

SYSTEMATIC EXAMINATION OF IMPLANT & MANDIBULAR RAMUS GRAFTS IN ADULTS WITH RADIOLOGICAL POINTS

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Abstract

Dental implants are known as the best replacement for missing teeth. Of course, maximum conditions must be provided for dental implants. One of these conditions is the presence of sufficient bone density to place dental implant bases. If these conditions are not met, the implant specialist will proceed with bone grafting. Graft materials used to preserve or regenerate bone are prepared and supplied from various sources. One of these sources is a part of the bones of the body. In order to perform dental implants and restore teeth in this way, in many cases, based on the conditions of the person, there is a need to perform a bone graft in order to improve the condition of the person's mouth and gums. The opinion should be suitable for placing the implant and the conditions for implanting the teeth should be provided. The ramus bone graft in the implant is used like other bone grafts to replace the tooth bone. In fact, bone grafting is used to save a tooth or to support dental implants. Many reasons for bone loss, such as gum disease, tooth development defects, long-term use of artificial teeth, severe impact or trauma to the jaw area, as well as the presence of empty spaces in the mouth after tooth extraction, all lead to the process of bone grafting in the implant. Auto graft is the first recommended option of the implant specialist, which is removed from the ribs, hips, pelvis or wrist. In this type, there is no trace of disease transmission and it contains the patient's own cells. An allograft is another bone grafting option that is taken from a deceased person or a cleaned corpse. Of course, clinical tests will be performed on them before transplantation to prevent disease and ensure safety.

Keywords: Implants, Teeth, Mandibular Ramus Grafts, Gum Disease

INTRODUCTION

Dental implants are the ultimate way to restore teeth that have reached the end of the line. The complication of complete tooth decay is actually more common than you think. In many cases, the dentist sees no other option than to remove the tooth completely [1-3]. In this situation, a dental implant is a way to solve the problem of toothlessness and compensate for this damage to the beauty of people's smiles [4]. Losing one or more teeth can happen to anyone in their lifetime. In addition to damaging the spirit of self-confidence, this issue can also damage the beauty of your face. Dental implant can be very useful in this regard and in addition to restoring the ability to chew and a beautiful smile, it can also remove damage to the face. The material of dental implant is titanium metal [5-7]. Titanium is a very corrosion-resistant metal that does not react with any substance under any conditions. Hence, it is very useful for internal use without any harm. Titanium is used in various medical applications, of which dental implants are only one of them. These bases are in the form of screws that are placed inside a base and gradually form a strong bond with the jaw bones [8-10].

The reason for this strong connection is the body's attempt to compensate for the initial damage done to the base of the dental implant to the jaw. With the release of osteogenic cells inside the transplant site, the process of ossification has started, which ultimately leads to the complete fusion of the implant bases with the bone tissue of the skull and jaw. These events should last for 3 to 4 months [11-12]. For this reason, the implant is performed in two stages: Base implantation and placement of the crown and cover. It should be noted here that the use of implants, like any other treatment, has its limitations. In fact, not everyone can use implants [13-15]. The reason for this in most cases is the volunteer's health problems or the lack of bone density in him. Also, in some cases, the jaw bone has eroded, which makes the implant impossible. In this case, the patient becomes a candidate for jaw bone transplant surgery. Regardless of the specific conditions, implant therapy is usually popular and has a success rate of over 97%. The lifespan of the implant is very high and it is considered the only and best treatment method for toothlessness [16].

DENTAL IMPLANT TREATMENT STEPS

- ❖ Preparation of OPG and CBCT radiographs;
- ❖ Complete examination of the bone in the implant area and examination of the need for bone grafting or sinus lift;
- ❖ Tooth extraction in the implant area;
- ❖ Placing the fixture and performing the implant surgery stage;
- ❖ Prosthetic stage and implanted tooth cover (Figure 1).

What is the structure of a dental implant?

Dental implant consists of two main parts. These two main parts are fixture and abutment. The part inside the jaw of the fixture and the part of the crown above the gum is called abutment. As we mentioned earlier, the material of the bases of this structure is titanium metal fixture.

This base does not interfere with the body's metabolism, and it is not possible to slip, damage or any kind of abnormality. Fixtures are parts that are made with great precision despite being invisible. For this purpose, they are completely made in the size of the natural root of the tooth and will be placed there [17].

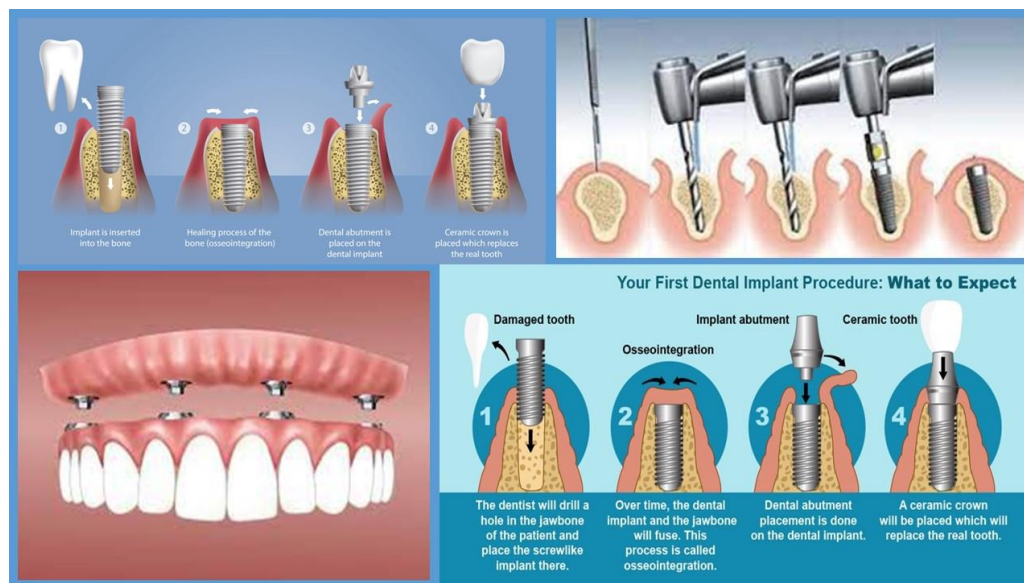


Figure 1: Dental Implant Treatment Steps

What are the advantages of dental implants?

As we mentioned at the beginning of this article, the implant has many advantages that have made it popular. Among these things, these points should be mentioned. The following are the main reasons for preferring implants to other similar methods, including dental bridges or movable and immovable artificial teeth.

- Beauty should be considered the main reason for the invention, use and popularization of dental implants. With the implant, the empty space of the used teeth will be compensated and the beauty will return to your smile. Implants, if performed correctly and by a good dentist, will not be any different from the teeth next to them.
- High speed of treatment, unlike many other basic treatments, dental implants can be implanted in a minimum time and replace lost teeth. Of course, this issue depends on the complete health of the jaw bones.
- High lifespan, along with these two items, is one of the main reasons for the popularity of implants. In general, implants are expected to be with the person until the end of their life and do not need to be replaced. However, this issue is also dependent on the complete observance of oral and dental hygiene. Therefore, even if you have implanted your teeth, you should still pay attention to these points [18].
- With implant treatment, other teeth are not victims of replacing lost teeth.

- One of the reasons why the implant preserves the shape of the face is that it strengthens the jaw bone and prevents its decay.
- Dental implants can prevent the spread of caries to adjacent teeth and help maintain their health.

Who can get dental implants?

Contraindications to the use of implants are rare. For this reason, usually there is not much problem to do dental implant in case of examination by a dentist. However, all steps of dental treatments must be done with high precision and sensitivity. Before any dental treatment, the dentist will explain to you how to prepare for your treatment. Usually, before filing a case, you will be given a questionnaire in which you must mention your medical records. Be very careful in filling this questionnaire and if you think there is something important that is not mentioned in the questionnaire, be sure to discuss it with the dentist [19].

CARE STEPS BEFORE DENTAL IMPLANTS

By performing these steps, the probability of success of the body implant without any special complications is known to be high. Before starting the implant procedure, there is a need to fully examine the gums and ensure their complete health. Any infection or decay in the gums and teeth adjacent to the implant must be treated completely. After ensuring the complete health of the oral tissues, we will need to prepare a special radiographic scan for the implant (called CBCT or DVT). This scan is usually prepared along with a specialized report and an electronic file. In some radiology clinics, this information is stored in an integrated medical information management system and the result is also emailed [20]. These photos help the dentist to determine the height and thickness of the bone as well as other important things such as the passage of important nerves and sinuses. In this way, the best dimensions and location of the dental implant are determined. Sometimes, in special medical conditions such as high blood pressure, history of heart or brain attacks, history of organ transplantation, and other such cases, there is a need to receive a special medicine or change the dose of current medicines. In addition, sometimes the implant candidate is under the care of another doctor due to underlying diseases such as heart problems. In this situation, it is essential to consult a doctor to proceed with the work.

Treatment of acute edentulous problems with implants

- In some cases, the severity of edentulous ness is such that all teeth must be implanted. For this, we need six to eight implants in the upper jaw, and four to six implants in the lower jaw. Such work is only possible if your jawbone can tolerate such a large number of prostheses (Figure 2).

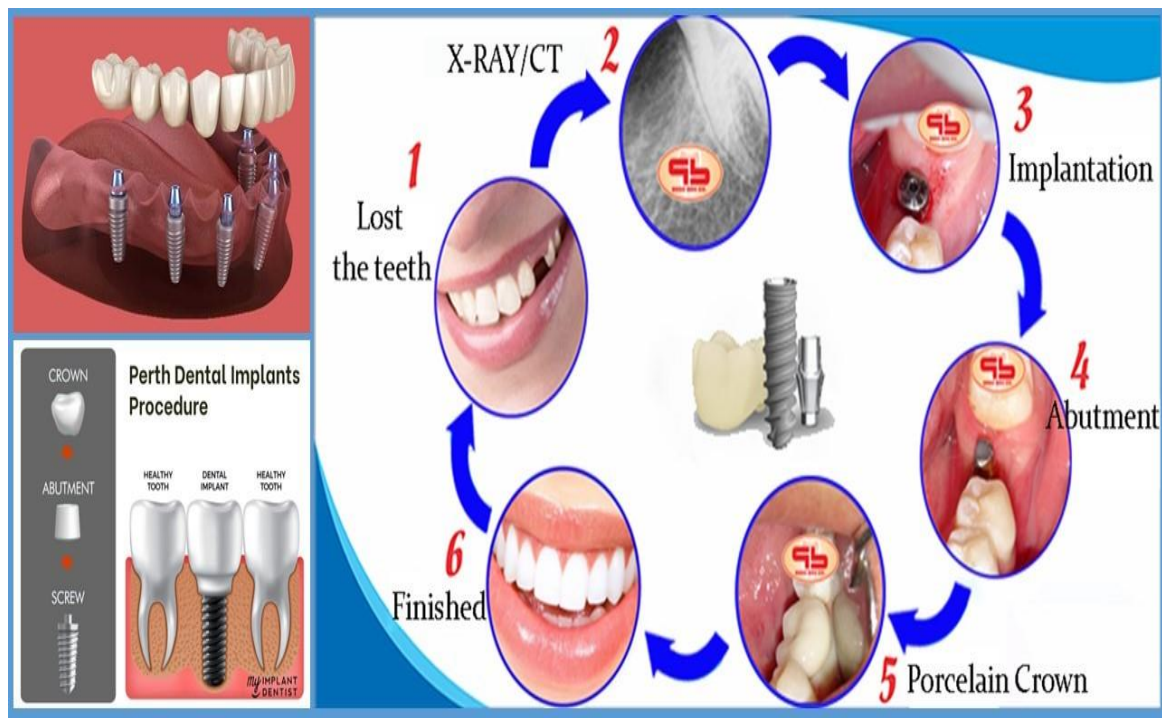


Figure 2: Treatment of Acute Edentulous Problems with Implants

- Implants are not possible if all your upper or lower teeth are missing. In addition to the necessity of jaw bone health, the gums of a candidate for implant transplantation are considered very important. In fact, people who have a tooth or jaw infection cannot use dental implants. In this situation, not only the problem is not solved, but it also creates another one. In this case, these people should first remove their tooth infection, and after treating the tooth infection, they should get a dental implant.
- In case of lack of attention, if a problem arises, the implant will be removed, which will cause the doctor's effort to be wasted and the individual's expenses.
- To perform an implant, there must be enough space to place a crown with natural dimensions between two teeth [21].
- If one or more teeth are missing from the end of each dental arch and the tooth is natural on only one side, it is not possible to have an implant.

Specific Diseases and Prohibited Drugs for Implants

- People who take blood anticoagulants or aspirin should stop their medication 5 to 7 days before surgery with the opinion of their doctor.
- People who smoke, it is better to forget smoking for a while or to reduce the amount of smoking. It is necessary for people who smoke to consult their doctor before the implant.

- People who have undergone radiotherapy, especially in the jaw and face area, and patients who have been under bisphosphonate treatment for a long time, are not candidates for implants.
- Implants are not performed for pregnant or lactating women.
- History of treatment with radiotherapy or chemotherapy reduces the chances of implant success.
- In people who have diabetes, the implant should be done with special precautions. Before the dental implant, the blood sugar level of the diabetic patient should be checked by the doctor. If the person's diabetes is controlled, an implant will be placed for him. Of course, the prohibition of implants in these people is not absolute, and the chances of diabetics are the same as other normal people, and there is no reason to worry.
- The use of drugs in which bisphosphonate derivatives are used creates limitations for implant [22].
- If you have osteoporosis, more investigations should be done regarding the implant.
- Implants should be done with caution in people with diabetes. Before the implant surgery, the blood sugar level of the diabetic patient is checked. If his diabetes is under control, it will be possible to have an implant. Therefore, the prohibition of implants in these people is not absolute, and the chances of diabetics are the same as other normal people, and there is no reason to worry.

DENTAL IMPLANT STEPS

Dental implant is actually a type of jaw surgery. For this reason, it should be performed by a jaw surgeon. To start the work, the root of the old tooth, if any, must be removed first. In this session, a small hole can be made inside the bone and the screw base of the implant can be placed inside it. At the end, the gum is placed on the wound and sutured. You have to wait about a few months until recovery. Of course, contrary to what it seems, this stage will not cause you much pain due to local anesthesia. However, it is better to rest the rest of the day after this surgery. In this way, the hardest part of the work is over. Because the fixture is in place. In the next stage, which is performed 12 to 24 weeks later, a second surgery is performed, which is the intermediary of the crown and fixture. This mediator, known as the connector or the abutment, is placed in the upper part of the base [23]. At the end, the crown made in the laboratory with special materials and a screw is placed on the abutment and with the help of tooth grinding tools, its size is modified according to your jaw. With the help of this sharpening tool, the appearance of the tooth will be completely similar to other teeth and will not be recognizable at all.

Getting To Know the Implant Steps Step By Step

In general, the dental implant steps step by step will be as follows:

- ❖ Initial examination, consultation and specifying the type and number of implants needed;
- ❖ Preparing the location of the implant base by removing the root or pulling the tooth completely;
- ❖ Jaw bone grafting in case of bone tissue degeneration;
- ❖ Planting the implant base;
- ❖ Initial recovery period for growth and repair of jaw bones;
- ❖ Choosing the color, molding and sending the specifications of the crown to the laboratory;
- ❖ Final placement of the crown and completion of the implant [24].

The Duration of the Implant

Implant surgery may be longer or shorter depending on the conditions of each candidate. Some patients need bone graft surgery or others need to extract the old tooth root. It is a debt that these things take time. In addition, in some cases, more than one abutment is placed inside the jaw, which takes effect during the time of the implant.

Complications of Dental Implants

Implant treatment is simple, long-term and without special complications. However, in some cases, it has been seen that the tissue of the body rejects the implant or problems arise for the person after the implant. The most important reason for such problems is lack of oral and dental hygiene after implanting a prosthesis or referring to non-specialists and fraudsters (known as experimental dentists) (Figure 3). Of course, unfortunately, in recent years, it has been seen that some licensed dental clinics have tried to earn maximum income by hiring inexperienced dentists and using low-quality cases and relying on advertisements, without paying attention to ethical and professional principles.

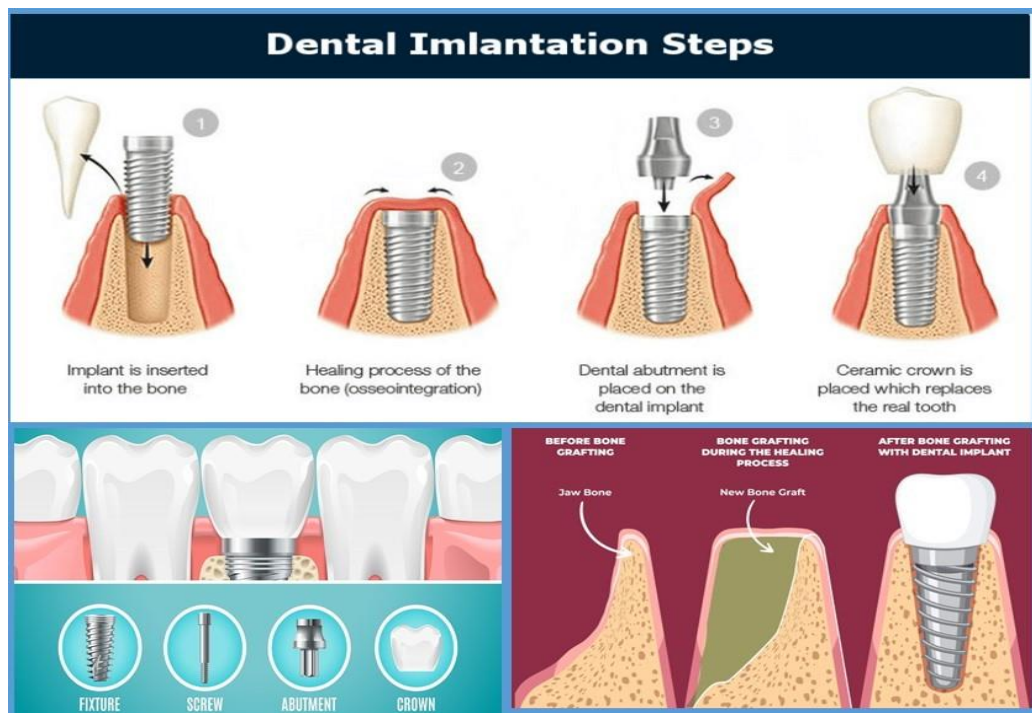


Figure 3: Complications of Dental Implants

If you follow both of the above, i.e. visit the best specialist dentist and follow the health tips, you can expect your treatment to proceed without any problems. Usually, the most important complications caused by improper treatment and dental implant implantation in a non-standard way or with low-quality materials are as follows:

- Infection of the implant placement site;
- Damage to adjacent teeth [25];
- Damage to the nervous system, as a result of which, we will face pain, burning, tingling sensation in the gums, lips and chin;
- Disturbance in the sinus structure, in such a way that the base protrudes from one of the sinus cavities as a result of the non-original implant in the upper jaw.

Problems and Disadvantages of Dental Implants

It is difficult to introduce a negative point or semi-darkness for the implant. Considering the benefits and results it brings, the implant is a very logical and path-breaking treatment.

However, these points can be mentioned as the biggest challenges for doing implants:

- The cost of the implant is actually the most important problem that we face in dental implants. Fixed and mobile prostheses or dental bridges cost less than implants. The cost for each implant in the summer of 1401 is at least six million tomans, which may increase with currency fluctuations.

- Despite mentioning the length of treatment time as an advantage, this issue may also be considered as a negative point. Due to the need to allocate time and opportunity to the body to adapt to the changes made, the implant may take up to 9 months.
- Implant is a surgical treatment in itself and has its own risks. For this reason, doing the necessary points before the implant should be taken very seriously.
- It is better to periodically examine the implant by a dentist [26].

TYPES OF DENTAL IMPLANTS AND IMPLANT PROCEDURES

If you are familiar with dental implants, you know that there are different prices for it in different clinics. The reason for this price difference is generally their quality, brand and country of manufacture. In addition, points such as guarantee, warranty, the amount of available bone, the hardness of the bone and other similar things have an effect on the final cost of the implant.

However, implants are divided into three main categories. These three categories include:

- Endo steal implants;
- Sub periosteal implants;
- Zygomatic implants.

Root Shaped Implant

The root-shaped implant is the most common type of implant used today. Almost everyone can use this type of dental implant. This type is also known as intra-osseous or intra-root. The reason for this name is the placement of the base of this implant inside the root of the tooth. The shape of the intraosseous implant is a spiral cone shape with a thick base. For successful placement, this type of implant requires the creation of a proper cavity and proper implantation. For this purpose, sufficient depth and width must be created inside the jawbone. These specifications are determined based on the clinical conditions of each dental implant candidate, such as the quality of the jaw bone, the type of coating and other similar points [27].

Ramos Framework Implant

The ramus frame implant can only be used if the mandibular bone is not suitable for implant treatment. It means that either the bone is very thin or we need to use a sub periosteal implant. The ramus frame implant is placed in the back corner of the jawbone, near the chin and the place where the wisdom teeth grow. With the placement of the frame and the improvement of the surrounding tissue, only a narrow metal line will be visible above the gum. This will prevent the pressure and possible fracture of the jaw bone and will be the basis of the next artificial tooth transplant.

One-Step Implant (Non-Submerged)

One of the complications that may arise after tooth extraction is insufficient overlap of the gums. In this case, the dentist has no choice but to use the non-submerged method. In this case,

the dental implant is placed in the jaw bone, the temporary part outside the jaw of the implant remains outside the gum. To cover it, it is necessary to cover the gum around this stitched part. Of course, in this case, we will not open the gum suture. After a period of at least two to three months, depending on the conditions, molding for the dental crown can be done. The advantage of this method is its generality [28].

Two-Stage Implant (Submerged)

This method is the same as the common method for dental implants. Doctors usually prefer this method due to the inaccessibility of the structure of this implant from the outside, and thus reducing the risk of exposure to environmental pollution. For this purpose, after placing the implant base inside the jawbone, it is covered with gum tissue and sutured until the abutment is placed. After a two-stage implant surgery, the fixture part is not visible from the outside. After the appropriate period of time, the sutures are opened and a screw part or the abutment is placed inside the fixture. After the recovery period of almost two weeks for gum repair, the molding work of the crown cover is done and it will be placed on the base. In some cases, the length of this period is exceeded, the movable prosthesis is placed on the base. However, it is preferable not to do such a thing and wait until the dental crown is ready [29].

Immediate Loading Implant

This method is the one-day implant method that we talked about earlier. In this method, at the same time as preparing the base, its crown will also be made and placed on it. This method is usually performed when something happened to one of the front teeth and the person wants to compensate for the lost tooth as soon as possible. Of course, the original tooth may be delivered to the patient in some cases, two to three months later. In the immediate implant, in the first session, the root of the tooth is removed, and a new temporary tooth is placed on it. Also, in some cases, jaw bone repair can be done in the same session.

Care after Dental Implant

A dental implant can be considered completely permanent if taken care of properly. Of course, this issue may be different depending on the situation in which it is located. As we mentioned earlier, dental implants may also be damaged in certain situations.

Therefore, be sure to take the following points seriously:

- After implant placement, it is better to rest at home due to local anesthesia performed on your teeth, as well as jaw surgery and gum suture. Your doctor may prescribe painkillers for you.
- In some more serious surgeries, general anesthesia may be performed on you. In this case, you must spend the next day completely resting, and have someone by your side during this time.
- Gingival infection and inflammation can damage the base and the implant itself. Even in the case of dental implants, you must take oral hygiene seriously. The use of dental

floss, interdental brushes, toothbrush, implant toothpaste and mouthwash should not be forgotten after the implant [30].

- In the first week after the implant, it is better to use only soft foods and chew on the opposite side of the base. Do not eat solid food until the anesthesia wears off.
- It is forbidden to brush your teeth in the first 24 hours after the implant. Also, it is not recommended to wash the mouth with water for 8 hours after the implant
- Drinking liquids with a straw can also lead to many problems.
- Avoid smoking, alcohol, tea and coffee for 72 hours after implant surgery.
- Avoid drinking liquids with a straw (at least two weeks).

What are the types of bone grafts in implants?

In general, three different methods are used for bone grafting regarding dental implants, and these methods can be considered as follows:

- Ramus bone graft or bone block graft;
- Sinus lift graft;
- Silent link.

Silent Link

In this method, after the desired tooth is extracted, it leaves a cavity that is surrounded by an alveolar bone shell, which is only responsible for protecting the tooth, and for this reason, when a tooth is extracted the body begins to absorb the desired bone. Unless the gap is filled by a silent link. When there is an infection in the extracted tooth or the size of the teeth are different, the silent bone grafting method is usually used. Because this method of bone grafting is designed to fill the gap created and this bone grafting method should be used for three to six months before implant implantation [31].

Sinus Lift Graft

When a tooth is missing it is possible that there is very little bone between the oral cavity and the space created. This problem makes the implant placement difficult, and for this reason, the sinus lift bone grafting method is used for this purpose in order to create a replacement for the upper molars.

What are the benefits of bone grafting?

In general, bone grafting has advantages that make the dentist and surgeon do this before the implant. Bone grafting increases the stability of the jaw and maintains the health of the bones, and by doing this, it is possible to greatly increase the resistance of the jaw and make it more resistant to dental implants and implants. In addition, bone grafting makes that the jawbone does not degenerate more than before and prevent diseases related to the gums. As a result, these advantages make bone grafting to be recommended by the doctor in some cases before dental implants.

What is ramus bone graft in implant?

As mentioned, bone will be obtained from many sources, especially the human ramus or chin. The need for two areas of the human body for surgery is one of the disadvantages of this type of bone graft pain. The bone removal site can be the human lower jaw. In this method, the removal is most likely done from the chin or ramus (rear part of the lower jaw) of the face. The pelvis or tibia is another important part of the patient, and if the ramus or chin bone is not suitable, they remove the bone from that part. Of course, you should not forget that the pelvis will be a better source than other parts. Because more bone area can be removed from this part. But to remove the bone from the pelvis, the patient needs to be admitted to the hospital. The chance of success in this method is higher than other methods and it reduces the possibility of disease transmission to zero [32].

The Rate of Sensory Problems after Bone Removal from the Ramus

Because the bone is removed from the patient's own body, its problems will be much lower than other methods, but on the other hand, the probability of nerve damage in this method is very low. Sensory problems after removing the hip bone will be more than other types of bone grafts such as ramus. If a high quality dental implant is used after the ramus bone transplant, the success rate of this method will be around 87%. Resorption of transplanted bone in the first years of transplantation is much reduced compared to the following years.

TYPES OF BONE GRAFT MATERIALS

Auto graft is the first recommended option of the implant specialist, which is removed from the ribs, hips, pelvis or wrist. In this type, there is no trace of disease transmission and it contains the patient's own cells. An allograft is another bone grafting option that is taken from a deceased person or a cleaned corpse. Of course, clinical tests will be performed on them before transplantation to prevent disease and ensure safety.

What are the ramus bone transplant complications?

Of course, when surgery is performed for ramus bone grafting, complications arise for a person, and these complications are caused by ramus bone grafting surgery, and if you encounter some of them, there is no reason to worry, but the occurrence of others is abnormal (Figure 4). And you should see a doctor if you encounter them:

The complications caused in this regard are:

- The possibility of bleeding gums;
- Possibility of blood clots;
- Possibility of nerve damage;
- Complications related to anesthesia;
- The possibility of infection at the bone harvesting site;
- The possibility of bone graft rejection [33].

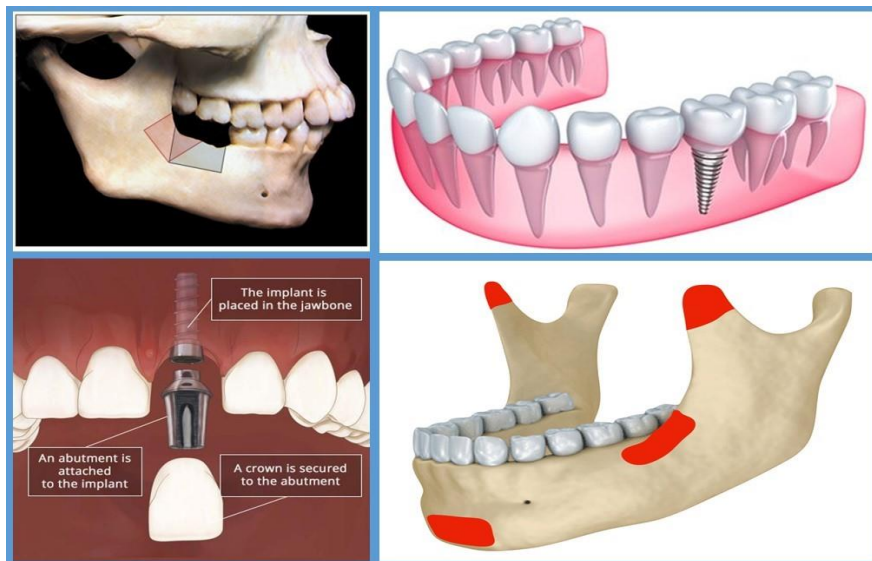


Figure 4: Mandibular Ramus Grafts

Care after Ramus Bone Transplantation

After ramus bone grafting, the patient is asked to avoid some hard foods. In order to heal and improve the wound, it is necessary for the patient to avoid putting pressure on that part as much as possible so as not to suffer from bone graft complications. Depending on the patient's physical condition and the materials used during ramus bone grafting, the time it takes for the patient's jaw to strengthen to receive the implant bases takes 4 to 9 months. This period is different depending on the condition of the patient and his body system. During this period, the patient needs to use proper care such as mouthwash, dental floss, and continuous brushing. If they use dentures for part of their teeth, it is better to leave the dentures for a month until the area is completely healed.

Dental Cavity Grafting or Alveolar Ridge Protection

When the tooth is extracted, the empty cavity of the tooth is surrounded by a layer of alveolar bone whose function is to support the tooth. The only function of this bone in the human body is to support the tooth and keep it. As a result, when a tooth is pulled or falls out, the body quickly begins to reabsorb the surrounding bone because it thinks there is no need to support the tooth anymore, unless you immediately fill the cavity with an implant or protective graft. Do it from bone marrow. Sometimes the conditions are such that an implant can be implanted immediately after tooth extraction, which is called immediate implant implantation. In these cases, the implant acts like a tooth and protects it by stimulating the growth of the surrounding bone and prevents its atrophy. Unfortunately, in most cases, it is not possible to immediately implant an implant after tooth extraction. Although there are various reasons for this, the most common reason is the presence of infection in the teeth or the uneven size of the missing tooth and the implant replacing it (Figure 5). In these cases, it is better to perform a jawbone protection graft. The graft is designed to fill the empty space left after tooth extraction and to

maintain the volume of this space in such a way that it is possible to fill the empty space with natural and living bone of quality provided above. Depending on the size of the tooth that has been extracted, the grafting should be done between three and six months before implant placement [4].

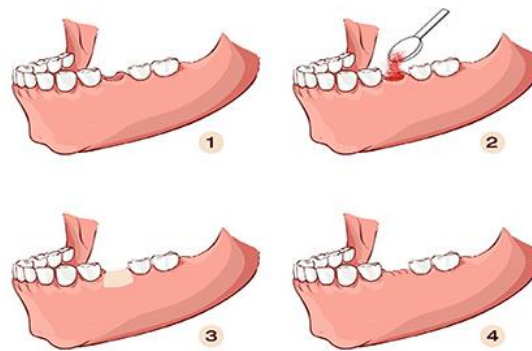


Figure 5: Dental cavity grafting or alveolar ridge protection

The material used for jaw bone grafting is often xenograft and is obtained from cow bone. This bone is removed from a healthy cow and processed and sterilized and prepared as a final product. Immediately after tooth extraction, grafting material is placed in the empty cavity and fixed in place using collagen ointment and one or two absorbable stitches. While grafting materials are prepared in granular form, when they are used for jaw bonding, they stay in the tooth cavity and integrate with the bone due to collagen and suture.

Chin/Ramus Transplant (Mandibular Horn) or Bone Fragment Transplant from the Patient

Sometimes it may not be possible to use processed grafting materials such as bovine bone because a large volume of bone is required and these materials cannot be used in high volume or it may be suitable to replace the amount of bone lost after tooth extraction. In these cases, sometimes the natural bone of the patient's own body must be used to use living bone in the bone-deficient area. There are several possible reasons for needing this procedure to compensate for bone loss, the most common of which are as follows:

- At the site of the extracted tooth, the tooth cavity was not grafted and the implant was not planted [5].
- The area where the tooth is lost, the nature of the disease related to the loss of the tooth (such as infection, cyst and tumor) has caused extensive bone destruction.
- The area of the jaw where the permanent teeth are located was congenitally deficient in bone and as a result the bone was not able to support the teeth sufficiently.

Bone Loss Due To Injuries

In such cases, the most common method of bone transplantation is transplantation from the patient's own body. Bone is used as a piece or block (Figure 6). Therefore, it is called a bone

graft. Sometimes the bone is removed from the part of the lower jaw where the wisdom teeth are located. This area is called the ramus or horn of the mandible. Another area of harvest is the chin bone.

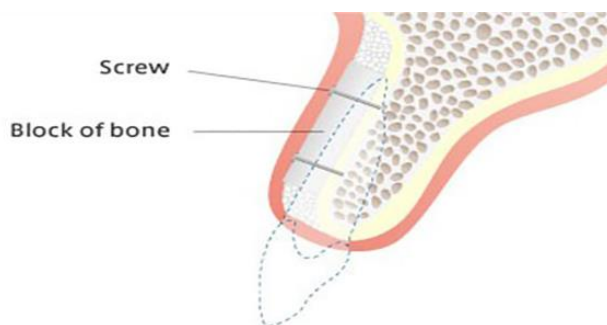


Figure 6: Bone Loss Due To Injuries

In this surgery, a piece of bone measuring about one square centimeter is removed from one of the two mentioned places and transplanted to the area of bone deficiency. The bone graft is fixed in place with the help of one or two small screws and covered with prepared bovine bone and collagen membrane. Then the surgical site is closed and it is given four months for the graft to fuse to the jaw bone. After that, the implant can be planted in this place. In addition to the fact that this bone is alive and supports the implant well, it also supports soft tissues. Therefore, in terms of beauty and health, good results will follow [16].

Sinus Lift

The upper jaw, which is called maxillary, has several characteristics that make it different for transplantation and implant placement. The most important difference between the upper jaw and the lower jaw is the presence of the maxillary sinus in the upper jaw. The maxillary sinus is one of several natural empty cavities that exist in the skull structure of all humans. The biological purpose of sinus cavities is to warm, moist and filter the air we breathe. Although you only notice the maxillary sinus when you have a cold or a nasal infection, the roots of the upper jaw teeth are actually located in it. As a result, when you lose a tooth, there is very little bone left between the tooth cavity and the sinus cavity [17]. This situation creates more problems in implant placement in the back of the jaw compared to other areas of the jaw. Fortunately, there is a relatively simple solution to solve this problem and implant a stable implant. The sinus lift operation is performed to make it possible to implant an implant in the back area of the upper jaw. This work is created by creating small windows in the sinus above the roots of the upper jaw teeth. The integrity of the lining of the sinus should not be disturbed, but the membrane should only be stretched higher to form a small cavity under it. This place is filled with cow bones. A period of six to nine months is required for this bone to be integrated and normal bone can be used in it. Since this surgery is performed for implant implantation, there are two methods:

Implant Placement Immediately After Sinus Lift Transplant

The ability to implant an implant at the same time as a sinus lift is determined by the amount of bone between the sinus and the tooth cavity. If the amount of bone is less than five millimeters and the bone in this area is soft, it is difficult to provide the initial stability of the implant, and its stability will be uncertain during the time we wait for the integration of the bone graft. This can lead to implant failure or adverse outcomes. However, if the bone is more than five millimeters, it is often possible to perform an implant at the same time as a sinus graft. Obviously, the advantage of this method is not needing another surgery for implant placement and shortening the treatment period. Therefore, the patient will have teeth sooner. If the implant is implanted at the same time as the sinus lift, after the period of bone integration (the fusion of the implant to the bone), which is usually four to six months, the dentist can install the restoration on the implant [18].

Implant Placement at a Distance from the Sinus Lift Transplant

If the existing bone between the oral cavity and the sinus cavity is not enough, the implantation of the implant is postponed to a time after the integration of the transplanted bone. After a few months, you will return to the surgeon for the second stage. At this stage, when the sinus graft is combined, the implant is implanted. After that, you have to wait a few months for the implant to fuse to the bone. After this period, the dentist places the final restoration on the implant.

Use of Laser in Bone Grafting

At first, the injection site of the anesthetic ampoule and its surroundings are anesthetized by low power laser rays, without any pain or side effects. And the person does not feel pain when injecting the anesthesia ampoule. In addition, by using the laser, the pain after the surgery can be reduced and the cells that cause the wound to heal faster can be activated [29].

Preparation before Bone Graft Surgery

No special preparation is required for bone graft surgery, but be sure to ask your specialist about pre-surgery care tips. But avoid eating or drinking anything from 8 to 12 hours before the procedure. (Depending on what kind of anesthesia you are under) If you have a special disease or take a special medicine, discuss it with the doctor, especially blood thinners that increase the complication of bleeding in surgery.

DISCUSS

Mandibular or ramus bone grafting is performed under local anesthesia and with surgery, and in order to be able to perform surgery in this field, one must go through the following steps: First, a local anesthetic should be used so that the patient feels less pain during the surgery, and then the mouth should be completely cleaned and disinfected to prepare the surgical area [30].

Ramus bone grafting is not needed for all people and only some patients find the need for this method according to their conditions, and these people have the following characteristics: Those who have lost their tooth and this tooth has a deep root in the jaw, bone grafting is usually needed to restore the empty space created in the jaw.

When molar teeth or wisdom teeth come out of the mouth, they need bone grafting more than other types of teeth because they have deeper roots and when they come out of the jaw, a bigger hole is created in the jaw. In addition, people who have lost the bone mass of their jaw due to various reasons such as: old age, osteoporosis, or accident also usually need this method (Figure 7 & 8). Another important candidate for mandibular bone grafting is those who intend to use implants for tooth restoration.

The implant needs to have healthy gums and a jaw with sufficient bone density, and if these conditions do not exist, the necessary conditions must be provided through bone grafting and other methods. The main goals of bone grafting are to increase the health of teeth and gums, after which restoration of lost teeth by implant method or increasing the beauty of teeth can also be considered in the group of goals of ramus bone grafting.

Because if the bone density of the jaw is not enough, many problems and complications will arise for people and the lifespan of their teeth will decrease, which bone grafting solves this problem to a large extent.



Figure 7: Forest plot showed Systematic Examination of Implant in Adults with Radiological Points

Raw	Study	Year	Severe COVID-19		non-Severe COVID-19		Severe COVID-19	non-Severe COVID-19		Weight %
			Yes	No	Yes	No				
1	Hastings et al.	1995	Yes	No	Yes	No		0.64	[0.11 – 1.72]	3.02
2	Watts et al.	1997						0.52	[0.42 – 2.11]	4.00
3	LeGrand et al.	2007						0.96	[0.44 – 1.02]	6.32
4	Hung et al.	1995						0.65	[0.25 – 0.98]	5.12
Heterogeneity $t^2=0.00$, $I^2=0.00$, $H^2=0.9$								0.55	[0.34 – 0.58]	1.23
Test of $\Theta = \Theta$, $Q(4) = 3.45$, $P = 0.77$										
1	Hosseini et al.	2008						0.56	[0.11 – 0.66]	1.55
2	Ibrahim et al.	2020						0.26	[0.15 – 0.48]	4.33
3	Kalantari et al.	2020						0.48	[0.19 – 0.55]	6.77
4	Rothan et al.	2020						0.24	[0.17 – 0.29]	3.03
Heterogeneity $t^2=0.05$, $I^2=0.07$, $H^2=0.78$								0.22	[0.03 – 0.32]	
Test of $\Theta = \Theta$, $Q(4) = 3.01$, $P = 0.11$										

Figure 8: Forest plot showed Systematic Examination Mandibular Ramus Grafts in Adults with Radiological Points

Dr. Lee H. Silverstein: Bone grafting or bone augmentation is a surgical procedure in which an attempt is made to replace or reconstruct the alveolar bone that has been depleted or destroyed in the patient. In this method, materials from the patient's own body or artificial substitute materials or natural bone materials are used. Given that there is enough space for bone growth, the body's bone tissue has the ability to regenerate lost alveolar bone. In this process, the new bone produced usually replaces the grafted material and therefore the overall result is a new area of the patient's own bone. The doctor's attempt to reconstruct the alveolar bone lost due to odontogenic infections or trauma or the attempt to correct the existing bone deficiency as a result of tooth loss in the posterior region of the maxilla, can lead to sinus pneumatization. In the previous scenario, when a tooth was lost, the main goal for bone replacement was to improve the topographic appearance of the soft tissue. I remember that one of my mentors in implantology, Dr. Carl Misch, told me that in almost 100% of cases, bone grafting is required because the bone rapidly degrades after tooth extraction, and the reconstruction of bone defects to maintain Ideal aesthetics or placement of a functional implant is essential [32-41].

For sinus grafts, specifically for lateral window grafts, I use a combination of allograft materials. Early on, an alloplast demineralized bone matrix (DBM) material of the putative type was used; Then tricalcium phosphate; and then a combination of mineralized cortical bone and larger particles mixed with corticocancellous bone was used. Since some bones are denser, they need a longer time to regenerate, and some bones, which are spongy and have less density, are repaired faster. Finally, most of the DBM putty alloplast material is placed in the lateral part of the graft so that it is this material that is attached to the bony walls of the osteotomy which is the lateral window. It is easier to use DBM putty than granular materials at the junction of the barrier and the sinus membrane and the external side window and the covering barrier. I have used these ingredients for thousands of people without side effects. I often use resorbable

cross-linked bovine collagen membranes that remain on the lateral access wall for at least a few weeks. For a sinus bump/implosion, I prefer to use a combination of ingredients. First, I use alloplast demineralized bone matrix putty; Then tricalcium phosphate; then a combination of large and small corticocancellous allograft bone particles; And finally, I use more DBM Alloplast putty, so that no granular, sharp or rough substance is placed on the sinus cavity and between the dental implant and the osteotomy wall, which causes macrophages to respond to foreign substances. It is easier to use putty graft than granular graft at the junction of the barrier and the sinus membrane and the external side window and the covering barrier. Again, I have performed thousands of sinus implosions without complications.

CONCLUSION

The ramus bone is actually a part of the jaw bone that is placed in the lower jaw and is often used for bone grafting. The ramus bone is also known by many other names and it is also known as the horn of the lower jaw or mandible. This bone has a rectangular and upward appearance that is stretched backwards. When the ramus bone is used for jaw bone grafting, it is also known as mandibular bone grafting. Mandibular or ramus bone grafting is performed under local anesthesia and with surgery, and in order to perform surgery in this field, one must go through the following steps: First, a local anesthetic should be used so that the patient feels less pain during the surgery, and then the mouth should be completely cleaned and disinfected to prepare the surgical area. Jaw bone grafting is an operation that has been analyzed to reconstruct the bone at the same time as the implant when the teeth have been lost due to various reasons such as gum disease or from the genetics of the patient's tooth bone, and we do not have enough bone to place the dental implant is being used. To replace missing teeth, implants or dental restorations, it is necessary to do bone grafting in people whose jawbone has been eroded. In this method, bone defects are filled. Also, the height and width of the bone increases. In this surgery, bone or bone-like materials are used to reconstruct and replace a part of the bone that has been depleted. People who have lost their teeth and are planning to get an implant because they have been toothless for a while may have weakened jawbone, in which case the weakened bone will not be able to support the implant. For implant implantation, a certain amount of bone tissue is necessary to hold the implant, because these tissues around the implant become one fabric with it after some time. This fusion with bone tissues is one of the most important stages of dental implant implantation, and the implant can withstand the pressure and force of the tooth when it is well welded and fixed with the jaw bone. In fact, after implantation, the implant also supports and regenerates the bone tissues because after the implant is welded to the bone, the force applied by the tooth to the implant stimulates the bone tissues and their regeneration and prevents bone loss. In order to prevent graft bone contamination, soft tissue grafting is usually used because soft tissue prevents graft bone contamination and covers the surface of the graft bone.

In bone grafting, the transplanted bone must remain stable and not move because it takes time to connect with the mother's bone. To solve this problem, membrane is used in bone graft. The repaired position with bone grafting must be supplied with blood, because blood supply to the position is very important for repair and grafting with the mother bone. For this, by piercing

the site and placing a burr, it provides the possibility of blood supply to the site. One of the things that lead to the failure of transplant treatment is the presence of infection in the repaired position, which should reduce the possibility of infection in the desired position. One of the ways to reduce the possibility of infection is to use mouthwash. The repaired site should not be contaminated. One of the sources of contamination is the contact of saliva with the site, and to prevent this contact, a complete and correct suture of the repair site must be performed. Antibiotics should also be used to prevent contamination. The main factor in bone grafting is the bone scaffold that exists in the grafted bone, which grows by absorbing the bone cells of this scaffold and over time, the grafting takes place. Bone graft substitutes, which are synthetic materials, are also used for grafting. A special type of grafting is vascular grafting, which is placed in the graft site along with the bone, artery, and vein.

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