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Editorial

The Editor of the " UPDATES IN DENTISTRY" had the audacity to publish my views from dentistry. As I write this column, we are living under the shadow of the corona-virus pandemic. The morbidity and mortality statistics are truly frightening at this point and are supposed to get much worse. Amidst this pandemic, this journal continues its normal publication schedule, thanks to the production team they are doing right now in the face of this global crisis.

With the concern of infection control in health care settings, personal protective equipments (PPE) have been given to many individuals. American Dental Association advised all the dental practices to cease non-emergent in-person care to reduce the infection rate and started to rebuild stockpiles of PPE for health care providers.

Many people today enjoy excellent oral health and are keeping their natural teeth throughout their lives. But for some, caries are still the most prevalent chronic disease of childhood. Too many people mistakenly believe that they need to see a dentist only if they are in pain or something is wrong.

Dentistry promotes continuity of care that is comprehensive, convenient, cost effective and efficient. Their responsibilities include diagnosing of oral diseases and promoting oral health and its prevention. Even the routine procedures such as tooth extractions, preparing and placing fillings, carry potential risks of complications such as infection, temporary or even permanent nerve damage, prolonged bleeding, pain etc. Dentists can spot early warning signs in t he mouth that may indicate disease elsewhere in the body. Regular dental visits and care will help maintain and improve optimal health throughout their lifetimes.

With people around the world wondering what the future will hold after this pandemic, I remain confident that our profession will not only survive but thrive. My confidence is even deeper, with a passion for symmetry, perfection and beauty to unlock each patient's epitome of a perfect smile.

Going forward with the most rewarding thing, the patient's happiness and satisfaction and the stability of the results.

Dr. Sandeep Kumar
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A Case Report

PERIPHERAL OSSIFYING FIBROMA OF THE GINGIVA: A CASE REPORT AND CLINICAL INSIGHTS

Dr. Rohit, Dr. Rajni Aggarwal, Dr. Archana Bhatia, Dr. Harsha

ABSTRACT

Peripheral ossifying fibroma (POF) is a benign, reactive gingival lesion commonly seen in young adults, often presenting as a slow-growing, firm mass on the gingiva. This case report details the clinical presentation, diagnostic process, and management of a 34-year-old male patient who presented with a 1.5 cm asymptomatic, firm mass in the premolar region of the second quadrant. A provisional diagnosis of peripheral granuloma was made based on clinical findings. The lesion was surgically excised with electro cautery assistance, and histopathological examination confirmed the diagnosis of POF. Post-operative follow-up showed no signs of recurrence, and the surgical site healed well with satisfactory aesthetic results. This case underscores the importance of considering POF in the differential diagnosis of gingival masses, highlights the necessity of thorough surgical excision to prevent recurrence, and emphasizes the role of regular follow-up in ensuring favorable outcomes.

Keywords: Peripheral ossifying fibroma, gingival lesion, fibro-osseous lesion, excisional biopsy, electro cautery,

INTRODUCTION

Peripheral ossifying fibroma (POF) is a benign, reactive gingival lesion, categorized under fibro-osseous lesions. It is marked by the presence of fibrous tissue, mineralized material, and varying levels of cellular proliferation. Typically presenting as a slow-growing, firm, and well-demarcated mass, POF can develop in both the maxilla and mandible, with a higher occurrence in the anterior maxilla. It is most often observed in young adults, with a higher prevalence in females. Peripheral ossifying fibroma (POF), one of the more frequent gingival lesions, has a recurrence rate of up to 20%. To reduce the likelihood of its return, complete excision of the lesion is essential. However, full removal of a POF in the anterior maxilla can lead to an aesthetically undesirable gingival defect.[1]

The exact etiology of POF remains unclear, though local irritants such as plaque, calculus, ill-fitting dental appliances, and trauma are believed to play a role. These irritants may stimulate the periosteum or periodontal ligament, triggering fibroblast proliferation and subsequent ossification or calcification within the lesion.[2]

Clinically, POF is usually asymptomatic but can cause discomfort, aesthetic concerns, or interfere with oral function depending on its size and location. Radiographically, POF may show varying degrees of radiopacity due to calcified material. A definitive diagnosis is established through histopathological examination, which reveals fibroblastic proliferation with areas of ossification and calcification.

The management of POF involves surgical excision, with careful removal of the lesion to prevent recurrence. Follow-up is crucial, as POF has a recurrence rate ranging from 8% to 20%. This case report presents a unique instance of POF in a 34-year-old male patient, detailing the clinical presentation, diagnostic process, treatment, and follow-up, while providing comprehensive clinical insights into this condition.

CASE REPORT

A 34-year-old male presented to the Department of Periodontology with a growth in the premolar region of the second quadrant. The lesion was asymptomatic, firm, non-tender, and smooth-surfaced. The patient reported the gradual growth of the lesion over several months.

Clinical examination revealed a well-defined, firm, non-tender mass measuring approximately 1.5 cm in diameter. (Fig.1) There was no evidence of tooth mobility, and the surrounding gingiva appeared healthy. Based on the clinical findings, a provisional diagnosis of peripheral granuloma was made.

TREATMENT

An excisional biopsy of the lesion was performed under local anesthesia, with electro cautery assistance to minimize bleeding and ensure complete removal.(Fig.2) The excised tissue was sent for histopathological examination.(Fig.3)

HISTOPATHOLOGICAL EXAMINATION

The histopathological examination of the excised specimen revealed a fibrous connective tissue stroma with areas of calcification and ossification. The stroma contained proliferating fibroblasts and collagen fibers interspersed with mineralized material. These findings were consistent with a diagnosis of peripheral ossifying fibroma.

The patient was monitored regularly post-operatively, with no evidence of recurrence. The surgical site healed well, and the patient reported no discomfort or functional issues, with a satisfactory aesthetic outcome.(Fig.5)

Fig 1 Initial presentation of Gingival growth

Fig 2 Excisional Biopsy procedure

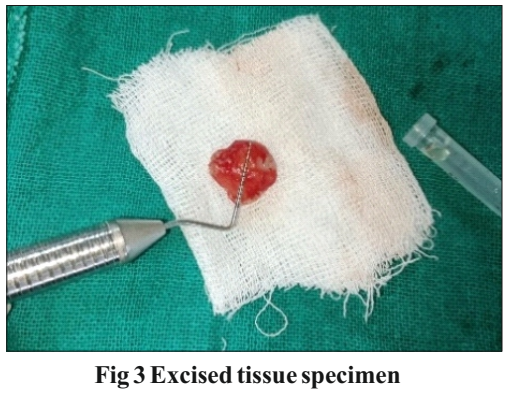

Fig 3 Excised tissue specimen

Fig 4 post surgical view of site

Fig 5 Healed site after 1 month follow up

DISCUSSION

Peripheral ossifying fibroma (POF) accounts for approximately 3.1% of all oral lesions biopsied, predominantly affecting young adults with a female predilection. The pathogenesis of POF remains unclear, though it is associated with chronic irritation or trauma that stimulates the periosteum or periodontal ligament, leading to reactive fibroblastic proliferation and subsequent ossification. Peripheral ossifying fibroma (POF) and pyogenic granuloma (PG) are classified as "focal reactive overgrowths," though they exhibit distinct histomorphological characteristics. The pathogenesis of POF is still debated, but it has been suggested that in certain cases, POF may begin as a PG that later progresses through fibrous maturation and calcification.[3]

The clinical presentation of POF in this case aligns with findings in the literature, where the lesion typically presents as a firm, painless mass on the gingiva. Although POF is most commonly found in the anterior maxilla, it can also present in other areas, as observed in this patient. Histopathologically, POF is defined by

the submucosal proliferation of clusters of primitive oval and bipolar mesenchymal cells, accompanied by scattered deposits of bone, cementum-like material, or regions of dystrophic calcification.[4]

The pathophysiology of POF involves a complex interplay between local irritants and the host's reparative response. Chronic irritation from factors such as plaque, calculus, or trauma can stimulate periosteal or periodontal ligament cells, leading to fibroblast proliferation. These fibroblasts produce collagen and extracellular matrix, and under the influence of growth factors and cytokines, they can differentiate into osteoblasts, resulting in mineralized material formation within the lesion.[5]

The primary treatment for POF is surgical excision, ensuring complete removal of the lesion with a small margin of surrounding healthy tissue to minimize recurrence risk. In this case, successful surgical excision was achieved with no recurrence observed at the 12-month follow-up. This outcome aligns with literature emphasizing thorough surgical removal to prevent recurrence, which occurs in 8% to 20% of cases.

Long-term prognosis for POF patients is generally favorable with complete excision. Regular follow-up is essential, particularly in the first year post-surgery, to monitor for recurrence. Good oral hygiene practices and avoiding local irritants are also crucial in reducing recurrence risk.

This case underscores the importance of considering POF in the differential diagnosis of gingival masses, especially in young adults. Detailed clinical and histopathological evaluation is essential for accurate diagnosis and appropriate management. Additionally, this case highlights the importance of patient education on maintaining good oral hygiene and avoiding trauma to gingival tissues to prevent reactive lesions. The comprehensive management approach in this case serves as a model for similar presentations, reinforcing best practices in POF diagnosis and treatment.

CONCLUSION

Peripheral ossifying fibroma (POF) is a benign but significant reactive lesion of the gingiva that requires careful clinical attention due to its potential for recurrence. This case report details the clinical presentation, diagnosis, and management of POF in a young male patient, emphasizing the importance of thorough surgical excision and regular follow-up to ensure favorable outcomes.

In conclusion, POF, though uncommon, should be included in the differential diagnosis of gingival lesions. A multidisciplinary approach involving clinical, radiographic, and histopathological assessments is crucial for accurate diagnosis and effective management. This case contributes to the existing body of knowledge on POF and reinforces the importance of comprehensive care in the management of oral lesions.

Future research and case studies are encouraged to further elucidate the pathogenesis, optimal management strategies, and long-term outcomes of POF, enhancing our understanding and ability to manage this condition effectively.

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A Case Report

A SEVERE SKELETAL CLASS II CORRECTION BY ACTIVATOR HEADGEAR COMBINATION: A CASE REPORT

Dr. Abin Mathew Thomas, Dr. Eenal Bhambri, Dr. Ankit Bharadwaj, Dr. Arun Raj RG, Dr.Narute Annaso Sarjerav

ABSTRACT

Skeletal Class II malocclusion with mandibular deficiency and maxillary excess is a severe skeletal problem encountered in growing individuals. Correction of mandibular deficiency and maxillary excess in a skeletal Class II patient with a vertical growth pattern poses a great challenge. The control of vertical dimension becomes very important as downward and backward rotation of mandible will exaggerate the facial convexity. The present case signifies the importance of functional jaw orthopedic treatment in a vertically growing female patient with mandibular deficiency and maxillary vertical excess. Activator headgear combination was used for skeletal correction which was followed by fixed mechanotherapy. Superimposition of pretreatment and posttreatment cephalometric tracings shows desired treatment outcomes.

Keywords: Activator headgear therapy, Skeletal Class II correction, Vertical maxillary excess correction

INTRODUCTION

Class II malocclusion may result from a mandibular deficiency, maxillary excess, or a combination of both, but the most common finding is mandibular skeletal retrusion.[1] Skeletal Class II malocclusion with mandibular deficiency and maxillary excess is a severe skeletal problem encountered in growing individuals. Functional jaw orthopedic appliances are designed to encourage adaptive skeletal growth by maintaining the mandible in a corrected forward position.[2] The activator developed by Andersen is one of the most widely used functional appliances. A high-pull face-bow attached to activator is indicated in those patients in whom an increase in vertical dimension should be minimized or avoided.[3] The combination appliance is also used to provide greater cumulative skeletal growth than either appliance alone.[4] In general,Class II, Division I malocclusion correction using high-pull headgear activator combination therapy produces restriction of forward maxillary growth, inhibition of the mesial and vertical displacement of the maxillary teeth, improvement of the mandibular posterior teeth, condylar and glenoid fossa remodeling, and improvement in muscle pattern.[5]

CASE REPORT

DIAGNOSIS

A 12-year-old female patient presented with a chief complaint of forwardly placed teeth in the upper front region at rest and on smile. Clinical examination revealed convex profile, acute nasolabial angle, incompetent lips, nonconsonant smile, increased interlabial gap, increased maxillary incisor show at rest and smile, short upper lip length, and hyperactive mentalis activity [Figure 1a-d]. Intraorally, she had a Class II canine relationship by 4 mm on the right side, 5 mm on the left side, and a Class II molar relationship bilaterally by 6 mm. The patient presented with spacing in the maxillary anterior, an increased overjet, (10 mm) and deep bites (4 mm). Teeth 36, 46 were root canal treated. The patient had a Bolton's discrepancy of 0.95 mm mandibular anterior tooth material excess and 2.81 mm total maxillary tooth material excess [Figure 1e-i].On the basis of cephalometric measurements, the patient was diagnosed as a case of skeletal Class II malocclusion due to with vertical growth pattern, prognathic, and vertically excess maxilla, retrognathic mandible [Figure 1j and k]. there were no signs and symptoms of temporomandibular disorders.

Figure 1: (a) Pretreatment frontal at rest, (b) pretreatment oblique at rest, (c) pretreatment profile at rest, (d) pretreatment frontal dynamic smile,(e) pretreatment right buccal dental photograph,

(f) pretreatment frontal dental photograph, (g) pretreatment left buccal dental photograph, (h) pretreatment maxillary occlusal dental photograph, (i) pretreatment mandibular occlusal dental photograph, (j) pretreatment lateral cephalogram, (k) pretreatment orthopantomogram

TREATMENT OBJECTIVES

Treatment objectives included the following:

· Correction of anteroposterior skeletal discrepancy to obtain a pleasing facial profile

· Control of vertical dimension and elongation of mandible

· Achieving neuromuscular balance by elimination of aberrant musculature

· Achieving Class I canine and molar relationship bilaterally

· Level and align the upper and lower teeth

· Achieving ideal overjet and overbite relationships

· To achieve a consonant smile

· To correct Bolton's discrepancy.

TREATMENT ALTERNATIVES

To improve patients profile by controlling the vertical maxillary excess and backward rotation of the mandible, activator-headgear combination therapy was opted as treatment option as the treatment was in growth status .SMI Stage is -5.Alternative treatment using twin block with greater vertical block height was considered, but activator headgear combination was preferred due to well-documented skeletal results of this combination[6].

TREATMENT PROGRESS

Construction bite for the activator was taken with 4 mm of vertical opening and 6 mm of horizontal advancement. After 1 week of activator wear the headgear was attached to the activator tubes in premolar-molar region of the acrylic blocks. High-pull headgear was used with the force of 400 g per side for 12-16 h daily for 11 months. The outer bow and extraoral force were adjusted such that force passed through the center of maxilla approximately between the root tips of maxillary first and second premolars.

The patient will be shifted to fixed mechanotherapy after achieving Class I molar relationship.

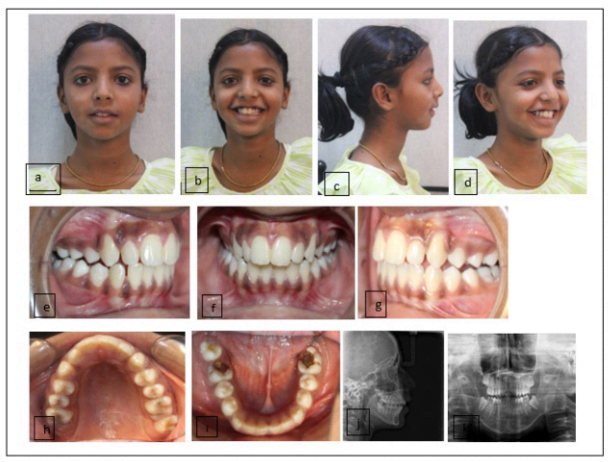

Figure 2: (a) Post activator headgear therapy frontal at rest, (b) post activator headgear therapy oblique at rest, (c) post activator headgear therapy profile at rest, (d) post activator headgear therapy frontal dynamic smile, (e) post activator headgear therapy right buccal dental photograph, (f) post activator headgear therapy frontal dental photograph, (g) post activator headgear therapy left buccal dental photograph, (h) post activator headgear therapy maxillary occlusal dental photograph, (i) post activator headgear therapy mandibular occlusal dental photograph, (j) post activator headgear therapy lateral cephalogram

TREATMENT RESULT

The patient's profile had significantly improved, although there was retroclination of upper incisors on rest and smile. There was a significant reduction in the soft tissue facial convexity with downward and forward mandibular growth, and a restraint of maxillary growth during the activator headgear therapy phase. A consonant smile was obtained at the end of treatment.Class I dental occlusion was achieved bilaterally with optimal overjet and overbite [Figure 2a-i]. Post treatment cephalometric tracing revealed significant improvement in the skeletal discrepancy (SNA pretreatment: 83° and post treatment 78°; SNB

pretreatment: 72° and post treatment 72°), inclination of the maxillary and mandibular incisors (upper incisors to SN angle, pretreatment: 112° and post treatment: 92°; IMPA pretreatment: 98° and post treatment 98°). The nasolabial angle was mildly obtuse at the end of treatment but showed a great improvement from its pretreatment value (pretreatment: 119° and post treatment: 126°) [Figure 2j and k]. Superimposition of pre- and post-treatment cephalometric tracings confirmed the inhibition of maxillary growth, attainment of mandibular growth, and retraction of anterior teeth as desired [Figures 2-5 and Table 1].

DISCUSSION

The nature of a Class II malocclusion is related to many factors, such as facial structure, maxillary and mandibular growth patterns, and dentoalveolar development. Individual variations of these factors have to be considered in relation to treatment procedures to correct the malocclusion. Correction of mandibular deficiency in a skeletal Class II patient with a vertical growth pattern poses a great challenge. The control of vertical dimension becomes very important as downward and backward rotation of mandible will exaggerate the facial convexity. It appears that the control of vertical dimension is imperative for an optimal forward displacement of the correction of a skeletal Class II malocclusion. Activator headgear appliance used in combination is one of the most widely used functional appliances for the sagittal advancement of the mandible with vertical control. This appliance increases the activity of protractor and elevator muscles with concomitant relaxation and stretching of retractors. This produces a more favorable muscle pattern and also a change in bony structures as muscles adapt to new functional stresses

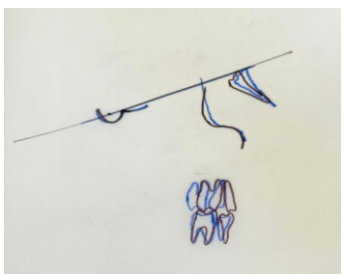

Figure 3 : Superimposition of cephalometric tracings pretreatment (black), post activator headgear therapy (blue). Along SN plane at S

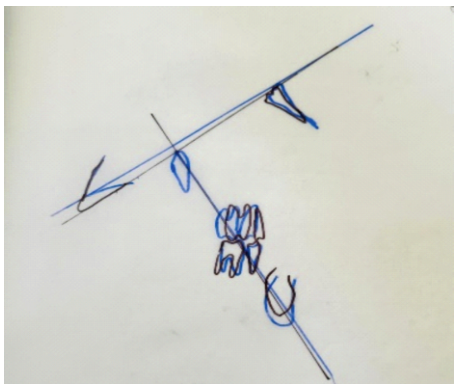

Figure 4: Superimposition of cephalometric tracings pretreatment (black), post activator headgear therapy (blue). Nasion Basion at Cc point

The effects of functional appliances in a skeletal Class II malocclusion includes reduction of ANB angle, restriction of maxillary growth, advancement of mandible, increase in lower facial height, correction of overjet, improvement in overbite, uprighting of the maxillary incisors, protrusion of mandibular incisors, correction of dental Class II malocclusion, correction of facial convexity, and reduction of mentolabial fold.[7] Oztórk and Tankuter[8] in their study have reported that restriction on the sagittal displacement of the maxillary complex with activator headgear appliance was more apparent than with activator alone. Katsavrias and Halazonetis found that posteriorly directed forces acting on the maxilla during activator wear were generally in the range of 100 g, whereas with activator headgear appliances the forces generated were generally in orthopedic range. The evidence suggests more orthopedic changes with the activator headgear appliance.[9] One of the major side effects of functional appliances including the activator and activator headgear combination is the protrusion of mandibular incisors, but the inclination of lower incisors is better controlled with an activator headgear combination.[10] The vertical development is better controlled by the activator headgear combination as it can induce clockwise mandibular rotation.[11]

Table 1: Pretreatment, postmyofunctional, cephalometric data

Parameter	Average	Pretreatment	Postmyofunctional	
SNA (°)	82	83	78	
SNB (°)	80	72	72	
ANB (°)	2	11	5	
FMA (°)	25	28	29	
SN-GoGn (°)	32	39	42	
U1-NA (angle)	22	39	15	
U1-NA (linear)	4	6	2	
U1-SN (°)	102	112	92	
L1-NB (angle)	25	32	33	
L1-NB (linear)	4	6	5	
IMPA (°)	90	98	98	
Nasolabial angle (°)	102	119	126	

SNA: Sella Nasion Point A angle, SNB: Sella Nasion Point B angle,ANB: Point ANasion Point B angle, FMA: Frankfort horizontal to Mandibular plane angle, IMPA: Lower incisor to mandibular plane angle

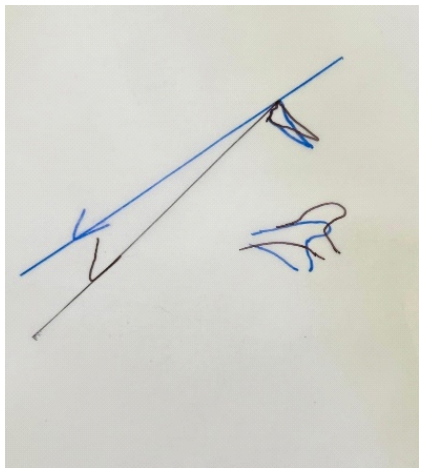

Figure 5: Superimposition of cephalometric tracings pretreatment (black), post activator headgear therapy (blue), Nasion Basion at N

Our patient had skeletal Class II pattern along with vertical growth pattern. As she was in growing stage, our objective was functional advancement of the mandible and inhibition of further maxillary growth. The best treatment plan for the patient

was activator headgear treatment option because the growth is remaining. High-pull headgear was used with the force of 400 g per side for 12-16 h daily for 11 months. The patient wore the appliance regularly. The skeletal correction was achieved by mandibular base lengthening and restriction of increase in maxillary basal length. The profile of the patient was improved drastically as seen from the postmyofunctional therapy photographs and the cephalometric readings [Table 1 and Figure 2]. Although we could not prevent the maxillary down growth, its forward growth was restricted using the headgear. There was a great amount of improvement in the nasolabial angle.

CONCLUSION

This case report elaborated on the use of activator headgear therapy for the correction of a severe skeletal Class II with vertical maxillary excess. After attaining the desired facial changes, fixed appliance mechanotherapy will be used to correct the dental discrepancy. The result obtained was a marked improvement in the facial features and the correction of dental disharmony. Thus, by using activator headgear therapy, the results were obtained which helped the patient gain pleasing profile and better esthetic results.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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NO

CONFLICTS OF INTEREST

There are no conflicts of interest.

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Case Report

CUSTOM CAST POST & CORE ON AN ENDODONTICALLY TREATED FRACTURED TOOTH: A CASE REPORT

Dr. Bharat Kumawat, Dr. Sandeep Kumar, Dr. Rajnish Aggarwal, Dr. Ashutosh Singh, Dr. Bhavna Thoidingjam

ABSTRACT

The structure of teeth that have undergone endodontic treatment can be restored using a variety of post systems and materials. The dentist has a difficult task when deciding the material and system to utilize for tooth replacement. Post is used in order to preserve the core, which holds the final prosthesis. When using crowns to reconstruct teeth that have undergone extensive endodontic treatment and have lost a significant amount of tooth structure, cast metal posts and cores are frequently utilized. The restoration of damaged teeth utilizing custom cast posts and all ceramic crowns is shown in the case report that follows.

KEYWORDS: Custom cast post, ferrule, anterior teeth, metal ceramic crown

INTRODUCTION

Dental caries involving pulp, fractures, and previous restorations results in endodontic treatment of teeth. The moderate or severe loss of coronal tooth structure are built up using various post and core techniques and materials[1,2]. Appropriate selection of post and core is essential for retentive capacity of remaining tooth structure [3,4,5]. Anterior teeth with more than 50% tooth structure loss, post and core followed by full coverage restorations are mandatory [6]. According to Franklin Weine, most of endodontically treated teeth often failed following root canal treatment due to poor post endodontic restoration rather than primary endodontic cause[7]. Post endodontic material is selected based on amount of tooth structure that is remaining after RCT, esthetics, existing periodontal condition[8]. The ease of use, less time consumption along with the available laboratory and clinical evidence utilizes fiber post more than metal posts. The custom-made cast post and core with metal ceramic crowns or all ceramic crown is the traditional choice of treatment. Custom cast post has advantage of approximating and adapting to the morphology of the prepared canal[9]. They are still a better option in cases where change in angulation of the core is required and where there is more tooth structure loss. This case report shows restoration of fractured maxillary incisors by custom cast post followed by metal ceramic restoration.

CASE REPORT

CLINICAL AND RAGIOGRAPHICAL EVALUATIONS BEFORE PROSTHETIC PHASE

A 54-year old female patient reported to the department of Prosthodontics including crown and Bridge, Surendera Dental college & Research Institute with a chief complaint of crown fracture with respect to 12. Patient had undergone endodontic therapy of the same tooth few months back. After clinical and radiographic examination, due to weak tooth structure and inadequate support of remaining of remaining tooth, custom cast post and core was planned followed by metal ceramic crown [Figure 1].

A diagnostic impression was made and casts were obtained. Treatment plan included post space preparation in 12 using Gates drills and endodontic hand instruments for placement of post. The canal was prepared leaving 5mm of gutta-percha to maintain apical seal. Radiograph was taken to confirm obturation and apical seal [Figure 2].

Petroleum jelly was used to lubricate the canal space and post space impression was made using autopolymerising resin with direct technique. Investment of post and core pattern was done and metal casting was done using Co – Cr alloy [Figure 3,4].

Custom post and core was finished and polished before cementation. Cementation of post was done with glass ionomer cement [Figure 5].

Tooth preparation for metal ceramic crown was done and final impression was made with putty and light body wash impression and casts was prepared in type IV dental stone. Provisional restorations was fabricated and luted with non eugenol cement. Shade selection for metal ceramic crowns was matched with adjacent teeth. Metal ceramic crown made for 12 was cemented using glass ionomer (GIC) cements [Figure 6,7]

Figure 1. : Pre-operative intra oral photograph

Figure 2. : Post space preparation

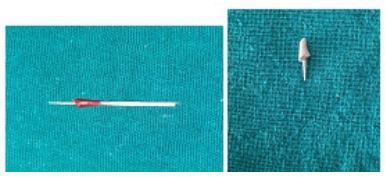

Figure 3,4 : Post & core pattern and casted Co-Cr Custom post and core

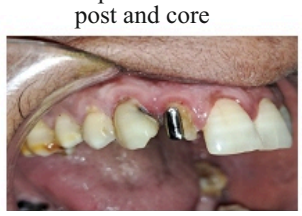

Figure 5 : Custom post and core cementation

Figure 6,7 : Final post operative intra oral photograph

DISCUSSION

Teeth that have undergone endodontic treatment or have shattered teeth are often repaired with full coverage crowns placed after a custom metallic cast post or prefabricated post and core. All-ceramic or metal-ceramic crowns are both possible for full coverage crowns. The exact fit, little luting cement interface, and built-in anti-rotation mechanism are the benefits of custom cast post and core restoration [10.] They also benefit from great strength and little tooth loss when preparing root canal crowns. The degree of tooth structural preservation is the primary determinant of post and core success[11.]

In this case, a custom-made metallic post and core along with individual metal-ceramic crowns were employed for a variety of reasons, including significant coronal destruction, functional rehabilitation, and loss of anterior tooth structure.

The purpose of the post is to stabilize and strengthen the core in order to maintain the crown; endodontically treated teeth are not strengthened or reinforced by the post [12,13,14,15,16.] It has been discovered by Santos Filho PC et al. that anterior teeth restored with cast post and core and metal ceramic crowns had increased fracture resistance when a 2 mm crown ferrule surrounded the residual tooth structure[17.]

CONCLUSION

For the treatment to be successful over the long run, it is crucial to choose the right post and core system and material. To preserve metal-ceramic crowns and repair significant coronal tooth structure loss, specially cast posts and cores are advised. A crucial component of restorative dentistry is tooth restoration following endodontic therapy. The procedure outlined is easy to follow and works well for treating broken teeth over the long run.

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Case Report

POLYCHROMATIC RESTORATION OF ANTERIOR FRACTURED TEETH USING A CUSTOM-MADE SILICONE IMPRESSION: A CASE REPORT

Dr. Atulya Verma, Dr. Neetu Jindal, Dr. Renu Aggarwal, Dr. Shikha Kansra

ABSTRACT

Silicone guide matrices made from diagnostic wax-ups are advised when restoring anterior teeth with resin composites, as layering is made easier and working time is maximized using this technique. This is especially crucial for polychromatic layering and when using resin composites to restoring anterior teeth. Waxing and taking an impression before hand are frequently impractical in situations like shattering of anterior teeth. Patients typically look for immediate cosmetic results in these situations because of trauma and associated psychological issues. Consequently, the development of a silicone guide matrix from the patient's fractured tooth which eliminates the necessity for previous waxing is an intriguing restorative strategy that can provide the restorative procedure. This type of personalized matrix was initially proposed by Bertholdo, Ricci, and Barrote. Thus, the purpose of the present work is to demonstrate a modification of the technique for making this type of custom-made matrix for the restoration of Ellies class II fracture of upper central incisors.

KEYWORDS: Permanent dentition, PVS material, resin-based cements, resin composites

INTRODUCTION

The most common kind of dental injuries in the permanent dentition is a coronal fracture of anterior maxillary teeth due to trauma.[1] Trauma can occur due to car crashes, sports-related injuries, physical altercations, and even occlusal function or para-functional stressors can result in fractures.[2-4] The primary elements that define the amount of trauma are its intensity, direction, flexibility, and soft tissue tolerance. The main criteria that affect the amount of the fracture are the degree of damage, the direction of the trauma, the substance's flexibility, and the soft tissue's tolerance.[5]

The most recommended course of action, for coronal fractures of anterior teeth is to restore the fracture fragment using resin composites. Restoring teeth with coronal fractures can be done in two ways, either on whether an impression can be taken or a wax-up can be completed. When a diagnostic wax-up of the fractured tooth is necessary, the restorative procedure is guided by a silicon matrix. This method is simpler and faster because the matrix directs the resin composite's palatal insertion, which also increases the restoration's predictability.[5]

The forefingers of the clinician are thus, typically used to assist in the free hand sculpture of the palatal surface. [6] Another name for this method is the free-hand stratification method. When using free-hand stratification, getting the restoration's palatal contour just right is a common issue. The clinician's forefinger is typically used to assist in the free-hand sculpture of the palatal surface. Therefore, the palatal enamel layer is typically labially tipped when restoring large Class IV cavities and coronal fractures with the immediate free-hand stratification technique. This makes it challenging to obtain restorations with an opacity compatible with the surrounding teeth. The restorative technique involves creating a silicone guide matrix from the patient's fractured tooth, which eliminates the need for prior waxing.[7] This technique, called BRB matrix, was by Bertholdo, Ricci, and Barrote in 2014.[8]

CASE REPORT

A 45 yr. old male patient reported to the Department of Conservative Dentistry and Endodontics, Surendera Dental College and Research Institute, Sriganganagar (Raj.) with a chief complaint of fracture of maxillary central incisors due to a motorcycle accident. Clinical and radiographic examinations demonstrated that fractures occurred only at the coronal part and no involvement without pulp exposure or involvement of the surrounding soft and hard tissues **(Figure 1).** Vitality test is normal. All orofacial hard and soft tissues were found to be normal. Patients advised for various treatment plans like veneers, crowns and indirect putty index and immediate restoration guided by silicon matrix. Patient opted for polychromatic restoration. Written consent was taken. Before the restorative procedure with resin composites, the interocclusal contact points occurring at the anterior teeth were checked with articulating paper strips (AccuFilm, Parkell, Edwood, USA).

The maxillary central incisors' distal surfaces showed signs of slight interocclusal interactions. demonstrates the relationship between the mandibular central incisors and the maxillary ones. **(Figure2).** Following occlusal examination, an intraoral imprint

was created utilizing PVS and a two-step double mixing procedure. After mixing, the putty (Scan Putty, Yller, Pelotas, RS, Brazil) was placed in the patient's mouth.**(Figure 3)** Following implantation, the patient was instructed to seal his mouth in a manner that replicated the function of his mandibular and maxillary teeth. After polymerization, the first impression was relined with a light PVS material (Scan Light, Yller) to improve adaptation The facial surface of the mold was removed using the incisal-facial line angle of the sound teeth as reference **(Figure 4).**

A pencil was used to assess the position of the incisal edges and the facial-interproximal line angles after the mold was put in the patient's mouth. The PVS mold's missing palatal surface near the fractures was sculpted using Minicut and Maxicut drills. The PVS mold was sculpted using the interocclusal relationship with the mandibular anterior teeth as a guide, and extra care was given to prevent perforation in the mesial region of both central incisors. Using effect resins and masses of dentin and enamel, a polychromatic layering might be completed with the sculpted matrix in place.

After 15 seconds of etching, the enamel was cleaned and blot dried. Next, a universal bonding system (Ivoclar vivadent te-econom bond refill, 5th generation bonding system) was used in accordance with the guidelines provided by the manufacturer.

To obtain the lingual anatomy, the palatal surface (palatal shell) was first sculpted using an achromatic enamel shade (Ivoclar Tetric N-Ceram Enamel Shade) in the polychromatic restoration process. To do this, the teeth were seated on the matrix after a thin layer of resin composite was applied. Using a dentin shade (DA2 Ivoclar Empress Direct Refill Syringe), the dentin mamelons were replicated. At the incisal edge, a translucent opalescent enamel shade (Ivoclar Tetric N-Ceram Enamel Shade) was applied after the dentin was sculptured. An Al enamel shade was put in a single increment as the last layer. As directed by the manufacturer, light activation was applied to all resin composites.

Utilizing a Valo Cordless LED gadget from Ultradent Products located in South Jordan, UT, USA. Following the completion of the restoration sculpting, articulating paper strips were used to examine the interocclusal contact sites. There was no need for occlusal adjustment because the PVS matrix assisted in the shaping of the initial layer of the achromatic resin composite. After defining the facial-interproximal line angles and making adjustments with coarse polishing disks (Diamond Pro, FGM), the fundamental anatomy was produced. Secondary and tertiary anatomies were created using a fine diamond bur (#862F, Jota, Ruthi, Switzerland).

Qota Brush, Jota, a silicon carbide brush, was used for the first polishing. Next, interproximal excesses were removed with a #12 scalpe blade. To clean the palatal surfaces, rubber disks (#9150 and #9837, Jota) were used **(Figure 4).** Polishing paste and flexible felt disks (Diamond Flex, FGM) were used to achieve the canal polishing. After treatment post-operative photograph was taken. **(Figure 5)**

DISCUSSION

The clinical method for restoring two maxillary central teeth was demonstrated in this case report. The use of a custom-made matrix to improve predictability was the main focus of the case presentation. Adjacent soft tissues as well as the hard tissues may be impacted by trauma at the orofacial region.[10]

The clinician must learn to observe the optical properties of the teeth and correlate these aspects with the patient's age and esthetic and functional needs after making the appropriate diagnosis of the etiology and biological conditions surrounding the fractured teeth during the treatment planning process.[(11)] The variety of resin composites that are available in market makes it possible to use various hue, chroma, translucency, and opacity combinations. This method uses layers in a bioinspired manner to replicate the anatomical of both dentin and enamel.[11]

When utilizing resin composites, the clinician's manual skill plays a crucial role in the treatment's outcome.[12] A successful polymerization is essential for the restoration of any material that is based on resin. All resin-based materials were used in this case study in accordance with manufacturer guidelines, and a multiwave LED device was employed.[13] PVS matrices are recommended not just for the repair of anterior teeth, but also in cases where the incisal edge needs to be restored for cosmetic purposes.[14] The interocclusal relationship was initially copied and

taken into consideration during the sculpture of the PVS matrix, which made it easy to obtain the lingual anatomy, including the incisal edge. Moreover, there was no requirement for occlusal adjustment.[14]

Figure 1 : Pre-Operative Photograph w.r.t. 11,21

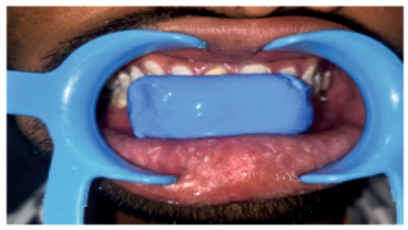

Figure 2 : First impression using a putty PVS material

Figure 4 : PVS Impression of interocclusal relationship

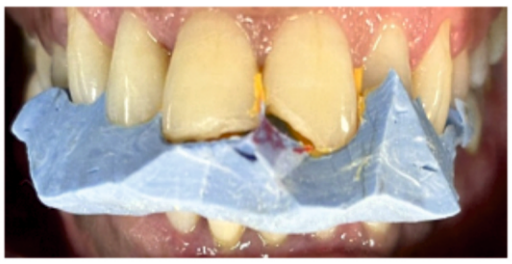

Figure 4 : Evaluation of the matrix on the patient's mouth

Figure 4 A,B,C : Finishing of composite restoration done using composite finishing and polishing burs

Figure 5, : A Post-operative photograph w.r.t. 11,21

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Case Report

SURGICAL MANAGEMENT OF SUBMANDIBULAR, BUCCAL, SUBMENTAL, PTERYGOMANDIBULAR AND SUBLINGUAL SPACE INFECTION WITH ADJUVANT ANTIBIOTIC THERAPY.

Dr. Hrushikesh Sonawane, Dr. Manisha Solanki, Pooja Jaiswal, Dr. Darshan R. Chauhan

ABSTRACT -

Anatomical and microbial factors and impairment in host resistance, compounded by a delay in receiving adequate treatment in the early stages, can result in the progression of a localized odontogenic infection into a maxillofacial space infection (MSI). Severe space infections present a challenging problem to the maxillofacial surgeon because of the complex anatomy and serious medical complications that can occur despite skillful management. Septicemia, airway obstruction, cavernous sinus thrombosis, necrotizing fasciitis, and mediastinitis, which can develop subsequent to MSI, are potentially fatal. This paper presents a case report of Submandibular, Buccal and Pterygomandibular space infection of 61 year old female patient, which was managed surgically.

KEYWORDS: Odontogenic infection, maxillofacial space infection, submandibular space, buccal space, pterygomandibular space, Hilton`s method

INTRODUCTION –

Odontogenic infections are the most common of all infections of head and neck . Early extraction of offending tooth and the incision and drainage tend to shorten the usual course of infection and minimize the chances for the development of further complication. Numerous facial spaces in head and neck have been described. These areas are either clefts [Potential spaces between facial layers] or compartments containing connective tissues and various anatomic structures ; They are not voids in the tissues.[1]

PRIMARY SPACES –

Canine space, Infratemporal space, Buccal space, Sublingual space, submental space, submandibular space. [1,2]

SECONDARY SPACES –

Massetric space, Pterygomandibular space, superficial and deep temporal, Lateral pharyngeal space, Retropharyngeal space, prevertebral space, Parotid space. [1,2,3]

CASE REPORT:

A 61 year-old female patient (Fig.1) reported to the Department of Oral and Maxillofacial Surgery presenting symptoms of pain, swelling and pus discharge in upper and lower right back region of jaw since 8 days. Patient gave history of visiting local dentist for the pain and swelling, took medications but no relief of symptoms, swelling progressively increased to present size . On presenting to our department she had facial asymmetry, with swelling on right side of the face. Extra oral, diffuse swelling was present, edge of swelling not clearly defined. Swelling was approximately 15mm in size, Ovoid in shape and bright red in colour with local rise in temperature. Swelling extended superoinferiorly from right infraorbital margin to right inferior border of mandible and mediolaterally extended from corner of mouth to preauricular region.. Swelling also extended crossing the midline towards the left angle of mandible. Swelling was soft to firm in consistency, compressible, tender on palpation and attached to underlying skin. Mouth Opening was reduced. Grossly Decayed 47,48 were seen with Buccal vestibular sulcus depth obliteration. Sublingual swelling was seen which was soft in consistency and also debris was seen in floor of mouth, floor of tongue and right buccal mucosa. So diagnosis of submandibular, buccal, pterygomandibular and sublingual space infection was made and CBC and RBS done and treatment was planned for Incision and Drainage under LA and Cervical Plexus block. After investigations patient turned out to be undiagnosed Diabetic.RBS as noted was 370 mg% and WBC level was high (17.9 x 107/L) .

Fig 1: Front profile of patient

Fig 2 : Intraoral picture showing Sublingual Space.

Extra oral submandibular stab incision was given (1.5 cms below lower border of mandible). A curved hemostat was inserted through incision into the submandibular and buccal space. Extraoral submental stab Incision was given and curved hemostat was inserted through incision in submental space. The beaks of hemostat were opened i.e Hilton`s method , thick yellowish foul smelling purulent discharge was drained. Locules broken Thorough irrigation was done with normal saline, betadine and metronidazole. A strip of corrugated rubber drain was inserted and sutured. Sublingual incision at was given and pus was drained. Extraction was done wrt 47,48. Dressing given . patient was kept under indoor observation and IV Emperical antibiotics and analgesics (Amoxicillin and Metronidazole). Regular irrigation and debridement was done. Medical consultation was taken for high blood sugar level. After 3 days swelling reduced with little pus discharge so drains were removed.

Fig 3: Pus Discharge through buccal Space by Hilton`s method

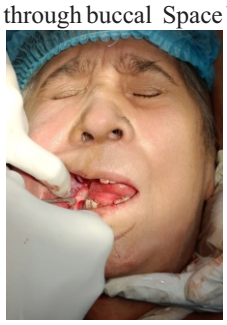

Fig 4: Pus Discharge through pterygomandibular space

Fig 5: Corrugated rubber drain Secured with sutures.

Fig 6: Post-op photograph Day-3

DISCUSSION:

Odontogenic infections are the most common type of head and neck infections among adults. Odontogenic infections contribute to MSI in the range of 50–89% in reports from different parts of the world. Odontogenic infections cannot be managed by antibiotic treatment alone; antibiotics are an adjunct to definitive treatment.[3] Self-medication by the patient and non-provision of definitive management by the primary practitioner, dental or medical, puts the patient at serious risk for progression of infection. MSI occur as an outcome of a prolonged disease process. Most patients have recurring symptoms much before the onset of space infection. The most common presenting complaint of patients with MSI is that of swelling associated with pain[4]. The most common origin of the MSI is from a pulpal focus. After the intact pulp chamber is breached, the root canals are colonized by a diverse mix of anaerobic bacteria. Abscess formation occurs when these bacteria and their toxic products enter the peri-apical tissue via the apical foramen and induce acute inflammation and pus formation. This pus spreads to the maxillofacial spaces in proximity with the roots of these teeth.[5] The submandibular space being the most commonly involved space and 38 and 48 (lower wisdom teeth) being the teeth most commonly involved. Adults tend to have more mandibular infections, while children tend to have maxillary infections. Among the mandibular spaces, the submandibular space has been reported to be the most commonly involved in MSI.[2] The mandibular buccal, the lateral pharyngeal, and the pterygomandibular spaces, have also been reported to be the most common in some studies. Pericoronitis leading to severe infection has a low prevalence (5%), probably because

pericoronitis occurs in younger individuals[6,7] and is often treated immediately due to its severe symptoms. The latency in presentation to the treatment facility is the probable reason behind the higher proportion of multiple space infections compared to single space infections. In present case patient was not aware of diabetic status and age and poor oral hygiene were precipitating factors. Some studies have also reported a preponderance of multiple space infections compared to single space infections in patients with head and neck infections of odontogenic origin. Empirical intravenous antibiotic therapy with amoxicillin with clavulanate potassium and metronidazole,[8,9,10] along with surgical drainage of the infection gives an excellent treatment outcome.

In present case report, submandibular, buccal and pterygomandibular space infection was seen and surgical management with adjuvant antibiotic therapy was planned. The surgical management was done by Hilton`s method and thorough irrigation with Metronidazole, Normal saline and Betadine.[11,12,13] Regular Follow up was done and patient was motivated to maintain oral hygiene to enhance the healing.

CONCLUSION:

The present case report was found to be Submandibular, buccal, submental, pterygomandibular and Sublingual space infection. It was managed successfully by surgical management along with adjuvant antibiotic therapy which involves Drainage of pus by Hilton`s method and through irrigation with Metronidazole, Normal saline and Betadine solution.

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Review Article

EFFECT OF VAPING ON PERIODONTIUM

Dr Sajan, Dr Rajni Aggarwal, Dr Archana Bhatia, Dr Rohit, Dr Harsha

ABSTRACT

Vaping, the inhalation of aerosolized substances via electronic devices, has grown in popularity, raising concerns about its impact on oral health, particularly the periodontium. Vape products typically contain propylene glycol, vegetable glycerin, flavorings, and nicotine, which, when heated, transform into an aerosol inhaled by users. Despite being perceived as safer than traditional smoking, vaping's potential adverse effects on periodontal health are significant. The periodontium includes gingiva, periodontal ligament, cementum, and alveolar bone, all crucial for tooth stability. Inhalation of vape aerosols can trigger inflammatory responses in these tissues, leading to gingivitis and other periodontal diseases. The heat from vaping devices and the presence of nicotine exacerbate these issues by causing thermal irritation, reducing blood flow, and impairing healing processes. Emerging research indicates that vaping ingredients may induce cellular toxicity and oxidative stress, further harming oral tissues. Thus, understanding the chemical interactions of vape products with periodontal tissues is essential. Ongoing research and awareness efforts are crucial in developing strategies to mitigate these risks and safeguard oral health amidst the rising trend of vaping. Comprehensive collaboration among researchers, healthcare professionals, policymakers, and the public is vital to address and reduce vaping-induced periodontal health risks.

Keywords : *Periodontivm, Vaping, Smoking, Periodontics, E-Cigrets, Nicotine, Oxidation Stress*

INTRODUCTION

Vaping, a practice involving the inhalation of aerosolized substances through an electronic device, has surged in popularity over recent years. This trend is particularly concerning due to its potential adverse effects on oral health, specifically on the periodontium, the specialized tissues surrounding and supporting the teeth. To comprehend the impact of vaping on the periodontium, it's crucial to delve into the chemical composition of vape products and their effects on oral tissues.

At the core of vaping lies the composition of e-liquids or vape juices, typically consisting of propylene glycol, vegetable glycerin, flavorings, and nicotine (although nicotine-free options also exist). When heated, these substances undergo a transformation into an aerosol, which users inhale. While commonly perceived as a safer alternative to traditional smoking, the oral health ramifications of vaping are increasingly gaining attention within the medical community.[1]

The periodontium, comprising the gangive, periodontal ligament, cementum, and alveolar bone, plays a pivotal role in supporting and maintaining the stability of the teeth within the jaw. Any disruption or damage to these tissues could lead to periodontal diseases, such as gingivitis or periodontitis2 Studies exploring the effects of vaping on oral tissues have indicated potential detrimental impacts on the periodontium[2]. The inhalation of aerosolized substances generated by vaping devices exposes the oral cavity to a concoction of chemicals, some of which can trigger inflammatory responses within the periodontal tissues. This inflammation can manifest as changes in the gum tissue, leading to swelling, redness, and tenderness, which are early signs of gingivitis. Moreover, the heat produced by vaping devices might exacerbate the damage. High temperatures can cause thermal irritation to the oral mucosa, potentially harming the delicate gum tissue and compromising its integrity. Such compromised barriers could allow for easier entry of bacteria and toxins into the periodontal tissues, escalating the risk of periodontal diseases. The impact of nicotine, a common component in many vape liquids, on the periodontium is a subject of particular concern. Nicotine, known for its vasoconstrictive properties, can impede blood flow to the gums and hinder the body's ability to fight off infections. Reduced blood supply compromises the gums' ability to receive vital nutrients and oxygen, further contributing to tissue damage and impairing the healing process. Comparatively, while vaping might present a reduced risk of certain oral health issues when compared to traditional smoking, emerging research suggests that it may still pose considerable threats to the periodontium. Some studies even propose that certain vaping ingredients might induce cellular toxicity and oxidative stress in oral tissues, exacerbating the risk

of periodontal diseases. Understanding the intricate interplay between the chemical constituents of vape products and their effects on the periodontium is essential in comprehending the potential risks associated with vaping on oral health.[3]

RESEARCH STUDIES ON VAPING AND PERIODONTAL HEALTH

As the prevalence of vaping continues to rise, scientific inquiries have intensified to unravel the impact of vaping on various aspects of health, including oral health. The exploration of vaping's influence on periodontal health has become a focal point of numerous research endeavors, aiming to understand the intricate relationship between vaping and the periodontium.

In one study published in a prominent dental journal, researchers conducted an in vitro analysis utilizing oral cell cultures to assess the impact of vape aerosols on periodontal cells. Their findings revealed that exposure to certain constituents present in e-cigarette aerosols resulted in an upregulation of pro-inflammatory markers within the periodontal cells. This heightened inflammatory response signifies a potential mechanism through which vaping may contribute to periodontal tissue damage.[4]

Furthermore, epidemiological studies have attempted to discern the prevalence of periodontal issues among individuals who vape compared to non-users. A cross-sectional study involving a sizable cohort of young adults examined the oral health status of both vapers and non-vapers. The results indicated a higher prevalence of gingival inflammation and increased pocket depths, characteristic of periodontal disease, in the vaping group compared to their non-vaping counterparts.[5]

Clinical trials involving individuals who exclusively vape or use both traditional cigarettes and e-cigarettes have also provided valuable insights. Longitudinal studies tracking changes in periodontal health parameters over time among these cohorts have suggested a potential exacerbation of periodontal conditions among exclusive vapers or dual users when compared to non-smokers.

However, it's important to note that while these studies provide crucial preliminary evidence linking vaping to periodontal issues, further comprehensive research is warranted. Many of these studies face limitations, such as small sample sizes, varying methodologies, and the relatively recent emergence of vaping, which impedes the ability to assess long-term effects accurately.

Understanding the impact of vaping on periodontal health requires multifaceted investigations encompassing the identification of specific chemicals in vape aerosols that contribute to periodontal damage, elucidation of underlying biological mechanisms, and longitudinal studies to ascertain the long-term implications of vaping on the periodontium.

These research endeavors not only shed light on the potential risks associated with vaping but also serve as a foundation for devising preventive strategies and interventions aimed at preserving periodontal health in individuals who engage in vaping practices. Continued scientific inquiry remains imperative to unravel the complexities of this relationship and guide effective oral health policies and interventions in the face of burgeoning vaping trends.[6]

MECHANISMS BEHIND VAPING-RELATED PERIODONTAL DAMAGE

The intricate relationship between vaping and periodontal health involves multifaceted biological mechanisms that contribute to the potential damage inflicted upon the periodontium. Understanding these mechanisms is crucial in elucidating how vaping may adversely impact the delicate tissues supporting oral health.

One significant pathway through which vaping may affect periodontal tissues involves the inflammatory response triggered by exposure to aerosolized substances. Vaping devices produce an aerosol containing various chemicals, including ultrafine particles, volatile organic compounds, and flavoring agents. Upon inhalation, these components come into direct contact with the

oral tissues, potentially initiating an inflammatory cascade.

The oral mucosa acts as a primary barrier against external threats, and any compromise in its integrity may allow these substances to infiltrate the periodontal tissues. Research indicates that certain compounds found in vape aerosols can stimulate immune cells within the periodontium, leading to an exaggerated inflammatory reaction. Chronic inflammation in the gums is a hallmark of periodontal diseases, contributing to tissue damage and eventual degradation of the supporting structures around the teeth.

Moreover, the influence of nicotine, a prevalent component in many vape products, cannot be overlooked. Nicotine, known for its vasoconstrictive properties, can impede blood flow within the periodontium. Reduced blood circulation in the gums compromises their ability to receive essential nutrients and oxygen, hampering the healing process and rendering these tissues more susceptible to damage.[7]

Nicotine's impact extends beyond vasoconstriction; it also affects cellular function within the periodontal tissues. Studies have suggested that nicotine exposure may disrupt the normal functioning of cells involved in tissue repair and maintenance. This disruption hampers the ability of these cells to perform their crucial roles in preserving periodontal health, potentially leading to compromised tissue integrity.

Furthermore, oxidative stress induced by vaping constituents represents another key mechanism underlying periodontal damage. Certain chemicals present in vape aerosols can trigger the production of reactive oxygen species (ROS) within oral tissues. Excessive ROS production overwhelms the body's antioxidant defenses, leading to cellular damage and exacerbating inflammation within the periodontium. The effects of vaping electronic cigarettes on periodontitis.

The combination of these mechanisms - inflammatory responses, compromised blood flow, cellular dysfunction, and oxidative stress - collectively contributes to the deterioration of the periodontal tissues in individuals who engage in vaping practices. While the precise interplay and hierarchy of these mechanisms remain subjects of ongoing research, their cumulative effect underscores the potential harm vaping may inflict on periodontal health

Understanding these intricate mechanisms paves the way for targeted interventions aimed at mitigating vaping-induced periodontal damage. By elucidating these pathways, researchers and clinicians can develop preventive strategies and therapeutic approaches tailored to safeguarding the periodontium in the face of increasing vaping prevalence among the population. Continued exploration of these mechanisms is crucial in enhancing our understanding of vaping's impact on oral health and formulating effective interventions to mitigate its adverse effects on the periodontium.

COMPARING VAPING-INDUCED PERIODONTAL ISSUES TO TRADITIONAL SMOKING[8].

The impact of electronic and conventional cigarettes on periodontal health-a systematic review and meta-analysis.

In the realm of oral health, comparing the impact of vaping on the periodontium to that of traditional smoking is a crucial endeavor to assess the relative risks posed by these distinct modes of nicotine consumption.

Historically, traditional tobacco smoking has been extensively linked to adverse oral health outcomes, including a heightened risk of periodontal diseases. Studies spanning decades have unequivocally established the detrimental effects of smoking on the periodontium. Smoking is associated with compromised blood flow, impaired immune response, and increased inflammation within the oral tissues, all of which contribute to the degradation of the periodontal structures.

Comparatively, vaping, often marketed as a potentially less harmful alternative to smoking, has gained traction as an alternative nicotine delivery system. While some believe that vaping might present a reduced risk profile concerning certain

health outcomes compared to smoking, including oral health, emerging evidence suggests that vaping might not be devoid of adverse effects on the periodontium.

Research comparing the impact of vaping and smoking on periodontal health has yielded mixed findings. Some studies suggest that individuals who exclusively vape might exhibit fewer signs of periodontal disease compared to traditional smokers. However, other research indicates that certain parameters of periodontal health, such as inflammation and clinical attachment loss, may not significantly differ between individuals who vape and those who smoke.

The comparative assessment between vaping and smoking regarding their impact on periodontal health remains an active area of investigation. While vaping might present nuances in its effects on the periodontium compared to traditional smoking, the emerging evidence underscores the need for caution. Both vaping and smoking have the potential to exert detrimental effects on the periodontium, highlighting the importance of comprehensive oral health assessments and preventive strategies for individuals engaging in these behaviors.

As the scientific community continues to delve deeper into these comparisons, it becomes increasingly evident that vaping, while possibly presenting a different risk profile than smoking, should not be considered risk-free concerning its potential impact on periodontal health. Thus, promoting smoking cessation and raising awareness of the potential risks associated with vaping remain crucial in safeguarding periodontal health and overall well-being.

PREVENTIVE MEASURES AND TREATMENT STRATEGIES

As the understanding of the potential risks posed by vaping on periodontal health expands, the development and implementation of preventive measures and treatment strategies become pivotal in preserving oral health among individuals who engage in vaping practices.

PREVENTIVE MEASURES:

1. Education and Awareness Campaigns: Initiating comprehensive educational campaigns targeting both users and healthcare professionals is essential. Educating individuals about the potential oral health risks associated with vaping and promoting oral hygiene practices can mitigate potential damage to the periodontium. This includes emphasizing the importance of regular dental check-ups, proper brushing, flossing, and the use of fluoride-containing products.

2. Behavioral Interventions: Implementing behavioral interventions aimed at reducing or ceasing vaping behaviors can significantly mitigate potential risks to periodontal health. Counseling programs and behavioral therapies focusing on smoking cessation have shown promise in aiding individuals in quitting vaping practices, thereby reducing the potential damage to the periodontium.

3. Regulatory Measures: Advocating for stringent regulations and policies concerning the manufacturing, marketing, and distribution of vape products is crucial. Implementing measures to control the quality and constituents of vape liquids can potentially reduce the harmful impact on oral tissues, including the periodontium.

Treatment Strategies:

1. Periodontal Evaluation and Management: Routine periodontal evaluations are essential for individuals who vape. Dental professionals should conduct comprehensive assessments to detect early signs of periodontal diseases.

2. Tailored Therapies: Developing specialized treatment modalities tailored for individuals who vape is essential. Personalized treatment plans that consider the unique oral health challenges posed by vaping can optimize outcomes.

3. Collaborative Care: Establishing interdisciplinary collaborations among dentists, physicians, behavioral health

specialists, and public health professionals is crucial. Integrated care models can ensure comprehensive management of both the oral health aspects and behavioral aspects associated with vaping.

4. Research and Innovation: Encouraging research endeavors focused on developing innovative treatment modalities targeting vaping-related periodontal damage is vital. Investing in research that explores novel therapies, biomaterials, or pharmacological interventions aimed at mitigating the impact of vaping on the periodontium can revolutionize treatment approaches.

By adopting a multifaceted approach encompassing preventive education, regulatory measures, tailored treatment strategies, and fostering collaborative care models, it's possible to mitigate the potential adverse effects of vaping on the periodontium. Prioritizing oral health assessments, implementing effective preventive measures, and leveraging innovative treatment modalities can collectively safeguard periodontal health in the face of evolving vaping practices.

FUTURE DIRECTIONS AND CONCLUSION

The evolving landscape of vaping and its potential impact on the periodontium necessitates a proactive approach in understanding, addressing, and mitigating associated risks for oral health. Looking ahead, several key areas merit attention in further exploring and managing the relationship between vaping and periodontal health.

Firstly, comprehensive longitudinal studies are imperative to ascertain the long-term effects of vaping on the periodontium. Given the relatively recent emergence of vaping, longitudinal investigations tracking oral health outcomes over extended periods in individuals who vape are essential for a more comprehensive understanding of potential risks and the development of preventive strategies.

Secondly, elucidating the specific components within vape aerosols responsible for periodontal damage is crucial. Identifying and analyzing these constituents will provide valuable insights into the mechanisms underlying vaping-related periodontal issues, paving the way for targeted interventions and regulatory measures.

Additionally, advancing our understanding of the comparative risks posed by vaping and traditional smoking on periodontal health remains a priority. Further research efforts aimed at delineating the nuanced differences and similarities between these two modes of nicotine consumption will facilitate more informed public health policies and clinical guidelines.

In conclusion, while vaping continues to gain popularity as an alternative to traditional smoking, its potential effects on periodontal health demand vigilance and comprehensive investigation. The periodontium, a crucial component in maintaining oral health, may be adversely affected by vaping through various biological mechanisms. Understanding these mechanisms, conducting robust longitudinal studies, and comparing vaping-induced periodontal issues with those from traditional smoking will collectively inform strategies to protect and preserve periodontal health amidst the evolving landscape of nicotine consumption practices.

As research progresses and awareness grows, the integration of evidence-based approaches into clinical practice and public health initiatives will play a pivotal role in addressing the potential risks associated with vaping and safeguarding the periodontium, thereby promoting optimal oral health for individuals engaging in these practices. Continued collaboration among researchers, healthcare professionals, policymakers, and the public will be pivotal in shaping a comprehensive approach to mitigate vaping-induced risks to periodontal health and overall well-being.

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Review Article

HISTORY OF DENTISTRY

Dr. A.P. Dadhich, Dr. Sajan

ABSTRACT-

Dentistry, a medical branch dedicated to diagnosing, preventing, and treating oral diseases, boasts a long and rich history dating back to ancient civilizations. As one of the oldest medical professions, dentistry has evolved from early attempts at treating dental ailments to the sophisticated techniques and technologies used today. Over millennia, the field has grown significantly, reflecting advancements in medical knowledge, technology, and societal attitudes toward oral health.

Throughout its history, dentistry has been crucial in improving overall health and quality of life. The development of specialized fields and the progression of dental practices underscore the profession's importance. From rudimentary tools and theories to the establishment of formal education and professional organizations, each milestone has refined and expanded dental care.

This review explores the historical progression of dentistry, highlighting key developments and milestones that have shaped the profession. By examining the journey from ancient origins to contemporary practices, we aim to provide insights into how historical contexts have influenced current dental care methodologies, ultimately illuminating the enduring significance of dentistry and its continual adaptation to better serve humanity.

Keywords : Dentistry, History, Indian Dentistry

INTRODUCTION-

Dentistry, the branch of medicine focused on the diagnosis, prevention, and treatment of oral diseases and conditions, has a rich and extensive history. As one of the oldest medical professions, its roots trace back to ancient civilizations. From the early attempts at treating dental ailments in ancient times to the sophisticated techniques and technologies of today, dentistry has continually evolved to meet the changing needs of society. The practice has grown remarkably over millennia, reflecting advancements in medical knowledge, technology, and societal attitudes towards oral health.

Throughout history, dentistry has played a crucial role in improving overall health and quality of life. The progression of dental practices and the development of specialized fields within dentistry underscore the profession's importance. From rudimentary tools and theories to the establishment of formal education and professional organizations, each milestone has contributed to the refinement and expansion of dental care.

This review aims to explore the historical progression of dentistry, highlighting key developments and milestones that have shaped the profession into its modern form. Through this examination, we seek to understand the journey of dentistry from its ancient origins to contemporary practices, providing insights into how historical contexts have influenced current dental care methodologies. Ultimately, this review will illuminate the enduring significance of dentistry and its continual adaptation to serve humanity better.

WHY TO CHOOSE DENTISTRY

· Restore the oral health & transform lives of their problem.

· Independent in their careers...

· Earn good salary .

· Choose from a numbers of career option .

· maintain a flexible life style.

· Shape the future of oral health care.

· Respected member community.

· exercise creativity in their daily work.

· work as a part of the team.

· Provide Benevolent case to their Communities.

HISTORY OF DENTISTRY.

Dentistry is an oldest medical profession since 7000 BC with the Indus valley civilization Tooth decay was described 5000 Bc and a Sumerian text described tooth worm as causing dental decay which was not proven false untill 1700s.[1]

In ancient Greece, Hippocrates & Aristotal wrote about dentistery In 1530 the first book published on dentistry - The little medicinal book. for all kinds of diseases and infermities of the teeth was published.

By 1700s dentistry had become more defined profession. In 1723 Pierre Fauchard, a French Surgeon Credited as Father of modern Dentistry, published his influential book A Treatise on teeth which

first time defined as comprehensive System for caring and treating teeth He gave idea of fillings and use of dental Prosthesis, He identified that acid from sugar led to tooth decay.[1]

In 1840 First dental college was started as Baltimore College of Dental Surgery. In the United State Alabama led the way by enacting the first dental practice act in 1841 and nearly 20 years later the American Dental Association (ADA was formed. The first university affiliated dental institutions the Harvard University Dental School in 1867.

By 1873 Colgate had mass produced the first tooth paste and used with by toothbrushes

what may come as a surprise is that the first African American to earn a dental degree dates all the way back to 1869. and the first female dental assistant was employed in New orleans in 1885. Surprising of all is that Most Americans did not adopted good brushing habits until after II world war when soldiers stationed abroad brought the concept of good oral health.

Pierre Fauchard -Father of modern Dentistry (2 jan 1679- 21 march 1761)

others Fun teeth facts.

· Hesy-Re was an Egyptian - who lived 2600 B.C. recognised as the first dental practitioners. Paul Revere was famous for warning Colonial troops that the British were coming, was also trained as a dentist by America's First dentist John Baker.

· Edward H. Angle, started first school of orthodontics in 1901. Created a simple classification for Crooked teeth in the late 1800s, a system still use today.

· The first dental x-ray was used in 1896.

· NOW ADA (American Dental Association) represents 157000 dentist members. Its vision is to be the recognized leader in oral health on the national leader to state level.

· American dental education assosication(ADEA) is the voice of dental education. It's vision is to lead institutions and individuals in dental education.

American student Dental Association (ASDA) is a national student run Organization that protects and advances the rights, interest & Welfare of dental students. Pre dental students can find information on maximizing their shadowing experiences and pursuing a Career in dentistery as a non Traditional Students.

HISTORY OF INDIAN DENTISTRY.

Dentistry in ancient India holds a significant place in the history of oral health care, reflecting advanced medical knowledge and sophisticated practices for its time. Ancient Indian texts, particularly the Vedas, contain detailed references to dental care, showcasing the early understanding and emphasis on oral hygiene and treatment.

One of the earliest mentions of dentistry in Indian literature is found in the Atharva Veda, dating back to around 1500 BCE. This text discusses various herbal remedies for treating dental issues, highlighting the importance of maintaining oral health. The use of medicinal plants and natural substances for dental care was a common practice, showcasing the advanced botanical knowledge of ancient Indian practitioners. Use of medicine without logics will be similar to poison, weapon, and fire Charakasamhita. 2000 Bc.[2]

The Sushruta Samhita, an ancient Sanskrit text attributed to the surgeon Sushruta, written around 600 BCE, is another vital source of information on ancient Indian dentistry.

This comprehensive medical treatise includes detailed descriptions of dental procedures, instruments, and treatments for various oral conditions. Sushruta is often regarded as the father of Indian surgery and dentistry, and his contributions to the field are considered foundational.[3]

Ancient Indian dentists, known as "dantakara," were skilled in performing various dental procedures, including tooth extractions and treatments for oral diseases. They used specialized tools and techniques to address dental issues, demonstrating a sophisticated understanding of oral health. Additionally, ancient Indian

dentistry placed a strong emphasis on preventive care, promoting regular cleaning of the teeth and gums to prevent diseases.

The holistic approach of ancient Indian dentistry, integrating herbal medicine, surgical techniques, and preventive care, laid the groundwork for modern dental practices. The enduring principles of Ayurveda, which emphasize balance and natural remedies, continue to influence contemporary dental care in India and beyond.

When researchers discovered the proto-dentistry skills of the people of Mehrgarh in the early 2000s, they were thrilled. An article published in Nature in April 2006 revealed that the earliest evidence of human teeth being drilled in vivo (in a living individual) was found in Mehrgarh. The study's authors suggest that their findings support the idea that early farming societies in this region had a tradition of proto-dentistry. The paper describes drilled molar crowns from nine adults in a Neolithic graveyard in Pakistan, dating back between 7,500 and 9,000 years. These findings indicate that early farming cultures had a long-standing practice of proto-dentistry.[4]

Dr. Rafidin Ahmed-Father of Indian Dentistry (Raffiuddin Ahmed)

He obtained BDS in 1915 from university of Iowa college of dentistry and was a full time staff at Forsyth Dental infirmary for children in Boston. He returned back to India in 1919 and Started private Practice. He founded India's first dental College in Calcutta in 1928 from his own earning, The course of dentistry was for one year and changed to 4 years in 1935. with his effort the Bengal dentist act was passed in 1939. He was founder member of Indian Dental Association and was the president for 3 years from 1945 to 1948. He drafted Indian dentist act in 1948. He was conferred the fellowship of dental Surgery royal college of surgeons of England in 1949. In the same year he gifted Kolkata Dental College to govt of west Bengal to run as National Institute.

Dr. Rafiuddin Ahmed (24 December 1890 – 9 February 1965)

(Father of Dentistry)

in 1950 he entered in to politics and assumed the charge as minister for the Co-operation in west Bengal and won the election in 1952. He was awarded Padmabhushan in 1964. The great man Passed away on 9th Feb. 1965. Dr R. Ahmed is a unique character a life of inspiration and the father of dentistry.

After Raffudin Ahmed, a pivotal figure in Indian dentistry, several transformative advancements have shaped the landscape of dental practice in India. These include the integration of CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) technology for precise prosthetics and same-day restorations, Cone Beam Computed Tomography (CBCT) for detailed 3D imaging enhancing diagnosis and treatment planning, and Artificial Intelligence (AI) applications supporting diagnostic accuracy, personalized treatment planning, and streamlined patient management. These innovations have not only improved treatment precision and patient outcomes but also exemplify India's progression towards cutting-edge dental care integrating traditional knowledge with modern technologies.

Dentistry has evolved tremendously from ancient practices to modern times, leveraging technological advancements to enhance diagnostic accuracy and treatment outcomes. Ancient civilizations, including those in India, utilized rudimentary tools and natural remedies for dental care, documented in texts like the Charaka Samhita and Sushruta Samhita. These early practices laid the foundation for the development of dental science over centuries.

In parallel, the field of medicine advanced significantly, particularly with the advent of computers and artificial intelligence (AI). In the 1970s, the introduction of AI systems like MYCIN marked a pivotal moment. MYCIN, developed at Stanford University, demonstrated AI's capability to analyze patient data and recommend treatment options for infectious diseases based on expert knowledge.[5]

The application of AI in dentistry followed suit, initially focusing on enhancing diagnostic capabilities through the analysis of

dental radiographs and clinical data. Early AI systems in dentistry, starting in the early 2000s, utilized machine learning algorithms to interpret dental images, aiding dentists in detecting caries, periodontal diseases, and anomalies in tooth morphology with greater precision than traditional methods.

This integration of AI into dental practice represents a significant milestone, expanding beyond diagnostic support to include treatment planning, personalized medicine, and patient management. Today, AI continues to revolutionize dentistry by improving efficiency, accuracy, and patient outcomes, marking a transformative shift in how oral healthcare is delivered and managed worldwide.

CONCLUSION

The field of dentistry has undergone remarkable evolution from its ancient beginnings to its current state, characterized by advanced techniques and technologies. As one of the oldest medical professions, dentistry's journey reflects significant advancements in medical knowledge, technology, and societal attitudes toward oral health. Over millennia, the profession has played a crucial role in enhancing overall health and quality of life, with each milestone contributing to the refinement and expansion of dental care.

The historical progression of dentistry, from rudimentary tools and early theories to formal education and professional organizations, underscores its enduring significance. This review has highlighted key developments and milestones that have shaped the profession into its modern form. By understanding the journey of dentistry from its ancient origins to contemporary practices, we gain valuable insights into how historical contexts have influenced current dental care methodologies. Ultimately, the continual adaptation of dentistry to better serve humanity showcases its importance in maintaining oral health and overall well-being.

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Review Article

TITLE: PALLIATIVE DENTAL CARE- A LIFELINE FOR CRITICALLY ILL PATIENTS.

Dr. Anjali Nayak, Dr. Meghanand T Nayak, Dr. Sandeep Kumar Bains, Dr. Shilpi Srivastava,

ABSTRACT:

Palliative dental care, an emerging field of dentistry, highlights offering oral care for those suffering from life-threatening conditions. Dentists can play an important role in the management of these individuals by offering comprehensive proactive comfort care of the oral cavity. Proper functioning of the oral cavity is critical to the patient's well-being. As a result, offering complete, active comfort for the patient should prioritize pain relief and infection control in the oral cavity. Paying attention to such details may minimize not only the microbial burden of the mouth but also the danger of discomfort and oral illness. Palliative care is a multidisciplinary approach in which dentists can act as 'healing hands' in pain management, social, psychological, and spiritual issues.

This article discusses some of the most frequent issues observed in palliative care dentistry for individuals with terminal cancer, as well as the recommended therapy for these issues.

Keywords: palliative care; quality of life; oral health; pain management; multidisciplinary approach.

INTRODUCTION

Palliative dentistry care, an important component of holistic healthcare, attempts to relieve pain, restore oral function, and improve the quality of life for patients suffering from severe or terminal diseases. The field of palliative dentistry has been described "as the study and management of patients with active, progressive, far-advanced disease in whom the oral cavity has been compromised either by the disease directly or by its treatment; the focus of care is quality of life".[1]

This method includes not just providing care for the patient's bodily requirements, but also for the patient's and family's spiritual needs. This article discusses some of the most recurrent difficulties observed in palliative care dentistry in individuals with terminal cancer, as well as the recommended therapy for these disorders.

Palliative Dental Care Has Many Advantages:

Patients benefit from palliative dentistry treatment in a variety of ways, including:

· Better dental health and function.

· Pain and discomfort have been reduced.

· Improved eating and drinking abilities.

· Improved communication and social interaction.

· Improved sense of well-being and life quality.

Service Offerings of Palliative Dental Care:

Palliative dentistry treatment includes a variety of services that are tailored to each patient's specific requirements and condition. These might include oral hygiene evaluation and education, controlling symptoms and managing pain, Oral infection treatment, and Fluoride therapy are examples of preventive care.

Managing pain is one of the most significant factors to consider in palliative care. It is still an essential component of excellent palliative care. Xerostomia, mucositis, candidiasis, dental caries, periodontal diseases, taste issues, and other oral problems are frequent in palliative patients. The following illustrations depict the oral issues connected with palliative care.

XEROSTOMIA

Xerostomia is the subjective perception of mouth dryness; it is a symptom, not a diagnosis or condition. Xerostomia is frequent in palliative care patients, primarily as a result of head and neck medicines or radiation. The most basic test for xerostomia is to ask the patient if his or her mouth feels dry. Although dry mouth or xerostomia does not necessarily correspond with salivary gland hypofunction, the doctor should address the patient's main complaint.[2]

To lubricate the oral tissues, water-soluble lubricants should be utilized. Because it includes lactoperoxidase, lysozyme, glucose oxidase, lactoferrin, and no glycerin, Oral Balance gel is a great water-soluble agent and an alternative to traditional lubricants. Nursing personnel should be advised to use a foam brush to spread the product thinly all around the mouth. These goods have no disagreeable flavour. Petroleum-based products, like Vaseline, are anhydrous and hygroscopic, meaning they absorb water from the tissues. They may also block dangerous microorganisms, preventing saliva from removing them from the mouth cavity.[2]

Alcohol-containing mouth rinses should be avoided as they will

further desiccate the mouth. There are alcohol-free rinses available, such as Oral B anticavity rinses. Saliva replacements benefit the patient and should be used before eating to facilitate swallowing.[3] The cholinergic-mimetic medicines pilocarpine and cevimeline have not been thoroughly studied in palliative care. Although topical applications of malic acid, vitamin C, and citric acid can stimulate saliva, their low pH adds to tooth demineralization.

STOMATITIS AND MUCOSITIS

Mucositis and stomatitis are typical side effects of chemotherapy and radiation.[4] Chemotherapy targets tissues with a high mitotic rate, and the oral cavity is usually impacted. Reduced mitosis produces tissue shrinkage, which can lead to ulceration, which can be exacerbated by microbial invasion.[5] Mucositis develops between 5-7 days of treatment using mucositis-causing medications such as 5-fluorouracil and methotrexate. Radiotherapy for head and neck cancer causes xerostomia due to the loss of salivary tissues inside the treatment zone. The loss of lubrication and protecting substances in saliva makes tissues more vulnerable to trauma and pathogen invasion. Pain relief is the primary goal of mucositis and stomatitis treatments. Topical anaesthetics such as xylocaine and dyclonine give relief but should be used with caution since they inhibit the gag reflex and increase the risk of aspiration. In addition to its anaesthetic properties, dyclonine has been demonstrated to have anti-inflammatory effects.[6] Herpetic stomatitis has been treated with a rinse containing 5% diphenhydramine hydrochloride and loperamide. Milk of Magnesia should not be substituted since it causes dry mouth.[7] Sucralfate should be utilized on a case-by-case basis, and the clinician should not only analyze the clinical indicators of mucositis but also obtain the patient's assessment of his or her condition.[8]

Many oncologists recommend a "magic mouthwash" mixture. It includes a wide range of chemicals, including antihistamines, antifungals, topical anaesthetics, and even antibiotics. These substances should not be taken as an ultimate solution, but rather as remedies to alleviate particular problems.

A 0.2% morphine solution can be administered topically to ease the discomfort associated with mucositis after teaching patients to expectorate thoroughly by practising with saline solution. To avoid overdose, patients must be carefully selected.[9]

Before implementing any of the foregoing procedures, it is critical to detect any local traumatic causes, such as shattered restorations or teeth, or an impinging detachable prosthesis. Patients should also be encouraged to refrain from eating hot meals, smoking, and consuming alcohol.

CANDIDIASIS

Candida infection is predicted to affect 70% to 85% of palliative care patients. low oral hygiene, xerostomia, immunological suppression, use of corticosteroids or broad-spectrum antibiotics, low nutritional condition, diabetes, and denture use are all risk factors for fungal infections. Candida albicans is the most commonly observed infectious pathogen in candidiasis. It is a typical oral cavity dweller whose proliferation is generally inhibited by other non-pathologic bacteria and natural host defence systems. The existence of a positive culture in the absence of clinical symptoms does not indicate Candida infection.[10]

Candida infections include pseudomembranous, erythematous, or hyperplastic candidiasis, as well as angular cheilitis. Pseudomembranous candidiasis (thrush) is characterized by tiny white or yellow plaques with erythemic regions around them. These sores can be wiped away to reveal bare mucosa. Erythemous (atrophic) candidiasis manifests as red lesions on the tongue's hard palate and dorsal surface. The plaques in hyperplastic candidiasis do not wash away like those in pseudomembranous candidiasis. Angular cheilitis is characterized by white and red cracks radiating from the corners of the mouth. It frequently contains bacterial and fungal components.[11]

Higher levels of candida in the saliva are more common in denture users than in dentate individuals.[12] Commercial hydrogen peroxide releasing agents have been proven to be unsuccessful in denture disinfection.[13,14] Soaking the denture for 30 minutes in

bleach (15 mL) and water (250 mL) will help remove odours. Bleach solution should not be used to soak partial dentures since it can cause metal fatigue. Microwaving soft denture linings repeatedly might cause them to harden. Dentures should be kept in clearly labelled jars in water, mouthwash, 0.12% chlorhexidine, Listerine antiseptic, or 100,000 IU nystatin suspension solutions.[15] Candidiasis can be treated with a mix of topical and systemic treatments. Nystatin is one topical medication that may be used in a variety of ways. Nystatin's fungicidal efficacy is directly dependent on contact time with oral tissues, which is often small with the solution because most patients drink it quickly. Nystatin suspension has a high sugar content and should be used with caution in the xerostomic dentate patient[15]

Systemic drugs should only be used when topical treatments are unsuccessful, as they are costly and may cause renal or hepatic damage. The antifungal medicines' medication interactions should be noted by the treating dentist. Antacids, which raise stomach pH, reduce ketoconazole absorption.

DENTAL CARIES AND PERIODONTITIS

Patients with terminal end-stage are more likely to develop caries and periodontitis, with the most common cause being radiation therapy, which causes changes in salivary flow, decreased pH, reduced buffering capacity, increased viscosity, reduced cleansing action, and debris accumulation, all of which contribute to an increased rate of caries and periodontitis. A combination of restorative dental procedures, appropriate oral hygiene, and topical sodium fluoride treatment is the most effective strategy to prevent caries. Teeth that are significantly decaying and periodontally impaired should be removed based on the patient's health state, since this improves the patient's comfort when eating. To increase masticatory effectiveness, lost teeth should be restored.

NAUSEA AND VOMITING

Nausea and vomiting in palliative care patients can be caused by a variety of factors, including chemotherapy, opiate usage, intestinal blockage, pancreatitis, and electrolyte imbalance, or they might be caused by movement or an emotional reaction. Vomiting is caustic to the hard tissues and might worsen the morbidity of mucositis. It may also cause a delay in healing if the patient is unable to eat the nutrients required for tissue repair. Many of the medications used to treat nausea and vomiting have oral adverse effects, the most famous of which are tardive dyskinesia and xerostomia. Xerostomia has an impact on nutrition, communication, and oral tissues. Although the antiemetics' oral effects are significant, the inability to swallow meals and drugs orally has far-reaching consequences. The palliative care personnel address emotional outbursts by listening to the patient's problems and recommending calming strategies.[9]

Nutritional, hydration, and taste disorders

Nervous system illnesses, chronic renal and liver diseases, endocrine disorders, medicine and a variety of conditions affecting the nose and oropharyngeal area are common risk factors for reduced taste and smell. Patients in palliative care are unable to take food or fluids if their oral cavity is affected. These patients typically do not burn a high quantity of calories and eat lightly. Dehydration can be caused by vomiting, diarrhoea, fever, swallowing problems, and anorexia, which can lead to xerostomia. Patients in palliative care should be gently urged to drink as much as possible. A room humidifier, especially for mouth breathers, can assist in alleviating oral dryness during the winter months. Many palliative care patients experience dysgeusia as a result of chemotherapy or head and neck radiation.[16] Zinc supplements can help to fix this.[17] To increase the patient's appetite, give dishes with gravy, which assists in swallowing for the xerostomic patient. Food can benefit from the addition of monosodium glutamate.[2]

OSTEORADIONECROSIS

Osteoradionecrosis is characterized as slow-healing radiation-induced ischemia necrosis of bone with varied amounts of soft tissue necrosis occurring in the absence of local original tumour necrosis, recurrence, or metastatic illness. The most prevalent cause of osteoradionecrosis is a radiation dosage of more than 65-75 Gy. Trauma can be a pathophysiology in infection and radiation theory. Unrepairable teeth caused by caries, periodontal disease, or root lesions can lead to bone infection and osteoradionecrosis. Alcohol and tobacco abuse have been recognized as risk factors

for the same.

DEPRESSION

Depression is frequent among terminally sick patients. The palliative care dentist must spend time listening to his or her patient. The dentist should sit close to the patient rather than stand next to the patient's bed. Make eye contact and gently touch the patient's hand or shoulder to show empathy. It is also crucial to thank any family members or significant others who may be there. These folks require the same level of emotional care as the sick. Many people who become sad are administered antidepressants, which are also used to relieve pain. Many of the drugs can induce xerostomia.[18] The dentist should advise the doctor on which saliva-sparing antidepressant to use; for example, amitriptyline is more xerogenic than citalopram.[19]

Patients who are disappointed may neglect routine oral hygiene practices, which might worsen periodontal disease, caries, and halitosis. When confronted with these situations, some friends and relatives may reduce or discontinue their visits, causing the patient to become even more despondent. As a result, the palliative care dentist must emphasize good dental hygiene.

FUTURE DIRECTIONS AND CHALLENGES

Despite its rising relevance, various obstacles prevent palliative dental care from being widely implemented. These include:

· Lack of understanding and awareness among healthcare providers and patients.

· There is a scarcity of qualified and skilled dentists.

· Inadequate funds and resources.

· Integration with the current healthcare system.

Overcoming these issues necessitates a multifaceted strategy that includes dental practitioners receiving more knowledge and training, campaigns to increase public understanding and usage of palliative dental treatment, and specialized training programs and certification for palliative dentistry being developed. Advocating for policy reforms and more financing. Collaboration across other healthcare disciplines to ensure that palliative dental treatment is seamlessly integrated into the entire patient care plan.

CONCLUSION

Palliative care medicine is a growing field that is becoming increasingly important in today's fast-paced environment. This can be attributed to the fact that modernity and current living styles have many psychological and physical morbidities as side consequences. Palliative care patients require particular dental treatment. Numerous adverse reactions of such diseases and therapies frequently affect the oral cavity, creating a great deal of discomfort and disruption in the usual diet, affecting nutrition and general well-being. This extends beyond surgical and preventive treatment to the notion of whole patient care, which encompasses both the physical and emotional components of well-being. The function of the dentist in palliative care is to improve the patient's quality of life. Dental practitioners contribute to a holistic approach to healthcare that stresses the well-being of the complete person by knowing and treating the special oral health needs of patients with advanced or life-limiting conditions.

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Review Article

PHYTOCHEMISTRY IN PAEDIATRIC DENTISTRY: A REVIEW

Dr. Hetal Sachanandani, Dr. Suruchi Juneja Sukhija

ABSTRACT:

The field of paediatric dentistry is progressively embracing holistic approaches to enhance oral health, including the use of natural and plant-based compounds. Phytochemistry, which studies plant-derived compounds, has shown significant potential in dentistry due to its therapeutic properties. This article explores the role of phytochemicals in paediatric dentistry, focusing on their preventive, therapeutic, and management applications for various oral health conditions in children. Phytochemicals such as green tea extract, cranberry juice, propolis, neem, aloe vera, and xylitol have demonstrated antibacterial, anti-inflammatory, analgesic, and regenerative properties. These natural compounds present an alternative to conventional treatments, offering minimal side effects and cost-effective solutions for paediatric patients. However, the lack of standardisation, regulation, and sufficient paediatric-focused research presents challenges to their integration into mainstream paediatric dentistry.

Keywords: Paediatric Dentistry, Phytochemistry, Plant-Based Compounds, Oral Health, Preventive Dentistry, Treatment, Phytochemicals, Safety and Efficacy

INTRODUCTION

The field of paediatric dentistry has evolved significantly in recent years to incorporate a holistic approach to oral health. One such aspect is the use of natural and plant-based compounds in dentistry. Phytochemistry, the study of plant-derived compounds, has gained recognition in dentistry due to its potential therapeutic properties. These compounds are being investigated for their use in prevention, treatment, and management of various oral health conditions in children. This paper aims to discuss the role of phytochemistry in paediatric dentistry and its potential benefits and challenges.

BACKGROUND

The use of medicinal plants has been a part of traditional medicine for centuries. With the advancement in scientific research, these natural compounds have gained recognition in modern medicine for their potential therapeutic properties. Phytochemistry, a branch of natural product chemistry, focuses on isolating, characterising, and synthesising plant-derived compounds for medicinal purposes. Over the years, phytochemicals have been widely used in various fields, including dentistry.

In paediatric dentistry, phytochemistry has emerged as a promising alternative to conventional treatment methods. Children are often more susceptible to medication side effects due to their developing bodies. The use of natural compounds can be a safer and more tolerable option for paediatric patients. Moreover, the preventive and therapeutic potential of phytochemicals can help improve oral health and reduce the need for invasive procedures in children.

ROLE OF PHYTOCHEMISTRY IN PAEDIATRIC DENTISTRY

The use of phytochemistry in paediatric dentistry can be classified into three categories: prevention, treatment, and management of oral health conditions.

PREVENTION OF ORAL HEALTH CONDITIONS

Phytochemicals can be used in paediatric dentistry to prevent the development of oral health conditions, such as dental caries and periodontal diseases. The antibacterial and anti-adherent properties of plant-derived compounds are effective in inhibiting the growth of cariogenic and periodontal pathogens[1]. For instance, the use of green tea extract mouthwash has been shown to reduce the number of Streptococcus mutans, the main bacteria responsible for dental caries [2]. Similarly, the use of cranberry juice has been found to inhibit the adhesion of Porphyromonas gingivalis, the bacteria associated with periodontal diseases[3]. These natural compounds can be used as adjuncts to conventional oral hygiene practices to prevent the progression of oral health conditions in children.

TREATMENT OF ORAL HEALTH CONDITIONS

Phytochemicals have also shown promising results in treating oral health conditions in children. For instance, propolis, a resinous substance derived from plants, can be used as a natural alternative to treat dental caries[4]. Its antimicrobial and anti-inflammatory properties can help control the bacterial colonisation and reduce

the inflammation in the affected area. Furthermore, plant-derived compounds such as neem, aloe vera, and clove have been used in paediatric dentistry for their analgesic and anti-inflammatory properties to relieve pain and promote healing in oral mucosal lesions[5].

MANAGEMENT OF ORAL HEALTH CONDITIONS

Phytochemicals can also be used in managing certain oral health conditions in children. For instance, xylitol, a natural sugar substitute found in plants, has been used as a preventive measure against otitis media, an infection in the middle ear, in children[6]. Its antibacterial and anti-inflammatory properties have been found to inhibit the growth of pathogenic bacteria and reduce the risk of developing otitis media. Moreover, plant-derived compounds such as azadirachtin, found in neem, have been investigated for their potential in promoting dental pulp regeneration in cases of pulpal injury or infection[7].

BENEFITS OF PHYTOCHEMISTRY IN PAEDIATRIC DENTISTRY

The use of phytochemicals in paediatric dentistry offers several benefits compared to conventional treatment methods. One of the primary advantages is the absence of adverse side effects. Children's developing bodies can be highly sensitive to medications, and natural compounds can be a safer alternative with minimal or no side effects. Additionally, phytochemicals have a low cost of production, making them more accessible to children and their families.

Another benefit is the potential for prevention and early intervention. By incorporating phytochemicals in oral hygiene practices, children can reduce the risk of developing oral health conditions. Furthermore, the use of natural compounds in the early stages of an oral health condition can prevent its progression and reduce the need for invasive procedures.

CHALLENGES OF INCORPORATING PHYTOCHEMISTRY IN PAEDIATRIC DENTISTRY

Despite the potential benefits, there are challenges in incorporating phytochemistry in paediatric dentistry. One of the significant challenges is the lack of standardisation and regulation of natural and plant-derived compounds[8]. Unlike conventional medications, these compounds may not undergo extensive clinical trials and regulatory processes, making it challenging to determine their safety and efficacy. Moreover, the effectiveness of these compounds may vary depending on the species, extraction methods, and quality controls, making it challenging to replicate results[9].

Another challenge is the limited evidence and research on phytochemicals' use in Paediatric dentistry. Most studies have been conducted on adult populations, and there is a need for more research on the effects of these compounds in children. Furthermore, the perception of natural and plant-based compounds as alternative or complementary medicine may limit their use in Paediatric dentistry[10].

CONCLUSION

Incorporating phytochemicals in Paediatric dentistry offers a promising option for prevention, treatment, and management of oral health conditions in children. The therapeutic potential, minimal side effects, and low cost of production make natural compounds an attractive alternative to conventional medications. However, the lack of standardization, limited research, and perception of alternative medicine pose challenges to the widespread use of phytochemicals in Paediatric dentistry. Therefore, further research and evidence-based protocols are needed to ensure the safe and effective use of these compounds in Paediatric patients.

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Review Article

ADVANCING PROSTHODONTICS: HARNESSING PHOTOGRAMMETRY FOR PRECISION AND PATIENT -CENTRIC CARE

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ABSTRACT:

This article explores photogrammetry's transformative impact on prosthodontics, highlighting its potential to enhance precision and improve patient outcomes. Photogrammetry, the science of making measurements from photographs, has emerged as a valuable tool in dental prosthetics due to its ability to capture detailed, accurate three-dimensional images of oral structures. This technology offers significant advantages over traditional methods, including reduced patient discomfort, shorter appointment times, and enhanced customization of prosthetic devices. By integrating photogrammetry into clinical practice, prosthodontists can achieve higher accuracy in measurements, leading to better-fitting prostheses and improved patient satisfaction. Additionally, the non-invasive nature of photogrammetry supports a more patient-centric approach, fostering a more comfortable and streamlined experience. This article reviews current photogrammetry applications in prosthodontics, discusses its benefits and challenges, and envisions future advancements that could further revolutionize dental care. Through a combination of technological innovation and patient-focused practices, photogrammetry represents a promising advancement in the quest for excellence in prosthodontic treatment.

KEYWORDS: Photogrammetry, 3D models, 2D photographs and objects, visualization

INTRODUCTION

Dentistry relies heavily on precise information regarding teeth morphology, their alignment within the dental arch, occlusion, and the overall structure of the face and jaws[1]. This knowledge is critical across various dental disciplines, guiding both preventive and corrective treatments, as well as procedures aimed at restoration and rehabilitation. Traditional methods involve creating plaster models from dental impressions, supplemented by 2D images that provide limited spatial and three-dimensional information[2].

Recently, there has been a growing shift towards using 3D models for enhanced accuracy and detailed treatment planning. This evolution is driven by advanced non-invasive techniques that offer superior precision and reproducibility in capturing patient data[3]. One such technique, photogrammetry, harnesses the science of deriving three-dimensional information from two-dimensional images[4]. By capturing multiple photographs from different angles using a mobile device and processing them with specialized software like Agisoft Metashape, dental professionals can generate comprehensive 3D models[5]. This approach allows for thorough analysis of facial profiles, teeth morphology, occlusion, bite registration, and other critical aspects of dental care.

Photogrammetry's versatility extends across various medical and dental applications, making significant contributions to fields like prosthodontics through its ability to digitally reconstruct and evaluate teeth and facial structures. This article explores the applications of photogrammetry in dentistry, focusing particularly on its role in digitally-driven practices such as prosthodontics.

The study utilized electronic databases including Pubmed/Medline, Google Scholar, Index, EBSCO, Directory of Open Access Journals (DOAJ), SCOPUS, and Primo Central Index to investigate photogrammetry and its use in prosthodontics. The objective was to explore and highlight the innovative technique of photogrammetry and its specific applications within prosthodontics.

DISCUSSION

The article explores the applications of photogrammetry, with a specific focus on its significance in prosthodontics:

1. Maxillofacial Reconstruction: Photogrammetry is employed to analyze and document maxillofacial defects using various reference points. The complex anatomical structures of the oral and facial regions can be accurately captured, which is challenging with traditional methods. This non-invasive technique provides superior esthetic outcomes necessary for rehabilitating significant defects. It enables precise 3D reconstruction of defects in areas like the eye socket, orbital region, nose, and ear. Additionally, photogrammetry allows for

detailed color characterization with high accuracy[6,7.]

2. Occlusal Registration: In this process, 3D models of the upper and lower dental arches are positioned based on their natural occlusion during mouth closure. Initially, plaster models are used to set the teeth in a specific posture using a dental articulator or silicone molds for alignment. The dental articulator ensures registration of the normal centric occlusion, while silicone molds are molded within the mouth to capture the occlusion on either the left or right side. These molds are then placed between the plaster models of the dental arches to maintain their mutual positions as they would be in the mouth. The front surfaces of the upper and lower teeth rows are scanned to create a precise digital model that accurately represents the occlusion of real jaws[1,8,9.]

3. Occlusal contacts: Traditional 2D analysis methods have limitations in capturing detailed tooth morphology needed for assessing occlusal contacts. Photogrammetry provides 3D positional data from 2D photos, using the black silicone method and generating facets to construct a 3D image. These facets replicate the occlusal surface with polygons, accurately depicting textures of occlusal contacts. This method contrasts with conventional 3D scanning, which often fails to replicate anatomical configurations. By integrating interocclusal records, it reflects mandibular displacement and periodontal ligament movement under occlusal force, enhancing detection of contact location and direction1[10.]

4. Facial evaluation and reconstruction: Digital facial photos are now standard in planning dental aesthetic treatments. They assess features like symmetry, smile and lip contour, and tooth visibility from standardized images. Precise head positioning and camera distance are critical to minimize errors. Symmetry is evaluated using horizontal and vertical lines, aligning the midface with the interincisal line for aesthetic balance. Key horizontal lines include the hairline, eyebrow line, interpupillary line, and interalar line, crucial for aesthetic assessments[11].

5. 3D duplication of teeth and face: Photogrammetric systems used in dental research are of the similar, as the object–camera distance is less than 300mm.The proposition of remodeling a 3D surface by photogrammetry is based on a method called bundle adjustment. This method involves simultaneously refining the 3D coordinates of surface points, the different positions of the camera and the camera's optical characteristics. virtually, positioning the intra-oral camera at angles α1, α 2, α 3 ... α50 to take 50 photographs of the tooth from divergent points of view in a 15 mm radius hemisphere. An overlaying of 60% between the sequential photographs is considered necessary to automatically find some correspondences between the points of a photograph and the subsequent photograph. The supreme results are obtained when we do not change the distance to the tooth between successive photographs. All photograph are unified on the tooth, with approximately half of the adjacent tooth in the field of view. All the obtained photographs are then sent to the Autodesk cloud via the Internet to be transformed into 3D models. Three uploads are performed separately for each image acquisition series (images of the tooth of interest and adjacent teeth, images of the opposing teeth, and images of the teeth in occlusion). Within 10 to 15 minutes, three reconstruction files can be generated and visualised with ReMake software[12,13.]

6. Occlusal Analysis: Specialized software has been developed for 3D modeling of dental arches, facilitating visualization in different modes (solid, wireframe, points), as well as sectioning and measurement capabilities. This software allows for manual or automatic sectioning based on reference points, with the ability to create multiple parallel sections. Contours of these sections are depicted in 2D or 3D curves, enabling precise measurement and comparison of tooth contours from different perspectives, including intact teeth, dental prostheses, and opposing teeth[2,14.]

7. Complete Arch Implant Prosthesis: Photogrammetric techniques are utilized to accurately record the positions and orientations of multiple dental implants. This method's fidelity is comparable to Coordinate Measuring Machines (CMM), and although slightly less accurate than traditional methods, it provides sufficient overall measurement precision. The photogrammetry system offers a panoramic view of implants within an arch, ensuring accurate fabrication of implant

suprastructures[15,16,17.]

8. Detection of Facial Profile: Photogrammetry plays a crucial role in assessing soft tissue facial profiles, which is essential for enhancing dental and facial aesthetics in prosthodontic treatments. This technique provides detailed insights into facial morphology by capturing precise details of soft tissue in relation to dentoskeletal structures[18,19.]

9. Production of 3D Models: Photogrammetric techniques are widely employed across various fields to generate accurate 3D models, ranging from landscapes to small objects. In physical anthropology, for instance, photogrammetry enables precise assessments of large skeletal elements like crania. The technique has also proven effective in capturing gross tooth shapes with high accuracy, comparable to other advanced systems like SfM (Structure from Motion) and SLS (Selective Laser Sintering), ensuring virtual models meet diagnostic standards required for clinical treatments[20,21.]

10. Tooth Shape: - Tooth assessment, including odontometry in dentistry, now increasingly relies on 3D models rather than physical teeth or plaster imprints. This shift offers extensive possibilities compared to traditional methods, facilitated by new measurement techniques that enhance precision, non-invasiveness, and detail. Historically time-consuming, tooth measurements benefit greatly from modern methods, making computerization pivotal for advancing and implementing these techniques. Our research utilizes computerized 3D modeling and automated measurements to efficiently gather vital data for suggesting recommendations in complex tooth preparation procedures within a short timeframe. Using our native photogrammetric 3D reconstruction system, we can create precise 3D models of dental arches, replicate their structures and occlusions, and conduct detailed measurements automatically[2,22.]

11. Measurement of dental casts: 3D virtual dental models constitute an alternate, suitable way of recording and maintaining occlusal data on hard drives. Multi-baseline digital close-range photogrammetry (MBDCRP) is a evolved technology to acquire 3D geometric information for real-world objects from stereoscopic image and has potential way in orthodontics to record plaster casts three-dimensionally. With a holographic sensor SLR digital camera, photos of dental casts can be gripped using a multi-short baseline method. The images are then imported into a programme designed for computerized space analysis. 3D models of dental casts without extreme horizontal overlap can be reconstructed by a novel method of MBDCRP profitably. The specific build on 3D digital models are replicable. Without expensive hardware and software, MBDCRP is an distinct way to reserve and estimate dental models without the requirement of a special room to keep plaster casts, mainly worthy for private dental clinics and community clinics[3].

12. Facial analysis: The facial emergence is biased as it is contrived by various agents such as race, ethnic, gender, socio-cultural, and age. Due to the dissimilarity in conception, clinicians should contemplate the suitable normal value of the thorough facial emergence is based on the patient's race and nationality when planning a treatment. complete facial appearance is affected by the soft tissue that covers the skeletal tissue. Facial profile is one of soft tissue component that has to be examined for prosthodontic diagnosis. Soft tissue of the face needs an independent evaluation in addition to the skeletal and dental inspection in order to wind up a full-scale diagnosis and treatment planning of the face. The reliability of the photogrammetry, mainly for the measurement of the lips and mouth was evaluated, strongly advocated and suggested that the sake of photogrammetry can be increased by developing superior techniques. Photographs provides a good assessment of agreement between the external craniofacial structures, including the soft tissues, in addition to providing dependable measurements. Through photogrammetric examination of the facial profile, proportionality, angular and linear measurements can be gained[1,6,23.]

13. Impression of multiple implants: The method used for recording the positions of multiple dental implants by displaying the positions of multiple dental implants using a system based on photogrammetry. The concept of photogrammetry contains of 'metering what is written in light,' in other words, getting reliable metric details from photographs. The photogrammetry technique

enlarges the two-dimensional information given by photos into three dimensions; using different cameras, the shape of every photographic object and their location in space are reconstruct in connection to an external system of reference points. To make the salient calculations for reconstruction, special cameras are needed that are able to identify this system of reference points. Photogrammetry permits the recording of the exact three-dimensional locations of the implants, moving all the information need to fabricate the prosthesis right from the patient's mouth to a computer file. This technique keeps away the disruption along with standard impression techniques. Impression abutments, implant body analogues, trays and impression materials are not needed. The PIC camera measures angles and distances between prosthetic attachments set down on the implants, allowing the patient total freedom of motion and the existence of blood, saliva or any other organic or inorganic remnants should not affect measurement precision. The clinical demand of this novel photogrammetry system for registering the location of multiple implants allowed the rehabilitation of a patient with utmost maxillary free end edentulism with a prosthesis of optimal fit. The prosthetic fabrication process was imposed, fast, simple for the dentist and satisfying for the patient[24,25.]

14. Analysis, planning and visualisation: Dentistry is a field which needs imposed information about teeth shape, their relative position and their emergence in the face. This statistic is essentially important for various dentistry fields such as orthodontia, teeth treatment, denture construction. prevailing system for inspecting mutual teeth arches position (occlusion) use plaster teeth arches casts and distinct mechanical tools which allow recording the occlusion. To Investigate and visualize the outermost appearance of teeth arches only 2D images are used which do not furnish full and acceptable presentation. So existing means do not give required accuracy and are not suitable for a dentist. Proposal of Photogrammetric technique gives solution for all described problems with relevant accuracy of measurements and high-quality data for investigation, documentation and presentation. A prop of new techniques for teeth occlusion registration and analysis is proposed based on seeking teeth arch 3D model instead of a plaster mould. The photogrammetric techniques are well developed and are used for computerized patient face and teeth arch 3D models creations, for occlusion registration, treatment planning and documentation[1,26.]

15. Facial and dental symmetry: Maxillary anterior teeth have presiding role in the interpretation of the dento-labial complex by their position, shape and size. If these are in harmony with other components of orofacial region, they significantly contribute to the aesthetics of the face. Symmetry is one of crucial component in the conception of dento-facial aesthetics. Imagined horizontal lines significant in the aesthetic evaluation are line of the hair, line of the eye brow, inter-pupillary line, ala-tragus line and inter-commisural line. Parallelism of those lines generates horizontal symmetry and merge the face composition. Interpupillary line is used as reference line in the assessment of incisal and occlusal plane. Concerning the aesthetic detail, ideal should be considered when inter pupilar line and the line drawn on incisal edges of incisor (incisal line) are parallel and both will be vertical to the line which goes on the mid of the face[11,27.]

CONCLUSION

The photogrammetric system of images accession has long been used in various fields of science and industry. Its advantages include the clarity and cost effectiveness of technical execution, high accuracy of the obtained data, complete contactless application and the chances for the digital processing of a wide amount of information over a short period of time, acquisition of a virtual model of high accuracy. The developed techniques allow fast and precise information generating full 3D model of a teeth arches in given occlusion and a multi-resolution face 3D model for treatment planning and visualisation. The developed software gives to a dentist new effectual and convenient means for teeth occlusion study, treatment planning and documenting. This technology is a boon for prosthodontics; however, this technology still does not provide enough precision or proven accuracy for incorporation into the treatment flow, it is a fascinating tool for the diagnosis, planning, and storing of documentation. More studies are needed before this methodology can be designated for a clinical application, such as for the preparation of guides for

guided implant surgery. upcoming agreements should be tested with the acquisition of new tools, such as the integration of target references, other photographic settings and alternative software.

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Review Article

DOES ORTHODONTIC TREATMENT AFFECT THE PERIODONTAL HEALTH – A REVIEW

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ABSTRACT

By correctly repositioning teeth, orthodontic therapy improves both the function and appearance of an occlusion. The relationship between teeth and the tissues that surround and support them significantly influences these alterations. Orthodontic therapy has been suggested to lead to an improved periodontal status through mechanisms such as increased ease of plaque removal and reduced occlusal trauma. Today, general dentists and orthodontists play integrative roles that enable them to achieve the best possible results for their patients. The objective of this review is to compare contemporary orthodontic treatment with no intervention, by means of evaluating periodontal outcomes by reviewing.

Keywords: periodontal health; periodontal disease; periodontitis; fixed appliances; orthodontic treatment; removable appliances.

INTRODUCTION

Orthodontics is that branch of dentistry concerned with prevention, interception and correction of malocclusion and other abnormalities of the dento-facial region.

Periodontitis comprises of a inflammatory conditions of the supportive tissues of the teeth that are caused by bacteria.

Orthodontic treatment ensures the accurate positioning of the teeth and optimizes the occlusion–jaw relationship. This approach not only improves the quality of life by helping patients with eating, talking, and their appearance[1] but also improves their overall health. Therefore, the number of adult patients choosing orthodontic treatment has steadily risen in recent years[2]. The effect of orthodontic treatment on the prevalence of periodontitis has been debated among scholars. Recently, periodontal health's importance has increased in line with the number of adult orthodontic patients. The orthodontic treatment–periodontitis relationship has been widely studied by scholars, and it often has a synergistic character. Orthodontic treatments enhance periodontal health by aligning teeth and balancing occlusion, in turn improving hygiene by making it easier for patients to access their teeth and reducing occlusal trauma. Fixed orthodontic devices can enhance supragingival biofilm formation and worsen periodontal tissue's condition[3].

Orthodontic tooth movement has enhanced periodontal health in numerous cases, while periodontal therapy frequently aids the promotion of orthodontic tooth movement[4].

Several factors, including host resistance, systemic diseases/conditions such as diabetes mellitus or a smoking habit, the periodontal phenotype (particularly for the width of the buccal bone plate), the quantity and type of dental plaque, and the patient's oral hygiene routine are all important for maintaining periodontal health during orthodontic treatment[5-6].

Bone levels and shapes in periodontally affected patients can benefit from orthodontic therapy as it facilitates plaque removal, a reduction in occlusal trauma, and potential action to stimulate bone growth within bony defects[7-8] . On the other hand, periodontal therapy might improve the efficiency of orthodontic treatment. Scholars often advise that practitioners perform orthodontic treatment after periodontal therapy to prevent quick and irreparable damage inflammation-related gum damage during such treatment.

Orthodontic treatment, like any other form of medicine, has both positive and negative aspects. Nonetheless, compared to other surgical and non-surgical procedures, this treatment's reported risk and complications are quite low. By highlighting the crucial relationship between orthodontics and periodontics in everyday clinical practice, we aimed to enhance multidisciplinary treatments' success and foster more collaboration between dental experts[1].

MECHANISM OF ACTION

The orthodontic and periodontal professions have a common objective, namely improving both the facial appearance and dental aesthetics while maintaining the masticatory apparatus' health and lifespan. In recent decades, a consistent rise in the number of adult patients seeking orthodontic treatment with fixed equipment has been noted. Furthermore, a recent survey revealed that 50% of 30-year-old individuals in the United States exhibit periodontitis symptoms. This correlation between periodontal and

orthodontic therapies, particularly in adult patients, has encouraged clinicians and academics to explore numerous related lines of inquiry[9].

The propagation of orthodontic forces within the strained tissue matrix to the adjacent cells in the periodontal ligament and alveolar bone leads to these cells releasing proinflammatory, angiogenic, and osteogenic substances, initiating the process of remodelling the periodontal ligament and alveolar bone[10] . According to the literature, fixed orthodontic appliances (FA) are associated with notable clinical attachment loss and alter the subgingival bacterial microbiota and gingival inflammation, regardless of the individual's dental hygiene practices[11].

The presence of orthodontic brackets and elastic modules hinders the efficient elimination of plaque, elevating the individual's susceptibility to gingivitis. Self-ligating brackets' (SLBs) purported advantages compared to conventional brackets (CB) include improved bacterial retention and reduced plaque buildup. Past research has indicated that orthodontic treatment, if not well managed, potentially impacts the inflammatory process and causes the periodontium to deteriorate, leading to a significant loss of attachment[12].

Although the prevailing belief is that SLBs lead to enhanced oral hygiene compared to CB, several studies have challenged this notion. The debate around this topic remains unresolved. Potential alternatives to fixed orthodontic appliances (FA) include utilizing transparent aligners. These aligners have several possible benefits, such as reduced plaque buildup and enhanced gingival and periodontal parameters, which may be more advantageous than the use of FA[13].

The way in which the jaws and gums react to orthodontic treatment is largely determined based on the duration and severity of the forces applied to the teeth. The bioelectric and pressure–tension theories can be used to assess the orthodontic biological mechanisms. The hypothesis states that bending the bone produces piezoelectric currents, in turn determining changes in bone metabolism. Orthodontic stresses usually cause alveolar bone displacement, and these strains alter the periodontal ligament, formed by electrons traveling from side to side within the network of a crystalline materia[11].

According to the pressure–tension theory, chemical signals regulate cell development and, by extension, tooth movement. When a constant strain is applied to a ligament, certain parts experience compression, decreasing oxygen tension and, eventually, blood flow, while other areas experience traction, increasing oxygen tension and, ultimately, blood flow [14]. Blood vessel damage leads to an inflammatory response, producing new blood vessels and connective tissue. When periodontal fibers are compressed, the "hyalinization" process [15] occurs, leading to the atrophy and/or pyknosis of cell nuclei and collagen fiber convergence in a gelatinous-like substance.

Hyalinization, as described by Reitan in his study of histological changes resulting from the orthodontic application of force16, involves the loss of normal tissue architecture and discoloration characteristics of collagen present in processed histological material, occurring in cell-free regions inside the periodontal ligament. Reitan observed that hyalinization occurred within the periodontal ligament if even slight pressure was applied. Direct resorption occurs after removing hyalinized tissue due to the activated osteoclasts originating from the ligament, followed by indirect resorption with cellularblood flow. When the periodontal ligament (PDL) is compressed, blood flow within the PDL decreases until the blood vessels collapse completely, causing ischemia. After 1–2 s of gentle pressure, the PDL is partially compressed, causing fluids to leak out of both the periodontal space and the alveolus; after 3–5 s, blood vessels passively compress on the pressure side and dilate on the tension side, with the PDL's fibers and cells appearing to be mechanically distorted[17-19].

Periodontal and Bone Biomarkers Related to Orthodontic Force Application

Orthodontic tooth movement causes a cascade of coordinated cellular and molecular activities that result in connective tissue

remodeling and osteoclast activation. During orthodontic tooth movement's early stages, IL-1 is one of the most abundant cytokines in the periodontium[18].

IL-1 is primarily released by macrophages, with macrophage increases in compressed periodontal regions identified later during treatment. Thus, during tooth movement's early stages, IL-1 is produced by other periodontal cell types, such as osteoclasts, as an immediate response to mechanical stress. Previous studies have demonstrated the upregulation of inflammatory cytokines and their associated receptors following an inflammatory response generated via the perforation of the buccal cortical plate in rats undergoing orthodontic treatment. The mRNA concentrations of IL-1β in rats' periodontal ligaments increase within a 3 h time frame following the application of an orthodontic force; this trend is primarily observed on the side experiencing pressure[19].

During the orthodontic movement process, several proliferative markers are expressed. The presence of KI-67 and the receptor activator of nuclear factor-Kappa β ligand (RANKL) [20] suggests the recruitment of osteoclasts in regions experiencing compression. Conversely, the expression of Runx225, Col1-GFP, and BSP-GFP in cells indicates increases in differentiated osteoblasts in regions experiencing tension. In the early stages of orthodontic tooth movement, the macrophage colony-stimulating factor (M-CSF) is key to osteoclast differentiation, increasing osteoclast recruitment and differentiation rates[26].

In particular, optimal M-CSF doses are associated with observable changes in tooth movement and gene expression. This relationship will enable future clinical studies for accelerating tooth movement methods. Vascular endothelial growth factor (VEGF) is the principal mediator of angiogenesis, and it increases vascular permeability during tissue neoformation, usually due to the presence of blood vessels[21].

Periodontal ligament angiogenesis and vascular endothelial growth factor activation are both triggered by compressive forces used in orthodontic tooth movement. When teeth are moved for orthodontic treatment, neurogenic inflammation manifests as an increase in certain proteins' concentrations in the periodontium. Periodontal peripheral nerve fibers transmit impulses to the central nervous system via somatosensory neurons. When orthodontic tension is physiologically applied to the gums, the nerve gums' fibers release the neurotransmitters calcitonin gene-related peptide (CGRP) and substance P29. Orthodontic tooth movement causes a biological change, primarily in the bone tissue around the teeth. Osteoblasts and osteoclasts express alkaline phosphatase (ALP) and acid phosphatase (ACP), respectively, which are both involved in bone metabolism[22].

The periodontal ligament has significantly higher ALP activity than other connective tissues 31. These enzymes are created in the periodontium in response to orthodontic force, and they diffuse in the gingival crevicular fluid at the affected location. Orthodontic tooth movement-related tissue changes can be observed by monitoring phosphatase activity in the gingival crevicular fluid. Prior human and animal studies have linked changes in GCF phosphatase activity to alveolar bone remodeling.

Orthodontic Fixed Appliances And Periodontal Health

For correcting various malocclusions, fixed orthodontic treatment remains the gold standard . Though traditional braces have been widely acknowledged as useful, there are still drawbacks associated with this treatment option. Plaque buildup in the teeth is encouraged by the use of a fixed orthodontic appliance because it makes cleaning teeth more difficult. Several studies have analyzed the correlation between bracket materials, designs, and ligations and the prevalence of cariogenic bacteria and periodontal damage1. For bracket ligation techniques, it has previously been hypothesized that self-ligating brackets (SLBs) exhibit superior periodontal outcomes due to the absence of ligature materials and reduced number of sites promoting retention[23].

Candida is a commensal, benign bacterium found in the oral cavity of 53% of people worldwide; however, if aberrations in the microbiota's usual range or host immunological deficiency exist, this bacterium may grow to aggressive and dangerous levels[1]. The colonization of candida and the prevalence of specific strains or species exhibit temporal variability during orthodontic therapy.

Contaldo et al.'s1 review underscored the lack of clarity regarding the presence of Candida sp., viruses and protozoa in orthodontic patients' oral microbiota. Candida was more prevalent 6 months after bonding orthodontic appliances compared with the pre-bonding period, while C. tropicalis was identified in 20% of patients in Hernández-Solise et al.'s study[24]. Furthermore, the studies of Perkowski et al.41 and Grzegocka et al.42both found that orthodontic treatment positively impacts the colonization of Candida sp. This correlation has specifically been observed in cases in which fixed appliances were utilized, while the extent of colonization might vary throughout the duration of treatment. Guo et al.[25] conducted a comprehensive review and meta-analysis encompassing 13 articles. Their research objective was to examine microbiological alterations in subgingival plaque among individuals undergoing orthodontic treatment. They found that the presence of subgingival infections increases during orthodontic therapy, although only briefly in most cases.

Fixed appliances' impacts on oral microbiota's composition and characteristics is a transient phenomenon contingent on controlling oral hygiene. Patients are advised to use caution when handling the stent and frequently remove the plaque accumulating around the wire to enhance the oxidation-reduction potential. Hence, using an alternative removable orthodontic appliance should make this process easier to perform and promote improved recovery in individuals in need of prompt interventions[26].

Orthodontic Removable Appliances and Periodontal Health

Multiple studies have demonstrated that using orthodontic fixed appliances (FA) leads to a notable increase in dental plaque accumulation. This trend is primarily attributed to the challenges related to maintaining adequate oral hygiene while wearing such appliances. Consequently, this heightened plaque accumulation causes gradual enamel demineralization and gingival inflammation. Ultimately, these factors may deteriorate the tissues supporting the teeth. Transparent plastic clear aligners (CAs) have been used to address some restrictions associated with traditional fixed appliances (Fas). The existing literature characterizes this treatment option as a secure, comfortable, and visually pleasing intervention[27].

In Pango Madariaga et al's study, the authors observed that multibracket appliances exhibited considerable GBI increases compared to aligners during the initial evaluation. However, they also found that the appliance type did not discernibly impact periodontal variable enhancement. This finding remained consistent for all factors, such as aging, and all sites assessed, even if these factors were statistically significant. Thus, the authors emphasized the need to consider alternative criteria to assess an appliance's efficacy. Similarly, Chhibber et al[28] presented findings that challenge the prevailing notion that removable appliances, relative to multibracket ones, have few adverse periodontal health impacts.

Levrini et al reported a statistically significant distinction between the removable aligner and fixed appliance groups in terms of the plaque index (PI), gingival bleeding index (GBI), and probing depth (PD), with patients using aligners having the lowest average values. The researchers found that removable appliances should be the primary therapy option for individuals susceptible to periodontal disease.

Periodontal Health During Aligner Treatment

As widely stated in the scientific literature, the most important orthodontic related risk factors for periodontal disease are the increase of plaque retention and the worsening of plaque quality . Between 3 and 12 weeks after the beginning of supragingival plaque formation, a distinctive[29] subgingival microflora predominantly made up of gram-negative, anaerobic bacteria and including some motile species, becomes established. In order to establish in a periodontal site, a species must be able to attach to one of several surfaces including the tooth (or retentive surfaces attached to the tooth), the sulcular or pocket epithelium, or other bacterial species that are attached to these surfaces.

The studies by Low et al. and Levrini et al. regarding the quality and morphology of the oral biofilm of patients treated with Clear aligner treatment (CAT) or fixed appliances stated, respectively, that biofilm starts forming on the raised edges or textural surfaces of the aligners and that the types of bacteria included in the biofilm were associated to a low risk of periodontal diseases.

From a clinical point of view, CAT seems to be a safe procedure

for periodontal tissues with respect to fixed appliance treatment techniques, with particular reference to the amount of possible plaque retention. This seems to be due to the removable nature of CAT, facilitating oral hygiene procedures, and to the reduced amount of plaque retentive surfaces. Considering all these observations, CAT could be indicated in the orthodontic treatment of patients with compromised periodontal health.

Considering all the results of this systematic review, strong limitations come from the heterogeneity and the low number of the selected studies, as well as multiple sources of bias that decreased the overall quality of evidence. It is recommended that future researches in this field should include randomized controlled design with rigorous methodology and proper sample size, in order to increase the power of the studies for estimating the periodontal effects.

CONCLUSION

When using orthodontics to treat individuals with periodontal problems, we must pay attention to the following aspects: the orthodontic appliance utilized, the state of the patient's teeth and periodontal tissues, the depth of the gum pockets, the position of the teeth in the supporting tissue, and the patient's motivation and ability to sustain oral hygiene and health. Periodontal health, as well as quantity and quality of plaque, were better during CAT than during fixed appliance treatments. A significant decrease of periodontal indices (GI, PBI, BoP and PPD) during CAT was observed in the analyzed sample of patients. Orthodontic therapy's success depends on an orthodontist's ability to anticipate and address any periodontal issues arising before, during, or after treatment.

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Review Article

RECENT ADVANCES IN OBTURTING MATERIALS IN PAEDIATRIC DENTISTRY

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ABSTRACT

In order to maintain arch length and function and to offer appropriate guidance for eruption of permanent teeth, primary teeth should be preserved until their regular exfoliation period. It also enhances aesthetics and mastication, prevent aberrant tongue habits, aid in speech and prevent the psychological effects associated with tooth loss. Obturation materials play a pivotal role in the success of endodontic treatment for carious primary teeth. Among various obturation materials, Zinc Oxide Eugenol is commonly used but has high toxicity and may delay healing in periapical tissue. Calcium Hydroxide-Iodoform mixture is now preferred despite its faster resorption rate. Ideal root canal filling material should be resorbable, antiseptic, non-inflammatory, radiopaque, easy to insert, flow, remove and non-discoloring as well as less time consuming. It must ensure effective sealing and biocompatibility. To fulfil these requirements many innovative obturating materials and combinations of antibiotic were introduced. Zinc Oxide combined with natural ingredients like Aloe vera, propolis have shown promising success rates as obturating materials. Newer alternatives like Smartseal shows superior clinical efficacy, promising long-term outcomes. These advancements not only enhance treatment success but also minimize discomfort for paediatric patients. By understanding the strengths and weaknesses of each material, they can optimize care for different clinical scenarios, ensuring the highest quality of treatment for patients. Research in pulpectomy emphasizes on developing newer obturating materials with characteristics similar to tooth. This article will explain the role of various major obturating materials, which we employ in dentistry, illustrating their benefits and drawbacks, as well as adjustments.

Keywords : Pediatric Dentistry, Root Canal obturation, pulpectomy, Herbal, Root Canal Filling Materials

INTRODUCTION

In paediatric dentistry, managing infections in primary molars during endodontic treatment poses a significant challenge for dentists. Treating infected primary teeth is necessary to maintain them as natural space maintainers, provided they can function and remain disease-free.[1] the goal is to maintain primary tooth health until natural exfoliation. Tooth loss in children can cause arch length loss, inadequate space for permanent teeth, ectopic eruption, and other issues.[2,3] primary teeth with pulp necrosis are polymicrobial, predominantly with anaerobic bacteria.[1] pulp therapy for deciduous teeth differs from permanent teeth, requiring specific medicaments and techniques.[4]

Optimal requirements of obturating material for deciduous teeth

In an attempt to improve the clinical success of pulpectomies, different filling materials and obturation techniques for primary teeth have been proposed. However, no filling material currently meets all ideal criteria: antibacterial properties, biocompatibility, seamless canal filling, resorption if extruded, removability, radiopacity, and non-discoloration.[5]

Rabinowitch's criteria for ideal root canal medications

· Non-irritating, stable disinfectants
· Easily resorbed if over-applied
· Easy to insert and remove
· Adheres well without shrinking
· Insoluble in water
· Does not discolor the tooth
· Radiopaque for visibility on x-rays
· Promotes tissue healing
· Harmless to adjacent tooth structures
· Avoids hard mass formation that could hinder tooth eruption[5]

Rifkin's criteria for ideal pulpectomy obturant

· Resorbable at the same rate as the root
· Antibacterial and antiseptic properties
· Non-inflammatory and non-irritating to periapical tissues and developing tooth buds
· Radiopaque for clear visualization on radiographs[5]

Zinc oxide eugenol (ZOE) is a widely used obturating material but has drawbacks, such as delayed resorption and toxicity concerns. Alternatives like calcium hydroxide and iodoform combinations

(e.g., metapex, vitapex), endoflas, and herbal derivatives shows promising results that can be used as alternatives to traditional ZOE.[1]

Due to the limitations of ZOE, calcium hydroxide as well as iodoform, ongoing research is needed to develop optimal obturation materials. Advancements in this area enhance treatment success and minimize discomfort for paediatric patients, ensuring high-quality care for various clinical scenarios. Hence, the aim of this review is to discuss various obturating materials that are available and used in daily clinical practice.[1,5]

Obturating materials for primary teeth

Zinc Oxide Eugenol (ZOE)

After Bonastre's discovery of zinc oxide eugenol, Chisholm employed it in dentistry in 1876 by combining zinc oxide with eugenol to create zinc oxide eugenol, or ZOE.[6] According to Sweet's 1930 description, it was the first root canal filling material that was advised for primary teeth.[1]

The obturating material zinc oxide eugenol has the following characteristics: anti-inflammatory and analgesic properties, greater zone of bacterial inhibition, ease of availability, radiopacity of material, cheaper/cost effective, good plasticity, insolubility in tissue fluids, easy mixing and sufficient working time. The path of eruption of succedaneous teeth can be altered by ZOE, which can also lead to anterior crossbite, palatal eruption, ectopic eruption of succedaneous teeth, necrosis of cementum and bone, slow resorption of ZOE compared to root resorption, enamel defects in permanent successors, failure of extruded material to resorb at the periapical region due to hardening, irritation of soft tissues, allergy to eugenol, and show signs of cytotoxicity and neurotoxicity.[6]

Praveen et al.[7] and Sunitha et al.[8] observed that excess material forced through the apex during filling procedures can remain in the apical tissue during the process of physiological root resorption and it takes few months or even years to resorb.[7,8]

Moskovitz and Samara[9] concluded that malformation of successor is attributed to the cytotoxic and neurotoxic nature of eugenol.

Sadrian and Coll[10] demonstrated that none of the retained ZOE particles caused any observable pathology and were also not related to treatment failure.

Calcium hydroxide

Herman introduced calcium hydroxide, which has widespread use in the apexification of permanent teeth, as a temporary intracanal dressing, and as a liner for deep restorations. It is suggested as the last obturation material for primary teeth undergoing root canal therapy. With a high alkaline pH, it stimulates fibroblasts and inhibits internal resorption, aiding in healing and repair. It has a moderate to mild antibacterial activity. However, it has limitations such as being resorbed too quickly from the root canal prior to the completion of physiological resorption. This creates a "hollow tube" effect wherein tissue fluid seeps in and eventually becomes a site for infection.[1,11]

In a short-term study by Chawla, a combination of zinc oxide powder and calcium hydroxide paste for obturation of primary teeth has shown promise and they found that the obturated material remained up to apex of root canals till the physiologic root resorption begins. Also, the material was resorbed at the same rate as teeth.[1,11]

Iodoform based pastes

Iodoform is an iodine preparation made by heating an alcoholic potassium iodide solution. It has strong germicidal qualities, creates no foreign body reaction, and is more readily resorbed from the periapical area than other filling materials. Compared to ZOE, iodoform pastes have superior biocompatibility and disinfection qualities. Iodoform has the drawback of causing material in the canals to resorb more quickly than physiological root resorption. The disadvantage is that it might discolour teeth a yellowish-brown colour.[1,11]

Erasquin et al. have shown that iodoform is irritating to the periapical tissues and can cause cemental necrosis[6].

KRI PASTE

Volkoff developed kri paste, which is essentially an iodoform paste and is resorbable and ideal for root canal filling. Iodoform (80.5%), para chlorophenol (2.023%), camphor (4.84%), and

menthol (1.213%) contribute to its composition. Kri paste is an endodontic root filling that is radiopaque. To reduce coagulation with adjacent tissues, camphor and menthol are combined with the antibacterial agent and para chlorophenol. Since iodoform is radiopaque and non-irritating, it is added as a vehicle to deliver the antimicrobial agent.[1,5]

Rifkin claims that it satisfies all requirements for the ideal root canal filling material for primary teeth. Long-lasting bactericidal potential was also discovered.[11]

Kri-1

A procedure for filling necrotic primary molars with a paste composed of kri-1 and pure calcium hydroxide was published in 1989. The technique achieved a high success rate with complete symptom remission. This was the first publication in which formaldehyde was mentioned as a component of root canal filling material, thus partly recovering buckley's formula, which contained 40% formaldehyde and glycerine.[5]

Kri-3

This liquid differs from the widely used kri-1 paste since it contains twelve times more parachlorophenol, camphor, and menthol and hence has stronger antibacterial qualities.[5]

Maisto paste

It was first introduced by Maisto in 1967, and tagger et al. Employed it to fill primary teeth's root canals.6 zinc oxide, iodoform, thymol, chlorophenol camphor and lanolin make up this mixture. It differs from kri paste because it also includes lanolin, zinc oxide, and thymol. It lowers the resorption rate of the paste from within the canals of endodontically treated primary teeth.[1,5,6]

Maisto paste: Pabla et. Al reported that, maisto paste had the best antimicrobial activity>idoform paste> ZOE >vitapex.[6]

Guedes-pinto paste

In 1981, Guedes-Pinto proposed guedes-pinto paste (GPP), a root filling substance for primary teeth made of iodoform, camphorated para chlorophenol, and rifocort. Each component is combined in equal parts on a glass plate that has been sterilised to create the paste.[12]

Endoflas

ZOE, iodoform, calcium hydroxide, barium sulphate, eugenol, and pentachlorophenol make up the hydrophilic material known as endoflas. It provides the root canals a good seal. Its broad-spectrum antibacterial action aids in cleaning the accessory canals and dentinal tubules, which are difficult to reach. Resorption is limited to the obturation material that is extruded beyond the apex extra without resorption of the material inside the root canal since endoflas's resorption rate is similar to the natural root resorption rate. When it comes to success rates, endoflas exceeds zinc oxide eugenol. ZOE, Ca(OH)2, and iodoform are three materials that were added to endoflas, this was possibly to compensate the drawbacks of each element with its benefits.[1,5,6]

Fuks et al. observed that endoflas resorbed when overextended periapically, however, it did not resorb intra radicularly and reported 70% success clinically with endoflas and a 100% decrease in periapical radiolucency. Endoflas's high rate of clinical and radiographic success demonstrates its superior healing properties and complete bone healing.[6]

Endoflas-chlorophenol-free (CF)

Radiolucent lesions that developed after primary teeth completed endodontic treatment may be due to phenol-containt in filling material. This led to the development of endoflas CF, which is chlorophenol-free. Since chlorophenol has a fixing action that might affect osteoblast cells, it was removed from the endoflas composition.[1]

Metapex/ Vitapex

30.3% calcium hydroxide, 40.4% iodoform, and 22.4% silicone oil are combined to create metapex. Using disposable tips, the mixture can be injected into the root canals. Less damage to the periapical tissues results from the silicone oil content of metapex, which neutralizes the paste's alkalinity. For primary teeth, calcium hydroxide-iodoform mixture (metapex) is thought to be the best pulpal filling material; however, its rate of resorption is slightly

higher than that of typical physiologic root resorption. As a result, there is a "hollow tube" effect that eventually results in an unfilled root that might harbour infections.[5,6]

Innovative materials

"Chitra HAP-Fil"

The usage of biomaterials like hydroxyapatite is currently trending in dentistry, Jeeva and Retnakumari et al. in troduced "Chitra HAP-Fil," a biocompatible root canal obturating material made from hydroxyapatite nanoparticle gel, mimicking bone and dentine mineral content. It contains 32% pure iodoform and 65% hydroxyapatite nanoparticle gel, with 3% alginate as a gelling agent (including 0.2% surfactant). This composition provides antibacterial properties through calcium ion binding. " Chitra HAP-Fil " meets ideal criteria for pulpectomy material. Cellular response evaluations ranked metapex as least cytotoxic, followed by Chitra HAP-Fil and then zinc oxide eugenol.[6]

Calen paste

Pinto contrasted the calen paste thickened with zinc oxide with the success rate of ZOE. Calen paste, thickened with zinc oxide, shows a high success rate by inducing new bone formation and preventing pathologic root resorption.[1]

Smartseal

It is a root canal obturating material which is based on polymer technology and uses a hydrophilic principle which can absorb surrounding moisture and expand which results in filling of spaces and voids. Hydrophilic nature is revealed by propoints, which permits infinite water volume existing in the root canal system that is engrossed by these points. This water may hydrogen bond to the existing polar locations, therefore, permitting the enlargement inside the polymeric chains.[5,12]

Pulpotec

Pulpotec combines antiseptic, antibacterial, and anti-inflammatory properties, primarily through its key ingredient, iodoform, which acts like an antibiotic paste at the root canal entrance. It helps reduce infection signs in teeth with bone lesions. Clinical and radiological evidence supports its use in pediatric dentistry as an alternative to traditional endodontic treatment for necrotic primary teeth.[1]

Rifocort

This potent medication combines an antibiotic and a corticosteroid, recommended for treating infected pulpal processes in primary teeth. It exhibits bactericidal effects against most species, except enterococcus faecalis and bacillus subtilis.[5]

CTZ paste

CTZ is an antibiotic paste containing 500 mg chloramphenicol, 500 mg tetracycline, 1000 mg zinc oxide, and 1 drop of eugenol. Chloramphenicol acts against gram-positive and gram-negative microorganisms, aerobic, facultative anaerobes, and spirochetes. Tetracycline is a broad-spectrum antibiotic effective against anaerobes and gram-negative bacteria. Zinc oxide eugenol (ZOE) paste provides analgesic properties and strong antibacterial activity against staphylococci, micrococci, bacilli, and enterobacteria for over 30 days.[11]

Zinc oxide eugenol propolis

Al-Ostwani AO et al.[11] evaluated zinc oxide and propolis (ZOP), endoflas-chlorophenol-free, metapex paste, and zinc oxide and eugenol (ZOE) for pulpectomy in nonvital primary molars. Clinical and radiographic outcomes were assessed at six and twelve months. Results showed similar success rates among all filling pastes. The ZOE group maintained stable radiolucency over both periods, with ZOE paste resorption slower than root resorption in 31.3% of cases. Conversely, ZOP demonstrated correlated resorption rates (62.5%) with root resorption during the observation periods.[11]

Ozonated oil and zinc oxide

Chandra et al. Found that a mixture of ozonated oil and zinc oxide showed a higher success rate (93.3%) in root filling of primary teeth compared to zinc oxide eugenol (63.3%), based on clinical and radiographic evaluations. They concluded that ozonated oil-zinc oxide is a viable alternative obturating material for infected primary teeth, showing good clinical and radiographic outcomes at 12 months follow-up.[6]

Aloe vera

Khairwa et al. found that zinc oxide combined with aloe vera

showed promising clinical and radiographic outcomes, suggesting it as a viable alternative to zinc oxide eugenol.[1,5]

CONCLUSION

ZOE can be substituted with zinc oxide ozonated oil or zo combined with aloe vera. Because endoflas only resorbs materials that have been extruded and has superior antibacterial properties, it can be recommended in everyday use.[5] Pulpototec can be utilized to save primary teeth that are necrotic. Based on the findings of this review, we can therefore apply this knowledge to our everyday clinical practice. Future randomized clinical trials with larger sample sizes should be carried out in the field of obturation materials, including comparisons between traditional and novel materials and herbal derivatives, as well as long-term follow-ups that promote sound evidence-based practice.[1]

Paediatric pulp therapy is a significant health benefit for the child when it is administered according to good standards for case selection and methodology. It has been discovered that even if the existing obturating materials for primary teeth provide satisfactory clinical outcomes, they still require modification to fit the different clinical situations that arise. The current combinations of calcium hydroxide and iodoform seem to provide better results than zinc oxide eugenol (ZOE) cements.[1,6] therefore, more research is required to create a root canal filling material for primary teeth that satisfies every need of the perfect obturating material.[6]

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Materials and Methods: Materials and/or subjects utilized in the study as well as the procedures undertaken to complete the work. The methods should be described in sufficient detail such that they could be repeated by a competent researcher. The sources of all major instruments and reagents used (kits, drugs, etc.) must be used with parenthesis. Illustrations and/or tables may be helpful in describing complex equipment elaborate procedures. The statistical tool used to analyze the data should be mentioned. All procedures involving experimental animals or human subjects must accompany a statement on ethical approval from appropriate ethics committee.

Results: Data acquired from the research with appropriate statistical analysis described in the methods section should be included in this section. The results section should highlight the important result obtained. Data should be organized into figures and tables. Qualitative as well as quantitative results should be included, if applicable.

Discussion/Conclusion: This section should relate the results section to current understanding of the scientific problems being investigated in the field. Description of relevant references to other work/s in the field should be included here. This section also allows the authors to discuss the significance of the results. This section should end with answers/questions that arise as a result of the author's work.

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1. West JD, Oates TW. Identification of stability changed for immediately placed dental implants. Int J Oral Maxillofac Implants 2007;22:623-30.

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1. Lee JS, Kim JK, Park YC, Vanarsdall RL. Applications of orthodontic mini implants. Chicago: Quintessence 2007.
2. Baumgartner JC. Pulpal infections including caries. In: Hargreaves KM, Goodis HE (Eds). Seltzer and Bender's Dental Pulp. Chicago: Quintessence 2002:281-307.

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