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Sinus Lifting in Dentistry and its Importance in Dental Implantation

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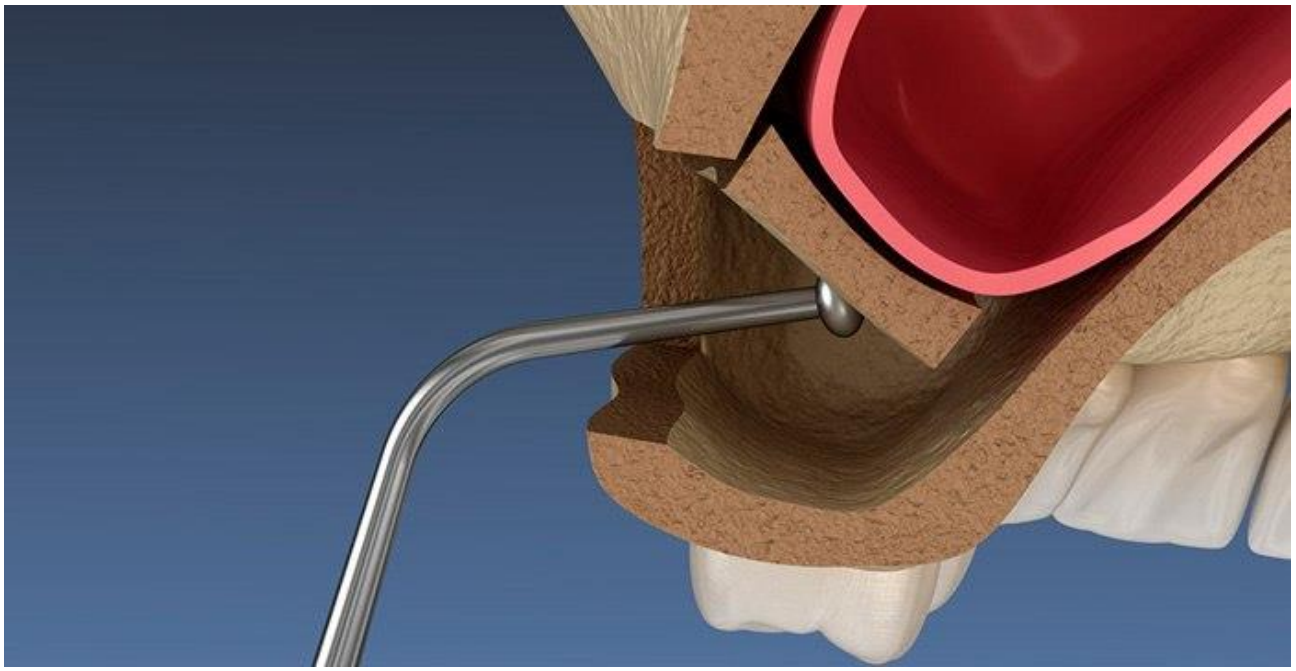
Abstract

Incompleteness of the dentition is not only an aesthetic problem, but also quite a medical one, entailing a fairly large number of consequences. To make up for the losses, modern dentistry has a huge arsenal of a wide variety of tools. However, the same dental implants must be installed on a properly prepared jaw, but here there are a number of nuances.

Keywords:

Introduction



What is sinus lifting during dental implantation?

Sinus lifting surgery is an approach in dental orthodontic treatment when it is necessary to install dental implants, but the patient does not have enough jaw bone for its reliable fixation. Synonyms are sinus augmentation, sinus transplantation. A similar procedure is performed by orthodontists or maxillofacial surgeons.

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Sinus lifting refers to an increase in the thickness of the maxillary (maxillary) sinus or its lifting in order to make room for a new bone.

Why do I need a sinus lift?

A natural tooth consists of two separate parts: the crown, which is a visible tooth that protrudes above the gum, and the root, which is hidden under the gum and inside the jaw bone. The root is responsible for holding the natural tooth in place.

When a person is missing a tooth, the dentist must decide how to recreate the crown part and choose the best method of holding it in place. Dental implants were created for this purpose.

Dental implants are metal (most often titanium) screw structures that are securely inserted into the jaw bone to replace the root and secure a new tooth.

But because the implants are inserted directly into the jaw bone, they mimic the stimulation that the root of a natural tooth exerts on the bone, and keep the bone strong and healthy like a real tooth, and prevent bone loss, which inevitably occurs after tooth loss and a decrease in chewing load on the jaw.

Important! Neither dentures nor bridges with support for teeth replace the root structure of missing teeth. This means that when a person with dental defects chews, his bone does not experience the load necessary to support the tooth. Over time, the bone may begin to lose its strength and bone density. This can lead to loosening of the surrounding teeth and even to a change in the shape of the face.

The process is called bone resorption, a "use it or lose it" rule. As the jaw bone loses density, its shape actually changes — and as a result, the shape may even change, leading to incorrect fitting of dentures.

And as soon as the bone begins to change shape, it usually continues to do so, requiring constant adjustment of the installed prostheses. Sinus lifting and implants allow you to solve the problem once and for all.

Contraindications for sinus lifting

Contraindications to maxillary sinus enlargement can be divided into general contraindications with the use of implants, absolute contraindications and relative contraindications.

Needless to say, maxillary sinus graft is not an appropriate treatment option for patients with general contraindications to implantation.

Absolute contraindications include:

severe or uncontrolled general illness,
high-dose radiation therapy of the upper jaw,
mental disorders,
sepsis,
excessive smoking,
severe alcoholism or drug addiction.

On the other hand, the factors constituting relative contraindications are:
local lesions of hard or soft tissues, such as sinus infection,
acute infection (of dental origin),
pathological condition of the sinus (polyp, cyst, tumor),
sinusitis, including allergic rhinitis,
surgical intervention in the sinuses in the anamnesis,
low-dose radiation therapy on the upper jaw,
habitual use of drugs, alcohol and tobacco,
restriction of mouth opening,
malocclusion,
pronounced bruxism.

In all dental procedures, including implant placement, careful case selection can lead to a successful outcome. For example, if sinusitis, maxillary cyst, maxillary tumor, or root resting in the sinus are found in the maxillary sinus, it is necessary to postpone all surgical procedures and first treat lesions or infections that may affect the results of surgery.

A mucous retention cyst, which is a pseudocyst without an epithelial cell lining that accumulates fluid under the sinus, usually has a domed or spherical shape. If it is detected, simultaneous or delayed installation of an maxillary sinus graft and implantation under local anesthesia may be the first treatment option in a dental clinic. When a cyst is detected in panoramic X-ray or cone-beam computed tomography images, it is necessary to first lift the flap and form a bone window in a preferred location according to the general principle. A 10 ml syringe and a 21-gauge needle are used to aspirate fluid from inside the cyst and, if necessary, the inner cavity should be rinsed with a saline solution including antibiotics. Then, according to the generally accepted technique, the cyst membrane is pushed up, so that the membrane of the maxillary sinus is lifted, and bone grafting is performed, followed by the installation of an implant. If the cyst size is less than 10 mm, it is difficult to consider it a contraindication, since it can be treated by suction during surgery. However, if the cyst is larger than 10 mm, a step-by-step approach should be considered to wait for aspiration and perform maxillary sinus transplantation, postponing it for some time after aspiration. The mouth or osteomaltal complex may be blocked if aspiration is performed incorrectly.

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How is sinus lifting performed?

The maxillary (maxillary) sinuses are the largest of all the paranasal sinuses, located just above the back of the upper jaw or upper jaw, lined with thin mucosa, filled with air. By lifting the sinus and transplanting the bone, the dentist gets more room for maneuver – bone augmentation and reliable implant placement. Otherwise, an installed replacement for a real tooth will not be able to perform such complex functions as chewing.

Bone loss – in addition to tooth extraction – can also lead to:

birth defects

osteoporosis

is a natural option when the sinuses are very large or the jaw bone is very thin

paradontosis

According to modern recommendations, sinus lifting surgery is necessary if the height of the bone in the back of the jaw is less than 4-6 millimeters.

Sinus lifting procedure

The installation of a dental implant or implants can be a multi-step process, with sinus lifting and bone grafting being earlier stages of the process before the installation of a dental implant.

There are several different approaches to sinus lifting surgery.

The ideal approach for you may depend on how much bone is currently in the patient's jaw, what type of bone graft the doctor uses, as well as a potential approach to installing dental implants at a later time.

Some of the main steps include the following:

The patient may be given oral or intravenous sedatives, and the option of local anesthesia in the area of surgery is also possible

A dental surgeon will make incisions in the back of the gum tissue and expose the bone.

He will cut out a small area of bone, trying not to touch the sinus membranes.

Next, the specialist will lift the severed part of the bone into the sinus cavity, lifting the Schneider membrane.

Then he will apply the bone graft materials to the newly raised area. It can be a bone taken from another part of the body, or synthetic bone material. Before the procedure, the doctor and the patient usually discuss the best option.

Stitches will be applied to the incisions in the gums.

There are different techniques for performing this procedure, such as the side window technique. With this more invasive approach, all the procedures described above are carried out. The healing is long, 4-12 months, but the long–term prognosis of success is about 94%, so it is still actively used.

Since 1980, the osteotomy technique has been used, a less invasive intervention option, and it is most often used with a thin sinus bottom, less than 4 mm. The gum tissues peel back, creating a hole in the bone at a distance of 1-2 mm from the Schneider membrane. Then the bottom of the sinus is lifted by tapping on it with osteotomes. However, the result is usually more modest here than when using the side window technique. One of the advantages is faster healing, 1.5–3 months.

Rehabilitation after sinus lifting

Some of the most common side effects after sinus lifting are swelling and bleeding. This discomfort usually does not last more than a few days, after which the patient can return to normal.

The most common complication of sinus lifting is perforation of the Schneider membrane. It lines the maxillary sinus cavity, and its perforation increases the risk of chronic sinusitis and sinus infection.

If this happens during surgery, the doctor will try to repair the membrane or stop the operation altogether.

After a simple sinus lifting operation, the doctor will most likely give the following instructions for recovery:

Taking antibiotics to avoid bacterial infection in the area of intervention

Avoiding vigorous blowing of the nose and sneezing, which may affect the placement of bone graft material.

Avoiding brushing your teeth for a certain period of time to avoid dislocation of clots or bleeding.

Taking painkillers (NSAIDs and paracetamol) to reduce discomfort.

Abstaining from drinking through a straw, which can displace blood clots that prevent bleeding.

Abstinence from smoking, which can worsen the healing time.

The result of sinus lifting.

Sinus lift surgery can pave the way for dental implants. The outpatient procedure helps to create a stronger bone support for the dental implant, increasing the likelihood that the implant or implants will take root.

The doctor should carefully assess the condition of the jaw bone before the implantation procedure and explain his recommendations for sinus lifting, approaches and potential materials for bone grafting.

Important! The final assessment of sinus lifting is done by a dentist. The result is expressed not in millimeters of enlarged bone (in some sources you can find the figure 8 mm), but in the functional suitability of the entire jaw for the installation of an implant or implants.

Alternatives to sinus lifting

One of the most common options is "All On 4", it is suitable for patients who need to replace at least half of a set of teeth. Since the entire set of adult teeth, in fact, can be supported by only 4 implants, this is an excellent option for patients with periodontal or bone problems.

In the case of a single tooth, a crown will be attached to the implant to create the most realistic and functional denture. In the case of a complete oral implantation, the entire set of upper or lower teeth is replaced, but instead of installing an implant for each of them, they are supported by only four basic dental implants.

In a typical dental implantation procedure, eight or more implants are required to replace the full arch. This method has limitations, as it requires the insertion of implants in the area of reduced bone density in the back of the mouth. This may require bone grafting and sinus augmentation to strengthen the jaw bone, which is a significantly more invasive procedure. Conversely, using "All on 4" requires only two implants in the back of the mouth, reasonably positioned at an angle of 45 degrees to avoid bone defects while maintaining strength.

"All on 4" offers several clear advantages over conventional implants:

Only four implants are required to support a complete dentition

Eliminates the need for bone grafting

A less invasive procedure shortens the healing and rehabilitation process

This is a much faster procedure.

More flexibility in the design and selection of optimal replacement teeth

The same bone density is not required to fix the implant

The patient receives new non-removable teeth within 24 hours after surgery.

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