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Complications and Techniques of Dental Implantation

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Perspective

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DESCRIPTION

In order to support a dental prosthesis like a crown, bridge, denture, or facial prosthesis or to serve as an orthodontic anchor, a dental implant, also known as an endosseous implant or fixture, interfaces with the bone of the jaw or skull. Modern dental implants are based on a biological process known as osseointegration, in which materials like titanium or zirconia develop a close link with the bone. Before a dental prosthetic is inserted, the implant fixture is first positioned to maximize its chance of osseointegration. Before the dental prosthetic (a tooth, bridge, or denture) is linked to the implant or an abutment that will support a crown is put in place, osseointegration may need to heal for a varied amount of time. The thickness and condition of the bone and gingival tissues that surround the implant determine whether it will succeed or fail. Other factors that affect osseointegration include the patient's health and the drugs they are taking. It is also assessed how much strain will be placed on the fixture and implant during routine use. Planning the placement and quantity of implants is essential for the prosthetic's long-term health because chewing might result in large biomechanical pressures.

General considerations

Planning for dental implants focuses on the patient's overall health, the condition of the patient's mouth and jaws locally, and the size, shape, and location of the jawbones, as well as the patient's neighbouring and opposing teeth. There aren't many health issues that make getting implants impossible, but there are some that can make them more likely to fail. The likelihood of long-term failures is increased by peri-implantitis, a form of gum disease that damages implants and is more common in people with poor oral hygiene, heavy smokers, and diabetics. Osteoporosis, chronic steroid usage, and other conditions that affect the bones can raise the chance of early implant failure.

Biomechanical considerations

The stresses that implants must withstand affect their long-term success in part. Implants lack a periodontal ligament, therefore biting forces are larger since there is no pressure sensation. In order to mitigate this, the implants' location must evenly distribute forces over the prosthesis they support. Concentrated strains may result in the fracture of the bridgework, implant components, or nearby bone loss. Final decision-making about implant location is made by both biologic (bone type, significant structures, and health) and mechanical factors. Compared to implants placed in lesser density bone, such the back of the upper jaw, implants implanted in thicker, stronger bone, like that found in the front section of the bottom jaw, had reduced failure rates. The surgical placement of dental implants involves the usual hazards associated with surgery, such as infection, severe bleeding, and necrosis of the flap of tissue surrounding the implant. When the osteotomy is made or the implant is inserted, nearby anatomical structures like the maxillary sinus, blood vessels, and the inferior alveolar nerve may also sustain damage. Long-term sinusitis is extremely uncommon, even when an implant has damaged the maxillary sinus lining. The chance of failure to osseointegration increases if the implant cannot be placed in bone to provide stability for the implant (referred to as primary stability of the implant). The stability of a dental implant immediately following placement is referred to as primary implant stability. Resonance frequency analysis can be used to non-invasively evaluate the stability of the titanium screw implant in the patient's bone tissue after surgery. While instant loading with prosthetic reconstruction may be possible if the initial stability is sufficient, early loading carries a larger risk of implant failure than typical loading. With the slow rebuilding of bone tissue around the implant in the initial weeks following surgery, secondary stability develops and primary implant stability becomes less important. Due to the ongoing process of bone regeneration into the implant (osseointegration), secondary stability differs from initial stabilization. The initial mechanical stability changes to biological stability once the healing process is finished.