

Impressions

Vol. 8. Issue 2

JUNE 2018

Journal of Indian Dental Association
Attingal Branch



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Best Journal State Award for 2013 , 2014 and 2017

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President's Message



Dear friends,

Seasons greetings from IDA Attingal branch. IMPRESSION's second issue for the year 2018 is on print. Dr Pradeep C. Dathan, our editor journal has been instrumental in releasing the journal on time.

Half way through the tenure, the journey has been satisfying, thanks to Hon. Secretary and the entire executive team. We have conducted various CDH, CDE activities during this period. No tobacco day, World health day, World family day to name a few activities for CDH.

Last month (May-June) we had a tough time in terms of Nipah virus, especially in the northern part of Kerala. The entire episode was threatening to our profession since we had to interact with patient at close proximity. Clinics were asked to shut down by IDA for some time to prevent untoward incidents happening. Now things are settling down, thank God.

I wish all success to the Journal Editor.

Thanking you all,

Dr Ramesh S
President
IDA Attingal Branch.

Secretary's Message

Dear Members,

Seasons Greetings

This year our membership strength increased to 352. I thank all the members for their support to achieve this. HOPE membership also increased by 20%.

State office is introducing new schemes for the members. HOPE assure, in which we can insure our clinic. IDA Mark is another new scheme. Members can buy materials at low price. There were some shortcomings in the delivery of materials, soon we will get around with it. I request our members to make use of these schemes.

CDE programmes have been conducted for the benefit of members. This year we conducted three CDE programmes. Among these one was for clinical staffs.

We have conducted CDH programmes with maximum support of our members. We expect the same response and support in future also.

I congratulate Dr Pradeep Dathan for his untiring effort in getting the journal released on time. I have every bit of faith that our journal will continue to excel as the years continue.

Thanking you,

With warm regards,

Yours in IDA,

Dr Anil Kumar D.
Honorary Secretary
IDA Attingal Branch.



ABOUT IDA ATTINGAL

IDA Attingal, symbolizes & represents, updates & educates, promotes & supports the local dental community of erstwhile Attingal, in delivering, quality dental health care to the general public. Maintenance of proper standards & ethical manner in practice, better interpersonal relations, as well as willingness to share knowledge, among members, has provided a high degree of respectability to the organization. Effective follow up of organizational proceedings at the state & national level by the branch executive, ensures that the members are kept abreast of all IDA activities. Regular representation at IDA events & healthy interaction with other branch members, has made IDA Attingal quite popular & a force to reckon. Adding to this would be a plethora of eminent leaders from the branch, who have raised to higher echelons in IDA. Through various Scientific programmes, presentations, journals & newsletters, the branch creates awareness of the latest advancements in dentistry, among members.

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Editorial



Quality or quantity

When it comes to taking care of human life, it is imperative that the professional should have excellence. Hence NEET was ushered in with great expectations, with the hope of ensuring excellence in the field of medicine and dentistry. It is generally argued that education must not be a commodity that can be purchased without merit. Could NEET ensure the credentials of merit and screen the brilliant brains to provide admissions to the medical courses? Sadly the answer is a big 'No'. In NEET-UG 2017, 5,43,473 candidates had qualified the criteria of 50th percentile with marks ranging from 96.8% to 18.1% out of a total of 720. In 40th percentile group, candidates securing as low as 14.8 % also got eligibility. The wide range of eligibility does not ensure effective screening for which the NEET was envisaged. In 2018, nearly 48937 candidates got eligibility in Kerala. Once the counseling is completed, the exact figures will be available.

How percentile is calculated?

Percentile for tests can be calculated in two ways- percentile based on highest marks and percentile based on rank. The official CBSE NEET Bulletin 2018 specifies that the NEET percentile shall be calculated based on the highest marks secured for NEET. We will check how to calculate percentile, based on highest marks obtained in NEET. For

example, let's assume the highest marks scored by the NEET topper is 690 and if a candidate gets 630, then, the percentile will be $630 \times 100 / 690 = 91.3$

India wants to produce more doctors to match with the WHO indicators. For 1000 people, there should be one doctor. It is desirable to have quality doctors but adhering to intellectual standards will not produce too many doctors. Hence, the dilution of standards in screening tests. In fact we need not produce doctors in haste. If we have one doctor for 6000 people, that doctor can manage the situation because the entire 6000 people will not queue up for treatment in a day. Unless there is an epidemic, present number of doctors and dentists are sufficient. We have to improve the quality of the doctors not the quantity. Otherwise the health of the country is going to face a challenging situation. If the government sector is not developed in the health care, poor people will not get adequate health care. While Sweden spends 9.2% of the GDP for health sector, India spends only 1.02%. India's per capita expenditure on health is roughly Rs.1100/-. Is it sufficient for a good quality anti biotic?

Dr. Pradeep C. Dathan
Editor, Impressions

"Aloevera" the herbal product in dentistry

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Abstract

Aloe vera is considered as a miracle plant due to its potential for healing of many of human ailments. Since 1st century AD it was used in herbal medicine. The applications of herbal products in medical field are usually with minimal side effects when compared with the conventional treatment modalities. In modern world oral infections are considered to be a serious health problem. Aloevera is said to be "Portable Nature's First Aid Kit" and has also been employed in dentistry for its beneficial properties in various clinical conditions.

Keywords: Aloevera, Herbal, Dentistry,

Introduction

Plants provide natural sources of medicines for decades of years¹. Nowadays people prefer to have natural herbal products in the treatment of various diseases². Aloevera is considered as a miracle plant due to its magical healing property in various human diseases. Aloe Vera is a succulent perennial and drought resistant herbal plant belonging to the Liliaceae family³. The botanical name of Aloe vera is Aloe barbadensis miller. The name of Aloe vera was derived from the Arabic word "Alloeh" which means "shining bitter substance," and a Latin word "vera" which means "true. There are more than 300 species of the aloe plant, but the species Aloe barbadensis species is with the best medicinal properties.

Active compounds

Almost 75 potentially active constituents have been reported in Aloe vera which include vitamins, essential amino acids, enzymes, lignins, anthraquinone, minerals, sugars, salicylic acid, folic acid, sterols and saponins.^{4,5} Aloe vera contains 7 of the 8 essential amino acids and 20 of the 22 human

required amino acids. Aloevera is a good source of vitamins A (beta carotene), B1, B2, B3, B6, B12, C, E, folic acid and choline. Vitamins in Aloevera act as antioxidants which neutralize free radicals.^{6,7} The sugars which present in the mucilage layer of Aloevera are known as mucopolysaccharides. The monosaccharide sugars are glucose and fructose and polysaccharide sugars are glucomannans/polymannose.⁸

Mechanism of Action

The magical healing property of Aloe vera is due to a compound called glucomannans, which is enriched with polysaccharides.⁹ Glucomannans enhances fibroblast growth factor and encourages the proliferation and activity of these cells result in more number of collagen and elastic fibers. It also improves transversal connections among these bands which makes the skin more elastic and less wrinkled. The antiseptic agents like salicylic acid, lupeol, cinnamonic acid, sulfur and phenols have an inhibitory action on fungi bacteria and viruses. Low molecular weight compounds present in aloe

mucilage inhibit the production of reactive oxygen free radicals from activated human neutrophils.¹⁰

Applications in dentistry oral submucous fibrosis

According to study by Acharya J et al topical application of Aloe vera is effective in management of oral submucous fibrosis. In this study they evaluated the clinical effectiveness of aloe vera gel three times daily for 1 month in 30 OSMF Patients with limited mouth opening. Clinical improvement was noted in all the patients in study group.¹¹

Oral mucositis followed by radiation therapy

In study by Sahebamee M et al Aloe vera mouth wash was as effective as benzydamine mouth wash in reducing the intensity of mucositis followed by radiation in patients. In this study 26 head and neck cancer patients who were undergoing radiation therapy were randomized to receive an aloe vera mouth wash or a benzydamine mouth wash. They concluded that aloe vera can be used as an alternative natural medication in the treatment of radiation induced oral mucositis¹²

Oral lichen planus

According to Sanchez NS et al topical application of aloe vera is effective in the management of oral lichen planus. In this study a total of 64 patients with OLP were randomized in a double blind study to either aloe vera (32) or placebo (32) 3 times a day for 12 weeks. In the Aloe vera group complete pain remission was noted in 61% after 12 weeks and in all patients aloe vera improved the total quality of life.¹³

Gingivitis

In a study conducted by Moghaddam AA et al the combined therapy of Aloe vera with scaling and root planing is more effective in treatment of chronic periodontitis with scaling and root planing alone. In this study 20 patients with moderate to severe periodontitis were treated with scaling and root planing in one quadrant and scaling, root planing and aloe vera in another quadrant. Clinical improvement was noted more in the quadrant treated with aloe vera, scaling and root planing.¹⁴

Alveolar osteitis

Nowadays, special medical bandages containing Acemannan Hydrogel which is obtained from the clear inner gel of Aloe vera is used after extractions and it fastens healing and formation of blood clots.¹⁵

Denture adhesive

Acemannan, a complex mannose carbohydrate which is present in aloe vera is a good denture adhesive.¹⁶

Dental implants

The antimicrobial & anti-inflammatory effects of aloe vera reduces inflammation around dental implants.¹⁵

Aloe vera in form of tooth gel

Aloe vera tooth gel contains no added fluoride content but it has almost an equal amount of antimicrobial activity of fluoridated toothpastes. It is less harsh on teeth and is a better alternative for people with sensitive teeth.¹⁵

Aloe vera in field of endodontics

In primary teeth aloe vera is a good obturating material. Currently herbal products are preferred over artificial products and Aloe vera has been proved to be a good antibacterial agent in root canals. Aloe vera is also found to be effective in decontaminating GP cones.¹⁶

Adverse effects

Topical

Burning sensation, redness, stinging sensation and rarely generalized dermatitis in sensitive individuals. Usually preferred to apply it to a small area first to test for possible allergic reaction.

Systemic

Abdominal cramps, hepatitis, diarrhoea, red urine, Prolonged administration has been reported to increase the risk of colorectal cancer. Laxative effect sometimes may cause electrolyte imbalances including low potassium levels.¹⁵

Drug interaction

Vitamin C and E absorption is increased after application with Aloe vera.¹⁷

Aloe vera is not recommended in combination with diuretic, antidiabetic, laxative drugs, sevoflurane and digoxin

Conclusion

Aloe vera is a novel herbal product having applications in various field of Dentistry. Aloe vera is an economical plant in contrast with the traditional medicine modalities. Being economical and without the side effects of traditional medications Aloe vera may be a good treatment option in current scenario and in future.

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Infection control practices

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Infection control practices are the discipline concerned with preventing nosocomial or health-care-associated infections a practical rather than academic approach.

It mainly consists of Asepsis and Sterilization-techniques, universal precautions, proper body fluid and mercury spill management, proper segregation and disposal of biomedical wastes etc.

The word 'Asepsis' means absence of sepsis (infection). The aseptic technique accurately describes the series of practices employed to prepare the environment, the personnel and the patient before a procedure. The term sterilization describes the procedures employed to prepare the instrument or surface free from all forms of living microorganisms. (Vegetative bacteria, spores, fungi and viruses.

Proper hand washing

Using elbow operated tap with running water, antiseptic soap solution (Fig. 1)

Proper hand washing include 6 steps of rubbing (fig. 2)

- Palm to palm
- Dorsum of hands
- Between fingers
- Knuckles
- Tip of fingers
- Thumb

When to do

Before and after each clinical contact with a patient

- Before and after eating
- After using the toilet
- Before and after using gloves
- After contact with used equipments
- After contact with body substances
- Proper wearing of sterile gloves

Sterile gloves – cuffs folded inside out. (Fig 4 and 5) The left glove is slid over the hand with

the right hand covered by sterile gown. The right cuff is then adjusted with gloved left hand and the right glove is slid using left gloved hand without touching the outside of the gloves with bare hands.

Sterilization

Dry heat sterilization

Hot air oven

This method is widely used for anhydrous soils, talcum powder, glass articles etc.

Advantage

Does not corrode instruments.

Disadvantage

Time consuming and cannot be used for rubber and pvc products

Timing for sterilization with hot air oven

Temperature	Time
121° C	6-12 hours
140° C	3 hours
150° C	2.5 hours
160° C	2 hours
170° C	1 hour
190° C	15 minutes

Moist heat sterilization

Boiling

Economical but not reliable

Autoclaving

It works on the principle of 'steam under pressure'. It is a reliable method for sterilization of instruments.

Timing for sterilization with autoclave

Pressure	Temperature	Time
15 psi	121° C	20 minutes
20 psi	134° C	3-5 minutes

2 types of autoclaves

Vertical body and horizontal body

Points to remember

All the blood stains, rust should be cleaned

The materials should be wrapped with material which allows proper steam contact

The articles should be kept loosely in the chamber / drum to facilitate proper circulation of the steam.

The materials which require more time for sterilization must be kept on the upper part of the drum since steam penetration starts earlier in the upper part than the lower part.

The steam inlets of the drum must be open

Once the heating source is started, all the air in the autoclave should be allowed to escape by opening the outlet valve so as to enable saturation with steam

The saturated steam is more lethal to the microorganisms than the mixture of air and steam. The air is a bad conductor of heat.

During autoclaving care should be taken to prevent entry of boiling water into the drum

To achieve full quality use autoclaving indicators (Chemical and biological indicators)

Normally the contents of sterile drum remain sterile for about 48 hours

Cold Sterilization

Using chemicals

Commonly used agents are

Absolute alcohol, 2% gluteraldehyde, Formaldehyde etc

Spirit

Bactericidal, pseudomonicidal & fungicidal in 10 minutes exposure

Tuberculocidal & virucidal in 20 minutes exposure, not sporicidal

2% gluteraldehyde

Bactericidal pseudomonicidal, virucidal & fungicidal in 10 mins exposure

tuberculocidal in 45-90 mins

sporicidal in 10 hours

Formaldehyde

30% aldehyde plus 10% methane-formalin

40% solution is used for fumigation (Operation theatre sterilization)

2-5 % solution is used for sterilization of surgical gloves and instruments.

Tablets of formalin are used in formalin chamber for the sterilization of thermo labile articles.

Bio-medical waste segregation

'Bio-medical waste' means any solid and/or liquid waste, including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research pertaining thereto or in the production or testing thereof. (Fig. 3)

Universal (standard) precautions

Treat all Human body, bodily fluids and other potentially infectious materials as if they are infectious.

The universal application of standard precautions is the minimum level of infection control required in the treatment and care of all patients to prevent transmission of blood-borne viruses. These include personal hygiene practices, particularly handwashing; use of personal protective equipment such as gloves, gowns and protective eye wear; aseptic technique; safe disposal systems for sharps and contaminated matter; adequate sterilisation of reusable equipment and environmental controls. Standard precautions should be implemented universally, regardless of information or assumptions about a patient's blood-borne virus status, and



Fig. 1 Elbow operated tap

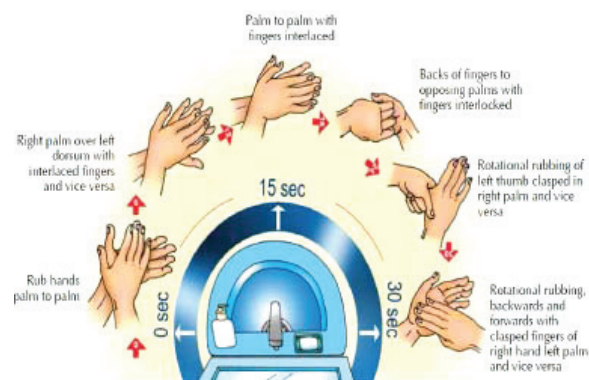


Fig. 2 Six steps of hand washing

therefore assist to reduce potential.

Preparation of 1% bleaching solution

Take 30 g of good quality bleaching powder. Make a paste by adding small quantity of water. Then add one litre of water, stir well and wait for some time for the sediment to settle. Use the clear water above as 1% bleaching solution up to 6 hours.

Management of body fluid spill

Spill kit

PPE-gloves, googles, mask apron etc

Red and yellow plastic bags

Cotton/Tissue paper



Fig 3 Bio-medical waste segregation

Procedure

After wearing PPE remove body spill from surface using cotton/tissue paper and put it in yellow bag. Then pour 1% bleaching solution (double quantity of spillage) to surface. Wait for ten minutes. Repeat the procedure till no stains of the spill on the surface. Gloves to red bag and both red and yellow bags to BMW

Mercury spill management

Mercury spill kit

PPEs, Torch, 2 Cardboard pieces, Plastic syringe, glass bottle, Adhesive tape, plastic bags

Procedure

Do it carefully as mercury can vaporise at room temperature. After removing ornaments wear PPE. Illuminate the area using torch to see the mercury beads. By using 2 cardboard pieces make the small piece of mercury to unite and by using syringe suck the mercury and pour to glass bottle which is half filled with water. Repeat the procedure till visible particles removed. Close the glass bottle and seal it in a plastic bag. Using adhesive tape very small mercury particles are stucked and keep it in another sealed pastic bag. Both the bags are kept in another sealed bag and label as mercury waste. Keep the mercury waste in a safe place.

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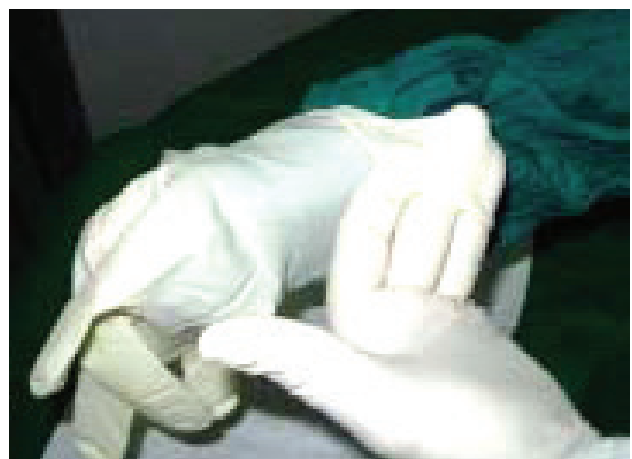


Fig. 4 and 5 Wearing the surgical gloves

An Overview of Platelet Rich Fibrin in Periodontal Therapy

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Abstract

Recent advancements in periodontal therapy concentrate on regeneration of soft and hard tissues. Postoperative wound healing is also a significant part of periodontal treatment. Efforts to augment periodontal tissue and bone regeneration, include regenerative periodontal therapy with the use of barrier membranes, recombinant growth factors, graft materials, gene therapy, root surface biomodification etc. Without any artificial biochemical modification Platelet Rich Fibrin represents a new advancement in the platelet gel therapeutic system for both periodontal regeneration & wound healing. This review article directs attention towards the novel platelet concentrate PRF, as a healing and autologous regenerative biomaterial.

Keywords: Platelet rich fibrin, wound healing, regeneration.

Introduction:

Wound healing and periodontal tissue regeneration are the two most important aspects of periodontal therapy. Efforts to augment periodontal tissue and bone regeneration, include regenerative periodontal therapy with the use of barrier membranes, recombinant growth factors, graft materials, gene therapy, root surface biomodification etc.

Post periodontal surgery, wound healing occurs through a complex interaction between gingival fibroblasts, periodontal ligament cells, osteoblasts and epithelial cells. Damage of blood vessels results in fibrin formation followed by platelet aggregation and elaboration of it is under the molecular control of biochemical mediators, i.e., cytokines and growth factors.¹

The potential role of platelets in inflammation and wound healing is due to the presence of several growth factors and cytokines² and some of them play an important role in osteoblast activity,

modulating their response in improving bone healing³. Moreover, fibrin, fibronectin, and vitronectin in platelets provide connective tissue, a matrix, and thereby facilitate cell migration.⁴

Platelet rich fibrin (PRF) is prepared from the patient's own blood, it concentrates almost all the platelets and growth factors.^{5,6} Hence this second-generation platelet concentrate is rated superior to other platelet concentrates like PRP (a first generation platelet concentrate) since no other exogenous components are included.

This review article directs attention towards the novel platelet concentrate PRF, as a healing and autologous regenerative biomaterial.

Platelet concentrates:

Depending on the difference in density of fibrin architecture and presence or absence of leukocytes, Dohan Ehrenfest *et al.*, 2009,⁷ for the first time classified PRF into the following four main types,

- 1) pure platelet-rich plasma,

- 2) pure platelet-rich fibrin (PRF),
- 3) leukocyte and platelet-rich plasma,
- 4) leukocyte and PRF

Platelet Rich Fibrin (PRF) :

Choukroun's platelet-rich fibrin (PRF) biomaterial is an autologous leukocyte with its specific components included as a three dimensional entity (Fig.1). This second generation platelet concentrate eliminates the risk associated with the use of bovine thrombin as it is prepared as a natural concentrate without the addition of any anticoagulants.⁸ The dense fibrin network with leukocytes, cytokines, structural glycoproteins and release of several growth factors⁹ (transforming growth factor β 1, platelet-derived growth factor, vascular endothelial growth factor) enhances the potent role of PRF in matrix remodeling during wound healing, immune regulation and anti-infectious activities.¹⁰ Moreover, the slow polymerization mode of PRF can make it a favorable bed for wound healing.

Historical background of PRF:

To overcome the risk of cross infection of fibrin adhesives, complexity and development of antibodies to the clotting factors V, XI and thrombin due to the presence of bovine thrombin¹¹ concentrated platelet-rich plasma (cPRP), a second generation PRF (platelet rich fibrin) was prepared from the patient's own blood which is activated by the addition of thrombin and calcium. PRF is a potent healing and autologous regenerative material with many novel applications to accelerate both soft tissue and hard tissue healing.

Role of PRF fibrin and growth factors:

- interleukin 4: differentiation of activated β cells, healing by moderate inflammation
- transforming growth factor beta 1: synthesis of fibronectin & collagen
- interleukin 6: stimulates antibody secretion
- platelet derived growth factor: regulation and proliferation of mesenchymal cells

Table 1: *Difference between platelet rich plasma (PRP) and platelet rich fibrin (PRF)*

	First generation - PRP	Second generation - PRF
Based on processing technique	Use of bovine thrombin and calcium chloride (anticoagulants) Two spin centrifugation After blood collection, one can Wait for 10 min for centrifugation, preparation is labour intensive	No anticoagulants are used Single spin centrifugation The tube is centrifuged at 3000 rpm for 10 min, It involves speedy blood collection and immediate centrifugation Simple and cost effective
Based on architecture	Sudden fibrin polymerization Bilateral junctions, unfavorable to cytokine enmeshment and cellular migration	Slow natural polymerization Equilateral junctions able to support cytokines enmeshment & cellular migration.
Based on biological property	There is Immediate release of growth factors	Growth factors are released slowly over a period of 7 or more days
Based on therapeutic concern	antibodies to bovine factor Va may cross react with human factor Va and may produce coagulopathies and rare bleeding episodes	No coagulopathies and no bleeding episodes An <i>in vitro</i> study showed that PRF is superior to PRP, considering the expression of alkaline phosphatase and induction of mineralization.

Bansal, et al. Platelet Concentrates in Periodontal Regeneration: Indian Journal of Dental Sciences, Volume 9 Supplement 1, 2017¹²

Uses of PRF in periodontics:

- Enables periodontal tissue regeneration(used in tissue engineering as a scaffold for human periosteal cell proliferation.
- Used to correct intrabony defects & enhances healing of osseous defects, also used in the treatment of gingival recession, guided bone regeneration, periapical lesions etc

Platelet Rich Fibrin (PRF) as healing autologous bioregenerative material:

PRF with its inherent regenerative capacity act as a scaffold for human periosteal cells in vitro, hence this healing and autologous biomaterial finds its application in the field of tissue engineering^{13,14} especially in the management of intrabony defects, gingival recession, furcation defects, and to accelerate

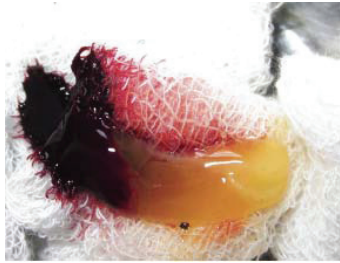


Fig. 1: PRF clot



Fig 2: Centrifuge

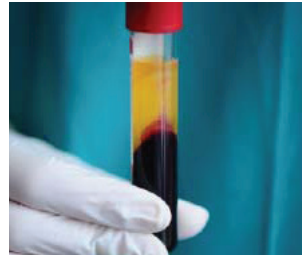


Fig. 3: Final product after centrifugation, with the three layers: acellular plasma, the fibrin clot, blood cells



Fig. 4: PRF clot

PRF USED FOR REGENERATION OF OSSEOUS DEFECTS



Fig. 5: preoperative buccal view

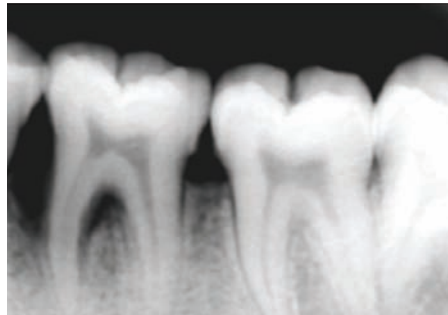


Fig. 6: preoperative radiograph



Fig. 7: intraoperative buccal view



Fig. 8: PRF placement



Fig. 9: Grafted defect & suture placement

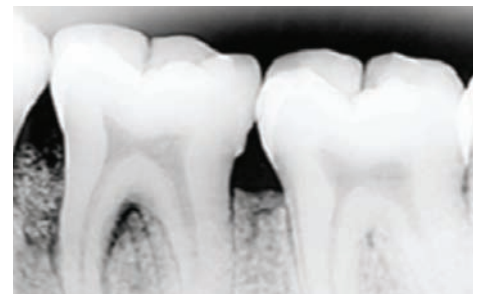


Fig. 10: 6 months postoperative radiograph

(Figures sourced from : Jayant R Ambulgekar et al. Platelet Rich Fibrin- A New Hope for Regeneration of Osseous Defects in Aggressive Periodontitis Patients: A Case Report: American Journal of Advanced Drug Delivery, 2014)²¹

wound healing. Combination of PRF with bone grafts (bovine porous bone mineral, nanocrystalline hydroxyapatite, and demineralized freeze-dried bone allograft [DFDBA]) or pharmacologic agents such as metformin gel was found to be more effective in terms of improvements in clinical parameters and radiographic defect depth reduction compared to when bone grafts or metformin used alone.^{15,16} Furthermore, the clinical and radiographic results of PRF used alone were comparable to DFDBA for periodontal regeneration.¹⁷

PRF reduces the biochemical handling of blood as well as physiologically available thrombin in PRF reduces risks associated with the use of bovine-derived thrombin and also enables the slow polymerization of fibrinogen into fibrin which in turn incorporates more circulating cytokines into it and hence provide a more natural environment that is favorable to wound healing. The difficulties associated with biochemical handling of blood are also reduced in PRF.

Sudden fibrin polymerization in PRP due to the presence of fibrin adhesives and artificial additives results in the loss of more of intrinsic cytokines.

During gelling in PRP fibrin assembles via bilateral junctions resulting in poor cytokine entrapment and cellular migration due to thickening of fibrin polymer network by strong thrombin concentrations while PRF assembles via equilateral junctions enhancing cytokine entrapment and cellular migration by weak thrombin concentrations. All these important facts make PRF a better healing biomaterial than PRP and other fibrin adhesives. Another added advantage of PRF is the presence of natural fibrin network in PRF which protects the growth factors from proteolysis¹⁸. PRF has an efficient cell migration due to excellent microvascularisation and since fibrin matrix is denser than a blood clot, PRF enhances soft and hard tissue healing and regeneration.¹⁹

Preparation of platelet rich fibrin (PRF):

The preparation protocol of the PRF clot

Using 10ml tubes venous blood sample, without any added anticoagulant, was collected from forearm of the patient which then was immediately centrifuged at 1500 rpm for 14 minutes (Fig.2) during which all the platelet gets activated (since the blood gets in contact with the test tube wall) result-

ing initiation of coagulation cascade.

And finally formation of three layers: the topmost acellular plasma, the red blood cells at the bottom and the fibrin clot in between (Fig.3).

The fibrin clot obtained is then detached from the tube (Fig.4) and all the attached red blood cells scraped off from it.

The slow handling of blood and resultant diffuse polymerization of fibrin aids to obtain a small blood clot with irregular consistency. The success and clinical outcome of this procedure depends on the duration of time between blood collection and centrifugation process.

(Mihaela Dimofte et al. Value of platelet rich fibrin in bone regeneration following tooth extraction: Romanian Journal of Oral Rehabilitation Vol. 9, No. 3, July- September 2017)²⁰

PRF used for regeneration of osseous defects

- **Presurgical Phase:** The patient who complained pain and mobility in relation to the lower left first molar initially received a full-mouth oral prophylaxis under local anesthesia and six to eight weeks following phase I therapy, periodontal evaluation was done (Fig. 5 & 6)

- **Surgical Phase:** After performing buccal and lingual sulcular incisions, mucoperiosteal flaps were reflected. (Fig. 7). Ultrasonic instruments and area specific curettes were used for careful defect debridement and root planing. Osseous recontouring was not done. A mixture of porous hydroxy apatite (HA) granules (600-700 microns particle size) and PRF at a proportion of 1:1 (v/v), was then delivered to the defect (Fig.8). Compressed PRF membrane was trimmed and adapted over the grafted defect and sutured. (Fig. 9)

- **Post surgical evaluation:** 6 months post operatively soft and hard tissue evaluation was performed. IOPA of the grafted site showed desired bone fill (Fig. 10). A significant clinical attachment gain and a reduction in pocket depth were observed.

Merits of PRF:

It's easy to prepare PRF without any significant biochemical alteration and it has enhanced circulating cytokines enmeshment and cellular migration. Its slow mode of polymerization accelerates the healing process. PRF also aids in hemostasis. Being a cost effective regenerative biomaterial it offers more long term beneficial effects.

Conclusion:

Without any artificial biochemical modification PRF represents a new advancement in the platelet gel therapeutic system. The easily applied fibrin acts have well known synergistic effects on healing processes. The presence of fibrin network with leukocytes and intrinsic cytokines play a significant role in reducing the inflammatory and infectious phenomenon within the grafted material. The use of PRF alone or in combination with other biomaterials (such as bone grafts, soft tissue grafts, and pharmacologic agents) is thus a novel method for improvements in clinical and radiographic parameters in the management of periodontal osseous defects and hard tissue. PRF also have added advantage in terms of increment in gingival tissue width and thickness (gingival biotype)

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National Oral Health Programme

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Oral Health is vital for overall well-being and quality of life. National Oral Health Programme launched in the year 2014-15 is a new initiative by National health mission which address the burden of dental disease in an effective manner for bringing about 'optimal oral health' for all by 2020. Oral cavity is a mirror that reflect the health of an individual. "Oral Health is a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, birth defects and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking and psychosocial wellbeing" (Source-WHO).

Disease burden (world)

Global burden of periodontal disease, oral cancer and caries increased markedly by an average of 45.6% from 1990 to 2010 in parallel with the major non-communicable diseases like diabetes by 69% (Global burden of disease study, 2010). Oral cancer is the world's 8th common cancer and the 3rd most cancer in south east Asia (Global burden of disease study, 2010). Tooth decay is the most prevalent of conditions, affecting almost half 44% of the world population in 2010 and Severe Periodontitis at 11% followed by Diabetes 8% and Asthma at 5% (Global burden of disease study, 2010).

Disease burden (India)

Children

1. Cleft lip/palate one of the most common birth defects.
2. Dental caries (tooth decay) is the most common chronic childhood disease – 5 times more

common than asthma and 7 times more common than hay fever.

3. Over 80% under 15-year-olds have caries and 40% suffer from malocclusion

Adults

1. 95% show signs of periodontal or gingival diseases
2. Tobacco-related cancer is the most prevalent. Annually 1,30,000 people succumb to oral cancer, meaning approx.¹⁴ deaths per hour in India
3. Herpes labialis and oral ulcers are common in adulthood as only 2% of the population visit a dentist

Vision 2020

FDI World Dental Federation, the principal representative body released the report, called Vision 2020 which comprises of five chief elements:

1. Meet the increasing need and demand for oral health care
2. Expand the role of healthcare professionals
3. Shape a responsive educational model
4. Mitigate the impacts of socio-economic dynamics
5. Foster fundamental and translational research and technology

Target population

programme addresses the 'silent epidemic of oral diseases, which aims at

1. Prevention of oral diseases in school children.
2. Timely interception and treatment of oral diseases.
3. Appropriate oral health care for rural population

4. Most vulnerable people - disadvantaged and socially marginalized

Activities under the programme

For District and below activities under NHM component:

A total of 200 districts in a phased manner would be taken up.

A District will be supported with equipment's and man-power for a Dental Unit at the district hospital in which the cost has been set as:

1. Equipment's @ Rs. 7 lakhs for each dental unit
2. Manpower and consumables @ Rs.13.4 lakh/year States, which already have the dental units at the district level, the option would be given to set it up at the CHC level or below

States, which already have the dental units at the district level, the option would be given to set it up at the CHC level or below

The Central and State HQ component

Training: Training modules would be developed by Centre for Dental Education and Research (CDER), AIIMS, New Delhi for State level trainers selected from 25 Dental colleges. General oral health training of all the health care staff would be provided by the district trainers.

Basic package on oral health: Atraumatic Restor-

ative Treatment can be performed even where electricity is not available. They are useful and should be locally developed.

Information, Education and Communication shall be conducted through word of mouth, rural outdoor methods and mass media: electronic and outdoor

Financial guidelines

Financial Management Group(FMG) support units at state and district level, established under National Health Mission (NHM).

In the Financial year 2014-15,

NHM Component:

1.72 crore have been released to 9 states i.e. Himachal Pradesh, Mizoram, J & K, Madhya Pradesh, Rajasthan, Sikkim, Gujarat, Nagaland & Arunachal Pradesh.

Central component:

Grant to CDER (Centre of Dental Education and Research) to develop IEC materials, training module through an MOU.

In the Financial Year 2015-16,

NHM Component

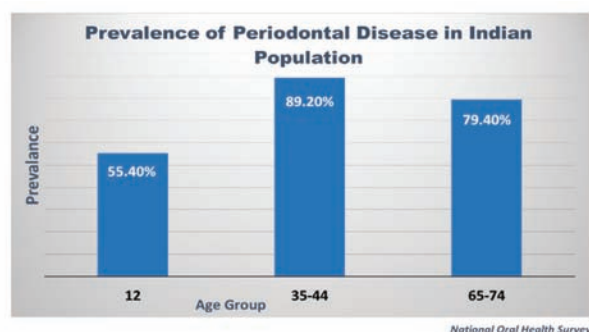
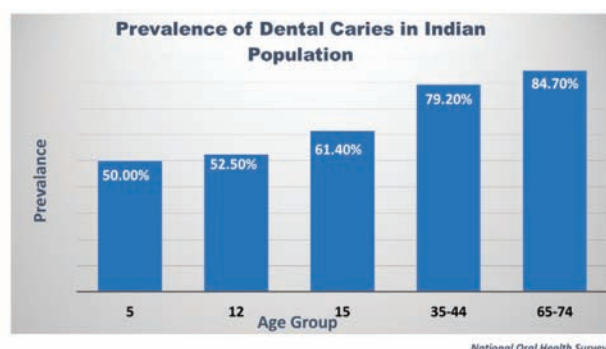
29 states/UTs were received via Program implementation planning(PIPs) demanding grants to strengthen oral health care delivery at public health facilities.

Central Component

Information, Education and communication (IEC) materials in the form of posters, leaflets have been developed and disseminated to 10 states Rajasthan, Haryana, MP, HP, Gujarat, Maharashtra, Odisha, Sikkim, Nagaland & Delhi in 1st phase.

Barriers and challenges of implementation

1. Inequalities in access to oral healthcare-India has the majority population in the rural area



GLOBAL STRATEGIES FOR PREVENTION & TREATMENT OF ORAL DISEASE

Promoting healthy lifestyles and reducing risk factors that arise from environmental, economic, social and behavioral causes.

Developing oral health systems that equitably improve oral health outcomes, respond to people's legitimate demands, and financially fair.

Reducing oral disease burden and disability, especially in poor and marginalized populations.

WHO's Four strategic directions provide the broad framework for the Oral Health Programme

Framing policies in oral health and promoting oral health as an effective dimension for development policy of society.

and distribution of dental professionals is highly skewed in favour of cities. Rural oral health projects may experience implementation challenges like

- 1) Dental clinic model has faced barriers in recruiting a dentist
- 2) Dental vans are limited in the types of services they can provide
- 3) Start-up costs are higher than the revenue that the program can generate
2. Large number of systemic barriers exist within the oral health care delivery system of India-Unequal distribution of health services with majority of dentists being located in urban areas and Non-availability of oral health records, statistics, dental treatment audit of that particular area served.
3. Over and above fastest growing population, rapid westernization and lack of resources are increasing the burden of oral diseases in our country
4. Ignorance about significance of oral health, lack of perceived needs, economic constraints, cultural and psychological barriers are few other constraints
5. Expensive at corporate and private levels and cheap in public medical and dental institutions

Recommendations for improvement

1. Water Fluoridation-Expand and maintain access to community water fluoridation for the health

benefit by Promote school-based sealant programs, educating and informing people about the importance of fluoridation

2. Oral Health Education: Add oral health education in school curriculums
 - a) Improve the understanding of people about various healthy oral health practices
 - b) Awareness through mass media, coverage both in national and regional language
3. Sugar is the new Tobacco: Imposing “sugar tax” might be able to cut down the consumption of sugary food items/drinks
4. Stringent anti-tobacco laws: evidence base of effective strategies and interventions to improve early detection of oral and pharyngeal cancers and to reduce incidence and mortality
5. Health Systems: cost containment measures to reduce inefficient oral health costs at private sector
 - a. Evaluate incentives for healthcare providers who provide services to rural populations
 - b. Research motivation in oral healthcare field
 - c. Build capacity and infrastructure for sustainable, effective, and efficient oral health programs at state level

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Ramifications of dental materials in head and neck MR imaging- a short review

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Abstract

Magnetic Resonance Imaging (MRI), being a diagnostic tool with huge potential, has become an important and feasible life saving measure for many clinical problems. It is a highly specific and sensitive imaging modality with very little risk to the patients. Although being of great clinical application, artefacts caused by dental crowns, metallic orthodontic appliances, dental implants etc in head and neck MRIs may obscure valuable diagnostic information and distort the image quality, shadowing the actual problem. This provides very little choice for diagnosing patients with metal implants and foreign bodies. The article focuses on ascendancy of dental material in head and neck magnetic resonance imaging.

Key words: MRI, Dental restorations, Artefacts

Introduction

Magnetic resonance imaging (MRI) is one of the most estimable diagnostic tools in imageology and diagnostic science. It is a non- invasive technique that produces highly specific and sensitive image data, helping in faster and easier analysis.

As the name suggests, MRI uses powerful magnetic field to create images of tissues and organs throughout the body⁶. Conventional radiographic examinations and CT scans, MRI uses radiofrequency pulses (that are essentially magnetic waves) to realign hydrogen atoms present in the body without causing any untoward changes in the body, while

the patient is in the scanner. As the hydrogen atoms return to their usual alignment, they emit different amounts of energy that are taken up by the detector system in MRI scanner and computer system uses these data to render the image.

But at times, metallic dental restorations like dental crowns and amalgam fillings can interfere with the magnetic field causing artefacts, resulting in undiagnostic images. Hence, MR imaging is not a good choice for patients with ferromagnetic materials due to the potential risk of displacement these objects^{1,2,3,4}.

Types	Magnetic field strength (T)	Features
Low field MRI scanners	0.23 T-0.3T	<ul style="list-style-type: none"> • Open MRI scanners • Decreased image quality • Require a longer scan time
High field MRI scanners	1.5 T -3.0 T	<ul style="list-style-type: none"> • Closed MRI scanners • 1.5 T MRI scanners provide great image quality • The 3.0 T MRI scanner is great for visualizing very fine details • Fast scan time
Ultra-high field MRI scanners	7.0 T – 10 T	<ul style="list-style-type: none"> • Not widely available • Typically used for researches

Types of MRI Scanners based on magnetic field strength⁷

The type of MRI scanners is differentiated by their magnetic field strength, Tesla, or by the construction or orientation. Usual scanners use 1.0-1.5 Tesla. More powerful scanners use 3.0 Tesla.

Indications of MRI in dentistry⁵

MR imaging is useful in

- evaluating soft tissue conditions such as the position and integrity of the disk in the TMJ
- evaluating soft tissue disease such as neoplasia of tongue, cheek, salivary glands and neck.
- Determining malignant involvement of lymph nodes.
- Determining perineural invasion by malignant neoplasia.
- Visualising oedematous changes in the fatty marrow as well as surrounding soft tissues in case of osteomyelitis.
- Useful in identifying the location of the mandibular nerve in case where it is not clearly seen on panoramic or CBCT images.

MR angiography is used to image arteries, including in the head and neck, to examine for occlusion, aneurysms, or arteriovenous malformations.

Ascendancy of dental materials in MR imaging

The artefacts caused by metallic objects are a predicament since the innovation in MRI scans. An artefact may be defined as a distortion of signal

intensity or void that does not have any anatomic basis in the plane being imaged⁹. It is so defined as the pixels do not faithfully represent the tissue components being studied⁸.

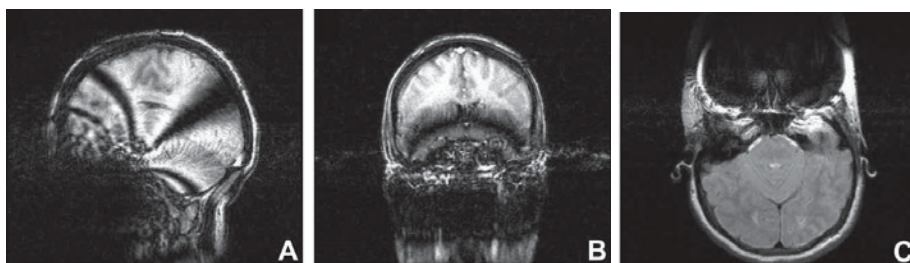
The strength of artefacts depends on several factors including magnetic field strength, pulse sequence, echo time, image resolution and the related gradient field strength, amount and shape of the dental material, imaging plane and the distance between the object of interest and the material¹⁰. Artefacts due to metals are well documented, and usually lead to areas of signal blackout, with rims of high signal strength around the offending objects¹¹.

Based on the magnetic susceptibility, dental materials are classified mainly as ferromagnetic, paramagnetic and diamagnetic^{6,8,9}.

Ferromagnetic materials are strongly attracted to a magnet. Their permeability is very high in the range of hundreds and thousands. Examples include chromium oxide, gadolinium, nickel, rare earth magnet, magnetite, yttrium cobalt, ferrite (iron) etc.

Paramagnetic materials are not very strongly attracted to the magnet. They are slightly magnetized when placed in a strong magnetic field and act in the direction of the magnetic field. Their relative permeability is slightly more than one. Examples of such materials are lithium, tantalum, aluminium, magnesium, tin, platinum, molybdenum etc.

Diamagnetic materials are repelled by a magnet. They are slightly magnetized when placed in a



Examples of orthodontic artifacts with signal loss: A. Sagittal T1-weighted MR image; B. Coronal T1-weighted MR image; C. Axial T1-weighted MR image⁶

strong magnetic field and act in the direction opposite to that of the magnetic field. Their permeability is slightly less than one. For example, wood, zinc, copper, bismuth, silver, gold, etc.

Ferromagnetic substances are strongly attracted by a magnetic field and thus have a high potential for causing MRI artefacts¹². Whereas, diamagnetic substances have a very weak and negative susceptibility to magnetic field and paramagnetic materials have positive susceptibility and augment the external field¹³, but both are far less likely to cause artefact¹⁴.

Amalgam, one of the most commonly used material, is composed of several metals, silver being the metal most commonly used in clinical practice. Based on the retrospective study by Magnetic Resonance Imaging Service of the University Hospital at the University of Campinas by Andre L. F. Costa et al., concluded that dental amalgam alloys do not cause significant artefacts in dental MRI⁶. On the other hand, gold crowns show significant image distortion¹².

The absence of artefact caused by amalgam could be explained by the presence of silver which is a non-ferromagnetic metal.

Another study by Eggers et al concluded that even small amounts of a ferromagnetic substance can cause an extensive blank in the image¹³. Although ferromagnetic objects lead to the most severe artefacts, dental implants are another major substance in artefact generation. Dental implants are made of non-ferromagnetic materials (titanium) but contains traces of ferromagnetic iron¹³ which causes a drop-out of signal near the metallic surface¹¹.

Factors that influence the risk of using MRI on a patient with implant or ferromagnetic material² includes:

1. The strength of the gradient and static magnetic fields
2. The geometry of the implant or material
3. The degree of ferromagnetism of the implant or material
4. The location and orientation of the implant or material in situ, and
5. The amount of time the implant or material has been in place.

Andre L. F. Costa et al. in their study showed that dental implants generated artefacts in all planes, but its score was smaller than orthodontic appliances⁶. Orthodontic appliances mainly compose of nickel

(8-12%), chromium (17-22%) and traces of other metals. Since nickel and chromium are ferromagnetic metals, significant amount of distortion can be expected on magnetic field.

Levels of artefacts produced by various dental materials⁷

No artefacts	Amalgam, Titanium, Cobalt- chromium crowns, Nickel chromium crowns, Light cured resin fillings, Acrylic resins, Gold fillings, Gold crowns, Galvano ceramics, all ceramic restorations, Carbon- fibre reinforced polymers, Magnesium, Zirconia, Aluminium crown, Micro filled resin
Minimal to moderate artefacts	Titanium, Vitallium, Zinc phosphate, Stainless steel crowns, Bur fragments, Metal ceramics, Pins for amalgam restoration, Ceramic brackets, Aluminium bronzes, Orthodontic bands
Significant artefact	Cobalt- chromium crowns, Nickel chromium crowns, Stainless steel crowns, Metallic dentures, Magnetic keepers, Orthodontic appliances, Orthopaedic metal plates, Gold, Endodontic post.

Conclusion

Significant amount of artefacts are produced by various dental materials such as stainless steel, crowns, endodontic metal post, metallic dentures, orthodontic appliances, gold etc. which are ferromagnetic in nature. Hence, it is necessary to take adequate measures to avoid such problems. Patients

with metallic orthodontic appliances are advised to get the appliance de-bonded before the scan. Dental personnel should have basic knowledge about the interactions between metallic dental restorations and MRI.

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Cone Beam Computed Tomography in Prosthodontics

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Introduction

To achieve optimal success in oral rehabilitation diagnostic treatment planning protocol has a critical role. Accurate evaluation and diagnosis becomes possible with diagnostic imaging. Several types of imaging are available, ranging from conventional intraoral periapical radiographs to cross-sectional imaging, which involves multi-detector computed tomography (MDCT) and cone beam computed tomography (CBCT).¹

In CBCT, imaging is accomplished by using a rotating gantry to which an x-ray source and detector are fixed. A divergent pyramidal- or cone-shaped source of ionizing radiation is directed through the middle of the area of interest onto an x-ray detector on the opposite side. The x-ray source and detector rotate around a rotation fulcrum fixed within the center of the region of interest. During the rotation, multiple (from 150 to more than 600) sequential planar projection images of the field of view (FOV) are acquired in a complete, or sometimes partial arc. This procedure varies from a traditional medical CT, which uses a fan-shaped x-ray beam in a helical progression to acquire individual image slices of the FOV and then stacks the slices to obtain a 3D representation. Each slice requires a separate scan and separate 2D reconstruction. Because CBCT exposure incorporates the entire FOV, only one rotational sequence of the gantry is necessary to acquire enough data for image reconstruction. In MDCT, a two-dimensional array of detector elements replaces the linear array of detector elements used in typical conventional and helical CT scanners.²

Indications in prosthodontics

- Implant prosthodontics
- Temporomandibular joint (TMJ) imaging
- Analysis of oropharyngeal structures
- Comprehensive treatment planning in over denture patients

• Maxillofacial prosthodontics

IMPLANT SITE ASSESSMENT: In presurgical imaging Conventional linear tomography and CT are traditionally used.³ The use of CBCT image-based planning for oral implant treatment is now widespread as they overcome the disadvantages of CT namely ghosting artifacts, high exposure and high cost. Using CBCT the surgeon can evaluate the surgical site preoperatively. It also enhances the surgeons' knowledge of specific anatomic situation in that region. Thus CBCT can be an invaluable tool during preoperative planning for complicated endosseous dental implantation procedures.⁴

In most instances, a radiographic stent is made using standard impression models. This stent is worn at the time of CBCT exposure to provide a precise fiduciary reference. The CBCT data set is then sent to the outside laboratory and an implant placement stent is provided for use at surgery. This facilitates the precise placement of implants and speeds completion of the case. This procedure is enabling dentists to carry out implant procedures that were previously beyond their scope of practice.⁵

The use of the third dimension has improved the clinical success of implants and their associated prostheses, and led to more accurate and aesthetic outcomes. The images produced provide more

precise evaluation of the alveolus.⁶

Analysis of oropharyngeal structures:

Airway analysis conventionally has been carried out by using lateral cephalograms. A recent study comparing lateral cephalograms to CBCT imaging found that there was moderate variation in the measurements of upper airway area and volume.⁷ The upper airway space is easy to identify from adjacent highly attenuating structures on CBCT images because it has a very low gray scale pixel intensity value.⁸

Three-dimensional airway analysis will be useful for the understanding of more complex conditions such as obstructive sleep apnea (OSA) and enlarged adenoids. CBCT has demonstrated significant differences in airway volume and the anteroposterior dimension of the oropharyngeal airway between OSA patients and gender-matched controls.⁹ It has been described as a marker of risk for obstruction of the airway.¹⁰

CBCT has emerged as a potential alternative to MRI and CT scanning for obtaining complete, fast, and detailed upper airway images at relatively modest cost

TMJ visualization:

The TMJ is difficult to image with conventional techniques because of superimposition of the adjacent dense temporal bone. In particular, panoramic imaging and conventional tomography may yield disappointing results. Cone-beam imaging offers radiation dose- and cost-effective alternative to helical CT for the diagnostic evaluation of osseous abnormalities of the TMJ.

Although CBCT does not permit a dynamic visualization of the joint like arthrography, it is less invasive and involves no pain or discomfort. The presence of a sign and/or symptom for more than six months should be one of the selection criteria for requesting such a modality, and in all cases, both joints should be imaged for comparison.¹¹

CBCT images provide high diagnostic quality

with lower patient radiation exposure as compared to conventional CT techniques. Therefore, CBCT should be considered as the imaging technique of choice when investigating bony changes of the TMJ.¹²

In suspicion of disk related TMJ disorder, an adjunct MRI may be a better choice to achieve a definitive diagnosis.¹¹

Maxillofacial prosthodontics

Three-dimensional augmented virtual models of the patient's face, bony structures, and dentition can be created out of CBCT DICOM (digital compatibility) data by software volume rendering for treatment planning. The shape of the graft can be virtually planned and can also be positioned in the defect creating a virtual reconstruction of the defect prior to the actual surgery. In addition, implant placement (if required) onto the graft can also be planned.¹³ Obturators for cleft closures can be precisely milled in larger CAD/CAM units, thereby eliminating the entire cumbersome clinical process of obturator construction.

Comprehensive treatment planning in Overdenture Patients

When teeth are extracted, the residual alveolar bone will be in a continual state of resorption, which will leave very little support for complete dentures, thus making them difficult to wear. However, the rate of resorption in the mandible was 4 times than that of the maxilla, as described by Tallagren,¹⁴ who found that after 25 years of denture wear, the average bone loss in the mandible was 9–10 mm of vertical height compared to 2.5–3 mm on the maxilla. This process of initial assessment to a follow-up during a 4 years review would be precise with the use of a CBCT, thereby improving the prognosis of such dentures.

CBCT versus MDCT:

- Visual resolving power varies upto 2 line pairs/mm, four times that of CT.¹⁵
- Reduced radiation dose since CBCT operates

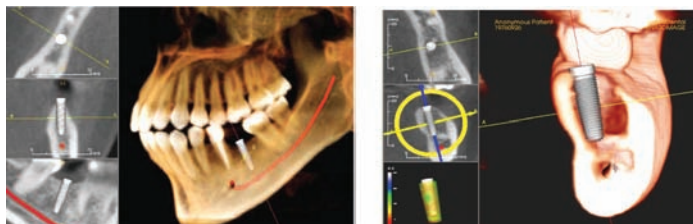


Fig 1 Implant site assessment using 3D reconstruction in CBCT

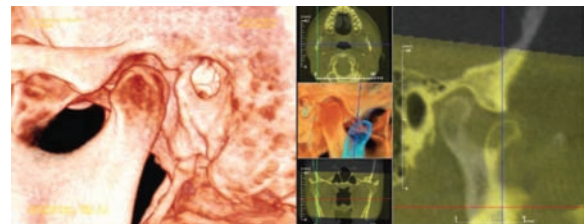


Fig 2 TMJ visualization using CBCT

on 60-120 Kvp and 8-15 mA and exposure time ranges from 5-25 secs depending on field of view (FOV) and manufacturer.

- Cost of the CBCT equipment is approximately 3-5 times economical than traditional MDCT. The lower cost of the machine may be passed on to the patient in the form of lower fees.
- CBCT equipment is substantially lighter and smaller; hence require minimal area for work station.
- Cone-beam CTs have better spatial resolution.
- No special electrical requirements needed.
- No floor strengthening required.
- Comparatively easy to operate and to maintain.
- Both jaws can be imaged at the same time, depending on availability of FOV in different CBCT machine)
- CT slice thickness is usually 1-2 mm, while a CBCT gives 0.1mm slice thickness.¹⁶
- Plain-film tomography results in magnification, the degree of which differs from manufacturer to manufacturer.
- Plain-film tomography provides direct (as opposed to reconstructed) cross-sectional, sagittal and coronal views.
- The disadvantage of plain-film tomography is that it requires much more chair time than CT. It can thus be especially difficult to do on patients who are unable to sit or hold still for a period of time. CBCT, on the other hand, can be performed within a 10-40 second range, depending on the region being imaged and on the desired quality of the image.
- Cone-beam CT also provides stronger indication of bone quality.

Limitation of CBCT compared to regular MDCT

Lower contrast resolution which means less discrimination between different tissue types (i.e. bone, teeth and soft tissue). Modern MDCT scanners have a contrast resolution of 1 HU, which is 10 times better than that afforded by CBCT scanners. This remains the most significant barrier in widespread clinical use of CBCT.

Conclusion

Cone-beam CT is advancement in CT imaging that has begun to emerge as a potentially low-dose cross-sectional technique for visualizing bony structures in the head and neck. Currently, several commercial systems for CBCT dedicated to den-

tomaxillofacial imaging are available for dental diagnosis and treatment planning.

The compact size and relatively low radiation dosage of the CBCT scanner makes it ideally suited for imaging the craniofacial region, including dental structures. With the increasing accessibility of CBCT imaging, this modality is emerging as the imaging “standard of care” for the number of diagnostic assessments of bony components of the face.

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Maxillary obturator prosthesis for rehabilitation after maxillectomy: A clinical case series

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Abstract

Maxillary defects are created by surgical treatment of benign or malignant neoplasms, congenital malformation and by trauma. Normal functions such as speaking and swallowing become difficult owing to absence of palatal roof. Because of these adverse effects, immediate and continual rehabilitation of patient with maxillary defect with obturator is essential. In this case series, two different techniques of fabrication of an obturator prosthesis used for the rehabilitation of a hemimaxillectomy patients have been discussed.

Keywords: Maxillary defect, Aramany class III, Aramany class IV, Obturator prosthesis

Introduction

Treatment modalities of a malignant tumor in the maxilla are varied according to many factors such as; size, type, severity, etiology and location of the tumor. The most frequent treatment is surgical removal of the affected area which results in a large defect with oro-nasal/antral communication. Acquired palatal defects resulting from hemimaxillectomy may cause major difficulties with speech, swallowing and mastication. In turn, these functional problems may affect the quality of life. Change in appearance resulting from the loss of tissue and underlying structures may also lead to emotional stress and depression.¹

When there are large resections of the maxilla, the defect may be obturated with a dental or maxillofacial prosthesis. Reconstruction of the maxillectomy with an obturator has several advantages.² Besides replacing the missing soft and hard tissues, it enables the patient to swallow, masticate, and speak approximately in the normal way, and forms a barrier between nasal and oral cavities. Other advantages include that the obturator can be removed from the patient's mouth permitting for a clear vision and early detection of any recurrent tumor; and a better facial appearance can be achieved with the presence of the obturator where it can provide

support for the tissues of the face. This case series describes two cases of maxillectomy rehabilitated maxillary open bulb obturator prosthesis made with autopolymerising and heat polymerizing resin.

Case report 1

A 45-year-old male patient reported with the chief complaint of loose fitting obturator due to broken clasp.

Intraoral examination revealed a large palatal defect in the left maxillary segment with oroantral communication (Fig-1). Speech was altered without the obturator. Teeth were present in the quadrant on the unaffected side of the maxillary arch except for central incisor and second molar. Examination of the prosthesis revealed that there was a broken clasp on the left side because of which the prosthesis was less retentive, causing dislodgement during functional movements.

As per design principles described by Aramany in 1978 for a maxillectomy defect, a linear design for a class-IV defect was selected for this case, in which remaining palatal tissues provided the support and retention was achieved from the direct retainers on remaining intact dentition. Due to the presence of a large defect, an open bulb obturator was planned for rehabilitation.

Procedure

1. Appropriate size of stock tray was selected for making the impression (Fig-2).

2. The stock tray was checked for extensions. Under extensions were corrected by adding autopolymerising acrylic resin. The over extensions were removed with an acrylic trimming bur.

3. Putty elastomer was loaded in the stock tray and impression was made, the extent of the defect was recorded so that soft tissue undercut was recorded to maximize the retention and obtain a

proper peripheral seal. A wash impression was made with light body elastomer. The impression was poured with type III gypsum (Fig-3 & Fig-4)

4. Lower impression in a stock tray with irreversible hydrocolloid alginate material was made and poured in type III gypsum.

5. Wrought wire clasps were placed in relation to right lateral incisor, right first molar and right third molar Maxillary denture base was fabricated with autopolymerising acrylic resin after blocking major undercuts. Curing was done in a pressure



Fig 1 Class IV Maxillary defect



Fig 2 Modified stock tray



Fig 3 Putty wash impression (of the defect)



Fig 4 Master cast



Fig 5 Acrylic open bulb obturator



Fig 6 Oral surface of bulb closed



Fig 7 Tray in done



Fig 8 Putty index made and dewasing done



Fig 9 Finished Prosthesis



Fig 10 Prosthesis in situ (or) patient wearing obturator



Fig 11 Class III maxillary defect

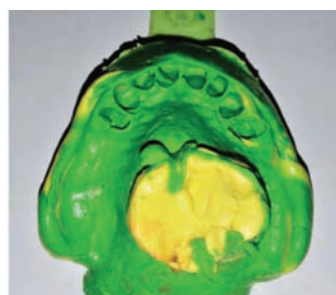


Fig 12 Pply wash impression



Fig 13 Open bulb obturator

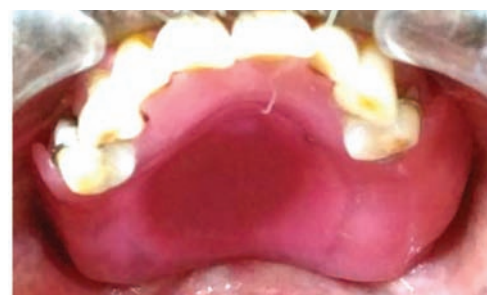


Fig 14 Obturator in situ

pot to reduce the residual monomer content. The bulb portion of the obturator was kept open (Fig-5).

6. The denture base was tried in mouth to ensure complete seating without any interferences. Once complete seating was ensured, the lid portion of the open bulb obturator was fabricated with autopolymerising resin. In dough stage autopolymerising resin was rolled into a sheet, placed over the obturator on to form the lid of open bulb portion of the obturator. The edges were smoothly adapted to the denture base (Fig-6).

7. Occlusal rim was made on the denture base and jaw relation recorded. And the upper and lower casts were articulated in a semi adjustable articulator.

8. Natural opposing teeth guided the placement of artificial teeth and the direct retainers placed on teeth on contralateral side provide sufficient retention for the prosthesis.

9. A trial insertion was done to check occlusion, aesthetics and speech (Fig-7).

10. After it was found to be acceptable to the patient, the waxed up trial denture was removed and a plaster index of the tooth portion was made

11. The wax portion of the denture base was then eliminated by immersing in hot water and the space was filled with autopolymerising resin (Fig-8).

12. After it was removed from the plaster index, the obturator was finished and polished (Fig-9).

13. Final obturator was inserted in the patient's mouth (Fig-10).

Case report 2:

A 57 year old male patient with the chief complaint of difficulty in speech and deglutition. Intra-oral examination revealed Armany's class III maxillary defect with oronasal communication (Fig-11). The treatment plan decided was rehabilitation with open bulb obturator.

Procedure:

Impression was made with putty and light body of rubber base impression material (Fig-12). Cast was poured in type III gypsum.

Two layers of modelling wax sheet was adapted to the cast excluding the bottom of the defect in the cast. Wrought wire clasps were placed in relation to right and left first premolars for retention.

The waxed up cast was then invested and dewaxed. Heat cure acrylic was packed into the flask and cured

After curing obturator was deflasked, trimmed and polished.

The obturator was then tried in the mouth to ensure complete seating without interferences.

The lid portion of the hollow bulb obturator was then fabricated separately in autopolymerising acrylic resin as mentioned in the previous case. Finally, the open bulb obturator was finished, polished and inserted in the mouth (Fig-13 & Fig-14).

Follow up:

Patient examination was performed after specific time intervals. Both patients reported satisfactory aesthetics and improved functioning of the prostheses without any discomfort

Discussion

Maxillectomy- total/partial results in a surgical and prosthetic reconstructive challenge. The goals of prosthetic treatment include separation of oral and nasal cavities, which allows for adequate speech and deglutition, along with restoration of esthetics. Lack of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy. Factors affecting the prosthetic prognosis for these patients are the size of defect, number of remaining teeth, amount of remaining bony structure, quality of existing mucosa, radiation therapy, and the patient's ability to adapt to the prosthesis.

Obturator prostheses are commonly used in the rehabilitation of total or sub-total maxillectomy patients. Several authors^{3,4} agree that the installation of an obturating prosthesis improves the speech intelligibility and decreases hypernasality, which was confirmed immediately after prosthesis installation in the cases described. The weight of the obturator has a major role in retention and stability. Creating a lighter obturator portion improves the cantilever mechanics of suspension, avoids the overloading of remaining supportive structures, and enhances retention

Conclusion

Obturator is a reliable treatment option to restore maxillectomy defects and improving quality of the patient's life over a very long follow-up period

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A case report on denture stomatitis – Treatment and prevention

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Abstract

In the modern era, despite of advancements in the field of medicine, opportunistic infections are on an increase day by day. *Candida albicans* is the most common yeast that entraps in between the dentures of the geriatric patients and this causes denture stomatitis. This article describes a case of a 53 year old female patient who was diagnosed with denture stomatitis and its effective management. It also highlights the various treatment options and preventive measures that are required to prevent the growth of these opportunistic organisms.

Introduction

Denture stomatitis is one of the most intriguing conditions of the oral mucosa associated with complete dentures. The term stomatitis is derived from the Greek word stoma meaning “mouth” and the suffix-itis meaning “inflammation”. It may be described as a chronic inflammation, with erythema of the oral mucosal tissues supporting a removable prosthesis, and is not caused by an allergic reactions to the denture constituents.¹ The condition is usually asymptomatic, but can give rise to bleeding of the affected areas of the mucosa, burning sensation, halitosis, altered taste and xerostomia.^{2,3}

Various terms associated with denture stomatitis include denture sore mouth, denture related stomatitis, chronic atrophic candidiasis, candida associated denture induced stomatitis and denture associated erythematous stomatitis.

Denture stomatitis is mainly caused by *Candida Albicans* and it has been identified in almost all the patients. This condition affects both partial and complete denture wearers. It is commonly seen on the palatal mucosa beneath a maxillary complete denture area. This is because the fungal infection is aggravated by adhesion of C.

Albicans to the tissue fitting surface of maxillary denture.⁴ It rarely affects the mandibular arch, probably due to the washing effect of saliva and the cleansing action of the tongue.

Trauma has been shown to have a role in production of basement membrane alterations involving expression of type IV collagen and laminin (alpha 1,) thus indicating a possible relationship between these elements and denture stomatitis.⁵

Causative factors for denture stomatitis as mentioned in literature are:

1. Ill fitting denture can traumatize the underlying mucosa of the denture. Normal functions like chewing or speaking can aggravate this condition.
2. Inadequate cleansing of the denture can cause accumulation of material such as food and epithelial cells under the denture which provide a favorable medium for the growth of bacteria/fungi.
3. Heat accumulation is theoretically possible under a denture material having low thermal conductivity. The influence of this factor is not yet clear but Hentze et al considers heat accumulation as a distinct etiological factor.

4. It is one of the symptoms of systemic disease like anemia, diabetes mellitus and nephritis, where resistance to trauma or infection is lowered.
5. Stress induced muscle activity
6. Delayed hypersensitivity reaction of the oral mucosa.

Predisposing factors include:

1. Systemic factors –
 - ♦ Physiological (advanced age)
 - ♦ Endocrine dysfunction
 - ♦ Nutritional deficiencies
 - ♦ Broad spectrum antibiotics
 - ♦ Neoplasias
 - ♦ Immunosuppression

2. Local factors
 - ♦ Wearing dentures (especially through the night)
 - ♦ Poor oral hygiene
 - ♦ Hyposalivation
 - ♦ Tobacco and alcohol consumption
 - ♦ Carbohydrate rich diet
 - ♦ Antimicrobials and topical or inhaled corticosteroids

Case report

A 53 year old female patient reported to the Department of Prosthodontics, Pushpagiri College of dental sciences with the chief complaint of broken upper complete denture since 3 months. On taking history, patient revealed that instead of consulting a



Fig A shows intaglio surface of fractured maxillary denture.



Fig B, shows the appearance of polished surface from the frontal view

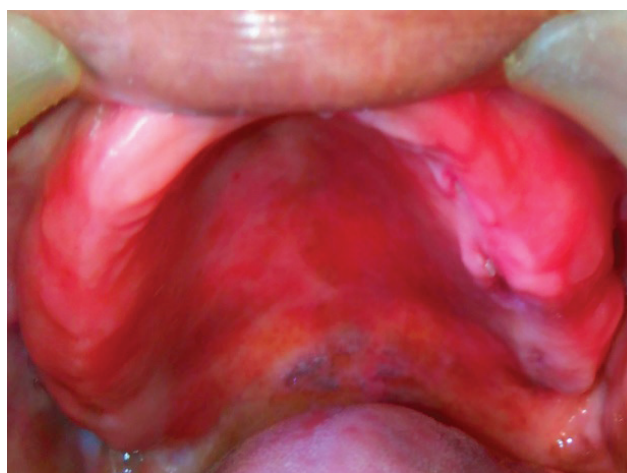
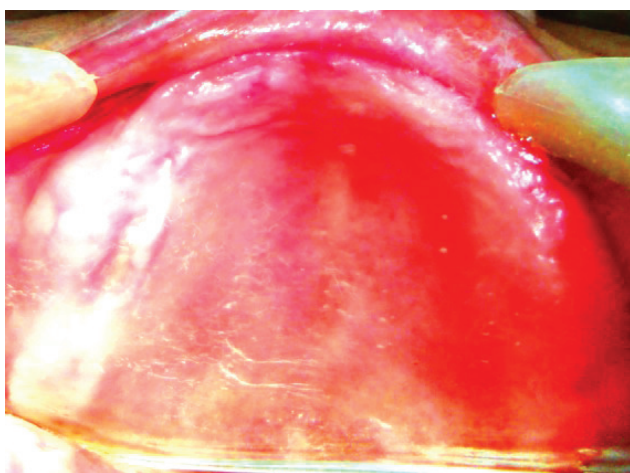


Fig C & D: shows intraoral view of maxillary arch denture stomatitis

dentist she herself had tried to fix the fractured part of denture with an adhesive and was wearing it for the purpose of esthetic. She presented with a mild burning sensation from the past 10 days. Patient lost her teeth due to caries and has been edentulous for the past 10 years. Personal history revealed that patient wore the denture overnight and cleansed her denture once daily.

On intraoral examination mild diffuse erythematous appearance and small eruptions were seen on the palatal area where the denture was fractured and it was due to the trauma caused by the roughness of the improperly replaced fractured denture area. There was no tenderness on palpation. It was identified as type III (Newtons classification).

Patient was advised to discontinue the fractured denture for two weeks. Topical application of candid gum paint was prescribed to use three times a day. Also rinsing the mouth with Chlorohexidine mouthwash three times a day was also advised. After two weeks patient was recalled for review. Impression procedures for complete denture was started and later patient was given a new maxillary complete denture and mandibular removable partial denture.

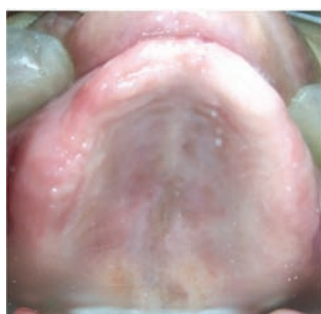


Fig.E: shows maxillary arch after two weeks.



Fig.F: shows partially edentulous mandibular arch



Fig. G & H: shows before and after prosthetic rehabilitation.

Discussion

Denture stomatitis can be a recurrent problem amongst denture wearers. In the initial stage patient is asymptomatic. The main etiological factor for denture stomatitis is wearing the denture overnight which is accompanied by the quality of the denture such as traumatic dentures, ill -fitting dentures, or dentures which are not cleaned on regular basis. The present case supports the fact that traumatic dentures can cause denture stomatitis and unclean denture can lead the yeast to colonize under the denture

In 1962, Newton has classified the denture stomatitis into three types.⁶

Type I: - Pin point hyperemia or localized simple inflammation.

Type II: - Diffuse erythema confined to mucosa in contact with denture base.

Type III: - Granular surface or inflammatory papillary hyperplasia of palate.

According to this classification, this case comes under type III denture stomatitis.

The treatment of denture stomatitis includes the following steps.

1. Patient should be advised to remove their denture at night.
2. Good oral hygiene should be maintained and mouth should be kept as clean as possible and a thorough rinse after meals should be done routinely. Mouth wash like Chlorohexidine helps to reduce plaque in oral cavity.
3. Denture fitting surfaces and occlusal balance should be checked to avoid trauma. A new denture should be made, if necessary. Tissue conditioning agents are not recommended because as they are porous materials it is easier to colonize than acrylic.



Fig. I shows intraoral view with new maxillary denture and mandibular removable denture

4. Topical applicants like Nystatin or Amphotericin B can be used to treat acute conditions.
5. Microorganism colonies can be reduced by overnight soaking of denture in Chlorohexidine gluconate. Sodium hypochlorite should not be used to avoid bleaching.⁷
6. Treatment of underlying systemic disease like diabetes mellitus, anemia etc.

First choice of treatment for most of the condition is stop wearing the denture and topical application of Nystatin. If the lesion doesn't resolve with oral hygiene instructions, systemic anti-fungal drugs can be given for a treatment period of 7 days⁸

- ♦ Miconazole 24mg/ml gel – Applied to the fitting surface of the denture four times daily
- ♦ Fluconazole 50mg capsules – Once daily
- ♦ Nystatin 100,000 units/ml oral suspension – 1ml taken and rinsed four times daily after food for five minutes, and then swallowed.

In this present case, tissues showed positive response to initial treatment modality itself.

Newer treatment modalities include the use of gaseous ozone (o3). This has been proven clinically as means for disinfection of the dentures.⁹ Use of polymerized coatings on the denture surface to reduce the adherence of *Candida albicans* by incorporating *Candida*-specific antibodies within the denture material, and the use of antifungal agents within the denture material are also advocated. Silver nanoparticles have been incorporated into denture resin to attain an antibacterial affect that help to control common oral infection in complete denture wearers.¹⁰

The prognosis of denture stomatitis is good, as malignant transformation has not been reported yet. The continuous aspiration and swallowing of candida species may rarely have potentially fatal consequences in immunocompromised patients.⁸

Prevention

Geriatric patients who are wearing removable prosthesis should be educated about the denture hygiene measures and prevention of denture stomatitis. A preventive programme should be included in oral health care programmes which include recall visits for inspection of oral cavity for this disorder.

Patient should be instructed to maintain proper denture and oral hygiene.

Conclusion

Denture stomatitis is a condition that commonly affects denture wearers and should be treated even if asymptomatic. The condition requires a combined treatment approach from both the patient and clinician, and the role of the patient is of prime importance. Irrespective of the treatment modalities employed, the main aim of treatment is to eradicate the *Candida albicans* from the patient's dentures. Regular check up is important in order to ensure long-term success in the prognosis of denture stomatitis.

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IDA Attingal Branch Reports & Activities

CDE

1) CDE programme on Restoration of Badly Mutilated Teeth and Post and Core preparation was conducted at Hotel Karthika Park, Kazhakootam, 22nd of April 2018, Dr Santhosh Raveendran was the faculty. He mainly pointed out the importance of case selection and the selection of materials used for restoration, the common errors in restoring Mutilated Teeth was pointed out the importance of post placement, different types of posts and core built up materials were also highlighted. The programme was well attended and appreciated by the participants

2) A state CDE programme was conducted in association with IDA Trivandrum Branch at Hotel Classic Avenue. On May 6th 2018 Topic : Dr Civy Pulayath and Dr Mili James delivered an interactive lecture on "Successful Dental Practice" They emphasized on the importance of sterilization, patient education and front office management in clinics. The importance of maintaining patient record, The art and science of communication, follow up appointment, and the importance of team work in dental clinics, tips for taking the practice to next level were discussed with the participants. The members found it interesting and had the opportunity to share their views.

3) A training programme was conducted for dental assistants at Al Saj Convention Centre on 17th June 2018. Dental assistants from different clinics and colleges all over Kerala attended the programme. Dr Joji Thomas (Maxillofacial Surgeon of Cosmopolitan Hospital, Trivandrum) delivered a detailed lecture on the importance of sterilization he also described the handling cleaning and sterilization of the instruments and described the recommended infection control practices in dentistry. Department wise sterilization practices handling of biopsy specimens and disposal of waste materials were described to the dental auxiliaries who attended. Dr Civy Pulayath National trainer JCI India gave the tips and tricks of assisting, the art of front office management and the importance of team work in dental office. Etc Dr Abhilash GS President elect IDA Kerala state, Dr Sudeep S, Dr Dinesh, Dr Arun S and Dr Hari Krishnan demonstrated different manipulative techniques of materials used in the clinics and laboratory. The programme was well attended a certificate of participation with participants photograph was issued.



CDE programme by Dr Santhosh Raveendran on 'Restoration of badly mutilated teeth and post and core preparation'

4) We conducted a training programme for dental assistants at Al Saj Convention Centre on 17th June. 160 dental assistants from different clinics and colleges attended the programme.

Sterilization part was handled by Dr Joji Thomas (Maxillofacial surgeon of Cosmopolitan Hospital, Trivandrum). Dr Civy Pulayath gave a clear picture of the importance of dental assistants in a dental clinic. He gave them so many tips regarding telephonic conversation, patient education, personality development etc Dr Sudeep, Dr Dinesh, Dr Abhilash, Dr Arun S and Dr Hari Krishnan demonstrated different mixing technics. All doubts of participants are cleared by faculties.

Certificate of attendance with their photograph was distributed to all participants. The programme was well appreciated by those who attended.

Report CDH

World Health Day was observed On 7th April at Kerala state Ex Service League, Pallickal. 50 ex service men with there families attended the programme. Oral Screening was done and Dental Awareness Class was conducted importance of maintenance of oral hygiene illefacts of tobacco and alcohol was explained by Dr Siji and Dr Roshith.

International Day for Families was observed on 15th May at Anganvadi, Madavoor.

A painting competition was conducted for the children. Colouring kits, Toothpastes and brush were distributed among the children. Dr Arun S Dr Roshith demonstrated the brushing techniques to the children and teachers who attended the programme.

World No Tobacco Day was observed On 31st May . A car rally and a bike rally were conducted from Kazhakutom to Attingal. 15 Enfield bikes and 12 cars driven by Dental surgeons joined the rally the vehicles displayed the posters and banners describing the harmful effect of tobacco. Pamphlets were distributed among the public.

IDA KSB President Elect Dr Abhilash GS gave awareness talk to public at selected centers in the stretch.

World Environment Day was observed on 5th June at Anganvadi, Pallickal. Saplings and seeds of various plants distributed among the pupils. Colouring kits, study materials, tooth pastes and brushes distributed.



CDE on Successful Dental Practice by Dr Mili James



Training programme for dental assistants. Dr Joji Thomas describing the Sterilization protocols.



Dr Civy Pulayath training the Dental assistance for successful assisting



Dr Abhilash G.S. demonstrating the mixing technics to Dental Assistants.



CDH convenor Dr. Roshit conducting the Oral screening programme on World Health Day at Kerala State Ex Service League, Pallickal.



Car and Bike rally by members of IDA Attingal conducted on 'World No Tobacco Day'.



15/05/2018 - International Day of Families at Anganvadi, Madavoor.



One day tour programme to Ponmudi by WDC, IDA Attingal