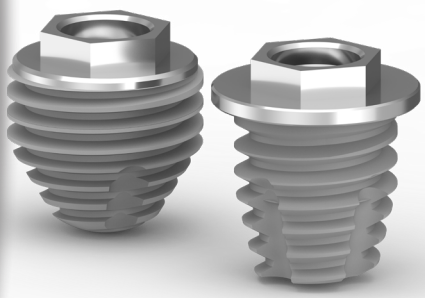
SOUTHERNIMPLANTS®
Innovative Treatment Solutions

Osseointegrated Fixtures
(Cranio-maxillofacial implants)
Surgical Manual



Southern Implants® is a leading provider of unique and innovative dental implant products with a focus on top-end professional users who want more choices. Southern's expertise in research, development and manufacturing of dental implants allows us to provide Innovative Treatment Solutions that will reduce treatment times and improve patient outcomes.

Striving for excellence and meeting customer needs, has led to our wide product range characterised by Unique and Innovative products which include:

- Multiple interfaces, to suit customer preference.
- INVERTA® implant, featuring a Body-Shift® design, engineered for primary stability and suitable for immediate loading.
- Co-Axis® , Subcrestal Angle Correction® implants, available in angulations of 12°, 24° and 36° and various internal and external connections.
- MAX implant, specifically designed for immediate molar tooth replacement.
- The ZYGAN , ZYGEX and ZYGIN implants for severely resorbed maxilla and craniofacial reconstruction.
- The Machined Surface Coronally (MSC) dental implant surface treatment offers practitioners an innovative way to take advantage of the best characteristics of both smooth and moderately rough implant surfaces.

Our product portfolio is in synchronised evolution with protocol improvements and technological advances.

My sincere thanks to all specialists, dentists and technicians who put their trust in our company.

Graham Blackbeard
Managing Director, Southern Implants

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For more information scan the below

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Overview of the Southern Implants' Osseointegrated Fixtures Surgical Manual

This manual serves as a comprehensive clinical and surgical guide for the successful use of Southern Implants' Osseointegrated Fixtures in craniofacial rehabilitation. The intended use of Osseointegrated Fixtures has been developed to assist surgeons, prosthodontists, and anaplastologists in planning, executing, and maintaining implant-retained facial prostheses.

Each section of this manual is designed to provide clarity on key aspects of treatment which include:

1. Section 1 introduces the Southern Implants Osseointegrated Fixture system, including its background, implant features, and available variants.
2. Section 2 outlines critical surgical considerations such as patient selection, anatomical assessment, preoperative planning, and treatment protocols for special cases like pediatric or irradiated patients.
3. Section 3 provides guidance on navigating the product catalogue, understanding component compatibility, and selecting appropriate accessories.
4. Section 4 presents a detailed step-by-step surgical technique, including fixture placement, drilling protocols, and handling the insertion tool.
5. Section 5 explains the prosthetic workflow, including abutment selection and prosthesis fabrication options.
6. Section 6 details postoperative care and maintenance recommendations to promote long-term success.
7. Section 7 addresses common complications and provides troubleshooting strategies.
8. Section 8 includes references and links to additional resources for continuing education and support.

NOTE: This manual outlines recommended clinical procedures and component usage related to the Southern Implants Osseointegrated Fixture System. The information provided serves as a professional guide to assist with surgical planning and implementation. It is not intended to replace individualised clinical judgment or hands-on surgical training. Surgeons must assess each patient's unique anatomical and medical circumstances and modify their approach accordingly.

This guide does not constitute direct medical or prosthetic advice from Southern Implants and should not be interpreted as such. It is essential that the procedures described herein are performed by qualified clinicians with appropriate surgical training and experience in craniofacial implantology.

Southern Implants does not accept liability for complications arising from use of products not specifically designed or recommended by Southern Implants. Optimal results depend on precise technique, proper instrumentation, and close interdisciplinary collaboration between surgeons, prosthodontists, anaplastologists, and technicians.

This surgical manual is not intended as a substitute for adequate training. Additionally, these guidelines do not substitute the Osseointegrated Fixtures Instructions For Use (IFU). The Osseointegrated Fixtures IFU (CAT-8071) can be found at our website: www.southernimplants.com/ifu. It is the surgeon's responsibility to analyse the most appropriate products for each clinical situation.

NOTE: Not all products are cleared for sale in all countries.

Implant description

The Southern Implants Osseointegrated Fixtures (also know as craniomacillofacial or extraoral implants) System builds on the proven principles of the Brånemark system, providing a dependable and secure method of retaining craniofacial prostheses through osseointegration.

Southern Implants' Osseointegrated Fixtures system is specifically engineered to support the retention of extraoral prosthetic devices, such as auricular, orbital, or nasal prostheses. It achieves long-term clinical success through precise surgical technique, carefully controlled biomechanical design, and an interdisciplinary treatment protocol. The implant is aimed to become biologically incorporated into bone that adapts to its new mechanical function through remodeling and healing.

To ensure optimal functional and aesthetic outcomes, several principles must be followed:

Implant design:
The anchoring fixtures must be constructed from a biocompatible, inert material commercially pure titanium grade 4 and shaped geometrically to allow for stable attachment of mechanical prosthetic systems.
Surface integrity:
Implant surfaces must possess microarchitectural properties conducive to osseointegration and remain uncontaminated during insertion.
Site preparation:
The implant osteotomy must be performed with minimal trauma and maximal irrigation to preserve the regenerative capacity of the bone.
Soft tissue management:
The skin-penetrating zone must be designed to reduce relative tissue mobility and promote adherence between skin and periosteum to prevent chronic irritation.
Interdisciplinary coordination:
All phases of treatment—from planning and surgical placement to prosthesis design and maintenance—should be conducted with close collaboration among surgeons, prosthodontists, anaplastologists, and technicians.

This manual provides a comprehensive protocol covering patient selection, surgical techniques, component usage, and long-term care. It should be used in conjunction with Southern Implants' Instructions for Use (IFU), product catalogues and relevant training programs. The success of this system depends not only on the product but also on precision, planning, and teamwork.

For additional guidance and updates, visit: www.southernimplants.com.

Implant features

Southern Implants' IE (Implants for Extra oral use) range is specifically engineered to meet the functional and anatomical challenges of retaining craniomaxillofacial prostheses. These implants are designed for osseointegrated anchorage in craniofacial regions such as the ear, orbit, and nose and compatibility with fixed screw retention, bar and magnetic retention systems.

Standardised 4 mm External Hex Connection

Secure interface for prosthetic components

High strength grade 4 Titanium (UTS >920 MPa)

Ensures high biocompatibility and strength for craniofacial anchorage

Length Options

Ultra short implant lengths of 3 mm, 4 mm and 6 mm

Body shape variations available in the range

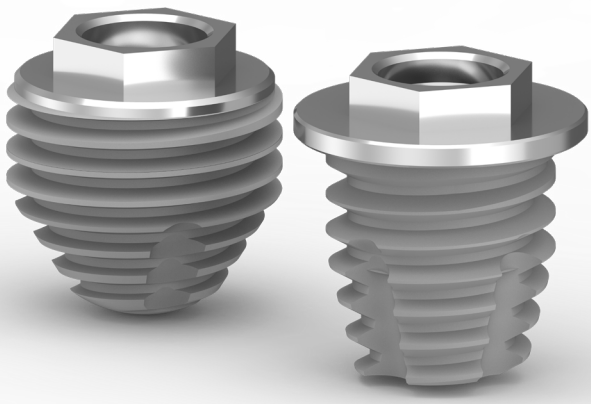
Providing flexibility for various anatomical conditions

Compatible with a Standard abutment

Designed for skin penetration with varying heights (3 mm, 4 mm, 5.5 mm, 7 mm, 8.5 mm and 10 mm) to suit different soft tissue thicknesses

Optional Flanged Collar

The wide flanged collar acts as a depth stop, unique to the parallel implant design.



Available implant variants and indications

The Osseointegrated Fixtures range consists of three implant groups:

IE Implants
(Cylindrical body with a flange)

3 mm | 4 mm | 6 mm

IET Implants
(Tapered body)

4 mm

IETi Implants
(Tapered body)

4 mm
(Internal drive)

IE Implants: defined by a parallel-walled design and a flanged top, which serves as a depth stop and broadens the platform to 4.8 mm.

- Available in 3 mm, 4 mm, and 6 mm lengths.
- Ideal for standard extra-oral cases requiring shallow to moderate depth.

IET Implants: a tapered 4 mm implant body with a 4.07 mm restorative platform.

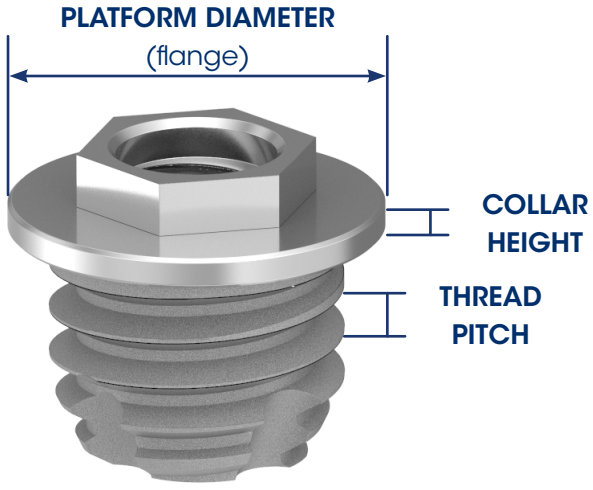
- Designed for cases requiring enhanced initial stability.

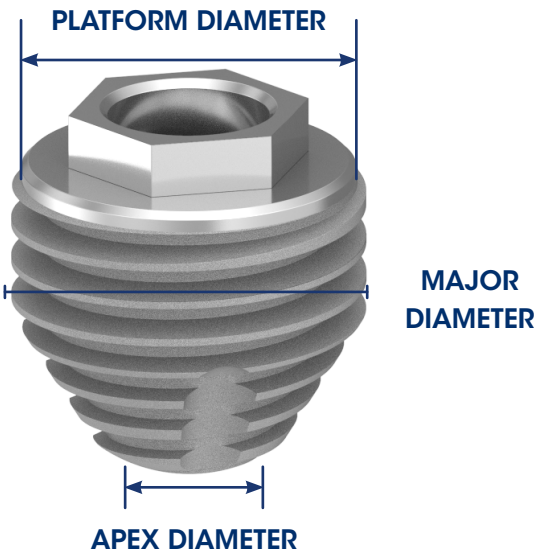
IETi Implants: identical to the IET in shape and size, but with an internal drive feature.

- Allows direct insertion using a defined insertion tool, eliminating the need for a fixture mount.

Connection specifications

RANGE		PLATFORM DIAMETER (flange)	HEX WIDTH	HEX HEIGHT	COLLAR HEIGHT
IE	Ø3.75 mm	4.80	2.70	0.7	0.40
IET	Ø4.5 mm	4.07	2.70	0.7	0.25
IETi	Ø4.5 mm	4.07	2.70	0.7	0.25





2. Surgical Considerations

For a comprehensive list of indications, contraindications and additional details about the Osseointegrated Fixtures, refer to The Osseointegrated Fixtures IFU (CAT-8071).

Successful treatment using osseointegrated extra oral implants is contingent on deliberate patient evaluation, structured planning, and input from an interdisciplinary team. Functional and aesthetic rehabilitation begins with assessing defect morphology, bone condition, systemic status, and patient expectations.

Medical and Anatomical Assessment

A full medical evaluation and physical exam are necessary to flag contraindications such as:

- Previous radiotherapy in the implant region.
- Poorly controlled medical conditions (e.g. coagulopathies, diabetes).
- Localised infection or soft tissue compromise.
- Pediatric patient considerations (growth and cooperation).

Imaging and anatomical review should include:

- Bone height and width at the desired site.
- Spatial relation to vital structures (e.g. orbital rim, dura mater).
- Scarring, reconstruction, or grafting history.

Cross-sectional imaging (CBCT or CT) supports:

- Cortical bone evaluation (≥3 mm for single-stage approach).
- Planning of angulation and trajectory.
- Fabrication of guided surgery templates.

Preliminary Examination and Consultation

A detailed clinical inspection of the defect site and history of defect cause (e.g. congenital, trauma, surgical resection) should be undertaken. Patient expectations must be aligned with the reality of implant-based prosthetic outcomes. Visual tools such as sketches, digital simulations, and pre-prosthetic models enhance communication.

Multidisciplinary planning, such as engaging maxillofacial and plastic surgeons, prosthodontists, and anaplastologists, is strongly advised. This may include collaborative pre-surgical meetings, guide fabrication, and involvement during surgery to ensure optimal implant orientation.

Bone quality and quantity

Choose the appropriate length implant for the placement site. Take care to avoid anatomical structures.

NOTE: Implant selection, positioning, and length should be guided by the anatomical availability of bone at the proposed site. The diagram below illustrates craniofacial implant classifications based on bone availability, as outlined by Sailaja et al. (2016):

- Sailaja CR, Shameen KP, Ravi SY, Hari KM, Satyendra KT. Extraoral implants as retentive aids for maxillofacial prosthesis: a review. Journal of Applied Dental and Medical Sciences. 2016; 2(2):135–142.

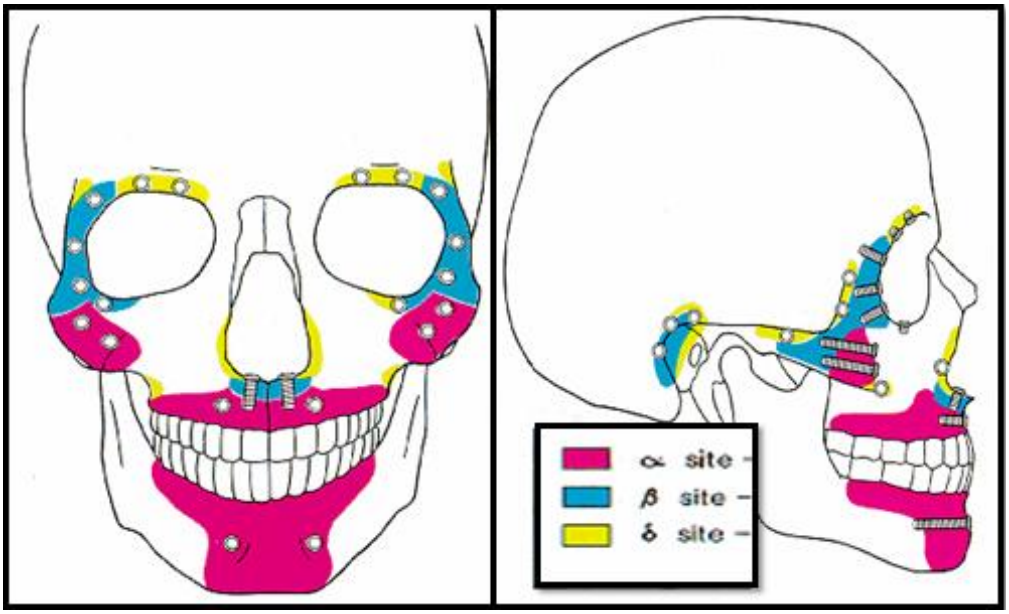
This classification provides a foundational framework for pre-surgical planning in maxillofacial rehabilitation and supports clinical decision-making regarding implant selection and placement.

According to Sailaja et al. (2016), the craniofacial skeleton is divided into three categories based on bone volume and suitability for implant placement:

α Alpha sites – offer the greatest bone availability and can typically accommodate implants of approximately 6 mm in length.

β Beta sites – present moderate bone volume, generally supporting implants of 4–5 mm.

δ Delta sites – represent areas with the least bone volume, usually only permitting implants of 3 mm or less.



This anatomical classification should be used in conjunction with patient-specific diagnostic imaging (e.g. CT or MRI scans), clinical examination, surgical history, and the planned prosthetic rehabilitation to determine the optimal implant type and dimensions.

Indications for Treatment

Southern Implants Osseointegrated Fixtures are suited to patients requiring prosthetic retention due to:

- Auricular defects (traumatic, congenital, or post-surgical).
- Orbital volume loss and lid/structure loss.
- Nasal reconstruction where adhesive-based options are not viable.
- Large midfacial defects not amenable to soft tissue prostheses.
- Retention post tumor resection or congenital absence.

Treatment Planning and Collaboration

Treatment success hinges on strong interdisciplinary coordination. Key planning steps include:

- Wax-ups or digital prosthetic simulations.
- Surgical guide and prosthetic mould creation by laboratory or clinical team.
- Shared understanding of hygiene protocols and aesthetic expectations.

Considerations for Specific Defect Types
Auricular Cases – Congenital/Trauma: Auricular remnants are often removed to improve prosthetic symmetry. The decision must rest with the patient, who should understand the irreversible nature of this step.

Auricular Cases – Tumor Resection: Preoperative impressions assist future prosthesis design. Skin grafts and tragus positioning should be preplanned. Where feasible, simultaneous implant placement can reduce total treatment time.

Orbital and Midface Defects: Careful analysis of orbital anatomy and bone remnants is essential. Implants should not obstruct prosthetic contours or create aesthetic asymmetries. Input from the prosthetics team ensures hardware can be fully disguised.

Nasal Reconstruction: As with orbital cases, implants must be positioned for support and retention without compromising symmetry or visibility.

Pediatric and Irradiated Patients
Children:
- Account for craniofacial growth; consider placing sleeper implants for delayed use.
- Hygiene compliance is critical and must be monitored.

Radiation Cases:
- Recommend delayed loading with two-stage placement.
- Healing time of 4–6 months post-placement.
- Adjunctive hyperbaric oxygen therapy may improve outcomes.
- Avoid placing implants in previously irradiated zones when possible.

Warnings
These instructions are not intended as a substitute for adequate training.

- For the safe and effective use of implants it is strongly suggested that specialised training be undertaken, including hands-on training to learn proper technique, biomechanical requirements and radiographic evaluations.

Responsibility for proper patient selection, adequate training, experience in the placement of implants and providing appropriate information for informed consent rests with the practitioner. Improper technique can result in implant failure, damage to nerves/vessels and/or loss of supporting bone. Implant failure increases when implants are placed in irradiated bone as radiotherapy can result in progressive fibrosis of vessels and soft tissue, leading to diminished healing capacity.

Breakage
Implant and abutment fractures can occur when applied loads exceed the tensile or compressive strength of the material. Potential overloading conditions may result from: deficiencies in implant numbers, lengths and/or diameters to adequately support a restoration, excessive cantilever length, incomplete abutment seating, abutment angles greater than 30 degrees, inadequate prosthesis fit and physical trauma. Additional treatment may be necessary when any of the above conditions are present to reduce the possibility of hardware complications or failure.

During surgery
- Drill at high speed (1000 - 2000 rpm) with copious irrigation (saline at room temperature). Drill with continuous back and forth motion, to avoid overheating of the bone.

Post-surgery
- Regular patient follow-up, and proper hygiene must be achieved are essential for favourable long-term results.

Considerations for Specific Defect Types
Soft-tissue complications.
If infection occurs, the patient's aftercare routines should be reviewed. An antimicrobial cream can be prescribed if appropriate. The abutment can be removed, if need be, to properly address soft-tissue complications. A new abutment can be placed after the appropriate healing period.

Skin overgrowth
If the skin begins to grow over the abutment, perform skin thickness reduction surgery again. If skin regrowth persists in cases of craniofacial implants, a longer abutment can be fitted.

Implant instability and loss
If the implant loses stability a cover screw can be placed and the skin closed up for osseointegration for another 3-6 months. If there is a failure to osseointegrate, the implant must be removed. In craniofacial sites, a suitable site for a new implant can sometimes be found in adjacent bone. All factors for case selection should be re-evaluated before proceeding with a second implant.

Handling procedure and sterility

Implants are packaged as follows:
1. An outer package consisting of a rigid, clear box which acts as protection for the inner package.
2. The inner package consisting of a blister pack (clear plastic-formed blister base with a TYVEK "peel-back" lid).
3. Within the inner package, there is a hollow tube which contains one implant suspended from a titanium ring, this ensures the implant never touches the inside of the plastic tube.

Labelling information is located on the surface of the peel-back lid and on the outside of the rigid box.

Care must be taken to maintain the sterility of the implant by proper opening of the packaging and handling of the implant. The outer rigid plastic box and the outside of the inner plastic blister tray-lid are not sterile; do not touch the outside with sterile gloves and do not place the plastic box or blister tray-lid onto the sterile field.

Inside the plastic box, the sealed inner plastic blister and peel back TYVEK lid is sterile only on the inside. The sealed blister is to be opened by an assistant (with non-sterile gloves): remove the TYVEK lid and do not touch the sterile implant.

Maintain the sterility of the implant, after opening the tray and removing the implant, until placement in the surgical site.

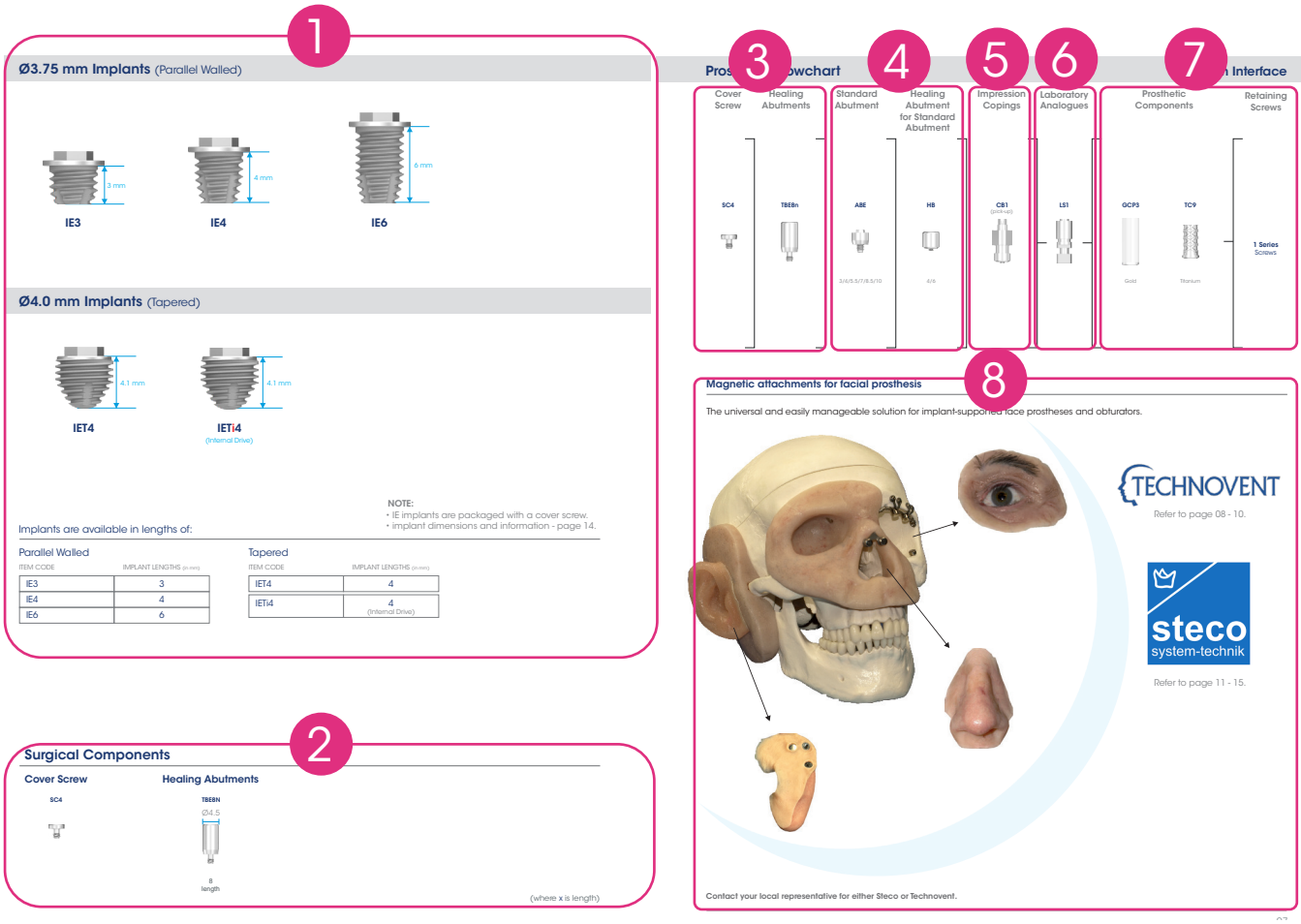
Other sterile components are packed in a peel pouch or blister base with a "peel-back" lid. Labelling information is located on the bottom half of the pouch, inside the packet or on the surface of the peel-back lid. Sterility is assured unless the pouch is damaged or opened. Non-sterile components are supplied clean but not sterile in a peel pouch or blister base with peel-back lid. Labelling information is located on the bottom half of the pouch or on the surface of the peel-back lid.

3. Understanding the product range and catalogue

Each implant type within the Osseointegrated Fixtures Implant Catalogue is listed with its correlating and compatible components. It is important to determine which components are compatible with which implants to a ensure precise fit.

The Implant catalogues are structured in a similar layout in order to improve readability and understand the potential configurations of the prosthetic components in relation to the implants. For a full explanation of the usage procedures for the prosthetic components, refer to CAT-4100 - Southern Implants Prosthetic Manual.

The below spread identifies the different sections of the product catalogue as well as references to compatible components from Technovent and Steco Technomagnetics:



This catalogue is designed to guide clinicians and technicians through the complete surgical and prosthetic workflow for Southern Implants' Osseointegrated Fixtures implant systems. It is structured as follows:

Section 1 – Implant Codes and Lengths
This section provides the implant code alongside all available length options. Use this to select the appropriate implant based on patient anatomy and surgical requirements.

Section 2 – Surgical Components
This section details the surgical components and accessories used during implant placement. For clinicians performing a two-stage surgery, cover screws are available to protect the implant interface during the healing period. If soft tissue contouring is required, a healing abutment can be placed after initial healing to shape the tissue prior to prosthetic restoration.

Sections 3–7 – Prosthetic Workflow
These sections outline the indirect restorative protocol recommended for Osseointegrated Fixtures implants. Osseointegrated Fixtures implants are restored using a standard abutment, on top of which prosthetic components are secured. The two-stage approach uses the standard abutment and its corresponding healing cap before the prosthetic components are attached. Direct-to-implant restorations are not recommended due to anatomical and bio-mechanical considerations.

Section 3 – Surgical Components
Indicates the available cover screw which is available to protect the implant interface during the healing period. If soft tissue contouring is required, a healing abutment can be placed after initial healing to shape the tissue prior to abutment selection and the prosthetic restoration.

Section 4 – Standard Abutment Components
Indicates all the standard abutment collar height options. For two-stage cases, healing caps can be used during the soft-tissue maturation phase.

Section 5 – Impression Components
Details all necessary items for taking impressions, supporting both analogue and digital workflows. It also includes the matching laboratory components should a laboratory replica be created in preparation for creating the prosthesis.

Section 6 – Laboratory Components
Details the matching laboratory components should a laboratory replica be created in preparation for creating the prosthesis.

Section 7 – Final Prosthetic Abutments
Provides a range of fixed prosthetic abutments compatible with the selected workflow. Once the final abutment is chosen, the appropriate prosthetic screw should be used to secure the prosthesis.

Section 8 – Compatible Magnetic Abutments
A variety of magnetic abutments compatible with Southern Implants' craniofacial fixtures are available through third-party suppliers such as Steco Technomagnetics and Technovent. These components offer effective solutions for the retention of extraoral prostheses. Selection should be based on the clinical indication and retention requirements. Once the magnetic abutment is selected, it must be properly secured according to the manufacturer's specifications and in conjunction with the appropriate prosthetic screw.

For a comprehensive guide on prosthetic handling, procedures, and troubleshooting, refer to CAT-4100 – Southern Implants Prosthetic Manual.

4.1. Determining one-stage or two-stage procedure

Choosing between a one-stage or two-stage surgical approach depends on patient-specific variables such as defect location, tissue condition, radiation history, age, and patient compliance. With the one-stage procedure, the implant, the abutment and the healing cap or the implant and the healing abutment are placed at the same time. After the osseointegration period (3–4 months) the making and fitting of the prosthesis can begin. The two-stage procedure has a 4–6 months interval between implant placement and abutment connection. The six months period for osseointegration should be used for paediatric patients, irradiated patients or other cases where the bone quality or clinical situation requires additional attention. One month after the abutment connection the work with the prosthesis can usually begin.

One-Stage Procedure:

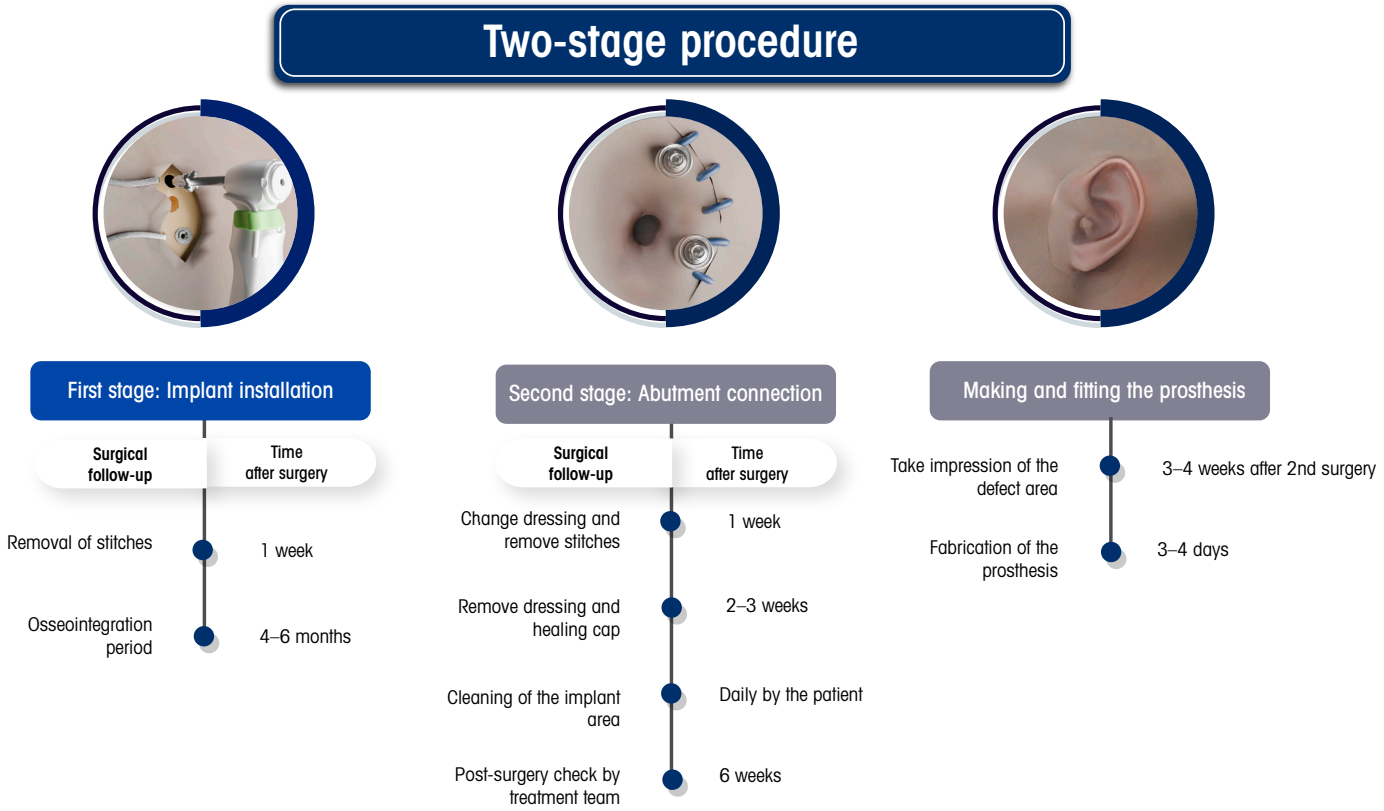
- Involves simultaneous placement of the implant, abutment, and healing cap (or healing abutment).
- Osseointegration period typically spans 3–4 months.
- Suitable for adult patients with auricular defects and non-irradiated bone.
- Allows earlier initiation of prosthetic phase, with impression-taking beginning 3 months post-op.

Two-Stage Procedure:

- Involves initial placement of the implant and a cover screw to seal the implant platform, followed by a 4–6 month healing phase.
- A second surgery connects the abutment to the osseointegrated implant.
- Ideal for pediatric cases, orbital and midfacial defects, patients with compromised bone, or those with prior irradiation.
- Prosthetic treatment typically starts 3–4 weeks after abutment connection.

NOTE: The one-stage procedure is not included in the indications for use in the European Union (EU) region.
Clinicians practicing in the EU must adhere to the approved indications outlined in the product's EU Instructions for use.

Summarised Timeline:



NOTE: As technologies such as surgical guides and 3D planning evolve, they may influence the timing and sequencing of prosthetic procedures.

Measuring Implant Stability

Resonance frequency analysis (RFA) is an option that can supply clinically relevant information about the state of the implant-bone interface at any stage of the treatment or follow-up examinations. The measurement is performed with a small SmartPeg, which acts as a transducer attached to the implant or abutment. For more information about the Osstell device and SmartPeg, please visit www.osstell.com. Studies indicate that implants with high and increasing implant stability quotient (ISQ) values are successfully integrated.

Irradiated Tissue Considerations

In patients with a history of radiation to the craniofacial region, the use of a two-stage surgical approach is strongly recommended to allow for enhanced osseointegration and soft tissue healing. If a patient has already received an osseointegrated implant and is subsequently scheduled for radiation therapy, it is advised that the skin-penetrating abutments be removed, and cover screws be placed prior to the start of irradiation. This approach reduces the risk of complications related to soft tissue breakdown and implant exposure during or after treatment.

4.2. Determining the number of implants

Determining the appropriate number of implants is essential for achieving stable and long-lasting retention of facial prostheses. The clinical goal is to provide adequate distribution of force and redundancy in case of implant failure.

Prosthetic Ears (Auricular Prostheses):

- Typically, two to three implants are sufficient for retaining an auricular prosthesis.
- Implants should be placed in parallel and aligned to support a retention bar designed to fit within the anti-helix region of the ear.
- Standard abutments and magnetic systems or bar retention methods can be employed.

Orbital, Nasal, and Midface Prostheses:

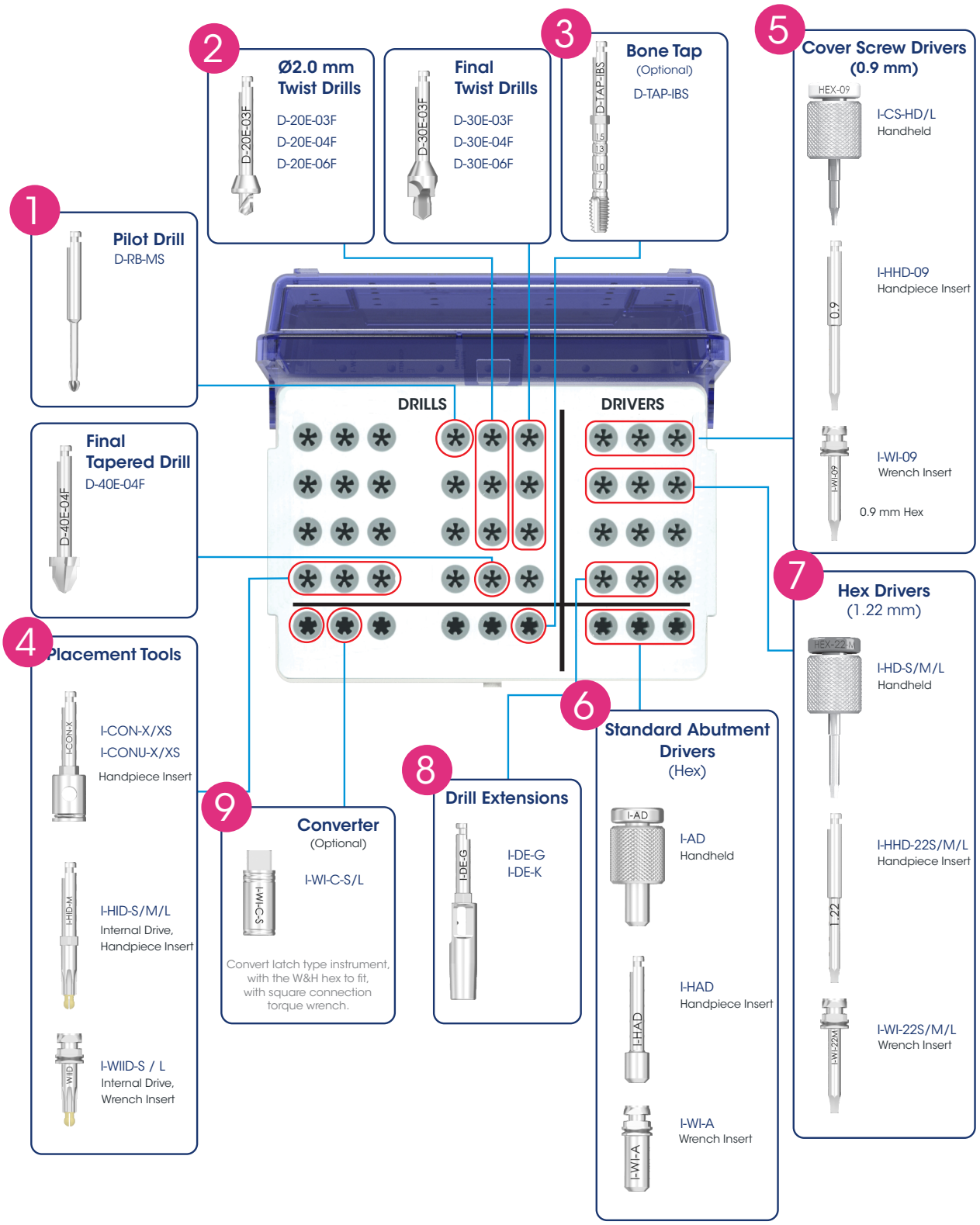
- Usually require a minimum of three implants to ensure adequate support and distribution of prosthetic load.
- Implant placement should consider the aesthetic contours and functional access for removal and hygiene.

Sleeper Implants in Paediatric Cases

In paediatric patients, sleeper implants should be considered as part of the treatment plan. These are implants placed intentionally without abutment exposure to preserve bone and maintain the possibility for future prosthetic use as the child grows. Sleeper implants help ensure that adequate bone anchorage is available when definitive prosthetic rehabilitation becomes feasible. Additionally, their use facilitates an additional failsafe since the implant failure rates in paediatric cases is higher.

4.3. Surgical tray contents

In order to place an Osseointegrated implant, it is important to familiarise yourself with the components in the surgical tray as well as the components used with the implants (as specified in the above section). Below outlines the different instruments provided in the tray with a brief description of its use case (exert from CAT-2010 - Osseointegrated fixtures catalogue).



No.	Item Category	Item indication
1	**Pilot drills**	Used to establish the initial osteotomy along the planned trajectory. It ensures the correct angulation and serves as the guide path for sequential drilling.
2	**Twist drills**	Used following the pilot drill to incrementally widen the osteotomy to the required diameter for implant placement. Multiple diameters may be used based on implant size.
3	**Bone taps**	Used to pre-thread dense cortical bone prior to implant placement, ensuring smoother insertion and reducing insertion torque. Recommended in cases of high bone density to minimise stress on the implant and surrounding bone.
4	**Handpiece and wrench insertion tools**	Handpiece insertion tools: used with a surgical motor to insert the implant, particularly during the initial insertion phase. Provides speed and torque values which is useful to determine initial insertion toque and bone to implant engagement. Note that the I-CON-X insertion tool is used to insert the IE and IET implants by engaging on the fixture mount whilst the I-HID insertion tool is used in the IETi implant which engages directly in the implant. Wrench insertion tools: allows for manual control during implant placement, especially in angled positions or high insertion torque cases when a handpiece is not suitable.
5	**Cover screw driver (0.9 Hex)**	Used to place cover screws in two-stage surgeries, protecting the implant interface during the healing phase.
6	**Standard Abutment drivers**	Used to place standard abutments onto the implant.
7	**Abutment screw drivers (1.22 Hex)**	Used to secure healing abutments, healing caps or prosthetic abutments to the implant or standard abutment.
8	**Drill extension**	Used to extend the reach of standard drills during osteotomy preparation, particularly in cases where anatomical access is limited or when working around soft tissue or prosthetic constraints.
9	**Converter (latch-to-square adapter)**	Converts latch-type instruments with a W&H hex connection into a square connection compatible with a torque wrench.
10	**Wrench converters**	I-WI-CST - For Handpiece inserts (latch-type) featuring the W&H hex. I-WI-SL - For Handpiece inserts (latch-type) without the W&H hex. I-WI-SS - For SQUARE connection of fixture mounts and instruments. I-WI-SH - For HEX connection of fixture mounts.

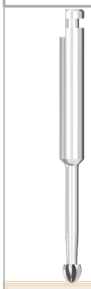
4.4. Drilling protocol overview

The drilling protocol for Southern Implants' Osseointegrated Fixtures has been developed to ensure precision and control when preparing the osteotomy in craniofacial bone regions. The system incorporates a range of pilot drills, twist drills, and countersinks—each selected based on the anatomical site, desired implant position, and bone quality.

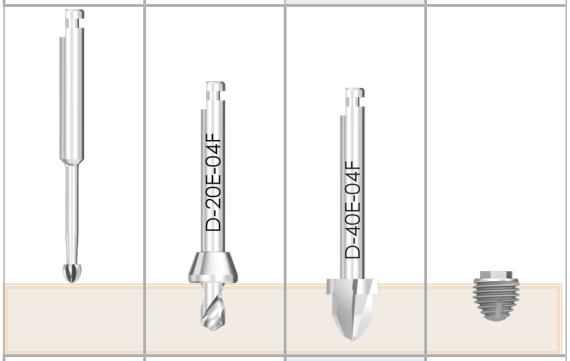
All drills are laser-marked with their respective item code allowing clinicians to align their drilling protocol with the available implant lengths to assist with accurate depth control during osteotomy preparation.

Clinicians should determine the appropriate drilling sequence based on bone density, cortical thickness, and implant length and diameter. Adjustments to the standard protocol may be made at the clinician's discretion to optimise primary stability and accommodate anatomical variability.

The following outlines the general drilling sequence for the parallel walled implants (IE range):

Pilot drill (Round burr)	Ø2.0 Twist drill	Ø3.0 Twist drill	Bone tap	Implant placement
		(Optional) For medium bone	(Optional) For hard bone	
Initiate the osteotomy. Modify the curvature or entrance point of the osteotomy site.	Begins the deep osteotomy along the planned trajectory. Length of implant determines chosen drill. Drills equipped with a fixed depth stop.	Widening of the osteotomy. Length of implant determines chosen drill. Drills equipped with a fixed depth stop.	Pre-thread dense cortical bone prior to implant placement	Implant is inserted using either a handpiece or manual driver.
				
D-RB-MS	D-20E-03F D-20E-04F D-20E-06F	D-30E-03F D-30E-04F D-30E-06F	D-TAP-IBS	IE3 IE4 IE6

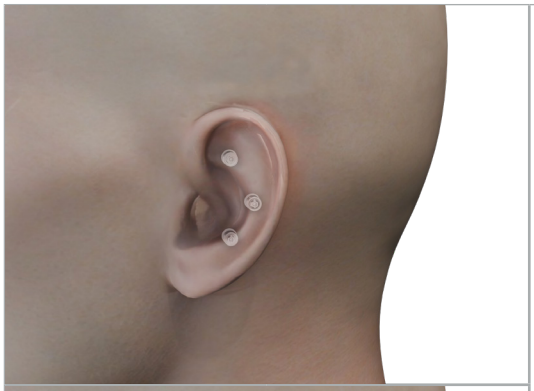
The following outlines the general drilling sequence for the tapered implants (IET & IETi range):

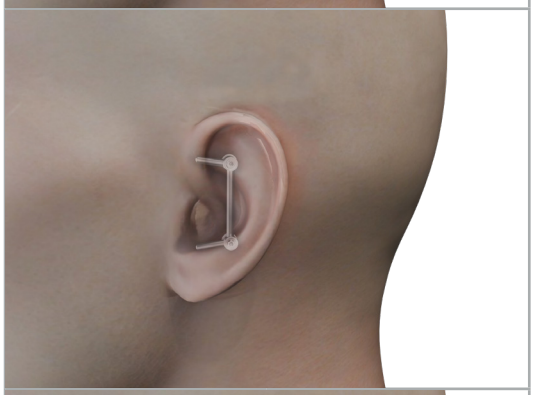
Pilot drill (Round burr)	Ø2.0 Twist drill	Ø4.0 Tapered drill	Implant placement
		(Optional) For medium and hard bone	
Initiate the osteotomy. Modify the curvature or entrance point of the osteotomy site.	Begins the deep osteotomy along the planned trajectory. Length of implant determines chosen drill. Drills equipped with a fixed depth stop.	Useful in cases where anatomy requires slight redirection or for creating a channel.	Implant is inserted using either a handpiece or manual driver.
			
D-RB-MS	D-20E-03F D-20E-04F D-20E-06F	D-40E-04F	IET4 IETi4

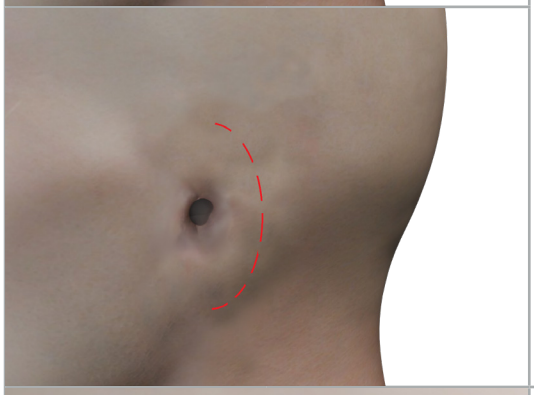
4.5. Surgical procedure

The following steps provide a general guide for the surgical placement of Southern Implants' Osseointegrated Fixtures. The surgeon should modify the technique based on individual patient anatomy, defect location, and systemic considerations.

NOTE: all drilling should be done at 800-1200 rpm unless specified otherwise.







Site Preparation and Marking

With the patient in an upright position, use anatomical landmarks and preoperative planning data to mark implant positions.

Ensure proper distance from hairline and prosthesis border.

Confirm planned placement with surgical template or preoperative stent if available. The planned distance between each implant should be atleast 10 mm to facilitate cleaning around the abutment.

For auricular prosthesis, it is suggested that the implants are placed under the anti-helix of the planned prosthesis which would allow concealment of the abutments or bar.

Skin Incision and Flap Reflection

Make a small skin incision (usually 10–15 mm) directly over the planned implant site.

Reflect the skin and soft tissue to expose underlying bone. Minimal dissection is recommended to preserve vascularity.

Begin the osteotomy

Use the round burr (D-RB-MS) to perforate the cranial bone at the desired location. Perform all drilling at 800-1200 rpm with copious irrigation. Use intermittent pressure to avoid thermal damage.

Pilot Drilling

Create the pilot hole using a Ø2.0 mm dedicated drill for the planned implant length. Drill to the full planned depth, guided by the drill flange. Ensure the implant will sit flush or slightly subcrestal.

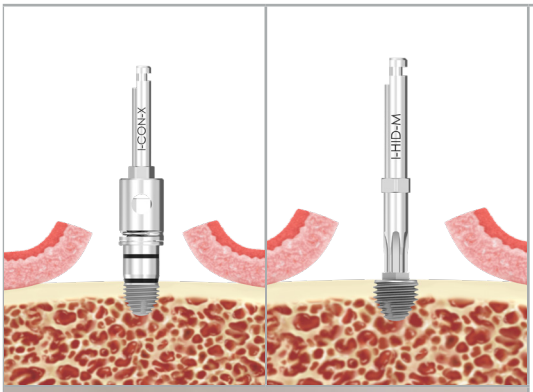
Gradually Enlarge the Osteotomy

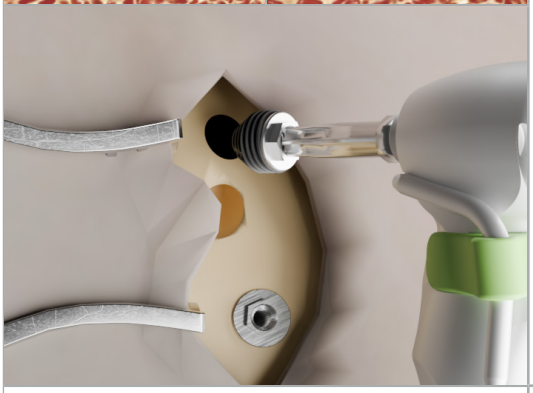
Use length- and diameter-specific drills matched to the chosen implant. Sequentially widen the osteotomy, finishing with the final drill. Take care not to exceed required depth as some drills are self-countersinking.

WARNING: Avoid placing implants near sensitive anatomical landmarks.

Use of Bone Tap in Dense Bone

In cases where the patient presents with particularly dense cortical bone, the use of a bone tap is recommended to facilitate implant insertion and minimise the risk of excessive insertion torque. The bone tap creates threads in the prepared osteotomy, matching the thread profile of the selected implant. This ensures controlled insertion, improves primary stability, and reduces the likelihood of implant stripping or heat generation during placement.





Implant Placement

IE and IET implants are supplied with a fixture mount.
IETi implants use an internal drive and do not require a fixture mount.

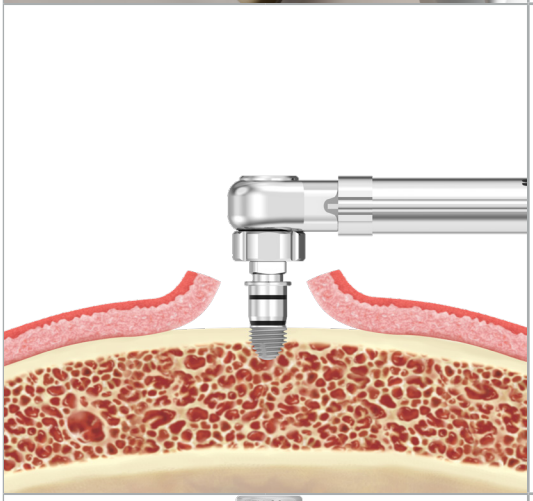
Attach the handpiece insertion tool (I-CON-X or I-HID) to the motor. Ensure full engagement of the implant (IETi) or fixture mount (IE/IET) before torque is applied.

Carefully retrieve the implant from the sterile vial and transport it to the osteotomy.

The handpiece with handpiece insertion tool is used for the initial insertion of the implant, with the torque control set at 50 Ncm at 15 rpm without irrigation. When the handpiece torques out, switch to the surgical wrench.

Avoid applying bending moments to the fixture mount while inserting the implant. Check the fixture mount screw for loosening periodically and re-tighten if necessary.

Insert the implant at low speed (15–20 rpm) without irrigation.

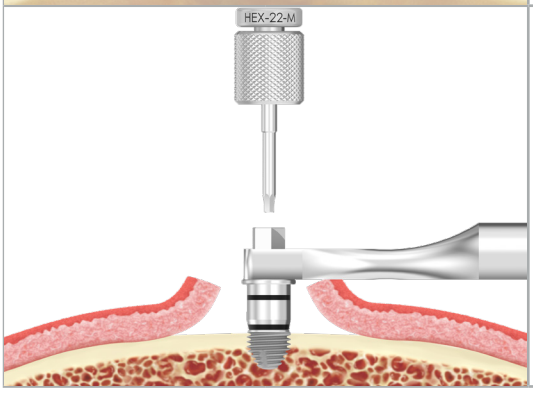


Fully Seat the Implant

The implant platform (IET) or flange base (IE) should rest flush with the bone. Final seating can be performed manually using the torque wrench system (I-TWS, I-TWS-B100 and I-WI-SH converter).

WARNING: Do not advance IE implants after flange contact with bone to avoid bone thread stripping.

NOTE: If torque is <10 Ncm, relocate and prepare a new site.



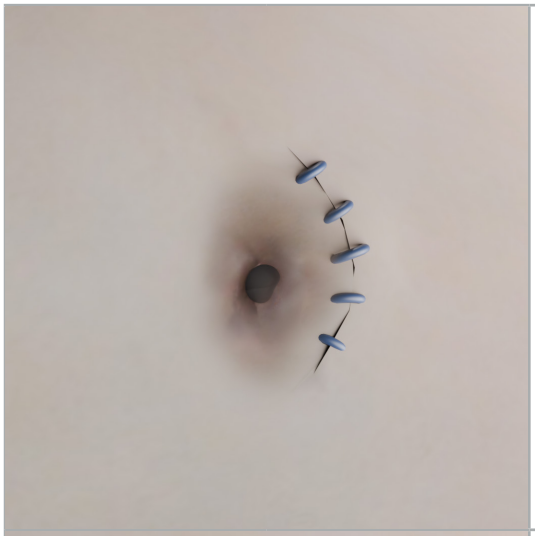
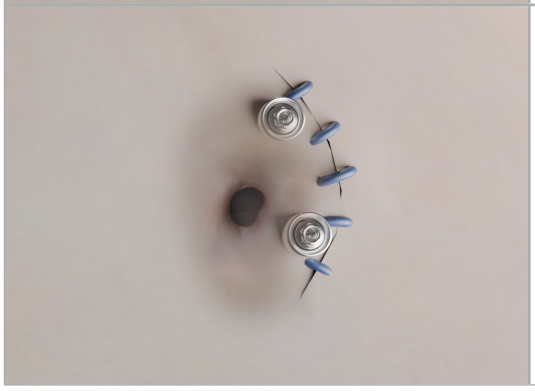
Removal of fixture mount

For IE/IET:

The fixture mount screw is then loosened with the abutment driver (1.22 Hex) and the fixture mount is removed.

Use fixture mount spanner (I-SP-X) to prevent implant rotation.

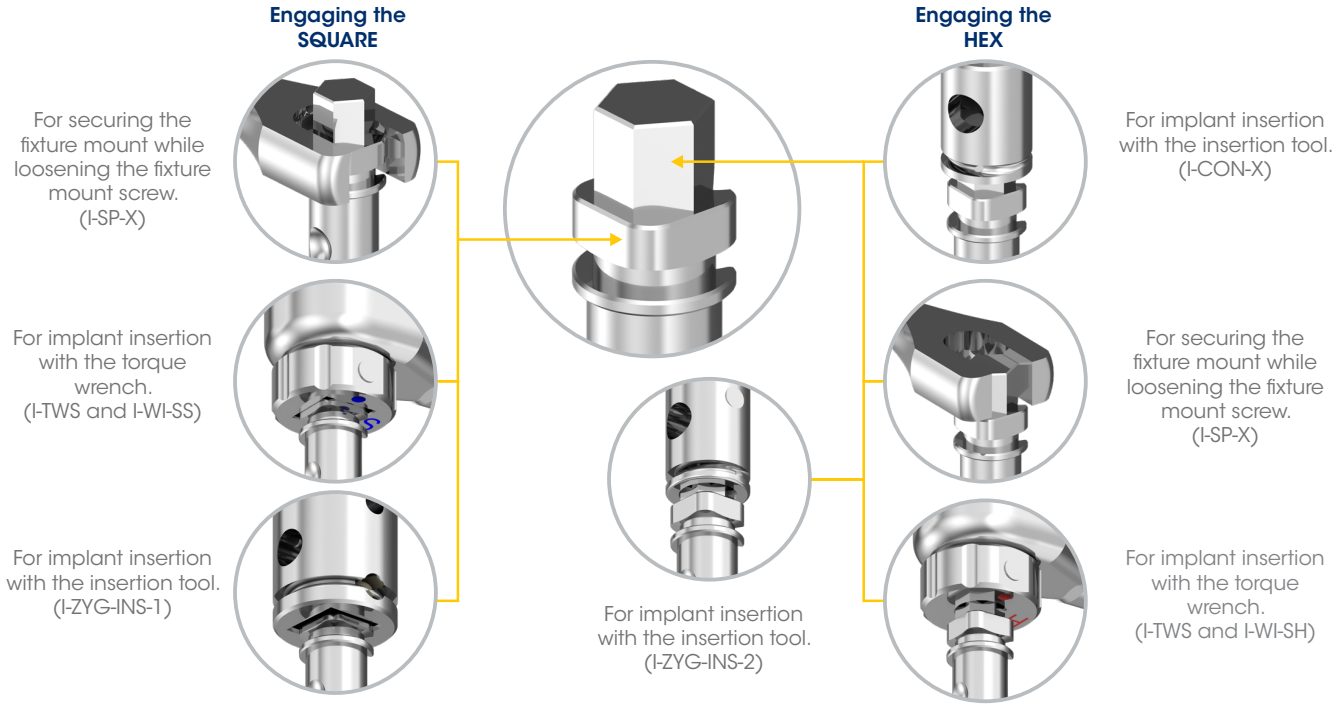
IETi implants require no mount removal.

	**For Two-Stage (delayed) surgery** Insert cover screw (SC4) with 0.9 mm hex driver (I-HHD-09). Torque to 10–15 Ncm. Suture soft tissue over implant to ensure proper closure. Should the surgeon opt for a two-stage delayed approach with proceeding straight to healing abutments, the desired healing abutment height can be selected and inserted using the 1.22 hex driver. **After Healing Period (3–4 Months)** Reopen site using midcrestal incision or soft tissue cutter (I-TC1). Locate and remove cover screw using 0.9 mm driver. Insert healing or standard abutment using 1.22 hex or standard abutment driver with the associated healing cap. Torque to 10–15 Ncm by hand.
	**For One-stage (immediate) surgery** Place a healing or standard abutment at time of surgery and cover with healing cap if applicable. Ensure soft tissue is adapted well around the abutment.

See section 4.1 for recommended timelines for healing before proceeding with the restorative phase of the treatment.

4.6. Correctly engaging the implant insertion tool

The fixture mount may be engaged either on the square portion or the hex.



Ensure that the I-CON-X or the implant driver (I-IMP-INS-1/I-IMP-INS-2) is fully engaged as per the figures below. Should the insertion tool not be fully engaged, damage to the insertion tool and/or fixture mount may occur.

Not fully engaged I-CON-X / I-IMP-INS-2

Fully engaged I-CON-X / I-IMP-INS-2

Not fully engaged I-IMP-INS-1

Fully engaged I-IMP-INS-1

5. Prosthetic Procedure

5.1. Component considerations

Auricular prostheses

The most commonly used abutment heights for ear prostheses are 3.5 mm and 4.5 mm. A low-profile abutment helps to achieve a more natural and aesthetically pleasing prosthesis, but ease of cleaning around the abutment must not be compromised. In patients with thicker skin or anatomical variations, taller abutments (6 mm or 7.5 mm) may be more appropriate to allow proper emergence and hygiene access.

If a one-stage surgical procedure is planned, it is essential to have cover screws on hand during surgery, in case intra-operative findings (e.g., poor bone quality) warrant conversion to a two-stage approach.

It is also advisable to have components ready for 3 mm length implants available, should the actual bone thickness at the time of surgery be less than anticipated.

Orbital and midface prostheses

A two-stage surgical protocol is recommended in these cases. Component selection must be tailored to the clinical situation, which should be assessed collaboratively with the prosthodontist or anaplastologist. Generally, 4 mm implants are preferred if sufficient bone is available. In cases involving irradiated or soft bone, sleeper implants should be placed with cover screws to allow for future activation when clinically appropriate.

5.2 Prosthetic Planning and Impression Procedures

Successful extra-oral prosthetic rehabilitation relies on accurate planning and collaboration between the surgical and prosthetic teams. Once osseointegration and soft tissue healing are confirmed, the restorative phase can begin.

Timing of prosthetic work

- One-stage procedure: The prosthetic phase should commence only after a minimum of 3 months, allowing full osseointegration and soft tissue maturation. Premature loading may jeopardise implant stability and the prosthesis fit.
- Two-stage procedure: Typically, 3–4 weeks after second-stage abutment connection, the site is ready for prosthetic impression and component fitting.

Workflow considerations

- Ensure abutments are clean and stable before taking impressions.
- Custom impression trays may be required to capture unique topography around the defect site.
- For auricular prostheses, impressions should reflect the anti-helix area if a bar is to be constructed.
- It is suggested to take an impression of the opposing ear is advised in order to determine characteristics to carry over into the final prosthesis to ensure symmetry.
- The prosthetic design must accommodate for easy hygiene access while ensuring secure retention.

Sleeper implants

If sleeper implants were placed, consider whether they should be activated during the prosthetic planning stage. These may be brought into function if primary implants prove insufficient for prosthetic support or if retention needs evolve.

Collaboration with the laboratory

Work closely with the prosthetic laboratory and/or anaplastologist to:

- Finalise the attachment system (e.g. bar-retained, magnetic, or screw-retained). Plan for aesthetic masking of components.
- Coordinate prosthesis try-in appointments to assess fit, retention, and appearance.

Impression techniques

Depending on the prosthetic design and clinician preference, impressions can be taken using the Traditional technique with standard impression copings.

Impression procedure

Achieving a precise impression is critical to the long-term success of the extra-oral prosthesis. Below is the step-by-step procedure for capturing an accurate mould:

1. Carefully cleanse the skin surrounding the abutments.
2. Check the tightness of the abutment screws and re-tighten if necessary.
3. Pack the external auditory canal with gauze to prevent ingress of impression material.
4. Attach the appropriate impression copings (CB1) to the abutments using the 1.22 hex driver to fasten the impression pins into the standard abutment. Ensure flap margins are well seated around the abutment to achieve a proper seal.
5. Apply a thin layer of flexible, light-bodied silicone around the impression copings and over the full area to be captured for the prosthesis.
6. Once the initial silicone has set, apply a secondary layer of firm or heavy-bodied silicone to lock the copings in place and provide overall impression stability.
7. Once the silicone has set, carefully unscrew the guide pins and remove the impression from the site.
8. Connect laboratory analogues (LS1) to the impression copings using the same 1.22 hex driver.

Preparing a working model

1. Pour dental stone into the impression with the connected lab analogues.
2. Allow the cast to dry fully.
3. Once hardened, release the impression pins and gently separate the impression from the stone.

The resulting cast offers an exact replica of the defect region with the abutment analogues correctly positioned in height, angle, and location—forming the foundation for a well-fitting prosthesis. This procedure ensures a stable and highly accurate replica of the clinical situation, providing the anaplastologist or dental technician with the necessary data to design and fabricate a well-adapted prosthesis.

5.3 Attachment Options and Retention Systems

A variety of attachment systems are available to retain craniofacial prostheses on osseointegrated abutments. The optimal choice depends on anatomical site, patient dexterity, hygiene needs, and aesthetic preferences. Southern Implants' extra-oral range is compatible with both mechanical and magnetic solutions, offering flexibility to clinicians and anaplastologists during prosthetic planning.

Screw-retained options

In certain cases, the prosthesis may be secured via a screw-retained framework, especially in midface or orbital defects where rigid fixation is required. These are less common and typically used in complex or hybrid reconstructions. Southern offers two screw retained options, gold abutments and titanium abutments, which can also be used to manufacture (cast) a bar onto it.

Bar-retained systems

Bar and clip systems provide strong mechanical retention and are commonly used in auricular prostheses. Bars are typically customised to follow the contours of the defect area and can be designed to house one or more clip housings for secure placement.

- Advantages: strong retention, customisable shape, suitable for multiple implant configurations.
- Considerations: requires sufficient inter-implant space and parallelism; hygiene access must be ensured under the bar.

Magnetic retention systems

Magnetic attachments, such as those provided by Steco Titanmagnetics® or Technovent, offer simple and reliable retention. These systems are especially useful for patients with limited manual dexterity or where soft tissue movement may interfere with clip-based mechanics.

- Advantages: easy to clean, self-aligning, reduced mechanical wear.
- Considerations: regular monitoring required for loss of magnetic strength over time. Exposure to MRI requires prior removal of magnetic components.

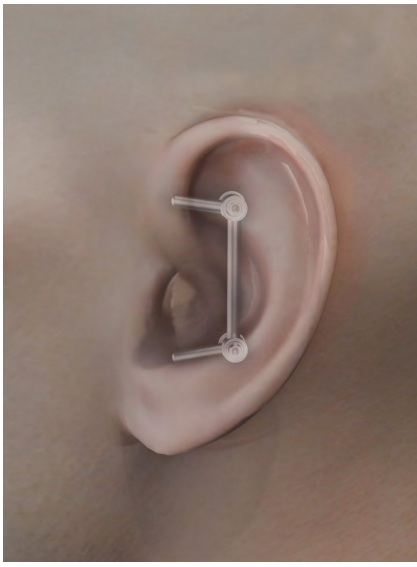
Compatible components for magnetic retention systems can be found in CAT-2010 - Osseointegrated Fixture Product Catalogue.

The associated surgical workflows for each retention solution are outlined in the manufacturers' Instructions for Use, accessible via:

- Steco Titanmagnetics®: https://www.steco.de/en/titanmagnetics/
- Technovent: https://www.technovent.com

When selecting a retention approach, clinicians should consider soft tissue clearance, cleaning access, expected load on the prosthesis, and ease of use for the patient. Interdisciplinary planning with the prosthetic team is essential to ensure a functional and patient-friendly outcome.

5.4. Screw (bar) retained workflows



5.4.1 Bar retention workflows

Bar-retained prosthetic restorations can be achieved through two primary methods: custom casting techniques and the integration of compatible prefabricated components. Both workflows are compatible with Southern Implants' gold and titanium abutments and allow clinicians and technicians to fabricate precise, stable, and patient-specific bar-supported restorations.

Bar Fabrication via Casting Method

Casting remains a widely used method for fabricating bespoke bar frameworks that conform precisely to the patient's anatomical structure and prosthetic requirements.

Bar Construction Using Prefabricated Components

A more streamlined approach involves using pre-designed bar components, such as Preci Horix bars, that interface directly with the abutments.

Clinical Considerations

- Ensure that the bar design allows for proper hygiene access and does not cause soft tissue impingement.
- Check that clip placement permits adequate retention while allowing easy insertion and removal by the patient.
- Evaluate soft tissue clearance and occlusal loads during planning.

For more details on compatible bar systems and abutment components, refer to CAT-4100 – Southern Prosthetic Manual and CAT-2010 – Osseointegrated Fixture Product Catalogue.

5.4.2. Gold abutments

Gold abutments are often chosen for their biocompatibility, mechanical reliability and ease of modification in craniofacial prosthetic applications. They offer a strong and stable interface for retaining bars or other superstructures and can be adapted to suit individual patient anatomy and retention requirements.

These abutments are precision-machined to ensure accurate fit and minimise micromovement between the standard abutment and the prosthesis. They can be incorporated into bar-retained systems or serve as bases for magnet housings. The use of gold abutments allows for easy polishing and long-term durability, making them a favoured option among anaplastologists and maxillofacial prosthodontists.

Material Composition and Handling

- Chemical Composition: 60% Gold, 19% Platinum, 20% Palladium, 1% Iridium
- Coefficient of Expansion (Ceramicor): 25–500°C: 11.9 & 25–600°C: 12.2
- Melting Point: Approx. 1475°C
- Casting Temperature: ±920°C

Casting Guidelines

- Avoid excessive furnace temperature to prevent distortion.
- Rapid heating to the target casting temperature is recommended to limit investment expansion and ensure precise fit

Compatible Casting Alloys for Custom Work:

- Stabilor-Betta Dental
- Procast Y45-Argen
- Argenco 1

Component Assembly and Workflow

1. Use the 1.22 mm hex driver (I-HD-L) to place a Series 1 brass screw (BSH1) into the chimney of the GCP3 abutment and mount it onto the LS1 analogue on the model.
2. Repeat this for all implant analogues.
3. The gold abutments and bar are cast as a single gold substructure which is then secured to the standard abutments, completing the prosthetic foundation.

NOTE: pre-fabricated bar systems, such as Preci Horix bars, can be used to simplify the bar construction process.

For more detailed guidance on prosthetic planning, component selection and retention strategies, refer to CAT-4100 – Southern Prosthetic Manual.

5.4.3. Titanium (Ti) abutments

Titanium abutments, such as the TC9 Temporary Titanium Cylinder, offer an effective and durable solution for supporting bar-retained prostheses. These components provide strong mechanical anchorage and are suitable for various clinical configurations.

Component handling and preparation

- Using the 1.22 mm hex driver (I-HD-L), insert a Series 1 brass screw (BSH1) into the chimney of each TC9 abutment.
- Attach the abutment to the corresponding LS1 analogue on the working model.
- Repeat this process for all implant analogues.
- For efficient bar fabrication, consider using pre-fabricated components like Preci Horix bars, which reduce the need for full custom bar construction.
- The TC9 abutments are later attached to standard abutments, and the bar framework is retained mechanically using self-cure resin or composite.

Wax-Up and Bar Construction Workflow

1. Place TC9 titanium cylinders onto the LS9 lab analogues of the working model.
2. Adjust the height of each cylinder by cutting them to the desired length.
3. Secure the screws to a torque of 10 Ncm using the 1.22 mm hex wrench.
4. Wax up a coping framework that spans from cylinder to cylinder, including any bar elements.
5. The TC9 abutments are not placed in the casting furnace.
6. A permanent superstructure is cast in high-strength chrome-cobalt.

Fabrication of Chrome-Cobalt Superstructure

- Mount the TC9 cylinders on the model analogues.
- Block out the retention grooves.
- Wax up a bar structure that fits over the TC9 cylinders without incorporating them.
- Cast the wax-up in chrome-cobalt alloy.
- Bond the chrome-cobalt bar to the titanium cylinders post-casting using adhesives such as Ceka Site or Panavia 4.
- This post-casting bonding creates a composite framework combining chrome-cobalt and titanium components, with lamination occurring after the casting process.

Finishing and Clip Placement

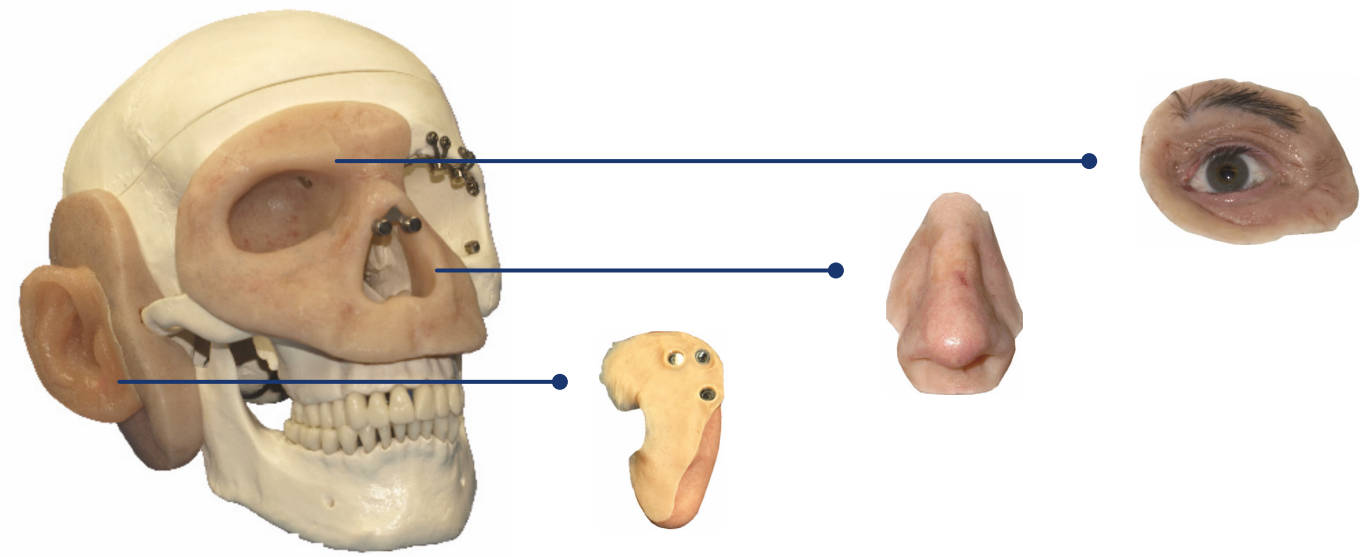
- After casting and devesting, return the bar structure to the working model.
- Attach retention clips to the bar.
- Apply a wax undercut block to prevent contact between the final acrylic plate and the skin.
- Protect the sides of the clips with wax to avoid resin coverage, ensuring easier adjustment and activation.

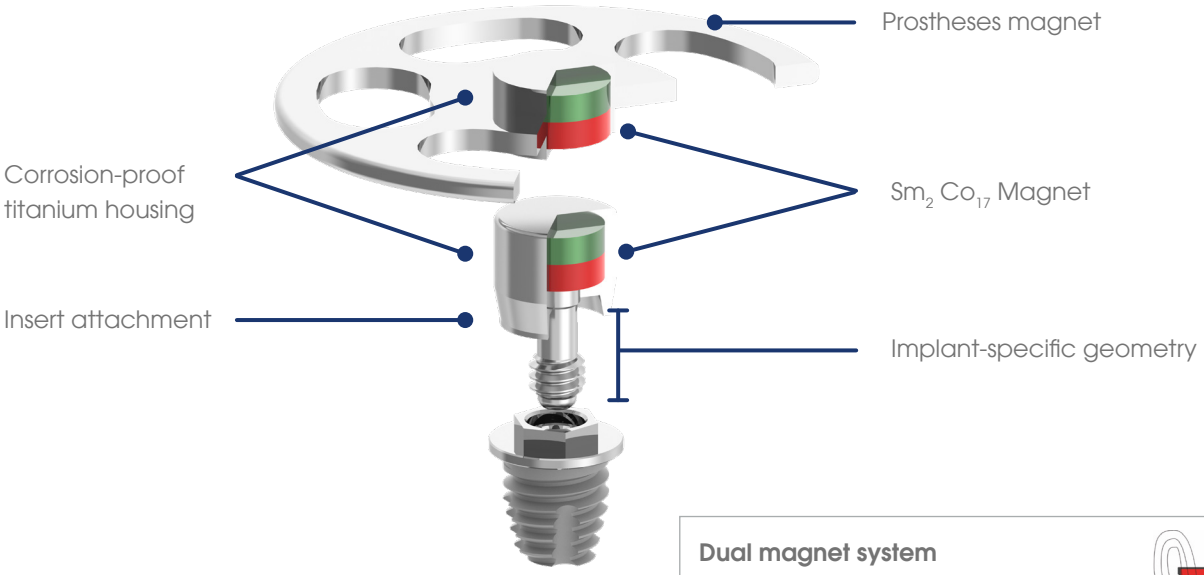
Final Prosthetic Fabrication

Proceed with construction of the craniofacial prosthesis (e.g. ear), following standard laboratory protocols.

5.6. Magnetic retention workflows

Magnetic prosthetic retention systems work on the principle of embedding magnetic housings within the soft tissue side of the prosthesis, which correspond to matching magnetic abutments anchored to the osseointegrated implants. These magnets provide a gentle but effective retention force, guiding the prosthesis into the correct position while allowing for easy removal and daily hygiene.

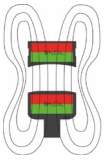




steco system-technik

TECHNOVENT

Dual magnet system
Two open magnet fields exert a force of attraction over a longer distance than mono-magnet systems.



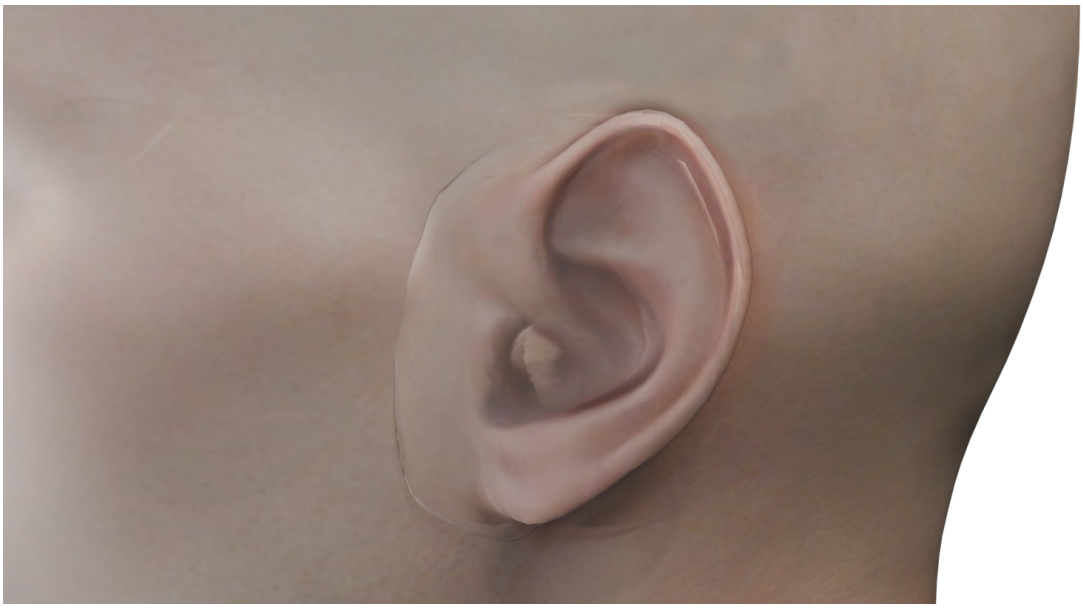
This type of retention is particularly suited to patients with limited manual dexterity, or those prioritising ease of placement and comfort. The low-profile design also benefits cosmetic outcomes, especially in orbital and nasal prostheses.

Compatible components for magnetic retention systems can be found in CAT-2070 - Osseointegrated Fixture Product Catalogue. The associated surgical workflows for each retention solution are outlined in the manufacturers' Instructions for Use, accessible via:

- Steco Titanmagnetics®: https://www.steco.de/en/titanmagnetics/
- Technovent: https://www.technovent.com

5.7. Making the Epithesis

The final stage of craniofacial rehabilitation involves the design and fabrication of a high-quality epithesis that meets both functional and aesthetic demands. This section outlines the step-by-step process for sculpting, moulding, and fitting a customised facial prosthesis using advanced techniques and materials. Emphasis is placed on anatomical accuracy, secure retention, and long-term biocompatibility. The collaborative efforts of skilled anaplastologists and prosthetic technicians are essential in delivering a lifelike restoration that integrates seamlessly with the patient's anatomy.



Preparation: Impression of the Opposite Ear

To aid the sculpting process and ensure anatomical symmetry, it is beneficial to take an impression of the unaffected, contra-lateral ear when possible. This provides a reference model to compare against the sculpted prosthesis.

- Apply a suitable impression silicone carefully around the patient's intact ear and allow it to cure completely.
- Once set, remove the impression and pour dental stone into the negative mould to form a positive model of the ear structure.

Wax Model Sculpture and Fitting

- Create a detailed wax prototype of the intended prosthesis.
- Tip: If available, reference the impression of the contra-lateral ear when sculpting, or scan and mirror the opposite plaster ear for greater anatomical accuracy.
- Gently soften and position the wax model onto the patient's acrylic plate.
- Ensure a 2 mm clearance between the skin and the posterior surface of the plate/prosthesis to promote ventilation and minimise skin irritation due to moisture accumulation.
- Assess the wax model's fit from multiple perspectives, including while the patient opens and closes their mouth, performs facial expressions, and changes position between sitting and standing.
- The anterior edge of the wax ear should be sculpted to a feather-thin margin for an aesthetically pleasing and natural transition.

Plaster Mould Fabrication

- Secure lab analogues to the impression coping cylinders of the bar construction, and position the bar and abutment replicas within the clips on the acrylic plate.
- Construct a three-piece mould as follows:
- Embed the bar and fitting surface of the wax model in the initial plaster section.
- Apply a separating agent to prevent adhesion between mould sections.
- Create key holes to ensure accurate repositioning of mould parts.
- Cast the second section up to the midpoint of the helix.
- Apply separating agent again and repeat key hole formation before pouring the final mould segment.
- Once the plaster has set, gently disassemble the mould sections using hot or boiling water.

Acrylic Plate Preparation (to ensure optimal bonding between the acrylic plate and silicone)

- Mechanically roughen the bonding surface with a stone burr.
- Clean the abraded surface with acetone.
- Apply two uniform coats of bonding primer and allow sufficient drying time.
- Accurately reposition the treated acrylic plate onto the bar assembly.

Silicone Preparation and Mould Packing

- Combine silicone with colour pigments carefully matched to the patient's natural skin tone.
- Introduce the catalyst as per the silicone manufacturer's specifications.
- Layer the internal surfaces of the mould with pigmented silicone, utilising internal colouration techniques to enhance realism.
- Tip: Add fine fibres to replicate the appearance of superficial vascular structures. Allow the silicone to fully cure.
- Once polymerised, delicately open the mould and extract the prosthesis. Perform any necessary contouring or refinement.

Final Prosthesis Fitting

- Place the completed prosthesis on the patient to verify retention, aesthetic integration, and colour harmony.
- Apply final extrinsic colouring if required for optimal match.
- Issue the prosthesis to the patient along with thorough guidance on maintenance and hygiene for both the prosthesis and peri-abutment skin.

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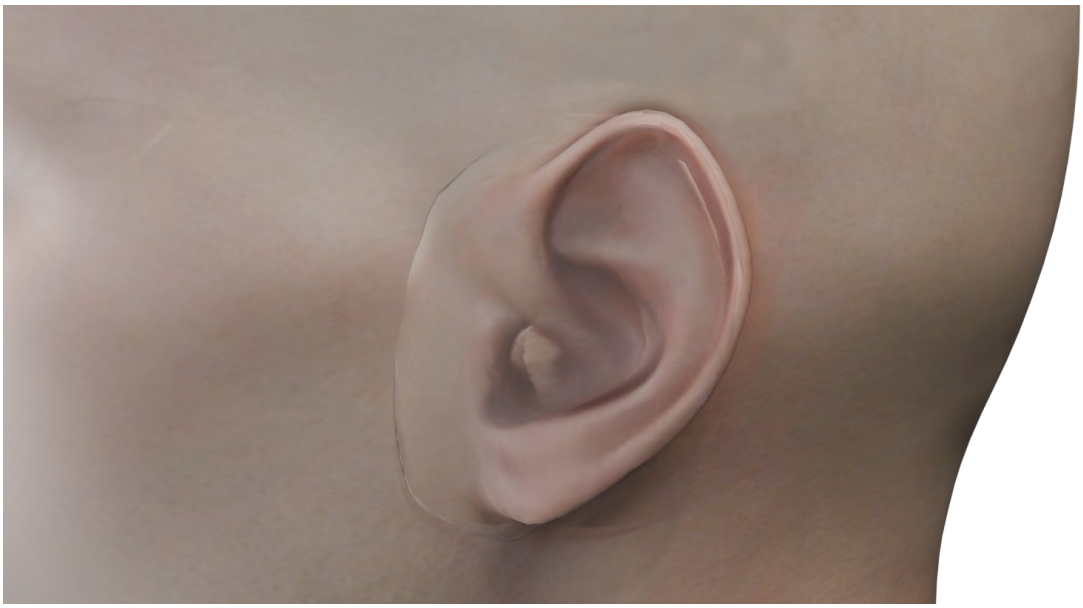

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- Gently soften and position the wax model onto the patient's acrylic plate.
- Ensure a 2 mm clearance between the skin and the posterior surface of the plate/prosthesis to promote ventilation and minimise skin irritation due to moisture accumulation.
- Assess the wax model's fit from multiple perspectives, including while the patient opens and closes their mouth, performs facial expressions, and changes position between sitting and standing.
- The anterior edge of the wax ear should be sculpted to a feather-thin margin for an aesthetically pleasing and natural transition.

Plaster Mould Fabrication

- Secure lab analogues to the impression coping cylinders of the bar construction, and position the bar and abutment replicas within the clips on the acrylic plate.
- Construct a three-piece mould as follows:
- Embed the bar and fitting surface of the wax model in the initial plaster section.
- Apply a separating agent to prevent adhesion between mould sections.
- Create key holes to ensure accurate repositioning of mould parts.
- Cast the second section up to the midpoint of the helix.
- Apply separating agent again and repeat key hole formation before pouring the final mould segment.
- Once the plaster has set, gently disassemble the mould sections using hot or boiling water.

Acrylic Plate Preparation (to ensure optimal bonding between the acrylic plate and silicone)

- Mechanically roughen the bonding surface with a stone burr.
- Clean the abraded surface with acetone.
- Apply two uniform coats of bonding primer and allow sufficient drying time.
- Accurately reposition the treated acrylic plate onto the bar assembly.

Silicone Preparation and Mould Packing

- Combine silicone with colour pigments carefully matched to the patient's natural skin tone.
- Introduce the catalyst as per the silicone manufacturer's specifications.
- Layer the internal surfaces of the mould with pigmented silicone, utilising internal colouration techniques to enhance realism.
- Tip: Add fine fibres to replicate the appearance of superficial vascular structures. Allow the silicone to fully cure.
- Once polymerised, delicately open the mould and extract the prosthesis. Perform any necessary contouring or refinement.

Final Prosthesis Fitting

- Place the completed prosthesis on the patient to verify retention, aesthetic integration, and colour harmony.
- Apply final extrinsic colouring if required for optimal match.
- Issue the prosthesis to the patient along with thorough guidance on maintenance and hygiene for both the prosthesis and peri-abutment skin.

6. Aftercare

Postoperative care plays a critical role in the long-term success of osseointegrated fixtures. Whether a one-stage or two-stage approach is used, consistent hygiene and structured follow-up are essential to support healing and implant stability.

One-stage procedures
Although the soft tissue management is similar to that of two-stage procedures, clinicians must be particularly cautious to avoid any functional loading of the implant until full osseointegration and tissue healing have occurred. It is recommended to wait at least three months before commencing prosthetic procedures. Loading the implants prematurely can compromise integration and negatively affect the prosthetic fit.

Two-stage procedures
One week following abutment surgery, the dressing and healing caps should be removed. The area is then carefully cleaned and exposed to air for an hour before reapplying the healing caps and placing a new dressing to gently compress the skin flap or graft. After another week, the dressing and caps are removed permanently, allowing the skin to remain exposed.

Over the next 2–3 weeks, patients should cleanse the area daily using an ointment, transitioning to soap and water thereafter, with occasional use of ointment as needed. Accumulated epithelial debris may need to be cleaned periodically. While some patients are able to do this themselves, others may require clinical assistance.

Cleansing must be performed gently to preserve the fixture–tissue interface. Strong detergents and vigorous scrubbing should be avoided.

Daily hygiene and follow-up
A consistent daily cleaning routine is vital to maintain irritation-free skin contact with the abutment. This is important even in the absence of discomfort, as minor irritation may escalate into infection if neglected.

Cleaning underneath bar structures is also important. If soft tissue encroaches upon the bar, it may indicate inadequate tissue reduction during the original surgery and may require revision.

Patients should be enrolled in a structured follow-up program, typically requiring one or two visits per year, though some individuals may require more frequent monitoring.

Clinical evaluations
During follow-up visits, clinicians should assess implant and abutment stability. Check for proper fit at the implant–abutment junction and assess the tightness of the standard abutment or retention screw. If any movement is detected, the screw or abutment should be re-tightened.

One of the most frequent causes of skin irritation is implant mobility at the soft tissue penetration site. Ensuring stable components, combined with consistent hygiene and routine clinical evaluation, will support long-term implant success.

7. Complications and Troubleshooting

Successful rehabilitation with osseointegrated extra-oral implants depends on careful planning, precise technique, and continued monitoring. Despite best efforts, complications may still arise. This section outlines common issues and management strategies, with guidance tailored to specific prosthetic sites.

General complications

- Loss of osseointegration: may result from poor primary stability, overheating during drilling, infection or patient systemic conditions. Management involves removal of the implant, bone healing (with potential bone grafting if required) and re-implantation in an alternative site.
- Soft tissue overgrowth: often caused by inadequate abutment height or poor hygiene. Management includes soft tissue re-contouring and use of appropriate abutment height.
- Skin irritation/infection: typically around abutments; treated with local antiseptics or systemic antibiotics depending on severity. Abutment design and patient hygiene must be re-evaluated.
- Inaccessible implant positioning: may interfere with prosthesis fit or compromise aesthetics. Often results from improper planning. Should be corrected via multidisciplinary coordination.
- Prominent abutments causing irritation: soft tissue sculpting and review of abutment length may be necessary.

Intra-operative Complications

- Implant resistance during insertion: If the implant becomes lodged during insertion, this may indicate misalignment. Reverse the motor to back the implant out and reassess alignment. If difficulty persists, prepare a new osteotomy a few millimeters away.
- Flange continues to rotate: Most often a result of low bone density or excessive insertion torque. Stop the procedure, and select a new site at least 5 mm away. Lower the torque setting before reinsertion.
- Dura or sinus exposure: In rare cases, minor cerebrospinal fluid (CSF) or venous bleeding may occur during drilling. If bone thickness allows, insert the implant to seal the site. Otherwise, select a new position after sealing with soft tissue or bone wax.
- Subdural haematoma: A rare, slowly developing complication from venous injury. Symptoms may present postoperatively as general neurological signs. Confirm via imaging (CT or MRI) and manage according to standard clinical protocols.
- Asymmetrical implant placement: can lead to a misaligned prosthesis. Prosthetic design must compensate via bar customisation or angled abutments.

Postoperative Soft Tissue Complications

- Peri-abutment inflammation or infection: May result from poor hygiene, excess soft tissue, insufficient osseointegration, or abutment movement. Thorough cleaning and application of antimicrobial agents are typically effective. Patients should receive renewed hygiene instruction.
- Chronic soft tissue irritation: If symptoms persist, remove the abutment and allow the area to heal for 1–2 weeks. Microbial culture can guide targeted antimicrobial or anti-inflammatory therapy. A corticosteroid cream may be indicated before reattempting abutment placement.
- Scar tissue present in visable sites: especially in post-trauma or irradiated patients. Preoperative soft tissue planning and possible grafting may be required.
- Inadequate retention: often due to low implant torque or improper bar fabrication. Addressed by assessing ISQ values and either leaving the site to heal and integrate or placing the implant in a new site. Revising the bar-retained system design or retention method might be alternate solutions for addressing poor prosthetic abutment retention.

Ongoing follow-up and interdisciplinary collaboration are essential to prevent and resolve these complications effectively.

8. Additional resources

For detailed specifications, compatible components, and extended surgical and prosthetic workflows, refer to the following Southern Implants resources:

CAT-4001 - Prosthetic Manual

Includes all prosthetic components compatible, relevant workflows and torque values for restorative procedures.

CAT-2010 - Osseointegrated Fixtures Implant Catalogue

Provides comprehensive product codes, dimensions, and compatible surgical instrumentation for the Osseointegrated implant systems.

CAT-2063 - Digital Workflow Guide (SIDigital)

For clinicians using CAD/CAM workflows, the SIDigital guide outlines scan body compatibility and digital restorative options.

CAT-8071 - Osseointegrated Fixtures Instruction For Use

Stipulates the technical indications, materials and regulatory information about the Osseointegrated Fixtures implant range.

CAT-1217 - How to remove a fixture mount that is too tight

Advises the protocol on how to handle an implant that has a fixture mount that is too tight.

To access these catalogues and additional surgical resources, visit the official Southern Implants web page:

southernimplants.com

For the latest Instructions for Use (IFU), including surgical protocols, sterilisation processes, and regulatory information, please refer to:

southernimplants.com/ifu

For more information scan below

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