

Inter Disciplinary Periodontics: A Multi Disciplinary Approach to Complex Case Planning and Treatment

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Abstract:- Dentistry has recently entered an era of specialized and interdisciplinary approaches to each clinical condition that requires specific skills. Complex situations require comprehensive management and may require interdisciplinary collaboration between physicians to achieve treatment goals and provide effective functional rehabilitation and cosmetological intensive treatment. Often, periodontal disease is widespread and affects oral health in many ways, so periodontal disease cannot be operated on alone and needs to be networked with other dental disciplines. It is clear that the interaction and interaction between periodontal treatment and other dental disciplines such as endodontics, prosthodontics, orthodontics is important to provide the best possible care. is. Some challenging treatments that may require an interdisciplinary approach include periodontal and periodontal complex lesions in patients treated for periodontitis, adult orthodontics, Includes prosthesis repair and placement of dental implants in patients with a history of periodontitis.

I. INTRODUCTION

Dental practise today is largely based on a multidisciplinary approach. Interdisciplinary dentistry can either be understood in a very specific sense as the real fusion of specialties or in a broader sense as a multidisciplinary phenomena where independent specialists collaborate to tackle a problem from each one's unique conceptual perspective. Longer lifespans, along with the quickly advancing advancements in clinical practises and biomaterials, have led to more complex treatment modalities that may include diverse therapies that should combine functional needs with more stringent aesthetic standards. Additionally, as the population ages, more and more medically compromised patients—such as cardiovascular patients—receive dental and periodontal care to restore their dentition. These patients' holistic management may require clinicians to work together in order to overcome composite and complex challenges in a multidisciplinary approach that combines a variety of medical and dental disciplines, such as periodontics, orthodontics, endodontics, and prosthodontics. Periodontitis impairs patients' quality of life and dental health in a considerable percentage of patients, which is unfortunate. The physicians' capacity to make the proper diagnosis, assess the prognosis of the damaged tooth or teeth, and plan and implement an appropriate therapy in accordance with biological and clinical evidence can be improved by understanding these interrelationships.

II. ENDODONTIC AND PERIODONTAL INTERACTIONS

A. ETIOLOGY

- **Bacteria:** Rupf et al.¹We studied the pulp and periodontal pathogen profiles associated with the same tooth. Aggregatibacter actinomycetemcomitans, Tannerella forsythia, Eikenellacorrodens, Fusobacterium nucleatum, Porphyromonas gingivalis, Prevotella intermedia, and Treponema denticola were all detected using specific PCR (polymerase chain reaction) methods.
- **Fungi:** Untreated caries dentin tubules failed root canal treatment with asymptomatic apical periodontitis and peri-root tissue with fungal colonization associated with root canal lesions Was done. Candida albicans was found in 21% of root canal infections. Other species have been discovered, including Candida glabrata, Candida guilliermondii, Candida inconspicua, and Rhodotorulamucilaginosa.
- **Viruses:** Human cytomegalovirus and Epstein-Barrvirus type I were detected in approximately 65% and 40% of periodontal pocket specimens and in approximately 85% and 80% of gingival tissue specimens, respectively. Subgingival P. gingivalis, T. forsythia, P. Increased incidence of intermedia, Prevotellanigrescens, T. Denticola and A. actinomycetemcomitans are associated with gingival herpesvirus and suggest that they are involved in the overgrowth of periodontal pathogens.
- **Contributing factors**
 - Poor endodontic treatment
 - Poor restoration
 - Trauma
 - Resorption
 - Perforations
 - Developmental malformation

B. DIFFERENT TYPES OF LESIONS

- Primary endodontic diseases
- Primary periodontal diseases and
- Combined diseases.

The combined diseases include:

- Primary endodontic disease with secondary periodontal involvement
- Primary periodontal disease with secondary endodontic involvement and
- True combined diseases.

a) Primary endodontic diseases:

Acute exacerbations of chronic apical lesions of teeth with necrotic pulp can coronarily flow through the periodontal ligament into the gingival sulcus. This condition may appear on the surface like a periodontal abscess. In fact, it is the pulp sinus tract that enters from the periodontal ligament area. Clinicians need to insert a gutta-percha cone or other positioning device into the sinus and take one or more x-rays to identify

the origin of the lesion for diagnostic purposes. The bag is small and has no width when examined. A similar condition occurs when the drainage extends from the tip of the molar to the bifurcation area in a coronal manner. This can also occur if the necrotic pulp has an outer canal that extends into the bifurcation area. After root canal treatment, primary endodontic disease usually recovers. (fig., 1)

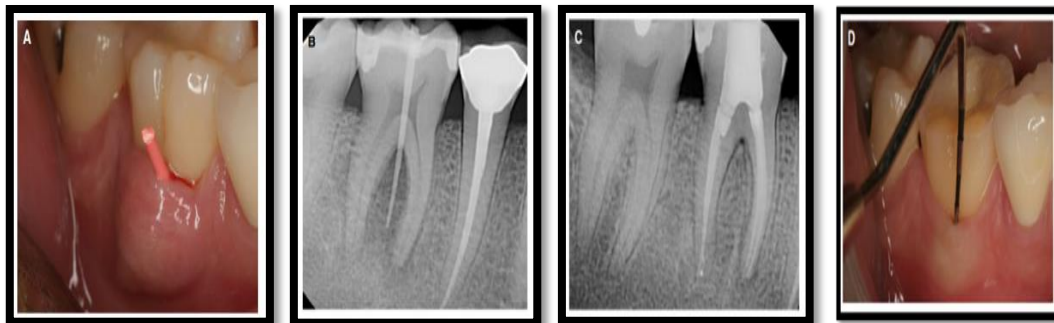


Fig. 1: Mandibular first molar with necrotic pulp presents with primary endodontic disease. (A) Gutta-percha cones are used to track abscesses on the buccal surface of teeth. (B) Radiation-impermeable mesial and distal root and bifurcation root cyst radiographs. (C) Four months after root canal treatment, x-rays show active bone healing. (D) Buccal periodontal defect is clinically healed and probing is normal.

When the affected necrotic pulp is removed and the root canal is properly cleaned, shaped, and occluded, the sinus extending into the gingival sulcus or bifurcation region declines at an early stage.

b) Primary periodontal diseases

Periodontal disease bacteria are the main cause of these lesions. At this stage, chronic marginal periodontitis progresses to the apex along the surface of the root. In

most cases, the pulp test shows a clinically normal pulp response (Figure 2). Plaque and tartar often accumulate, resulting in larger pockets. The prognosis depends on the degree of periodontitis and the effectiveness of periodontal treatment. In addition, in patients with abnormal nerve root development, clinicians should pay attention to the presentation of radiographs of periodontal disease.



Fig. 2: Shows a primary periodontal lesion that resembles an endodontic lesion. (A) Radiation permeability around the root of the mandibular first molar and absorption around the apex in radiographs. (B, C) View of damaged tooth from buccal and lingual side. There are signs of gum edema and periodontitis. In addition, the pulp cavity has an occlusal filling. Despite its clinical and radiological appearance, the pulp responds normally to vitality testing techniques, indicating that radio transparency, absorption, and gingival swelling are all caused by periodontitis.

c) Combined diseases

Secondary periodontal disease due to primary endodontic disease If a purulent primary endodontic infection is left untreated for an extended period of time, it may be secondary to a slight exacerbation of periodontal disease. (fig., 3)



Fig 3: Primary endodontic disease with periodontal complications. (A) Preoperative radiograph of the symptomatic mandibular first molar. The pulp sensitivity test was negative. Periapical periodontitis was found to be caused by necrotic pulp. (B) The mesial root still showed deep pockets (7-9 mm), but endodontic treatment was performed. (C) There is a serious mucosal gingival defect with limited keratinization and no connected gingiva at the time of examination. (D) Investigation revealed significant bone loss and extensive calcification in the mesial roots. (E) The bone defect was washed and the root surface was resected. (F) A bone defect was repaired using a substitute bone and a resorbable membrane. (G) A two-month follow-up shows active troubleshooting.

Periodontitis is caused by gingival plaque in the sinus canal. The management and prognosis of teeth with plaque or stones is different from that with only primary endodontic disease. Teeth are currently in need of endodontic and periodontal treatment. Prognosis is determined by the severity of marginal periodontal injury and the effectiveness of periodontal treatment when endodontic treatment is

adequate. With endodontics alone, only some of the lesions heal to the level of secondary periodontal lesions. In general, tissue damage caused by pulp suppuration heals. Perforation of the root during root canal treatment, or misaligned post or post during repair of coronary arteries can lead to primary endodontic disease with secondary periodontal disease (fig., 4)

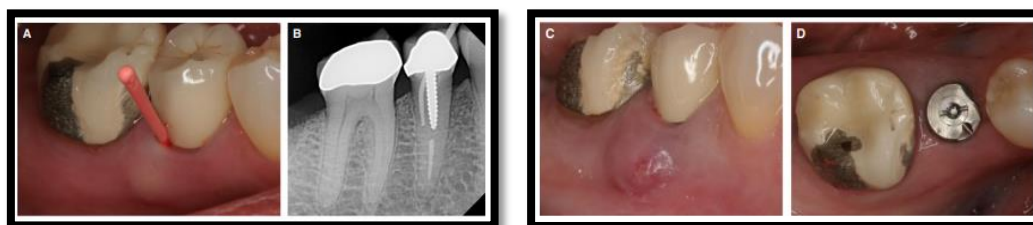


Fig. 4: The clinical manifestations of complications from some root abnormalities can be comparable to primary endodontic disease with secondary periodontal disease. (A) The mandibular second premolar that received endodontic treatment was connected to a local deep pocket (traced with a gutta-percha cone). (B) Radiograph of a root cyst showing a gutta-percha cone pointing to the root area associated with the screw post. (C) The buccal plate was lost after an abscess formed on the buccal surface of the tooth. (D) Surgical examination revealed a fracture of the vertical root, the tooth was removed and replaced with an implant

Pain, swelling, drainage of pus, pockets, and tooth movements are all symptoms of periodontal abscess. A more chronic reaction is the sudden appearance of bleeding pockets during probing or exudation of pus, which may or may not be painful. If the root hole is close to the bundle bone ridge, you can raise the flap to fill the defect with the appropriate filler. Repairing a deeper perforation or bifurcation cover has a better prognosis than treating the infected one. Mineral trioxide aggregate has been shown to improve cement healing after rapid perforation repair in such situations. Root fractures can occur as a primary endodontic disorder followed by periodontitis. These are most common in root canal teeth with posts and crowns. Symptoms can range from local deepening of periodontal

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pocket to the establishment of a more severe periodontal abscess. Root fractures have been a growing problem with molar teeth that have had their roots resected.

- d) Primary periodontal disease with secondary endodontic involvement

Development of the apical part of the periodontal pocket can continue until the apical tissue is affected. The pulp in this scenario can become necrotic as a result of infection through the outer canal or apical foramen. (fig., 5)

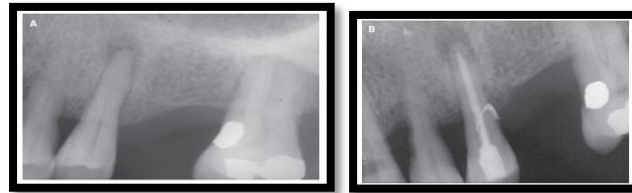


Fig. 5: Maxillary premolars with primary periodontal disease and secondary endodontic treatment. (A) X-rays showing radiation permeability and bone loss around the apex of one-third of the root of unity. The crown was intact, but the pulp susceptibility test was negative. (B) Radiographs taken immediately after root canal treatment show a sealer of the lateral root canal exposed due to bone loss.

The prognosis of one root tooth is usually poor. You can improve the visibility of the molars. Root resection can be a viable treatment option, as not all roots lose supporting tissue in the same way. Pulp has a high chance of survival if the blood supply circulating at the tip is intact. When the apical foramen is affected, pulp changes secondary to periodontitis are more likely to occur. In these cases, root canal infections are caused by bacteria from the periodontal pockets. Microorganisms in the root canal have been found to be significantly associated with their prevalence in the periodontal pockets of advanced periodontitis. Studies show that cultured samples taken from the pulp tissue and root dentin of periodontal-affected human teeth showed bacterial development in a percentage of the teeth. Treatment of periodontitis may lead to the involvement of later endodontics. Curettage, scaling, or surgical flap treatment can open the outer canal and dentin canaliculus into the oral environment. Curettes can cut the blood arteries in the outer canal, pushing bacteria into the area during treatment, causing inflammation and necrosis of the pulp.

- e) True combined diseases

The occurrence of a combination of true endodontics and periodontal disease is rare. This occurs when an endodontic disorder growing in the coronary arteries encounters an infected periodontal pocket that progresses to the apex. This type of injury usually has a high degree of loss of attachment and an uncertain prognosis. (fig., 6)

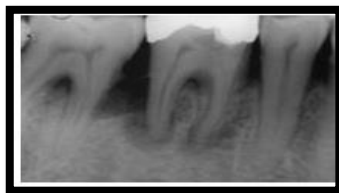


Fig. 6: Mandibular first molar with a combined infection of true endodontic treatment and periodontal disease. This x-ray image shows endodontic and periodontal disease separately. The teeth were left untreated and the two lesions eventually merged.

This is especially true in the case of single-rooted teeth. (fig., 7)

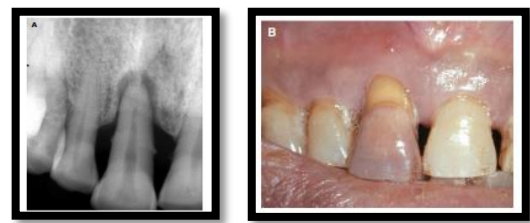


Fig. 7: True combined endodontics and periodontal disease. (A) X-rays showing bone loss of two-thirds of the roots, as well as stones and radiation permeability around the apex. (B) Laboratory examination revealed a coronal color change and pus oozing from the gingival sulcus. The pulp sensitivity test was negative

Otherwise, all roots of the molars will be seriously affected. Root resection can be considered as a treatment option. In some cases, additional surgical intervention may be required (Figure 8). After successful endodontic treatment, peri root healing is usually expected. However, depending on the severity of the complex disease, the periodontal tissue may not respond well to treatment. The combination of endodontics and periodontal disease may appear as a vertically fractured tooth on x-ray. Fractures that penetrate the pulp cavity and cause necrosis may be classified as true mixed lesions, but do not respond to treatment. If a sinus canal is present, it may be necessary to raise the flap to determine the cause of the lesion.

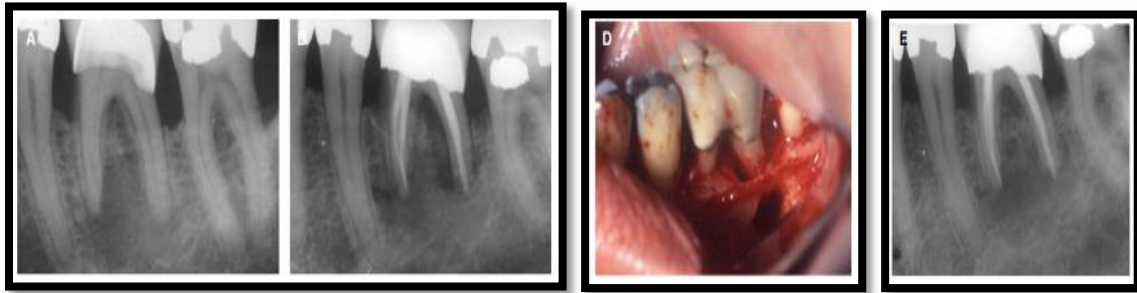
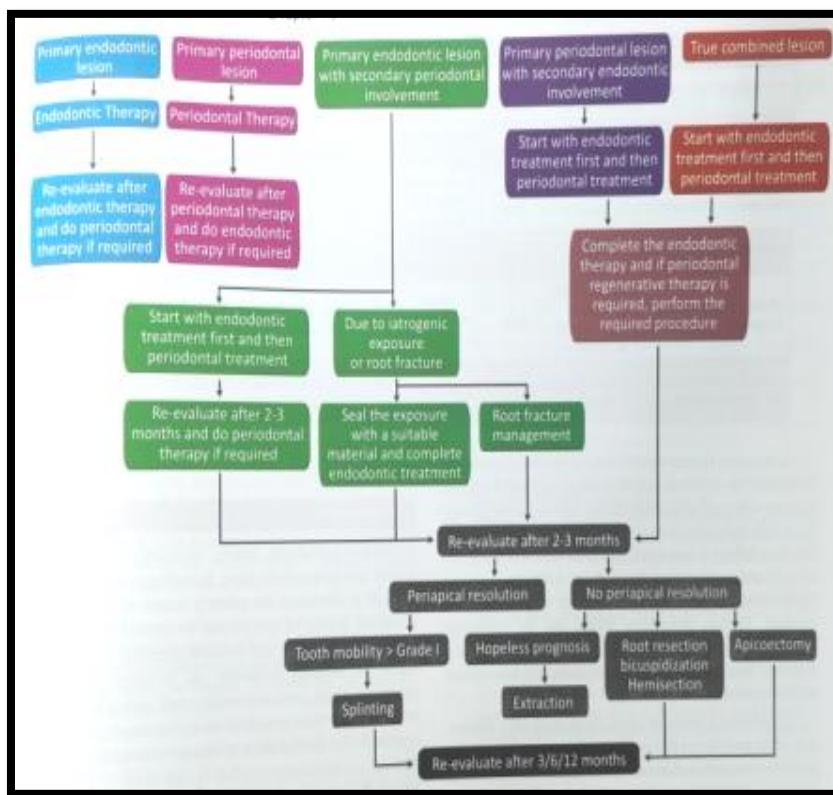


Fig. 8: Mandibular first molar that combines true endodontic treatment with periodontal disease. (A) X-ray permeability around the papilla in preoperative radiographs. The pulp sensitivity test was negative. (B) X-rays taken immediately after non-surgical endodontic treatment. (C) Six-month follow-up radiographs showed no signs of healing. The gutta-percha cone is placed in the buccal gingival sulcus. (D) Clinical photographs showing root surface reconstruction therapy and eradication of periroot lesions. (E) 1-year follow-up radiographs show signs of active healing.

MANAGEMENT²



III. PERIODONTICS AND FIXED PROSTHODONTICS INTER DISCIPLINARY INTERFACE

Interdisciplinary treatment is needed to promote patient satisfaction. For patients with complex prosthetic and / or periodontal problems, this includes simultaneous and coordinated periodontal and prosthetic therapy. The following six periodontal-prosthetic interactions are associated with fixed prosthetic treatment:

- Gingival contour and level.
- Edentulous region
- Periodontal support magnitude
- Tooth preparation for the abutment.
- prosthesis morphology
- The prosthetic material

A. Gingival contour and level

The morphological features of the gingiva that can affect all stages of prosthetic treatment have been mentioned by several authors. (Table 1).

Variable	Description and ideal criteria
Attached gingiva	Continuous and uniformly wide (at least 2mm)
Gingival display	Individual differences exist. During function, the lip line determines: Clinically, the highest lip line is the most difficult to control. The average lip line is thought to be the most attractive. Low lip line is the easiest to achieve.
Color and surface texture	Pink and tightly wrapped down to the tooth throats The gingival tissues have a stippled surface texture with an orange-peel look.
Interdental papilla	Knife-edged and firm Occupies the interdental space created by the interdental embrasure and a contact point.
Contour	Symmetric Follow the contour of the upper lip. The gingival height should be the same for the central incisor and the canine. The gingival height of the lateral incisors should be slightly higher than that of the central incisors (approximately 1.5 mm). On the labial surface of the upper anterior tooth, the convex surface of the gingival margin should be distal to the long axis of the tooth.

B. Edentulous area

According to Zitzmann et al³, low pressure was not associated with significant clinical consequences as long as

effective plaque control was maintained. Material type and tissue contact does not appear to be more important to tissue health than prosthesis irrigation or patient home care.

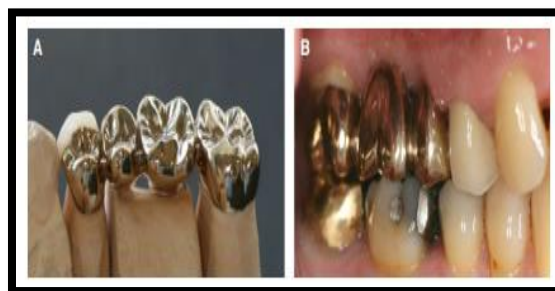


Fig. 9: (A) Clinical case of modified ridge lap pontics to replace a lost second premolar and a missing first molar (B) The embrasures were thoroughly cleaned to allow for patient care at home.

The ridge lap, modified ridge lap, and ovate designs are the most prevalent pontics for the anterior regions.

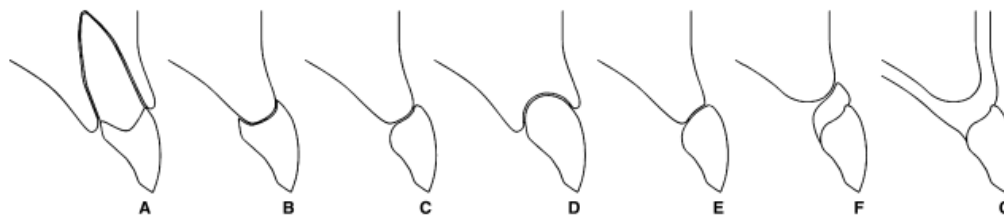


Fig. 10: Pontic design of the anterior restoration. Natural teeth (A). (B) Ridge Lap Pontic provides a surface that the patient cannot clean. (C) The modified Ridge Wrap Pontic is a washable and aesthetic choice. (D) The advantage of an egg-shaped pontic is that it resembles a natural tooth rash. (E) Oval link modified for thin combs. (F) If the defect in the ridge is obvious, you can examine the pontic with a gingival-colored ceramic. (G) Removable partial dentures are an effective way to treat severely weakened ridges.

The sanitary, conical, and modified ridge lap designs are the most ideal pontics for posterior sites.

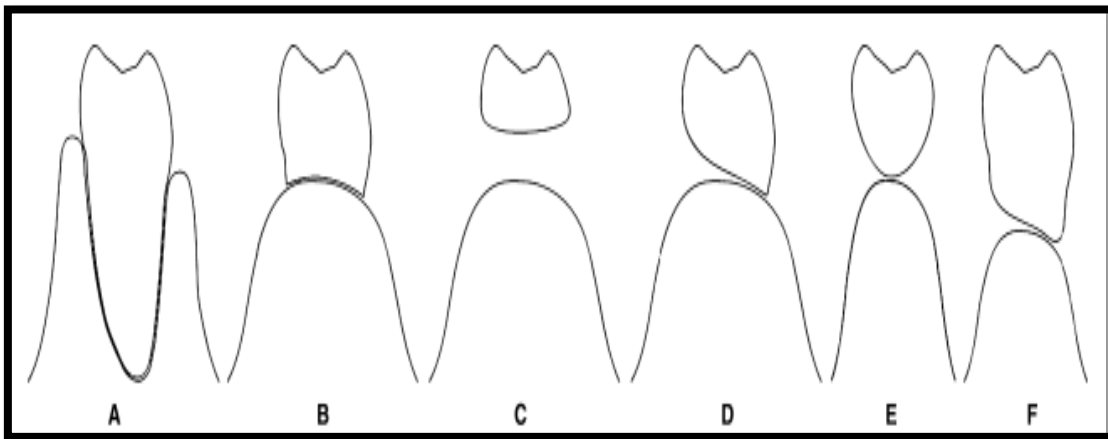


Fig. 11: Pontic design for rear replacement. Natural teeth (A). (B) Ridge Wrap Pontic can restore natural tooth contours, but is difficult to clean. (C) Pontic piping. (D) For wide summits, a modified ridge lap pontic is a good option. (E) The tapered intermediate link is suitable for thin burrs. (F) Route form with ridge wrap members.

C. Periodontal support magnitude

Patients with a history of periodontitis that may clinically manifest as increased crown-to-root ratio and or tooth loss should be evaluated for periodontal support. Therefore, a crown-to-root ratio of 1: 2 was declared optimal, but this ratio is difficult to detect clinically, so a 1: 1.5 ratio is sufficient, and a 1: 1 ratio is the smallest. According to Ante's Law, the cumulative perceived area of all abutment teeth supporting a fixed prosthesis must be equal to or greater than one or more teeth to be replaced. However, increasing the span of dentures increases the risk of non-periodontal disease.

D. Tooth preparation for the abutment

The goal when preparing teeth is to achieve sufficient clearance to allow permanent and physiological recovery without much sacrifice of natural tooth material. The problem of caries or periodontal disease is not always associated with marginal openings that have not been clinically diagnosed. However, to reduce the risk of illness, the dentist should aim for the smallest possible marginal deviation.

E. Designing a margin

The chamfer, shoulder, and feather-edge margin designs are available.

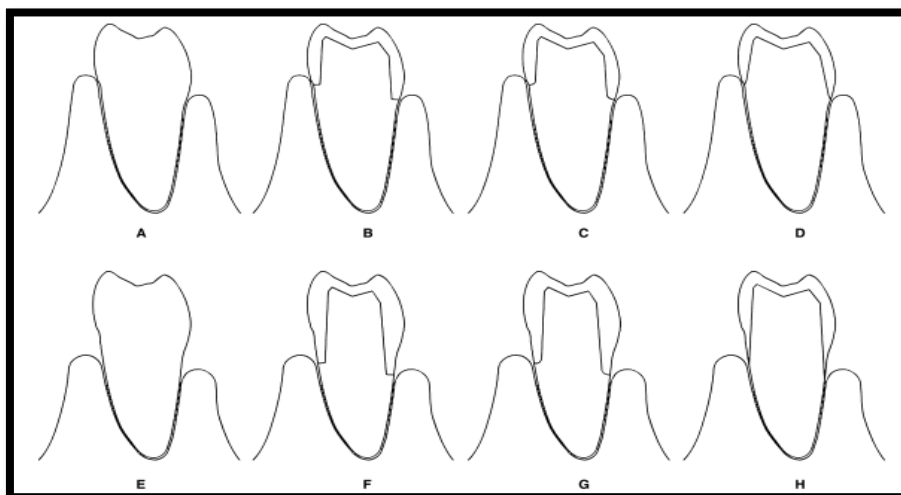


Fig. 12: Teeth with normal gums and teeth with gingival recession have different peripheral designs. For teeth without gingival recession, shoulder margin preparation (B) and chamfer margin preparation (C) are often accepted solutions. (D) For teeth without gingival recession, the preparation can be tapered with a margin with soft edges. (E) Special attention should be paid to dented teeth. For elongated teeth, the preparation of shoulder and chamfer margins is very invasive. (H) For such teeth, spring rims are a conservative alternative to prevent significant axial loss.

F. Prostheses morphology

The form and profile of the prosthesis play a role in whether it blends in with the surrounding teeth. Food accumulation and gingival irritation occur with over-

contoured prostheses with significant convexities, but not with under-contoured prostheses⁴.

G. Prosthesis material

Material	Type of prosthodontic					Applications	Disadvantages
	Anterior veneers	Anterior crowns	Posterior crowns	Anterior fixed dental prostheses	Posterior fixed dental prostheses		
Glass ceramic							
Feldspathic glass	Yes	Yes	Yes	No	No	Highly esthetic Can be stained and glazed Etchable Conservative	Should be adhesively cemented Cementation is technique sensitive Weakest ceramic
Leucite reinforced	Yes	Yes	Yes	No	No	Highly esthetic Can be stained and glazed Etchable Conservative	Should be adhesively cemented Cementation is technique sensitive Weaker than lithium disilicate
Lithium disilicate	Yes	Yes	Yes	No	No	Highly esthetic Can be stained and glazed Etchable Conservative Strongest glass ceramic	Should be adhesively cemented Cementation is technique sensitive
High-strength ceramic							
Aluminium oxide	No	Yes	Yes	Yes	No	White color Esthetic when veneered Can be conventionally cemented	Adhesive cementation is difficult Less esthetic than glass ceramics More invasive than glass ceramics
Zirconium dioxide	No	Yes	Yes	Yes	Yes	White color Esthetic when veneered Can be conventionally cemented	Adhesive cementation is difficult Less esthetic than glass ceramics More invasive than glass ceramics
Reinforced ceramic							
Metal ceramic	No	Yes	Yes	Yes	Yes	Relatively esthetic Very good track record	Adhesive cementation is difficult Less esthetic than ceramics Invasive
Base metal	No	No	Yes	No	Yes	Conservative Etchable Can be conventionally or adhesively cemented Durable in thin sections	Unesthetic Risk of allergic reactions Less accurate than noble metal

Table 1

H. Biocompatibility and allergy

Biocompatible materials should be used in the oral cavity. Alloys with high gold or palladium content used in metals and metal-ceramic prostheses and ceramic materials are unlikely to cause health problems. Nickel-containing alloys, on the other hand, can pose a health risk and should be avoided by people who are allergic to nickel.

A thorough inspection should be carried out in consultation with a specialist in the field such as dermatologist.

IV. PERIODONTAL TISSUES AND ORTHODONTIC TREATMENT

Orthodontic therapy can be important to provide the best foundation for restoring an attractive and functional dentition. Periodontitis is not necessarily a contraindication to orthodontic treatment once the condition has stabilized. However, loss of alveolar bone and soft tissue structure can complicate oral rehabilitation. Root resorption and bone dehiscence are two possible side effects of orthodontic treatment.

A. The tooth movement envelope

Bundle bone structure, soft tissue pressure, periodontal adhesion levels, neuromuscular strength, and lip-tooth interactions are all factors that can affect the range (and stability) of orthodontic movement. is. Restriction of tooth movement is believed to be defined by strict physiological and anatomical parameters, beyond which periodontal and bundle bone support can be reduced. The result is large tooth movements outside this so-called "mismatch

envelope". are only conceivable with favourable facial skeleton remodelling or orthognathic surgery.

B. Response of tissue to orthodontic pressures

When orthodontic force is applied to the tooth, the surrounding tissue experiences both compressive and tensile stress⁶. Bone juxtaposition has traditionally been defined as occurring in the area of tension, whereas bone resorption occurs in the area of compression. As a result of this remodeling process, the tooth moves towards the applied force and into the space created by the previously resorbed bone.

C. Closure of the orthodontic space

The reduction in periodontal pocket depth resulting from apical movement of the gingival margin and raising of sharp teeth helps improve plaque control and access to the restoration margin.

D. Forces of orthodontic treatmenton tipped teeth with infrabony defects

The reaction of periodontium to orthodontic tooth movements was studied in dogs with poor dental hygiene and experimentally created bone pockets. Apical displacement of adjacent supragingival plaques to the subgingival region is likely to be responsible for the progressive deterioration of periodontal tissue and the persistence of subgingival pockets in these cases. The importance of maintaining healthy periodontal tissue in the process of orthodontics and space closure is an important clinical significance from both animal and human studies. Therefore, oral health should be monitored regularly during orthodontic treatment.

E. Considerations for dental implants

If the underlying skeletal inconsistency is not corrected, gap closure can be difficult in patients with severe class II or class III malocclusion. Bone buildup, target tissue regeneration, and pre-repair orthodontics are all recommended for future implant sites. The distal approach to alveolar bone formation is especially beneficial for patients who do not have congenital lateral incisors. Preparing the lateral incisor alveolar ridges for future transplantation using erupting the canines adjacent to the central incisor and then returning them distal to their normal position within the dental arch. I can. Post-treatment bone deposition is expected because the mesial part of the distal canine is the stress point.

V. ORTHODONTIC INTRUSION

In a variety of situations, for example, in the treatment of elongated incisors and traumatic maxillary anterior protrusions, and in the restoration of heavily worn incisors 106, orthodontic intrusion is useful as an adjunct to treatment.

A. Flared and elongated teeth intrusion

Flared elongated incisors are common in patients with severe periodontal disease. Improved grinning aesthetics and reduced soft tissue trauma are two major benefits of penetrating elongated incisors. Periodontal tissue is affected in many ways by tooth intrusion. Bone deposition occurs along the central and coronal one-third stretched periodontal ligament fibers in the root. Penetration strength and direction, on the other hand, appear to have a significant impact on the response of these tissues. Rather, light pressure reduces stress in the area surrounding the periodontal tissue, and forces directed across the long axis of the tooth promote entry into the body and limit the degree of hyalinization. The magnitude of the force affects the reactivity of the tissue at the apical level, and strong intrusion is associated with a higher degree of root absorption.

B. Worn incisors intrusion

Gingival tissue usually follows the path of the tooth upon entry, but to a lesser extent. However, after orthodontic treatment, mucosal gingival surgery may be required to improve clinical crown height and eliminate pockets caused by gingival fiber extension.

C. Extrusion of the teeth in orthodontics

Tooth extrusion has been proposed as a viable treatment option for single-walled and double-walled subosseous defects. The extension of periodontal ligament fibers appears to cause some bone juxtaposition in the alveolar bone ridge, which makes biological sense. Orthodontic extrusion is very beneficial when growing the implant site.

D. Development of the implant site

Extruding the desperate teeth before implanting can help the soft and hard tissue development of the attachment. The authors were able to achieve approximately 4 mm of bone and soft tissue enhancement by extruding the tooth approximately 6 mm (to the extrusion point). Interestingly, none of the patients with developed periodontal pockets

experienced soft tissue migration. The gingival margin initially looks like a red collar, and the depth of the pocket decreases as the extrusion process progresses. As you continue to extrude, non-keratinized red areas appear in the free-rimmed coronal shape of the gingiva. Turning the pocket lining over creates this thin tissue that eventually keratinizes and mimics the surrounding gum tissue.

E. Incisor proclination and orthodontic expansion

Theoretically, the lateral expansion of the buccal segment and the labial advancement of the incisors can provide a variable amount of additional space for misaligned tooth alignment. Mandibular central incisor tilting and advancing have been shown as viable alternatives to tooth extraction and orthognathic surgery in adult patients with increased overjet and moderate to severe congestion. The impact of orthodontic expansion on the gums and bundle bone is a major concern.

F. Expansion in both directions

Adult patients with lateral skeletal inconsistencies are often treated with rapid surgically-assisted maxillary dilatation. Periodontal tissue appears to be less affected by rapid surgically-assisted maxillary extension, with only minor changes in adhesion levels reported. The severe stress these instruments put on the supporting periodontal tissue can cause more serious consequences of traditional rapid maxillary growth in the periodontal tissue. During the rapid growth of the maxilla, heavy loads are often required to stop the movement of the first tooth and to promote periodontal ligament around the anchor tooth. The force exerted on the teeth of the anchor is used to extend the twomaxilla laterally at this fairly late stage of weakening absorption.

G. Expansion of the sagittal plane

For example, patients with highly diverse skeletal patterns may have thin alveoli and an increased risk of bone dehiscence. Patient age and gingival biotype are important predisposing variables. Gingival tissue with thin biotypes and high incisor tilt is susceptible to plaque-induced inflammation and stressful brushing.

VI. INTERDISCIPLINARY RELATIONSHIP BETWEEN PERIODONTOLOGY, ORAL AND MAXILLOFACIAL SURGERY, AND SURGICAL MANAGEMENT IN DENTISTRY

The surgical needs of dental patients can range from routine tooth extractions to treatment of intraosseous periodontal defects, orthognathic surgery and trauma.

A. An impacted canine is surgically exposed for orthodontics

During aggressive orthodontic treatment, surgery may be required to facilitate eruption and migration of the palate-affected dog to the dental arch. This can be done either with an open technique (exposing the dog's crown (figure)) that erupts when there is ample space, or with a closed technique (lifting the full-thickness mucosal periosteal flap that is the crown). I can do it. Exposed and replace flaps). Before closing the flap, the closed approach requires the orthodontic appliance to be glued during surgical exposure.

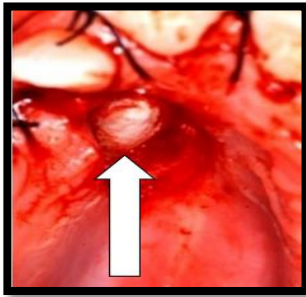


Fig. 13: An open surgical procedure was performed to expose a palatally impacted permanent maxillary canine(arrow).

B. Mandibular tori removal

The mandibular tongue is a common benign bone growth that may require surgical resection if long-term trauma, impaired general oral hygiene, or prosthetic reasons. The lingual torus of the mandible can be removed in a variety of ways, but the most common method is to lift the full-thickness mucosal periosteal flap to the lingual side to expose the torus and remove it with a fast-rotating handpiece and osteotome. Piezoelectric handpieces and short pulse Er: YAG lasers can also be used to remove bone from other areas of the oral cavity. (for example, during third-molar surgery).

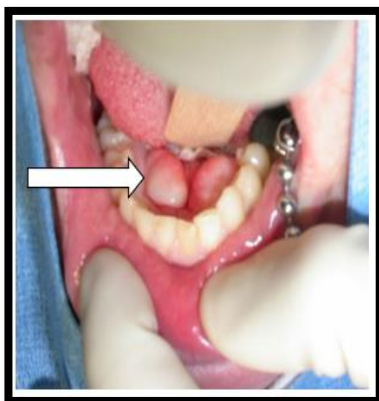


Fig. 14: (a) Patient with significant mandibular lingual tori (arrow)



Fig.14: (b) Removal of a large lingual torus from the patient in using an Er: YAG laser.

C. Bone grafting with autogenous blocks for dental implants

The durability of dental implants requires proper bone quality and quantity, and many augmentation methods such as autologous bone graft, substitute bone, guided bone regeneration, and distraction osteogenesis are described.



Fig. 15: (a) Block bone-graft harvest site from the anterior mandibular symphysis region



Fig., 15 (b) Block bone-graft augmentation to the left anterior maxilla. The graft is being placed before screw fixation to the underlying maxillary bone.

D. Referrals from various disciplines

The following scenario is an example where an oral surgeon and maxillofacial surgeon need to send a patient to a periodontologist. The patient had an anterior open bite and a Class II, Division I malocclusion. The surgery was successful, but the orthodontist showed extensive gingival recession on the labial surface of the mandibular central incisors on a regular 4-week postoperative examination. (Fig.16).



Fig. 16: Periodontal defect after genioplasty and orthognathic surgery. (A) 4 weeks after surgery and (B) 6 months after connective tissue grafting

Early extraction of impacted mandibular third molars is recommended because it improves the periodontal health of young patients, especially if they are angular and close to the second molars.



Fig., 17: Impacted mandibular third molar in close proximity to the adjacent second molar.

There is little bone between those two teeth

Immediate bovine bone transplantation with and without collagen membranes has been documented with promising results to prevent periodontal abnormalities after mandibular third molar surgery.

VII. MAXILLOFACIAL RADIOLOGY'S EMERGING PART IN THE DIAGNOSIS AND MANAGEMENT OF COMPLEX PERIODONTITIS PATIENTS

Radiography is commonly used to assess the condition of hard tissue and the response to treatment. Imaging can show common and specific bundle bone values, plaque retention factors, caries, bifurcation abnormalities, subgingival calculus and other disorders. The most commonly used diagnostic imaging methods to locate, quantify, and assess patterns of alveolar bone loss are two-dimensional planar images of the oral cavity and panoramic radiographs.

A. Technologies that enable imaging

a) Modalities in two dimensions

Intraoral (root cysts and bites) and panoramic radiographs produce two-dimensional images of supporting structures such as teeth and alveolar crests, periodontal ligament, and dural membrane.

b) Panoramic radiography

The accuracy of panoramic radiography in detecting horizontal bone loss associated with periodontitis is controversial. Many authors say that radiographs of bites and root cysts are a more accurate way to assess bone for both alveolar and intraosseous defects, especially slight bone loss, compared to panoramic radiographs. Insist. However, in the case of intraosseous defects, some claim that panoramic x-rays and root cyst x-rays, or occlusion and panoramic x-rays 8, are equally accurate.

B. Quantitative modalities (three dimensional)

a) Panoramic Tomosynthesis

This method can generate distortion-free, accurate, low-dose, spatially oriented 3D panoramic images for measuring periodontal bone height.

b) Cone-beam computed tomography

Maxillofacial cone-beam computer tomography allows rapid assessment of the facial / buccal, lingual / palatal, and mesial / distal alveolar bones of all teeth in a single rotation scan. Acquisition volume technology.

c) Limitations.

Cone beam computer tomography limits the contrast resolution. It is suitable for imaging relatively debilitating bone features such as teeth and bones.

d) Display of images

Images that are orthogonal

Reformation on multiple planes

e) Imaging techniques

Horizontal bone loss and crestal alveolar bone morphology

Intrabony defects that are localised

Defects in the buccal cortical plate

Involvement of the molar furcation

The maxillary canines that are surgically exposed.

f) Pathology in the periradicular area

Periradicular diseases involving the alveolar bone and overlying gingival mucosa are increasingly being identified and treated as part of periodontal therapy.

g) Root resorption externally

External cervical resorption can be determined, quantified, and distinguished from internal root resorption using cone beam computed tomography.

h) Periodontal abscess

Cone-beam computed tomography (CBCT) may be useful in determining the extent and pattern of localised bone loss, as well as establishing a baseline for treatment. This is helpful in excluding other pathologic entities.

i) Periodontal cyst on the lateral side

They are small (less than 1 cm in diameter), well-defined, round, oval, or teardrop-shaped single low-density areas on the side of the root between the alveolar bone ridge and the root on x-ray. Appears as. Apex, and often asymptomatic.

j) Pericoronal pathology of the third molar

Cone beam computer tomography detects bone inflammation, assesses the location of the mandibular subalveolar canal in relation to the root of the tooth,

and the following accidental peri-coronary arteries on the distal surface of the second molar: Can detect the medical condition of. B. Tooth cysts or odontogenic tumors (such as ameloblastoma). Or keratocystic odontogenic tumor). In contrast to panoramic radiography, cone-beam computer tomography has been reported to lead to changes in surgical approaches.

- k) Rhinosinusitis
On radiographs, maxillary sinusitis manifests as unilateral sinusitis with varying degrees and patterns of relative soft tissue / fluid opacity of the sinus cavity.
- l) Osteomyelitis
Diffuse osteolysis of the interdental septum with subsequent expansion to the apical region on radiographs.
- m) Lesions that are both periodontal and endodontic in nature
Affected teeth are usually important when the root surface of the neck is involved. On radiographs, this can also manifest itself as a bifurcation-like lesion or loss of dura, as well as a general enlargement of the periodontal ligament space on each side of the tooth. The bone destruction process is clearly visible on the x-ray image until it converges. Periodontal endodontic lesions have a radiographic appearance that resembles the bone reaction caused by a fracture of the vertical root. Conebeam CT scan imaging helps detect these fractures as well as other factors such as inadequate endodontics, root canal perforation, and developmental abnormalities.
- n) Procedures for regeneration
In periodontology, digital subtraction radiography is a relatively sensitive indicator of bone response to regenerative therapy¹¹. Before or at the same time as transplantation, cone-beam computer tomography imaging was used to study bone augmentation or conservation procedures for ridge development.
- o) Examining the soft tissues
A technical protocol, soft tissue cone-beam computer tomography, has been reported to help visualize the facial / buccal soft tissue profiles of sockets and dentition¹². In this method, the patient scans the lips / cheeks. A retractor to prevent soft tissues from coming into contact with the teeth and buccal mucosa. This allows accurate measurement of clinical parameters such as the position of the gingival margin with respect to both the alveolar bone ridge and the cementum-enamel junction, and the thickness of the mucous membrane adjacent to the tooth and buccal alveolar bone.

VIII. THE INTERFACE OF PEDIATRIC DENTISTRY AND PERIODONTOLOGY IN THE MANAGEMENT OF PERIODONTAL HEALTH IN CHILDREN

A. Periodontal tissue development

Pumice¹³ is characterized by the development of healthy gingival tissue throughout the primary and early permanent dentition. Healthy dentition turns pale pink in the primary dentition in young children and darkens when transitioning to mixed dentition in older children, who may develop inflammation due to dekeratinization and rashes. During this time, the height of the alveolar bone also changes. A distance of 1-2 mm from the cement enamel junction to the alveolar bone apex is considered to be the typical alveolar bone height of the primary tooth. Distances greater than 2 mm may be considered normal if they are close to exfoliated deciduous teeth or emerging permanent teeth.

B. Plaque, periodontal disease, and dental cavities

Even with poor oral hygiene and plaque, inflammation of the gums in early childhood is often mild, unless the teeth have cavities¹⁴. Infants with severe caries had more symptoms of periodontitis in their deciduous teeth, as evidenced by the loss of adjacent alveolar bone. Inflammation of the gums is found next to open lesions, and adolescents avoid diets (meat, vegetables, fruits) that get stuck between the teeth.

C. Periodontal disease in children: diagnosis and management

According to the American Academy of Pediatric Dentistry¹⁵, children and adolescents need to assess and record periodontal disease as part of regular dental examinations. Codes 0, 1, and 2 provide more meaningful findings in detecting mixed dentition gingival inflammation and plaque, as pseudopockets can form around partially erupted teeth. It is believed to provide. A WHO 621 probe was used to inspect 6 index teeth (16, 11, 26, 36, 31, and 46) for subgingival calculus.

Pediatric dentistry and periodontology are important in working together to develop evidence, tools, and recommendations so that children with oral health problems can be diagnosed by all medical professionals play a role.

D. Periodontal disease prevention and treatment

Periodontal disease should be treated with specialized periodontal counseling and / or pediatric and adolescent care to maintain healthy periodontal tissue. After the diagnosis of periodontal disease, the first treatment should focus on eliminating the cause of the problem, then corrective therapy to restore function and appearance, and finally supportive care to prevent recurrence. 16. Professional scaling and referral to a periodontist to treat complex problems should be standard.

E. Dental enamel abnormalities and other dental malformations in children and teenagers with periodontal consequences.

If the gingival margin is subgingival with inflamed gingival tissue, a significant number of children and adolescents have teeth with enamel abnormalities. Teeth are prone to fractures (often near the gum line) and can interfere with restorative care. Fused teeth and excess teeth are abnormalities of two tooth malformations or rashes that affect periodontal development and health. In these cases, the contributions of pediatric dentistry and periodontology help improve the long-term results of the dentition.



Fig. 18: (A, B) Anterior image of a supernumerary tooth attached to the maxillary left central incisor's labial surface. The incisor can have healthy labial periodontal support with surgical sectioning of the supernumerary and guided tissue regeneration.

IX. PERIODONTICS AND ORAL PATHOLOGY

A. Gingival lesions caused by trauma

Mechanical gingival trauma is common and easy for patients and clinicians to recognize. Peripheral giant cell epulis (bluish or purple gingival mass) is more common and manifests as bluish or purple gingival mass.



Fig. 19: Reddened swollen gingiva in primary herpetic gingivostomatitis with associated vesicles and ulcers involving the palatal and labial mucosa.

B. HIV infection

Highly active antiretroviral therapy (HAART) has revolutionised the management of HIV patients and reduced the incidence and severity of gingival erythema and necrotizing periodontitis.



Fig. 20: A patient with AIDS has painful necrotizing periodontitis.

C. Immunologic gingival lesions

a) Lichen planus

Oral lichen planus is a very common condition, usually manifested as a bilateral lesion of the buccal mucosa, but can also affect the outer edges of the tongue and gums. A biopsy is recommended to confirm the diagnosis, as other diseases may show similar clinical symptoms. However, in the presence of other sites of involvement, the gingival gingiva can be associated with inflammatory infiltration associated with associated gingival inflammation, destroying the typical histological features of lichen planus and making a definitive diagnosis difficult. It is best to avoid biopsy.

b) Gingival lesions caused by drugs

Drug-induced gingival overgrowth can be severe enough to interfere with chewing and cause aesthetic problems. Phenytoin, calcineurin inhibitors (such as cyclosporine and tacrolimus), and calcium channel blockers (such as nifedipine, diltiazem, oxydipine, and amlodipine) are all associated with gingival overgrowth.

D. Gingival cysts, possibly malignant gingival lesions, and neoplastic gingival lesions

a) Cysts and neoplasms that are odontogenic

Gingival lesions can occur as cysts and neoplasms of dental tissue form in the intraosseous region and grow or erode the cortical plate. Although less common, these lesions can be found in the soft tissues of the gingival complex. B. Gingival cyst develops.

b) Squamous cell carcinoma

Squamous cell carcinoma is the most common oral cancer and can affect the lining of the gums or the alveolar lining of the toothless jaw. Gingival lesions that do not resolve after other causes have been ruled out should be biopsied within 3 weeks. Early stage squamous cell carcinoma of the gingiva can usually be successfully treated with local surgery. On the other hand, advanced lesions with infiltration of the underlying bone present significant surgical difficulties and have a low 5-year survival rate.

X. THE RELATIONSHIP BETWEEN PERIODONTAL EXAMINATION AND GENERAL MEDICINE

A. *The impact of periodontal disease on vascular health*

Bacteremia associated with periodontitis lasts longer and has more serious consequences¹⁹. Carotid plaques, coronary plaques, intraluminal thrombi, atherosclerotic vascular plaques, and primary varicose veins have been shown to contain periodontal bacterial DNA²⁰. High levels of inflammatory mediators such as C-reactive proteins, fibrinogens, cytokines and white blood cells are also present. These mediators adversely affect plaque stability. The fact that periodontal disease increases the incidence of cardiovascular disease by 25-50% and increases cardiovascular disease-related mortality by a factor of five, ¹⁹², demonstrates the relevance of this association. Infective endocarditis is caused by bacteria, most commonly *Staphylococcus aureus*, and spreads to the heart valves, most commonly the mitral valve.

B. *The link between periodontal health and overall health*

Glycemic regulation is adversely affected by periodontitis ²¹. Patients with periodontitis have been reported to be more likely to have metabolic disorders defined by high-density lipoprotein levels and low-density lipoprotein levels higher than mild insulin resistance. Treatment of periodontitis has been shown to improve glycemic control in patients with type 2 diabetes. This indicates that referrals to periodontists do not have to wait for glycemic control to be achieved. Instead, referrals to periodontists should be immediate.

C. *Oral health is influenced by chronic renal disease*

In patients with renal disease, a thorough examination of the oral cavity is a crucial tool for preventing problems caused by the disease or the therapy used to treat it.

D. *Physicians' advice*

Age, gender, socioeconomic status and income, education level, ethnicity, smoking, and alcohol consumption are all risk factors for periodontitis and systemic illness, indicating management interdependence. Physicians need to be able to recognize the correlation of systemic disease with oral health, identify risk factors, and make appropriate referrals. The dentist should confirm the list of surgeries performed, their prognosis, and the need for follow-up appointments.

XI. IMPLANT DENTISTRY AND CHRONIC PERIODONTITIS

• Evidence of periodontitis as a risk factor for implant success and survival

A. *Dental implants' survival and success*

The term "implant survival" refers to whether the attachment is still in the mouth. According to a systematic review, single implant survival was > 95% (12) at 5 years and > 90% at 10 years²³. Success is a difficult concept to explain. The condition of the tissue surrounding the implant is generally considered to be an important factor in the success of the implant. In addition to the success of the implant, patient-centric aspects were investigated, including appearance, comfort, function, and whether the results met pretreatment expectations.

B. *Peri-implant infections*

Peri-implant mucositis is defined as mucosal inflammation without bone loss, whereas peri-implantitis is defined as inflammation plus bone loss around a functional implant²⁵

C. *Implants in patients with a history of periodontitis*

Bacterial species around the tooth and implant appear to be comparable 6 months after placement of the abutment, and these similarities persist after 3 years. Depending on changing circumstances, the disease around the implant can be chronic, dull, and periodic, similar to chronic periodontitis. The accumulation of implant failures can also be explained by implant analysis at the patient level (explaining systemic susceptibility) rather than at the implant level²⁶.

Patients with periodontitis who had a periodontal pocket of at least 6 mm at follow-up were more likely to have greater bone loss and pocket depth during implant placement. The clinical parameters around the implant in periodontal challenge patients without a periodontal pocket of at least 6 mm were similar to those in periodontal healthy patients. This group of patients requires regular supportive periodontal treatment to maintain periodontal stability and regular supportive peri-implant treatment to maintain the health of the peri-implant tissue.

XII. PATIENTS WITH SPECIAL NEEDS AND PERIODONTAL DISEASE

According to the American Dental Association, individuals in society who have physical, sensory, intellectual, mental, medical, emotional, or social disability or disability, or more generally a combination of these variables. And improve the dental health of the group. Patients with 27 dementia, 28 depression, 29 post-traumatic stress disorders, 30 psychiatric disorders, 31 motor restrictions, and 32 learning disabilities are all associated with increased periodontitis. Patients with Down syndrome have been shown to be at increased risk of periodontitis³³. As a young adult, people with Down syndrome can suffer from early and widespread gingival inflammation, as well as systemic and rapidly progressing periodontitis, which is severe tooth mobility and teeth by the end of 40 years. Can

lead to loss of 34. Patients with Parkinson's disease had poor oral health, frequent gingival recession, large periodontal pockets, frequent probing bleeding, frequent tooth movements, and poor oral hygiene. Periodontitis causes physical and mental stress and quality of life when tooth mobility, post-retreat tooth hypersensitivity, periodontal infections, unaesthetic smiles, bad breath, and decreased masticatory function are described. It may damage the tooth mobility. In some cases, dentures and implants that replace lost teeth can help with diet, enjoyment, self-esteem, social involvement, and social acceptance.

Children with impairments were less likely to have orthodontic evaluation and treatment, while adults with disabilities were less likely to undergo endodontic treatment.

There are several things that can be done at the dental level to improve access for patients with mental illness. Patients with periodontitis often need to complete a home care program to improve oral health and / or treatment outcomes. The harmful effects of oral biofilms on the hard and soft tissues of the oral cavity can be reduced by a coordinated prophylactic approach. Removal of supragingival plaque with a toothbrush and interdental brush or dental floss is part of daily mechanical plaque control. Chemical additives to improve plaque control can also facilitate routine oral hygiene management.

XIII. PERIODONTITIS AND DENTAL GERIATRICS

Alveolar bone loss can occur in the elderly as a result of changes in bone mineral density caused by osteoporosis. Elderly women with severe periodontitis, despite stable or reduced probing depth, may experience rapid loss of alveolar bone³⁵. The importance of the link between osteoporosis and periodontitis is substantiated by a study that found that people with osteoporosis who also suffered from periodontitis had a four-fold increased risk of fractures in three years.

Attachment and bone loss appear to be associated with gingival recession and shallow probing depth in older adults, whereas attachment and bone loss are associated with gingival edema and deep probing depth in young adults.

A. Gingival inflammation and diet

For the elderly living in the community, high intakes of antioxidants can help prevent periodontitis. Consumption of high energy density foods such as fats, sauces, sweets, pastries and bread is common among the elderly in life support facilities. Such a diet can exacerbate inflammation. Therefore, diet can play an important role in the management of periodontitis in the elderly.

B. The link between systemic disorders and periodontitis in the elderly and geriatric

Periodic management is especially difficult for patients with dementia or Alzheimer's disease because the periodontal treatment routine is based on the principles of compliance, self-care and effective oral hygiene. Patients with more severe dementia or Alzheimer's disease may not benefit from this type of treatment. The only microorganism that expresses peptidyl arginine deiminase is

Porphyromonas gingivalis, which results in the production of antibodies against cyclic citrullinated peptides, which may thus increase the risk of rheumatoid arthritis in people with periodontitis.

C. Periodontal treatments and the elderly

Individuals in later years appeared to have a limited response to treatment. As a result, older people may be less responsive to periodontal treatment than younger people. According to recent systematic studies, non-surgical debridements in the treatment of periodontitis moderately improve the subjective quality of life of the elderly. According to the data, the role of dental assistants, especially dental hygienists, seems to be an important aspect of successful periodontal treatment.

D. Geriatric patients and implant therapy

Success rates appear to be similar for young individuals (mean age 48 years) and older people (mean age 68 years) 3 years after implant placement³⁶. However, other evidence suggests that older people lose bone around the implant over time. It should be noted that receiving dental implants later in life can improve the quality of life of elderly toothless people.

XIV. CONCLUSION

Practitioners can use an interdisciplinary approach to provide the best possible care in minimally invasive periodontology, ensuring the longevity and continuous functioning of the restoration³⁸. Healthy periodontal tissue is a prerequisite for successful dental treatment. Treatment outcomes can be compromised without a good interdisciplinary link between periodontology and prosthetic, aesthetic, endodontic and orthodontic modalities, which can be long-term and costly. Follow-up treatment is required.

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