

Dental Extraction, Immediate Placement of Dental Implants, and Immediate Function



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KEYWORDS

• Dental extraction • Dental implants • Immediate placement • Immediate function

KEY POINTS

- Immediate function requires adequate implant stability.
- Immediate function requires prosthetic stability, particularly when multiple implants are loaded.
- Factors to consider for immediate implants into extraction sites are thickness of socket walls, thickness of gingival drape, optimal position of the implant, and patient factors such as hygiene and smoking cessation.

The placement of implants into a traumatic osseous wound in which the pattern of postextraction healing is epigenetically and biomechanically determined suggests caution on the part of dentists and patients desiring immediate function treatment.¹ What happens after extraction is patterned in the biology and cannot be substantially changed at baseline by any effort to replace teeth immediately with implants. Therefore, treatment must be compensatory, that is, treatment must include conjunctive augmentation procedures, often both hard and soft tissue, to account for loss of postextraction volume.²⁻⁴ The art of treatment, even guesswork, of what should be done is a clinical challenge because inevitably postextraction bone loss is indeterminate.

A recent review of immediate placement of single-tooth implants by Vignoletti and Sanz⁵ concluded that immediate placement, even with grafting procedures, is still not fully validated with no clear evidence of consistent clinical outcomes. One of the reasons for this is reports are mostly based on implant persistence. Findings in the literature are usually 2 years or less with descriptive findings most often emphasized. Quantitative

findings, particularly in the esthetic zone, are difficult to determine because adjacent teeth and supporting bone can mask relative peri-implant failure. Even in longer-term studies, such as a 9-year study done by Buser and colleagues,⁶ there was found to be about a 5% incidence of complete resorption of the facial bone graft. When adjacent implant cases are reported or multiple extraction sites are addressed, there is much less information regarding gingiva-esthetic and/or osseous stability around immediate placement implants. If one reads the literature critically, a bias for reporting successful outcomes is obvious. In other words, clinicians seldom report treatment failures.^{7,8}

Figs. 1 and **2** show a 6-month treatment sequence of periapical radiographs of complete maxillary arch implant treatment. The 60-year-old female patient was a healthy nonsmoker in which extractions, implant placement, and peri-implant bone grafting were done uneventfully as was placement of the provisional restoration, all completed on the same day. By month 3, one central incisor implant became infected (number 9) and was treated by antibiotics only. By month 4, it was decided to remove the implant due to

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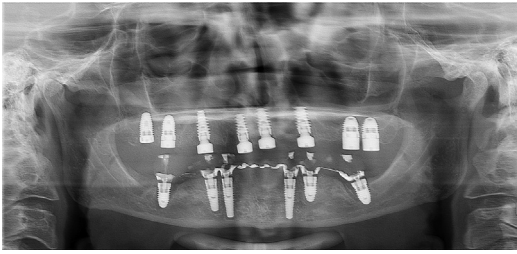


Fig. 1. Complete extraction of the maxillary dentition was followed by placement of 8 dental implants placed vertically into extraction sockets, all of which had insertion torque values greater than 50 Ncm and were immediately loaded on the same day.

3 mm of crestal bone loss despite the implant being firmly integrated apically (**Fig. 3**). A flap of the anterior arch revealed generalized crestal bone loss and compromised osseointegration of 3 other anterior implants necessitating removal and replacement of all 4 implants (numbers 5, 8, 9, and 12). Why did this happen? Can this be attributed to technical factors or armamentarium? Or is it strictly an effect of underlying biology?

The initial postplacement computerized axial tomographic scan showed well-grafted implants, all of which had insertion torques greater than 50 Ncm with implants placed deep into the extraction sockets (about 4 mm). Grafting material was composed of 50% by volume of an allograft/bone morphogenic protein-2 admixture. The prosthesis had never become loose or unstable. Following removal of the 4 implants, it was noted that facial bone had remodeled extensively around the arch. There was reductive vertical and horizontal bone loss of 2 to 3 mm throughout. Re-treatment implants were placed into adjacent sites or left submerged. The follow-up provisional required modification to make up for significant loss of facial bone support. One had the sense that remodeling events could not be curtailed despite efforts to prevent them.

A review of the initial surgery after extraction revealed very thin facial plates of bone with relatively



Fig. 2. A screw-retained cross-arch stabilized interim prosthesis is placed on the day of surgery. The prosthesis is made with emergence profile principles based on single-tooth implant restorations.

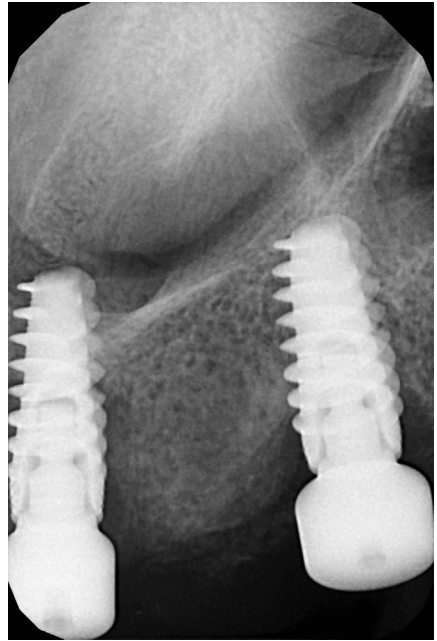


Fig. 3. Four months after immediately loading, there is bone loss evident around the anterior implants. A mucoperiosteal flap is raised to inspect the sites and a decision is made to remove the 4 anterior implants due to generalized bone loss despite continued implant stability.

thin interseptal bone between extraction sites (**Fig. 4**). In addition, there was reduced alveolar height overall, suggestive of short face syndrome such that implant lengths were generally short (**Fig. 5**). Overall, there was reduced bone mass. Although implants were well spaced apart and implants placed well away from the facial plate with intervening grafting material, failure still occurred. The important factors favorable for implant success mentioned by Vignoletti and Sanz include the following:

1. Substantial thickness and integrity of socket walls
2. Adequate vertical and horizontal position of the implant
3. Gingival thickness and integrity
4. Patient factors such as hygiene and smoking

Of these factors, the existing bone volume and its capacity to heal are most important. When there is not enough bone to support implants or bone structure resorbs away, implant failure occurs even in the setting of multiple splinted implants as was found in this example patient.

This implant failure is further exemplified in looking at cases in which multiple implants are lost, so-called cluster failures. Jempt and Hager⁷ found in a review of 17 cluster-failure patients that the

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