

Periodontal Treatment Planning

The Influence of Osseointegrated Dental Implants

By Dr. Murray Arlin

The success of osseointegrated dental implants¹ has added a new dimension to periodontal treatment planning. The potential incorporation of osseointegrated dental implants may drastically modify the periodontal treatment plan. For example, a periodontally guarded tooth that could possibly be maintained (albeit only for a short time) might otherwise be extracted when the socket area would be better utilized for placement of an osseointegrated implant.

This article will describe and illustrate several cases where incorporation of osseointegrated dental implants profoundly changed the periodontal treatment plan. Readers interested in articles covering other aspects of periodontal treatment planning are referred to the bibliography for articles that discuss periodontal treatment planning,² periodontal prognosis,³ and periodontal considerations for dental implants.⁴ The medical histories for the cases presented were non-contributory.

Case 1 (Figures 1-4)

A 28-year-old male patient presented

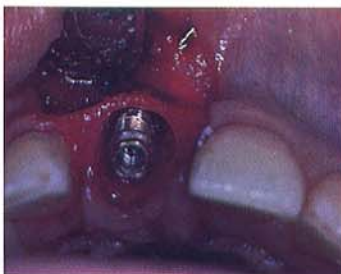


Figure 1



Figure 2

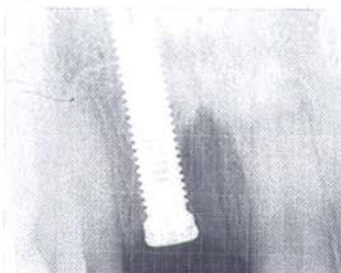


Figure 3



Figure 4

Case One

Figure 1: Facial view of Stage 1 surgery after "immediate" (that is, immediately following extraction of the fractured central incisor) placement of an 18 mm, self-tapping Bränemark fixture. Stabilization was achieved by extending the implant site several millimetres apical to the extraction socket apex. To encourage healing with complete bone fill, the peri-implant void was filled with an osseous allograft and covered occlusally with a GoreTex membrane. **Figure 2:** Facial view of Stage 2 surgery (seven months after Stage 1 as seen in Fig. 1). There has been complete bone fill around the fixture. Judicious removal of any new bone that interfered with precise seating of the abutment was now possible (that is, with proper access that the flap provided). Following abutment placement, a radiograph was taken to verify the accuracy of the fit to the fixture. **Figure 3:** Periapical radiograph corresponding to Fig. 2 (that is, taken seven months after initial implant placement). The radiograph confirms the complete bone fill around the full length of the fixture (as seen clinically in Fig. 2). The maximum fixture length was utilized in order to engage the cortical bone of the floor of the nasal cavity and thus help in achieving initial fixture stabilization. **Figure 4:** Facial view after temporary cementation of the Cera-one prosthetic restoration. The excellent esthetic result was achievable because of the carefully planned surgical and prosthetic treatment. Of critical esthetic importance was the pre-prosthetic maintenance of the bulk of the hard and soft tissues, achieved as a result of the particular surgical techniques utilized in this case, (that is, most of the usual post-extraction tissue loss was prevented).



Figure 5

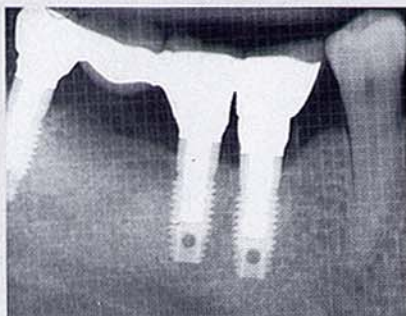


Figure 6



Figure 7

Case 2

Figure 5: Periapical radiograph of the mandibular second molar demonstrating extensive bone loss in the furcation area. The location of the mandibular canal indicated that there was sufficient vertical bone height available for placement of 10 mm fixtures. **Figure 6:** Periapical radiograph taken 18 months after final cementation of the

custom-cast abutments and bridge. Two fixtures were placed anterior, and one fixture was placed posterior to the extracted molar. **Figure 7:** Buccal view of the fixed bridge as seen in the radiograph in Fig. 6. Note the narrow occlusal tables, which allow for a gradual gingival emergence profile and also help to minimize lateral occlusal loading.

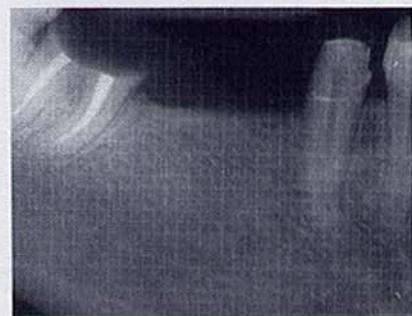


Figure 8



Figure 9



Figure 10

Case 3

Figure 8: Periapical radiograph illustrates minimal tooth structure left coronal to the osseous crest, especially at the furcation. The superimposed grid (lines one millimetre apart) allows one to more accurately measure the available bone. **Figure 9:** Periapical radiograph taken immediately after placement of the healing abutments (in this case, THC3s; Dentsply/Corvent) corresponding to four months after initial

implant placement and extraction of the second molar. **Figure 10:** Lingual view of the completed prosthesis demonstrating adequate interproximal embrasures for home care and professional maintenance. The restorative dentist decided to attach the implant bridge section via a precision attachment (masked occlusally with etched porcelain) to the crown on the second bicuspid.

on an emergency basis with a fractured central incisor. The fracture extended five millimetres subgingivally and thus conventional crown lengthening was contraindicated for esthetic reasons. The patient was unwilling to consider orthodontic eruption of the fractured incisor and therefore extraction was recommended. Although the patient declined preparing his adjacent teeth for bridge abutments, extraction was still decided upon, largely because the predictability of a single-tooth osseointegrated implant was an available option.

In this case, extraction and immediate placement of an 18 mm self-tapping Brånemark fixture was carried out utilizing adjunctive osseous grafting and Guided Tissue Regeneration. (See References 5 and 6 for more details on this "immediate" technique.) The case was restored utilizing the Cera-one Brånemark restorative system attaining excellent results both

esthetically and functionally.

The patient was very pleased with the implant treatment option. Had implants been unavailable, the patient would have been forced to carry through with other treatments that were less acceptable to him. (Prosthetic treatment courtesy of Dr. Morley Rubinoff.)

Case 2 (Figures 5-7)

This 58-year-old male physician had been on a three-month periodontal maintenance program for four years. He presented with an acute swelling in the second molar furcation area which was treated with closed curettage. Despite continued conservative maintenance, the patient experienced two additional acute exacerbations in the same area over the ensuing 12 months. In consultation with the patient, several options were discussed. The technique of Guided Tissue Regeneration was not available at that time.



Figure 11

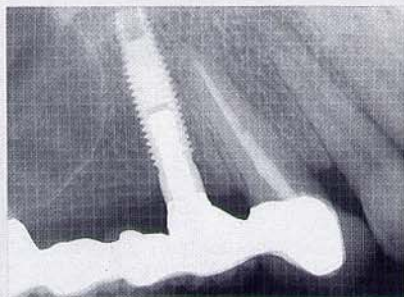


Figure 12



Figure 13

Case 4

Figure 11: Occlusal view of the abutments after removal of the non-retentive pre-existing bridge. Note that clinically the ridge seems wide. However, one must examine a radiograph to ascertain the sinus anatomy. (See Fig. 12.)

Figure 12: Periapical radiograph of the completed case demonstrated a pneumatized sinus. Where precise im-

plant positioning is critical, it is advisable to take an interim periapical radiograph with the initial pilot drill in place.

Figure 13: Buccal mirror image view of the completed prosthesis. All centric stops are present. It is advisable, however, to eliminate all working and non-working contacts on the implant portion of the prosthesis.



Figure 14



Figure 15

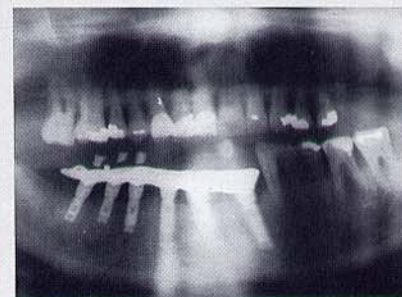


Figure 16

Case 5

Figure 14: Facial view illustrates generalized-advanced attachment loss. The mandibular periodontium on the mandibular left, however, has been stable over the last six years while the patient has been on periodontal maintenance. **Figure 15:** Occlusal view after placement of three titanium healing abutments anteriorly (Implant

Innovations) and three permanent abutments posteriorly (AB300; Implant Innovations). **Figure 16:** Panoramic radiograph of the completed case. Despite the radiographic midline distortion and overexposure, one can visualize 3-18 mm fixtures anteriorly and 3-10 mm fixtures posteriorly (all SwedeVents; Dentsply/Corevent).

Hemisection or root separation was not acceptable to the patient as the prognosis might still be guarded. As well, he preferred not to undergo the periodontal surgery and endodontic treatment. Open or closed curettage did not carry a guarantee against future acute exacerbations. The availability of osseointegrated implants provided a treatment option of extracting this terminal molar while still providing a predictable implant-supported and retained fixed bridge. The location of the mandibular canal limited the implant length to 10 mm. In this case, 3-10 mm length Screw-Vents (Dentsply/Corevent) were placed and restored with cemented abutments and a cemented suprastructure.

Had implants not been available, it is likely that an attempt would have been made to maintain the molar for a period of time. However, a conventional fixed bridge would have been contraindicated. (Prosthetic treatment courtesy of Dr. Harvey Branicky.)

Case 3 (Figures 8-10)

This 23-year-old female was referred to consider the possibility of saving a broken-down second molar. The first molar had been missing for many years and the second bicuspid had already been prepared and temporized with a full-acrylic crown.

If surgical crown lengthening was to be attempted on the second molar, there was a high risk of furcation involvement due to the necessary surgical bone removal. Additionally, there was a high risk of restorative-related complications with respect to the minimal tooth structure available. Root separation would also have been risky. In short, the second molar had a guarded prognosis. In the pre-osseointegrated implant era, attempts may have been made to salvage the second molar. The ability to place two predictable implants in the first molar area, however, made the guarded second molar dispensable. In this case, the implants were placed immediately after second molar extraction (to minimize the treatment time period). Otherwise, an



Figure 17



Figure 18



Figure 19

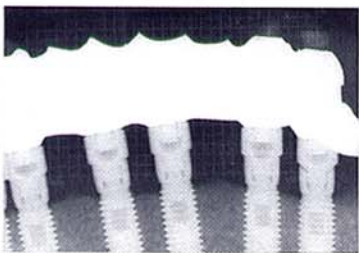


Figure 20

Case 6

Figure 17: Lingual view at the time of initial examination. Attempts to salvage these teeth would involve periodontal crown lengthening, mucogingival surgery, endodontics, foundation restorations, and, at best, a precision or semi-precision partial denture. In the end, the long-term prognosis at best would only be fair. **Figure 18:** Panoramic radiograph of the same case seen in Fig. 17 one year after extraction of all six teeth and immediate placement of 6-16 mm length Screw-Vents (Dentsply/Corevent). The fixtures were placed mesial to the mental foramen and apically engaged the inferior cortical bone. **Figure 19:** Occlusal view of the "fixed-detachable" prosthesis one year after insertion (corresponding to two years after initial placement). In the opinion of the author and patient, this treatment approach was more predictable, more satisfying and more conservative, as compared to the treatment plan that would have been necessary to restore the natural mandibular anteriors. **Figure 20:** Periapical radiograph corresponding to Fig. 19 (that is, one year after insertion of the prosthesis and two years after initial implant placement). Note the excellent bone level (roughly corresponding to the first implant thread). During initial bone remodeling, it is common to see some bone resorption, especially along the smooth surface portion of the implant.

implant could have been placed in the second molar area following sufficient extraction socket healing. Screw-Vents (Dentsply/Corevent) were placed Mesially (13 mm) and distally (10 mm). The end result was a fixed bridge with an excellent long-term prognosis. In this particular case, the restorative dentist attached the implant section to the full crown on the second bicuspid via a precision attachment which he masked by etching porcelain on the occlusal aspect. (Prosthetic treatment courtesy of Dr. Tzvi Rubinger.)

Case 4 (Figures 11-13)

This 40-year-old male patient was referred with the chief complaint of a nonretentive maxillary posterior

bridge. Periodontal analysis revealed a short root trunk on the molar abutment as well as significant mobility. Surgical crown lengthening on the molar might have provided increased crown length for sufficient bridge retention. At the same time, however, there were concerns: crown lengthening might encroach upon the molar furcation; there was too much occlusal stress on the molar, such that mobility might progressively increase.

The decision was made to augment the retention and support of the restoration with an additional implant abutment. A 16 mm length Screw-Vent (Dentsply/Corevent) was carefully placed so as not to encroach on the sinus or root of the cuspid. Had the maxillary antrum anatomy allowed, two

implants supporting an independent fixed bridge might have been suggested. The final restoration was completed without need for surgical crown lengthening on the molar, or double abutting to help control mobility. The implant abutment and suprastructure were both cemented in this case. (Prosthetic treatment courtesy of Dr. Richard Goodfellow.)

Case 5 (Figures 14-16)

This 68-year-old male patient had been on regular periodontal maintenance for six years. He had been wearing a mandibular removable partial denture for 10 years. In the last 12 months, he had become uncomfortable with the mobility of the teeth on the lower right. The maintenance records indicated progressive mobility and some bone loss on the lower right. Although there was also mobility and bone loss on the lower left, the maintenance records over six years indicated a stable state. (As well, the patient had no symptoms on the left side.)

Treatment options included: splinting of the mobile teeth on the lower right and continued periodontal maintenance; or selective extractions and placement of osseointegrated implants, followed by appropriate prosthetic restoration.

The initial option would likely have eliminated the patient's awareness of mobility. However, ongoing attachment loss was still possible and the patient would have been obliged to continue to wear the removable denture. The implant option offered the advantages of predictability and the elimination of the removable prosthesis and replacement with (in this case) a "fixed-detachable" prosthesis. In this case, SwedeVents (Dentsply/Corevent) were utilized; 3-18 mm length anteriorly, and 3-10 mm length posteriorly. The remaining teeth were maintained despite obvious bone loss as our long-term records indicated a stable-state situation. (Prosthetic treatment courtesy of Dr. Izchak Barzilay.)

Case 6 (Figures 17-20):

This 50-year-old female was referred to analyze her periodontal and restorative options. She had been wearing a mandibular removable partial denture

where the lingual major connector had contributed to severe recession and mucogingival problems. The only remaining mandibular teeth were the six anteriors. Had osseointegrated implants not been available, it would have been justified to attempt to save the remaining teeth. In that case, treatment likely would have included periodontal surgical crown lengthening and mucogingival surgery. Additionally, endodontic therapy, foundation restorations and crowns would follow. The best prosthesis possible would have been a removable mandibular partial denture, perhaps with precision or semi-precision attachments.

Fortunately, with the predictability of osseointegrated implants, a more predictable and conservative treatment plan was indicated. In this case, all remaining teeth were extracted followed by immediate placement of 6-16 mm length Screw-Vents (Dentsply/Corevent) between the mental foramen. The case was later restored with a fixed-detachable bridge. (Prosthetic treatment courtesy of Dr. Harvey Branicky.)

Summary

Several cases have been discussed and illustrated in an attempt to demonstrate how the availability of osseointegrated implants can change the periodontal treatment plan. The astute dentist and periodontist should willingly inform the patient of their treatment options. In some cases the inclusion of osseointegrated implants provides a more conservative and predictable final result. With the predictability of osseointegrated implants today, patients deserve the best treatment dentistry has to offer. ♦

References

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