

Tall And Tilted Pin Hole Immediately Loaded Implants (Ttphil™)- All Tilt™ Concept – Rehabilitation Of The Atrophic Ridges: A Review

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Abstract

Dental implants are an ideal treatment plan for the loss of teeth. The science of Implantology is highly dynamic. Dental implants have evolved over the years with the introduction of newer techniques and implant designs such as basal implants, root analogue implants and the socket shield. However, there still exists a dilemma among clinicians regarding the concept of immediate implantation and immediate loading of the prostheses. Rehabilitation of patients with a completely resorbed edentulous maxilla and/or mandible with implants becomes difficult because of inadequate bone quantity, poor bone quality, proximity to the maxillary sinus in the posterior maxilla, mental foramen and mandibular canal. Sinus lift and bone augmentation procedures are required to treat such patients, prior to implant placement. There have been various alternative methods like zygomatic implants and pterygoid implants which have demonstrated higher success rates in compromised bone situations. But these procedures carry a higher risk of intra and post-operative complications. An innovative TTPHIL – ALL TILT™ concept is introduced by Venkatratna nag. The aim of this article is to provide an overview of this technique called Tall and Tilted Pin Hole Immediately Loaded Implants (TTPHIL).

Keywords: TTPHIL technique, Immediate loading, Bicortical anchorage.

Introduction

The goal of modern implant dentistry is no longer represented solely by successful osseointegration. The clinical success of implant therapy in edentulous and partially edentulous patients is well documented and many clinicians realize the benefits of adopting implant therapy in their practices. Implant therapy offers many advantages over conventional fixed or removable treatment options and in many cases is the treatment of choice. However, many clinicians still do not use implant therapy and choose instead to prepare teeth for fixed partial dentures. To obtain optimal aesthetic results with fixed partial dentures, a significant reduction in the amount of tooth structure is necessary, occasionally predisposing to endodontic, periodontal and structural sequelae [1]. The increased need and advantages of implant supported and retained restorations are a result of many factors which can be divided into four categories:

1. Preservation of tooth structure
2. Preservation of bone
3. Provision of additional support
4. Resistance to disease.

Edentulism can lead directly to impairment, functional limitation, physical, psychological, and social disability, and handicap. Thus, the impact of edentulism on general health should be examined by analyzing the major dimensions of health: physical symptoms and functional capacity, social functioning and perception of well-being[2]. It affects patients in various ways such as reduced chewing efficiency, inadequate intake of nutritious diet, declined self confidence and premature ageing appearance and many of them live the life as a dental cripple. Complete edentulism can be the result of various factors and diseases such as periodontitis, dental caries, trauma, intentionally removed or lost post surgical or after radio therapeutic dose in oral carcinoma cases, etc[6].

Advances in implant dentistry have allowed a shift from the early paradigms established by the work of Branemark and coworkers.

In recent times, removable dental implant supported prostheses (implant overdentures) have offered several advantages such as improved retention and support, reduced size of the prosthesis, improved phonetics, and enhanced mastication ability when compared to the conventional dentures. But in this modern world of comfortable life, most of the patients express desires to have the fast and fixed prosthesis which should appear and work as the natural teeth[6].

Conventional techniques of full arch/full mouth implantation work on placement of implants and leaving them undisturbed for subgingival healing until they get osseointegrated into the jaw bone. These implants are uncovered after a subgingival healing period of 3 to 6 months depending on various factors such as bone density, implant dimensions and occlusal load. The implants are restored in function once the soft tissue has healed.[11]

The full mouth rehabilitation is difficult in many cases because the edentulous patients usually do not have adequate bone dimensions for the placement of implants especially in case of long term edentulous patients. The vertical ridge loss along with maxillary sinus pneumatization restricts the clinician from placing implants of adequate length into posterior maxilla without performing the sinus augmentation procedures[11].

The sinus augmentation procedure needs a skilled approach and quality bone graft materials to regenerate the new bone into the sinus. Further, sinus augmentation procedure not only adds the number of surgical procedures to the implant treatment but also extends the time to place and restore the implants, often to the complete year. Further, many patients who have the chronic sinus pathologies do not qualify to receive the sinus graft and are refused by the dentists for the fixed implant prosthesis. Uncontrolled diabetics are also not good candidates for sinus grafting. In implant dentistry, such patients have simply been treated with the implant overdentures by avoiding posterior maxilla.[6]

Similarly, the vertically resorbed posterior mandible also presents a big challenge. In such cases, the dentist may find insufficient bone dimensions to place even short implants above the mandibular canal. Various procedures such as onlay block grafting and nerve repositioning have been advocated to manage the resorbed posterior mandible. Such procedures are more invasive, require multiple surgical steps, prolong the treatment time and also cause tissue morbidity to some extent.[6]

As discussed earlier, the conventional method of treating edentulous patients with full mouth implant supported fixed prostheses may require placement of multiple numbers of implants, bone grafting and augmentation procedures, prolonged treatment duration and multiple surgical interventions.[6]

The concept of tilted implants was described by Paulo Malo, Lisbon, Portugal with his state of the art All-on-4™ concept. In this technique, the posterior implants are tilted distally such that the implant head lies at the second premolar or first molar region. It is a graft less implant placement procedure for restoring edentulous jaws by tilting posterior implants utilizing the maximum amount of available bone.[6] The implants are stabilized into the highest possible bone density found in the anterior mandible. Angled implants were first introduced in the early 1990s with zygomatic and pterygoid implants.[9] The implants were tilted in a bodily fashion to bypass anatomical structures that otherwise hindered clinicians from placing them in areas of close proximity to the maxillary sinus, inferior alveolar nerve canal, the mental foramen, mandibular lingual concavities and maxillary buccal concavities. In addition to bypassing these anatomical constraints, the tilting of posterior implants in a distal manner results in an increase in the length of the prosthetic table thereby allowing better load distribution and reducing the cantilever lengths. According to Krekmanov et al, posterior tilting of distal implants will reduce cantilever lengths, broaden the prosthetic base, and improve implant-to-bone surface areas because longer implants can be used.[3]

Immediate loading is a therapeutic intervention for patients who require their appearance and function in a short period of time.

Disadvantages of All-On-4 and All-On-6 Concept

- Free hand arbitrary surgical placement of implant is not always possible as implant placement is completely prosthetically driven.
- Length of cantilever in the prosthesis cannot be extended beyond the limits,

- It is very technique sensitive and requires elaborate pre-surgical preparation and the use of a CAD/CAM, surgical splint for precise placement.[13]

Concept of Tall And Tilted Pin Hole Immediately Loaded Implants- All Tilt™ Technique:

TTPHIL-ALL TILT™ concept is an innovative technique which overcome the limitations of axially placed implants, as well as the disadvantages of All-on-4 concept and the All-on-6 concept. Here, tall (16-20mm), tilted (TT) implants (angulations of 30° – 70°) are used. Tall implants provide more surface area for osseointegration and also engage the cortical bone (bicortical anchorage). The implants are placed in pinhole (PH) manner i.e. flapless. All implants are immediately loaded (IL) within 48 hours using CAD/CAM (Computer-aided design and Computer-aided manufacturing) prostheses.[8]

Discussion

Previously, to achieve bone-to-implant contact (i.e. osseointegration), oral implants were placed mostly in a two-stage surgical procedure and remained undisturbed for a period of 3-6 months. [11]

In the TTPHIL-ALL TILT™ concept, implants are placed in such a way that the inner and outer diameter of the implants engage bone and also engage both cortices for higher primary stability. Implants are placed at a higher insertion torque (45N/cm)[11]. Due to the high primary stability, it is possible to load the implants immediately. The procedure is flapless which provides better wound healing. In this technique, the remaining denser trabecular bone is used for placement of tilted implants. This procedure is devoid of bone grafting, sinus augmentation, and alveolar bone augmentation. Finite element analysis has shown that the use of tilted implants is much more favourable biomechanically than using shorter implants with axial inclinations[8].

Tilted implants require short cantilevers to restore the posterior occlusion which prevents crestal bone loss, unretained restorations, fracture of prosthetic components and complete implant and prosthetic failure. Inclination of distal/posterior implants does not have any deleterious biomechanical effect on force magnitude from short arch to long arch which is the advantage of TTPHIL-ALL TILT™ concept over All-on-4 and All-on-6 concepts.[8]

Taller implants will increase bone to implant contact (BIC) which is vital for osseointegration. Bicortical anchorage transfers the forces to cortical bone which is highly mineralized and most resistant to bone resorption. The stress in the bone is decreased when the distance from the implant is greater. Tilted to bypass the sinus and luting structures. By using flapless technique (pinhole) periosteal blood vessels are intact as no flaps are raised. Immediate multiunit abutment will prevent and cooperate angulation of implant and utilizes the concept of muointegration. One time abutment concept thereby placing till gum level.[11]

The implant prosthesis is rigid, retrievable, passive fit and also follows cross arch stabilization which makes this technique unique among all other techniques both biomechanically and functionally.[8]

Conclusion

The goal of implant dentistry is to return a patient to oral health in a predictable fashion. Implant therapy is a most reliable treatment option to replace the missing teeth. TTPHIL-ALL TILT™ concept provides a predictable method for completely edentulous patients with resorbed ridges. It has proven to be a clinically effective technique, patient pleasing and applicable in clinical situations where otherwise more invasive, complicated, expensive bone augmentation procedures and sinus lifting would have been indicated. This concept can be adopted by dentists to deliver a short treatment procedure with

extraction followed by implants insertion surgery on the same day. The implants placed in a flapless procedure in a direction makes this concept predictable in both a biomechanical and functional manner. However, a large sample and long term follow-up study is needed to explore the success rate of implants and prostheses with this technique.

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