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Guided Tissue Regeneration versus Hemisection in the Treatment of Furcation Lesions. A Clinical Analysis

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Indications for hemisection are discussed taking into account that the guided tissue regeneration technique cannot successfully treat all the situations that affect multirooted teeth.

Key Words: guided tissue regeneration, hemisection, furcation.

Introduction

Regeneration of periodontal tissues destroyed by periodontal disease, with the use of the guided tissue regeneration (GTR) technique, is now a reality. Among the lesions predictably regenerated by GTR are some furcation lesions such as Classes I and II (Nyman et al., 1982; Gottlow et al., 1984; Becker et al., 1987, 1988). On the other hand, Class III furcations are not predictably regenerated by GTR even though Pontoriero et al. (1989) have reported some success. Prior to GTR, the majority of these lesions were treated by hemisections.

The successful treatment of furcation lesions by GTR may obscure the value of hemisections in today's periodontal practice. The purpose of this paper is to discuss the indications for hemisections in the treatment of lesions affecting multirooted teeth not treatable by GTR.

Eight of the indications for hemisection in the treatment of lesions affecting multirooted teeth that are not treatable by GTR are discussed below.

1. Lack of access for adequate debridement of the furcation

Matia et al. (1986) reported that, even with surgical access, total calculus and plaque removal from the interradicular area, through the use of curettes or ultrasonic points, is not possible. It is well known that root debridement is one of the most important steps in any surgical procedure and if complete plaque removal is not possible, treatment failure is expected. To increase the possibility of totally removing plaque and calculus from the furcation area, the use of finishing burs is recommended following the use of curettes and/or

ultrasonic points. Therefore, access with the bur to the interradicular area is fundamental for GTR success. If access is not adequate, in lesions with a deep vertical component, or in the case where anatomical characteristics (i.e., oblique ridge) hinder access to the interradicular area, hemisection is indicated instead of GTR. Areas with deep interproximal defects affecting either the distal furcation of the first molar and/or mesial furcation of the second molar can also be included in this group.

2. Endodontic or prosthetic perforations in the furcation areas or of the roots

Perforations during endodontic treatment or during preparation for posts and core will induce irreversible mechanical bone resorption in the interradicular area or of the root close to the perforation. The treatment commonly used in this situation is the restoration of the perforation, which would further increase bone resorption (Parma-Benfenatti et al., 1986; Tal et al., 1988). In this case, GTR is not able to regenerate the lost bone due to the existence of a physical barrier (perforation or restoration) and the treatment of choice should be the removal of one of the roots.

3. Crown lengthening procedures that invade the furcations

In some cases, reestablishment of the invaded biological width, due to the proximity of the interradicular area to the anticipated cervical finishing line, results in the removal of bone close to the bifurcation area, therefore mechanically exposing the interradicular space. This may occur in 1) deep caries or crown fractures where the most apical portion is located less than 3 mm from the interradicular area; 2) repreparations to replace preexisting restorations where the new cervical finishing lines are located less than 3 mm from the bi-trifurcation area; 3) upper molars that extrude due to the absence of the opposing teeth invading the free space. In this situation, reestablishment of the occlusal plane requires crown lengthening procedures on the upper molars to create space for the construction of a lower removable partial denture or even for the placement of osseo-integrated implants and a subsequent fixed bridge. In all three situations, the crown lengthening procedure would require osteoplasty apical to the bifurcation area, thus mechanically creating a furcation lesion. This would not be an ideal situation. The removal of one or two roots would permit the crown lengthening procedure without the possibility of creating a furcation lesion.

4. Root proximities untreatable by the R.A.I. technique

The R.A.I. technique described by Ross and Gargiulo (1982) is a good solution for minimizing root proximities, a major problem in perio-prosthetic cases (Kramer, 1987). Anatomical characteristics such as apical convergence of roots are not always easily resolved by the R.A.I. technique and plaque retention areas persist. Kramer (1987) considers the gingival crater, related to root proximity, to be of major importance in the initiation and perpetuation of periodontal disease. When not solved by R.A.I., removal of one of the roots

will certainly eliminate the plaque retention area which would undoubtedly affect the longevity of the prosthesis and the teeth.

5. Extensive gingival recessions

Gingival recessions when extensive, especially in an occlusal-apical direction, constitute a major mucogingival problem not only because large areas of the periodontium have been destroyed but also because it is usually related to a periodontal pocket that approximates or reaches the apex. When this type of defect affects the buccal roots, depending on the extension, it can be treated by mucogingival surgery or GTR, but when it is too extensive on the buccal roots, or when it affects the palatal roots, root resection is the best solution.

6. Deep caries involving the roots

Subgingival caries involving one of the roots is a critical problem since a crown lengthening procedure requires extensive removal of supporting bone which would leave the root in question with very little support and would also affect the neighboring teeth. Thus, hemisection is the best solution in this case.

7. Untreatable endo-periodontal lesions

When the endo-periodontal lesions are very destructive, the combination of endodontic and periodontic treatment may not be successful. In this case the only obvious solution is the removal of the root or even removal of the tooth. Another related situation is when previous root canal treatment was not successful and cannot be retreated either because of the type of the first treatment or because of instruments fractured inside the canal. In both situations, removal of one of the roots is the solution when periapical surgery is not indicated.

8. Longitudinal root fractures

A tooth with a longitudinal fracture in one of the roots can be preserved only by the elimination of the fractured root.

Discussion

Guided tissue regeneration is certainly a major step forward in periodontal treatment and should be the treatment of choice even if another solution like pocket elimination or root resection exists. In cases like the ones discussed above, GTR is not indicated and hemisection is still a good solution. In a study of 500 teeth followed up for 3 to 11 years, Carnevale et al. (1991) showed the predictability of the treatment. Only 5.7 per

cent of the 500 hemisectioned teeth were lost, with only 0.6 per cent of the failures due to the recurrence of periodontal disease.

The above mentioned study and the situations cited by us show that hemisection is a valid treatment and is indicated when GTR will not be successful. It is important to emphasize that GTR can be used associated with hemisection, thus improving the final surgical result.

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