

Dental Implants: Composition and Treatment for its Failure

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DESCRIPTION

A dental implant interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown or denture to act as an orthodontic anchor. Osseointegration is the biological process for modern dental implants, in which materials such as titanium or zirconia form an intimate bond with bone.

The four types of dental implant restorations are single tooth implants, implant supported dentures, full mouth acrylic and full arch dental implants. Depending upon the health of the person receiving the treatment, drugs which affect the chances of osseointegration and the health of the tissues in the mouth, implants are suggested. The amount of stress that will be put on the implant and fixture during normal function is also evaluated. The position of implants is determined by the position and angle of adjacent teeth and also by using computed tomography with CAD/CAM simulations and surgical guides called stents.

Composition of dental implants

A typical conventional implant consists of a titanium screw with a roughened or smooth surface. The majority of dental implants are made of commercially pure titanium, which is available in four grades depending upon the amount of carbon, nitrogen, oxygen and iron contained. Cold work hardened CP4 is the most commonly used titanium for implants. Titanium 6AL4V is the grade 5 titanium which is slightly harder than CP4 and is used in the industry mostly for abutment screws. Modern dental implants also have a textured surface to increase the surface area and osseointegration potential of the implant. If C.P. titanium or a titanium alloy has more than 85% titanium content, it will form a titanium-biocompatible titanium oxide surface layer or veneer that encloses the other metals, preventing them from contacting the bone.

Ceramic (zirconia-based) implants exist in one-piece; combining the screw and the abutment or two-piece systems; the abutment

being either cemented or screwed and might lower the risk for peri-implant diseases.

Treatment for technical implant failure

Abutment loosening and fracture aesthetic complication leads to the failure of technical implants. The initial phase of treatment involves occlusal therapy and anti-infective therapy and finally surgical technique.

Occlusal therapy involves the change in prosthesis design, an improvement in implant number and position. Occlusal adjustment can contribute to arresting the peri-implant breakdown. Anti-infective therapy involves the local removal of plaque with plastic instruments and polishing of all surfaces with pumice, sub-gingival irrigation of all implant pockets with 12% chlorhexidine, etc. Mechanical devices such as high pressure air spray and a powder abrasive is used for preparation and detoxification of implant site. Chemotherapeutic agent such as a supersaturated solution of citric acid is used for 30 to 40 sec for removal of endotoxins from implant surface.

Surgical technique involves 2 types of therapies such as resective osseous therapy and regenerative therapy. Resective osseous therapy is used to correct the negative osseous architecture and rough implant surface and also increases the area of keratinized gingiva. Regenerative therapy is used for the regeneration of the lost bone tissue

Advantages of dental implants

- Dental implants replace the tooth root helping to strengthen the jaw bone and restore full function.
- Improves the facial structure.
- Prevents bone loss.
- Adjacent teeth are healthy and maintained.

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