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The Mouth-Body Connection

Key points:

- The mount and body are integral to each other
- Recognition that oral health and general health are interlinked is essential for determining appropriate oral health care programmes and strategies at both individual and community care levels
- Oral health shares common risk factors with other chronic diseases/conditions.
- The adoption of collaborative "Common Risk Factor Approach" which addresses common risk factors and their underlying social determinants for oral health promotion is more resource-efficient and effective than a targeted disease-specific approach

WHO – Oral Health Response

Public health solutions for oral diseases are most effective when they are integrated with those for other chronic diseases and with national public health programmes. The WHO Global Oral Health Programme aligns its work with the strategy of chronic disease prevention and health promotion. Emphasis is put on developing global policies in oral health promotion and oral disease prevention, including:

- building oral health policies towards effective control of risks to oral health;
- stimulating development and implementation of community-based projects for oral health promotion and prevention of oral diseases, with a focus on disadvantaged and poor population groups;
- encouraging national health authorities to implement effective fluoride programmes for the prevention of dental caries;
- advocacy for a common risk factor approach to simultaneously prevent oral and other chronic diseases; and
- providing technical support to countries to strengthen their oral health systems and integrate oral health into public health.

Edited by: **Dr. K. Nandakumar,** Hon. Editor • Published By: **Dr. O.V. Sanal,** Hon Secretary • **For IDA, Kerala State Branch**
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Contents

President's Message

Dr. Thomas K C

Dear colleagues,

Warm greetings from your president.

This will be my last communication through this media as the president of Indian Dental Association Kerala state branch.

The novel achievement for this IDA year is the implementation of HOPE-MEDI, the health insurance scheme for the members and their family.

I congratulate the efforts made by Dr. Joseph C.C, secretary IDA HOPE.

Clinic standardisation became a reality. Congratulations to Dr. Gigu Zakariah Philip and Dr. Biju A Nair.

It is a happy note that most of the branches functioned extremely well. Congratulations to local branch presidents,secretaries and all the executive committee members.

I sincerely appreciate the state office under the secretaryship by Dr. O.V Sanal. Mentions to joint secretary Dr. Anil Kumar P.K, assistant secretary Dr. Naveed Sait and treasurer Dr. Dinesh Nambiar.

Dr. Subhash Madhavan,CDH convenor has performed extremely well and wishing him a bright future. Dr. Deebu J Mathew, CDE convenor also performed extremely well.

Our journal is the best in IDA and kudos to Dr. K. Nandakumar.

Special thanks to national president Dr. Alias Thomas, IPP Dr. Nizaro Sio, vice presidents, state executive committee members and all those who encouraged and supported me.

Expecting a wonderful year under the leadership of Dr. Sameer PT and wishing him all the best.

Thanking you

With regards,

Dr. Thomas K C
President, IDA Kerala State.

Secretary's Report

Dr. O.V. Sanal

Dear Colleagues

"Greetings from IDA Kerala State"

We are reaching fag end of one more year of IDA activities. Only two more months left for our state conference going to be held at Alappuzha. Next year a new team of office bearers will take charge. I am stepping down as the Hon, Secretary of IDA Kerala State after a gap of three years. From my heart I thank all the members of IDA Kerala State for their support and cooperation given me for the last three years. There may be some faults from my office, but I believe whatever I have done for the association with my energy, time and dedication have been to the best of my ability & sincerities. Some time my way of working and dealing may have affected some persons. I am very much sorry to the persons with whom I hurt through words or my activities.

I thank my office bearers especially my presidents Dr. Antony Thomas, Dr. Nizaro Siyo and Dr K.C. Thomas. All Three presidents are very much cooperative for the smooth functioning of state office. I thank joint secretary Dr. Anil Kumar P.K, Assistant Secretary Dr. Naveed Sait and treasurer Dr. Dinesh Nambiar for their continuous support for the whole year. All the state office bearers who worked with me for the last three years were very helpful and they cooperated with me in a fantastic manner. All the presidents and secretaries of the IDA local branches also very cooperative and supported the state office.

IDA Kerala state and all local branches are very active for conducting the activities. I have mentioned in last report that some branches are very relueant for sending the reports to state. But they are also doing activities in branch level. Coastal Malabar, Ernad, Kochi, Trupunithara, Kodugalloore, Mavelikkara, Central Kerala Kottayam, Kollam, Attingal and Trivandrum sending their reports regularly to state office. Congratulation to all the secretaries of these particular branches. Our Kerala State official whats app group for the office bearers is very active. So it is very easy for state office to inform important matters to local branches. Our CDH wing is very active. We celebrated oral hygiene day on August 1st at Tripunithara. It was a good public programms and well appreciated by everyone. Congratulation to Dr. Subash Madhavan CDH Chairman and Tripunithara branch members.

World geriatric day also celebrated by IDA Kerala State at pain and palliative care centre Perinthalmanna on 1st October. It was also a good programme. Appreciation to Dr. Subash Madhavan and Ernad branch.

Our CDE wing already conducted two CDE programme at Malappuram and Kottayam. The third CDE programme will be held at Attingal on 22nd of November. Forth CDE programme at Payyannur on 6th December. Congratulations to our CDE chairman Dr. Deebu Jacob.

Sports day of IDA Kerala State was held at Iringalakuda on 11th October in a fantastic way Around 15 branches participated in the programme. It was well organized and all appreciation goes to the host branch Kodungallore and sports committee chairman Dr. Dinesh Nambiar. All Kerala IDA Cricket final held at Kozhikode on 27th September. Olympian P.T. Usha was the Chief Guest. IDA Central Kerala won the Championship and it was well arranged by Malabar branch. Congratulation to Malabar branch and sports committee chairman.

Chilamboli our cultural programme held at Kochi on 13th September 2015. Around ten team participated in the programme. It was well attended by our IDA members. Kochi branch hosted the programme. Congratulation to Kochi branch and Dr. Anil. T State Central Committee Chairman.

The Second new branch of this year after Tripunithara and 30th branch of IDA Kerala State Vatakara was inaugurated on 4th October at Vatakara by Sri. C.K. Nanu, MLA. Our State President installed new branch President Dr. Gafoor and secretary Dr. Salil Chakravorthy. All the best wishes for Vatakara branch.

Appreciating all the members of IDA Kerala State for the active involvement in the programmes and expressing my sincere thanks and gratitude to all.

"I am not afraid of an army of lions led by a sheep, I am afraid of an army of sheep led by a lion"

Thanking you,

With warm regards,

Dr. O.V. Sanal
Hon. Secretary, IDA Kerala State.

Editorial

Dr. K. Nandakumar

Usher in an era of interdisciplinary treatment

Dentist alone cannot always solve complex oral, cranial, and facial problems from which patients suffer. This is when the dentist will traditionally refer the patient to a specialist in order to seek additional expertise. In a particularly complex case, there may be several referrals to several different specialists over the course of treatment. This multidisciplinary approach to treatment can be very effective, as one specialist cannot deal with all aspects of a complicated problem. The interdisciplinary approach brings in the collaborative element and allows all specialists involved to conduct a dialogue concerning patient care.

Interdisciplinary dentistry focuses on interaction, not only between the primary dentist and the specialists, but also between the interdisciplinary team and the patient. The patient should always be included in the process as a member of the team and should be updated regularly on incoming information and decisions. Including the patient in this way not only brings treatment to a new level, but it also provides optimal customer service from the dental practice. The interdisciplinary team creates a network of shared skills and expertise, open communication and trust. The ultimate goal is to create and perpetuate an ideal treatment environment in which the patient feels confident and comfortable, and doctors can work effectively.

The formation of an ideal interdisciplinary team requires considerable amount of time and energy. However, it will be worthwhile to the practice to create a valuable network of specialists on whom both the dentist and the patient can rely. Team members should meet at the beginning to discuss the patient's diagnosis and treatment plan together. By combining the individual skills and expertise of all the specialists, a comprehensive treatment plan can be developed. As with any sort of collaborative effort, the interdisciplinary team can benefit from a written agreement delineating all responsibilities, expectations, and financial compensation.

Interdisciplinary approaches are discussed everywhere but it is not taught effectively in our dental colleges. Associations are also not taking this matter seriously in organizing training sessions on this approach. When shall we start implementing interdisciplinary treatment in our country seriously?

Dr. K. Nandakumar
Editor, KDJ

CASE REPORT

Prosthetic full mouth rehabilitation of a patient with dental flurosis

* K. Suresh

Abstract

Full mouth rehabilitation implies enhancement of aesthetics, restoration of impaired occlusion and maintenance of a healthy periodontium. Hereby presenting a case report showing the treatment modalities of patient with discoloration of teeth and severe attrition, in a simple and systematic manner to improve aesthetics and function.

Key words: Full mouth rehabilitation, Dental flurosis, Crown lengthening

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► Introduction

Full mouth rehabilitation is a demanding treatment modality that enhances the aesthetics and quality of life of the patient. The word rehabilitate implies, 'to restore to good condition'. The term full mouth rehabilitation is used to indicate the extensive restorative procedures in which occlusal plane modified in many aspects in order to accomplish equilibrium. This also converts all unfavorable forces on teeth which can lead to periodontal problems to favourable forces which permits normal function and to induce healthy mouth. Also involves enhancement of aesthetics and maintenance of healthy periodontium.

► Case report

A 40 year old male patient came with a chief complaint of teeth discoloration and requested aesthetic enhancement. Extra oral examination revealed no significant findings. His face was symmetrical and has no muscle tenderness. Intraoral examination revealed generalized discoloration with severe attrition, and overclosure. The mandibular arch having a missing 42 and wore a removable partial denture. Maxillary arch was dentate with anterior spacing. He has a dental caries involving pulp in relation to 46. His periodontal status was good. Patient reported no deleterious habits and was not under any medication.

Radiological investigations were also performed and accordingly full mouth rehabilitation to restore aesthetics and function was planned for the patient so as to achieve optimal oral health for the patient.

Patient was informed about the treatment. After obtaining his consent, local anaesthesia was administrated and Root canal treatment was done on 46. Aesthetic crown lengthening procedure was performed to raise gingival tissue in 46 region. Patient had sent for 5 days for proper healing of the tissues.

In the next appointment diagnostic impressions were made and study cast poured using die stone. Preoperative bite registration also had done using bite registration paste [Imprint™ Bite Registration Material 3M™ ESPE™]. Local anesthesia was administrated with 2% lignocaine and after taking impressions for provisional restoration, tooth preparation was done on all teeth.

Master impressions were made using vinyl polysiloxane impression material [3M™ ESPE™]. Postoperative bite registration taken with Imprint™ Bite Registration Material 3M™ ESPE™ and sent to the lab for the fabrication of metal ceramic crown. Final temporary restorations were made using temporary crown material [Protemp 4 3M™ ESPE™] and cemented with temporary Cement [Rely X™ Temp NE 3M™ ESPE™]. Occlusal discrepancies corrected.

In the next appointment [after 3 days] a trial assessment of metal substructure was done prior to the original prosthesis to evaluate whether there is any occlusal discrepancy. Patient made to use the provisional restoration for one week

In the next appointment[that is after one week], provisional restorations are removed. Full mouth prophylaxis done and after that FPDs were cemented to prepared teeth with resin cement [RelyX™ Ultimate Adhesive Resin Cement]. Patient is advised to maintain proper oral hygiene.

► Discussion

Dental fluorosis, also called mottling of tooth enamel, is a developmental disturbance of dental enamel caused by

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the consumption of excess fluoride during tooth development. In its mild forms (which are its most common), fluorosis often appears as unnoticeable, tiny white streaks or specks in the enamel of the tooth. In its most severe form, tooth appearance is marred by discoloration or brown markings. The enamel may be pitted, rough and hard to clean. The spots and stains left by fluorosis are permanent and may darken over time. A tooth is no longer at risk of fluorosis after eruption into the oral cavity.

The severity of dental fluorosis depends on when and for how long the overexposure to fluoride occurs, the individual response, weight, degree of physical activity, nutritional factors and bone growth. The risk period for esthetic changes in permanent teeth is between 20 and 30 months of age. The recommended level for daily fluoride intake is 0.05 - 0.07 mg F/Kg/day, which is considered of great help in preventing dental caries, acting in remineralization. A daily intake above this safe level leads to an increased risk of dental fluorosis. Currently recommended procedures for diagnosis of fluorosis should discriminate between symmetrical and asymmetrical and/or discrete patterns of opaque defects. Fluorosis can be prevented by having an adequate knowledge of the fluoride sources, knowing how to manage this issue and therefore, avoid overexposure. The differential diagnosis for this condition may include Turner's hypoplasia (although this is usually more localized), some mild forms of amelogenesis imperfecta, and other environmental enamel defects of diffuse and demarcated opacities.

Conclusion

Dental flurosis can be cosmetically treated by a dentist. The cost and success can vary significantly depending on the treatment. Tooth bleaching, micro abrasion, and conservative composite restorations or porcelain veneers are commonly used treatments. Generally speaking, bleaching and micro abrasion are used for superficial staining, whereas the conservative restorations are used for more unaesthetic situations. Severe dental flurosis cases present many challenges to the restorative dentist including satisfaction of the patient's aesthetic desires, while also fulfilling occlusal and functional parameters that are essential for long term success.

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REVIEW

Comparison of three mouthwashes in Exodontia

*Ajoy Vijayan, **Joy R. Das, ***Arun V., **** O.V. Sanal

Abstract

Exodontia is one of the most routinely performed dental procedure and involves ensuring a completely aseptic environment intra operatively as well as minimizing the post operative bacterial load within the mouth thus reducing the incidence of post operative complications like pain, inflammation, trismus and alveolar osteitis. The anti bacterial mouth rinses perform a vital role in reducing such complications. The promising prospects of Herbal green tea mouthwash need to be tapped in the field of exodontia.

Keywords: Povidone Iodine Mouthwash, Chlorhexidine Mouthwash, Green Tea Mouthwash, Exodontia

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► Introduction

Surgical removal of teeth is one of the most commonly performed dental procedure. It usually involves removal of some amount of the alveolar bone and/or splitting of the teeth. One prime concern the operating surgeon should consider is to make the post operative period as hassle-free as possible. The most commonly seen sequale of surgical extraction are post operative pain and swelling, trismus and alveolar osteitis or dry socket. Alveolar Osteitis has been defined by Blum as a postoperative pain in and around the dental alveolus, which increases in severity at some stage between the first and third day post extraction, accompanied by a partial or total disintegration of the intra-alveolar blood clot, and which may be accompanied by halitosis.[1]

The major cause for these post operative complications has been attributed to the inflammation in and around the extraction socket. It has also been found out that dental extraction creates a discontinuity in the mucosa and this can lead to a bacteremia due to the presence of bacteria in the oral cavity.[2,3] Alveolar osteitis, specifically has been associated to the process of fibrinolysis within the extraction socket and this may be due to bacterial contamination of the area.[4] Intra alveolar extraction poses a 32-38% risk of causing bacteremia.[5] Hence the aim should be to prevent the bacteremia through the use of agents systematically or topically.

► Role Of Mouthwashes In Exodontia

According to Mosby, "mouthwashes are defined as medicated liquid for cleaning the oral cavity and treating mucous membranes of the mouth". Mouthwashes typically consist of an antimicrobial agent along with various other substances dissolved in a solvent, usually low concentration alcohol.

Commonly used mouthwashes are based on Chlorhexidine gluconate, povidone iodine, and special medicated mouthwashes like tranexamic acid mouthwash. Warm saline rinse also has been a time tested approach for the reduction of post-operative complications. As the concept of healthy living is gaining popularity, the use of green tea as a mouth rinse is also slowly rising along with its well established role as an antioxidant and an anti diabetic agent.[6]

No single method, either topical or systemic antimicrobials, has been very effective to reduce post extraction bacteremia, but some measures reduce the prevalence of bacteremia significantly when compared to others.[7]

Chlorhexidine mouthwash

Chlorhexidine is the most widely studied antiseptic for the prevention of bacteremia after dental procedures[8]. Chlorhexidine is a biguanide antiseptic agent that has proven its mettle in the prevention of Alveolar Osteitis as a mouth rinse and also as a bio adhesive gel. Single use of a 0.20% Chlorhexidine mouthwash has strong antimicrobial effect[9]. American Heart Association recommends the use of antiseptic mouthwash containing either Chlorhexidine or povidone iodine to reduce risk of infective endocarditis produced as a result of bacteremia from dental treatment.[10]

British Society for Antimicrobial Chemotherapy guidelines also suggest

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that a mouthwash with 0.2% Chlorhexidine gluconate administered preoperatively and held in the mouth for 1 min reduces the bacteremia post dental extraction[11]. Preoperative mouth rinse with 0.2% chlorhexidine has significantly reduced prevalence of bacteremia associated with tooth extraction.[12] Chlorhexidine in gel form remains in the area of application for a longer period of time and this ensures a greater bioavailability in the application area, and hence a prolonged release.[13] Chlorhexidine gel has been found out to produce an 11 % reduction in the incidence of alveolar osteitis following surgical removal of impacted third molar teeth.[14]

The effectiveness of Chlorhexidine is based on its property of substantivity or sustained availability and the substantivity is more when the concentration is more.[15] But the use of 1 % Chlorhexidine gel did not result in a statistically significant reduction in the incidence of Alveolar osteitis when compared to 0.2% gel, as the low concentration formulation has been thought to form a relatively stable monolayer of retained Chlorhexidine, whereas the higher concentration might have caused an oversaturation of Chlorhexidine with a rapid release of its excess.[16,17]

Povidone Iodine Mouth Wash

Polyvinylpyrrolidone iodine (PVP-I; povidone iodine) is a highly potent antiseptic solution known for its bactericidal activity against a wide spectrum of pathogens. It is also found to possess a haemostatic and an anti oedematous property.[18,19] Povidone iodine decreases bacteremia post extraction more effectively compared with normal saline.[20] The anti inflammatory effect of povidone iodine may be due to inhibition of the production of reactive oxygen species and oxygen consumption by poly morpho nuclear cells, and inhibition of human complement, mast cell degranulation, nitric oxide, and tumor necrosis factor-alpha production.[21] Povidone iodine rinses results in an immediate fall in the salivary bacterial count but the effect is not lasting, because it lacks the property of substantivity.[22] Antimicrobial povidone iodine used for oral cavity prophylactic care associated with lower incidence of infections, when compared to normal saline mouthwash.[23] Gargling with povidone iodine has been found to reduce the bacterial count of oral cavity immediately following the rinse and thus reduce the number of bacteria transported into the trachea during oral intubation.[24] Because of its shorter lasting actions Povidone iodine has been recommended as a irrigant or as a topical antiseptic rather than as a mouthwash for post extraction use.

Green Tea Mouthwash

Green tea (Camellia sinensis) is a popular drink rich in poly phenols, which possess various properties including antioxidant, anti-diabetic, anti-mutagenic, antiviral, antibacterial, and anti-inflammatory.[25] Studies have shown the benefits of green tea in periodontal disease, oral surgery, and caries.[26,27] As a result of the anti-inflammatory properties conferred by the aromatic components of green tea, it could reduce the biochemical mediators of inflammation in the gingival tissues surrounding the mandibular third molar, resulting in reduction in the pain levels and the amount of swelling experienced.[25] Certain compounds of green tea known as catechins (epigallocatechin (EGC), epigallocatechin gallate (EGCG), and epicatechin gallate (ECG)) have antibacterial property against the bacteria involved in periodontal diseases and caries. [28] Green tea also contains carotenoids, tocopherols, ascorbic acid, minerals such as Chromium, Manganese, Selenium or Zinc and certain phyto chemical compounds with potent anti oxidant effects.[29]

Green tea mouth rinse has been found to be effective in controlling the pain and trismus of acute peri coronitis and these effects could be attributed to its antibacterial properties as well as its anti inflammatory activity. Green tea also possess an anti oxidant property thus acting as an free radical and reactive oxygen species scavenger. Thus it further improves the healing of extraction socket. Postoperative pain is predominantly due to the trauma during surgery as there is an increase in the biochemical mediators of pain and inflammation like prostaglandins, histamine, bradykinin, and serotonin.[30] NSAIDs have been found to be effective in reducing these inflammatory mediators and their effects. But various adverse effects like peptic ulcer, gastrointestinal bleeding or perforation, renal function impairment, and platelet function inhibition have been related to NSAID.[31] Green tea mouthwashes do not have any such adverse effects.

▶ Discussion

Chlorhexidine, the most widely used mouthwash formulation for based on its property of substantivity has shown to be an effective agent in reducing the incidences of alveolar osteitis. Chlorhexidine, also available in gel formulation remains in the area of application ensuring more duration of action because of its local concentration. Gel formulation is a convenient method to apply postoperatively in the extraction socket further improving patient compliance. Povidone Iodine is another mouthwash offering excellent antiseptic and anti oedematous effects. It acts by inhibiting production of reactive oxygen species and inhibition of human complement. It has a shorter duration of action and hence despite of its antiseptic property it is not a successful mouthwash. But povidone iodine when used as an irrigant provides excellent results reducing post extraction complications.

Green tea mouthwashes have an excellent anti bacterial, anti inflammatory and anti oxidant effects. It is highly effective

in reducing the symptoms of peri coronitis and minimizes the post extraction complications as well. The number of analgesic tablets taken by patients after surgical extraction was less in the patients who used green tea mouthwash compared to a control group, confirming its anti inflammatory property.[26] The presence of tannins in this plant extract makes it as a potential treatment option for stopping gingival bleeding as well as post extraction bleeding.[32] With an added astringent action green tea is a promising option in the field of exodontia.

► Conclusion

Use of mouthwashes after exodontia promise to be an option in reducing the post operative complications and is found to have a long term effect in reducing the salivary micro flora along with anti bacterial and anti inflammatory properties. Rinsing with green tea does not possess the side effects of antibiotics (including bacterial resistance) and Chlorhexidine (including taste changes and oral discoloration). Moreover, green tea is commonly available in the country and is cost effective than other mouthwashes. Since it is purely a herbal product patient motivation for the use is further improved. But enough studies on the effect of green tea mouth wash on the complications of exodontia are lacking and future researches should be focused on its use in exodontia.

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Crestal bone preservation in implantology

*Swapna C., **Afsa Ahmed, ***C. Pradeep Kumar, *Sheejith M, ****Ranjith M.

Abstract

Maintenance of crestal bone around dental implants is one of the critical factors that affect its longevity and aesthetic soft-tissue architecture. The level of bone crest surrounding the implant is of utmost significance to determine osseointegrated implant success, as preservation of marginal bone height is highly important for long-term dental implant survival. Preservation of such bone is a multifactorial process. Various approaches have been described in the literature to prevent the crestal bone loss, including platform switching, non-submerged approach, scalloped implants, implant design modifications, progressive loading, immediate implant placement, etc. The purpose of this paper is to review all the possible methods to preserve the crestal bone, when each method should be used, and their success rates in an attempt to address this complex problem of crestal bone resorption. The technique to be followed in a given case will depend upon the density of bone, force factors by the patient, bone volume, and amount of soft tissues etc.

Keywords: Crestal bone loss, Marginal bone, Osseointegration, Implants

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► Introduction:

The face of prosthetic dentistry has changed drastically with the incessant progress of implantology. Implants have become a very important part of prosthodontic treatment in both edentulous and partially edentulous patients. Success rates although very high for dental implants, it depends on various factors. The practice of implant dentistry requires proficiency in all facets whether it be patient selection, treatment planning, surgery or the prosthetic element. Thus it is not just concerned with precise surgical skills, but hugely dependent on the knowledge, acumen, clinical experience and intelligence of the clinician to choose the appropriate implant design to achieve the stable peri-implant tissue health postoperatively[1].

Osseointegration is defined as the apparent direct attachment or connection of osseous tissue to an inert, alloplastic material without intervening connective tissue[2]. Although the achievement of osseointegration after implantation is important in obtaining treatment success, it does not necessarily indicate that this bone biomaterial interface will keep its integrity throughout the patient's life, since a large number of factors play a role in the kinetics of mineralized tissue. Various clinical and radiographic criteria have been established to decide the outcome of implant supported prosthesis therapy. These criteria include mobility, pain, peri-implant bone loss at implant level, and suppuration and bleeding at the peri-implant soft-tissue level. Of particular importance is the crestal bone loss after implantation occurring during the first year after implant placement[3]. Marginal bone loss not only hampers the hard tissue support to implant but can also result in loss of interdental papilla and hence can affect the esthetics by altering the gingival contour. Thus its occurrence can influence esthetic outcome of implants and its progression can eventually lead to failure of implants. However, early peri-implant bone loss has been commonly observed as a consequence of physiologic bone remodeling during initial phase of healing. Crestal bone loss may be attributed to several factors including

a. excessive occlusal forces
b. trauma to bone during the surgical procedure
c. inflammation/ infection
d. implant exposure during soft tissue healing
e. microgap at implant – abutment interface
f. invasion of biologic width
g. implant neck design, particularly the crest module profile[4].

In general crestal bone loss makes the way for further bacterial accumulation that tends to cause secondary peri-

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implantitis. This process in turn can lead to occlusal overload due to loss of bone support and results in additional crestal bone loss which ultimately lead to failure of implant[5].

This paper reviews all the possible methods described in literature to preserve and/ or prevent the peri-implant crestal bone loss. The various concepts include platform switching, implant crest module design, implant design modifications, laser-lok microtexturing, surgical flap design, immediate implant placement, and progressive loading.

1. Platform switching:

The concept of "platform switching" explains the use of a smaller-diameter abutment on a larger-diameter implant collar. This connection shifts the perimeter of the implant–abutment junction (IAJ) inward toward the central axis (i.e., the middle) of the implant (Fig. 1).

The mechanism by which this stepped effect produced by platform switching may contribute in maintaining the crestal bone height can be because of four main reasons:-

a. Shifting of the inflammatory cell infiltrate inward and away from the adjacent crestal bone. (theorized by Lazzara and Potter[6])
b. Maintenance of biological width and increased distance of IAJ from the crestal bone level in the horizontal way.
c. The possible influence of microgap on the crestal bone is reduced.
d. Decreased stress levels in the peri-implant bone[7].

Various studies comparing platform and non-platform switched implants have been done in literature. Markus Hurzeler et al compared crestal bone loss around platform switched and non-platform switched implants. They found the mean crestal bone loss in platform switched implants to be 0.22 mm and it was 2.02 mm for non-platform switched implants. They also concluded that reduction of the abutment of 0.45 mm on each side was sufficient to avoid peri-implant bone loss. An average of 1–2 mm of bone loss occurs in non-platform switched implant[8].

Fernandez - formoso et al conducted a randomised controlled study to assess radiographically marginal bone level alterations in implants restored according to the platform switching concept compared with traditionally restored implants. Mean of bone loss with platform-switching implants was 0.01 mm, and the mean of bone loss with standard platform implant was 0.42 mm. Outcomes of this study indicated that the platform-switching design could preserve the crestal bone levels. There was a statistically significant difference in marginal bone loss between the control group and the test group which was approximately 0.38 mm higher for control group[9].

2. Implant neck / crest module profile

Crest module is that portion of a two-piece metal dental implant, designed to hold the prosthetic components in place and to create a transition zone to the load bearing implant body. The design of crest module is unique making it compatible with both hard and soft tissues where the highest amount of bone stress is concentrated. Crest module is said to have a surgical influence, biological width influence, loading profile considerations, and a prosthetic influence. Hence, the design of this portion of an implant plays a critical role in crestal bone preservation and the overall success of an implant[10].

a) Shape and size

Based on current literature, implant collar designs varying from straight /parallel sided to flared /divergent and tapered/ convergent have been proposed (Fig. 2). According to Misch, implant crest module with cylinder collar transfers primarily shear forces to the bone whereas an angled crest module may load with a compressive component. Studies show that cortical bone is strongest when loaded in compression, 30% weaker to tensile loads, and 65% weaker to shear loads. Thus a parallel –sided crest module loses marginal bone during occlusal load conditions because it loads the bone in shear [10].

Wan-Ling Shen et al evaluated divergent, straight and convergent collar designs and demonstrated lowest stress and strains for the divergent collar designs, followed by straight and convergent. The reason being that divergent collar has the maximum surface area of all the three designs hence transferring the least force under similar loading conditions[11].

The crest module diameter should be slightly larger than the outer thread diameter of an implant body thereby providing initial stability to implants, especially soft bone. This larger diameter will seal the osteotomy site completely acting as a barrier for an ingress of bacteria and fibrous tissue during the initial healing. It also increases the surface area thereby decreasing the stress at the crestal region. A larger platform additionally would aid in reducing the stress transferred to the abutment screw for the abutment connection[10].

b) Submerged vs. non-submerged approach

It has been stated that a certain width of peri-implant mucosa is required to enable a proper epithelial–connective tissue attachment and, if this soft tissue dimension is not adequate, crestal bone resorption will occur to ensure the establishment of attachment with appropriate biological width. Thus literature states that non-submerged implants have better crestal bone preservation (Fig. 3).

The reasons for less resorption in non-submerged approach which have been cited in the literature are the following:

a) Elimination of the apical migration of junctional epithelium during second-stage surgery which could disrupt the biological width.
b) Maintenance of biological width as microgap is placed away from the crestal bone.
c) The additional advantage of one-piece non-submerged approach is the absence of microgap and micromovement which will maintain the biological width, thereby preserving the crestal bone 5.

There are basically three approaches for implant placement:-

a) Submerged approach in which implant is placed below or at the level of the bone, requiring second surgery to place the abutment.
b) Non-submerged two-piece implants in which both the implant and abutment are placed during the first stage surgery, eliminating the need for second surgery.
c) Non-submerged one-piece implants in which implant and abutment are there as one piece with no micromovement between implant and abutment and no microgap. Moreover, there is no need of second surgery[5].

Histological and radiographic studies by Herman et al have proven that a crestal bone loss of about 2 mm occurs with the submerged, two-pieces approach, dependent on the location of microgap, and minimal or no resorption occurs with non-submerged, one-piece implants. They demonstrated that a rough/smooth border on the surface of one-piece implants determines the crestal bone levels adjacent to such implants. All two-piece implants exhibited the crestal bone loss depending on the location of microgap. This was independent of whether the implants were placed by submerged or non-submerged technique[12].

c) Scalloped implants

The scalloped implant, a design by Noble Perfect (Noble Biocare AB, Zurich, Switzerland), enables the surgeon to place the implant in the residual bone which is characterized by remaining interproximal osseous peaks. The implant is designed such that interproximal peaks of the bone apposition area are in contact with interproximal peaks of the residual bone.[5] This design intends for the shoulder of an implant to be placed above the bone on the proximal area to minimize bone loss and lower in the buccal and lingual aspects, so there is minimal esthetic compromise due to an implant collar exposure in situations with differential gingival height between the facial and proximal aspect of an implant site[13] (Figure 4). It has been found that there is mixed review in literature on whether scalloped crest module design increases or decreases the crestal bone loss.

McAllister et al performed a radiological study in which they found that the use of scalloped implants enhances the interproximal bone levels as well as the esthetic outcome[14].

Kan et al found that though favourable implant success rates and peri-implant tissue response can be achieved with scalloped implants in the esthetic zone, bone was not regularly maintained at the original levels around the scalloped area of the implants[15].

d) Surface characteristics and Microthreading

The concept of smooth / machined collar was developed for a reduction in plaque accumulation and to aid in an improved hygiene. However, studies have reported that on an average, the initial sulcus depth around an implant is about 3mm above the bone approximately and the extent

Fig. 1 Platform switched and platform matched design

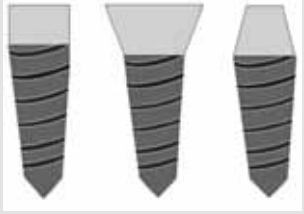

Fig. 2 Implant crest module design (a) Parallel collar, (b) Divergent collar, (c) Convergent collar

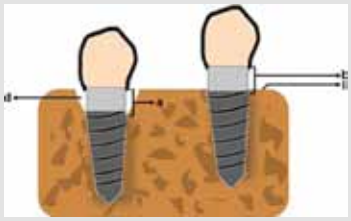

Fig. 3 Submerged and Non-submerged approach (a- submerged implant collar, b- non-submerged implant collar, l- bone level, a- crestal bone loss).

Fig. 4 Scalloped neck design

Fig. 5 Thread shapes for implant design

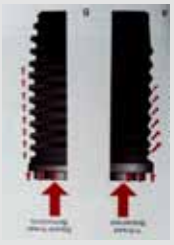

Fig. 6 Implant thread design and type of force transmitted to implant bone interface

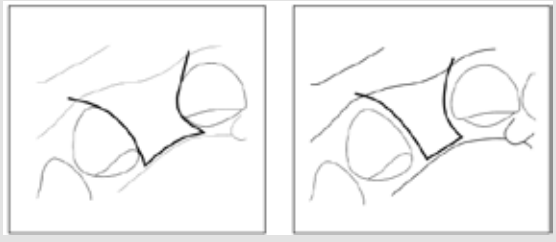

Fig. 7 Widely mobilized flap and limited flap

to which the brush bristles can reach is only about 0.5-1mm. A significant drawback of smooth collar stems with its questionable integration with the hard tissue. When the smooth collar of an implant is placed under the crest of the bone, increased shear forces are created. Bone being 65% weaker to shear forces resorbs, leading to marginal bone loss with an eventual pocket formation. Hermann et al examined the peri-implant soft tissue dimensions at varying locations of a rough / smooth implant border in one-piece and two-piece implants in relation to the crest of the bone, when submerged and non-submerged techniques were employed. Their findings suggest a coronal location of the gingival margin with the biologic width dimensions being more similar to natural teeth around one-piece non-submerged implants, compared to either two-piece non-submerged or two-piece submerged implants. An absence of bone loss was also observed when the implants with rough crest modules were placed at the level of crestal bone[16].

Minute microthreads on implant neck were first introduced on the Astra Tech Implant System TM in 1992. These microthreads increases the surface area and leads to well established bone-to-implant contact.[1] According to a Finite element analysis (FEA) study, principal stresses at the bone–implant interface in microthread model were perpendicular to the lower flank of each microthread irrespective of the loading angle, whereas in smooth model stresses were affected by the loading angle and directed obliquely to the smooth interface, resulting in higher shear stress. Therefore although peak principal stress values were higher, the peri-implant bone volume exhibiting a high strain level was smaller around the microthread implant. Hence, microthreading at the collar of the implant provide more compressive and less shear stress leading to optimal occlusal load distribution, thereby counteracts marginal bone resorption and maintains the crestal bone levels. This implant design can improve the prognosis of implant therapy by efficiently preventing crestal bone resorption and even provide long-term esthetic result. The survival rate of the implants with rough neck and microthreading (100%) is found to be higher than those with only rough neck (94.5 to 100%) or polished neck (87 to 97.7%)[17].

3. Implant design modifications

a) Implant geometry

There are basically two different geometric designs of implants body, threaded and cylindrical implants. Increasing the functional surface area of an implant will better distribute the stresses, resulting in lesser forces at the crest. Use of threaded implants than the cylindrical implants for crestal bone preservation has been documented in the literature. The threaded can be v- shaped, square, buttress, and reverse buttress[10] (Fig. 5).

Thread depth, thread face angle, and thread pitch are some of the varying geometric patterns that determine the functional thread surface and affect the biomechanical load distribution of the implant. The influence of threads can be easily understood as the greater the number of threads present as well as greater the depth of the threads, the more is the functional surface area available. It has been found that the shear force on a V-shaped thread-face is 30º which is approximately 10 times greater than the shear force on square thread. Therefore, square-shaped threaded implants will concentrate lesser forces at crestal bone as well[5]. According to Misch, under axial loads to a dental implant, a V – thread face angle loads the bone at a 30-degree angle which results in more shear loads to the bone. The reverse buttress thread face is similar to the V-thread face because of the similarity in the inferior portion of the thread face angle. Under axial loads to an implant, a buttress or square-shaped thread would primarily transmit compressive forces to the bone[10] (Fig 6).

b) Implant dimensions

Increasing the implant length and width increases the surface area but it has been found that implant width is more important for crestal bone preservation than the implant length as stress values, and concentration areas decreased for cortical bone when implant diameter is increased[5]. According to Misch, improved functional surface area per unit length of the implant (in contrast to total surface area) is beneficial to reduce the mechanical stress to bone. The diameter of an implant may also affect functional surface area because the length requirements of the implant body are affected by the width of the implant[10].

Ivanoff et al found that 6mm long implants with a 5mm diameter had a failure rate of 33% in the mandible and 10% in the maxilla. The 8-mm long, 5-mm diameter implant yielded 33% and 25% failure rates in the mandible and the maxilla respectively. On the other hand, the longer 10-mm and 12-mm implants that were 5-mm in diameter yielded no mandibular failures but 10% failure rate in the maxilla. Increase in implant diameter alone is not sufficient to improve survival[18].

Winkler et al studied the influence of implant diameter and length on implant success rate. Their results on 3-year survival and stability of various implant lengths and diameters were 90.7% for 3–3.9 mm and 94.6% for 4–4.9 mm implants. Also, longer implants had significantly better survival rates as compared with shorter implants[19].

4. Laser-lok microtexturing

Laser-Lok is a dental implant surface treatment developed to create the optimal implant surface design. It includes series of precision-engineered cell-sized channels which are laser-machined onto the dental implant collar's surface. These surface microchannels are in the form of microgrooves with

specific size and depth to perform definite functions. 8 μm microchannels which are 6 μm deep, present in upper zone of implant limited epithelial cell downgrowth by inhibition of cell migration and enhanced soft tissue attachment. 12 μm microchannels which are 12 μm deep present in lower zone of implant inhibited the fibrous tissue growth and enhanced proliferation of osteoblastic cells[1]. According to a recent Finite Element Analysis (FEA) study, this design demonstrated reduced stress which is associated with off axis loading, that usually occur in collar area[20]. Histological evaluation of 3 retrieved immediately loaded Laser-Lok implants demonstrated more stable crestal bone level after 4 months[21]. In several clinical trials also Laser-Lok surface has confirmed its role in preventing crestal bone loss[22,23]. Laser-Lok design has been incorporated even to the implant abutment. Such abutments created a biologic seal to establish superior osseointegration and supported the periimplant health even in implants without Laser-Lok surface[20].

5. Flap design

Surgical procedures during implant placement require elevation of a mucoperiosteal flap which causes transitional changes in the blood supply to the crestal bone. When the periosteum is reflected the cortical blood supply is affected and osteoblasts death on the surface of the bone occurs. The blood supply is reestablished when the regeneration of the periosteum occurs. Apart from the periosteum the crestal bone is supplied by the underlying trabecular/cancellous bone. Thus in spite of periosteal flap reflection vascular supply is obtained to some degree from trabecular bone. It is observed that greater the trabecular bone under the crestal bone, the less the crestal bone is seen to resorb[24].

Flap design is of particular importance in anterior esthetic zone since crestal bone preservation helps in preservation of interdental papilla. Thus the anterior maxilla represents a therapeutic challenge for single tooth replacement with implants. German Gomez-Romen conducted a prospective study to determine to what extent the surgical flap used during implant placement influences peri-implant interproximal crestal bone loss. Two flap techniques were utilized for placement of single-tooth implants: the conventional technique with a widely mobilized flap (WF) that included the interdental papillae, and a limited flap (LF) design that protected the interdental papillae. The mean interproximal crestal bone loss was statistically significantly lower after the use of an LF than with a WF procedure (Fig. 7). At the time of crown placement, the mean interproximal bone loss was 0.29 mm (SD 0.46) in the LF sites, and 0.79 mm (SD 0.87) for the WF sites[25].

Over the past decade in medicine the concept of minimally invasive surgery has taken a frontline advantage in diagnostic and surgical techniques. In implantology the advent of flapless procedure is one such advancement, in which a dental implant is installed through the mucosal tissues without reflecting a flap. This approach has advantages for soft tissue healing and patient comfort because it is less traumatic and less time consuming compared to an open-flap approach. With less postoperative bleeding and swelling, it offers the possibility to adjust the provisional appliance immediately. A disadvantage of flapless surgery is that the true topography of the underlying available bone cannot be observed because the mucogingival tissues are not raised. Another concern regarding flapless technique is the presumption that some amount of epithelial tissue could be carried to the osteotomy site which can interfere with osseointegration[26, 27].

6. Immediate implant placement

Placing immediate implants after tooth extraction will help in preserving the denser bone and preventing the atrophy and results in less loading of the marginal bone.

Schwartz-Arad and associates compared the crestal bone resorption adjacent to immediate and delayed placed implants. They found that after an average of 3.5 years, the immediate implants had less crestal bone loss with an average of 0.61 mm compared to the delayed implants with the loss of 0.89 mm[28].

Yournis et al compared crestal bone remodeling following both immediate and delayed placement of titanium dental implants in the extraction sockets. The width and the depth of the defects located in mesial and distal sites of the implants were evaluated radiographically using computer software. The mean reduction of bone defects was 48% in the case of immediately placed implants, but it was only 17% in the case of delayed implants. They concluded that immediate implantation offers advantages of significant reduction in crestal bone resorption[29].

7. Progressive loading

The progressive loading of implants was first suggested by Misch in 1980. A study by Manz found that the crestal bone loss after successful bone integration was related directly to the bone density. An implant may fail if the stresses applied exceed the physiologic limits of the bone density present around the implant. A gradual and progressive increase in the loads during prosthetic fabrication stimulates an increase in density. This will result in definite preservation of crestal bone[5].

Appleton et al determined the effectiveness of progressive loading procedures on preserving crestal bone height and improving peri-implant bone density around maxillary implants. The mean values of crestal bone height loss at 12 months were 0.2±0.27 mm for the progressively loaded implants, and 0.59±0.27 mm for the conventionally loaded implants. The peri-implant bone around progressively loaded implants demonstrated less crestal bone loss than the bone around

conventionally loaded implants. The peri-implant density measurements of the progressively loaded implants showed continuous increase in peri-implant bone density by time[30].

► Conclusion:

The success of dental implants is highly dependent on integration between implant and intraoral hard and soft tissues. An understanding of the etiology of crestal bone loss is very important for the implant success. Once the clinician has identified the sources of forces on the implant system, the treatment plan should be designed to minimize the negative impact on the implant and the bone. Crestal bone preservation should be thought of starting from the design of the implant to be placed because it is of utmost importance in the long term survival of the dental implant. Various techniques and approaches have been reviewed in the paper. The best technique to be followed will depend upon the density of bone, force factors by the patient, bone volume, and amount of soft tissues etc., and hence depends on the clinical situation as each technique cannot be applied to every clinical situation.

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Dental caries status and treatment needs of the Permanent first molars in 12 year old School children in Trivandrum city

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Abstract

First permanent molar has been quoted as being the most caries-prone tooth in the permanent dentition, probably as a result of its early exposure to the oral environment. Loss of first permanent molars, because of dental caries, negatively affects both arches and has adverse effects on occlusion.

The present research was a cross sectional study conducted in randomly selected schools of Government and Private (aided and unaided) sectors. The sample size of the study was 328. Dental caries status and treatment needs of first permanent molars were recorded. Observed findings of first permanent molars include 83.8% decayed, 1.5% filled molars and 12.5% with deep pits and fissures. Treatment needs of first permanent molars include one surface and two surface fillings together as 76.7%, pulp care and restoration 3.6%, extraction 1.2%, fissure sealant 12.5% and full coverage restorations 13.6%.

Key words: dental caries status, treatment needs, permanent first molars

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► Introduction

The first permanent molars are the most important teeth, with a key role in occlusion from a functional and developmental point of view. It should be noted that occlusal surfaces of permanent first molars has several pits and fissures that make them susceptible to dental caries. Besides, it is reported that occlusal caries comprise 90% of dental caries in children and adolescents. In addition, they are the first permanent teeth which erupt in the posterior area of the oral cavity.

More than 50% of children over 11 years have some experience of caries in such teeth.

► Aims and objectives

To assess the dental caries status and treatment needs of permanent first molar in 12 year old school children.

► Review of literature

Hata et al[1] studied the prevalence of dental caries in first permanent molars in 220 children who have been under regular dental care at the Paediatric Dental Clinic, Tohoku University School of Dentistry. The caries prevalence rate of first permanent molars reached approx. 50% five years after the eruption. Pit and fissure sealants were applied to approx. 75% of first permanent molars and the occlusal caries were reduced as a result of sealing. Hunter et al[2] investigated changes in the condition of first permanent molars in a total of 453 South Wales school children at the ages of 11-12. 89.6 per cent of children had all four first permanent molars, while 3.3 per cent had already lost these teeth. Of those first permanent molars present, 61.7 per cent had some caries experience. Noronha JC et al[3] investigated among children in the initial mixed dentition phase the presence of clinical signs that might eventually function as more sensitive indicators of the development of caries disease. The first permanent molars of the schoolchildren studied comprised 87.3% of the affected surfaces recorded in the DMFS, suggesting that the development of new lesions was preferentially located on the surfaces of the first permanent molars. Masoumeh Ebrahimi et al[4] conducted a cross-sectional descriptive study on 700, 7-9 year-old students in primary schools in Mashhad. A total of 95.3% of the children required dental treatment in first permanent molars. Fissure sealant application and filling were the treatments most required in all age groups. Khalid H.M. Al-Samadani et al[5] studied the carious status of the first permanent molar (FPM) in 432 school children (aged 9–12 years) of Jeddah, Kingdom of Saudi Arabia. In total, 24.5% had all of their FPMs sound and 6% had all FPMs carious. The prevalence of sound FPMs varied according to age with the highest (33%) amongst the nine-year olds and the lowest (16.5%) in the oldest children (12 years). Kadambari et al[6] studied the caries status of first permanent molar in 200 school children

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aged (9-12 years) from randomly selected primary schools from south Bangalore area, India. The prevalence of caries in four first permanent molars varies according to age with highest among the twelve year old and lowest among the 9 year old children.

Methodology

Cross sectional community based study included all 12 year old school children in the selected Government and Private schools in Trivandrum city which forms the sample unit of the study meeting the inclusion and exclusion criteria. Sample size obtained was 328

The children were examined in their respective schools by Type III examination by a single trained examiner and children sitting on ordinary chairs with good natural day light illumination facing away from direct sunlight, with sterile plane mouth mirror and explorer. WHO oral health assessment form (1997), Dentition status and treatment needs form by WHO (1997) was used to record the observed data. The assessment involved recording of scores for status of permanent molars.

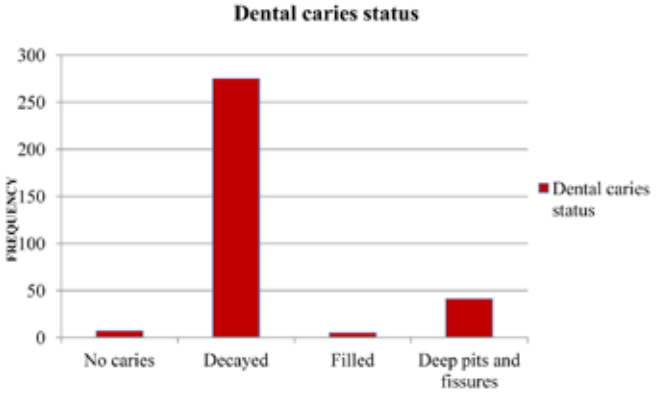
Results

The results regarding dental caries status and treatment needs of permanent first molars among 12 year old school children in Trivandrum city were tabulated in Tables I and II and given in Graphs I and II.

Table I: Dental caries status of first permanent molars

Description	Frequency	Percent
No caries	7	2.1
Decayed	275	83.8
Filled	5	1.5
Deep pits and fissures	41	12.5
Total	**328**	**100**

Graph I: showing the dental caries status of first permanent molars



Discussion

Carious process in the first permanent molars starts as soon as they erupt in the oral cavity and can be clinically observed within 1-2 years[6]. The first permanent molar has been quoted as being the most caries-prone tooth in the permanent dentition, probably as a result of its early exposure to the oral environment. More than 50% of children over 11 years have some experience of caries in such teeth[7].

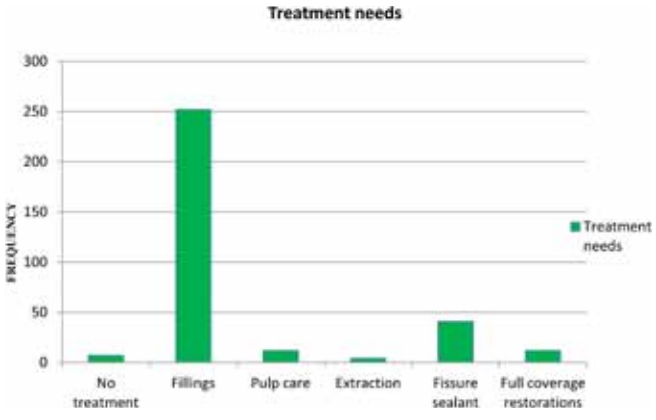
In the present study, first permanent molar dental caries status and treatment needs were assessed as the caries status of this tooth will reflect on the future caries status of the child. Many studies have reported that aging is accompanied with an increase of caries prevalence of the first permanent molar among children.

In the present study, observed findings of first permanent molars include 83.8% decayed, 1.5% filled molars and 12.5% with deep pits and fissures. Treatment needs of molars include one surface and two surface fillings together as 76.7%, pulp care and restoration 3.6%, extraction 1.2%, fissure sealant 12.5% and full coverage restorations 13.6%.

Table II: treatment needs of first permanent molars

Description	Frequency	Percent
No treatment	7	2.1
Filling	252	76.7
Pulp care and restoration	12	3.6
Extraction	4	1.2
Fissure sealant	41	12.5
Full coverage restorations	12	3.6
Total	**328**	**100**

Graph II: showing the treatment needs of first permanent molar



In a study by Khalid H.M. Al-Samadani et al[5] regarding the prevalence of caries in 9–12-year olds, 80% of first permanent molar in the 12-year-old children were decayed. Noronha et al[3] and Wyne et al[8] reported that 87% and 86% of 12-year-old children had the permanent first molar affected by caries respectively. These studies were in accordance with the present study.

It is clear from these studies that the carious process in the FPM starts as soon as they erupt and can be clinically observed within 1-2 years. A previous study done in Japan[1] during 1990 reported a 50% prevalence of caries in the FPM amongst 11- and 12-year-old children. This was considerably lower than the 83.8% found in this study. Possible reasons for the high prevalence could be due to changes in socioeconomic factors between the two groups, the Japanese culture which differs from Indian culture and the diet which differs among these nations. These results emphasize the importance of early intervention and educational programmes which should be implemented even before the FPMs erupt (4- to 5-year-old children).

Our study showed that 97.8 % of the children needed some type of treatment in permanent first molars which was comparable to the study conducted by Masoumeh Ebrahimi et al[4]. A study conducted in Nigeria showed that the first permanent molars accounted for 42% of all extractions due to caries which is the highest when compared to other teeth as reported by G. A. Chukwu et al[9] and is higher percentage compared with the present study.

The reasons for the high caries prevalence in the first permanent molars could be due to various reasons such as the deep pits and fissures on the occlusal surface, the large-sized crown which leads to accumulation of acid produced by bacteria, and the early eruption of the tooth. An early preventive program like application of fissure sealants and the use of fluoride among primary school children could help reduce the prevalence of caries in these teeth[10].

Improvements in diagnostic techniques, restorative materials and techniques and high parental expectations, dentists should consider restoration of first permanent molars with extensive caries and pulpal symptoms during the mixed-dentition stage. Evaluating the treatment needs of these teeth will also aid in formulating an effective preventive programme.

It is however alarming to note that over 95% of children in this age group require either dental restorations or extractions. Given the cost of dental treatment, the time, and the resources required, the treatment will be extremely costly for the government and emphasizes the need and importance for preventive programmes.

Conclusion

Based on the observations of the study, the following conclusion can be drawn:

- 83.8% of the study participants had decayed first permanent molars, 97.9% of them needed one or other type of treatment for decayed first permanent molars.

Recommendations

- ✓ An early prevention program at the age of 6-7 years will reduce caries prevalence in permanent molars. Restorative and preventive regimens for teeth must be based on frequent recall examinations of not more than 6 monthly intervals to reduce dental decay and further caries progress in the first permanent molars among children.

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Current perspectives in the use of platelet rich fibrin in open apex

* Divya Chandukutty, ** Faizal C Peedikayil, ***Chandru T P

Abstract

Regenerative endodontic procedures are biologically based procedures designed to restore function of a damaged and nonfunctioning pulp by stimulation of existing stem and progenitor cells present in the root canal and/or the introduction and stimulation of new stem and dental pulp progenitor cells into the root canal under conditions that are favorable to their differentiation and reestablishment of function. Regeneration of pulp-dentin complex in an infected necrotic tooth with an open apex is possible with the use of Platelet rich fibrin (PRF). PRF has the potential advantage of creating a bioactive construct that stimulates the local environment for differentiation and proliferation of these stem and progenitor cells and are showing encouraging results.

Key words: Regeneration, PRF, Open apex, Apexification, Dental pulp progenitor cells

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► Introduction

Treatment of open apex is always a challenge for clinician. Endodontic management of teeth with open apex includes periapical surgery and retrograde sealing, calcium hydroxide induced apexification and recently, placement of mineral trioxide aggregate (MTA). Most of the clinicians rely on traditional apexification with calcium hydroxide. Mineral trioxide aggregate provides an artificial barrier; however, it also has the limitations of non-reinforcement of root canal dentin and a high cost.[1] A novel concept of revascularization of open apex nonvital, infected teeth was introduced to overcome the limitations. Knowledge of pulpal biology, dental trauma and tissue engineering can be applied to deliver biologically based regenerative endodontic procedure to immature teeth to help in continued root development.[2] Regeneration of pulp dentic complex is undergoing continuous research and the results are promising.

Regenerative Endodontic procedures are defined as biologically based procedure designed to replace damaged structures including dentin and root as well as cells of pulp dentin complex.[3] The common procedure of regenerative endodontics is intra canal disinfection using copious irrigation, placement of antibiotic pastes and formation of a sterile blood clot inside the pulp cavity. Studies show that there are pleuri potent stem cells at the apex of young tooth which can proliferate under sterile conditions to help in regeneration.[3,4] It uses the concept of tissue engineering to restore the root canal into a vital state allowing the continued development of tooth into the surrounding tissue.

The understanding of physiological properties of platelets has led to lot of therapeutic applications Platelets isolated from the peripheral blood acts as autologous source of growth factors. In general medical practice, platelet concentrate which is derived from blood can be used for the prevention and treatment of bleeding.[5,6] Regenerative potential of platelets have been studied because of the release of growth factors trapped in the fibrin matrix which, acts as a stimulant for mitogenic response in the periosteum and are responsible for bone repair during the process of normal wound healing.[7] A wide range of activities mediate and regulate the healing process of soft and hard tissues but understanding the entire process is still incomplete. Platelet-rich fibrin (PRF) is an immune and platelet concentrate collecting on a single fibrin membrane, containing all the constituents of a blood sample which are favourable for healing and immunity. PRF represents a new revolutionary step in the platelet gel therapeutic concept and is being used in dentistry with high success.[7,8,9 10]

► Evolution

Rose et.al. was the first to describe the potential of platelets to stimulate growth in 1974. The development of platelet concentrate as a bioactive surgical additive, stems from the use of fibrin adhesives. Over the last few decades

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medical science has recognized several components in blood, which are a part of the natural healing process, and when added to wounded tissues or surgical sites, have the potential to accelerate wound healing. Fibrin glue was first described in 1970 and is formed by polymerizing fibrinogen with thrombin and calcium. It was originally prepared using donor plasma; however, because of the low concentration of fibrinogen in plasma, the stability and quality of fibrin glue was low.[11] These adhesives can be obtained autologously from the patient or can be obtained commercially, the latter carrying a small risk of disease transmission.[8]

PRP is an autologous modification of fibrin glue, derived by methods that concentrate autologous platelets. It is an easily available and is a rich source of growth factors to support bone and soft tissue healing. PRP is a simple strategy to concentrate platelets or enrich natural blood clot. A natural blood clot contains 94% red blood corpuscles (RBCs), 5% platelets and 1% white blood corpuscles (WBCs), while PRP contains 95% of platelets.[12] PRP obtained from autologous blood is used to deliver growth factors in higher concentration to the site of bone defect or a region requiring augmentation. The drawbacks of PRP include biochemical blood handling with addition of anticoagulants.[10]

The PRF is a second generation platelet concentrate which is an improvement over traditionally prepared PRP. PRF was first developed in France by Choukroun and Dohan in 2001.[13,14]

► Properties of PRF

PRF consists of platelets, cytokines and the fibrin matrix. They play the key role in determining the biological properties of PRF. It also Contains growth factors including transforming growth factor beta, vascular endothelial growth factor, and platelet-derived growth factor.[15]

Platelet rich fibrin stimulates osteoblasts, gingival fibroblasts and periodontal ligament cells proliferation as a mitogen. Platelet rich fibrin is an immune platelet concentrate, collecting all the constituents of a blood sample favorable for healing and immunity on a single fibrin membrane. Does not dissolve quickly after application and is completely natural. The low cost and greater ease of the procedure makes it attractive. PRF can be produced in large quantities and is Completely autologous and biocompatible. Platelet rich fibrin membrane has a soft consistency and it inherently contains some amount of moisture, still it serves as a good matrix material.[7,13-16]

Cytokines contains a number of growth factors (TABLE 1) like platelet derived growth factors (PDGF), transforming growth factorB1 (TGF B1), insulin like growth factor (IGF) which makes it an ideal biomaterial for the regeneration of pulp-dentin complex.[12]

Fibrin matrix present in PRF is flexible, elastic and strong. The cytokines entrapped in the fibrin matrix of PRF helps in the process of angiogenesis. The main platelet cytokines play a fundamental role in initial healing mechanisms owing to their capacity to stimulate cell migration and proliferation (particularly by PDGFs) and induce fibrin matrix remodelling as well as secretion of a collagen matrix. [12-16]

► Preparation

Choukroun and his coworkers developed a simple method to prepare fibrin gels without exogenously added supplements[17]

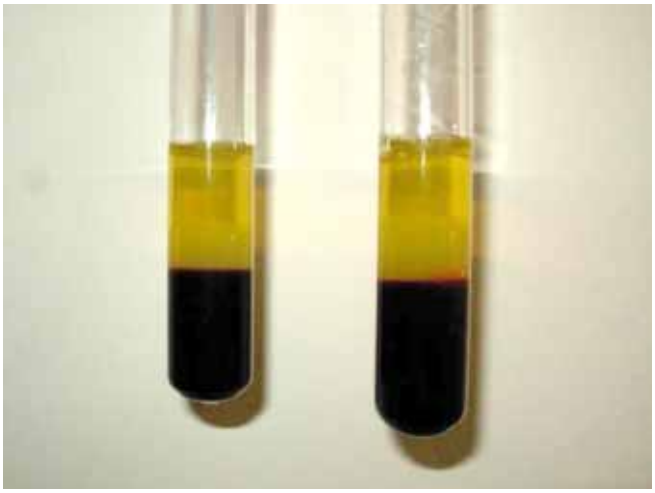

Fig. 1 Different layers after centrifugation

Fig. 2 PRF membrane

Steps involved

1) About 8 ml blood is collected from the patient

2) The blood specimen is placed in the centrifuge (3000rpm for 10 mins)

3) Following this the blood sample settle into various layers. (Fig. 1)

1) Lower fraction containing RBCS

2) Middle fraction containing fibrin clot

3) Upper fraction containing straw colouredacellular plasma.

Upper portion containing plasma is removed. The middle portion containing the fibrin clot is taken and the clot can be squeezed between two gauze pieces to obtain fibrin membrane. (Fig. 2)

PRF box is also commercially available to prepare the PRF membrane. The membrane obtained by this method is of uniform thickness.

Table 1- Cytokines in PRF and their functions

Cytokines	Functions
1) Platelet derived growth factor (PDGF)	a) Migration and proliferation of mesenchymal cells b) Angiogenesis
2) Transforming growth factor – B (TGF-B)	a) Stimulation of osteoblasts b) Angiogenesis c) Release of X granules from platelets
3) Insulin like growth factor (IGF - 1)	a) Wound healing b) Proliferation of osteoblasts
4) Vascular Endothelial growth factor(VEGF)	a) Angiogenesis
5) Interleukin – 1	a) Key mediator of inflammation Control
6) Interleukin - 6	a) Eliminates secretion of antibodies b) Differentiating factor for B- lymphocytes

PRFin revascularization

The fresh PRF acquired from patients blood has jelly like in consistency. It can be condensed into the canal using a hand plugger Till the level the cementoenamel junction. MTA has to placed directly over the PRF. The access cavity can be double sealed with GIC and Composite restoration.

PRF stimulates osteoblasts, gingival fibroblasts, and periodontal ligament cells proliferation as a mitogen. Many growth factors such as platelet derived growth factors and transforming growth factors, are released from PRF.[12,18] These properties of this natural fibrin biomaterial thus offer great potential in revascularization.

Huang et al,[19] concluded that the PRF causes proliferation of human Dental Pulp Cells and increases the protein expression of osteoprotegerin (OPG) and alkaline phosphatase (ALP) activity. Studies show that some amounts of human dental pulp cells present in the apical papilla usually remain vital even in case of a large periapical lesion. Under the influence of Hertwigs Epithelial Root Sheath these Dental Pulp Cells differentiate into odontoblasts like cells. OPG and ALP expression are generally regarded as markers of odontoblastic differentiation. Studies have demonstrated that the PRF has a very significant slow sustained release of many key growth factors like PDGF and TGF for at least 1 week and up to 28 days, which means that PRF could release growth factors with its own biological scaffold for wound healing process.[12,15] This lead to the idea of using PRF as a biomaterial for pulp regeneration.[19] PRF does not dissolve quickly after application and the strong fibrin matrix is remodeled in a similar way to a natural blood clot. The presence of leukocytes and cytokines in the fibrin network can play a significant role in the self-regulation of inflammatory and infectious phenomena within the PRF.[15]

Drawbacks

PRF is prepared without adding any anticoagulants, so the time interval between blood collection and centrifugation has a significant effect on the clinical efficacy of PRF. It should be used immediately after preparation because dehydration of PRF can occur if it is not used immediately which results in decreased growth factor in PRF.[20,21]

► Summary

Many case reports have shown encouraging results with the use of PRF in nonvital tooth with open apex. However, controlled clinical trials are necessary to investigate the predictability of the outcome of the technique.

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REVIEW

"Resuscitating the pulp" revascularization or revitalization

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Abstract

This review focuses on the current concepts on revascularization/ revitalization therapy. Revascularization/revitalization procedures performed under current protocols have reportedly achieved successful clinical and radiographic outcomes for immature permanent teeth with non-vital pulps.

Keywords: Revascularization, Revitalization, Apexification, Apexogenesis, obturation, metronidazole, scaffold, coronal seal, PRP- platlet rich plasma, PRF-platelet rich fibrin.

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Regeneration Endodontics is defined as "Biologically based procedures designed to physiologically replace damaged tooth structures including dentine and root structures, as well as cells of the pulp-dentine complex"

(AAE-American Association of Endodontists)

► Why do we need revascularization??

Immature permanent teeth may become non-vital, usually as a result of trauma, caries, or congenital abnormalities. Apexification treatment has been a routine procedure to treat and preserve such teeth for many decades[1,2,3]. Calcium hydroxide [$Ca(OH)_2$] has been the material of choice for apexification as Frank reported its capacity to induce physiological closure of immature pulpless teeth in 1966. However, this technique has several disadvantages, including the unpredictability of apical barrier formation and the long duration of treatment, which often requires multiple visits. Complete removal of the paste represents another challenge, and residual $Ca(OH)_2$ in the canal has been shown to interact with zinc oxide-based sealers, resulting in poor cohesion.

While $Ca(OH)_2$-releasing gutta-percha points represent an innovate solution to this problem, no solution has been found to address another important issue related to $Ca(OH)_2$, namely that the hygroscopic and proteolytic properties of $Ca(OH)_2$ can cause tooth brittleness as a result of prolonged exposure. These concerns have led to a modification of the traditional $Ca(OH)_2$-based apexification procedure to achieve immediate obturation of the canal through the introduction of an artificial barrier of mineral trioxide aggregate (MTA)[4]. MTA apexification reduces treatment time and results in favorable healing of periradicular tissue. In spite of these advantages, the outcomes of MTA apexification do not vary greatly from those of $Ca(OH)_2$ apexification. Thin dentinal walls still present a clinical problem, and the high costs associated with MTA and the difficulties in handling the material to the apical 3–4 mm may restrict it widespread use.

Revascularization/revitalization treatment is based on the theory that in the absence of bacteria and in the presence of an appropriate three-dimensional scaffold and stem/ progenitor cells inside the root canal space, and with creation of a bacteria-tight seal, tissue repair can occur as in devitalized, uninfected, avulsed, immature permanent teeth. Hypothetically, the close proximity of apical papilla stem cells (SCAP) to the periodontal blood supply may allow them to survive apical infection to form odontoblast-like, dentin producing cells. Such biologically based treatment approaches could be of particular value in treating necrotic, immature permanent teeth in terms of restoring root development, and reinforcing dentinal walls to increase the likelihood of long-term tooth retention.

According to Murray et al. revascularization/revitalization is a technically simple, inexpensive procedure that is suited to currently available instruments and medicaments. A retrospective study by Jeruphuaanet al.[5] has shown a higher survival rate with regenerative endodontic treatment when compared to both MTA and $Ca(OH)_2$

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apexification. In addition, revascularization/ revitalization technique has been recently advocated in treatment of immature and abnormal teeth such as dens invaginatus in which it is difficult to carry out conventional endodontic treatment or apexification because of their complex anatomies.

Three issues need to be taken into consideration with regard to revascularization/revitalization therapies, namely

(i) Disinfection of the root canal system,
(ii) Provision of a scaffold, and
(iii) Coronal sealing

► Disinfection of the root canal system

Regenerative endodontic treatment requires high levels of disinfection. However, bacteria have been shown to penetrate deeper in teeth of younger individuals than older individuals, making bacterial elimination in immature infected teeth a significant challenge. The most commonly reported protocol for disinfection of the root canal system is irrigation with sodium hypochlorite (NaOCl) and chlorhexidine followed by disinfection with antimicrobial dressings such as $Ca(OH)_2$ or antibiotic paste. NaOCl is the irrigant most commonly used in endodontic therapy. At either half- or full-strength, NaOCl has been shown to reduce the incidence of cultivable bacteria by 40–60%. Irrigation with 20 ml/canal NaOCl is recommended in the first appointment of revascularization treatment 6; however, low concentrations are advised, as high concentrations could prevent stem cells from attaching to the dentin surface and could be toxic to SCAP. In this regard, Martin et al. suggested that dentin conditioning with 1.5% NaOCl promoted greater survival of SCAPs than 3% NaOCl. In addition, the use of an EndoVac system or a needle with a closed end and side vents was recommended to avoid periapical extrusion.

Haapasolo et al. recommend a final rinse with 0.12% chlorhexidine in addition to NaOCl for the first appointment because of chlorhexidine's antimicrobial activity and its ability to extend this activity through interaction with dentin. However, in view of the fact that chlorhexidine has been reported to be cytotoxic to stem cells, Geisler cautions that it should be avoided. Basrani et al. suggest that if chlorhexidine is used, then sterile saline should be applied between the NaOCl and chlorhexidine rinses to minimize potential chlorhexidine precipitate in the canal. In the first report of successful revascularization, a double antibiotic paste of metronidazole and ciprofloxacin was used as an intra-canal disinfectant. Successful outcomes were subsequently reported with a triple antibiotic paste containing 1:1:1 ciprofloxacin, metronidazole, and minocycline, which has as come into widespread use in revascularization procedures.

Various other antibiotics (amoxicillin, cefaclor, cefroxadin, fosfomycin, and rokitamycin) have also been used in combination with ciprofloxacin and metronidazole. While all of these triple antibiotic combinations have been shown to inhibit the growth of bacteria[7], triple antibiotic pastes containing minocycline have been found to achieve significantly better results than other pastes in terms of root wall thickness. Triple antibiotic pastes containing minocycline have been found capable of diffusing throughout the entire dentin thickness and effectively disinfecting deep layers of root canal dentin 8. However, discoloration after treatment is a serious drawback related to the use of minocycline. According to Kim et al. discoloration can be reduced, but not prevented, by dentin bonding prior to antibiotic dressing, whereas Reynolds et al. claim that discoloration can be prevented by sealing the dentinal walls of the access cavity with flowable composite before introducing the paste into the canal.

Recently, an interesting issue has been raised regarding the strong toxicity of antibiotic pastes on human dental cells. Althumairy et al. stated that this toxicity has a concentration-dependent effect. It has been demonstrated that both triple and double antibiotic pastes at the paste-like concentrations typically used revascularization/revitalization procedures are lethal in direct contact with SCAPs, human dental papilla cells (DPCs), apical papilla cells (APCs), and PDL fibroblasts. According to Cheumsombat et al. the 0.39 mg/ml concentration of triple antibiotic paste was the best candidate for use because it produced less cytotoxicity whereas it was able to significantly reduce bacteria isolated from necrotic teeth. The most recent AAE protocol 9 recommended the use of triple antibiotic pastes at concentrations no greater than 0.1 mg/ml. Therefore, calcium hydroxide has been alternatively mentioned because recent studies showed that it could stimulate the proliferation of stem cells from the apical papilla and had no detrimental effect.

Clinically, it has also been found to be effective when used as an antimicrobial in revascularization/revitalization therapies however, concerns have been raised that direct contact with this highly alkaline medicament will limit the possibility of increasing root canal wall thickness on the dentin surface. Chueh et al. showed a high rate of progressive calcification of the root canal space in teeth medicated with $Ca(OH)_2$, suggesting that root development induced by regenerative endodontic treatment does not follow a natural pattern. For this reason, if $Ca(OH)_2$ paste is used, placement should be limited to the coronal half of the root canal in order to permit thickening of dentinal walls. Additional studies are clearly necessary to identify biocompatible antimicrobial therapies that take into appropriate account the vitality of apical tissue.

Provision of a scaffold

Regenerative procedures involve the use of a scaffold to provide a framework for the growth and development of cells and vasculature. A scaffold can also be infused with a variety of factors for the promotion of cell growth and differentiation. Construction of a scaffold usually begins at the second appointment, which takes place between 2 and 4 weeks after access and disinfection. However, additional treatment time with the same antimicrobial, or with an alternative antimicrobial, may be considered if signs and symptoms of infection persist. The suggested protocol for providing a scaffold is the introduction of a sterile #20 pre-curved K-file 2 mm past the apical foramen to allow the entire canal to fill with blood to the level of the cemento-enamel junction. Prior to this step, copious, gentle irrigation with 20 ml ethylenediamine tetra-acetic acid (EDTA) is recommended. EDTA has weak antimicrobial activity, but is capable of inhibiting biofilm formation. Yamuchi et al.[10] and Galler et al.[11] reported that EDTA may encourage dentin–pulp regeneration and enhance the attachment of newly formed tissue to the canal walls by exposing the dentin matrix and cause release of growth factors from the dentin matrix reservoir. In a recent study, Martin et al. recommended use of 17% EDTA in regenerative endodontics as it reverses the deleterious effects of NaOCl. Residual pulp tissue should be suspected in cases where, despite anesthesia, resistance can be felt when a file is inserted in the canal. In these cases, it may be unnecessary to penetrate the apical foramen, as bleeding may be achieved at the point of this residual tissue. Bleeding should be controlled using pressure applied with a cotton pellet soaked in sterile saline until a clot has formed. This should occur within 15 min. Bleeding and clot formation, the initial steps in tissue wound healing, lead to granulation tissue formation, an essential component of both regenerative and reparative healing. Several reports have been published demonstrating radiographic success with blood clot scaffolds however, this technique is limited by the unpredictability of both the concentration and the composition of cells trapped in the clot, as tissue engineering requires effective concentrations and composition of cells to restore function.

In addition, a number of authors have reported cases in which it was not possible to produce bleeding in a canal. In such cases, conventional apexification procedures are required in single-rooted teeth; however, Zehreli et al. shown that in molar teeth, if there is insufficient bleeding from the smaller canals, blood can be provided from a larger canal The above-mentioned concerns have prompted researchers to look for better 3D scaffolds that can be constructed regardless of whether or not bleeding can be evoked. The use of autologous fibrin matrices such as platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) has been widely reported on in this regard. PRP, a volume of autologous plasma with above baseline platelet concentrations and, thus, greater amounts of growth factors. PRF, a second generation platelet concentrate, is a non-thrombonized autologous fibrin mesh that serves as a reservoir for the slow, continuous release of growth factors.

While PRP requires association with bovine thrombin and calcium chloride to commence the final stages of coagulation, PRF, which is, essentially, nothing more than unadulterated centrifuged blood, achieves polymerization naturally. Revascularization/revitalization treatment with PRP and PRF has both been demonstrated to be successful clinically as well as radiographically and this success was attributed to the growth factors which assist in stem cell proliferation for healing induction and tissue regeneration. However, histological findings from Martinet al. showed no evidence of the formation of pulp-like tissue with odontoblast-like cells, even when autologous fibrin matrices were used in treatment; therefore, given the expense and difficulty involved in the preparation of PRP and PRF, their use is not recommended, except for cases in which a blood clot cannot be induced without them. In a recent study, Bottino et al.[12] evaluated the use of antibiotic-containing nano fibrous scaffolds for regenerative endodontics and stated that these scaffolds hold promise for the improvement of current regenerative strategies by providing a drug delivery system to disinfect necrotic immature permanent teeth through a controllable release of low antibiotic doses, while serving as a matrix for the growth and differentiation of new tissue in the root canal.

► Coronal sealing

Once a scaffold has been produced within the canal, a bacteria-tight seal is indicated. MTA is currently the material of choice for achieving coronal sealing in regenerative procedures. MTA is a bioceramic capable of setting even in the presence of blood; once set, it is highly resistant to bacterial penetration. MTA is currently marketed in two forms, gray and white. Although white MTA was developed to address problems of tooth discoloration related to gray MTA, both types have been found to result in discoloration. Nowadays, several types of bioceramic cements have become available for use in endodontics that are not known to cause discoloration such as BioAggregate and Biodentine. Nosrat et al. reported two successful cases of revascularization using Biodentine. However, long-term studies are needed to assess the success of these new materials. In areas where esthetics is crucial, glass ionomer applied over a collagen matrix may be used as an alternative to tri-mineral cements. It can be concluded that coronal sealing can be chosen according to the esthetics requirements. In anterior teeth, tri-mineral cement which do not cause discoloration or glass ionomer cement can be chosen; however, in posterior teeth MTA still can be the first choice for clinicians.

Outcomes of revascularization/revitalization therapies

Revascularization/revitalization therapy outcomes can be evaluated at four levels:

1. Clinical evidence of periapical healing
2. Radiographic evidence of periapical healing and root development.
3. A positive response to pulp vitality testing
4. Histologic evidence of dentine pulp regeneration.

Clinical evidence of periapical healing

This includes the absence of sensitivity to percussion or palpation and the absence of sinus tracts and swelling. These have been documented in all clinical reports on revascularization/revitalization.

Radiographic evidence of periapical healing and root development

This includes complete osseous healing of the periapical lesion, an increase in root length, an increase in root wall thickness, and the formation of a radiographic apex. While these outcomes are desirable, they may not always be achievable, nor are they essential for treatment success. Outcomes such as no root development, or apical closure without an increase in root length or root wall thickness have also been reported. Kahler et al.[13] suggested longer periods of review in regeneration cases because in their study, continued root maturogenesis was observed in two cases over 36 months follow up. Nosrat et al. reported a possible relationship between duration of pulp necrosis and treatment outcome, suggesting the long-standing infection might destroy cells capable of pulp regeneration. Duarte et al.[14] observed vital pulp tissue in the apical third until 60 days, and vital apical papilla until 90 days of infection in a rat model. In light of these results, it can be concluded that duration of pulp necrosis is a very important factor for achieving root maturogenesis. If no adverse symptoms are present, teeth without radiographic evidence of periapical healing and root development may be left as space maintainers until a suitable restorative option is identified[19].

A positive response to pulp vitality testing

This is the tertiary goal of treatment and indicates a high level of success, that is, re-enervation of the root canal space, regardless of the type of tissue generated inside the canal. The literature includes mixed reports regarding tissue response to sensitivity testing (both cold and electrical pulp testing) following revascularization treatment, with some authors reporting positive responses and others reporting negative responses. As suggested by Johns and Vidyanath[15], negative responses to vitality testing may be attributed to the presence of a thick layer of MTA (3–4 mm) as well as cement and restorative materials such as composite resin. Laser Doppler flowmetry has been reported to be faster than thermal responsiveness in determining vitality and can be recommended for use in revascularization treatment[16].

Histological evidence of dentin–pulp regeneration

Histological examination of the tissues formed inside root canal spaces in human teeth and animals have documented osseous healing and root development following treatment; however, none of these studies have shown regeneration of the dentin–pulp complex within root canals[16,17,18,19]. Findings do include in growth of periodontal ligament, cementum, and bone into the root canal space as well as it was reported that the narrowing of the root canals and apices was caused by deposition of cementum without dentin. It would certainly be desirable if the hard tissue formed by revascularization/revitalization therapies was similar to original dentin. However, the reported regeneration studies to date have not provided a hard tissue with the classical pulp–odontoblast–dentin relationship.

The usual result was postnatal wound healing by repair with new tissues. In this regard, long-term studies and cases are needed to learn how these different tissues will behave over time.

What happens in adult teeth….

When the pulp of adult teeth becomes necrotic, its debridement followed by root canal obturation with gutta-percha is the conventional treatment and it is extremely successful[20]. A small apical foramen smaller than a diameter of 1.1 mm can limit blood flow into teeth and these teeth are were thought to unlikely revascularize in response to regenerative endodontic procedures[20,21]. However, Laureys et al.[22] showed that a size smaller than 1 mm does not prevent revascularization and in growth of vital tissue into the root canal. Therefore, the apical diameter and associatively the age of the patient may not be the most important parameter in revascularization/revitalization treatment[22].

► Conclusion

Endodontists are at the forefront of addressing the developments that must be made in tissue engineering inorder to further pulp regeneration in the future. Hargreaves et al recommended three major components of pulp regeneration which require further research for the development of pulp regeneration- (1) Reliable cell source capable of differentiating into odontoblasts (2) Appropriate scaffold to promote cell growth and differentiation (3) Signaling molecules, both growth factors and other compounds that are capable of stimulating cellular proliferation and directing cellular differentiation.

Research into these areas of regenerative endodontics is being conducted internationally.

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Mineral trioxide aggregate apexification

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Abstract

Mineral Trioxide Aggregate (MTA) was introduced as an alternative to traditional materials for pulp capping, root end filling and repair of perforations replacing Calcium hydroxide formerly the material of choice for the apexification of permanent teeth with blunderbass canals. Advantages of MTA include superior biocompatibilty and ability to set in a wet environment.

The given case report highlights the use of MTA as an apical barrier as opposed to the traditional use of long term calcium hydroxide for apexification. Clinical presentation, examination findings and treatment are reviewed

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► Introduction

The completion of root development and closure of the apex occurs up to 3 years following eruption of the tooth (Nolla 1960). Any traumatic injuries during the root development stage can lead to cessation of root formation, and pulpal necrosis. Root canal therapy of such teeth often poses a challenge to the dentist because of the size of the canal, thin dentinal walls and a large open apex.

Apexification is defined as 'a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp' (American Association of Endodontists, 2003). The goal of this treatment was to obtain an apical barrier to prevent the passage of toxins into the periapical area as well as to allow the compaction of the root filling material.[1]

Although Calcium hydroxide was the most widely accepted material for apexification and its efficiency was demonstrated by various authors[2,3]. But it had significant disadvantages like prolonged treatment time[4] and weakening of the tooth due to its continuous use.[5]

Mineral Trioxide Aggregate (MTA), introduced in 1993 at the Loma Linda University by Torabinejad, is currently the material of choice for apexification because of its shorter treatment time, biocompatibility and ability to achieve hermetic seal even in the presence of moisture contamination, Better compaction of obturating material against a hard and non-resorbable apical barrier[6] and ability to stimulate cell growth, adhesion and proliferation[7] which were substantiated by Torabinejad et al in 1995 and Xavier et al in 2005 and the ability to stimulate cytokine release from the bone cells, indicating that it actively promotes hard tissue formation[8]

► Case

A 41 year old male patient reported to the Department Of Conservative Dentistry And Endodontics, Manipal with chief complaint of discoloured and tilted upper right front teeth (Fig 1). He gave a history of trauma during childhood. On clinical examination discoloured and mesially tilted 11 was noted and diastema in the lower anterior region. Tooth 11 did not respond to heat test, cold test and Electric pulp testing. Radiographic examination revealed mesially tipped upper right maxillary central incisor with open apex and periapical radiolucency (Fig.2)

Diagnosis of periapical abscess in relation to 11 was made. Treatment plan of MTA apexification followed by non surgical root canal treatment and prosthetic rehabilitation was formulated.

Access opening was done under rubber dam isolation and drainage was noted from the canal. Working length was determined using 80K file (Fig 3). Minimal cleaning and shaping was done using the 80K(Mani files) file in circumferential motion. Canal debridement was carried out using alternate irrigation of 1% hypochlorite and normal saline. Calcium hydroxide was mixed with propylene glycol and placed into the canal and sealed with Cavit (Dentsply, Tulsa).

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Patient was recalled after 1 week wherein patient exhibited mild discomfort for which calcium hydroxide dressing was repeated and patient was recalled after 1 week

In the third appointment, the canals were found to be dry and the patient was asymptomatic. Irrigation was carried out using 1% hypochlorite and saline alternatively and 17 % EDTA was used for smear layer removal. The canals were the dried with paper points and MTA was mixed according to manufacturer's instructions (3: 1, powder liquid ratio for one minute)and was placed at the orifice using an amalgam carrier and was carried to the apex using the customised 80 K file. (Figs. 4a, b). The customized file was made by wrapping cotton around an 80 k file so that it fits snuggly in to the canal 5mm short of the working length

Apical plug formation was confirmed using an IOPA and the a wet cotton pellet was placed, access cavity sealed with cavit. In subsequent appointment which was 24 hours later, a hard stop was felt using a hand plugger, root canal was back filled with injection moulded thermoplastic gutta percha (Obtura II, USA)and sealer AH Plus, Dentsply, Germany) (Fig.5) and access cavity sealed with composite.

In the subsequent appointment crown preparation was carried out for porcelain fused to metal with ceramic facing and crown was cemented followed by the prosthetic rehabilitation of lower anterior tooth using Maryland bridge.(fig 6)

Discussion

Single visit apexification, non surgical condensation of biocompatible material to the apical end of the root canal is gaining popularity. The rationale was to create an apical barrier so that the root canal could be completed immediately.

There is increasing popularity of the one-visit apexification technique using MTA as an osteoconductive apical barrier. MTA is relatively non-cytotoxic and stimulates cementogenesis. This material generates a highly alkaline aqueous environment by leaching of calcium and hydroxyl ions, rendering it bioactive by forming hydroxyapatite in the presence of phosphate containing fluids. Unlike the extended use of Calcium Hydroxide in immature roots, prolonged filling of these roots with MTA did not reduce their fracture resistance.[10]

MTA as an apexification material represents a primary monoblock. Apatite like interfacial deposits form during the maturation of MTA resulting in filling of the gap induced during material shrinkage phase and improves the frictional resistance of MTA to root canal walls. The formation of nonbonding and gap filling apatite crystals also accounts for the sealing of MTA.[11]

A common disadvantage of teeth with open apices is the reduced fracture resistance due to the reduced amount of root dentin minimising the shaping of the canal, therefore emphasis was placed on disinfection of the canal using irrigants and intracanal medicamants. In the current case, Sodium hyplochlorite was used as the main irrigant, but considering

Fig 1

Fig 2

Fig 3

Fig 4 a

Fig 4 b

Fig 5

Fig 6

the danger of extrusion, a lower concentration was used and to compensate for the lower concentration an increased volume was used[13]. In the present case, calcium hydroxide was used as the intracanal medicament because it has been shown that use of calcium hydroxide for 1 week can reduce bacteria from the root canals without compromising the fracture resistance of dentin. Calcium hydroxide placed less than 30 days does not cause deleterious effects on dentin.[14]

Manufacturer recommends placement of 3 -5mm plug for apexification procedure. Al –Khatani A et al have shown that 5 mm plug prevented bacterial leakage and so in the current case a 5 mm plug was placed.[15]

In order to provide the necessary dampness for the hardness of MTA the use of a moist pellet for 24 hrs is recommended. Care was taken to see that no fibres extended through the temporary filling as it may cause bacterial re-entry through the temporary filling.[16]

For filling the root canal space, soft filling technique is advocated as the apical diameter is larger than the coronal diameter and because lateral forces can fracture the thin root canal walls.[13]

Remaining tooth tissue is compromised due to thin dentinal walls and the access restoration. Strengthening the immature tooth can be achieved by bonded resin restorations which was done in the current case,[17] which was reinforced using cast restorations.

Taking the mesial tipping of the tooth into account,minimal reduction of the tooth was favoured for the prosthetic rehabilitation and so a porcelain fused to metal crown with ceramic facing was chosen.

One visit apexification reduces the possibility of leakage between visits and shortens treatment time between first and final visit and because the final restoration can be delivered quickly, the potential for fracture of the immature tooth is reduced which makes single visit apexification cost effective.[16]

Conclusion

Apexification using MTA is a novel technique which strengthens the thin fragile root in open apices by binding to the root and also reduces the patient treatment time from first to last appointment.

The crucial factor, though, is the thorough cleaning of the canal and use of a material which promotes periapical healing.

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REVIEW

Selection of specific implant system in different craniofacial defects

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Abstract

Maxillofacial prosthodontics plays a major role in the overall rehabilitation of patients who have undergone tumor resections and trauma or have congenitally missing body parts. The purpose of this review is to give an insight about improving the functional rehabilitation of silicone prostheses with the help of Osseointegrated implants, which is one of the most recent and successful advances in the field of maxillofacial prosthetics. Placement of implants for retaining prosthesis depends on a number of factors such as presence of bone, the dexterity of the patient, soft tissue conditions, prognosis of health for the patient, radiation therapy and economic conditions. Implants offer a high degree of stability, retention and comfort. Dental implant support also improves the confidence of the patient in public. Following the discovery of the Osseointegration of titanium in the 1950s, dental implants have been made of titanium in 1960s. In 1977, the first extra oral titanium implant was inserted in a patient. Later, solitary extra oral implants and grouped implant systems were developed which may be placed more reliably and offer a retrievable prosthesis with increased retention and support by the use of tissue bars with clip retention, magnetic retentive mechanisms in low bone presentation, as in the nasal region, orbital region or in the mastoid process. Today, even large final prostheses may be securely retained. The classical atraumatic surgical technique is a prerequisite for successful implantation of any system. Maintenance of fine feathered margins and simple positioning of an implant retained craniofacial prostheses greatly ensured their esthetic qualities and acceptance of final prostheses.

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► Introduction

Any facial deformity arising from congenital disorders, severe trauma and the excision of tumours of the jaws, skull and face is frequently managed by several experts. Defects or deformities in the head and facial area almost always lead to a severe emotional burden, requiring rehabilitation. The introduction of implants to restore the dentition has been extended to Maxillofacial rehabilitation and hence solved many of the problems created by a deficient biomechanical link. Craniofacial implants are tiny titanium implants used as stabilizing devices for prosthesis to replace missing ear, nose, orbits and eyes. The breakthrough for rehabilitation of facial defects with implant – retained prosthesis came with the development of the modern silicones and bone anchorage.

Coupling of implant and prosthesis

Metal bar is screwed onto the percutaneous abutments on to which the prosthesis can be clipped. This has the advantage that the retention strength can be adjusted individually and altered by bending the clips. But the bar construction requires the percutaneous abutments to be aligned in parallel. This parallelism is never achieved in nasal and orbital areas when compared to the mastoid region. The advancement in magnetic connections facilitate cleaning and intersection of the prosthesis by the patients, and hence magnets are been used almost exclusively today in the nasal and orbital regions. Since abutments are placed with non-parallel axes in auricular prosthesis and for individual hygiene problems, magnets are preferred in such regions and also in case of too closely placed implants to one another (less than 15mm). Following the installation of long percutaneous abutments or magnets, the loading force imposed upon the implants should be gauged exactly in order to avoid loosening of the implants as a result of too strong leverage. This potential overload must be considered with the alternative use of mushroom – shaped push button systems.

Anchorage of prosthesis

The anchorage of prostheses can be achieved in four ways.

- Anatomical anchorage – To already existing anatomical structure such as undercut.
- Mechanical anchorage – To spectacle frames
- Chemical anchorage – Using adhesives
- Surgical anchorage – Using surgically created retention elements

Due to the secure retention, bone anchorage has contributed to a breakthrough in prosthetic rehabilitation.

Extra – oral implant systems

The classic Branemark system as a solitary screw implant, as well as the large number of analogous systems from the

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field of dentistry are collectively referred to here, under the term "solitary implants". To distinguish these from classic titanium fixtures, the term "grouped implants" for grid and plate systems are chosen which are secured with several smaller bone screws.

Extra Oral systems with "solitary Implants":

Branemark system:

The Branemark system was the first implant system to be used extraorally. Since the introduction of self-tapping implants, the necessity for tapping has ceased. Titanium screws of a length 3, 4 and 5.5 mm are available for the extraoral areas.

Implants with flange was originally designed to avoid an intracranial dislocation of the implant. The flange is now available in closed form. Flangeless screws are also obtainable at present. Currently: the Branemark system is marketed by the cochlear company under the brand name vistafix.

ITI systems:

ITI implants (International Team for Implantology) were marketed by Straumann company. A sand-blasted, large grit, acid etched surface was introduced and so called SLA surface. The resulting roughness is two staged. The greater roughness of ca 20µm is overlaid by a finer roughness of 2µm intervals. The longer screws which were designed for the extraoral region are also available with the hydrophilic SLA active surface.

Extra oral systems with grouped implants:

In 1976, Kole and Wirth described subperitosteal frame implants made of cobalt chrome alloy (Wisil). These subperiosteal implants were adapted to the bone surface, without being anchored into the bone itself. This system is used to treat patients with nasal and auricular prosthesis. In contrast to this, the analogues use of subperiosteal implants in the jaw for fixing dental prostheses was less successful. The forces are distributed across the plate over several titanium bone screws, compared to the solitary implants. This system can be used in anatomically difficult regions with limited bone

Epitec system:

This system was developed in 1991, by Mostafa Fermand. The system consists of a quadratic titanium grid with 16 thread holes, and so called 3D carrier plate. Self tapping 2mm titanium screws are available in lengths of 4.5mm and 6.0mm 3D carrier plate has to be cut to the required shape and as many connecting bridges between the single screw holes as possible must be maintained to improve stability and retention. The 1mm thickness of connecting bridges of the 3D carrier plate will be covered by bone.

Epiplating system:

This system was developed in 2000, by the Medicon Company in collaboration with P. Federspil, Ph.A. Federspil & M. Schneider. Specially adapted implants as well as a universal plate are available for the orbital, auricular and nasal regions. The thickness of the titanium plates of the Epiplating system are 1mm thick, 2mm in width and are thus stronger than the Epitec grid system. To anchor the plates, titanium screws of 2mm in breadth are used with various lengths available as 4, 5.5 and 7mm. The plates are also more resistant against rotational forces. Magnets can also be screwed either directly into the plate or onto a base posts. This system can also be combined with the hearing device abutment of the BAHA system.

Treatment planning

1. Clinical appraisal of defective tissue area:

- Estimation of likely retention and support sites from implants
- Consideration of surface contours to identify rebundant tissue and penetration by the abutment of unfavorable skin or mucosa.
- Determination of desirable form and border shape of prosthesis.

2. Radiographic Examination:

- CT Scan to determine suitable sites of available bone.

3. Laboratory assessment:

- Diagnostic model for preparation of trial prosthesis
- Template for locating implant sites.
- Preliminary prosthesis design.

4. Decision taken:

- Surgical Stage 1: Implantation, decision on number, type, position, angulation and relationships of fixures.
- Surgical Stage 2: Abutment connection penetration of skin decision on thickness movable or fixed cuff, hair free or grafted skin.





- Penetration of mucosa: Decision on thickness and fixed or mobile cuff, having non-keratinised mucosa; need for mucosal graft.

5. Prosthesis construction

- Determination of perimeter identified by fixed or mobile tissue and tissue contour.
- Retention mechanism separate or linked abutments using bar, magnets or precision attachments.
- Ventilation
- Additional characterization (eyebrows, moustache, hairstyle, spectacles)

Planning implant position and reglonally specific characteristics

EAR:

Surgical Technique:

The classic regions for implantation would be eight O'clock or even better 9 O'clock as well as between 10 and 11 O'clock at a distance of 2 cm from external ear canal, if the dial of a watch was to be projected on to the right ear.

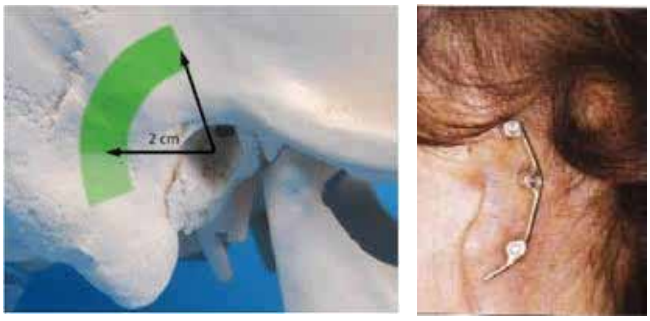
Two abutments are sufficient for a bar construction when using magnets, a third magnet can improve the retention. If 3 magnet are used they should preferably not be in a straight live grouped implant systems have more advantage in this region.

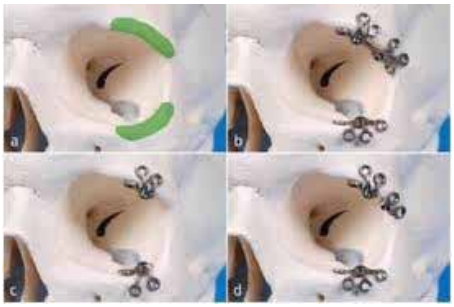
Prosthetic Technique:

A special tray impression is recorded over the abutments using plaster of paris to stabilise the transfer copings. This master cast will carry the cylinders and soldered bar upon the abutments (dummy).Then a laboratory mould is prepared for packing the silicone elastomer onto the prepared acrylic cover incorporating retaining clips. Now the completed case will contain two abutments carrying the bar, where the prosthesis fabricated can be clipped on to position.

NOSE:

Solitary implant in the nasal region is problematic due to the limited amount of bone available in this region. Sufficient bone can be found around the glabella which makes it possible for anchoring a nasal prosthesis to a solitary Branemark implant. Good bone availability for the use of epiplating system can be found around the piriform aperture and in the frontal process of the maxilla. A universal plate of the epiplating system can be implanted in the glabella.





ORBITAL CAVITY:

The classical implant regions in the orbital cavity is found in the laterocranial and laterocaudal orbit rim. In standard situations an orbital plate of the epiplating system can be implanted laterocranially for one further magnet. In case of a small orbital cavity, 2 magnets distributed laterocranially and laterocaudally on the universal plate respectively are sufficient. In case of a flat orbital cavity the epitec or epiplating system can be placed through the orbital cavity like a ladder in the sagittal plane.

Extensive facial defects:

In case of missing frontal bone the possible solution lies in the use of the long plate of the epiplating system that can be laid straight through the orbital cavity from the glabella to the malar bone. The zygomatic arch can also save as an anchorage point for a universal plate.

Complications

The most frequent problems come from the site of the skin penetration. Some patients occasionally experience adverse skin reactions.

Holgers et al have described a scoring system for the classification of these skin reaction. 0-No reaction; 1-Reddish; 2-Red & moist; 3-Granulation tissue; 4-Skin infection

In orbital and auricular prostheses, the score is found to be zero and the success rate is found to be 91.1 % and 89.3 % respectively.

Current developments

A further field where exciting developments are awaited is that of robot-supported interventions.

Bioactive surfaces are an offer from a number of producers of dental implants. It is hoped that a speedier osseointegration is achieved. Calcium phosphate bonded implants, fluoridated implant (osseospeed) are produced by AstraTech. Tiunite, Nobel Biocare offers implants with an oxidized surface to speed up osseointegration. Bone Morphogenetic Protein(BMP) are coated to implants and a nano-porous TiO_2 coating is also proved to be more favourable, than standard implants. Siegert and Stemmann treated patients with a subcutaneously implanted double magnet, where the auricular prosthesis attached magnetically can be worn on intact skin.

► Conclusion

Through careful presurgical and radiographic planning, it is possible to achieve high Survival Rate (SR) of implants in the auricular & piriform/nasal sites. A comparison of pre-treatment and post-treatment assessments revealed Implant-retained craniofacial prostheses increased patient's quality of life.

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CASE REPORT

Aesthetic rehabilitation of mutilated maxillary anterior teeth under general anaesthesia in a patient with mild intellectual disability and seizure disorder

*Minimol K Johny, **Rupesh S., ***Haeigin Tom Varghese, ****Benley George, *****Baby James

Abstract

Intellectual disability (ID) is one of the most common developmental disorders of childhood. ID formerly known as mental retardation is a disability characterized by significant limitation in both intellectual function and adaptive behavior as expressed in conceptual social and practical adaptive skills. This disability originates before the age of eighteen. ID affects the mind, body and everyday life skills like thinking, talking and self care. People with disability often need extra help to attain and preserve good health which includes oral hygiene. Poor dental health which is prevailing in most of these children may further compromise their mental health; both of which may affect their psychological well being. There are numerous obstacles in delivering quality dental care under Local Anesthesia (LA) in ID children because of various behavioral problems. So general anesthesia is a safer and preferred option for such patients and currently it is a widely accepted treatment modality in rendering oral care in ID patients. This article describes a unique case of aesthetic rehabilitation of maxillary anterior teeth in a sixteen year old male patient under general anesthesia who was diagnosed with mild intellectual disability and seizure disorder.

Keywords: Intellectual Disability, Rehabilitation, aesthetics, caries, General anesthesia.

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Introduction:

Intellectual disability formerly known as mental retardation is a disability characterized by significant limitation in both intellectual function and adaptive behaviour as expressed in conceptual social and practical adaptive skills. This disability originates before the age of eighteen.[1] Such lower intellectual functioning will lead to reduced ability to adapt to the needs of daily living which includes personal care.[2]

Intellectual disability (ID) is one of the most common developmental disorders of childhood. In India, incidence of the same is 3.1% in rural & 0.9% in urban area (National Samples Survey Organisation). According to ICD 10 of World Health Organization (2007), ID can be classified based on Intelligence Quotient levels as mild (50-69), moderate (35-49), severe (20-34), and profound (<20).[3]

Many people with ID also have other co-morbid conditions such as cerebral palsy, seizure or psychiatric disorders, attention deficit hyperactivity disorder, or problems with vision, communication and eating. Though language and communication problems are common in people with ID, motor skills are typically more affected when a person has coexisting conditions.[4]

ID affects the mind, body and everyday life skills like thinking, talking and self care. People with disability often need extra help to attain and preserve good health. Oral health is no exception.[5] Children with ID are the most vulnerable group as far as oral health is concerned because of the dependence on others for the management of self care.[6] Children with severe ID and those from lower socioeconomic status are predominantly at risk with high dental needs and poor access to care.[7] Regular usage of sweetened medications, slow oral clearance of food, preference for carbohydrate rich foods, impaired salivary flow are the common reasons for increased dental needs in people with ID.[7,8] The most common oral health problems seen in patients with ID are poor oral hygiene, periodontal diseases, dental caries, malocclusion etc. Prevalence of untreated dental caries, is however, high in patients with ID.[5]

One of the major drawbacks in rendering care, especially oral care to these patients is that the medical and

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dental teams work as two separate entities making cross referrals difficult. This often leads caregivers to seek dental care when symptoms dictate rather than for preventive care. Lack of awareness about the different modalities of available dental services among care givers and low socio economic status are the other obstacles in delivering proper oral health care.[9] Poor dental health which is prevailing in most of these children may further compromise their mental health; both of which may affect their psychological well being.

Though chair-side dental treatment can be attempted in those with ID with behavioural modification techniques, there are numerous obstacles in delivering quality dental care under Local Anesthesia (LA) in ID children because of various behavioural problems like hyperactivity, impulsiveness, stubborn or fearful behaviour etc. So general anaesthesia is a safer and preferred option for such patients and currently it is a widely accepted treatment modality in rendering oral care in ID patients.[10]

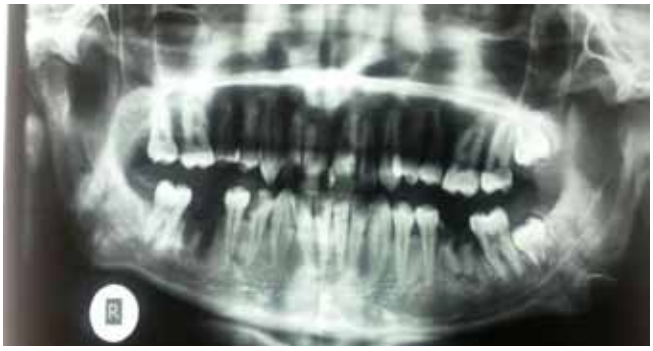
This article describes a unique case of aesthetic rehabilitation of maxillary anterior teeth in a sixteen year old male patient under general anaesthesia who was previously diagnosed with mild intellectual disability and seizure disorder.

► Case report:

A sixteen year old male patient was referred from a private dental clinic to the Department of Dentistry, Pushpagiri Medical College Hospital, Tiruvalla. The patient presented with a chief complaint of painful decayed upper front teeth which was hampering his facial aesthetics.

The medical history of the patient revealed mild intellectual disability and seizure disorder since childhood which was verified by a thorough evaluation of the patient at the Department of Neurology, Pushpagiri Medical College Hospital. There was no relevant family history for the same. Dental treatment history (as told by the parent) revealed multiple previous failed chair-side attempts at rendering dental care including oral prophylaxis, restoration and extraction under local anaesthesia as the patient was uncooperative.

Intraoral examination of the patient's tongue, lip mucosa, buccal mucosa, hard and soft palate, and sublingual region revealed no pathological findings. Patient's oral hygiene was poor and presented with chronic generalised marginal gingivitis. Teeth numbers 12, 11, 21, 22, 44 had deep multi surface caries which had an impact on his facial appearance and aesthetics (Fig 1). A root stump was seen in relation to 36. Considering the patient's medical and emotional status, dental treatment was decided to be carried out under general anaesthesia and informed consent was taken from the parents. Since the patient was not co-operative for intra oral radiographic examination, an orthopantomogram (Fig 2) was taken and a provisional treatment plan was formulated which comprised of root canal treatments of 13, 12, 11, 21, 22, 23, 44 followed by placement



of metal ceramic crowns for the same. Extraction of 36 root stump, oral prophylaxis, sealants in all remaining molars and premolars and fluoride application was also planned.

Intra- operative period:

Patient was admitted to the hospital one day prior and preanesthetic evaluation was completed. NPO was observed for 6 hours prior to the procedure. Nasotracheal intubation was carried out in order to obtain unobstructed access into the patient's mouth, which was kept open using a mouth prop. A saliva ejector was used to control oral moisture, and aspiration was prevented by placing moist sterile gauze in the pharyngopalatine area.

Initially full mouth prophylaxis was carried out and the oral cavity was rinsed with 2% chlorhexidine.[11] After caries excavation, root canal treatment of six maxillary anterior teeth and tooth 44 were completed using portable dental x-ray (DX3000, DEXCOWIN, Korea), Vistascan (indirect digital imaging system, Durr dental AG Germany), NSK iPex digital apex locator and Protaper rotary system (Dentsply). 3% sodium hypochlorite and normal saline were used as irrigants. Obturation was completed with Protaper gutta percha points (Dentsply). AH plus (Dentsply) was used as the root canal sealer (Fig 3). Access cavity was sealed with Filtek Z350 XT composite (3M ESPE). Following RCT, crown preparation of the six anterior teeth was completed and temporary acrylic crowns were fabricated and cemented using zinc oxide eugenol cement. Sealant (Clinpro 3M ESPE) was applied to all susceptible pits and fissures of all molars and premolars. Extraction of root stump 36 was also carried out.

Post –operative period:

The oral cavity was cleaned thoroughly and retropharyngeal gauze was removed. Extubation was successfully accomplished following which the patient was transferred to the recovery room, where he recovered uneventfully. All dental procedures were completed without any problems, and the entire procedure took about 2 hours. After an oral examination, he was discharged from the hospital the next day with proper home care, oral hygiene and dietary instructions. Patient reported to Department of Dentistry after one week, during which metal try in for 21, 22, 23, 11, 12, 13 was done. Permanent metal ceramic crowns were cemented without necessitating any adjustments (Fig 4). The patient and the parents were instructed on maintaining a proper oral hygiene. The patient was then placed on a 3 month recall.

► Discussion:

General anaesthesia (GA) ensures efficient delivery of comprehensive dental treatment in a single appointment and necessitates little or no cooperation of the child. However, it is often the last resort because of the expense and risk-benefit considerations.[12,13] In addition, some parents may find it hard to accept dental treatment for their children under GA.[14] It is an alternative to chair-side treatment under LA. It is a method of choice in some cases especially for medically compromised patients who cannot tolerate longer treatment times which may be unavoidable in complete oral rehabilitation situations. For patients with ID and seizure disorder, general anaesthesia is an excellent alternative. The aim of treatment under GA is to restore the child's oral health in a single visit, allowing behaviour-modification methods to be introduced more readily afterwards.[15] The various advantages of GA include reduced intra-operative patient awareness and recall, possibility of prolonged treatment time, complete control of airway, breathing and circulation. Besides these, GA can also be administered rapidly and is easily reversible. The demerits like increased cost, need for hospital stay and general anaesthetic complications, however, are far outweighed by the benefits of carrying out the treatment under GA.

In a study conducted in Mangalore, India in about 2823 children about 561 children with intellectual disability were identified, with 37.3% (209) in the rural with a prevalence rate of 3 per 1000 and 62.7% (392) in the urban area having a prevalence rate of 5 per 1000.[16] Some Indian studies have reported a prevalence rate of psychiatric disorders in children ranging from 2.6 to 35.6 percent.[17] Prevalence rates ranging between 1/1000 – 6/1000 are reported from Ghana, Thailand, and Cuba. The prevalence of MR was higher among males than in females ($p<0.001$) which are in support with other studies,[18] but there was no notable sex difference between rural and urban areas.

Overall facial appearance plays a major role in the emotional development of patients with mild mental retardation. In the present case, on completion of aesthetic oral rehabilitation, an enhanced self confidence, well being and an increased motivation for maintaining good oral hygiene was observed and reported by the parent.

Dental caries has evolved as a major public health problem in developing countries like India with the trend showing a constant increase.[19] Studies have shown that dental caries not only affects child's appearance but it also affects learning (Leaf et al), behaviour (Gradella et al), nutrition and general health (Benzian et al).[20] Awareness about the importance of dental health and various caries preventive measures should be made among the parents and caregivers of I.D children. A multidisciplinary approach which includes medical and dental professionals should be carried out in order to enhance the quality of care given to I.D children.[21]

► Conclusion:

This approach of using general anaesthesia offers the advantage of providing extensive complete oral rehabilitation in a short period of time and in a single visit, allowing immediate relief of pain, even with little or no cooperation from the patient. However, it has little effect in promoting oral health and acceptance of routine dental care.

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REVIEW

Salvaging a compromised tooth by conservative treatment with post and core: A review of the various designs and materials.

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Abstract

The restoration of Endodontically treated teeth with post and core is an extensively studied topic in dentistry. The restored teeth usually have a reasonably good prognosis and can assume full function after the treatment. The successful treatment of badly broken tooth with pulpal disease depends not only on good endodontic treatment but also on a good subsequent prosthodontic reconstruction. After Endodontic therapy a tooth must be restored to fulfill functional and esthetic demands. The primary objective of the post and core buildup is to replace the missing coronal tooth structure sufficiently to provide the required retention and resistance form for the final restoration. It is therefore important that we make a proper choice of the design of the post length, material and the proper luting cement to lute the post to the radicular portion of the tooth. This article emphasizes on the different designs and materials of posts, to help dentists in better selection of the post system according to the clinical situation.

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Introduction

The extraction of grossly decayed teeth with minimal tooth structure has now become an absolute outdated treatment modality. With advancement in the field of dentistry, teeth formerly considered fit for extraction are now being effectively saved. Compromised tooth can be endodontically treated, but after which it has a different stiffness and resistance as compared to the original tooth and is less resistant as a consequence of the loss of tooth structure. The use of intraradicular posts has extended as a technique to restore teeth that have lost a considerable amount of coronal tooth structure[2].

In endodontics there are mainly two classes of intervention for the treatment of pulpless teeth by using dental posts. In the oldest one, the dentist uses a cast metal post, obtained on the basis of a mould taken from the root cavity. More recently, prefabricated posts of various types, dimensions and materials are commercially available 2.

Designs of post and core:[10]

According to their surface characteristics posts can be mainly of two types: Active or passive.

Active posts: The active post mechanically engages the dentin with threads on their surface. They are more retentive than passive posts, but introduce more stress into the root than passive posts. Active posts can be used safely, only in substantial roots with maximum remaining dentin. Their use should be limited to short roots in which maximum retention is needed

Passive posts: Passive posts do not have threads on their surface. They are less retentive than active posts. It depends on the cement and its close adaptation to the canal wall for its retention. Passive posts, even though they do not engage dentin in the root canal space, still transfer stress to the remaining root structure, but to a lesser extent when compared with active posts.

Parallel posts: They are more retentive in the root canal but more dentin removal is required from the thinner apical and middle aspects of root canal walls in their post space preparation. They distribute forces along the long axis more evenly than tapered posts, and may lead to less root fracture. A parallel post is therefore recommended when there is a need for increased retention, circular canal, and preparation of the parallel canal space will not jeopardize the root integrity in the apical one third.

Tapered posts: In regard to conservation of tooth structure, the use of tapered posts requires removing less

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dentin because root canal spaces are cleaned and shaped in a tapered fashion. However, there may be a higher risk of root fracture because the stresses absorbed by the tapered sides concentrate at the apex. Tapered post is an ideal choice in: small circular canals, teeth not subjected to high functional and parafunctional loads, and in teeth with thin root walls, that are perforated or have perforation repairs.

Other designs:

1) Intermittent threaded dental posts: It is formed of an elongated cylindrical rod having intermittent thread segments which actively engage the death of the tooth stub and passive land portions in between the thread segments.

2) Active/passive dental posts: It is formed of an elongated cylindrical rod having an active threaded portion and a passive portion.

3) The D.T. Light-post has a tapered form toward the apex, with parallel sides coronally.

4) Cast post and core with a Kaitlyn Loop: It is a small loop on the occlusal surface of the cast post. The purpose of this is to allow threading of the dental floss through the loop, to make the post and core retrievable and not swallowed if it drops in the back of the mouth. The Kaitlyn loop has to be drilled off after cementation of the post, after the cement has dried.

Materials used for fabrication of post and core:

The materials used for fabrication of post and core can be classified as metallic and non-metallic.

Metallic posts: The metals that are commonly used for fabrication of post and core are: stainless steel, titanium and its alloys, gold plated brass, cobalt chromium. Stainless steel contains nickel, and nickel sensitivity is a concern, especially among female patients. Stainless steel and brass have problems with corrosion. Pure titanium has slightly lower physical properties such as in compressive and flexural strength than alloys, but it is the least corrosive and most biocompatible material. Furthermore, most titanium alloys used in posts have a density similar to that of gutta-percha when seen on radiographs, which makes them more difficult to detect[10].

Carbon posts: Carbon fiber has certain properties that makes it potentially useful in dentistry. It is biocompatible, corrosion-resistant, and strong. The carbon fiber post is reported to have a modulus of elasticity that is nearly identical to that of dentine, so that it causes less tooth stress and hence, fewer root fractures. However, due to their unfavourable optical properties they are not suitable to be used with all ceramic restorations for anteriors[4].

Carbon-fiber reinforced epoxy resin posts: It was developed in France by Duret and Renaud, and became commercially available in Sweden in 1992. It was composed of unidirectional carbon fibers that are 8 μm in diameter embedded in a resin matrix. It is radiolucent, biocompatible, non-corrosive, and its placement technique is less invasive due to short post length of 7 to 8 mm with less chance of perforation. They possess inferior strength compared to metal posts, and were less likely than metal posts to cause fracture of the root at failure. The disadvantage of the CFP includes its radiolucency, which may be impossible to detect radiographically and black color[10].

The metal free alternatives are mainly made up of-composite materials or ceramics

Aesthetic fiber posts:

Aesthetic fiber posts have become more popular. They are also well accepted because of their favorable physical properties a biocompatibility and superior esthetics. They can be bonded within root canal spaces with polymer dentine-bonding agents and resin cements of similar flexibility. They effectively transmit stresses between the post and the root structure, thus reducing stress concentration and preventing fracture. They have high tensile strength and at the same time exhibit elasticity charateristics that are similar to dentin.

Aesthetipost (from RTD, France) retains a core of carbon fibre bundle surrounded by quartz fibres similarly arranged longitudinally.

Aestheti Plus also from RTD, France is composed entirely of Quartz Fibres. The posts have characteristics that are similar to their carbon fiber ancestors, including high flexural strength and a low modulus of elasticity. The posts are retrievable if required for endodontic retreatment[1].

Glass fiber reinforced posts:

Glass fiber-supported resin dowel systems were introduced in 1992. The dowels are composed of unidirectional glass fibers embedded in a resin matrix that strengthens the dowels without compromising the modulus of elasticity. Another advantage of glass fibers is that they distribute stress over a broad surface area, increasing the load threshold at which the dowel begins to show evidence of microfractures[4].

Zirconia posts:

Strong, tooth colored zirconia posts are highly radiopaque and rigid. The post is made from fine grain, dense tetragonal zirconium polycrystals TZP. Zirconium posts require a special

surface treatment in order to achieve a strong and permanent bond to the tooth. They are sandblasted with aluminium oxide, silanated, and cemented with a phosphate-monomer modified resin composite. Zirconia Posts possesses optical properties compatible with an all ceramic crowns. The disadvantages include lower fracture resistance than metal posts, difficult retrieval of the fractured post within the root canal, and poor resin-bonding capabilities of the post to radicular dentin.

Lucent anchor post technique: The Luscent anchor post (Dentatus) is a fiber-glass, clear resin post that is designed to refract and transmit natural tooth colors for esthetic post-and-core foundations. It is radiolucent, and identified on radiographs by the surrounding resin cement. Designed to be placed passively in prepared canals, it is available in three diameters, and is size integrated with the Light Transmitting Posts. The Luscent anchor is easily removed, if required, for endodontic retreatment[1].

Parapost fiber white: The ParaPost Fiber White Post (Coltene/Whaledent, Mahwah, NJ) is a filled resin, mono-directional fiber matrix with a flexural modulus that very closely approximates that of the natural dentin. It is white and translucent. The parallel- sided posts are intended for passive seating in the canal, and the antirotational post head stabilizes the core materials. It is available in four diameters, color coded to matching drills. These posts are readily removed if endodontic retreatment be necessary. It is compatible with the existing Parapost system in shape and is available in diameters of 1.14mm, 1.25mm, 1.4mm and 1.5mm.

Fibre kor: The FibreKor Post (Jeneric/Pentron, Wallingford, CT) uses glass fibers bundled in a resin matrix. The bundles are in turn impregnated with resin, cured, and precision milled it is white in color. The modulus of elasticity of the FibreKor Post is closely matched to that of dentin, helping to distribute impact forces more uniformly along the prepared canal interface. The post is available in three diameters with size-matched drills: l mm, 1.25mm, 1.125mm, 1.375mm and 1.5mm. Should endodontic retreatment become necessary, the FibreKor Post can be carefully extracted from the canal using conventional burs and drills[1].

Snowpost from Carbotech, France – was developed originally at Switzerland by Professor Bois & colleagues. The Snow Post is composed of 60% longitudinally arranged Silica Zirconium glass fibres in an epoxy resin matrix.

Very similar in construction to the D.T. Light-post® is the new Illusion post from bisco. It has quartz fibers in a resin matrix, and comes in colors which become clear when heated to body temperature. This aids in identification and placement.

Ribbond post and core:

The fibre ribbons are used as a matrix for construction of direct post with retained composite as core. The polyethylene fibers of Ribbond are plasma treated to allow the dental resin to bond to its surface Removal of the obturation material and a minimal amount of dentine to facilitate insertion of the ribbon is the only preparation required. One or more lengths of fibre are coated with light cure resin, folded into a V shape and around an instrument and then carried into the canal space to be cured. Additional increments are then added to complete the core build up. For this technique to work well there must be sufficient light reaching depth of post space[10].

Light transmitting posts: Translucent Posts (Lightpost; Luscent Anchor) have been introduced in order to use light cured luting agents. The technique involves inserting a luscent plastic post into a light-curing composite placed within the canal. The light transmitted down and through the post then cures the composite. Once the composite is cured, the post is withdrawn and a matching metal or fibre post is luted with resin cement. The plastic posts require a diameter greater than 1.5mm to achieve composite curing for depth of about 7mm.



Spiraposts are constructed of surgical stainless steel wires twisted around biocompatible, natural color polyfiber strands. They conform to the shape to the canal. They can be retrieved easily. Conforms to curvature of canal, does not hold memory, so there is no concern for undue stresses within the canal. Minimizes removal of tooth material. Creates a strong structure that absorbs and distributes external forces, minimizing the risk of failure. Coronal portion of post can be angled intraorally. Once the post cement has been cured, Spirapost can be angled so that it is centered within the core. This distributes stresses evenly and provides the maximum amount of support for the restoration. Easy to use and cost-effective. Non-technique-sensitive.

► Conclusion:

Various types of posts with different designs and materials are available because they all have certain strengths and weaknesses. There are a few things that a clinician should bear in his mind while he plans for a post and core like: Preserve as much coronal and radicular dentin as possible, familiarity and cost, Selection criteria should include adequate strength, modulus of elasticity, retention, biocompatibility, esthetics and retrievability.

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CASE REPORT

Field cancerization of oral cavity: A clinical case of multiple primaries in oral submucous fibrosis

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Abstract

Squamous cell carcinoma (SCC) of the buccal mucosa is the most common form of oral and pharyngeal cancer in South and Southeast Asia. Betal-quid chewing, tobacco smoking and alcohol consumption are the major risk factors for the high incidence of mucosal SCC. Oral squamous cell carcinomas (OSCC) often develop in a pre-cancerous field, defined as mucosal epithelium with cancer-related genetic alterations, and which may appear as a clinically visible lesion. Field cancerization is the term used to describe multiple patches of pre-malignant disease, with a higher-than-expected prevalence of multiple local second primary tumors, presence of synchronous distant tumors and local recurrence. Second primary tumors (SPTs) are one of the implicated causes for treatment failure and poor survival rate in patients with head and neck SCC. Recent molecular findings support the carcinogenesis model in which the development of a field with genetically altered cells plays a central role. In this article, we emphasize on the concept of field cancerization and its clinical implication by presenting a case of multiple primary tumors developing in oral submucous fibrosis.

Key-words: Field cancerization, Squamous cell carcinoma, Second primary tumors

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► Introduction:

Oral and pharyngeal cancer is the 6th most common cancer in the world. Two-thirds of these cases are reported in developing countries where they form 25% of all cancers. 90% of these cases are squamous cell carcinomas.[1] Oral squamous cell carcinomas frequently develop in precancerous fields.[2] It is now widely accepted that head and neck cancer patients are at a high risk to develop second primary tumors (SPTs), post surgically, even in lesions with histopathologically tumor free surgical margins.[3-7] Tumors of same clonal origin have been reported arising greater than 7cm apart[8] and recent studies have shown increased risk of contralateral mucosa in oral premalignant and malignant lesions.[9,10]

Such observations support the hypothesis of a field effect in cancer. The term "field cancerization" was first proposed by Slaughter et al (1953) to explain the occurrence of multiple primary tumors in oral squamous cell carcinoma[11] Since then, field cancerization has been described in oropharynx, larynx, lung, esophagus, cervix, colon, breast, bladder and skin.[12] According to this concept an exposure to carcinogens induce a field of mucosa which is more susceptible to tumor formation, and thus may lead to increased risk of multiple primary tumor development. Exposure of oral cavity and upper aero-digestive tract to carcinogens have shown to increase epithelial cancer risk in head and neck, lungs and esophagus.[6,13] These observations indicate the need for focusing on the field from which the tumor arose, rather than the tumor alone, for diagnosis and treatment planning.

► Case History:

A 54 year old female patient reported to the department of oral pathology with a complaint of pain and growth in the left cheek region of 6 months duration. The lesion initially appeared as a white patch and gradually progressed to an ulceroproliferative lesion of present size. The growth was associated with a burning sensation while taking hot and spicy food. The patient was relieved of pain on medication and was using candid mouth paint for the past 2 years.

The patient had the habit of chewing betel leaves with slaked lime, tobacco and arecanut on the left side of mouth, 3-4 times a day for more than 20 years. The patient quit the habit 4 years back. Patient reported a history of restricted mouth opening 3 years back for which she had visited a hospital and a diagnosis of oral submucous fibrosis was made. About 2 years back, a white lesion developed on the left buccal mucosa extending till the left commissure of the lip which was histopathologically diagnosed as microinvasive carcinoma

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and was surgically excised under general anesthesia.

On extraoral examination, there was no gross facial asymmetry. A solitary submadibular lymph node was palpable and tender on the left side. It was firm in consistency and freely movable.

Intraorally an ulceroproliferative lesion was found on left commissure of lip, measuring about 2.5cm x 1.5cm in size. It was irregular in shape with everted edges. The lesion was tender on palpation with indurated borders (Fig 1). A small white, non-scrapable patch was seen on the left buccal vestibule, in 36 region, measuring about 1cm x 0.5cm in size. On the palate a reddish-white patch was found extending posterior to the incisive papilla and involving the entire hard palate (Fig 2). Buccal mucosa on either side was pale and taut, losing its normal elasticity. Multiple fibrous bands, extending vertically, were palpable on both right and left buccal mucosa and soft palate. The tongue was smooth and depapillated with areas of pigmentation (Fig 3).

Routine blood investigations were carried out before performing biopsy and all parameters were well within normal limits, which ruled out the possibilities of anemic stomatitis. A provisional diagnosis of squamous cell carcinoma of left commissure of lip (T2 N0 M0), leukoplakia in the left buccal sulcus in relation to 36, speckled leukoplakia on the palate and Stage II oral submucous fibrosis (Pindborg's staging) were made. Vital toludine blue staining was performed and positive areas were identified for biopsy. Ultrasonography of the neck, lymph nodes, salivary gland and thyroid and flexible video laryngeoscopy was done to rule out any other primary lesions in the upper aero-digestive tracts.

Incisional biopsy was performed of the lesion on the left commissure of the lip and that on the palate, from the most representative site. Histopathology of the lesion from the left commissure of the lip showed islands of neoplastic cells, with numerous keratin pearl formations, infiltrating deeply into the connective tissue. The neoplastic islands were predominantly well-differentiated (Fig 5). Histopathology of the palate showed severely dysplastic epithelium with a few foci of indistinct basement membrane. A few neoplastic cells were seen infiltrating into the adjacent connective tissue, suggestive of microinvasion (Fig 6).

The treatment plan for squamous cell carcinoma of lip included wide excision under general anaesthesia and reconstruction with split-skin graft with 2 months follow up. The treatment plan of the palatal lesion included wide excision, followed by stent placement with 2 months review. The palpable left submandibular lymph node was also planned to be removed and subjected to histopathological examination.

Wide excision from the retromolar area to the corner of the mouth was done under general anesthesia and split skin graft was positioned over the buccal mucosa. Borders clear wide excision of the palatal lesion was done and the wound was left for secondary healing, after which a palatal stent was placed. Palpable left submandibular lymph node was surgically removed (Fig 4) and submitted for histopathological analysis, which showed normal architecture, with lymphocytes packed in lymphatic follicles showing germinal centers and were negative for neoplastic cell invasions. Patient is currently under regular follow-up to detect any local relapse or formation of any other primary tumors and none have been observed till the time of reporting.

► Discussion:

Second primary tumors (SPTs) are reported in up to a fifth of all head and neck cancer patients.[14] Oral squamous cell carcinoma patients have shown 6-27% probability of developing a second primary cancer.[15] SPTs contribute to poor prognosis with a 5 year survival rate of 26%.[16] According to Braakhuis et al (2003) the concept of field cancerization proposed by Slaughter(1953) has since been cited by many workers in order to explain,

(i) Oral cancer developing in multifocal areas of a precancerous change
(ii) Abnormal tissue surrounding a tumor
(iii) Oral cancer that sometimes arise as multiple independent lesions that coalesce
(iv) The persistence of abnormal tissue after surgery leading to second primary tumors or local recurrences.[12]

Fig 1: Clinical picture showing ulcero-proliferative lesion in the commissure of the lip.

Fig 2: Clinical picture showing reddish-white lesion of the palate.

Fig 3: Clinical picture showing depapillated tongue.

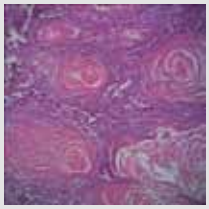

Fig 4: Clinical picture showing ulcero-proliferative lesion in the commissure of the lip.

Fig 5: Photomicrograph (10x) showing keratin pearls in well differentiated SCC.

Fig 6: Photomicrograph (10x) showing severe dysplasia.

Various studies have proposed different theories for the molecular mechanisms in field cancerization. Braakhuis (2003) proposed that oral squamous cell carcinoma arises from a field of cancerization in the oral mucosa, which has cells showing cancer-associated genetic alterations. These genetically altered cells undergo a clonal expansion replacing a part of normal epithelium in the oral cavity.[12] These alterations has been demonstrated in various molecular studies.[17,18]

The concept of field cancerisation has often been used to describe the presence of a wide field of genetically altered cells in the mucosa due to a premalignant disease and the frequent occurrence of the multiple primary tumors from fields of mucosa affected by premalignant disease.[10] Various studies have been conducted to study the clonal relationship between fields of premalignancies and SPTs. Califano et al (1996) while proposing a genetic progression model for premalignancy showed a step-wise progression of allelic loss as the premalignant lesions increased in histopathological severity and developed into malignancy.[19] Concordance in clonality between premalignancies, first and second primary tumors have been found in various studies, indicating their origin from a single field of genetically altered cells.[18,20,21]

Warren and Gates described a criteria in order to distinguish SPTs from recurrence or metastasis.[22] According to this criteria,

(1) Each tumor must present a definite picture of malignancy

(2) Each neoplasm must be anatomically separate and distinct

(3) The possibility that the second primary carcinoma represents a metastasis or a local relapse must be excluded.

It has to be separated from the first by at least 2 cm of normal epithelium or has to occur at least 3 years after the first diagnosis. International Agency for Research on Cancer (IARC) proposed a set of rules to define multiple primaries as two or more tumors occurring in different sites, or histologically different tumors occurring at the same site.[23] SPTs may present as either synchronous or metachronous lesions. Synchronous carcinomas are two anatomically distinct carcinomas that are diagnosed within 6 months period while metachronous carcinomas are anatomically distinct carcinomas which are diagnosed more than 6 months after an index carcinoma was diagnosed.[16]

In the present case two different foci of oral squamous cell carcinoma were seen to develop synchronously at two anatomically distinct sites; buccal mucosa and palate; from a known precancerous condition. The lesion on the buccal mucosa was a local recurrence of oral squamous cell carcinoma, two years after surgical excision with histopathologically confirmed tumor free margins as per Warren & Gates criteria. Local recurrences of tumors have often been considered to arise from cancer cells remaining, which were not included within the excised margin. However a local recurrence of 10-30% has been reported in cases where surgical margins were diagnosed histopathologically as tumor free.

In order to explain this it has been recently suggested that "fields" of genetically altered cells surrounding the tumor, may be responsible for many of the local recurrences. Based on recent studies it has been proposed that nearly 60% of local recurrences develop from a precursor field of genetically altered cells.[18] Considering the tendency of the patient to develop multiple primary tumors at different sites, the recurrent lesion could have arisen from a field of genetically altered cells.

The follow-up period is important in identifying a SPT, as a tumor developing from a premalignant field will require more time to present as a recurrence as compared to one developing from remaining tumor cells. According to Curtis et al (2006) tumors with the same histology as the index cancer occurring in the same site can be reported as a second primary cancer, if it arises at least 2 months after the first cancer diagnosis.[4]

Risk factors for development of SPTs are similar to those for the initial squamous cell carcinoma lesion, such as tobacco, alcohol and late adverse effects of radiotherapy.[1] Higher risk of development of SPTs in women has been reported[24] with the risk in women associated with tobacco use reported to be 3 times more than that in men associated with tobacco use.[14] There have also been studies which have reported that stopping tobacco habits did not seem to reduce the risk of development of SPTs[25] whereas Khuri et al (2001) has reported higher risk of SPT in tobacco users than people who never used tobacco, whereas people who stopped tobacco usage after treatment for primary tumor has showed an intermediate risk.[26] These studies are in accordance with the reported case where the female patient had stopped tobacco chewing after treatment of first lesion.

Distant metastasis occurs mostly during the late stages of the disease but second primary tumors may be found in patients in early stage of disease progression.[27] Thus the early diagnosis and thorough screening of these tumors is important for precise tumor staging and optimal management.[28] Patients with head and neck cancer are at a high risk of producing SPTs in the head and neck, esophagus and lungs.[13] In the present case ultrasonography of the neck, lymph nodes, salivary gland and thyroid and flexible video laryngoscopy was done in order to rule out any other primary lesions or metastasis in the upper aero-digestive tracts.

► Conclusion:

SPTs and distant metastasis are the leading causes of treatment failure and poor prognosis in head and neck cancer patients. SPTs maybe found even in the early stages of the disease and thus their early detection is important. Occurrence

of multiple primary tumors in a patient point to the possibility that these tumors maybe arising from a field of genetically altered cells. So further research in this area is required in order to develop new diagnostic methods for early identification of these fields and for developing new treatment modalities targeting these fields of genetically altered cells.

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CASE REPORT

Tissue adhesives in third molar impaction surgery- Report of a case with review of literature

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Abstract

Surgical tissue adhesives continue to evolve as an important technology for the facial plastic and reconstructive surgeon. Twelve years ago there was little routine use of these substances; however, in the past 5 years there have been significant advances. It is becoming increasingly important for the facial plastic and reconstructive surgeon to be familiar with the indications and shortcomings of these compounds.

Keywords: Cyanoacrylate Tissue Adhesive, Third Molar Impaction, Suturing, VAS

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► Introduction:

Surgical removal of impacted teeth is the routine procedure performed in oral and maxillofacial surgery. After removal the conventional method is to suture the surgical wound and let it heal by primary intention. Surgical time, trauma, and difficulty are important factors in postoperative complications. The postoperative period following surgical removal of the third molars is frequently characterized by swelling, bleeding, and pain. Suitable closure and optimal maintenance of the surgical area are the most important factors that affect proper wound healing and surgical success.[1] The conventional method of wound closure causes trauma during the needle penetration while passing through the tissues and provides a "wick down" through which bacteria can gain access to the underlying tissues and it has been proved that the presence of suture material itself increases the susceptibility to infection.

The first cyanoacrylate adhesives were synthesized in 1949, but they had limited tensile strength and there were reports of associated acute and chronic inflammatory reactions. Subsequently NBCA (N-butyl-2-cyanoacrylate) was developed, which readily polymerises in contact with moisture and has better tensile strength. The addition of plasticisers and stabilisers has further increased its flexibility and reduced toxicity. NBCA is primarily used as a tissue adhesive for closure of surgical wounds and traumatic lacerations. N-butyl-2-cyanoacrylate (NBCA) glue has been used in many ways since it was introduced 40 years ago.[2]

In many studies, the efficacy of cyanoacrylate as a sclerosing agent in children's wound closure, craniofacial fixation, and so forth, has been supported by reports. In the maxillofacial field, it has been used for wound closure, skin graft, face lifts, blepharoplasty, brow lifts, and other cosmetic surgeries; but there has been no indication in the literature supporting the efficacy of cyanoacrylate for wound closure after the removal of mandibular impacted third molars.[3-6]

► Case report

A 27 age female patient reported to department of oral and maxillofacial surgery at Kannur Dental College, with history of pain on bilateral in the posterior mandible. On examination it revealed the presence of bilaterally impacted third molars in the mandible, with an inflamed pericoronal tissue, and OPG (Fig. 1) was advised which revealed horizontally impacted third molars on both sides. The patient was informed about the procedure such that one side is closed with the cyanoacrylate [ENDOCRYL] (Fig. 2) and the other side is closed with the conventional 3-0 silk suture. Informed consent was obtained. A routine blood test was done which showed all normal para-meters.

► Surgical Procedure:

A bilateral inferior alveolar Nerve block was given with 1:200000 Adrenaline. Modified Wards incision was given, the mucoperiosteal flap reflected to expose the impacted teeth, sectioned amount of bone was removed on both side using 702 Bur. Teeth sectioning was performed and the impacted teeth were removed, both the sockets were irrigated

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with saline and betadine. Right side socket was closed using cyanoacrylate adhesive after approximating the buccal and lingual tissue, approximation was done with the tissue forceps, using the dropper and syringe (Fig. 3) the cyanoacrylate was pushed drop by drop into the approximated margins, care was taken not to spill cyanoacrylate on any other tissues and instruments (Fig. 4).

On the left side after irrigation the socket was closed using with conventional simple interrupted sutures with 3-0 silk suture material(Fig. 5).

The following parameters viz, pain, swelling and trismus were checked 3rd and 7th day respectively. The pain was measured using visual analogue scale, the swelling was measured as per the criteria said to by Sneha Setiya et al. they measured the swelling by drawing lines between Lateral corner of the eye to gonion, Tragus to outer corner of the mouth, Tragus to pogonion. All the measurement was added and the average was taken as the swelling.[7]

► Results:

The parameters were evaluated on 3rd day respectively as per the visual analogue scale the values for pain was obtained on the test side is 4 (closed with cyanoacrylate) and the control side was 6 (3-0 silk suture). The values obtained for swelling on 3rd the test side is 7.3 and on the control side is 8.4. which clearly indicated that cyanoacrylate have an important role in postoperative oedema.

The parameters were evaluated again on the 7th day respectively as per the visual analogue scale, the values for pain was obtained as on the test side is 2 and even the control side is 2. The swelling was obtained as 6.7 and 6.9 cm respectively on the test and control side. These results showed that pain and swelling were reduced on the side closed with cyanoacrylate were less when compared to the side closed with silk. The result on the 7th day showed more or less the same values.

► Discussion:

Healing process after the closure of wound can be enhanced by proper approximation of wound edges and by proper isolation of the wound. If superficial contamination of the wound occurs postoperatively, it results in delayed epithelialization of the wound surface and the production of excessive granulation tissues. All these factors contribute to the failure of surgery to produce the desired result and lead to greater postoperative pain and discomfort.[8]

In general, wound closure biomaterials can be divided into three major categories: suture materials, staples and tissue adhesives. Suturing has been the most widely and commonly used method. However, alternative techniques have been sought, since suturing technique requires skill and experience, a relatively longer time and the need for its removal if a non resorbable suture is used. Due to these reasons, surgeons are increasingly using tissue adhesives over sutures for wound closure.[9, 10]

Cyanoacrylate can be used for mucosal closure. This adhesive can eliminate the need for suture placement and suture removal. Pasqualini and Cocero conducted a study to compare effects after primary and secondary surgical closure of wound after third molar surgery and found that the pain was less severe with secondary healing than with primary healing. They used the VAS for assessing pain, which is considered to be an efficacious tool to evaluate clinical parameters, such as pain.[11]

Waite and Cherala demonstrated good results and fewer complications after third molar surgery with the suture less method. They examined sutureless method in 366 patients after third molar surgery.[12] In 1993, Ellis showed, unlike the earlier study, reduced pain after wound closure using cyanoacrylate adhesive. They compared the effect of silk suture closure and N-butyl-2-cyanoacrylate on healing of the skin wounds.[13] Al-Belasy and Amer described the hemostatic effect of cyanoacrylate glue on warfarin-treated patients undergoing oral surgery.[14]

All these his studies suggested that the efficacies of cyanoacrylate adhesive and suturing in wound closure were similar. However, use of cyanoacrylate adhesive had some advantages such as simplicity, higher speed, and better hemostasis. Cyanoacrylate itself acts as a water proof dressing and helps in reduction in number of follow-up visits. As they do not require any needles, accidental needle stick injuries are also prevented. The time required for wound closure with the tissue adhesive is half that of a suture. There is also significant cost savings using adhesives due to reduced physician, ancillary services and reduced equipment needs. Furthermore the effect of the bio adhesive wears off after 48-72 hours without local allergic or other reactions.

Surindar et al studied the efficacy of cyanoacrylate in

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

patients undergoing various minor intraoral surgical procedures and found it to be a hemostatic adhesive that polymerizes almost immediately on contact with cut oral tissue.[15] The same was noted by Kulkarni et al. after use of cyanoacrylate in periodontal flap surgery.[16] Immediate hemostasis in bleeding pulp took place in the study conducted by Milton et al. [17] The results of the study conducted by Ghoreishian et al. showed that postoperative bleeding with cyanoacrylate adhesive method was less significant than with suturing on the 1st and 2nd day after surgery.[18] The same was noted by Ajit et al. where the use of cyanoacrylate showed better hemostasis.

Post-operative clinical evaluation of case in this study clearly revealed that the sites which were closed with silk sutures showed longer duration and more dense inflammation when compared to sides treated with the cyanoacrylate, this is possible because of irritation and trauma from the sutures and collection of food particles on sutured area. The blood coagulum which fills the defects to protect the incision from outside influence probably gets effected by the fibrinolytic effect of the saliva during the healing period whereas the adhesion of the two margins of the incision by the cyanoacrylate leaves no space for salivary interference during healing, thus the isolation of the wound margins from the saliva and food debris/plaque appears to be added advantage provided by the use of adhesive materials like cyanoacrylate for closing the incision margins post operatively, it is also observed that cyanoacrylates has antimicrobial activity, bacteriostatic effects against gram positive microorganisms of n-butyl-2-cyanoacrylate have been also reported by Tse.[18 - 20]

The disadvantage of using cyanoacrylates is that it cannot be used for infected wounds and cannot be used to close wounds without well approachable margins. The wound bursting strength of bio adhesive is less than that of sutures.

► Conclusion

Our study revealed suture less closure of wound after surgical removal of impacted mandibular third molars using cyanoacrylate glue to be more beneficial when compared to the conventional suturing technique. Use of cyanoacrylate adhesive had certain advantages over conventional suturing technique like as follows: it was hemostatic, reduced pain and swelling, avoids second visit for suture removal and was an expeditious procedure. The cost of tissue adhesive was the only limitation of this study. Thus we conclude that cyanoacrylate glue is a better alternative to conventional suturing for closure of intraoral minor surgical wound.

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Gingival biotype

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Abstract

Gingival biotype is an anatomical factor that can influence disease progression as well as treatment outcome. Of the two biotypes, a thin biotype is reported to have a faster disease process, resulting in recession and bone loss, hence a thicker biotype is more preferred. Different gingival biotypes respond differently to trauma and inflammation, therefore a disparity is seen in case of treatment outcome. Periodontal surgical technique can improve the tissue quality and treatment outcome. This review article gives an overview of type and characteristics of the gingival biotypes, factors affecting the biotypes, methods of evaluation and responses to different treatment procedures.

Key words: Gingival biotype, treatment outcome, probe transparency, tissue response.

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► Introduction

The normal periodontium provides the support necessary to maintain teeth in function. It consists of four principal components namely gingiva, periodontal ligament, cementum and alveolar bone. The gingiva is the part of oral mucosa that covers the alveolar process of the jaws and surrounds the necks of the teeth.[1] Gingival Biotype refers to the quality of the soft tissue profile surrounding the teeth.[2] Among the factors that may determine successful treatment, gingival biotype is a great cause of concern, as it has significant impact on the outcome of periodontal surgery and implant placement.[3]

The term gingival biotype was coined by Muller H.P in the year 1997. Siebert and Lindhe later used the term periodontal biotype.[4] Since the advent of implants it has been renamed to soft tissue biotype to encompass the tissue surrounding both the tooth and implants.[5]

Gingival biotype refers to the type of gingiva based on the bucco lingual thickness of the gingiva. Different gingival biotype responds differently to inflammation, restoration, trauma and parafunctional habits.[6] These responses dictate different modalities of treatment for the different gingival biotype.[7,8]

Tissue biotype is a critical factor that determines the result of dental treatment hence it should be recognized during treatment planning. The initial gingival thickness is significant as it may predict the outcome of root coverage procedures and restorative treatments.[9,10] However periodontal surgical techniques can enhance the tissue quality resulting in a more favorable treatment out come.[6]

► Factors affecting tissue biotype

Gingival biotype is known to be dependant upon many factors such as age, gender, growth, tooth shape, tooth position, tooth size and genetically determined factors.[5]

Among different age groups, younger age group had a thicker biotype when compared to older groups.[2]

The thicker biotype was observed to be more prevalent in male population with shorter and wider forms of tooth while females had thinner biotypes, seen associated with long and slender tooth forms.[2]

The dimensions of the buccal gingiva may also be affected by the bucco lingual position of the tooth within the alveolar process.[2]

A change of the tooth position in buccal direction results in reduced dimensions of the buccal gingival, while an increase is observed following a lingual tooth movement.[11]

► Different tissue biotypes

Early, in the year 1923, Hirschfeld observed a thin alveolar contour and made the assumption that a thin bony contour was probably accompanied by thin gingival form.[12]

In 1969 Ochsenbien and Ross indicated that, gingival biotype are of two types: they are scalloped and thin (Fig. 1) or flat and thick gingiva. (Fig. 2) The authors reported that flat gingiva was associated with a square tooth form, while scalloped gingiva was associated with a tapered tooth form.[13]

In 1977, Weissgold emphasized that the form and function are related and also observed that the gingival tissues in a scalloped periodontium are generally thinner than in a flat periodontium. Therefore the terms thin scalloped and thick flat type was introduced.[14]

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Later in 1986 Claffey and Shanley defined the thin tissue biotype as a gingival thickness of <1.5 mm, and the thick tissue biotype was referred to as having a tissue thickness >2 mm (measurements 1.6 to 1.9 mm were not accounted for).[15]

Seibert and Lindhe in 1989 categorized the gingiva into "thick- flat" and "thin-scalloped" biotypes.[3]

Becker et al in 1997 proposed 3 different biotypes: flat, scalloped and pronounced scalloped gingiva. Measuring from the height of bone interproximally to the height at the direct midfacial, there findings are as follows: flat = 2.1 mm, scalloped = 2.8 mm, pronounced scallopped = 4. 1 mm.[16]

De Rouck et al in 2009, illustrated with reference of two distinct gingival biotypes. The first occurred in 1/3rd of the study population and was prominent among females, was classified as having a thin gingival biotype, slender tooth form, narrow zone of keratinized tissue and a high gingival scallop. The second, which occurred is 2/3rd of the study population and was prominent among males, was classified as having a thick gingival biotype, quadratic tooth form, broad zone of keratinized tissue and a flat gingival margin.[17]

Characteristics of thick and thin biotype

Thin gingival tissue tends to be delicate and almost translucent in appearance. The tissue appears friable with a minimal zone of attached gingiva. The soft tissue is highly accentuated and often suggestive of thin or minimal bone over the labial roots. Surgical evaluation often reveals thin labial bone with the possible presence of fenestration and dehiscence. It reacts to insults and disease with gingival recession.[3]

Thick gingival tissue is probably the image most associated with periodontal health. The tissue is dense in appearance with a fairly large zone of attachment. The gingival topography is relatively flat with the suggestion of a thick underlying bony architecture. This type of tissue is resistant to acute trauma and reacts to disease with pocket formation and infrabony defect formation.[18]

Methods of evaluation of bio types

Various methods, both invasive and non invasive have been used to evaluate the thickness of facial gingiva and other parts of the masticatory mucosa.[19] These methods include, visual evaluation, ultrasonic devices, cone beam computed tomography, histological sections, probe transparency, transgingival probing and modified caliper.

Visual evaluation

Simple visual evaluation is used in clinical practice to identify the type of Gingival Biotype. However it is not the most reliable method, because the degree of gingival thickness cannot be assessed and it is highly subjective.[13,17,20]

Fig. 1 Thin gingival Biotype

Fig. 2 Thick gingival Biotype

Fig. 3 Probe visible through the gingiva

Fig. 4 Probe not visible through the gingiva

Ultrasonic devices

A 1971 study by Kydd et al was the first to measure the thickness of palatal mucosa using an ultrasonic device.[21] Ultrasonic devices appear to be the least invasive method, inexpensive, rapid, convenient and offer excellent validity and reliability. Such devices are no longer available commercially.[22,23]

CBCT

CBCT is the most advanced technology used to visualize and measure thickness of both hard and soft tissues.[8] CBCT measurements may be a more objective method than direct measurement.[24]

Fu et al reported that CBCT measurements of both bone and labial soft tissue thickness are accurate and concluded that CBCT measurements might be a more objective method to determine the thickness of both soft and hard tissues than direct measurements. Disadvantages of CBCT is the cost, need for technical expertise and higher radiation exposure.[25]

Probe transparency – tran method

De Rouck et al (2009) introduced a method to check for the gingival thickness based on the transparency of the periodontal probe through the gingival margin while probing the sulcus at the midfacial aspect of incisors.[17]

If the outline of the underlying periodontal probe could be seen through the gingival margin (Fig. 3) it was categorized as thin, if not (Fig. 3) it was categorized as thick. This is the most commonly used method as it was relatively easy and not too invasive.[15]

Transgingival probing

Direct measurements using a periodontal probe or an endodontic file/reamer have been frequently used to determine the thickness of gingiva.[15,26]

Transgingival probing although simple and straight forward, is an invasive procedure that requires LA and may result in distortion of the gingival tissues during probing.[27]

Effects of biotype on tissue response

It has been suggested that since the two tissue biotype have different gingival and osseous architecture, they exhibit different pathological responses when subjected to inflammatory, traumatic or surgical insults.[3,10]

The different responses dictate different modalities of treatment. Therefore an accurate diagnosis of gingival tissue biotype is of atmost importance in forming an appropriate treatment plan to achieve a predictable treatment outcome.[3]

Response to Inflammation and Healing

In case of thick gingival biotype, the soft tissue shows marginal inflammation, cyanosis, bleeding on probing, edema/ fibrotic changes and there is bone loss with pocket formation / infrabony defects.

In case of thinner biotype, the soft tissue shows thin marginal redness and gingival recession. Hard tissue shows rapid bone loss associated with severe gingival recession.

Thicker biotype is reported to have a more predictable prognosis, better healing and a more favourable treatment outcome when compared with a thinner biotype.

Tissue biotype and extraction of teeth

Though extractions should always be atraumatic, teeth with thin gingival biotype merit more attention due to their association with thin alveolar plates. Thick bony plates associated with thick biotypes and thin bony plates with thin biotypes respond differently to extraction. Also thick biotypes are associated with minimal ridge atrophy following extraction.[3]

Tissue biotype and implant treatment planning

If osseous and gingival tissues are different for thick and thin tissue biotypes, it seems logical that these distinction would significantly influence implant site preparation and treatment planning.[3] This is consistent with previous observations that the stability of the osseous crest and soft tissue is directly proportional to the thickness of the bone and gingival tissue.[27,29]

A thick biotype is more resistant to recession,[30,31] is better at concealing titanium[32] and is more accommodating to different implant positions.[33] Therefore compared to a thin biotype, it is preferred around dental implants.[27]

Tissue biotype and immediate implants

A delayed implant approach might be taken when there is not enough thickness in periodontal tissues to predictably minimize alveolar bone resorption secondary to healing or a lack of anchoring bone to ensure stabilization. For a thin biotype case, practitioners must be aware of the possibility of significant resorption, which may have an impact on esthetics. In a thick biotype environment, immediate placement of an implant can be completed with predictable results.[34]

Tissue biotype and root coverage procedures

An initial gingival thickness was found to be the most significant factor that influences the prognosis of a complete root coverage procedure.[9]

Nisapakultorn et al reported a significant association of thin biotype with increased risk of facial mucosal recession.[36]

Tissue biotype and orthodontic treatment

Alterations of mucogingival dimensions may occur during orthodontic treatment. It was found that the bucco lingual thickness determines gingival recession and attachment loss at sites with gingivitis during orthodontic treatment. In cases with thin gingiva caused by prominent positioning of teeth there is no need for preorthodontic gingival augmentation procedures, the recession and bone dehiscence will decrease

when the tooth is moved in a more proper position within the alveolar bone.[3]

Conclusion

Different tissue biotypes exhibit different pathological responses when subjected to inflammatory, traumatic or surgical insults as they have different gingival and osseous structures. These different responses dictate different modalities of treatment. By order understanding the nature of tissue biotypes, clinicians can employ appropriate periodontal management to minimize tissue resorption and provide more favorable results after dental treatment. Also new technologies, for assessment of periodontal biotype have opened new avenues for clinicians for accurate and predictable diagnosis, planning and treatment in a multidisciplinary patient based approach. So by taking into consideration the gingival tissue biotypes during treatment planning, more appropriate strategies for periodontal management may be developed, resulting in more predictable treatment outcomes.

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Legal aspects of orthodontic treatment

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Abstract

The purpose of this article is to acquire knowledge about the key legal aspects of orthodontic practice which may be used as an important defence tool in the event of ethical or legal actions. It is revealed that some analysis parameters are very satisfactory, such as the availability of service provision, communication with patients, orthodontic documentation etc. The informed consent is an important tool to be used when faced with a litigation. However some practices have yet to be adopted, such as, patient signature should be collected in the event of damage to orthodontic accessories and copies of drug prescriptions and certificates should be filed.

Key words: informed consent, negligence, ethics

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► Introduction

Orthodontics is an interesting speciality which includes preventing pain, preserving and restoring oral function for normal speech and mastication, the preservation and restoration of the patient's physical appearance, promoting responsibility to take control over his/her health. All this should be done taking into consideration the fundamental principle of professional ethics, ie, the best interests of the patient should always take predescence over any consideration of profit or personal gain.

In various studies conducted to assess level of awareness among medical and dental professionals, it was found that dentists are often ignorant about the laws governing their profession. It is therefore imperative for health professionals today to be aware of such laws which will be beneficial to patients and doctors and to the society as a whole.

Present society is increasingly aware about the standards of treatment and also have the potential to take legal action if their expectations are not met. It is prudent to implement potential risk management strategies for the dual purposes of rendering an enhanced level of treatment and minimising exposure to potential legal actions. Since most orthodontic treatments are neither emergencies nor life threatening, every opportunity must be given by health professionals to nurture the development of a trusting relationship that is based on mutual respect in providing dental care. The purpose of this article is to increase awareness among orthodontists about the legal aspects of treatment and its importance in the legal front.

► Ethics

Ethics represent a set of principles of professional conduct, rules and responsibilities by which dental professionals must strive to fulfil their duties to their patients, to the public and to the profession.

► Broad principles

- Orthodontist should be honest and impartial in serving patients and the public.
- He/she should strive to increase personal competence and esteem with which the profession is held.
- He/she should use knowledge and skill to improve the health and wellbeing of patients and public.
- He or she should respect the dignity, professional status and relationships with his/her colleagues and also with other health care professionals.

► Negligence

Negligence is a breach of duty to care.[4] A breach of duty gives the patient right to initiate action against negligence. Due to lack of knowledge updation by the professionals there is an increased risk of malpractice, especially in complex case situations.

For an act to be considered negligent, the following aspects must be present:

1) Orthodontist owed a certain standard of care but did not maintain it.
2) Injury resulting from the lack of care.
3) There should be a connection between the negligent act and resultant injury.

Effects of negligence in orthodontics

- Root resorption
- Increased mobility of teeth and ultimately their loss
- Temporomandibular joint injury
- Tooth attrition
- Trauma from occlusion

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► Non negligent acts:

- Not obtaining a consent form in an emergency is not negligence
- Patient's dissatisfaction with progress of treatment cannot be called negligence
- Not getting desired relief is not negligence
- Charging what the patient thinks is exorbitant is not negligence
- When the patient does not follow the advice of the doctor and does not get satisfactory results, orthodontist cannot be held negligent.

Methods to avoid negligent acts in orthodontics

- Patients must be x-rayed periodically to check for root pathology
- Treatment may need to be modified or ceased if root resorption occurs.
- Adult patients should be monitored closely for accelerated bone loss.

Legal issues in orthodontics

47% of lawsuits against orthodontists are based on poor interaction between orthodontists and the orthodontist's staff and the patient or parent.[2]

40% are initiated as a result of second orthodontist's criticism.[2]

6% are in retaliation for collection attempts.[2]

3% or less as a result of poor treatment results.[2]

Rationale behind law suits

- The primary reason is failure to keep patients informed of progress or lack of progress. Unwillingness on the part of the orthodontist to speak with the patient or parent about various problems or concerns about treatment may aggravate the situation
- Failure to obtain adequate informed consent is of substantial importance.
- Several other areas included wrong tooth extraction, poor orthognathic surgery outcomes, failure to provide antibiotic coverage for patients with cardiac problems, etc.

Methods to avoid litigations

- Orthodontists like any other health care professionals should always be well documented (degree certificate, registration number etc) and ready for any legal disputes.
- Patient signature should be collected in the event of damage to orthodontic accessories and copies of drug prescription and certificates should be kept filed.
- Documentation of all phases of treatment with photographs, radiographs and dental casts is of utmost importance
- An informed consent, which covers the entire aspects of treatment duly signed by the patient/parent should be obtained

► Consent

The concept of informed consent arises from the fundamental ethical principle of autonomy and rights of self-determination.[4] The orthodontist must explain the proposed treatment to the patient, the risks involved, and the possibility of any alternative treatment and ensure that appropriate consent is obtained. Positive patient communication is always necessary to build confidence, increased rapport and co-operation. It also minimises patient misunderstanding about treatment.

The principle of informed consent requires orthodontist to inform their patients adequately enough for them to reach a well-informed decision about the treatment. The patient/parents should be explained about the various treatment modalities(fixed or removable appliances) with due stress on the merits and demerits of each appliance.

► Sample for consent form

Results of Treatment

Orthodontic treatment usually proceeds as planned. However, complete satisfaction with the results cannot be guaranteed, nor can all complications or consequences be anticipated. The success of treatment depends on co-operation in keeping appointments, maintaining good oral hygiene, avoid damaging the appliance, and following the orthodontist's instructions carefully.

Length of Treatment

The length of treatment depends on a number of issues, including the severity of the problem, the patient's growth and the level of patient cooperation. The actual treatment time is usually close to the estimated treatment time, but treatment may be lengthened, if unanticipated growth occurs, if there are persisting habits, if periodontal or other dental problems occur or if patient cooperation is not adequate. Therefore, changes in the original treatment plan may become necessary.

Discomfort

The mouth is very sensitive so an adjustment period can be expected and some discomfort might be present due to the introduction of orthodontic appliances. Prescribed pain medication can be used during this adjustment period.

Relapse

Completed orthodontic treatment does not guarantee perfectly straight teeth for the rest of life. Retainers will be required to keep teeth in their new positions as a result of orthodontic treatment. Retainers must be worn as instructed or teeth may shift, in addition to other adverse effects. Regular retainer wear is often necessary for several years following orthodontic treatment. However, changes after that time can occur due to natural causes, including habits such as tongue

thrusting, mouth breathing, and growth and maturation that continue throughout life. Minor irregularities, particularly in the lower front teeth, may have to be accepted. Some changes may require additional orthodontic treatment or, in some cases, surgery. Some situations may require fixed retainers.

Extractions

Some cases will require the removal of deciduous teeth or permanent teeth. There are additional risks associated with the removal of teeth which should be discussed with family dentist or oral surgeon prior to the procedure.

Orthognathic Surgery

Some patients have significant skeletal disharmonies which require orthodontic treatment in conjunction with orthognathic surgery. There are additional risks associated with this surgery which should be discussed with oral and/or maxillofacial surgeon prior to beginning orthodontic treatment. Be aware that orthodontic treatment prior to orthognathic surgery often only aligns the teeth within the individual dental arches. Therefore, patients discontinuing orthodontic treatment without completing the planned surgical procedures may have a malocclusion that is worse than when they began treatment.

Decalcification and Dental Caries

Excellent oral hygiene is essential during orthodontic treatment. Inadequate or improper hygiene could result in cavities, discolored teeth, periodontal disease and/or decalcification. Same problems can occur without orthodontic treatment, but the risk is greater to an individual wearing braces or other appliances. These problems may be aggravated if the patient has not had the benefit of fluoridated water or its substitute, or if the patient consumes sweetened beverages or foods.

Root Resorption

The roots of some patients' teeth become resorbed during orthodontic treatment. It is not known exactly what causes root resorption, nor is it possible to predict which patients will experience it. However, many patients have retained teeth throughout life with severely resorbed roots. If resorption is detected during orthodontic treatment, orthodontist may recommend a pause in treatment or the removal of the appliances prior to the completion of orthodontic treatment.

Nerve Damage

A tooth that has been traumatized by an accident or deep decay may have experienced damage to the nerve of the tooth. Orthodontic tooth movement may, in some cases, aggravate this condition. In some cases, root canal treatment may be necessary. In severe cases, the tooth or teeth may be lost.

Periodontal Disease

Periodontal disease can develop or worsen during orthodontic treatment due to many factors, but most often due to the lack of adequate oral hygiene. A general dentist, or if indicated, a periodontist should monitor the periodontal health during orthodontic treatment every three to six months. If periodontal problems cannot be controlled, orthodontic treatment may have to be discontinued prior to completion.

Injury From Orthodontic Appliances

Activities or foods which could damage, loosen or dislodge orthodontic appliances need to be avoided. Loosened or damaged orthodontic appliances can be inhaled or swallowed or could cause other damage to the patient. Orthodontist should be informed of any unusual symptoms or of any loose or broken appliances as soon as they are noticed. Damage to the enamel of a tooth or to a restoration is possible when orthodontic appliances are removed. This problem may be more likely when aesthetic appliances have been selected. If damage to a tooth or restoration occurs, restoration of the involved tooth/teeth by the dentist may be necessary.

Headgears

Orthodontic headgears can cause injury to the patient. Injuries include damage to the face or eyes. In the event of injury or especially an eye injury, however minor, immediate medical help should be sought. Refrain from wearing headgear in situations where there may be a chance that it could be dislodged or pulled off. Sports activities and games should be avoided when wearing orthodontic headgear.

Temporomandibular Joint Dysfunction

Problems may occur in the temporomandibular joints (TMJ), causing pain, headaches or ear problems. Many factors can affect the health of the TMJ, including past trauma, arthritis, hereditary tendency to TMJ problems, excessive tooth grinding or clenching, poorly balanced bite, and many medical conditions. Any TMJ symptoms, including pain, jaw popping or difficulty opening or closing, should be promptly reported to the orthodontist.

Treatment by other medical or dental specialists may be necessary.

Impacted, Ankylosed, Unerupted Teeth

Teeth may become impacted, ankylosed or fail to erupt. Often these conditions occur for no apparent reason and generally cannot be anticipated. Treatment of these conditions depends on the particular circumstance and the overall importance of the involved tooth, and may require extraction, surgical exposure, surgical transplantation or prosthetic replacement.

Occlusal Adjustment

Minimal imperfections in the occlusion following the end of treatment can be anticipated. An occlusal equilibration procedure may be necessary, to fine-tune the occlusion. It may also be necessary to remove a small amount of enamel in between the teeth, thereby "flattening" surfaces in order to reduce the possibility of a relapse.

Non-Ideal Results

Due to the wide variation in the size and shape of the teeth, missing teeth, etc., achievement of an ideal result may not be possible. Restorative dental treatment, such as aesthetic bonding, crowns or bridges or periodontal therapy, may be indicated.

Third Molars

As third molars develop, teeth may change alignment. Orthodontist should monitor them in order to determine when and if the third molars need to be removed.

Allergies

Occasionally, patients can be allergic to some of the component materials of their orthodontic appliances. This may require identification of the allergen and a change in material used or discontinuation of treatment prior to completion. Although very uncommon, medical management of dental material allergies may be necessary.

General Health Problems

General health problems such as bone, blood or endocrine disorders, and many prescription and non-prescription drugs (including bisphosphonates) can affect orthodontic treatment. It is imperative to inform orthodontist of any changes in general health status.

Use of Tobacco Products

Smoking or chewing tobacco has been shown to increase the risk of gum disease and interferes with healing after oral surgery. Tobacco users are also more prone to oral cancer, gum recession, and delayed tooth movement during orthodontic treatment.

Temporary Anchorage Devices

Treatment may include the use of a temporary anchorage device(s) (i.e. metal screw or plate attached to the bone.) There are specific risks associated with them.

It is possible that the screw(s) could become loose which would require its/their removal and possibly relocation or replacement with a larger screw. The screw and related material may be accidentally aspirated. If the device cannot be stabilized for an adequate length of time, an alternate treatment plan may be necessary.

It is possible that the tissue around the TAD could become inflamed or infected, or the soft tissue could grow over it, which could also require its removal, surgical excision of the tissue and/or the use of antibiotics or antimicrobial rinses. It is possible that the screws could break (i.e. upon insertion or removal.) If this occurs, the broken piece may be surgically removed. This may require referral to another dental specialist. When inserting the device(s), it is possible to damage the root of a tooth, a nerve, or to perforate the maxillary sinus. Usually these problems are not significant; however, additional dental or medical treatment may be necessary.

Local anaesthetic may be used when these devices are inserted or removed, which also has risks. The doctor placing the device should be informed about any difficulties with dental anaesthetics in the past.

If any of the complications mentioned above do occur, a referral may be necessary to the family dentist or another dental or medical specialist for further treatment. Fees for these services are not included in the cost for orthodontic treatment.

Acknowledgement

I hereby acknowledge that I have read and clearly understood the treatment considerations and risks presented in this form. I also understand that there may be other problems that occur less frequently than those presented, and that actual results may differ from the anticipated results. I also acknowledge that I have discussed this form with the undersigned orthodontist(s) and have been given the opportunity to ask any questions. I have been asked to make a choice about my treatment. I hereby consent to the treatment proposed and authorize the orthodontist(s) indicated below to provide the treatment.

I also authorize the orthodontist(s) to provide my health care information to my other health care providers. I understand that my treatment fee covers only treatment provided by the orthodontist(s), and that treatment provided by other dental or medical professionals is not included in the fee for my orthodontic treatment.

I hereby consent to the making of diagnostic records, including x-rays, before, during and following orthodontic treatment to the above doctor(s) and, where appropriate, staff providing orthodontic treatment prescribed by the above doctor(s) and also give my permission for the use of the above for purposes of professional consultations, research, education, or publication in professional journals. I understand that once released, the above orthodontist(s) and staff has(have) no responsibility for any further release by the individual receiving this information.

I fully understand all the risks associated with the treatment

Signature Date

Witness Date

I have the legal authority to sign this on behalf of

Name of Patient

Relationship to Patient

Patient or Parent/Guardian Initials _____

Patient _____ Date _____

Conclusion

Mistakes occur in every profession. It is each orthodontist's duty to avoid errors and foresee the potential for mistakes. He/she has a duty to warn the patient of risks inherent in the treatment procedure. Records are therefore the most important proof needed to prevail in the law suit. Written record including medical and dental history, photographs, notes, radiographs and models, are the only available guidelines from which to deliberate a negligent lawsuit. The best defence is avoiding the lawsuit in the first place. It is concluded that the potential for civil lawsuits against orthodontist for negligent actions is existent, although the prospect of an orthodontist being held liable for criminal negligence is low.

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REVIEW

A renaissance in aesthetic orthodontics – A review on transparent aligners

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Abstract

Who wouldn't love a beautiful smile? But to have that smile, one has to wear wires and braces, which leads to second thoughts especially in those adults who are professionals or public figures. The transparent aligners are a possible solution for correction of mild to moderate malocclusion in individuals bothered about aesthetic appearance. Transparent aligners offer many advantages, but there are limitations and inconveniences as well.

Keywords; Transparent aligners, aesthetics, appliances

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Introduction

Transparent aligners are orthodontic devices that use incremental transparent aligners/trays to adjust teeth as an alternative to dental braces. Transparent aligners are the latest development in the field of aesthetic orthodontic treatment. Lingual orthodontics and ceramic braces have been tried and are losing their popularity because of the difficulty in placement (lingual braces) and oral hygiene maintainance.

Aligners are made of thin, clear semielastic polyurethane material that fits over the buccal, lingual/palatal and occlusal surfaces of teeth [12]. They are mainly indicated for correction of mild to moderate malocclusions but some complex tooth movements can also be accomplished with them.

History

Since the introduction of thermoforming in 1950, aesthetic removable appliances have evolved from rubber based and thermoformed substances to Invisalign Ex30 plastic material[1].

Kesling's 'tooth positioning appliance' in 1945 popularized overlay appliances that allowed teeth to move to their ideal position as well as retain them. This was followed by vacuum formed dental contour appliance by Nahoum in 1964 to treat malocclusions with adjunctive use of tooth attachments and elastics[1] Invisible retainer was introduced in 1971 by Pontiz R J which claimed to produce limited tooth movement[19].

In 1993 Sheridan introduced Essix transparent aligners which consisted of a single aligner that can be modified according to treatment needs[1]. Essix aligners were fabricated in the office laboratory itself. Tooth movement was achieved with the help of space creation within the appliance or space created within the dentition by interproximal reduction, expansion or extraction.

Align technology was founded in 1997 by Zia Chisti and Kelsey Wirth who along with two orthodontists and a computer engineer, applied three dimensional computer imaging graphics to create Invisalign system[5,7].

Orthoclear was developed by Zia Chisti in 2005, which was similar to Invisalign. This resulted in many legal disputes. The case was settled in 2006 following which Orthoclear agreed to end its operations[5]. Clear Correct was established in 2006 by Willis Pumphrey[5].

ClearPath aligners are USFDA APPROVED removable medical grade plastic aligners designed for minor teeth movement in patients[5].

The Inman aligners uses superelastic open coil springs. But this aligner is not entirely clear and has a visible metal bar across the anterior teeth[3].

Nuvola and Fantasmino System- the two systems use aligners made of different polymers. Fantasmino aligners are made of polyvinyl chloride which had elastic properties of high performance but with decreased patient compliance owing to the size. The Nuvola aligners are made of polyethylene terephthalate glycol which showed good tooth movement and patient compliance[6,7].

Patient selection

Whether a patient can effectively be treated with removable aligners is decided after initial examination by the dentist and after consultation with Align Technology.

- Adult patients or responsible adolescents who are reluctant to wear fixed appliances with minor malocclusions are good candidates for aligner therapy[14].
- Patients who are concerned only with aesthetics, with acceptable posterior occlusion.

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- Patients with history of orthodontic treatment with fixed appliance who do not want fixed appliance for their present orthodontic treatment.
- As the plaque and gingivitis associated with aligners are less compared to brace, patients with successful periodontal treatment can be considered for aligner therapy.
- Patients with short roots, as recent study has shown no measurable root resorption[2,20].
- Patients with shallow overbite, edge to edge bite or a slight open bite can show improvement as the aligners have intrusive effect on posterior teeth as converse to fixed appliances which are extrusive in nature.
- Patients who have excessive wear on their teeth from grinding or bruxism as the appliance act similar to night guard during treatment.
- Patients with extensive porcelain, gold or highly restored mouth.

Steps in clear aligner therapy

For Invisalign clear aligner therapy, after taking X-rays, photographs, bite registration and polyvinyl siloxane impression of teeth, a diagnosis and treatment plan is derived by the orthodontist with computer aided technology-Stereolithography, a three dimensional computer image is formed from the impression and a virtual treatment is performed using a proprietary software program, which is then reviewed by the clinician, the process being termed as Clincheck. Revisions after reviewing the planned correction are sent to the technician. After final approval, a series of custom made aligners are fabricated, each aligner being designed to move a tooth or small group of teeth by 0.25 to 0.33 mm. Each aligner is to be worn for 14 days. They removed only for cleaning, having food or while tooth brushing or flossing. Sometimes interproximal tooth reduction may be required for gaining space[4,5,14].

► Indications

- Mild to moderate mal-alignments, crowding and/ spacing (1-5mm)
- Deep overbite
- Non-skeletally constricted arches (4-6mm) that can be expanded without tipping the teeth too much.
- Mild relapse after previous fixed appliance treatment
- Teeth movement following interproximal reduction
- Dental expansion
- Molar distalization[18]
- Absolute intrusion of 1 or 2 teeth[4]
- Space closure following extraction of lower incisor for severe crowding cases.

Contraindications

- Crowding and spacing greater than 5mm
- Skeletal antero-posterior discrepancies of more than 2mm as measured in cuspid relationship.
- Centric relation and centric occlusion discrepancies
- Rotated teeth greater than 20 degrees
- Extrusion of teeth
- Severe open bite
- Teeth with short clinical crowns
- Severely tipped teeth greater than 45 degrees
- Dental expansion for blocked out teeth
- Closure of premolar extraction space
- Molar uprighting
- Arches with multiple missing teeth

Advantages

- Aligners are clear and remain nearly invisible that most people won't even notice that you are wearing the appliance
- They are comfortable to wear. The disadvantage of abrasions resulting in ulcerations caused by wires and/or brackets are avoided here
- Aligners can be removed for brushing, flossing and while having food. So good oral hygiene can be maintained convenient for both operator and patient as there is often less time spent at the dentist's office.
- Decreased allergic responses as metal wires (nickel) are avoided
- Simultaneously, aligners can be used for bleaching
- Aligners can be used as active and passive retainers
- Can be used in patients with bruxism
- Patient motivation and education possible

Disadvantages

- Poor compliance by patient by not wearing aligners the required number of hours per day, missed appointments, poor oral hygiene etc can lengthen the treatment time, increase cost and affect the quality of end results.
- All permanent teeth should be fully erupted for aligner therapy
- Basal orthopaedic changes cannot be incorporated
- Tooth sensitivity and tenderness of the mouth may occur during treatment
- Initially irritation to oral mucosa and tongue causing soreness
- Temporary alteration of speech
- Temporary increase in salivation or dryness of mouth
- Limitation with extraction space cases-premolar extraction treatment is difficult to manage with the appliance
- Expensive as of now

► Conclusion

Transparent aligners are definitely a giant leap in the field of orthodontic treatment which is conventionally done with fixed appliances. Aligners are like a breath of fresh air for adults seeking orthodontic treatment without wires and braces. Mild to moderate and some complex malocclusions can be effectively treated with aligners. Many limitations and disadvantages are also there.

As with any appliance therapy, transparent aligner therapy also depends on the clinicians' skill and experience. With experience the orthodontist can give better finishing and detailing of occlusion. Treating mild cases and gaining experience before attempting to treat complex cases can also increase the success rate.

The transparent aligners continue to evolve trying to overcome their limitations. More research and scientific evidence are needed to confirm the treatment effectiveness of transparent aligners. As of now the cutting edge of transparent aligners are that they are nearly invisible, removable, comfortable and convenient method of correction of mild to moderate malocclusion without hindering oral hygiene maintainance.

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Ozone therapy in dentistry

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Abstract

Ozone therapy has been successfully used in periodontics for treating various diseases over the past few years. Studies have proved that both gaseous and dissolved ozone are effective against a wide range of bacteria, bacterial spores and viruses. Ozone could also help in healing wounds, treatment of radiation-induced mucositis and osteoradionecrosis by increasing the blood supply and through its immune-modulating effects. Because of these beneficial effects, ozone is indicated in treatment of gingival and periodontal diseases, which are the most common inflammatory diseases of supporting tissues of teeth. In spite of these advantages, ozone therapy is limited in periodontics because of its side effects in respiratory system. The objective of this article is to provide a general review about clinical applications of ozone in periodontics.

Key words: Ozone, anti-hypoxic, immunostimulating, anti-microbial, anti-oxidant, gingivitis, periodontitis.

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► Introduction

Ozone was discovered by the German Chemist Christian Friedrich Schonbein in 1840.[1] He reported that the electrolysis of water produced an odour at the positive electrode[2]. He named that 'ozone' from the ancient Greeks who also observed this strong odour after electric stroms, and they called it 'Ozein' (to have a smell)[3]. Ozone is a chemical compound consisting of three oxygen atoms (O_3– triatomic oxygen), a higher energetic from than normal atmospheric oxygen O_2. Molecular weight of ozone is 41.98g/ mol. It is a powerful oxidiser[4]. It is one of the most important gases in the stratosphere due to its ability to filter ultra violet rays, which is critical for the maintenance of biological balance in the biosphere[5].

It protects living organisms by surrounding the earth at altitudes of 50,000- 1, 00,000 feet. One molecule of ozone is equal to 3000-10,000 molecules of chlorine and kills pathogenic organisms 3,500 times faster[6]. Ozone is naturally produced by the photo dissociation of molecular oxygen into activated oxygen atoms which then react with further oxygen molecules. This transient radical anion rapidly becomes protonated, which in turn decomposes to an even powerful oxidant, the hydroxyl radical OH[7].

The first reported medical application is the use of ozone for treating gaseous, post-traumatic gangrene in German soldiers during the 1st world war. Ozone has been successfully used in medicine for more than 100 years to now because of its microbiological properties.

It was first used in DENTISTRY by the German dentist Edward. A Fisch, in Zurich, Switzerland for the treatment of infected wound cavities and chronic periodontal disease in 1933[8]. Following this, the use of ozone therapy has been advocated in dentistry for the past 6 decades.

In dentistry ozone has been recognised for its anti-microbial effect and it can be used as a useful disinfectant in clinical applications[9, 10]. It is a part of the evolving minimally invasive dentistry theme [MI] and its aim of preserving the original tissues where possible. It is claimed that ozone promotes haemostasis, enhances local oxygen supply and inhibits bacterial proliferation[11]. Although there are some promising studies, ozone has not been proven superior to other clinical approaches[12]. There is still need for more scientific data on the subject, as clinical evidence for application of ozone in dentistry is not extensive[13]. Furthermore, there is little evidence for the use of ozone in periodontal treatment and there is a need for more studies in this particular field[14]. It is known that ozone can kill bacteria by rupturing their cell membranes within a few seconds. In medicine and dentistry, ozone is used as a powerful sterilizing agent either in the gaseous or aqueous phase, as it successfully kills bacteria, fungi and viruses. Ozone has been found to have a bactericidal effect, particularly in staphylococcal, streptococcal and other infections. Recent researches showed that exposure of carious dentine specimens to ozone reduced the levels of pathogenic micro- organisms in these samples[15]. Ozone can be used for sterilisation of heat sensitive material including medical devices and narrow lumen devices[16].

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Some researchers found that even soaking toothbrushes contaminated with oral microorganisms in ozonated water has good disinfectant results[17]. There are currently 2 ozone generators used in clinical dental applications and both utilise corona discharge (Heal ozone by Kavo and Ozo-top by TTT).

Mechanism of action of ozone

Ozone is a thermodynamically highly unstable compound that decomposes to pure oxygen depending on system conditions like temperature and pressure[18]. Ozone is the third most potent oxidant after fluorine and per sulphate and has a half-life of 40 min at 20oC.[19]

Potential applications of ozone in the clinical practise of dentistry and medicine is based on the actions such as antimicrobial (bactericidal, viricidal, and fungicidal), anti-inflammatory, immunomodulating, biosynthetic (activation of the metabolism of carbohydrates, proteins, lipids), bio energetics, anti-hypoxic, analgesic and haemostatic effects (Fig. 1). The main antiviral actions of zone are the change of the capsid and the irreversible destruction of viral DNA[20]. However ozone does not have the same strength of action on every germ. For example, enteroviruses[21], rotaviruses[22], hepatitis A[23] and human immunodeficiency viruses[24] are more ozone sensitive than poliomyelitis and coxsackieviruses. The antibacterial effect of ozone is based on the inhibition of their metabolic activity and the lysis of bacterial cell wall[25, 26]. In bacterial cultures, Escherichia coli and candida albicans are more ozone sensitive than staphylococci.

Research on the use of ozone in combating bacteria typical for dental diseases has shown that the gas has an oxidizing effect on these bacteria and is bactericidal[27]. Whereas in vitro study in which evaluation of antibacterial effect of ozone was done after 2 months of disinfection with ozone on streptococcus mutans and Lactobacillus casei showed that ozone has a significant antibacterial effect against S. mutans but L. casei was found to be more resistant to ozone[28].

The study conducted by Guinesi et al[29] evaluated the presence of ozone as well as by products of ozonation such as formaldehyde in ozonated oils (sunflower oil, castor oil, and almond oil) and propylene glycol. A complete absence of ozone and presence of formaldehyde was observed in all the samples tested suggesting that the healing and antibacterial effect of ozonated oil could be attributed to products formed by ozonation of mineral oils such as formaldehyde and not to the ozone itself.

1. Antimicrobial effect

Ozone works destructively against bacteria, fungi and viruses. The antimicrobial effect of ozone is a result of its action on cells by damaging its cytoplasmic membrane (Fig. 2) due to ozonolysis of dual bonds and also ozone induced modification of intracellular contents because of secondary oxidant effects. This action is selective to microbial cells but does not damage human body cells because of their major anti oxidative ability[30].

2. Immunostimulating effect

Ozone influences cellular and humoral immune system. It stimulates proliferation of immunocompetent cells and synthesis of immunoglobulins. It also activates function of macrophages and increases sensitivity of microorganisms to phagocytosis. Ozone causes the synthesis of biologically active substances such as interleukins, leukotrienes and prostaglandins which is beneficial in reducing inflammation and wound healing. Ozone in high concentrations causes immunodepressive effect whereas in its low concentrations immunostimulating effect[31].

3. Antihypoxic effect

Ozone improves the transportation of oxygen in blood, which results in change of cellular metabolism – activation of aerobic processes(glycolysis, Krebs cycle, β- oxidation of fatty acids) and use of energetic resources. Ozone improves the metabolism of inflamed tissues by increasing their oxygenation and reducing total inflammatory processes[32].

4. Biosynthetic effect

It activates mechanisms of protein synthesis, increases amount of ribosomes and mitochondria in the cells. These changes on the cellular level explain elevation of functional activity and regeneration potential of tissues and organs.

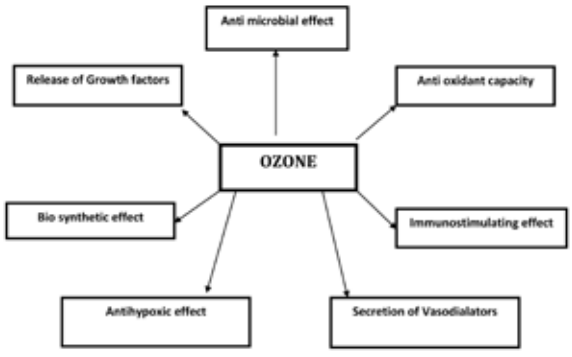

Fig. 1 Mechanism of Action of Ozone

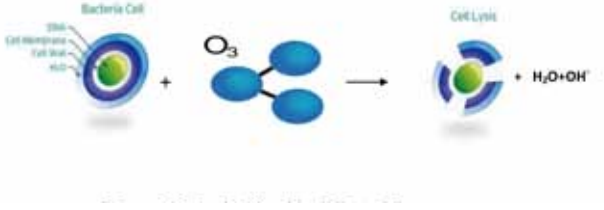

Fig. 2 Anti- Microbial Effect of Ozone

Ozone generators

In clinical settings, ozone generators are used to produce ozone from medical oxygen via an electrical field that stimulates the natural production of ozone at the time of lightening. This ozone is thereafter led to a hand piece fitted with a silicone cup. Differently shaped silicone cups are available that correspond to the form of various teeth and their surfaces[33].

The first ozone generator was developed by Werner Von Seimens in Germany in 1857. There are several different techniques used to produce therapeutic grade ozone. They are

- Ultraviolet system: Produces low concentrations of ozone. It is used in esthetics, saunas, and fro air purification.
- Corona discharge system: Produces high concentration of ozone. Most common system used in medical and dental field. It is easy to handle and it has a high controlled ozone production.
- Cold plasma system: Used in air and water purification[34].

Commercially available ozone generators

- HEALOZONE BY KAVO

Mechanism of Action of HealOzone by Kavo

HealOzone by Kavo (Fig. 3 & Fig. 4) is air-based and the application of the gas takes place in a closed circuit. Its surplus is sucked out and neutralized by manganese ions. The concentration of ozone in the cap adjacent to the tissue amounts to 2100ppm. Perfect air tightness of the cap is necessary for the application of ozone. Therefore, the application is only possible on the surfaces where such air tightness can be provided.

- OZONYTRON BY MYMED

Mechanism of action of OZONYTRON by Mymed (Fig. 5)

Oxygen activation generator uses the power of high frequency and voltage. Activated oxygen (ozone) concentration can be adjusted in 5 levels via current strength. Inside the glass probe, which is formed by a double glass camera, is a noble gasses mixture that is conducting and emitting electromagnetic energy. When the tip of the probe gets in contact with the body it emits energy around the treated area and splits environmental diatomic oxygen in singular atomic oxygen and ozone. The concentration of ozone in the operation field is 10 to 100 mg/ml. There is no closed circuit here therefore ozone can be applied to the places that are difficult to reach. Eg: gingival pockets, root canals.

Others Include:

- ULTRADENT – ULTRAOZON (Fig. 6)
- OZOTOP (Fig. 7)
- WORKING OF AN AIR OZONE GENERATOR (Fig. 8)

USES OF OZONE IN PERIODONTICS

- PLAQUE CONTROL

Ozonated water (4mg/l) was found effective for killing gram positive and gram negative oral microorganisms and oral candida albicans in pure culture as well as bacteria in plaque biofilm and therefore might be useful as a mouthrinse to control oral infectious microorganisms in dental plaque.

- AS AN ORAL ANTISEPTIC

Has less cytotoxicity than established oral antiseptic gents. Studies conducted by Huth et al in 2006, declared that the acqueous form of ozone, as a potential antiseptic agent, showed less cytotoxicity than gaseous ozone or established antimicrobials (chlorhexidinedigluconate (CHX): 2%, 0.2%: sodium hypochlorite 5.25%,2.25%; hydrogen peroxide H_2O_2 3% under most conditions. Therefore, aqueous ozone fulfills optimal cell biological characteristics in terms of biocompatibility for oral application[35].

- Aggressive periodontits, gingivitis, periodontal abscess

Fig. 3 Healozone

Fig. 4 Healozone

Fig. 5 OzonyTron

They irrigated the periodontal pockets by ozonized water in 22 patients suffering from aggressive periodontitis. Periodontal pockets were irrigated with 150ml of ozonized water over 5-10 min once weekly for a clinical 4 weeks study using a blunt tipped sterile plastic syringe. High significant improvement regarding pocket depth, plaque index, gingival index and bacterial count was recorded related to quadrants treated by scaling and root planning together with ozone application. They also reported significant reduction in bacterial count in sites treated with ozonized water[36].

Almost all patients with gingivitis showed subjective and objective improvement of their status, as well as patients with periodontal abscess, where no exudation was observed[37].

- CHRONIC GENERALISED PERIODONTITIS

They conducted a randomized, double- blind, crossover split- mouth study on 16 patients suffering from generalized chronic periodontitis. The study period of 18 days was divided into two time – intervals; ie, baseline (0 days) to the 7th day, with a washout period of 4 days followed by a second time-interval of 7 days. Subgingival irrigation of each half of the mouth with either ozone or chlorhexidine was done at different time intervals. They observed a higher percentage of reduction in plaque index (12%), gingival index (29%) and bleeding index (26%) using ozone irrigation as compared to chlorhexidine. The percentile reduction of Aa (25%) using ozone was appreciable as compared to no change in Aa occurrence using chlorhexidine. By using O_3 and chlorhexidine, there was no antibacterial effect on porphyromonasgingivalis (Pg) and Tannerallaforsythensis. The anti-fungal effect of ozone from baseline (37%) to 7th day (12.5%) was pronounced during the study period, unlike CHX, which did not demonstrate anyanti- fungal effect. Anti- viral efficacy of chlorhexidine was better than that of ozone. They concluded that despite the substantivity of chlorhexidine, the single irrigation of ozone is quite effective to inactivate microorganisms.[38]

- Peri-implantitis and osseointegration

Dental implant therapy has become the ultimate standard for replacement of missing teeth. An adequate and steady plaque control regimen must be ensured for the prevention of peri-implantitis. Ozone kills the microorganisms causing peri-implantitis and shows a positive wound healing effect due to the increase of tissue circulation. Gaseous ozone or ozonized water shows an increased healing compared to wound healing without ozone therapy.

An in vivo study conducted by E1 Hadaryet al[39] has evaluated that short- term administration of cyclosporine A, when administered with topical ozonatedoil, may influence bone density and the quality of dental implant ossoeintegration. Therefore, topically applied ozonated oil may influence bone density and the quality of ossoeintegration around dental implants.

Ozone toxicity

Ozone inhalation can be toxic to the pulmonary system and other organs. There are a number of good experimental studies showing that exposure by inhalation to prolonged tropospheric ozone damages the respiratory system and extra pulmonary organs. The skin, if extensively exposed, may also contribute to the damage. Known side- effects are epiphora, upper respiratory irritation, rhinitis, headache, occasional nausea, vomiting, shortness of breath, blood vessel swelling, poor circulation, heart problems and at a time stroke[40].

Because of ozone's high oxidative power, all materials that come in contact with the gas must be ozone resistant, such as glass, silicon, and teflon. If ozone intoxication occurs, the patients must be placed in the supine position and treated with vitamin E and n-acetyl cysteine[41].

Contra- indications

The different contra- indications of ozone include pregnancy, glucose-6-phosphate dehydrogenase deficiency (favism), hyperthyroidism, severe anemia, severe myasthenia, active hemorrhage, acute alcohol intoxication, recent myocardial infarction and ozone allergy. Prolonged inhalation of ozone can be deleterious to the lungs and other organs but well calibrated doses, avoiding ozone inhalation, can be therapeutically used in various conditions without any toxicity or side effects[42].

Fig. 6 Ultradent-Ultraozon

Fig. 7 Ozotop

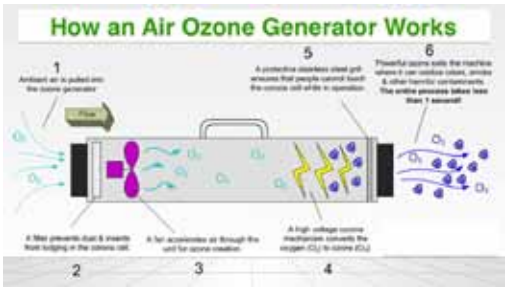

Fig. 8 Working of an Air Ozone Generator

Conclusion

Since its introduction in 1840, ozone therapy is proving to be a new therapeutic modality with great benefits to the patients. The potent antimicrobial power of ozone, along with its capacity to stimulate the circulatory system and modulate the immune response, makes it a therapeutic agent of choice in the treatment of infectious oral diseases. There is still a need for the highest level of evidence, ie, well designed, double blind randomized clinical trials to justify the routine use of ozone as a treatment modality in dentistry

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INTERVENTIONAL STUDY

Effect of oral hygiene instructions in improving the periodontal status among diabetic patients

* Reethu S., **K. Nandakumar *** Malu Mohan

Abstract

Background: Patients with poorly controlled diabetes are at greater risk of developing periodontal disease. However, few studies were conducted regarding the effect of oral hygiene instructions among diabetic patients. Hence this study was conducted to find out the effect of oral hygiene instruction and its periodic reinforcement in improving the oral hygiene status among diabetic patients.

Methodology: A total of 100 diabetic patients were selected through random sampling irrespective of gender. Patients aged above 35 were taken from two tertiary care hospitals in south Kerala. Basic relevant data regarding patients was collected. Oral examinations were conduced and indices (OHI, CPI, and loss of attachment) were recorded and oral hygiene instructions were given along with a pamphlet containing instructions. Periodic reinforcement was given over telephone and patients were recalled after 3 months for follow up.

Results: 95 patients returned in follow up. 33 of them showed an improvement in oral hygiene index and CPI index.

Conclusion: Reinforcement of daily plaque control practices is essential to successful plaque control. By communicating and coordinating the treatment of diabetes patients, medical and dental care providers have an opportunity to provide better care of their patients.

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Methodology

The study setting was 2 tertiary care hospitals in south Kerala. Three months prior to the baseline data collection, the principal investigator randomly selected 100 patients from the Diabetic clinics of both hospitals. Literate, mentally sound subjects with good visual and auditory acuity, aged 35 years and above belonging to the lower socio economic status (as per the Modified Kuppuswamy scale) with a fasting blood glucose level of greater than 126mg/dl (as per the guidelines of American Diabetic Association) were selected for the study. To ensure uniformity among subjects with respect to the glycemic control, only those subjects, whose fasting glucose levels consistently fell within 150 mg/dl during the past ten monthly blood glucose estimations, were included. Subjects who were tobacco users, with other systemic conditions, who used antimicrobial mouth rinses the past year, and/or who underwent any form of periodontal therapy during the past one year were excluded from the study.

Written informed consent was obtained from all subjects and they were subjected to oral prophylaxis at the time of enrolment into the study. All the subjects were recalled after three months for baseline oral examination. Socio-demographic details (age, gender, occupation, education) and oral hygiene practices (type of brush, frequency of brushing and method of brushing) were recorded. Clinical examinations were done with the help of a dental explorer, CPI probes and William's periodontal probe aided by mouth mirror and good light. Indices used were (OHI-S) and (CPI and LoA).

After recording the data, patients were given oral hygiene instructions and the appropriate method of brushing was demonstrated with the help of a large model and an oversized tooth brush. Modified Bass method was recommended for routine oral cleaning for all subjects while, Modified Stillman's method was recommended for those subjects with gingival recession. Dental flossing was recommended and demonstrated for all subjects with Type 1 embrasures. Emphasis was placed on mouth rinsing after every meal and on tongue cleaning after brushing. The instructions were given orally and also in the form of pamphlets in the vernacular language (Malayalam). The printed pamphlets were prepared in an aesthetically appealing mode and the information was provided in simple language with appropriate illustrations to deliver relevant oral health information. The subjects were asked to read out the instructions in the presence of the investigator and queries if any, were discussed and cleared.

The oral health information provided, broadly covered the following aspects:

i) The use of a soft tooth brush and a daily brushing frequency of at least two times were recommended.

ii) A moderate brushing force and replacement of tooth brush in case of

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fraying of bristles (approximately once in three or four months) was recommended.

iii) The effect of tobacco products on oral tissues was highlighted.

38 subjects, who were found to have poor oral hygiene according to OHI(S) scores, at baseline oral examination, were advised the use of 0.2% chlorhexidine gluconate mouth wash once daily at night for two weeks after brushing.

Patients were called periodically over telephone and enquired about their oral hygiene habits. The interval of reinforcement was 2 to 3 weeks and the mean duration of telephonic conversation was 10:23± 2:14 minutes. A follow up after 3 months was done and oral hygiene habits were enquired and indices were recorded in each patient. Patients were informed about their oral hygiene status and advised to continue with the recommended oral hygiene practices.

Results

The statistical analysis was done with the help of the software Statistical Program for Social Sciences (SPSS version 16). CHI Square test was used to compare OHI(S) and CPI scores at baseline and after follow up. The mean age of the subjects was 55.83 years. The prevalence and severity of periodontal disease is found to increase with age. It is found that attachment loss and bone loss seen in older individuals are the result of prolonged exposure to other risk factors over a person's life creating cumulative effect over time. In support of this, studies have shown minimal loss of attachment in aging subjects enrolled in preventive programs throughout their lives. Therefore it is suggested that periodontal disease is not an inevitable process and that aging alone does not increase disease susceptibility. socio economic status was measured using Kuppuswamy scale and 43% of total subjects belong to lower middle class (group 3). Generally those who are better educationally and live in more desirable circumstances enjoy better health status than the less educated and poor segments of the society. Periodontal diseases are no different and have been related to lower socio economic status. Oral hygiene index simplified at the base line 22% of the subjects had good oral hygiene, 40% had fair and 38% had poor oral hygiene. 5 subjects were lost at follow up after 3 months. The proportion of subjects with good oral hygiene had increased to 45.3% and fair oral hygiene had increased to 54%. Study conducted by R. D Bartizek et al in USA 2003 stated that statistically significant plaque and gingival scores were observed one month after starting participation in educational programs. CPI scores were markedly reduced in follow up than in base line. Bleeding upon probing continues to be a valid portion of periodontal examination. Bleeding is one of the classic signs of inflammation[1]. It is the responsibility of the dentist to provide information about periodontal disease. Many patients believe that visits to the dental office for periodontal care will eliminate the disease process. Treatment is not a passive process, however, and it is incumbent on the dentist to educate and reinforce the patient's responsibility for long term success of any therapy. Only the combination of regular office visits with conscientious home care significantly reduces gingival and loss of supporting periodontal tissues over the long term.

OHI-S Baseline.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	22	22.0	22.0	22.0
2	40	40.0	40.0	62.0
3	38	38.0	38.0	100.0
Total	**100**	**100.0**	**100.0**	

1-Good, 2-Fair, 3-Poor.

OHI-S FOLLOW UP

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	43	45.3	45.3	45.3
2	52	54.7	54.7	100.0
Total	**95**	**100.0**	**100.0**	

Conclusion

The good OHI-S scores increased from 40% to 45.3% and fair OHI-S scores increased from 38% to 54%. Mean age of the patients were 55.82± 9.74. Forty three percent of the subjects participated were belonging to lower middle class. Reinforcement of daily plaque control practices is essential for plaque control. The association between diabetes and periodontal diseases are proven so, a combined effort between dentist and other health care providers should work as a team to address the issue and health educate the patients.

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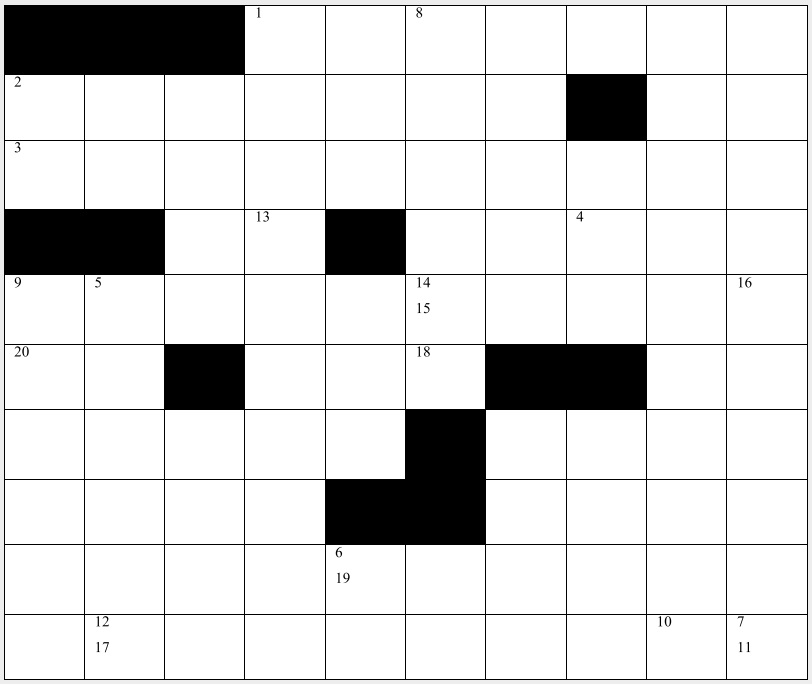
CROSSWORD



HINTS: the number of letters in each word is given in brackets

HORIZONTAL

1. Widely accepted pain questionnaire developed by Melzack and Tugerson in 1971 (6)
2. A rare genetic disorder in which a sphingolipid (glucocerebroside) accumulates in cells (7)
3. Any substance, radionuclide or radiation that causes cancer (10)
4. A systemic autoimmune disease affecting multiple organ systems characterised by presence of antibodies to nuclear antigens (3)
5. Hamartomatous lesion composed of dental tissues (8)
6. Sensation of tingling along the distribution of a nerve elicited by percussion (5)
7. Common lesion that results from the rupture of salivary gland duct and spillage of mucin into the surrounding tissue (9)

VERTICAL

8. Basic physical and functional unit of heredity (4)
9. Static bone cyst / lingual mandibular bone cavity (6)
10. A breach or discontinuity in the epithelium (5)
11. Supernumerary tooth present in the midline between the two maxillary central incisors (9)
12. A form of brachial plexus palsy occurring as a complication of difficult labour (delivery) (4)
13. Chemical messenger produced by glands that circulate in the blood to distant target organs to regulate physiology and behaviour (7)

DIAGONAL

14. Chronic ulcer induced by trauma with a histopathology of polymorphic inflammatory infiltrate including lymphocytes and eosinophils (5)
15. Abnormal mass of body tissue (5)
16. Chemical substance that has known biological effects on humans and animals (4)
17. Non-pathologic, benign bony growth (9)
18. Bilateral synovial articulation between mandible and temporal bone (3)
19. A common exostoses occurring in the palate (5)
20. Syndrome describing clinically similar congenital infections caused by toxoplasma gondii, rubella virus, cytomegalovirus and herpes simplex viruses 1 and 2 (5)

ANSWERS

HORIZONTAL
1. McGill
2. Gaucher
3. Carcinogen
4. SLE
5. Odontome
6. Tinel
7. Mucocoele

VERTICAL
8. Gene
9. Stafne
10. Ulcer
11. Mesiodens
12. Erb's
13. Hormone

DIAGONAL
14. TUGSE
15. Tumor
16. Drug
17. Exostoses
18. TMJ
19. Torus
20. TORCH

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Association News

Chalakkudy Branch

Our second general body meeting was on 8th August at lions hall. We had a CDE programme on 8th August The topic was an over view on endo perio lesions by Dr Soonu.

Our third GB was on 28th of august at lions hall with a class on endodontic mishaps by Dr Shahnavaz Mohammed.

We had our 4th executive meeting on 3rd September at Dr Beryl s residence

Our branch had a family meet with Onam celebration. NILAVU 2015 at hotel Clay House Chalakudy with various cultural activities of our members on 20th September.

We took part in dental camps in NSS school

Our branch participated in state sports meet Conducted at Christ college hosted by IDA Kodungallur. Our members bagged several prizes.

North Malabar Branch

EXECUTIVE COMMITTEE MEETING:

SIXTH executive committee meeting was held on 30 – 11– 2015 at I.D.A. Hall, Podikkundu, Kannur

C.D.E PROGRAMMES:

TOPIC: Infection control in dental practice. Venue: IDA hall, Podikkundu, Kannur

DATE: 21– 08– 2015 Faculty: Dr. Mathai Joseph Time: 07.30 pm to 10.00 pm.

Members Attended: 42

C.D.H Programmes:

1. A dental check up and awareness class were conducted at Chovva High School, Kannur. Dr. took the awareness class. Dr. Faizal C.P, Dr. O.V. Sanal and interns of Kannur dental college participated in the camp. Around 200 students were examined.

2. A dental check up, treatment and awareness class were conducted at Chorakala,Kannur. Dr. Subair took the awareness class. Dr. Rakend V.K.P, Dr. Shafeeque, Dr.Thasneem Fahir and interns of Kannur dental college participated in the camp.

Eranad Branch

CDE: 2nd Inter-Branch CDE on 'Pedodontic update' by Dr. Hafiz, Dr. Jophie, Dr. Shaniya & Dr.Puneeth,Faculties Dept. of Pedodontia from MES Dental college, Perinthalmanna was held at KPM Residency, Perinthalmanna on Sunday the 6th Sept. 14 members attended.

CDH:

World Geriatric day: State level observation of World Geriatric Day hosted by IDA Eranad branch was held at pain & palliative care clinic Perinthalmanna, which was inaugurated by Dr. Nilar Mohammed, Secretary Pain & Palliative care society, Perinthalmanna on October 1st 2015 at 9 am.

Dental check up camp for 49 registered patients & their family members were conducted by Dr. Sameer T.A & Dr.Subash Madhavan. Variety entertainment programs for elderly were conducted by Women's wing of Indian Medical Association, Perinthalmanna represented by Dr.Feseena, Mrs. Sabitha & Mrs Tresa which included filmy quiz, musical chair. Gifts for all 49 patients are given by Dr.Subash Madhavan Chairman, Council for dental health,IDA Kerala state & addressed the gathering. Program concluded by vote of thanks by Dr.Sameer.T.A, Secretary,IDA Eranad branch & which was followed mouth watering feast.

IDA Eranad branch wishes to thank Prof. Surendranath, President, members, volunteers & staff Pain & Palliative care society, Perinthalmanna in associating with IDA for organizing the observation. Would also place on record of thanks to Dr. Sameer T.A for gifts, Dr.Biju, Dr. Mohsin & Dr.Francis for their contribution towards the fund & IDA Kerala state & Dr.Subash Madhavan Chairman, Council for dental health, IDA Kerala state for entrusting IDA Eranad to organise this event.

State level observation of world geriatric day hosted by IDA Eranad branch was held at Pain & Palliative Care Clinic, Perinthalmanna, on October 1st 2015 at 9 am.

Onam –Eid celebrations at City Palace Residency Ambalapady, Wandoor on 11th October 2015 Sunday 10 am -3 pm, 22 Members with their families & 6 International Guests from Ohio & Texas in U.S attended the program which had Pookalam by members & families, Variety entertainment programs by Friend's Musicals, Perinthalmanna & Mouth watering Sadhya was served.

Executive committee meeting: 7th Executive committee meeting was held on 5th October 2015 at City Palace Residency Wandoor, 5 members attended.

Kodungallur Branch

IDA Kodungallur branch conducted 3 executive committee meetings and 3 general body meeting during the month of July-October period. Other programs conducted by the branch included

1. A dental check up camp was organised in association with rotary club of Kodungallur at Govt Boys high school, Kodungallur on 15-07- 2015. 300 students were examined, oral hygiene demonstrated and tooth pastes distributed. Those requiring treatments were directed to the free dental clinic run by IDA Kodungallur.

2. A grand Onam celebration and family meeting was organised at IMA Hall, Kodungallur on 20-09-2015. Onam pookalam, songs and dance performances from members and competitions for the best dressed family was held during the function.

3. Branch level CDE program was held on 7-10-2015 and financial planning matters were discussed for the benefit of members

4. The journal of IDA Kodungallur branch " Imprints " was released by State secretary Dr Sanal O V in the presence of magazine editor Dr Sunil K B and others on 11-10-2015

5. State sports and games meet " SPADIKAM 2015" was hosted by IDA Kodungallur branch on 11-10-2015 at Irinjalakuda. It was a mega event in which 16 branches and 350 members participated making it the best sports event organised so far in the history of IDA KERALA State. IDA Kochi was declared winners and IDA Wayanad was the runner up.




Kasargod Branch

We had a CDE meeting on 16 Sept, Wednesday at lions club hall in Kasargod at 7.30 pm. CDE topic was" Composite Restorations; Newer materials and techniques" faculty: Dr Navin Kumar K MDS. Reader, Dept of Conservative Dentistry & Endodontics KVG Sullia. The meeting was well attended. Followed by dinner.

Wayanad Branch


Executive meeting held at IMA hall Mananthavady 9-08-2015. 16 members attended the meeting.

Onam and EId celebration. IDA Wayanad celebrated Onam and EId on 6 th September 2015 at wynd valley resort Kalpatta. The programme was fun filled followed by delicious lunch.

State sports. Ida Wayanad attended state sports meet held at Irinjalakuda and bagged runners up with 76 points.

Quilon Branch


1. The 5th and 6th GB meeting of IDA Quilon branch was on 20-6-15 and 16-7-15 at lions hall kollam.

2. IDA Quilon branch conducted an inter branch cde programme ON 9-8-2015 at hotel sea palace Kollam with 6KDC credit points.
Topic— Endodontics simplified with hands on
Faculty- Dr.Ashish Medha MDS endodontist
70 members from different branches participated.

3. 3rd ECM was on 9-9-2015 at hotel Ritz Kollam. Decision taken for conducting a family get-together on 18-10-15.

4. Family get together----ON 18-10-15 at aquasserrenne Paravoor. 15 families attended, followed by games, lucky dip, karakae, lunch, fellowship and photo section.

Malabar Branch

1. CDE No.7: The seventh CDE of IDA Malabar branch was held on 06/09/2015 at Hotel Maharani Kozhikode. The topic of CDE was a symposium and the topic was Conquering The Apex. The Faculties for the symposium were Dr.CV Pradeep MDS (Endodontist) Former Principal & HOD YDC Manglore, Dr.Madhu AV MDS Associate Professor Dept. of Pedodontics Govt. Dental College Calicut, Dr.Raveendran Nair MDS Professor & HOD Dept. Of Oral & Maxillofacial Surgery Govt. Medical College Manjery. The CDE programme was of three sessions, first session was of Lecture and case presentations on 3 case scenarios in young permanent tooth with open apex and management of fractured vital tooth with and without pulp exposure, Non vital tooth with or without crown fracture & Avulsed tooth including regenerative Endodontics by Dr.Madhu AV.

2. PARTICIPATION IN CHILAMBOLI: Team IDA Malabar lead by Dr.Saju NS President IDA Malabar branch participated in the IDA Kerala State cultural competition held at Cochin on 13/09/2015.

3.CDE No.8: The eighth CDE of IDA Malabar branch was held on 20/09/2015 at Hilite Business park Thondayad Kozhikode in association with KMCT Dental College Calicut. The topic of CDE was Management of TMJ Disorders in Clinical Practice. The Faculties for the CDE were Dr.Susha S MDS Professor & HOD Department of Oral Medicine & Radiology Sri Siddhartha Dental College and hospital Tumkur and Dr.Deepak Daryani MDS Stomatologist & Consultant TMJ Specialist HSR Dental Clinic & Implant Centre, Banglore.

4.PARTICIPATION IN WORLD DENTAL CONGRESS: Dr.Saju NS President IDA Malabar branch attended the World Dental Congress (FDI 2015) held at Bangkok on 23/09/15 – 25/09/2015 and presented scientific paper titled Impact of Maxillo Mandibular fixation on body weight.

5.IDA KERALA STATE CRICKET TOURNAMENT 2015: IDA State Cricket Tournament was conducted by IDA Malabar branch on 27/09/2015 at Corporation Stadium Kozhikode. Chief guest of the occasion was Olympian Mrs. PT Usha. IDA State President Dr.KC Thomas along with Dr.Dinesh Nambiar Sports Convenor IDA Kerala State introduced the players to Chief Guest.

6.PARTICIPATION IN IDA BADAGARA BRANCH INSTALLATION: Many senior and Junior members along with President Dr.Saju NS and Secretary Dr.Sudheer KT participated in the Installation ceremony of our neighbouring newly formed branch IDA Vdakara.

7. PARTICIPATION IN SPADIKAM IDA SPORTS DAY 2015: Team IDA Malabar lead by Dr.Sudheer KT Secretary IDA Malabar branch along with senior and junior members participated in Spadikam sports IDA Keralam 2015 held at Christ College ground & Aquatic complex Irinjalakuda on 11/10/2015. IDA Malabar branch were Runners up in Tug of War and we reached the semifinals of Shuttle Badminton and Table Tennis and individual victories for Dr.Pravish in Swimming and Dr.Sooraj in Javvelling, but the star who stole the show was Dr.Nisha Soumithran who won the tittles both in shuttle badminton and Table tennis.

8.CDH PROGRAMME: IDA Malabar branch in association with Lions Club Calicut Conducted an awareness class and oral screening programme in Christian College Calicut on 11/10/2015. Around 140 patients Participated the camp.

9. FOURTH EXECUTIVE MEETING: The fourth executive meeting of IDA Malabar Branch 2015 was held on 15/10/15 at IDA hall Asokapuram Kozhikode. Meeting began at 7.30pm when Hon Secretary Dr.Sudheer KT Collared the President Dr.Saju NS followed by a silent Prayer. Secretary presented the minutes of first executive committee meeting and was passed by executive members.

10. FAMILY TOUR: IDA Malabar branch arranged a two days 17th, 18th October family tour for its members to Wayanad. Around 24 members along with their families joined together to make the trip a memorable one. Trip was arranged in Upavan Resorts Wayanad with various verity entertainments for kids and elders. All members and their family very actively participated.

11. OUTSTANDING YOUNG DENTIST AWARD: IDA Malabar branch President Dr.Saju NS received Outstanding Young dentist award for the year 2014-15.



Central Kerala - Kottayam Branch

AUGUST 2015

CDE: State CDE on Dental Jurisprudence by Dr. George Paul was held on 9th August 2015 @ Hotel Arcadia 220 members participated.

SPORTS: We bagged the Cricket Championship held @ Calicut on 27 th September 2015.

SPADIKAM 15, we bagged overall 3rd position which was held @ Iringalikuda on 11th October 2015.

CDH ACTIVITY.: Mega camp at Karikatoor, talk given by IDA Kerala State IPP Dr. Antony Thomas,

Camp at Korithodu.

EXECUTIVE MEETING

6TH executive meeting was held on 14th August 2015 @ Kottayam club, 28 members attended the meeting.

7TH executive meeting was held on 17th September 2015 @ Kottayam club, 25 members attended the meeting

8th executive meeting was held on 30th September 2015 @ Kottayam club, 22 members attended the meeting.

9th executive meeting was held on 28th October 2015 @ Kottayam club, 22 members attended the meeting

COC MEETING: COC meeting was held on 30th September 2015, @ Kottayam club.



NedumbasseryBranch

IDA Nedumbassery celebrated our Onam Celebration in a grand manner on 13th September at Hotel Rukmini Angamali. Dr Alias Thomas National President IDA was our chief guest. The Onam message was delivered by Dr Rageena Sajee. Onam games for the Doctors and their families were enjoyed by all. We had a sumptuous Onam sadya.

CDE s. We conducted 2CDEs for which credit points were also allotted 1. Talk on Aesthetic Dentistry by Dr Rumpa Wig which was attended by more than 35 dentists 2. Talk on rotary endodontics and correcting mishaps in endodontics by Dr Rakesh Rajan.

Executive meeting: Our fifth executive meeting was on 8th September. Important decisions pertaining to CDH, CDE were taken. It was decided to provide posters to all nearby schools to educate the students about the importance of good oral hygiene and ways to maintain it.

Our sixth executive meeting was on 13th September. We decided to go for a branch tour to Cherthala on 7th of November. Nominations from members to our next executive were invited

Tripunittura Branch

MONTHLY MEETING: On 17/10/2015 at Hotel Aquaria monthly meeting was conducted. Dr Jose Paul (H O D Dept of Perio, Anoor Dental college) conducted a talk on the topic "periodontics, practitioners perspective". Around 30 members attended the meeting. Matters related to future branch activities were discussed in detail.

CDH PROGRAMME: ON 24/09/2015 IDA Tripunithura conducted free dental checkup and treatment camp at RVR. Sr. Superior, Sisters of Destitute, Karunalayam, Thrikkakara. Dr Kunal Viswam (Hon secretary), Dr James Thomas, Dr Biju CN (Vice president) and Dr Sabu participated in the camp.

CDE PROGRAME: Third cde program was conducted at hotel Hill palace, Tripunithura on 2nd August 2015. Pulp therapy and stainless steel crowns in pediatric dentistry, programme was conducted by Dr Rupesh Suresh.

Oral Health Day Celebrations: State oral hygiene day 2015 celebration was organised at the Royal Town Tripunithura on Aug 1st by IDA Tripunithura. The venue for the celebration was newly inaugurated Koothambalam municipal hall at statue junction Tripunithura. Around 500 Kudumbasree workers participated in this programme and made it a grand success.

The programme was inaugurated by Sri R Venugopal (Chairman Tripunithura Muncipality), Sri C N Sundaran (Opposition leader Tripunithura Muncipality) released Spread Smile, Institution adoption programme of IDA Tripunithura. The meeting was presided by Dr Anil G (Kerala state vice-president) with our National president Dr Alias Thomas as guest of honour and released oral hygiene day message. Dr Subash Madhavan (CDH Chairman Kerala state spoke about IDA Kerala CDH activities. Dr Jayan B (IDA Tripunithura President) did the welcome address and Dr Kunal Viswam (IDA Tripunithura secretary) did vote of thanks.

The highlight of the programme was the awareness class by Dr Anjana (WDC State President) and the active participation of around 500 kudumbasree workers. Though kudumbasree workers promised us that a good number of people will be participating in this programme, we never expected such an overwhelming response and active participation from them. They cleared all their doubts with faculty of the day Dr Anjana.

The programme was announced in advance in all the popular news papers and covered after the programme with photographs. The programme was well appreciated by the public, participants and council members of Tripunithura Muncipality.

It was indeed a great challenge for IDA Tripunithura, 5 month old and the youngest branch of IDA Kerala to organise STATE ORAL HYGIENE DAY 2015 celebration at the Royal Town Tripunithura on Aug 1st.

ONAM CELEBRATION AND FAMILY GET TOGETHER: Onam celebration and family meet was conducted on 2015 September 20th Sunday 6 pm at Hotel N M World Layam road, Tripunithura. The program was conducted by our newly formed WDC branch. Though the participation was very less compared to our cde programs, it was well participated by our members and their family. A beautiful pookalam was made by WDC members, variety of cultural, entertainment program and games was conducted and all members as well as their family had a good time. Onam sadhya was served.

CHILAMBOLI: Our members participated in Chilamboli, the cultural fest of IDA Kerala organized by Kochi branch at lotus club Eranakulam on 13th September. Even with lack of practice we won the second prize for group song. A special mention and thanks to Dr Noushad, Dr Krishnakumar, Dr Chetana, Dr Sabu, Dr Biju CN,Dr Vasundhara, Dr Dhanya and Dr Avneet for participating and making our branch proud.

Attingal Branch

4th BRANCH EXECUTIVE COMMITTEE MEETING

The 4th executive meeting of IDA Attingal branch was held on 14th July 2015 at Lions club, Attingal at 7:30pm. Dr Arun Roy welcomed all ex-members and in his speech he congratulated Dr Saji Mathew for achieving best dentist award on the occasion of doctor's day which was observed by CDH wing on July 1st. President also mentioned about the upcoming events like 3rd CDE, Onam celebration, ASAP and overnight executive meeting.

CDH: CDH wing of IDA Attingal observed July 1st as doctor's day and Dr Saji Mathew has won the best dentist award of Ida attingal. CDH wing also observed oral hygiene day on 1st August 2015 at Kuriyanikkara Nilamel Kollam Dist. Oral screening camp and oral hygiene instructions were given. 75 patients attended the camp lead by the CDH convener Dr Deepak S Das.

ONAM CELEBRATION: Onam celebration and family get-together of the branch was held at Park Rajadhani, Ulloor on 23rd August,Sunday. President Dr Arun Roy welcomed the gathering. Dr Mohammed Sameer P T (President elect IDA Kerala) was the chief guest. On this occasion Chief Guest presented the best dentist award to Dr Saji Mathew for the dedicated service to dentistry through four generations of a family. After this a very interesting and humourous speech was delivered by our chief guest on various day to day issues, which was very well appreciated by the audience. Various cultural programmes were performed by the WDC wing. Live Orchestra was another attraction of the day. It was followed by grand onasadhya in the noon. After that various games for kids,family and members were conducted. Before concluding the Onam celebration, Prizes were given by our state president elect to the winners.

CDE: The 3rd inter branch CDE with 6 KDC Credit points was conducted at Park centre, Trivandrum on 6th September 2015. The topic was on 'Periodontal Treatment Protocol for General Dentist and Orthodontic Periodontics Interdisciplinary Approach' by Dr Arun Sadasivan and Dr Deepu Mohandas. 96 members attended the cde.

IDA SOUTH ZONE CRICKET TOURNAMENT: IDA Attingal participated IDA South Zone cricket Tournament held at Central Stadium, Trivandrum on 13th September 2015.

OVER NIGHT EXECUTIVE MEETING (ONET) Over Night Executive Meeting along with 5th branch executive committee meeting was held at Regent Lake Palace, Chavara on 10th and 11th October 2015. President Dr Arun Roy welcomed the members. Meeting decided to host State CDE Programme on 22nd November.

WDC: WDC Attingal conducted a Dental Camp and Awareness class in Mancode LPS, Chithara, Kadakal for primary school children. 225 students was examined. Dr Rakhee, Dr Sereena, Dr Minahal and Dr Shameema lead the camp.




Coastal Malabar Branch

Oral Hygiene Day Celebration 1/08/2015, Saturday

16th CDH Activity

Venues: 1. Progressive English School (P.E.S), Wadihuda, Payangadi

- Janaki Memorial U.P School(J.M.U.P), Cherupuzha.

Programmes Conducted- • Oral Health Education Seminar – By Dr Pratap Pavithran and Dr Santhosh Sreedhar • Oral Check Up Camp for Students. • Parental Awareness Class- Dr Sajan Joseph

Competitions Held- 1.Healthy Teeth Contest, 2. Best Smile Competition, 3.Quiz Competition, 4. Essay Writing Competition, 5. Elocution

17th CDH Activity Venue- G.M.L.P School. Kunhimangalam

Date- 12.08.2015: Dental education class was taken by Dr. Pratap Pavithran. Dental check up conducted

5th Executive Committee Meeting

Venue- Hotel K.K. Residency, Payyannur Date: 13.08.2015

Agenda- Onam Celebration -2015 decided to be conducted on 23.08.2015, Sunday and Organising Committee was formed for the same.

Onam Celebration-2015

Venue- Oyster Opera Resort, Padanna Date- 23.08.2015

Competitions - Idly Eating Competition, Singing Competition, Arm Wrestling, Tug of war. 95 members took part in the event

Sixth Executive Meeting

Venue- Hotel K.K Residency, Payyannur Date- 14.09.2015

Fifth CDE Programme finalised on 04th October 2015 From 04.00pm onwards

Decided to participate for IDA Kerala State sports meet on 11.10.2015

Eighteenth CDH Activity- Screening Camp of Free Denture Camp

Date-04/10/2015 Venue- St.Marys High School Payyannur

23 Patients out of 60 Patients selected for Free Denture Delivery.

Fifth CDE Programme-

Venue- Hotel K.B.C Green Park,Edat,Payyannur

Topics- Session 1- Management of Common Oral lesions by Dr. Sreejan C.K., Reader, Dept of Oral Medicine and Radiology, Malabar Dental College, Malapuram

Session 2- Day to Day Management of Dental equipments by Mr. Pratap. Asher, M.D, Jaypee Agencies. Date-04.10.2015

Nineteenth CDH Activity

Venue- A.K.G Vayanashala, Arimba, Cherupuzha Date- 06.10.2015

Dental Check Up done for 80 patients

Dental Awareness Class by Dr.Sajan.Joseph

Twentieth CDH Activity

Venue- Nursery School, Kakkara Date- 08.10.2015

Dental awareness class for nursery students, teachers and parents by Dr.Abby Alex

Dental check up conducted

IDA-Kerala State Sports Meet

Participated in IDA Kerala State Sports Meet on 11.10.2015 at Christ College, Aquatic Complex, Irinjalakuda. Dr AV Sreekumar bagged Silver in 100Mts Race and Mens Badminton. Dr Abby Alex bagged Gold in Shortput and Silver in Javelin Throw.



Mavelikkara Branch

The Onam celebrations of our branch was conducted at Hotel Sougandhika on 23rd August 2015. Famous magician Samraj was the chief guest. The Women's wing of the branch conducted the programme. It was a fun-filled evening and everyone especially children had a wonderful time. About 40 members and their family attended the programme.

After many days of enthusiastic practice which induced a huge camaraderie amongst our members, IDA Mavelikara won the first prize, this year in 'Chilamboli ', the annual cultural competition which was hosted by Kochi Branch, bringing back, the coveted Overall first place of this prestigious event organized by IDA Kerala State,to the branch for the third time. Dr. Bessy Anoop won the best female singer award while Dr. Lakshmi Gopakumar bagged the best actress award. Our team also came second in group dance performance.

Ida Mavelikara won the zonal cricket competition hosted by Alappuzha branch and entered the semifinal of the state event. In the semifinal at Kozhikode the team lost to Central Kerala Kottayam, who eventually won the cup.

The fifth CDE of the branch was held at hotel Travancore Regency, Mavelikara on 20th September 2015. The topic "Sterilization at dental clinics" was discussed by in depth by Dr. Bobby John M.D.S.

The sixth CDE programme of the branch was held at Hotel Sougandhika Haripad on 25th October, 2015. Dr. Anandraj M.D.S., spoke about "Pulpal therapy of deciduous and young permanent tooth".

At the IDA Kerala State sports meet hosted by IDA Kodungallur, Dr.Mohammed Riyas and Dr.Suraj Simon George of Ida Mavelikara won the runner's up trophy in men's doubles badminton competition.

Malappuram Branch

CDE ACTIVITIES

MIDA CDE PROGRAMMES: Our 3rd CDE on; perfecting complete dentures; were held on 2/8/15 Sunday at hotel Surya regency Malappuram. Renowned prosthodontist Dr Professor Chandrasekharan Nair was the speaker. More than 52 members were participated.

Our 4th CDE on "Rotary Endodontics - An insight' were held on 6/9/15 Sunday at hotel Surya regency Malappuram. Renowned Endodontist Dr Madhu Hariharan was the speaker. More than 50 members were participated. Along with that hands on programme were arranged for 10 members.

Our 5th CDE on "Paediatric dentistry in general practice "were held on 25/10/15 Sunday at hotel "Rydgess inn" Kottakkal. Renowned Pedodontist Dr Gopu Hareendralal was the speaker. More than 25 members were participated. A special thanks to Dr Shasi Kumar, CDE chairman, MIDA for organizing wonderful programme.

EXECUTIVE COMMITTEE MEETINGS: 4th Executive committee meeting held on 7/5/15 from 8pm onwards at Hotel SURYA REGENCY,Malappuram,. 18 members were attended.

5th Executive committee meeting held on 12/8/15 from 8pm onwards at Hotel SURYA REGENCY,Malappuram,. 17 members were attended.

6th Executive committee meeting held on 15/10/15 from 8pm onwards at Hotel SURYA REGENCY,Malappuram,. 16 members were attended.

7th Executive committee meeting held on 30/10/15 from 8pm onwards at Hotel Rydgess inn Kottakkal, Malappuram,. 20 members were attended.

CDH ACTIVITIES: Our sixth CDHCamp was held on 18/6/15 at CSI Boys Orphanage at Parpperi codakkal in association with CSI mission hospital Codakkal. More than 25 inmates were benefitted. Dr Amith Unni and Dr Sonia are participated.

Our sixth CDH Camp was held on 8/10 /15 at MES Central School Tirur. More than 250 students were benefitted. Dr Amith Unni and Dr Fazil, Dr Shabeer and Dr Jasmin are participated in the screening camp.

MIDA ONAM –BAKRID FEST, & KALIKKALAM SPORTS MEET: We conducted M IDA BAKRID & ONAM FEST & Kalikkalam sports meet at Cosmopolitan club indoor stadium Manjery on 20 /9/15. Many sports events including shuttle badminton, Tug of war, Carroms Fun games, Lucky games were conducted. More than 50 members were participated. Special thanks to programme coordinator Dr Sujith, Dr Lalappan, Dr Salman.Dr Shareef.

IDA KERALA SPORTS MEET: We M IDA TEAM participated in sports meet at Christ college; Iringalakuda on 20 /9/15. We participated in

Many sports events including Athletics, Swimming, shuttle badminton, Tug of war, Carroms.

IDA Sports committee

Dr. Dinesh Nambiar
Chairman, Sports Committee

Cricket: The Zonal competitions were held at 4 centers.

North Zone – Manjeri, Winner – Malabar

Central Zone – Kodungallur, Winner – Central Kerala Kottayam

South Zone – Alappuzha, Winner – Mavelikkara

Trivandrum, Winner – Trivandrum

The semi finals and finals were held at Corporation Stadium, Kozhikode on the 27th of September. Legendary Olympian P.T Usha was the Chief Guest for the inaugural function. The tournament was won by IDA Central Kerala Kottayam who defeated IDA Trivandrum.

My sincere thanks to the regional coordinators, Dr Rajesh Raveendranath, Dr Shaji Haridas, Dr Abhilash G.S and Dr Sudhir for their efforts and also the branches IDA Malappuram, IDA Kodungallur, IDA Alappuzha, IDA Trivandrum and IDA Malabar.

Annual Sports Meet: It was held at Christ College, Irinjalikkuda and was hosted by IDA Kodungallur. Events included Shuttle Badminton, Table Tennis, Carroms, Arm-Wrestling, Swimming and Athletics.

The overall Championship title was won by IDA Kochi who pipped IDA Wayanad to the title. My sincere thanks to the President and Secretary of IDA Kodungallur, Dr Mahesh and Dr Shaji and all branch members for being wonderful hosts and for providing a fantastic venue. I congratulate the winners in individual events and team events and appreciate the efforts of all branches for their enthusiastic participation which made this meet one of the best attended and best conducted.

Dr Dinesh Nambiar

Chairman, Sports Committee

WDC Report

We are extremely happy to inform the release of a poster stressing on Dental Care of Pregnant Women.

The Poster was released on 16 the August 2015 during the State Executive Committee held at Cochin

The Poster on Dental Care of Pregnant women was launched at the Dept of Gyenecology at District Hospital Kannur followed by a Oral health Awareness Class for Pregnant Women .The Programme was well organized and conducted by IDA North Malabar.

We appreciate the efforts taken by IDA Thrippunithara for conducting a survey which covered 10 schools in and around Ernakulam with the objective of promoting night brushing habits among school children. Hats off to Dr Vasundara, Dr Avneet Kunal and their team for the same.

WDC of IDA Attingal under Dr Rakhee have proved their mettle by conducting a camp and Oral health awareness class for 225 school children. We sincerely appreciate their efforts

IDA Hope Report

Dr. Joseph C.C.
Hon. Secretary

Hope and Hope Medi

"The purpose of human life is to serve and to show compassion and the will to help others."

HOPE is moving one step ahead with our new health insurance scheme HOPE MEDI. Conflating our members and the insurance corporation, we successfully implemented this new health insurance plan. We are glad to inform that, 1003 members joined the scheme. This includes spouse's kids and Parents. Total of 4500 family members are the covered of hope medi umbrella.

Our TAILOR MADE GROUP POLICY NO.: 1009042815P108336608

PERIOD OF INSURANCE

FROM 01/10/2015

To Midnight on 30/09/2016

We have paid 92 lakhs as premium. Last month we had 14 claims and around 13 lakhs we conferred as claims. ,

IDA hope expresses sincere thanks to Chairman Dr. Thomas K C., Dr.Suresh Kumar and The United India Insurance co and Cosmos insurance brokers for their timely efforts for HOPE MEDI.

Our Hope Medi Insurance which is a tailor made policy covering Ida members and their immediate family members, This unique policy covers pre existing diseases and also offers insurance sharing , at a very nominal premium. This policy can be claimed from any accredited hospital all over south India. An additional feature of this policy is it gives cashless or reimbursement.

Ida members who have availed this unique very beneficial insurance policy covering all immediate family members including those having preexisting diseases would have received IDA HOPE MEDI Health card by separate post from VIDAL Health TPA Pvt Ltd.

We the office bearers of HOPE have put in best possible effort for getting in maximum possible benefit for our members, it is upto all the members of HOPE and subscribers of HOPE MEDI to keep the momentum going and make only valid claims.

In recent past , there IDA HOPE has seen a spurt in legal claims, this may be due to increased awareness in patient , However a point we should never forget is it is our duty to provide best possible dental care with proper procedures being followed to avoid and minimize the claims.

Last year four of our members expired and 40 lakhs handed over to bereaved families. Out of this, Dr. Tennison Thazhath (Hope No.1799) of Central Kerala Branch. whose payment has been withheld under court directives due to family issues. Now the Family court of Muvatupuzha ordered to Hope secretary to handover the money to legal hires of Tennison . Our National President Dr.Eilias Thomas handed over the cheque to Bilsy Tennison.

Our sincere gratitude to all those people who made this possible.

Dr Joseph CC
Hope Secretary

INDIAN DENTAL ASSOCIATION
KERALA STATE BRANCH

HOPEMEDI
GROUP HEALTH INSURANCE SCHEME OF IDA KSB

CLAIM MANAGEMENT GUIDELINES - Reimbursement

For reimbursement of claims Claim form, discharge summary, discharge bill (summary and detailed) from the hospital, medical certificate, investigation reports etc should be submitted to TPA through M/s Cosmos Insurance Brokers Pvt. Ltd. within 15 days of discharge from the hospital along with account details of the member by way of enclosing a blank cancelled cheque leaf and copy of ID proof / Driving license / Aadhaar Copy etc.

Contact Details :

TPA (M/s Vidal Health TPA): Ph: 0484-2358683
Fax: 0484-2359269
#39-4130, 1st Floor, Mareena Building,
M G Road, Cochin – 682 016

Assigned Contact Person : Ms.Priya
Ph. 0484 2359191
priya.sinu@vidalhealthtpa.com

M/s Cosmos Insurance Brokers : Ph: 0484 - 2351432
No- 39/ 2338, 2nd Floor,
Durbar Hall Road,Cochin-682 016

Assigned Contact Person : Sri.Darwin Gomez
Mob. 9746048805

For any further help or clarifications contact your branch HOPE Representive

For attention of all HOPEMEDI members

INDIAN DENTAL ASSOCIATION
KERALA STATE BRANCH

HOPEMEDI
GROUP HEALTH INSURANCE SCHEME OF IDA KSB

CLAIM MANAGEMENT GUIDELINES - Cashless

VIDAL HEALTH is the Third Party Administrator (TPA) for United India Insurance. Claim has to be intimated immediately to the TPA – M/s Vidal Health TPA whether it is cashless or reimbursement basis

Insurance desk of Hospital should be contacted for cashless facility showing identity cards and see that relevant treatment details are provided to TPA for approving cashless facility. It is advisable to report the claim to M/s Cosmos Insurance Brokers also when the same is initially intimated to the TPA.

Contact Details :

TPA (M/s Vidal Health TPA): Ph: 0484-2358683
Fax: 0484-2359269
#39-4130, 1st Floor, Mareena Building,
M G Road, Cochin – 682 016

Assigned Contact Person : Ms.Priya
Ph. 0484 2359191
priya.sinu@vidalhealthtpa.com

M/s Cosmos Insurance Brokers : Ph: 0484 - 2351432
No- 39/ 2338, 2nd Floor,
Durbar Hall Road,Cochin-682 016

Assigned Contact Person : Sri.Darwin Gomez
Mob. 9746048805

For any further help or clarifications contact your branch HOPE Representive

For attention of all HOPEMEDI members

Congratulations

Dr. M.K. Mangalam, Principal, Government Dental College, Alappuzha took charge as Registrar, of Kerala University of Health Sciences. She graduated from Government Dental College, Trivandrum in 1984 and took MDS in Oral Medicine & Radiology from College of Dental Surgery, K.M.C, Manipal in 1990. Earlier she occupied the post of Joint Director of Medical Education and special officer for the new Dental College, Alappuzha. Indian Dental Association wishes all the best to Dr Mangalam M.K. for the registrar's appointment.

CDE Report

Dr Deebu J Mathew
Convenor CDE

The second state level CDE programme of IDA Kerala State Branch was held on the 9th of August 2015 at the Hotel Arcadia, Kottayam and was hosted by the IDA Central Kerala Branch.

The topic of the event was on "Dental Jurisprudence" and it covered the various aspects of the Dentists Act, relevant to clinical practice in our state. An eminent person in his own right Dr George Paul elaborated on the topic in a jam packed hall. The formal inauguration of the day's proceedings was done by the IDA State president Dr K.C Thomas in the presence of the faculty Dr George Paul, KDC president Dr Mathew Joseph,IDA CKK president Dr Geoji Cherian and program co-ordinator Dr Eapen Thomas.

After the initial sessions there was a panel discussion wherein Dr George Paul, Dr Mathew Joseph and Dr K.C Thomas answered queries from the delegates. A total of 221 doctors attended the session

Upcoming programmes

3rd State level CDE program

Hosted by IDA Attingal on November 22nd 2015 at technopark, Thiruvananthapuram on Lasers in Clinical dentistry by Drs Mahesh Narayan and Simple Varghese. KDC credit points -6

Train the teachers- Intensive training sessions for college teachers on November 27th at Kozhikode hosted by IDA Malabar

4th State level CDE program

Hosted by IDA Coastal Malabar on December 6th 2015 at Payyannur on Oral Surgery by Drs Mohan Baliga, Ranjith Raveendran and Sony Jacob




CDH Report

Dr. Subhash Madhavan
Chairman CDH

Oral Hygiene Day Celebrations

State Oral Hygiene Day 2015 celebration was organised at the Royal Town Tripunithura on Aug 1st by IDA Tripunithura. The venue for the celebration was newly inaugurated Koothambalam municipal hall at statue junction Tripunithura. Around 500 kudumbasree workers participated in this programme and made it a grand success.

The programme was inaugurated by Sri R Venugopal (Chairman Tripunithura Muncipality), Sri C N Sundaran (Opposition leader Tripunithura Muncipality) released Spread Smile, Institution adoption programme of IDA Tripunithura. The meeting was presided by Dr Anil G (Kerala state vice-president) with our National president Dr Alias Thomas as guest of honour and released oral hygiene day message. Dr Subash Madhavan (CDH Chairman Kerala state spoke about IDA Kerala CDH activities.

The highlight of the programme was the awareness class by Dr Anjana (WDC State President) and the active participation of around 500 kudumbasree workers. Though kudumbasree workers promised us that a good number of people will be participating in this programme, we never expected such an overwhelming response and active participation from them. They cleared all their doubts with faculty of the day Dr Anjana.

The programme was announced in advance in all the popular news papers and covered after the programme with photographs. The programme was well appreciated by the public, participants and council members of Tripunithura Muncipality.

World Geriatric day:

State level observation of World Geriatric Day hosted by IDA Eranad branch was held at pain & palliative care clinic Perinthalmanna, which was inaugurated by Dr. Nilar Mohammed, Secretary Pain & Palliative care society, Perinthalmanna on October 1st 2015.

Dental check up camp for 49 registered patients & their family members were conducted by Dr.Subash Madhavan & Dr. Sameer T.A.. Variety entertainment programs for elderly were conducted by Women's wing represented by Dr.Feseena, Mrs. Sabitha & Mrs Tresa which included filmy quiz, musical chair. Gifts for all 49 patients are given by Dr.Subash Madhavan Chairman, Council for dental health,IDA Kerala state & addressed the gathering. Program concluded by vote of thanks by Dr.Sameer.T.A, Secretary,IDA Eranad branch & which was followed mouth watering feast.

IDA Kerala State wishes to thank Prof. Surendranath, President, members, volunteers & staff Pain & Palliative care society, Perinthalmanna in associating with IDA for organizing the observation. Would also place on record of thanks to Dr.Sameer.T.A, Dr.Biju, Dr.Mohsin & Dr.Francis.