Treatment of a post-traumatic alveolar defect

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Introduction

Fractures of the alveolar process can be easily overlooked with standard diagnostic methods, especially in the anterior region. Inadequate splinting of the fracture can lead to incomplete bony healing. This can result in major osteolysis with possible tooth loosening and loss of attachment.

The following clinical report illustrates the use of Straumann® Emdogain PLUS (Straumann® Emdogain in combination with Straumann® BoneCeramic) to treat post-traumatic osteolysis at the alveolar process. The ambitious aim was to regenerate the massive loss of periodontium and bone.

Initial situation

A 17-year old patient sustained an accident in January 2007 with a fracture of the alveolar process in region 31/41. The fracture was not diagnosed on the orthopantomograph (OPG) and treated elsewhere (Figure 1). Because of persistent pain in the fracture region, the patient was referred to us on 8 February 2007. Accordingly, the fracture had remained undetected for a month and had not been treated up to this time. Our investigations found a marked bone and soft tissue deficit in region 31/41 (Figure 2). The mesiobuccal probing depth at tooth 41 amounted to 13mm. However, there was no tooth movement or mobility of the alveolar process at this first examination.

Surgical procedure

Despite the absence of tooth mobility, we decided to carry out splinting of region 33-43 by means of a lingual retainer. This was followed by open curetting on 02.02.2007 to evaluate the extent of the osteolysis and clean the root surface (Figures 3–5). Following a marginal incision and lateral relieving incisions, the mucoperiosteal flap was mobilized far in the basal direction. To avoid recessions, relieving incisions were not made. Extensive elevation of the periosteum was necessary because of the size of the defect. The defect and the roots surface were carefully cleaned and the granulation tissue removed. A fracture gap could no longer be seen in the region of the buccal bone layer.

7 weeks postoperatively, the bone level was slightly improved but there was still a massive interdental defect at 31/41 (Figure 6). The probing depths were 9–11 mm. We now decided to build up the periodontal defect further with Straumann® Emdogain PLUS. In this procedure, the buccal flap was dissected again. After conditioning the root surface with Straumann® PrefGel (24% EDTA) it was irrigated as usual with saline. Emdogain was first applied directly to the root surface. The remainder of the Emdogain was then mixed directly in the blister with Straumann® BoneCeramic. The resulting mixture has exactly the consistency that experience has shown to allow optimal handling for filling a large defect. It was possible to fill the defect fully with this. The flap was then sutured easily with Supramid® (Resorba GmbH & Co. KG, Nuremberg) 4-0 without tension. In the authors' experience, better

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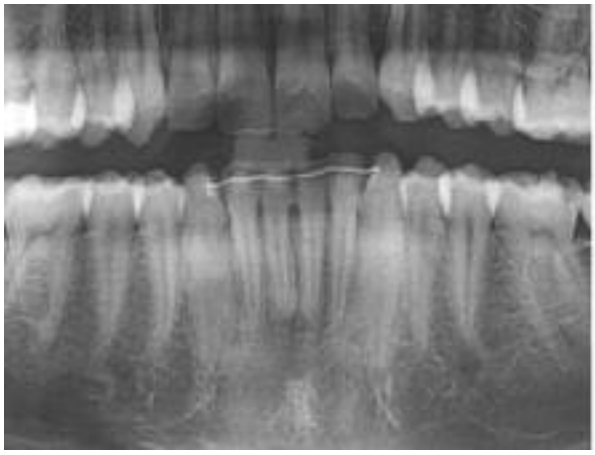

Figure 1: Post-traumatic radiograph. The alveolar process fracture in region 31/41 was not diagnosed on the orthopantomograph and treated elsewhere.

Figure 2: Marked bone and soft tissue deficit in region 31/41, 1 month post-trauma.

results are not obtained in the periodontal region with suture material finer than 4-0. The patient was given antibiotic prophylaxis with amoxicillin for 3 days. In addition, the patient rinsed with 0.12% chlorhexidine over a period of 4 weeks. There was little postoperative swelling or pain. The sutures were only removed 14 days postoperatively. The patient was not allowed to carry out interdental hygiene for a total of 6 weeks. At the 6-

Figure 3: Clinical appearance prior to curetting to remove the granulation tissue, 1 month post-trauma.

Figure 4: Deep defect following open curetting.

Figure 5: Deep defect following open curetting.

Figure 6: Persistent interdental defect, 7 weeks postoperative. The probing depths were 9–11mm. Decision to repeat the surgical procedure using Straumann® Emdogain PLUS.

Figure 7: 6 months after the second procedure using Straumann® Emdogain PLUS. Probing depths are reduced to ≤ 3mm and all teeth are vital.

Figure 8: 12-month follow-up shows periodontium completely healed radiographically and bone level already corresponding to the level of the adjacent teeth.

month follow-up, the periodontium was found to be fully healed clinically. The bone level at this time already corresponded to the level of the adjacent teeth (Figure 7), and the probing depth was 3mm at all sites in the anterior mandible. Minimal bleeding occurred mesially in region 31. At the 12-month follow-up (Figure 8) a continuosly stable periodontal situation with unchanged bone level could be observed radiographically.

Results

Six months postoperatively the probing depths were 3 mm or less. There was no recession of the defect-associated interdental papillae or buccal gingival margin. The attachment gain in the present case was thus an impressive 10mm. Bleeding on probing was minimal and the buccal soft tissue margin was at an ideal level. All of the teeth in the mandible continue to be vital and react to CO_2 snow. The patient cannot find any change in the clinical appearance compared with her pretrauma appearance. The result can therefore be described as satisfactory.

Conclusions

The alveolar process has a great potential for regeneration following fracture even without the application of Emdogain. In the case described here, the defect was very large and protracted over a period of nearly 2 months because of the absence of diagnosis elsewhere. In the authors' opinion, waiting longer without an operative intervention would not have been justifiable. The described bone repair was therefore performed with Emdogain and BoneCeramic. The outcome impressively confirms the correctness of this treatment method. Straumann® Emdogain PLUS combines the regenerative capacity[1] and the confirmed longterm efficacy[2] of Emdogain with the stability required for wide defects of BoneCeramic.

In the present case, the degree of bone regeneration is impressive. The range of indications for Emdogain can, in the authors' opinion, be expanded to include such post-traumatic oral surgical cases. However, further controlled studies of traumatic bone loss are necessary for further evaluation.

References

1 Hammarström J Clin Periodontol 1997; 24; 658 and 669

2 Sculean et al. Int J Periodontics Restorative Dent. 2007; 27: 221