A Multidisciplinary Approach To Implant Restoration and Provisionalization In The Esthetic Zone

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Implant restoration in the esthetic zone requires precise coordination between all members of the dental team. This coordinated approach to treatment is exemplified in the cases to follow which required the expertise of an implant surgeon, orthodontist, restorative dentist, and lab technician. Orthodontic extrusion for site development was used in both cases. Problems occasionally encountered when planed immediate implant placement and provisionalization are found not to be possible at the time of surgery are also discussed.

Recently, much of the focus and attention in implant dentistry has been on implant placement and provisionalization immediately following tooth extraction. Studies have shown that, under favorable conditions, the success rates of immediate implant placement and loading rival that of the traditional implant surgical/restorative protocols [1-3]. When working in the esthetic zone, immediate implant placement and provisionalization following extraction has several advantages including decreased treatment time, no need for removable temporaries, and better maintenance of the hard and soft tissue profile to help maximize esthetics. Even though a case might initially be treatment planned for immediate implants, there are times when we find, at the time of surgery, immediate implant placement and provisionalization to be risky or impossible. Compromised socket anatomy, presence of active infection, inability to control occlusal loads, and inability to obtain a high level of initial stability upon implant placement, are just a few contraindications to immediate implant placement and provisionalization[4]. In such cases it is important to have a secondary plan for temporization in place so the dentist, who was counting on an immediate implant supported provisional, is not left "scrambling" to figure out how to temporize the case after the tooth or teeth have been extracted.

The following case presentations illustrate two different situations. The first case demonstrates immediate placement and provisionalization as was originally treatment planned. In the second case it was found, at the time of surgery, that immediate implant placement and provisionalization could not be carried out as originally planned. In this case execution of a secondary "contingency" plan still enabled the case to be easily provisionalized with a removable appliance made ahead of time for just such a contingency. In both cases orthodontic extrusion was first performed on the teeth being extracted in order to optimize the hard and soft tissue profile and gingival levels.

Case Presentation 1

The first case involves a 36-year old female with an unremarkable medical history initially referred to the author's office for a pre-orthodontic evaluation. Her periodontal status was deemed stable and healthy and she was cleared for orthodontic treatment. Approximately 18 months into orthodontic therapy she began to experience extreme sensitivity and occasional pain of the upper right central incisor. The patient was referred to an endodontist and diagnosed with irreversible pulpitis that was subsequently treated with conventional endodontics. The patient's pain persisted and ultimately an apicoectomy was required. As things progressed from bad to worse, the tooth soon developed clinical signs and symptoms consistent with root fracture. Two millimeters of recession and 4mm. periodontal probing on the direct facial was noted. Since the patient was still in active orthodontic treatment, the decision was made to orthodontically erupt this tooth to develop the site for a single tooth implant and create a more favorable bone crest/gingival margin relationship for subsequent implant placement [5] (Figures 1–3).

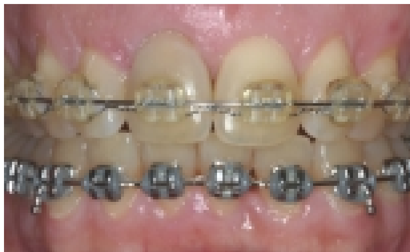
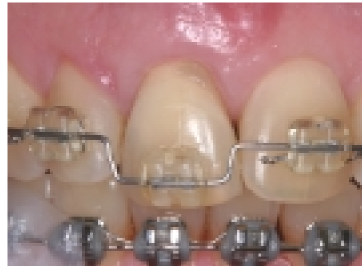


Figure 1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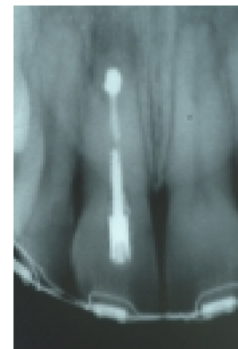
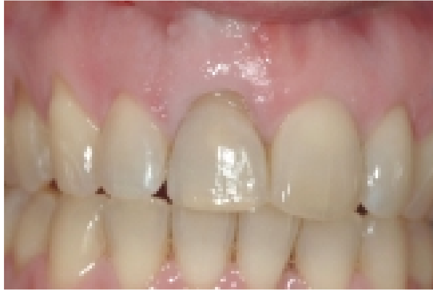


Figure 3

The patient returned to our office following orthodontic treatment and de-banding (Figure 4). The treatment plan was to extract the tooth and immediately place the implant and provisional. It was assumed conditions would be favorable for an immediate implant and provisional at the time of surgery. A temporary abutment and temporary crown were prepared on a model prior to the scheduled surgery. The "contingency" plan if immediate placement and provisionalization could not be done, was to graft the area for future implant placement and use an orthodontic retainer with an acrylic tooth built in for temporization.



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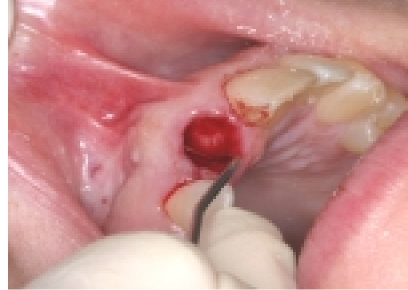

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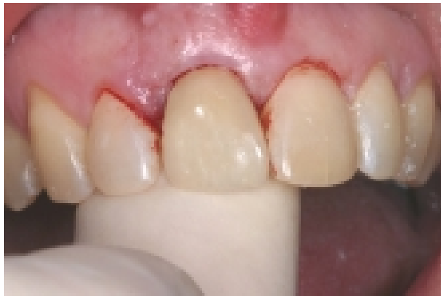

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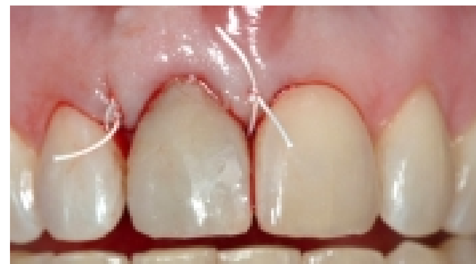
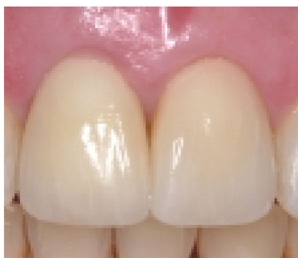


Figure 7

The tooth was carefully extracted and the socket anatomy was checked to be sure the facial cortical plate was intact (Fig 5). A 5X16mm. tapered implant (Replace Select Implants, Nobel BioCare, Yorba Linda California) was carefully placed in the extraction site. After placement to the desired depth, the implant was torque tested to 35 Ncm with no evidence of rotation. This indicated good initial implant stability. A temporary abutment was then placed and hand tightened. The pre-fabricated temporary crown was relined with acrylic, smoothed and polished, then temporarily cemented onto the abutment (Fig 6). Occlusion was checked so that the provisional did not contact in centric occlusion and was clear of any lateral and protrusive interferences. Two sutures were placed to adapt the tissues around the temporary (Fig 7). The sutures were removed after two weeks and the occlusion was again checked. The patient wore the provisional for 4 months to allow the tissues to heal and stabilize prior to definitive restoration.

The implant was ultimately restored using a Procera all-ceramic abutment and Procera crown. A Procera crown was also placed on tooth #9 in order to optimize the esthetic result (Figures 8,9,10).



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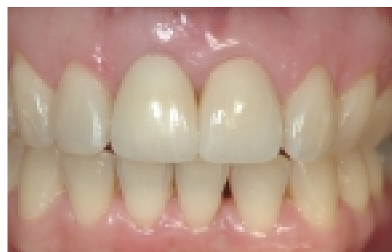

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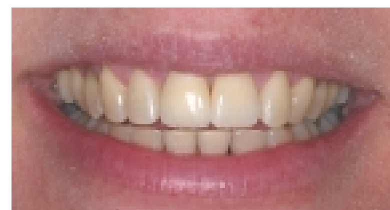


Figure 10

Case Presentation 2

A 44 year-old female patient was referred for evaluation of the upper right and left central incisors. These teeth had a history of trauma and endodontic treatment approximately 10 years prior. The teeth were restored with conventional posts, core build-ups, and rather un-esthetic crowns. She had noticed progressive loosening of these teeth and the space between them "seemed to be getting worse" (Figures 11,12). Radiographs demonstrated breakdown of osseous support and severely compromised and failing teeth (Figure 13).

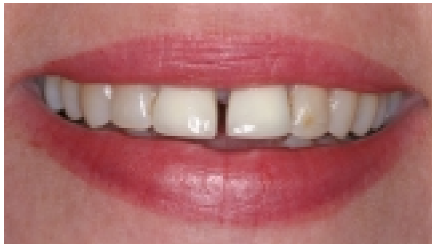


Figure 11

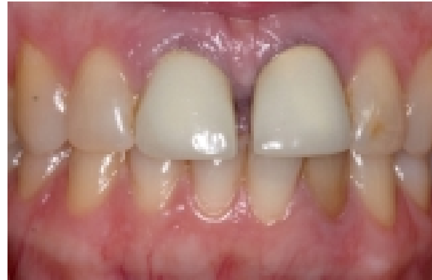


Figure 12

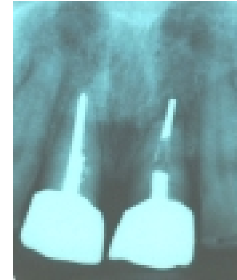


Figure 13

Clinical examination revealed class 2 mobility with significant fremitus on both central incisors in centric closure. Various options were discussed with the patient and the decision was made to extract these teeth replace them with dental implants.

A key component to implant therapy in the maxillary anterior is proper evaluation of the future implant sites. Several important hard and soft tissue considerations should be evaluated prior to implant placement [6-8]. After evaluating the existing height of the central papilla, position of the free gingival margins, and existing bony architecture, it was determined that orthodontic extrusion of the centrals, prior to extraction, would help optimize the hard and soft tissue profile and allow for the best possible final esthetic result (Figure 14).

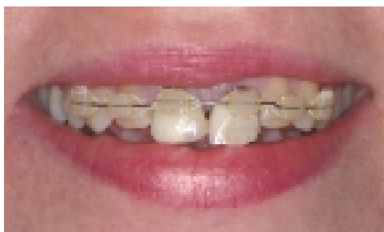


Figure 14

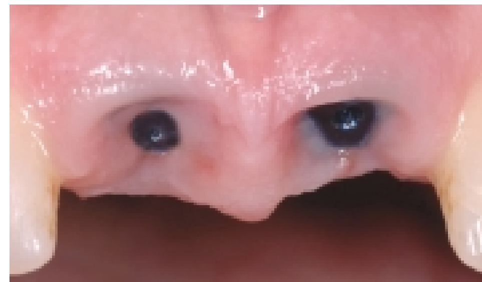


Figure 15

As the orthodontic phase of treatment was nearing completion, the plan was to extract both central incisors and replace them immediately with implants, temporary abutments, and provisionals. Upon extraction and placement of two 5X16mm tapered implants (Replace Select Implants, Nobel BioCare Yorba Linda, California.), the implant in the #8 position did not torque test to 35 Ncm. Failure of an implant to resist torque testing indicates poor initial stability and is a

contraindication for immediate load and provisionalization [4]. Because of this, the decision was made to fall back on the contingency plan for temporization. Healing abutments measuring 3 mm. high were placed rather than cover screws to help develop and support the soft tissue profile during the integration phase of healing (Figure 15). A removable temporary appliance replacing the central incisors had already been fabricated prior to the surgery and ready to use as part of the back up plan. This appliance was constructed with clasps and definitive occlusal stops on the lateral incisors to avoid pressure on the implants during healing (Figures 16-17).

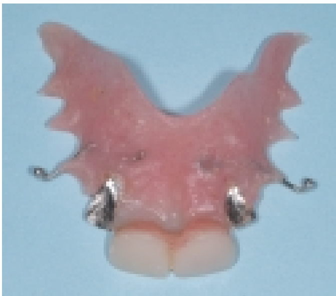


Fig 16

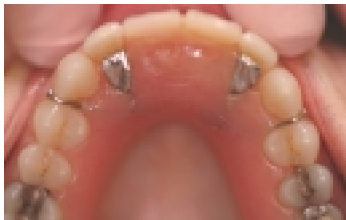


Fig 17

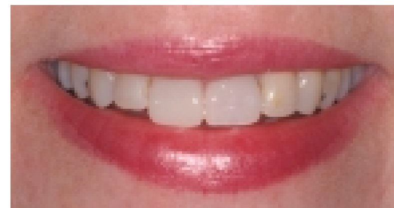


Fig 18

As we were unable to immediately load and provisionalize the implants on the day of surgery, the temporary removable appliance was placed and adjusted. Occlusion was carefully checked and the underside of the pontics adjusted so as to clear the underlying tissue drape and healing abutments. The patient was able to leave the office with a well fitting removable temporary appliance that satisfied the initial esthetic and functional requirements of the case (Figure 18). Typically only the laboratory cost of the temporary appliance is transferred to the patient. This additional fee is negligible compared to the importance of having a contingency temporary available for the patient should it be required as seen in this case.

After 4 months excess tissue was cleared from around the healing abutments using a biopsy punch (Figure19) and the prosthetic component of the case completed. The central incisors were restored with ceramic abutments and Procera crowns (Figures 20-22). Careful treatment planning and attention to detail ultimately led to an excellent final esthetic and functional result.

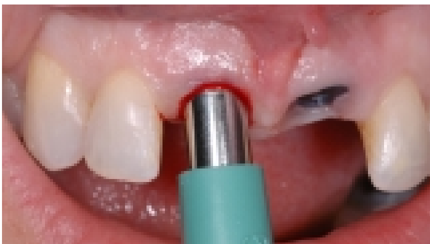


Figure 19

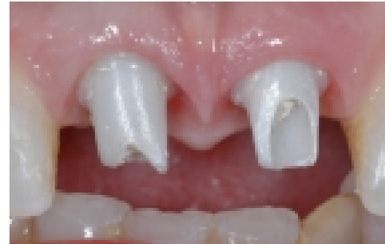
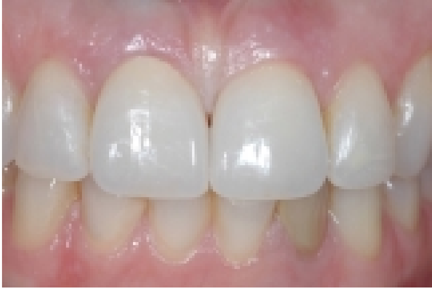


Figure 20



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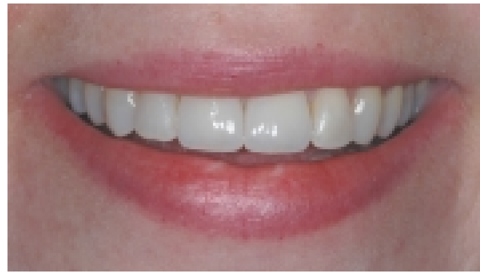

Figure 22

Summary

Immediate placement and provisionalization of implants following extraction in the maxillary anterior is almost always the treatment of choice when conditions are favorable. Shortened treatment time in conjunction with fixed provisionals is always preferable. The esthetic and functional advantage of this treatment, as previously discussed, is clear. Sometimes, at the time of surgery, we find immediate provisionalization to be impossible or risky. The two cases presented in this article were both treatment planned for immediate placement and immediate provisionalization. However, at the time of surgery it was determined that one case did not meet the criteria for immediate load/provisionalization. In that instance, the importance of having a contingency plan for provisionalization, that does not require implant support, is demonstrated.

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