



## **Overdentures may be the best answer for lower complete dentures**

### **Background – denture success**

For many years upper and lower conventional removable complete dentures have been worn by patients with varying degrees of success. Generally upper complete dentures work well but sadly the lower complete denture is often extremely unsuccessful. Many patients chose to leave their lower denture out and find it almost impossible to eat well with them.

In view of the poor clinical outcomes seen in complete lower dentures, there has been an increasing interest in “*overdentures*”. These are dentures that fit over either implants or retained natural teeth or roots, and are attached to them using mechanical precision attachments. The attachment of the denture provides the denture with greater stability and retention and gives the patient better chewing function and greater confidence.

Partial dentures that replace only some of the teeth, are rather more successful as they often have clasps that fit around the remaining natural teeth improving the denture’s retention in the mouth. However there are times when implants may be used to keep partial dentures in place too.

### **Variable success in upper and lower complete dentures....**

The reason for the difference in denture experience between an upper and lower complete denture is the denture design and the difference between the surface area of the two dentures in contact with the soft tissues of the mouth.

*In the upper jaw* the denture rests on the gum or both the ridge where all the teeth use to be, and on the palate. This palate soft tissue covers a very large surface area and increases the denture to soft tissue contact area greatly. If the denture fits well and creates a seal around it’s periphery where the denture flanges fit up under the lips and around inside the cheeks, then the upper denture can be “sucked” into place and a small negative pressure is able to remain under the denture providing adequate retention.

*In the lower jaw* however, the denture rests on a horseshoe shaped pad of gum. The denture is surrounded with moving soft tissues. The tongue moves a great deal inside the denture, the cheeks move on the outside of the denture and the lips are constantly moving at the front. With so much movement, it is not surprising that the lower complete denture cannot sit still and generally moves around during speech and eating.

### **Saliva is important too....**

The saliva also helps with the seal at the periphery of the upper denture in particular hence the importance of an adequate volume of good quality saliva to enjoy success, wearing dentures. Patients with chronically dry mouths often find it impossible to wear dentures with any comfort. The denture will rub on relatively dry oral soft tissues and this leads to ulcers that are painful. For more information on dry mouth refer to our leaflet on dry mouth and saliva (*patient handout No. PH-51*).

### **Ways to help with denture success....**

There are a number of technical tricks that prosthetists and prosthetic technicians use to improve the ability of the lower denture to sit still during eating and speaking.

The shape of the denture periphery is very important and the use of a concave surface next to the tongue to encourage the tongue to rest on the denture acrylic flange is one of many that help to retain the denture preventing the lower denture from lifting.



The avoidance of excessive volume of acrylic in the flanges projecting into the sulcus inside the lips and cheeks is also important. If these flanges are “over-extended” then movement of the lips, cheeks and tongue will constantly cause instability and movement of the denture with the result that the denture will become dislodged.

An over-extended flange is a common problem with new dentures and adjustment is often possible to improve the denture fit and stability. However the most common problem with denture flanges is UNDER-extension resulting from poor impressions. This means the denture flange does not reach the depth of the sulcus inside the lips and cheek and therefore the flange is unable to make a good peripheral seal with the soft tissues. If there is not a close fit of the flange and soft tissue then air can leak underneath the denture, releasing the slight negative pressure beneath the denture and the denture immediately becomes loose. Retention is immediately lost and it drops away from the palate becoming loose in the mouth.

### **Modern approach to improving denture experience**

Over the last 15 years there has been an increased use of osseointegrated dental implants used to retain dentures and provide a firm and reliable denture that offers excellent function and allows the wearer to eat and speak with confidence.

### **Bone density varies between the upper and lower jaws....**

In the upper jaw the bone is of relatively low density while in the lower jaw, the density is far greater and consequently implants placed in the high density lower jaw bone can tolerate greater loading than those placed in the lower quality upper bone.

In the upper jaw therefore, the loading applied to implants must be lower than that applied to lower implants. This is why it is necessary to use a greater number of implants in the upper arch to support a prosthetic appliance thereby distributing the loads over a greater surface area of implant to bone contact.

In the upper jaw the implants are joined together by a bar and the prosthesis (denture) clips to this bar. Usually in the upper arch 5-6 implants would be used to support a full arch of teeth irrespective of whether the appliance is removable or fixed permanently.

In the lower jaw it is usual to place only 2 or 3 implants to retain a lower denture. The lower full denture with precision attachments clips onto these implants.

### **Guidelines on the number of implants used....**

Until the last couple of years we placed only 2 implants in the mandible to provide the necessary retention for lower denture. This worked extremely well for almost all patients. There could be a slight rocking of the denture in a forward-backward direction but it was usually so minimal that patients were not concerned and managed to wear their overdentures with great success.

Around 2012, the *International Team for Implantology* published their guidance for overdenture treatment using implants and recommended the use of 3 implants in the lower jaw as the tripod is the most stable of all designs. This avoids rocking and provides very good retention and stability. This is now the gold standard.

Dr Priestland has been using only 2 implants in the lower jaw to support overdentures for a number of years most successfully but fully accepts that three implants are better. However, the cost of using three implants is significantly higher. This is therefore always discussed with patients. It is clear that placing three implants in the lower jaw is the best plan and generally this would always be the treatment advised. However where financial circumstances dictate



that only 2 can be used, patients can expect a good result and a successful clinical outcome even on only 2 implants in the lower jaw.

#### **A fixed or permanent prosthesis....**

An alternative method of providing prosthetic teeth is to provide a fixed dentition. This means the implants are surgically placed in the jaw bone and once healed are used to permanently retain a solid structure of teeth and pink material to look like the missing soft tissues. Such a prosthetic appliance is screwed into the implants and is therefore described as a fixed appliance, as it cannot be removed by the patient.

#### **The pros and cons of fixed and removable prostheses....**

The main problem with permanently fixed prosthetic appliances is the patient's inability to remove the teeth to maintain a high standard of cleaning around the implant and underneath the appliance.

Failure to remove all the plaque from beneath a prosthetic appliance will lead to inflammation in the gum around the implants and this may then result in the loss of bone supporting the implant. It is for this reason that Dr Colin Priestland has now stopped providing fixed prosthetic appliances. He now believes that unless cleaning is made easy and plaque removal can be performed effectively on a daily basis by the patient, then the long-term future for the appliance is not good.

Dr Priestland now only provides over dentures, sometimes referred to as "hybrid bridges" that are attached to the implants but are removable by the patient for cleaning. They still offer an excellent level of stability, retention and provide patients with complete confidence while allowing them far easier access to remove any plaque from around the implant and gum margin.

#### **The All-on-4 principle....**

A Portuguese implant surgeon, Dr Paulo Malo, pioneered the use of only four angled implants in the upper jaw and the same in the lower jaw to support fixed permanent prosthetic appliances. This has become known as the "All-on-4" technique. It is practiced in many countries including Australia and has attracted many followers. However, there are also many surgeons who are unhappy using this system.

The upper jaw having lower density bone was found to provide adequate support by using implants that are longer and hence have a greater surface area of the implant through which to distribute the load to the supporting bone. The posterior two implants are placed into the bone at an approximately 30 degree angle, both in the upper and lower jaws. This increases the anchoring effect of the implants but the load distribution is no longer along the long axis of the implants.

While this technique works extremely well in many cases, the biggest short-coming is that should one implant fail, the entire prosthesis fails and it becomes necessary to place an additional implant or implants and remake the prosthesis. This adds significant cost to the treatment.

Once again, being a fixed appliance, cleaning beneath it and around the implants is more challenging for the patient and hence the potential for inflammation relating to retained plaque is much higher.

#### **Recent research....**



Research data has been published on the health of implants after they have been restored and the patient has returned to their routine dental care in general dental practice.

The degree of bone loss in those patients who fail to get the professional support they need is disturbing. The results do vary between published studies but even so, the findings are:

- between 50 and 90% of implants are found to have inflammation around the adjacent gum
- *between 15 and 43% of all implants were found to have suffered from bone loss* resulting from plaque-related inflammation.

Dr Priestland therefore avoids “All-on-4” treatment and now avoids using fixed prostheses on implants and only uses a well tried and tested technique involving removable overdentures retained by either 2 or 3 implants in the lower jaw, or 5 to 6 implants in the upper jaw joined together using a bar.

### **Partial dentures can benefit from implant retention....**

Many patients suffer the loss of posterior teeth but keep their own front teeth. This is of psychological benefit but leaves the patient to face a very difficult prosthetic challenge.

The denture will replace the teeth at the back of their mouth and consequently the only teeth that can be used to keep the denture in place are the anterior teeth. This is a problem as any clasps placed on these front teeth would be visible and in most circumstances patients would find this unacceptable.

A novel way to get around the problem is to use either one or two implants in the posterior region of the upper jaw to allow the use of precision attachments in the denture to connect to these implants thereby keeping the denture in place.

Precision attachments are useful as they allow the patient to remove the denture for cleaning and to provide the soft tissues with a break overnight, but during the day they provide the denture with a firm anchor and this allows the patient to eat, smile, laugh and speak with confidence.

### **Who provides the prosthetic work?**

A Prosthetist in Townsville, Mr Bernie Courtney, provides the prosthetic work in support of the patients we treat. With over 50 years experience, his dentures look natural and fit beautifully. By working together with a single prosthetist we have a close team relationship allowing us to know exactly what the other requires to achieve the best clinical outcomes for our patients. We meet regularly to discuss patients we are treating and maintain clear communication between us.

Pre-surgical planning usually allows Dr Priestland to provide Mr Courtney with an accurate assessment of the expected change in bone contour that is likely to take place at surgery. This allows him to modify the stone models and manufacture the immediate denture so that at the end of surgery it will fit well.