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Chair person's Message

I feel extremely happy to address you through this edition of the international journal of Women's Dental Council, Kerala state.

The awareness among women dentists about the need of this subcommittee is evident as many IDA branches are coming forward to start WDCs in their respective branches. IDA Palghat has started women's dental council and IDA Tripunithura is inaugurating its WDC on the 14th of June.

Social and scientific activities and women oriented programs as well as creating camaraderie among women dentists of Kerala are the prime motives of The WDC Kerala state. We have been successful in conducting though few, quality programs in the past. Resources and (wo)man power are our major challenges. I request all the branches to initiate their WDC activities and give women an opportunity to come to the fore front of IDA activities as the number of women dentists active in association activities are still very few in number. As the number of women opting Dentistry as a profession is rising, initiating woman dentists into association activities becomes the need of the association in the long run.

We have been successful in bringing out this journal as a part of our scientific activities for 3 years. I thank Dr. Rethy Ravindran, Editor and Dr. Shoma Anil, Secretary, WDC, Kerala State for their tireless efforts.

I thank all the women dentists who have contributed to our activities and request all women dentists to be a part of our programs.

Thanking you

Wishing this Journal all success

Dr. Anjana G

Prof & HOD, Department of Pedodontics and Preventive Dentistry
Royal Dental College, Iron Hills, Chalissery, Palghat, Pin:679536



Secretary's Message

Dear Colleague,

SMILE is said to be the first alphabet in Public Relations. And a big SMILE will of course enhance the charm and charisma of the face.

It's my privilege to address you all in the third volume of IJWDC. With its features on clinical practice, research and latest trends in dentistry, let this journal serve as an essential aid for improving the range of applications in clinical practice.

Regards,

Dr Shoma Anil

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Age estimation using mandibular first molar from orthopantomographs

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ABSTRACT

OBJECTIVE : To estimate the age using tooth coronal index from orthopantomograph of mandibular first molars and correlate the estimated age with chronological age of that individual.

MATERIALS AND METHODS : Orthopantomographs for 80 subjects with known age were taken. They were divided into study subset [60] to find regression equation to calculate age and test subset [20] to test the accuracy of the formula.

RESULTS : A statistically significant correlation was obtained between chronological age and Tooth Coronal Index (TCI) [$p = < 0.01$]. Correlation coefficient [$r = - 0.869$] between TCI and age indicated that they were linearly related to each other. Coefficient of determination ($r^2 = 0.754$) for the regression equation proved TCI as a strong predictor of age.

CONCLUSION : Coronal pulp cavity index is a reliable biomarker for age assessment in the forensic context, especially in living individuals of unknown personal data.

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Introduction

Forensic dentistry is defined as application of dental knowledge in the investigation of crime and administration of justice. In cases of mass disasters or individual corpses where the identity of the deceased is unknown, age and gender identification is of utmost importance.¹

Of all the methods used for chronological age determination, the odontological methods are considered to be the most precise.² Teeth is an indestructible part of the body with the least turnover of natural structure that remains relatively unchanged even after thousands of years.^{3,7-9} It is not affected by hormones, nutritional effects or environmental variations.³

The various methods of age estimation on the basis of

teeth are modification of coronal pulp cavity, attrition¹³, root dentin transparency¹², cementum annulations^{10,11}, counting of cross-striations and Striae of Retzius and aspartic acid racemization^{14,4}.

Bodecker in 1925 found that the apposition of secondary dentine is related to chronological age. Secondary dentin is continuously deposited in layers by odontoblasts lining the pulp chamber. Routine non-invasive radiographic techniques are used to measure the amount of secondary dentin deposited seen as a reduction in size of pulp cavity.⁴

Ikeda et al. (1985) computed the coronal index of premolars and molars and regressed on the actual age of the individuals to obtain equations that allow estimation of age. Using these equations, the age of the unknown was calculated by Drusini in 1993.⁴

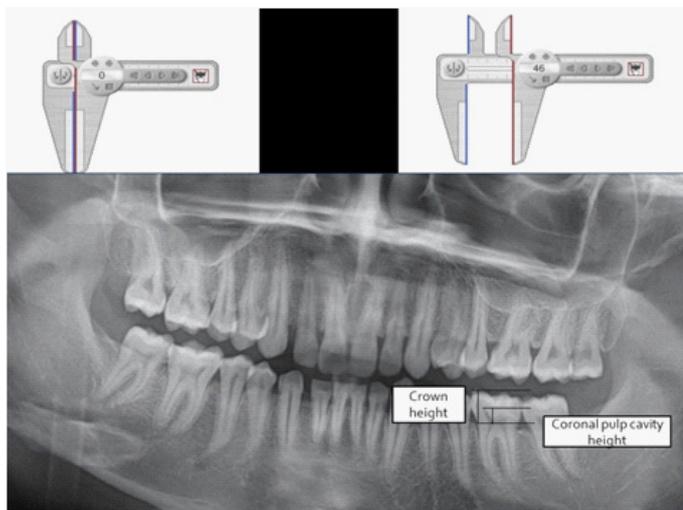


Figure 1

The aim of this study was to estimate the age of an individual by measuring the reduction in size of pulp cavity of permanent mandibular first molar using orthopantomographs.

Materials and methods

80 pantomographs with known age, taken as a part of routine treatment, were collected from patients coming to Azeezia College of Dental Sciences and Research, Kollam.

Inclusion Criteria

1. OPGs were selected from patients aged between 15-54 years.
2. The index tooth, mandibular first molar, must show good morphological features.

Exclusion Criteria

1. Teeth that have undergone root canal treatment, radiopaque fillings and full crown are excluded from study.
2. Impacted teeth, teeth with any periapical pathology, attrition or caries are also not included.

Methods

The subjects were divided into a study subset [60] and test subset [20] and were distributed into 4 age groups constituting 15 subjects per group. Tooth coronal index was used to standardize tooth size based on the formula;

$$TCI = \text{Coronal pulp cavity height} \times 100 / \text{crown height}$$

Cervical line was used as a reference point for measuring crown height and coronal pulp cavity. This was to ensure

Table 1

Pearson correlation	r{correlation coefficient}	r ²	Adjusted r ²	Sig [t]
value	-0.869	0.754	0.750	0.000

Table 2

Age group	TCI value -combined
15-24 years	44.4
25-34 years	38
35-44 years	32.4
45- 54 years	27.4

Table 3

AGE GROUP	TCI IN FEMALES	TCI IN MALES
15-24 years	43.7	45.2
25-34 years	38.4	37.7
35-44 years	31.7	32.7
45- 54 years	25.9	28.9

the accuracy and the reproducibility of the technique. Crown height was measured vertically from cervical line to tip of highest cusp; while coronal pulp cavity height was measured vertically from cervical line to tip of highest pulp horn. Measurements were recorded by using a digital vernier caliper (Figure 1).

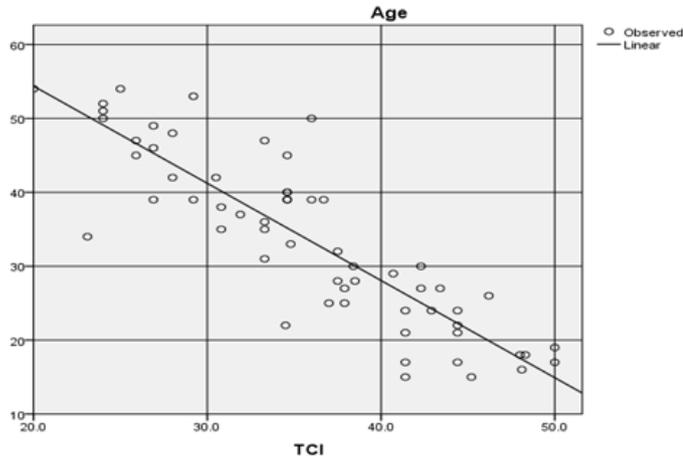
Results

Pearson’s correlation was used to compare chronological age and Tooth Coronal Index (TCI) and p value was found to be < 0.01 (Table 1). It was thus concluded that there was a statistically significant correlation between the two. Correlation coefficient [r] between TCI and age was found to be - 0.869, which indicated that both are linearly related to each other.

Regression analysis was done on TCI and a formula was derived to estimate the age. The formula obtained was:

$$AGE = [-1.315 \times TCI] + 80.79$$

The regression equation showed coefficient of



Graph 1

determination (r^2) as 0.754 which proved TCI as a strong predictor of age (Graph 1).

- The regression equation was applied on the test subset, using Pearson correlation and t test, to test its accuracy. A correlation existed between age and TCI value in test sample and no significant difference in estimated age and chronological age was found in the first three groups (Table 2).

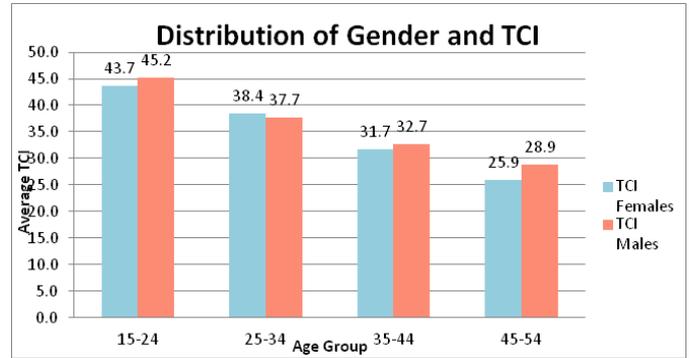
- ♦ Chi square analysis was done to correlate age and TCI in both genders. The entire sample was distributed into 4 different age groups – 15-24, 25-34, 35-44 and 45-54 years. A p value of 0.680 was obtained which showed no significant difference between correlation of age and TCI in males and females (Table 3, Graph 2).

Discussion

Tooth, being the strongest structure in the human body can withstand great variations in environment. It is therefore useful as evidence in establishing the identity of dead, decomposed or burned individuals.

Among the various methods of age estimation, the radiographic method has gained acceptance because of certain advantages. It is a simple, quick, economic and non-invasive method of age identification that can be used in living as well as dead persons.

The various radiographic images that can be used in age identification are intraoral periapical radiographs, lateral oblique radiographs, cephalometric radiographs, panoramic radiographs, digital imaging and advanced imaging technologies.⁵



Graph 2

Since radiographic age estimation after the eruption of 3rd molars becomes difficult, other methods such as pulp-to-tooth ratio method by Kvaal and coronal pulp cavity index helps in assessment of the volume of teeth.⁵

The coronal pulp cavity index correlates the reduction of the coronal pulp cavity to the chronological age in mandibular premolars and molars³. The length of the tooth crown and the length of the coronal pulp cavity are measured to calculate the reduction of pulp chamber. As age advances, secondary dentin gets deposited on the roof and floor of the pulp cavity, reducing its height.⁶

In our study, panoramic radiographs were used to estimate tooth coronal index from mandibular first molars. On statistical analysis, the p value was found to be < 0.01 (Table 1) which showed a significant correlation between chronological age and TCI. The correlation coefficient 'r' was found to be 0.869 which indicated that the estimated age was a linear function of the chronological age.

Drusini et al. in a similar study, found that the correlations were significant especially in males ($r = 0.92$).⁴

In a study conducted by Mathew et al. in mandibular first molars using 88 orthopantomographs, a significant correlation was found between the actual age and the calculated age. However, a negative correlation was obtained between pulp chamber crown root trunk height ratio and chronological age.⁶

We also analysed the effect of gender on age estimation and found that there was no significant difference between the two.

Conclusion

In our study, the estimation of the age of an individual by measuring the reduction in size of pulp cavity was found to be fairly accurate. We have therefore come to a conclusion that the coronal pulp cavity index is a reliable biomarker for age assessment in living individuals for human biology studies and also in archaeological specimens.

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Tissue engineering and stem cells in dentistry: an orthodontic perspective

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ABSTRACT

Tissue engineering is one of the most widely explored areas of research in the field of biology and biosciences. The results of these researches have spilled into the field of dentistry as well and along with stem cells, it is the most promising technique or method in regenerative medicine. In this article, we intend to look at the various conditions in dentistry where application of tissue engineering and stem cells have proven to be effective. We also intend to throw light on research done, extending these techniques to the field of orthodontics.

Keywords: Tissue engineering, stem cells, dentistry, orthodontics

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Introduction

There has been an explosive evolution in research and development in dentistry in the field of tissue engineering, over the last decade. The psychosocial consequence as well as the physiological and psychological challenges posed by any tissue loss in the craniofacial region, be it due to trauma, disease or congenital abnormalities are immense and serious. Therein lies the need to aesthetically reconstruct these areas, with as less loss of function as possible, to the affected patients.

Cleft palate is one craniofacial defect that can pose a problem to orthodontic therapy¹, in that the presence of an alveolar cleft impedes or rather limits tooth movement in the area adjoining the cleft. The gold standard treatment modality in this condition – secondary alveolar bone graft^{2,3,4,5} – although considered to be clinically effective

and efficient, is also associated with high cost, need of general anesthesia, need for orthopedic surgeon in case of harvesting from a distant site and morbidity.

Tissue engineering provides a very promising option for obtaining tissue for craniofacial defects without many of the related complications⁶. Of the lot, stem cell biology is a field which holds much promise. Here, we attempt to give a better understanding on stem cell biology and the essentials required in its procurement. We also look at the significant advances in tissue engineering, from an orthodontic viewpoint.

Tissue Engineering

Tissue Engineering is the study of the growth of new connective tissues, or organs, from cells and a collagenous scaffold to produce a fully functional organ for

implantation back into the donor host. Tissue engineering frequently involves stem cells, a kind of premature cell first isolated from the body in 1992; implanting stem cells in the appropriate location can generate everything from bone to tendon to cartilage. Broadly, tissue engineering techniques may be divided into three:

Cell Injection therapy- Since the tissue formation results from cellular action, Injection of inherently intelligent cells, stem cells in particular, into the defect have been suggested to regenerate tissues. Historically, this technique has proven challenging as the injected cells seldom were retained at the site of injection or were attacked by the host immune system^{7,8}. However, development of a delivery vehicle to carry and deliver the cells has shown promising results⁹. Stem cells are ideal for this technique.

Cell Induction Therapy: This involves the introduction of exogenous growth factors, locally, to modulate the cell behavior. Examples include fibroblast growth factors¹⁰, transforming growth factors¹¹, vascular endothelial growth factors¹² and bone morphogenic protein¹³. Disadvantages associated with this method involved the expense of purification and the difficulty in developing a suitable carrier for delivery¹⁴.

Cells seeded scaffolds : This is the newest and so far most effective method of tissue engineering. This involves collection of stem cells from the subject directly by way of a biopsy and subsequent isolation of appropriate cell population. This most commonly involves Mesenchymal Stem Cells (MSCs) and its potent immunomodulatory and anti-inflammatory properties when isolated from human oral mucosa or gingiva is a marked advantage in therapies for wound repair and inflammation related diseases.

Stem cells:

The term stem cell means “undifferentiated cells with the capacity for self renewal and the ability to produce one highly differentiated progenitor”. The two major features of stem cells are:

1. They have self renewal capacity and
2. While multiplying, they may either remain with the features of a stem cell or may differentiate into a wide range of other cell types.

There are basically two types of stem cells:

- (1) Embryonic stem cells
- (2) Adult stem cells

Embryonic stem cells as their name suggests, are derived from embryos. Specifically, embryonic stem cells are

derived from embryos that develop from eggs that have been fertilized in vitro—in an invitro fertilization clinic, and then donated for research purposes with informed consent of the donors. They are not derived from the eggs fertilized in a woman’s body.

Stem cells are derived from eggs that have been fertilized in vitro. The embryos from which human embryonic stem cells are derived are typically four or five days old and are a hollow microscopic ball of cells called the blastocyst. The blastocyst includes three structures: the trophoblast, which is the layer of cells that surrounds the blastocyst; the blastocoel, which is the hollow cavity inside the blastocyst; and the inner cell mass, which is a group of approximately 30 cells at one end of the blastocoel. These are the cultured undifferentiated stem cells, which are capable of differentiating into specialized cells like blood cells, neural cells, muscle cells, etc^{15,16}.

Adult stem cells are undifferentiated cells found among differentiated cells of a specific tissue or organ. These stem cells can renew themselves and can differentiate to yield the major specialized cell types of the tissue or organ. They are mostly multipotent cells. The primary roles of adult stem cells in a living organism are to maintain and repair the tissue in which they are found¹⁷. The origin of adult stem cells in mature tissues is unknown. E.g., hematopoietic stem cells, bone marrow stromal cells, neural stem cells, skin stem cells that occur in the basal layer of the epidermis and at the base of hair follicles.

Embryonic stem cells	
Advantages	Disadvantages
They are flexible.	It is hard to control its growth.
They are easily available.	It is ethically controversial to use human embryos
	It is rejected by the immune system of the human body

Adult Stem Cells

Advantages	Disadvantages
They are immune to immunological attack	They are very scarce in nature because all types have not been found yet
They are partly specialized	They are vanishing in nature, as they don’t live long
They are flexible in their nature as they may form other types of tissues	They are very rare

All stem cells, regardless of their source, have three general properties, which make them different from other cells in the body:

(1) They are capable of dividing and renewing themselves for long periods:

Unlike muscle cells, blood cells, or nerve cells – which normally do not replicate themselves – stem cells may replicate many times, called proliferation. A starting population of stem cells that proliferates for many months in the laboratory can yield millions of cells. If the resulting cells continue to be unspecialized, like the parent stem cells, the cells are said to be capable of long-term self renewal.

(2) They are unspecialized:

One of the fundamental properties of a stem cell is that it does not have any tissue-specific structures that allow it to perform specialized functions. However, unspecialized stem cells can give rise to specialized cells, including heart muscle cells, blood cells, or nerve cells.

(3) They can give rise to specialized cell types:

When unspecialized stem cells give rise to specialized cells, the process is called differentiation. Scientists are just beginning to understand the signals inside and outside cells that trigger stem cell differentiation.

Sources Of Adult Stem Cells

The oral and maxillofacial region provides sources of stem cells from the following region:

- Stem cells in the dental follicle
- Stem cells in the dental pulp
- Stem cells from human exfoliated deciduous teeth
- Stem cells in the periodontium
- Stem cells from the Apical Papilla

Clinical Applications of Stem Cells in Dentistry

1. In continued root formation/ Stem cell mediated root regeneration

There has been research aimed at using human stem cells from apical papilla (SCAP)¹⁸ and periodontal ligament cells to generate a root – periodontal ligament complex that can support a porcelain crown and be implanted at a site with missing tooth. This type of root has been termed a “bioroot” and along with the associated periodontal ligaments, has

been postulated to maintain the physiological function of tooth. Such a Bioroot complex may be built using post natal stem cells, especially the stem cells from apical papilla and periodontal ligament stem cells.

Stem cell-mediated root – regeneration offers opportunities to regenerate a bioroot and its associated periodontal tissues, which are necessary for maintaining the physiological function of teeth. A bio-root periodontal complex can be built up by postnatal stem cells including stem cells from root apical papilla (SCAP) and PDLSCs, to which an artificial porcelain crown can be [13] affixed. In a study conducted by Wataru Sonoyama et al (2006), using a minipig model, both human SCAP and periodontal ligament stem cells (PDLs) were transplanted to generate a root/periodontal ligament complex capable of supporting a porcelain [2] crown. Further research is needed to support the role of stem cells from apical papilla in continued root formation.

2. In pulp healing and regeneration

Apexification has long been the only treatment option to treat young permanent teeth that had become non vital or associated with apical periodontitis and sinus tract formation or had undergone total pulpal necrosis. Iwaya et al and Banchs and Trope¹⁹ have successfully used dental pulp stem cells to not only revascularise any pulpal tissue, but also induce physiological root formation, at the laboratory level.

3. In reimplantation and Transplantation

Reimplantation and Transplantation are occasional treatment options exercised in rare traumatic condition resulting in complete avulsion of teeth. Although these techniques have been in use for long, the expected success rate is very low and always results in either ankylosis of the tooth or eventual falling off. The introduction of stem cells during the procedure has been showing promising results, with revascularization and new periodontal ligament attachment²¹. The revascularization takes between 10 to 30 days and can potentially extend throughout the pulpal space²⁰. There have also been reports of growth of periodontal ligaments and bone into the pulpal cavity in studies conducted by Andreasen et al and King et al.

4. Pulp/dentin tissue engineering and Regeneration

Mooney’s group was the first to test Dental pulp tissue engineering. They were successful in culturing pulp cells in vitro, on polyglycolic acid²². Pulp cells thus cultured were shown to have high cell density as in native pulp,

by Bohl et al. Production of extracellular matrix and neo-vascularization were also noted *in vivo* in studies conducted by Burma et al. Dental pulp stem cell isolation and characterization has been drawing much interest from researchers since then, especially in the field of pulpal regeneration.

5. Regenerating human periodontal Ligament

Stem cell populations in periodontal ligament was first reported by Seo et al²³. These native cells have the capacity to generate periodontal ligament and cementum, when the need arises and the conditions are favourable. Hasegawa et al²⁴ used mesenchymal stem cells to treat periodontal defects. In their study, experimentally created class III periodontal defects were treated with bone marrow derived mesenchymal stem cells and four weeks after transplantation, the bone defects were almost regenerated with periodontal tissue. All normal cell types were seen in the newly formed bone matrix.

6. Direct orthotopic transplantation into segmental defects

In animal models, investigators have developed a number of segmental defects, namely in mice, dogs and sheep. Ceramic blocks loaded with bone marrow derived stem cells were introduced into long bone defects in sheep and these were found to completely heal over a short time. Similarly, *ex vivo* expanded BMSCs in collagen sponges were used to fill critical size defect in the cranium of dogs and these defects too healed completely with no complications. The newly formed bone was found to integrate into the margin of the defect²⁵.

7. Alveolar ridge augmentation

Over the years, standard practice of alveolar ridge augmentation involved use of autologous or allogenic bone graft. These were modified with ceramics, growth factors and other modifiers to improve mechanical properties of the newly formed bone and rate of uptake of the graft material. These techniques have provided only variable outcomes, as per literature. However, use of bone marrow stem cells in conjunction with Hydroxyapatite grafts has shown remarkable promise in reconstruction of alveolar bone along predictable lines. This greatly enhances the ability of older patients to wear dentures and also prevent tooth loss in patients, due to bone destruction^{22,26}

8. Vascularized bone grafts

Vascularised bonegrafts are the latest in a series of newer materials in reconstructive therapy that helps to provide early, predictable graft uptake at recipient sites. These

have been developed by growing bone marrow derived stem cells in collagen sponges, which are then wrapped around an artery or vein. They are then wrapped in Teflon (Dupont) so that there is no in growth of blood vessels from the outside. The sponges, over a period of several weeks are converted into bone rudiments and are seen to be fully perfused by blood vessels. They can then be moved to a recipient site and reattached to existing blood vessels in the recipient site.²⁷

9. Tissue engineering of temporomandibular joint

Alhadlaq and Mao in 2003 used tissue engineering utilizing mesenchymal stem cells from tibial and femoral bone marrow of adult rats in an osteogenic culture medium, separately. After 4 weeks of *in vivo* implantation, the tissue engineered joint condyles were seen to have the dimensions of the cadaver human mandibular condyle and retained them.²⁸

10. Re-growing dental enamel

The fact that dental enamel does not regenerate is the reason for a lot of problems related to tooth wear. However, recent research has shown that dental epithelial cells and dental pulp stem cells seeded onto collagen sponge scaffolds are capable of producing dental enamel. The prepared scaffold was transferred to the abdominal cavity of rat for a period of 4 weeks. The remnant of the scaffold was found to contain hard tissue comparable in structure to dental enamel at the time of retrieval.²⁹ This is a major breakthrough in the field of regenerative dentistry and has the potential to bring about a paradigm shift in the field of restorative dentistry.

Tissue Engineering and Orthodontic Treatment

The “pressure-tension theory” associated with OTM states that the application of physiologic force, including compressional and tensional changes to the periodontal ligament (PDL), will activate mesenchymal stem cells. The PDL progenitor cells that experience force will differentiate into compression-associated osteoclasts and tension-associated osteoblasts, causing bone resorption and apposition, respectively³⁰ The multipotent mesenchymal stem cells begin their differentiation within hours of orthodontic force application.^{30,31}

Tissue engineering in orthodontics has been limited, to a large extent, to the use of various tissue modified graft materials for the closure of osseous defects in areas of orthodontic tooth movement. The various materials used include hydroxyapatite, β -tricalcium-phosphate, PGLA/

gelatin sponges with BMP 2, bovine bone graft materials, and bioglasses. Allografts in combination with different materials, such as bioglass or enamel matrix derivatives, have also been demonstrated to achieve augmentation of alveolar defects before tooth movement into the area. A collagen bovine bone mineral (bio-Oss) has also been used for augmenting periodontal defects with a subsequent successful orthodontic tooth movement.

Another area where tissue engineering, related to orthodontics, has shown potential is the closure of alveolar cleft defects. There are at least two case reports of accomplished orthodontic tooth movement into tissue-engineered bone where there have been alveolar cleft defects treated with a synthetic alloplast or hydroxyapatite. Here, Tissue engineering principles have been applicable in the craniofacial area, with the potentiality for normal function that could work in conjunction with orthodontic treatment. Although any of these new technologies need time to mature, we can predict that postnatal or adult stem cells can be manipulated to regenerate the same structures in adults.

Conclusion

Although many challenges remain, stemcell-based tissue engineering of teeth could be a choice for the replacement of missing teeth in the future. Developments in dental stem cell research are taking place in such a way that they are beyond our expectation at present. However, it is a long journey, there are certain milestones to be passed and need to surmount obstacles encounter in the way before the use of stem cells in a clinical setting to transform dentistry as we know it, and even revolutionize contemporary dentistry. Along with technical aspects, various other issues like social, political, ethical, and religious viewpoints need to be addressed in the scientific and clinical use of stem cells. Dental precursor cells are attractive for novel approaches to treat diseases like periodontitis, dental caries or to improve dental pulp healing and the regeneration of craniofacial bone and teeth. Further, dental stem cells can be utilized to regenerate different tissues like nerve and bone. Even though most of these modalities are still in infancy, it is evident that the 21st century dentist is going to play a critical role in the field of medicine.

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Dermatoglyphics in Oral Cancer -A Brief Review

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ABSTRACT

Study of the patterns of the epidermal ridges of finger, palm, and sole can serve as an aid to the diagnosis of many diseases particularly those caused by chromosomal aberration. In early pregnancy an intrauterine growth disturbance affecting the extremities, will be accompanied by abnormal dermatoglyphics. Several studies have shown association between dermatoglyphics and different types of cancer. It is suggested that many genes which take part in the control of finger and palmar dermatoglyphic development can also give indication to the development of premalignancy and malignancy. The field of dermatoglyphics holds promising results for determining the genetic susceptibility of individuals to develop SCC.

Key words: Dermatoglyphics, Palmar pattern, Triradius

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Introduction

Dermatoglyphics are the dermal ridge configuration on the digits, palms and soles. They are genetically determined and influenced by environmental forces that are operating before birth. Several studies have shown association between dermatoglyphics and different types of cancer. In 1936, Dr. Harold Cummins, examined several children with Down's syndrome (trisomy 21) and found consistent dermatoglyphic changes that were absent among controls¹. Dermatoglyphic studies have been done on other syndromes like Turners syndrome, Klinefelters syndrome, Rubinstein Taybi syndrome, etc. Early diagnosis of Diabetes Mellitus, Schizophrenia, hypertension, Breast cancer, obsessive compulsive disorders etc can now be aided by dermatoglyphic analysis.²

The word "Dermatoglyphics" is derived from the Greek word 'Derma' (skin) and 'Glyphic' (carvings). The term dermatoglyphics coined by Cummins and Midlo (1926)³.

In humans, dermatoglyphics are present on fingers, palms, soles and toes. The dermal ridge are formed by the 6th weeks of gestation and they reach maximum size between 12th and 13th weeks. So the normal or abnormal genetic message contained in the genome is deciphered during this period and is also reflected by dermatoglyphics. Dermatoglyphic patterns are constant during life and sometimes it may play a significant role in diagnosis of many disorders with genetic background.⁴

Various epidemiological and experimental evidence indicates a causal relationship in between tobacco or betel nut chewing habit and few potentially malignant disorders and OSCC, but only fraction of people exposed to these agents develop lesions. Genetically determined differences among this individual would explain the difference in susceptibility⁵. Since epidermal ridge patterns form early in fetal development and remain unchanged throughout life^{6,7}. Unusual dermatoglyphics may indicate gene or chromosomal abnormalities consistent with

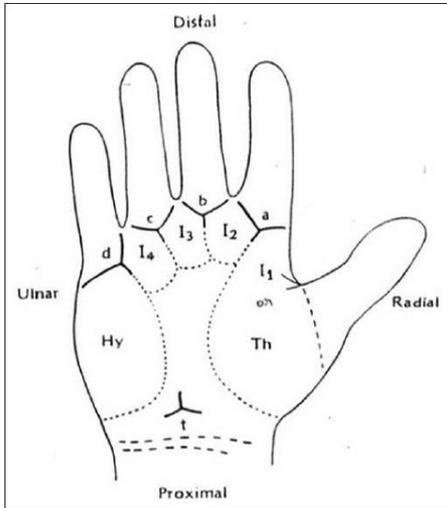


Figure 1: Palm Patterns

FINGERPRINT PATTERNS AND CLASSIFICATIONS

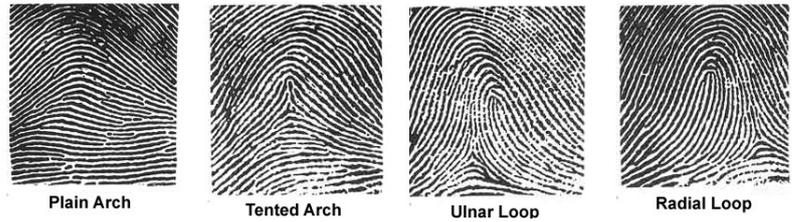


Figure 2 :Finger tip pattern

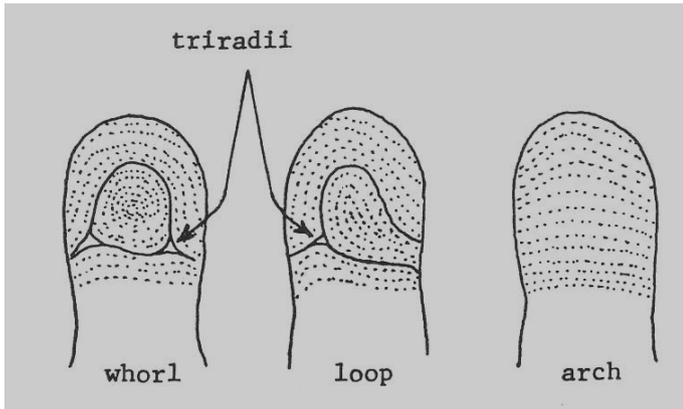


Figure 3

diseases such as oral leukoplakia and OSCC³.

Dermatoglyphic pattern configuration

Palmar patterns

The palm has been divided into several anatomically designed areas such as thenar areas; four inter-digital areas, and the hypothenar area.(Figure 1)

- i) Thenar and first inter-digital area: These two areas are closely related anatomically and are considered one area. Patterns, when present, are most often loops.
- ii) Second, third and fourth inter-digital area: Configurations encountered in the inter-digital regions are loops, whorls, vestiges and open fields.

iii) Hypothenar area: Patterns commonly seen are whorls, loops and tented arches.⁸

Finger tip pattern

The ridge patterns on the distal phalanges of the fingertips are divided into the three groups. They are arches, loops, and whorls (Figure 2)

A) Arches: It is the simplest pattern found on fingertips. It is formed by succession of more or less parallel ridges, which traverse the pattern area and form a curve that is concave proximally. Sometimes, the curve is gentle; at other times it swings more sharply

The arch pattern is subdivided into two types:

- a) Simple or plain arch composed of ridges that cross the fingertip from one side to the other without recurving.
- b) Tented arch composed of ridges that meet at a point so that their smooth sweep is interrupted.

B) Loops: It is the most common pattern on the fingertip. In this type a series of ridges enter the pattern area on one side of the digit, recurve abruptly, and leave the pattern area on the same side.

The loop pattern is subdivided into two types:

- a) Ulnar loop composed of ridges that open on the ulnar side.
- b) Radial loop composed of ridges that open on the radial side.

c) Whorls: It is any ridge configuration with two or more tri-radii. One tri-radius is on radial and the other on the ulnar side of the pattern.

Subtypes of whorl patterns are:

a) Plain/simple/concentric whorl composed of ridges that are commonly arranged as a succession of concentric rings or ellipses.

b) Spiral whorl is a configuration in which ridges spiral around the core in either a clockwise or a counter clockwise direction.

c) Central pocket whorl is a pattern containing a loop within which a smaller whorl is located. Central pockets are classified as ulnar or radial according to the side on which the outer loop opens.

d) Lateral pocket/twinned loop pattern is composed of interlocking loops.

e) Accidentals/complex patterns are one in which patterns cannot be classified as one of the above patterns.⁸

Triradius

A useful descriptive term in dermatoglyphics is the triradius. (Figure 3) A triradius is a point of convergence for three regions that separate almost parallel ridges. Loops have one triradius (on the thumb side if ulnar and towards the little finger if radial) and whorls have two. Arches lacks triradius.¹⁰

Total Ridge Counts

A ridge count is made by drawing a line from the triradius to the center of the pattern and determining the number of intersected ridges between these two points. Arches are defined as having a ridge count of zero. The ridge count of a whorl consists of the higher of the two counts. A total ridge count (TRC) is the summation of the ridge count for all¹⁰ fingers¹¹

Discussion

Oral squamous cell carcinoma is a major worldwide health problem and the number of sufferers is increasing rapidly due to more and more people embracing deleterious habits such as tobacco chewing, smoking and alcohol abuse. It is a widespread disease associated with considerable amount of morbidity and mortality¹². Tobacco and alcohol are established risk factors for oral leukoplakia and OSCC. Substantial evidence also suggest that the carcinogenic process is driven by the interaction between exposure to exogenous carcinogens and inherent genetic

susceptibility. In response to environmental exposures, genetic damage accumulates more quickly in individuals with genetic susceptibility to DNA damage than in those without such instability but with a similar exposure. Consequently, individuals with genetic instability might be at a greater risk for developing cancer^{13,14}

The dermal ridges have various notable characteristics which make them important, not only in personal identification, but also in human biology for various reasons. Firstly, unlike many bodily traits the dermal ridges and configuration once formed remain unchanged through out the life except in dimensions¹². It is suggested that many genes which take part in the control of finger and palmar dermatoglyphic development can also give indication to the development of premalignancy and malignancy.¹⁵

Elluru Venkatesh (2006) carried out a study to determine whether specific dermatoglyphic patterns exist which help in predicting the occurrence of oral squamous cell carcinoma and oral leukoplakia. This study comprised of 30 subjects with oral squamous cell carcinoma, 30 subjects with oral leukoplakia and 30 individuals with habits and no lesions as controls. In patients with oral leukoplakia and OSCC, there is an increased frequency of arches and loops whereas in control group there is an increased frequency of whorls. ($p < 0.01$). Loops were at higher frequency in the inter-digital areas in cases than in control ($p < 0.05$).³ This study concluded that dermatoglyphic patterns may have a role in identifying individuals either with or at risk for developing oral leukoplakia and oral cancer.

Polat Hakan M (2004)⁹ studied fingerprint pattern in 29 oral cancer patients and found increased frequency of arches compared to normal individuals. However, in this study, in very few cases (3% in OSCC and 4% in OSMF) arches were found to be the predominant pattern in 100 cases of oral cancer. This difference would probably because of disparity in the sample size.

In the study by David and Sinha, Fingerprints were collected from 70 patients that includes 30 subjects with potentially malignant disorders, 10 subjects with oral cancer and 30 healthy controls. Mean number of loops and the mean number of total ridge count were found to be higher in case of subjects with potentially malignant disorders and oral carcinoma when compared with controls. Arches were seen predominantly in patients with oral cancer. Right ATD angle was lower in subjects without deleterious habit and potentially malignant disorders. These findings were highly significant statistically.⁵

Ambika Gupta and Freny R Karjodkar divided 120 individuals were divided into four groups based upon their habits of tobacco/areca nut usage and presence of OSF/SCC. In SCC, there was an increase in frequency of arch and ulnar loop patterns on fingertips, decrease in frequency of simple whorl patterns on fingertips, decrease in frequency of palmar accessory triradii on right and left hands. Significant findings in OSF included an increase in frequency of arch and ulnar loop pattern, decrease in frequency of simple whorl patterns on fingertips, decrease in atd angle on right hand, decrease in frequency of palmar accessory triradii on right hand. The results revealed that the field of dermatoglyphics holds promising results for determining the genetic susceptibility of individuals to develop SCC and OSF.¹²

Ganvir and Gajbhiye recorded Fingerprints of 400 individuals which comprises 100 normal individuals without habit of chewing or smoking tobacco or betel nut, 100 normal individuals with habit, 100 OSCC patients, and 100 OSMF patients. They found that whorl type of fingerprint pattern was predominant in significantly higher number of individuals of OSCC and OSMF group than in control groups, whereas individuals of both the control groups showed loop as a predominant fingerprint pattern. This indicates that the predominance of whorl type of fingerprint pattern would serve as a candidate screening marker for susceptibility to oral squamous cell carcinoma and oral submucous fibrosis in general population with or without tobacco chewing habit.¹⁶

Jutty. D et.al compared the dermatoglyphic patterns of patients having oral submucous fibrosis (OSMF) and oral leukoplakia (OL), and oral squamous cell carcinoma (OSCC) with patients without habits and in patients with habits but with no lesions. Fingerprints and palm prints were studied in 90 patients of Karnataka origin, who were randomly divided into three groups: (A) 30 subjects with OSMF, OL and OSCC, (B) 30 patients with habits and no lesions, and (C) 30 healthy controls, for the purpose of finding patterns that could identify patients with PMDs and OSCC. Prints were analysed by two examiners and were repeated 1 month later. It was observed that the arch pattern (60.7%) was pre-dominant with a decrease in whorl pattern (29.3%) in group A when compared with the controls (group B and C) and the difference was highly significant ($P < 0.01$). The study group demonstrated an increase in the mean total finger ridge count as compared to the controls and the result was found to be highly significant ($P < 0.02$).¹⁷

One of the studies examining dermatoglyphics in cancer

patients noted an increase in whorls and a decrease in radial loops in 201 Turkish cancer patients.¹⁸ That study was in consistent with the study by Lynch et al. who found more whorls present in high risk group.¹⁹ In the another study, a decreased ridge count was found in patients with cancer.²⁰ Yet another study found an increased proportion of ulnar loops in cancer patients.

A prospective study was carried out by Tamgire et al.²¹ to collect the dermatoglyphic prints of the gutkha chewers with and without Oral Submucous Fibrosis (OSMF). Study consisted of 200 subjects divided into two groups. Group A consisted of 100 gutkha chewers without OSMF and group B consisted of gutkha chewers with OSMF. The results showed a highly significant decrease in simple whorl pattern with increase in composite whorl pattern on left little finger in Group B as compared with Group A, decrease in composite whorl pattern of right index finger in Group B when compared with Group A, increase in simple whorl pattern on right thumb in Group B when compared with Group A, increase in composite whorl pattern on left thumb in Group B as compared with Group A and decrease in radial loop on left index finger in Group B when compared with Group A

The analysis of dermatoglyphics to identify individuals who are more prone to develop potentially malignant disorders and OSCC and the use of the same as an education tool for genetic counseling need to be further researched.

Conclusion

The field of dermatoglyphics holds promising results for determining the genetic susceptibility of individuals to develop SCC. But, further multicentric studies must be conducted in larger population with age, sex, religion and race matched controls.OSCC is not just an environmentally acquired, but their roots are deep seated in the soil of genetics. Further research into the relation between, OSCC and genetics can give us more valuable clues which would probably help in preventing these diseases and free the mankind from these menacing diseases which are rampant everywhere, particularly now.

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Today's Woman – “The Go-Getter”

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ABSTRACT

Not only has dentistry progressed a long way from the era of the Morrison cast iron dental chair, kerosene dental lamp and a foot drill but we are also into an era where we are witnessing a significant increase in the number of women surging through dentistry. This correlates with the representation of women who apply to dental schools. The influx of women into the traditionally male dominated field of dentistry has also presented new challenges for women dentists as they experience the dilemma of wanting to be perceived as ‘competent dentists’ striving to achieve professional goals as well as fulfill marital and maternal obligations.

Key words: Female Dentists, Gender & Career, Professional Practice & concerns of female dentists.

Introduction:

This article takes a peek into the professional lives of women dentists and explores prime factors that lead to the gender shift in the recent years and also focuses on factors that are interwoven into women dentist’s practice profiles.

Materials and methodology:

This review incorporates information from a wide range of sources and considers the findings from published primary studies, previous reviews, policy statements and opinions of a wide range of experts from across the globe. It provides a comprehensive summary of work already undertaken in dentistry or in similar fields such as medicine.

Estimations and predictions of the gender shift :

There has been a steady growth in the proportion of female general practitioners (Newton-et-al 2001). In the ‘Netherlands’, the proportion of female general dental practitioners has increased from 18.4% in 1996 to 23.3% in 2003. In ‘Northern Ireland’, currently 39% of practicing general dental practitioners are female. In ‘the U.S’, 37.5% of dental graduates were female in 2001-2002 whereas in ‘the U.K’, it was 30% in 2000. It was estimated that at least 50% of current dental students in the above mentioned countries were female or this percentage would be reached in the forthcoming years (Gorter –et-al 2006). In ‘the UK’, in 2006, 55% of the applicants to dental schools were women (Cooper-et-al 2006). It is predicted that by 2020, over 55% of applications will be female (Murray 2002).

Recent studies have shown that in the U.K, in the past five years alone the percentage of female dentists has risen by 5% & as over 50% of dental students are now female, this trend is set to continue.¹ Majority of the dentists in 'the U.K' under the age of 35 are female (55.4%, 2011/12) while 90% over 65 yrs are male indicating that 2greater proportion of the dentists leaving the profession over the coming years will be men, while women continue to enter the workforce at a higher rate.

In 'the U.S', in 1980, female were lesser than 3% of all dentists. Women currently represent an estimated 19% of the dental workforce. By 2020, 30% increase in the workforce is estimated based on the current dental enrollment trends. This data indicates that the number of male dentists probably began to decline around the year 2000.

In 'Finland', women dentists constitutes 75 % of practicing dentists. In 'Russia', women dentists constitute 8% of dental workforce. In 'India', since 1999, there has been an increase in the enrollment of female students, more so in the year 2000. Nearly 50-60% of students in all dental schools in India are female³.

'Dental Deans': The U.K had its first dental dean. In the U.S, 9 out of 56 deans are women. Germany and China too have dental deans.⁴ India too is treading a similar path with 15 % women deans in dental schools.

Global scenarios to consider while discussing the gender shift:

a)Female-Male ratios:

The countries with less female to male ratios in the general population are as follows:

India : 933 females to 1000 males

China :944 to 1000

Pakistan : 938 to 1000

The countries with more females to males ratio in the general population are as follows:

The U.S: 1129 females to 1000 males

Indonesia : 1004 to 1000

Japan :1041 to 1000

b) Percentage of women employed in various fields of work in different countries :

Countries with low percent:

India : 45%

Pakistan :10 %

Countries with higher percent:

Japan : 40%

China: 43 %

Russia :44 %

The U.S :45 %.

Motivating factors that lead women to choose dentistry as profession:

A) Two developments took place in the U.S that were radical & changed centuries of prejudice against women as doctors:

a) Women's liberation & civil rights movements of the 1960' s & early 1970' s with the attendant federal legislation to fund grants & encourage increasing enrollments of women in professional health schools.

b) The impact birth control had on opening the doors for a woman to a professional career because most women could choose when to have children.

"It should be noted that ' birth control stands as one of the greatest biological & cultural changes in history."

It is also interesting to note that prior to these two developments, dentists were almost exclusively male in the U.S, before the early 1970's. The U.S had the lowest percentage of women dentist I the western world. Nearly half the dentists were female in Greece. About one-third in France, Denmark, Sweden & Norway and almost four-fifths in Russia, Finland, Latvia & Lithuania.¹

B) 5 Reskin & Roos claimed that the increase in the number of women in the workforce was due to enhanced levels of education, social changes and occupational changes as well as increased passion among women to practice within health professions & "a concomitant steady or decreased enthusiasm among men".

C) 6,7,8 Additional reasons for the feminization process may be abundance of job opportunities in many health sectors. Emigration of countless foreign female practioners to developed coutries such as the U.S & Canada are other attributed factors.

D) Other motivating factors that accounts for the increase

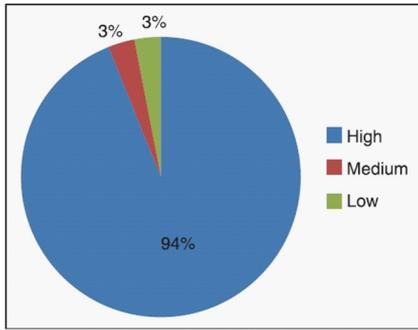


Fig (1) Distribution of dental students according to the emotional exhaustion scores (EE) (n=259)

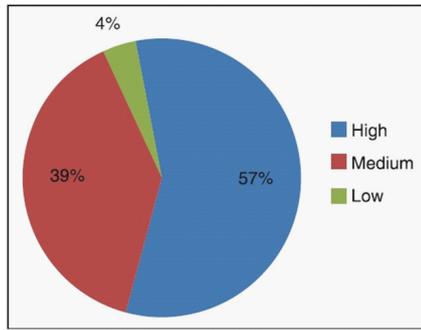


Fig (2) Distribution of the dental students according to personal accomplishment scores (n=259)

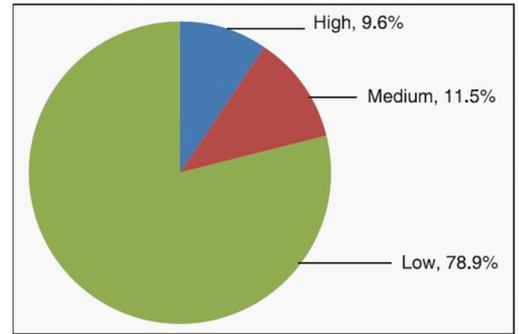
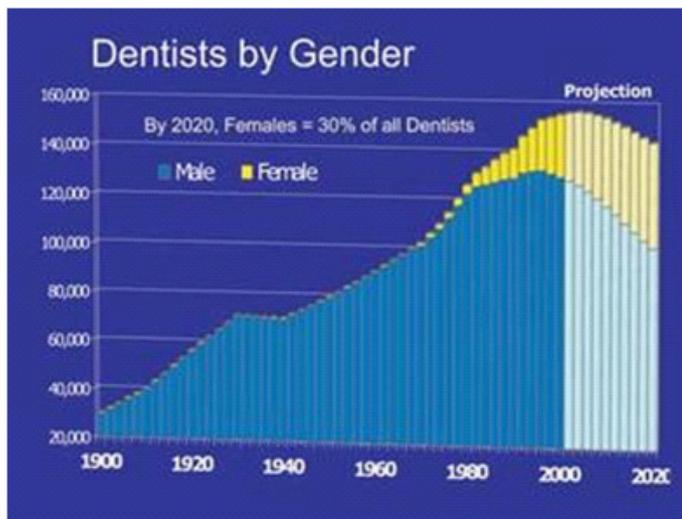


Fig (3) Distribution of the dental students according to Depersonalization scores n=259



Us Dentists by Gender

in women dentists are :

- a) Dentistry has the availability of part time working which could fit-in with raising a family.
- b) Upon entry into the field of dentistry, one also gets absorbed into the health profession which offers remarkable remuneration that compares favourably with that of other professions.
- c) One gets the opportunity to use a variety of interpersonal skills, encourage team working & interaction with patients (Seward 2001).

Differences in practice patterns between the genders:

A) CHOICE OF SPECIALISATIONS:

9 Fields dominated by male dentists: Periodontics, Prosthodontics & implantology.

Fields dominated b female dentists: Pedodontics, Orthodontics & Dental prophylaxis.

“Reasons for the 10dominance of males in high status specialities such as surgery is not because women have a lack of interest to this feild but because increased number of men entering this speciality. Certain variables exists that could influence career choices such as women’s family responsibilities along with lack of role models coupled with increased number of men entering this speciality are the key factors.

B) PRACTICE HOURS: PART-TIME AND CAREER-BREAKS:

11 Females are seen to work fewer hours than their male counterparts. The average working hours per week for female dentists was 35.6 while the average working hours for male dentists was 39.5. Similarly, Aquila -et-al also noted that female dentists, particularly those aged 25-40 work 10% fewer days & treat 10% fewer patients than their male counterparts¹².

Part –time: Similarly, Wilson-et-al (1988), reported that female dentists were more likely than male dentists to work part-time and that the number of hours worked by women were significantly related to the number of dependent children in their families.

Career-breaks: According to recent reports of the emale dental workforce (Seward 2001), nearly half (49%) of women had returned to work after a career break. However, working patterns changed upon return to work with 54% working fewer hours per week.

C) PRACTICE OWNERSHIPS INCLUDING ACADEMIA & LEADERSHIPS & NET INCOME:

Practice ownerships: Men are more likely to own their practice since qualifications & commitments to organizing a practice are commonly seen in men& they are the primary earners in their families^{13,14}.

Self employment: Multitude of factors contribute to female self employment choices: Discrimination in male-female market opportunities, experience & skill differentiation, maternity & children concerns & variations in lifetime occupational strategies^{15,16}.

Academics & Leaderships: Contrary to the high influx of women into the dental workforce, women dentists remain the minority with regard to academics & leaderships since men outnumber females in terms of specialization in various fields. Men with postgraduate qualifications hold most senior management positions while women are more likely to be employed in faculty or government positions.^{17,18}

Net Income: Aguila et al reported a significant earnings difference, finding that women's net income was 10% lower than that of men¹⁹. In a study conducted by Brown & Lazer on female & male dentists with the same professional qualifications and practice characteristics, it was found that female dentists earned have a mean net income 22% below that of men²¹. These differences in income may be due to the fact that men mostly own their practices whereas women usually work for others^{20,21}.

PERFORMANCE CONCERNS:

Definition: The National Clinical Assessment Service (NCAS 2010) defines the term as any aspects of a practitioner's performance or conduct which:

- Pose a threat or potential threat to patient safety.
- Expose services to financial or other substantial risk.
- Undermine the reputation or efficiency of services in some significant way.
- Are outside acceptable, practice guidelines & standards.

a) Quality of clinical care: Female dentists are perceived by both male & female patients as being more caring (Newton- et- al 2010). There may be a number of reasons. One such is superior communication skills in women which leads to more effective interactions & relationships with patients, thereby lessens the chance of complaints & litigation (Firth -Corzens 2008).

b) Relationship with the dental team: Studies have shown that significant differences exist in the communication styles of male & female dentists.

Gorter-et-al 2006, reported that male dentists tend to be more 'businesslike' & female dentists more 'friendly' in their communication with the dental team. Gorter &

Freeman 2005, concluded that male dentists generally had an 'easier working relationship' with their nurses.

The dental nurses were found to neglect the instructions or react in a disruptive manner irrespective of the strategies ('friendly or business-like') adopted by women dentists. Interestingly, the male dentists felt that inconsistent working strategies employed by the women dentists in their workfield contributed towards their technical difficulties.

"In short, female dentists, tended to be both -friendly-like & business-like towards their assistant at different times whereas male dentists tended to 'maintain' a hierarchical management framework throughout."

Factors influencing the practice of dentistry among women dentists:

a) MATERNAL OBLIGATIONS & FAMILY RESPONSIBILITIES :

The stress created by trying to balance work with child care responsibilities is a major concern among women dentists. The pursuit of a balance between work and family appears to be a difficult equilibrium. Women need to prioritise her needs at the beginning of her career. She can opt to build her practice before starting a family. Once she decides to start a family, she would have to take a career-break for few months which is disruptive to her practice. Upon returning to work from a career-break, women are presented with significant challenges like leaving young children at home or arranging child-care, loss of confidence, lack of respect, lack of updated knowledge, family conflicts. Very few women dentist (8%) would like to work full-time if they returned to practice after a career -break. Most (44 %), wanted part time, term time (37%).

In a nut-shell, it is seen that it is extremely difficult to take a career -break and return on the same footing.

b) WORKPLACE SETTING:

Every dental office has its own protocols & practice standards. Apparently, professional practice of women dentists seem to be affected by the work setting environment. An unstable work environment throws challenges and raises concerns about their future, thereby forcing them to withdraw & start looking elsewhere for work. Interprofessional collaborative relationships ensures sharing of best practices and high quality care to patients.

c) SOCIETAL OBLIGATION:

Women prefers to choose a line of work that fits into their

current stage of life. Married women dentists prefer a schedule that is family friendly whereas unmarried female dentists tend to look out for jobs that can accommodate their commitments to the society as well as family.

Discussion:

Impact of Maternal Obligation and Family responsibilities:

Women are constantly trying to negotiate a balance between family responsibilities and work to ensure that their productivity is not compromised. An example can be cited from a study conducted by Naidoo on women dentists of South Africa²². The outcome from this battling is “stress & burn out syndrome”²³ if the issue fails to be addressed in time.

(Risk factors for burn out include organisational causes of aspects of dental practice such as time-pressures, patient related problems, management of auxiliary staff as well as individual causes such as gender, clinical speciality area & ability to cope. Measurement of burn out in current scientific research is usually carried out using the Maslach Burn Out Inventory as described by Maslach & Jackson (1997). The literature describes this as the most appropriate instrument to measure burn out.)

“Dental Associations could also offer stress management workshops, professional help, counselling services & support network as high levels of workplace stress, burn out & other work-related mental illness have been reported in dentists both in UK and abroad. ”It is suggested that one method of promoting the quality of work for women dentists is to ‘ encourage the use of frameworks & standards for developing ‘ family –friendly’ workplaces which requires concrete policy approaches”

Impact of workplace settings:

Work place settings have a major impact on the practice choices of women dentists. It would be desirable to have an adjustable professional setting to fit into their transitional stages (marriage –child care) of their life & career to rule out dissatisfaction in their jobs. Similar findings were observed in a study conducted in South Africa where poor working conditions were strongly associated with job dissatisfaction²⁴.

Ayers, suggested that work environment should motivate employees to perform at their best & show commitment to the organization’s mission & thus impacting on job satisfaction & work effectiveness²⁵. It is ultimately critical to provide a supportive workplace for female dentist to provide high quality services & to ensure that the

productivity of the dental workforce is not negatively affected.

Impact from societal obligation:

Female dentists experience hardship from the influence of social obligation and or restriction. According to Riser-et-al, the time commitment & social compromises were the principal deterrents to entering the field of ‘Oral & Maxillofacial Surgery’ among the female students in the U.S²⁶.

Impact of Individual Preferences:

Women dentists may prefer to work part time, full time or few hours a week to have free time to study or to shoulder family responsibilities. They may return to work full time when their children have grown older or when higher education has been completed. It is important to have feasible choices in decision making to suit their needs during the transitional stages of their lives & career.

“Some interesting facts about climbing the ladder to excellence”:

1) PRACTICE PATTERNS :When men & women graduate from dental school there is little difference in the way they want to practice according to Anecdotal reports. Also, when the women dentist are single or do not have children, they have almost similar working patterns as male dentists. But when women dentists have children and the ‘ mommy-brain’ kicks in, that their focus shifts to wanting a more balanced life. Extreme stress results and one of the stress mitigating scenarios is to leave their private practice and hunt for part time jobs as they are less demanding.

2) DEVELOPMENTAL STAGES IN CAREER:

TIME AND MONEY FACTOR : In private practice, to practice dentistry at its highest levels, dentists have to pay an enormous price in time and money in a relentless pursuit of advanced courses in technique, human relations, marketing and business.

THE DEVELOPMENTAL PERIOD: In men, this journey traditionally starts in the 35-45 age group. This turning point in men coincides with the biggest demands on women dentists by their family & children. As a result, women with children decide to take a backseat in their career & may delay their pursuit of advanced education until their children are older.

Conclusion:

Dentistry is diagnostic, technical and surgical enough to be continually interesting. The current generation of women dentists will be a bridge generation that deals with the many challenges of being pioneers in the way women practice dentistry. To further inspire women dentists, the milestones of women dentists from the 16th century-to date are listed below.

Milestones of women dentists:---

16th Century:

In the 16th century, a travelling dentist can be seen along with a woman, acting as his assistant in an early copper engraving by Lucas Van Leyden.

19th Century:

- 1852: As the profession was not legally open to women until 1861, with special permission from Royal Board of health, the first female dentist in Sweden to be given the freedom to practice independently as a dentist: Amalia Assur
- 1855: The first woman to practice dentistry in the US, after she married dentist Daniel Jones and became his assistant: Emeline Roberts Jones.
- 1866 : The first woman to officially practice in Sweden : Rosalie Fougelberg.
- 1866 : The first woman dentist who graduated from a recognized college: Lucy Hobbs Taylor.
- 1869: A woman dentist of German origin who received credit for her time in dental practice before graduating from Pennsylvania College of Dental Surgery: Henriette Hirschfeld Tiburtius.
- 1874: The second American woman to earn the degree of Doctor of Dental Surgery from Pennsylvania College of Dental Surgery, worked in Philadelphia and one who limited her practice to women & children only : Fanny A Rambarger.
- 1886: The first female dentist in Mexico: Margarita Chorne' y Salazar.
- 1890: The first African –American woman to earn a dental degree in the US, from the University of Michigan: Ida Gray Rollins.
- 1892: The women's Dental Association of the US was founded : by Mary Stillwell-Kuesel with 12 charter members.
- 1895: Britan's first licensed female dentist: Lillian Lindsay.

- 1898: The first licensed female dentist in Canada: Emma Gaudreau Casgrain.

20TH Century:

- 1907: Australia's first female bachelor of dental science graduate from the University of Melbourne: Frances Dorothy Gray.
- 1920: The first recorded female delegate to the ADA: Maude Tanner.
- 1921: Formation of American women dentist ie. AAWD during the annual meeting of the ADA by 12 female dentists.
AAWD's first president and founder of Pedodontics, one of the first to limit her practice to children. : M. Evangeline
- 1923: First woman to be inducted into the American dental honor society Omicron Kappa Upsilon: Anita Martin.
- 1946: First female president of British Dental Association: Lillian Lindsay.
- 1951: The first female dental officer commissioned in the US Army Dental Corps: Helen. E. Myers.
- 1975 : First female dean of a American Dental School 'Howard University, School of Dentistry': Jean C. Sinkford.
- 1977: First female president of The American Association of Dental Schools : Nancy Goorey.
- 1988: First female president elected by the American Student Dental Association: N. Gail Mc Laurin.
- 1991: The first female president of ADA : Geraldine Morrow.
- 1997: The first female president of the American National Dental Association: Hazel J Harper.

21st Century:

- 2001: First female editor of ADA : Marjorie Jeffcoat.
- 2003: First female chief of the US Navy Dental Corps: Rear Admiral Carol I Turner.
- 2004: First female president of American Association of Endodontics: Sandra Madison.
- 2005: First female president of the FDI World Dental Federation: Michele Aerden
- 2007: First female president of the American Academy of Cosmetic Dentistry: Laura Kelly
- 2008: First female president of the American Academy

- of Pediatric Dentistry: Beverly Largent.
- 2008: First female president of the American Academy of Oral and Maxillofacial Pathology: Valerie Murrah.
- 2008: First female president of the Academy of General Dentistry: Paula Jones.
- 2008: First female president of the Canadian Dental Association : Deborah Stymiest.
- 2008 : First female president of the Academy of Dentistry International: Susan Bordenave Bishop.
- 2009: First female executive director of the American Dental Association: Kathleen T. O'Loughlin
- 2013: First female president of the American Association of Orthodontics : Gayle Glenn.

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Ameloblastic Carcinoma – a rare entity

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ABSTRACT

Ameloblastic carcinomas are aggressive malignant tumour of the jaw compared to its benign counterpart. Cases of ameloblastic carcinoma should be studied carefully due to its aggressive nature. Also the lack of well-documented cases in the literature contributes toward being a rare entity. Here we present a case report of ameloblastic carcinoma, of a 60 year old female patient who reported with a history of trauma.

Key words: Ameloblastic carcinoma, Odontogenic tumour, Metastasis

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Introduction

The tissues and related structures of orofacial region can be the site of frequent pathologic conditions which may be benign or malignant.^{1,2} Some pathologic lesions such as Squamous cell carcinoma, soft and hard tissue sarcomas, Carcinoma of salivary glands and melanoma may lead to secondary invasion of mandible.^{3,4} Metastases of the lower jaw can also occur from Cancer of the Lungs, Breast, abdominal organ and prostate. Benign lesions may be odontogenic or non odontogenic in origin, and are predominantly Ameloblastoma.^{5,6}

The most common clinically significant and benign aggressive odontogenic tumours of epithelial origin are ameloblastoma.⁷ These tumours comprises about 1% of all cysts and tumours occurring in the jaw bones.⁸ The origin of these tumours may occur from dental embryonic remnants perhaps from stratified Squamous epithelium of the oral cavity; the epithelial lining of an odontogenic cyst; or displaced epithelial remnants of enamel organ, remnants of dental lamina or maybe from basal cells of overlying mucosa.⁹ This neoplasm rarely behaves aggressively or shows metastatic dissemination even

when they have shown high chance of recurrence.⁸

While there is a considerable debate over the malignant potential of Ameloblastoma, little argument exists that a tumour showing benign histologic feature are malignant if evidence of metastasizes are established. An aggressive clinical course in absence of metastasis is also considered to be malignant. Atypical or bizarre histological features are seen commonly in these tumours.¹⁰ Carcinomas derived from ameloblastoma have been designated by a variety of terms, including “Ameloblastic carcinoma [AC],”⁶ “malignant ameloblastoma”,¹¹⁻¹³ “metastatic ameloblastoma”¹⁴ and “primary intra-alveolar epidermoid carcinoma”.¹⁵

World Health Organisation (WHO) defines “malignant ameloblastoma as the one that has metastasized but exhibits the well-differentiated morphological features of a typical ameloblastoma in both primary and metastatic sites, in contrast to Ameloblastic carcinoma that has retained the features of Ameloblastic differentiation, nevertheless also exhibits cytological features of malignancy.”^{6,16} The occurrence of ameloblastoma is common at age groups of 30 years with involvement of



Figure 1: Extraoral photograph showing swelling in the lower anterior part of the jaw



Figure 2 : Intraoral view showing swelling from 46 to 36 region with floating teeth



Fig 3: Floating teeth and resorption of anterior tooth



Figure 4: Photograph showing excised surgical specimen

mandible (Two-third) compared to maxilla (one third) and a male female ratio of 2.4:1.¹⁷

Lung metastasis are most frequent with brain and bone dissemination also being reported.^{18,19} In the updated histologic classification of the World Health Organization in 2005, “ameloblastic carcinoma is classified as ameloblastic carcinoma, primary type; ameloblastic carcinoma, secondary type (dedifferentiated), intraosseous; and ameloblastic carcinoma, secondary type (dedifferentiated), peripheral (carcinoma ex peripheral ameloblastoma).”²⁰

Case report

A 60-year-old female patient was referred to our hospital, Maruthi Medical center, Kortagere, Tumkur district, Karnataka with a chief complaint of swelling in the lower front region of face since 4 months (Fig. 1). Swelling gradually increased in size. The patient gave a history of trauma to the lower part of the face. Mobility of lower front teeth was noted along with numbness of lower lip.

On clinical examination, extra orally an ovoid shaped painless swelling was seen on the anterior part of the lower jaw crossing the midline, roughly measuring 4x3 cm extending 2cm anterior to the angle of mandible on right side, with 3cm extension to the other side of the mandible and superiorly from vermilion of lower lip to 0.5cm below the mandible. Paresthesia of the lower lip was noted.

On intraoral examination a painless growth was noted, extending from 46 to 36 regions with involvement of the buccal sulcus and extending lingually with lingual cortical expansion. The growth appeared reddish pink in colour; nodular surfaced (Fig. 2). On intraoral palpation the growth was soft with no signs of infection/discharge. The growth was fluctuant, with lingually positive crepitus. Grade 3 mobility of all the anterior teeth was noted.

Radiologic findings:

Buccal cortical plate expansion with perforation was identified on occlusal radiograph; Multilocular radiolucencies with septae, floating teeth appearance were also noted (Fig 3).

On Lateral Cephalogram a single well defined multilocular radiolucent lesion measuring 3.5x 2.5cm along the anterior part of mandible along the symphysis menti, with scalloped and uneven margins extending from symphysis region to 45 with thinning and erosion of the inferior border was observed. Resorption of roots of anterior tooth was seen.

Computed Tomography on axial and coronal sections showed a homogenous expansile lesion affecting the anterior part of the body of mandible with thinning and expansion of the buccal cortex and extension into soft tissues.

Based on these findings, diagnosis of Ameloblastoma was made. The area was surgically excised under Local anaesthesia (Fig. 4).

Microscopic examination showed cells with atypical features of pleomorphism, hyperchromatism, altered nuclear cytoplasmic ratio, and mitotic figures. A final diagnosis of ameloblastic carcinoma was established. Surgery was planned as a definitive modality of treatment which included Partial mandibulectomy with surrounding bone margin and reconstruction with vascularised free fibula flap.

Discussion

Ameloblastic carcinomas (AC) are extremely rare malignant lesions with distinctive histologic behaviour and pattern that may arise de novo or from a pre-existing

odontogenic lesion.²¹ The term “Ameloblastic carcinoma” was designated for a tumour with a malignant morphologic appearance, apart from the presence of metastasis. The term “Ameloblastic carcinoma” was introduced by Shafer in 1983 to describe “ameloblastoma in which there had been histological malignant transformation”.⁶

Elzay,²² Slootweg and Müller¹⁴ used the term Ameloblastic carcinoma to indicate the presence of cytologic features of malignancy. According to these authors, the term Ameloblastic carcinoma “should be used to designate lesions that exhibit histologic features of both ameloblastoma and carcinoma”.^{14,22}

The histologic and radiologic features seen are commonly different as seen in conventional ameloblastoma. The most common signs include swelling, pain, fast growth, difficulty in mouth opening and dysphonia. Aggressive nature of AC may be attributed to cortical plate expansion, extension into surrounding soft tissue with tendency for recurrence and metastasis into cervical lymph nodes.¹⁷

In the present case final diagnosis of Ameloblastic carcinoma was made based on thorough clinical evaluation, thorough patient history, and histologic examination of the tumor. In addition to biopsy, imaging techniques using computerized tomography (CT) scanning was performed. The role of Magnetic resonance imaging (MRI) may be useful in further evaluation of the tumour.²

Controversy exists regarding the management of Ameloblastic carcinoma, but it is highly suggested that surgical treatment with resection of jaw including 2- to 3-cm bony margins and with paramount importance to radical neck dissection, for limiting the recurrence rate and degeneration into AC.¹⁷ Role of radiation therapy stands controversial but adjuvant postoperative radiotherapy improves the probability of local control, especially if margins are close or microscopically positive.²³

The rate of recurrence of this tumour locally is high even after appropriate therapy.²⁴ It is highly recommended that a patients treated with ameloblastic carcinoma should undergo a regular follow up to reduce the chance of recurrence and metastasis.^{25,26}

Conclusion

Ameloblastomas encompass a group of particularly interesting lesions because they exhibit diverse histologic and biologic behavior. The clinical and biological differences between conventional ameloblastoma and Ameloblastic carcinoma are noteworthy and can be

useful to distinguish between the two entities when the pathological diagnosis is not certain in addition to predicting aggressive behavior. Finally, considering the rarity of these lesions larger clinical series and longer periods of follow-up would help to establish the most appropriate treatment modality for these tumours.

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Multilocular Unicystic Ameloblastoma in a young female patient: A Case Report

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ABSTRACT

Unicystic ameloblastoma (UA) refers to those cystic lesions that show clinical, radiographic, or gross features of an odontogenic cyst, but on histological examination show a typical ameloblastomatous epithelium lining, with or without luminal and/or mural tumour growth. Here we report an uncommon multilocular variant of unicystic ameloblastoma in a 32 year old female patient. Radiographic evaluation revealed a multilocular radiolucency in the body of the mandible on the right side which was confirmed as unicystic ameloblastoma upon histopathological examination of the entire specimen. This case, thus, highlights the uncommon multilocular variant of UA and the emphasis on careful microscopic examination of the entire specimen which may resemble other odontogenic cysts or solid multicystic ameloblastoma on clinical and radiographic examination.

Key words: unicystic ameloblastoma, mandible, multilocular

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Introduction:

Ameloblastomas are benign tumors whose importance lies in its potential to grow into enormous size with resulting bone deformity.¹ A solid or multicystic ameloblastoma is a benign epithelial tumor of odontogenic origin showing a strong tendency for recurrence and local aggression. Intraosseous, infiltrative, peripheral, desmoplastic, or unicystic ameloblastomas are other subtypes of ameloblastoma.²

The unicystic ameloblastoma (UA) represents an ameloblastoma variant, presenting as a cyst.³ In 1977,

Robinson and Martinez first used the term 'unicystic ameloblastoma'(UA) for such lesions⁴ but it was adopted in the second edition of the international histologic classification of odontogenic tumors by the WHO in 1992.⁵ The other name as recognised by WHO is 'cystogenic ameloblastoma'.³

5 to 15% of all ameloblastomas are of the unicystic type. Cases associated with an unerupted tooth show a mean age of 16 years as opposed to 35 years in the absence of an unerupted tooth. The mean age is significantly lower than that for solid/multicystic ameloblastoma. There is no gender predilection.³ Unicystic ameloblastoma (UA)



Fig. 1: Orthopantomograph showing a multilocular radiolucent lesion in the right body of the mandible.

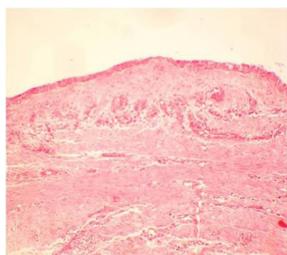


Fig. 2: Cystic lining epithelium resembling dentigerous cyst lining (Haematoxylin and eosin, 10x)

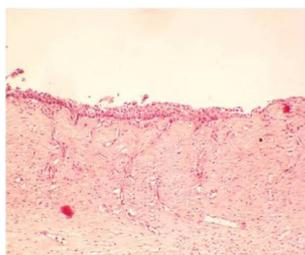
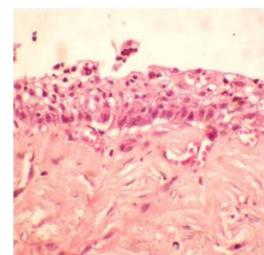


Fig. 3: Cystic lining epithelium showing ameloblastomatous features (Haematoxylin and eosin, 10x)



Fig/ 4: Cystic lining epithelium showing ameloblastomatous features (Haematoxylin and eosin, 40x)

is a prognostically distinct entity. It has a recurrence rate of 6.7-35.7%, and the average interval for recurrence is approximately 7 years.²

When the radiographic appearance is divided into the two main patterns, unilocular and multilocular, there is a clear predominance of a unilocular configuration of UA, especially in cases associated with impacted teeth.^{6,7} Eversole et al. further stated that six radiographic patterns could be identified for UA, ranging from well-defined unilocular; macromultilocular pericoronal; interradicular or periapical expansile radiolucencies.⁶

UA is essentially a monocystic lesion (when compared to solid multicystic ameloblastoma) in that it shows a usually quite large cystic cavity with a lining composed focally, or rarely, entirely, of ameloblastic (ameloblastomatous) cells (luminal variant). In addition, the UA may show one or more nodules arising from the cyst lining and projecting into the lumen of the cystic cavity, comprising odontogenic epithelium with a plexiform pattern which may mimic a plexiform ameloblastoma (intraluminal variant). Lastly, a number of UAs may contain one or more mural nodules or focal thickenings of the cyst wall (intramural variant).⁷ It is well known that UAs often show a variety of histological features and can be a combination of luminal, intraluminal and intramural variants in isolation or seen together.⁸

Here we are reporting a case of multilocular ameloblastoma which resembled other odontogenic cysts in a 32 year old female patient and was confirmed upon histopathological examination of the entire specimen.

Case report:

A 32 year old female patient reported with a chief complaint of swelling in the lower right back jaw region since 1 year and pain in the same region since 1 month.

On extraoral examination, a diffuse swelling was noticed over the right side of the body of mandible. Intra oral examination revealed a solitary, oval swelling measuring 4x2 cm in size seen in the right side of the mandible in the body region. The swelling was hard in consistency with a smooth surface, diffuse margins and is non tender. The buccal and lingual cortices were thinned out. Pain associated with the swelling was insidious in origin and dull, non-radiating, intermittent in nature. Patient gave history of extraction of 46,47,48 five years back. Panoramic radiograph revealed a well defined multilocular radiolucenct lesion with thin corticated borders in the right body of the mandible extending from first molar region upto retromolar anteroposteriorly. Inferior border of the mandible was seen to be intact (Figure 1). A provisional diagnosis of kerotocysts odontogenic tumor was given.

Histopathologic examination demonstrated cystic lining epithelium overlying the connective tissue wall containing collagen bundles and mild chronic inflammatory infiltrate. The lining epithelium revealed an area with 2-4 cell thickness of the lining epithelium resembling a dentigerous cyst lining (Figure 2).

However, on taking deeper and step sections, the tissue showed basal layer of epithelium with columnar cells having hyperchromatic nuclei and palisaded nuclei and intracytoplasmic vacuolisation. The suprabasal layer showed loosely arranged superficial cells resembling stellate reticulum (Figure 3,4). Thus, the histopathological findings after examining the entire tissue confirmed the diagnosis of simple unicystic ameloblastoma.

Discussion:

The term unicystic ameloblastoma has been described as an ameloblastoma developing within the lining, lumen, or wall of a cyst as well as an invasive ameloblastoma that

has a single cystic space rather than multicystic spaces.⁹ Unicystic ameloblastoma, a variant of ameloblastoma was first described by Robinson and Martinez.¹ This terminology may also represent an odontogenic cyst in which there has been ameloblastic transformation of the epithelial lining.⁴

Various contradictory theories about the development of UAs have been proposed. While some authors suggest that UAs develop by cystic degeneration of solid ameloblastomas, there are certain indications that UAs may develop by mural and/or luminal ameloblastomatous change in a pre-existing cyst.² Leider et al have proposed three pathogenic mechanisms for the evolution of Unicystic ameloblastoma: reduced enamel epithelium, from dentigerous cyst and due to cystic degeneration of solid ameloblastoma.¹⁰

More than 90% of cases involve the mandible, usually the posterior region. Up to 80% are associated with an unerupted mandibular third molar. The lesion presents radiographically as a well corticated unilocular, often pericoronal radiolucency.³ The unilocular pattern is more common in the unicystic variant than the multilocular, especially so in cases associated with tooth impaction.⁷

Unicystic ameloblastoma may mimic other odontogenic cysts clinically and radiographically. Moreover, the histologic distinction between UAs and certain non-neoplastic odontogenic cysts can be difficult.¹¹ It appears to be more difficult to differentiate UAs in cases of dentigerous UAs (associated with an impacted tooth) than in cases of non-dentigerous UAs (not associated with an impacted tooth). UAs that are not associated with an impacted tooth may mimic a residual cyst or a kerotocystic odontogenic tumor (KCOT).² Much confusion stems from the fact that a UA may appear not only as a unilocular, but indeed also as a multilocular bone defect.⁷ As was seen in our case, the lesion presented as a localised swelling in the body of the mandible and multilocular radiolucency on radiographic examination, which resembled a solid multicystic ameloblastoma or kerotocystic odontogenic tumor (KCOT).

Since 1925, many had reported the development of ameloblastoma within the walls of odontogenic cysts and the most commonly cited was the dentigerous cyst.⁴ There have been many reports of ameloblastomas apparently arising from the epithelium of what initially was considered an odontogenic cyst.⁷ Hyperplastic epithelium may also resemble ameloblastomatous lining epithelium in radicular cyst and dentigerous cyst. However, since this type of

feature was also associated with a dense inflammatory cell infiltrate where the stellate-reticulum like epithelium was a result of intercellular oedema arising from the presence of chronic inflammation in the area, it should be considered as not diagnostic of unicystic ameloblastoma.⁴ In the present case, a lining epithelium resembling dentigerous cyst lining was evident in one tissue bit. However, a characteristic ameloblastomatous lining was evident on taking deeper sections of the tissue sample, confirming the diagnosis of unicystic ameloblastoma. This case, thus, highlights the role of careful microscopic examination of the complete tissue in the biopsy specimen and the role of deeper and step sections in the diagnosis of unicystic ameloblastoma as also has been shown by Dunsche A et al.² In the past, other authors had suggested that in cases of small islands of ameloblastomatous epithelium within the cystic epithelium of a lesion, it might be necessary to examine the entire specimen to be sure of finding these islands.^{7,12,13}

It is generally held that UAs are less aggressive than the SMA counterparts.⁷ Enucleation is sufficient for tumors that have proliferated into the lumen (types 1 and 2), whereas subtypes involving the periphery of the fibrous connective tissue wall of the cyst (types 3 and 4) must be treated radically, i.e. like a solid or multicystic ameloblastoma.²

Conclusion:

It may be concluded that at present, histologic examination is the most sensitive tool for differentiating between odontogenic cysts and UAs. However, both clinical and radiologic findings share equal contribution to the final diagnosis. This case also highlights the importance of careful examination of the entire specimen and the usefulness of deeper and step sections in diagnosis of unicystic ameloblastoma. Thus, it is of utmost importance to correlate the histopathologic findings with clinical and radiographic features to arrive at an accurate definitive diagnosis as all such lesions may have prognostically different biologic behaviour and the final diagnosis may alter the therapeutic decision significantly.

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Tongue positioning stent for Radiation therapy – A Case Report

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ABSTRACT

Several adverse tissue reactions are associated with the use of radiotherapy in the management of patients with head and neck malignancies affecting quality of life, often discouraging the patient from taking treatment. Customized intraoral radiographic stents can help in preventing the unnecessary irradiation to surrounding normal tissues, thus reducing severity of reactions. This case report describes the fabrication of tongue positioning stent for a patient with a palatal salivary gland malignancy to displace and protect the mandible and tongue away from the primary field of irradiation.

Key words: Malignancy; Positioning stent; Radiotherapy; Salivary Gland.

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Introduction:

Various treatment modalities involved in the management of malignancies related to head and neck region include chemotherapy, radiotherapy and surgical intervention and often require involvement of dentist in patient care. Early dental intervention is an important factor in preventing infection during active phases of chemotherapy and in reducing potential short and long term problems in the irradiated patient.¹ Therapeutic doses of radiation may lead to various reversible or irreversible changes in the surrounding nondiseased tissues. The possible oral complications include xerostomia, taste loss, rampant dental decay, trismus, infections, nutritional stomatitis, osteoradionecrosis, and mucositis.²⁻⁴ According to Kaanders et al, the soft tissue not directly involved with tumor can be displaced or shielded to minimize morbidity associated with radiation to the oral cavity. Different types of intraoral radiation stents have been designed^{1,6} and the choice of stent depends on the location of tumor and type of radiation therapy. Although the benefits provided

can be weighed against the time used and complex techniques involved in their fabrication, these prosthesis are used only at the larger radiation treatment centers that provide dental oncology support for their cancer patients.

This case reports describes the use of a tongue positioning stent in a patient undergoing radiation therapy for the malignancy of palatal salivary gland.

Case report:

A 59 years old male patient was referred to the department of Prosthodontics of M.S. Ramaiah Dental College from the oncology department of M.S. Ramaiah Hospital with the diagnosis of malignant tumor involving the palatal salivary glands. On intraoral examination, a swelling was noted involving the hard palate and a part of soft palate (Figure 1). Patient was given the option of surgical removal of the lesion or radiotherapy along with chemotherapy. Patient opted for radiotherapy as surgical intervention required removal of maxilla and teeth on the involved



Figure 1: Intraoral view of swelling involving hard palate and soft palate.



Figure 2: Wax pattern.



Figure 3, 4: Intraoral view of finished positioning stent.

side along with the lesion. A tongue positioning stent was planned to position the mandible and tongue out of the primary field of radiation during radiotherapy sessions.

Technique:

1. Place the patient in physiological rest position determined by the operator. The patient was draped with hospital towel.
2. Irreversible hydrocolloid impression [Tulip alginate impression material (CAVEX) Holland] was made for the maxillary and mandibular arch.
3. The impression was then poured in Type III dental stone (Kalabhai Karson Ltd, Vikhroli (W), Mumbai, India), using a vibrator to avoid any voids. A wax pattern was fabricated over the mandibular cast using modeling wax in consultation with the treating radiation oncologist.
4. The intra orally verified pattern was transferred to the cast, taking care not to distort the wax pattern while transferring from the oral cavity (Figure 2).
5. The pattern was then invested and dewaxed.
6. After dewaxing, clear heat cured methyl methacrylate resin (DPI-RR; Dental Product of India, Wallace Street, Mumbai, India) was packed and processed in a conventional manner.
7. The processed stent was finished and polished carefully, making certain of smooth surfaces and edges. (Figure 3, 4). At the time of insertion, instructions regarding use and maintenance were given to the patient and handling procedures were explained to the radiation oncologist.

Discussion:

The treatment of head and neck malignancies involve a combination of chemotherapy, radiotherapy or surgical removal of the diseased tissue. Although surgery is a viable

treatment option it often requires removal of adjacent hard and soft tissue and results in loss of function and esthetic disfigurement. In such cases, radiotherapy can be used as an alternative treatment option. Before commencing radiotherapy, protection of surrounding normal oral tissues should be ensured. Inflammation of the tongue due to radiotherapy can make speech and swallowing extremely painful.

Tongue positioning stent or Tongue depressing stent is a customized prosthesis which positions the mandible and depresses the tongue during radiotherapy of head and neck tumors. It involves fabrication of an inter occlusal stent that extends lingually from both the alveolar ridges with a flat plate of acrylic resin which serves to depress the tongue.^{1,7} Placement of such stents also requires patient to keep his mouth open during treatment sessions. Thus accurate bite records and height should be recorded with the wax pattern ensuring comfort for the patient and help in proper displacement, positioning and shielding of tongue and mandible. Additionally, an assessment has to be made regarding patient's ability to maneuver and tolerate the stent.

This case report describes the fabrication of tongue positioning stent for a patient diagnosed with malignancy of palatal salivary gland tumor. A similar intraoral positional stent was described by Knudson et al for a patient with soft tissue lesion undergoing radiotherapy.⁸ Triad Reline VLC resin was used to fabricate the stent and a radiopaque string was incorporated to make it radiographically detectable, so that the position can be verified. Clear heat cure polymethyl methacrylate resin was used. The major advantages of using clear heat cure polymethyl methacrylate is that it helps in verification of tongue position and also helps in detection of unwanted pressure or irritation caused by the stent in the form of tissue blanching. The stent was carefully finished and polished to not cause any irritation to the oral tissues. The

major advantage of polymethyl methacrylate resin is that it is more cost effective.

This type of stent is primarily used for tongue lesions being treated with external radiation. Modifications can be made in the basic design of the positioning stent to accommodate the needs of most treatment situations. An opening can be made in the anterior region for the tip of tongue which helps in tongue positioning. An alloy or polyvinyl siloxane material can be incorporated into the stent as a shielding layer.^{9,10}

Conclusion:

The use of radiation-protective stents markedly minimizes the treatment sequelae from therapeutic irradiation and can be used as valuable aid during radiation therapy. At times, the oral and maxillofacial surgeon and radiation therapist are not fully aware of the supportive services that the maxillofacial prosthodontist can perform through use of such prostheses. It is recommended that a maxillofacial prosthodontist be an integral part of the treating team from treatment planning phase before starting with more invasive procedures for such lesions. This would help prevent any adverse effects of irradiation on the patients and also help the treating team of doctors to deliver optimum therapy.

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Dr. Shameena P.M.*

- 1) Discoloration of teeth will not occur from tetracycline administration _____.
 - a) between the ages of six-months to four-years
 - b) between ages of four-years to eight-year
 - c) with long-term use by any child
 - d) after crown formation is complete
- 2) Which of the following is true?
 - a) Gemination and fusion can be distinguished only by dental x-rays.
 - b) Fusion is the union of two separate developing teeth.
 - c) Geminated teeth have two pulp chambers, two canals.
 - d) Fused teeth have one pulp chamber, two canals.
- 3) Teething can cause systemic distress. Which of the following is not recommended for the child?
 - a) maintain and increase fluid consumption
 - b) give analgesics to the child
 - c) apply topical medication
 - d) teething rings
- 4) The correct sequence of words used when describing a tooth is _____.
 - a) dentition, arch, quadrant and tooth
 - b) arch, quadrant, dentition and tooth
 - c) tooth, dentition, arch and quadrant
 - d) dentition, quadrant, tooth and arch
- 5) Which of the following is the pattern of the teeth affected by ECC?
 - a) Maxillary posterior → maxillary anterior → mandibular posterior → mandibular anterior
 - b) Maxillary anterior → maxillary posterior → mandibular posterior → mandibular anterior
 - c) Mandibular anterior → mandibular posterior → maxillary anterior → maxillary posterior
 - d) Mandibular posterior → mandibular anterior → maxillary posterior → maxillary anterior
- 6) A 13 year old boy with generalized inflammatory gingival swelling did not respond to periodontal therapy. The peripheral white cell count of the patient was found to be 63000 and 95% was immature lymphocytes. The most likely diagnosis is
 - a) infectious mononucleosis
 - b) acute lymphocytic leukemia
 - c) thrombocytopenia
 - d) burkitt's lymphoma
- 7) A patient who gives history of increased alcohol use is at increased risk of prolonged bleeding following surgery because
 - a) alcoholism affects liver which is the site of coagulation factors
 - b) alcohol affect synthesis of vitamin C
 - c) alcohol patient does not follow the instruction
 - d) factor IX deficiency increased in alcohol patient
- 8) A periapical radiograph of mandibular right second molar reveals a sharp right angle deviation of apical third of the root. This is diagnostic of
 - a) dilaceration
 - b) dens indente
 - c) dilated odontome
 - d) hypercementosis
- 9) A 19 year old male reported with family history and symptoms suggestive of diabetes. The most reliable means of establishing diagnosis is
 - a) post prandial blood sugar
 - b) glucose tolerance test
 - c) benedict's test
 - d) glucose uptake test
- 10) Identify the tooth anomaly in the photograph given below



Courtesy: Dr. Nivia

Answer

Q 1	Q 2	Q 3	Q 4	Q 5
d	b	c	a	b
Q 6	Q 7	Q 8	Q 9	Q 10
b	a	a	b	Dens evaginatus

WDC, IDA Kerala Branch activities

Brief report about the activities of WDC IDA Kerala State.

Women's Day Celebrations

The International Women's Day Celebrations were held in a grand manner.

-A CDE was conducted on **EARLY ORTHODONTIC INTERVENTION** at Hotel Peevees Arcade Nilambur. Dr Anjana.G Chairperson was the faculty.

-A Poster on OralHealth Awareness in expecting mothers was launched on the same day by Dr Anjana.

-An Oral health awareness class and a check up camp was conducted for the inmates of Mookambika Balasadan,Kannur.We appreciate the efforts taken by

IDA Ernad and IDA North Malabar for hosting both the programmes.

We also appreciate IDA Malabar and IDA Coastal Malabar for conducting the Women's Day Celebrations in an excellent manner.

-An initiative was taken by WDC Kerala State and IDA Kochi along with COGS (Cochin Obstetrics and Gynecological Society) to make anticipatory guidance and prenatal dental care mandate for all pregnant women.

Thanking you

Yours faithfully,

Dr Shoma Anil
Secretary
WDC Kerala State



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Title Page Title page should include the title of the article and the name, degrees, position, professional affiliation of each author. The corresponding author's fax, telephone, email address and complete mailing address must be provided.

Abstract/ Key Words Page 2 should include a maximum of 200 words abstract with abbreviated title for the page head use. The abstract should state the purpose of the study/ investigations, basic procedures, main findings and the principal conclusions. Emphasize new and important aspects of the study/ observations. Only approved abbreviations are to be used.

Clinical Relevance Statement experimental investigations should include a brief statement of the clinical relevance of the paper.

Text: The text of articles should be divided into sections with the headings introduction, Material & Methods, Results and Discussions.

Introduction Summarise the purpose and rationale of the study. Give only pertinent references & do not extensively review the subject. Clearly state the working hypothesis.

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Results Present results in a logical sequence in the text, tables & illustrations. Do not repeat in the text all the data in the tables, summarise only important observations.

Discussions Emphasize the new & important aspects of the study and the conclusions that follow them. Do not repeat the observations to other relevant studies. Relate observations to other relevant studies & point out the implications of the findings & their limitations. Avoid unqualified statements & conclusions not completely supported by your data. Recommendations, when

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