Implant retained mandibular over-dentures

Willie Jack presents a case study which describes an alternative method that gives an immediately loaded solution in 24 hours

In each of our practices how many patients do we have who struggle to cope with loose and unstable mandibular dentures? Many patients are not regular attenders as they have discovered there is little that we can do to help them; endless re-makes and relines do not make a significant difference and so they try all sorts of denture pads & adhesives every day.

Dentists often view denture work as a difficult and generally unrewarding part of daily clinical life. How often do we see (with dismay) a very familiar patient’s name listed on our diary for yet another ‘case’ and wonder how much benefit we can offer them? The first implant case I did in practice was a two-implant lower denture case as I was advised that this type of case would be easy to start with.

Surgically these cases can be straightforward, but the angle of the anterior mandible compared to the denture tooth position often makes for an awkward connection to the implants. In addition there are further challenges:

The bar & clip method of retention can be time consuming, complicated and costly. As the denture is processed indirectly obtaining an accurate fit is technically sensitive. The press-stud type ‘Locator’ is a common dental abutment today, while giving an excellent degree of retention these stand-alone implants must wait till they are fully integrated before the denture can be connected to the abutments.

Looking for ways to make over-denture treatment quicker, simpler and give better value for money, I came across Cendres & Metaux’s new ‘SFI Bar system’. This is a method of placing an adapter type abutment into your usual implant system and connecting a bar chairside at the time of implant placement. You can then pick up the gold clip onto the bar position in the denture with cold cure acrylic.

Case study

The first case that I treated with Euroteknik’s Aesthetica+ implants and the SFI bar was a lady who came to see me who was happy with every aspect of her dentures except the stability and retention of her lower denture. When I examined her I could see that she had sufficient bone for implant placement, as is often the case in the anterior mandible. However the alveolar ridge and the denture bearing area was clearly going to cause a problem with any conventional denture. What this lady did not have was time: she had a family wedding within a month! I am normally reluctant to give any guarantees about the timing of implant treatment, but with only one month before the wedding it made me think that the SFI system may be an ideal solution in her case.

The patient’s denture was adequate and so we decided to use this as the template as well as the final denture so we could start her treatment earlier and keep the cost down. Her treatment was planned to start early one day and to finish the end of the same day! When she arrived on the day of treatment, we took her denture to our on-site prosthetics laboratory where our technicians added more acrylic on the lingual aspect, bulking it out for strength. Then they made a large opening just lingual to the tooth positions from the first premolar positions left to right, but ensuring that the acrylic was removed above the alveolar ridge. It is important to ensure that the sites

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• Two-piece 3mm design offers restorative flexibility in narrow spaces
• Implant design is more than 20% stronger than competitor implant
• 3mm threadform shown to be effective when immediately loaded
• Laser-Lok microchannels create a physical connective tissue attachment (unlike Sharpey fibers)

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2. Implant strength & fatigue testing done in accordance with ISO standard 14801.
4. Laser-Lok microchannels create a physical connective tissue attachment (unlike Sharpey fibers)
5. Two-piece 3mm design offers restorative flexibility in narrow spaces
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of both canine teeth are visible in the mouth when the denture is seated.

The patient was prepared for implant surgery with a pre-operative chlorhexidine mouth rinse, analgesics, antibiotics and infiltration local anaesthesia. The denture was seated in position and from the Aesthetic+ surgical kit we used the very sharp ‘point-drill’ to identify the canine sites at the limit of the anterior part of the denture slot. By punching through the mucosa we could also mark the alveolar bone; then all soft tissue was removed and a small full-thickness flap opened from just distal to each mark and with a midline relieving incision. I prefer to place a midline relieving incision in these cases as if they are distal to the sites it is possible to make an incision too close to the mental foramen & nerve. The second drill is the 2.2mm twist drill to 6-8mm depth, and then the orientation is checked by re-seating the denture over the direction/depth gauge indicator.

When happy with the orientation, the site is further prepared with the 2.8mm & 3.5mm twist drills. The Aesthetic+ regular platform implant to be placed is 12mm in length and 4.1mm diameter with a 4.8mm collar. These implants are Straumann compatible surgically and the 4.8mm collar is compatible with Straumann regular neck prosthetics; they are better able to maintain marginal bone levels by the Euroteknika designed Micro-Threads which are synchronous with the main threads. Once in place the denture is again re-seated to check that the first implant is sited correctly and that it will still be possible to place the second implant in the optimal site.

As both implants are being fully seated the final insertion torque is measured and then a reading is taken using the Osstell resonance frequency system. These give an understanding of the primary stability of the implants and will allow the clinician to make a decision as to whether to immediately load or not. We are aiming for a minimum of 35Ncm final insertion torque and an ISO of at least 60. In this case the implants were very firm and so, after closing the site with 6/0 mono-filament suture, we chose the appropriate height SFI abutments and torqued them to 35Ncm. We now come to the slightly fiddly aspect as the system: measuring and cutting the bar to the length which matches exactly the distance between the two implants. With typical Swiss efficiency C&M have developed a very precise measuring abutment which allows the length of the bar to be calculated and then cut. When cut the bar is slotted into the bar ends which are then fitted into the abutments and torqued to 20Ncm.

The denture is tried in over the bar and if it is too close it is adjusted to give a uniform clearance. The gold clip is cut to fit the bar and then left with a spacer between the bar & clip.

The denture is re-seated allowing the horizontal slot on top of the gold clip to be tacked to the buccal and lingual aspects of the denture with cold cure acrylic.

The patient is asked to close together in occlusion so that the correct occlusal position & vertical height is maintained. When the acrylic has set, bite registration material is added into the remains of the denture opening, giving a ‘ceiling’ to the denture, before it is carefully removed from the mouth. The patient is then discharged until later on the same day.

In the dental lab an analog of the bar is seated inside the gold clip and the denture is based in stone. When set, the denture is removed and the analog bar and the sides of the gold clip are blocked out; the denture can then be re-seated onto the model over the analog bar. It is a simple yet exact process of adding more acrylic to seal the clip into the denture, processing this and then removing the excess lingual acrylic and polishing the denture.

Later that same day, the patient arrives back to have the denture fitted. There was no doubt that the fit & retention was exceptional, but to allow for some swelling of the tissues it meant that some acrylic had to be removed, especially buccal to the implants & bar. When the patient returned in seven days for removal of the sutures her response was that she had no pain and while she had been cautious with her diet, she had been able to eat many different foods that she had not been able to eat up to that point.

At the completion of the operation the patient was prepared to use her dentures, whilst still in the clinic, to ensure the best occlusion. She was then discharged until later on the same day.

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Literature review

These types of treatments are associated with a high success rate, although it has been suggested that clinical & radiographic evaluation must be maintained over the long term. (COOPER et al 1999) Some authors report no indications of worsening of the clinical or radiological state after 10 years (MEIJER 2004). Patients’ expectations of a two implant retained over-denture may be too high compared with what can be delivered; it must be remembered that the prosthesis is still the same size as their previous denture, still removable and not completely immobile in function. (ALLEN et al 1999) Other authors report a considerable benefit compared to conventional dentures (RAGHOEBAR et al 2000) and patients report that they have a better chewing & biting function than their previous conventional dentures (BAKKE et al 2002). Some patients have noticed that their chewing force is so much greater that – if they have an opposing denture – it is this other denture which is the limiting factor in functional terms (FONTIJN-TEKAMP ET AL 2001) I have even noticed that the opposing denture fractures after provision of an implant retained over denture in the mandible.

In some cases I am making the implant denture itself in chrome to prevent fracture (SHOR et al 2007). In relation to bone quality and healing times, it has been suggested that this type of treatment can allow the implants to be loaded within two weeks of placement. (PAYNE et al 2003)

References