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Review Article

Dental Implants: Dual Stabilization Technology

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Abstract

More recent epidemiological data seem to show an increasing trend of tooth loss due to periodontal reasons rather than caries; the presence of initial attachment loss, bone height and the habit of smoking significantly increase the risk of tooth mortality. A dental implant is a titanium screw which is placed into bone to replace missing teeth. The implant mimics the root of a tooth in function. Dental Implants have changed the face of dentistry over the last three decades. Success of dental implants is generally defined by implant survival. Implant failure perhaps results from multi-factorial process. With changing concepts in technology and incorporation of better implant design, the chances of implant failures can be minimized by using dual stabilization implants that focus on osseous fixation.

Keywords: Dual Stabilization Technique, OCO Implant, Osseous Fixation, Dental Implants

1. Introduction**1.1 Periodontal Health and Tooth Loss**

Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions and oropharyngeal cancers, human immunodeficiency virus/ acquired immunodeficiency syndrome (HIV/AIDS)-related oral disease and orodental trauma are major public health problems worldwide. Poor oral health may have a profound effect on general health, and several oral diseases are related to chronic diseases.[1] Periodontitis is a destructive inflammatory disease of the supporting tissues of the teeth and is caused by specific microorganisms or a group of specific microorganisms resulting in progressive destruction of periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both.[2] Periodontitis is initiated by oral biofilm formation if untreated progress to gingivitis further leading to periodontal disease. The link between periodontal disease and systemic diseases has been scientifically proven over last two decades. [3] Living without teeth severely affects quality of life and can lead to unhealthy diets, malnutrition and social

isolation. Worldwide, 30% of people aged 65-74 years have lost all their natural teeth. More recent epidemiological data seem to show an increasing trend of tooth loss due to periodontal reasons rather than caries; the presence of initial attachment loss, bone height and the habit of smoking significantly increase the risk of tooth mortality. There is a strong correlation between smoking, the severity of periodontal disease and tooth mortality.[4]

Periodontal diseases, dental caries, and tooth loss also are common conditions in the United States, but their prevalence is generally decreasing. Nevertheless, among important subgroups of the population, particularly certain minority and economically disadvantaged groups, there is a disproportionately higher burden of periodontal diseases, dental caries, and tooth loss.[5] The percentages of tooth loss due to periodontal reasons and of patients who did not experience tooth loss varied from 1.5% to 9.8% and 36.0% to 88.5%. Studies' individual outcomes showed that different patient-related factors (i.e. age and smoking) and tooth-related factors (tooth type and location, and the

initial tooth prognosis) were associated with tooth loss during periodontal maintenance.[6] The association between cancer, tooth loss, and periodontal disease has been evaluated by several studies.[7]

1.2 Dental Implants: The Clinical Perspectives

Dental Implants have changed the face of dentistry over the last three decades. Dental implants have become increasingly common for the management of tooth loss. In the late 1970's, a Swedish orthopedist named Per-Ingvar Brånemark introduced what he termed osseointegrated implants to dental practice.[8] A dental implant is a titanium screw which is placed into bone to replace missing teeth. The implant mimics the root of a tooth in function. It is not only biocompatible, but actually fuses to bone by osseointegration. The growth of osseointegrated implants symbolizes one of the most significant breakthroughs in current dental practice in the oral rehabilitation of partially or fully edentulous patients.[1] As with most treatment procedures in dentistry today, dental implants not only involve scientific discovery, research and understanding, but also application in clinical practice. The practice of implant dentistry requires expertise in planning, surgery and tooth restoration; it is as much about art and experience as it is about science.

2. Implant: Success or Failure

Success of dental implants is generally defined by implant survival. Implant failure perhaps results from multi-factorial process. There are diverse causes related to early (overheating, contamination and trauma during surgery, poor bone quantity and/or quality, lack of primary stability, and incorrect immediate load indication), and late (periimplantitis, occlusal trauma, and overloading) failure. The main predictors for implant success are the quantity and quality of bone, the patient's age, the dentist's experience and location of implant placement, length

of the implant, axial loading, and oral hygiene maintenance. Primary predictors of implant failure are poor bone quality, chronic periodontitis, systemic diseases, smoking, unresolved caries or infection, advanced age, implant location, short implants, acentric loading, an inadequate number of implants, parafunctional habits and absence/loss of implant integration with hard and soft tissues. Inappropriate prosthesis design also may contribute to implant failure.[9]

3. Innovative Implant Technology: Future Prospects

In the future, many dental implant systems will have minimal placement/restorative instrumentation, and one universal implant body to fulfil all surgical needs as found today in OCO Biomedical's dental implant system. OCO dental implants are designed for immediate loading using Dual Stabilization™, an industry unique design feature that biomechanically secures the tip and collar of the implant. While other implant companies boast their revolutionary surface treatments, OCO implants immediately "lock" into the bone at placement as illustrated in Figure 1. The patented Bull Nose Auger™ tip locks the apex of the implant by pulling bone up and around the threads, and the mini Cortic-O Thread™ locks into the cortical bone, stabilizing the collar as illustrated in Figure 2. The thread pattern and pitch of OCO implants are purposely designed to immediately maximize bone to thread contact. The implant placement procedure is easy (despite the complexity of implant design): placement can be done with flap or flapless surgery; no need of multiple twists, intermediate drills, or taps; and you don't need a mount to thread in implants. The Dual Stabilization™ dental implants achieve Osseous Fixation™, a biomechanical lock at placement, and are engineered to stimulate bone growth with patented implant features.[10]

Figure 1: OCO Implant: Dual Stabilization Technique

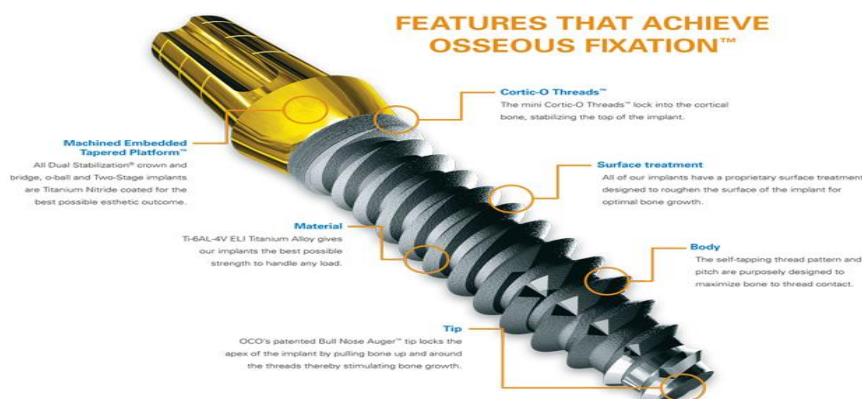
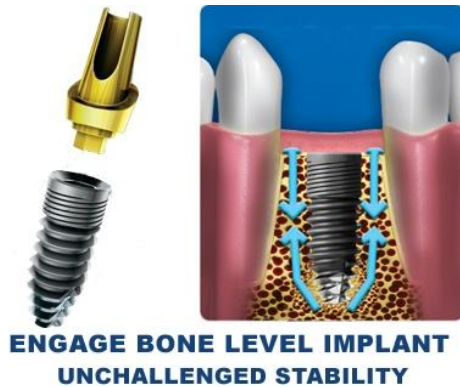


Figure 2: OCO Implant-Bone Stability

4. Conclusion

A dental implant is a titanium screw which is placed into bone to replace missing teeth. The implant mimics the root of a tooth in function. It is not only biocompatible, but actually fuses to bone by osseointegration. The growth of osseointegrated implants symbolizes one of the most significant breakthroughs in current dental practice in the oral rehabilitation of partially or fully edentulous patients. With changing concepts in technology and incorporation of better implant design, the chances of implant failures can be minimized by using dual stabilization implants that focus on osseous fixation.

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