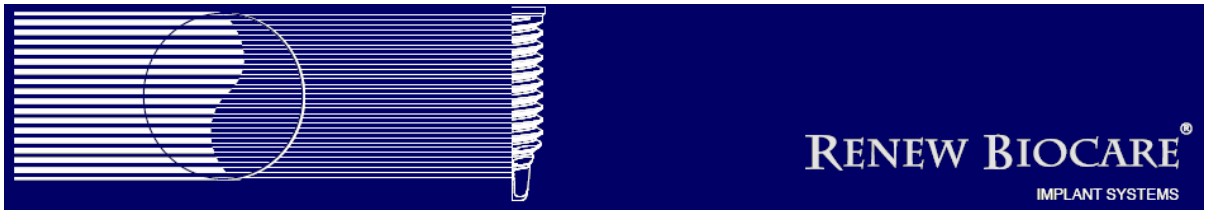

Orthodontic Implants

In early 2000, research intensified in the area of mini or micro implant systems for absolute anchorage in orthodontics. Korean and Taiwanese researchers experimented with titanium mini bone plates and mono cortical screws and also titanium micro implants as anchorage for orthodontic cases.[1,2,3] These implants are placed through a minimally invasive procedure and allow immediate loading. Proper planning is done beforehand on the patient's dental casts to decide on the optimal position for the micro implants. Radiographs are usually taken if the placement of the implants is to be close to the tooth roots. Surgically, installation of the implants is performed under local or topical anesthesia in the dental office. There is no need for an operating theatre environment. Minimal equipment is needed. The standard procedure involves a stab wound to the gingiva at the predetermined position and a series of bone drills are then employed. In some systems, no drilling sequence is described. The length and diameter of the micro implants are selected based on the depth of the bone and the position it is to be installed at. During the installation process, care is taken to install it at the desired angle. The micro implants are loaded after a week of healing. It is not unlike immediate loading in conventional dental implant therapy. It is found that the success rates of these implants are between 89 and100 per cent. Upon completion of the orthodontic treatment, the implants are retrieved under local or topical anesthesia. There are some minor problems and complications associated with the retention and movement of these micro implants but they are insignificant in the bigger application of the technique.[4,5]Applications of this technique were next on the clinical researchers' minds and it was noted that through absolute anchorage with these micro implants, up righting of molars can be achieved with relative ease.[6] The Korean and Taiwanese researchers have led the way in this and they have found more and more applications for these micro implants .Intrusion of molars was demonstrated to be successful [7] and this changed the treatment concepts of cases with mild anterior open bite.[8] The possibility to intrude maxillary molars through micro implants has cast a shadow on the need to use headgear appliances in some cases. Segmental intrusion of anterior maxillary teeth 9 led to the success full treatment of mild vertical maxillary excess cases. The treatment of Bi-maxillary protrusion has also been shown to be successful.[10,11] The scope of applications is changing every year.[12] Professor Proffit spoke of pushing the envelope of treatment in orthognathic cases. With this new revolutionary technique in orthodontic anchorage, borderline cases of AOB and VME can now be successfully treated without the need for invasive surgery. It is without a doubt that orthognathic surgery still has its place in

the treatment of dento-facial deformity. However, there is no longer a need to “over indicate” surgery in mild AOB and VME cases. The orthodontic Micro-Implant has thus opened a new scope of possibilities in the field on orthodontics by providing a new, predictable and flexible method for achieving absolute anchorage.

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The Renew Biocare Orthoplant® Implant System.

In planning the biomechanical aspects of orthodontic treatment for a specific patient, it is imperative that the orthodontist consider not only the forces required for the necessary tooth movement to achieve the patient's objectives, but also the undesired tooth movement that may occur in response to these forces. In the past, orthodontists have searched for the perfect anchorage in order to minimize these undesired tooth movements. Headgear, elastics, adjacent teeth, and any number of appliances have been suggested as anchorage in the past; however, the main drawback was that they all relied on patient compliance in order to be successful.

Implant anchorage has burst onto the clinical orthodontic scene in order to assist the orthodontist in controlling tooth movement. The primary advantage over the previously mentioned forms of anchorage is that implants provide skeletal anchorage, which is undoubtedly more predictable and stable than methods requiring patient compliance. While there are many types of implants available, we will examine three categories that may be useful to today's orthodontist: cylindrical, mini-plate, and mini-screw.

Cylindrical implants are the most common type on the market today. Retromolar implants, as well as the traditional abutment implants used for restorative therapies, fall into this category. These implants are highly predictable with regard to success of the implant itself; however, there are important considerations and potential limitations to their use. In general, these implants are primarily useful as anchor units to control anterior-posterior (A-P) movements in orthodontics. A minimum of 4-6 months is needed for osseointegration of the implant prior to use as an anchorage unit. Finally, implants that are to be used as abutments for future restorative treatment require careful planning and coordination between the orthodontist, oral surgeon, and restorative dentist. Inadequate planning from the onset may result in failure of the implant, a minimally useful anchor unit for the orthodontist, or a poorly positioned implant for the restorative dentist.

Traditional mini-plate implants have been used by oral surgeons for decades and are highly predictable in their success after placement. These plates are placed and retained in the skeletal anchorage unit by screws engaging the cortical bone. The most common areas for placement for orthodontic use are in the zygomatic strut in the maxilla and the buccal aspect of the body of the mandible. Mini-plate anchorage may be effective in controlling anchorage in the vertical and anterior-posterior planes, and therefore offers the orthodontist a particular advantage in treating skeletal open bite malocclusions. Although an 8-week healing period was initially recommended, there is debate in the current literature as to whether immediate loading of mini-plates may be possible. Once in place, true molar intrusion of either maxillary or mandibular molars may be achieved by connecting elastic thread, rubber bands, ligatures, or niti coils between the molar(s) and the anchorage unit. A disadvantage to using miniplates as anchorage is that a full thickness flap is required for their placement, and the plates must be retrieved after termination of treatment.

Mini-plates do offer advantages over other implant options in that they do not move, they are low profile, and the attachment for clinical use may be easily accessed for adjustment by the orthodontist.

“Orthoplant” mini-screw implants have recently become a very hot item with regard to implant anchorage, primarily based on their ease of placement and retrieval. These screws may be placed by the dentist using only local anesthetic and retrieved, in some cases, using only topical anesthetic. Once placed, the mini-screw is available for immediate load placement in conjunction with the specified treatment plan. Since mini-screws are retained in the interdental and interradicular alveolar crest, osseointegration is not required. However, since osseointegration is not required, the possibility exists that minor movement of the mini-screws (loss of anchorage) may occur. A final important consideration in the placement of mini-screws is the precise placement between the roots of adjacent teeth and the risks that may be associated with such a technique.

Without question, implants have changed, and will continue to change, the way orthodontists approach tooth movement. Movements of teeth that were previously thought difficult—if not impossible—may now be possible using implants as anchorage. As I have described, there are a number of different types of implants being commonly used; however, there is no perfect implant. The orthodontist and oral surgeon must carefully consider and weigh the options for implants and their advantages and disadvantages to determine which implant to utilize for each individual patient. Regardless of personal preferences of surgeons and orthodontists, implants have provided orthodontics with a new horizon that is exciting for patients and doctors alike.

RENEW BIOCARE ORTHOPLANT® (orthodontic micro anchorage system)
The ORTHOPLANT® is a new concept for temporary skeletal anchorage in orthodontic treatment, e.g. for active tooth movement or passive stabilization.
Its special overall design, as well as self tapping double threaded design and the complete product range including our comprehensive service makes the ORTHOPLAN® the premium modern system. ORTHOPLANT® is the first complete product range using sterile packaged mini-screws.

Advantages of the ORTHOPLANT® concept at a glance:

- enables simpler, more effective orthodontic treatment
- can replace headgear treatment
- designed to conserve teeth, avoiding extractions
- only partial banding required
- optimized use of time and materials
- well tolerated by the patient
- pin not visible during treatment

*Depending on the initial situation and type of treatment

RENEW BIOCARE, THE COMPANY BEHIND THE ORTHOPLANT® :

- **Product Quality**: all the products are manufactured by a serious manufacturer (Renew Biocare AG. Switzerland) in four production centers located in three continents which all have the required certifications from international notification bodies (ISO and CE and the relevant health authorities (local FDA).
- **Original:** Not to be confused with locally made low quality no brand products.
- **International:** They have been, and are used daily and successfully to treat patients worldwide.
- **Manufacturing:** All of our medical devises are manufactured either in Europe by our Swiss Company in Switzerland and in Asia by a wholly owned subsidiary of our Swiss Company. In both locations we manufacture with exactly the same (Swiss made Tornos, Decco2000-13b CNC machines) and in the USA our devices are manufactured under license and quality supervision of Renew Biocare Corp. USA , a wholly owned subsidiary.
- **Switzerland:** boasts the fastest growing pharmaceutical and medical device industry today and we guarantee that our products are manufactured according to good manufacturing practices (GMP) and ISO Specifications. They are manufactured to standards generally superior to these of other companies in this field.
- **Research:** Renew Biocare has participated in the research and development of Narrow Body Implants. since their inception.
- **Thread:** Renew Biocare's Orthoplant® have a unique self tapping double thread design.
- **Material:**

  Titanium Alloy Ti 6AL-4V ELI ASTM F-136 ASTM B 348 Gr. 23 ISO 5832-3 Ti6AL4V ELI Analysis Carbon (Maximum) 0.08% Titanium Balance Aluminum 5.50 to 6.50% Vanadium 3.50 to 4.50% Nitrogen (Maximum) 0.05%Iron (Maximum) 0.25%Oxygen (Maximum) 0.130% Hydrogen (Maximum) 0.013%Other, Total (Maximum)0.40% * Other, Each (Maximum) = 0.1% ** For AMS 4930 rev. D, Hydrogen = 0.0125% and Yttrium = 0.005
- **Quick Shipping:** Renew Biocare is present in all mayor markets directly.

Absorbable implant used as orthodontic anchorage

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Objectives: Recently, the implant was recognized as one of the useful methods for orthodontic anchorage. In cases where non-absorbable implants are placed, it is necessary to remove them after orthodontic treatment. The aim of this study was to investigate the possibility of the absorbable implant for orthodontic anchorage. Methods: The maxillary and mandibular bones of six male Beagle dogs (ten-months old, 10~11kg) were used. After healing periods of three months after the extraction of the 4th premolars (P4), the absorbable implant (FIXSORB-MX, Takiron company, Japan, poly lactic acid, a molecular weight 200,000, mini-screw-type 2.0x8.0mm) was inserted into the buccal side of the maxillary and mandibular bones at the root apical of the first molar. Orthodontic force of 100gf was applied by means of a closing coil that was connected to the implant and the 3rd premolar (P3). The position change of P3 and the broken strength of the implant (The universal material tester, EZ-test, Shimadzu company) were measured after loading of orthodontic force for three and six months. In the control group, the broken strength test was performed just after the insertion of the implant into the bone. T-test was performed for statistical analysis. (Each group n: 8~10) Results: 1. The loading of orthodontic force resulted in no mobility and deciduation in the implant.2. On the distance changes of distalized P3, the six-month group (9.57±1.65mm) was significantly longer than the three-month group (4.32±3.29mm). ($P < 0.001$) 3. On the broken strength of the implant, the six-month group (3.47±3.68 kgf) was significantly smaller than the three-month group (10.92±3.85 kgf). ($P < 0.01$) (Control 14.75±3.67kgf) Conclusion: The results showed that the absorbable implant had a clinically acceptable strength when the orthodontic anchorage was applied.