

Implantation and Restoration of Teeth: Errors and Complications After Implantation

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DOI : <https://doi.org/10.61796/jmgcb.v2i3.1191>



Sections Info

Article history:

Submitted: January 14, 2025

Final Revised: January 14, 2025

Accepted: January 15, 2025

Published: January 15, 2025

Keywords:

Pain

Gums

Cheek swelling

Trigeminal nerve injury

Maxillary sinus perforation

ABSTRACT

Objective: This study is to evaluate the body's response to temperature changes following dental implant surgery, specifically focusing on the natural increase in temperature post-surgery. **Methods:** Used involve observing patients after implant insertion, where a small incision is made in the gum to access the bone, and the implant is screwed into the jaw. This process disrupts bone tissue integrity, leading to a temporary rise in body temperature. **Results:** The results indicate that a temperature increase up to 38 degrees Celsius is normal within the first 2-3 days after surgery due to the body's natural response to microsurgical interventions in the oral cavity. Notably, implants are made from hypoallergenic materials, thus preventing allergic reactions. **Novelty:** Its exploration of the diverse patient responses to temperature changes, emphasizing that individual tolerance varies, with some patients feeling unwell even at 37 degrees Celsius. For managing elevated temperatures, the use of antipyretic drugs like Paracetamol or Ibuprofen is recommended. This research contributes to understanding postoperative reactions and patient care in dental implant procedures.

INTRODUCTION

During implantation, the surgeon damages the soft tissues with nerve endings. Therefore, after the anesthesia wears off, the patient feels moderate pain. It can spread not only to the implantation site, but also to the jaw and throat. The pain depends on the number of implants inserted (the more, the more severe the pain), as well as on the individual pain threshold [1], [2].

A. Pain after implant placement is possible in the first few days after surgery

The pain is dull and aching and will subside over time. It usually disappears completely within 5-7 days after surgery. The doctor will prescribe analgesics to relieve the pain [3].

B. Gums, swelling of the cheeks

Due to damage to blood vessels, fluid accumulates at the surgical site. It has two functions: it accelerates regeneration and compresses nearby vessels to protect the blood from infection. Swelling occurs within 1-2 hours after implantation and lasts for 3-5 days. To reduce it, use a cold compress (wrap ice in a towel and apply it to your face for 10 minutes several times a day) [4], [5].

C. Usually, these symptoms gradually subside and then disappear completely

1. Temperature - after 2-3 days [6];
2. Swelling - after 3-5 days [7];

3. Pain - after 5-7 days [8];
4. Gum discoloration - after 5-7 days [9];
5. Discharge from the surgical site - after 2-3 days [10].

If they last longer than usual and increase over time, you should immediately consult a dentist. He will diagnose, determine the cause and prescribe treatment.

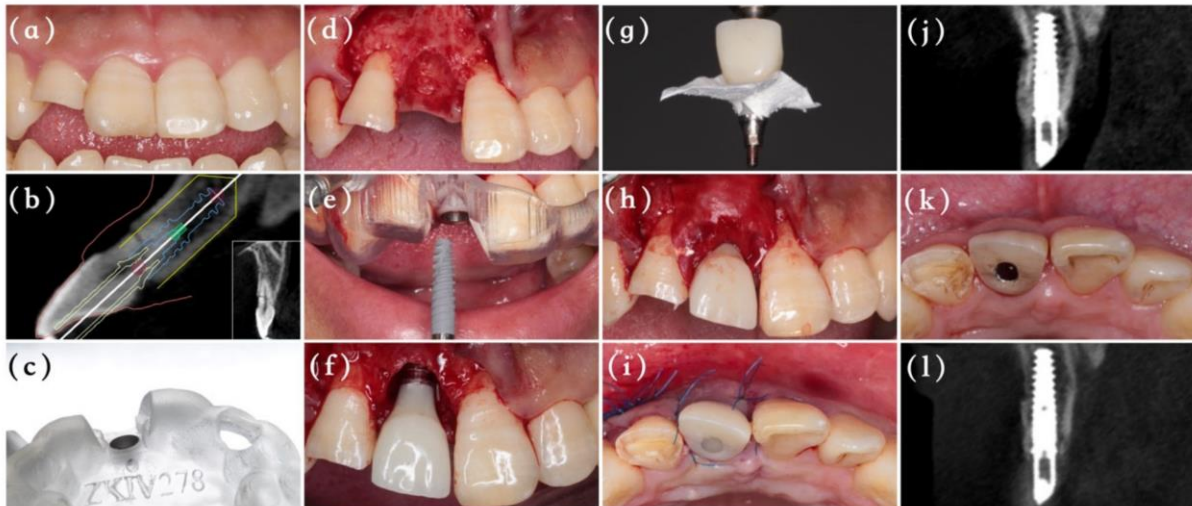


Figure 1. Consult a dentist if symptoms persist and worsen over time for proper diagnosis and treatment.

D. Maxillary sinus perforation

At the top of the upper jaw, in the area of the molars and premolars, are the maxillary sinuses - cavities associated with the nose. Inside, they are lined with a thin mucous membrane. The bone septum separating them from the teeth can be only 1-2 mm. Sometimes the roots of the teeth can extend into the sinus [11], [12].

E. The cause of maxillary sinus perforation may be

Long implant length. If it is longer than the height of the bone septum.

Excessive force during insertion. If the doctor applies too much pressure to the artificial root, it will damage the sinus.

Maxillary sinus perforation is a complication that occurs due to an error by a dentist-implantologist. If you ignore this complication, you will experience severe pain, swelling, runny nose, watery discharge from the surgical site, and implant mobility. This can lead to the development of sinusitis, as well as implant failure [13], [14].

F. Trigeminal nerve injury

One of the branches of this nerve, the mandibular, passes near the roots of the lower teeth. It provides sensitivity to the teeth, gums, tongue, and ear. It also innervates chewing and some facial muscles. During implantation, an inexperienced doctor can injure the nerve with a needle during anesthesia, a device for forming a bed, or the implant itself [15].



Figure 2. Numbness, pain, difficulty chewing, and impaired expressions may occur, with neuropraxia resolving in 1-2 months.

As a result of such damage, numbness in the lower third of the face, pain around the implant, difficulty chewing, and impaired facial expressions are observed. The consequences depend on the degree of damage:

1. Neuropraxia: Minor injury, nerve intact. Insomnia and other symptoms resolve spontaneously within 1-2 months [16].
2. Axonotmesis: During the injury, the nerve sheath is damaged. After 1.5 months, numbness and pain may decrease. However, without medical help and intensive therapy (within 2-6 months), the nerve cannot be fully restored [17].
3. Neurotmesis: Severe damage to all nerve structures. The damage is irreversible because scar tissue forms and prevents recovery. Treatment can only be done surgically.

G. Alveolar process injury

The alveolar process is the part of the bone where the roots of the teeth are located. Damage can occur for two reasons:

1. Implant size mismatch: If the artificial root is larger than the width or length of the alveolar ridge, a crack will appear on its outer or inner wall.
2. Incorrect implant placement: If the doctor does not use a surgical template, he may make a mistake in the location of the artificial root or change its angle of inclination. As a result, the implant will damage the wall of the alveolar process.

If you ignore this complication, the crack will grow and a fracture of the alveolar process will occur. The position of the adjacent teeth will change and the implant will begin to vibrate.

RESEARCH METHOD

Important, to prevent these complications, at the Akademstom clinic we carry out thorough preparation - we accurately calculate the length of the implant and the angle of screwing. If, according to the diagnostic results, the doctor determines a lack of bone tissue volume, he prescribes osteoplasty (increasing its length or width).

RESULTS AND DISCUSSION

Short-term complications after implantation, complications that may occur within the first six months after surgery.

A. Separation of sutures

If the implantologist has placed the implants using the patchwork method, he will then apply the stitches. They may differ for several reasons:

- a. Poor oral hygiene;
- b. The appearance of infection, severe swelling;
- c. Chewing hard foods;
- d. Mechanical damage.
- e. Suture breakage can cause the implant to loosen and fail to heal.
- f. After implant placement, there is a risk of sutures coming loose.
- g. Insomnia

A little numbness is normal after dental implants. It often goes away after the swelling subsides. However, if the loss of sensation affects a large area of the face, does not go away after a week, or recurs, it may be a sign of trigeminal nerve damage.

B. Mucositis

This is an inflammation of the mucous membrane around the implant that does not affect the bone. The risk of developing it is highest in the first 3-4 months after the procedure. Symptoms of the mucous membrane are pain, bleeding of the mucous membrane on probing, and the formation of pus under the gums.

Inflammation can occur due to poor oral hygiene. After the implants are placed, a film of streptococci and actinomycetes forms on them. If it is not washed off, it prevents the gum from firmly attaching itself around the structure. This leads to the formation of a gum pocket, where bacteria or food particles can remain.

C. Sinusitis

Immediately after implantation, a runny nose and difficulty breathing may occur. Usually, these symptoms disappear within a week after the swelling subsides. If after 7 days the runny nose worsens, pain remains near the wings of the nose - these are signs of sinusitis. Sinusitis is sinusitis (inflammation) of the maxillary sinuses.

It occurs due to a violation of the integrity of the maxillary sinus and the development of infection in it. The injury can occur during sinus lift (bone grafting of the upper jaw), as well as during implantation (during sinus perforation).

D. Implant failure

Within six months after the implant is placed, secondary bone tissue (lamellae) forms around it. It firmly attaches to the titanium rod and stabilizes it. However, for some reasons, bone growth can be disrupted.

1. Injury: Mechanical injury can cause implant movement and loss of primary stability.
2. Weakened immune system: When the body lacks resources, bone and gum healing slows down.

3. Inflammation of the mucous membrane: When infection enters the surgical site, the gum does not adhere tightly to the implant and its fixation is disrupted.
4. Special bone structure: If the bone tissue is porous, it will form more slowly and will not adhere tightly to the titanium rod.
5. Strong pressure: If the patient does not follow the doctor's recommendations and chews hard foods on the implant side, it may move and become loose.

Important!

If you experience any short-term or long-term complications, you should contact your implantologist immediately. He or she will be able to determine the cause of the problem and then provide quality treatment.

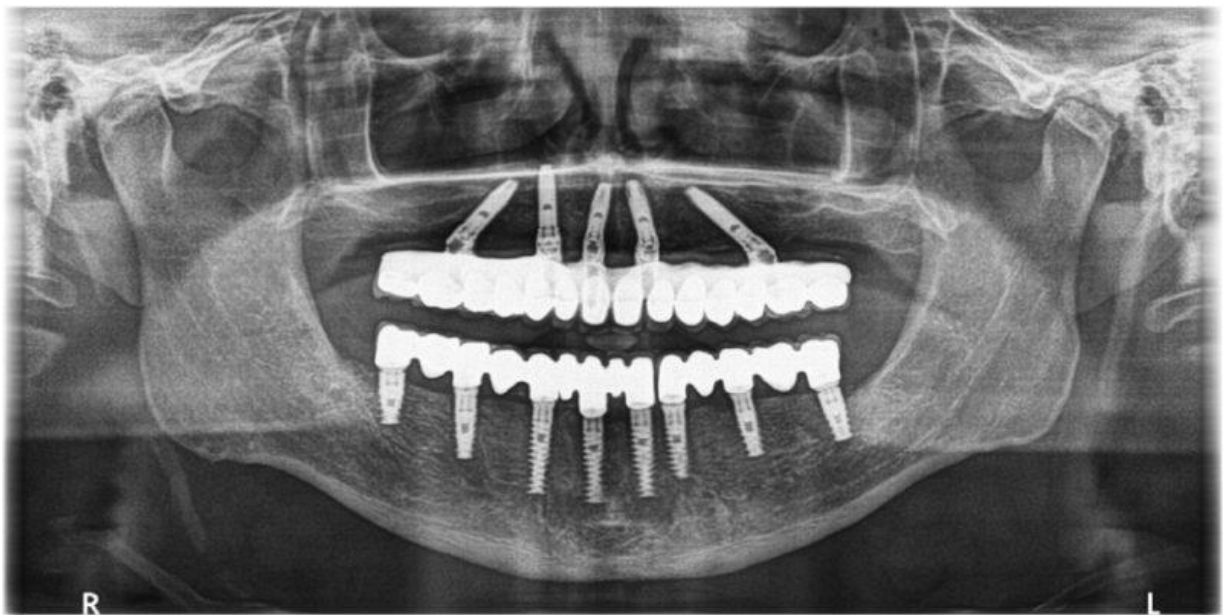


Figure 3. Bone tissue forms and stabilizes the implant.

E. Long-term complications

These are problems that occur a year or more after the implants are placed. Peri-implantitis, this is an inflammation of the bone, as well as the lining around the implant. Pain, swelling, pus accumulation, fever occur, and the implant begins to ossify.

F. There can be two causes of peri-implantitis

1. Development of mucositis. If gum inflammation is left untreated, the infection can spread to the bone tissue.
2. Poor oral hygiene. Due to the accumulation of harmful bacteria, inflammation can begin, which quickly spreads to the bone.
3. Implant rejection
4. Six months after implantation, osseointegration is complete and secondary bone is fully formed around the artificial root. However, the implant may loosen again and fall out after a year or more.

G. Most often this happens for the following reasons

Progression of inflammation. If periodontitis, mucositis, or peri-implantitis is left untreated, the infection will eventually destroy the bone around the artificial root. The lack of strong fixation will lead to collapse of the structure.

Increased load on the implant. If the patient does not follow the doctor's recommendations and chews hard foods on the implant side, it will gradually loosen. Microcracks will appear in the secondary bone, which will destroy it over time.

Improper implant placement. If the doctor fixes the structure at the wrong angle, the chewing load after prosthetics will be unevenly distributed. This leads to the gradual destruction of the secondary bone, dislocation and loss of the implant.

Patient diseases. Bruxism (teeth grinding) causes constant pressure on the implants. Also, osteoporosis, diabetes mellitus, autoimmune diseases and oncology increase the risk of rejection of the structure.

CONCLUSION

Fundamental Finding : The study highlights that short-term complications following dental implant surgeries are common, including pain, swelling, and bruising, with symptoms subsiding within 5-7 days. However, long-term complications, such as peri-implantitis and implant failure, can occur due to factors like poor oral hygiene, mechanical injuries, and weakened immune systems. Proper surgical techniques and post-operative care are essential to minimize complications. **Implication :** The findings underscore the importance of precise implant placement, adequate bone volume, and regular follow-ups to prevent complications. Surgeons should focus on patient education regarding oral hygiene and post-operative care to ensure the success of the implant. Early detection and treatment of complications like sinusitis or nerve injuries are critical for preventing long-term issues. **Limitation :** This study is based on the analysis of typical complications observed post-implant surgery, but it does not account for every individual variation in response to implantation. The findings may not fully represent cases with rare or severe complications that require more complex interventions. **Future Research :** Future studies should focus on the development of new techniques and materials to prevent complications like peri-implantitis and improve implant stability, particularly for patients with pre-existing conditions. Additionally, research on patient-specific factors influencing the success of implants could lead to more personalized approaches in dental implantology.

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