IATROGENIC FACTORS AFFECTING PERIODONTIUM

Anand A J¹, Karthikeyan R², Annapoorani S³

¹Senior Asst. Prof, Dept of Periodontics, TNGDC
²Senior Asst Prof, Dept of Periodontics, TNGDC
³PG Student, Dept of Periodontics, TNGDC

ABSTRACT

It is universally accepted that for a natural dentition to function optimally, the periodontium must be in a state of health. The etiology of periodontal disease can be iatrogenic in nature, meaning those injuries that are the result of carless therapy and those that irritate or aggravate on already existing periodontal condition. This paper addresses the iatrogenic factor affecting the periodontium.

Key Words: Latrogenic factors, Restorative dental procedures and periodontium, improperly designed removable partial denture, Orthodontic therapy and periodontium.

INTRODUCTION

Periodontitis results from the extension of inflammatory process initiated in the gingiva to the periodontal tissues. Iatrogenic diseases are defined as any untoward or adverse consequences of preventive, diagnostic or therapeutic regimen or that causes impairment resulting from physician’s professional activities. Iatrogenic factors are the inadequate dental procedures that contribute to the deterioration of the periodontal tissues. Faults in dental restoration and prosthesis referred to as iatrogenic factors, are common causes of gingival inflammation and periodontal destruction.

FACTORS CONTRIBUTING TO PERIODONTAL DISTURBANCE

In periodontal disease, microbial dental plaque is the single most important factor associated with the cause of dental pathology. Major factors affecting the equilibrium is tooth drifting, which is commonly the result of failing to replace or restore strategic teeth, injudiciously executed restorative and surgical procedures and the placement of faulty prosthesis, fixed or removable.

Prior to any dental procedure existing pathological condition of the supporting structures must be recognized and treated in order to set up healthy environment. Removal of gingival irritants, correction of functional occlusal interferences, treatment of the morphological pathological gingival conditions and correction of bony deformities of supporting structure are important to keep sound environment.

To avoid both morphologic and functional arrangement in occlusion, missing teeth should be replaced as soon as possible in order to maintain occlusal integrity, otherwise following changes will occur.

1. Intrusion of teeth
2. Migration of adjacent teeth
3. Impaired function
4. Changes in the form of papillae and embrasure
5. Encourage food impaction and retention
6. Occlusal disharmony
IATROGENIC FACTORS AFFECTING PERIODONTIUM

IN PERIODONTAL DISEASE

Increased amount of microbial plaque

Increased of bacteria covering root surface

Destruction of supporting structures

Altered natural chewing habit

Loss of teeth

DENTAL CARIES LEADS TO DENTAL CARIES

Destruction of proximal contact

Breaking of smooth surface

Trapping of food

Accumulation and retention of plaque
  Tooth drifting, root proximity
  Bite collapse

Disturbed cleaning mechanism

Premature loss of teeth

RESTORATIVE DENTAL PROCEDURES AND PERIODONTIUM

Marginal periodontitis is where the field of restorative dentistry and periodontics overlaps. Properly designed dental restoration provides functional stimulation. Healthy periodontium is essential for the proper function of restoration.

Any dental procedure must be carefully executed and this specially applies to dentition with preexisting periodontitis, since those patients have an exaggerated response to the slightest tissue injury. Diseased cusps and missing tooth structure are routinely replaced with inert material. The dentist performing restorative dentistry is always aware of his work upon dental pulp, but it is equally important that he should not lack a thorough understanding of the nature and degree of the response in the periodontal tissues to the procedure carried out.

APPLICATION OF RUBBER DAM

Rubber dam is a useful aid in protecting the surrounding gingival tissues. Its significances in relation to periodontium are of two aspects. The first one falls on its use and the second one is regarding placement of rubber dam. Rubber dam affords protection against physical and chemical injury to gingival

Gingival retraction

Well placed restorations

Well finished, contoured, polished restorations

Easy removal of excess cement and debris

REGARDING THE PLACEMENT OF RUBBER DAM

Care should be taken in thin and delicate area. If the clamp is not planned properly stripping of epithelium results. Wrong placement of rubber dam results in stripping of epithelial attachments, ischemia, sloughing, necrosis and recession later.

CAVITY AND CROWN PREPARATION

During cavity and crown preparation, care must be exercised not to injure the gingiva. Even minor trauma must be avoided when attached gingiva is minimal, but slight abrasion heals very rapidly. The epithelial attachment is most vulnerable supportive structure to periodontal tissues. The procedural trauma can initiate
theapical migration and results in periodontitis and recession. So without disturbing the epithelial attachment the margins must be placed subgingivally. Some dentists, prior to placing a sub gingival finish line, retract the marginal gingiva either by electro surgery or by retraction card. Should the use of rubber dam be impractical, use of a thin blunted instrument to retract the free gingival margin helps to avoid damaging the epithelial attachment.

LOCATION OF GINGIVAL MARGIN OF RESTORATION

It depends greatly upon a number of factors and it is directly related to the health status adjacent periodontal tissues. Factors more important and relevant to the current discussion are:

1. Degree of personal oral hygiene
2. Susceptibility of mucogingival region to irritation
3. Morphological characteristic of marginal gingiva
4. Depends upon gingival recession

Black's theory of "extension for prevention of caries sensitivity" have influenced the practice of restorative dentistry for well over 50 years. Now, after more than half a century, it is becoming increasingly accepted that this theory has been over emphasized and that not only can extension of the cavity be wasteful of healthy tooth structure, but caries is not prevented by extension. Currently more emphasis is placed on caries prevention by plaque control and by systemic and topical application of caries inhibitors. The gingival termination of all restoration should be placed well coronal to the edges of the marginal gingiva. It is very difficult to finish a subgingival margin in such a way that it does not act as some form of irritation and in addition gingival line provides a place where food can be retained and plaque can accumulate making these regions more susceptible to caries.

PLACING THE MATRIX

Properly designed and contoured matrix must be placed in such a manner that it does not injure the epithelial attachment. The careful placement of well contoured interproximal wedges and further supported by compound is necessary in case of class II restorations. Insufficient or absent inter proximal contacts, over contoured or undercontoured at the gingival third overhangs, excessive round contact areas accounts for inter proximal food impaction and exaggerated accumulation and retention of microbial plaque results in recurrent caries and periodontal breakdown.

Inter-proximal wedge placement should be done with care to avoid injury to the attachment. Injudicious separation of anterior teeth for class 2 restorations will also cause injury to periodontium. It should be borne in mind that separation should be minimal; it should not exceed the width of periodontal ligament any separator should be removed as soon as possible.

IMPRESSION

It is more difficult to obtain impression of the teeth where the margins are placed sub gingivally. Injudicious use of gingival retraction cord can often injure the soft tissue and cause periodontal alteration such as recession. Careful consideration for the tissue during crown preparation and impression making will avoid permanent alteration in tissues. While making tube impression, excessive digital force should be avoided. The individual tubes must be carefully adapted to the preparation and their length must be accurately relates to the gingival line.

During impression procedure gingival retraction cord should be used with relative safety. Precaution must be taken not use too much or the use cord of excessive diameter into the sulcular space, undue force in card placement during impression procedure. Special precaution must be taken while retracting thin biotype gingiva and inadequate attached gingival, undue insult in such cases usually causes rapid recession.

ELECTROSURGICAL RETRACTION

If carefully done this method greatly facilitates accurate impression taking. In the region of inflammation and extremely thin gingival tissue
this electro surgical retraction is not indicated, since it will usually results in gingival recession.

TEMPORARY COVERAGE

Temporary coverage made without consideration for the periodontium can cause disturbances of the periodontium. Over extended temporary crowns may result in permanent gingival alterations in the interdental region or in facio-lingual marginal region may cause gingival hyperplasia or recession, if the epithelial attachment has been injured. Under extended temporary coverage may contribute to hypersensitivity by interfering with adequate oral hygiene measures. Poor proximal contact relationship contributes to food impaction and retention. The aim of the temporary crown is to protect the teeth and promote gingival healing.

PLACEMENT & FINISHING OF RESTORATION

Extensive care must be exercised therefore to finish the restoration correctly, particularly below the gingival margin, where removal of over hangs is much more of a problem than is the removal of subgingival calculus. Marginal discrepancies, overhangs, and surface roughness may cause progressive destruction of the periodontium in the proximities of fillings and crown. This may be initiated by the material used in restoration.

The cement which is used for luting and filling will initiate physical and chemical irritation and furthermore will be exposed to region by oral fluids with consequent cavitations and creation of rough areas. It is important to smooth and contour the area of restoration so that it duplicates or improves upon the original.

Rough areas and overhangs, always covered with microbial plaque, they soon become areas for the generation and accumulation of microorganisms and their destructive secretions. For the correct degree of contact, the restoration and the inter proximal relation should be checked by dental floss.

In preparing the full crown restoration, it is desirable to reduce the buccolingual width so that less axial stress is transmitted to the periodontium during mastication with narrow occlusal tables than wide ones. Improper management of proximal contact will jeopardize the interdental soft tissues, which are most vulnerable to periodontal break down. Tilting will cause unequal height of marginal ridge. Improper contour of marginal ridge will encourage food impaction and retention and contribute to the breakdown of interdental tissues and subsequently to interdental bone loss. Too broad contact areas of facio-lingual and or occlusal will result in morphological and pathological changes of the interdental papillae or Col. If the patient is not able to maintain the oral hygiene in interdental areas, there is facio-lingual hyperplasia of the interdental papilla which causes exaggerated collagen formation and exposure to microbial invasion, inflammation, edema and subsequent osseous involvement results. Extremely narrow proximal contact will promote food impaction and retention and will allow for tooth drifting.

The purpose of facial and lingual enamel bulge of a human teeth is to protect the gingival from traumatic effects of mastication. Panel et al (1971) showed that under contouring caused no apparent gingival pathosis, whereas over contouring gave rise first inflammation and collection of debris to hyperplasia, engorgement of marginal gingival, scant keratinisation and deterioration of fibres up to gingival collar.

Incise of crown preparation in tooth with recession removal of more coronal tooth structure in order to gain sufficient convergence is necessary which may cause pulpal complication. Anatomical variation of the clinical crown possesses other problems related to contour if recession is excessive it is better to exclude the root portion from preparation. And depending on the oral hygiene effects upon the patient, topical application of caries inhibiting solutions to control sensitivity and root caries.

Furcation regions should not be over contoured in preparation of crown restoration.
because these are the areas more vulnerable to plaque accumulation and periodontal breakdown and are the most difficult to cleanse. During crown preparation adequate tooth structure must be removed to maintain original contours. Triangular papilla in the interproximal region should be ideally shaped for oral physiotherapy and we should preserve it. The interproximal region should be left large enough to accommodate the tissue without restriction. And this will permit proper accessibility to oral hygiene and maintain tissue health.

The gingival surface of the pontic must never traverse the muco-gingival junction and contact the alveolar mucosa or impinge upon the frenum or on muscle attachment. In posterior region esthetic requirements are less important, the pontic design should ideally be such that there is no contact with the soft tissues. If esthetics demand the muco-gingival junction should be traversed, periodontal plastic surgery is considered in order effect apical positioning of the muco-gingival junction.

IMPROPERLY DESIGNED REMOVABLE PARTIAL DENTURE

Unless the partial denture is carefully constructed, it may exert acantilevering effect on the abutment teeth resulting in occlusaltraumatism. Improperly designed clasp by causing excessive stresses continues results in occlusaltraumatism. During the setting of posterior partial dentures, it has to be supported adequately on occlusal rest, or the arms of the clasp may impinge up on the marginal tissues of the abutment tooth. Patients with removable partial denture must be routinely examined to assess the morphological tissue changes that result from progressive alveolar resorption.

ROLE OF CLASPLESS REMOVABLE PARTIAL DENTURE (RPD)

Patients with RPD's should be made aware that good oral hygiene is extremely important to prevent periodontal breakdown. It should be borne in mind that all periodontitis, once started with minimal lesion. Poor oral hygiene patients with RPD is toneglect brushing in areas that bleed easily. The further accumulation of microbial plaque, with subsequent increase in inflammation, may lead to periodontitis sometimes, eventually settling of such RPD's superimposed on plaque and calculus will cause apical migration of epithelial attachment.

MINOR ORAL SURGICAL PROCEDURES THAT AFFECT THE PERIODONTIUM

Injudicious tooth removal can often initiate periodontal disease or aggravate an existing pathosis. Some errors in tooth extraction techniques may adversely affect the periodontium.

1) Manner in which facial and lingual flaps are reflected
2) The way in which teeth are luxated and elevated
3) Degree of post extraction debridement
4) The way in which the wound is closed.

Partially impacted third molars are frequently complicated by periodontal breakdown of the approximating tooth. Removal of impacted tooth should always be followed by treatment of periodontal lesion. Injudicious use of forceps or elevators during luxation, elevation may result in crushing injury to the alveolar bone. Elevators should therefore be used carefully so as not to loosen the approximating teeth.

ORTHODONTIC THERAPY AND PERIODONTIUM

The patient who present themselves to orthodontist are usually in the age group of twelve to fifteen years. Unsatisfactory esthetics is mainly due to some type of malocclusion by virtue of this malocclusion, they have a higher than average incidence of periodontal disease. This is probably due to malpositioned teeth which are more difficult to be kept clean. The placement of tooth separating appliance causes inflammation of the interdental tissues. The placements of bands in sub gingival areas alters the environment within the sulcus. It is very difficult to place the bands below the crest of interdental gingival and that itself does not cause irritation unless they provides a mean for plaque to accumulate (Waerhugs). Rough enamel
surface created by orthodontist to gain space for bands causes microbial retention and the mechanical cleaning is difficult in these areas.

Oral hygiene is hampered and the conventional use floss is prevented by arch-wires. Occulsal alterations occurring during any type of dental therapy can create conditions that may affect the health of periodontium. While teeth being orthodontically moved a form of occlusal traumatism is created and this may be more tolerable. Other irritating factors such as microbial plaque, prematurities, root resorption and parafunctions enter into the picture and worsen the condition. Trauma appears to be the most important factor in producing cemental resorption. A good outline for integrating occlusal adjustment by selective grinding with orthodontic treatment was prepared by Heimlich.

CONCLUSION

Iatrogenic factors are one of the most important etiological agents, more specially in periodontics. It is highly imperative that the tooth and the supporting structures, be given its due importance while doing any procedures in the mouth and proper methods adapted to prevent any injury to the same.

For moral ethics with current increase of awareness among public and stringent laws, no one can afford to be negligent while rendering a treatment. These add a new level of responsibility on the therapist in treatment planning before and follow up later.

REFERENCES

2. Carranza's .the role of iatrogenic & other local factors – clinical periodontology 8th edition chapter 12 page-161
5. Swartz ML, Philips RW; Comparison of bacterial accumulation on rough and smooth surface J.Periodontol 28:304, 1957
12. Armitage GC, Svanberg GK, Loe H Microscopic Evaluation clinical measurements of connective tissue attachment levels J Clinperiodontol 4 ; 173,1977