SOUTHERNIMPLANTS®

Innovative Treatment Solutions

ZYGOMATIC 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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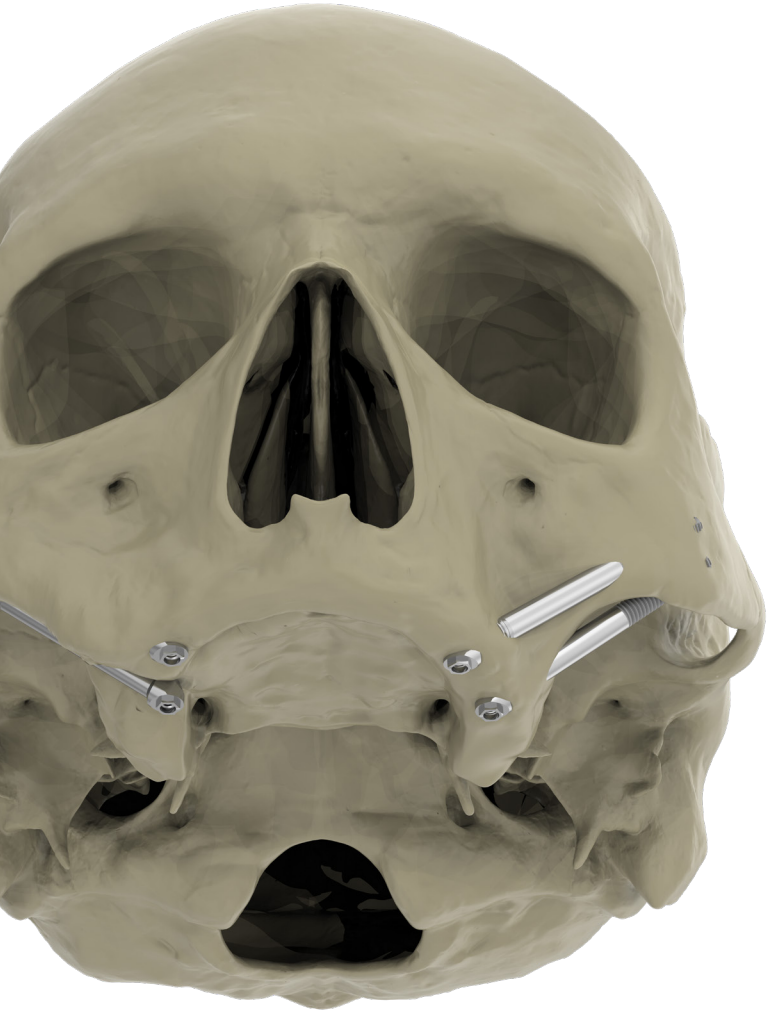
Overview of the Southern Implants' Zygomatic Surgical Manual

The Southern Zygomatic Implant range provides advanced solutions for the rehabilitation of patients with severely resorbed maxillae, post-oncological defects, or failed augmentation procedures. These implants offer bio-mechanical stability in compromised bone conditions by anchoring in the Zygomatic bone. Zygomatic implants are intended to treat partially or fully edentulous patients with severely resorbed or absent maxillae for whom conventional implants are not an option as a means of fixing a permanent or removable dental or maxillofacial prosthesis.

The purpose of this surgical manual is to provide a detailed, step-by-step guide for clinicians to plan and execute surgical procedures using the full Southern Zygomatic range: ZYGAN, ZYG-55, ZYGIN, ZYGIN-W, ZYGON, ZYGEX, and ONC-55. This guideline is formulated from experienced surgeons, manufacturer specifications, and peer-reviewed literature.



Key features of this manual include:

1. *Southern Implants Zygomatic Implant Features*: Comprehensive review of macro- and micro-design elements.
2. *Surgical Considerations*: Access, visibility, torque control, angulation, and anatomical zones.
3. *Zygomatic Protocol Synopsis (ZAGA Classifications)*: Outlining ZAGA types 0–4 and implant selection guidance.
4. *Understanding the Product Range and Catalogue*: Indications for each system, compatibility, and component codes.
5. *Surgical Procedures Covering*:
   i. Surgical access, flap design, and osteotomy preparation.
   ii. Implant-specific insertion protocols, with torque values and handpiece guidance.
   iii. Prosthetic management and loading guidance, including immediate vs. delayed load workflows.
6. *Postoperative protocols.*

NOTE: This manual is written for maxillofacial surgeons and advanced implantologists and assumes familiarity with Zygomatic surgical principles. Southern recommends prior hands-on training and education before clinical application to learn proper technique, bio-mechanical requirements and radiographic evaluation. This surgical manual is not intended as a substitute for adequate training. Additionally, these guidelines do not substitute the Zygomatic Implants Instructions For Use (IFU). The Zygomatic Implants IFU (CAT-8054) 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.

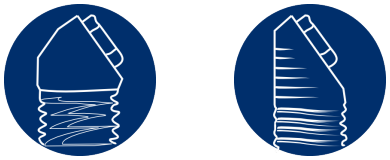
NOTE: Not all products are cleared for sale in all countries.

Implant description

The Southern Implants Zygomatic range includes the standard ZYG-55, ZYGAN, ZYGIN, ZYGIN-W, ZYGEX, ZYGON and ONC-55 Implants. The implants are available in different length variations ranging from 27.5 mm up to 60 mm long to enable anchorage in the Zygoma and have a 55° head angle for prosthetic emergence. They are made from biocompatible, commercially pure Titanium grade 4 (>900 MPa) and are to be used with a wide range of prosthetic components.

Implant Features

Prosthetic axis is inclined at 55° to the surgical axis



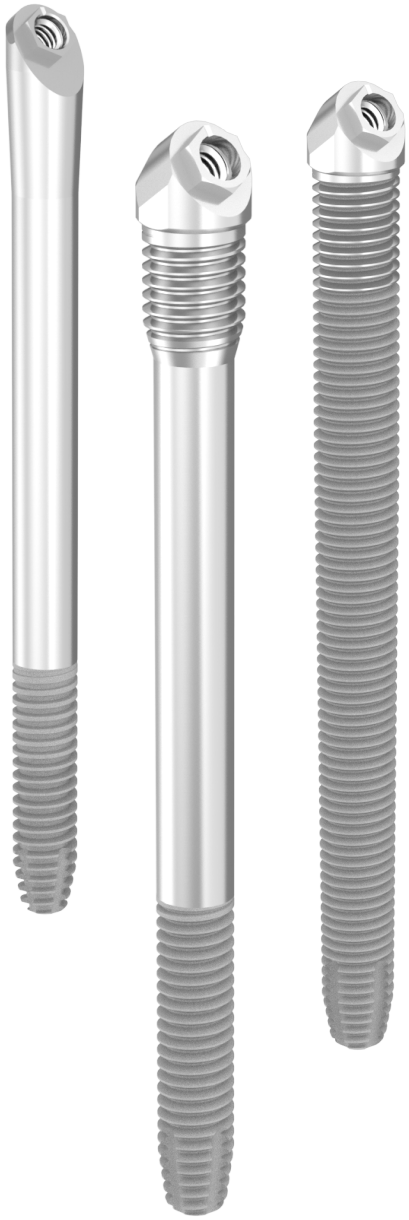
7 different variations

The entire length of the ZYG-55 is threaded.

The *ZYGAN, ZYGIN, ZYGIN-W* have apical and coronal threads. The coronal threads have a smooth, machined finish with a non-threaded mid-section.

The ZYGEX, ONC-55 and ZYGON only have apical threads, with a smooth machined coronal portion.

High strength grade 4 Titanium (UTS >900 MPa)



External hex connection with an M2 screw thread

Narrow head in the ZYGIN Family range

All non-threaded surfaces have a machined finish

Apical threads are grit blasted

Narrow apex on ZYGAN, ZYGEX, ZYGIN, ZYGIN-W & ZYGON

Zygomatic Family			
ZYG-55	ZYGAN	ZYGEX	ONC-55
			
Compatible with **AMCZ** Compact Conical (MUA)			
			

ZYGIN Family		
ZYGIN	ZYGIN-W	ZYGON
		
Compatible with **MC-ZYG** Compact Conical (MUA)		
		

Connection Specifications:
The Zygomatic and ZYGIN implant families are available in an external hex connection. The Zygomatic family use the Ø4 External Hex (IB) prosthetic components. The ZYGIN family uses the MC-ZYG prosthetic components. The size of the hex, the size of the implant platform and the length of the screw channel are vital information to consider when determining compatible components for restorative solutions.

See CAT-4100 (Southern Prosthetic Manual) for information regarding prosthetic components, their workflows and indications.

2. Surgical Considerations

For a comprehensive list of indications, contraindications and additional details about the Zygomatic implant range, refer to the Zygomatic Implants IFU (CAT-8054).

The Southern Implants Zygomatic System Standard implants, the ZYGAN (narrow apex), ZYGIN (narrow apex and coronal implant head), the wide ZYGIN, the ZYGON, the Oncology and the ZYGEX (narrow apex) implants are intended to be implanted in the upper jaw to provide support for fixed or removable dental prostheses in patients with partially or fully edentulous maxilla. All implants are appropriate for immediate loading when good primary stability is achieved and with appropriate occlusal loading.

Bone quality and quantity

Choose the appropriate length implant for the placement site. Take care to avoid anatomical structures such as the orbit and infraorbital nerve. Take note of the implant path (trans-sinus/through the sinus wall/extra-sinus/extra-maxillary) when determining the correct drill sequence.

Loading times

Healing period is generally 4-6 months in the maxilla; however, healing periods may vary for each patient. When a shorter healing time or immediate loading is being considered, the assessment must be based on the individual clinical situation (i.e. bone quality, bone quantity, primary stability achieved, loading conditions, design of super-structure, etc.).

Implants may be immediately temporised on splinted multiple-unit restorations, if good primary stability is achieved. It is advised to utilise regular implants in conjunction with Zygomatic implants in order to stabilise larger prostheses. The patient should adhere to a soft diet and place minimal forces on the restoration for 6-12 weeks.

Troubleshooting

- **Implant mobility during insertion:** If the implant is very loose, consider removal and replacement with a wider diameter implant (if possible) without further drilling, or consider placement in a new site adjacent to the first.
- **Exposed threads:** If surface roughened implant threads are exposed in the coronal region, perform a bone augmentation procedure.
- **Sinus membrane perforation:** Depending on the perforation, it is advised to manage the performation with collagen membrane placement.
- **Difficulty with prosthetic access:** In cases with poor prosthetic emergence, consider ASC (Angulated Screw Channel) abutments to correct the prosthetic axis up to 20°, or use approved angled abutments designed for zygomatic implants.

NOTE: Periodic follow-up and imaging are essential to monitor resolution or progression.

Warnings

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

- For the safe and effective use of dental 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.

Additionally, use of Zygomatic implants in bone tissue which has been irradiated as part of cancer therapy may result in the following:

- Delayed or failed osseointegration of implants due to reduced bone vascularity, clinically expressed as osteoradionecrosis.
- Tissue dehiscence and osteoradionecrosis.

- Implant failure and loss.
- Implant treatment of irradiated patients is dependent upon issues like the timing of implant placement in relation to the radiation therapy, anatomic site chosen for implant placement and radiation dosage at that site and consequent risk of osteoradionecrosis.

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; incorrect abutment seating; abutment angles greater than 30 degrees; occlusal interferences causing excessive lateral forces; patient parafunction (e.g., bruxing, clenching); loss or changes in dentition or functionality; 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

- Care must be taken that parts are not swallowed during any of the procedures, thus rubber-dam application is recommended when appropriate.
- Care must be taken to apply the correct tightening torque of abutments and abutment screws.
- Drill at high speed (1000 - 1500 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 oral hygiene must be maintained and are essential for favourable long-term results.

Handling procedure and sterility

Precautions should be taken to maintain the sterility of the implant
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 plastic blister and peel back TYVEK lid are sterile only on the inside. The sealed blister is to be opened by an assistant (with non-sterile gloves).

Follow the illustrations below to maintain sterility whilst handling the implant.

NOTE: white gloves and background represent non-sterile items. Blue gloves and background represent sterile items.

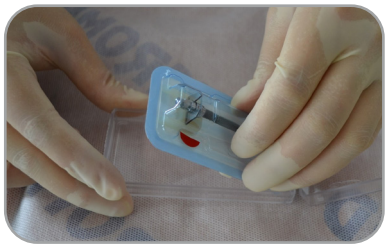


Figure 1: to open implant package in the non-sterile field, with non-sterile gloves, tear the tamper-proof label to open the box. With non-sterile gloves remove the inner blister.

Figure 2: the sealed blister must be opened by an assistant (non-sterile gloves). Peel back the TYVEK lid and present the open blister to the surgeon.

Figure 3: without touching the outside of the blister, the surgeon removes the implant holder. Take care to not touch the implant.

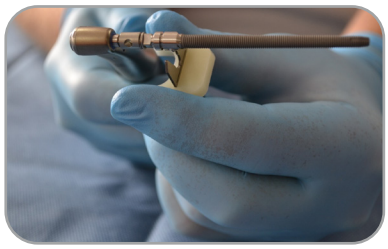


Figure 4: engage the handpiece placement tool (I-CON-X) onto the fixture mount and with upwards movement, remove the implant from the metal clip on the implant holder.

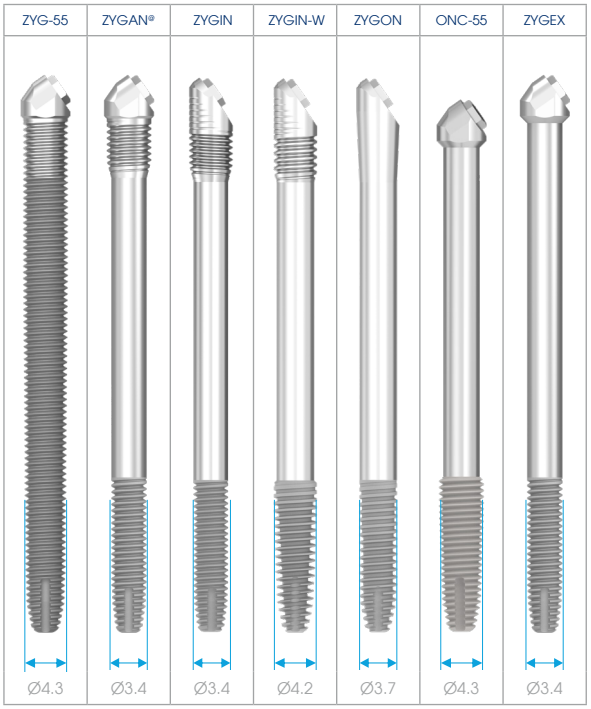
3. Zygomatic protocol synopsis (ZAGA Classifications)

Southern Implants is aware of a number of different protocols currently used by various centres around the world. The classic technique for Zygomatic placement involved cutting a sinus window and placing the implant through the sinus. The sinus-slot technique and exteriorised technique have since been developed, with the implant placed through the sinus wall and outside the sinus wall respectively. It has been suggested that the choice of technique should consider the ridge crest concavity and sinus anatomy (Chrcanovic et al. 2013).

The ZAGA approach classifies the anatomy into different types to determine the appropriate technique for Zygomatic implant placement (Aparicio et al. 2014). The ZAGA (Zygomatic Anatomy-Guided Approach) classification system provides a clinically relevant framework to customise the surgical path of Zygomatic implants based on individual anatomical variation of the maxillary sinus and lateral wall. Understanding the ZAGA type helps the surgeon determine the ideal implant trajectory and emergence location to achieve optimal primary stability and prosthetic outcome while minimising sinus involvement.

While the chosen placement technique and implant selection is up to the practitioner's preference, this section illustrates the best Southern Implants Zygomatic implant for each technique using the ZAGA approach.

Anatomy	ZAGA classification	Implant path	Alternate placement technique	ZYG-55	ZYGAN®	ZYGIN	ZYGIN-W	ZYGON	ONC-55	ZYGEX
Anterior maxillary wall is very flat	ZAGA 0	Intra-sinus	Classic	✓	✓	✓	✓			
Anterior maxillary wall is slightly concave	ZAGA 1	Intra-extra path	Classic/ sinus-slot	✓	✓	✓	✓			
Anterior maxillary wall is concave	ZAGA 2	Extra-intra path	Sinus-slot/ exteriorised	✓	✓	✓	✓			
Anterior maxillary wall is very concave	ZAGA 3	Extra-sinus	Exteriorised		✓	✓	✓	✓	✓	✓
Maxilla and alveolar bone show extreme atrophy or maxilla has been resected	ZAGA 4	Extra-maxillary	Extra-alveolar					✓	✓	✓



The quad protocol entails placing two implants in one Zygoma. The ZYGAN®, ZYGIN, ZYGIN-W, ZYGON and ZYGEX are best suited to the quad protocol due to their narrower apex.

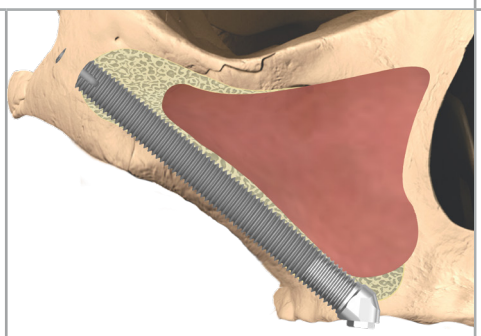
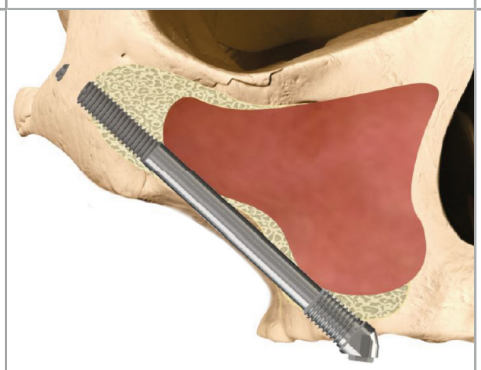
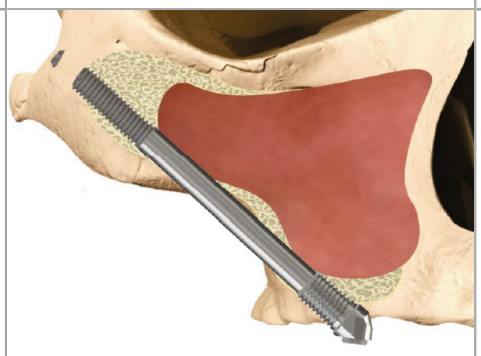
The Zygomatic implants features a Machined Surface Coronally (MSC) which captures the advantage of a machined coronal surface that covers the crestal portion of the implant. Indicated for patients with higher risk of coronal bone loss (smokers, history of periodontitis and cardiovascular disease).

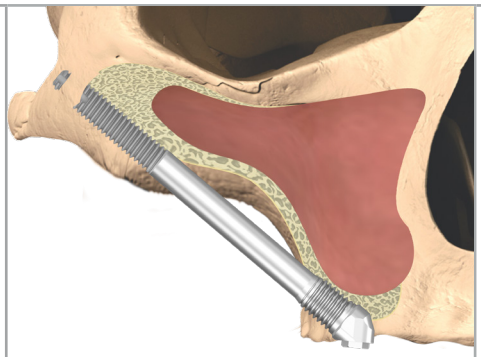
The ZYG-55, ZYGAN® and ZYGEX implants are equipped with a bone mill fixture mount which aims to provide a multipurpose function where it performs as both the fixture mount required for insertion as well as a bone mill to prepare the alveolar bone for abutment seating. For more information regarding the Bone Mill Fixture Mount, refer to CAT-1219.

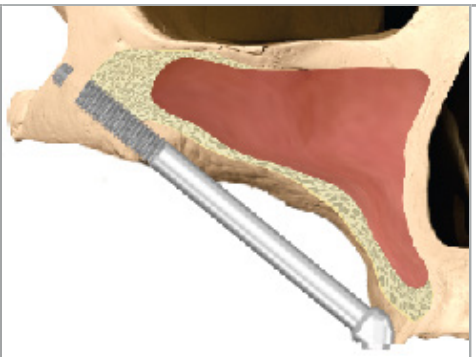
The ZYGIN, ZYGIN-W and ZYGON implants are equipped with a narrower fixture mount and implant head which is indicated for patients with a severly atrophic maxilla. Should there be insufficient primary stability during insertion, the ZYGIN-W designed with a wider apical region is indicated for use.

The ONC-55, ZYGEX and ZYGON implants are indicated for oncological resections and maxillectomy cases.

ZAGA approach classifications and suggested implants

ZAGA Classification			Indicated implant	Rational
ZAGA 0	The anterior maxillary wall is very flat. The implant head is located on the alveolar crest. The implant body has an intra-sinus path. The implant comes in contact with bone at the alveolar crest and Zygoma, and sometimes at the internal side of the sinus wall.		ZYG-55 ZYGAN® ZYGIN ZYGIN-W	Should the entire section of the implant be surrounded by bone or bone material due to a sinus lift, a fully threaded ZYG-55 implant may be used. Alternatively the smooth mid-section design reduces the exposure of the sinus and soft tissues to roughened implant thread.
ZAGA 1	The anterior maxillary wall is slightly concave. The implant head is located on the alveolar crest. The drill has performed the osteotomy slightly through the wall. Most of the implant body has an intrasinus path. The implant comes in contact with bone at the alveolar crest, lateral sinus wall and Zygoma.		ZYG-55 ZYGAN® ZYGIN ZYGIN-W	Should there be sufficient bone coverage, the ZYG-55 implant can be used in these indications. Alternatively, it is recommended that an implant with a smooth mid-section should be used as it reduces the exposure of the sinus to a roughened threaded surface.
ZAGA 2	The anterior maxillary wall is concave. The implant head is located on the alveolar crest. The drill has performed the osteotomy through the wall and the implant can be seen through it and most of the body has an extra-sinus path. The implant comes in contact with bone at the alveolar crest, lateral sinus wall and Zygoma.		ZYG-55 ZYGAN® ZYGIN ZYGIN-W	The smooth mid-section design reduces the exposure of the sinus and soft tissues to roughened implant thread whilst the coronal thread engages the bone at the alveolar crest.

ZAGA 3	The anterior maxillary wall is very concave. The implant head is located on the alveolar crest. Most of the body has an extra-sinus path. The middle part of the implant body is not touching the most concave part of the wall. The apical region of the implant contacts the bone in the Zygoma, whilst the coronal region of the implant rests against the alveolar bone.		ZYGAN® ZYGIN ZYGIN-W ZYGON ONC-55 ZYGEX	In ZAGA-3 anatomies, where there is sufficient alveolar bone for intra-sinus or trans-sinus placement, the ZYGAN®, ZYGIN, and ZYGIN-W implants are optimal choices. These implants offer a threaded coronal portion that allows for engagement within available bone. However, in cases where the residual crest is extremely thin and there is concern that coronal threads may compromise soft tissue or lead to dehiscence, the ZYGON, ZYGEX or ONC-55 implants serve as ideal alternatives.

ZAGA 4	The maxilla and alveolar bone show extreme vertical and horizontal atrophy. The implant head is located buccally of the alveolar crest. There is no minimum osteotomy at this level. The drill has arrived at the apical Zygomatic entrance following a path outside the sinus wall. The implant contacts bone in the Zygoma and part of the lateral sinus wall.		ZYGON ONC-55 ZYGEX	ZYGON, ZYGEX and ONC-55 implants are specifically engineered for ZAGA-4 cases, where the maxilla is severely resorbed and extra-sinus placement is necessary. Their wide diameter provides engagement with the available bone. Additionally, the unthreaded coronal section minimises pressure on thin crestal bone and soft tissue, reducing the risk of dehiscence or exposure. **NOTE:** due to the unsupported coronal section of the implant, it is important that the prosthesis is designed to reduce and splint the overall bite force over the ridge. It is important to note that implants placed without support around the alveolar head are at a higher risk of fracture and where possible, should be avoided.

References:

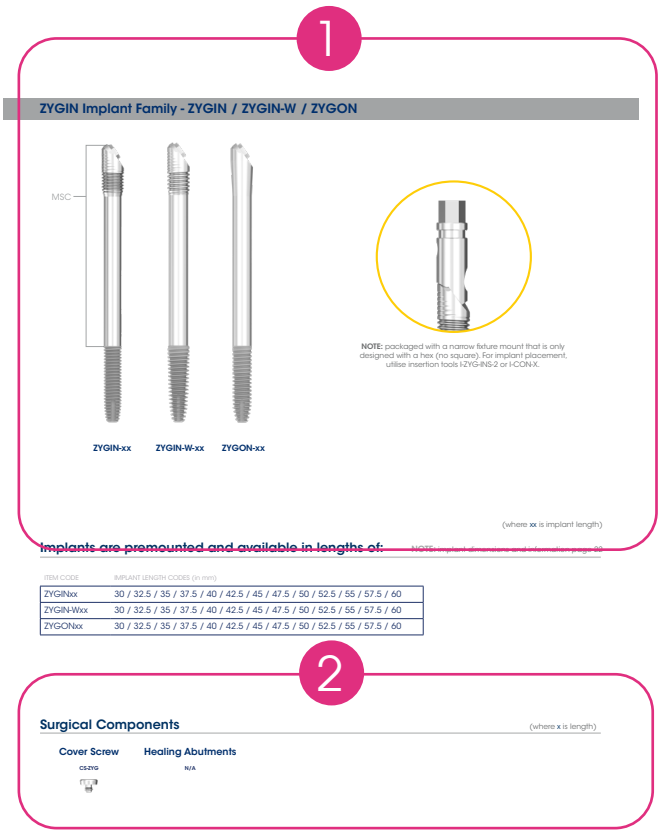
- Chrcanovic BR, Abreu MHNG. Survival and complications of Zygomatic implants: a systematic review. Oral Maxillofac Surg. 2013 Jun;17(2):81–93.
- Aparicio C, Manresa C, Francisco K, Aparicio A, Nunes J, Claros P, et al. Zygomatic implants placed using the Zygomatic anatomy-guided approach versus the classical technique: a proposed system to report rhinosinusitis diagnosis. Clin Implant Dent Relat Res. 2014 Oct;16(5):627–42.

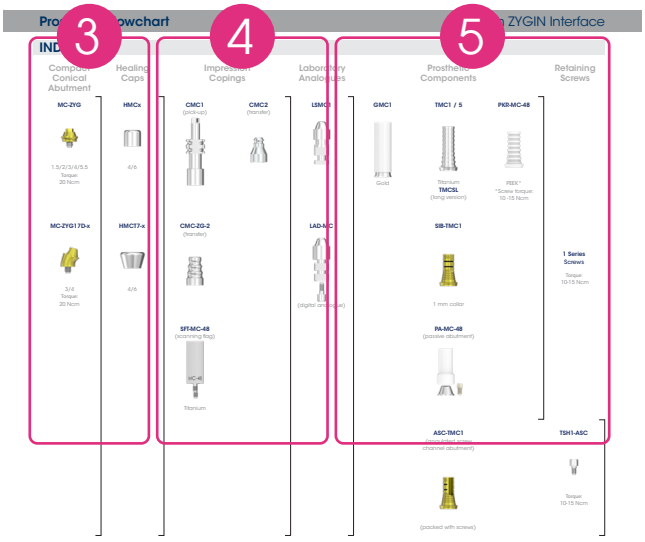
4. Understanding the product range and catalogue

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





This catalogue is designed to guide clinicians and technicians through the complete surgical and prosthetic workflow for Southern Implants' Zygomatic 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.

For example, the implant is called the ZYGIN implant, followed by the available lengths shown as 30/32.5/35 mm and onwards. If a 30 mm implant is required, the product code used for ordering will be ZYGIN-30.

Section 2 – Surgical Components
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 3–5 – Prosthetic Workflow
These sections outline the indirect restorative protocol recommended for Zygomatic implants. Zygomatic implants are restored using a compact conical abutment (commonly referred to as a Multi-Unit Abutment), on top of which prosthetic components are secured. Direct-to-implant restorations are not recommended due to anatomical and biomechanical considerations.

The flowchart is organized into columns. At the top of each column, the category is displayed. Each column contains a render of the product, with the product name used for ordering shown above and the available configurations indicated underneath.

Examples:
• If a 4 mm compact conical abutment is required, the product code to use is MC-ZYG-4.

Section 3 – Compact Conical Abutments
This section lists all collar height options and corresponding torque values. For two-stage cases, healing caps can be used during the soft-tissue maturation phase.

Section 4 – Impression and Model Components
This section outlines all necessary items for taking impressions using open and closed tray techniques. It includes the corresponding laboratory analogue used in stone models following a traditional analogue workflow. Additionally, it details the scan flag used during intra-oral scanning procedures and the corresponding digital lab analogue inserted into a 3d-printed model. This forms part of Southern Implants' fully digital workflow, which is termed SIDigital.

Section 5 – Final Prosthetic Abutments
This section provides a range of prosthetic abutments compatible with the selected workflow. Once the final abutment is chosen, the appropriate prosthetic screw and its torque value (listed below each retaining screw) should be used to secure the prosthesis.

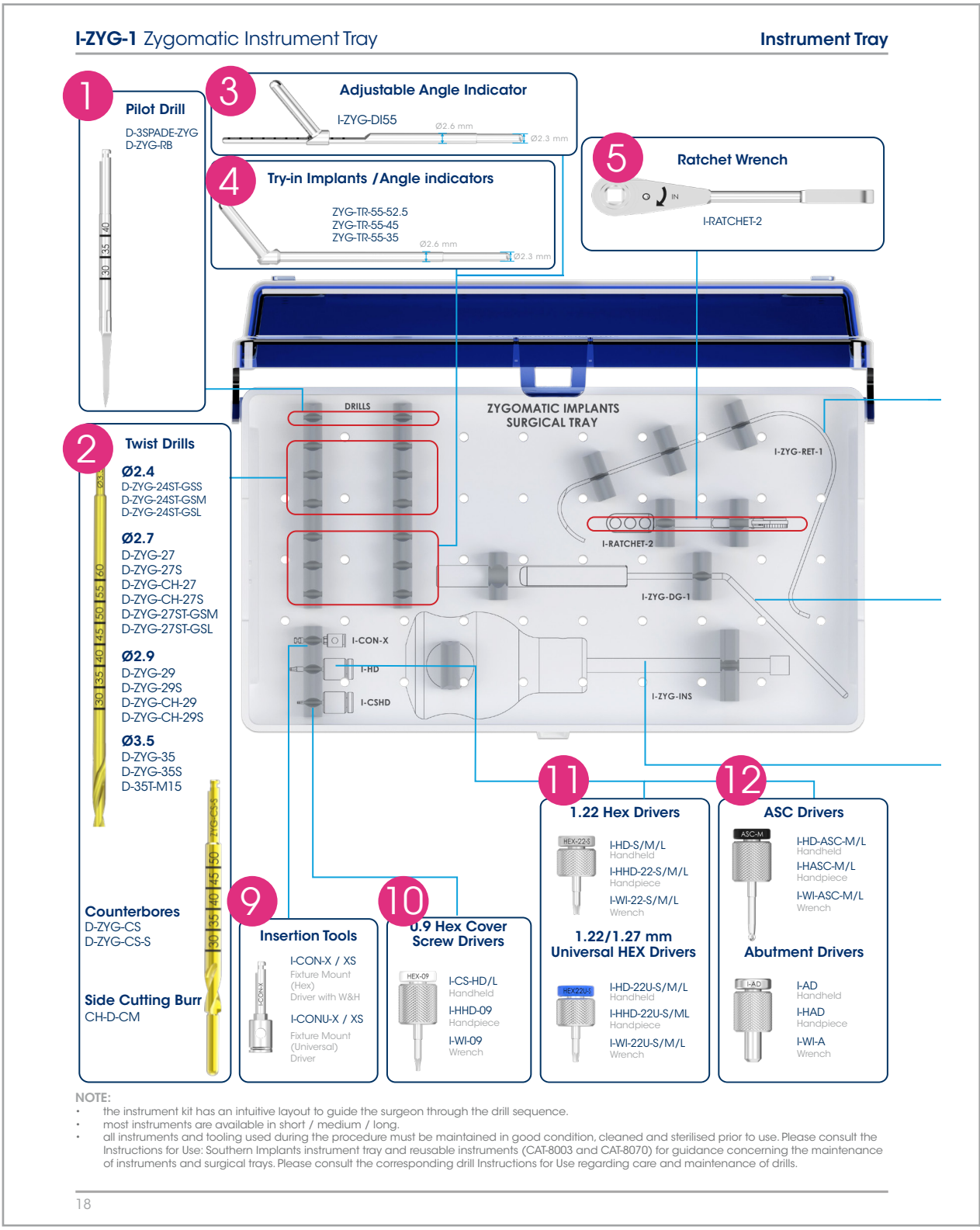
For a comprehensive guide on prosthetic handling, procedures, and troubleshooting, refer to CAT-4100 – Southern Implants Prosthetic Manual.

5. Surgical procedures

In order to place a Zygomatic 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).

5.1. Surgical tray contents

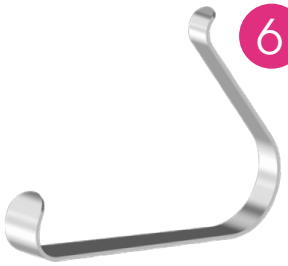
Below outlines the different instruments provided in the tray with a brief description of its use case (exert from CAT-2070 - Zygomatic product catalogue).



Retractor

6

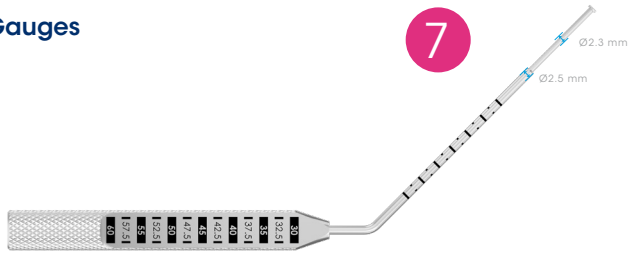
I-ZYG-RET-1



Depth Gauges

7

I-ZYG-DG-1



CH-I-DG

(Optional alternative instrument)

Insertion Tools

8

I-ZYG-INS-1

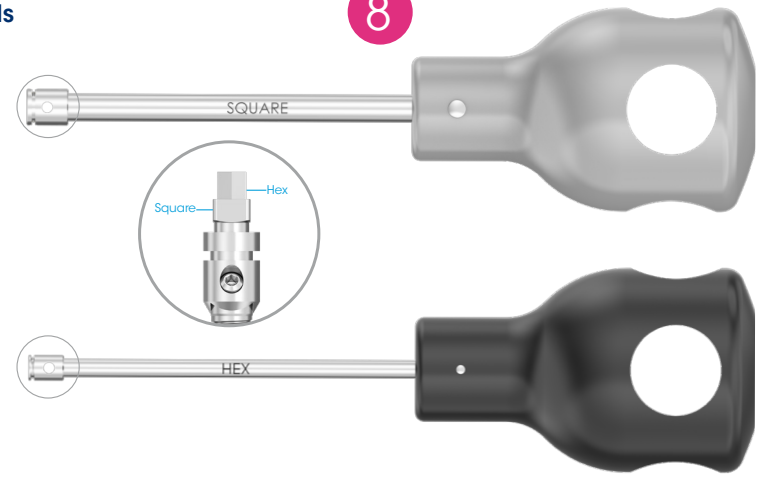
To fit square on fixture mount

*only compatible with the Zygomatic family

or

I-ZYG-INS-2

To fit square on fixture mount



NOTE:

- I-ZYG-INS-1 drives on the square of the fixture mount (silver handle for easy identification).
- I-ZYG-INS-2 drives on the hex of the fixture mount.The narrow hex tip allows for more visibility of the implant head (black handle for easy identification).

No.	Item Catagory	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.
	Counterbore	These are used to widen the crestal opening of the osteotomy, particularly when dense cortical bone is encountered. This is partially useful when creating the osteotomy entrance point in the Zygomatic arch.
	Side cutting burr	Ideal for fine-tuning the path of the osteotomy, when minor direction changes are necessary. Useful in cases where anatomy requires slight redirection or for creating a channel for ZAGA 2/3 indications.
3	**Adjustable angle indicator**	Used to confirm and visualise the planned implant emergence angle in relation to the arch. This helps guide prosthetic planning and alignment with the prosthetic envelope. The adjustable head enables users to determine the desired implant length in the created osteotomy.
4	**Try-in implants (angle indicators)**	These simulate the final implant trajectory and help verify angulation prior to actual implant placement. Useful for visual confirmation during complex cases.
5	**Ratchet wrench**	Used to manually advance the implant when tactile control is preferred or when the handpiece torque is insufficient. Also useful for final seating.
6	**Zygomatic retractor**	A specialised retractor to protect soft tissues and improve visibility when accessing the lateral maxillary wall and Zygoma.
7	**Depth gauges**	Inserted into the osteotomy to confirm the required implant length by measuring the depth of the preparation before implant insertion.
8	**Handheld insertion tools**	Allows for manual control during implant placement, especially in angled positions or high insertion torque cases when a handpiece is not suitable.
9	**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 torque and bone to implant engagement.
10	**Cover screw driver (0.9 Hex)**	Used to place cover screws in two-stage surgeries, protecting the implant interface during the healing phase.
11	**Abutment screw drivers (1.22 Hex)**	Used to secure prosthetic abutments to compact conical abutments.
12	**ASC (Angulated Screw Channel) driver**	Used when the final prosthetic includes an angulated screw channel abutment. Allows the clinician to insert prosthetic screws at an angle.

Certain instruments are available in different lengths, indicated by a suffix on the product code (S, M, or L for Short, Medium, and Long, respectively), as shown in the catalogue. For example, should you require a medium-length hex driver, you would use the 'M' reference in the code I-HD-S/M/L, and place an order for I-HD-M.

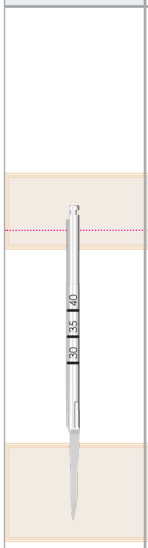
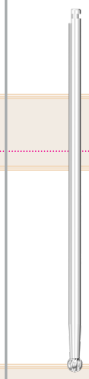
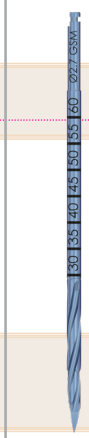
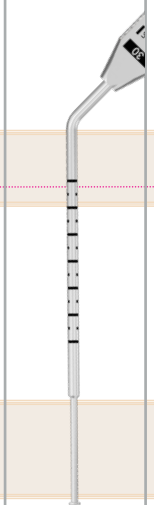
5.2. Drilling protocol overview

The drilling protocol for Southern Implants' Zygomatic implants has been designed to provide precision and efficiency when preparing the osteotomy in the maxillary alveolar and Zygomatic bone. The system utilises a range of pilot drills, twist drills, counterbores and side-cutting burrs, each serving a specific function based on anatomical access, desired site preparation and bone quality.

The drills are laser-marked in 5 mm increments, corresponding directly to the available implant lengths for accurate depth control. To verify the trajectory and depth of the osteotomy, a direction indicator and depth gauge should be used before implant placement. This step is essential to confirm that the chosen implant length and angulation align with the surgical plan.

Clinicians should determine their preferred osteotomy preparation protocol based on the bone density and the diameter of the implant being placed. Modifications to the standard drilling sequence may be made at the clinician's discretion to achieve ideal primary stability in varying bone conditions.

Below outlines the overall drilling protocol (note that the drills are available in different shaft lengths):

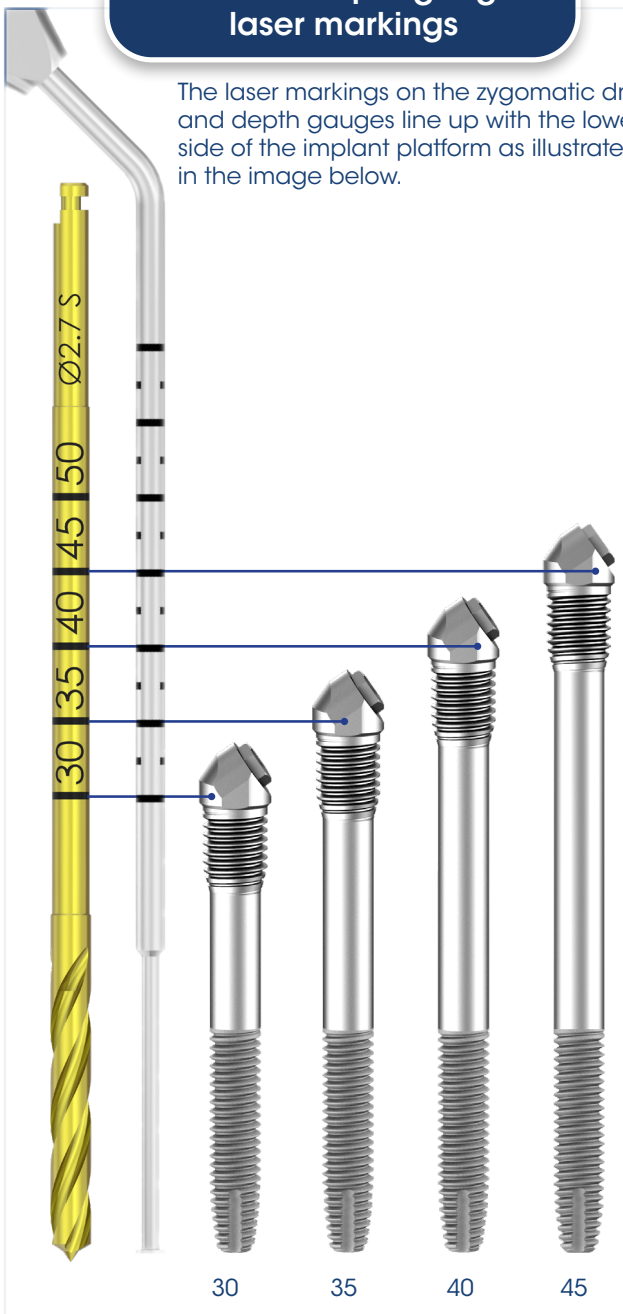
Pilot drill	Round burr	Ø2.4 Twist drill	Depth gauge & direction indicators	Side cutting burr	Ø2.7 Twist drill	Ø2.9 Twist drill	Ø3.5/4.0 Twist drill	Counterbores	Implant placement
	(Optional)	For medium bone	(Optional)	(Optional) For channel creation	(Optional) For hard bone	(Optional) For hard dense bone	(Optional)	(Optional) To enlarge osteotomy entry point	
Initiate the osteotomy.	Modify the curvature or entrance point of the osteotomy site.	Creates the osteotomy along the planned trajectory. Should the GS (Guided Surgery) drill be used, the pilot drill can be omitted.	Verifies the depth and angulation of the osteotomy; confirms implant length.	Useful in cases where anatomy requires slight redirection or for creating a channel.	Widening of the osteotomy.	Widening of the osteotomy.	Widening of the osteotomy and essential for preparation of the alveolar or zygomatic bone for the coronal portion of the implant.	Enlarges the Zygoma entry for implant apex insertion.	Implant is inserted using either a handpiece or manual driver.
									
D-3SPADE-ZYG	D-ZYG-RB	D-ZYG-24ST-GSS D-ZYG-24ST-GSM D-ZYG-24ST-GSL	DEPTH GAUGE I-ZYG-DG-1 CH-I-DG INDICATORS I-ZYG-DI55 ZYG-TR-55-35 ZYG-TR-55-45 ZYG-TR-55-52.5	CH-D-CM	D-ZYG-27S D-ZYG-27 D-ZYG-CH-27S D-ZYG-CH-27 D-ZYG-27ST-GSM D-ZYG-27ST-GSL	D-ZYG-29S D-ZYG-29 D-ZYG-CH-29S D-ZYG-CH-29	D-35T-M15 D-40T-M15 D-ZYG-35S D-ZYG-35	D-ZYG-CS-S D-ZYG-CS	

5.3. Zygomatic drills and direction indicator laser markings

In order to determine the ideal zygomatic implant to fit the osteotomy, the clinician can choose the appropriate length by using the direction indicator (I-ZYG-DI55) and depth gauge (I-ZYG-DG-1 or CH-I-DG) or by the laser markings on the drill to measure and correlate the length. The illustration below shows the correlating measurement of laser markings to the implant length.

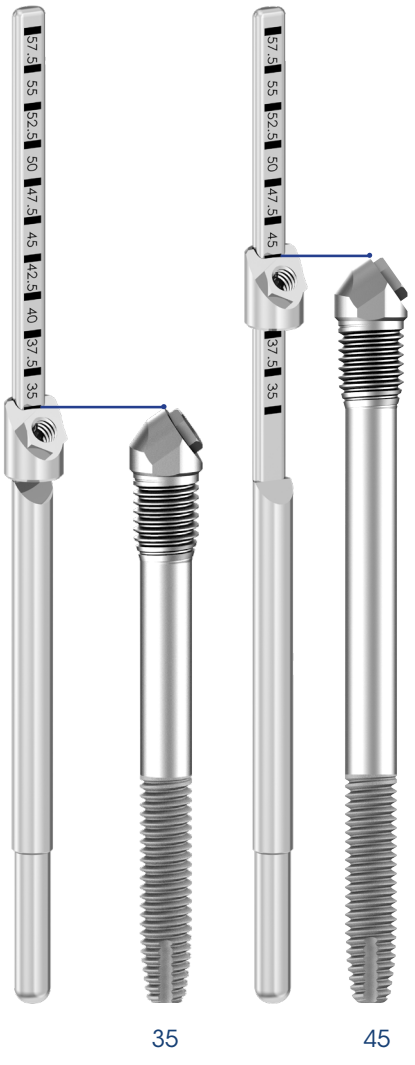
Drill and depth gauge laser markings

The laser markings on the zygomatic drills and depth gauges line up with the lower side of the implant platform as illustrated in the image below.



Direction indicator laser markings

The laser markings on the zygomatic direction indicators line up with the top point of the external hex on the implant platform. This can be easily read by sliding the head on the direction indicator to the appropriate position as shown in the image below.



5.4. Preoperative preparation

Comprehensive medical and dental histories must be obtained prior to treatment, with particular attention given to any existing soft or hard tissue pathology. The patient should present with clinically healthy, asymptomatic maxillary sinuses, and there must be no lesions or defects in the adjacent bone or soft tissue structures.

A CT scan and/or CBCT analysis is strongly recommended during the planning phase to:

- Identify any pathology within the maxillary sinuses
- Assess bone quality, quantity, and structural integrity
- Evaluate maxillomandibular relationships and anatomical considerations

Zygomatic implants are typically indicated for posterior maxillary rehabilitation, particularly in the premolar and molar regions. The standard protocol involves placing one Zygomatic implant per side, supplemented by two or more conventional dental implants in the anterior region to support a fixed prosthesis. In cases where anterior support is not feasible, two Zygomatic implants may be placed on each side as an alternative full-arch solution (e.g. quad zygoma protocol).

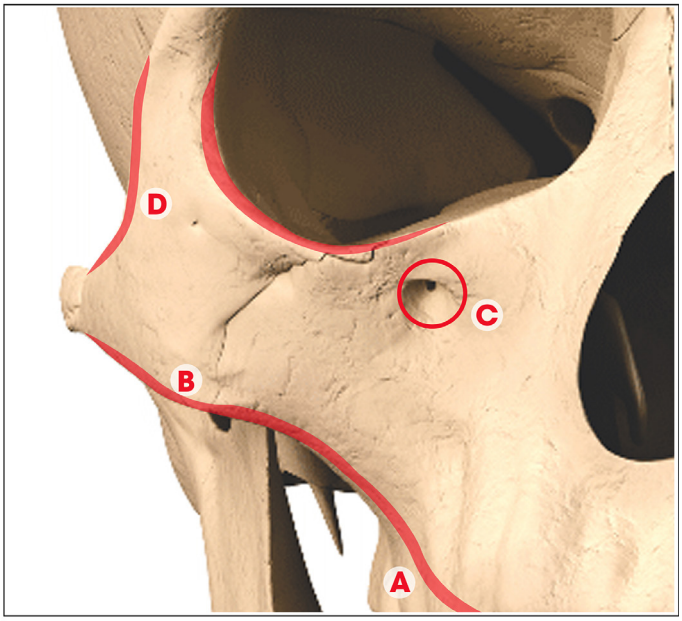
5.5. Landmarks and flap design

A crestal incision is made from just anterior to the maxillary tuberosity on one side to the same point on the other side. Three vertical releasing incisions are made in the second molar regions and the mid-line. These 3 incisions facilitate flap mobilisation beyond the infra-orbital margin. In unilateral cases a hemi-maxillary approach is used.

The buccal mucoperiosteal flaps are raised to expose the infra-orbital nerve, the body of the Zygoma and the Zygomatic arch. A palatal flap is raised to expose the alveolar bone. The periosteum in the region of the upper molar teeth is incised to enhance flap mobility.

A modified retractor (I-ZYG-RET) is placed on the upper border of the Zygomatic arch (Fronto-zygomatic notch).

Raise a full thickness mucoperiosteal flap by making a crestal incision with bilateral releasing incisions in the tuberosity area and the mid-line if necessary.

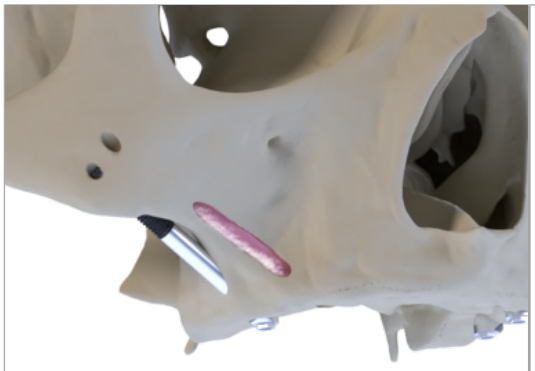
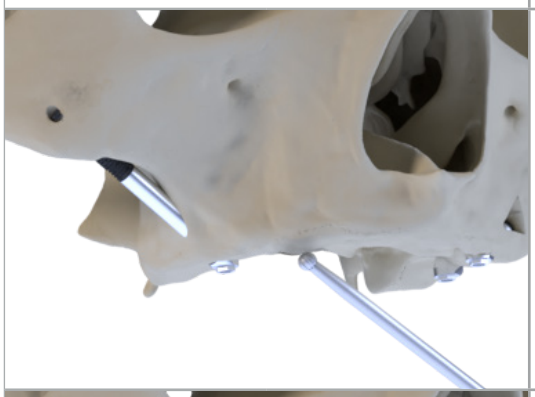
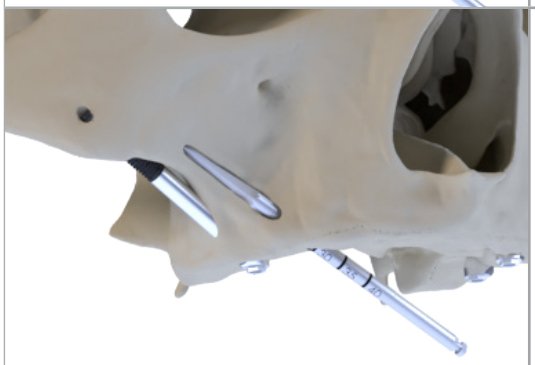
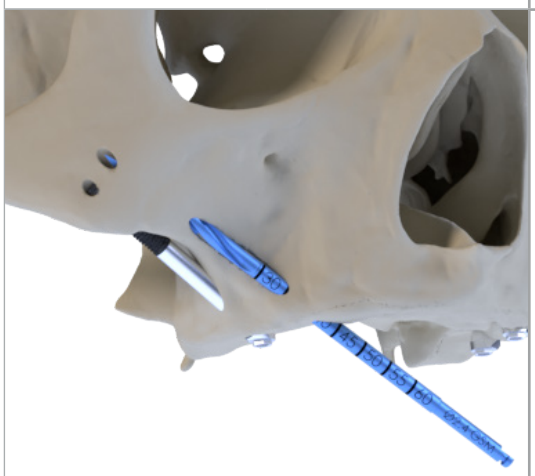


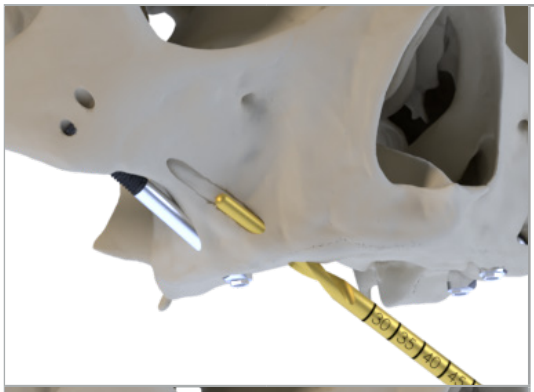
Anatomical landmarks

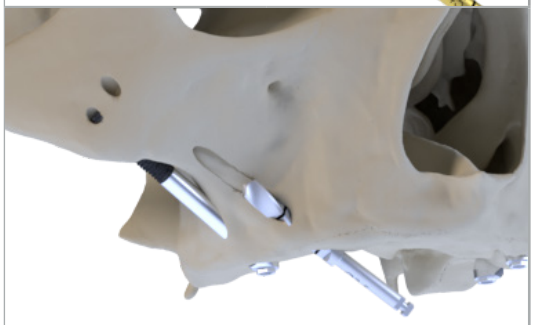
A. Posterior wall of the maxillary sinus
B. Zygomatic-maxillary buttress
C. Infra-orbital foramen
D. Fronto-zygomatic notch

5.6. Surgical procedure

NOTE: all drilling should be done at 800 -1500 rpm unless specified otherwise.

	**Sinus lift/reflection (if required)** A small sinus window is cut on the lateral aspect of the maxillary sinus and the block of the bone is removed. The lining of the sinus is reflected, attempting to keep it intact if possible. Thorough reflection of the lining is essential. Additional bone material can be added as a barrier between the membrane and the planned trajectory for the implant. For ZAGA 3 & 4 classifications, this step might not be required.
	**Prepare the alveolar/palatal entry point and the entry point on the Zygomatic arch** The entrance point on the alveolus is made using a round burr or pilot drill and following the same trajectory, on the insertion point of the Zygomatic bone. For ZAGA 3 & 4 classifications, a slot/channel can be created in order to accommodate the coronal aspect of the implant.
	**Begin the osteotomy** Begin the entrance point of the implant (site preparation) for the Zygomatic implant at the first- second pre-molar area on the maxillary crest using either the pilot drill or the Ø2.4 guided surgery drill and follow the posterior maxillary wall. Aim to end just in front of the fronto-zygomatic notch.
	**Enlarge the osteotomy** The implant site is enlarged by the Ø2.4, Ø2.7 and/or Ø2.9 mm twist drill and continued into the Zygoma. Emergence of the drill out the Zygoma is palpated on the cheek of the patient. It is recommended that the trajectory and prosthetic angle is verified after the Ø2.4 mm drill using the direction indicators to ensure the osteotomy is in the planned orientation. Should the trajectory of the implant be passing through the sinus, care should be taken to reflect the schneiderian membrane to prevent perforation by the drills and subsequent implant. Depending on the clinician's analysis of the bone density and implant diameter, the size of the osteotomy can be increased.

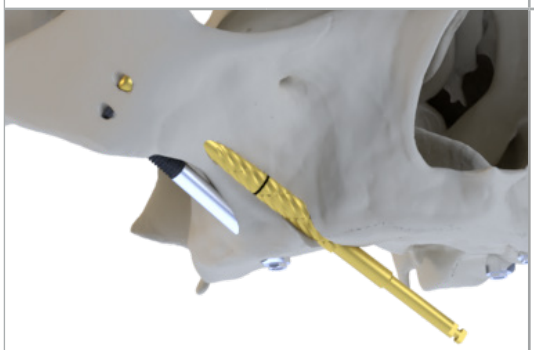




Preparation of alveolar bone and Zygomatic osteotomy entry point

The site preparation is completed by means of the Ø3.4 counterbore and/or Ø3.5 twist drill drilled either partially (through the alveolar bone only) or fully through the osteotomy.

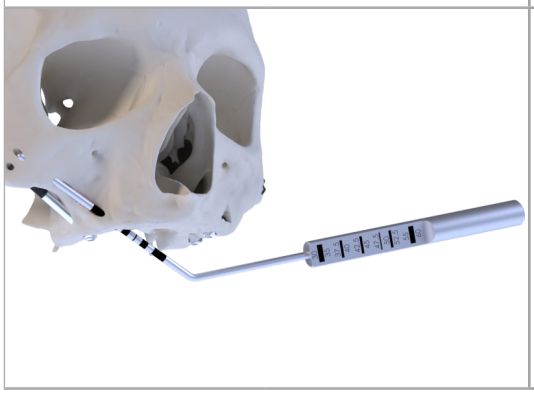
For narrow implants such as the ZYGIN and ZYGAN®, this step is only recommended for preparation of the alveolar bone.



Creating a channel or slot osteotomy

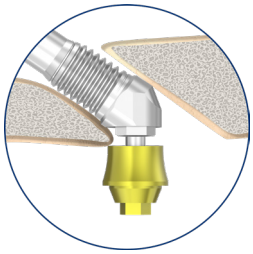
When the ZAGA classification requires a channel or slot to accommodate the implant, the side cutting burr can be used. Gradual lateral movements in the direction of the intended slot can be made while the tip of the side cutting burr remains inserted into the Zygomatic osteotomy.

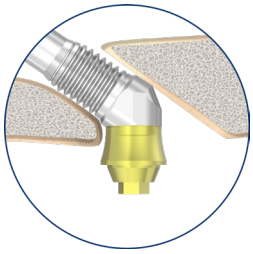
Slight alterations to the implant trajectory can also be performed using this burr; however, care should be taken not to over-prepare the osteotomy site.



Osteotomy depth and prosthetic angle confirmation

The depth of the prepared implant site and the implant head angulation are gauged by use of the depth gauge and the try-in direction indicators.

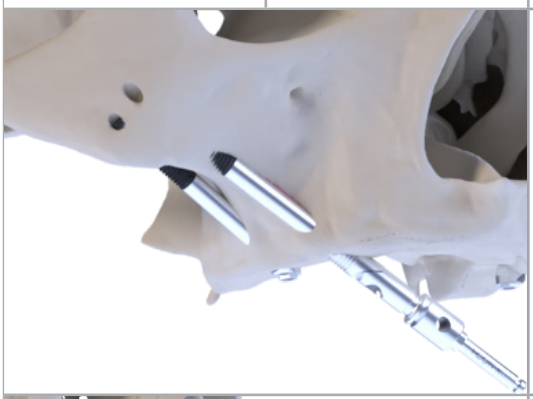




Clearance for seating of the prosthetic components

An oval cut can be made extending slightly buccal to the palatal alveolar emergence hole to allow for the correct seating of the prosthetic components.

An alternative procedure to performing the oval cut is to utilise a dedicated bone mill to remove any bone that infringes on the prosthetic seating.



Implant insertion

Before inserting the implant, ensure that the implant site is free of soft tissue remnants. The handpiece with connector (I-CON-X) is used for the initial insertion of the implant, with the torque control set at 50 Ncm at 15 rpm. When the handpiece torques out, switch to the surgical wrench or the implant insertion hand driver (i.e. also know as an onion driver).

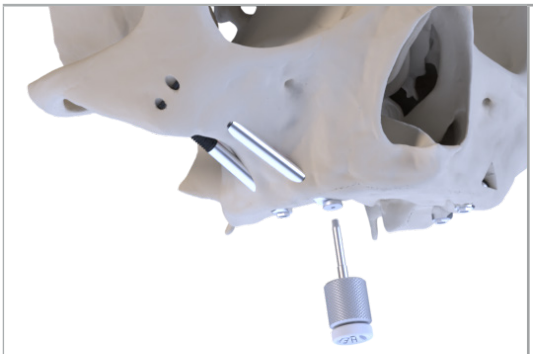
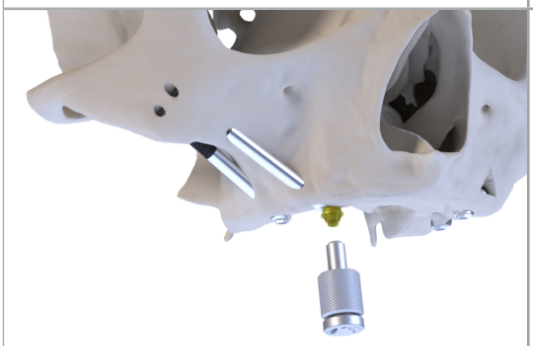
Avoid applying bending moments to the fixture mount while inserting the implant. Check the fixture mount screw for loosening periodically and re-tighten if necessary.

Implant insertion finalisation

The implant must follow the prepared path of insertion. Any soft tissue that may have been picked up on the implant threads while moving through the alveolus and sinus must be cleared off before the implant enters the Zygomatic placement site. One revolution of the ZYGON or ZYGIN-W implant results in 0.75 mm axial movement. For all other implants in the range, one revolution results in 0.6 mm axial movement. Insertion is complete when the head is in the correct prosthodontic position and angle.

Removal of fixture mount

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

	**For Two-Stage (delayed) surgery** The cover screw (SCU2 for the Zygomatic implant family range (ZYG-55, ONC-55, ZYGAN and ZYGEX) or CS-ZYG for the ZYGIN family range (ZYGIN, ZYGIN-W and ZYGON) is picked up and placed with the cover screw driver. Suturing is then carried out according to the surgeon's preference. Should the surgeon opt for a one-stage approach with proceeding straight to healing abutments, the desired healing abutment height and width can be selected and inserted using the abutment driver. Note that this is only applicable for the Zygomatic implant family range (ZYG-55, ONC-55, ZYGAN and ZYGEX) and not the ZYGIN family range.
	**For One-stage (immediate) surgery** The placement of a compact conical is done by using the abutment driver (I-AD / I-WI-A) followed by the healing caps or prosthetic abutments. NOTE: It is recommended to tighten the abutments and healing caps to the recommended torque value as stipulated in the catalogue and abutment packaging.

5.7. Surgical procedure for the oncology (ONC-55, ZYGON and ZYGEX) implants

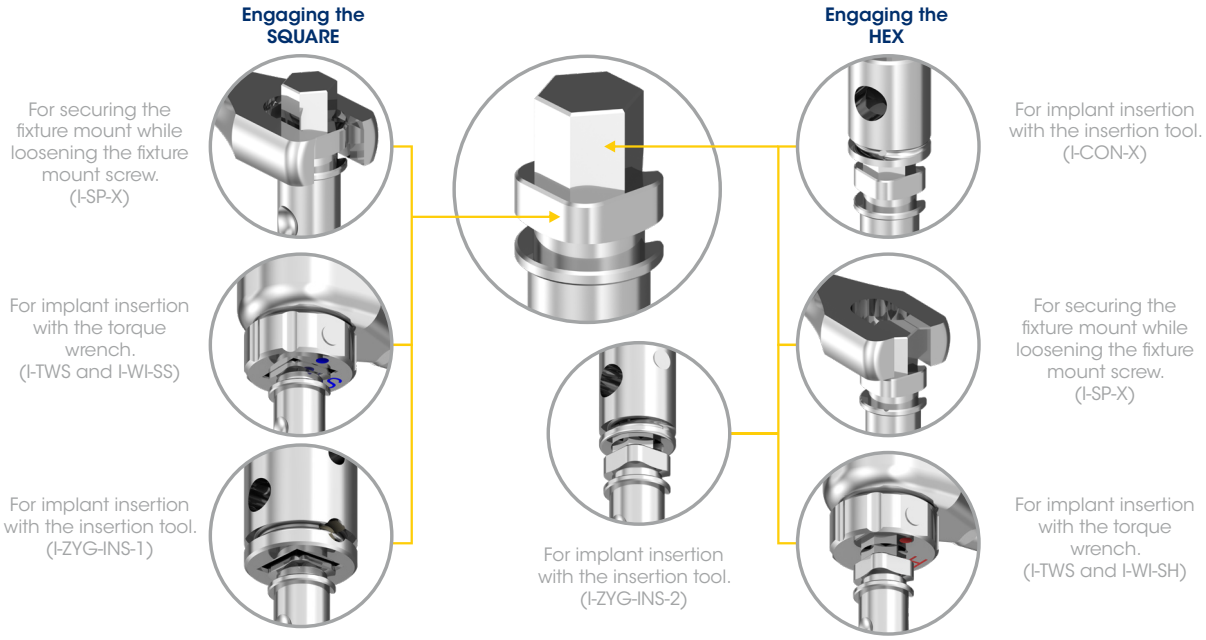
The same instruments and drilling procedure are used for the Oncology (ONC-55), ZYGEX and ZYGON Implants as above for the regular ZYGIN and Zygomatic implants. However, since the anatomy is substantially different, the procedure differs in the following way:

- No sinus window is required if the maxilla and the sinus have been removed. In this case drilling begins directly in the zygoma.
- The implant placement position is determined by the available bone. However, in a standard maxillectomy case, the placement angle of the Implants in the Zygoma is more horizontal than a standard Zygomatic Implant. Aim to position the head of the implant where the tip of the missing tooth root would have been. The prosthetic platform can be angled slightly forward to assist in the manufacture and fitting of the prosthesis.

5.8. Correctly engaging the implant insertion tool

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

NOTE: the ZYGIN Implant family is packaged with a narrow fixture mount which does not have the square interface. It is thus important to note that for implant insertion, the I-CON-X or I-ZYG-INS-2 (black handle handheld insertion tool) should be used to engage the hex.



Ensure that the I-CON-X or handheld insertion tool (I-ZYG-INS-1/I-ZYG-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-ZYG-INS-2

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

Not fully engaged I-ZYG-INS-1

Fully engaged I-ZYG-INS-1

6. Prosthetic procedure with Compact Conicals (Multi-Unit Abutments)

Zygomatic implants from Southern Implants are restored using an indirect prosthetic workflow, which relies on the use of Compact Conical Abutments. This method ensures soft tissue management and long-term prosthetic stability with a more passive prosthetic fit.

Step-by-Step Protocol

1. Abutment Selection and Seating

After the appropriate healing period (or immediately in the case of immediate loading), select the correct Compact Conical Abutment based on tissue thickness and implant compatibility. Below shows the compatibility between implant type and compact conical abutment.

Zygomatic Family			
ZYG-55	ZYGAN®	ZYGEX	ONC-55
			
Compatible with **AMCZx** and **MC-EX4017D-x** Compact Conical (MUA)			
			

ZYGIN Family		
ZYGIN	ZYGIN-W	ZYGON
		
Compatible with **MC-ZYG** and **MC-ZYG17D-x** Compact Conical (MUA)		
		

Ensure that the implant's prosthetic interface is clean and dry. Place the abutment onto the implant using the abutment driver (I-AD) or hex driver in the case of the angled abutments.

Torque the abutment to 20 Ncm using a torque driver.

In cases where the prosthetic component does not seat fully on the implant, bone mills may be used to carefully remove the bone and create sufficient clearance for proper seating. For further details and product options, please refer to catalogue CAT-1223 – Handpiece and Handheld Bone Mills.

2. Soft Tissue Contouring (Optional)

Where necessary, contour soft tissue using a healing cap seated on the Compact Conical Abutment. Allow sufficient healing time before proceeding with the final impression.

3. Impression taking

Use compact conical-level impression copings for a closed or open tray impression. Confirm stability and proper seating radiographically if required. Use a high-accuracy impression material such as PVS or polyether.

Alternatively use scan flags to take a digital impression.

4. Model fabrication

Laboratory technicians should use analogs that replicate the Compact Conical interface to fabricate the master model. Ensure soft tissue replication for accurate emergence profile design.

5. Framework and prosthesis design

Design the prosthetic framework (e.g., screw-retained bridge or bar) to be supported entirely by the compact conical abutments. Avoid direct restoration on the implant platform—direct-to-implant restorations for zygomatic implants are generally discouraged due to associated prosthetic and biomechanical challenges.

6. Try-In and Final Prosthesis Delivery

Conduct a passive fit try-in of the framework. Final prosthetic components should be secured using prosthetic retaining screws torqued to 15 Ncm (check catalogue or packaging torque value for the specific component). Verify occlusion, aesthetics, and phonetics. Torque abutment screws to final values and seal access holes with appropriate material.

7. Post-Delivery Instructions

It is important to provide hygiene instructions focusing on access beneath the prosthesis. Schedule regular maintenance visits to monitor peri-implant tissues and prosthesis integrity.

7. Additional resources

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

CAT-4100 - Prosthetic Manual
Includes all prosthetic components compatible with Compact Conical (Multi-unit) abutments and relevant workflows and torque values for restorative procedures.

CAT-2070 - Zygomatic Implant Catalogue
Provides comprehensive product codes, dimensions, and compatible prosthetic components and surgical instrumentation for the ZYGAN, ZYG-55, ZYGIN, ZYGIN-W, ZYGON, ONC-55, and ZYGEX implant systems.

CAT-2063 Digital Workflow Guide (SIDigital)
For clinicians using intraoral scanning and CAD/CAM workflows, the SIDigital guide outlines scan body compatibility and digital restorative options for zygomatic-supported cases.

CAT-6044 Zygomatic Implants Brochure
For a list of all features and a case study utilising a Zygomatic implant.

CAT-8054 Zygomatic Instruction for Use
Stipulates the technical indications, materials and regulatory information about the Zygomatic 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.

CAT-1219 ZYGAN, ZYG-55 and ZYGEX bone fixture mount
Describes the bone milling functionality on the ZYGAN and ZYGEX bone milling fixture mount.

CAT-1223 Handpiece and Handheld Bone Mills
Describes the available bone mills for all connections.

To access these catalogues and additional surgical resources, visit the official Southern Implants Zygomatic Implant web page: southernimplants.com/zygomatic-implants

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

to contact your Southern Implants Representative
or visit southernimplants.com

SOUTHERNIMPLANTS®
Innovative Treatment Solutions

South Africa – Headquarters 1 Albert Road, Irene, RSA
T: +27-12-667-1046 | **E:** info@southernimplants.com

EC REP
Southern Implants Europe AB Holmgatan 30, S-791 71, Falun, Sweden
E: ecrep@southernimplants.com

Subsidiaries

Australia
Southern Implants Australia
T: +61-8 -9466-2627
E: info@southernimplants.com.au

Spain and Portugal
Southern Implants Ibérica
T: +34-935-053-507
E: info@southernimplants.es

United Kingdom and Ireland
Southern Implants UK
T: +44-20-805-94490
E: info@southernimplants.co.uk

USA and Canada
Southern Implants North America Inc.
T: +1-561-472-0990
E: customercare@southernimplants.com

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