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... SO YOU WANT TO HAVE AN IMPLANT?

Some essential facts for patients
who consider treatment with
dental implants

First Edition

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Preface and Acknowledgement

This evidence-based information booklet was developed as according to the International Patient Decision Aid Standards (IPDAS)¹ in order to provide patients with simple and reliable information with regards to treatment with dental implants. The aim of the booklet is to

- empower patients to better informed treatment choices
- improve the effectiveness of clinical care
- promote self-care and co-ownership of treatment outcomes by the patient

This booklet was designed after the requests we have received by numerous patients and was designed based on the most frequent questions we receive. This booklet would not have been possible without the enthusiastic co-operation of several focus groups of patients, clinicians and researchers, who contributed to the development and testing. We are grateful for their help.



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Contents

P3	1. What is a dental implant?
P4	2. Which are the main treatment options for replacing the missing teeth?
P6	3. Are dental implants safe?
P7	4. Are dental implants appropriate for everyone?
P8	5. How long time does an implant treatment require?
P9	6. Is implant surgery painful?
P10	7. What is my commitment once I receive implants?
P11	8. Do implant supported prostheses look like natural teeth?
P12	9. Do implant supported prostheses function as natural teeth?
P13	10. How long do dental implants last?
P14	11. Why do you have to come to the dentist frequently?
P15	12. Can things go wrong after the end of the treatment?
P16	13. How about the cost of the dental implant treatment?
P16	14. Who is qualified to provide the implant treatment?

1. What is a dental implant?

Dental implant is a treatment option for replacing missing teeth. A dental implant is like a screw, usually made from titanium. It mimics the root of the natural tooth.

Complete treatment involves two phases: **the surgical phase** (placement of the dental implant) and **the prosthetic phase** (placement of teeth on implants).

During a small surgery (usually under local anesthesia) the dental implant is placed in the bone of the jaw, where it remains undisturbed for a period of 6-24 weeks. The implant is either not visible during this period or only the top of the implant is visible. In this period, the bone grows in tight contact with the dental implant, an event we call "osseointegration".

After osseointegration is achieved, the implant is restored with a metal or ceramic abutment which can be used to support a crown, a bridge or another dental prosthesis which replaces one or more missing teeth. This is the prosthetic restoration.

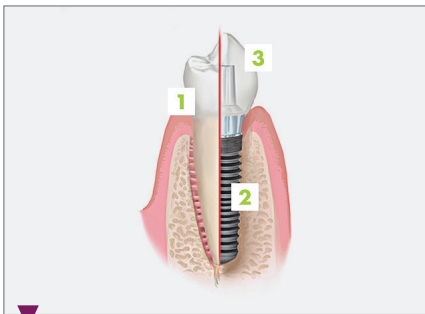


Figure 1. (1)Tooth (2) Implant (3) Crown

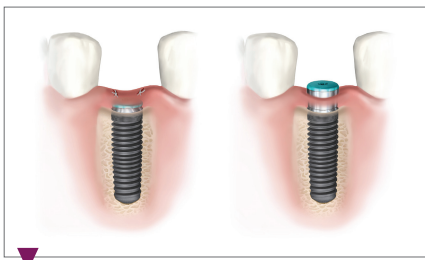


Figure 2. The implant is either not visible during the healing period or only the top of the implant is visible

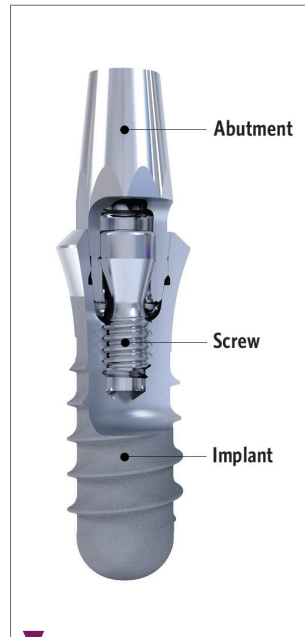


Figure 3. Implant with abutment and abutment screw

2. Which are the main treatment options for replacing the missing teeth?

There are several options for replacing missing teeth. Each treatment option has its own indications and contraindications.

Implants

Implants can be placed in the area where the teeth are missing. Then single crowns or a bridge can be fixed on to the implants. Implants can replace single or multiple teeth, or support prosthesis for people who have no teeth at all.

Figure 4. Implant supported single crown

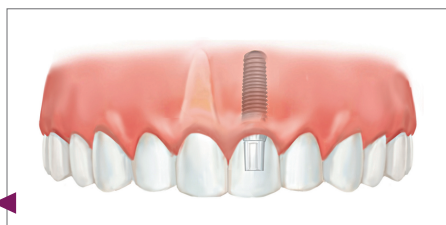


Figure 5. Implant supported bridge

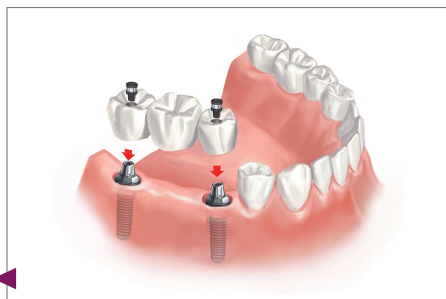
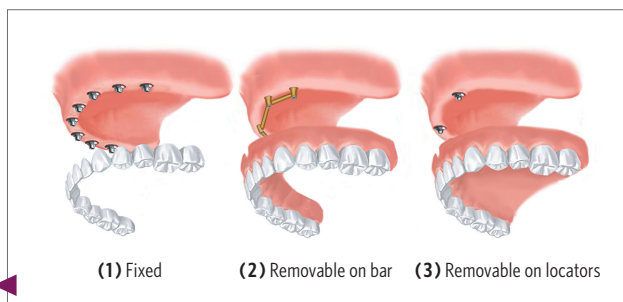


Figure 6(1-3).
Implant supported
full arch prosthesis



Tooth supported bridge

Teeth/tooth adjacent to missing teeth can be prepared to carry a bridge and provide support for the replacement of the missing teeth. This involves slicing teeth under local anesthesia, followed by preparing a bridge in the lab. The bridge is cemented on to the teeth and replaces the lost teeth. A certain number of healthy teeth are required in order to support a fixed bridge.



Figure 7. Bridge

Removable prosthesis on teeth (Partial denture)

A tooth supported removable prosthesis may also be an option for replacing adjacent missing teeth. However, these are not fixed in the mouth and often might be less comfortable to wear, while a period of adaptation is required.



Figure 8. Removable partial denture

Full denture

When there are no teeth present, a full denture can be made which is supported by the alveolar ridge (remaining bone and soft tissues). The comfort and stability of such a denture depends greatly on the amount of bone left and can be difficult if there is little bone left. Sometimes, the stability of a full denture can be greatly improved by introducing some implants to provide anchorage.



Figure 9. Conventional full denture

3. Are dental implants safe?

Dental implants have been in use for more than 30 years and have been proven safe and effective at replacing missing teeth. Millions of people have benefited from treatment with dental implants, while today we achieve osseointegration in more than 98% of the implants placed.

Allergic reactions or rejections of the dental implant are very rare. Titanium is one of the most tissue-accepted metals, and has negligible metal toxicity.

Nevertheless, placement of the dental implants requires a surgical intervention, which might be contraindicated in patients with certain health conditions or medications.

Implant surgery, like every surgical procedure can have complications. Depending on the **local anatomy and proximity to sensitive structures (e.g. nerves, arteries, sinus)**, careful planning is required and often detailed **radiographic examinations** in order to prevent injury. Your dentist will discuss with you in detail if any risks exist in your case.

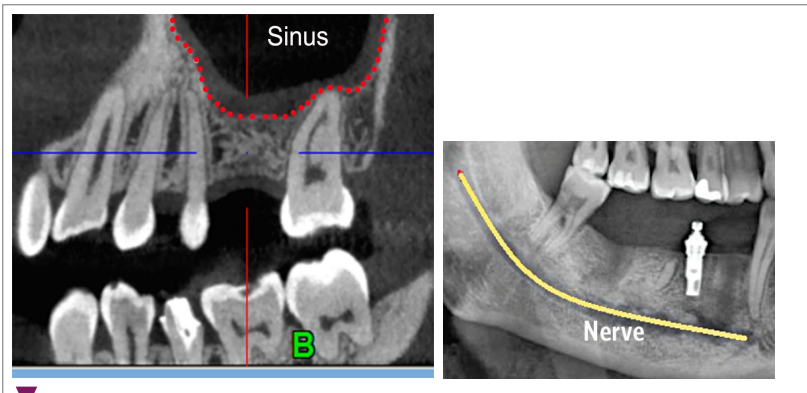


Figure 10. Local anatomy which is sensitive to implant surgery

4. Are dental implants appropriate for everyone?

Most people who are in good general health are good candidates for treatment with dental implants and can enjoy a predictable and highly successful outcome.

Establishment of optimal gingival health and **effective oral hygiene** is however a prerequisite for implant treatment, as bacterial plaque and inflammation of the gums are major threats for the success of implant treatments.

Certain systemic conditions might increase the risk for failures or complications, although not directly prohibit implant treatment.

For example:

- Patients with **Diabetes Mellitus** are strongly advised to achieve proper metabolic control prior to implant treatment.
- **Smokers** have increased risk for implant complications. Smoking cessation is recommended before implant treatment takes place in order to increase the success rate.
- Patients with a history of **Periodontitis** are more susceptible to implant inflammation and must maintain an optimal hygiene and regular visits to the dentist for checkups.

Sometimes the local anatomic conditions might complicate implant treatment or increase risks for failures. Some people **do not have enough healthy natural bone** to support dental implants, or anatomical structures such as nerves and the sinus cavity might be in close proximity.

Certain **radiographic examinations** such as Computer Tomography might be needed to identify the residual bone quality and quantity and decide if an implant is the best option and what type of procedure will be required.

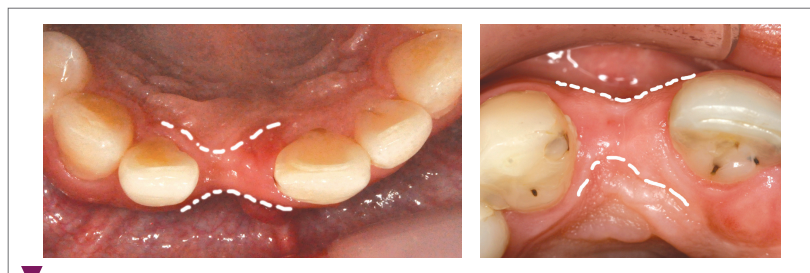


Figure 11. Horizontal loss of bone after the tooth extractions.

5. How long time does an implant treatment require?

The timeframe of an implant treatment depends greatly on the type of reconstruction and individual conditions such as each patient's restorative needs, medical and dental histories, the condition of the jawbone, and the technique and materials used. The duration might vary from 2-3 months in simple cases to more than a year in complex reconstructions.

After an initial consultation, your implant dentist should provide you with a treatment plan including the estimated amount of time required to complete the treatment. Implant treatment usually comes once complete oral health is present or established. Often the treatment with dental implants might be delayed because of other existing conditions that need to be treated first such as periodontal disease, caries, periapical inflammations etc.

The usual implant treatment procedure consists of two parts: implant installation surgery and prosthetic restoration.

If you need to extract a tooth, a healing period of at least 6-12 weeks, most likely will be required before implant surgery is possible to replace this tooth. In exceptional cases, extraction of the tooth and placement of the implant can happen in the same day, which is called **immediate placement**.

Once placed, implants require an undisturbed healing time of 6 to 12 weeks before placement of the prosthesis. Manufacturing of the prosthesis itself might require from 2-6 weeks, depending on the complexity. Multiple appointments are almost always necessary.

Under specific circumstances, implants may be restored (have a prosthesis placed) on the same day the implant is inserted. This is known as **immediate loading**.

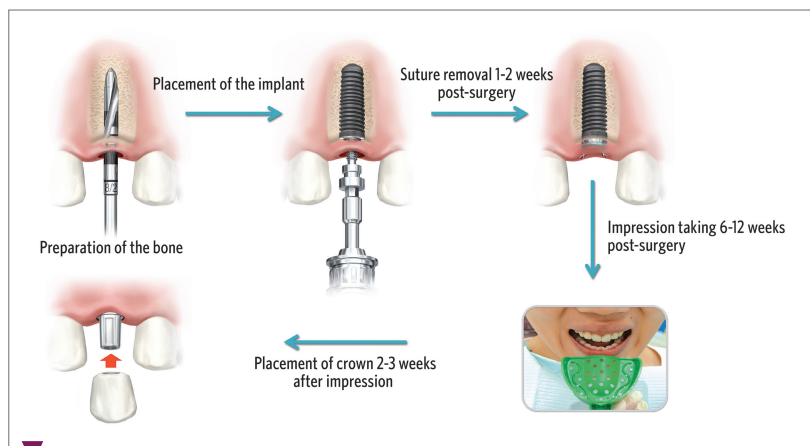


Figure 12. Most common procedure of implant treatment.

6. Is implant surgery painful?

In the great majority of cases, implant surgery is well tolerated with mild post-surgical discomfort.

Local anesthetic is in most cases enough to ensure that no discomfort is felt while implants are being placed.

Post-surgical pain usually responds well to over-the-counter painkillers such as Paracetamol. According to a study conducted with patients in our clinic after straightforward implant surgery, half of the patients needed painkillers on the first day, while one out of 4 patients still took painkillers on the 4th day (5). By the 6th day, only one in thirteen patients used painkillers.

Minor discomfort in most cases is transitory and can be controlled after the surgery. Most common post-surgical complications are swelling, pain, hematoma and bleeding. There are very few major risks associated with implant surgery and although they can potentially occur, they are rare.

Implant= Straight forward Implant Surgery;

Implant+GBR= Implant placement with simultaneous bone augmentation surgery

Figure 13. Patient-reported swelling scores post-surgery in a scale 0-10 (no swelling- very much swelling), day 1 to day 14.

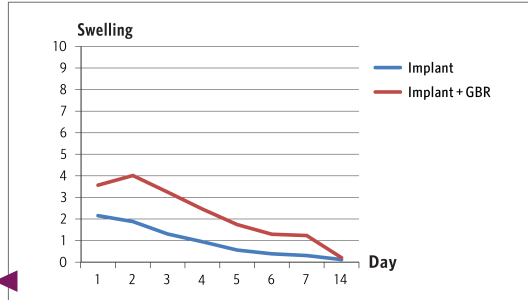
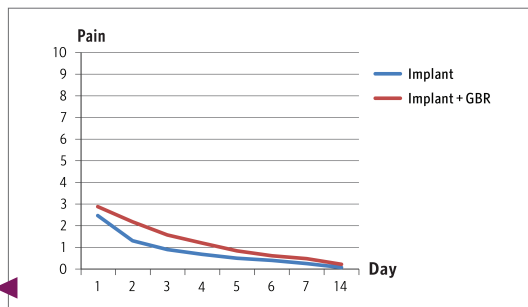


Figure 14. Patient-reported pain scores post-surgery in a scale 0-10 (no pain- very much pain), day 1 to day 14.



7. What is my commitment once I receive implants?

Implant Prostheses require effective oral hygiene and frequent examinations, in order to prevent or detect any early potential problems.

In most cases, as a minimum, an annual check-up appointment will be required so that the prosthesis and the peri-implant tissues are examined and also are professionally cleaned by your dentist or hygienist. In certain patients with increased risk, more frequent appointments are often recommended.

Moreover, effective practice of oral hygiene with brushing and flossing twice a day is essential. As Implant prostheses are often different in structure than teeth, sometimes effective oral hygiene might require **special types of brushes or devices**, which your dentist or hygienist can demonstrate.



Figure 15. Use of dental floss



Figure 16. Interproximal brush

8. Do implant supported prostheses look like natural teeth?

Implant prostheses are of many types and can vary from single crowns replacing one missing tooth to extensive restorations that cover the whole jaw. At present, we have a wide variety of aesthetic techniques and materials which in many cases result in very high aesthetics with dental implants. Often, crowns on dental implants will appear very natural and quite similar to your real teeth.

The final esthetic outcome however, greatly depends on the kind of reconstruction as well as the local conditions (availability of bone and gums). **In some cases, additional procedures to improve soft tissue might be required** if an optimal aesthetic outcome is necessary. In other cases, a small compromise in the aesthetics is necessary in order to achieve healthy and sustainable treatment outcomes.

At present, there are protocols available that can help your dentist assess the aesthetic risks in your case and give you a reliable opinion on how likely we are to achieve a high aesthetic outcome and if any special procedures will be required. If aesthetics is your major priority, please discuss with your dentist on the possibilities to achieve a highly aesthetic outcome in your case.

Figure 17. Single implant with implant crown

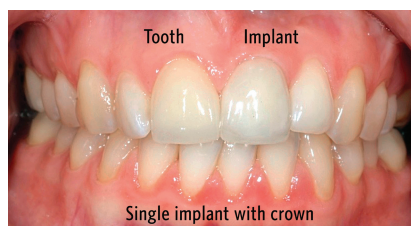
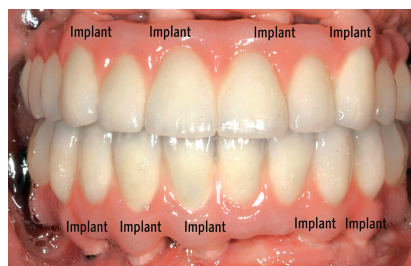


Figure 18. Full arch implant supported fixed dental prosthesis



9. Do implant supported prostheses function as natural teeth?

Dental implants remain fixed in the bone and allow for normal function. Patients with fixed prostheses on dental implants enjoy comfortable chewing that is very close to this of natural teeth. Your ability to enjoy a meal and experience taste and texture is the same as when you have natural teeth.

Crowns on dental implants will feel very natural only after a couple of weeks and in most cases quite similar to your real teeth. Normally, you will not be able to feel that you have a dental implant.

However, natural teeth are surrounded by the **periodontal ligament** which offers very precise perception during mastication. Implants are deprived of periodontal ligament, so in case that you no longer have natural teeth remaining in the mouth, your sensation of pressure while chewing might be significantly reduced.

Patients with **removable prosthesis** (overdenture) on implants will enjoy a high stability of the denture. Such overdentures however often have an extensive coverage of the palate or mandible and might reduce your perception of taste as well.

10. How long do dental implants last?

Implants have a high success rate, but it is still a relatively new treatment and thus documentation beyond 10 years is scarce. Nevertheless, there are reports that have assessed their performance over a period of more than 35 years. The most recent studies indicate that about 90% of implants placed are still in function after ten years.

Even with a long-term survival, implants are not always free of complications. Complications can occur either in **the technical parts** (screws, abutments, porcelain crown etc) or in **the tissues surrounding implants** (inflammation - peri-implantitis).

The technical parts of implant prosthesis have a certain life span and it is reasonable to expect that within a period of 5-10 years, some parts such as abutment screws or porcelain crown might need repairs or replacement.

The tissue complications however such as chronic inflammation around implants is difficult to manage once established, therefore prevention is the best strategy. Prevention of inflammation related complications is possible through **effective oral hygiene** and long-term health of peri-implant tissues depends greatly on **how well they are cleaned and maintained**.

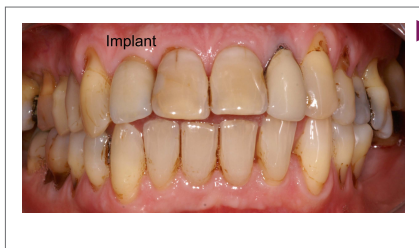


Figure 19. Twelve-year follow-up of a 68 years old female patient. The upper right lateral incisor was replaced by an implant.

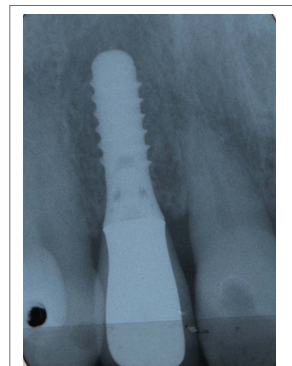


Figure 20. Twelve-year post operative radiograph of the maxillary right lateral single-tooth implant restoration

11. Why do you have to come to the dentist frequently?

Dental implants are as susceptible to **bacterial inflammation** as your natural teeth. Therefore, effective cleaning is required. Special brushes may be used to facilitate this, along with dental floss.

Your dentist will put together **a maintenance program** that is appropriate for your individual needs. As a minimum, an annual check-up is likely to be recommended, but more frequent supportive therapy could be necessary if you have any increased risk for example if you have lost teeth due to periodontitis.

Smoking can significantly increase the risk of **inflammation** and **bone loss** around implants. Therefore, smoking cessation is an important step in order to achieve good overall oral health and to reduce bone loss around dental implants, as well as around the natural teeth.

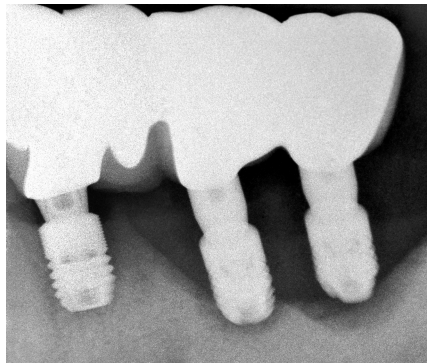


Figure 22. Radiograph of a patient with peri-implantitis. Observe the bone loss around the two last implants.

12. Can things go wrong after the end of the treatment?

At present, osseointegration is very predictable and between 98 % and 99 % of the implants placed will successfully osseointegrate. However, problems or complications can be encountered shortly or long after the implants are successfully restored. The majority of these complications can be managed effectively if they are detected early.

Bone loss

Bone loss can occur around implants. Regular check-ups by your implant dentist will ensure that such a condition is diagnosed early and adequately managed.

Infection/Inflammation

Bacterial plaque might lead to chronic inflammation around implants which is known as peri-implantitis and can result in continuous bone loss around implants. **Poor oral hygiene** is the main cause for such infections and once established they can be very challenging-to-treat problems. Bacterial infection, is however preventable through good hygiene and professional cleaning by your dentist or a hygienist. Poor systemic health such as **uncontrolled diabetes** and **smoking** are known to increase the risk of peri-implantitis.

Complications relating to the prosthesis

Technical complications such as mechanical fracture of crowns, bridges, prosthetic screws, or loosening of screws, are not uncommon, especially for prostheses that have been more than 5 years in function. This type of complications can be increased in patients with parafunctional habits (bruxism or clenching) or unstable occlusion. And in most cases, they are dealt effectively with replacement of damaged components.

Implant fracture

Fracture of implants occurs rarely (in less than 1 % of cases). This type of complication usually results in patients with parafunctional habits (bruxers or clenchers) or unstable occlusion, as well as with other kinds of overload.

13. How about the cost of the dental implant treatment?

The implant treatment will greatly depend on the **individual needs** of the patient, and includes a wide diversity of costs. Other than clinical procedures and fees related to the work of the dentist, the costs include a wide number of necessary implant surgical and prosthetic components, the laboratory fees and material for manufacturing the prostheses, special diagnostic examinations and the cost of biomaterial for bone and soft tissue augmentations. Consequently, customized cost estimation can only be offered by your dentist once the treatment plan is arranged.

Furthermore, different implant systems have significantly different prices, which usually reflect differences in quality, similar to any high-tech product brands. **As long term success** is important and prioritized in implant treatments, the focus in our clinic remains in using products that are of high quality, well documented to be safe and lead to highly effective and predictable outcomes.

After an initial appointment and assessment, your dentist should provide you with a treatment plan including the estimated number of appointments and cost, and then notify you if there are any changes during the process.

14. Who is qualified to provide the implant treatment?

The use of dental implants is not part of the undergraduate dental curriculum and any dentist practicing (either placing or restoring) dental implants must acquire the necessary skills with education after graduation.

Today, the education of the dental specialist (Periodontist, Prosthodontist, Oral Surgeon) includes the skills to work with dental implants. In addition, general dental practitioners can also attend post graduate courses in order to safely and effectively perform dental implant treatments. The sources and the levels of education with dental implants vary significantly, as well as the complexity of the cases. Certain cases can well be managed by a properly trained general dentist, while others will require the skills of a specialist. It is therefore advisable to inquire your dentist about his/her credentials and training within implant dentistry prior to deciding for an implant treatment.

Reference and further resources

1. International Patient Decision Aid Standards (IPDAS) <http://ipdas.ohri.ca/>
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