EXTRACTING AND LOADING PLANNING AHEAD

Martin Wanendeya demonstrates the importance of preoperative assessments in an implant case with immediate loading for a periodontally compromised patient

Immediate loading can be defined as the placement of an abutment and prosthesis (usually a provisional prosthesis) on an implant within 48 hours of placement of the implant[1], ie the implant is restored immediately. This is different to conventional loading, in which the implant is loaded after a period of 3-6 months.

In order to carry out immediate placement and restoration, careful diagnosis and treatment planning needs to be carried out before the surgical and restorative treatment begins. As with any surgical treatment, the patient needs to be medically evaluated to ensure that any contraindications to implant placement are noted and managed.



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The prognosis of the tooth to be extracted needs to be determined. Common reasons for extraction can include insufficient crown:root ratios, loss of periodontal attachment, unrestorable sub-crestal caries, root fractures, teeth with large endodontic posts and root resorption[2].

ASSESSMENTS

Assessment of the dentition should include a thorough intraoral examination, radiographs that should include a periapical radiograph of the tooth or teeth to be extracted, a panoramic radiograph of the jaw, and where appropriate, a cone beam CT scan of the jaw. The laboratory records should include study casts, diagnostic wax up and diagnostic clinical photos.

In the aesthetic zone, special consideration needs to be given to:

- Smile line. Patients with a high smile line may need more attention paid to the final aesthetic outcome
- Gingival biotype. Thin and medium biotype tissue will be more prone to recession[2] and a connective tissue graft may need to be considered
- Interproximal bone height. There should be no more than 5mm between the crest of the bone and contact area of the tooth in order to create a papilla[3]
- Gingival scallop and shape.



Figure 2: Initial radiograph

There are several factors that have to be considered in order to be able to immediately load an implant or several implants and ensure that osseointergration occurs.

The implant needs to have been placed with good primary stability[4], which can be improved by adapting the surgical protocol. It can also be influenced by the implant design, as an implant with a more aggressive thread pattern and tapered body is likely to gain better primary stability.

The occlusal design of the provisional restoration needs to reduce the load on the



Figure 1: Initial presentation



Figure 3: Initial presentation (occlusal view)



Figures 4a and b: Diagnostic wax ups

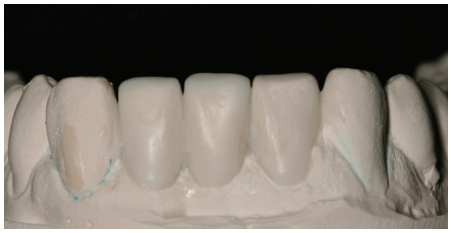




Figure 5: Abutments in situ after surgery

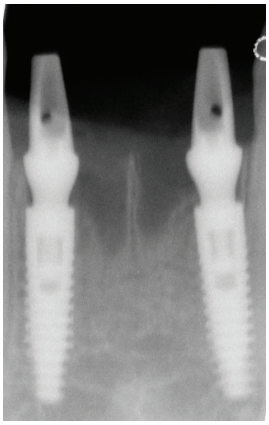


Figure 6: Radiograph of abutments in situ



Figure 7: Provisional bridge after surgery



Figure 8: Conventional impression

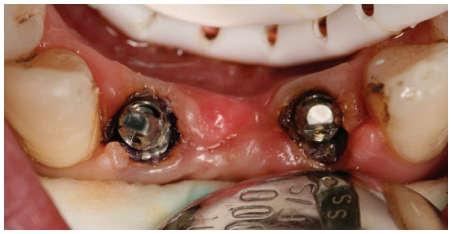


Figure 9: Abutments in situ eight weeks postoperative



Figure 10: Metalwork try in



Figure 11: Bite registration with metalwork in place

implant during the initial phase of healing. If the primary stability of the implant is below a threshold of 25Ncm or the occlusal load is excessive, then micromotion can occur. If micromotion beyond a threshold of between 50-150M[4-6] occurs, then fibrous encapsulation of the implant will take place, and the implant will fail to integrate. So if an implant is to be loaded immediately, every effort should be made to reduce the amount of micromotion to within these tolerated limits.

CASE PRESENTATION

The patient presented complaining of loose lower front teeth, he was having problems biting and chewing as the lower incisor teeth had overerupted and this had resulted in a traumatic bite to the palate. His medical history was clear; he was a light social smoker. His dental history showed that the patient has had previous periodontal problems, but he had not attended routine maintenance.

On initial examination there were pockets of greater than 4mm on many of the upper and lower molar teeth, as well as the lower incisors. The lower incisors were Grade 3 mobile and the LL1 was overerupted (Figures 1-3).

After the initial examination and completion of essential restorative treatment, the patient was referred to our specialist periodontist and full mouth debridement was carried out over three visits.

At the periodontal reassessment some residual pocketing was present on the UL7/8 UR7/8 LR7/8 LL7/8 and these teeth have a guarded long-term prognosis, with a good prognosis on all the first molar teeth. The patient's oral hygiene and motivation had improved markedly and the periodontal condition was stable. The patient will attend the periodontist for annual reviews, and visit the hygienist at least every three months.

The long-term restorative treatment plan involved maintaining the upper second and third molars for as long as possible with frequent non-surgical periodontal treatment.

At the start of the restorative phase of treatment, a diagnostic wax up was fabricated and it was decided to fabricate three larger lower incisors to fit into the limited space between the lower canines (Figures 4a and b).

Surgery was carried out under a full aseptic setup. The lower incisor teeth were gently extracted in order to preserve the buccal plate. The integrity of the buccal plates was checked with a blunt instrument before the implant placement was undertaken. Two A14 Ankylos (Dentsply Friadent) C/X implants were placed 1-2mm below the buccal crest at over 35Ncm of torque.

Two 3mm 15° balance abutments were adjusted and connected to the implants (Figures 5 and 6), paralleled and torqued to the recommended 15Ncm. A chairside provisional bridge was made from Structur (Voco) using the wax up to determine the tooth shape, cemented with Temp Bond (Kerr) and left out of occlusion (Figure 7). The patient was instructed to eat soft food for a period of eight weeks.

After 3 months of uneventful healing, a conventional impression (Figure 8) was taken of the abutments in situ (Figure 9) and retraction cord was used to allow a good impression of the margin. The metalwork for a three-unit bridge was fabricated and tried in the mouth (Figure 10), then the bite was checked and registered (Figure 11). The fit of the metalwork was checked on a long cone



Figure 12: Metal ceramic bridge

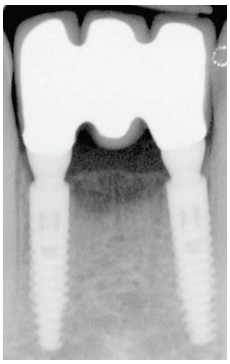


Figure 15: Final radiograph

periapical radiograph.

The final metal ceramic bridge (Figure 12) was fabricated and cemented with Temp Bond (Figures 13-14) and a periapical radiograph (Figure 15) was taken to check for residual cement, as well as to serve as a baseline for future monitoring of bone levels. An occlusal splint was fabricated (Figure 16) for the patient to wear at night to prevent the transmission of excessive forces onto the implant retained bridge. Two-year postoperative views can be seen in Figures 17 and 18.

REVIEW

In order to carry our immediate implant placement and loading it is important that the appropriate surgical and restorative treatment planning is carried out. At the time of planning, before surgery, a provisional

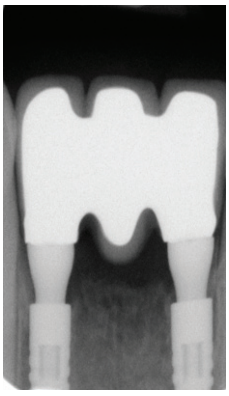


Figure 17: Close up of periapical taken at two-year review showing stable bone levels



Figure 13: Final bridge in place



Figure 16: Splint in place

bridge as well as provisional Rochette bridge or denture should be available. The technician must be aware of the surgical treatment plan so, at the time of construction, the metalwork on the Rochette bridge is made in such a way as to allow this adaptation to take place.

The occlusal load must be managed in order to reduce micromotion. If a single unit is immediately loaded, the provisional crown should be kept out of occlusion in centric and lateral excursion[4]. If multiple units are to be immediately loaded, then these should be splinted together rigidly, with no contact in centric and lateral excursion. If a full-arch restoration is placed there will be inevitable contact in centric and lateral excursions, so lateral excursions should be in group function. The nature of the opposing arch should also be evaluated- a denture will provide less opposing force than natural teeth.

The advantages of immediate loading include the reduced treatment time for the patient (in some cases), the lack of a removable provisional restoration, the lack of a second surgical stage, the aesthetics and



Figure 18: Two-year postoperative view



Figure 14: Occlusal view of final bridge in place

phonetics can be assessed at an early stage, improved function for the patient at an early stage of treatment, reduced cost and chairside time as there are fewer treatment stages, and the greater bone density that is present around immediately loaded implants compared to conventionally loaded implants[7].

The disadvantages of this technique are the higher risk of failure if all the key clinical requirements are not met. Failure can lead to a lack of osseointergration and the loss of an implant. If failure occurs then the cost and time until the patient is fully restored will increase. In some cases this may lead to prosthesis failure.

When treating cases where the patient is periodontally compromised, careful assessment and continuous monitoring of the periodontal condition before treatment is needed. The periodontal condition must be stable before treatment is started. The patient must be made aware of the need for ongoing treatment in order to maintain the teeth and implants.

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For a full list of references, or to ask a question or comment on this article please send an email to: comments@ppdentistry.com