Predictable Anterior Aesthetics with the INVERTA™ Implant – A Dossier

Optimizing Predictable Anterior Aesthetics with an Innovative Body-Shift™ Implant Design
Introducing the INVERTA™ Implant

A NEW Implant Designed for Optimizing Aesthetics in Maxillary Anterior Extraction Socket Sites

Table of Contents:

The Background of Breakthrough Innovations 2
- Evolution of the INVERTA™ Implant
The INVERTA Difference 4
INVERTA Site Preparation 5
Research Summaries 6
Case Studies 8
INVERTA Product Breadth 18
Acknowledgement 19
In 2016 Dr. Stephen Chu (Prosthodontist, New York, USA) and Graham Blackbeard, Engineer, founder and managing director of Southern implants, Pty (Republic of South Africa) met for discussions about dental implant design, specifically Southeners’ MAX Implant. Graham detailed for Dr. Chu how the MAX Implant’s innovative design is tailored to optimize molar post extraction sites and engage the bony septum in the interradicular and lateral walls, providing high primary stability. The latter being key as Dr. Chu explains, achieving high primary stability in molar extraction sockets is very challenging.

The conversation then evolved to Southern Implants’ long-standing, privately owned history (established 1987), and how Graham has designed and manufactured products in collaboration with leading clinicians and designed and manufactured products in Southeners’ existing product portfolio: Zygomatic, Co-Axis® Subcrestal Angle Correction® Implants, MAX, Extra Oral Ultra-Short implants, as well as conventional Parallel-Walled and Tapered implants. The INVERTA™ Implant Design History

Graham highlighted collaboration with leading clinicians and designed and manufactured products in Southern Implants’ long-standing, privately owned history. Dr. Chu then concluded “Southern Implants is like a Formula 1 racing car team; the technology that develops from the high-performance division is disseminated to the overall implant portfolio.” This is clearly characterized by Southern’s existing product portfolio: all-in-one implants, Zygomatic, Co-Axis® Subcrestal Angle Correction® Implants, MAX, Extra Oral Ultra-Short implants, as well as conventional Parallel-Walled and Tapered implants.

Dr. Chu was intrigued with Southern Implants’ vision, triggering a thought. “The dental implant profession laces similar challenges with maxillary anterior extraction sockets, which has been a subject of particular interest and expertise for Dr. Chu and his long-time surgical partner Dr. Dennis Tarnow. According to Dr. Chu and many thought leaders on the subject, there are anarchic limitations in an apical direction for bone engagement and primary stability below existing ridge anatomy. Dr. Chu then outlined ‘Southern Implants’ potential for Dr. Chu and his long-time surgical partner Dr. Dennis Tarnow.’ The INVERTA™ Implant Design History

The INVERTA™ Implant Design History

Initial commercial release consists of INVERTA™ Co-Axis® and Straight Deep Conical and External Hex configurations. Additional configurations planned for release are designs in PREDNAX™ Internal Hex connection and narrow, and wide bodies.

Dr. Chu brought the basic concept in implant scheme to Graham Blackbeard, and together the INVERTA™ Implant Design History

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Dr. Chu found the provisional restoration of Tapered, Parallel-Walled and Co-Axis Implants to be problematic since the top of the implant is divergent and wide, which limits the amount of restorative space for prosthetic components. Dr. Chu found platform switching to help this cause, but it was frequently not enough. Therefore, in Dr. Chu’s opinion, the simplest solution to these dilemmas could be to significantly decrease the coronal diameter of the implant. The Co-Axis Implant was designed in 2002 for edentulous ridge applications, making Subcrestal Angle Correction® novel for that application, however the actual body of the implant was not ideal for immediate extraction socket therapy set out to look for a corporate partner to bring this concept to life. Recalling his enlightened meeting with Graham, knowing the company can be nimble, reactive and proactive for this endeavor. Dr. Chu believed Southern Implants may be the right partner for this endeavor. Dr. Chu brought the basic concept in implant scheme to Graham Blackbeard, and together the INVERTA™ Implant Design History

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Over the past 10-years we have been engaged in studies of immediate placement in anterior extraction sockets. What we’ve learned in following these patient groups has been extremely valuable in developing the INVERTA™ Implant Site-Specific Implant™

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Invention of the INVERTA™ Implant

The INVERTA™ Implant Design History

The INVERTA™ Implant Design History
The INVERTA™ Difference

Popular Co-Axis® Feature
- Built-in 12° Subcrestal Angle Correction®
- without using angled abutments resulting in greater facial soft-tissue volume and ideal screw-retained restorative options.

Body-Shift™ Implant Design
- Coronal aspect is narrow and tapers outward to a maximum diameter midway down the length of the implant. This innovative design allows for apical bone engagement in immediate placement and a coronal chamber for bone growth resulting in natural aesthetics.

High Strength Titanium
- Manufactured from High Strength Grade 4 Pure Titanium (≥900 MPa) providing exceptional fatigue strength.

Coronal Thread
- All INVERTA Implants feature a shallow square thread at the coronal aspect designed for blood clot and graft stability and thereby the ability to effectively transfer load to the bone.

SInergy™ Surface with 20-Year History
- Decades of clinical research back the un-changed, moderately rough Southern Implants Alumina-blasted surface shown to have consistent results for early osseointegration and longevity.

Apical Thread
- Aggressive thread for maximum primary stability in trabecular bone.

Deep Conical Internal Connection

INVERTA™ Site Preparation

Deep Conical
- 4.5mm
- Shown here for ø 13mm x Ø3.5/4.5mm
- INVERTA Implant

Steps:
1. Create preliminary osteotomy with the dedicated spade drill (D-3SP ADE-IV)
2. Shape the osteotomy with the dedicated tapered drill (D-IV45)
3. Place the implant 2-3mm subcrestally

Deep Conical
- 5.0mm
- Shown here for ø 13mm x Ø3.5/5.0mm
- INVERTA Implant

Steps:
1. Create preliminary osteotomy with the dedicated spade drill (D-3SP ADE-IV)
2. Begin shaping the osteotomy with the dedicated tapered drill (D-IV50)
3. Complete the osteotomy shaping with the dedicated tapered drill (D-IV50/13)
4. Place the implant 2-3mm subcrestally

External Hex
Surgical sites were healed uneventfully for 3 months, and then samples of soft and hard tissues surrounding the implants were retrieved to perform light microscopic and histo-morphometric analyses.

Results

All 18 implants were stable and completely integrated both clinically and radiographically. The analyses revealed that the amount of hard tissue formation and bone healing that occurred during the healing period was significantly influenced by the thickness of the bone plate, the size of the horizontal buccal gap, and the implant diameter, position, and depth within the extraction socket. The P3 and P4 hybrid implants placed approximately 1.0 mm subcrestally from the interproximal height of bone with less gap distance (≥ 1.0 mm) exhibited minor to modest (1.5 to 2.2 mm) crestal bone remodeling relative to the implant platform. Conversely, M1 implants positioned with greater depth (≥ 2.5 mm) and gap distance (≤ 2.0 mm) that were evaluated in a buccal-con- tinuous alveolar ridge environment exhibited minimal crestal bone remodeling with first bone-to-implant contact within 1.0 mm (range: 2.0 to 0.89 mm) of the mesio-buccal implant extraction site. The lingual bone plate on all M1 implants was relatively maintained and unaffected. The apical half of the implant provided high initial stability (range: 65 to 14.0), with nearly 90% of treated sites with an “almost perfect” score. The average PES was 12.5 (range 9.0 to 14.0), with nearly 60% of treated sites with an “almost perfect” score.

Conclusion

This preclinical study provided clinical and histologic evidence that the safety and efficacy of a new hybrid macrogeometries implant design that achieved excellent primary and secondary stability in immediately extract sockets without grafting.

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Figure 1

A prospective cohort clinical study was performed to evaluate the concept and design of a novel macro hybrid implant placed into maxillary anterior postextraction sockets. Thirtythree patients with an equal number of hybrid implants were used to replace mandibular anterior single implants in a single session (immediate implant placement and immediate provisional restoration)

A mean insertion torque value of 65 Ncm (range 45 to 100 Ncm) was reached with the radiographic observation of the hybrid implant body. No implants failed during an average healing period of 1 year. A labial plate dimension between 1.8 and 2.1 mm was attained immediately posttreatment and remained stable over time. A tooth-to-implant interdental crest distance and dimension of 2.3 to 2.6 mm was reached; it was also sustained at the 1-year follow-up. The average PES was 12.5 (range 9.0 to 14.0), with nearly 60% of treated sites with an “almost perfect” score.

Conclusion

This macro hybrid implant in concept and design may be useful in immediate tooth replacement and should be designed to achieve successful implant survival and esthetic outcomes, specifically labial plate and papilla preservation without midfacial or interdental tissue loss and discoloration.
Utilizing the INVERTA™ Co-Axis® Implant to Achieve Predictable and Highly Aesthetic Outcomes

Clinical Treatment By:
Stephen J. Chu, DMD, MSD, CDT & Dennis P. Tarnow, DDS

Case Overview
A 47-year-old female patient presented with a chief complaint of discoloration of teeth #9 and #10. Radiographic and clinical examination resulted in a diagnosis of secondary occlusal traumatism and pulpal atrophy with a poor endodontic prognosis. Based on this diagnosis, the treating clinicians recommended immediate tooth replacement therapy for tooth #9 utilizing a PROVATA™ Implant and an INVERTA™ Co-Axis Deep Conical Implant for #10. A provisional restoration using acrylic resin was placed the day of surgery and the final restorations will be two single-unit, metal-ceramic screw-retained crowns.

1. Patient presents with complaints of discoloration and hypermobility of #9 and #10. Radiograph shows signs of trauma and recession.

2. Pre-operative condition of teeth #9, 10. Note the thin periodontal phenotype, scalloped gingival architecture and mid-facial gingival recession.

3. PROVATA™ Implant placed at tooth #9 and INVERTA™ Co-Axis® (12° Subcrestal Angle Correction®) Deep Conical Implant placed at tooth #10. Note the INVERTA™ Implant does not impinge on the buccal wall.

4. The design of the mount for the INVERTA™ Implant allows visualization of the screw access hole to be in the ideal restorative position.

5. Temporary cylinders screw access holes aligned with the cingulum for proper aesthetics. Provisional restorations set over the temporary cylinders prior to luting with acrylic resin.

6. The finished, polished, and characterized provisional restoration is used as a prosthetic socket seal device in dual-zone grafting therapy.

7. Provisional restoration and CBCT at three-month follow-up.

“The INVERTA™ Implant design represents a paradigm shift in biologic and aesthetic thinking. Combining apical stability with an inverted body-shift design allows for coronal spacing, optimizing the ability to provide more bone and ultimately superior aesthetics for patients.”

- Stephen J. Chu, DMD, MSD, CDT
New York, USA
Immediate Implant Placement with 18-Month Follow-Up and No Buccal Recession

Clinical Treatment By:
P.O. Östman, DDS, PhD, MD

Case Overview
A 35 year old male patient presented with a crown and root fracture endodontic complication. Radiographs and clinical examination resulted in a diagnosis of a mobile tooth #9 with horizontal root fracture, endodontic complication, biotype 2 with keratinized mucosa, and tooth #8 enamel/dentin fracture. Based on diagnosis, treating clinician recommended extraction of tooth #9, immediate implant placement and temporization utilizing a PEEK Temporary Cylinder with a composite crown. After 10 weeks healing, a veneer was placed on tooth #8 and a definitive restoration was placed on the implant at tooth #9 location.

1. Pre-operative clinical photograph showing tooth #9 with temporary filling after trauma.
2. The tooth was carefully removed and the buccal bone plate was shown to be intact.
3. Bone quality was type 2 and a 5.0 mm INVERTA™ Final Drill was used to shape the osteotomy.
4. An INVERTA External Hex implant was placed with a final torque of 80 Ncm.
5. The INVERTA Co-Axis Implant was oriented according to the dimple of the implant mount. The driver was used to verify prosthetic direction.
6. CBCT at 18-months showing stable buccal bone wall.
7. 18-month follow-up clinical pictures. Note: No evidence of buccal recession.

“I am able to use INVERTA Implants in aesthetically challenging cases gives me a predictable outcome with limited buccal recession and healthy soft tissue.”

- P.O. Östman, DDS, PhD, MD
Falun, Sweden
Achieving Predictable Aesthetic Results When Immediately Loading the Anterior Maxilla Extraction Socket

Clinical Treatment By:
Costa Nicolopoulos, BDS, FFD (MFOS) (Oral Maxillofacial Surgeon)
& Petros Yuvanoglu, DMD (Prosthodontist)

Case Overview
A 39 year old male patient presented with mobility in anterior.
Radiographs and clinical examination resulted in a diagnosis of an unrestorable, fractured root at tooth #8. Based on diagnosis, treating clinicians recommended extraction of the fractured tooth, immediate implant placement and a screw-retained final restoration.

1. Pre-operative situation demonstrates mobility and root fracture.

2. Mobile clinical crown, swelling over cervical and mid-buccal region.

3. An AWEER™ External Hex Implant was placed with a final torque of 80 Ncm.

4. Final all ceramic zirconia screw-retained crown placed 4 hours after implant placement. CBCT scan taken at the same time. Note the "gap" in between the buccal plate and the implant coronally.

5. CBCT and clinical photographs at 1-year follow-up.


7. By body shifting with the AWEER™ Implant we see less bone and papilla loss at SameDay Dental Implants in Dubai™.

- Costa Nicolopoulos, BDS, FFD (MFOS) & Petros Yuvanoglu, DMD
Dubai, UAE

8. "INVERTA affords surgeons the best opportunity to achieve primary stability and hard/soft tissue maintenance for long-lasting predictable Immediate Tooth Replacement."

- Barry P. Levin, DMD
Pennsylvania, USA

Achieving High Primary Stability After Immediate Implant Placement in the Aesthetic Zone

Clinical Treatment By: Barry P. Levin, DMD

Case Overview
A 34 year old female presented with the chief complaint of poor aesthetics at tooth #9. Radiographs and clinical examination resulted in a diagnosis of replacement resorption. Based on diagnosis, treating clinicians recommended extraction of the tooth and immediate implant placement with provisional crown. Final will be a screw-retained PFM restoration.

1. Mobile clinical crown swaying over cervical and mid-buccal region.

2. Endodontically treated tooth #6, appearing to have fracture line on palatal and confirmed at tooth extraction.

3. An INVERT A™ External Hex Implant was placed with a final torque value of 61 Ncm.

4. Final all ceramic zirconia screw-retained crown placed 4 hours after implant placement. CBCT scan taken at the same time. Note the "gap" in between the buccal plate and the implant coronally.

5. CBCT and clinical photograph at 1-year follow-up.


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Immediate implant placement and provisionalization with GBR/GTR

Clinical Treatment By:
Nicholas Egbert DDS, MDS

Case Overview
A 22 year old female presented complaining about an infection and short front tooth. Radiographs and clinical examination revealed a diagnosis of severe root resorption at tooth #9, 2-3mm of root resorption, localized moderate periodontitis with CAP, #9, non-restorable. Based on diagnosis, the treating clinician recommended extraction of tooth #9. Guided Bone Regeneration (GBR), Guided Tissue Regeneration (GTR) and implant placement immediately. Immediate screw-retained provisional restoration out of occlusion was completed day of surgery. Final restoration will be a screw-retained all-ceramic crown.

1. Patient presented with failed root canal tooth. Tooth #9 showing resorption.

2. Co-Axis Subcrestal Angle Design provides the ideal location for screw access.


4. Occlusal view of GBR using Dermal Apron Technique.

5. Facial of provisional restoration showing Dermal Apron Technique.

6. CT showing INVERTA Co-Axis Implant placement.

Treating the Endodontic Tooth with a Long-Term, Aesthetic Option

Clinical Treatment By:
Harold Baumgarten, DMD

Case Overview
A 53 year old female patient presented with a broken crown at endodontically treated tooth #9. Radiographs and clinical examination resulted in a diagnosis of the tooth being unrestorable. Based on diagnosis, the treating clinician recommended extraction of tooth #9, immediate implant placement, bone grafting and immediate PMMA provisional restoration. After healing a screw-retained all ceramic crown will be fabricated for the final restoration.

5. Implant placed, coronal gap grafted with FDBA and radiographs taken. Note the direct bone-to-implant contact at the middle and apical portion of the implant and the chamber at the narrower coronal portion. The gap was grafted with FDBA.

6. CT showing INVERTA Co-Axis Implant placement.

"I get great primary stability in sockets while having a narrow implant at the bone crest."
- Harold Baumgarten, DMD
Pennsylvania, USA

"INVERTA increases the predictability of provisionalizing immediate implants while optimizing biological, biomechanical and aesthetic outcomes; a tremendous benefit to the patient."
- Nicholas Egbert DDS, MDS
Utah, USA
Immediate Extraction with Implant Placement and Immediate Non-Occlusal Loading

Clinical Treatment By:
Robert A. del Castillo, DMD

Case Overview
A 22 year old male patient presented unhappy with his anterior aesthetics. Radiographs and clinical examination resulted in a diagnosis of a crown fracture on the palatal side, composite buildup with defective margins, and recurrent decay of tooth #9. Based on diagnosis, treating clinician recommended immediate extraction, implant placement with non-occlusal load using a screw-retained PEEK abutment and provisional crown. Proximal extension 6-8 months post implant insertion will be screw-retained zirconia crown with layered porcelain using Passive Abutment Components.

1. Preclinical picture and radiograph demonstrating large composite buildup with defective margins.
2. Immediate non-occlusal loading of provisional restoration was achieved. Provisional was fabricated using a screw-retained PEEK interim abutment and lab provisional crown.
3. Orientation of hex with 12° angle correction toward the palatal. Dual zone grafting with Cortico/Cancellous allograft.
4. Immediate non-occlusal loading of provisional restoration was achieved. Provisional was fabricated using a screw-retained PEEK interim abutment and lab provisional crown.

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3. Orientation of hex with 12° angle correction toward the palatal. Dual zone grafting with Cortico/Cancellous allograft.

Instant A Co-Axis® Implant placed along the incisal edge axis with a palatal 12° correction and access for screw retention.

INVERTA’s innovative Body-Shift™ Design combined with the Co-Axis 12° Subcrestal Angle Correction® represents a treatment solution ideal for long-term, sustainable anterior aesthetics for my patients.”
- Robert A. del Castillo, DMD
Florida, USA

INVERTA Co-Axis provides predictable palatal screw-axis for final restorations. This implant system routinely meets and frequently exceeds all of the esthetic requirements for highly successful aesthetic zone immediate implant placement outcomes.
- Michael Will, DDS, MD, FACS
Maryland, USA

Achieving High Primary Stability After Immediate Implant Placement in the Aesthetic Zone

Clinical Treatment By:
Michael Will, DDS, MD, FACS

Case Overview
A 41 year old female presented with internal resorption of tooth #6. Radiographs and clinical examination resulted in a diagnosis of internal root resorption, secondary to trauma with a healthy thick biotype and no swelling or inflammation noted. Based on the diagnosis, the clinician recommended extraction, bone graft, immediate implant placement, and provisional screw-retained crown at site #6. A natural tooth provisional crown was fabricate and relined with composite resin. A PFM crown final restorations will be placed following healing.

1. Preoperative panoramic radiograph showing cervical internal resorption, secondary to trauma.
2. Initial INVERTA® 3mm flared PEEK.
3. Final INVERTA® 3mm flared PEEK.
4. Internal Hex INVERTA® Co-Axis implant placed. Correct orientation of implant is achieved with aid of template making on implant mount.
5. Five-days post operative soft tissue follow-up.

‘INVERTA® Implants combine the aggressive thread design of the Max implant and a narrower coronal portion to achieve outstanding primary stability. INVERTA Co-Axis provides predictable palatal screw-axis for final restorations. This implant system routinely meets and frequently exceeds all of the esthetic requirements for highly successful aesthetic zone immediate implant placement outcomes.”
- Michael Will, DDS, MD, FACS
Maryland, USA
INVERTA™ Product Breadth

Available in INVERTA Co-Axis® and Straight Deep Conical and External Hex Implants. Additional configurations coming soon are designs in PROVATA™ Internal Hex connection and narrower, and wider bodies.

Acknowledgment

It isn’t often that a chance meeting, a short three years ago, would lead to a groundbreaking innovation in optimizing predictable aesthetics. Three years to design, test, research and commercialize a line of products is unheard of, yet, INVERTA happened! By combining Southern Implants expertise and willingness to seize an opportunity to optimize patient outcomes with clinician innovators, patients around the globe now have a treatment option they didn’t have before. To this end, the Southern Implants Team sincerely thanks all who contributed to INVERTA. Special thanks to Dr. Chu for trusting Southern with bringing his vision to reality. To Drs. O. Östman, Costa Nicolopoulos, and Denna Tarnow for their tireless clinical inputs into the final design. To Drs. Myron Nevins and Hanae Saito for their valued research expertise. To Dr. Véronique Christiaens for the validation of the design, stability and gap distance through an extensive cadaver study. To Drs. Baumgarten, Chu, Del Castillo, Egbert, Levin, Nicolopoulos, Östman, Will and Yuvanoglu, for their participation in the registry, meticulous INVERTA case documentation, expert review and assistance bringing this Dossier to completion.
Aesthetics Reimagined

INVERTA™ Implant

The implant designed for natural looking aesthetics in anterior maxillary extraction sockets.

To learn more, contact your Southern Implants Representative or visit southernimplants.com