HOW TO BEGIN WITH DENTAL IMPLANTS

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Basics of Dental Implant

A dental implant restoration consists of 3 parts:

1. Dental implant - A surgical component that is placed within the bone of the jaw to support a dental prosthesis such as a crown, bridge or removable denture.

   A surgical procedure is required to place the dental implant inside the jawbone. One or more implants may be required for a specific case.

   For example, when a single tooth is missing, a single implant will be positioned. If all teeth from a dental arch are missing, 4 to 8 implants may be required to support the restoration.

2. Abutment - Implant abutments are artificial devices that are usually connected to the dental implants after the healing process is over.

The abutments are used to attach a crown, bridge, or removable denture to the implant fixtures.

3. Prosthetic device - Dental implants can support a large variety of prosthetic devices: dental crowns, dental bridges and various types of implant-supported removable dentures.

1. Dental implant

Dental implants come in a variety of shapes and sizes, so there is one to suit every clinical situation. An implant is actually an "artificial tooth root"; the implant surface is ribbed for better integration into bone tissue.

Dental implants

Implants are also threaded; when they are screwed into the bone, threads increase the surface area for osseointegration and they collect bone tissue so that the implant is as stable as possible when it integrates into the bone.

Some implants are molded as one piece with the crown; in this case, the type of the crown is pre-determined. More often, an abutment is attached to the implant after the healing period.

Manufacturing material

Most often, dental implants are made of titanium. Titanium is the most favored material by most of the dental clinicians and implant manufacturing companies due to its high biocompatibility, non-

allergic and tissue friendly nature and its great ability to make a connection of its surface with the alveolar bone for the process of osseointegration.

Besides titanium, zirconia dental implants have lately emerged. Even though they are relatively new, there has been a considerable increase in the use of these dental implants.

2. Abutment

Abutments are manufactured in a range of sizes and shapes and are usually delivered by manufacturing companies along with the implants. From the various range of abutments, the ones that best fit the clinical case are selected.

Manufacturing materials

Implant abutments can be made from a variety of materials, such as titanium, surgical stainless steel, gold and, more recently, zirconium.

- Titanium abutments

Titanium abutments are widely used due to the excellent properties of the titanium alloys. They have a very good strength and biocompatibility and can be used for any type of prosthetic restoration.

Titanium abutments

Most clinicians feel more comfortable using a metal prosthetic abutment in the posterior molar areas, due to the increased masticatory forces present in these areas.

- Zirconium abutments

Zirconium abutments are more modern abutments, which are used to better complement the aesthetics of a dental implant restoration.

When all ceramics or zirconium restorations are planned, zirconium implant abutments provide a highly desirable option. When a zirconium abutment is used, the problem of matching the shade of adjacent teeth while hiding the dark colour of the metal abutment is avoided.

Moreover, in 2011, a one-piece zirconia implant (fixture and abutment) was introduced into the market.

- Other materials

  Besides titanium and zirconium, artificial abutments can be made of other materials: gold alloy, stainless steel, PEEK etc. Although indications are narrower, there are situations in which these may be successfully utilized.

Zirconia abutments

Gold abutments

How is an implant abutment selected?

When the practitioner selects the abutments, several factors are involved:

- The type of prosthesis that is executed: crown, fixed bridge or removable denture
- How the restoration is attached to the abutments: with dental cement, with lag-screws or with special retainers
- The position of the implant inside the mouth cavity: generally, larger artificial abutments are positioned in the back of the mouth because of the increased chewing forces

3. Implant supported prostheses

Dental implants can support a large variety of prosthetic devices. When planning for a type of implant-supported restoration, several factors are involved:

- The number and position of missing teeth
- The overall clinical conditions
- Aesthetic and functional demands
- Geographical location: different types of prostheses can be designed in various parts of the world
- Whether a patient can afford the designed solution
- The expertise and preferences of each practitioner

Dental crown

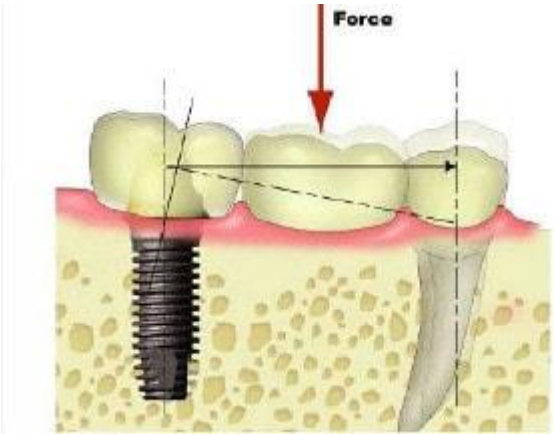
An implant-supported crown is normally indicated when a single tooth is missing. However, it is possible to design adjacent implant crowns and bridges when several teeth are missing.

The dental crowns can be made of porcelain fused to metal alloys (gold, titanium, base metals), zirconia or all ceramics. The time of execution is relatively short and the prognosis is very good.

Dental bridge

Many patients prefer fixed implant-supported bridges because they do not have to be removed for cleaning. Bridges are permanently secured to the implants either with dental cement or with lag-screws. Large dental bridges supported by many implants can be quite expensive.

It is not advisable to design dental bridges that are supported by both natural teeth and dental implants- Tooth implant supported prosthesis (with some exceptions). This could lead to the loosening of the implants (because of natural teeth physiologic mobility) and failure.



The graphic above shows an implant in a bridge connection with a natural tooth. The movability of the tooth causes the chewing forces to act as a lever on the rigid implant situation.

It is also important to design enough implant units to adequately support the bridge. For example, if all teeth are missing and a fixed dental bridge is designed, at least 6 to 8 implants are required to support the bridgework.

Dentures

An implant-supported denture is a type of overdenture that is supported by and attached to implants. An implant-supported denture should be daily removed, to clean the denture and gum area.

Compared to a traditional denture (full denture) which rests exclusively on the gums, implant supported dentures allow chewing the food better, speaking more clearly and provide a better stability.

Removable dentures are designed when a large number (most of the times, all) of teeth are missing. When a removable denture is worn, retainers to hold the denture in place are attached to the implants and the denture.

Special retainers

Most often, the retainers are made of two components:

- A male-adapter attached to the implant
- A female adapter housed in the denture. This part will require periodic replacement.

The male-adapters are attached to the implants

The female-adapters are housed in the denture

There are various types of adapters designed to hold overdentures in place: the ball-and-socket style retainer (image above) and the button-style adapter are just two examples.

Another variation is when a cast bar of metal is secured to the implants. The complete denture then attaches to the bar with attachments allowing no movement of the denture (image below).

Orthodontic anchors

Dental implants can be used as orthodontic anchors in order to align teeth. Orthodontic implants are different from the ones used for prosthetics, as there is no osseointegration. Mini-implants provide absolute anchorage and have revolutionized the field of orthodontics.

Planning for dental implants

In the presence of healthy tissues, well integrated dental implants with appropriate biomechanical loads can have long term success rates: 93 to 98 percent for the fixture and 10 to 15 years lifespan for the prosthetic teeth.

For this, proper planning is essential. The medical examination and the imaging methods allow the practitioner to devise a treatment plan that will give the implant-supported prosthesis the best prognosis.

a. Medical examination

The medical examination will have to focus on general health conditions to local conditions, the assessment of bone support, the soft tissue structure, etc.

The medical examination involves taking of the medical history - an account of the symptoms as experienced by the patient, followed by physical examination.

- Medical history

  For example, long-term steroid use, osteoporosis and other diseases that affect the bones can increase the risk of early failure of implants.

- Physical examination

  Specific methods are used: inspection (or visual examination), palpation and percussion with the help of the examination tools.

  All the important aspects are examined. Additional important information is obtained after a dental radiography and/or a CT scan/CBCT scan.

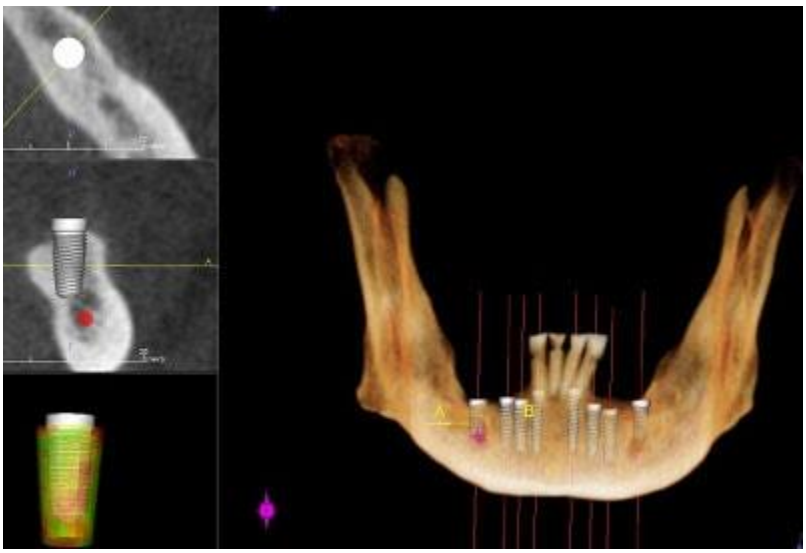
- Dental X-ray

  The dental X-rays are still the standard way to get an image of the mouth structures prior to placing dental implants. Various views are available: periapical view, panoramic films, skull radiography or sinus radiography.

- CT scan

  A CT scan is an imaging method that uses x-rays to create pictures of cross-sections of the body.

  A CT scan provides three-dimensional images of a high quality and extreme complexity. CT scanning software is becoming a viable tool in the diagnosing of dental implant position and placement.



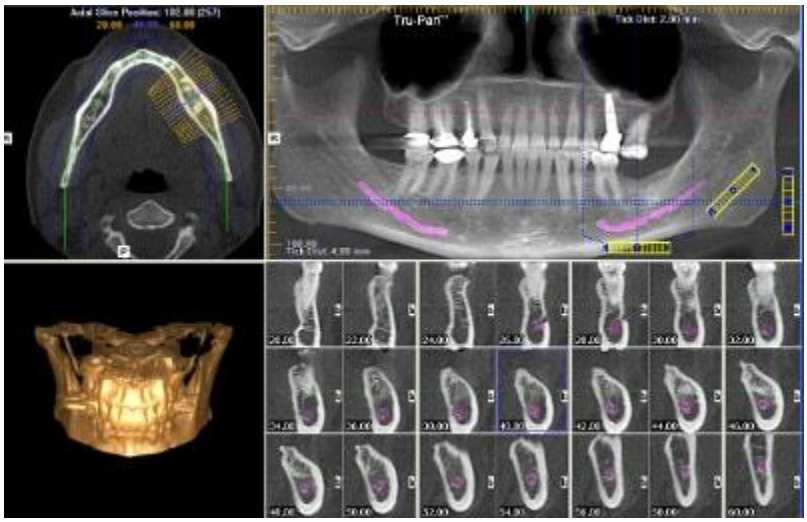
CT scan

The CT scanning software allows the dentist to determine the type of bone quantity and quality that exists and can be used to virtually place dental implants using the computer program prior to any surgical intervention. Thus, it eliminates the possible manual placement errors and matches planning to prosthetic requirements.

Besides that, other information is still available on a CT scan: bone infections, possible tumors, blood vessels and the position of important anatomical structures; the use of CT scanning in complex cases helps the surgeon identify and avoid vital structures such as the inferior alveolar nerve and the sinus.

- Cone beam computed tomography (CBCT)

A CBCT is a compact, faster and safer version of the regular CT. Through the use of a cone shaped X-Ray beam, the size of the scanner, radiation dosage and time needed for scanning are all dramatically reduced.



CBCT with more windows

The CBCT produces 3D types images that let the dentist look at mouth structures from different vantage points; it can show the width of mouth structures in addition to their height. It also can show things like cysts and impacted teeth, as well as nerves and arteries that might make the implantation more challenging.

c. Treatment plan

When the treatment plan is designed, all the important issues will have to be considered:

- the data obtained from the medical history and the physical examination
- the information gathered from the dental X-rays, CT scan and other imaging methods
- patient preferences for a particular prosthetics; for example, some people prefer to have fixed (permanent) crown and bridgework instead of removable ones

- patient financial situation and time available; sometimes, patients cannot afford a particular solution
- other factors can be involved depending on the clinical situation, geographic area, practitioner preferences etc

Dental implant procedure

The treatment of all existing etiologic infections/inflammatory conditions

It is essential that before any surgical procedures, all structures inside the mouth cavity are healthy or properly treated. Otherwise, there is a great risk of failure.

- The treatment of caries
- The treatment of gingivitis, periodontal disease, and any other soft tissue conditions
- Endodontic therapy for the teeth with chronic infections
- Professional dental cleaning and the removal of dental tartar (scaling)
- The teeth that can no longer be treated are extracted

These operations should be completed before any surgery takes place.

Adjunctive surgical procedures

For an implant to Osseo integrate, it needs to be surrounded by a healthy quantity of bone.

A dental implant must be surrounded by healthy bone (with red)

If the size and/or structure of the bone is not adequate to support the designed implants, adjunctive surgical procedures (Guided bone regeneration/ridge augmentation/sinus augmentation) are planned to increase the amount of bone.

Other adjunctive procedures (Periodontal plastic surgery) aim to recreate the soft tissues that surround the implants or to reposition anatomical structures that might interfere with the dental implants.

Lowering of the maxillary sinus
Sinus lift is indicated before the implants placed

While there are many types of adjunctive procedures, these are the most common:

- Sinus lift is a surgical procedure which aims to increase the amount of bone in the posterior maxilla, by sacrificing some of the volume of the maxillary sinus, by lifting the sinus floor & augmenting the sinus cavity.
- Bone graft is a surgical procedure that replaces missing bone in order to repair bone fractures that are extremely complex or to increase the amount of bone in a particular site for various reasons.

  In dental implantology, both procedures are used to increase the amount of bone, so more bone is available to support the implants.

- Soft tissue reconstruction (or gingival graft) is a surgical procedure that aims to cover an area of exposed tooth root surface or dental implant with grafted oral tissue.

  When replacing a tooth with an implant, a band of strong, attached gingiva is needed to keep the implant healthy in the long-term.

- Alveolar nerve repositioning is a complex surgical procedure that is used when the inferior alveolar nerve (located inside the mandible), has an abnormal position and can interfere with the dental implants.

Depending on the clinical conditions, these procedures are performed either before (more often) the base procedure or during implant placement.

Dental implant surgery

The surgical placement of dental implants is a painless procedure that can last a variable time (from 10 min to 2 hours) depending on how many implants are inserted.

Dental implant procedure is normally performed by a specialized/trained surgeon under local anaesthesia. However, in some cases, general anaesthesia can also be used.

Timing of implants after extraction of teeth

There are different approaches to placement of dental implants after tooth extraction:

- Immediate post-extraction implant placement

  An increasingly common strategy to preserve bone and reduce treatment time includes the placement of a dental implant into a fresh extraction site. On the one hand, it shortens treatment time and can improve aesthetics because the soft tissue envelope is preserved.

  On the other hand, implants may have a slightly higher rate of initial failure. This approach can be used in specific situations and case selection remain the key challenge to the clinician.

  Delayed immediate post-extraction implant placement

  The implant is placed from two weeks to three months after extraction. The procedure may require some type of bone grafting to create a bony base for the implant.

- Late implantation

  The surgery is performed three months or more after tooth extraction. It is still a common approach; during this time, the body will grow new bone inside the alveolar socket (where the tooth was formerly held). However the socket would now have a reduced bony dimension to receive the implant. Hence to prevent socket dimensional loss, socket preservation procedures involving use of a bone graft and a barrier membrane immediately post extraction is recommended.

Surgery technique

Most implant systems have five basic steps for placement of each implant.

- 1. Soft tissue reflection

  The aim of this step is to expose the bone in the area where the implant is placed. An incision is made over the crest of bone splitting the soft tissue. The edges of tissue, each referred to as a flap are pushed back to expose the bone.

Soft tissue reflection

Flapless surgery is now an alternate technique, where a small punch of tissue (the diameter of the implant) is removed for implant placement rather than raising flaps.

- 2. Drilling

  For this operation, specific sequential titanium burs are utilized. A cooling saline or water spray keeps the temperature low to prevent bone damage caused by overheating.

  - To guide optimal positioning of the implants, a guidance stent/surgical stent can be utilized

Guidance stent

  - Pilot holes are placed with precision drills at highly regulated speed (usually 800-1000 rpm) to prevent burning or pressure necrosis of the bone
  - The pilot holes are expanded by using progressively wider drills, typically between three and seven successive drilling steps, depending on the implant width and length.

Drilling

- The last drill used usually matches implant dimensions (width and length).However placement of implants in soft bone may require you to underdrill/undersize the osteotomy by one drill to ensure active placement & primary stability of the implant.

- 3. Placement of the implants

  The implant is screwed into place at a precise torque so as not to overload the surrounding bone (which may cause osteonecrosis and the failure of the implant). A specific torque driver is utilized for the operation.

Placement of the implant

Implant placed

- 4. Soft tissue adaptation

  After placement of the implant, a specific healing device is screwed into the implant. There are 2 possible alternatives:

  - Healing abutment/Gingival former

    The healing abutment passes through the mucosa, and the surrounding mucosa is adapted around it, to form a gingival collar, post healing.

Healing abutment

  - Cover screw

    The cover screw is flush with the surface of the dental implant and is designed to be completely covered by mucosa. A second procedure would then be required to uncover the implant at a later date (two-stage procedure).

The choice of one or two-stage procedure centres on how best to reconstruct the soft tissues around lost teeth.

The gingiva is adapted around the entire implant to provide a thick band of healthy tissue around the healing abutment. When a cover screw is used, the implant is "buried" and the tissue is closed to completely cover it.

- 5. Temporary restoration

When the procedure is completed, a temporary restoration is constructed especially if the implants are loaded (with the prosthetic device).

The temporary restoration will replace the missing teeth during the biological process of osseointegration (which may take more than 3–6 months).

After the operation

After the surgical procedure, some medication may be prescribed (depending on each case):analgesics, anti-inflammatory medication, antibiotics etc.

It is advisable to protect the areas where the procedure was performed in the early days after surgery. A proper and thorough oral hygiene is essential.

Most often, there are no major side effects. Bruising and swelling of the gums and face, pain, and minor bleeding are not uncommon - and not necessarily indicate that something has gone wrong.

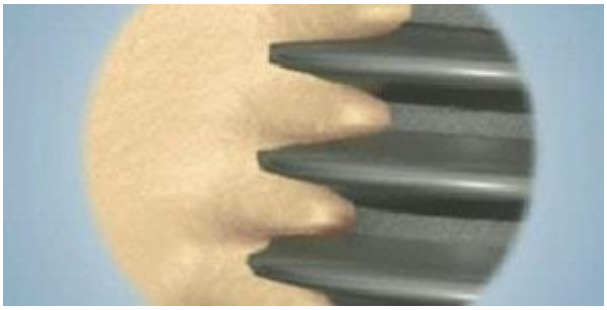
Sutures are usually removed after 7-10 days. During this appointment, the healing process has to be assessed.

Placement of dental implants is a surgical procedure and carries the risks of surgery.

Healing and Osseointegration

For an implant to become permanently stable, the body must grow bone into and around the surface of the implant. This process is called osseointegration and ensures secondary stability of the implant.

Osseointegration is defined as the formation of a direct interface between an implant and bone, without intervening soft tissue. Applied to oral implantology, this means that the bone grows right up to the implant surface without an interposed soft tissue layer.



This means that the osseointegration process continues well after the definitive restoration is secured to the implants.

A restoration that overloads one (or more) implants can damage the osseointegration process, which may result in implant failure.

Loading time

Loading time refers to when the artificial teeth are attached to the implants.

There are three options for when to attach teeth to dental implants:

- Immediate loading procedure

  Immediate loading means that the artificial abutments and (sometimes) the prosthetic restoration are attached to the implants during the surgical placement procedure (or immediately after).

  This relatively new approach aims to shorten treatment time. Followers suggest that the initial stability of the implant in bone is a more important determinant of the success of implant integration, rather than after a certain period of healing time.

- Early loading

  Early loading means that abutments and artificial teeth are attached to the implants one to twelve weeks after surgery.

  These two loading methods have certain limitations. Even in the event of early or immediate loading, many practitioners prefer to place temporary restorations for a certain period of time, to avoid excessive loads on a healing implant.

  Once the implants have had a chance to heal and have been tested for successful integration, the definitive restoration is manufactured and placed.

- Delayed loading

  This is the most common approach; three to six months of integrating time (depending on various factors) is allowed before placing the teeth on implants.

  Before connecting the artificial abutments, the implants are tested for successful osseointegration.

Prosthetic phase

The prosthetic phase begins once the implant is well integrated or has a reasonable assurance that it will integrate. Even in the event of early loading (less than 3 months), many practitioners will place temporary teeth until osseointegration is confirmed.

A functional bite (or occlusion) is restored, the aesthetics of the smile, and the structural integrity of the teeth to evenly distribute the forces of the implants, is maintained.

Several steps are involved:

1. Testing the degree of osseointegration

The first criteria to be considered are the absence of pain, clinical mobility, infection and gingival bleeding.

Periotest is a specific device that measures the degree of implant mobility inside the bone. It has the advantage of measuring the levels of subclinical mobility using an ultrasonically vibrating probe.

The Periotest is successful in assessing the stability status of an implant, but it can detect the quantity of bony osseointegration only in terminal cases (that means 3 to 6 months after the implant placement).

Therefore, it is advisable to combine this test with a dental radiography; radiography is proved to be a more sensitive method of determining the degree of bone formation (or loss) around a dental implant.

Periotest

Periapical radiography: a well-integrated dental implant

Periapical radiographs in addition to the Periotest device were found to offer the most reliable assessment of an implant osseointegration status.

2. Attaching the implant abutments

Implant abutments are artificial devices that are connected to the dental implants after the healing process and are then used to attach the prosthetics to the implant fixtures.

Abutments come in a wide range of sizes and shapes and the ones that best fit the clinical case are selected. Generally, the selection is done when the treatment plan is devised, before the surgical placement (but this is not a general rule).

How is the abutment attached

Implant abutments of various types

After the selection, the abutments are attached to the implant fixtures with lag-screws. There are some variations on this, such as when the abutment and implant body are one piece or when a custom made abutment is used.

Another variation is when the crown and abutment are one piece and the lag-screw traverses both to secure the one-piece structure to the internal thread on the implant.

5. The dental impression

The impression is made after the abutments are attached to the implants. Regardless of the size of the restoration, a complete impression (that captures all teeth and surrounding structures) of both dental arches is taken.

Complete impression for an implant-supported denture

In some variations, after the impression, the abutment is unscrewed from the implant and sent to the dental lab along with the impressions.

When & how to take open tray v/s Closed tray impression?

Open tray technique

The open tray technique for making a definitive impression is one of two choices (the other being a closed tray impression) in the fabrication of a implant prosthesis. The open tray technique is specifically indicated, when the implants are not sufficiently parallel to allow an impression to be withdrawn from multiple impression copings.

The temporary copings can be connected using flowable composite, impression plaster or acrylic resin. Connecting the copings may assist in improving the accuracy of the definitive impression and cast and may facilitate fabrication of a verification jig.

The impression tray is coated with adhesive and loaded with heavy-body impression material. Concurrently light-body impression material is expressed around the copings to capture the morphology of the soft tissue. Monophase impression material can be used as a convenient and practical alternative to the combination of heavy-body and light-body consistency. The loaded custom tray is placed and a finger or Q-tip is used to wipe across the occlusal opening to expose the occlusal aspect of the copings so their screws can be located before polymerization of the impression material occurs and for subsequent easy access for loosening.

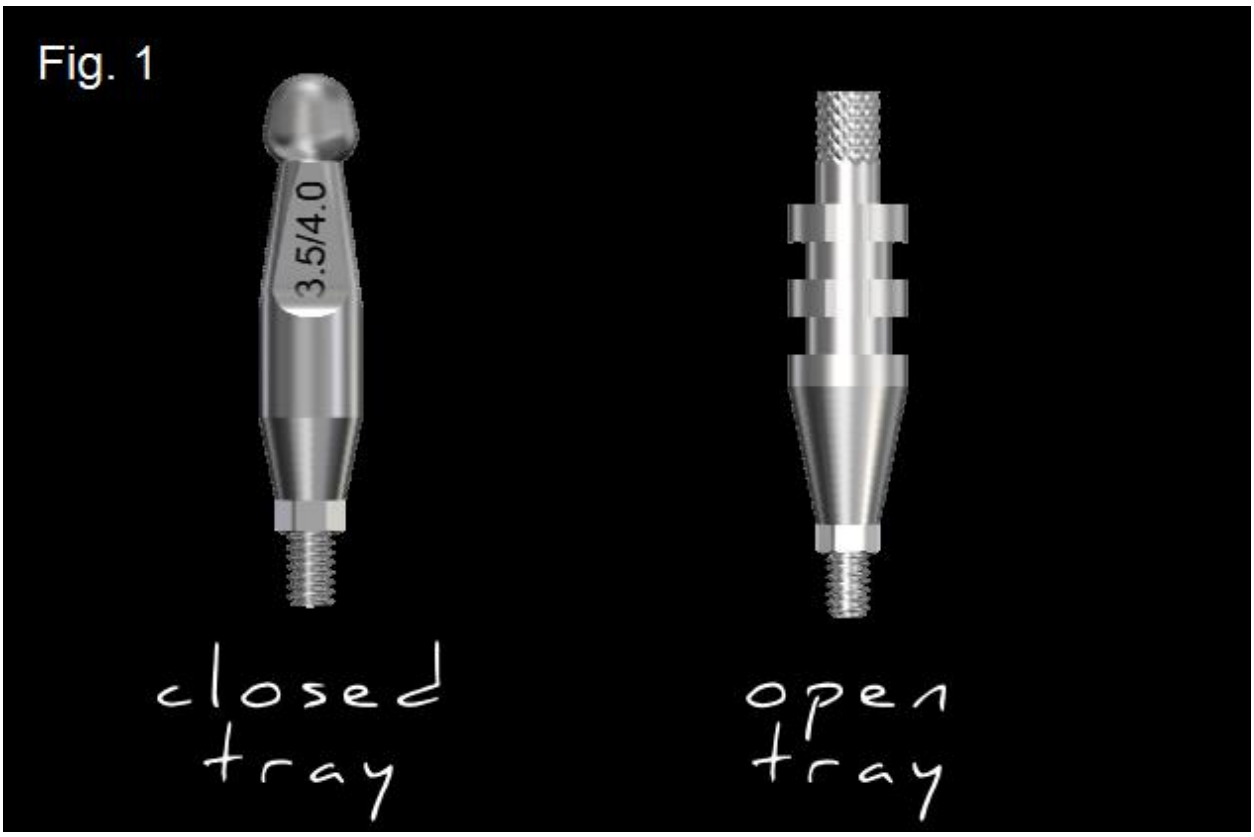
After the impression material polymerizes, the screws in the temporary copings are loosened and the impression removed. The impression should record the edentulous ridges and contains (pick-up) the temporary or impression copings. An alternate approach would be to make the definitive impression using a modified stock tray. Implant analogs are fastened to the copings and then the impression is sent to the laboratory for further fabrication of the prosthesis.

Closed tray technique

The closed tray impression technique is utilized:

- When the implants are sufficiently parallel to each other
- In situations with limited interarch distance and insufficient space for use of screw-retained impression copings

A stock tray or a custom tray can be used in the fabrication of a closed tray impression for an implant prosthesis. Closed tray impression copings are placed on implants or multi-unit abutments and a routine crown and bridge impression made. Once the impression material polymerizes the impression is dislodged from the closed tray impression copings. The closed tray impression copings are then removed and implant or abutment analogs attached to the copings. The combined coping-analog assembly is then inserted into the definitive impression and sent to the laboratory for further fabrication.



6. Bite registration

The bite registration captures the relationship between the upper and the lower teeth. The long-term success of implants is determined, in part, by the forces they have to support. Therefore, restoring a proper occlusion (or bite) is one of the most important goals.

It is essential not to overload the implants with additional pressures and to evenly distribute the chewing forces of the implants. Otherwise, there is a high risk of failure.

Many times the usual bite registration techniques do not provide enough data for the dental technician. As a result, in some situations, particularly when a large restoration is designed, it is advisable to use advanced jaw tracking devices that provide additional details.

Jaw tracking device

The jaw tracking devices provide details about the precise position of the maxilla and mandible against different anatomical structures of the head. This information is extremely useful when manufacturing large restorations that need to be extremely accurate.

7. Dental laboratory stages

All the impressions, along with the bite registration and other important details are sent to the dental laboratory. The dental technician will fabricate the designed prosthesis according to the specifications received from the dental office.

8. Fitting

Before the restoration is definitively attached to the dental implants, one or more fitting appointments may be needed. During these appointments, the practitioner checks how well the prosthesis fits and makes the necessary adjustments if the fitting is not perfect.

The dentist will first check the fitting of the framework; after porcelain build-up, the shape, size and general appearance of the prosthesis are also tested.

Framework fitting for an implant-supported denture

When to choose screw retained v/s choosing cement retained?

Both screw- and cement-retained fixed dental restorations have their advantages and limitations. The clinical decision as to which type best suits the patient depends on several factors, such as the indication, retention provided, retrievability, esthetics and clinical performance.

Cemented prosthesis is the most commonly used restoration in dental implantology. Advantages include the compensation of improperly inclined implants, easier achievement of **passive fit** due to the cement layer between the abutment and reconstruction, lack of a screw access hole, hence more esthetic, and thus the presence of an intact occlusal table and easier control of **occlusion**.

Cement retained (above=12) and screw retained (below=16).

Nonetheless, one major disadvantage is the difficulty of removing **excess cement**, which has been associated with the development of peri-implant mucositis and **peri-implantitis**.

Screw-retained restorations on the other hand have the advantage of more predictable **retrievability**. They require a minimal amount of interocclusal space and are easier to remove when hygiene maintenance, repairs or surgical interventions are required. Additionally, **angulated screw channel solutions** have made screw-retained restorations available for a wide range of indications.

Making the right decision

In view of data connecting cement retention to an increased likelihood of peri-implantitis, both the consensus review paper published in 2014 and the latest systematic study (2017) have limited the recommended use of cement to the following situations:

- For short-span prostheses with margins at or above the mucosa level.
- For cases where an easier control of occlusion without an access hole is desired – for example with narrow diameter crowns.

Furthermore, they advise that any cementation procedure should be carried out with great caution. **Screw retention is recommended** where possible, especially:

In the presence of restricted interarch space (minimum 4 mm.).

- For fixed prostheses with a cantilever design.
- For long-span fixed prostheses.
- In the esthetic zone, for provisionalization of implants to enable soft tissue conditioning and finalization of the emergence and mucosal profile.
- When retrievability is desired.

However, it remains the clinician's responsibility to select the most appropriate method of retention for each individual case.

The occlusal adjustment is an essential step. This is a vital element, as a dysfunctional environment created by an inaccurately adjusted implant-supported restoration can lead to overloading, leading to the implants' failure.

9. Attaching the prosthesis

This final step is performed when the definitive restoration is completed and ready to be secured to the implants. Depending on the type of prosthesis, this particular step may be different:

a. Fixed prosthesis

A fixed prosthesis is when a person cannot remove the denture or teeth from their mouth. Where the prosthetic is fixed, the crown, bridge or denture is fixed to the abutment with either lag-screws (screwed) or cement (cemented).

- Prosthesis is attached with lag-screws (screwed)

  The restoration is secured with screws that traverse the dental crowns and attach to the threaded holes inside the abutments. After the screws are positioned, the holes that penetrate the crowns are sealed with a composite material.

Artificial abutment with a threaded hole

The crown is secured with a lag-screw

Another variation is when the crown and abutment are one piece and the lag-screw traverses both to secure the one-piece structure to the internal thread on the implant.

- Prosthesis is secured with dental cement

  In this case, the restoration is secured with dental cement, just like crowns and bridges are attached to natural teeth.

b. Removable dentures

Removable dentures are held in place by special adapters (or retainers). Generally, a male-adapter is attached to the implant and a female-adapter is housed in the denture.

The male-adapters are attached to the implants

The female-adapters are housed in the denture

The retainers allow movement of the denture (that should be daily removed, to clean the denture and gingival area), but enough retention to improve the quality of life for denture wearers, compared to conventional dentures.

Immediate care:

- protect the part with the restoration in the early days
- thorough oral hygiene
- report any discomfort
- the first periodic check-up at no more than 6 months

Immediate follow-up

After the prosthesis is definitively attached to the implants, it takes a little time for the dental tissues to adapt to the new situation. Therefore, some minor reactions may occur.

Most often, the symptoms gradually disappear after a period of time or after simple adjustments performed at the dental office.

- Light pain in the gums

  In many cases, the practitioner will try to hide the margin of the restoration by keeping it equi-gingival or subgingival. The line is an unsightly thing to have exposed, so the dentist would like to place the margin below the gingiva.

  Because of that, some patients may feel mild pain at this level until the gingiva adapts to the new situation. Usually, the pain goes away after several days without any medication (although some mild pain relievers may be prescribed).

- Pain or discomfort when chewing

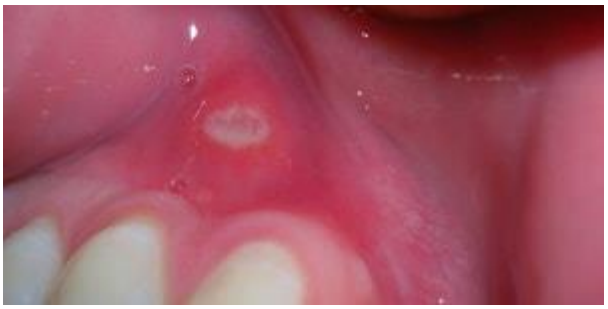
  If patients experience pain or discomfort when biting down on something, most often the bite needs to be readjusted (occlusal adjustment). The same is true when patients feel that a part of the restoration is "too high".

  It is essential that the prosthesis perfectly fits in the bite so all chewing forces are evenly distributed on the implants.

- Removable dentures

  New removable dentures or overdentures may feel awkward for few weeks until the body becomes accustomed to them. Dentures are generally larger than fixed restorations (crowns, bridges), so the dental tissues need time to adapt.

  It is not unusual to experience minor irritation or soreness in the early days. When small lesions (image below) appear on the mucosa, the removable denture needs minor adjustments performed at the dental office.



The saliva flow may temporarily increase. As the mouth becomes accustomed to the dentures, these problems should go away.

Follow-up appointments with the dentist are generally needed after a denture is inserted so the fit can be checked and adjusted. If any problem persists, particularly irritation or soreness, it is advisable to contact the dentist.

Generally, it takes time to get used to any new restoration. However, after a period of time, the implant-supported prosthesis should look, function, and feel like regular teeth.

Care and maintenance

Dental implants require regular professional maintenance as well as proper home care. Taking good care of dental implants is vital for long-term success.

- Oral hygiene

  Proper and thorough oral hygiene is a prerequisite for successful dental implant rehabilitations. Poor oral hygiene greatly increases the risk of failure.

  After placement, implants need to be cleaned (similar to natural teeth) with a Teflon/plastic/titanium instrument (or a similar one) to remove any plaque. Because of the more precarious blood supply to the gingiva, care should be taken with dental floss.

  Fixed implant restorations (crowns, bridges) should be carefully cleaned as well. For example, a bridge should be brushed at least twice a day with a fluoride paste and cleaned between the teeth and under the bridge with dental floss, interdental cleaners, and water jet.

Dental implant cleaned with a Teflon instrument

Implant-supported crown: flossing

Removable dentures supported by implants should be daily removed and cleaned separately. Special attention should be given to the subgingival area.

- Periodic monitoring

  Regular check-ups should be conducted at least twice a year. During check-ups, the practitioner assesses the overall situation, verifies implants stability and integration, the status of the prosthetic devices and makes the necessary adjustments.

  The oral mucosa is checked and professional teeth cleaning and scaling is performed. The patients should report any pain, discomfort or unusual signs.

- Implant rehabilitations should not be overloaded

  It is advisable to avoid biting on extremely hard pieces of food: peanuts or pistachios, very hard bread crumbs, etc.

  Besides that, there are conditions that can be extremely harmful to dental implants and the prosthetic devices. For example, bruxism or teeth grinding is a condition that involves involuntary habitual grinding of the teeth, typically during sleep. It may require such patients to wear a nightguard.

  It is advisable that patients contact the dentist as soon as they notice the first signs of such conditions.

- Maintenance of removable dentures

  Removable dentures and overdentures require continuous maintenance. The female adapters that are housed in the denture need to be changed or refreshed every one to two years because they wear off. The operation is extremely simple and quick.

Relining

Relining or rebasing is indicated when a removable denture fit has worsened resulting in an unstable denture or tissue trauma. A denture reline involves refitting of the tissue side of the denture to custom fit to the mouth.

A removable denture fit can worsen due to 2 possible causes:

- The manufacturing material (normally acrylic) from the base of the denture has worn off or/and
- The bone beneath the denture underwent a process of remodelling and has diminished its height

Removable denture relining

Relining consists of replacing the fitting surface with a new material, usually cold or heat cured acrylic or tissue conditioner. This can be carried out directly (at the dental office) or, more often, indirectly (at the dental lab). The procedure takes little time (1 session) and it is not very expensive.

Risks and complications

Every medical procedure carries some risks and dental implants are no exception. Accidents and complications may occur during various stages of the treatment. Generally, dental implants risks and complications can be divided into 3 distinct groups:

- Risks and complications during implant surgery

Placement of dental implants is a surgical procedure and carries the normal risks of surgery. If additional surgical procedures are performed (sinus lift, bone graft etc.), they also carry the normal risks.

However, the risk of complications is considered to be very low - less than 5 percent, according to current statistics. Problems are rare and when they do occur, they are usually minor and easily treated.

- Risks and complications in the first 6 months

  These complications occur in the first 6 months after implant placement. The most common complication is the failure to integrate.

- Long term complications

  Long-term implant failures may be caused by an improper design of the prosthetic restoration or by inappropriate care and maintenance. Regardless of the cause, implants fail due to either loss of bone around them (peri-implantitis) or a mechanical failure of the implant (excessive occlusal overload).

  There are also the risks associated with the prosthetic components which over time can wear off, chip, break or cause a lack of satisfaction on the part of the patient.

Patients who wear implant-supported prosthesis should ideally be free of pain or any other unpleasant signs, Be able to chew comfortably and taste and pleased with the aesthetics.

Implants should be tested at least twice a year during regular check-ups. Criteria for the success are the absence of pain, mobility, radiolucency (greater than 1.5 mm) around implants, the lack of suppuration or bleeding in the soft tissues, adequate function, and aesthetics in the prosthetic zone.

The good news is that about 95% of implants today are successful. Moreover, a well-integrated implant with appropriate biomechanical loads can have long-term success rates for the fixture and close to 15 years lifespan for the prosthetic teeth.

Protocol For Beginners

1. Educate, educate & educate. The dentist needs to educate himself on implantology on an almost daily basis as this field is constantly updating, evolving and changing.
2. Start by reading the book on implantology by Dr. Carl Misch in detail.
3. Update yourself by reading review articles and interesting research work on implantology using the search engine database- www.pubmed.com
4. Attend as many CDE's as possible as implantology cannot be learnt in 3-days.
5. Join an local implant study club/group to discuss cases and share your experiences with local clinicians/Implantologists and learn from them.
6. Join a recognized implant body/association(ISOI/ICOI) to gain access to their journals & participate in their national activities & conferences.
7. Join a 1-2 year postgraduate diploma/degree course recognized by MUHS/DCI for professional training.
8. Share and learn from other experiences & mistakes.

" EVOLVE CONSTANTLY"

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