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CASE REPORT

Multidisciplinary Treatment of a Fenestration-type Defect

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ABSTRACT

The case report aimed at treating a fenestration-type defect with multidisciplinary conventional and advanced surgical techniques. Fenestrations are isolated areas in which the exposed root surface is covered only by the periosteum and gingiva, but the remaining cortical bone remains intact. Root coverage is indicated in cases of root hypersensitivity, treatment of shallow caries lesions, cervical abrasions, and esthetic and cosmetic needs. In this case report, after proper hygiene instruction and dental biofilm control, a fenestration-type defect was treated using guided tissue regeneration (anorganic bovine matrix and resorbable membrane) and a connective tissue grafts, associated to an endodontic apicoectomy. After reevaluation, the remaining gingival recession was treated with a second gingival connective tissue graft covered with q double papillae type in order to reconstruct the periodontal tissues of the involved tooth. In this clinical case, the interaction between the different areas of dentistry has made it possible to correct a fenestration-type defect, following procedures based on scientific evidence, restoring periodontal health, esthetics, self-esteem, and meeting the patient's expectations regarding her initial complaint. This case report shows the important role of interdisciplinary approach to treating a patient with a complex periodontal defect that required different types of knowledge and abilities to achieve the best results based on the current status of dentistry possibilities.

Keywords: Periodontal disease, Tooth apex, Gingival recession, Guided tissue regeneration.

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INTRODUCTION

Fenestrations are isolated areas in which the exposed root surface is covered only by the periosteum and gingiva, but the remaining cortical bone remains intact. When there is bone involvement, the defect becomes a dehiscence. These defects are more commonly found in the maxilla and in the buccal region of anterior teeth.[1] Its etiology is not fully understood, however, it presents some predisposing factors, such as root prominence, malocclusion and buccally positioned teeth in thin cortical bone.[1,2]

Bone fenestration is also a predisposing factor for the development of gingival recession, when present in the anterior region, gingival recession causes esthetic discomfort for the patient due to changes in the tooth size, root exposure, tooth darkening and elongated teeth, resulting in an aged appearance and disharmony of the smile.[3] Bacterial biofilm directly influences attachment loss of periodontal tissues as studies show that patients with poor oral hygiene and presence of plaque-induced gingivitis have the highest rates of gingival recession.[4]

However, for the treatment of bone defects generated by periodontal disease, root coverage is indicated, especially in cases of hypersensitivity, root caries treatment in shallow roots and cervical abrasions and aesthetic and cosmetic needs.[5] However, procedures, such as scaling and root planing, oral hygiene orientation and identification of the etiologic factors of gingival recession should not be dismissed prior to the surgical phase of treatment.

The indication of surgical technique to be used depends on the size and shape of gingival recession, with the predictability associated with proximal bone height.[6] Other factors, such as amount of keratinized gingiva, gingival thickness, presence/absence of cervical lesions, height and width of papillae also influence the choice of the most appropriate technique for coating the exposed roots.[6,7]

Among these techniques, the guided tissue regeneration (GTR), proposed by Nyman et al in 1982,[8] assumes the use of a physical barrier to prevent cells from the gingival tissues come into contact with the root surface treated, allowing the cells coming from remaining periodontal ligament and adjacent endosteum repopulate the clot to form cementum, periodontal ligament and alveolar bone.[8,9]

The GTR has been applied in several clinical trials for treating various periodontal defects, such as furcation involvement, localized gingival recession and intrabony defects.[6] Only histological examination can truly indicate if regeneration of periodontal tissue support occurred. However, studies[10-12] suggest that clinical signs of attachment gain, bone level, probing depth of the pocket and position of the marginal gingiva may be accepted as evidence for periodontal regeneration in the evaluation of GTR procedures.

In this case report, a fenestration-type with root exposure defect associated with an endodontic lesion and poor oral biofilm control was treated with multidisciplinary conventional and advanced surgical techniques of the soft tissue and regeneration in order to reconstruct the periodontal tissues of the tooth involved.

Case Presentation

A 35-year-old patient sought the clinic with a complaint in the region of maxillary left canine. The patient reported having had treated it with several professionals, but the gingiva around the tooth never improved. The patient had no significant systemic problems and at initial clinical examination, we observed a fenestration-type defect in the buccal region of the maxillary left canine involving the middle third of the tooth apex and abundant presence of biofilm and calculus (Fig. 1). Radiographically, it was observed that the tooth had endodontic treatment and a small periapical lesion, but the interproximal bone tissue was preserved suggesting that the lesion was limited to the buccal surface of the tooth (Fig. 2). As a treatment protocol, was held initially performed scaling and root planing of the lesion (Fig. 3) and instructed the patient to control dental biofilm in the region, so that it could then discuss the possibility and need for a surgical procedure to treat the fenestration.

Thirty days after the basic procedures, the patient returned presenting good biofilm control, which resulted in epithelialization of part of the ulcerated mucosa surrounding the fenestration, yet exposure of the tooth apex was still present (Fig. 4).

Due to extensive destruction of the periodontal tissues, the aim of the surgical treatment plan was to remove the tooth apex that was causing the periapical lesion in an attempt to at least partially regenerate the periodontal tissues affected and change the gingival tissue conditions by covering the portion of exposed root. First, a conventional flap technique for root coverage was performed with two vertical incisions in the mesial and distal aspects of the maxillary left canine, starting at the base of the proximal papillae up to the mucogingival tissue. A full flap was elevated and the granulation tissue present in the damaged area was removed further exposing the tooth apex (Fig. 5). Then apicectomy of the maxillary left canine was performed and the intraosseous portion of the bone defect was filled with demineralized bovine bone (GenMix—Baumer®) (Fig. 6), which was covered with a membrane

Fig. 1: Initial aspect of the maxillary left canine

Fig. 2: Initial radiographic aspect of the maxillary left canine

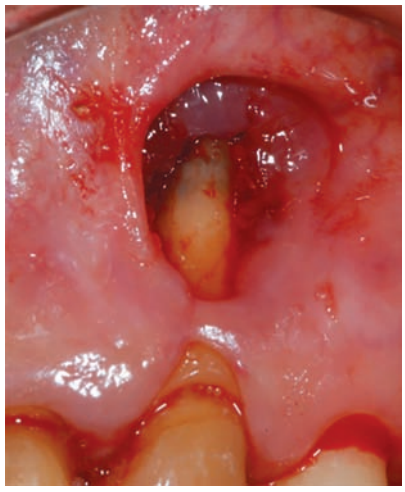

Fig. 3: Clinical aspect after basic treatment with scaling and root planning

Fig. 4: Clinical aspect 30 days after basic treatment

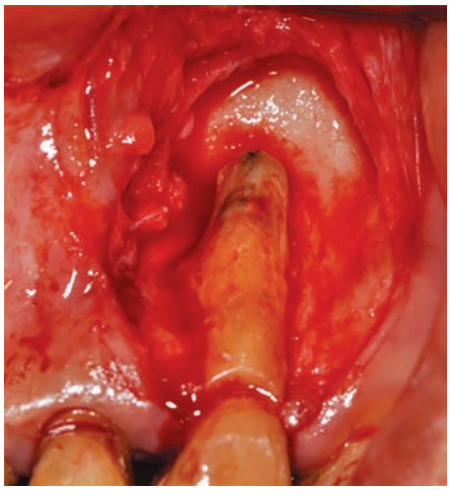

Fig. 5: Buccal full flap elevation and vertical incisions

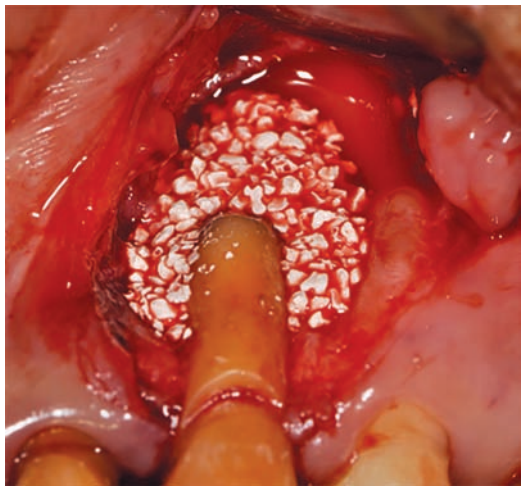

Fig. 6: Apicectomy and bone filling of the periradicular area

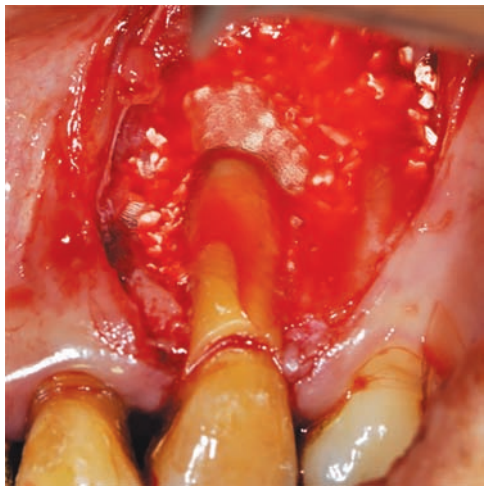

Fig. 7: Root coverage with a resorbable membrane

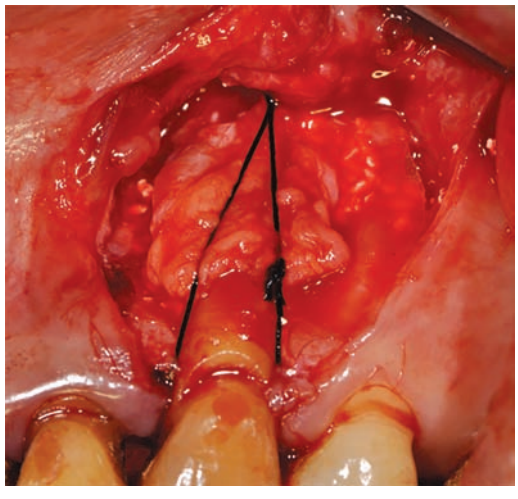

Fig. 8: Placement of connective tissue graft

of bovine cortical bone (GenDerm—Baumer®) to guide tissue regeneration (Fig. 7). At last, a subepithelial connective tissue graft was placed on the membrane to increase the amount and thickness of the keratinized tissue in the region of the recession (Fig. 8). The graft of subepithelial connective tissue was obtained with a palatal horizontal incision perpendicular to the subjacent bone tissue made at approximately 3 mm apically to the soft tissue margin. The mesiodistal extension of the incision was determined by the size of the graft needed. An incision in the apical direction from the first incision line was needed to divide the flap of the palatal mucosa. A small periosteal detacher

Fig. 9: Interrupted suspensory and simple sutures

Fig. 10: Ninety day postsurgery aspect

Fig. 11: Incisions and divided flap of the second surgery

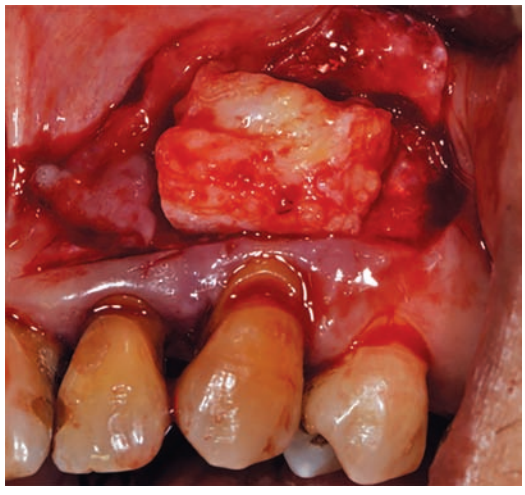

Fig. 12: Placement of the second connective tissue graft

was then used to release the graft tissue. The graft was immediately placed and the donor site was closed with simple sutures, obtaining healing by first intention. Interrupted suspensory sutures were used for the coronal position of the flap and supplemented with simple sutures in the vertical incisions in the fenestration area (Fig. 9).

Ninety days after the first surgery, the patient returned for revaluation and observed that there had been a gain in soft tissue and possibly hard tissue in the apical portion of the maxillary left canine, however, remaining fenestration in the soft tissue was still present (Fig. 10). It was decided to perform a second surgery, this time with the goal of increasing the band of keratinized gingiva thus eliminating gingival fenestration of the tooth. The lateral displacement of the flap utilized (Fig. 11) which consisted of a horizontal incision at the base of the mesial and distal papillae preserving the gingival margin of the maxillary left canine and the adjacent teeth. Two vertical incisions were made at the extremities of the horizontal incision and one intrasulcular incision in the fenestration area. The divided flap was elevated and a new subepithelial connective tissue graft, using the above-mentioned technique, was placed on the root in the fenestration area (Fig. 12). The divided flap was then placed coronally and sutured with simple sutures in the horizontal and vertical incisions (Fig. 13).

Ninety days after the second surgery, it was observed complete elimination of gingival fenestration with the presence of an adequate band of keratinized gingival tissue from the gingival margin up to the apex of the maxillary left canine (Fig. 14). It was also observed radiographically the absence of periapical lesion and the presence of remaining particles of bone substitute in the periradicular region, confirming the success of the procedure (Fig. 15).

DISCUSSION

As established in the literature,[13-15] basic procedures of scaling and root planing (SRP) must be performed before any intervention in periodontal tissues, particularly in cases requiring surgical procedures. Scaling and root planning is recommended, because it might solve the

Fig. 13: Coronal placement of the flap and simple sutures

Fig. 14: Clinical final aspect of the maxillary left canine

Fig. 15: Radiographic final aspect of the maxillary left canine

problem without the need for more invasive procedures or as a means of intercepting the development of more severe periodontal problems. Only if there is a satisfactory response regarding dental biofilm control more complex methods to re-establish periodontal health may be indicated.

The paraendodontic surgery is a therapeutic option indicated when there is persistent infection after endodontic treatment without possibility of retreatment and in cases of accidents and anatomic and pathological complications.[16] The surgical technique varies according to the anatomic characteristics of the local etiological factors, consisting of cortical trephination, periapical curettage, apicoectomy, cavity preparation and retrograde obturation.[17] In the present case, we opted for apicoectomy due to the persistent periapical lesion in a previously endodontically-treated tooth, because the tooth had a long root and presented persistent painful symptoms.[16] In addition, it served as a means of promoting tissue regeneration of the adjacent periapical tissues.

The filling of the surgical area of the apicoectomy with demineralized bovine bone was based on its osteoconductive action,[18] because this method provides rapid bone formation and allows control of the local response.[18] In addition, it activates undifferentiated cells capable of binding to the bone matrix, which may result in newly formed adjacent tissues.[18,19] To cover the region, we chose to use a resorbable collagen membrane because it does not require a second surgical procedure[20] and it is a tensile, waterproof and biodegradable material.[12,21] After the resorption phase of the membrane, it is replaced by endogenous cicatricial tissue and no foreign material is detected by the body.[42]

Given the persistence of the exposed root areas after the first surgery, we decided to perform a second subepithelial connective tissue graft. The soft tissue grafts (gingival graft and subepithelial connective tissue graft) have been successfully used in periodontics for reconstructing areas showing gingival recession, loss of interdental papillae, and alveolar ridge deficiency.[22] This technique allows a dual blood supply to the graft and minimizes problems related to color of the graft after healing,[23] which helps obtaining a favorable prognosis. It is believed that the connective tissue present in the graft plays an important role in directing the epithelial expression and it is capable of inducing keratinization of the epithelial cells that migrate from the non-keratinized adjacent tissue. However, to obtain these results, adequate primary graft fixation, graft revascularization and intimate contact between the graft/receptor is required.[23] Another important factor for success is the removal of debris of epithelial tissues, glandular and adipose tissue of the graft surface, avoiding interference in the induction of keratinization.[24]

The guided tissue regeneration (GTR) technique is based on the use of biocompatible membranes to prevent immediate migration from the epithelium to the wound, allowing bone regeneration.[9] Therefore, this technique was the first choice in the case described, since it would

regenerate lost periodontal tissues due to the accumulation of biofilm and subsequent destruction of elements of periodontal support.

CONCLUSION

In this clinical case, the interaction between the different areas of dentistry has made it possible to correct a fenestration-type defect, following procedures based on scientific evidence, restoring periodontal health, esthetics, self-esteem, and meeting the patient's expectations regarding her initial complaint.

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