

Implant retained dentures

03/09/2018

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- Recent studies on the clinical success of dental implants have indicated a high implant survival rate. Nevertheless, the inadvertent association of most surgical and prosthetic complications with improper diagnosis and implant placement has also been documented. These factors play a crucial role in the long-term predictability and success of implant prosthetics. Surgical guide templates not only assist in diagnosis and treatment planning but also facilitate proper positioning and angulation of the implants in the bone. Moreover, restoration driven implant placement accomplished with a surgical guide template can decrease clinical and laboratory complications. Hence, increasing demand for dental implants has resulted in the development of newer and advanced techniques for the fabrication of these templates.

Dental CBCT Scans – there are now a number of advanced x-ray techniques that allow your jawbone to be looked at in all three dimensions. The most accurate and widely available is known as the CBCT (cone beam computed tomography) scan. Images obtained by CBCT scanning will normally be able to show all of the information required about your bone, including quantity and quality, but most importantly the presence of anatomical structures that must be avoided.

To determine placement and bone depth it is possible to use surgical guide as a dual CT scan, this is done by creating a copy denture with the following as markers to give the height of the restoration then hollow the back for a guide of where the implant needs to be placed:

- radio opaque teeth
- Gutta percha
- Ball bearings
- Orthodontic wire
- radio opaque resin

Bone can be harvested from a number of sources but usually from behind the back teeth in the lower jaw or from the chin. Sometimes it is taken from the hip or shinbone (tibia). When you use your own bone to create new bone in another area of the mouth you will have to contend with the discomfort created by the donor site as well as the surgical site. Many people feel this is well worth any additional discomfort as your own bone is normally considered the 'gold standard'.



How does it work?

Osseointegration

Direct bone healing, as it occurs in defects, primary fracture healing and in Osseointegration is activated by any lesion of the pre-existing bone matrix. When the matrix is exposed to extra cellular fluid, noncollagenous proteins and growth factors are set free and activate bone repair. Once activated; osseointegration follows a common, biologically determined program that is subdivided into 3 stages:

- Incorporation by woven bone formation;
- Adaptation of bone mass to load (lamellar and parallel-fibered bone deposition);
- Adaptation of bone structure to load (bone remodeling).

In general the **survival rate for dental implants is around 95%**; however, in practice this could mean that 1 in 20 of the implants placed might not survive in the long-term. Implants which survive can suffer other problems including periimplantitis, gum recession and fracture of the restoration. It is a good idea to discuss how your treatment plan might be affected by the loss of an implant.

There are many reasons why a dental implant can fail including smoking, oral hygiene, and systemic disease. In these particular risk groups, the failure rate could be expected to be much higher. <http://consideringdentalimplants.co.uk/considering-dental-implants/placement1.html>

Osseointegration is defined as a time dependent healing process whereby clinically asymptomatic rigid fixation of alloplastic materials is achieved, and maintained, in bone during functional loading (Zarb & Albrektsson,). Histologic appearance resembled a functional ankylosis with no intervention of fibrous or connective tissue between bone and implant surface.

The successful outcome of any implant procedure is mainly dependent on the interrelationship of the various components of an equation that includes the following:

1. Biocompatibility of the implant material
2. Macroscopic and microscopic nature of the implant surface & designs
3. The status of the implant bed in both a health and a morphologic (bone quality) context
4. The surgical technique per se
5. The undisturbed healing phase
6. Loading conditions

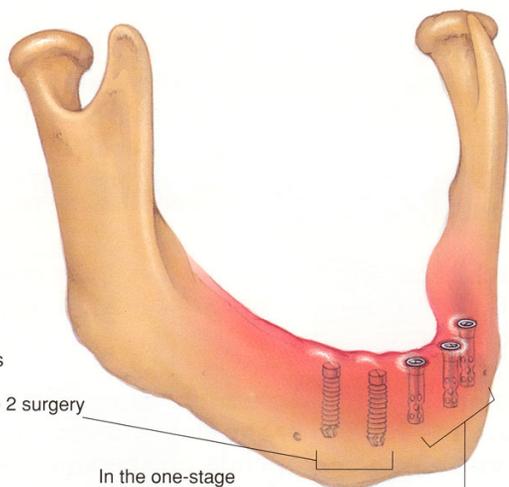
Osseointegration: An Update [S. Parithimarkalaignan](#) and [T. V. Padmanabhan](#)

[J Indian Prosthodont Soc.](#) 2013 Mar; 13(1): 2–6.

Implants in place
in jawbone
at the end
of stage 1
surgery

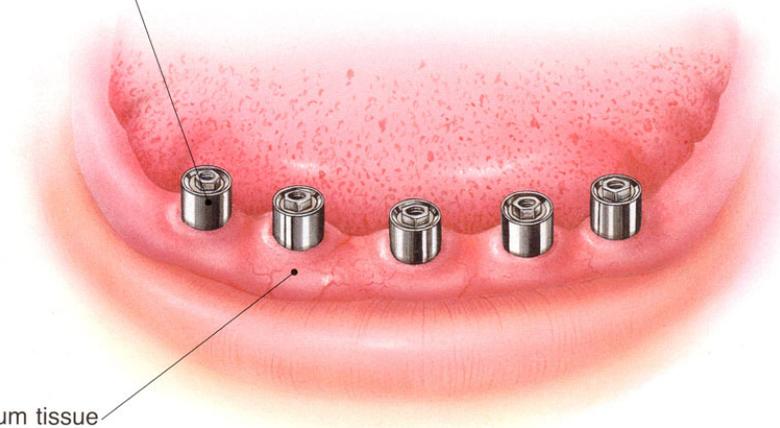
In the two-stage
procedure, implants
remain covered
by gums until stage 2 surgery

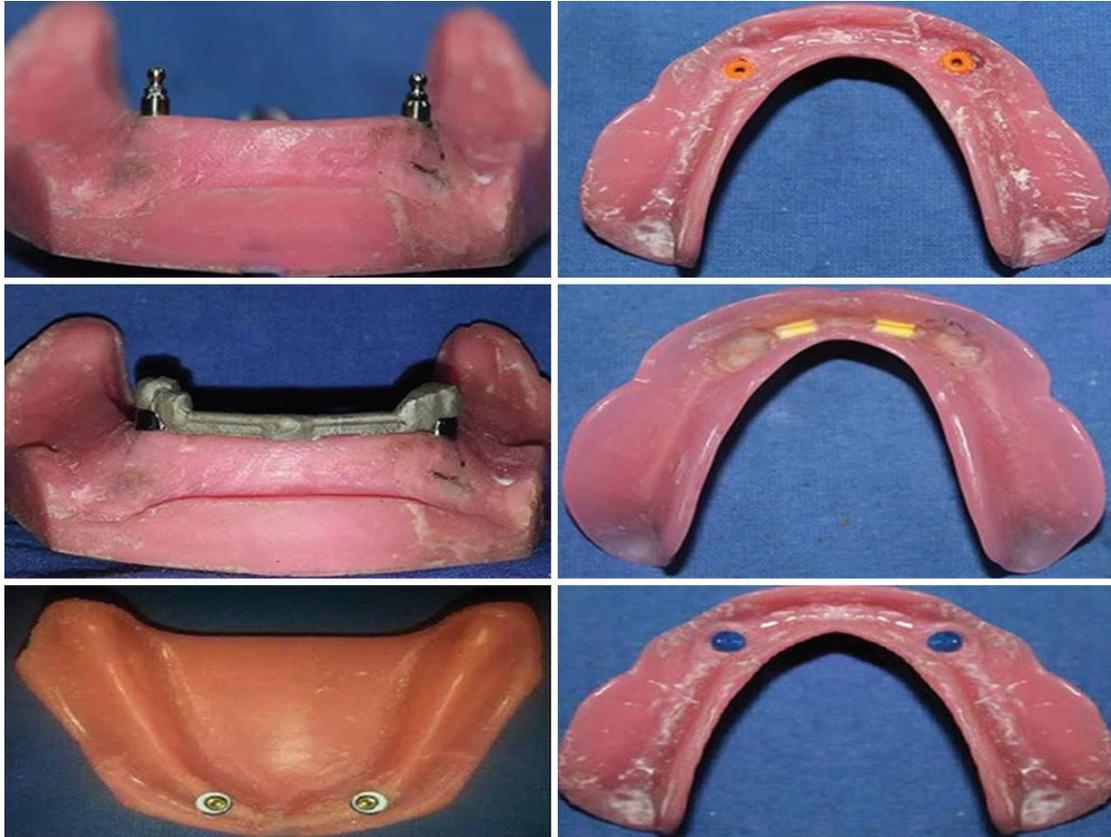
In the one-stage
procedure, implants
are left uncovered



Abutments are attached to the implant
during stage 2 surgery

Gum tissue





An *in vitro* comparative study to evaluate the retention of different attachment systems used in implant-retained overdentures

Tejomaya Shastry, N. M. Anupama, Shilpa Shetty, M. Nalinakshamma

Common types of systems associated with implant supported complete prosthesis

1. O ring type
2. Bar
3. Locator®

The underlying principle in employing retentive implant-overdenture systems for the treatment of edentulous patients is to increase denture retention and stability, there by promoting chewing function as well as patient comfort and compliance.

The ball/o-ring and bar–clip attachments maintain their retentive capacity longer than the Locator® attachment

‘Implant-supported removable partial dentures (ISRPDs), which can transform a tooth/tissue-supported mandibular Kennedy class I or II removable partial denture into a pseudo- Kennedy class III, have become a popular prosthodontic treatment option in recent years. Compared with conventional removable partial dentures (CRPDs), ISRPDs offer maximum denture stability and greater occlusal force, and facilitate functional recovery. ISRPDs also offer excellent maintainability, because they have removable superstructures. Additionally, ISRPDs have a high implant survival rate of 95–100% and high patient satisfaction

Problems- poorly designed frameworks can cause abutment teeth to become loose

Do implants have an impact on nutritional intake?

Hamdan et al, 2013 undertook a trial starting with 255 patients in ranges with male and female. Over 65 years of age and edentulous. The findings show that whilst patients chew with less difficulty the nutritional intake is closely aligned with complete denture wearers.

The authors acknowledge the patients involved with the trial had an above average of education and income therefore, could have a health conscious attitude and the knowledge of preparing foods differently.

The ability to bite into an apple or cut it up to eat it still gains the nutritional benefits.

Patients would benefit from dietary counselling specifically to that patient.

Do Implant Overdentures Improve Dietary Intake? A Randomized Clinical Trial: N.M. Hamdan, K. Gray-Donald, M.A. Awad, L. Johnson-Down, S. Wollin, and J.S. Feine

Allen et al 2002; stated that where patients in trials were from non-professional backgrounds consumed a diet low in vegetables but did not assess whether this was due to denture wearing and couldn't tolerate eating these types of foods or simply didn't like them (acknowledged in the text). However, the intake was higher in the south than the north.

Foods such as bacon, apples and nuts tend to be more difficult to chew. Implant retained dentures in this trial did see an ability to eat these.

The findings did state for conventional denture wearers in the CGD1 selection where base extensions had been altered and a high quality denture provided, these patients perceived no increase in dietary intake or function in mastication.

It is worth noting however these patients requested implants, was their responses biased?

Food selection and perceptions of chewing ability following provision of implant and conventional prostheses in complete denture wearers: Finbarr Allen, Anne McMillan

‘A dodging problem that has been seen with using osseointegrated dental implants are the amount of stress that is transferred from the implant to the surrounding bone. Studies have shown that clear differences exist in the way stresses are transferred to the bone in a tooth-supported overdenture and an implant-supported overdenture. The main difference cited was the absence of relative movement in response to load transfer from root analog to bone in osseointegrated implants. Titanium implants are stiffer than natural teeth and tend to transmit and distribute greater stresses to adjacent bone. Excessive stresses developed at bone-implant interface could cause the degradation of osseointegration and the failure of the treatment.’

Studies have demonstrated that implants retaining overdentures are subject to both axial and transverse forces, the latter being smaller but potentially more harmful. Thus it is desirable to study stress distribution through the prosthesis and implants to the supporting bone.

Force Transfer and Stress Distribution in an Implant-Supported Overdenture Retained with a Hader Bar Attachment: A Finite Element Analysis

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