patient to achieve and maintain good oral hygiene while undergoing orthodontic treatment to prevent the chances of occurrence of periodontal diseases is also very important.

Aim: To identify the common periodontopathogenic microorganisms in patients undergoing orthodontic treatment.

Materials and Methods: Supragingival plaque samples are collected from 10

patients who are undergoing orthodontic treatment with an age group between 13-35 years and the plaque samples are incubated in 37°C under aerobic conditions for 24 hours. Samples inoculated in to different medias (Blood agar, Chocolate agar, Mac conkey agar) and incubated to 37°C under aerobic conditions for 24 hours. The colony characters and morphology on gram staining were observed. The different isolated colonies were subjected for phenotypic characterisation by automated bacterial identification system (MALDI-TOF-MS).

Results: *Streptococcus* and *Enterobacter* species are the predominant microorganisms followed by *Neisseria* species, *Acinetobacter* species, *Pseudomonas* species and *Klebsiella* species in patients undergoing orthodontic treatment.

Keywords: Periodontitis, Supragingival plaque, Microorganisms

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► Introduction

Dental plaque is a natural microbial deposits and a true biofilm which contain bacteria in a matrix mainly composed of bacterial extracellular polymers and salivary or gingival exudate¹. The maturation of the plaque is achieved by the accumulation of bacteria, growth and reproduction of bacteria, leads to release of number of organic and inorganic metabolites². It is generally accepted that the primary etiologic factor in periodontal disease is represented by the dental plaque microorganisms. However not all the infected sites suffer periodontal destructions, this phenomenon can be explained on the assumption that only a limited number of pathogens are present in the sufficient amount, capable of affecting the periodontal tissue, while the same pathogens present in a less amount are capable with a healthy periodontium³. Fixed orthodontic appliances introduce mechanical plaque (biofilm) traps and impair plaque removal, proper oral hygiene, and gingival health. This promotes specific alteration in oral environment, including decreased PH, and

increased plaque accumulation⁴. Patient often exhibit gingival hypertrophy, bleeding, increased plaque accumulation and calculus formation during orthodontic treatment⁵.

The oral hygiene measures are recommended because the brackets, bands, elastics and ligature wire encourage the accumulation of microbial flora and food residues⁶. In time the plaque accumulation which is present around the orthodontic appliances may cause periodontal disease². This study is to identify the common periodontopathogenic bacteria in supragingival plaque sample on patients undergoing orthodontic therapy.

Patients and ethical issues: The study will be carried out in a randomly selected cohort patients who were undergoing orthodontic therapy with an age between 13-35 years, in the Department of orthodontics in Mahe Institute of dental sciences and hospital, Mahe, Pondicherry.

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Inclusion criteria: Subjects undergoing orthodontic treatment with fixed appliance of 0.22 slot MBT prescription.

Patient with minimum 20 teeth.

Patient without any systemic diseases.

The subjects who had not received any periodontal therapy for past 6 months.

Exclusion criteria: Patients with history of smoking and alcohol consumption.

Known intake of antibiotics within last three month.

Patient using mouthwashes/mouthrinses

Sample collection and processing: The study were conducted after obtaining ethical committee clearance from Mahe institute of dental sciences and hospital. Patients were counselled and informed consent were taken from each participant. Selected patients was subjected to oral prophylaxis by ultrasonic scaling. After placing orthodontic brackets patients are recalled for follow up after 1 month. All participants are

ask to use orthodontic tooth brush during the study phase. Marginal plaque along the gingival margin are collected from all the teeth present.

The site is isolated from saliva by applying cotton rolls and gently dried with a compressed air to avoid contamination. With the help of sterile jaquette scaler, marginal plaque samples are collected and are immediately transported to the laboratory in brain heart infusion broth as the transport medium and further microbial analysis were done. Samples are incubated in 37°C under aerobic conditions for 24 hours. Samples inoculated in to different medias (Blood agar, Chocolate agar, Mac conkey agar) and incubated to 37°C under aerobic conditions for 24 hours. The colony characters and morphology on gram staining were observed. The different isolated colonies were subjected for phenotypic characterisation by automated bacterial identification system (MALDI-TOF-MS) (It is one of the automated rapid, precise bacterial identification system by using proteomics based detection.)

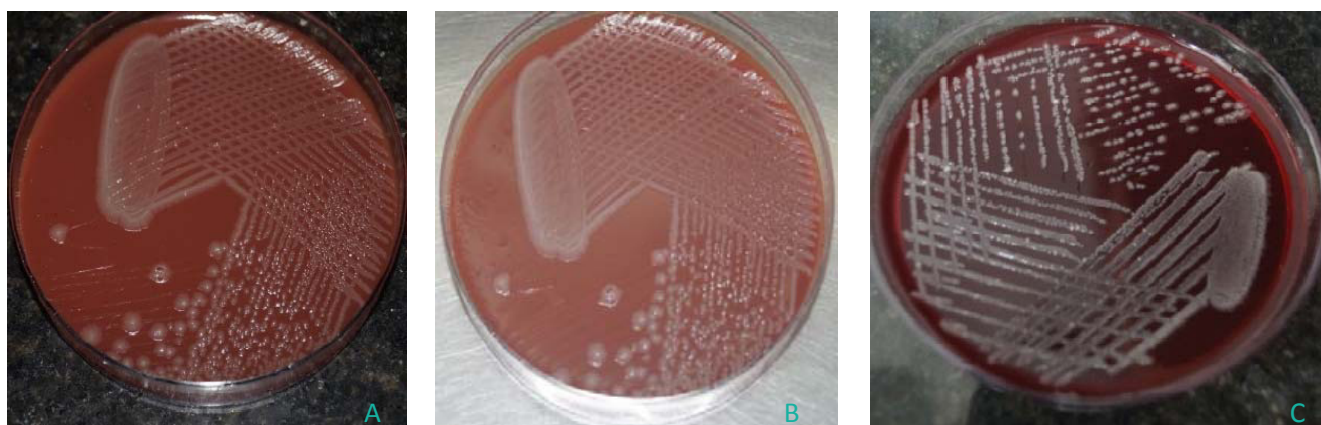


Fig. 1 Media used for isolation of microorganism from supragingival plaque sample A)Blood agar B)Chocolate agar C)Mac conkey agar



Fig 2: MALDI-TOF-MS)- Automated rapid, precise bacterial identification system

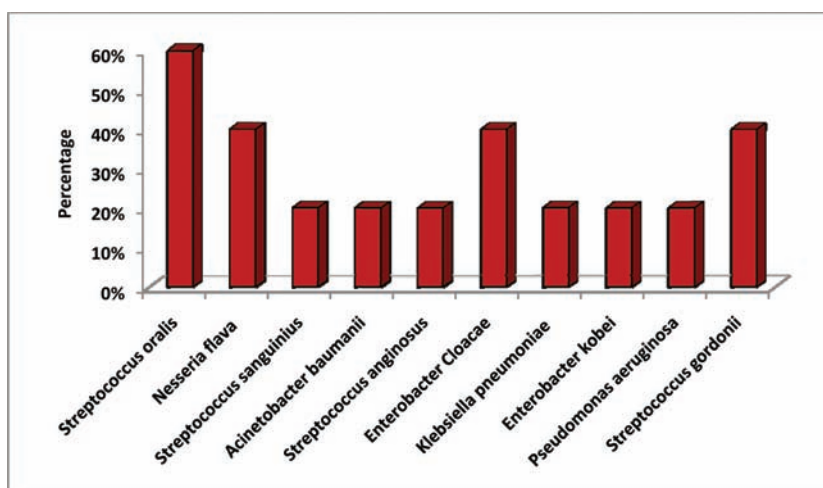


Fig 3. Distribution of bacterial isolates from supra gingival plaque

► Results

The supra gingival plaques are collected from orthodontic patient and the gram positive and gram negative organisms are identified. *Streptococcus* sp. (7,46.67%) and *Enterobacter* sp.(3,20%) are the predominant group identified, followed by *Neisseriasp.* (2,13.33%), *Acinetobacter* sp.(1,6.67%), *Pseudomonas* sp.(1,6.67%) and *Klebsiella* sp.(1,6.67%) (Table 1)

Among the isolated Streptococcal species *Streptococcus mitis* (3,60%) is the predominant species isolated from supra gingival plaque sample, followed by, *Streptococcusgordonii* (2,40%), *Streptococcus sanguinius* (1,20%) (1,) *Streptococcus anginosus* (1,20%). Other organism identified are *Enterobactercloacae* (2,40%), *Neisseriaflava* (2,40%), *Actinobacterbaummanil* (1,20%), *Klebsiella pneumoniae* (1,20%), *Enterobacter kobei* (1,20%) and *Pseudomonas aeruginosa* (1,20%). (Table 2, Figure 2)

► Discussion

This study examined the microbiological status of patients undergoing orthodontic therapy. Several studies have investigated the effects of orthodontic treatment on periodontal health, most of the investigators concluded that the overall gingival changes produced by the orthodontic appliances are transient with no permanent damage to the periodontal tissues.

The plaque is the most important ethiological agent for the occurrence of periodontal disease, thus proper plaque control must be emphasized as the most important factor in presenting periodontal health in patients undergoing orthodontic therapy. The orthodontic appliance present a challenge to proper removal of plaque from the tooth and gingival surface. The main organisms commonly present in early plaque are gram positive rods and cocci, overtime these organisms are

replaced by more gram negative and anerobicorganisms,which may initiate a periodontal reaction. The biofilm may become unbalanced and pathological due to the result of changes in the environment due to the impact of orthodontic appliances.

From this study it was identified that the streptococcal species mainly streptococcus mitis are the predominant species isolated from the supragingival plaque samples from the patients undergoing orthodontic treatment. The study done by Vizitu et al in 2011, they evaluated the changes of oral microflora, concentrating on oral streptococci after 3-6 months of orthodontic treatment and the results showed that the most common identified streptococcal species were *Streptococcussalivarius*, *Streptococcusoralis* and *Streptococcal mutans* (37.5%, 22.5%, 10%)⁷.

Other than the streptococcal species different organisms are identified from the supragingival plaque samples of patients undergoing orthodontic treatment eg-*Neisseraflava*, *Enterobacter Cloacae*, *Acinobacter Baumannil*, *Klebsiella pneumonia*, *Enterobacter kobei*, *Pseudomonas aeruginosait* was similar with the study done by U.Hagg et al in 2004, in there study they evaluated the prevalence of candida and *Enterobacteriaceae* in a group of adolescents during fixed orthodontic therapy and they identified 8 coliform species, include *Klebsiella pneumonia*, *Enterobacter sakazakii*, *Enterobacter cloacae*, *Enterobactergergoriae*, *Pseudomonas*

Table 2. Bacterial isolates from supra gingival plaque

	Number of organisms	Percentage
<i>Streptococcus mitis</i>	3	60%
<i>Neisseraflava</i>	2	40%
<i>Streptococcus sanguinius</i>	1	20%
<i>Acinetobacter baumannil</i>	1	20%
<i>Streptococcus anginosus</i>	1	20%
<i>Enterobacter cloacae</i>	2	40%
<i>Klebsiella pneumonia</i>	1	20%
<i>Enterobacter kobei</i>	1	20%
<i>Pseudomonas aeruginosa</i>	1	20%
<i>Streptococcus gordonii</i>	2	40%

Table 1. Different groups of organisms identified from supragingival plaque sample from patient undergoing orthodontic treatment.

Microorganisms	No.of observation	Percentage
<i>Streptococcus</i> sp.	7	46.67%
<i>Neisseria</i> sp.	2	13.33%
<i>Acinetobacter</i> sp.	1	6.67%
<i>Enterobacter</i> sp.	3	20.0%
<i>Pseudomonas</i> sp.	1	6.67%
<i>Klebsiella</i> sp.	1	6.67%

aeruginosa, *Enterobacter agglomerans*, *Acinetobacter* and *Yersinia* species⁸.

Study done by Brett Eckley in 2012 concluded that there was a concurrent increase in the BANA positive periodontopathogens *P.gingivalis*, *T.denticola* and *T.forsythia* with the orthodontic treatment and the dark field microscopy confirmed an increase in the populations of large and small spirochetes, filaments bacteria, non motile rods and fungiforms⁹. Another study done by W.Sukontapitipark et al, assess the bacterial plaque accumulation adjacent to orthodontic brackets using SEM study and demonstrate that excess composite around the bracket base is the critical site for plaque accumulation due to its rough surface and also the presence of distinct gap at the composite enamel interface are the main ethiological factor for plaque accumulation¹⁰. Farronato et al, describes some of the main periodontal risk factors that are likely to arise during orthodontic treatment. Presence of orthodontic bands, poor oral hygiene and intrusive movements of dental elements can lead to the movement of deeper bacterial plaque into the gingival site and subsequent variations in the microflora and development of gingivitis into full-blown periodontal disease. For this reason, the authors advise preventive screening that will help detect the presence of periodontal-pathogenic bacteria or possible genetic predisposition to periodontal diseases in each treated patient.

The periodontal test is a basic tool used for diagnosis and treatment planning in periodontal diseases. Specific advantages of this test are as follows:

- ◆ Identify and quantify the pathogens during diagnostic stage of orthodontic therapy
- ◆ Measure the presence of periodontal bacteriae and their anticipated risk profile during therapy
- ◆ Objectively control excess surgical therapy and up keeping of orthodontic and periodontal protocols
 - Improve patient compliance to therapy after making them aware of their correct microbial profile during treatment planning
 - Accurate diagnosis patient disease before and any residual sites after therapy
 - Innovation in orthodontic research.

The presence or absence of pathogenic bacteria, their sub-types and proportions defines the level and intensity of periodontal disease during orthodontic therapy

- These parameters are fundamental and necessary to
- Define a therapy procedure.
- Plan intervals for follow-up.
- Therapeutic planning and promote patient involvement in therapeutic plan.
- Improve compliance of patient's with oral hygiene.

- Certification of outcomes of therapy and decide possible further activities post-therapy.
- Monitoring the sustainability of therapeutic results via periodical check ups¹¹.

► Conclusion

The main principles of optimal orthodontic treatment in relation to oral hygiene include preference of banding for orthodontic attachments, use of shortend bands, applying fluoride varnish around bracket bases, use of Glass Ionomer Cement for banding, re-cementation of loose bands and brackets, removing excess adhesive and cement remnants, prevent labial tipping of lower incisors in case of narrow or thin gingival propria, use of fluoride releasing materials in case of retainers with less interferences, intentional use of Hawthorne effect to improve oral hygiene compliance, use of single tufted brushes, chemical cleaning and horizontal scrub technique, use of self-ligating brackets and most important is instituting oral hygiene programme prior to orthodontic treatment.

► References

1. Lindhe J, Karring T, Lang NP. Clinical Periodontology and Implant Dentistry 4th Edition. Blackwell Publishing Munksgard. Oxford, United Kingdom. 2003.
2. Michael G Newman, Henri H Takei, Fermin A, Caranza-Clinical Periodontology 9th Edition, 2003.
3. Darby I.B, Mooney J, Kinane DF. Changes in subgingival microflora and humoral immune response following periodontal therapy. J Clin Periodontol. 2001;796-805.
4. Naranjo AA, Trivino ML, Jaramillo A, Betancourth M, Botero JE. Changes in the subgingival microbiota and periodontal parameters before and 3 months after bracket placement. Am J Orthod Dentofacial Orthop 2006;130:275.
5. Türk kahraman H, Sayin MO, Bozkurt FY, Yetkin Z, Kaya S, Onal S. Archwire ligation techniques, microbial colonization, and periodontal status in orthodontically treated patients. Angle Orthod 2005;75:231-6.
6. Kiliçoğlu H, Yildirim M, Polater H. Comparison of the effectiveness of two types of toothbrushes on the oral hygiene of patients undergoing orthodontic treatment with fixed appliances. Am J Orthod Dentofacial Orthop 1997;111:591-4.
7. Vizitiu TC, Giuca MC, Ionescu E. Influence of orthodontic treatment on oral streptococci. Roum Arch Microbiol Immunol. 2011;105-8.
8. U.Hagg et al, The effect of fixed orthodontic appliances on the oral carriage of candida species and enterobacteriaceae. Eur J Orthodont. 2004;623-629
9. Eckly B, Thomas T, Crout R, Ngan P. Periodontal and microbiological status of patients undergoing orthodontic therapy. Hong Kong Dent J. 2012;9:11-20.
10. W.Sukonta Palipark et al,. Bacterial colonization associated with fixed orthodontic appliances. A scanning electron microscopy study. Eur J Orthodont. 2001;475-484.
11. Lauritano D, Caccianiga G. Periodontal aspects in orthodontics. OA Dentistry. 2013;1:1.

Applicability of dental age estimation by Demirjian method in Kodava and Kerala young adolescents –a digital radiographic retrospective comparative study

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Abstract

Demirjian method of dental age estimation which is based on eight tooth development stages (A to H) provides a non-invasive method of determination of the age of a person. It is a valuable tool for age assessment in forensic, pedodontic, and orthodontic patients. The present observational study was aimed to determine and compare the dental age of Kodava and Kerala patients aged between 2 to

17 (n=100) using the Demirjian method utilizing the dental panoramic radiographs. Statistical analysis was carried out using Chi-square test, Student t-test, and ANOVA. It was observed that in the Demirjian method, the age of the subject was overestimated by 0.17 years but with 'p' value of >0.05 years which was not statistically significant. The overestimation was higher among the females with no difference between the

Kodavas and Keralities. Further studies may be required with a larger cohort to further ascertain the findings.

Key words: Dental age estimation, Demirjian method, forensic odontology

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► Introduction

Age refers to a period of human life, measured by years from birth and is usually marked by certain degree or stage of mental or physical development and involves legal responsibilities. Chronological age refers to attainment of a certain number of years. It is most obvious and easily determined by developmental parameter.¹ Age estimation of living people can likewise be made for different people without worthy recognizable proof papers and require a check of age. In a perfect world, among the dental age estimation strategies most of the time consumed is to do extraction, preparation of microscopic section and so on.^{1,2} In a developing country like India, a large number of people are illiterate and have no proof papers of their date of birth which is required by law enforcing agencies in matters, purposes like admission at the time of schooling, joining services and during retirement and enhancement of pensions in the old age. Hence scientific determination of age is very important.^{3,4} At no time during life of an individual is a tooth unit static. There are many methods that have been tested and tried to determine

the dental age using orthopantomograms the recent evidence on is conflicting regarding estimation of age by Demirjian method⁵. Tanner et al.⁶ described for skeletal maturity. The scoring was limited to the first seven teeth of the lower left quadrant and compared to a graphical representation of the developmental stages.

Kodavas have been known as Kodagaru after British annexed Kodagu in the year of 1834 called as Coorgis. They are of unknown origin, are ethnically distinct, have unique facial and physical characteristics, unique lifestyle and culture of their own. No evidence of gene variation till now.

Hence we undertook a study entitled as “Applicability of dental age estimation by Demirjian method in Kodava and Kerala young adolescent –a digital radiographic retrospective comparative study.

► Materials and Methods

The present study was a observational study carried out in on 100 radiographs of age between 2-17 years without the presence of systemic illnesses which impair the growth of

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dentition, past history of any dental procedure or treatment, congenital abnormalities affecting the jaw, trauma to head and neck region. After obtaining the clearance from Yenepoya Medical College Ethics Committee for conducting research, the study was initiated with data from Yenepoya Medical College (study done under PGDFAO Project 2017) and Coorg Institute of Dental Sciences, Virajpet, Karnataka. Dental panoramic radiographs were collected. The chronological age was calculated from the difference in the date of birth of the patient and the date on

which orthopantomograph was taken. The study was blinded that the one reading the radiograph was not aware of the chronological age of the patient so that variability be reduced within the observer the radiographs were evaluated again after a minimum gap of fortnight. If no significant differences were observed in the findings such that they did not exceed one developmental stage they were included in the study. The dental age was judged based on the degree of maturation of the seventh left mandibular teeth the third molar was excluded from the



Fig 1: Dental age used in our study 5

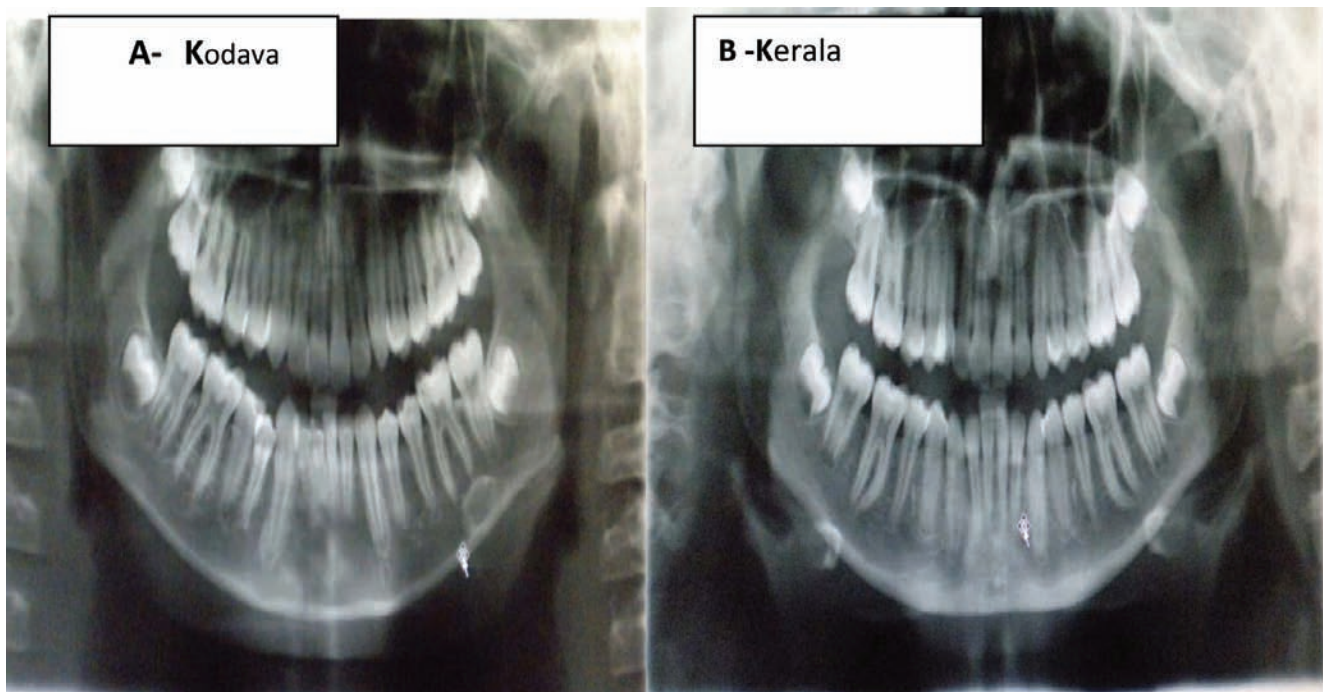


Fig. 3 X-ray Showing OPG of A- Kodava And B Kerala

	KERALA	KODAVA	Age Chronological Kerala	Age Demirjian Method Kerala
Females	19(38%)	19(38%)	6.9768	7.0068
Males	31(62%)	31(62%)	Age Chronological Kodava	Age Demirjian Method Kodava
TOTAL	50	50	6.676	6.7366

Table 1: Demography of the study

study. The discrete variables were presented as percentages/ proportions. Continuous variables will be expressed in terms of mean and standard deviation. Chi square test was used to compare the discrete variables between the groups. Student t-test was used to compare the continuous variables between the groups. ANOVA was used to test the statistical significance of multiple variables among different groups.

Every tooth was assigned a rating from “A” to “H” as described in picture below following which the tables were converted to scores by using the conversion tables which are gender specific. The total of the sum of all scores was done to obtain a total maturity score, which was then transformed into dental age by the use of the standard tables for each gender.

The chronological age for each patient was calculated from the medical records by using the date of birth and the date on which the radiograph was taken.

► Observations and Results

The analysis shows that there was no difference between the two groups in terms of age that was estimated by the chronological and Demirjian methods by paired test hence the two are comparable

The analysis shows that there was a good correlation between the two groups in terms of age that was estimated by the chronological and Demirjian methods hence this can be used.

Sig. (2-tailed)	
Age Kerala Chronological - Age Demirjian Method	.158
Age Kodava Chronological - Age Demirjian Method	.091

Table 2: The analysis of age in both the populations chronological and demirjian

► Discussion

The estimation of the age of a person has been an archaic exercise, and since decades even dentists have contributed to this science with several methods through radiography. The tooth with its developmental stages provides us with a non-invasive modality to determine the age of the person. The broadening frontiers of dentistry have taken the dentist as an expert witness in legal room proceedings and in the field of forensic sciences. But forensic odontology for long had been a less explored area of dentistry. Age estimation forms one of the most important sub-disciplines of forensic sciences and is of paramount importance in medico-legal issues. The age estimation process has to be highly accurate in predicting the individual's age and easy to use. In children when the skeletal maturity has not yet occurred estimation of dental age has its own problems the study was done by using radiographs from Dept. of Oral Medicine and Radiology, Coorg Institute of Dental Science, Virajpet, Coorg.

Madhulika Macha⁷, Bushra M. Hasan⁸ showed a positive correlation between chronological age, dental age and skeletal age in females was found to be statistically significant ($p < 0.05$). This was similar to our study which showed a positive correlation between chronological age, dental age and skeletal age in females was found to be statistically significant ($p < 0.05$).

Amitha J Lewis in their study found that statistically no significant differences were found in third molar development between males and females. Depending on the available number of wisdom teeth in an individual, R² varied for males from 0.21 to 0.48 and for females from 0.16 to 0.38. Similar to our study in which the no significant differences were found age estimation between males and females $p > 0.05$ ⁹ In our study there was overestimation in both sexes in all age groups but this was not statistically significant as the differences was less than 0.3 in all cases as in contrast to the study by Bolaños et al. in 2003 stated that believed that the greater number of developing teeth in younger children leads to better will be the age accuracy estimation accuracy if the child is less than 10 years of age.¹⁰ In our study the mean difference in the chronological age was 0.17 more in the girls and 0.19 in the males.

Group			N	Correlation	Sig.	Lower	Upper
Kerala	Pair 1	Age Chronological & Age Demirjian Method	50	.998	.000	-.072039653690071	.012039653690069
Kodava	Pair 1	Age Chronological & Age Demirjian Method	50	.998	.000	-.096714937832979	-.024485062167031

Table 5: Correlation of age by the chronological and Demirjian method

The results of the Madhulika Macha⁷ study revealed correlation with statistical significance ($p < 0.05$) between chronological, dental and skeletal ages among all the subjects.

Hegde Rahul on assessment of chronological age in children of Belgaum showed that the mean difference between true and assessment of dental age by using Demirjian method for males was an overestimation of 0.14 years and females an overestimation of 0.04 years.¹¹ Fotiet al concluded that age determination by using the Demirjian method overestimated the real age by 0.57 years.¹²

Kosh et al d in 184 South Indian Children opinioned that Demirjian's method overestimated the age by 3.04 and 2.82 years in males and females, respectively. The skeletal age was found to differ from the dental and chronological age.¹³

Lexus and coworkers concluded that there was a statistically significant difference in the chronological age and dental age between the boys and girls Dutch boys were 0.4 and girls 0.6 years a head of the French – Canadian children analyzed by Demrjian.¹⁴

► Conclusion

We concluded the following using the Demirjian method the age is overestimated slightly by approximate 0.17 years but this was not statistically significant with a p value of > 0.05 years. It overestimates the age more in males than in females. There was no difference in the Kerala and Kodagu children in terms of age estimation

► Bibliography

1. Chaillet Nils, Ph. D., and Demirjian Arto Ph.D., D.D.S. Journal of Forensic Science. sept. (2004) 49: 1059 – 1066.
2. Liversidge HM, Buckberry J, Marquez-Grant N. Age estimation. Annals of human biology. 2015 Jul 4;42(4):299-301.5
3. Mani S A, Lin Naing, Jacob John, Abdul Rani Samsudin. Comparison of two methods of dental age estimation in 7 -15 year old Malays. International Journal of Paediatric Dentistry 2008; 18: 380-388.
4. Pathak SK, Mathur PN, Jain S, Saini OP. A study of eruption of 3rd molar in relation to estimation of age in people of thirteen to twenty-five years age group. Journal of Forensic Medicine and Toxicology 1999; 16(1): 17-9.
5. Demirjian A, Goldstein H, Tanner J M. A new system of dental age assessment. Hum Biol 1973;45:221-227.
6. Demirjian A, Goldstein H. New systems for dental maturity based on seven and four teeth. Ann Hum Biol. 1976; 3: 411-421.
7. Macha M, Lamba B, Avula JS, Muthineni S, Margana PG, Chitoori P. Estimation of Correlation between Chronological Age, Skeletal Age and Dental Age in Children-A Cross-sectional Study. Journal of clinical and diagnostic research: JCDR. 2017 Sep;11(9):ZC01.
8. Hasan BM, Abuaffan AH. Correlation between Chronological Age, Dental Age and Skeletal Maturity in a sample of Sudanese Children. Global Journal of Medical Research. 2016 Jun 7.
9. Lewis AJ, Boaz K, Nagesh K R, Srikant N, Gupta N, Nandita K P, Manaktala N. Demirjian's method in the estimation of age: A study on human third molars. J Forensic Dent Sci 2015;7:153-7
10. Bolaños MV, Moussa H, Manrique MC, Bolaños MJ. Radiographic evaluation of third molar development in Spanish children and young people. Forensic science international. 2003 May 5;133(3):212-9.
11. Hegde Rahul J, Sood P B. Dental Maturity as an indicator of chronological age: Radiographic evaluation of Dental age in 6 to 13 years children of Belgum using Demirjian method. J Indian SocPedoPrev Dent December (2002) 20 (4):132-138.
12. Foti B et al, Loic Lays, Paascal Adalian, Jean Giustiniani, Marta Maczel, Michel Signoli, Olivier Dutour, Georges Leonetti. New forensic approach to age determination in children based on tooth eruption. Forensic Science International 132 (2003) 49-56.
13. Koshy, S. Tandon, Dental age assessment: The applicability of Demirjian's method in South Indian children. Forensic Science International 94 (1998) 73 –8
14. Leurs IH, Wattel E, Aartman IH, Eddy E, Prah-Andersen B. Dental age in Dutch children. The European Journal of Orthodontics. 2005 Jun 1;27(3):309-14.

An innovative approach of fabricating pressure appliance to prevent recurrence of auricular seroma: A case report

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Abstract

Background: Auricular seroma is a cystic swelling with no definite etiopathogenesis. It occurs following trauma. It usually shows high tendency of recurrence. Numerous methods have been proposed for the treatment of auricular seromas like steroid injections and negative pressure application. In this case report, an innovative approach was used for the fabrication of a pressure appliance.

Case report: A 32 year old female with

a history of swelling in her right ear after a minor accident was referred for the fabrication of a pressure appliance following drainage. An impression was made and master cast was obtained. An appliance made with three spring loaded clutches (hair clips) were used to provide optimal pressure for closure of the two ends of the clutch. Self-cure resin was mixed and placed on both clutch arms for fabrication of pressure appliance for the drained seroma.

Conclusion: This non-invasive, simple and effective technique of using clutch in the pressure appliance will ensure patient compliance and comfort. However, regular follow-up appointments are mandatory so as to prevent any complications due to the overuse of pressure appliance.

Keywords: Auricular seroma, pseudocyst, pressure appliance

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► Introduction:

Auricular seroma or pseudocyst is characterized by asymptomatic swelling of the pinna.¹ Repeated minor trauma such as resting head on hard pillow, carrying large weights on the shoulder,² wearing headphones and helmets has been suspected to be an etiologic factor for auricular pseudocyst. Various treatment modalities are followed such as aspiration, pressure

dressing after incision and drainage, intralesional steroid injections and surgical deroofting of the pseudocyst. Kanotra SP and Lateef M compared two commonly used treatment modalities of incision drainage with compression and deroofting with compression and found that surgical deroofting followed by buttoning is the definitive treatment as it is associated with no recurrence in one month follow up.³ A compression appliance that can apply positive pressure is therefore key to



Fig. 1 Pressure appliance fabricated by using 19-gauge stainless steel wire and chemically cure resin



Fig. 2: Pressure appliance fabricated by using clutch (hair clip) and chemically cure resin, placed on drained site of auricular seroma (front view)

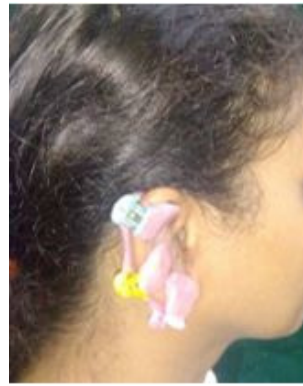


Fig. 3 Pressure appliance fabricated by using clutch (hair clip) and chemically cure resin, placed on drained site of auricular seroma (lateral view)

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prevent recurrence. In this case report, an innovative method of using clutches (hair clip) were used for the fabrication of pressure appliance.

► Clinical report:

A 32 year old female patient was referred to the department of Prosthodontics, and Crown and Bridge, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bengaluru, for the fabrication of a pressure appliance to prevent recurrence of seroma on the right auricle following drainage in the ENT department of M S Ramaiah Hospital. The patient gave a history of swelling in her right ear after a minor accident and was concerned about the aesthetics of the pressure appliance which was to be fabricated. Upon examination it was seen that it was confined to upper, middle and lower aspect of external auditory meatus.

A gauze piece was used to block the external auditory meatus and impression was made with irreversible hydrocolloid (Algitek, DPI, Mumbai, India) and was poured with type III dental stone (Goldstone, Rajkot, Gujarat, India) to obtain the master cast.

An appliance made with 3 pieces of 6cm each, 19-gauge stainless steel wire (Leo wire, Leone, Italy) held on the dorsal and ventral aspect of the pinna did not exert enough pressure without constant compression of the helices. On addition, it did not fulfil the aesthetics requirements of the patient (Figure 1). Three spring loaded clutches (hair clips) were used to provide optimal pressure for closure of the two ends of the clutch. Self-cure resin (DPI-RR Cold Cure, Mumbai, India) was mixed and placed on both clutch arms for fabricating pressure appliance which was then placed over the drained seroma (Figure 2).

► Discussion:

Auricular seroma, also known as pseudocyst, is characterized by collection of serous fluid between the perichondrium and cartilage with no definite etiopathogenesis.⁴ Since the etiological factors are inconspicuous, the definitive treatment is still debated. Numerous methods have been proposed for the management of auricular seroma. The most common approach is drainage followed by compression. Ghanem et al found recurrence of auricular seromas after aspiration and compression bandage.⁵ Malgonde and kumar used fixed corrugated rubber drain for compression for 72 hours. Kim et al suggested intralesion steroid injection and compression dressing to prevent recurrence of auricular pseudocyst.⁶ Miyamoto et al. found no relation between LDH isoenzyme and intralesional steroid injection.⁷ Kanthikeyan and Alalasundaram advocated drainage and negative pressure application for treating auricular seromas. The limitation of their study was patient noncompliance and discomfort as the syringe was suspended beside the ear for initial 24 hours after drainage.⁸ Purwar et al used double helical pressure appliance. The described method require frequent compression of helices to maintain pressure.⁹ In another study, seroma cases were treated with needle aspiration and pressure dressing with Plaster of Paris cast. The disadvantage with this technique is the sensitivity of

Plaster of Paris to water exposure.¹⁰ Incision and drainage of the pseudocyst with auricular splinting was suggested in another study. Pinna discoloration and skin thickening was reported in few cases.¹¹ Here we have suggested a novel approach to provide optimum pressure to the affected site of the pinna, which was not achieved with the help of resin or stainless steel wire alone. The use of clutch in this situation has provided the desired pressure and patient satisfaction, and recurrence has not been reported even after 6 months.

The compression technique has its own disadvantages like tissue necrosis, if the pressure is too high. However proper instructions for usage of the appliance and subsequent follow-up can avoid such situations. If such condition arises, it is required for relieving pressure and discontinue the appliance for a few days until the situation resolves.

► Conclusion:

This non-invasive, simple and effective technique of using clutch in the pressure appliance will ensure patient compliance and comfort. However, regular follow-up appointments are mandatory so as to prevent any complications due to the overuse of pressure appliance.

► References:

1. Prasad KC, Karthik S, Prasad SC. A comprehensive study on lesions of the pinna. Head and Neck Medicine and Surgery. Am J Otolaryngol. 26:1e6: 2004.
2. Choi S, Lam KH, Chan KW, et al. Endochondral pseudocyst of the auricle in Chinese. Arch Otolaryngol. 110:792e796: 1984.
3. Kanotra SP, Lateef M. Pseudocyst of pinna: a recurrence-free approach. Am J Otolaryngol. 30(2):73-9: 2009.
4. Monika Shamrao Malgonde, Manoj Kumar. Auricular seroma: a new concept in Management, Plast Aesthet Res. 1(1): 1-5: 2014.
5. Ghanem T, Rasamny JK, Park SS. Rethinking auricular trauma. Laryngoscope. 115:1251-5: 2005.
6. Kim TY, Kim DH, Yoon MS. Treatment of a recurrent auricular pseudocyst with intralesional steroid injection and clip compression dressing. Dermatol Surg. 35:245-7: 2009.
7. Miyamoto H, Okajima M, Takahashi I. Lactate dehydrogenase isozymes in and intralesional steroid injection therapy for pseudocyst of the auricle. Int J Dermatol. 40:380-4: 2001.
8. D. Anand Karthikeyan, Karunakaran Alalasundaram. Steroid injection and negative pressure application in successful treatment of auricular seroma. Indian Journal of Otolaryngology. 22(3): 168-170: 2016.
9. Purwar A, Shetty V, Khanna S, Gupta S. Pressure appliance to prevent the recurrence of auricular seroma: A new clinical trial. J Oral Biol Craniofac Res. 3:42-4: 2013.
10. Sanjana V. Nemade, Chetana S. Naik. Treatment of auricular seroma: A conservative, Innovative and Effective Approach. Annals of Otolaryngology, Rhinology & Laryngology. 123(11): 749-753: 2014.
11. Karthik Rao, Mohan Jagade, Vitthal Kale, Dev Kumar, and Amol Hekare. An Economical Method of Auricular Splinting in Management of Auricular Pseudocyst. World J Plast Surg. 7(2): 220-225: 2018.

A peculiar case of hyperdontia in a young adult

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Abstract

Hyperdontia otherwise called, as supernumerary teeth are characterized by the presence of excessive number of teeth in addition to the normal primary or permanent set¹. This may or may not be associated with a syndrome. Various

syndromes associated with hyperdontia are Gardner's syndrome, cleidocranial dysostosis and cleft lip and palate. This can therefore serve as an important factor in the early diagnosis of syndromes in children. Here we present to you a case that we stumbled

upon of hyperdontia in a young adult not associated with any syndrome.

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► Introduction:

Supernumerary teeth are defined as any teeth or tooth substance in excess than the usual configuration. Supernumerary teeth may cause delayed or maleruption, impaired eruption of succedaneous teeth displacement or rotation of permanent teeth, crowding, diastema, dilaceration or abnormal root development of permanent teeth, cyst formation or eruption into nasal cavity².

Supernumerary teeth may be classified as follows²: (Table 1)

Supernumerary teeth based on eruption and orientation²: (Table 2)

Supernumerary teeth based on morphology²: (Table 3)

Several theories have been suggested for their occurrence, such as the phylogenetic theory, the dichotomy theory, occurrence due to hyperactive dental lamina, and due to a combination of genetic and environmental factors⁵. Generally, multiple supernumerary teeth are associated with diseases or syndromes.

Here we have a case of hyperdontia that we accidentally stumbled upon during the course of an orthodontic treatment. The patient was posted for a surgical exposure of the lower

Mesiodens	Located between maxillary central incisors (pre- maxillary region)	Conical or peg shaped
Paramolar	Buccal/ palatal/ lingual between 2nd and 3rd molars, rarely between 1st and 2nd molars.	Conical/ supplemental
Distomolar	Distal/ distolingual to maxillary or mandibular 3rd molars.	Conical/ tuberculate
Parapremolar	Additional tooth in premolar region	Supplemental
Paramolar root	Additional root often in mandibular molar region	Rudimentary or fully formed
Paramolar tubercle	Additional cusp often on the buccal surface of a permanent molar.	Tuberculate

Table 1

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canine, but on further radiological evaluation, a compound odontome was observed.

► Investigation:

Occasionally, supernumerary teeth are asymptomatic and may be detected as an accidental finding during radiographic examination.

An occlusal or periapical radiograph and OrthoPantomograph are the most useful radiographic investigations to detect supernumerary teeth. Also recently, the conventional computed tomography and cone beam computed tomography (CBCT) have been very useful in visualizing the presence and more precise location of supernumerary teeth, including the adjacent vital structures.

► Management:

Removal of all supernumerary teeth are not mandatory unless it poses a complication, some of which include maleruption or delayed eruption of other teeth in the arch, eruption into nasal cavity or maxillary sinus, or even displacement or rotation of adjacent teeth. Presence of other pathology like a cyst may also necessitate the removal of such a tooth.

However, since our patient faced a maleruption of the lower canine due to the presence of these supernumerary teeth (Fig.1), we decided to surgically remove the supernumeraries.

For the surgical extraction, the patient was prepped and local anesthesia delivered through an inferior alveolar nerve block. A mucoperiosteal flap was raised in the region, surrounding bone guttered and multiple supernumerary teeth were removed individually (Fig.2). The area was irrigated and vertical mattress suture given using 3-0 silk.

► Discussion:

Supernumerary teeth can present in any region of oral cavity. These may erupt or remain impacted and may lead to various complications. Though their occurrence is rare, clinicians should be aware of their presence and problems it can cause. Also since multiple supernumerary teeth are commonly associated with syndromes like cleidocranial dysplasia, Gardner's syndrome and cleft lip & palate, it can help in the early detection of any of these conditions.

According to Francesco Inchingolo et al hyperdontia is an odontostomatologic anomaly characterized by excess in tooth number. It seems to occur more often in patients with hereditary factors concerning this anomaly³. P Batra et al has suggested that non-syndromic multiple supernumerary teeth are transmitted as an autosomal dominant trait⁴.

Extraction should be performed carefully to prevent damage to adjacent permanent teeth, as this may cause ankylosis and maleruption of these teeth. The clinician should be careful especially while removal of teeth at aberrant positions to



Fig 1



Fig 2

Supernumerary Teeth According To Eruption	Supernumerary Teeth According To Orientation
Erupted: complete coronal aspect is seen in oral cavity clinically	Vertical: oriented as normal series of dentition.
Partially erupted: only occlusal part is visible	Inverted: upside down.
Impacted: cannot be seen in oral cavity clinically, can only be diagnosed using radiograph	Transverse: horizontally placed.

Table 2

Morphology	Appearance	Occurrence
Conical	Small/peg shaped tooth with normal root	70-80
Tuberculate	Barrel shaped crown with rudimentary root, often paired	10-12
Supplemental	Duplication of teeth in normal series	6-8
Odontome	No regular shape, disorganized diffused mass of dental tissue	3-4

Table 3

avoid complications such as damaging nerve and blood vessels during manipulation of the tooth, perforation of maxillary sinus, pterygomaxillary space, orbit and fracture of maxillary tuberosity.

► Reference

1. Prevalence and characteristics of supernumerary teeth: A survey on 7348 people Levent Demiriz, Mustafa Cenk Durmuşlar and Ahmet Ferhat Mısırlı- J Int Soc Prev Community Dent. 2015 May; 5(Suppl 1): S39–S43.
2. Management of supernumerary teeth- Abhishek Parolia, M Kundabala, Marisha Dahal, Mandakini Mohan, and Manuel S Thomas- J Conserv Dent. 2011 Jul-Sep; 14(3): 221–224.
3. Non-syndromic multiple supernumerary teeth in a family unit with a normal karyotype: case report- Francesco Inchingolo, Marco Tatullo, Fabio M. Abenavoli, Massimo Marrelli, Alessio D. Inchingolo, Mattia Gentile, Angelo M. Inchingolo, and Gianna Dipalma- Int J Med Sci. 2010; 7(6): 378–384.
4. P Batra, R Duggal, H Prakash- Non- syndromic multiple supernumerary teeth transmitted as an autosomal dominant- Journal of oral Pathology & medicine 34(10), 621-625, 2005
5. Smith JD. Hyperdontia: Report of a case. J Am Dent Assoc. 1969;79:1191 [PubMed]

Aesthetic rehabilitation of mandibular anterior region by immediate implant placement following the extraction of mobile retained deciduous teeth: A case report

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Abstract

Loss of teeth in the aesthetic region is often a traumatic experience to the patient and its rehabilitation a challenge to the Prosthodontist. The patient suffers from detrimental psychological effects following the loss of one or more teeth. Dental implants offer a permanent and long-term solution for the rehabilitation of missing teeth, providing the patient with a sense of

security and well-being. Recently, immediate implant placement after extraction of tooth with immediate loading has become more common. This procedure results in reducing overall treatment time, fewer surgical interventions, reduced soft and hard tissue loss and psychological satisfaction to the patient. This case report describes extraction of mobile retained deciduous

teeth in the anterior aesthetic region followed by immediate implant placement and immediate loading of implants by provisional restoration.

Key words: Retained deciduous teeth, Immediate implant placement, Immediate loading, Anterior aesthetic zone.

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► Introduction

The retention of primary teeth well past its expected exfoliation age is encountered relatively frequently. Primary teeth may be retained in an adult patient due to variety of reasons, the most common being the absence of its permanent successor. In most cases, a decision has to be made whether to consider retaining it or to extract and substitute. The treatment plan depends on the clinical and radiographic assessment of the retained deciduous teeth. Teeth with resorption of its roots and mobility on clinical examination have poor prognosis and must be extracted and substituted.

Patients may suffer from detrimental psychological effects following the loss of one or more teeth especially in the anterior region. Tooth loss results in loss of confidence, avoidance of laughing in public, isolating oneself from social interaction and reluctance to form close relationships¹. So the plan for removal of teeth should go hand in hand with plan to minimise the period of edentulousness of the patient and immediate solution to this issue.

There are three basic approaches to replace missing teeth which includes removable dental prosthesis, fixed dental prosthesis and dental implants. Each treatment option presents with advantages and shortcomings. It is important to consider the patient's medical, financial and emotional conditions before deciding upon a form of treatment.

Treatment with dental implants is an ideal fixed treatment option preserving the gingival mucosa and bone with no damage to adjacent teeth. It is designed to replicate the natural tooth root and crown². It can be psychologically most acceptable form of treatment giving the patient a feeling of tooth emerging from his bone.

Conventional procedure for implant placement involves extraction of the tooth and waiting for 2-4 months post extraction for the socket to heal. After this, the implant is inserted and it takes 3 to 6 months for integration of implant with surrounding bone, following which another surgery is necessary to expose the implant and to place a prosthetic abutment³. Taking the

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prosthetic treatment into consideration, the patient has to wait for 8 to 12 months for a lost tooth to be replaced with dental implants. Because of the shortcomings related to conventional technique, strategies were developed to substantially shorten the entire treatment by placement of implant immediately after extraction of tooth followed by immediate loading of implant with prosthesis⁴.

This case report describes immediate aesthetic rehabilitation of mandibular anterior teeth followed by extraction of mobile retained deciduous teeth with preservation of soft and hard tissue architecture.

► Case report

A 40 year old male patient reported to the Department of Prosthodontics for aesthetic rehabilitation of mandibular central incisors by fixed prosthesis. On examination he had retained mandibular central incisors 71 and 81 (Fig. 1) with grade III mobility. Radiographic examination of the teeth revealed resorbed roots with respect to 71 and 81.

► Procedure

Routine radiographic (Fig. 2) and blood investigations were done and informed consent was obtained from the patient.

1. The patient was administered 2% lignocaine local

anaesthetic solution following which both the retained deciduous teeth were atraumatically extracted (Fig. 3).

2. The extraction sockets were thoroughly debrided (Fig. 4) and inspected. No bone grafting was required as the sockets were shallow and the cortical plates were intact.
3. Osteotomy sites were prepared with sequential order of drills as recommended by the manufacturer.
4. Gen XT single stage implants of compressive type with dimensions 3*12 mm each were inserted in the osteotomy sites (Fig. 5) with insertion torque of 45 Ncm and adequate primary stability was obtained.
5. Provisionalization was done with light cured composite resin (Fig. 6) and the provisionals were relieved from occlusion.
6. Post-operative intraoral periapical radiograph was taken (Fig. 7), confirming the accuracy of placement of implants.
7. Appropriate analgesics and antibiotics were prescribed and post-operative instructions were given to the patient.
8. At 4 months follow-up, an IOPA was taken (Fig. 8) to confirm osseointegration of the implants. The provisionals were removed (Fig. 9) and abutment level impression was made with putty and light body polyvinylsiloxane rubber base material.
9. Impression was sent to the laboratory for fabrication of all ceramic connected crowns with respect to 31



Fig. 1: Pre-operative Intraoral View



Fig. 2: Pre-operative IOPA



Fig. 3: Extracted retained deciduous teeth



Fig. 4: Extraction sockets debrided



Fig. 5: Immediate implant placement

and 41 regions.

The crowns were cemented (Fig. 10) and patient was given instructions.

Discussion

In the modern era, the concept of immediate implant placement is gaining popularity especially when anterior teeth are missing. Krump and Barnett reported high success rates with dental implants placed at the time of extraction⁵. Studies have shown the success rate in maxilla to be 66 to 98% and in mandible to be 90 to 100 %^{6,7}.

Immediate implant placement is most commonly indicated when tooth extraction is due to trauma, endodontic lesion, root fracture, root resorption, root perforation, unfavourable crown to root ratio (not due to periodontal loss) and when bony walls of alveolus are still intact⁸. Contraindications include the presence of active infection, insufficient bone (less than 3 mm) beyond the tooth socket apex for initial implant stability and wide gingival recession⁴.

In this case, prior to extraction of teeth, the potential implant site was carefully assessed and proper plans were made for atraumatic extraction of teeth, soft tissue treatment protocol and position of implant placement with respect to the crest.

Evidence has shown that the immediate implant placement

presents more advantages as compared to delayed implant insertion.

- Implants in fresh extraction sites can be placed in the same location as the extracted tooth thereby minimising the need for angled abutments².
- Osseointegration is more favourable².
- The bony receptors are preserved by preventing recession of the mucosal and gingival tissues².
- Immediate placement of implant keeps contaminants away from the extraction socket².
- Waiting period for primary healing of the soft tissues and regeneration of the osseous structure are eliminated².
- Immediate functional and aesthetic (sculpting of soft tissues) rehabilitation of the patient⁹.
- Elimination of second stage surgery⁹.
- Adjacent papillae are well preserved contributing to the final aesthetic outcome⁹.

Elias and Sheiham carried out a review of available literature and found that in general, patients were more willing for replacement of missing anterior tooth than a posterior tooth, and they had prioritised aesthetics over function in replacement of the lost tooth¹⁰.

Immediate placement and immediately loaded implants show more predictable and successful results if careful patient screening and case selection are done. Immediate loading protocol cannot be applied in all cases planned for extraction



Fig. 6: Provisionalisation with composite resin



Fig. 7: Post-op IOPA



Fig. 8: IOPA at 4-month follow-up



Fig. 9: Soft tissue profile at 4 month follow-up



Fig. 10: Permanent crowns cemented

and rehabilitation. The ideal situation for immediately loaded implants would include adequate bone quality (D2 or D3 bone), screw shaped implants, rough implant surface, minimum implant length of 10 mm, adequate primary stability and avoidance of lateral forces¹¹. Primary stability of immediately place implant seems to be one of the important factors contributing to success of implant therapy.

Some studies conducted also report implant failure in case of immediate placement. Quirynen et al concluded that the incidence of implant failure is significantly higher when combining immediate implant insertion with immediate loading¹².

In this case report, atraumatic extraction of the grade III mobile retained deciduous teeth was done. Single stage immediate loading implants were placed and primary stability of 45 Ncm was achieved by extending osteotomy 3mm beyond the apex of the socket and by selecting width of the implant slightly greater than the width of extraction socket. The implants were immediately loaded with temporary crowns and replaced by permanent restoration after 3 months. After completion of treatment excellent aesthetic rehabilitation was observed and the patient was very satisfied with the overall outcome of the treatment.

► Conclusion

The immediate implant placement with immediate loading is a viable treatment option for cases requiring earliest restoration of teeth to be extracted, especially in the anterior aesthetic zone. This approach is however very technique sensitive and requires expertise of the operator for proper execution of the planned treatment. Careful case selection, proper treatment

planning and regular follow-up can give commendable results.

► References

1. Craddock HL. Consequences of tooth loss: 1. The patient perspective – Aesthetic and functional implications. *Dent Update* 2009;36:616-9.
2. Singh M, Kumar L, Anwar M, Chand P. Immediate dental implant placement with immediate loading following extraction of natural teeth. *Natl J Maxillofac Surg* 2015;6:252-5.
3. Schropp L, Isidor F. Timing of implant placement relative to tooth extraction. *J Oral Rehabil* 2008;35 Suppl 1:33-43.
4. Singh A, Gupta A, Yadav A, Chaturvedi TP, Bhatnagar A, Singh BP. Immediate placement of implant in fresh extraction socket with early loading. *Contemp Clin Dent* 2012;3 Suppl 2:S219-22.
5. Krump JL, Barnett BG. The immediate implant: A treatment alternative. *Int J Oral Maxillofac Implants* 1991;6:19-23.
6. Uribe R, Peñarocha M, Balaguer J, Fulgueiras N. Immediate loading in oral implants. Present situation. *Med Oral Patol Oral Cir Bucal*. 2005;10(Suppl 2):E143-53.
7. Zadikian J-L, Stojanovic J, Perez MR, Zadikian L, Zadikian C, Trushkowsky R. Immediate Placement of Dental Implants after Extractions and Immediate Loading of Complete Restorations of the Maxilla, Mandible and Full-Mouth: A Retrospective Consecutive Case Series on 122 Patients and 1042 Implants with up to 8 Year Follow Up Period. *Clin Surg*. 2017; 2: 1846.
8. Douglass GL, Merin RL. The immediate dental implant. *J California Dent Assoc*. 2002;30:362-5.
9. Agarwal DS, Devkar ND, Vibhute AR, Walke PD. Immediate placement of dental implants: An overview. *Journal of Dental and Allied Sciences*. 2018;7(2):70-74.
10. Elias AC, Sheiham A. The relationship between satisfaction with mouth and number and position of teeth. *J Oral Rehabil* 1998;25:649-61.
11. Vidyadharan A, Hanawa Y, Godfrey S, Resmi PG. Immediate implants and immediate loading in full arch maxilla and mandible of a bruxer – A case report. *IOSR J Dent Med Sci* 2014;13:62-7.
12. Quirynen M, Van Assche N, Botticelli D, Berglundh T. How does the timing of implant placement to extraction affect outcome? *Int J Oral Maxillofac Implants* 2007;22 Suppl 1:203-23

Endodontic management of morphologically variant mandibular first molars: A case series

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Abstract

Knowledge of internal anatomy of root canals for the success of endodontic treatment is very important. The prevention or healing of endodontic pathology depends on a thorough

chemo-mechanical cleaning and shaping of the root canals. Several variations in root canal morphology exist in permanent mandibular molars. The case series contain three case reports

describing the endodontic management of morphologically variant mandibular first molars.

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► Introduction

A thorough knowledge about the root canal anatomy and its morphological variations is vital for a successful endodontic therapy¹. Main causes of endodontic treatment failures are missed canals, inadequate cleaning and shaping, and defective obturation of root canal system.

Anatomical variations seen in different types of teeth are real challenges routinely faced by clinicians performing endodontic treatment. Many in vitro and in vivo studies were conducted which have investigated the anatomical configuration of mandibular molars². The mandibular first molars seems to be the tooth that most often requires endodontic treatment as it is the first permanent posterior tooth to erupt. The presence of a mid mesial canal was described by Baugh D and Wallace. J..Martinez and Bandaneli described two cases reported with six canals³. In a study by Kottor et al. and Ahmed et al. they found a prevalence rate of 4% and 3% for 3 canals in mesial and distal roots respectively⁴.

Radix Entomolaris which has an occurrence⁵ of < 5% is an anatomical variant described by Carabelli found in permanent mandibular molars in which an additional third root is present, which is typically seen disto-lingually⁶.

This clinical case series describes three different cases of endodontic management of morphologically variant first molars.

► Case 1:

A 39 year old female patient presented with pain in the mandibular right posterior region for past two weeks. Medical history was non contributory. Clinical examination revealed restoration in mandibular first and second molars.

The radiograph (figure 1) showed secondary caries in mandibular first molar invading distal pulp horn and widening of lamina dura. The clinical and radiographic findings led to a diagnosis of chronic apical periodontitis, necessitating endodontic therapy.

Anaesthesia of mandibular first molar was achieved with inferior alveolar nerve block using 1.8ml 2% lignocaine with 1:200,000 epinephrine. Access cavity preparation was done. Clinical examination revealed four distinct orifices, two located mesially (mesiobuccal and mesiolingual), and two located distally (distobuccal and distolingual). On careful examination of the access cavity with endo explorer, an additional orifice was detected between the two main canals both mesially and distally.

Glide path and patency was achieved using no 6,8 and 10 k files. Working length radiographs (Fig 2) were taken at different angulations with a file placed in each of the three mesial and three distal orifices, and confirmed with electronic apex locator (Raypex).

Cleaning and shaping was performed using crown down

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preparation with rotary Protaper files (Densply Maillefer) upto F2 under profuse irrigation with 3% NaOCl solution. Master cone radiographs were taken at different angulations (Fig 3). After drying the root canals with sterile paper points, obturation was carried out with gutta percha cones using zinc oxide eugenol sealer (Fig 4). The access cavity was temporarily restored and permanent restoration was done with amalgam after one week.

► Case 2

A 42 years old female patient presented with chief complaint of spontaneous pain in the lower left mandibular region for 3 days. History reveals that pain was intermittent for the past 15 days. On clinical examination, deep carious lesion was seen distally and a temporary restoration occlusally. Radiograph (Fig 1) shows a deep restoration and a deep caries nearing the pulp in mandibular first and second molars and there was widening of lamina dura in relation to the distal root of mandibular first molar. The clinical and radiographic findings led to a diagnosis of chronic apical periodontitis, necessitating endodontic therapy.

After a consent from the patient Anaesthesia of mandibular first molar was achieved with inferior alveolar nerve block using

1.8ml 2% lignocaine with 1:200,000 epinephrine. Access cavity preparation was done. On keen observation, there appeared to be an additional root outline seen distolingually. Radiographs were taken in three different angulations keeping in mind the Slob Rule to confirm presence of an extra root distolingually.

After endodontic access cavity preparation, a clinical examination was carried out with a DG16 endodontic explorer revealed two mesial and two distal canals; disto buccal orifice located away from the center (buccally) and disto lingual orifice (lingually), mesiobuccal orifice located buccally and mesiolingual orifice located lingually.

Glide path and patency was achieved using no 6,8 and 10 k files. All the canals were negotiated, and the working length was measured with Raypex and confirmed with radiograph.

Canals were cleaned and shaped using a crown down preparation with rotary Protaper instruments under profuse irrigation with 3% NaOCl solution., and disinfection was carried out using calcium hydroxide. In the next visit after a week, the canals were dried using paper points, master cone radiograph

► Case 1



Fig. 1 Preoperative radiograph



Fig. 2 Working length determination



Fig. 3 Master cone radiograph

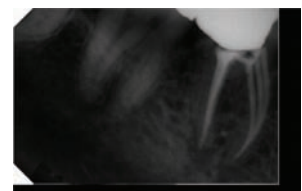


Fig. 4 Obturation radiograph

► Case 2



Fig. 1 Preoperative xray

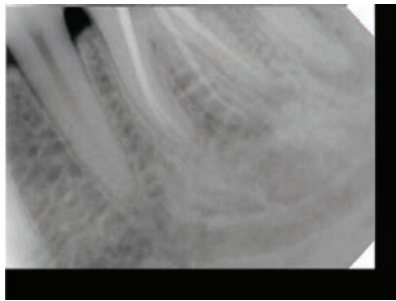


Fig. 2 Master cone radiograph

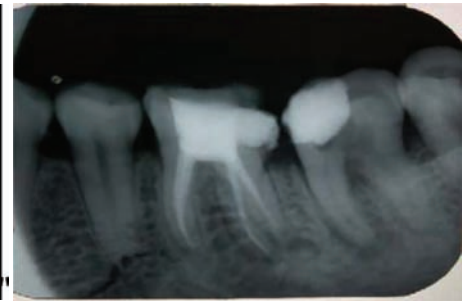


Fig. 3 Final obturation of 36

► Case 3

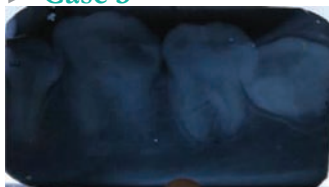


Fig. 1 Preoperative radiograph



Fig. 2 Working length radiograph

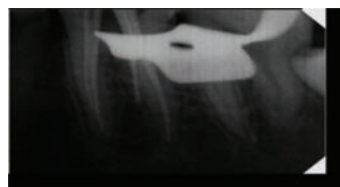


Fig. 3 Master cone radiograph

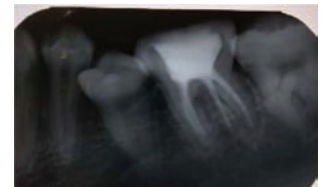


Fig. 4 Obturation

(fig 2) was taken, and obturation was done. The access cavity was restored with amalgam restoration, postobturation radiograph was taken [Figure 3], and the patient was scheduled for full coverage restoration.

► Case 3:

A 17 years old female patient presented with chief complaint of spontaneous pain in the lower left mandibular region for 5 days. History reveals that pain was intermittent for the past 2 weeks. On clinical examination, deep carious lesion was seen disto occlusally. Radiograph (fig 1) deep caries involving pulp in mandibular first molar and there was widening of lamina dura in relation to the mesial root of mandibular first molar. The clinical and radiographic findings led to a diagnosis of chronic apical periodontitis, necessitating endodontic therapy.

After a consent from the patient Anaesthesia of mandibular first molar was achieved with inferior alveolar nerve block using 1.8ml 2% lignocaine with 1:200,000 epinephrine. Access cavity preparation was done.

Extension and de-roofing of the pulp chamber were done to provide straight line access to the canals. Three canals were located immediately but the dentinal map seemed to be slightly extending in a distolingual direction. Probing with a Dg-16 explorer revealed an extra canal in distolingual aspect of the floor of access cavity. All the canals were negotiated, and the working length was measured with Raypex and confirmed with radiograph. (Fig 2)

Canals were cleaned and shaped using a crown down preparation with rotary Protaper instruments under profuse irrigation with 3% NaOCl solution., and disinfection was carried out using calcium hydroxide. In the next visit after a week, the canals were dried using paper points, master cone radiograph (fig 3) was taken, and obturation (fig 4) was done. The access cavity was restored with amalgam restoration, postobturation radiograph was taken.

► Discussion:

The main aim of endodontic treatment is thorough mechanical and chemical debridement of the entire pulp cavity and its complete obturation with an inert filling material which provides a fluid tight seal. The success of endodontic therapy relies on the knowledge of anatomic variations in the internal anatomy of human teeth.

The mandibular first molar generally has (i) a mesial root with 2 canals at an incidence of 94.4%; (ii) a third canal (middle mesial), (2.3%); (iii) a distal root with 1 canal (62.7%) or 2 canals (37.3%)⁴.

Diagnostic aids which are used for locating canal orifices are CBCT, Dentascan, examination of the floor of pulp chamber with a sharp explorer, multiple preoperative radiographs, troughing of the grooves using ultrasonic tips, staining the chamber floor using 1% methylene blue dye, performing the sodium hypochlorite “champagne bubble test” and visualising canal bleeding points³.

RE is most commonly situated in the same plane and it tends to give an inaccurate diagnosis as it is overlapped by the distobuccal root in the buccolingual plane which results in superimposition of both the roots⁵. Its frequency of occurrence is 0.2%–32% in different populations. A thorough radiograph interpretation is necessary to identify RE⁵; To reveal the RE, the involved tooth should be exposed from three different horizontal projections, the standard Buccal-To-Lingual Projection, 20 Degree from the mesial, and 20 degree from the distal should be taken⁶. RE can be identified using Three-dimensional imaging technique-based computer tomography (CT) and cone-beam CT in a noninvasive manner with lesser radiation⁶.

► Conclusion:

Human mandibular molars show considerable anatomic variation and abnormalities with respect to number of roots and root canals; Proper diagnosis and implementing the treatment plan with appropriate techniques and instruments facilitates the endodontic outcome and avoids possible errors. Proper interpretation of radiograph in different angulations may help to identify the morphology of the tooth.

► References:

1. M. Jyothi1, M.H. Sruthi Keerthi2*, Ch. Uma3, A. Mounika2, R. Subash2, B.S. Jyothirmayi2, K. Girish2. Endodontic Management of Variants of C-Shaped Canal: Case Series. Indian Journal of Mednudent and Allied Sciences Vol. 4, No. 1, February 2016, pp- 53-58
2. Pradnya Sunil Nagmode, Ankit Vasant Patel, Archana Bhaskar Satpute, Pooja L. Gupta. Endodontic management of mandibular first molars with mid mesial canal: A case series. Journal of Conservative Dentistry | Volume 20 | Issue 2 | March-April 2017:137-40.
3. Sachin Guptha, Shikha Jaiswal, Rohith Arora. Endodontic management of permanent mandibular left first molar with six root canals. Contemporary clinical dentistry. April 2012, Vol 3/ Supplement
4. Claudio Maniglia-Ferreira, 1 Fabio de Almeida Gomes, 1 and Bruno Carvalho Sousa 2 Management of Six Root Canals in Mandibular First Molar Hindawi Publishing Corporation Case Reports in Medicine Volume 2015, Article ID 827070, 5 pages
5. Parupalli Karunakar P, Faizuddin U, Nagarjun M, Ranga Reddy MS. Endodontic management of radix entomolaris in second molar. Contemp Clin Dent 2018;9:137-9.
6. Prof. Dr. Pardeep Mahajan, Pratima Sharma, Harsimran Kaur, Harshita Wadhwa, Divya Pipat, Pallvi Dhand. Endodontic Management of Radix Entomolaris: A Case Series IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 17, Issue 3 Ver. 4 March. (2018), PP 06-09.

Self assembling peptides in enamel remineralization: a review

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► Introduction

Enamel caries is probably the most common of all skeletal tissue pathologies, presenting as progressive subsurface demineralization (mineral loss) and ultimately resulting in mechanical failure and cavitation¹. Preventive approaches for caries, such as fluoride, mainly act by inhibiting demineralization by fluoride incorporation in the crystal lattice, resulting in lower solubility of the enamel². But the potential of fluoride to protect the enamel is restricted to the outer ~30 µm of the tooth. What is expected from a true regenerative approach, is to regenerate hydroxyapatite crystals within the subsurface carious lesion possibly by using the natural remineralization process from saliva³.

During odontogenesis, the enamel matrix enables formation of hydroxyapatite crystals to form enamel⁴. However, the enamel matrix is unavailable to support regeneration of larger defects afterwards, as it is mostly degraded during the final enamel maturation step⁵. A biomimetic approach would present the possibility to form de novo hydroxyapatite crystals⁶. One such approach is to use rationally designed small peptides that self-assemble into a 3-dimensional scaffold with surface characteristics mimicking the enamel matrix⁷. The peptide has shown encouraging results as a scaffold for enamel regeneration. There is, however, still limited evidence of its use at the clinical level. The aim of this article is to present the current scientific evidence and clinical results for the self-assembling peptide P11-4 in a modern carious-lesion management concept.

What is self assembling peptide?

P11-4 is a synthetic, pH controlled self-assembling peptide used for biomimetic mineralization, which consists of the

naturally occurring amino acids Glutamine, Glutamic acid, Phenylalanine, Tryptophan and Arginine.

These are a new generation of well-defined biopolymers formed by oligomeric-sheet-forming peptides that spontaneously undergo hierarchical self-assembly into fibrillar scaffolds in response to specific environmental triggers⁸. These peptides undergo one-dimensional self-assembly to form micrometer-long, sheet "nanotapes". Induction of further assembly leads to pairing of nanotapes to form ribbons⁹, which in turn can further assemble to form fibrils, and pairs of fibrils entwine edge-to-edge to form fibers. This assembly process has been⁹ principally driven by intermolecular H bonding arising from the peptide backbone, together with additional interactions between specific side chains.

Once assembled, these fibrillar networks can form scaffold-like structures that mirror the biological macromolecules found in extracellular matrices, including those of the mammalian skeleton, where (predominantly anionic) matrix proteins are known to control the deposition and growth of hydroxyapatite crystals¹⁰.

Other names

Oligopeptide 104

Ac-Gln-Gln-Arg-Phe-Glu-Trp-Glu-Phe-Glu-Gln-Gln-NH₂

Ace-QQRFWEFEQQ -NH₂

Chemical formula: C₇₂H₉₈N₂₀O₂₂

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Pathogenesis of dental caries

Caries is the most common disease worldwide¹¹. It is caused by metabolism of carbohydrates into organic acids by certain oral bacteria, consequently dissolving the minerals which make up enamel and dentin. Enamel caries starts by subsurface demineralization, unlike dentin, leaving a porous mineral surface covering the lesion body. After approximate 30% demineralization, the mineralized surface collapses and breaks irreversibly.¹²

Demineralization/Remineralization Equilibrium

Within the oral cavity, there are alternating periods of demineralization caused by bacterial acids and remineralization facilitated by saliva (Hara and Zero 2010). During the demineralization process, calcium phosphate minerals, which constitute most of the enamel structure, is dissolved due to acidic pH and results in pores between crystallites. During remineralization, calcium phosphate supersaturated saliva redeposits minerals either on existing crystallites or triggers de novo formation of crystallites. This presents the natural regeneration process of the enamel tissue²

Are all carious lesions indicative of sap treatment?

Enamel caries is a progressive subsurface demineralisation ultimately resulting in mechanical failure and cavitation. The earliest clinical sign of enamel caries is the appearance of a 'white spot' lesion on the tooth surface.² Non-surgical intervention promoting defect biomineralisation or regeneration at the white spot lesion stage would remove the need to 'wait and

see' and avoid the ultimate excavation of the tooth to place a restoration. Infiltration of early ('white spot') caries lesions using low viscosity monomeric P11-4 would result in triggered self-assembly within the lesion, generating a subsurface bioactive scaffold capable of recapitulating normal histogenesis by inducing mineral deposition in situ.

Synthesis of SAP

P11-4 (Ace-Gln-Gln-Arg-Phe-Glu-Trp-Glu-Phe-Glu-Gln-Gln-NH₂) is synthesized by standard solid-phase peptide synthesis.⁸

Mechanism of action

This peptide forms a 3D matrix within demineralized carious lesions areas, which enables novo hydroxyapatite crystal formation facilitating the so-called guided enamel regeneration of the lost enamel structure.

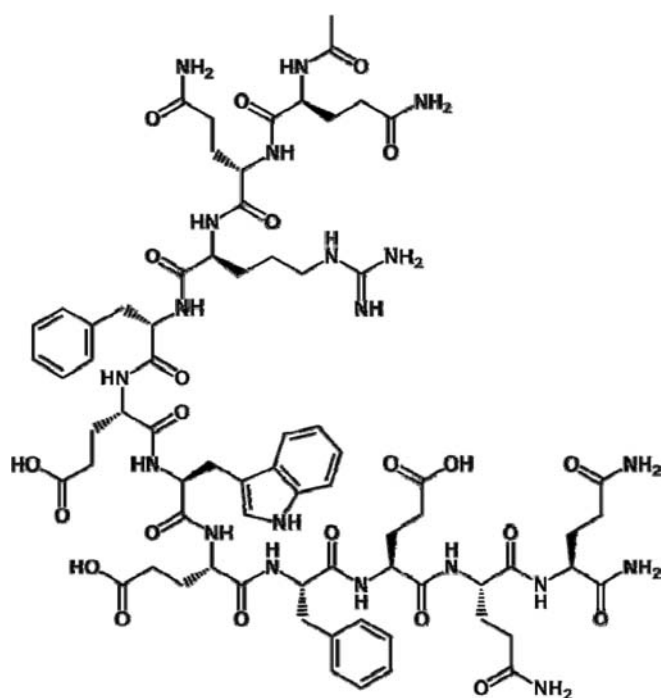
The surface of the 3-dimensional structure determines its chemical and physical properties. P11-4 assembled into fibers presents clusters of negative charges made up of 4 Glu-residues on its surface, presenting a potential Ca²⁺-binding site. Molecular dynamics simulations have shown that those binding sites are approximately 9.4Å apart—a distance found for the columnar Ca²⁺-ions in the hydroxyapatite crystal (Thomson et al. 2014). Therefore, P11-4 fibers present a suitable surface that could mimic the biological macromolecules found in mammalian skeleton, where (predominantly anionic) matrix proteins are known to control the deposition and growth of hydroxyapatite crystals.¹²

Invitro studies

Scientific literature proposes that clinical management of tooth demineralisation should emphasize on early detection and prevention, before a restorative approach is applied. In order to reinforce and aid in oral health, advancement of technologies that can promote enamel remineralisation or down scale demineralisation has been obtained through longterm research¹³. Eventhough clinical studies remain the gold standard, standardized invitro models are the most conventional techniques in cariology research and can serve as a valuable tool for assessing anti caries efficacy of remineralising agents¹⁴.

Most of the invitro studies were conducted based on standard pH cycling model given by Featherstone et al or Ten Cate et al.

Each of the samples were individually immersed in the demineralising solution (20 ml) for 96 hours to produce artificial carious lesions in the enamel. Samples were then divided into groups and pH cycling model was adopted. The remineralising pastes were applied with applicator tips and left on for two minutes, following which the samples were



thoroughly washed with deionized water. The samples were then individually immersed in 20 ml of demineralising solution (pH 4.4) for a period of three hours and were then washed with deionized water. This was followed up with treatment of the samples again with the respective remineralising agents for two minutes which was then washed off with deionized water. All the enamel samples were then individually immersed in 20 ml of remineralising solution (pH 7) for a period of 17 hours. The pH cycling was carried out for a period of 30 days.

The remineralising and demineralising solutions were replaced every 48 hours and five days respectively. After the culmination of the pH cycling process, all the enamel samples were assessed for remineralization. Assessment of enamel remineralisation can be achieved either quantitatively by mineral content and hardness profiles or qualitatively by Polarized Light Microscopy (PLM) and SEM.³³

Almost all the invitro studies showed favourable results for SAP in promoting remineralization.

According to Kirkham et al, a single application with a monomeric solution of P11-4 significantly increased net mineral gain by the caries-like lesions, compared with controls, after 5 days of pH cycling.

It could be shown by using various analytical methods that the self-assembling peptide P11-4 diffuses into the subsurface lesion, assembles into higher formed aggregates throughout the whole volume of the lesion, and supports nucleation of de novo hydroxyapatite nanocrystals. This results in increased mineral density within the subsurface carious lesion. The results showed that the application of self-assembling peptide P11-4 can facilitate the subsurface regeneration of the enamel lesion by supporting de novo mineralization similar to that for the natural¹⁵.

When P11-4 gels were incubated for 7 days at pH 7.4 in physiologically relevant “mineralizing” solutions supersaturated with respect to hydroxyapatite, electron-dense deposits were observed throughout the body of the gel.⁷

Research has established that, at certain peptide concentrations, P11-4 switches from a low viscosity isotropic liquid to an elastomeric nematic gel at pH <7.4, the anionic groups of the P11-4 side chains then attract calcium ions, activating precipitation of new hydroxyapatite, thereby promoting mineral deposition in situ. The scaffold can then function as nucleator for hydroxyapatite, inducing tissue regeneration.^{16,17}

Kirkham J et al showed that P11-4 is able to nucleate new

hydroxyapatite crystals and promote repair of caries like lesions in vitro. Jablonski-Momeni A et al., concluded that the SEM images of samples treated with self-assembling peptide P11-4 revealed large areas of remineralised enamel surface in 93 % of the samples, thereby proving to be efficacious.

Renita Soares et al through their study, showed that the self assembling peptide P11-4 group had the best results, with considerably greater increase in the percentage of SMH recovery as compared to the other groups. This could be attributed to the ability of the peptide to induce biomimetic mineralisation by nucleating hydroxyapatite crystals.

Clinical studies

Clinical effects and safety of self-assembling peptide P11-4 were first examined in an uncontrolled safety trial conducted by Brunton PA et al., fifteen healthy adults with Class V ‘white spot’ lesions received a single application of P11-4. Adverse events and lesion appearances were recorded over 180 days. The results of the study suggested that treatment of early caries lesions with P11-4 is safe, and a single application is associated with significant enamel regeneration, presumably by promoting mineral deposition within the subsurface tissue.

No adverse events were recorded by the use of the product, and the blinded evaluation of the lesions showed a significant improvement of lesions as judged by size and perceived progression, further clinical studies were feasible.

In the study by Brunton et al. (2013), a laboratory formulation was used, whereas in all other clinical studies, the formulation as in the product Curodont Repair was used. Prior to the application of the peptide, the enamel surface was cleaned chemically with sodium hypochlorite and etching gel (35% phosphoric acid).

In a study done by Schlee et al. 2014, 2017, the treatment effect of self-assembling peptide P11-4 in 25 patients with proximal carious lesions was monitored with standardized radiographs that were evaluated by two independent blinded examiners and also by digital subtraction radiography (DSR) for baseline and the 1-year follow-up. The combined assessments indicated a clear trend toward regression of the lesions visible on clinical radiographs. Such radiographic lesion regression was previously reported and considered to be impossible by applying normal remineralization agents such as fluorides (Paris et al. 2010).

In a randomized, controlled, single-blinded study, the safety and clinical efficacy of P11-4 in treatment of initial caries were evaluated using a randomized controlled trial (RCT) design¹⁸. The additional effect of the application of self-assembling peptide P11-4 (Curodont Repair) was compared to that of the

application of fluoride varnish (Duraphat) alone. One-half of the 70 children (>5 years) with active occlusal initial caries lesions on erupting permanent molars was assigned to the test (n = 35, P11-4 + fluoride varnish), and the other half to the control group (n = 35, fluoride varnish only).

Lesions were assessed at baseline, fluoride varnish was applied on both test and control lesions at baseline and follow-up sessions. In the 3- and 6-month recalls, the test group showed, in both the laser fluorescence readings by Diagnodent and assessment of the caries activity according to the Nyvad criteria²⁰, significantly superior lesion regression in the test group (odds ratio: 3.5, $P = 0.015$; 12.2, $P < 0.0001$, respectively). No adverse events, medical complications, or allergic reactions related to the treatments were reported. Clinical applicability of test and control treatments was regarded as satisfactory, and was reported as easier than placing a filling or a sealant. The results demonstrated that biomimetic mineralization facilitated by self-assembling peptide P11-4 in combination with fluoride is a simple, safe, and effective noninvasive treatment for early carious lesions, and is superior to the present clinical gold standard of fluoride treatment alone.

Comparisons With Alternative Approaches

In an invitro study conducted by Schmidlin et al, to assess the remineralization potential of enamel-matrix proteins (EMD - lyophilized protein fractions dissolved in acetic acid, Straumann), (B) self-assembling peptides (SAP, Curodont) & amine fluoride solution, significant rehardening was observed in the EMD and SAP groups.

Dina Kamal et al in an invitro study to compare the effects of fluoride varnish, casein phosphopeptide-amorphous calcium phosphate fluoride (CPP-ACPF) and self-assembling peptide (P11-4), concluded that self-assembling peptide confers the highest remineralizing efficacy compared to fluoride and CPP-ACPF, showing a promising, noninvasive regeneration potential.

Renita Soares et al in their study to evaluate the ability of Casein Phosphopeptide-Amorphous Calcium Phosphate Fluoride (CPP ACPF), Bioactive Glass (BAG), fluoride enhanced Hydroxyapatite (HA) gel and self-assembling peptide P11-4 to remineralise artificial carious lesions in enamel in vitro using a 30 day pH cycling model through surface microhardness analysis and SEM, the results of the study revealed that remineralisation of enamel was the highest in samples of Self assembling peptide P11-4) followed by CPP-ACPF.

Future perspective

The remarkable caries decline of past decades, not just in children and adolescents but also in adults (Frencken et

al. 2017), was mostly attributed to the preventive effects of fluorides (Bratthall et al. 1996). Fluorides, however, seem to be less effective in the arrest or remineralization of initial lesions 21, which leads to the development of alternative approaches such as sealing or infiltrating initial caries lesions 19. In contrast to these composite-based treatment measures, biomimetic techniques, such as the self-assembling peptide P11-4, offer a therapeutic option for enamel regeneration. The self-assembling peptide P11-4 was designed to deliver a scaffold for improved (re)mineralization of the lesion body; this scaffold is thought to be in analogy to the formation of enamel. Several ex vivo studies proved the retention of P11-4 in enamel, plus the formation of de novo minerals and additional mineral deposits compared to the gold standard of fluorides. In addition, a clinical study confirmed this clearly for initial caries lesions in fissures of erupting permanent molars¹⁸. Thus, a promising future therapy to enhance remineralization of carious enamel has been systematically developed that should be investigated in further clinical settings, especially because detrimental side effects were not found.

► Conclusion

In conclusion, the data demonstrated that biomimetic mineralization facilitated by P11-4 in combination with fluoride is a simple, safe, and effective noninvasive treatment for early carious lesions. Most of the invitro studies as well as clinical trials have given promising results for enamel remineralization using SAPs. Taken together, it suggests that self-assembling peptides offer a potentially exciting route to “smart” dental biomaterials, though much research remains to be carried out.

► References

1. Robinson C, Kirkham J, Baverstock AC, Shore RC (1992). A flexible and rapid pH cycling procedure for investigations into the remineralisation and demineralisation behaviour of human enamel. *Caries Res* 26:14-17.
2. Ten Cate JM, Duijsters PP. Alternating demineralization and remineralization of artificial enamel lesions. *Caries Res* 1982;16:201-10.
3. Schmidlin P, Zobrist K, Attin T, Wegehaupt F. 2016. In vitro re-hardening of artificial enamel caries lesions using enamel matrix proteins or self-assembling peptides. *J Appl Oral Sci.* 24(1):31-36.
4. Goldberg M, Septier D, Lecolle S, Chardin H, Quintana MA, Acevedo AC, Gafni G, Dillouya D, Vermelin L, Thonemann B, et al. 1995. Dental mineralization. *Int J Dev Biol.* 39(1):93-110.
5. Brookes SJ, Robinson C, Kirkham J, Bonass WA. Biochemistry and molecular biology of amelogenin proteins of developing dental enamel. *Arch Oral Biol.* 1995;40:1-14.
6. Hannig M, Hannig C. 2010. Nanomaterials in preventive dentistry. *Nat Nanotechnol.* 5(8):565-569.
7. Kirkham J, Firth A, Vernals D, Boden N, Robinson C, Shore RC, Brookes SJ, Aggeli A. 2007. Self-assembling peptide scaffolds promote enamel remineralization. *J Dent Res.* 86(5):426-430.
8. Aggeli A, Bell M, Boden N, Keen JN, Knowles PF, McLeish TC, et al. (1997a). Responsive gels formed by the spontaneous self-assembly of peptides into polymeric beta-sheet tapes. *Nature*

- 386:259-262.
9. Aggeli A, Nyarkova I A, Bell M et al. Hierarchical selfassembly of chiral rod-like molecules as a model for peptide beta -sheet tapes, ribbons, fibrils, and fibres. *ProcNatI AcadSci U S A* 2001; 98: 11857–11862.
 10. Boskey AL (2003). Biom mineralization: an overview. *Connect Tissue Res* 44(Suppl 1):5-9.
 11. Petersen PE. 2003. The world oral health report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO global oral health programme. *Community Dent Oral Epidemiol*. 31(Suppl 1):3–23.
 12. Brunton PA, Davies RP, Burke JL, Smith A, Aggeli A, Brookes SJ, Kirkham J. 2013. Treatment of early caries lesions using biomimetic self-assembling peptides—a clinical safety trial. *Br Dent J*. 215(4):E6.
 13. Bertassoni LE, Habelitz S, Marshall SJ, Marshall GW. 2011. Mechanical recovery of dentin following remineralization in vitro—an indentation study. *J Biomech*. 44(1):176–181.
 14. Jablonski-Momeni A, Heinzel-Gutenbrunner M. 2014. Efficacy of the selfassembling peptide p11-4 in constructing a remineralization scaffold on artificially-induced enamel lesions on smooth surfaces. *J OrofacOrthop*. 75(3):175–190.
 15. Kind L, Stevanovic S, Wuttig S, Wimberger S, Hofer J, Müller B, Pieses U. 2017. Biomimetic remineralization of carious lesions by self-assembling peptide. *J Dent Res*. 96(7):790–797.
 16. Kyle S, Aggeli A, Ingham E, McPherson MJ. 2010. Recombinant selfassembling peptides as biomaterials for tissue engineering. *Biomaterials*. 31(36):9395–9405.
 17. Takahashi F, Kurokawa H, Shibasaki S, Kawamoto R, Murayama R, Miyazaki M. 2016. Ultrasonic assessment of the effects of self-assembling peptide scaffolds on preventing enamel demineralization. *Acta Odontol Scand*. 74(2):142–147.
 18. Alkilzy, M., Santamaria, R. M., Schmoedel, J. & Splieth, C. H. Treatment of carious lesions using self-assembling peptides. *Adv. Dent. Res*. 29, 42–47 (2018).
 19. Splieth CH, Flessa S. 2008. Modelling lifelong costs of caries with and without fluoride use. *Eur J Oral Sci*. 116(2):164–169.
 20. Nyvad B, Machiulskiene V, Bælum V. 2005. The Nyvad criteria for assessment of caries lesion activity. In: Stookey GK, editor. *Clinical models workshop: remin-demin, precavitation, caries: proceedings of the 7th Indiana Conference, Indianapolis, Indiana, USA*. Indiana University School of Dentistry. p. 99–116.
 21. Altenburger MJ, Gmeiner B, Hellwig E, Wrbas KT, Schirmermeister JF. 2010. The evaluation of fluorescence changes after application of casein phosphopeptides (CPP) and amorphous calcium phosphate (ACP) on early carious lesions. *Am J Dent*. 23(4):188–192.
 22. Marinho VC, Higgins JP, Logan S, Sheiham A. 2002. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev*. 3:CD002279.
 23. Aggeli A, Bell M, Boden N et al. Engineering of peptide beta-sheet nanotapes. *J Mater Chem* 1997; 7: 1135–1145. 4. Aggeli A, Bell M, Carrick L M et al. pH as a trigger of peptide beta-sheet self-assembly and reversible switching between nematic and isotropic phases. *J Am Chem Soc* 2003; 125: 9619–9628.
 24. Aggeli A, Fytas G, Vlassopoulos D et al. Structure and dynamics of self-assembling beta-sheet peptide tapes by dynamic light scattering. *Biomacromolecules* 2001; 2: 378–388.
 25. Firth A, Aggeli A, Burke J L, Yang X, Kirkham J. Biomimetic self-assembling peptides as injectable scaffolds for hard tissue engineering. *Nanomedicine (Lond)* 2006; 1: 189–199.
 26. 1- Aoba T, Komatsu H, Shimazu Y, Yagishita H, Taya Y. Enamel mineralization and an initial crystalline phase. *Connect Tissue Res*. 1998;38:129-37.
 27. Featherstone JD. Dental caries: A dynamic disease process. *Aust Dent J* 2008;53:286-91. 3. Goswami M, Saha S, Chaitra TR Latest developments in non-fluoridated remineralizing technologies. *J Indian Soc Pedod Prev Dent* 2012;30:2-6.
 28. Amaechi BT. Remineralization therapies for initial caries lesions. *Curr Oral Health Rep* 2015;2:95-101.
 29. Oliveira GM, Ritter AV, Heymann HO, Swift E Jr., Donovan T, Brock G, et al. Remineralization effect of CPP-ACP and fluoride for white spot lesions in vitro. *J Dent* 2014;42:1592-602
 30. Bröchner A, Christensen C, Kristensen B, Tranaeus S, Karlsson L, Sonnesen L, Twetman S. 2010. Treatment of post-orthodontic white spot lesions with casein phosphopeptide-stabilised amorphous calcium phosphate. *Clin Oral Investig*. 15(3):369–373.
 31. 14- Laurance-Young P, Bozec L, Gracia L, Rees G, Lippert F, Lynch RJ, et al. A review of the structure of human and bovine dental hard tissues and their physicochemical behaviour in relation to erosive challenge and remineralisation. *J Dent*. 2011;39:266-72.
 32. Schmidlin PR, Zehnder M, Imfeld T, Swain MV. Comparative assessment of hardening of demineralized dentin under lining materials using an ultramicroindentation system. *J Biomed Mater Res B Appl Biomater*. 2007;83:199-205.
 33. Oliveira GM, Ritter AV, Heymann HO, Swift E Jr., Donovan T, Brock G, et al. Remineralization effect of CPP-ACP and fluoride for white spot lesions in vitro. *J Dent* 2014;42:1592-602

An invitro comparative study to determine the efficacy of chemo-mechanical caries removal agents carie care and v-carie – solve

*Chaitra P R, ** Anjana G, *** Saravanakumar M S, **** Muralikrishnan B, ***** Amrutha Joy

Abstract

Introduction: Chemo mechanical caries removal method, a minimal invasive method has been developed and is found to be efficient in removing infected dentin without altering the healthy dental tissue.

Aim: The aim of this study is to determine the efficacy of Chemo-mechanical caries removal agents using CARIE CARE and V-CARIE-SOLVE.

Materials and methods: A total of 20

extracted primary molars were included in the study. The samples were divided into Group A and Group B, each containing 10 teeth itself. Group A treated with CARIE CARE and Group B with V- CARIE -SOLVE. The samples were then decalcified, sectioned and stained with H & E stain and then evaluated using Light Microscope to determine the dentinal tubule destruction and the amount of bacterial deposits.

Results: Samples were statistically analyzed

using Chi-Square test. No significant differences were found between the groups for dentinal tubule destruction ($p= 0.524$) and bacterial deposits ($p= 0.460$).

Conclusion: Both the groups showed similar efficacy in caries removal.

Key words: Chemomechanical caries removal, Carie Care, V-Carie –Solve

KDJ 2019 | Vol. 42 | No. 2 | Pg 110-113

► Introduction

Bangkok global summit on ECC 2018 defined dental caries as a biofilm mediated, sugar driven, multifactorial dynamic disease that result in the phasic demineralization and remineralization of dental tissues, determined by biological, behavioral and psychological factors linked to an individualized environment. It is one of the most prevalent oral diseases and is of great public health concern. The most serious problem encountered during caries removal is anxiety, fear and pain.

Conventional caries removal and cavity preparation entail the use of burs. Mechanical bur drilling often causes over preparation of sound healthy dentin, leading sometimes to pulp inflammation and even exposure. The chemomechanical method for caries removal was developed to overcome these shortcomings. As the name suggests, Chemomechanical Caries Removal involves the application of a chemical solution to the carious dentin followed by gentle removal with hand instruments. It has seen to be very efficient in its caries removal

effectiveness while maintaining its minimal invasive potential. It is more comfortable for the patient and is able to preserve the healthy dental tissues better. It is claimed to reduce the need of anesthesia, preserve the tooth structure better, decrease the use of rotary instruments and to relieve anxiety efficiently.¹

The principle of chemomechanical caries removal (CMCR) is the use of a solution to chemically alter carious tooth tissue to further soften it, thus facilitating its easier removal. The softened dentin is then mechanically removed using a hand instrument. Early attempts were introduced in the 1970s using various agents such as ethylene diamine tetra-acetic acid (EDTA)², collagenase^{3,4} and sodium dodecyl sulfate.³

Most of these systems proved too time consuming to be of any use clinically. More recently, other agents have become available. There is also a need to evaluate and compare the antimicrobial efficiency of commercially available newer enzymatic CMCR agents such as Carie Care and V-Carie- Solve which has similar

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active ingredients for caries dissolution.

► Objectives

This study was to compare and determine the dentinal tubule destruction and the amount of bacterial deposits using Carie Care and V-Carie-Solve under light microscope and hence evaluate and compare the efficiency in caries removal.

Study materials and methodology

Carie-Care	V-Carie-Solve
Papaya extract	Papaya extract
Clove oil	Silicon dioxide
Chloramine	Chloramine
Sodium chloride	Vitamin A and Vitamin C
Sodium methyl paraben	Sodium methyl paraben
Sodium propyl paraben	Sodium propyl paraben
Sterile water	Clove oil

The study was carried out in the Department of Pedodontics and Preventive Dentistry in association with the Department of Oral Pathology and Microbiology, Royal Dental College, Chalissery. Twenty extracted human carious primary molar teeth, involving the dentin, were selected for the study. After cleaning with pumice and water slurry to remove the debris, each tooth was rinsed in distilled water and dried with compressed air for 5 seconds.

The samples were randomly divided into Group A and Group B, each containing 10 teeth itself. Group A treated with CARIE CARE and Group B with V- CARIE- SOLVE. Carious lesions were covered with CMCr and left undisturbed for 30 seconds (Fig. 1). When the gel was cloudy, it was removed gently by scraping with the spoon excavator without applying pressure (Fig. 2), after which additional fresh gel was applied on the excavation site. Removal of carious dentin was continued until the gel was no longer cloudy. The gel was then removed and the cavity was wiped with a moistened cotton pellet and dried (Fig. 3).

The samples were then decalcified in 10% nitric acid for 48 hours at room temperature. After washing the teeth were dehydrated in ascending degrees of ethanol, cleared in xylene and embedded in paraffin (Fig. 4). They were sectioned and stained with H & E stain (Fig. 5) and then evaluated using light

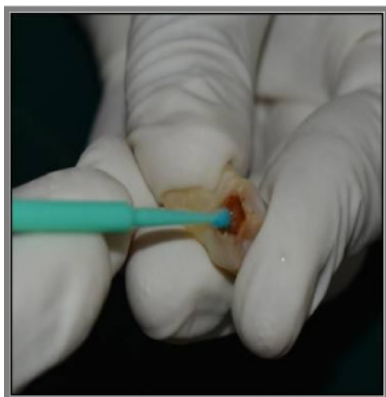


Fig 1

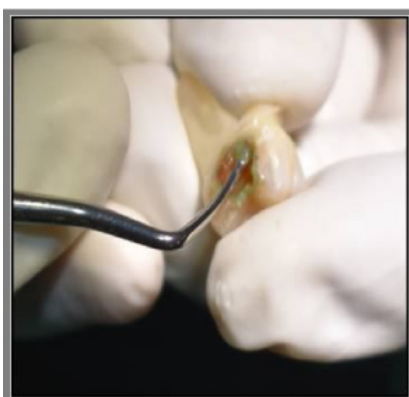


Fig 2



Fig 3



Fig 4



Fig 5

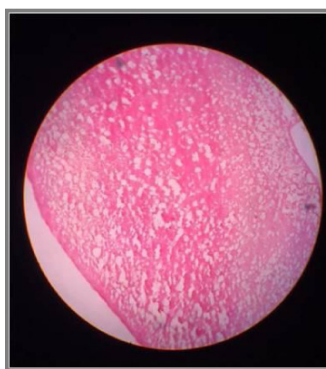


Fig 6 Group A

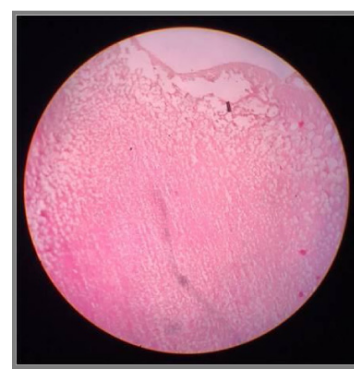


Fig 7 Group B

microscope to determine the dentinal tubule destruction and the amount of bacterial deposits (Fig 6, Fig 7).

The differences between the groups in clinical efficiency were compared and statistically analyzed using Chi-square test.

► Results

In Carie Care group (group A), 60% of them showed mild and 40% showed (moderate) microbial deposits. In V-Carie-Solve group (group B) 20% showed mild, 40% showed moderate and 40% showed severe microbial deposits (Graph 1, Table 1). Mild dentinal tubules destruction was observed in 60% of specimen and moderate destruction was found in 40% of specimen from group A. Group B showed mild dentinal tubule destruction in 20% specimen, moderate destruction in 60% specimen and severe destruction in 20% specimen (Graph 2, Table 2). There

was no statistically significant difference between the efficacy of group A and group B as the calculated P values were 0.460 (microbial deposits) and 0.524 (dentinal tubule destruction) which is $> .05$.

► Discussion

The earliest attempt to remove caries used hand drill, which was soon succeeded in 1871 by treadle instrument invented by James Morison. Since that time, various drills have been developed to improve the efficiency of rotary instruments⁵. Fear and anxiety are barriers to dental treatment among children which may be a cause of discomfort due to conventional drilling method. Earlier studies have already proven the efficiency of chemo mechanical caries removal as comparable to mechanical caries removal or even better.⁶

In vitro studies have shown that primary teeth are better

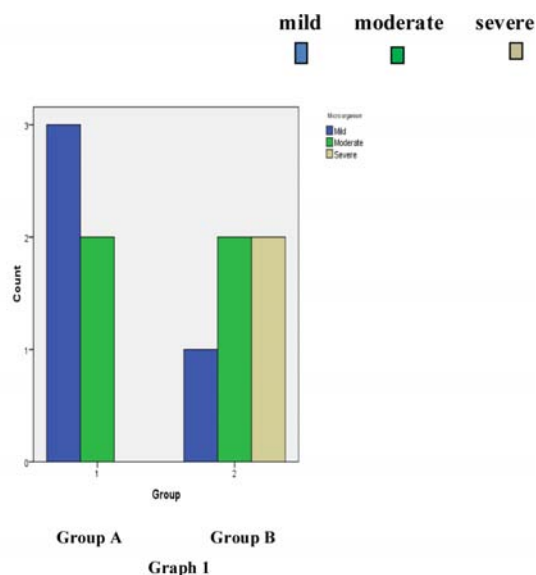


Table 1: Comparison of microbial deposits between group A and group B

		Micro organism			Total
		Mild	Moderate	Severe	
Group A	Carie Care	6	4	0	10
		60.0%	40.0%	0.0%	100.0%
Group B	VCarie Solve	2	4	4	10
		20.0%	40.0%	40.0%	100.0%
Total		8	8	4	20
		40.0%	40.0%	20.0%	100.0%

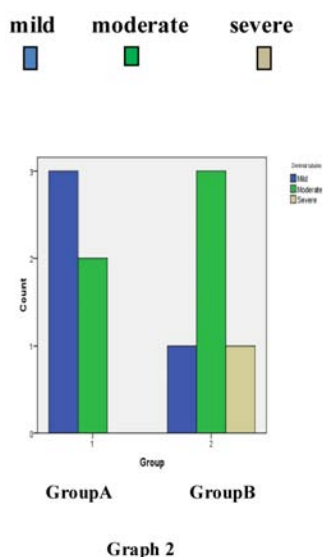


Table 2: Comparison of dentinal tubule destruction between group A and group B

		Dentinal tubule involvement			Total
		Mild	Moderate	Severe	
Group A	Carie Care	6	4	0	10
		60.0%	40.0%	0%	100.0%
Group B	V-Carie Solve	2	6	2	10
		20.0%	60.0%	20.0%	100.0%
Total		8	10	2	20
		40.0%	50.0%	10.0%	100.0%

suited to chemomechanical caries removal when compared with permanent teeth.⁷ This mode of treatment has achieved more acceptance in children and patients presenting with dental anxiety.⁸

The chemomechanical agents Carie-Care and V-Carie-Solve were used in this study. Carie-Care is a more recent solution developed by Uni-Biotech Pharmaceuticals Private Limited, Chennai, India in collaboration with Vittal Mallya Scientific Research Foundation in 2010. This is a gel-based formulation containing papain enzyme along with the benefits of clove oil. Papain breaks peptide bonds and involves deprotonation of Cys-25 by His-159. Clove oil is a natural analgesic and anaesthetic.⁹

V Carie-Solve (Vishal Dentocare Pvt Ltd Ahmedabad) contains papain which is a trypsin like enzyme. The main action depends on the presence of the papain enzyme which is a proteolytic enzyme that causes degradation of proteoglycans in the dentinal matrix.¹⁰

Elindt demonstrated that papain acts only on infected tissues since infected tissues lack plasmatic anti-protease called A1 antitrypsin, this is present only in sound tissues which inhibit protein digestion. The infected dentin does not contain A1 antitrypsin enzyme, so this allows partially degraded molecules to be broken by Papain.^{11,12}

It also has bactericidal and anti-inflammatory actions.¹³ The chloramine enhances the removal of denatured tissues by destructing H bonding.¹⁴ In addition to these ingredients V-Carie -Solve contains vitamin A and vitamin C.

In the present study both Carie-Care and V-Carie-Solve exhibited minimum dentinal tubule destruction after caries excavation which shows their minimal invasive method in preserving the underlying affected dentin for remineralization. In this study group A (Carie-Care) showed 60% mild dentinal tubule destruction, 40% of them showed moderate destruction and none of them showed severe destruction. 20% mild, 60% moderate and 20% severe dentinal tubule destructions were shown by Group B (V-Carie-Solve).

From the study it was found that after caries removal 80% of group B (V-Carie- Solve) showed moderate to severe microbial deposits while 60% of group A (Carie-Care) demonstrated mild deposits. But the differences between the two groups were statistically not significant. Even though inclusion of vitamin A and vitamin C into V-Carie- Solve has an added advantage as both these vitamins play an important role in odontoblast formation and collagen repair, in this study the beneficial effects of these vitamins were not found.

► Conclusion

Removal of decayed tissues with chemomechanical caries removal agents is efficient, easy to perform, comfortable and less destructive to the dentinal tissue. From the study the following conclusions were drawn;

- Carie-Care and V -Carie-Solve were both clinically efficient for carious dentin removal.
- Carie-Care was marginally better in the tested clinical parameters

Based on existing evidence, it can be concluded that the currently available chemomechanical caries removal methods can be considered as a minimally invasive alternative to conventional rotary caries removal methods.

► References

1. Erricson D, Zimmermen M, Raber H. Clinical evaluation of efficacy and safety of a new method for chemo-mechanical removal of caries. *Caries research*. 1999;33:171-77.
2. Albrektsson T. Tissue preservation in caries treatment. London: Quintessence, 2001:118-120, 159.
3. Goldberg M, Keil B. Action of a bacterial Achromobacter collagenase on the soft carious dentine: an in vitro study with the scanning electron microscope. *J Biol Buccale* 1989;17:269-274.
4. Beltz RE, Herrmann EC, Nordbo H. Pronase digestion of carious dentin *Caries Res* 1999;33:468-472.
5. Elkhoolany NR, Abdelaziz KM, Zaghloul NM, Aboulenine N. Chemo-mechanical method: A valuable alternative for caries removal. *Dent Update*, 2002; 9:16-22
6. Ganesh.M and Dhaval Parikh.Chemo-mechanical caries removal (CMCR) agents: Review and clinical application in primary teeth. *Journal of Dentistry and Oral Hygiene*, 2011; 3(3):34-45.
7. Ansari G, Beeley JA, Fung DE. Chemomechanical caries removal in primary teeth in a group of anxious children. *J Oral Rehabil* 2003;30:773-9.
8. Burke FJ, Crisp RJ, Hall AF. Patient's perception of treatment with carisolv in general dental practice. *J Dent Res* 1999;33:171-7.
9. Suzan Sahana, Aron Arun Kumar Vasa, Divya Geddiam, Vamsi Krishna Reddy, Sowjanya Nalluri, et al. (2016) Effectiveness of Chemomechanical Caries Removal Agents Papacarie® and Carie-Care TM in Primary Molars: An invitro Study. *Journal of International Society of Preventive & Community Dentistry* 6(4): 391.
10. Bussadori SK, Castro LC, Galvao AC (2005) Papain gel: a new chemomechanical caries removal agent. *J Clin Pediatr Dent* 30(2): 115- 119.
11. Kush A, Thakur R, Patil SD, Paul ST, Kakanur M. Evaluation of antimicrobial action of carie Care™ and Papacarie Duo™ on Aggregatibacter actinomycetemcomitans a major periodontal pathogen using polymerase chain reaction. *Contemp Clin Dent*. 2015;6:534-8.
12. Basting RT, Gonçalves FR, França FM, do Amaral FL, Flório FM. Antimicrobial potential of papain chemomechanical agent on Streptococcus mutans and Lactobacillus casei followed by the use of self-etching adhesive systems. *J Clin Pediatr Dent*. 2016;40:62-8.
13. Fusayama T (1979) Two layers of carious dentin: diagnosis and treatment. *Oper Dent* 4(2): 63-70.
14. Botelho Amaral FL, Martao Florio F, Bovi Ambrosano GM, Basting RT (2011) Morphology and micro tensile bond strength of adhesive systems to in situ-formed caries-affected dentin after the use of a papain-based chemomechanical gel method. *Am J Dent* 24(1): 13-19.

Review of adverse reactions of peroxide containing bleaching materials

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Abstract

The International Organization for Standardization (ISO) defines tooth bleaching as 'removal of intrinsic or acquired discolorations of natural teeth through the use of chemicals, sometimes in combination with the application of auxiliary means'. Hydrogen peroxide has been used for

tooth bleaching since more than 100 years. And it became one of the most frequently requested treatment procedure in the field of dentistry, but there also raised concern about safety of such procedure. And vast varieties of studies have been conducted, giving varying results and opinion regarding

its use. This current literature discusses the adverse reactions of bleaching tooth discoloration using peroxide containing materials.

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► Introduction

The desire for brighter teeth has made bleaching one of the most sought-after cosmetic procedures in the field of dentistry. With the introduction of at home bleaching procedure it became easier to get a brighter smile with less cost and difficulties.

Contemporary tooth bleaching systems are primarily based on hydrogen peroxide (H₂O₂) or, carbamide peroxide (one of its precursors). These materials convert the chromogens within the dentine into smaller lighter molecules, thereby whitening the tooth and are often used in combination with an activating agent such as light, heat and/or laser. Such agents can be applied externally to the teeth or even internally to the nonvital teeth.¹

Due to ever increasing popularity and introduction of new bleaching procedures and materials many have studied the local and systemic adverse effects of such tooth whitening materials. It is well known fact that there is no therapy without any risks. With correct use of material in terms of frequency of application, treatment duration, application time, concentration of bleaching material, its composition, mode of application and following manufactures and clinician's instructions etc there are only minor consequences.

► Mechanism of tooth bleaching

Bleaching is an oxidative process which alters the light reflecting or light absorbing nature of the tooth structure, results in increased perception of whiteness. The majority of the bleaching agents used in dentistry are various concentrations of either hydrogen peroxide (HP) or carbamide peroxide (CP). HP is a powerful oxidizing agent and can give rise to monoanion (HO₂⁻) and hydroxyl radical (OH[•]) agents and they act as effective bleaching agents. While carbamide peroxide also releases urea, which decomposed rapidly releasing carbon dioxide and ammonia^{2,3}. HP and CP oxidize the double bonds of organic molecules like pigments or chromogens, convert into lighter colored compounds and constitute the chemical basis of tooth whitening.

Urea has the ability to degrade organic matrix present in the enamel^{4,5,6}. Urea and ammonium ions causes protein degradation by acting on hydrogen bonds (crucial for secondary, tertiary, and quaternary structures of proteins) results in conversion of larger protein molecules into small peptides, and finally eliminated from the enamel^{4,5,6,7,8}. Urea creates empty minute spaces in the enamel causes diffusion of hydrogen peroxide throughout its whole thickness up to the dentino-enamel junction⁹. Bleaching

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agents cross the DEJ and interact with the chromophores, pigments, and ions present in the dentin.

► **Tooth bleaching systems**

American Academy of Cosmetic Dentistry categorized tooth whitening systems into following categories¹⁰. Whitening Toothpastes -These are basically teeth whitening systems not bleaching agents contain higher amounts of abrasives and detergents compared to standard tooth pastes but some contain low amounts of CP or HP.

Over The Counter (OTC) Whitening Strips and Gels - Whitening strips(introduced in the late 1980's) are plastic strips shaped to fit onto the labial or buccal surfaces of the teeth can deliver a thin layer of peroxide gel, usually applied for 30 min twice daily for 2 weeks. Whitening gels are peroxide-based gels applied directly on to the tooth surface with the aid of a small tooth brush. Manufacturer's instructions are usually twice a day applications for 14 days.

Whitening Rinses: it contain oxygen sources (such as hydrogen peroxide) to react with the chromogens. Manufacturer's instructions are usually rinse twice a day for 1 min each.

Tray-based Tooth Whiteners: they are available both professionally and OTC. This method involves use of a fitted tray containing CP -bleaching gel worn for 2–4hrs a day or overnight.

In-office Whitening: It is quicker because the products with higher concentrations of peroxide can be used compared to OTC. Gingival tissues are usually protected with rubber dam before application and bleaching reaction can be accelerated with the application of light, heat, and or laser. Tooth lightening results are seen after one 30- to 60-min treatment.

► **General and Local Toxic Effects of Hydrogen Peroxide**

Allergic reactions to peroxide containing tooth bleaching materials have not yet been reported in literature while acute and Sub-acute toxic effects of such materials are well reported in literature. Some studies shows that 10%(w/w) carbamide peroxide resulted in acute cytotoxic effects when applied at doses more than 5g/Kg/day (which corresponds to 0.3 to 1.8 mg/kg/day HP)^{11,12}. Inhalation of HP vapours from 3% solutions may cause respiratory tract irritation and pulmonary oedema. The Work Safe Australia Occupational Exposure Limit for vapours from solutions of HP with a concentration > 3% is 1 ppm.

There are no reported sub acute toxic effects in humans. While animal studies have shown such effects and the daily critical doses should be lower than 30 mg/kg/day and 26

mg/kg/day for the rats and mouse respectively. Theoretically topical application of HP in humans, released °OH radical can induce lipid peroxidation, and DNA alteration results in cell lysis and death^{13, 14}. Antioxidants, iron chelators, catalase enzymes and vitamin E have the ability to prevent such sub acute systemic effects by scavenging °OH or lipid peroxy radicals, attenuating ability of Fe(II) to participate in Fenton-type reactions, consumption of HP and by scavenging LOO° radicals respectively^{14,15}.

According to the data released by International Agency on Research on Cancer¹⁶ risk of neither cancer nor mutation attributable to professional exposure. However, duodenum carcinoma and adenoma have been detected after oral administration of HP in animal studies.

► **Local effects of bleaching agents on dental tissues and oral mucosa**

Effect of bleaching on non-vital teeth

A discolored nonvital tooth can be whitened by placing materials like SP, HP and carbamide peroxides after proper obturation and cervical root sealing¹⁷⁻²². Inflammatory mediated external cervical root resorption has been reported following intracanal bleaching of a nonvital tooth²³. Many studies reported the cervical root resorption as an unfavorable sequelae of such bleaching procedures but it is important to note that among these many of the cases had suffered known trauma. So it is very difficult to distinguish if the cervical root resorption noted was due to the effect of the bleach or the trauma²⁴⁻³³.

The mechanism behind the cervical resorption is unclear, it is postulated the bleaching material reaches the periodontal ligament tissues through dentinal tubules that are particularly directed apically from pulp chamber and initiates inflammatory process. And few studies shows that application of heat, associated trauma, effect of pH and localized structural and or pathological alterations of cementum can favor bacterial penetration through dentinal tubules there by promote cervical root resorptive process³⁴⁻³⁷

Effect of bleaching on vital teeth

Hyper sensitivity: Most common adverse effect reported after external bleaching of vital teeth is increased sensitivity to temperature changes, with an incidence up to 50%³⁸. And this usually appears during early stages of treatment phase and last for 2-3 days and vary from mild to moderate and even only transient increase in sensitivity with peak at 3rd day of post treatment(day with maximum oxygen content). And sensitivity usually increased with frequency of changing the bleaching gel, time of contact and concentration of HP in the bleaching material, but not proportionally. Only few cases reported with severe hypersensitivity which required cessation

of treatment procedure, and many of these may even not a true case of hypersensitivity, rather a wrong candidate for bleaching procedure (e.g. tooth with periapical lesion, nonvital teeth). It is essential to check the vitality of the teeth before bleaching procedure, and it's a must to exclude an untreated tooth with periapical pathology, as there is chances of flare up of pain during the procedure. Treating the teeth with desensitizing agents containing 0.11% per wt fluoride and 3% potassium nitrate 30 min before bleaching can prevent or decrease the post operative sensitivity

Pulpal alteration: Bleaching agents containing HP in high concentration may favor bacterial penetration through dentinal tubules. Diverging results have been published with respect to the consequences of the influence of whitening treatments on pulp. According to Seale et al., a 35% (w/v) hydrogen peroxide gel used for 30 min induces severe pulp reactions in dog teeth⁴⁰. In general studies show that, application of bleaching gel with concentration of HP upto 12%, for upto 7 hrs, about < 30 µg of HP may reach the dental pulp⁴¹.

Alteration of enamel surface:

Regarding the effects of bleaching on enamel surfaces, literature give divergent reports, some studies shows no effect on or only minor changes to the enamel surface⁴²⁻⁴⁵. While others have shown moderate to severe alterations of enamel surface⁴⁶⁻⁴⁸. Few others found that bleaching create some enamel porosity^{49,50}. According to study conducted by Seghi and Denry, application of 10% (w/w) CP gel displays a reduction in apparent fracture toughness. Many studies reported changes in surface roughness, leads to the formation of supra- and sub-gingival plaque, which intern promotes the future developments of carious decay. However, there are no clinical reports available regarding the occurrence of dental caries as a consequence of a bleaching procedure. Fluoride containing bleaching agents shown to induce less enamel surface demineralization and altered micro hardness⁵¹.

Alteration of Dentin and Cemental surface:

The effect of hydrogen peroxide on the inorganic composition of human dentine and cementum may be significant if concentrated solutions (in a time dependent manner) are used,. Use of high concentration of HP when applied intra coronally during nonvital bleaching procedure removes some amounts of smear layer, opens the dentinal tubules, creates a channel for bacterial penetration and may contribute to post-bleaching pathology, such as cervical resorption.

Gingival irritation:

Gingival irritation is also a common sequelae of tooth bleaching procedure and the reported incidence of gingival irritation for at home bleaching procedure ranges from 5-50%

in most studies, Usually it is mild to moderate, occurring two to three days after bleaching, and then gradually dissipates. For most of the patients it is tolerable, do not require cessation of the treatment. Use of ill-fitted trays is usually the primary cause for the irritation. If tissue burn is detected, the surface should be immediately rinsed thoroughly with water until the whiteness is reduced. If it is severe, administer local anesthesia for pain relief, and advise patient to limit the movements and maintain good oral hygiene in order to prevent further infection and promote the healing process. Direct application of vitamin E to the affected area also has shown to promote healing in such situations.

Effects on restorative materials

Even though adverse reaction of tooth bleaching on restorative materials are not considered as direct health risks, its consequences can be significant to the quality and longevity of the restoration. Many studies reported that tooth bleaching will decrease chemical and or physical properties of restorative materials like development of cracks, marginal breakdown, increased surface roughness, release of metallic ions, and decreasing the bond strength.

Amalgam: Tooth bleaching with HP can cause release of mercury from dental amalgam restorations. As mercury release pose some health problems, it is safe to avoid bleaching in patients whose teeth are extensively restored with amalgams.

Glass Ionomer Cement and Resin-Modified Glass Ionomer Cement: Bleaching the dentin with high concentrations of HP can adversely effect bonding of glass ionomer cement. Teeth restored with resin modified Glass Ionomer cement, bleaching agents can easily penetrate the dentin to reach pulpal cavity.

Composite Resins: Use of high concentration of HP for extended period can cause decrease in mechanical properties of composite resin. Bleaching the teeth will reduce the bond strength of composite. This could be due to increased oxygen concentration created as an effect of bleaching process, which inhibit polymerization of resin fillings. So it is better to wait for at least 2 weeks before restoring the teeth with composite resin after a bleaching process, which not only improves the polymerization but also can get better shade matching as some amount of whitening obtained by bleaching will revert back during that time.

Zinc oxide-eugenol materials: Prolonged exposure to 10% HP has been shown to adversely affect the surface morphology of reinforced zinc oxide-eugenol (IRM) restorations. When samples of IRM were placed in HP for 1, 3 or 7 days at 37°C, numerous cracks were found and the samples appeared swollen when compared with controls maintained in phosphate buffer.

There were no changes in levels of zinc oxide compared with controls.

► Stability of Tooth-Whitening Treatments

Few days after, bleaching teeth will loss 1 or 2 color divisions on a tooth shade device. Unfortunately after some period of time, the initial staining colour returns, or in view of dental enamel permeability, a renewed level of exogenous staining agents penetrates and diffuses throughout enamel and even reaches dentine. This is the case for, tea, coffee, tobacco smoke and many other potential staining agents. This may lead to uncontrolled multiple treatments and, hence, the repeated re-exposure of enamel and gingiva to peroxides. Some individuals will unnecessarily over-use whitening devices. Patients with existing restoration may have to change the filling after bleaching in order to match the whitening obtained in the adjacent enamel and dentin. Since the effect of bleaching is not stable, in future the filled area may comparatively whiter and they need again to be renewed

► Conclusion

Tooth bleaching with hydrogen peroxide and carbamide peroxides are comparatively safer when used following manufacturer's instructions. Like any other therapies tooth bleaching also have some adverse reactions on hard and soft tissues of the body, and adjacent restorative materials. But with proper use of the material, in terms of correct diagnosis and treatment planning, proper concentration of material used, frequency, tooth contact time, duration of treatment, activation method, mode of application, isolation of adjacent soft tissue etc, these adverse reactions are minimized. It is important to inform the patient regarding the possible adverse effects of the bleaching process especially for home bleaching process instructed for identification of adverse occurrences in order to seek professional help if needed. Supervision of the tooth whitening strategy by an oral health care professional will reduce the potential risks and optimize benefits of tooth bleaching.

► Reference

- C. J. Tredwin,¹ S. Naik,² N. J. Lewis³ and C. Scully CBE(2006). Hydrogen peroxide tooth-whitening (bleaching) products: Review of adverse effects and safety issues. *British dental journal* volume 200 no. 7 apr 8
- Dahl JE, Pallesen U (2003) Tooth bleaching—a critical review of the biological aspects. *Crit Rev Oral Biol Med* 14:292–304
- Hermans N, Cos P, Maes L, De Bruyne T, Vanden Berghe D, Vlietinck AJ et al (2007) Challenges and pitfalls in antioxidant research. *Curr Med Chem* 14:417–430
- Arends J, Jongebloed WL, Schuthof J (1984) Interaction of urea and human enamel. *Caries Res* 18:17–24
- Goldberg M, Arends J, Jongebloed W, Schuthof J, Septier D (1983) Action of urea solutions on human enamel surfaces. *Caries Res* 17:106–112
- Goldberg M, Arends J, Jongebloed WL, Schuthof J, Septier D, Apap M (1984) Action of urea solutions on unerupted and erupted teeth: an investigation on late maturation of human enamel. *Gerodontology* 3:191–195
- Hermans N, Cos P, Maes L, De Bruyne T, Vanden Berghe D, Vlietinck AJ et al (2007) Challenges and pitfalls in antioxidant research. *Curr Med Chem* 14:417–430
- Li Y (1996) Biological properties of peroxide-containing tooth whiteners. *Food Chem Toxicol* 34:887–904
- Michel Goldberg & Martin Grootveld & Edward Lynch(2010) Undesirable and adverse effects of tooth-whitening products: a review. *Clin Oral Inves* 14:1–10
- American Academy of Cosmetic Dentistry. Teeth Whitening. www.aacd.com/whitening; Assessed 01.06.14.
- International Agency on Research on Cancer (1999) Hydrogen peroxide. Monographs on the evaluation of carcinogenic risks to humans—re-evaluation of some organic chemicals, hydrazine and hydrogen peroxide, vol 71. IARC, Lyon, pp 671–689
- Watt BE, Proudfoot AT, Vale JA (2004) Hydrogen peroxide poisoning. *Toxicol Rev* 23:51–57
- Hermans N, Cos P, Maes L, De Bruyne T, Vanden Berghe D, Vlietinck AJ et al (2007) Challenges and pitfalls in antioxidant research. *Curr Med Chem* 14:417–430
- Li Y (1996) Biological properties of peroxide-containing tooth whiteners. *Food Chem Toxicol* 34:887–904
- Sinensky MC, Leiser AL, Baqbish H (1995) Oxidative stress aspects of the cytotoxicity of carbamide peroxide: in vitro studies. *Toxicol Lett* 75:101–109
- International Agency on Research on Cancer (1999) Hydrogen peroxide. Monographs on the evaluation of carcinogenic risks to humans—re-evaluation of some organic chemicals, hydrazine and hydrogen peroxide, vol 71. IARC, Lyon, pp 671–689
- Baratieri L N, Ritter A V, Monteiro S et al. Nonvital tooth bleaching: guidelines for the clinician. *Quint Int* 1995; 26: 597–608.
- Rotstein I, Zalkind M, Mor C et al. In vitro efficacy of sodium perborate preparations used for intracoronal bleaching of discoloured non-vital teeth. *Endod Dent Traumatol* 1991; 7: 177–180.
- Rotstein I, Mor C, Friedman S. Prognosis of intracoronal bleaching with sodium perborate preparations in vivo: 1 year study. *J Endod* 1993; 19: 10–12.
- Ari H, Ungor M. In vitro comparison of different types of sodium perborate used for intracoronal bleaching of discoloured teeth. *Int Endo J* 2002; 35: 433–436.
- Freccia W F, Peters D D, Lorton L, Bernier W E. An in vitro comparison of nonvital bleaching techniques in discoloured teeth. *J Endod* 1982; 8: 70–77.
- Vachon C, Vanek P, Friedman S. Internal bleaching with 10% carbamide peroxide in vitro. *Pract Periodon Aesthet Dent* 1998; 10: 1145–1148, 1150, 1152.
- Friedman S, Rotstein I, Libfelt H et al. Incidence of external root resorption and esthetic results in 58 bleached pulpless teeth. *Endod Dent Traumatol* 1988; 4: 23–26.
- Latcham N L. Postbleaching cervical resorption. *J Endod* 1986; 12: 262–264.
- Latcham N L. Management of a patient with severe postbleaching cervical resorption. A clinical report. *J Prosthet Dent* 1991; 65: 603–605.
- Goon E Y, Cohen S, Borer R F. External cervical tooth resorption following bleaching. *J Endod* 1986; 12: 414–418.
- Harrington C V, Natkin E. External resorption associated with bleaching of pulpless teeth. *J Endod* 1979; 5: 344–348
- Lado E A, Stanley H R, Weisman M I. Cervical resorption in bleached teeth. *Oral Surg Oral Med Oral Pathol* 1983; 55: 78–80.
- Gimlin D R, Schindler W G. The management of postbleaching

- cervical resorption. *J Endod* 1990; 16: 292-297.
30. Al-Nazhan S. External root resorption after bleaching: a case report. *Oral Surg Oral Med Oral Pathol* 1991; 72: 607-609.
 31. Abou-Rass M. Long-term prognosis of intentional endodontics and internal bleaching of tetracycline stained teeth. *Compend Contin Educ Dent* 1998; 19: 1034-1044.
 32. Anitua E, Zabalegui B, Gil J, Gascon F. Internal bleaching of severe tetracycline discolourations: four-year clinical evaluation. *Quint Int* 1990; 21: 783-788.
 33. Holmstrup G, Palm A M, Lambjerg-Hansen H. Bleaching of discoloured root-filled teeth. *Endod Dent Traumatol* 1988; 4: 197-201.
 34. Rotstein I, Torek Y, Lewinstein. Effect of bleaching time and temperature on the radicular penetration of hydrogen peroxide. *Endod Dent Traumatol* 1991; 7: 196-198.
 35. Rotstein I, Torek Y, Lewinstein I. Effect of cementum defects on radicular penetration of 30% H₂O₂ during intracoronal bleaching. *J Endod* 1991; 17: 230-233.
 36. Heling I, Parson A, Rotstein I (1995) Effect of bleaching agents on dentin permeability to *Streptococcus faecalis*. *J Endod* 21:540-542
 37. Rotstein I, Torek Y, Misgav R (1991) Effect of cementum defects on radicular penetration of 30% H₂O₂ during intracoronal bleaching. *J Endod* 17:230-233
 38. Leonard R H, Haywood V B, Phillips C. Risk factors for developing tooth sensitivity and gingival irritation in nightguard vital bleaching. *Quintessence Int* 1997; 28: 527-534.
 39. Leonard R H Jr, Smith L R, Garland G E, Caplan D J (2004) Desensitizing agent efficacy during whitening in an at-risk population. *J Esthet Restor Dent* 16:49-55
 40. Seale NS, McIntosh JE, Taylor AN (1981) Pulpal reaction to bleaching of teeth in dogs. *J Dent Res* 60:948-953
 41. Y. Li*1 and L. Greenwall2 *British dental journal* volume 215 NO. 1 JUL 13 2013
 42. White DJ, Kozak KM, Zoladz JR, Duschner HJ, Götz H (2000) Effect of tooth-whitening gels on enamel and dentin ultrastructure—a confocal laser scanning microscopy pilot study. *Compendium* 21: S29-S34
 43. White DJ, Kozak KM, Zoladz JR, Duschner HJ, Götz H (2002) Peroxide interaction with hard tissues: effects on surface hardness and surface/subsurface ultrastructural properties. *Compendium* 23:42-48
 44. . White DJ, Kozak K, Zoladz JR, Duschner HJ, Götz H (2003) Effects of Crest® Whitestrips™ bleaching on surface morphology and fracture susceptibility of teeth in vitro. *J Clin Dent* 14:82-87
 45. Chen HP, Chang CH, Chuang SF, Yang JY (2008) Effect of fluoride containing bleaching agents on enamel surface properties. *J Dent* 36:718-725
 46. Markovic L, Jordan RA, Lakota N, Gaengler P (2007) Micromorphology of enamel surface after vital tooth bleaching. *J Endod* 33:607-610
 47. McCracken MS, Haywood VB (1996) Demineralization effects of 10 per cent carbamide peroxide. *J Dent* 24:395-398
 48. Zantner C, Beheim-Schwarzbach N, Neumann K, Kielbassa AM (2007) Surface microhardness of enamel after different home bleaching procedures. *Dent Mater* 23:243-250
 49. Leonard RH, Haywood VB, Phillips C (1997) Risk factors for developing tooth sensitivity and gingival irritation associated with nightguard vital bleaching. *Quintessence Int* 28:527-534
 50. Leonard RH Jr, Smith LR, Garland GE, Caplan DJ (2004) Desensitizing agent efficacy during whitening in an at-risk population. *J Esthet Restor Dent* 16:49-55
 51. Chen HP, Chang CH, Chuang SF, Yang JY (2008) Effect of fluoride containing bleaching agents on enamel surface properties. *J Dent* 36:718-725

Transmigration of maxillary canine - rare case reports

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Abstract

Maxillary canine impaction is a common dental anomaly with an incidence of 0.8% -2.8%. Migration of tooth across midline is a rare phenomenon. This phenomenon of intraosseous tooth crossing the midline is known as transmigration. Transmigration is common in mandibular canine. Maxillary canine transmigration is a rare phenomenon. It is most often asymptomatic with no pain and detected only with help of radiograph. The first case of maxillary

canine transmigration was reported in 2003. Till date only 31 cases of maxillary canine transmigration have been reported in the literature, with only 2 cases in Indian population.

The treatment options of transmigration include transplantation, surgical exposure & orthodontic alignment, observation in case of symptomless teeth or surgical removal. The most favored treatment of

transmigration is surgical removal. This paper reports a series of 2 cases of maxillary canine transmigration with special emphasis on the treatment options.

Keywords: Impaction, Maxillary canine, Transmigration.

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► Introduction

Transmigration is a phenomenon of intraosseous tooth crossing the midline. Intraosseous migration of unerupted tooth is a rare & unusual dental anomaly which mostly occurs in lower jaw. Ando et al were the first to use the term transmigration.¹ Tarsitano et al defined transmigration as the phenomenon in which an unerupted mandibular canine migrates, crossing the mandibular midline.² Joshi considered the tendency of a canine to cross the barrier of the mandibular midline suture is more important parameter than the actual distance of migration after crossing the midline.³ Auluck et al suggested that the actual distance of canine migration across the mandibular midline is less important than the tendency of the canine to cross the midline.⁴

Transmigration occurs exclusively with mandibular canine with an incidence of 0.34%.⁵ Maxillary canine transmigration is rarer phenomenon. This may be due to negligible distance between the apexes of the maxillary canines and the floor of the

nasal fossae and to the presence of the midpalatal suture, which is a considerable barrier against maxillary canine migration. Aydin & Yilmaz reported the first case of maxillary canine transmigration in the literature in 2003.⁶ Aydin et al reported a panoramic radiographic survey of 4500 patients in a Turkish subpopulation which revealed 14 cases of canine transmigration, out of which six were maxillary and eight mandibular canines, with an incidence of 0.31%.⁷ In North Indian population, a prevalence of 0.66% canine transmigration was reported by Gaurav Sharma & Archana Nagpal. In their study the prevalence of Mandibular canine transmigration was 0.5% & Maxillary transmigrated canine 0.16%. All the transmigrated canines were unilateral with no gender predilection.⁸

There is several treatment options proposed for this rare phenomenon. The treatment options include surgical removal, transplantation, surgical exposure & orthodontic alignment and observation in case of symptomless teeth. If space for transmigrated canine is sufficient, transplantation can be

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undertaken. Surgical exposure & orthodontic alignment can be done to bring labially impacted transmigrated canine to its position. Some authors believe that transmigrated tooth can be left in place, if it is symptomless and not associated with any pathology. In such cases, periodic radiographic monitoring is required. Surgical removal appears to be the most favorable treatment, rather than attempting to bring the tooth back to its position. It is also indicated in the existence of pressure resorption towards the roots of adjacent teeth, periodontal problems, infections, cysts, prosthetic problems and neuralgic symptoms.^{9, 10}

This paper reports a series of two cases of maxillary canine transmigration and its surgical management.

► Case reports

CASE-1

Twelve (12) year old female patient reported to the Department of Pedodontics, nine months back with a chief complaint of backwardly placed upper front teeth. No extra oral abnormality was detected. On intraoral examination she had full complement of permanent teeth in the lower arch and in the upper arch, missing left lateral incisor and retained right maxillary deciduous canine with complete anterior cross bite,

maxillary midline shift towards the left (Fig. 1A). The patient did not give any history of extraction or traumatic avulsion of teeth. Periapical and panoramic radiographs were taken (Fig. 1B&C). Radiographic evaluation revealed a transmigrated permanent right maxillary canine horizontally impacted with its cusp tip against the root of maxillary left central incisor and the left maxillary lateral incisor was congenitally missing.

In this case, the crown of transmigrated maxillary right canine has migrated to the opposite incisor area and the apex of the canine is migrating towards the apex of the adjacent lateral incisor. There is also insufficient space in the arch for the



Fig. 1A: Intraoral photograph



Fig. 1B: Periapical radiograph showing transmigrated maxillary right canine



Fig. 1C: Panoramic radiograph showing transmigration of maxillary right canine with its cusp tip against the root of maxillary left central incisor.



Fig. 1D: Surgical removal of transmigrated maxillary canine teeth



Fig. 1E: Orthodontic appliance treatment

transmigrated canine to be transplanted and so it was impossible to bring back the canine to its original position. Thus a decision of surgical removal of transmigrated tooth was planned. Surgical extraction was performed under local anesthesia and patient was kept under periodic monitoring (Fig.1D).

After three months, orthodontic treatment was initiated for correction of anterior cross bite. Presently patient is under treatment (Fig.1E).

► CASE -2

Ten (10) year old female patient reported to the Department of Pedodontics with a complaint of erupting bulge of an extra tooth near to the upper front tooth. Patient noticed erupting prominence since 1 week. No extra oral abnormality was detected. On intraoral examination, patient was in mixed dentition stage, with the presence of right and left maxillary deciduous 2nd molar, right mandibular deciduous 2nd molar and remaining permanent teeth. She had missing maxillary right deciduous canine, missing permanent right maxillary canine, spacing between maxillary right lateral incisor and first premolar tooth, a bony prominence seen labial to maxillary right central incisor and presence of midline diastema (Fig.2A). Parent gave a history of fall at the age of 2 years, resulting in loss of maxillary right deciduous canine. Radiographic investigation was advised. Periapical and panoramic radiographs were taken (Fig. 2B&C)

Radiographic examination revealed a transmigrated permanent right maxillary canine in the midline, labial to maxillary right central incisor with a tendency to cross the midline.

There is insufficient space for the transmigrated canine to be transplanted to its original position. In the present case, due to unfavorable position of the transmigrated tooth and lack of space in the arch, a surgical removal of the tooth & closure of space in upper arch was planned. Extraction of the transmigrated tooth was performed under local anesthesia (Fig. 2D). Patient is kept under observation for interceptive treatment for correction of midline diastema and orthodontic alignment.

► Discussion

Transmigration is the phenomenon of an unerupted tooth crossing the midline or when more than half of the impacted tooth has passed through the midline. Joshi and Auluck et al suggested that the tendency of a canine to cross the midline suture is more important consideration than the actual distance of migration after crossing the midline.^{3,4} Moreover it will depend on the stage of transmigration when the dental surgeon first finds the patient. Transmigration of canine is a rare phenomenon more commonly found in mandible. The larger cross sectional area of the anterior mandible compared to anterior maxilla may be the reason for higher frequency of mandibular canine transmigration. But maxillary canine transmigration is a rarer

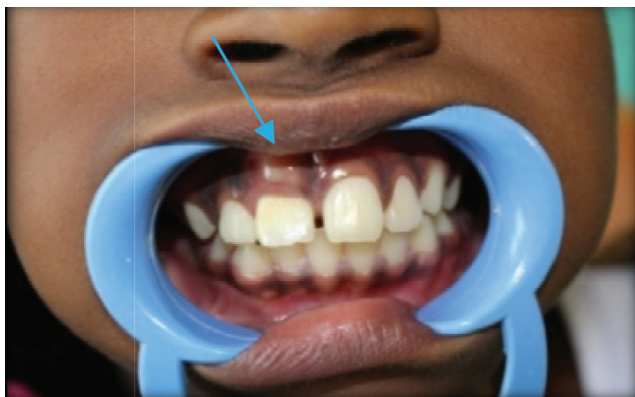


Fig. 2A: Intraoral photograph



Fig. 2B: Periapical radiograph showing transmigrated maxillary right canine



Fig. 2C: Panoramic radiograph showing transmigration of maxillary right canine



Fig. 2D: Surgical Removal of transmigrated maxillary canine tooth

phenomenon. In the maxilla, transmigration of canine might be prevented due to the shorter distance between the roots of maxillary incisors and floor of nasal fossa and restriction of the path of tooth movement by the roots of adjacent teeth, the maxillary sinus and the mid palatal suture, which acts as a barrier.⁵

Aydin and Yilmaz reported the first case of maxillary canine transmigration in 2003.⁶ Till date only 31 cases of maxillary canine transmigration have been reported in the literature with only 2 cases in Indian population.¹⁰ In the present paper, unilateral maxillary canine transmigration was found in both cases.

The etiology and exact mechanism of transmigration is not clear. A number of factors have been suggested, abnormal displacement of dental lamina in embryonic life is a commonly accepted explanation.³ Marks and Schroeder suggested that a regional disturbance in the dental follicle might lead to local defective osteoclastic function with an abnormal eruption pathway being formed.¹¹ Other local or pathologic factors suggested in the etiology of transmigration are premature loss of primary teeth, retention of deciduous canine, discrepancies of tooth size, genetics, trauma, tumors, odontomes, cyst or even small obstacle like root fragment can divert a tooth from its normal path of eruption.⁵ In the present reports, retention of primary canine in the first case and loss of the deciduous canine due to trauma in the second case, may be the etiological factors for the transmigration of permanent maxillary canines.

There has been several treatment options proposed for transmigrated tooth. They are surgical removal, transplantation, surgical exposure with orthodontic treatment and radiographic follow up. In the above reported cases transplantation could not be done as there was not enough space to accommodate the teeth to its original position in the arch. Surgical exposure and orthodontic alignment is difficult due to the unfavorable position of the transmigrated impacted tooth. Wertz stated that once the canine crown migrated past the adjacent lateral incisor apex, it is impossible to reposition the tooth to its ideal position orthodontically.¹² So surgical removal of transmigrated canine was considered as the treatment of choice in the reported cases and then orthodontic correction was planned. During the surgical removal, it is important to anesthetize the nerve on the contralateral side as the transmigrated canine maintains

the nerve connection to the original side. Both cases are under regular follow up.

► Conclusion

Transmigration of maxillary canine is a rare phenomenon. Maxillary canines are the cornerstones of the dental arch, which are necessary to maintain esthetics and function. Transmigration of canine is of significant importance in dentistry, creating orthodontic, surgical and interceptive problems. Early detection of them can improve prognosis and treatment outcomes and also prevent complicated situations that may occur later on time. Though it is not possible to predict when dental migration will occur, it is the responsibility of the dentist to observe the status of the canine which shows a delay in their eruption to carry out interceptive treatment and avoid possible pathology in future.

► References

1. Ando S, Aizawa K, Nakashima T, Sanka Y, Shimbo K, Kiyokawa K. Transmigration process of the impacted mandibular cuspid. *J Nihon Univ Sch Dent.* 1964; 6:66–71
2. Tarsitano JJ, Wooten JW, Burditt JT. Transmigration of nonerupted mandibular canines: report of cases. *J Am Dent Assoc.* 1971; 82:1395–1397.
3. Joshi MR. Transmigrant mandibular canines: a record of 28 cases and a retrospective review of the literature. *Angle Orthod.* 2001; 71:12–22.
4. Auluck A, Nagpal A, Setty S, Pai K, Sunny J. Transmigration of impacted mandibular canines: report of four cases. *J Can Dent Assoc.* 2006; 72:249–52.
5. Santhosh Kumar, Arun Srinivas Urala, Kamaath TA, Priyanka Jayaswal, Ashima Valliathan. *Imaging Sci Dent* 2012; 42:47–54.
6. Aydin U, Yilmaz H.H. Transmigration of impacted canines. *Dentomaxillofac Radiol.* 2003; 32(3):198–200.
7. U. Aydin, H. H. Yilmaz, and D. Yildirim. Incidence of canine impaction and transmigration in a patient population. *Dentomaxillofac Radiology* 2004; 33(3):164–169.
8. Gaurav Sharma and Archana Nagpal. A Study of Transmigrated Canine in an Indian population. *International Scholarly Research Notices.* Vol 2014.
9. Simon Camilleri, Erica Scerri. Transmigration of mandibular canine-A review of the literature and a report of five cases. *Angle Orthod* 2003; 73:753–762.
10. Sulabha A. Narsapur, Sameer Choudhari, Shrishal Totad. Unusual transmigration of canines-report of two cases in a family. *RSBO* 2014; 11(1):88–92.
11. Marks SC Jr, Schroeder HE. Tooth eruption: theories and facts. *Anat Rec* 1996; 245:374–393.
12. R.A. Wertz. Treatment of transmigrated mandibular canines. *American Journal of Orthodontics and dentofacial orthopedics* 1994; 106(4):419–427.

Ozone in periodontal disease management

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Abstract

Gingival and periodontal diseases are the most common inflammatory diseases of supporting tissues of teeth. Role of microbial etiology and host response in progression of gingival and periodontal diseases has been well established. Tissue alterations seen in periodontal diseases are due to an immunoinflammatory reaction to microbes present in dental plaque. Elimination/suppression of microbes and modulation of host response is the mainstay of periodontal therapy. Ozone, a triatomic molecule of three oxygen atoms, is a successful

treatment modality employed for more than a decade. Its unique properties include immunostimulant, analgesic, antihypnotic, detoxicating, antimicrobial, bioenergetic and biosynthetic actions. It is an ideal treatment choice for patients due to its non invasive nature thus increasing patient's acceptance and compliance. Ozone is well indicated in all stages of gingival and periodontal diseases because of its anti-microbial activity and healing and tissue regeneration properties.

The primary objective of this article is to provide a review of ozone therapy in periodontal diseases and to summarize the available in vitro and in vivo studies of ozone use in periodontics.

Key Words – ozone, ozonated water, periodontitis, bacteria, biofilm

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► Introduction

Periodontal disease is defined as a complex, multifactorial disease characterized by pocket formation and/or gingival recession that result in inflammation and consequent destruction of periodontal tissues.¹ The prime etiological agent is bacteria existing as biofilm. The primary goal of periodontal treatment is the elimination or reduction in pathogenic bacteria and thus, inflammation. The mechanical removal of the biofilm have been the conventional method for periodontal therapy.² But it cannot completely eliminate the periodontopathogenic bacteria especially at sites inaccessible to periodontal instrumentation.^{3,4} Hence, adjunctive therapies, such as topical antiseptics and local or systemic antibiotics have been successfully used to improve the outcome of periodontal therapy. There is no consensus on the best method to improve the therapeutic outcome.

A new approach in the management of periodontitis is the application of ozone as an adjunctive treatment as it has

shown potential results in eliminating bacterial counts more precisely. Ozone is a triatomic molecule and an allotropic form of oxygen occurring naturally in the Earth's atmosphere, surrounding the earth at an altitude between 50,000 and 100,000 feet.⁵ It is created when ultraviolet rays causes oxygen atoms to temporarily recombine in groups of three and also by the action of electrical discharges on oxygen. Its ability to filter ultraviolet rays makes it critical for the maintenance of biological balance in the biosphere.⁶ Ozone is unstable and quickly gives up nascent oxygen molecule to form oxygen gas. It is the third-strongest oxidizing agent which makes it suitable for use in human medicine to kill bacteria, fungi, to inactivate viruses and to control hemorrhages.⁷ Ozone is employed in the field of dentistry for procedures like management of early caries lesions, ulcerations and herpetic lesions of oral mucosa, sterilization of root canals and reduction of periodontal pockets. Extensive research has been carried out over the past 50 years about the use of ozonated fluids for infection control and wound

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management.

► History

In 1785, Van Marum noticed a characteristic odour near his electrostatic machine when electric sparks were passed. In 1840 Christian Frederick Schonbein discovered and named it “Ozone” derived from “Ozein”, meaning smell.

The first ozone generator was developed by Werner Von Siemens in 1857. Joachim Hansler and Hans Wolff developed the first ozone generator for medical use. However, it was not until 1932 that ozone was seriously studied by the scientific community, when ozonated water was used as a disinfectant by Dr. E.A. Fisch, a Swiss dentist, in his practice.⁸ Edwin Payr, an Austrian surgeon on whom Dr. Fisch tried ozone therapy, extended it into the field of general surgery.

Medical grade ozone

It is a mixture of pure oxygen and pure ozone in the ratio of 95-99.95% of O₂ and 0.05-5% of O₃. It is produced commercially in ozone generators by sending an electrical discharge through a specially-built condenser containing oxygen. It must be prepared immediately before use because it is unstable.

Ozone generation

Therapeutic grade ozone is generated by ultraviolet system, cold plasma system and corona discharge system. Medical and dental fields employ corona discharge systems.

Biological effects

Ozone exhibits immunostimulating, analgesic, antihypoxic, antimicrobial, detoxicating, bioenergetic and biosynthetic properties on human body.⁹

Immunostimulating Effect – Ozone activates both cellular and humoral immune systems. It causes proliferation of immunocompetent cells, synthesis of immunoglobulins and activation of macrophages. It increases sensitivity of microorganisms to phagocytosis and increases synthesis of interleukins, leukotrienes and prostaglandins.⁹

Antimicrobial Effect – Ozone has antimicrobial action against bacteria, fungi, viruses, yeast and protozoa in gaseous or aqueous phase. It damages the cell wall and cytoplasmic membrane of bacteria and fungi. In viral infections ozone upsets the reproductive cycle.¹⁰

Antihypoxic effect- Ozone increases partial pressure of oxygen in tissues and improves transportation of oxygen in blood. It improves oxygenation of inflamed tissues and reduces the local inflammatory processes.

Biosynthetic Effect – Ozone activates angiogenesis⁹ and intensifies the remineralization potential of mineralized tooth tissues.

Modes of administration

Ozone Gas – More effective microbicide than aqueous form but can cause toxicity when inhaled. So other modes are preferred to control oral infections.¹¹

Ozonated water – Effective against bacteria, fungi and viruses and is less expensive.¹² It is more preferred for use in dentistry.

Ozonized oil - It is a competitive antimicrobial agent effective against Staphylococci, Streptococci, Enterococci etc and is utilized for the cure of fungal infections.¹³

OZONE THERAPY IN PERIODONTAL DISEASES

The application of ozone therapy in periodontal disease is based on its disinfection power over other antiseptics making it an adjunct to standard antiseptics. Ozonated water was found to be effective against gram-positive and gram-negative oral microorganisms, candida albicans in pure culture and bacteria in plaque biofilm. In implant dentistry, the use of ozone for the decontamination of the implant surface is under investigation.

Brauner et al in 1992 compared the clinical periodontal status between patients treated with ozone water to patients treated with SRP and concluded that ozone water rinse is not a substitute for professional dental plaque removal.¹⁴

Thanomsut et al in 2002 studied the effects of ozone treatment on cell growth and ultra structural changes in bacteria. He concluded that ozone at 0.167 mg/min/l concentration can be used to sterilize water, which is contaminated with up to 105 cfu/ml bacteria within 30 min. In this concentration, ozone destroys bacterial cell membrane producing intercellular leakage and eventually cell lysis. But they had no significant effect on the cell viability in bacterial cultures at higher concentrations.¹⁵

Ebensberger et al in 2002 evaluated the effect of ozonated water irrigation on the proliferation of periodontal ligament cells adhering to the root surfaces of freshly extracted completely erupted third molars. The teeth were intensively irrigated with ozonated water for two minutes. The control group was irrigated with sterile isotonic saline solution. They concluded that the two minutes irrigation of the avulsed teeth with non isotonic ozonated water might lead to mechanical cleansing and decontamination of root surface, with no negative effect on periodontal cells remaining on the tooth surface.¹⁶

Nagayoshi et al in 2004 tested the efficacy of ozonated

water on the survival and permeability of oral micro-organisms. Gram negative bacteria like *Porphyromonas endodontalis* and *gingivalis* were more sensitive to ozonated water than gram positive oral *Streptococci* and *Candida albicans* in pure culture. Ozonated water had strong bactericidal activity against bacteria in plaque biofilm and inhibited the accumulation of experimental dental plaque in vitro.¹⁷

Bezrukova et al in 2005 concluded in their study that both gaseous and aqueous ozone therapy reduced the growth of *Actinobacillus actinomycetemcomitans*, *Treponema denticola*, *Porphyromonas gingivalis* and *Prevotella intermedia*; No information on application time or dose was provided.¹⁸

Ramzy et al in 2005 did a four weeks study in patients with aggressive periodontitis. He irrigated the periodontal pockets with 150 ml ozonized water for over five to ten minutes once weekly using a blunt tipped sterile plastic syringe. Significant improvement was noticed in pocket depth, plaque index, gingival index and bacterial count related to quadrants treated by scaling and rootplaning together with ozone application.¹⁹

Huth et al in 2006 concluded that the aqueous form of ozone showed less cytotoxicity than gaseous ozone or other established antimicrobials like chlorhexidine digluconate, sodium hypochlorite and hydrogen peroxide under most conditions.¹¹

Huth et al in 2007 studied the effect of ozone on host immune response. The results showed that NF kappa B activity of oral cells in periodontal ligament tissue, from root surfaces of periodontally damaged teeth was inhibited following incubation with ozonized medium, suggesting that it has an anti-inflammatory capacity.²⁰

Muller et al in 2007 compared the influence of ozone gas with photodynamic therapy (PDT) and known antiseptic agents (2% Chlorhexidine; 0.5 and 5% hypochlorite solutions) on a multispecies oral biofilm in vitro. They concluded that the matrix-embedded microbial populations in biofilm are well protected towards antimicrobial agents. Only 5 % hypochlorite solution was able to eliminate all bacteria effectively. Usages of gasiform ozone or PDT could not reduce significantly or completely eliminate bacteria in the biofilm.²¹

Kronusova in 2007 used ozone for management of chronic gingivitis, periodontitis and periodontal abscesses. Almost all patients with gingivitis showed subjective and objective improvement of their status, as well as patients with periodontal abscess.²²

Filippi observed the influence of ozonized water on the

epithelial wound healing process in the oral cavity. When applied on a daily basis, it accelerates the healing rate in oral mucosa.²³

Karapetian et al evaluated peri implantitis treatment with conventional, surgical and ozone therapy and found out that the most effective bacteria reduction was in the ozone-treated patient group.²⁴

Kshitish and Laxman in 2010 conducted a study on generalized chronic periodontitis patients. They employed subgingival irrigation on each half of the mouth with either ozone or chlorhexidine at different time intervals. They observed a higher percentage of reduction in plaque index, gingival index and bleeding index using ozone irrigation as compared to chlorhexidine. The percentile reduction of *Actinobacillus actinomycetemcomitans* using ozone was appreciable as compared to no change when using chlorhexidine. There was no antibacterial effect on *Porphyromonas gingivalis* and *Tannerella forsythia*. Ozone also showed antifungal effect unlike chlorhexidine but had no antiviral property. They concluded that despite the substantivity of chlorhexidine, the single irrigation of ozone is quite effective to inactivate microorganisms.²⁵

Skurska et al in 2010 did a comparison of the clinical status and salivary MMP levels, after SRP alone or with ozonotherapy, in patients with aggressive and chronic periodontitis. Twelve patients with chronic periodontitis underwent scaling and root planing (SRP), 25 patients with chronic periodontitis underwent ozonotherapy in addition to SRP. The same therapy was performed in group containing 15 patients with aggressive periodontitis also. They found out that all the clinical parameters assessed in the study groups were reduced after treatment. SRP with additional ozonotherapy provided an increase in MMP levels in patients with chronic periodontitis and a reduction of MMP levels in patients with aggressive periodontitis.²⁶

Dodwad et al in 2011 compared the effect of oral irrigation of ozonated water, 0.2% chlorhexidine and 10% povidone iodine in chronic periodontitis patients and concluded that local ozone application can serve as potent atraumatic antimicrobial agent to treat periodontal disease non-surgically.²⁷

Dhingra et al in 2011 evaluated the clinical effects of a single subgingival irrigation with ozonated water on gingival inflammation in orthodontic patients and correlated the clinical effects with lactate dehydrogenase (LDH) enzyme activity in GCF. Significant reduction in clinical parameters, GCF LDH activity and GCF volume were observed after subgingival irrigation with ozonated water, proving that ozonated water can effectively reduce the gingival inflammation in orthodontic patients.²⁸

Huth et al in 2011 investigated the antimicrobial effectiveness of gaseous/aqueous ozone in comparison with that of the established antiseptic chlorhexidine digluconate (CHX), against periodontal microorganisms like *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Tannerella* etc in planktonic or biofilm cultures. They were exposed for one min to gaseous ozone, aqueous ozone, CHX, or phosphate-buffered saline (control). None of the agents was able to substantially reduce the *A. actinomycetemcomitans* count in biofilm cultures. In contrast, *P. gingivalis*, *T. forsythia*, and *P. micra* could be eliminated by 2% CHX or by ozone gas at 53 gm-3. Planktonic cultures were more affected than biofilm bacteria. There were no significant differences in the effectiveness of aqueous ozone or gaseous ozone compared with 2% CHX but they were more effective than 0.2% CHX. Their study point out that high-concentrated gaseous and aqueous ozone merit further investigations as antiseptics in periodontitis therapy.²⁹

Hayakumo et al in 2013 evaluated the clinical and microbiological effects of ozone nano-bubble water (NBW3) irrigation as an adjunct to subgingival debridement for periodontal treatment. Subjects were randomly assigned to one of the two treatment groups: full-mouth mechanical debridement with tap water (WATER) or full-mouth mechanical debridement with NBW3 (NBW3). The probing pocket depth reduction and the clinical attachment gain after four and eight weeks in the NBW3 group were significantly greater than those in the WATER group. Only the NBW3 group showed statistically significant reductions in the mean total number of bacteria in subgingival plaque over the study period. The study suggested that subgingival irrigation with NBW3 may be a valuable adjunct to periodontal treatment.³⁰

Ozdemir et al in 2013 analyzed histologically the effect of ozone therapy in combination with autogenous bone graft on bone healing in rat calvaria. Critical size defects were created in calvaria of male Wistar rats. The animals were divided into three groups - autogenous bone graft group; autogenous bone graft with ozone therapy group; non-treatment (control) group. Histomorphometric assessments and histological analyses revealed that the total bone area in the autogenous bone graft with ozone therapy group was significantly higher than that of the autogenous bone graft group. Thus they concluding that ozone therapy along with autogenous bone graft enhance new bone formation in the rat calvarial defect model.³¹

Katti et al in 2013 studied clinical effects of ozonated water on periodontal tissues. Subjects with pocket depth of five mm were divided into two groups - group one (control group - irrigation with saline) and group two (study group - irrigation with ozonized water). They concluded that subgingival irrigation with ozonized water is a beneficial adjunct treatment modality

with significant role in periodontal therapy.³²

Shoukheba et al in 2014 evaluated the effect of subgingival application of ozonated olive oil gel as an adjunct to scaling and root planing in aggressive periodontitis. Patients were divided into two groups receiving scaling and root planing only (group I) and scaling and root planing with ozonated olive oil gel subgingivally (group II). The results after six months showed improvement in all clinical parameters in group II which was maintained up to six months whereas group I showed a significant improvement maintained upto three months only. Microbiological results revealed significant reduction of the mean *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* DNA copies for group II whereas group I resulted in slight reduction only. Thus they concluded that local ozone application can serve as a potential atraumatic promising antimicrobial agent to treat periodontal disease non-surgically.³³

Hayakumo et al in 2014 evaluated the bactericidal activity of ozone nano-bubble water (NBW3) against periodontopathogenic bacteria using in vitro time-kill assays and assessed the cytotoxicity of NBW3 against human oral cells using three-dimensional human buccal and gingival tissue models. The number of colony forming units of *P. gingivalis* and *A. actinomycetemcomitans* exposed to NBW3 dropped to below the lower limit of detection (<10 CFUs mL⁻¹) after only 0.5 min of exposure. There were only minor decreases in the viability of oral tissue cells after 24 h of exposure to NBW3. They concluded that the use of NBW3 as an adjunct to periodontal therapy would be promising.³⁴

Habashneh et al in 2015 studied the clinical and biological effects of the adjunctive use of ozone in nonsurgical periodontal treatment. Chronic periodontitis patients were randomized to treatment with subgingival scaling and root planing followed by irrigation with ozonated water (test) or irrigation with distilled water (control). There was significant improvement in the study parameters in both groups but results were not statistically significant.³⁵

Anitua et al investigated for the first time whether different ozone treatments of plasma rich in growth factors (PRGF) alter the biological properties and outcomes of autologous platelet-rich plasma. Human PRGF was treated with ozone using one of the following protocols: a continuous-flow method or a syringe method in which constant volumes of ozone and PRGF were mixed. Ozone treatment of PRGF with continuous flow protocol impaired formation of the fibrin scaffold, drastically reduced the levels of growth factors and significantly decreased the proliferative potential of PRGF on primary osteoblasts and gingival fibroblasts. In contrast, the syringe method did not alter the biological outcomes of the autologous therapy. These findings

suggest that the way of ozone treatment of PRGF may alter the biological potential and therapeutic outcomes of PRGF.³⁶

Carinci et al in 2015 compared the efficacy scaling and root planing (SRP) alone versus Aquolab® ozone therapy along with SRP in the treatment of chronic periodontitis in adults. There was a statistically significant reduction of *Tannerella forsythia* loading in sites treated with ozone therapy with respect to those treated with SRP alone. They concluded that Aquolab® ozone therapy is effective in reducing the total bacterial loading in pockets of periodontitis patients.³⁷

Isler et al in 2018 studied the impact of additional topical gaseous ozone therapy on decontamination of implant surfaces in surgical regenerative therapy of peri-implantitis. Patients with moderate or advanced peri-implantitis were randomly allocated to test group using sterile saline with ozone therapy and control group using sterile saline alone. All clinical parameters evaluated showed significant improvement on additional use of ozone therapy.³⁸

Uraz et al in 2018 evaluated the clinical, biochemical and microbiological efficacy of ozone treatment as an adjunct to SRP in generalized chronic periodontitis patients. Significant improvements were noticed in all clinical parameters accompanied by a reduction in microbiological and biochemical parameters in both treatment groups but there were no significant differences between two treatments. Thus, within the limitations of this study, adjunctive ozone therapy did not provide additional benefits to clinical, microbiological and biochemical parameters over SRP in chronic periodontitis patients.³⁹

Ozone toxicity

The broncho pulmonary system is very sensitive to ozone. Side effects like epiphora, upper respiratory irritation, rhinitis, nausea, vomiting, blood vessel swelling, poor circulation etc have been reported. Ozone intoxication is treated by placing patient in the supine position and administering humid oxygen along with ascorbic acid, vitamin E and N acetyl cysteine. Direct intravenous administration of ozone causes pulmonary embolism and is prohibited by the European Society of Ozone therapy since 1983.

► Conclusion

Ozone therapy is used in almost all specialties of dentistry. It is a minimally invasive painless procedure which increases patients' acceptability and compliance making it an ideal treatment choice for pediatric patients. In comparison with classical treatment modalities ozone therapy is quite inexpensive, predictable and conservative. Different studies prove that the approaches established till date on ozone are so promising that

they may evolve as a standard treatment. But better designed, double-blinded randomized clinical trials are needed to justify or standardize the indications and treatment procedures.

► References

1. Savage A, Eaton KA, Moles DR, Needleman I. A systematic review of definitions of periodontitis and methods that have been used to identify this disease. *J Clin Periodontol* 2009; 36:458-67.
2. Feres M, Haffajee AD, Allard K, Som S, Goodson JM, Socransky SS. Antibiotic resistance of sub gingival species during and after antibiotic therapy. *J Clin Periodontol*. 2002; 29:724-35.
3. Van der Weijden GA, Timmerman MF. A systematic review on the clinical efficacy of subgingival debridement in the treatment of chronic periodontitis. *J Clin Periodontol* 2002; 29:55-71.
4. Heitz-Mayfield LJ, Trombelli L, Heitz F, Needleman I, Moles D. A systematic review of the effect of surgical debridement vs. non-surgical debridement for the treatment of chronic periodontitis. *J Clin Periodontol* 2002; 29:92-102.
5. McKetta JJ. Chemical Technology an Encyclopedic Treatment. Vol. 1. New York: Barnes & Noble, Inc.; 1968. p. 79.
6. Gupta G, Mansi B. Ozone therapy in periodontics. *J Med Life* 2012; 5:59-67.
7. Garg R, Tandon S. Ozone: A new face of dentistry. *The Internet Journal of Dental Science*.2009; 7:2.
8. Fisch E, inventor. Ophthalmic Ventures, assignee. Apparatus for the production and use of ozone in therapeutics. 2,054,367. United States Patent. 1936 Sep 15.
9. Seidler V, Linetskiy I, HubalkovaH, Stankova H, Smucler R, Mazanek J. Ozone and Its Usage in General Medicine and Dentistry. A Review Article. *Prague Medical Report*. 2008; 109: 5-13.
10. Elvis AM, Ekta JS. Ozone therapy: a clinical review. *J Nat Sci Biol Med* 2011; 2:66-70.
11. Huth KC, Jakob FM, Saugel B, Cappello C, Paschos E, Hollweck R, et al. Effect of ozone on oral cells compared with established antimicrobials. *Eur J Oral Sci*. 2006; 114:435-440.
12. Nagayoshi M, Kitamura C, Fukuizumi T, Nishihara T, Terashita M. Antimicrobial effect of ozonated water on bacteria invading dentinal tubules. *J Endod*.2004; 30:778-781.
13. Sechi LA, Lezcano I, Nunez N, Espim Dupre I, Pinna A, Molicotti P. Antibacterial activity of ozonized sunflower oil (Oleozone). *J Microbiol*.2001; 90:279-284.
14. Brauner AW. Periodontology: new methods. *Ozone Sci Eng* 1992; 14:165-76.
15. Thanomsub B, Anupunpisit V, Chanphetch S, Watcharachaipong T, Poonkhum R, Srisukonth C. Effects of ozone treatment on cell growth and ultra structural changes in bacteria. *J Gen Appl Microbiol*2002; 48:193-9.
16. Ebensberger U, Pohl Y, Filippi A. PCNA-expression of cementoblasts and fibroblasts on the root surface after extraoral rinsing for decontamination. *Dent Traumatology* 2002; 18:262-6
17. Nagayoshi M, Fukuizumi T, Kitamura C, Yano J, Terashita M, Nishihara T. Efficacy of ozone on survival and permeability of oral microorganisms. *Oral Microbiol Immunol* 2004; 19:240-6.
18. Bezrukova IV, Petrukhina NB, Voinov PA. Experience in medical ozone use for root canal treatment. *Stomatologiia (Mosk)* 2005; 84:20-2.
19. Ramzy MI, Gomaa HE, Mostafa MI. Management of aggressive periodontitis using ozonized water. *Egypt Med J. N R C* 2005; 6:229-45.
20. Huth KC, Saugel B et al. Effect of aqueous ozone on the NF kappa B system. *J Dent Res*. 2007.

21. Muller P, Guggenheim B, Schmidlin PR. Efficacy of gasiform ozone and photodynamic therapy on a multispecies oral biofilm invitro. *Eur. J. Oral. Sci.* 2007; 115: 77–80.
22. Kronusova M. Aplikace atomarniho kysliku v ordinaci praktickeho zubniho lekare. *Progresdent.* 2007; 3:34–36.
23. Fillipi A. The influence of ozonized water on the epithelial wound healing process in the oral cavity. *Clinic of Oral Surgery, Radiology and Oral Medicine, University of Basel, Switzerland.* Available at: www.oxyplus.net.
24. Karapetian VE, Neugebauer J, Clausnitzer CE, Zoller JE. Comparison of Different Peri implantitis Treatment Methods. Available from: http://www.helbo.at/datasheets/poster_karapetian_0304.pdf.
25. Kshitish D, Laxman VK. The use of ozonated water and 0.2% chlorhexidine in the treatment of periodontitis patients: A clinical and microbiologic study. *Indian J DentRes* 2010; 21:341-8.
26. Skurska A, Pietruska MD, et al. Evaluation of the influence of ozonotherapy on the clinical parameters and MMP levels in patients with chronic and aggressive periodontitis. *Adv Med Sci* 2010; 55: 297-307.
27. Dodwad V, Gupta S, Kumar K, Sethi M, Masamatti S. Changing paradigm in pocket therapy-ozone versus conventional irrigation. *Int J Public Health Dent* 2011; 2:7-12.
28. Dhingra K, Vandana KL. Management of gingival inflammation in orthodontic patients with ozonated water irrigation – a pilot study. *Int J Dent Hygiene* 9, 2011; 296–302.
29. Huth KC, Quirling M, et al. Effectiveness of ozone against periodontal pathogenic microorganisms. *Eur J Oral Sci* 2011; 119: 204–210.
30. Hayakumo S, Arakawa S, Mano Y, and Izumi Y. Clinical and microbiological effects of ozone nano-bubble water irrigation as an adjunct to mechanical subgingival debridement in periodontitis patients in a randomized controlled trial. *Clin Oral Investig.* 2013; 17:379-88.
31. Ozdemir H, Toker H, Balci H, Ozer H. Effect of ozone therapy on autogenous bone graft healing in calvarial defects: a histologic and histometric study in rats. *J Periodont Res* 2013; doi: 10.1111/jre.12060.
32. Katti SS, Chava VK. Effect of Ozonized water on Chronic Periodontitis - A Clinical Study. *J Int Oral Health* 2013; 5:79-84.
33. Shoukheba M Y M, Ali S A. The effects of subgingival application of ozonated olive oil gel inpatient with localized aggressive periodontitis. A clinical and bacteriological study. *Tanta Dental Journal* 11 (2014) 63-73.
34. Hayakumo S, Arakawa S, Takahashi M, Kondo K, Mano Y, and Izumi Y. Effects of ozone nano-bubble water on periodontopathic bacteria and oral cells - in vitro studies. *Sci Technol Adv Mater.* 2014; 15: 055003.
35. Al Habashneh R, Als Salman W, Khader Y. Ozone as an adjunct to conventional nonsurgical therapy in chronic periodontitis: a randomized controlled clinical trial. *J Periodontal Res.* 2015; 50:37-43.
36. Anitua E, Zalduendo MM, Troya M, Orive G. Ozone dosing alters the biological potential and therapeutic outcomes of plasma rich in growth factors. *J Periodontal Res.* 2015; 50:240-7.
37. Carinci F, Palmieri A, Girardi A, Cura F, Lauritano D. Aquolab® ozone-therapy is an efficient adjuvant in the treatment of chronic periodontitis: A case-control study. *J OrofacSci* 2015; 7:27-32.
38. Isler SC, Unsal B, Soysal F, Ozcan G, Peker E, Karaca IR. The effect of ozone therapy as an adjunct to the surgical treatment of peri-implantitis. *J Periodontal Implant Sci.* 2018;48:136-151
39. Uraz A, et al. Ozone application as adjunctive therapy in chronic periodontitis: Clinical, microbiological and biochemical aspects, *Journal of Dental Sciences* (2018), <https://doi.org/10.1016/j.jds.2018.06.005>

Association News

CDE Report



Dr Jose Paul
Chairman CDE

It is heartening to see that there are umpteen number of quality CDEs conducted across different branches in our state. Another positive that we see is the active participation of our members in these programs.

The 2nd CDE of IDA Kerala state was conducted on 28th April on the topic 'Interceptive and Myofunctional Orthopedics' at Kanhangad jointly hosted by the branches of Coastal Malabar

and Kasaragod. The lecture in the morning was followed by a hands on session in the afternoon. The faculty was Dr Joby Peter MDS, Professor and Head, Department of Pedodontics, Malabar Dental College.

The third CDE was conducted on May 19th at Kochi on the topic 'Meet the Masters-An update on Oral surgery for general practitioners'. It was a CDE conducted without registration charges and the faculty were eminent maxillofacial surgeons – Dr Varghese Mani, Dr George Paul, Dr Oommen Aju Jacob and Dr Sherry Peter. A panel discussion was also included which was well moderated by Dr Eapen Thomas.

There were participants from 24 different IDA branches which made the program a state CDE in all essence. Only 300 registrations were allowed and it was full house. The program was hosted by the branches of Kochi, Smart city and Tripunithra. The state CDE wing wholeheartedly thank the principal office bearers of these branches in conducting this program at a shoe string budget.

The fourth CDE, which is again a state CDE, free of registration charges will be held at Karunagapilly on June 30th. The Topic is 'Rendezvous with the rising stars – An update on recent concepts on restorative dentistry' and the faculty will be Dr George Jacob, Dr Jojo Kottoor, Dr Shibu Sreedhar and Dr Vijit Narayana. The moderator for the CDE will

be Dr Pradeep CV. Interested participants can contact their branch secretary for registration.



CDH Report



Dr Subash K. Madhavan
Chairman CDH

Indian Dental Association observed both International Dentist Day and World Oral Health Day in branch and state level. Almost all branches observed the days in an excellent manner.

The state level observation of International Dentist Day held at Thiruvananthapuram and World Oral Health Day at Tripunithura.

World Oral Health Day.

Indian Dental Association kerala state conducted world oral health day on March 20th hosted by IDA Tripunithura at Layam koothambalam, Tripunithura

The function was inaugurated by Adv M. Swaraj MLA and guest of honour was Municipality Chairperson smt Chandrika Devi. IDA Kerala State President Dr. Abhilash G S presided the function. Kerala State CDH Chairman Dr. Subash Madhavan, IDA Tripunithura Branch President Dr Krishnakumar, Branch secretary. Dr Noushadh, Branch CDH convener Dr. mathews baby were present

The program was well attended by the public and an oral cancer

awareness talk done along with Dental exhibition, Free Dental check up and Dental Hygiene kit were also distributed

Dentist Day Celebration

IDA Kerala State Branch International Dentists Day Celebration was hosted by IDA Trivandrum Branch at Kanakakunnu Palace Durbar Hall on March 6th Wednesday 2019.

Evening 4 PM it started with a scientific deliberation by Dr. Binu Purushothaman and Dr. Civy Pulayath for the housesurgeons of various colleges in and around Trivandrum on the topic titled "PATH TO FUTURE."

Evening by 7PM the official programme started in which Dr. Shashi Tharoor M.P was the Chief Guest, followed by IDA National Vice President Pratapkumar. K.N, IDA KSB President Dr. Abhilash G.S, Hon.Secretary Sureshkumar. G, CDH Chairman Dr. Subhash K. Madhavan, President Elect Dr. Joseph C.C, Immediate Past President Dr. Ciju A Poullose, Vice presidents Dr. Anil Thunoli, Dr. George Abraham and state Treasurer Dr. Arun R. Dr. Shashi Tharoor M.P inaugurated the function by lighting the Lamp. IDA Media Awards were distributed to various medias. IDA Dental Excellence Awards were awarded to winners.

The function was followed by dinner and live orchestra. More than 200 people attended the function.





Dr Mili James
WDC chairperson

WDC Report

Dr Priya Rajendran
WDC secretary



A host of colourful events were organized by the WDC teams across the state to celebrate the joy of womanhood. 6th March 2019, on occasion of International Women's day, turned out to be a day of programmes that truly addressed the needs of the present-day lady professional.

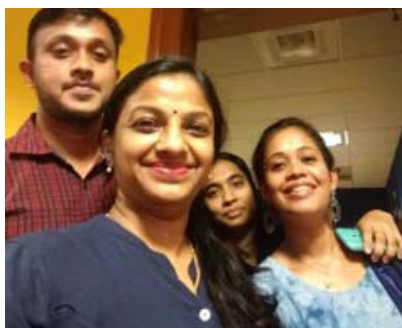
World Oral Health day was observed on 20th March 2019, with WDC Palakkad and Vatakara hosting innovative events. WDC Palakkad came up with "Say Ahh: act on oral health", a live talk show with wide public interaction, going on air with Ahalia Voice 90.4 FM radio station. This event was also featured on the FDI website.

WDC Vatakara organized a class on oral health awareness by Dr. Hafeefa Kunhabdulla, for the staff and inmates of Amana Hospital, Kuttiady, and it was received with great enthusiasm.

WDC Trivandrum organized a health talk with diet tips and Yoga demonstration to combat neck and back pain, by Ms. Uma, a renowned nutritionist and Yoga trainer at Innu apartment on 31st March 2019. With an attendance of 27 WDC members, the event was a big success.

WDC State Secretary Dr. Priya R. inaugurated the official activities of WDC Thiruvalla in a function held at Club 7 on 5th May 2019. The programme consisted of a family meet and a brilliant oration by Mrs. Grace Lal, family counsellor, titled "Why men lie and women cry".

"Venalkkinavu, a summer vacation family get together, was organized by WDC Mavelikkara on 19th May 2019. Dr. Mili James, WDC State President, was the chief guest at the event.



► Malabar Branch

CDH Activity- No.9 'World Oral Health day' (Awareness Programme - 2)

IDA Malabar did observation of World Oral Health day on 20.03.19. Oral Health posters were displayed at the Kozhikode Moffussil bus stand and pamphlets containing awareness messages were distributed among the public. Dr. Susha C.N, Dr. Navjeevraj M.N, & Dr. Pravish Vishnudas were leading the awareness programme.

CDH Activity- No.10 (Dental checkup camp- 4)

Dental screening camp held at PHC, Karassery, Mukkam. Around 100 patients were examined and oral health kits distributed. Dr. Manoj. A and Dr. Ikram conducted the camp, which was inaugurated by medical officer, Dr. Sajna.

CDE activity- No.2 'Sterilization, Asepsis and Infection Control' (Mandatory CDE topic.2)

We conducted the 2nd CDE of 2019 on 17.03.09 at Hotel Maharani. Topic was on Sterilization, Asepsis and Infection Control in dental clinic, Medical negligence – what to do? By George Skariah Prescribing drugs – what does a dentist need to know? By Dr. Fazil K A

CDH Activity- No.11 (Dental checkup camp- 5)

We conducted a dental check-up camp at Avala-Kuttoth LP School Perambra on 22.03.19 lead by Dr Mohammed Salu.

Student activity.

'Focus' our PG entrance coaching students had an interaction with Dr. Harikumar Menon (Associate Professor, Periodontology, GDC Kozhikode) on 31.03.19 about the hurdles in PG entrance preparation. The session was followed by a 3 hour term revision test paper for the students.

Publication – 1st issue of Malabar Dentist

This year's 1st issue of Our Official journal 'Malabar Dentist' was released on 6.04.19 by IDA kerala state president, Dr Abhilash with auspicious presence of state secretary, Dr Suresh Kumar and Hon. Editor-IDA Malabar, Dr Vinni Pramod. 700 copies were printed and distributed to members of IDA Malabar.

CDE activity- No.3 'Road Map to Endodontics'

The third CDE programme with hands on training 'Road map to Endodontics' by Dr. Adarsh M.S was conducted on 7.04.19

Sports activity

IDA Malabar become the semi-finalists in IDA Kerala State football league 2019 held at Malapuram.

Additional Acquisition programme on Dental Assistant course (ASAP)

We had conducted ASAP programme at Karaparamb Govt. H.Sec. School. Classes this year was started on 8-04-2019 with strength of 29 students and were trained by Dr. Didisha Balan & Dr. Hysha (trainees undergone training of trainers-TOT and programme coordinated by Dr. Gireesh.

Kids Programme

We conducted Summer Camp 2019 For Kids from April 22nd to May 2nd. Kids enjoyed the activities of Drawing, Art & Craft, Games and Puzzles, Public Speaking, Creative Writing.

Second executive meeting

The second executive meeting of IDA Malabar branch held on Friday, 26th April 2019 at IDA Hall, Asokapuram, Calicut.



► Trichur Branch

An EOGM was held on 24th February at Hill Gardens, Kuttanellur to select the IDA District Committee in respect to CEA. IDA Trichur also paid homage to the martyrs of Pulwama by keeping a candle light vigil and releasing dove in hope of eace in presence of Retd Commodore Suresh T K.

Dentist's day was celebrated on 6th March at Hotel Elite International. Trichur DMO Dr. Reena KJ was invited as the chief guest for the function.

A general body with Webinar on Dilemma in management of dental infection in special population: Cardiac, Diabetic, Pregnant, Pediatric was held on 23rd March at Hotel Joy's Palace. 84 members attended the meeting.

The cheques from IDA KSB was presented to the flood affected members, Dr. Priyadarshini, DrManju KA, DrAwin Thomas and Dr. Robby Alappat

The 1st CDE Program of IDA Trichur was conducted on April 7th at Hotel Joy's Palace on "Tune up your clinic Practice". Lectures on Sterilization protocols, Open extraction technique, complications and management of medically compromised cases was taken by Dr. Siji J Chiramel and Dr.JineeshNath C K. Applications was Soft tissue lasers was taken by Dr. Jaison J Valiakulangara. The lectures were much appreciated and attended by 85 members.



► Malanadu Branch

Family meeting: 25-03-2019:

Dentist day and women's day family celebration was held on 25-03-2019 at hotel kabana, Muvattupuzha. Inauguration of dentist day celebration was done by Dr Ciju A paulose, IPP, IDA KSB

Dr Alias Thomas, Past IDA National president and drBabu John felicitated the gathering

Honouring of past presidents of IDA Malanadu was done by Dr Litto Manuel

Release of 1st Issue of MALANADU DENTAL JOURNAL was done by Dr Alias Thomas

IDA Kerala state disaster fund was distributed to the members who were affected by floods.

Webinar on "DILEMMAS IN MANAGEMENT OF DENTAL INFECTIONS IN SPECIAL POPULATION" Wasalso conducted

Executive meeting: 26-02-2019:2nd Executive meeting was conducted on 26-02-2019 at hotel kabani, Muvattupuzha

08-05-2019: 3rd Executive meeting was conducted on 08-05-2019 at hotel Kabani palace, Muvattupuzha

CDE Activities: 05-03-2019:2nd CDE was held at peter's 9 central hall, Thodupuzha by Dr. NoushinFaizal. Topic was " PRF A NATURAL HEALER"

17-03-2019: 3rd CDE (INTER BRANCH CDE)

3rd CDE by IDA Malanadu was an interbranch CDE in association with IDA kochi and IDA Smartcity on 17-03-2019 at Hotel Hill View, Kakkanadu. Topic: Advanced Endodontics by Dr. Harsh Haren Shah. MDS

07-04-2019: 4th CDE was held at hotel Raj Riveria, Muvattupuzha

Topic: "Everyday oral surgery revisited and management of Impacted teeth" by Dr. Oommen Aju Jacob MDS & Dr. SankarVinod, MDS

07-05-2019:5th CDE was held at rotary club hall, Perumbavoor. Topic: " Endodontic diagnosis & treatment planning in contemporary

clinical practice" By Dr Bobby Joseph. MDS

CDH ACTIVITIES:

1. 06-03-2019: The dental camp of IDA Malanadu on dentist day was held at Anganavadi Auditorium Perumbavoor. Inauguration of Project "Susmeram 2019" done By Our Senior Member Dr John Joseph. Awareness class for students and teachers taken by Dr Terry Thomas Edathotty. Oral Kit Distribution for 400 students of 24 Anaganvadis of perumbavoor area done by Dr UshaNarayanan and Dr Amal E.A. Dental Health Care Booklet release for Anganavadi Teachers done by Dr Reji Thattampuram.

1. 20-03-2019: IDA Malanadu observed World Oral Health Day on 20/3/2019 at Snehmandhiram, Murikkassery, Idukki. Which is a shelter home for 350 inmates of oldage, oraphans and physically - Mentally disabled category. Programme was inaugurated by DrLitto Manuel (President IDA Malanadu). Screening camp and oral kit distribution was conducted for 70 inmates. DrAmal taken the oral health awareness talk, As a part of our Charity programmeidamalanadu contributed the lunch expence for the 325 inmates of snehamandiram. DrLitto Manuel, DrAmal DrJayesh and Dr Nelson participated in the camp.

WDC Activities: 08-03-2019: WDC of IDA Malanadu celebrated international women's day on 08-03-2019 at Al Azhar dental college, Thodupuzha.

A Talk on "THE WOW OF BEING A WOMEN" was conducted by Prof. Sheela Stephen, Principal of BCM College, Kottayam.

Honouring of celebrated women luminaries was also done during the program.

PUBLICATIONS: 25-03-2019:1st Issue of Malanadu dental journal was released on 25-03-2019 during dentist day celebration. It was released by Dr Alias Thomas.



► North Malabar Branch

CDE: 3rd CDE of the year MANAGEMENT OF MEDICALLY COMPROMISED PATIENTS AND MEDICAL EMERGENCIES IN DENTAL PRACTICE, an accredited programme conducted at Hotel Malabar Residency on 24/3/19. Faculty was Dr EAPEN THOMAS. 79 members attended it.

4th CDE was conducted in IDA Hall Podikundu on the topic ELASTOMERIC IMPRESSION MATERIALS on 30/4/19. Faculty was Dr MATHAI JOSEPH. 22 members attended this evening programme.

CDH: March 6th DENTIST DAY was observed with an awareness programme for the parents of ASHRAYA SPECIAL school kids. Dr Jithin P M took the classes.

8th March WOMEN'S Day was observed along with Kannur Dental College Students Union, Kannur Dental College and IDA North Malabar. Dr Suchitra Sudheer inaugurated the function. A debate on Modern Women was conducted by Dr Jayashree K T. Two of our senior lady members was honoured.

March 9th a dental checkup and awareness class was done in

ISLATHUL ISLAM ENGLISH SCHOOL Mammalacunn. Dr Saleem C K took the awareness class and Dr Zahir, Dr Vijana, Dr Mridula and Dr Binujith done Dental checkup for both adults and kids.

March 20th Oral Health Day was observed with a dental checkup camp and awareness programme at CHM UP SCHOOL Taliparamba. Dr Thasneem Fahir Dr Valsalan K V, Dr Sang o V and a few more of our members participated.

A Dental awareness programme was conducted on 22nd and 26th March at CHINMAYA BALABHAVAN TALAP for the classes 1 to 4 by Dr Raj A C.

7th April WORLD HEALTH DAY was observed by conducting a FRIENDLY FOOTBALL MATCH with IDA Coastal Malabar at TURF Football Ground Manna. IDA NMB won.

21st April a boat cruise was organized for the members and family. About 10 families participated.

Our Team under leadership of Dr Saleem C K participated in the KSB league football match at Malapuram.



► Quilon Branch

MEETINGS:

A) Branch:

1st EOGM

The 1st EOGM was conducted on 21st of February 2019 at the Vaidya Hotel, Quilon at 10.15 pm to discuss the implementation of the clinical establishment bill and formation of IDA district committees. The meeting was attended by 31 members

1st ECCM: The 1st ECCM was held at the Ritz Hotel on 2nd march 2019, 8 pm mainly to select IDA Excellence Award 2019 nominees. The meeting was attended by 23 members

B) State:

1st IDA HOPE MC meeting:

Attended by Hon. Sec. of the branch on 17th March at IMA House, Kochi

C) Family Meeting:

2nd family meet on 7th March at Hotel Shah Intl attended by 26 members

Awards:

IDA Excellence Awards:

Dr Kiran KS & Dr Shanima Nizam were the members endorsed

by the branch executive.

CDH: 21st February: Paid tribute to martyred soldiers in Pulwama at Chinnakada by wearing black badges, lighting candles, displaying the Indian flag & banner. Patriotic songs were dedicated & patriotic speeches were delivered by respected State Secretary, President of the branch & few members.

27th March: 1st School dental health programme at CFHS, Quilon. An awareness talk by Dr Siddiq AJ, a dental screening camp for 218 students, a dental exhibition & 2 competitions were held.

6th & 7th March: Two day Dentist day programme at SN College for Women & at Shah Intl. The prog. sched. on the 6th included an awareness talk by Dr Manoj Varghese resp. President IDA Quilon, a dental screening camp for 193 students & a dental exhibition & on the 7th dentist day celebrations

20th March: Observed WOHD at KEL, Kundara. An awareness talk by Dr Ciju P Cherian, a dental screening camp for 44 factory employees & a dental exhibition were conducted.

WDC: 8th March: Observed Intl. Womens day at Abhayam Charitable Trust, Qln by honouring 3 women leaders, conducted an awareness talk with a dental screening camp along with charitable contributions & entertainment.



► TELlichERY BRANCH

1) INSTALLATION OF NEW OFFICE BEARERS 2019

Installation of office bearers of IDA Tellicherry Branch was held on 2nd February 2019 at hotel Victoria, Thalassery. Program started at 7 pm. Dr. Anil Thunoli, Vice president of IDA was the chief guest. Dr. Arun Narayan, Principal of Kannur Dental college was the guest of honor. Dr. Preetha Rajeev welcomed the gathering. Dr. Anil Thunoli installed Dr. Mohamed Jamsher as the president of IDA Tellicherry branch. Other office bearers were also installed. Felicitations were given by Dr. Thasneem and Dr. Johnny Sebastian. Momentos and gifts were presented to the delegates. Dr. Arun Shyam, the secretary delivered vote of thanks. Installation was followed by entertainment programs, music nights etc. It was a well attended function by our members.

2) Organized a candle light vijil to pay homage to martyrs who sacrificed their life for our nation at Pulwama on 20/2/2019 at overburysolly, Thalassery.

CDH Activities

1. A Dental treatment camp was conducted in iritty in association with Kannur dental college. Dr. shermil, Dr. Arun Shyam coordinated the camp.

2. A dental camp and dental awareness class was held on march 10 th 2019 at ulikkal, iritty in association with malayalamanorama. 200 patients were examined and dental kits were distributed. Dr. Sunith,

Dr. Vincysunith coordinated the camp.

DENTIST DAY CELEBRATION

Dentist day celebration and a dental awareness class and camp was conducted in Valiyamadavil Govt Senior basic School, Thalassery. Dr. Deepthi took awareness class for children and interactive session was conducted. Dr. M C Mohan presided the function. Dr. Jamsher, Dr. Deepthi, Dr. Sujatha, Dr. Preetha, Dr. Abhinav, Dr. Peeyusha participated in the camp.

WOMENS DAY CELEBRATION

Womens day celebration was conducted in SNEHA SADAN – A SHELTER FOR DIFFERENTLY ABLED CHILDREN, MAHE. Womens wing of tellicherry branch actively participated in the function. Screening camp, dental awareness class for the parents and lunch with the inmates of snehasadan was actively done by Dr. Namithavijesh, Dr. Sujatha, Dr. Preetha, Dr. Deepthi, Dr. Peeyusha, Dr. K P M Ali, Dr. vijesh, Dr. Jamsher.

ORAL HEALTH DAY CELEBRATION

Oral health day was celebrated with a public awareness class by Dr. Deepthi and pamphlet distribution among public at Down Town Mall Thalassery.

EXECUTIVE MEETINGS

1 st executive meeting held on 23-01-2019



► Central Kerala - Kottayam Branch

CDH activities:

- March 6th: Dentist Day celebration; IMA Hall, Kottayam.
- March 8th: Providence Home, Aruvikuzhy, Pallikathodu. Treatment camp in association with GDC
- March 20th: World Oral Health Day Awareness classes for nursing staff. Mitera hospital, Kottayam.
- 7th April: St George Church, Chittar Check up camp
- May 9th: Maria Bhavan School, Kumarakom Check up camp
- May 12th: Mariyasadanam, Pala Check up camp and Awareness class
- May 31st: No tobacco day

Indian Dental Association Kerala State NO TOBACCO DAY PROGRAMME

- Marathon in association with Decathlon from Govt Dental College
- Gandhinagar

□ Flash Mob at Medical College Bus Station by students of School of

Medical Education, Kottayam

□ Public meeting and Awareness class in School of Medical Education, Kottayam

Chief Guest: Shri Thomas Chazhikkadan, Member of Parliament Awareness class

Shri Abdul Kalam, Deputy Commissioner of Excise, Kottayam Circle Dr Sreela Jayakumar, Head of the department, Oral Medicine and Radiology, Govt Dental College, Kottayam

□ Anti tobacco pledge

Hosted by Indian Dental Association, Central Kerala Kottayam Branch

CDE activities:

1. Emergencies in day to day practice & use of emergency drug kit Dr Sebastian Thomas

08-04-2019

Nellickal auditorium, Pala, Pravithanam

2 Approach, diagnosis & treatment of oral cancer

Dr Cessal thommachan

Role of dentist in rehabilitation of oral cancer survivors.

Dr faiz ansari

27-04-2019; IMA hall, Kottayam.



► Malappuram Branch

CDE Programme

❖ IIIrd CDE Programme: 17-03-2019

Early interceptive and myofunctional orthopedics was held at Hotel Soorya Regency Malappuram 53 members registered
Speaker; Dr Joby peter MDS

This CDE programme was allotted with “6” Credit points (D/1781/19/DC)

❖ IVth CDE Programme: 10-04-2019

Class practice vs Mass practice was conducted in association with Malabar Dental college and research centre, Edappal Around 75 members were registered

CDH Programme

❖ VIth CDH programme (05/03/2019)

An oral health checkup camp at G.U.P School PainKanoor near Valanchery, Around 450 students were screened and Dental Kits & Awareness brochures were distributed.

❖ VIIth CDH Programme (06/03/2019)

An oral health check up and awareness class at “Pakalveedu” Mangalasseri near Manjeri. Around 50 patients were screened. Awareness class was taken by Dr. Muzammil. Dental camp inaugurated by Municipal Councillor Vallanchira Muhammedali.

❖ VIIIth CDH Programme (08/03/2019)

This programme was done in association with WDC On International Women's Day. A Dental Health Check Up and Awareness class was taken for around 40 inmates of Gov. women and child care home “NIRBHAYA”. Women's Day message was conveyed by Dr. Rehana Sadiq. Dental Awareness class was taken by Dr. Shibna. A water purifier was distributed by our president Dr. Muhammed Haris. KT.

❖ IXth CDH Programme (20/03/2019)

World oral Health Day Observation

An oral Health Awareness class and Oral Health kit distribution

at IRHS School, Pookatri near Valanchery in association with JCI Valanchery and MES youth wing Malappuram District. Around 150 students and staff participated. This Dental Camp was inaugurated by Dr. Mohammed Haris. KT, President of IDA Malappuram.

❖ Xth CDH PROGRAMME (21/03/2019)

An oral awareness checkup and oral health kit distribution at Nila Park Kuttippuram, in association with GCT Special school, Vayomithram Valanchery and social Department ideal college. Around 100 students, Parents and staff participated

❖ XIth CDH PROGRAMME (29/03/2019)

An oral awareness class and oral health check up was done at Pullikkode Anganvadi Thokkampara in association with JCI Kottakkal, around 50 kids and parents participated.

❖ XIIth CDH PROGRAMME (31/03/2019)

An oral awareness class and oral health check up was done at RM Higher Secondary School Melattur. Screening of 25 patients were done.

❖ XIIIth CDH Programme

World Health day observation 07/04/2019 IDA Malappuram friendly football match was conducted between JCI Valanchery in association with MES youth wing Malappuram District.

Executive Meeting

05/04/2019 IInd Executive meeting was held at Rydges, in Kottakkal. 16 members attended.

SPORTS

IDL' 2019,

IDA Kerala state football league

We hosted IDA Kerala state football league IDL' 19 on 28/04/2019 at B square football arena, Malappuram. 15 teams from all over the state participated, IDA Malappuram team won the IDA Kerala state rolling trophy.



► Thiruvalla Branch

Dentist Day Celebration

IDA THIRUVALLA branch celebrated the Dentist Day 2019 on March 8th by Honouring our senior members who completed 25yrs of practice in the field of Dentistry. 42 members were honoured on the occasion. Pathanamthitta jilla panchayath president srinathi Annapoorna Devi was the chief Guest for the event. 130 members and family attended the meeting.

CDE on Creating Invisibility in Dental Procedures

IDA THIRUVALLA branch conducted a CDE on topic CREATING

INVISIBILITY IN DENTAL PROCEDURES by Dr C P JOHN on April 7th at Club 7 hotel Thiruvalla. 135 member's attended the meeting

Woman's dental council program inauguration and family get together

IDA THIRUVALLA WDC program inauguration and family counseling was conducted on May 5th at Club 7 Thiruvalla. WDC state secretary Dr Priya Rajendran was the chief guest and the counselling session was lead by Mrs Grace Lal. About 60 families attended the meeting.



► Kodungallur Branch

ACTIVITY REPORTS IDA KODUNGALLUR BRANCH JAN -MAR 2019

The First CDE of IDA Kodungallur branch was held on 26/01/19 at IMA Hall, Kodungallur on Trips and Tricks in Practice Management

The Second CDE of IDA Kodungallur branch was held on 27/01/19 at IMA Hall, Kodungallur on Team Management in Dental practice

The Third CDE of IDA Kodungallur branch was held on 24/02/19 at Hotel Aswathy, Kodungallur on Esthetic Laminate Veneers. Speakers were Dr Eldo Koshy, Dr Sebastian Thomas and Dr Laju Mahesh

The Fourth CDE of IDA Kodungallur branch was held on 23/03/19 at Hotel Seashore Residency, Kodungallur on Dilemmas in management of dental infections in special population

20 CDH dental checkup camps and orientation class were conducted President Dr Laju Mahesh, Secretary Dr. Plato Palathingal and Hope Representative Dr Rajmohan participated in Preside 2019 held at Poovar Island, Trivandrum on 09/02/19.

Dentist Day celebrations was conducted in IMA Hall, Kodungallur along with the womens dental council installation on March 8th. All

the past presidents and secretaries of IDA kodungallur was appreciated with Ponnada.



► Chalakkudy Branch

MANTHASMITHAM 2019

Date: - 06/03/2019; Time: - 9.30 am

Venue: - Madona Special School Potta

Inauguration Of Dentist Day: - MLA Sri B D Devassy (Chief Guest)

Inauguration Of Year Planner: - Chairperson Jayanthi Praveen Kumar (Guest Of Honor)

Felicitation n Lamp Lighting: -

1) Municipal Councillor: - VJ Joji

2) Ward Councillor: - Varghese Varokky
Oral Health Awareness Talk President: - Dr George Sebastian Pullan
Year Planner Elaboration: - Dr Anjo Jimmy
Oral Health Screening: - 107 Students (treatment will be provided after 2 weeks for the screened)
No Of Kits Distributed: - 107
No Doctors Attended: - 17



► Wayanad

IDA wayanad branch formed a literary club at a function held at hotel Great Jubilee, Sulthan bathery on March 22, 2019. Renowned writer Mr Benniyamin was the chief guest. President Dr Sanoj P B and state Vice President Dr George falicitated the gathering.(pic.1)

IDA wayanad branch conducted a camp at Manimunda colony, a tribal hamlet 3 kilometers off Naikatty in the forest. Dr Bijoy, Dr Sanoj, Dr Shameer and Dr Basil attended the camp. (pic 2&3).



► Trivandrum Branch

Installation ceremony for the year 2019 of Dr. Ashok S. & team was held on 27th January 2019 at residency tower, Trivandrum. 185 members attended the programme. Dr. Joseph C.C president elect IDA Kerala State was the chief guest & famous actor Shanker Ramakrishnan was the guest of Honour. World Cancer Day Was celebrated on February 4th. Preside 2019 was hosted along with IDA Attingal branch at Isoladicocco on feb 9th and state executive was conducted at Hotel

Kingsway on feb 10th. WDC conducted a talk on “womens health from gynec perspective” by Dr. Veena Choodamani on feb 17 th.

A candle light vigil on the memory of our soldiers who gave their life on pulwama attack was held at martyr square palayam on feb 17th. A CDE on the topic medical emergencies and management of medically compromised by Dr. Eapen Thomas Was held on Feb 24th.



IDA Kerala State Branch International Dentists Day Celebration was hosted by IDA Trivandrum Branch at Kanakakunnu Palace Durbar Hall on March 6th Wednesday 2019. Dr. Shashi Tharoor was the chief Guest. In a special segment IDA Trivandrum Branch along With IDA KSB honoured there senior members Dr. K.G Nair, Dr. Balakrishnan Nair Dr. Thomas C Thelly during the segment titled IDA PRANAMAM. IDA Trivandrum JOBCELL was launched by IDA National Vice President Dr. Pratapkumar.K.N.

World Womens Day was conducted by Womens Dental Council of IDA Trivandrum Branch on March 8 Friday at Mental Health Centre Oolampara. Dr. Anita Balan Principal GDC, TVM, Dr. Jolly Mary Varghese JDME, Dr. Sagar Suprintendent MHC, Dr. Gibi paul WDC

President, Dr. Bindu V WDC Secretary presided over the programme. 10 Lady staff of MHC were felicitated for their Compassionate work. Clothes were distributed to 100 inmates.

Second CDE Programme on the topic CBCT in Dentistry was held on 27-03-2019 at PMS Dental College, Vattapara.

Free CDE programme on the topic Tips & Tricks in Pediatric Dentistry was held at IDA Hall Innu Apartments on 14-04-2019 by Dr. Gopu Hareendralal.

Autism Awareness day was observed on April Second in association with ERISHA speech language intervention.

IDA Samridhi Member privilege card Release and mothers day celebration was done during the COC meeting held on 12-05-2019.



► Nedumbassery Branch

Hosted state CDE programme along with IDA Kodungallore.
Observed Dentist Day -March 6th
Honored Dentists completed 25 years of Dental Practice on Dentist day
Conducted CDE On Endodontics with hands on for 95 participants

Observed World Oral Health Day
Conducted a screening camp at Aluva railway station.
Aluva MLA Anvar Sadath inaugurated the event.
Free dental clinic activity at Daivadan Center is continuing.



► Coastal Malabar Branch

INSTALLATION: Installation ceremony of IDA Coastal Malabar Branch 2019 was held on 30th December 2018 at Hotel K.K Residency Payyanur at 5.30pm. Dr Suresh Kumar G, (Hon Sec IDA Kerala State) was the chief guest and Dr Santhosh Sreedhar, (Past National Vice President IDA Head Office) was the Guest of Honor. Dr Ranjith Raveendran installed as the new president of IDA Coastal Malabar Branch. Vote of Thanks were delivered by Dr. Prabhath T Hon. Secretary IDA Coastal Malabar branch.

CDE PROGRAMS: The first CDE program of IDA coastal Malabar branch was held on 27/01/19 at Hotel K.K Residency Payyanur. Topic of the CDE was SIMPLIFIED PROSTHODONTICS, Faculty was Dr. Santosh Ravindran.

The second CDE program of IDA coastal Malabar branch in association with Indian Society of Periodontology Professional Enrichment program was held on 20/02/19 at Hotel K.K Residency Payyanur.

CDH ACTIVITIES: IDA Coastal Malabar Branch conducted CDH activities like dental checkup and treatment camps, awareness classes at various places like Snehabhavan old age home Cherupuzha on 01/01/19, at Madayi girls High School Payangadi on 23/01/19, at Madayi Boys High School Payangadi on 24/01/19, at Kanayi with Korom Girls High

School NSS unit on 26/01/19, with Janasakthi arts and sports club at Chathamath on 27/01/19, with Lions club of Perumba at Crescent English Medium School Thayineri Payyanur on 06/02/19, at Parappa HSS on 15/02/19 and at Snehalayam old age home at Ambalathara, Kanhangad on 17/02/19.

SPECIAL DAY OBSERVATIONS

1) Palliative Care Day Observation: IDA coastal Malabar branch observes Palliative Care Day by taking class for people who are interested in stopping tobacco using habit on 15/01/19. Dr Reshmi Jayakrishnan Assoc Prof, Dept Of Community Dentistry had taken the class.

2) World Cancer Day Observation: Observed by an Oral Cancer Awareness Exhibition at Pariyaram Dental College. Distribution of pamphlets on oral cancer awareness were done at various places.

CDH PROJECT: Launching of MUKTHI Tobacco Cessation Clinic The project MUKTHI, a Tobacco Cessation Clinic in association with Pain and Palliative Care Society, Payyanur was launched by IDA Coastal Malabar on 15/01/19. Monthly one session is planned for those who need scientific assistance in stopping tobacco use habit.

RELEASE OF NEWS LETTER: First issue of Monthly News Letter of IDA Coastal Malabar about the activities of branch has been released on February 20th.



CDE PROGRAMS: The third CDE program of IDA Coastal Malabar Branch was held on 03/03/19 at Hotel J.K Residency Cheruvathur. Topic of the CDE was SUCCESSFUL DENTAL PRACTICE, Faculty was Dr. Civy V Pulayath. The fourth CDE program of IDA Coastal Malabar was held on 06/03/19 at Hotel K.K Residency Payyanur. TOBACCO CESSATION INTERVENTION IN DENTAL OFFICE was the topic. The faculty of the program was Dr. Reshmi Haridas., Assoc Prof, Dept of Public Health Dentistry, Govt Dental College, Kannur. The Fifth CDE program was a State CDE program along with IDA Kasaragod branch. The topic was INTERCEPTIVE & MYOFUNCTIONAL ORTHOPEDICS. The faculty of the program was Dr. Joby Peter.

CDH ACTIVITIES: IDA Coastal Malabar Branch conducted CDH activities like dental checkup and treatment camps, awareness classes at various places like Kooleri LPS on 05/03/19, at ParakkadLP School Cherupuzha on 07/03/19, at Peralam UPSK Rivallur on 08/03/19, at Kanhangad with Prathibha Club on 21/03/19, at Snehabhavan and Y'S Nivas old age home on 07/04/19, with Nelli Boys Arts and Sports Club Chakkumukku, Kodakkad on 28/04/19. Charity programs were also carried out at CHC cheruvathur on 20/03/19, Snehabhavan old age home and Y'S Nivas old age home on 07/04/19.

SPECIAL DAY OBSERVATIONS

1) Dentist day: IDA coastal Malabar Branch observes Dentist

Day by conducting a CDE on 06/03/19 and inaugurating Cancer Care Project for members.

2) World Oral Health Day: IDA Coastal Malabar Branch observed World Oral Health Day with various programs like distribution of Medical Equipments to Secondary Palliative Care CHC cheruvathur, awareness talk at CHC Cheruvathur on 20/03/19. The program was held at Community Health Center Cheruvathur.

3) World Womens day: As part of International Women's Day observation, WDC, IDA Coastal Malabar conducted the following programs Self Defense Class for lady & student members of our branch, Female student members were felicitated by giving certificates, Dental Health Checkup Camp & Awareness Class

4) World Health Day: IDA Coastal Malabar Branch observed World Health Day by different programs on 6th and 7th April with various programs like Trekking tour with Tent Stay, CDH camps, Charity programs, Distribution of Sukritham Cancer Care Cards, Veteran football match at Thaliparambu

RELEASE OF NEWS LETTER AND JOURNAL

First issue of Journal MIRROR has been released on March 6th Dentist Day. In addition to that second and third issue of monthly News Letter of IDA Coastal Malabar Branch about the activities of branch has been released on March 3rd and April 28th respectively.



Kunnamkulam Branch

The First CDE of IDA Kunnamkulam was held on 22nd February 2019 at Hotel KR Residency, Kunnamkulam from 7.00PM to 10.15PM on Topic: "MEDICAL EMERGENCIES IN DENTAL OFFICE" by Dr. Vikas Elias Kuruvila (Prof. Dept. Of Oral & Maxillofacial Surgery, PSM College of Dental Science & Research, Akkikavu).

IDA Kunnamkulam conducted Second CDE On Topic: "DECODING MINOR ORAL SURGERY & MAXILLOFACIAL TRAUMA" At Hotel KR Residency Kunnamkulam on 17th March 2019 (Sunday) from 10.00 AM to 4.30 PM By Dr. SijiChiramel (Prof. & HOD, Dept. Of Dental & Maxillofacial Surgery, Amala Institute of Medical Science, Thrissur), DrJineeshNath & Dr. Deepak Kalathil

IDA Kunnamkulam conducted Webinar on topic "DILEMMA IN MANAGEMENT OF DENTAL INFECTION IN SPECIAL POPULATION" (CARDIAC, DIABETIC, PREGNANT & PEDIATRIC) At Hotel KR Residency Kunnamkulam on 23rd March from 7.55PM to 9.30 PM. Speakers: Dr. Krishna Raj Ganesh Narayan, Dr. ShaliniJoshy, Dr. Kumar NC & Dr. Susheela Rani. 22 Members attended.

IDA Kunnamkulam conducted Fourth CDE on 30th March 2019 at Hotel K R Residency, Kunnamkulam from 7.00 PM to 10.00 PM. The Class was conducted by National trainer JCI India Dr. Civy V Pulayath (HOD, Dept. of Public Health Dentistry, Malabar Dental College, Edappal) On Topic "DENTAL PRACTICE MANAGEMENT".

IDA Kunnamkulam conducted One Day Dental Clinic Assistant Training Programme on 31st March 2019 from 10.00 AM to 4.30 PM at Hotel KR Residency, Kunnamkulam by Dr. Civy V. Pulayath (HOD, Dept. Of Public Health Dentistry, Malabar Dental College, Edappal). 70 Dental Assistants participated.

TRI MONTHLY CDH REPORT – IDA KUNNAMKULAM

IDA-Kunnamkulam branch conducted a total of '13' CDH PROGRAMS screening almost 2500 registrations in its first 3 months. The programs were arranged systematically including dental screening, awareness class, teacher's training, parent awareness program, smile contest, dental quiz, good oral hygiene competition along with prize distribution and distribution of dental health kit covering all the sections of public such as Schools, Orphanages, Old age homes, Government

institutions, Charity run institutions, Clubs, General Public etc.

IDA –KKM took over two charitable institutions namely Thaqwa Banath Orphanage along with its other charity run firms and Sandheepini Mathru Sadanam. We had an overwhelming support from our members which contributed to the success of our events. IDA Kunnamkulam looks forward to play a very important role in spreading oral and dental health awareness and overall well being of the public through similar programs in the coming months.

Camp -1: Date: 03.02.2019; Venue: Thaqwa Orphanage, Anadathode; Total Screened: 100

Camp -2: Date: 06.02.2019; Venue: Kadavnad School, Ponnani. Celebrated Overall Cleanliness And Wellness Week; Total Screened: 400

Camp -3: Date: 07.02.2019; Venue: Cmlp School, Kunnamkulam; Total Screened: 100

Camp -4: Date: 12.02.2019; Venue: Mjd High School, Kunnamkulam; Total Screened: 380

Camp -5: Date: 15.02.2019; Venue: Government School, Manathala; Total Screened: 250

Camp -6: Date: 19.02.2019; Venue: Rpees Kids And Rp Junior School, Edakazhiyur; Total Screened: 350

Camp -7: Date: 26.02.2019; Venue: Rpmms School, Edakazhiyur; Total Screened: 496

Camp -8: Date: 03.03.2019; Venue: Amlp School, Palappetty; Total Screened: 60

Camp -9: Date: 05.03.2019; Venue: St. Mary's Lp School, Ethai; Total Screened: 43

Camp -10: Date: 06.03.2019; Venue: Bharath Matha Lp School, Thiruthikkad. Dentist's Day Celebration; Total Screened: 98

Camp -11: Date: 08.03.2019; Venue: Sandheepini Mathru Sadanam, Mammiyur. Women's Day Celebration; Total Screened: 22

Camp -12: Date: 20.03.2019; Venue: Pagal Veedu Porkulangad. World Oral Health Day Celebration; Total Screened: 50

Camp -13: Date: 28.03.2019; Venue: St. Thomas Lp School, Arthar; Total Screened: 100



Kottarakkara Branch

1. Observed candle light vigil to pay tribute to the brave martyrs of Pulwama on 16th February 2019.

2. Dentist day celebration at Kanakakunnu Trivandrum on 6th March

3. CDE on MANAGING THE CHALLENGES IN PROSTHODONTIC REHABILITATION by Dr Dinesh N on 31st March 2019.



► Kunnamkulam Branch

IDA Kunnamkulam is happy to say that till date we have conducted 3 Executive Meetings, 2 Emergency Meetings, Meeting to Show Unity with State IDA, 16 CDH activities and 9 CDEs.

In the 2nd trimester, IDA Kunnamkulam conducted 1 Executive Meeting, 3 CDH activities, 4 CDEs and a meeting on National Strike day by Doctors.

Meet on Strike Day

On 17th June IDA Kunnamkulam stood strongly with State IDAs stand to strike by closing all the clinics of its members. Also held a Dharna in Kunnamkulam centre.

A. CDH Activities

IDA-Kunnamkulam branch conducted a total of '16' CDH PROGRAMS so far screening almost 2800 registrations.

CAMP -14

DATE: 20.04.2019; Venue: Karakkadu, Machingal Padi, Guruvayur; Total Screened: 92

EVENT -15

DATE: 31.05.2019; VENUE: Anti Tobacco Day Celebration, At PSM Dental College.

PROGRAMS CONDUCTED: All Kerala E-Poster Competition And Awareness Class

CAMP -16

DATE: 05.07.2019

VENUE: San Jos Public School, Pavaratty

TOTAL SCREENED: 176

CDE Activities

6th CDE PROGRAMME

TOPIC :IDA HOPE - Safeguard Yourself & Your Practice

IDA Kunnamkulam conducted Half Day CDE on 26th April 2019 at

Hotel K R Residency, Kunnamkulam from 7.00 PM to 10.00 PM. The Class was conducted by Dr. Anvar M Ali (Hon.Secretary IDA HOPE, Kerala State Branch) & Dr. Deebe J. Mathew (Vice Chairman, Legal cell Kerala State Branch) On Topic "IDA HOPE - Safeguard Yourself & Your Practice. 39 participants attended.

7th CDE PROGRAMME (Inter Branch)

TOPIC : Hemophilia & Other Bleeding Disorders

IDA Kunnamkulam conducted Half Day INTER BRANCH CDE on 17th May 2019 at Hotel K R Residency, Kunnamkulam from 7.00 PM to 10.00 PM on Topic :Hemophilia & Other Bleeding Disorders..37 participants were attended. The Programme was informative and interesting.

8th CDE PROGRAMME

TOPIC: Soft Skills in Dentistry & Role of Dentist in Tobacco Cessation

On occasion of 'No Tobacco Day' on May 31st 2019, IDA Kunnamkulam along with PSM College Of Dental Science & Research, Akkikavu had organized a Half Day CDE programme from 10AM to 1PM for Dentists, PG Students & UG Students dental undergraduate students.. Prizes were given to the winners of All Kerala Inter dental College E poster competition conducted to raise the awareness about harmful effects of tobacco. Number of participants attended : 107.

9TH CDE PROGRAMME (Inter Branch)

TOPIC: Periodontics in General Practice

IDA Kunnamkulam conducted Half Day INTER BRANCH CDE on 18th June 2019 at Hotel K R Residency, Kunnamkulam from 7.00 PM to 10.00 PM on Topic : PERIODONTICS IN GENERAL PRACTICE. The Programme was informative and interesting. Number of participants attended : 32.



► Kochi Branch

Monthly meeting of IDA Kochi was held on 31/5/19 at 7-30 pm in IMA house and speaker was Dr Prashanth Pillai, maxillofacial oral Surgeon, on Strategic Immediate load dental implants.

26.April.2019: IDA Kochi conducted its 4th monthly meeting at, IMA House, Kochi. Speaker: Dr Anup Warrier

Topic: 'infectious diseases and infection control, what a dentist should know* The Jersey of foot ball team of IDA Kochi which was participating in all Kerala Level was unveiled. E journal of JIDAK was launched and hard copy was released.

29.March.2019: 3rd Monthly Meeting

Held at Holiday Inn, Grand Ball Room, 7-30 pm. It started with a scientific session by Dr Tanya Thomas MDS (OMFS) on "Amoxicillin-Clavulanate in Dental Infections". Meeting was blessed with the presence of Special Chief Guest, Dr Abhay Kolte, immediate past president of IDA Maharashtra State and Current Hon Secretary of Indian Society of Periodontology. Meeting was followed by Cultural activities of IDA Kochi members



► Tripunithura Branch

TRI MONTHLY REPORTS APRIL 2019 TO JUNE 2019

1. MAINTAINENCE OF OFFICE

Conducted one executive committee meeting.
minutes copy...

2. MEMBERSHIP

12 new members have joined IDA Tripunithura 2019, till this date.

3. MEETINGS

Conducted 3rd executive meeting at Lovedale club, Udayamperoor, Tripunithura

4. CDE ACTIVITIES

IDA Tripunithura was co-host to conduct 1st state FREE CDE (3rd state CDE), on May 19th at Kochi PWD rest house, Kalamassery
“MEET THE MASTERS”

AN UPDATE ON ORAL SURGERY FOR GENERAL PRACTITIONERS

On, May 19th, the faculties were

- Dr George Paul ▪ Dr Varghese Mani
- Dr Sherry Peter ▪ Dr Aju Oommen
- Dr Eapen Thomas

It was a full day programme which included, lectures, demo and CDE was attended by more than 300 members.

2nd Tripunithura branch CDE was conducted by CDE wing and in association with WDC Tripunithura, this was a complete FREE CDE on Pedodontics (PEDOSCOPE)

“PEDOSCOPE”

A kaleidoscope of Pediatric dentistry

Faculties where ▪ Dr Kavitha Vijit MDS ▪ Dr Krishna Kumar MDS
▪ Dr Dileep Menon MDS

It was a full day program on 23/6/2019 from 9.30am to 4.30pm at hotel Hill Palace Irumpanam, Tripunithura.

The CDE had lectures, demos on various aspects in Pediatric dentistry, the CDE had more than 56 participants.

5. CDH ACTIVITIES

REPORT FOR CDH ACTIVITIES

APRIL 2019 TO JUNE 2019

Thripunithura branch

13. On, 31/3/2019

Conducted a dental treatment camp at St Marys Church, Nedyasala
71 patients were screened and 14 pts treated

14. DENTAL TREATMENT CAMP, for rural area [kunjithanni]

15. 28-4-19

Village camp at Thiruvaniyur, around 100 pts. were screened and oral hygiene kits were distributed

16. 12-5-19

Residence association dental screening camp, Tripunithura

Around 97 pts were screened and for treatments referred to nearby clinics

17. 31-5-2019 NO TOBACCO DAY

IDA Tripunithura members did awareness talk, did a bike rally in and around Tripunithura for 10kms, did talks at various spots where public were there, more than 15 members participated rally holding placards.

18. 2-5-19

Public Screening camp at Thiruvankulam.

Around 77 pts. were screened and oral hygiene kits were distributed

19. WORLD ENVIRONMENT DAY

5TH JUNE 2019

World environment day was celebrated by IDA Tripunithura in association with WDC Tripunithura

50 saplings were distributed free of cost to the members.

A competition was done to take a selfie with the sapling and the best selfie were given away with gifts.

20. “THE INNOCENT SMILES”

The innocent smiles a school dental health programme, plan for reaching 10,000 students in 3 months. Spreading the message of oral health through health education

Screening and referring them to the nearby clinics

Phase I: Bhavans public school, Eroor (10/6/2019 - 15/6/2019)

PHASE II: Chinmaya Vidyapeet, Tripunithura (17/6/2019 - 26/6/2019)

21. 17/6/2019 PROTEST DAY

Doctors practicing in and around tripunithura didn't open their clinics as a mark of protest against brutal attack against doctors in West Bengal. Ida members did a candle light protest in statue in Tripunithura.

22. 30/6/2019 Dental checkup camp and oral cancer awareness talk at Kumbalam, RPM High school.

Oral cancer awareness talk was done by Dr Krishna Kumar and around 60 members were screened and oral hygiene kits were distributed. The camp was conducted along with WDC Tripunithura.

STATE EVENTS HOSTED:

IDA Tripunithura, along with 2 other local branches hosted a state CDE (1st FREE CDE)

Topic on oral surgery, MEET THE MASTERS, the CDE was attended by more than 300 members.

OTHER BRANCH ACTIVITIES

- No tobacco day May 31st • World environment day June 5th
- Protest day June 17th • Sneha Sangamam June 1st

Conducted a family meeting, to celebrate vishu, easter, eid celebrations, the meeting had a theme as SNEHA SANGAMAM, the get together was attended by more than 80 members. The meeting had games, karaoke with live band, and sumptuous dinner.

REACHING TO IDA MASSES

- o NO TOBACCO DAY o PROTEST DAY

WDC ACTIVITIES

- WORLD ENVIRONMENT DAY
- PEDOSCOPE FREE CDE ON PEDODONTICS
- DENTAL CAMP AND ORAL AWARENESS CLASS

NEW PROJECTS.

“THE INNOCENT SMILES”

The innocent smiles a school dental health programme, plan for reaching 10,000 students in 3 months. Spreading the message of oral health through health education

Screening and referring them to the nearby clinics

Phase i: Bhavans public school, Eroor (10/6/2019 - 15/6/2019)

Phase ii: Chinmaya Vidyapeet, Tripunithura (17/6/2019 - 26/6/2019)

