Modern implants from a different angle

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Background
With the success of dental implants, the profession of dentistry has moved into applying innovative ideas that have developed over time and has amplified the quality of patient’s lives. While integrating into modern dentistry, implant treatment has shifted direction from being surgically driven to prosthetically driven. Amongst other developments in improving all aspect of implant dentistry, angled implants were first introduced in the early 1990’s and since then there has been ample research on tilted implants to assess and support their success. (Figure 1)

Implants were originally tilted in a bodily fashion to bypass certain anatomic structures that otherwise hindered clinicians from placing them in areas such as the posterior maxilla, sinus, inferior alveolar nerve canal, the mental foramen, mandibular lingual concavities and maxillary buccal concavities. Procedures such as nerve repositioning, various grafting procedures, distraction osteogenesis, ridge splitting and many more not only lengthened treatment time, but also increased patient morbidity during implant rehabilitation cases. In addition to bypassing the anatomic structures, 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 forces associated with them. Tilted implants became an effective and safe alternative to major augmentative procedures such as maxillary sinus grafting procedures and ridge augmentation procedures.

Initially there were negative opinions regarding the hard and soft tissue response around tilted implants as opposed to axially straight implants. However various in vitro and in vivo studies have proven no apparent long term complications. Prosthetic tilting with time, tilted implants became an effective and safe alternative to major augmentative procedures such as maxillary sinus grafting procedures and ridge augmentation procedures.

Although these abutments are widely used today, they do present certain disadvantages that warrant mention. Firstly the connecting surfaces of custom-made abutments may have casting imperfections that may attract bacteria and bio film accumulation. Secondly if used in cement retentive restorations, they promote the use of cements that can cause treatable peri-implantitis and peri implant mucositis. Thirdly, the body of the custom abutment decreases the abutment material thickness, which may lead to fractures of the final restoration under severe load. Finally, the use of abutments takes up interocclusal vertical prosthetic space often needed for the restoration of the final restoration. Finally in certain cases one may not be able to redirect the access screw hole in the lingual direction to aid with esthetics of the final restoration. In cases of severe angulations, prosthetic tilting is limited to the use of cemented restorations with the use of custom made abutments (Figure 2).

Co-Axis Implants
Co-Axis implants in the esthetic area has been a popular topic in recent years due to the catastrophic failures associated with implants in the esthetic region. The difficulty that arises with implants in the esthetic area is related to anatomic limitations and the higher resorptive properties of the buccal plate. The anatomic limitation is the esthetic area. (Figure 4)

Anterior Maxilla
Implants in the esthetic area have a popular topic in the recent years due to the catastrophic failures associated with implants in the esthetic region. The difficulty that arises with implants in the esthetic area is related to anatomic limitations and the higher resorptive properties of the buccal plate. The anatomic limitation is the esthetic area. (Figure 4)

Posterior area
As mentioned earlier the use of angled implants not only aids with the bypassing of anatomic constraints that would otherwise require grafting procedures, but also aids with load distribution and the elimination of long cantilevers(Figure 5). The mental foramen, maxillary sinus and severe concavities can be avoided with the use of angled implants. However this necessitates the use of angled abutments to correct the severe distal inclination of the implants. The use of the Co-Axis Implants facilitates the avoidance of anatomic limitations, shortening of cantilevers, and enables the use of screw retained restoration without the need of angled abutments. The use of angled abutments is hence not necessary since Co-Axis Implants correct the angulation within the body of the implant.

Deciding on the Angle
This tapered body implant is available in 12°, 24° and 36° degree built in angle, ranging in 4, 5, 6 mm diameter and 8.5mm to 14mm in length. It is currently available in the external hex, Tri-nex and internal octogon connections. In extreme cases for even higher angle correction, the Co-Axis implant can be designed with a 17° or even the 50° angled abutment. With various angulations available one can make a decision of the angle needed by the use of angled direction indicators that may be used to orientate and assess the 3-D position of the desired access hole within the surgical guide(Figure 6). The angled direction indicator is inserted into the osteotomy and the prosthetic axis is checked regarding the access hole position for screw retention as well as for parallelism with other implant fixtures. When the orientation is cor-
firmed, then the site is enlarged to appropriate implant diameter & length and the implant with the appropriate built in angulation is inserted(Figure7). The angle correction of the implant is therefore at a sub-crestal level and prosthetic space is not utilized by angulated abutments.

Conclusion

Today more clinicians are advocating the use of angled implants. This leads to less grafting procedures that not only minimizes the overall treatment time, but also reduces the cost and diminishes the patient’s morbidity associated with grafting procedures. Co-Axis implants also allow early or immediate loading protocols that would otherwise not be possible with conventional implants. Therefore, the use of native bone, the avoidance of expensive angulated abutments, decreased patient morbidity, reduced cost, benefits of immediate loading, likelihood of bone retained restorations, and elimination of long conical wafers are all advantages of using Co-Axis implants.

References


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Dr. Costa DDS qualified as a dentist in 1984 receiving his dental degree cum laude from the University of Witwatersrand, Johannesburg, South Africa. He graduated top of this class with rank order No.1 and received numerous awards including the Gold Medal of the Dental Association of South Africa for the most outstanding graduate. In 1990 he completed his 4 year full time postgraduate Maxillo-Facial & Oral Surgery training at University of Witwatersrand, South Africa and was awarded FFD (SA) MFOS.Since 1999 he is in full time specialist Maxillo-Facial & Oral Surgery private practice concentrating on immediate loading rehabilitation of dental implants. To date he has placed over 50,000 dental implants. He has also presented as a key lecturer at numerous international implant congresses.

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Dr. Safa Tahmasbi Completed his Bachelor’s degree in Biology and a minor in Biochemistry at Saint John’s University Queens New York in 2004 with a full scholarship based on academic performance. In 2005 he joined State University of New York at Buffalo School of Dental Medicine where he attained his Doctor of Dental Surgery and qualified as a Dentist in 2008. He joined the Albert Einstein Medical hospital of Montefiore in Bronx New York where he completed one-year hospital dentistry fellowship. In 2013 he completed three and half year full time training in prosthodontics and surgical training with a masters degree in prosthodontics at the West Virginia University School of dentistry. During this time He was an adjunct clinical instructor to the undergraduate programs at the WVU University. In 2015 he joined the SameDay Dental implants Bränemark Osseointegration Center (BIOC) Dubai as a full time prosthodontist specializing in full mouth rehabilitation, immediate loading and Smile reconstruction.

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Piezosurgery offers the patient a gentle treatment with less complications and time saving benefits.

By Dr. Peter Hentschel

Fig. 1. Autogenous Bone

Fig. 2. Pre-clinical situation

The during the procedure gained autogenous bone can be placed alone or in combination with a bone graft material (eg. Compact Bone S, biphasic Calciumphosphate) around the placed implant. Sinus Eleva-
tion with simultaneous implant placement is indicated with up to 97.0% survival rate in after-
years (Pelegr et al. 2000).

Guided Bone Regeneration (GBR) as state of the art method for bone grafting uses in most cases bioresorbable Mem-
branes. Resorbable membranes offer several advantages beside the easy handling, as no need for a second surgical procedure for removal or minimization of complications, e.g. soft-tissue dehiscences.

Fig. 3. Peri-surgical Preparation

Fig. 4. Release of Schnei-
derian Membrane

For filling of horizontal-cranial space and stabilization of bone lid a bovine bone graft is used mixed with Compact Bone B and placed in the sinus for stabilization (Fig. 8).

Fig. 5. Preparation of Implant Tunnel

Fig. 6. SL-Implant In Situ

After release of the sinus mem-
brane (Fig. 4) the implant tunnel was prepared (Fig. 5) and the Implant (SL Implant; Denteg-
ris, Germany) placed (Fig. 6). Simultaneously the surrounded space was covered with a re-
hydrated Collagen Membrane (Bone Protect Membrane; Den-
tegris, Germany) as protections of the Schneiderian membrane (Fig. 7). Autogenous bone was mixed with Compact Bone B and placed in the sinus for stabilization (Fig. 8).

Fig. 7. Bone Protect Membrane In Situ

Fig. 8. Grafting with Bo-vine Bone

For filling of horizontal-cranial space and stabilization of bone lid a bovine bone graft is used (Compact Bone B; Dentegris, Germany). Bovine bone has been used in dental surgery for decades and is well known for stable and reliable results.

Fig. 9. Covering of Sinus Membrane with Bone Protect Membrane

Fig. 10. X-ray Post - OP

Fig. 11. 12 month Post-OP

For filling of horizontal-cranial space and stabilization of bone lid a bovine bone graft is used (Compact Bone B; Dentegris, Germany). Bovine bone has been used in dental surgery for decades and is well known for stable and reliable results.

To ensure the barrier and to stabilize the particulated bone-grafting material a pericar- dium membrane with a resur-
tabination of 16-24 weeks is used (Bone Protect Membrane; Den-
tegris, Germany). The pericardi-
um membrane offers very good handling properties in combi-
nation with a prolonged barrier function.

Case Study

The patient (36 y, f) was showing a alveo- loss tooth in 15 (Fig. 2). Patient’s request was aesthetic and masticatory rehabilitation which was suggested by one-
stage sinus elevation.

Based on diagnostic planning pi-
eosurgical window preparation in 15 (Fig.5) was performed after local anesthesia and periostal flap. By choosing a round-oval lid design sharp edges can be avoided which reduces the risk of perforation.

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After control of primary stabil-
ity particulate materials was filled laterally and covered with pericard membrane according to GBR standards (Fig.9). The flap was readapted and closed, control by X-ray shows axial po-
sitioning and augmentation of sinus maxillarhs (Fig. 10).

Reentry after five months was accompanied by full ceramic crown and results in aesthetic and harmonic rehabilitation (Fig. 11).

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Fig. 12. 12 month Post-OP

For filling of horizontal-cranial space and stabilization of bone lid a bovine bone graft is used (Compact Bone B; Dentegris, Germany). Bovine bone has been used in dental surgery for decades and is well known for stable and reliable results.

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