

General Information about Dental Implants

This section is designed to provide general information and complement existing patient material, such as the ADI patient leaflet, *Considering Dental Implants?*, and information on the ADI websites, www.consideringdentalimplants.co.uk and www.adi.org.uk.

What are Implants?

Missing teeth can often be replaced by implants. Implants act like roots of teeth. After they have been fitted and have healed in place, dentures or crowns may be attached to them. When dentures are held in place by implants they do not slip around. If crowns are fitted on implants, they act like normal teeth.

There are various types of implants; however, the most commonly placed throughout the world are often described as root-form or endosseous implants. These generally have a cylindrical form and may be threaded on the outer surface to assist placement. Other designs such as blades or subperiosteals are rarely if ever placed these days and whilst in use by some practitioners are not the focus of this information. The success and rapid growth in popularity of the root-form implant is largely due to its predictable outcome when trying to achieve a rigid fixation with the surrounding bone and the maintenance of this state throughout many years of function.

Implants can only be placed if there is enough bone present in the jaw. When teeth are lost, the bone around the teeth gradually disappears. If too much bone has been lost it is possible to re-grow bone in its place utilising one of many protocols and materials.

What are the alternatives?

For people who have **NO** remaining teeth the alternatives are:

- Complete dentures
- Implants to secure their dentures in place
- Implants to support crowns and bridges

For people who have **SOME** of their own teeth the alternatives are:

- Crowns and bridges supported by implants and/or teeth
- Partial dentures secured by implants and/or teeth
- Partial dentures supported by teeth
- Bridges supported by teeth

The Initial Evaluation and Additional Diagnostic Material

General dental health

To plan the most suitable treatment certain information is helpful - for example photographs, X-rays, models of the teeth and jaws. In some circumstances, a more comprehensive three-dimensional X-ray evaluation using a CT/CBCT scan may be requested to give greater detail of the shape of the jaw to assess the quantity of the host bone.

What is a CT/CBCT scan?

The conventional X-ray views most familiar to patients are only two-dimensional and subject to varying degrees of distortion and inaccuracy. Where important anatomical structures must be avoided, the information they provide may therefore be inadequate. The CT/CBCT scan in contrast can provide life-sized three-dimensional information of all regions of the upper and/or lower jaw from which precise measurements can be taken for pre-operative treatment planning. In some cases the CT/CBCT scan may also be used to evaluate the results of bone grafting procedures prior to placing implants.

Having a Healthy Mouth

Implants survive best in a healthy environment. Any tooth decay or gum problems need to be discussed with the patient and corrected before implants are placed to give them the best chance of success.

Sometimes treatment is needed before you are ready for implants

Gum Health: Will need to be discussed with the patient and may involve the use of special brushing methods, flossing, toothpicks and small “bottle” brushes. Some gum treatment may be necessary.

Removal of Un-savable Teeth: It is worth explaining to the patient that despite advances in modern dentistry, some teeth may have reached a stage when no treatment can save them. It is often best to remove them at an early stage so as to prevent further bone loss due to diseased teeth.

Treatment of Existing or Potential Oral Infections

Treat or remove all pre-existing oral infection wherever possible

The success of implant therapy can be seriously affected by infections resulting from failed gum or root canal treatments or untreated gum disease or infected teeth in sites adjacent to implants. Long-standing infections of the soft tissues beneath dentures can also adversely affect healing at the various surgical stages. The patient’s treatment may be delayed whilst these areas are resolved.

Although gum infections arising in opposite jaws have no clearly proven link with problems around implants, there is at least the theoretical risk of bacterial transmission; therefore it would be considered prudent to assume that there is a risk. The patient’s mouth should be treated as a whole and not simply as unrelated regions with oral hygiene needing to be adequate prior to treatment.

How many Implants?

As a general principal, as many implants as possible should be used. This allows the stresses of biting to be spread over the maximum number of implants, thus diminishing the load on each particular one.

Upgrading

Some people find it more convenient to proceed in stages

It is sometimes possible to have two or three implants placed, use them for a while and some time later add more implants to improve the treatment plan. This is not an approach that is feasible in all situations and is probably most suited for treatment of the lower jaw where no teeth are present.

An example of this might be the patient with no teeth in the lower jaw who has two or more implants placed in the first instance. By stabilising their denture using the implants, it can be held more firmly in place. Later on, if they have sufficient bone, more implants can be added and eventually fixed-teeth placed on the implants eliminating the denture altogether. A number of the implant systems available today could support this approach; however, the feasibility of upgrading should be confirmed by all parties rather than assumed although it is always preferable to select the treatment option best suited to the patient at the outset.

What is it like having Implants Placed?

Before and after implants are placed

Generally speaking, having implants fitted is not at all painful. The majority of patients are simply and effectively treated with local anaesthesia alone mainly due to newer protocols and materials. For apprehensive patients, sedation can be used making the procedure quite comfortable.

What is it like after having the Implants Placed?

The after-effects of having implants placed are usually mild and may include slight bruising, dull ache, and swelling, the amount of which will vary dependent upon the number of implants placed and the difficulty of the surgical procedures as well as patient sensitivity.

When choosing a date for implant placement the patient should be advised to avoid significant social engagements and work commitments for at least a week after. This is just to be on the safe side. Taking time off work is not usually necessary. The vast majority of cases do not require medication for pain the following day.

Additional Procedures before Implant Placement

Creating more bone

It is a natural phenomenon that after teeth have been removed the bone that once supported them slowly resorbs away. This occurs faster when prolonged gum problems (or infections) have been present or poorly fitting dentures are being worn. The result is that there is sometimes not enough bone to support implants.

When there is not enough bone present, it may be necessary to create new bone to fill in missing areas allowing implants to be fitted. A variety of techniques and protocols are available to do this and these are referred to as '**bone grafting**' or augmentation.

The bone or graft particulates used in these situations may be specially treated human donor material from a 'Bone Bank,' animal based products, synthetic substitutes, or the patient's own bone taken from other areas in the mouth where it is available. In special cases where larger amounts of bone are needed, it is possible to move bone from other places such as the hip or shin to the deficient area of the mouth. The area from which the bone is taken will re-grow.

Bone grafting and duration of implant treatment

Where the clinical conditions indicate that bone grafting is required to increase the amount of bone into which implants are placed it may increase the time taken to complete treatment. Under routine circumstances where no bone grafting is required the implants are commonly ready to begin function between 3 and 6 months later. If the bone grafting can be undertaken at the same time that implants are placed, treatment is more likely to take 6 months. Where implant placement must be delayed until after maturation of the bone graft, overall treatment may take 12 months.

Guided tissue regeneration

A technique call '**guided bone regeneration**' has also shown considerable success where the amount of bone at the intended implant site is less than ideal.

When a tooth is removed a hole in the gum and bone remains for the first few weeks. Anyone who has lost a tooth or had an extraction knows that this generally heals uneventfully, and eventually the patient cannot tell where the tooth was.

The basic principle behind socket preservation is that placing a special membrane over the extraction socket creates a layer above which the fast growing soft tissue cells are prevented from entering the bony socket. This allows bone cells present beneath the membrane the extra time they need to fill the socket without competition from soft tissues to occupy the same space. Graft materials may also be placed in the socket with or without the use of porcine-based membranes.

Sinus Augmentations

The purpose of sinus augmentation

It is very common to find that the softer bone in the area above the upper back teeth (molars and sometimes premolars) is very shallow and not suitable for normal implant procedures. This loss is usually from both directions, by increased pneumatization of the maxillary sinus and bone loss associated with the loss of the diseased teeth. To solve this problem a procedure known as a 'sinus augmentation' or 'sinus lift' was developed.

Bone may be successfully grown in the sinus spaces above the upper back teeth, allowing implants to be placed. Specially treated donor bone from a 'Bone Bank,' synthetic bone substitutes, or bone from other areas of the mouth or body is placed into these empty areas. Over a period of time this is replaced by new bone thus providing a bed into which implants can be placed.

Implant placement and bone grafting

If the amount of bone overlying the sinus is adequate, some surgeons prefer to place the implants at the same time as the grafting procedures. Whatever type of bone is added to the sinus it must be left to mature before implants are placed or brought into function. If the implants are placed as a secondary procedure (depending on the amount of bone being grown and the nature of the graft material used), they can be inserted after four to nine months, although occasionally it may be necessary to wait longer. The integration of the implants can be measured with a special meter prior to loading to ensure it is adequate.

As with other bone grafting procedures, the implants are left to become firmly attached to bone. Commonly a slightly extended healing period is chosen with an average of six to nine months before a denture or crown and bridgework is fitted. However, all bone grafting is unique to each individual and this information is for guidance only.

Additional Procedures at the Time of Implant Placement

Additional procedures

Despite the thoroughness of the planning, extra procedures are sometimes required during treatment to produce the best results. It is important that in this event the patient accepts that appropriate alternative treatment is performed at the time of treatment, although it may be different to that already planned. This may include a second bone graft or soft tissue (gum) grafting to improve the aesthetic outcome.

Treatment Fees May Vary

Fee variations

This is due to:

- Alternative procedures required due to changes in the treatment plan.
- Extra grafting or change in materials to improve the aesthetic result.
- Treatment extending over a longer period of time than expected.

It is important to highlight to the patient that if for some reason it is not possible to proceed with the planned procedure at the treatment appointment, the time spent will be charged at the normal hourly rate. An alternative treatment (even possibly a non-implant route) may be performed if considered appropriate.

After Implant Placement

Bone loss after implant placement

Sometimes bone may be lost around an implant. There are techniques available to treat these problems if the cause can be identified. In some situations however, progressive bone loss might result in the loss of the implant after many years.

New Advances

New techniques and materials

Implantology is a rapidly advancing science. We may take advantage of some of the new procedures or materials as they become available if they promise to improve the outcome significantly. It is important to highlight this to the patient and state that alterations to the original plan may therefore be made during the treatment.

How long does the Treatment take to Complete?

The need for patience

This depends on the complexity of the treatment. Initially there is a treatment planning stage, which may last a month or so. Then there may be some time spent on such preparatory procedures as improving gum health, removing any un-savable teeth and bone regeneration. This may take anything from a few weeks to many months.

After the implants are placed they are left to settle in place from three to six months. The final fitting of crowns or bridges or the attaching of dentures to the implants takes a month or two. The time depends on the patients individual situation. In some cases the implants are suitable for immediate function with either transitional or permanent teeth fitted at or soon after the placement.

Special medication will be prescribed for the patient to help healing and produce minimal discomfort. To gain the maximum benefit the patient must follow the instructions given.

Do Not Rush the Treatment

Respect nature

It is important that neither the patient nor the implant provider attempts to rush the treatment or tries to advance the various stages faster than the time required for complete healing and maturation of bone and soft tissues.

Even treatment that is well planned and executed can fail as a result of moving too quickly from stage to stage. If the patient does not have the time available, then it may be more sensible for them to consider conventional forms of dentistry, which may be completed more rapidly.

You, the implant provider, may suggest that procedures to grow bone are undertaken separately from placing the implants, even though under certain conditions (with newer materials and protocols) it is possible to combine these stages.

Precautions for Denture Wearers

Wearing dentures immediately after surgery?

Denture wearers may require their dentures to be modified or be asked to leave them out for a period of time to prevent them resting on newly placed implants. During settling-in stages, metal framework dentures may need to be replaced with a plastic set, as they are more easily adjustable. The fitting surface can then be altered when the implants are placed.

Reporting Problems and Queries

The patient should be advised to telephone immediately should anything arise that they are concerned about.

The Finished Teeth - Aftercare

Unlike teeth, implants cannot get tooth decay. However, like teeth, they can suffer from gum problems. Teeth with untreated gum problems can become loose and be lost. This is also true of implants.

Thorough daily cleaning is as important with implants as it is with teeth.

Follow-up Appointments and Regular Check-ups

Routine maintenance

To ensure that any problems are detected early, regular maintenance check-ups are advisable. Problems are more easily treated if detected early. Check-ups may be recommended three, four or six monthly. In most cases review appointments will be more frequent during the first year that the implants are in function.

Some Examples of Problems that can Arise

When to contact your dentist

Porcelain crowns attached to implants may break in the same way that they can when attached to natural teeth. However, removal of crowns from implants for repair is usually easier than from natural teeth. Implant supported bridges that become loose should be re-tightened immediately to reduce the likelihood of further unnecessary damage.

Should it be discovered during a routine maintenance visit that an implant has failed or is failing, appropriate remedial action will be planned accordingly. Implants that become loose will not re-tighten and should be removed at the earliest opportunity. It is important that the patient immediately reports any areas of soreness, discharge or pain on chewing near any implant or tooth to the dentist responsible for their maintenance.

Successful Treatment

Implant success and your commitment to long-term maintenance?

Success depends on the patient's body's reaction to implants and their personal care of them. Implants can fail due to gum disease, just as teeth do. Success is constantly improving due to improved techniques. Natural teeth last longer today as awareness of the need for looking after them becomes more accepted. However, there would not be a need for implants if teeth were totally successful.

Smoking and Alcohol Consumption

Both smoking and heavy alcohol consumption reduce the survival of implants (and teeth). If the patient thinks that either of these two habits could be a problem for them and their implants, it may be advisable to avoid this form of dental treatment or accept the higher risk of implant failure.

General Health Advice Before, During and After Implant Placement

The guidelines shown on the following pages are not intended to be prescriptive, but should be borne in mind for the pre- and post-operative phases of the implant treatment. As the dentist or physician, you should be prepared to advise the patient as to which elements are most appropriate.

General Health Considerations Before Implant Placement

Introduction	Dental implants are fixed into the bone of the jaw through an opening in the gum. In order for the implants to be usable, they must be locked into the jawbone and surrounded by healthy gum tissue. The complex healing requirements of bone and skin required for this to come about can be critically influenced by the patient's oral health and general health. It is important that the patient provides you, the dentist with a clear and accurate medical history including a list of long term illness and medication that they may be taking.
Healing	Healing can be enhanced by the patient arriving at the dental office in the best possible state of health prior to the operation, and by following the regime suggested by the surgeon during and after each stage.
Timing of the treatment	Inform the patient that they may be asked to leave out their denture or adhere to a particular dietary regime for a period of time. It is important to explain that there may be some minor discomfort or swelling after the operation which can last for an average of 2-3 days. Sometimes these symptoms may persist for slightly longer depending upon the complexity of the surgical procedures and individual patient variations.
Sedation	Inform the patient that if they are having sedation, they must make sure a responsible person is available to escort them home and someone must remain with them for 24 hours.
Aspirin	If the patient has been prescribed Aspirin or any other anti-coagulants (blood thinning medications), by their physician, you must tell them to cease the medication for 24 hours prior to surgery unless specifically told otherwise by their specialist. It is also important to ask the patient to inform you, the dentist if they are self-medicating and the dose.
Antibiotics	Remind the patient to ensure they have taken the prescribed antibiotics before arriving at the dental office and that they complete the course of medication in the period afterwards.
Smoking	Research has shown that heavy smoking, i.e. more than 15 cigarettes daily, may adversely influence post-operative healing and could affect the long-term health of the implants and supporting bone. If at all possible, smokers should give very serious consideration to giving up smoking altogether, or discuss with the patient a suitable period of cessation pre- and post-operatively for the key surgical stages. It is suggested that even smoking cessation for a 2-week period around the surgical phase can be very beneficial.
Supplements	Vitamin/mineral supplements may be advised in the pre-operative phase although clear benefits have not yet been established.

Instructions to Patients at Implant Placement (Stage 1)

Discomfort	Normally we find that implant placement is followed by only minor discomfort. Any discomfort can be minimised by following the instructions below.
Pain	If the patient experiences pain when the anaesthetic has worn off they should follow the regime of pain control that has been given. If the pain continues for more than a few days it is advisable that they contact their dentist.
Bleeding or oozing	Minor oozing may discolour the patient's saliva for some hours after leaving the surgery. However, if bleeding continues and clots are evident, the patient should be advised to identify the source and apply gentle pressure to the area with a gauze pad soaked in warm salty water for 15 minutes. This may be repeated three or four times. If bleeding continues after this, they should contact the dental office.
Sleeping	The patient should be advised to sleep with an extra pillow to lift their head for the first 2-3 nights to reduce the amount of swelling that may occur.
Ice packs	Ice packs can be held over the area operated upon for 20-30 minute intervals, totaling not more than one to two hours during the first two days after the operation. This will normally reduce the amount of swelling.
Smoking	The patient must be informed that they should not smoke for two weeks before and after the operation as this can seriously affect the success of the implant placement.
Drinking	The patient should avoid alcohol for two weeks after the operation as this can impair healing. <ul style="list-style-type: none"> • For the first 24 hours take no hot liquids, e.g. coffee, tea or soup • For the first 24 hours minimise your exertion; rest, books and TV are best
Salt water	The day after surgery (not less than 24 hours), the patient should commence warm salt rinses (1/4 to 1/2 teaspoon of salt in a cup of warm water) two or three times a day. <p>Each rinse should be held against the affected area so that the warm salty water cools over it and is held there until the heat is gone. This should be repeated until the cup is finished. This should last about 10 minutes each time.</p>
Dentures	The patient must leave their denture out if instructed to do so, until it can be re-lined with a soft lining material.
Meals	After each meal, the patient should gently rinse their mouth with warm water.
Brushing	The patient should not brush the area where the implants have been placed for at least a week.
Tongue	The patient should be advised to not explore the area with their tongue as this may loosen the stitches.
Diet	The patient should be advised that during the first week any food may be eaten provided it is soft. Such as, boiled fish, scrambled eggs, pasta, rice, etc., although any meal may be mashed or passed through a blender to render it soft.
Supplements	Vitamin/mineral supplements may be suggested although clear benefits have not yet been established. Taking Arnica pre-operatively may be of some benefit in the reduction of post-op swelling.

Problems

The patient should contact the surgery if:

- Numbness persists for more than six hours after the operation
- The stitches become loose or fall out
- There is excessive pain
- There is excessive bleeding
- The implants become visible

The following instructions should be given to patients after sinus augmentation

- Avoid blowing nose for 2 weeks
- Sneeze through mouth
- Avoid swimming or flying
- Report nosebleeds or sinus pain or swelling IMMEDIATELY

**Nosebleeds
or sinus pains**

There is a small chance that a nosebleed may occur after the procedure. Should this happen the patient should sit upright and apply a cold compress.

**Typical healing
patterns**

There is a wide range of normal healing responses. Swelling is often worse by the second or third day and may persist for a few days.

Instructions to Patients at Implant Exposure (Stage 2)

Discomfort	Normally we find that implant exposure is followed by only minor discomfort. Any discomfort can be minimised by following the instructions below.
Pain	If the patient experiences pain when the anaesthetic has worn off they should follow the regime of pain control that has been given.
Bleeding or oozing	Minor oozing may discolour the patient's saliva for some hours after leaving the surgery. However, if bleeding continues and clots are evident, the patient should be advised to identify the source and apply gentle pressure to the area with a gauze pad soaked in warm salty water for 15 minutes. This may be repeated three or four times. If bleeding continues after this, they should contact the dental office.
Smoking	The patient must be informed that they should not smoke for two weeks after the operation as this can seriously affect the success of the implant placement.
Alcohol	The patient should be told to avoid alcohol for two weeks after the operation as this can impair healing.
Hot food and drinks	The patient should be told to take no hot food or drinks for the first 24 hours. After this, they should avoid food that is fibrous or tough as this may damage the gums healing around the posts.
Salt water	The day after surgery (not less than 24 hours), the patient should commence warm salt rinses (1/4 to 1/2 teaspoon of salt in a cup of warm water) two or three times a day. Each rinse should be held against the affected area so that the warm salty water cools over it and is held there until the heat is gone. This should be repeated until the cup is finished. This should last about 10 minutes each time.
Dentures	The patient must leave their denture out if instructed to do so, until it can be re-lined with a soft lining material.
Meals	After each meal, the patient should gently rinse their mouth with warm water.
Brushing	The patients should not brush the area where the posts have been placed for five days. Then commence gently with a soft toothbrush dipped in hot water.
Stitch care	The patient should be advised to not explore the area with their tongue as this may loosen the stitches.
Problems	The patient should contact the surgery if: <ul style="list-style-type: none"> • The stitches become loose or fall out • There is excessive pain • There is excessive bleeding • If the posts become loose
Stitch removal	After the stitches have been removed or dissolved away, the implants are the patient's responsibility and it is their duty to keep all scheduled maintenance appointments and build a habit of rigorous cleanliness around these posts.
Late problems	The patient must contact the surgery if there is any alteration in the way their mouth feels in regard to pain, bleeding, loosening of implants, bad taste or any change in the way the teeth meet on closing their jaw.

Notes on the Care of Implant-Supported Teeth

General and Dental Implant Hygiene

Home care	Implants with the longest history of comfort and function are those that reside in healthy, clean mouths. The patient's implants should be maintained in a healthy condition by a combination of excellent oral hygiene practice at home and regular visits to the dental hygienist. You should inform the patients that during the early years they will commonly be asked back annually to check the implants by means of an X-ray and careful probing.
Objective	The patient should be informed that tooth cleaning has the primary objective of preventing bacteria from plaque growing down into the crevice between the gum and the implant post. This area must be physically cleaned at least twice a day around every implant.
Timing	As a minimum teeth and implants should be thoroughly cleaned on waking to remove the abundant plaque that accumulates at night and last thing at night before retiring.
Materials	Any soft/medium toothbrush, angulated brushes or bottlebrushes as appropriate may be recommended.
Toothpaste	Any anti-plaque toothpaste or gel, preferably not powder.
Flossing	'Superfloss™' type materials are excellent for polishing the necks of implants. Regular dental floss/tape may also be recommended. Floss threaders can be helpful in reaching otherwise difficult to clean areas.
Electric toothbrush	An electric toothbrush can be effective and may be recommended and advice given on its appropriate use and efficacy.
Irrigation	You, the dentist could advise manual or electric irrigation systems to be used with chlorhexidine or saline solution.
Mouthwashes	Mouthwashes or gels: preferably chlorhexidine based and used only as advised.
Problems	The patient should be told to contact the practice PROMPTLY if any teeth or implant-supported structures become loose or if they notice pain, bleeding, swelling, a bad taste or alteration in the way the teeth bite together.