



Dental Implants

Patient Information and Post-Operative Consequences

What is a Dental Implant?

Almost all dental implants in use today are made from titanium or titanium alloy, materials that have been shown over many years to be well tolerated by bone. The term 'osseointegrated implant' is used to describe dental implants that can develop and maintain a close union with bone in order to support replacement teeth.

There are many different implant systems available and when competently used they can all deliver a highly reliable form of treatment.

A dental implant is essentially a substitute for a natural root and commonly it is screw or cylinder shaped. Each implant is placed into a socket carefully drilled at the precise location of the intended tooth. If an implant has a screw-thread on its outer surface it can be screwed into position and if it does not, it is usually tapped into place. The main aim during installation of any implant is to achieve immediate close contact with the surrounding bone. This creates an initial stability, which over time is steadily enhanced by further growth of bone into microscopic roughness on the implant surface.

In order to support replacement teeth, dental implants normally have some form of internal screw thread or post space that allows a variety of components to be fitted. Once fitted, these components provide the foundation for long-term support of crowns, bridges or dentures.

How many teeth can be supported by implants?

All the common forms of tooth replacement, such as bridges or dentures can be replaced by dental implants. If you are missing just one natural tooth, then one implant is normally all that will be needed to provide a replacement. Larger spaces created by two, three or more missing teeth do not necessarily need one implant per tooth, however the exact number of implants will depend upon the quality and volume of bone at each potential implant site.

Occasionally, it is even possible to join natural teeth to implants with a conventional bridge, but can create complications and is rarely provided.

In the upper jaw, bone density is generally poorer than in the lower and if you have no teeth at all, most treatment providers will want to place a minimum of 4 implants to support a complete arch of 10 or more replacement teeth.

In the lower jaw, the bone towards the front of the mouth is often very strong and as a direct result, fewer implants may be needed than are required to treat an upper jaw. A simple treatment plan to provide 10 or more teeth in the lower jaw might be possible with as few as 4 implants, although it is still more common to use 5 or 6.

What else can be done with dental implants?

If you have no teeth in the lower jaw, and are not yet ready for multiple implant placements, a conventional lower denture can be considerably improved with two implants placed beneath the front section - this is called an 'overdenture'. The same overdenture concept when used to treat the upper jaw will usually require more implants as the bone is generally softer. Implant-supported overdentures, just like conventional dentures are still removed for daily cleaning, however, once back in the mouth, the implants make them much more stable.

Whilst not suitable for everyone, with proper preparation it is sometimes possible to fit new implant-supported teeth on the same day. This fast-track treatment can be applied to a number of different situations, however you do have to balance shorter treatment times against an increased risk of implant failure.

There are many options and every case can be dealt with in a number of ways. You will therefore need to talk to someone who has examined your mouth thoroughly, before having a clear idea as to what is possible. Dental implants have to obey simple engineering principles, in that they must be placed in strong foundations with enough of them to prevent overloading. In addition each implant must be accessible for daily cleaning so that the biology of the mouth can be used to maintain healthy surrounding bone and gum.



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Who is suitable for dental implants?

If you have good general health then dental implants will almost certainly work for you. However, habits such as heavy drinking or smoking can increase the number of problems associated with initial healing and thereafter may negatively influence the long-term health of gum and bone surrounding each implant.

Remaining teeth might also be compromised making treatment planning less certain.

Some dentists will decline to place implants if smoking cannot be reduced or given up altogether.

If you have any other complicated medical problems then speak to someone with relevant experience - it is rare to have health problems that prevent the use of dental implants.

Do you need to have a healthy mouth?

When you first enquire about dental implants it is often in response to an awareness of ongoing dental problems or the recent loss of teeth. Each of these problems will need to be diagnosed and treated in a logical manner, often placing implants in order to establish healthier conditions.

Although it is tempting to focus on the more glamorous aspects of teeth supported by implants, basic dental health, which includes the treatment of gum disease, repair of decay and the elimination of abscesses will be just as important for the long-term success of your treatment.

If you are aware of bad breath, loose teeth, or have noticed excessive bleeding, particularly when your teeth are cleaned professionally, you may have gum problems. Periodontal (gum) disease is a major cause of bone loss and with reduced bone, dental implant treatment can be more complicated.

What else causes bone loss?

Whenever a tooth is lost or extracted a considerable amount of the bone that once surrounded the remaining root portion may disappear. This loss can be particularly rapid during the first few months and is described as 'bone resorption'. Although the rate and amount of bone resorption is highly variable between individuals, it will always occur to some extent, unless specific care is taken to reduce its effects. Sometimes, the simplest measure to minimise bone loss after an extraction is to place the implant immediately or within the first few weeks.

Dentures - Many patients report that after a while their dentures become progressively looser and do not fit as well as they once did. Initially the increased rate of bone loss following extractions is responsible for the observed deterioration of denture fit. Over the long-term it is the direct effect of chewing forces that causes slow resorption of supporting bone. Most people who have had dentures for many years will have needed a relining procedure to compensate for this bone loss. Therefore the longer dentures are worn, the more the amount of bone available for dental implants may be reduced.

Can dental implants preserve bone?

This is one of the most important features of dental implants. Once in place and supporting teeth, everyday functional forces stimulate the surrounding bone which responds by becoming stronger and more dense. Like all things there are limits to how much work an implant can do. Your treatment provider will be able to discuss this in more detail as it relates to your case.

Bruxism - Patients who have a habit of clenching or grinding (bruxing) their teeth may be at risk of overloading their implants. For most people bruxism occurs during sleep, which is why they are generally not aware of it. Heavily worn or flattened teeth, chipped enamel edges and/or regularly breaking pieces of heavily filled teeth are the most common clinical signs of bruxism. The effects of bruxism need to be considered during treatment planning and can be compensated for by placing additional implants, selecting appropriate restorative materials and providing a night time bite guard to protect the new teeth.

How long does treatment take?

For routine cases, from the time of implant placement to the time of placing the first teeth, treatment times can vary between 12 weeks and 6 months. The availability of better bone can be used to decrease time, whilst more time and care must be taken with poorer bone, which can therefore extend time beyond 6 months. If there is no reason to shorten the duration of your treatment then be prepared to wait - nobody loses an implant from being patient and allowing extra time for healing to occur.



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What can you do if an implant does not work?

If an implant does not achieve or cannot maintain a rigid fixation with the surrounding bone it will eventually become loose and no longer be able to support replacement teeth. Commonly the failing implant causes no discomfort and if there are enough remaining, it may not be necessary to replace it at all.

Failures may not always be so easy to deal with and if you embark upon this type of treatment you have to be prepared to deal with this possibility. Most treatment providers will want to achieve failure rates much less than 5%, however in practice this could mean that 1 in 20 of the implants placed might not survive in long-term function. It is a good idea to discuss how your treatment plan might be affected by the loss of an implant.

Are the new teeth joined together?

When multiple implants are placed, they are routinely joined together in the same way that a bridge supported by natural teeth would be designed.

If enough implants are available, it is often easier and just as effective to make several smaller sections of bridgework each supporting a few teeth. The overall effect in the mouth is the same and if you ever need to repair one of the small sections, this can be very much easier to do.

Again the bone quality and the number and position of the implants will largely determine which option is most suitable for you. When implant-supported teeth are linked together, they are mechanically stronger than the individual parts and can better resist the forces of normal function which will try and undo the screw components, posts and/or cements that secure the underlying structure to each of the implants.

How do I look after the implants?

For most implant-supported teeth you will be able to clean around each supporting implant by brushing and flossing in just the same way that you would around natural teeth and tooth-supported bridges. In some areas special floss, interdental toothbrushes and other cleaning aids may be needed to maintain good oral hygiene. Cleaning is not at all difficult, provided that you do not have impaired use of your hands.

It is reasonable to expect some of the daily hygiene procedures to be a little more complex than around your original teeth - equally expect to spend more time than you may have done in the past if you wish to maintain optimum implant health.

For the first few months the implants are in function your dentist may ask that you are seen more frequently, however once they are satisfied your treatment is performing as planned, ongoing care will be similar to any patient with natural teeth.

How long will the implants last?

During the period after the new teeth are fitted, the success of each treatment stage will be the main factor determining how the implants are performing. Once the implants and surrounding soft tissues are seen to be healthy and the new teeth comfortable and correctly adjusted, it is the quality of your home care and willingness to present for regular maintenance reviews that will have most influence on how long they last.

When poorly cared for, implants will develop a covering of hard and soft deposits (calculus and plaque) which is very similar to that found on neglected natural teeth. Untreated, these deposits can lead to gum infection, bleeding, soreness and general discomfort, just as can occur around natural teeth. It could probably be said that implants much like teeth will last for as long as you can keep them clean.

Well maintained implants placed into adequate bone can be expected to last for many years and probably for your lifetime. However, just as you would expect conventional crowns, bridges and fillings to need occasional repairs or replacements during their lifetime, your implant-supported teeth may also have similar maintenance requirements over theirs.

How will you know if you are suitable for implants?

When consulting someone to find out more about dental implants you will be expected to answer detailed questions concerning your medical history and there will be a complete examination of your mouth and remaining teeth to discover the nature and extent of any current dental problems. If you do not have up-to-date x-rays of your remaining teeth you may also be required to have new ones taken. Sometimes models

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and photos will also be needed so that these can be examined after your visit.

As described earlier, establishing good basic dental health is a key stage in any treatment plan. At this first appointment you should be made aware of which problems are urgent, and what treatment is required to stabilise any gum or tooth related problems. It would be reasonable to expect a verbal outline of how your particular implant treatment might be approached. If you are discussing this type of treatment with a dentist that you have been seeing for many years, much of this information will already be known.

What should you know before you start treatment?

It is accepted practice that you should be given a written summary of your treatment planning discussion(s), highlighting your current dental situation and any alternatives there are to dental implants. This summary should also include an over-view of the anticipated treatment stages and give you some idea of how long treatment is likely to take, how many implants are required and what the fees are expected to be. There may well be other issues specific to your case and these would be dealt with accordingly.

Do you have enough bone for dental implants?

Routine dental x-rays show large amounts of detail, but in only two dimensions. From these views it is generally possible to judge the height of bone available for implant placement, however, more advanced imaging techniques are sometimes needed to determine the equally important bone width, which can otherwise only be estimated from clinical examination.

Dental CT scans - There are now a number of advanced x-ray techniques which allow your jaw bone to be looked at in all three-dimensions. The most accurate and widely available is known as the CT (computed tomography scan). Images obtained by CT 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.

What anatomical structures must be avoided during the placement of dental implants?

Upper jaw - In the upper jaw, provided the implants stay within the bone that once supported your own teeth there are really no important risk areas. If you have missing upper back teeth then the shape and location of the maxillary sinus (the region above the roots) can be shown to you. The maxillary sinuses can be seen on most x-rays and are therefore readily avoided.

Lower jaw - In the lower jaw the most important anatomical structure to be avoided is the 'inferior dental nerve'. This nerve runs from the area behind the wisdom teeth, passes under the molars and emerges onto the skin of the face in the region where your premolar teeth are or used to be. This is why a normal dental anaesthetic produces a numb lip even when the needle was placed right at the back of the mouth.

If this nerve is disturbed or damaged during the placement of dental implants it can lead to temporary or even permanent numbness of the lip on the affected side. This is a rare but important complication. CT scans are generally the best means for identifying the location of this nerve and allow implants to be placed with considerable confidence, however these are rarely available within a normal dental surgery environment. It will therefore require a visit to a suitable hospital where the scan is generally completed within a few minutes. Whilst CT scans are more expensive than routine dental x-rays, the information they provide is often invaluable for complex treatment planning and knowing where important anatomical structures are located.

Can dental implants be placed next to natural teeth?

Dental implants are routinely placed beside natural teeth and this is generally very safe to do. The only exception to this would be if the natural root was very curved or tilted unfavourably in the proposed path of the implant. This could cause the root to be damaged by the implant, however this can usually be avoided by careful pre-operative planning.

If a tooth is inadvertently damaged by the placement of a nearby implant, any resulting problems can generally be resolved by root canal treatment in which the nerve of the natural tooth is removed.



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Can you wear teeth during the course of implant treatment?

If the teeth being replaced by dental implants are in a clearly visible part of your mouth it is most likely that you will want to have some teeth present whilst the treatment is underway

There are a number of ways that this can be done, ranging from simple plastic dentures to removable bridges. If replacement teeth are used during treatment stages it is important that they do not apply uncontrolled pressure to the underlying implants. You should expect to make a number of visits after the implants are placed and before they are brought into function, for adjustments to any temporary teeth.

Is it uncomfortable when the implants are placed?

Most patients will be very familiar with the dental anaesthetics used for routine dentistry and will know how effective they are. Implants are placed using the same anaesthesia. Depending upon the complexity of your case, the operation might take anything from 30 minutes for a single implant, to several hours for complex bone grafting and multiple implant placements.

Since the surgery normally involves exposing the bone in the area where the implant and/or bone graft is to be placed you can expect some minor swelling and occasionally bruising afterwards.

For most patients, any of the simple painkillers you might take for a headache will be all that is needed for a few days. If you experience more discomfort than this, contact your treatment provider who can prescribe a stronger medication.

Healing is generally uneventful and any stitches are removed a week to ten days later. During the first few days you should report any unexpected levels of pain or swelling so that it can be assessed. If in doubt always ask for advice, as early detection of a problem will often lead to a simpler solution. You may also be asked to take a course of antibiotics and to follow some simple procedures such as rinsing with salt water or an antiseptic mouthrinse. It is important that you carry out these instructions.

Can you have sedation or a general anaesthetic for implant placement?

Although it is quite straightforward to provide good pain control during surgery, most people will be quite anxious for all but the most simple of implant cases. There is no need to suffer in silence as there are several very effective means by which you can achieve a relaxed state.

Conscious sedation For treatment of greater complexity it may be suggested that you have a more controlled way of keeping relaxed and comfortable during the surgical stages. This is known as a 'conscious sedation' and is distinctly different from a general anaesthetic, because you remain alert enough to respond to simple instructions which may be helpful to the surgeon - however you will remember almost nothing about the treatment stage.

It is particularly beneficial for procedures taking more than an hour where a hospital admission is not required - this is probably true for the majority of treatments related to dental implants. For a routine 'conscious sedation' a carefully controlled amount of sedative is delivered through a vein in your arm or hand for as long as the treatment takes. It is a very safe procedure during which your heart rate and oxygen levels are monitored throughout by an anaesthetist.

With conscious sedation, a normal dental local anaesthetic is injected around the proposed implant sites. Most people do not remember this stage because the sedation has already taken effect by the time the dental anaesthetic is given.

General anaesthesia General anaesthetics require a hospital admission and are mainly, but not exclusively used for complex cases such as where bone is being grafted from the hip to the mouth, or where large numbers of implants are being placed at the same time. Most patients will not require a general anaesthetic since conscious sedation is very much safer and has fewer post-operative complications.



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If you do not have enough bone what can be done?

So far we have covered the building blocks that are part of routine implant placement. This has included the initial examination and diagnosis, special x-rays such as a CT scan, sedation during surgery and what to expect after the implants have been placed. However, for some people, bone loss after the removal or loss of teeth leaves them without enough to secure an implant.

Sinus augmentation - In the upper jaw above the back teeth, it is possible to increase the height of bone available by creating new bone in the sinus. This procedure is called a 'sinus augmentation'. A skilled surgeon can deliver very predictable results in this location and without the general success of this technique many patients would be unable to have implants in a part of the mouth where teeth are so commonly missing.

Onlay grafting - There are many ways in which bone can be added to, however one simple concept is to take a piece of bone from somewhere else and secure it as an 'onlay graft' to a deficient area. The new piece of bone will slowly join to the underlying region and when healed and mature, an implant can be placed in a more favourable position.

Where can you get extra bone from?

Bone can be harvested from a number of sources such as the hip, tibia, chin and posterior regions of the lower jaw. 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'.

Alternatives to your own bone for grafting

For those who would prefer an easier, but slightly slower solution, there are other sources of bone specially prepared to make them safe for use in humans. All of these materials including your own bone, simply provide a scaffold into which new bone will grow and consolidate ready to receive dental implants a few months later.

New bone can take anything from 3 to 12 months before it is ready to receive dental implants. Do not be in a hurry to move to the next stage. If you need a large volume of bone it will take longer to mature than a small amount.

Guided tissue regeneration - Each surgeon will have his or her preferred way of creating new bone. Many of them will also use a supplementary technique called 'guided tissue regeneration'. Using this technique slow moving bone cells are given time to fill a space by placing a barrier material between them and the fast moving cells of the soft tissues lining the mouth. When this technique was originally developed the barrier material had to be removed during a separate surgical stage a few months later. Whilst these original materials are still in use, it is now more common to use a 'resorbable barrier' that will disappear naturally a few months after it has done its work.

Does Bone Grafting affect the length of treatment?

If you need bone grafting, it will almost invariably increase the length of time your treatment will take, however when successfully applied it will greatly improve the outcome of the implant(s) placed. When used in the front of the mouth it can also allow for creation of very much better aesthetics.

Bone grafting requires a considerably higher degree of skill from the operator and is often more complex to perform than the placement of the implant itself.

In certain situations some operators will recommend combining the implant placement with bone grafting and the placement of a barrier membrane all at the same time. This considerably reduces treatment time and can produce results that are difficult to achieve any other way. However, many surgeons will still prefer to carry out bone grafting as a distinct stage, so that the implants are only placed when the bone grafting has been successful.

Whatever method is chosen to improve the bone quantity the time, effort and expense is generally well worthwhile.



Summary of stages for routine dental implants

1. Diagnosis and treatment planning after which it may be necessary to carry out repairs or treatment to any remaining teeth. The diagnosis will usually involve a cone beam CT scan.
2. Implant placement is usually followed by a period of healing lasting from 12 weeks to 6 months. Often the implants are completely hidden beneath the gum, however one-stage procedures where the implant is visible from the time of placement are also commonplace. Stitches are normally removed 7 to 10 days after the implant placement.
3. Several visits may be needed over the next few weeks to adjust temporary teeth or dentures and to monitor healing.
4. Once the implants have healed uneventfully for the required time, they are uncovered if necessary and made ready to connect the teeth. Sometimes the time allowed for implants to integrate may be increased or decreased to suit the local bone conditions and the overall quality of healing.
5. In some cases the first teeth fitted to your implants are not the final ones, but replicas of the intended design. This stage can be used to assess the implants, control early loading and in areas where aesthetics are more critical, also gives the gums time to mature around each implant before final teeth are fitted.
6. Final teeth are commonly fitted between 3 and 9 months after the implants were first placed. The way that the teeth fit together is carefully adjusted so that they do not interfere with each other.
7. Regular examination and hygiene appointments are then all that is required to maintain the health of the mouth, teeth and implants.

One-stage implant The implant is placed into a new, healing or healed extraction site and is visible above the gum immediately after placement. The advantage of this method is that a second surgical stage is not necessary to expose the implant. The implant will not normally be ready to support a tooth for several weeks or months.

Two-stage implant The implant is placed into a new, healing or healed extraction site and then covered by a layer of gum so that it cannot be seen - this is the first stage. At the second stage some weeks or months later, the implant is uncovered and components added bringing it above the gum ready to begin placing a new tooth.

Same day implants This technique is most often used to treat the lower jaw and requires considerable planning before the actual day of surgery. Several implants are installed and a few hours later a complete arch of temporary or permanent teeth can be fixed in place. If temporary teeth are used these will normally be replaced with a permanent bridge after a suitable healing interval. Not all patients are suitable for this style of treatment.

Immediate implant For this technique a tooth is removed and an implant placed immediately into the extraction site. Depending upon the local bone and soft tissue conditions, the implant surgery may be a one- or two-stage procedure. Not all patients are suitable for this approach.

Immediate implant and early loading - This is distinctly different from an immediate implant placement. It is effectively a one-stage technique where the implant is placed into a new, healing or healed extraction site and is fitted with a new tooth at the same appointment. This first tooth will normally be kept out of direct contact with opposing teeth for a healing period of more than 3 months, after which it is finally restored. This technique tends to be more common in regions of the mouth where optimum aesthetics are important. Again, not all patients are suitable for this approach.