

Effect of Restorations on Periodontal health

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Abstract : Periodontal disease is one of the most prevalent diseases of the oral cavity which may lead to premature shedding of teeth or a compromise in the aesthetics of an individual. Though the duty of maintaining oral hygiene practice relies on the patient, there are instances where the technique sensitive nature of restorative procedures or the faulty restorative margins may inadvertently lead to conditions which could bring about periodontal disease/destruction.

Keywords: Dentistry, Overhangs, Periodontics, Periodontal health, Restorations.

I. Introduction

Over-hanging restorations have documented sufficient results to state that they contribute to oral environmental changes. The disturbances between the beneficial and pathogenic bacteria present in the oral cavity¹ causes an exacerbation of plaque formation². It is defined as an extension of restorative material beyond the confines of a cavity³.

The major cause for periodontal disease as a sequel of restorations is interproximal restorations. The next cause is fixed prosthesis, then artificial crowns and the least possible cause being removable prosthesis⁴. The type of restorations and its placement has a direct relationship with the prevalence of periodontal disease; there is also the relationship of the materials used for each individual restoration⁵. With these pathognomonic criteria in mind, various studies have been conducted on a range of population and materials with the use of indices such as the plaque index, gingival index and a periodontal probing depth to evaluate the differences between natural teeth and a restored counterpart.

II. Restoration-Periodontal Relationship

In relation to position of the decayed portion, the local factors should be first assessed to determine the type of restoration required and the material of choice. Most restorations involving the interproximal region either above or below the gingival sulcus, usually involve the posterior teeth. Depending on the extent of caries, the margins of restorations can be placed subgingivally or supragingivally. Though many clinicians prefer to place the gingival margins of restoration coronal to the gingival sulcus⁴, during the restorative procedure, pre-existing gingival inflammation make it difficult for the clinician to appropriately place the gingival margin in the presence of bleeding and tissue oedema⁶. That being said, there are also instances which necessitate the subgingival placement of a restorative margin. These may include aesthetic concerns, need for increased retention form, refinement of pre-existing margins; root caries, cervical abrasion and root sensitivity⁴. Restorations placed in such cases have displayed increased furcation involvement and greater attachment loss⁷.

Another noted cause for predisposition to periodontal disease is the proximal contact relationship of the restored tooth with that of the adjacent natural tooth. It is generally accepted that tight interproximal contact are important for gingival health, there has been no significant evidence in showing that an open contact may differ from a tight proximal contact⁸. Where tight contacts can lead to impacted food and poor accessibility to oral hygiene aids, open contacts lead to food lodgement which and be easily accessed by oral hygiene aids but have other effects such as mesial drifting/tipping.

In cases where there is a need to place the restoration margins sublingually, encroachment of the biological width may be done inadvertently. Based on studies, it has been determined that the biological width is usually 2.04mm and ranges between 1.0mm to 9.00mm⁹. Situations such as this may lead to the placement of margins too near to the alveolar crest leading to an inadvertent resorption of the alveolar bone.

1.1 Restorative Materials

Most restorative materials are biocompatible and are not injurious to the periodontal tissue, with the exception of self curing acrylics. All restorative materials should have a highly polished surface to prevent the accumulation of plaque and ultimately the initiation of periodontal disease.

Materials such as amalgams (used in conventional interproximal restorations), crown substitutes (gold, resin or porcelain) require the highest possible degree of polish due to their interaction to the gingival

environment. These materials usually contain surface roughness which can act as foci for plaque accumulation and hence the need for polishing.

Restorative resins, over time, have a greater degree of polish attainable but lack in strength, develop porosity and wear off. Another noted issue is that on interaction between the resin and the organic compounds in toothpaste, plaque and soft drinks there may be softening of the composite material/ resin cement leading to surface roughness and plaque retention.

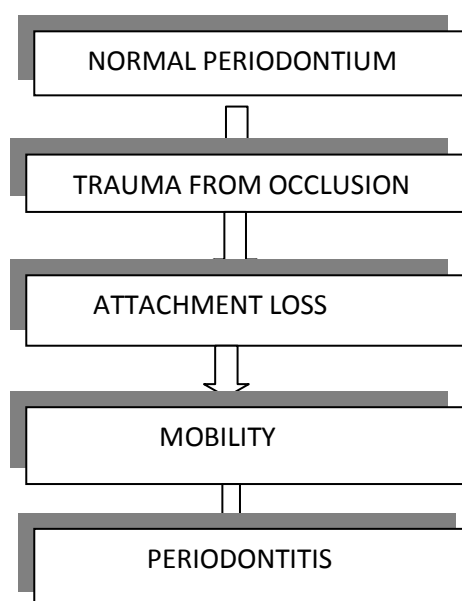
1.2 Design of Bridges and Removable Partial Dentures

Bridges should be designed to minimize the accumulation of dental plaque and debris. Designs which straddle the ridges for example the Ridge lap pontic are the least desirable design and should be avoided. The Ovate pontic is the most hygienic⁵.

A partial denture will favour the accumulation of plaque due to presence of minor flaw in the surface and near the junctions of the framework and tooth. It is also seen that the insertion of a partial denture increases the chances of mobility in the abutment which subsequently leads to gingival inflammation and pocket formation. There is also a shift in the microbial flora by promoting growth and development of spirochetes⁵.

1.3 Occlusion

Abnormal occlusal relationship caused due to high points in restorations increase the risk of periodontal disease⁵. It has also been reported that teeth with occlusal discrepancies presented with deeper pocket depths and worse prognosis than those who did not have occlusal discrepancies. In addition, when followed over time, there was a significant increase in probing depths in teeth with occlusal discrepancies, and when left untreated, were associated with progression of periodontal disease. Furthermore, occlusal treatment seems to reduce the progression of periodontal disease over time. There is some evidence of association between trauma from occlusion and periodontal disease, but none proves a cause and effect relationship.



1.4 Case Studies

In a study involving 15 patients with pre-existing interproximal restorations, the plaque index, gingival index and periodontal probing depth were recorded. Before the old restoration was removed, all indexes were noted and base line radiographs were taken. Standard oral hygiene instructions were given. The overhanging restorations were either removed or replaced with a new restoration, or the overhang was removed, with a rubber cup polish done to ensure smoothness of surfaces. Patients were recalled after the 1st week and 4th week. The results revealed that the plaque and gingival indexes had shown a 5 fold reduction in the first week and further dropped by half in the fourth week. The probing pocket depth had also shown improvements over the first and fourth week. GCF volume collected showed a dramatic decrease by the first and fourth week⁴.

In a study where 50 patients required restorative treatment, all of whom received correct restoration (with exact marginal fit and polish). Gingival index, Plaque index, Bleeding point index and probing pocket depth index were recorded. All results showed an exaggerated result within a 4 fold range for the initial normal values¹⁰.

A study involving 100 patients in where an amalgam restoration was required inteproximally. This study's aim was to asses alveolar bone resorption hence bitewing radiographs were taken. Mesial and distal overhangs were noted. 51% if posterior amalgam restoration had overhanging margins and had shown bone loss in teeth with overhanging dental restorations than with teeth without overhanging dental restorations³.

III. Conclusion

There is a definite correlation between the effects of restoration on the periodontal health status. Research shows that the periodontal apparatus of teeth are very sensitive to minor changes to their environment and require extreme care and immense scrutinization to maintain periodontal health and prevent any further inadvertent destruction.

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