Handbook

Nobel Biocare™

NobelZygoma™

TiUltra™ system

SURGICAL PROCEDURE

The scope of this handbook is to provide a comprehensive overview of the surgical steps and options for the NobelZygoma™ TiUltra™ system. This handbook does not replace the Instructions For Use (IFU). Please review the Instructions For Use, including Indications For Use, Contraindications, Warnings and Cautions before using the products. Instructions for Use are available at:

ifu.nobelbiocare.com

For a full list of article numbers and for ordering information, refer to the Solution overview – Zygoma advanced treatment option available at nobelbiocare.com or contact a Nobel Biocare representative.

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Contents

The NobelZygoma™ TiUltra™ system

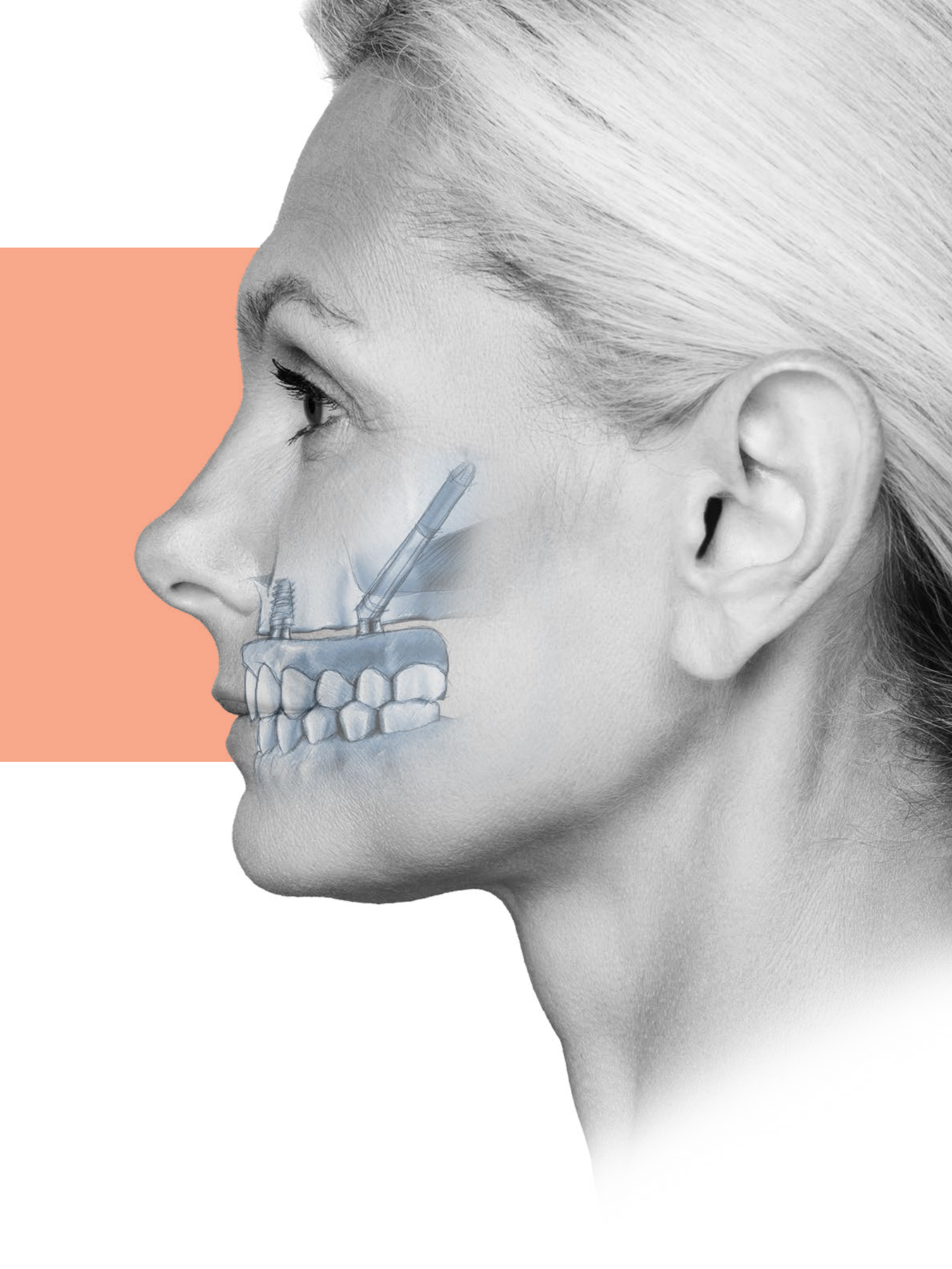
Mastering complexity

With TiUltra™ and Xeal™ surfaces

NobelZygoma TiUltra implants are designed based on over 20 years of clinical experience with Nobel Biocare zygomatic implants[1].

Experience great flexibility using the NobelZygoma TiUltra system, thanks to the expanded portfolio[2], to better match the clinical situation.

1. Clinical success of NobelZygoma 45°, NobelZygoma 0°, Branemark System Zygoma TiUnite and Zygoma Implant RP (machined) reported on in: Davó R, Fan S, Wang F, Wu Y. Long-term survival and complications of Quad Zygoma Protocol with Anatomy-Guided Approach in severely atrophic maxilla: A retrospective follow-up analysis of up to 17 years. Clin Implant Dent Relat Res. 2024;26(2):343-355. Pesce P, Menini M, Bagnasco F, Gamalero M, Pera F, Tealdo T. Outcomes of Zygomatic Implants Combined with Anterior Regular Implants: A Retrospective Analysis with a Mean Follow-up Time of 36 Months. Int J Oral Maxillofac Implant. 2023;38(2):251-258. Vrielinck L, Moreno-Rabie C, Coucke W, Jacobs R, Politis C. Retrospective cohort assessment of survival and complications of zygomatic implants in atrophic maxillae. Clin Oral Implant Res. 2023;34(2):148-156. Lopes A, Nobre M de A, Ferro A, Guedes CM, Almeida R, Nunes M. Zygomatic Implants Placed in Immediate Function through Extra-Maxillary Surgical Technique and 45 to 60 Degrees Angulated Abutments for Full-Arch Rehabilitation of Extremely Atrophic Maxillae: Short-Term Outcome of a Retrospective Cohort. J Clin Med. 2021;10(16):3600. Additional references available upon request.
2. Compared to NobelZygoma 45°, NobelZygoma 0°, Branemark System Zygoma TiUnite and Zygoma Implant RP (machined).

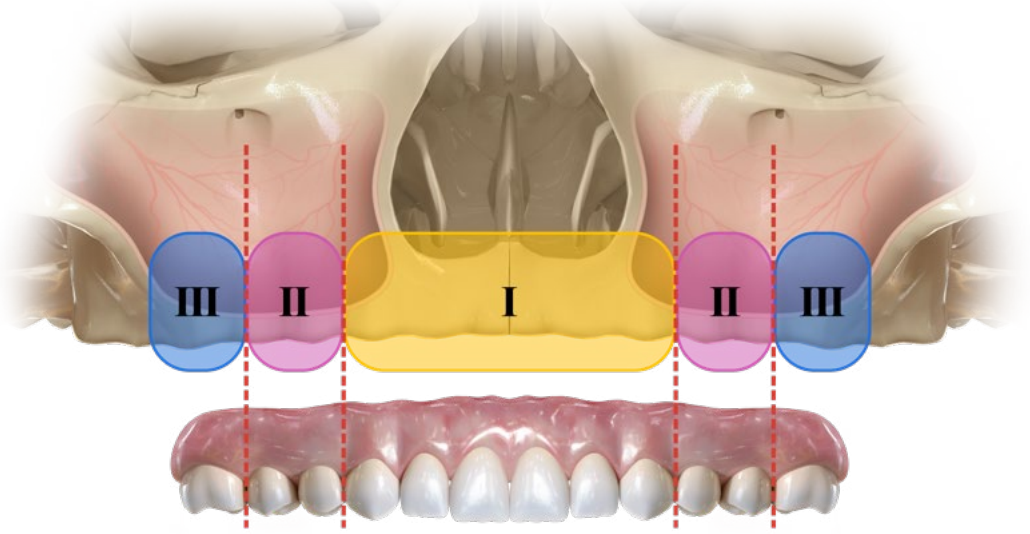


Introduction

Biomechanical considerations

Zones of the maxilla

The image below illustrates the 3 different zones of the maxilla. If insufficient bone is available in zones II and III for standard implants, the zygoma advanced treatment option may be considered to establish posterior support. Depending on the anatomical situation, parts of the implant body might be located outside of the maxillary sinus, but it is strongly recommended to optimize the biomechanics by ensuring that the coronal part of the implant has bone support. In zone I, between two and four standard implants may be placed for anterior support.

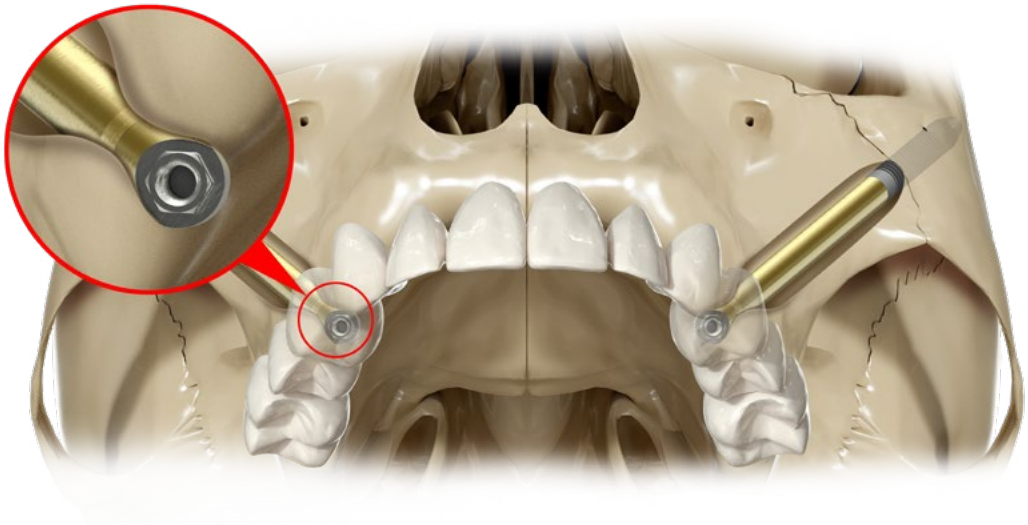


Zones of the maxilla

Implant position

A zygoma implant typically pierces the oral mucosa in the premolar region and passes through the sinus along the lateral wall of the maxilla. Depending on the contour of the lateral maxillary wall, the mid-portion of the implant may also pass laterally to the lateral wall.

The implant tip enters the base of the body of the zygomatic bone (the superior-lateral corner of the maxillary sinus), traveling through and piercing its lateral cortex. The implant trajectory is usually parallel to the zygomatic buttress.



Place the implant platform as close to the crest of the ridge as possible

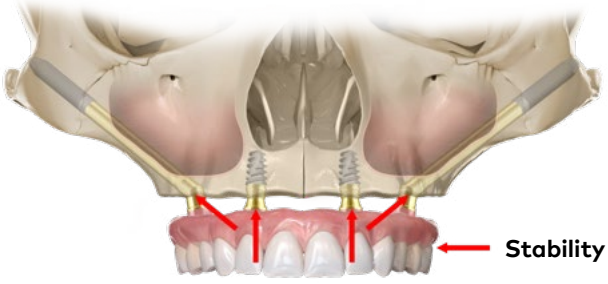
Number of implants

Compared to a standard implant, a zygoma implant has an increased tendency to bend under horizontal loads. This is related to two factors:

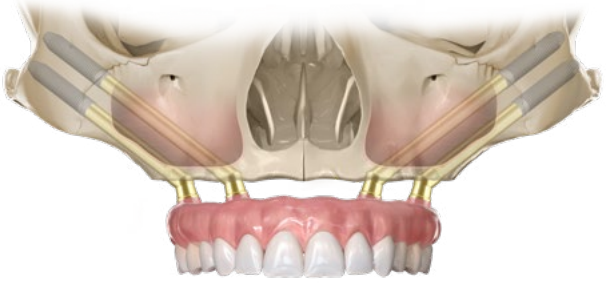
- Bigger lever arm due to greatly increased implant length (up to 60 mm).
- Limited bone support in the maxillary alveolar crest.

Based on clinical experience and biomechanical calculations, a full-arch restoration in the maxilla with two zygoma implants (one on each side) should be assisted in the anterior maxilla by at least two standard implants in a hybrid configuration, or with two additional zygoma implants in a quad configuration.[1]

Hybrid zygoma



Quad zygoma



Example restoration in a hybrid and quad configurations

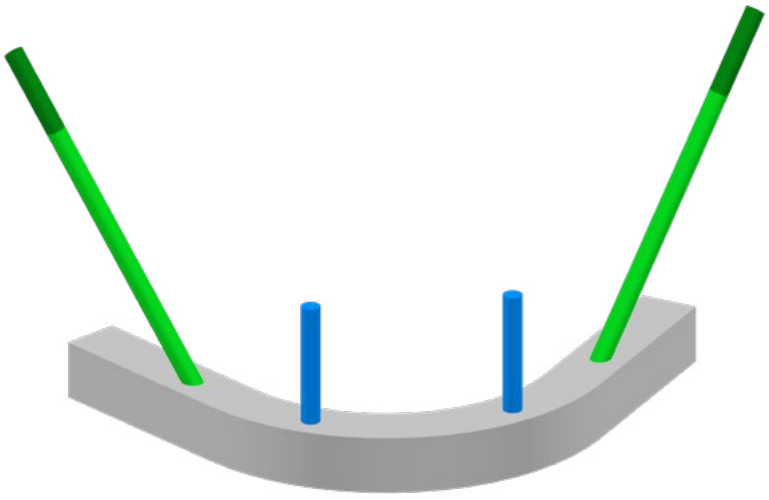
1. Bedrossian E, Brånemark P-I. Zygomatic Implant: A graftless approach for treatment of the edentulous maxilla. In: Fonseca R, Turvey T, Marciani R (2nd Ed). Oral and Maxillofacial Surgery. Volume 1. Philadelphia: Saunders. 2009:491-500. Original drawing from an unpublished textbook by Per-Ingvar Brånemark, Richard Skalak and George Zarb.

In order to counteract the adverse effects of bending moments, an optimal distribution of forces is better managed by:

- Cross-arch stabilization of the zygoma and the premaxillary implants
- Minimizing distal cantilevers of the prosthesis
- Balanced occlusion
- Decreased cuspal inclination of the prosthetic teeth

Caution In the rehabilitation of a partially edentulous maxilla with unilateral zygomatic implants, implant distribution adheres to the general principle of achieving optimal occlusion load, avoiding cantilever, and maintaining the integrity of the prosthetic reconstruction[2]. It is recommended to avoid full lateral dental occlusion.

Caution The mechanical performance of implants, abutment screws, and prosthetic components, as well as long-term osseointegration, may all be adversely affected by lack of passive fit of the restoration, inadequate design of the prosthesis, trauma to the oral region, and various other aspects of biomechanical overload.



The zygoma implants must always be cross-arch stabilized with the anterior implants when exposed intraorally.*

2. Fan S, Davo R, Al-Nawas B, Valmaseda-Castellón E. The Rehabilitation of Partially Edentulous Maxilla With Unilateral Zygomatic Implants: A Retrospective Study up to 23 Years Follow-Up. Clin Oral Implants Res. 2025 Feb;36(2):228-238. doi: 10.1111/clr.14377. Epub 2024 Nov 15. PMID: 39545437; PMCID: PMC11810560.

Considerations for the placement of 4 versus 6 implants

When planning the position and the number of implants to place, it is important to consider the functional and biomechanical properties of the fixed, implant-supported final prosthesis.

Two important points must be considered:

- Anterior-posterior spread of the implants (AP spread)
- The forces placed on the implant framework in lateral excursions

AP spread

As reported in the literature (Silva et al. 2010, Bevilacqua et al. 2010), the AP spread of the implants is important in limiting or eliminating the posterior cantilevers.[1] Placing an implant in the posterior maxilla distalizes the implant platform, which enlarges the AP spread and therefore, reduces the forces on the distal implants (Krekmanov et al. 2000).[2]

Distalization of the most posterior implants may be achieved by either using the All-on-4® treatment concept with tilted posterior implants in cases where bone in zone II (premolar region) is available; or by placing zygoma implants in cases where there is lack of bone in zones II and III (premolar and molar region).

1. Silva GC, Mendonça JA, Lopes LR, Landre J Jr. Stress Patterns on Implants in Prostheses Supported by Four or Six Implants :A Three-Dimensional Finite Element Analysis. Int J Oral Maxillofac Implants 2010 ;25 :239-46

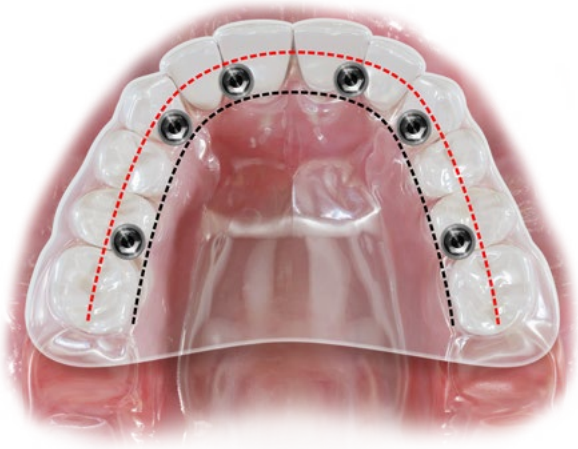
   Bevilacqua M, Tealdo T, Menini M, Pera F, Mossolov A, Drago C, Pera P. The influence of cantilever length and implant inclination on stress distribution in maxillary implant supported fixed dentures. J Prosthet Dent 2010;105:5-13

2. Krekmanov L, Kahn M, Rangert B, Lindström H. Tilting of Posterior Mandibular and Maxillary Implants for Improved Prosthesis Support. Int J Oral Maxillofac Implants 2000; 15:405-14

Lateral excursions

Increased stress values on the framework may be observed during lateral function, which may be addressed by the addition of two implants in the canine region.

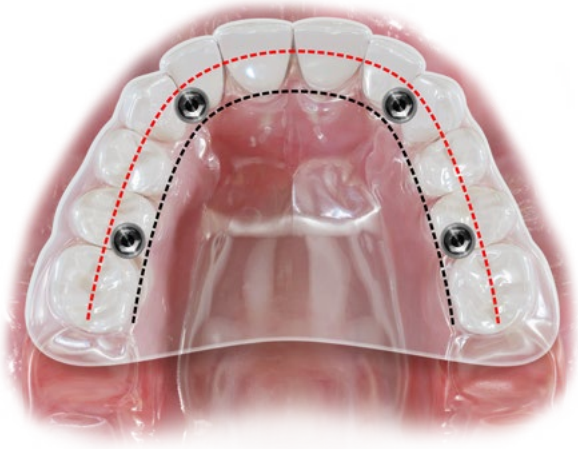
Therefore, consideration of the number as well as the distribution of the implants is paramount in treatment planning the fully edentulous maxilla. Placement of six implants as distributed in the figure addresses the involved forces.



Placement of six implants

For the advanced resorbed maxilla

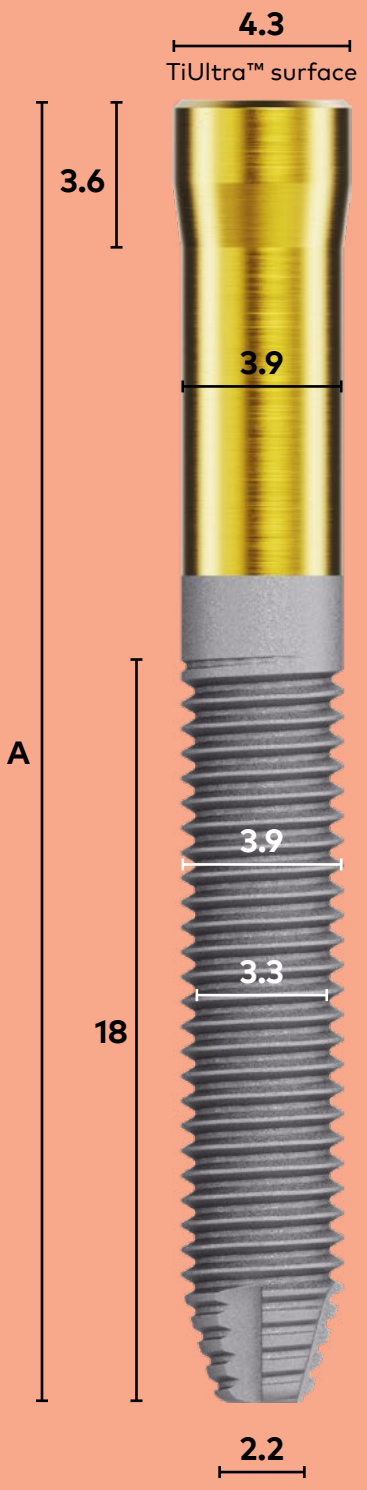
The resorption pattern of the maxilla may not enable the placement of six implants. By distributing four implants as shown in the figure, biomechanical properties of the final prosthesis are addressed. The AP spread is maintained, and the anterior implants lend support in lateral excursions, as they are placed in the cuspid position due to the posterior resorption pattern of the premaxilla.



Placement of four implants

In case of rehabilitation of a partially edentulous maxilla with unilateral zygomatic implants, the positionning and number of zygomatic implants and additional conventionnal implants depends on the patient's atrophy. The splinting of the zygomatic implant with at least one additional implant is essential.

Implant SPECIFICATIONS

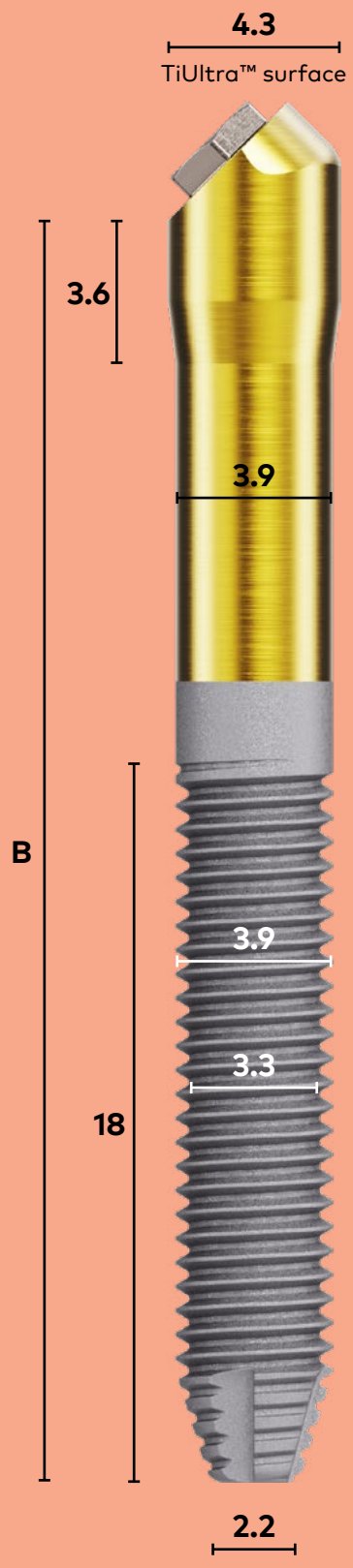


NobelZygoma™ 0° CC TiUltra™ Implant

Conical connection

		Art. no. TiUltra	A
RP	30 mm	301541	31.50
	32.5 mm	301542	34
	35 mm	301543	36.5
	37.5 mm	301544	39
	40 mm	301545	41.5
	42.5 mm	301546	44
	45 mm	301547	46.5
	47.5 mm	301548	49
	50 mm	301549	51.5
	52.5 mm	301550	54
	55 mm	301551	56.5
	57.5 mm	301552	59
	60 mm	301553	61.5

All measurements in millimeters. Sectional measurements do not necessarily add up to total length.



NobelZygoma™ 45° Ext Hex TiUltra™ Implant

External hex

		Art. no. TiUltra	B
RP	30 mm	301554	31.5
	32.5 mm	301555	34
	35 mm	301556	36.5
	37.5 mm	301557	39
	40 mm	301558	41.5
	42.5 mm	301559	44
	45 mm	301560	46.5
	47.5 mm	301561	49
	50 mm	301562	51.5
	52.5 mm	301563	54
	55 mm	301564	56.5
	57.5 mm	301565	59
	60 mm	301566	61.5

All measurements in millimeters. Sectional measurements do not necessarily add up to total length.

Differences between implants

NobelZygoma 45° Ext Hex TiUltra Implant

The angulated platform of the NobelZygoma 45° Ext Hex TiUltra Implant is closed, and specific compatible components with a shorter screw need to be used, as they can otherwise not be fully seated.

There are two dedicated healing abutments, two dedicated multi-unit abutment families – Straight with 4 heights (S-XL) and 17° with 2 heights (S-M) a pre-assembled implant mount for NobelZygoma 45° TiUltra Implants (see page 44).

NobelZygoma 45° Ext Hex TiUltra Implant and NobelZygoma 0° CC TiUltra Implant, with their respective implant mounts

**NobelZygoma 0°
implant mount + screw**

**NobelZygoma 0°
CC TiUltra Implant**

NobelZygoma 0° CC TiUltra Implant

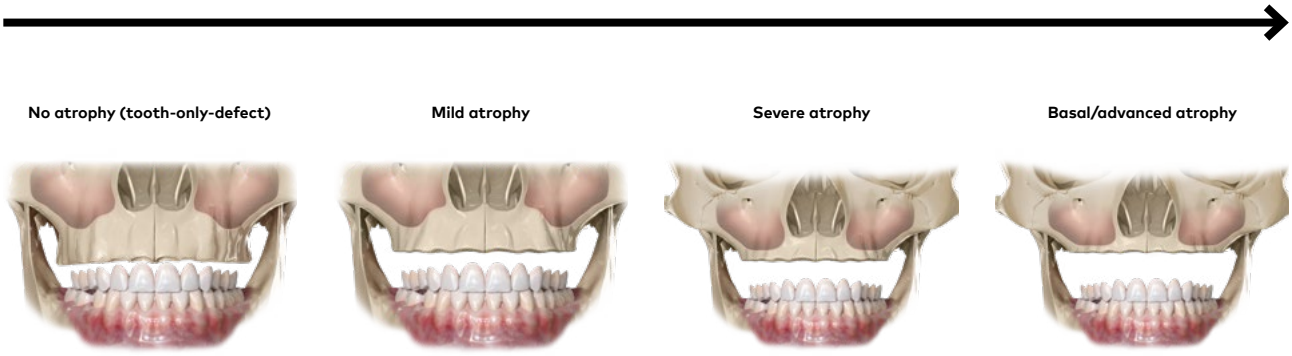
The straight platform of NobelZygoma 0° Implant has no angulation in the implant neck.

It has two dedicated multi-unit abutment families 45° / 60°, each with 4 heights (S-XL). All prosthetic components compatible with the NobelZygoma 0° implants are listed page 45.

Pre-treatment guidelines

Bone resorption patterns[1] and treatment options

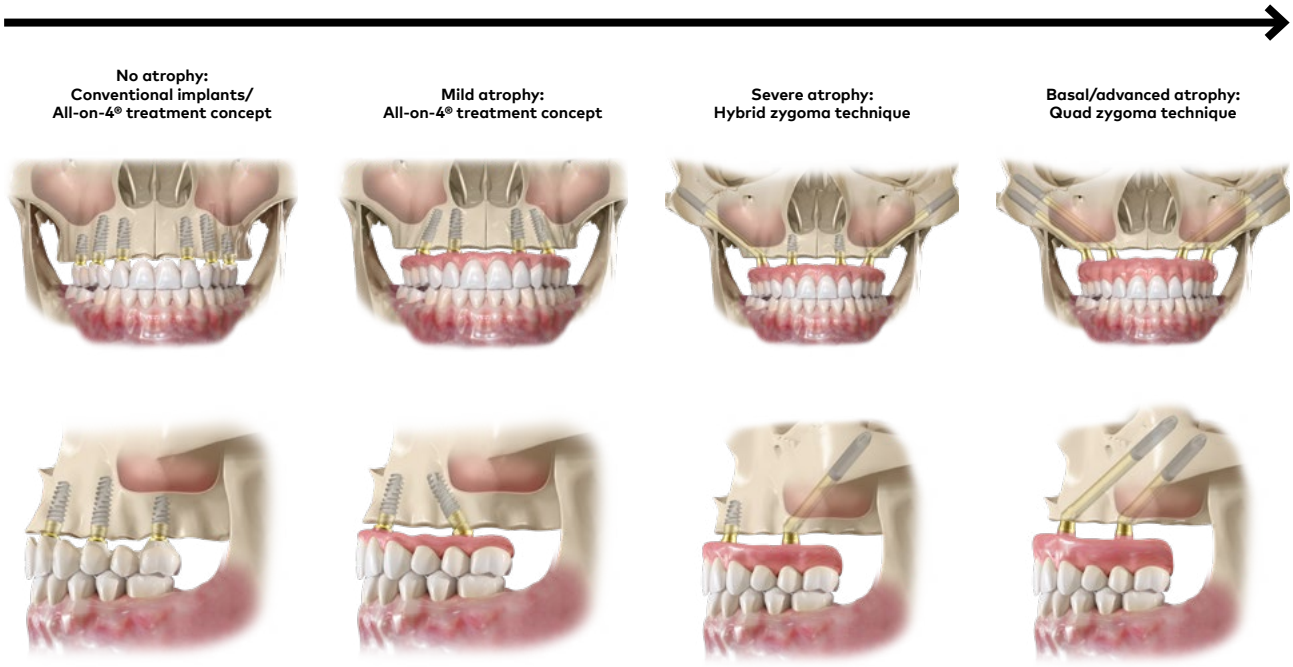
It is very important to understand the degree of hard and soft tissue loss, as the degree of atrophy directs the restorative protocol. This means that the remaining alveolar bone directs the surgical protocol, which in turn supports the restorative treatment plan*.



Bone resorption patterns[1] – before rehabilitation

* The same considerations can be made for partial bone resorption when rehabilitating a maxilla with a unilateral zygomatic implant.

1. Cawood JI, Howell RA. A classification of the edentulous jaws. Int J Oral Maxillofac Surg. 1988 Aug;17(4):232-6. doi: 10.1016/s0901-5027(88)80047-x. PMID: 3139793.
2. Recently described by Davo R, Fan S, Wang F, Wu Y. Long-term survival and complications of Quad Zygoma Protocol with Anatomy-Guided Approach in severely atrophic maxilla: A retrospective follow-up analysis of up to 17 years. Clin Implant Dent Relat Res. 2023;1-13. doi:10.1111/cid.13296



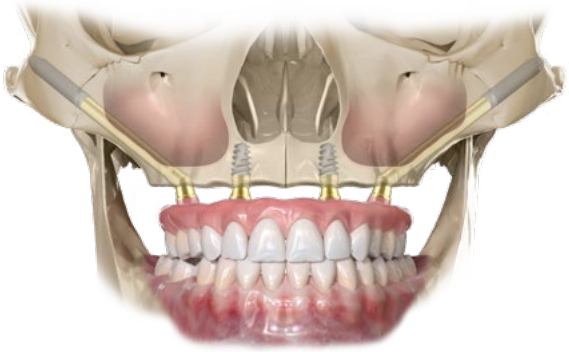
Bone resorption patterns and potential rehabilitation strategies

Different surgical techniques

Hybrid zygoma technique

In a treatment following the hybrid zygoma technique, two zygoma implants are positioned posteriorly to emerge in the region of the first or second premolar. In the premaxilla region, a minimum of two dental implants are placed.

Note For a planned hybrid surgery, it is recommended to place the anterior implants first, to confirm their stability prior to finalizing the placement of posterior zygoma implants.

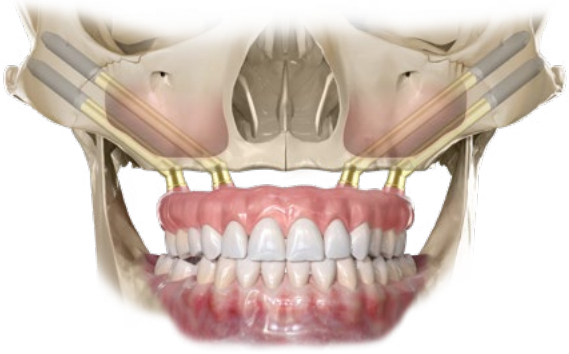


Hybrid zygoma technique

Quad zygoma technique

In a quad zygoma technique using only zygoma implants, it is recommended to place two implants to emerge in the pre-molar region and two in the canine/lateral incisor region.

Note For a planned quad zygoma surgery, it is recommended to start placing the anterior implants while maintaining a safe distance to the orbital rim to protect the orbital floor. The posterior implant is placed after the anterior one, to avoid collision.



Quad zygoma technique

Anatomically guided approach

The objective of the installation is for the threaded part of the zygomatic implant (the apical portion) to be firmly anchored within the zygomatic bone, with the implant platform well positioned to support a prosthesis.

Caution Avoid excessive protrusion of the shaft or platform of the implant beyond the lateral wall of the maxillary sinus or the alveolar crest to minimize sinus-related complications or mucosal recession.

The optimal trajectory of the implant is thus influenced by the anatomical features of the maxillary-zygomatic complex such as the curvature of the maxillary wall and the degree of alveolar atrophy.

Digital planning may help to define the approach to be used in advance of surgery and support the use of an anatomically guided approach.

* The same considerations can be made for partial bone resorption when rehabilitating a maxilla with a unilateral zygomatic implant.

Treatment planning

Oral examination

Oral examination of the patient

A thorough pre-treatment evaluation of patients who are edentulous or with failing/terminal dentitions is necessary to establish a predictable treatment outcome. To begin the evaluation, the following may be taken into consideration.

1 Medical history and chief complaint

Any conditions that might affect the result or influence candidacy for surgery are noted here. Consideration for referral for medical clearance as indicated.

2 Dental history

Ascertain the patient's expectations, past dental history with dental failure, e.g. periodontal disease, admitted or known habits including clenching and bruxing.

3 Intra- and extraoral examination

For patients with existing non-restorable teeth, documentation of the findings for their removal is noted. A screening exam for intraoral soft tissue health is paramount. Evaluation of the temporomandibular joint (TMJ) is also recommended.

Pre-treatment evaluation of an edentulous maxilla
Case courtesy of Dr Raphäel Bonnet

Diagnostics and treatment planning

Prosthetic considerations

The pre-surgical prosthetic examination and evaluation are multifaceted. In order to determine the type of final prosthesis, three specific clinical criteria must be evaluated at the initial consultation:*

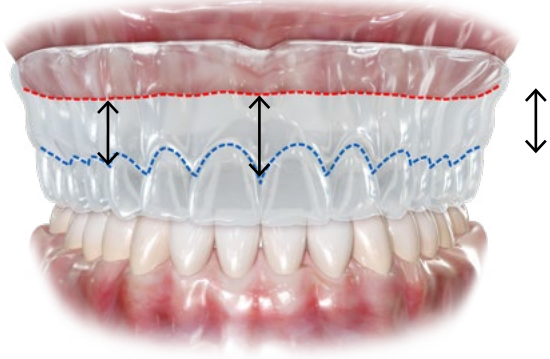
1. Presence or lack of composite defect
2. Type of final prosthesis
3. Visible or hidden transition line

Step I: Determine the presence or lack of a composite defect

Tooth-only defect (missing teeth)
In this group of patients, there is no space between the cervical portion of the denture teeth and the crest of the soft tissues. Therefore, they are missing teeth only.

Tooth-only defect

Composite defect (missing teeth, hard and soft tissues)
In this group of patients, there is space between the cervical portion of the denture teeth and the crest of the soft tissues (as shown by the black arrows). Therefore, they are missing teeth as well as hard and soft tissues.



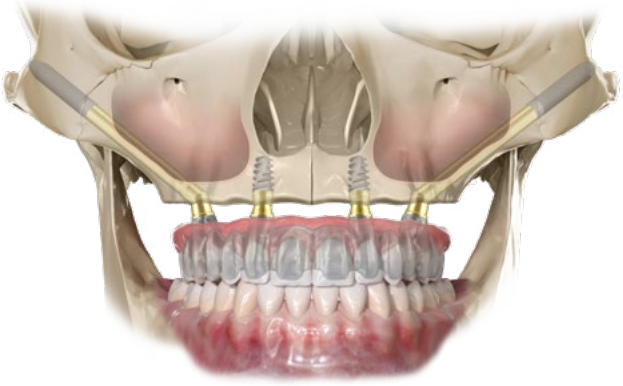
Composite defect

* Bedrossian E et al. Fixed-Prosthetic Implant Restoration of the Edentulous Maxilla: A Systematic Pretreatment Evaluation Method. J Oral Maxillofac Surg 2008;66:112-122

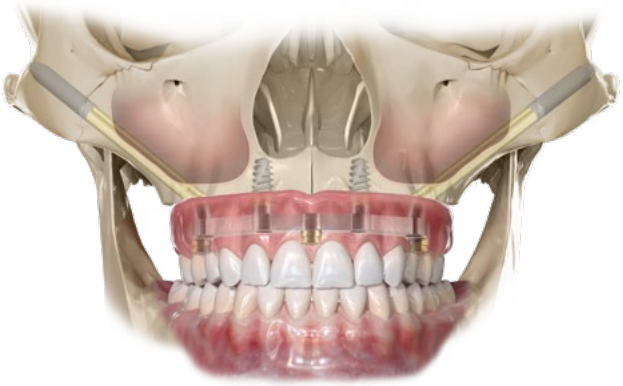
Step II: Determine the final restoration

Patients with tooth-only defects receive a NobelProcera Implant Bridge or conventionally fabricated porcelain-fused-to-metal bridge.

However, the majority of zygoma implant patients demonstrate mild to advanced atrophy. For these patients, either the fixed NobelProcera Implant Bridge or the fixed-removable NobelProcera Implant Bar Overdenture are available.



NobelProcera Implant Bridge (crowns showing as transparent for clearer identification of bridge)

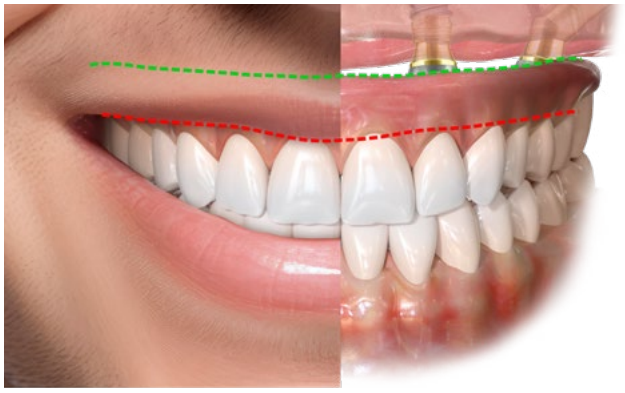


NobelProcera Implant Bar Overdenture (pink composite showing as transparent for clearer identification of bridge)

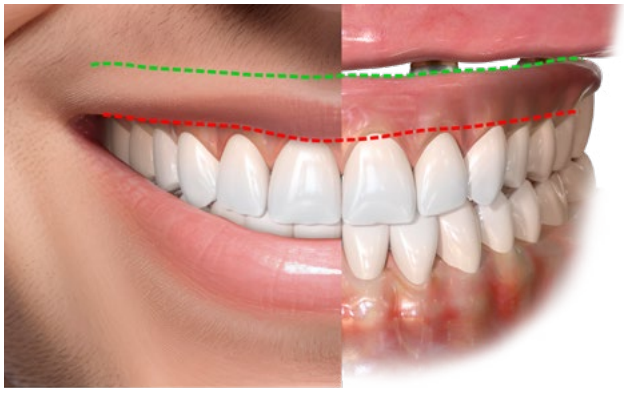
Step III: Determine the transition line

Determination of a hidden or visible transition line can assist in determining potential esthetic considerations, the needs of the patient, and the requirements for the final prosthesis.

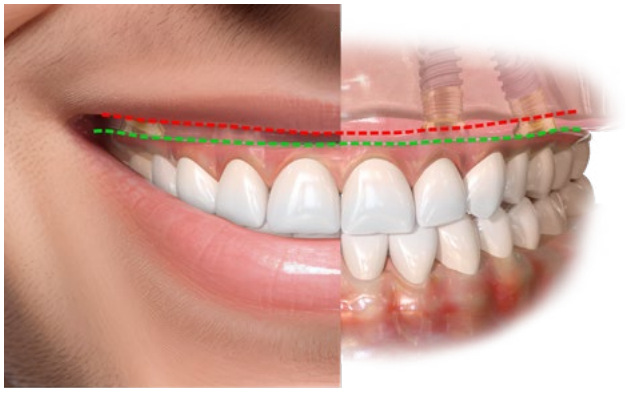
If the smile line is apical to the transition line, the margin of the prosthesis will show and an unesthetic outcome will result. It is recommended to have the smile line coronal to the transition line.



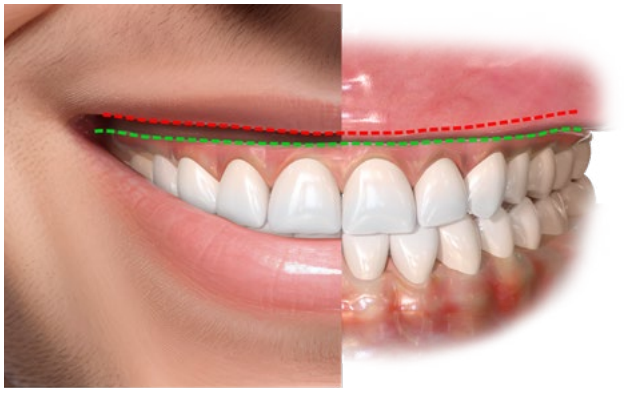
Hidden transition line



Esthetic outcome: transition line (in green)



Visible transition line



Unesthetic outcome: transition line (in green) is coronal to the smile line (in red).

Once the three criteria are assessed, evaluate the following

- Facial profile and contours, determined by evaluation of the VDO (vertical dimension of occlusion) and the AP (anterior-posterior) tooth position
- Parafunctional habits
- Horizontal and vertical jaw relationships
- Status of the opposing dentition
- Status of present dentition or the existing complete upper denture

General guidelines for prosthetic design when using zygoma implants

- Incorporate sufficient rigidity and precision to achieve a passive fit in the final restoration. If the prosthesis is insufficiently rigid, deformation and deflection of the zygoma implants can lead to screw loosening or implant loss.
- It is recommended to use NobelProcera CAD/CAM precision-milled restorations for precision and fit.

Position and angulation of implants

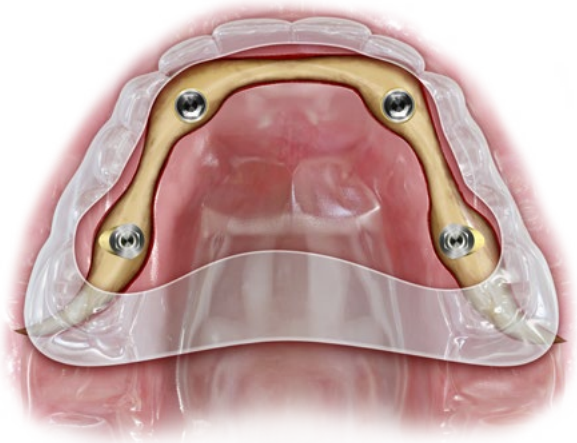
The tooth positions for the planned restoration should be determined preoperatively, allowing for the selection of the most appropriate position and angulation for each planned implant. The existing or the newly fabricated full denture must be in the correct vertical dimension of occlusion (VDO) and have the proper AP tooth position in order to allow fabrication of a surgical guide.

It is the responsibility of the prosthetic team to ensure that the surgical team clearly understands the tooth positions required for the final prosthesis. One of the most appropriate means of doing this is to provide a surgical guide. A quick and simple way of fabricating a surgical guide is to use 3D planning software to calculate the guide (refer to next guided section) or make a replica in clear acrylic resin, either of the existing or the newly fabricated denture.

Surgical guide, based on the existing or newly fabricated denture, helps to angulate the drills correctly and to maintain the desired implant angulation during insertion.

To help visualize the surgical field, it is recommended to use a clear reference guide where the palatal portion is removed, except for a supporting posterior connection. Leaving only the buccal contours of the teeth, it helps the surgeon to angulate the drills correctly during osteotomy preparation and to maintain the desired implant angulation during insertion.

A 3D printed pilot drill guide can be designed and produced through the DTX Studio software to assist with implant positioning. Note that this will not replace the need for the surgical guide when it comes to selecting implant length, abutments, alignment of prosthetic screw access holes.



Palatal portion of reference guide

Radiological assessment

Pre-surgical evaluation of maxillary sinus health.

3D radiographic survey allows for the identification of the following in the maxillary sinus:

- Maxillary sinus polyps
- Thickness of the Schneiderian membrane
- Potential air-fluid level
- Patency of the osteomeatal complex (OMC)

A healthy maxillary sinus is essential for the placement of zygoma implants.

Radiographic analysis

Initial radiographic evaluation may be done with the help of a panoramic radiograph (OPG). It is recommended to perform a cone beam computed tomography scan (CB)CT scan analysis.

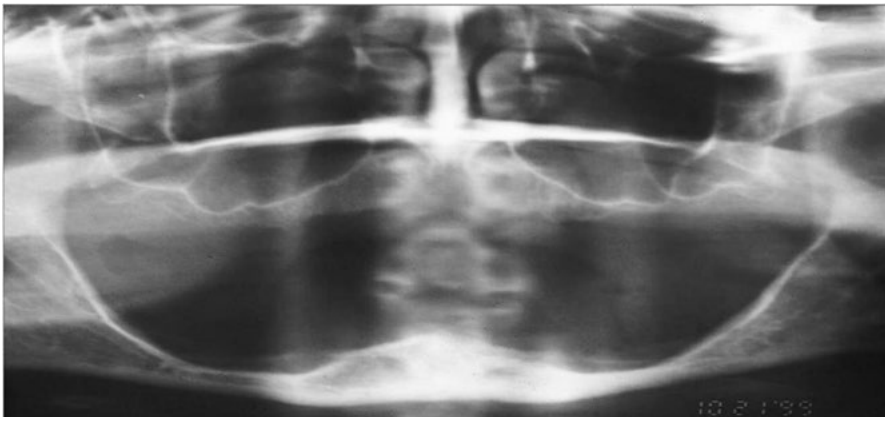
Panoramic image (OPG)

Initial radiograph of choice; a scout film visualizes the three zones of the maxilla.

3D studies

It is essential that the (CB)CT scans include maxilla and zygomatic bone in their entirety. They provide detailed information on the maxillary sinus topography, such as the width and height of the zygomatic body and the width of the residual alveolar bone.

Reconstruction of the 3D anatomy using CB(CT) images allows for clearer evaluation of the maxillary sinuses and the zygomatic body. The location of the osteomeatal complex, as well as the existence or lack of sinus pathology, can also be identified.

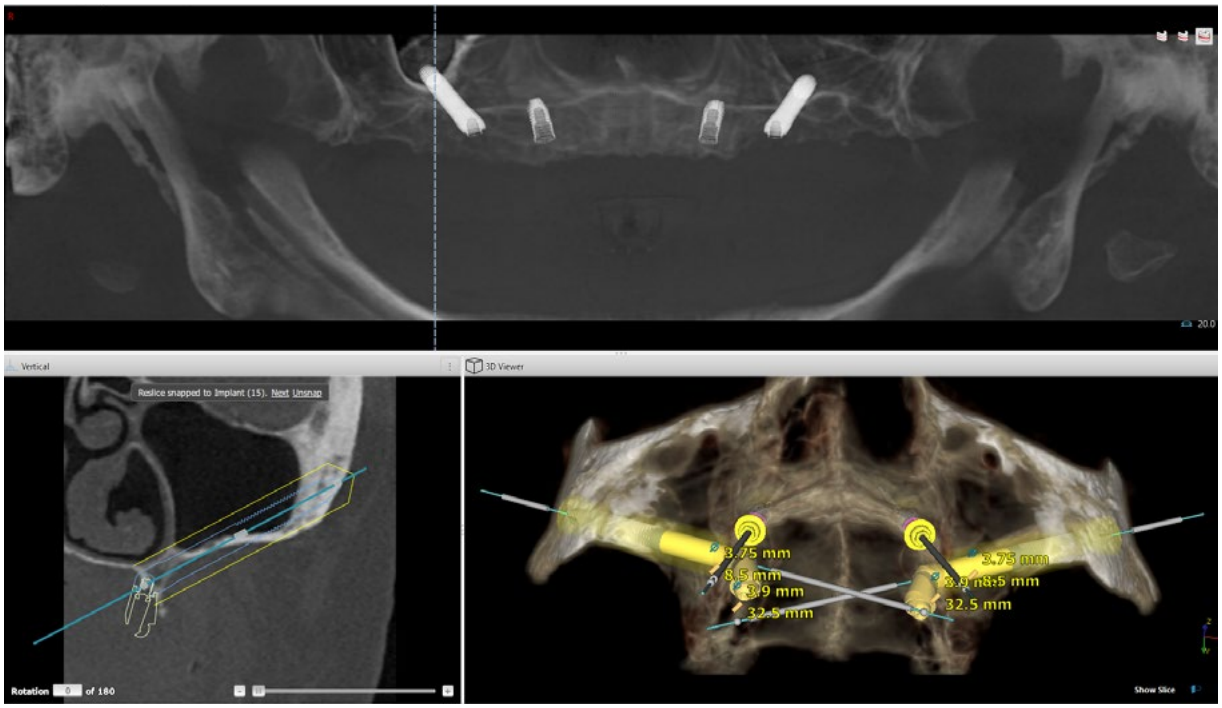


Panoramic radiography of an edentulous patient

Patient treatment data authorized for release

DTX Studio™ software

The use of the DTX Studio software allows for the 3D evaluation of the edentulous maxilla as well as the planning of the implant placements. Both the premaxillary implants as well as the zygoma implants can be planned, visualized, and ordered in the DTX Studio software.



3D radiograph using DTX Studio software
Case courtesy of Dr. Andrew Dawood

Note The exact length of the zygoma implant has to be determined at time of surgery, but an indication of sizing can be reached pre-operatively.

Presentation of treatment options to patient

The final phase in treatment planning includes an in-depth presentation of all appropriate treatment options to the patient. Any anticipated esthetic or functional limitations arising from the proposed treatment must be discussed with the patient. Final acceptance of the treatment plan is documented with the patient's confirmation and consent.

Immediate function concept

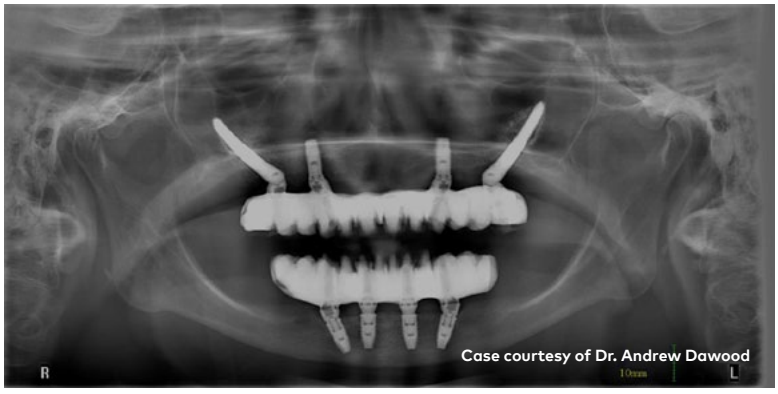
Immediate function means patients received a functional, fixed restoration within 48 hours of implant insertion.

Osseointegration is defined as a direct structural and functional connection between living bone and the surface of a load-carrying implant.* With the immediate function protocol, osseointegration has not yet taken place when abutment and provisional restoration is delivered to the patient. Immediate function with its potential loading is an alternative to later loading protocols for the experienced implant user.

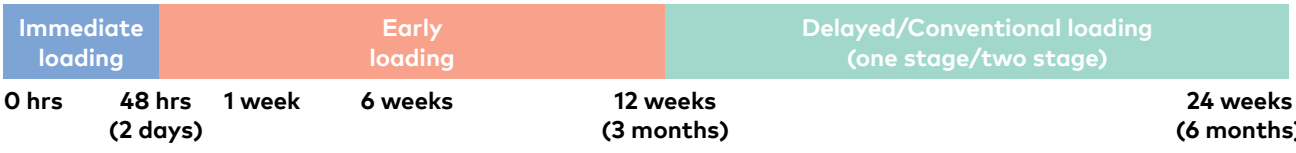
As with any surgical or restorative implant procedure, the treatment outcome may be affected by many different factors. It is prudent to consider the following interdependent variables:

- Implant and multi-unit abutment design
- Implant surface technology
- Surgical technique
- Prosthetic loading conditions
- Individual patient local site conditions

When considering the immediate function concept, it is essential to utilize sound surgical and prosthetic principles as well as place the implants with an initial stability of minimum 35 Ncm with immediate cross-arch splinting using a provisional fixed bridge. Careful patient selection and follow-up is necessary for this group of patients.

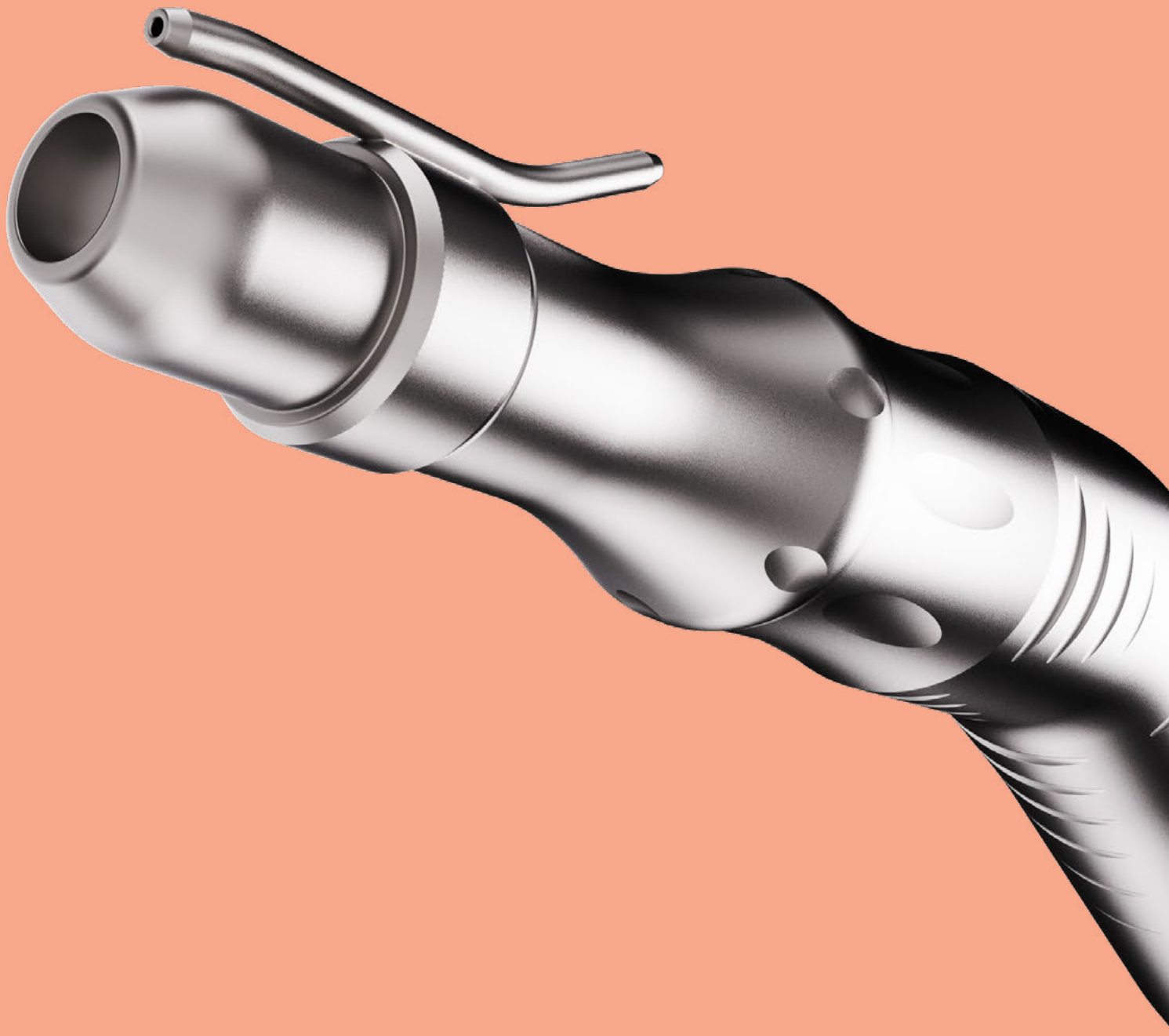


Immediate function concept: OPG of cross-arch splinted fixed implant-supported provisional bridge



Loading protocols – definitions

* Brånemark P-I, Zarb G, Albrektsson T. Tissue-integrated prostheses: Osseointegration in clinical dentistry. Chicago: Quintessence Publishing Co., Inc. 1985.



Surgical aspects

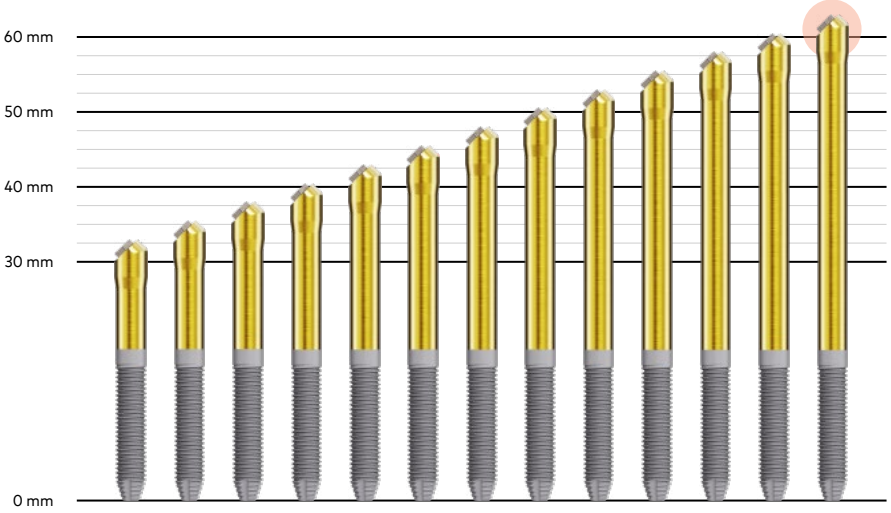
Pre-operative preparation

Pre-medication

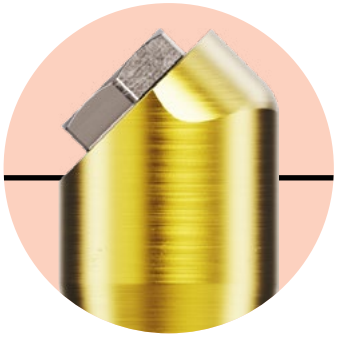
Patients are pre-medicated with antibiotics prior to the surgical visit as instructed by the surgical team.

Anesthesia

Patients may be treated under local anesthesia, IV sedation, or general anesthesia.



Scope of NobelZygoma External Hex TiUltra implants

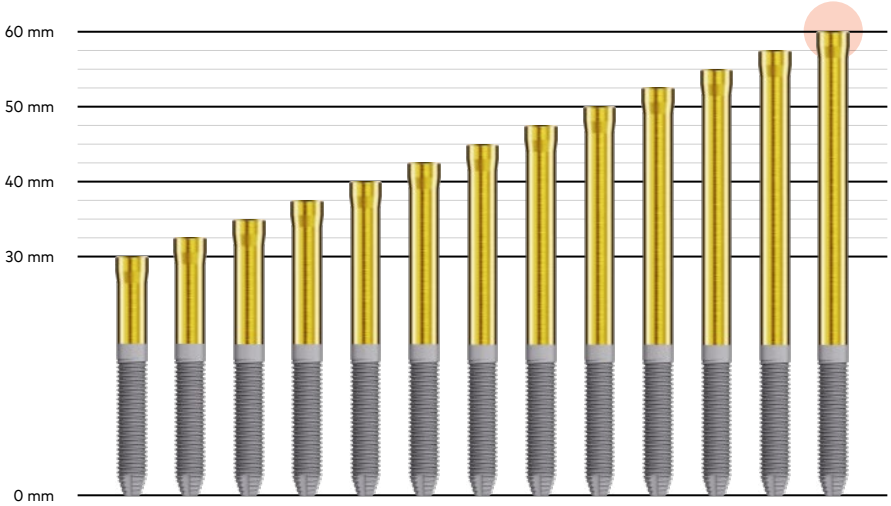


Surgical inventory

Implants

It is recommended that the surgical team maintains at least two NobelZygoma implants of every available size. Identifying the required implant lengths is a critical process during the preparation of the osteotomy.

In multi-unit reconstructions (e.g. the All-on-4® treatment concept), the NobelZygoma TiUltra implants may be used together with Nobel Biocare's standard implant portfolio to support the restoration.

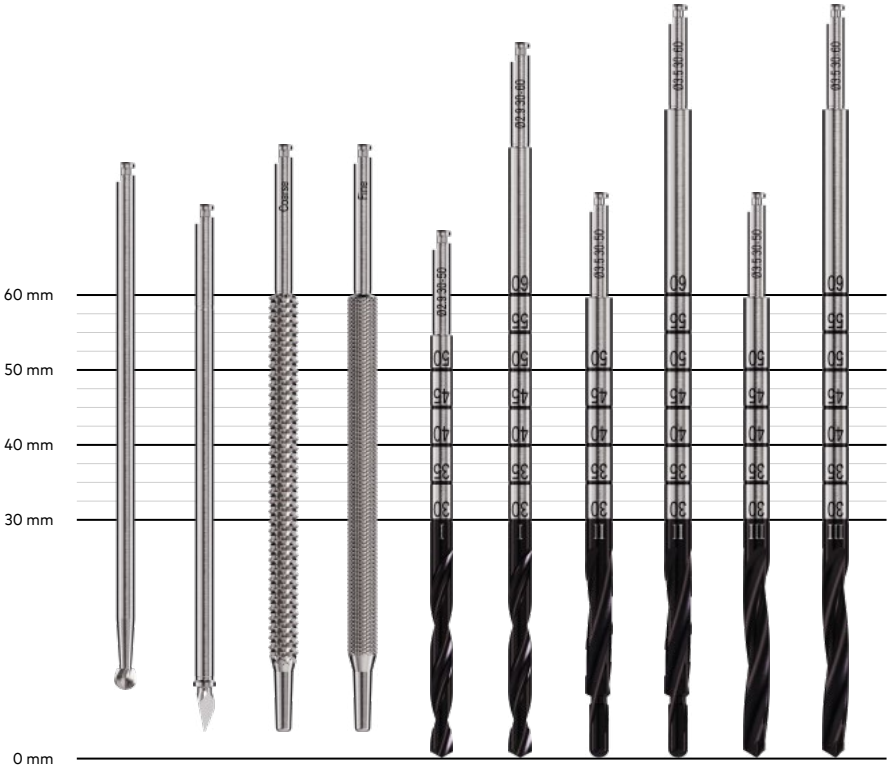


Scope of NobelZygoma 0° CC TiUltra implants

Surgical inventory

Instruments for osteotomy preparation

The NobelZygoma Round Bur, Precision Drill, Lateral Bur, Twist Drills, and Pilot Drills support the preparation of the osteotomy for placement of NobelZygoma TiUltra Implants (0° and 45°) and are for single-patient use. The drills are available in different diameters (Ø2.9 mm and Ø3.5 mm) and lengths to widen the osteotomy step-by-step to the appropriate diameter and depth. A coarse and a fine lateral bur are available, to create a slot/groove.



NobelZygoma Round Bur, Precision Drill, Lateral Burs, Twist Drills, and Pilot Drills

The NobelZygoma Bone Mills are co-packed with the NobelZygoma Bone Mill Guides, and the NobelZygoma Bone Mill Guides are also available separately.

Two versions of the bone mill guide exist, to support the 0° and 45° variants of the NobelZygoma TiUltra implants.

NobelZygoma Bone Mill with Guide and Bone Mill Guide (Ext Hex and CC)

Surgical inventory

Instruments to support implant placement

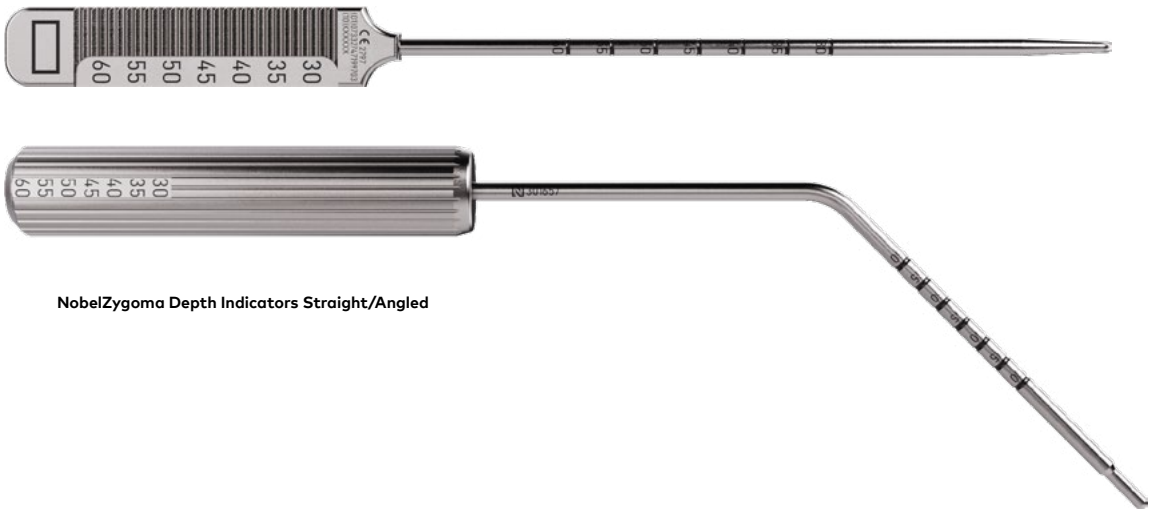
The NobelZygoma Handpiece Adapter is used to pick up a NobelZygoma TiUltra Implant when connected to its implant mount, and is connected to a dental handpiece, for insertion and initial placement.

NobelZygoma Handpiece Adapter

The NobelZygoma Handle connects to the implant mount for final placement of the NobelZygoma TiUltra Implant into the osteotomy.

NobelZygoma Handle

The NobelZygoma Depth Indicators Straight and Angled are used to verify the depth of the osteotomy during dental implant surgery. They feature numbered scales on the handle and shaft to verify the depth of the osteotomy and to support selection of the appropriate NobelZygoma TiUltra Implant length.



NobelZygoma Depth Indicators Straight/Angled

Prosthetic inventory when considering immediate loading

When following the conventional restorative workflow, the surgical and prosthetic teams ensure that the patient arrives to surgery with either their existing full denture or their newly fabricated full maxillary denture, as it will be converted into an immediately loaded fixed provisional bridge.

Ensure that all necessary components for this procedure, including a surgical guide, are at hand.

Note There are dedicated multi-unit abutments for NobelZygoma 45° Ext Hex TiUltra and NobelZygoma 0° CC TiUltra Implants.

NobelZygoma 0° CC TiUltra

Conical connection

Tightening torque clinical screw = 35 Ncm

45° Multi-unit Abutment Xeal Zygoma CC

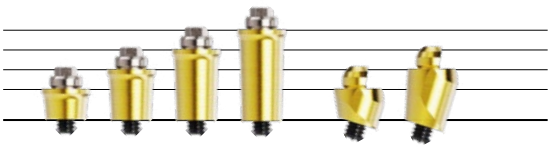
60° Multi-unit Abutment Xeal Zygoma CC

XL - 9 mm
L - 7 mm
M - 5 mm
S - 3 mm
Gingival height

NobelZygoma 45° Ext Hex TiUltra

External hex

Tightening torque clinical screw = 35 Ncm



Multi-unit Abutment Xeal Zygoma Ext Hex

17° Multi-unit Abutment Xeal Zygoma Ext Hex

Scope of Multi-unit Abutments Xeal Zygoma

NobelZygoma Multi-unit Abutment Xeal Zygoma Screws

Compatibility

NobelZygoma TiUltra Implants

NobelZygoma 45° Ext Hex TiUltra Implant (size 30 – 60 mm)

Multi-unit Abutment Xeal Zygoma

Multi-unit Abutment Xeal Zygoma Ext Hex RP Sizes S-XL

17° Multi-unit Abutment Xeal Zygoma Ext Hex RP Sizes S-M

NobelZygoma Multi-unit Abutment Xeal Zygoma Screws

NobelZygoma Multi-unit Abutment Xeal Zygoma Screws Sizes S-XL

NobelZygoma 17° Multi-unit Abutment Xeal Zygoma Screw

NobelZygoma 0° CC TiUltra Implant (size 30 – 60 mm)

45° Multi-unit Abutment
Xeal Zygoma CC RP
Sizes S-XL

60° Multi-unit Abutment
Xeal Zygoma CC RP
Sizes S-XL

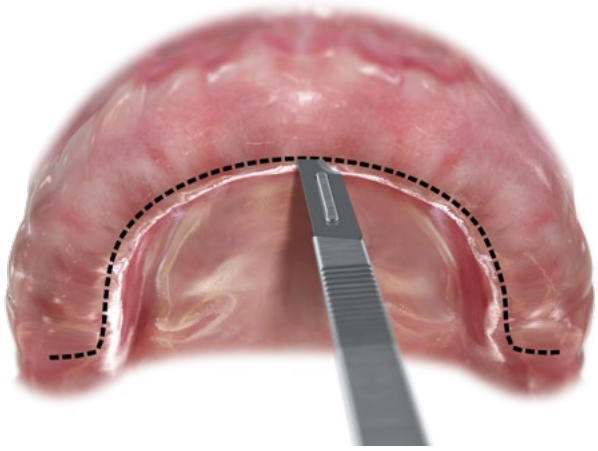
NobelZygoma
Multi-unit Abutment
Screw 45°/60°

Surgical access

Incision

1. Incise slightly palatal of the crest to secure a sufficient amount of keratinized tissue of the edentulous maxilla with distal vertical releasing incision.
2. Reflect a full thickness mucoperiosteal flap to expose the lateral maxillary wall and the zygoma bone.
3. Design the surgical flap to incorporate thick palatal soft tissue to be repositioned buccal to the implant platform.

Note Whenever feasible, refrain from placing the incision buccally.



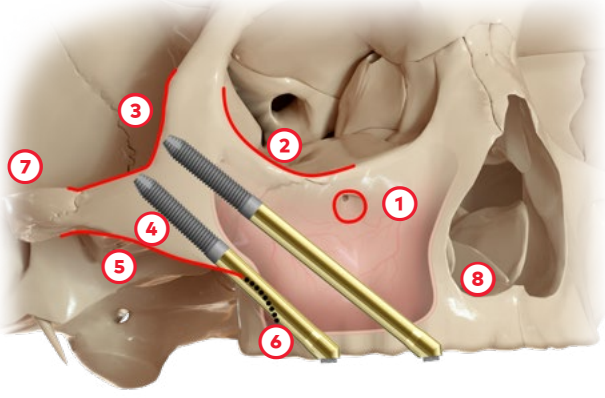
Crestal incision

Anatomical landmarks

Warning When performing exposure of the surgical site, it is imperative to be aware of vital structures including nerves, veins, and arteries. Injuries to vital anatomic structures can lead to complications including injury to the eye as well as extensive bleeding and nerve-related dysfunction.

A comprehensive understanding of various anatomical reference points is crucial to prevent undesired surgical complications. Some key landmarks, as shown in the figure, include:

1. Infraorbital foramen
2. Orbital floor angle
3. Frontozygomatic notch
4. Zygomaticomaxillary suture
5. Inferolateral border of the zygoma – masseter muscular insertion
6. Posterior and lateral wall of the maxillary sinus
7. Infratemporal fossa
8. Nose angle



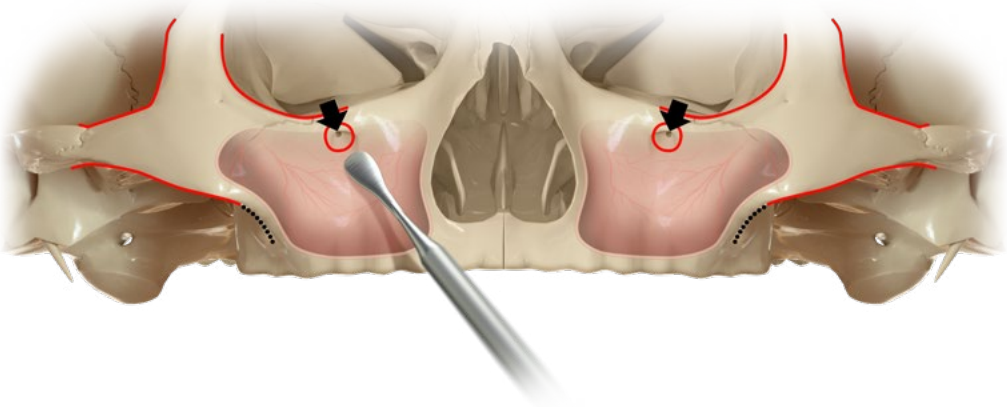
Anatomical landmarks

Initial orientation

Identification of the maxillary bone and infraorbital region:

1. The visualization of the maxillary bone is generally performed from mesial to lateral and posteriorly.
2. Starting with the identification of the bony structure of the nasal cavity, nasal floor, and nasal angle, arriving apically to the infraorbital foramen, find the position of the infraorbital rim and take precautions to safeguard it throughout the entire procedure.

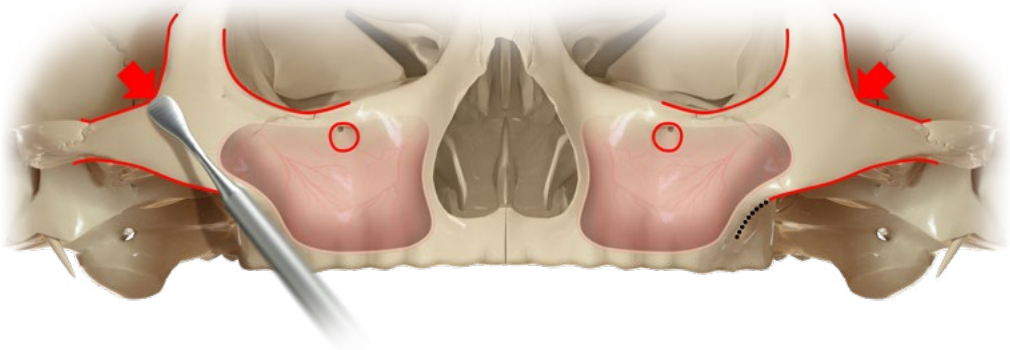
Warning To avoid nerve damage, it is crucial to identify and safeguard the infraorbital nerve.



Landmarks identification – maxillary bone and infraorbital region

Laterally expose the body of the zygomatic bone

3. Dissect laterally over the buccal aspect of the zygomatic bone, finding the zygomaticomaxillary suture, extending up to the frontozygomatic notch.
4. Caudally isolate and eventually detach (in rare cases) any fibers of the masseter muscle which impede access from the zygomatic bone
5. Expose the inferolateral border of the maxillary bone up to the body of the zygomatic bone.



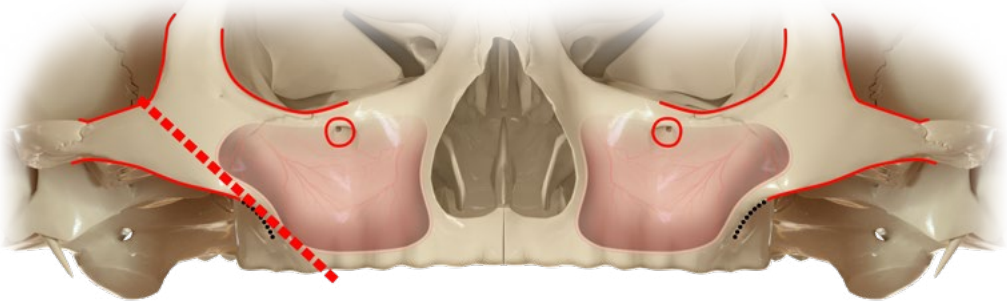
Landmarks identification – body of the zygomatic bone

Identify surgical outcome of entry point and path of the implants

With reference to the virtual (digital) plan, identify the trajectory of the implant(s) along the lateral wall of the maxilla towards the frontozygomatic notch, preserving the integrity of noble structures.

Caution While the trajectory of the zygoma implants can be towards any point on the zygomatic bone, take into account potential collisions between two zygoma implants in case of a quad zygoma procedure, or in case of a hybrid zygoma procedure, the potential need for available space for implantation when converting to quad configuration in the future.

It is not necessary for the threaded tip of the implant to arrive up to the frontozygomatic notch.



Identification of implant trajectory

Osteotomy preparation

Guidelines for an effective drilling technique.

1. Place a retractor to visualize the apical region of the zygomatic bone (corresponding to the emergence of the zygomatic implant).
2. Additionally, position the retractor in the frontozygomatic notch to enhance the visualization of the intended apical emergence points of the implant.
3. Once the dissection is complete, the following landmarks will be visible: angle of the nose, infraorbital foramen, maxilla-zygoma suture, masseter muscle insertion, and body of the zygomatic bone.
4. Find the correct entry point of the drill, to obtain the intrasinus osteotomy (when applicable), just palatal to the alveolar crest.
5. Utilize an in-and-out motion, drilling into the bone for 1 to 2 seconds at a time.
6. Employ the drill without stopping the handpiece motor. This ensures continuous irrigation to flush away debris.

Note All drilling and bone preparation should be performed under copious irrigation and at a maximum speed of 2000 rpm.

7. Maintain copious irrigation with saline throughout the drilling process, upon completion of the sequence, and before removing the retractor.

Drill guard

Drill guards can help prevent injury to the tongue or lip from the drill shaft.

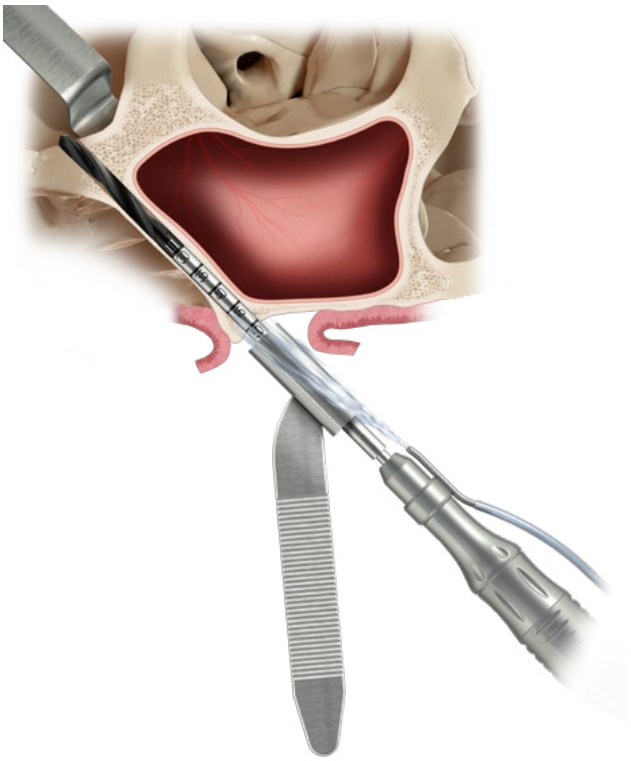
The surgeon and assistant should ensure the protection of these tissues throughout the procedure.

Note Drill guards are available in two lengths.

Caution Avoid applying lateral pressure on twist drills, as this may lead to device fracture and/or injury to the patient.

Warning Verify that all interconnecting instruments are securely locked before use. A loose drill may pose a risk of accidental harm to the patient or members of the surgical team and accidental swallowing or aspiration of the device.

Warning Take care to avoid damaging critical/vital anatomical structures when drilling, either due to wrong trajectory or excessive depth, as this may incur permanent patient injury.

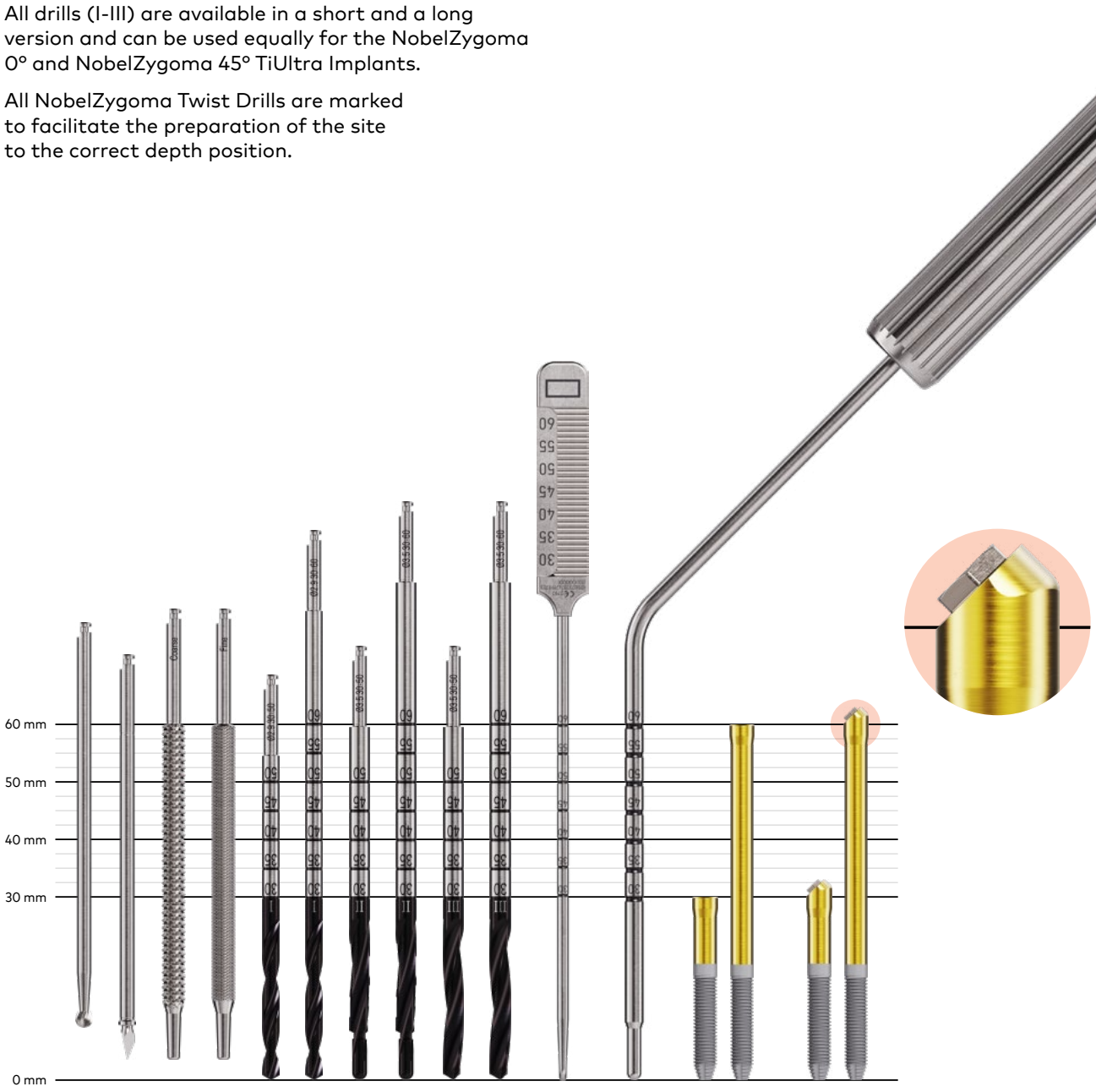


Osteotomy preparation with the NobelZygoma™ Drill

Depth verification system

All drills (I-III) are available in a short and a long version and can be used equally for the NobelZygoma 0° and NobelZygoma 45° TiUltra Implants.

All NobelZygoma Twist Drills are marked to facilitate the preparation of the site to the correct depth position.



Depth verification system

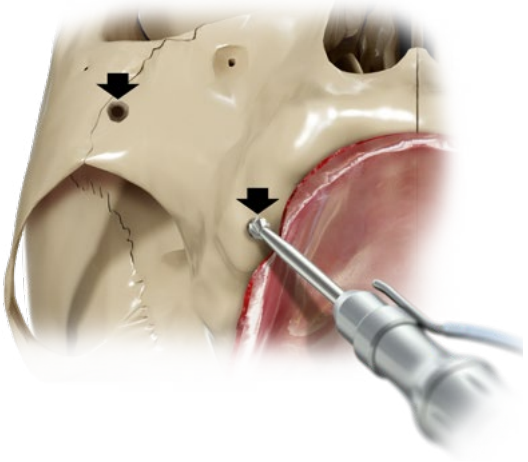
Osteotomy technique

Management of the alveolar bone, entry point, and design of the groove

The following steps will describe how to create an appropriate osteotomy for the placement of the Zygoma Implant, where the insertion shall be within the aveolar crest and the fixation shall be within the Zygomatic bone.

Note The precision drill can also be employed to create a notch in the zygomatic bone.

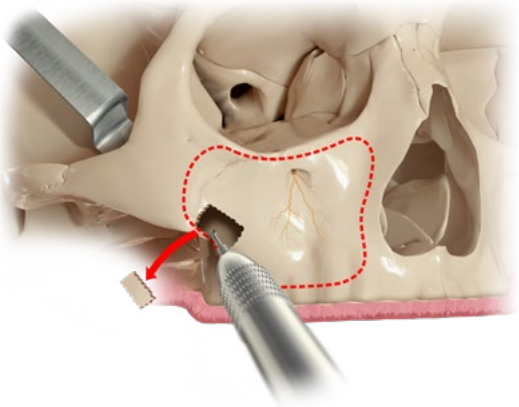
Caution All drilling and bone preparation should be performed under copious irrigation and at a maximum speed of 2000 rpm.



Entry point preparation with the round bur

Note An inspection window may optionally be created through the anterior wall of the maxillary sinus enabling the location and gentle manipulation of the sinus mucosa, while providing a direct visual assessment of the inner aspect of the zygomatic bone.

Caution Endeavor to preserve the integrity of the sinus/Schneiderian membrane throughout this process.



Window to access sinus

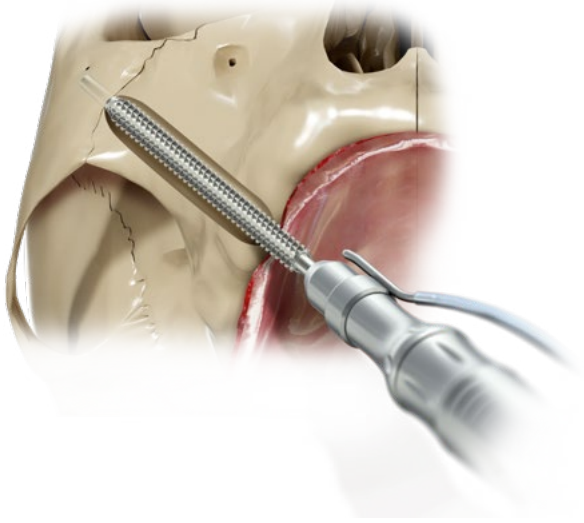
Prepare groove for implant placement (optional)

1. The two prepared holes are then connected with a slot/groove, which continues through to the alveolar crest to receive the coronal part of the implant, by using the NobelZygoma Lateral Bur Coarse, then NobelZygoma Lateral Bur Fine. Using the blunt tip of the NobelZygoma Lateral Bur in the notch, perform a side-cutting milling operation to prepare an unimpeded path for seating of the Zygoma implant.

Note The side-cutting lateral burs are designed to create a channel for the implant.

Note It may be desirable to conserve bone at the crest of the ridge. Therefore, the use of the lateral burs may not be appropriate in all cases.

Caution The NobelZygoma Lateral Burs Coarse and Fine should be used sequentially (Coarse followed by Fine) to prevent over-reaming of the bone and avoid exposure/damage to the sinus membranes.



Creation of the slot with lateral burs

2. The groove should be sized to neatly fit the implant to avoid protrusion of the coronal part of the implant beyond the crest, avoiding pressure on the mucosa.

Caution Use copious irrigation when preparing the osteotomy with the lateral burs to prevent overheating of the device tip. Overheating may lead to localized tissue damage and reduce the potential for osseointegration of the zygoma implants.

Drill using NobelZygoma Drill I Ø2.9mm

To support ease of osteotomy creation (and avoid drill slipping/skipping over the bone surface), an initial entry point for the drills may be created using either the NobelZygoma Round Bur or NobelZygoma Precision Drill.

The tip of the drill is guided along the slot and advanced superiorly toward the zygomatic bone to prepare the implant osteotomy.

Caution Place the reference point to locate the osteotomy within the bulk of the zygoma to avoid fracture of the lateral bone plate.

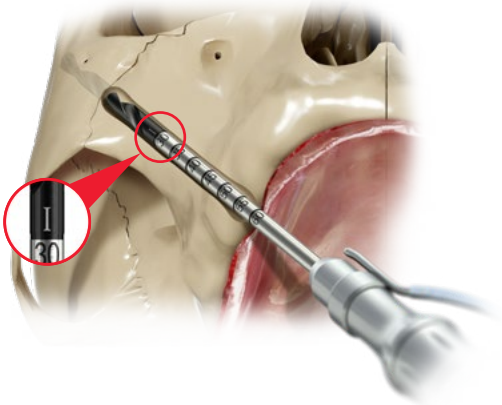
Advance with NobelZygoma™ Twist Drill 2.9mm along the identified trajectory until it penetrates the outer cortical layer of the zygomatic bone.

Ensure direct visualization of the body of the zygomatic bone or feel the tip of the drill with the tip of your finger.

Caution All drilling and bone preparation should be performed under copious irrigation and at a maximum speed of 2000 rpm.

Caution Be attentive to the drill markings to prevent excessive drilling.

Caution In cases where part of the drill may pass through the sinus, consider the use of the small window to avoid damage the integrity of the membrane.

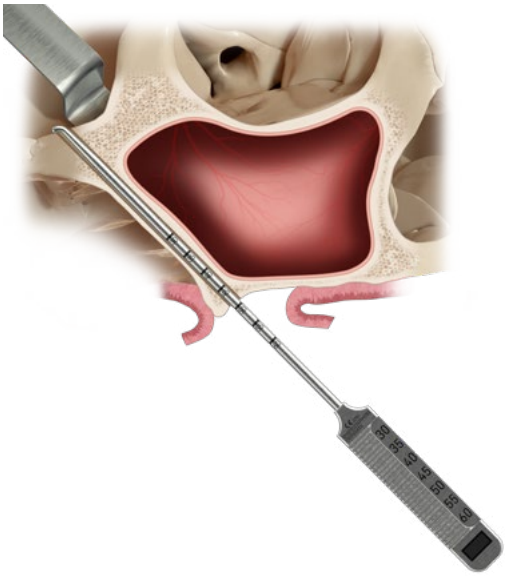


Drill using NobelZygoma Drill I

Evaluate osteotomy length to avoid protrusion beyond the zygomatic bone

Insert the NobelZygoma Depth Indicator Straight into the osteotomy path until the angled tip securely hooks onto the outer surface of the zygomatic bone.

Subsequently, the implant length appropriate for the osteotomy can be determined from the markings on the indicator.



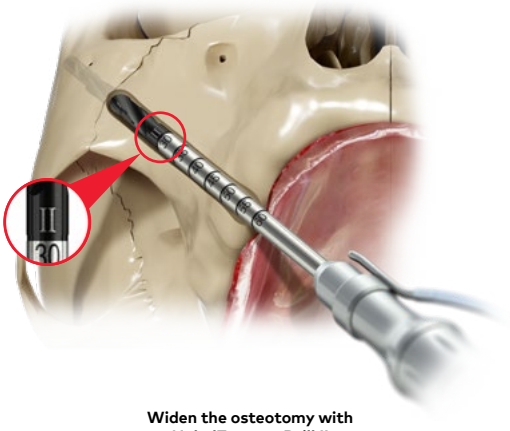
Evaluation of the osteotomy length using NobelZygoma™ Straight Depth Indicator

Widen the osteotomy with NobelZygoma Drill II Ø3.5mm

Utilize NobelZygoma™ Pilot Drill 3.5 mm (Drill II) to engage the original osteotomy created by NobelZygoma™ Twist Drill Ø2.9 mm (Drill I). The NobelZygoma™ Pilot Drill 3.5mm will perform a partial 3.5 mm osteotomy through the zygoma body.

Caution Ensure correct angulation and avoid drill wobble, as this can inadvertently widen the preparation site. Before placing the implant, irrigate to clear debris from the field.

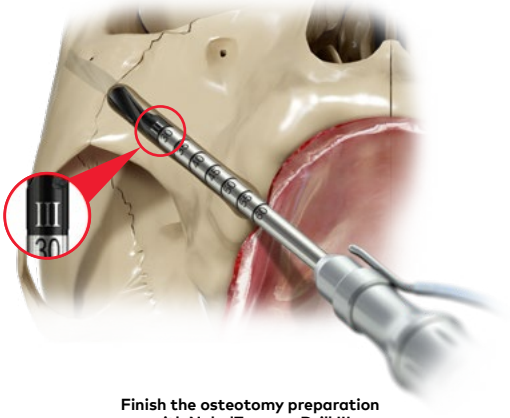
Caution Incomplete preparation of the osteotomy may result in excessive insertion torque for the implant and may result in fracture of the zygomatic bone and/or pressure necrosis.



Widen the osteotomy with NobelZygoma Drill II

Finish the osteotomy preparation with NobelZygoma Drill III Ø3.5mm

Use NobelZygoma™ Twist Drill 3.5 mm (Drill III) to finalise the osteotomy preparation.



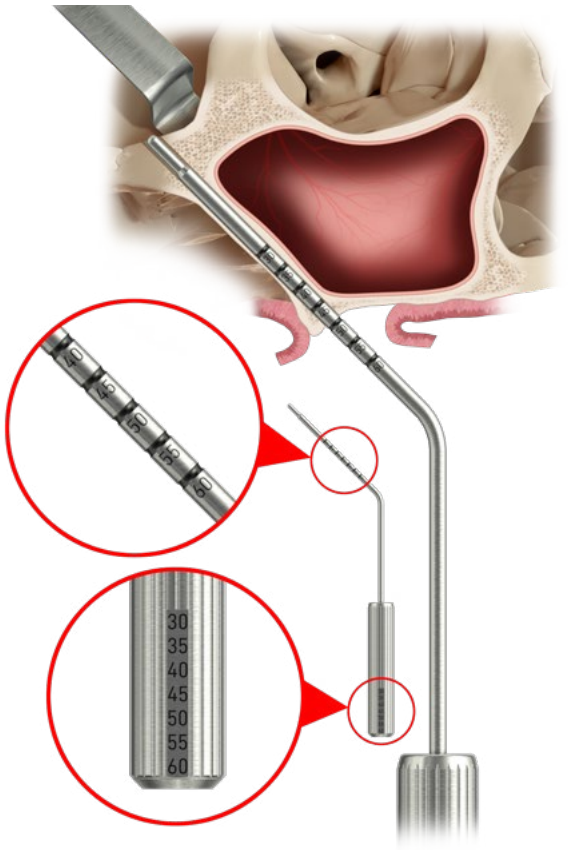
Finish the osteotomy preparation with NobelZygoma Drill III

Verify implant length

Verify the required implant length with either the NobelZygoma Depth Indicator Angled or NobelZygoma Depth Indicator Straight.

Note It is possible to gauge the depth of the tip of NobelZygoma Depth Indicator Angled by palpating the skin over the zygomatic bone, or by direct visualization of the bone.

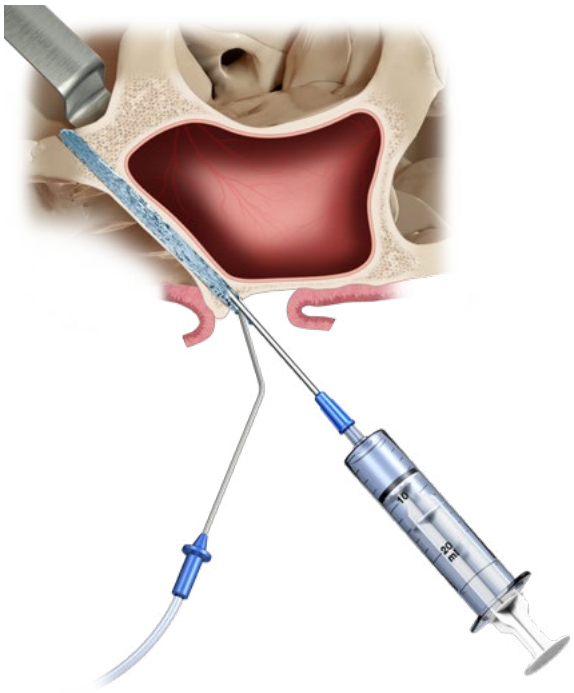
An appropriate crestal emergence of the zygomatic implant must be achieved to align with prosthetic objectives.



Verification of the required implant length using the NobelZygoma Depth Indicator Angled

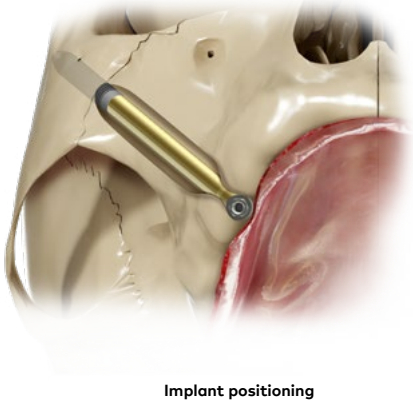
Final rinsing after completing the osteotomy

When the osteotomy is completed, thoroughly rinse the intrasinusal cavity, the inner aspect of the zygomatic bone, and the outer aspect of the zygomatic bone with a saline solution, to prevent infection related to the accumulation of debris following drilling procedures.



Final rinsing

An appropriate crestal emergence of the zygomatic implant must be achieved to align with prosthetic objectives.



Implant positioning

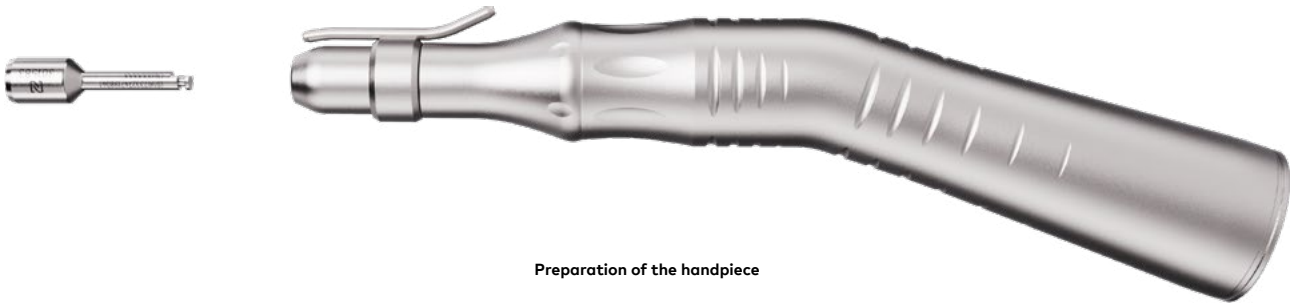
Implant insertion

Setup

Prepare handpiece and pick up zygoma implant

Attach the NobelZygoma Handpiece Adapter to a surgical handpiece, for example Surgical Handpiece Zygoma SZ-75, 20:1 (article number NB30095000).

Warning Ensure that devices are securely locked in the handpiece before initiating use. A loose device may pose a risk of accidental harm to the patient or members of the surgical team. Verify that all interconnecting instruments are securely locked before use to prevent accidental swallowing or aspiration.



Preparation of the handpiece

Unpack and pick up the implant

Engage the implant mount with the handpiece adapter and pick up the implant.

Pick-up of the NobelZygoma TiUltra implants from the packaging sleeve

NobelZygoma 45° Ext Hex TiUltra Implant

Implant insertion with drilling unit

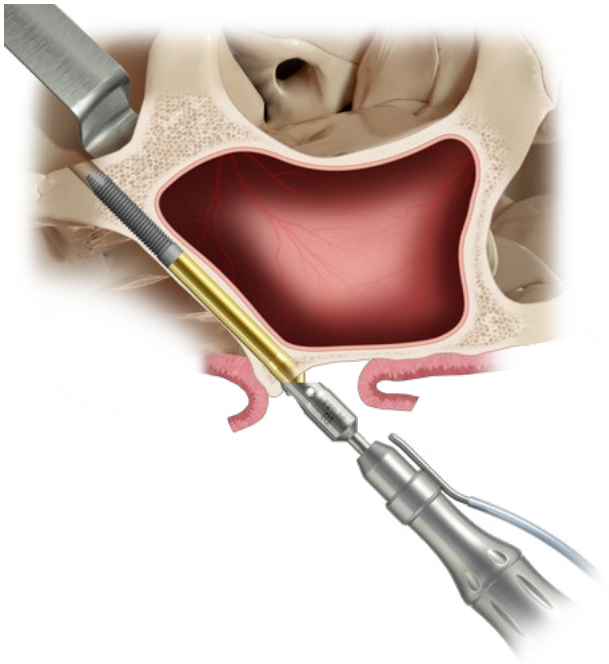
Note Confirm that the screw connection between the zygoma implant and implant mount is secure prior to installation. If the connection is deemed loose, hand tighten using the Unigrip screwdriver.

Caution Take care to ensure that the screw does not drop into the patient's mouth during removal, as it may lead to it being swallowed or aspirated.

Caution During insertion of zygoma implant, apply controlled axial force to engage the zygomatic bone. Under applied axial force, the implant may experience an uncontrolled and sudden jump forward as the threaded section of the implant disengages from the maxillary crest.

1. Confirm the correct insertion angle of the implant while progressing past the sinus until the implant apex engages in the zygomatic bone.
2. Insert the implant using the handpiece adapter into the prepared bone site with a maximum speed of 25 rpm and a maximum torque setting of 40 Ncm.

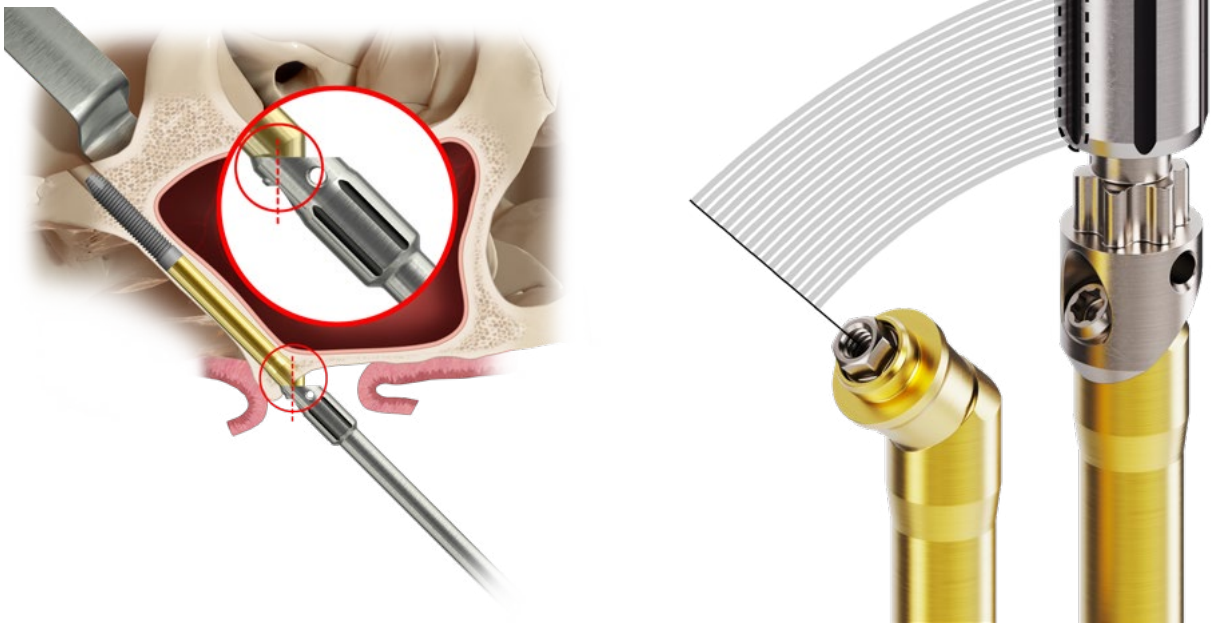
Note For immediate function, the implants should be able to withstand a final torque of at least 35 Ncm.



Insertion of the NobelZygoma 45° Implant with drilling unit and NobelZygoma Handpiece Adapter

Tighten 45° implant manually

1. The NobelZygoma Handle may be used to manually tighten the implant to the proper insertion depth connection from the handpiece.
2. Disengage the connection to the handpiece from the implant mount and connect the NobelZygoma Handle to the implant mount.
3. Rotate the NobelZygoma Handle clockwise until the desired depth and orientation of the platform are achieved. The 45° implant platform can be accurately positioned by observing the black lines on the NobelZygoma Handle, and the emergence direction of the implant mount screw. They indicate the planes of the projection of the multi-unit abutment angulations.



Tightening of the NobelZygoma 45° TiUltra Implant manually, and alignment of NobelZygoma Handle markings with plane of projection of the multi-unit abutments

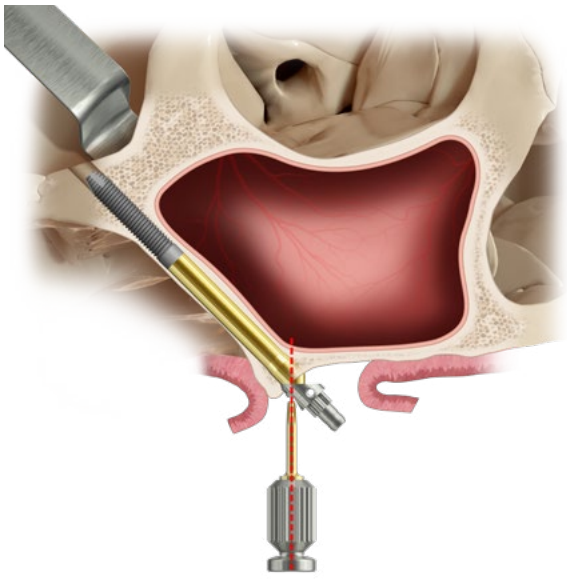
Caution When using the NobelZygoma Handle and Handpiece Adapter, applying excessive torque, or bending can distort the implant head or fracture the implant mount and/or the implant mount screw. To prevent possible damage of the head or of the implant mount, it is advisable to perform controlled in-and-out axial movements; the backward action of the implant allows the elastic response of the bone, enabling the forward movement.

The 45° implant platform can be accurately positioned by observing the screw that locks the implant mount to the implant.

The implant mount screw position marks the future position of the abutment screw. Ideally, its position needs to be perpendicular to the occlusal plane, verifying the correct position of the implant platform by placing Screwdriver Manual Unigrip into the screw head of the implant mount.

Note Compatible multi-unit abutments can make corrections of 17° compared to the emergence angle of the 45° implants.

Note Align the shaft of the screwdriver to be perpendicular to the crest of the ridge.

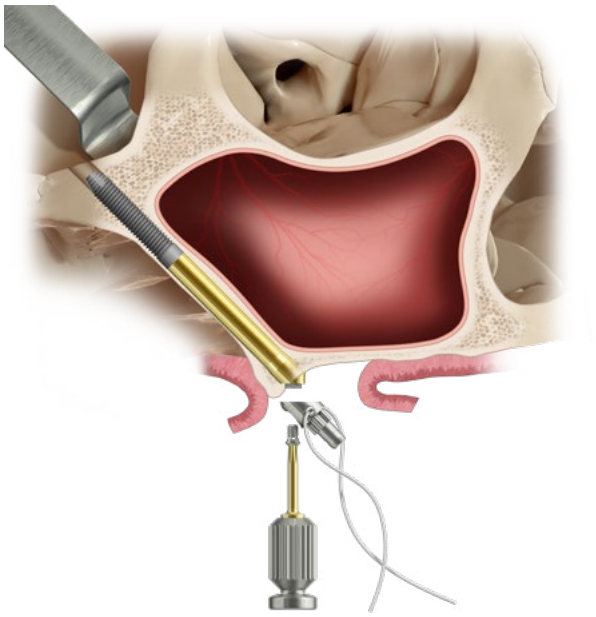


Verification of implant orientation

Remove NobelZygoma 45° implant mount

1. Secure the implant mount with a surgical suture through the tool's hole.
2. Unscrew the screw of the implant mount with machine Unigrip Screwdriver using the contra-angle or torque wrench.
3. If necessary, gently ease the implant mount from side to side to ensure that it does not bind on the implant head.
4. Carefully remove the screw from the implant mount and then remove the implant mount.

Caution Take care to ensure that the screw does not drop into the patient's mouth during removal, as it may lead to it being swallowed or aspirated.



Removal of the NobelZygoma 45° implant mount

Utilization of NobelZygoma™ 45° Implant Bone Mill with Guide and Bone Mill Guide

For the cases in which immediate loading is performed, following implant placement, the use of a bone mill with a bone mill guide is recommended to facilitate the removal of bone impinging upon the implant platform.

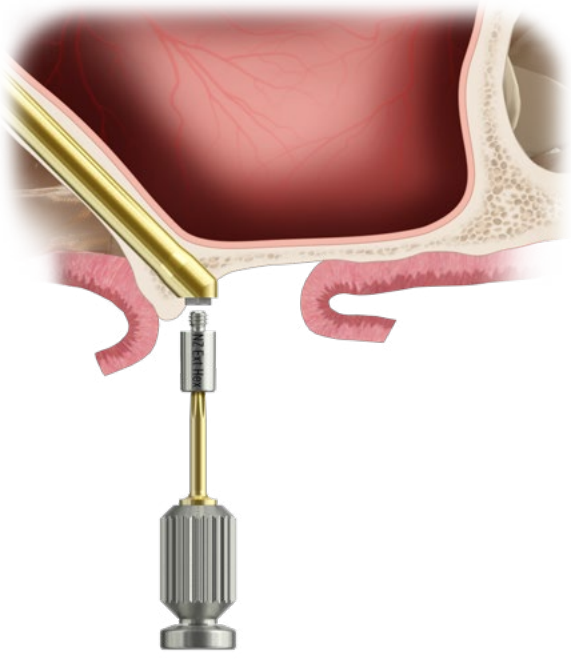
When performing delayed loading for the NobelZygoma TiUltra Implant, without placement of the multi-unit abutment, protect the platform connection by placing a compatible cover screw or healing abutment.

1. If applicable, remove the cover screw.

Caution Take care to ensure that the cover screw does not drop into the patient's mouth during removal, as it may lead to it being swallowed or aspirated.

2. Attach the bone mill guide dedicated to the NobelZygoma 45° TiUltra Implant and hand-tighten using the Screwdriver Manual Unigrip.

Caution Overtightening the screw may cause damage or fracture to the inner threads of the implant, causing implant damage or preventing disassembly.



Place NobelZygoma 45° implant Bone Mill with Guide

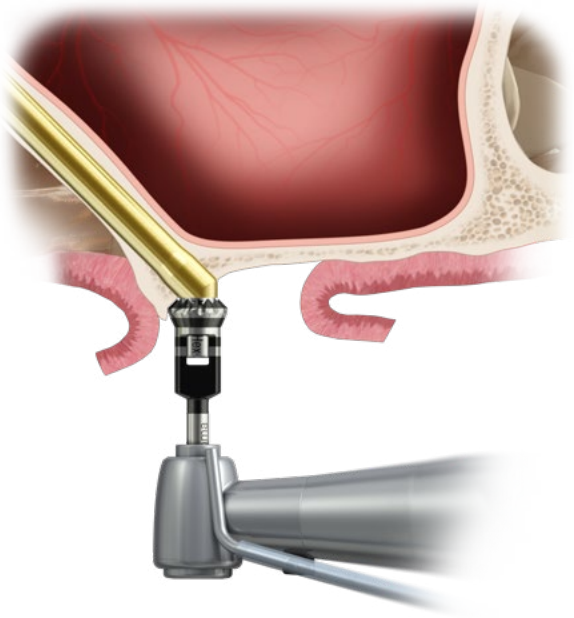
3. Connect the bone mill to the handpiece. Before starting the machine, position the bone mill over the bone mill guide.

Caution The bone mill features an upper window for visual inspection, aiding in determining when the bone mill is fully seated on the bone mill guide.

4. Start milling at a low speed (not exceeding 100 rpm) and ensure generous irrigation.

Caution Avoid applying bending forces during bone milling procedure to prevent collisions with the bone mill guide.

5. The height markings on the bone mill are in 1 mm increments.



Utilization of NobelZygoma 45° Implant Bone Mill with Guide and Bone Mill Guide

NobelZygoma 0° CC TiUltra Implant

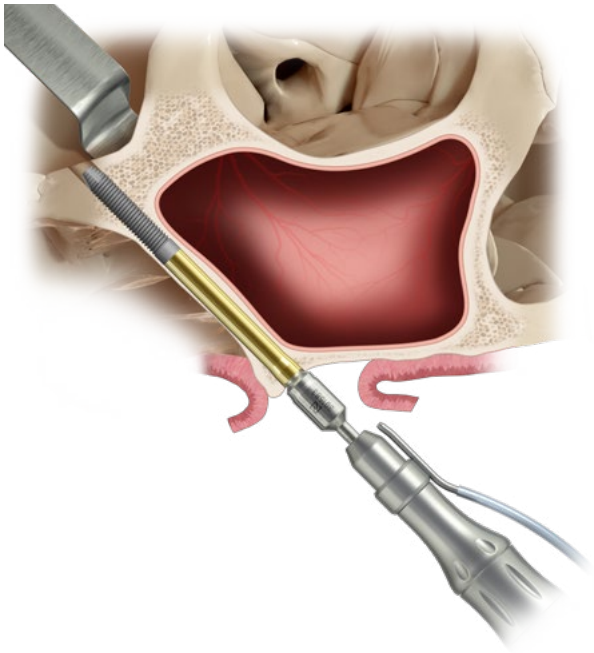
Implant insertion with drilling unit

Note Confirm that the screw connection between the zygoma implant and implant mount is secure prior to installation. If the connection is deemed loose, hand tighten using the Unigrip Screwdriver.

Caution During insertion of the zygoma implant, apply controlled axial force to engage the zygomatic bone. Under applied axial force, the implant may experience an uncontrolled and sudden jump forward as the threaded section of the implant disengages from the maxillary crest.

1. Confirm the correct insertion angle of the implant while progressing past the sinus until the implant apex engages in the zygomatic bone.
2. Insert the implant into the prepared bone site with a maximum speed of 25 rpm and a maximum torque setting of 40 Ncm.

Note For immediate function, the implants should be able to withstand a final torque of at least 35 Ncm.



Insertion of the NobelZygoma 0° Implant with drilling unit

Tighten 0° implant manually

1. The NobelZygoma Handle may be used to manually tighten the implant to the proper insertion depth connection from the platform.
2. Disengage the connection to the handpiece from the implant mount and connect the NobelZygoma Handle to the implant mount.
3. Rotate the NobelZygoma Handle clockwise until the desired depth and orientation of the platform are achieved. The 0° implant platform can be accurately positioned by observing the black lines on the NobelZygoma Handle, which indicate the planes of projection of the multi-unit abutment angulations.

Caution When using the NobelZygoma Handle and Handpiece Adapter, applying excessive torque, or bending can distort the implant head or fracture the implant mount and/or the implant mount screw. To prevent possible damage of the head or of the implant mount, it is advisable to perform controlled in-and-out axial movements; the backward action of the implant allows the elastic response of the bone, enabling the forward movement.

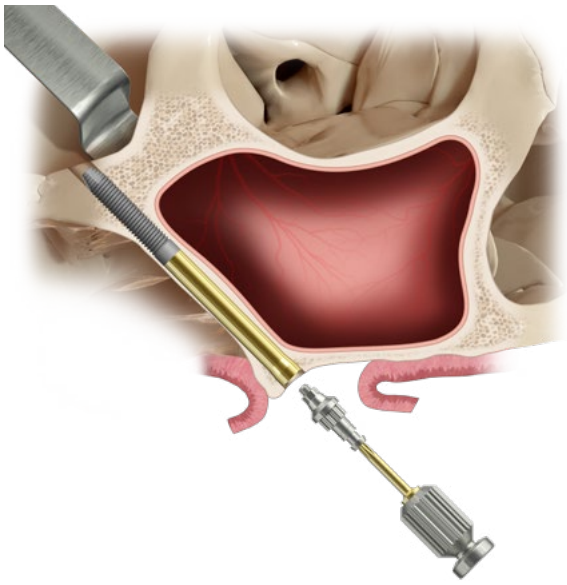
Tightening of the NobelZygoma 0° CC TiUltra Implant manually, and alignment of NobelZygoma Handle markings with plane of projection of the multi-unit abutments

Remove NobelZygoma 0° TiUltra implant mount

1. Unscrew the screw of the implant mount with Screwdriver Manual Unigrip or Screwdriver Machine Unigrip Screwdriver using the contra-angle or torque wrench.
2. If necessary, gently ease the implant mount from side to side to ensure that it does not bind on the implant head.
3. Carefully remove the screw from the implant mount and then remove the implant mount.

Caution Take care to ensure that the screw does not drop into the patient's mouth during removal, as it may lead to it being swallowed or aspirated.

Caution If the insertion torque is low, consider stabilizing the implant mount with a clamp during removal to prevent rotation of the implant.



Removal of the NobelZygoma 0° CC TiUltra implant mount

Utilization of NobelZygoma 0° CC TiUltra Bone Mill with Guide and Bone Mill Guide

For the cases in which immediate loading is performed, following implant placement, the use of a bone mill with a bone mill guide is recommended to facilitate the removal of bone impinging upon the implant platform.

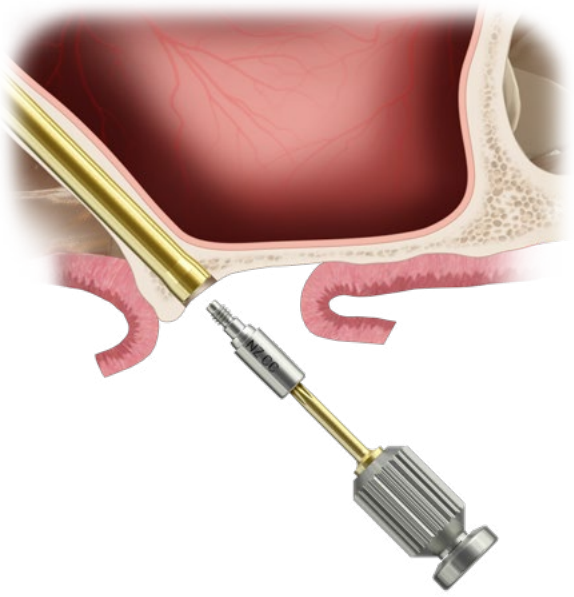
When performing delayed loading for the NobelZygoma TiUltra Implant, without placement of the multi-unit abutment, protect the platform connection by placing a compatible cover screw or healing abutment.

1. If applicable, remove the cover screw.

Caution Take care to ensure that the cover screw does not drop into the patient's mouth during removal, as it may lead to it being swallowed or aspirated.

2. Attach the bone mill guide dedicated to the NobelZygoma 0° TiUltra Implant to the implant and tighten it finger-tight using a Screwdriver Manual Unigrip.

Caution Overtightening the screw may cause damage or fracture to the inner threads of the implant, causing implant damage or preventing disassembly.



Installation of NobelZygoma 0° CC TiUltra Bone Mill with Guide

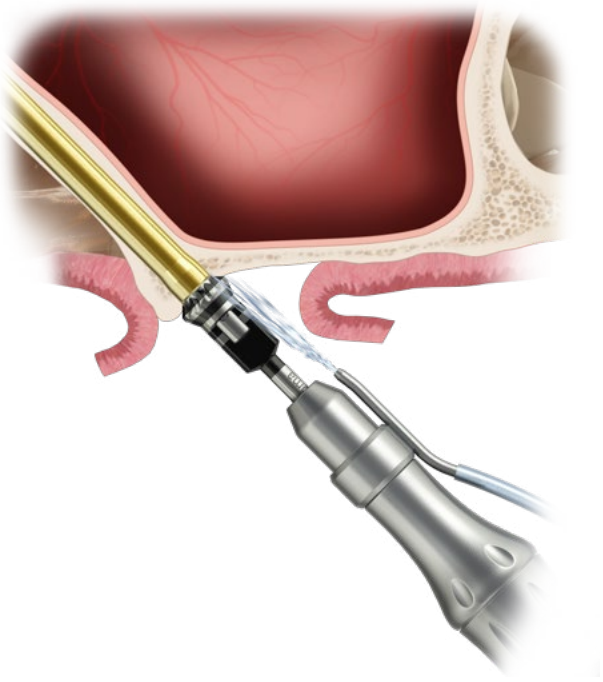
3. Connect the bone mill to the handpiece. Before starting the machine, position the bone mill over the bone mill guide.

Caution The bone mill features an upper window for visual inspection, aiding in determining when the bone mill is fully seated on the bone mill guide.

4. Start milling at a low speed (not exceeding 100 rpm) and ensure generous irrigation.

Caution Avoid applying bending forces during bone milling procedure to prevent collisions with the bone mill guide.

5. The height markings on the bone mill are in 1 mm increments.



Utilization of NobelZygoma 0° CC TiUltra Bone Mill with Guide and Bone Mill Guide

Finalization of the implant surgery

One-stage immediate function

Provisionalize the implant for immediate function at the abutment level by fabricating a provisional bridge using Nobel Biocare Multi-unit Abutments optionally in combination with Temporary Copings Multi-unit.

Two-stage delayed function

Use Unigrip screwdriver to connect the cover screw or the healing cap. Close and suture the tissue flap around the implant.

Post-operative instructions

Medication

Appropriate antibiotics as well as analgesic for pain management are prescribed for one week following the surgical procedure.

Diet

A soft diet is to be maintained throughout the period of using the immediately loaded provisional prosthesis. It is strongly recommended that "tearing" forces and hard food (e.g. raw vegetables and fruit, nuts) are to be avoided.

Oral hygiene

Encourage the use of salt water rinses for the first week and prescribe 0.12% Chlorhexadine rinse b.i.d. (twice daily) for one month following surgery. In addition, ensure that the use of pulsating mechanical hygiene instruments is avoided. The modification of oral hygiene protocols is an ongoing process monitored by the surgical team on an individual patient basis. Also remind patients that they are not to blow their nose until instructed.

Follow-up appointments

The patients are seen post-operatively by the surgical as well as the prosthetic team. The need for more frequent surgical or prosthetic monitoring is determined by each team on an individual basis.

For immediate loading cases: Post-insertion visit

At each visit, the stability of the restoration is checked, and a general evaluation of function, phonetics, and esthetics is made. The stability of the prosthetic screws is also tested and, if necessary, the screws are retightened. The screw-access holes can be sealed by placing a soft, easily removable material over the screw head and a temporary or more permanent filling material of choice, such as composite resin, on top. The immediately loaded provisional prosthesis is normally left undisturbed for the first six months to allow sufficient time for osseointegration.

Appointment for final prosthesis

After a period of six months to allow for osseointegration, the surgical team determines the integrity of all implants. The patients are then referred back to their prosthetic team for the fabrication of the final prosthesis.

Re-call schedule

A re-call schedule is established, based on an individual evaluation of each patient's needs and circumstances. Annual clinical check-ups are recommended, with intraoral radiographic examinations after 1, 3, and 5 years. Encourage patients to return to the clinician immediately if they feel pain or movement of their implants.

Restorative aspects

Multi-unit abutments

Prosthetic portfolio

Implant level

NobelZygoma 0° CC
TiUltra Implant

NobelZygoma 45°
Ext Hex TiUltra Implant

Multi-unit Abutment
Xeal Zygoma CC RP

Multi-unit abutment level

45° Multi-unit Abutment
Xeal Zygoma CC RP

17° Multi-unit Abutment
Xeal Zygoma Ext Hex RP

NobelProcera Titanium
Fixed Implant Bar

Multi-unit Abutment Xeal Zygoma Ext Hex RP

Nobel Procera Zirconia Implant Bridge

Tightening torques

Table 1 Specifications for installation of multi-unit abutments compatible to the NobelZygoma TiUltra implants

	NobelZygoma 45° TiUltra Implant	NobelZygoma 0° TiUltra Implant	
 **Screwdriver Machine Multi-Unit** **35 Ncm**	 **Multi-unit Abutment Xeal Zygoma**		
 **Screwdriver Machine Unigrip** **35 Ncm**	 **17° Multi-unit Abutment Xeal Zygoma**	 **45° Multi-unit Abutment Xeal Zygoma**	 **60° Multi-unit Abutment Xeal Zygoma**

Caution Not applying recommended tightening torques may lead to component fracture or system performance issues.

Caution Ensure all surfaces are clean prior to assembly of the multi-unit abutment to the implant, to ensure effective mechanical locking and to prevent infection due to trapped biological materials.

Placement of multi-unit abutment

NobelZygoma 45° Ext Hex TiUltra Implant

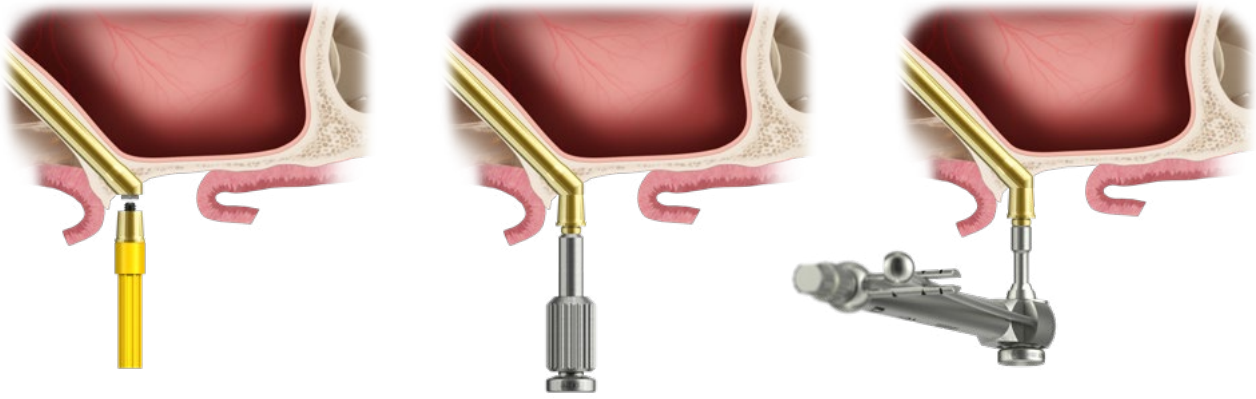
Ensure adequate implant stability before initiating the prosthetic procedure.

1. Select the appropriate multi-unit abutment height (based on the gingival thickness) and angulation (based upon the implant orientation).
2. Place the abutment, using the holder to facilitate insertion.
3. Hand-tighten the abutment screw using the compatible screwdriver (see Table 1)

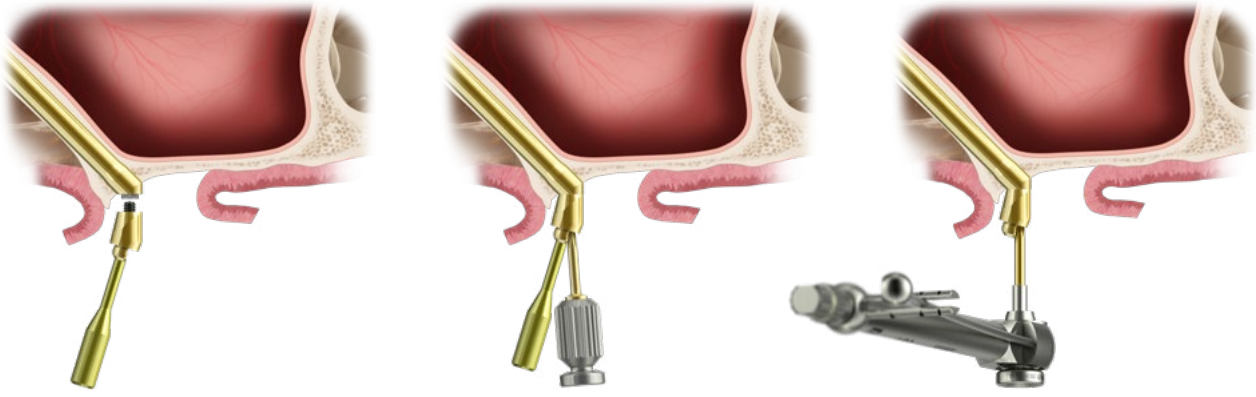
Caution For the Multi-unit Abutment Xeal Zygoma, first remove the plastic holder by bending the handle away from the multi-unit abutment, prior to hand-tightening of the abutment screw with the Screwdriver Manual Multi-unit.

Caution For the 17° Multi-unit Abutment Xeal Zygoma, hand-tighten the abutment screw using Screwdriver Manual Unigrip.

4. Tighten the abutment screw to 35 Ncm (Table 1) and with the compatible Screwdriver Machine using the Manual Torque Wrench Prosthetic for the Multi-unit Abutment Xeal Zygoma and for the 17° Multi-unit Abutment Xeal Zygoma.



Steps for installation of the Multi-unit Abutment Xeal Zygoma to the NobelZygoma 45° Ext Hex TiUltra Implant



Steps for installation of the 17° Multi-unit Abutment Xeal Zygoma to the NobelZygoma 45° ExtHex TiUltra Implant

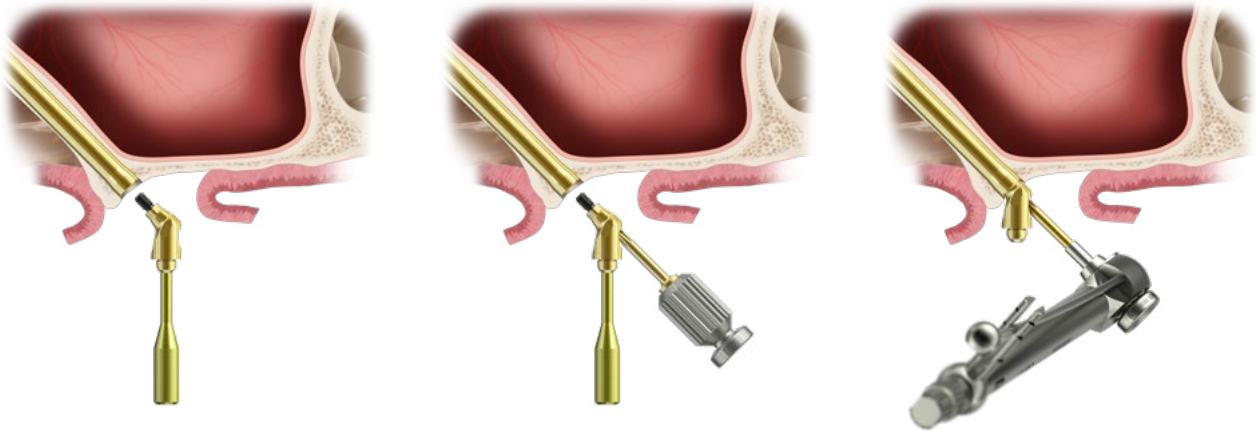
NobelZygoma 0° CC TiUltra Implant

Ensure sufficient implant stability before starting the prosthetic procedure.

1. Select the appropriate abutment height (based on the gingival thickness) and angulation (based upon the implant orientation).
2. Pre-assemble the screw and the selected abutment via the retention thread within the multi-unit abutment.
3. Place the abutment, using the handle to facilitate proper positioning.
4. Hand-tighten the abutment screw using the Screwdriver Manual Unigrip.
5. Unscrew the handle.
6. Tighten the abutment screw to the required torque of 35 Ncm using the Screwdriver Machine Unigrip and Manual Torque Wrench Prosthetic.

Caution Not applying recommended tightening torques may lead to component fracture or system performance issues.

Caution Ensure all surfaces are clean prior to assembly of the multi-unit abutment to the implant, to ensure effective mechanical locking and to prevent infection due to trapped biological materials.



Steps for installation of a multi-unit abutment to the NobelZygoma 0° CC TiUltra Implant

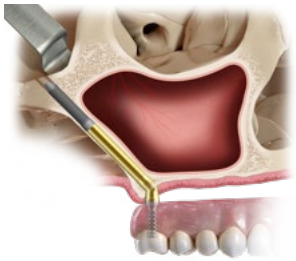
Restorative procedure: Conventional workflow

There are two options to temporarily restore the maxilla onto newly placed zygomatic implants.

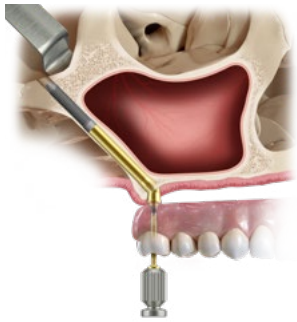
One-stage immediate function

Provisionalize the zygoma implant for immediate esthetics and function, using multi-unit abutment-level temporary abutment.

See more on page 87



One-stage immediate function with Temporary Copings Multi-unit

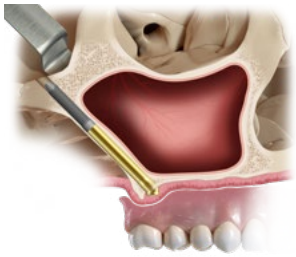


One-stage immediate function with screw retained on multi-unit abutment

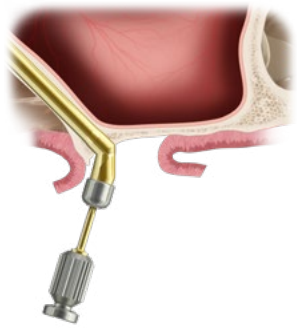
Two-stage delayed function

Connect a cover screw to the zygoma implant. Suture the tissue flap using the desired technique.

See more on page 97



Two-stage delayed function with cover screw



Two-stage delayed function with Healing Caps Multi-Unit

Temporary restorations

One-stage immediate function

The following illustrations show the immediate function protocol with immediate loading of four implants with a fixed provisional bridge on abutment level. The provisional restoration is fabricated from the existing upper denture.

The same prosthetic procedure for provisionalization applies for restorations with six or more implants and for implants that follow a two-stage delayed loading protocol.

Impression taking

1 Ensure that denture is suitable

In order to successfully convert a denture into a fixed provisional bridge, consider the following:

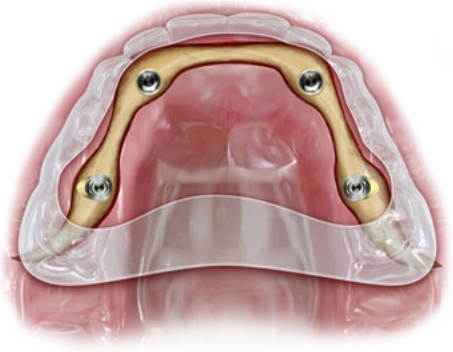
- Function: The denture must be functional. After several years of use, many dentures are worn and weakened, which will affect the strength of the fixed provisional bridge.
- Fit: The fit of the denture is critical. If the base is not stable, the conversion process is significantly challenged.
- Occlusion: The denture should be in an ideal occlusal and vertical relationship.
- Esthetics: The esthetics should be acceptable to the patient. If not, making a new denture for this procedure will be needed to enhance the patient experience.

Suitable denture

2 Confirm implant positions and choose multi-unit abutments

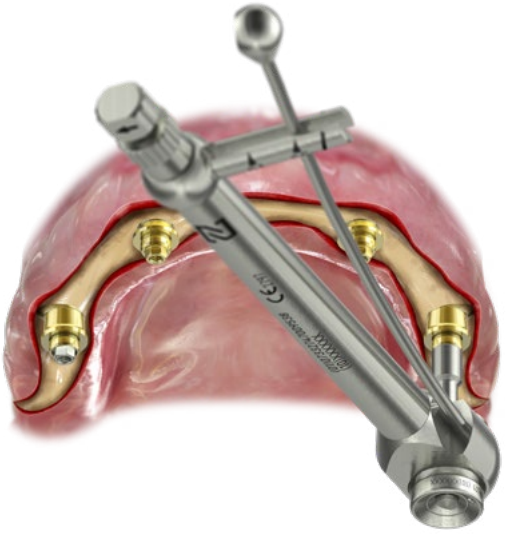
Place the reference guide to confirm implant positions. This helps to select the correct multi-unit abutments.

Caution There are dedicated multi-unit abutments for NobelZygoma 45° Ext Hex TiUltra and NobelZygoma 0° CC TiUltra implants.



Confirmation of implant positions

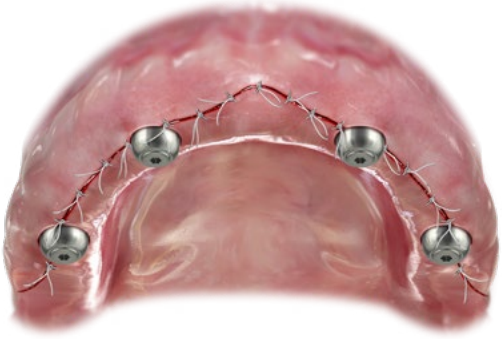
3 Connect and tighten multi-unit abutments



Tighten multi-unit abutments

4 Suture surgical site

- Place Healing Caps Multi-unit and tighten prosthetic screws manually with the Screwdriver Manual Unigrip.
- Close and suture tissue flap around the abutments.



Place healing caps and close suture

5 Make trial insertion

- Place impression material into denture. Be sure to keep the palatal aspect free from impression material.
- Verify clearance for Healing Caps Multi-unit and reduce any interferences.
- Secure correct occlusal relationship.
- Remove impression material.

Note For final indexing, ensure clearance for Healing Caps Multi-unit.

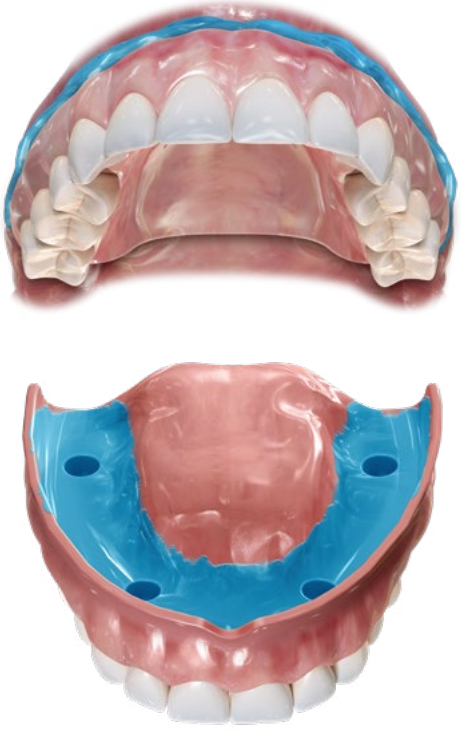
Make trial insertion 1

Make trial insertion 2

6 Register abutment positions for final indexing

- Place impression material into denture. Be sure to keep the palatal aspect free from impression material.
- Place denture into patient's mouth with finger pressure on palatal area to index the position of the Healing Caps Multi-unit.
- Use opposing dentition to verify occlusal relationship.
- Remove denture with impression material.

Register abutment positions for final indexing 1



Register abutment positions for final indexing 2

Temporization

7 Make holes for temporary copings

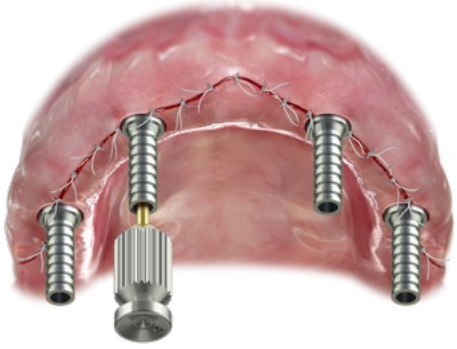
- Drill holes into the denture where Healing Caps Multi-unit have left an impression using a carbide bur.
- Remove impression material.

Make holes for temporary copings

8 Place temporary copings

- Remove Healing Caps Multi-unit.
- Place Temporary Copings Multi-unit Titanium on the multi-unit abutments and tighten the prosthetic screws with the Screwdriver Manual Unigrip manually.

Note Ensure that no soft tissue is trapped between coping and abutment.



Place temporary copings

9 Verify passive fit

- Confirm passive fit of the denture by placing denture over the temporary copings.
- Confirm proper midline position as well as occlusal plane.
- Block out screw access holes.

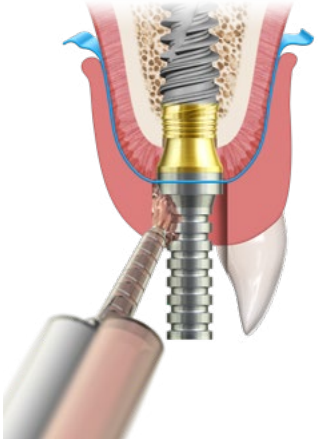
Verify passive fit 1

Verify passive fit 2

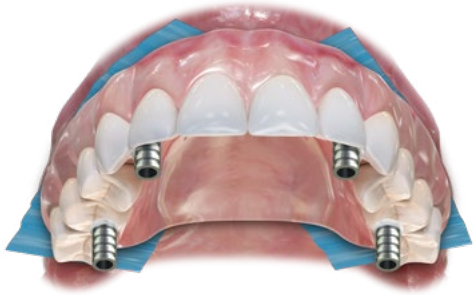
10 Lute denture to temporary copings

- Use rubber dam or other suitable material to protect surgical site.
- Lute the denture with resin acrylic onto the temporary copings in the patient's mouth.
- Unscrew and remove denture together with luted temporary copings from patient's mouth.
- Finish luting procedure extraorally and polish.

Tip A Protection Analog Multi-unit could be used to protect the temporary copings from resin acrylic.



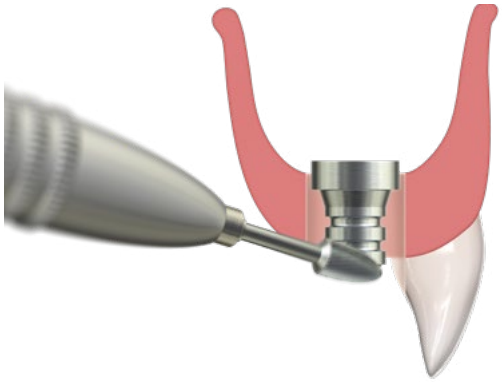
Lute denture to temporary copings 1



Lute denture to temporary copings 2

11 Trim titanium copings

Use a carbide bur to trim the titanium copings extraorally so that they are flush with the acrylic resin.



Trim titanium copings

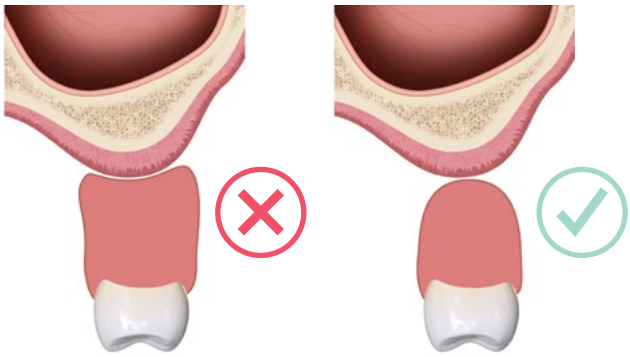
12 Trim denture (convert into provisional bridge)

After removing the patient's denture from the mouth, and in order to complete the conversion of the patient's denture into a fixed provisional bridge, remove the palatal portion and recontour the buccal flange. In addition, remove cantilevers that exist distal to the position of the zygoma implants. Take care to remove any sharp edges or burs on the denture as these can cause patient discomfort and/or injury.

Trim denture

13 Finalize provisional bridge

Make sure that the palatal surface of the bridge is convex and smoothly polished to avoid food impaction and bacteria accumulation.

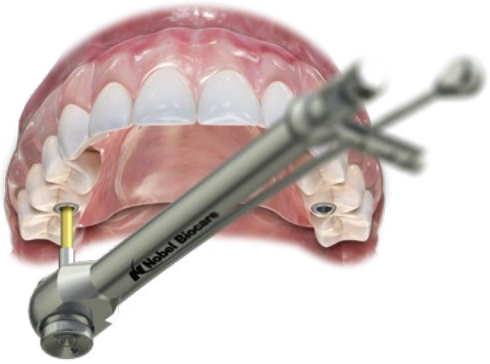


Finalize provisional bridge 1

Finalize provisional bridge 2

14 Connect provisional bridge

- Place the provisional bridge on the abutments and tighten the prosthetic screws to 15 Ncm using Screwdriver Machine Unigrip and Manual Torque Wrench Prosthetic.
- Block out screw access and fill holes with suitable material.
- Check and adjust the occlusion if necessary.



Connect provisional bridge

15 Wait for sufficient healing

Allow 4–6 weeks for soft tissue healing prior to fabrication of the final prosthesis.

16 Review the patient

To check occlusion and prosthetics screw tightness and initiate hygiene maintenance.

Two-stage delayed loading

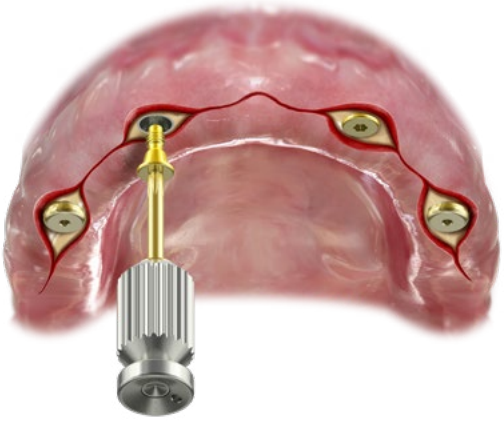
When delayed loading is considered, it is essential that the zygoma implants are cross-arch splinted after the second-stage surgery (uncovering of the implants). For stage-two surgery, the zygoma implants must be splinted to the premaxillary implants through a rigid cross-arch splinted bar.

Cover screw

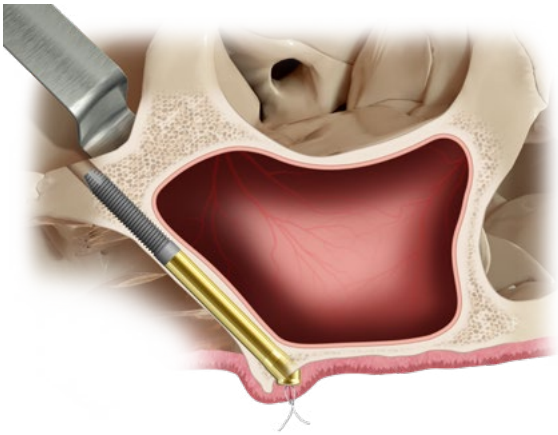
1. Use Cover Screw Driver Brånemark System Hexagon to connect the cover screws.
2. Ensure the screw is fully seated to avoid bone ingrowth (hand-tightening only).
3. Close and suture tissue flap around abutments.

Removal

Remove the cover screws using Cover Screw Driver Brånemark System Hexagon.



Make crestal Incision and remove cover screws

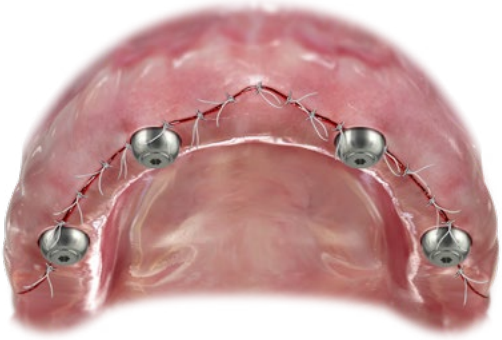


Two-stage delayed loading with cover screw

Healing cap

1. Select the appropriate healing cap.
2. Hand-tighten using Screwdriver Manual Unigrip.
3. Close and suture tissue flap around abutments.

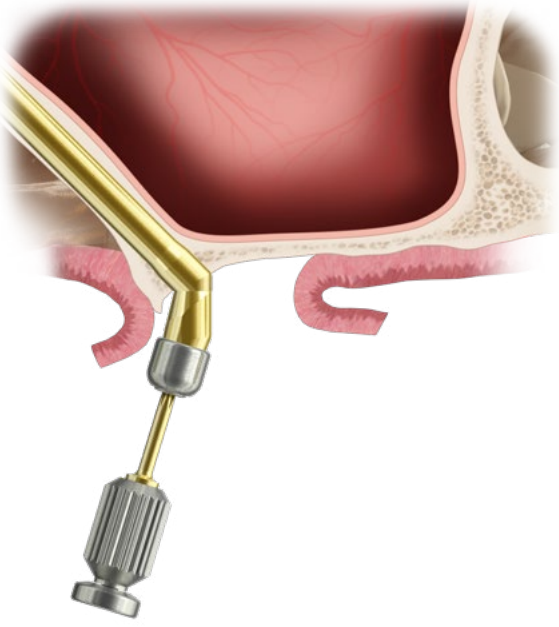
Caution Ensure all surfaces are clean prior to assembly of the healing cap to the implant, to ensure effective mechanical locking and to prevent infection due to trapped biological materials.



Suture surgical site

Removal

Remove the healing cap using Screwdriver Manual Unigrip



Two-stage delayed loading with healing cap

Final restoration

The following illustrations demonstrate the abutment level, open-tray impression taking technique using multi-unit abutments after second-stage surgery and fabrication of a NobelProcera Implant Bridge Titanium or Zirconia as final restoration.

1 Verify hard and soft tissue integration

Prior to the final restorative procedure, the dental team ensures that the implants are properly osseointegrated and soft tissue maturation has taken place.

2 Remove the provisional prosthesis

Remove the provisional prosthesis using Screwdriver Unigrip.

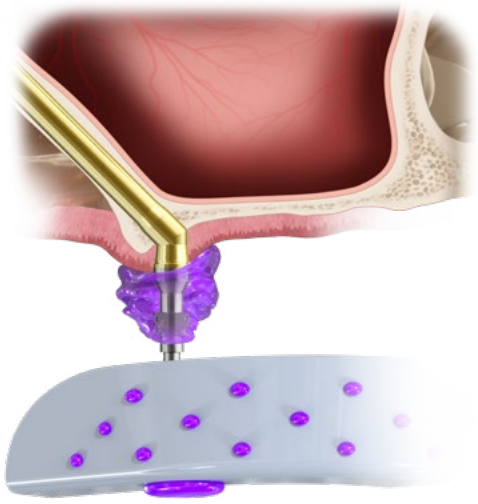
Remove the provisional prosthesis

Impression taking

3 Take impression

- Connect the Impression Copings Open Tray to the multi-unit abutments and block out the screw-access holes.
- Take an impression with a custom-made tray using the open-tray technique.
- An impression of the lower jaw is also recorded, as well as a preliminary registration and jaw-relation records.

Note Specific impression copings are available for restorations on implant level.



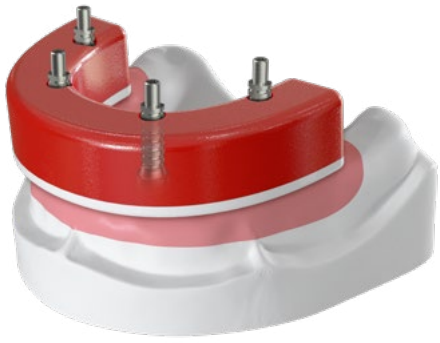
Take impression

Temporization

4 Laboratory procedure: Fabrication of master cast and tooth set-up

- Deliver the impression to the dental laboratory, which makes a master cast.
- An acrylic record base with a wax occlusal rim is fabricated on this cast.

Fabrication of master cast



Acrylic record base

Registration of jaw relations

The acrylic record base is attached to the abutments, and the occlusal rim is adjusted to the correct vertical height and occlusal plane orientation. Adequate lip support and facial contours are also evaluated, and appropriate adjustments are made to the occlusal rim. Tooth shape and shade are selected.

Registration of jaw relations

Tooth set-up in wax

A preliminary tooth set-up is made, following conventional prosthetic principles.

Tooth set-up in wax

5 Confirm tooth set-up

Try the wax tooth set-up in the patient and evaluate all relevant parameters such as vertical dimension, occlusal relationships, cantilevers, cuspal inclination, tooth shade and shape, hygiene access, lip support, facial contours, as well as phonetics.

Confirm tooth set-up

6 Laboratory procedure: Framework fabrication

A rigid framework with adequate volume and precision is made.

Caution A passive fit of the framework on the master cast is imperative.

Framework fabrication 1

Framework fabrication 2

7 Try-in framework

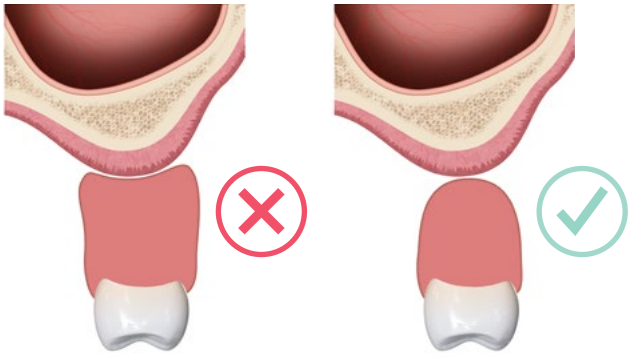
Verify the passive fit of the framework by placing one screw and checking the complete seating of the framework on the abutments.

Try-in framework

8 Laboratory procedure: Finalization of restoration

The restoration is finalized and delivered to the clinician.

Make sure that the palatal surface of the bridge is convex and smoothly polished to avoid food impaction and bacteria accumulation.

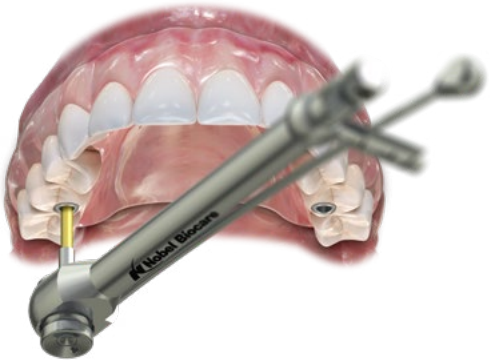


Finalization of restoration

9 Connect final restoration

- Verify the passive fit of the final restoration intraorally.
- Tighten the prosthetic screws to 15 Ncm using Unigrip Screwdriver Machine and Manual Torque Wrench Prosthetic.
- Block out screw access and fill holes with suitable material.
- Check the occlusion.

Note Eliminate any primary occlusal contacts on distal cantilevers.



Connect final restoration

Check the occlusion

Restorative procedure: Digital workflow

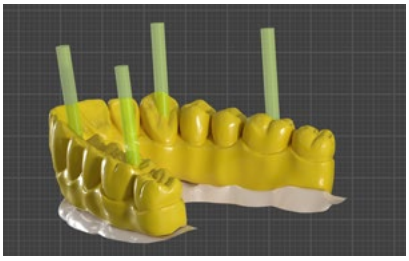
Scan

Ensure sufficient implant stability before starting the prosthetic procedure.

1. Once the multi-unit abutment healing caps are placed, and sutures are in place – take a photogrammetry scan to record implant location. Following this, take an intraoral scan (or intraoral impression) including the reference markers placed prior to extraction and at the start of surgical procedure.

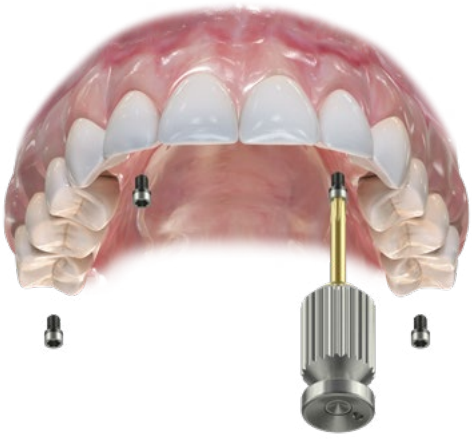
Design

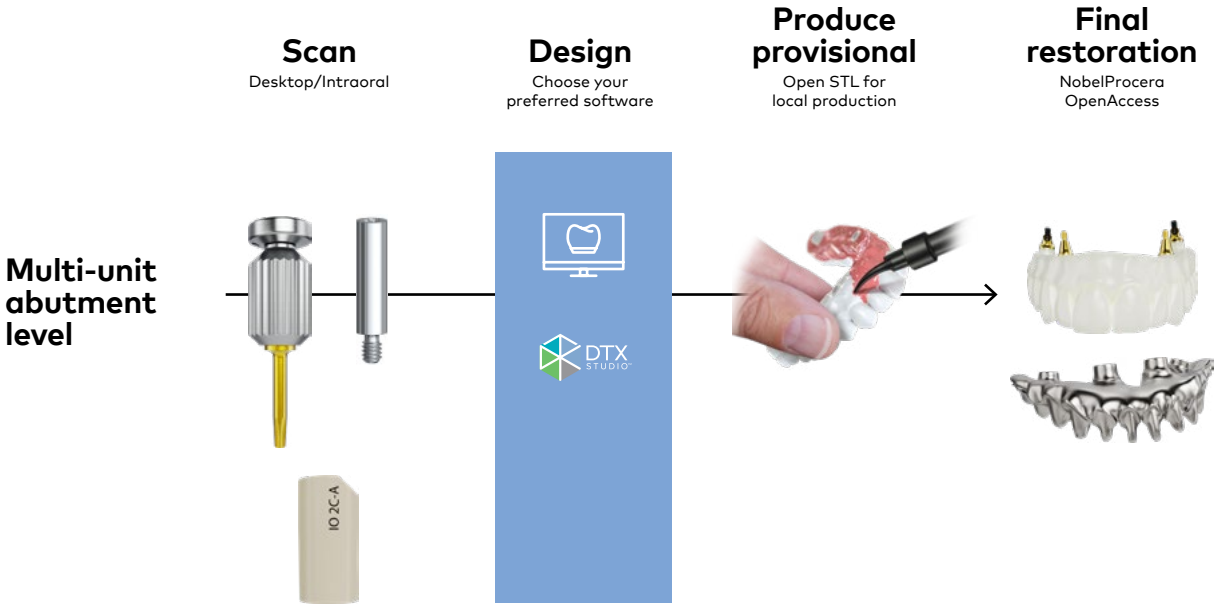
2. Using the pre-smile design and post-surgery records, align both intraoral scan (or scanned impression) with photogrammetry data to export temporary bridge that can be printed or milled.
3. Design provisional in CAD software (e.g. exocad™).
4. Finalize provisional.

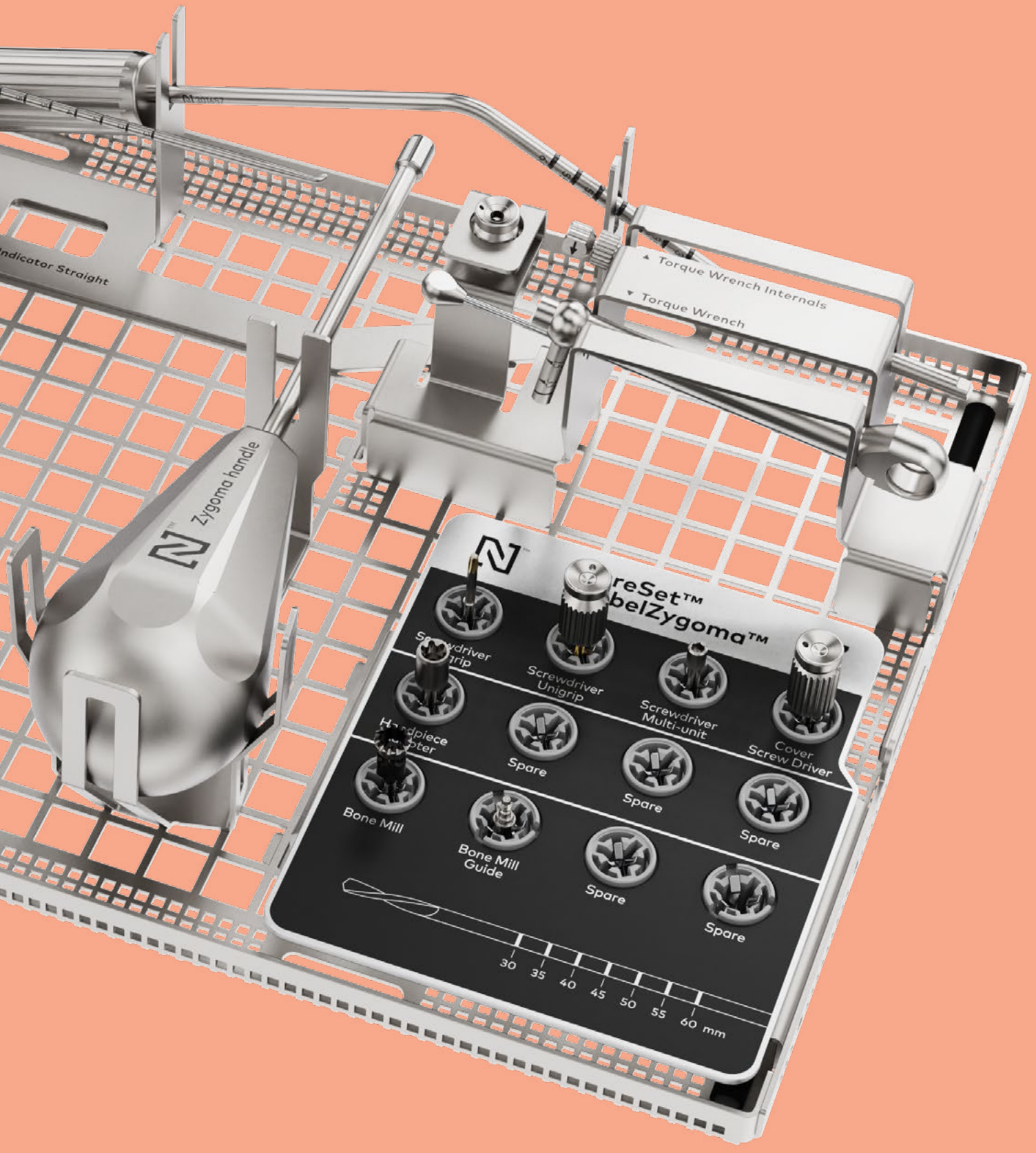


Restore

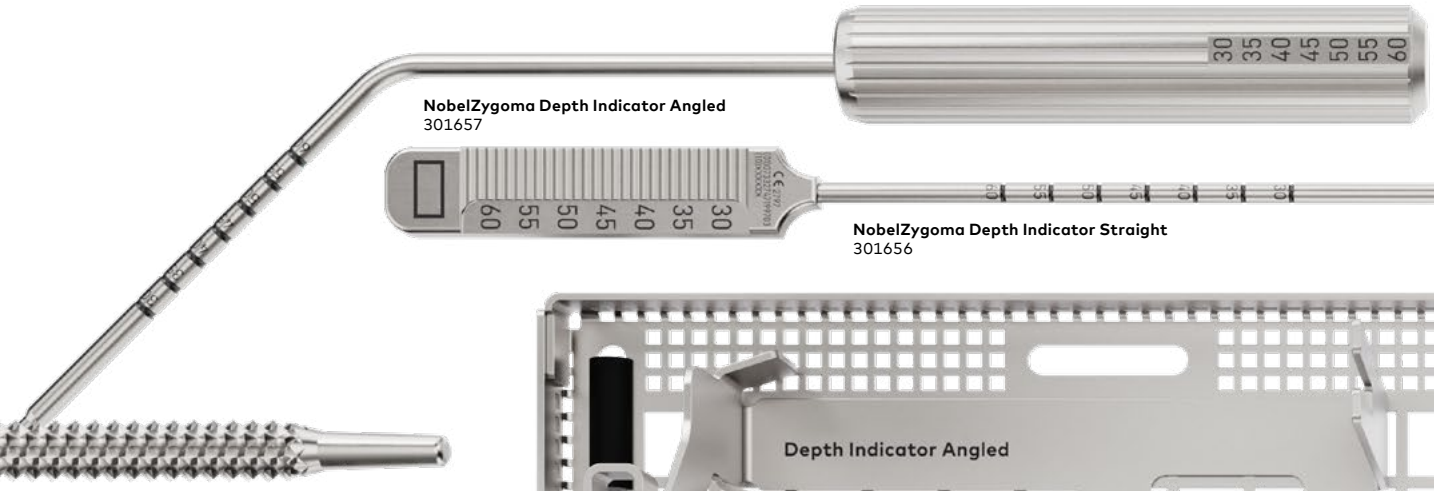
5. Finalize the temporary bridge and restore the patient by hand tightening the clinical screw with the Unigrip screwdriver.
6. Check for occlusion and adjust as needed.
7. Tighten the clinical screw to the required torque of 15 Ncm with Unigrip screwdriver and Manual Torque Wrench Prosthetic.






Torque Wrench Internals
Torque Wrench
Zygoma handle
Screwdriver Unigrip
Screwdriver Multi-unit
Cover Screw Driver
Spare
Spare
Spare
Bone Mill
Bone Mill Guide
Spare
Spare
30
35
40
45
50
55
60 mm

Appendices



NobelZygoma Depth Indicator Angled
301657

NobelZygoma Depth Indicator Straight
301656

NobelZygoma Lateral Bur
Coarse 301586
Fine 301694

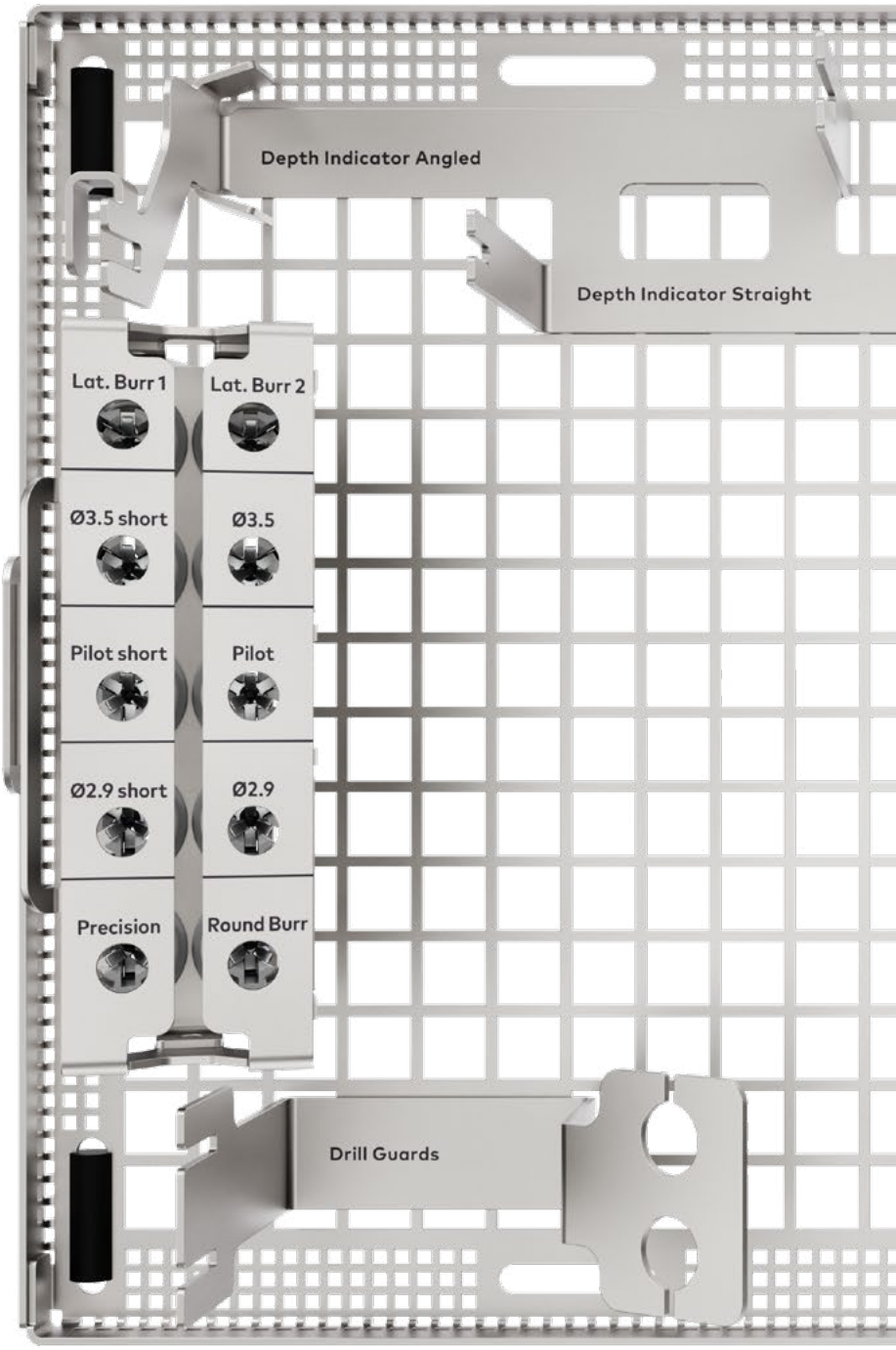
NobelZygoma Pilot Drill Ø3.5 mm
301604
Short 301605

NobelZygoma Twist Drill Ø3.5 mm
301606
Short 301607

NobelZygoma Twist Drill Ø2.9 mm
301602
Short 301603

NobelZygoma Precision Drill
301585

NobelZygoma Round Bur
301601



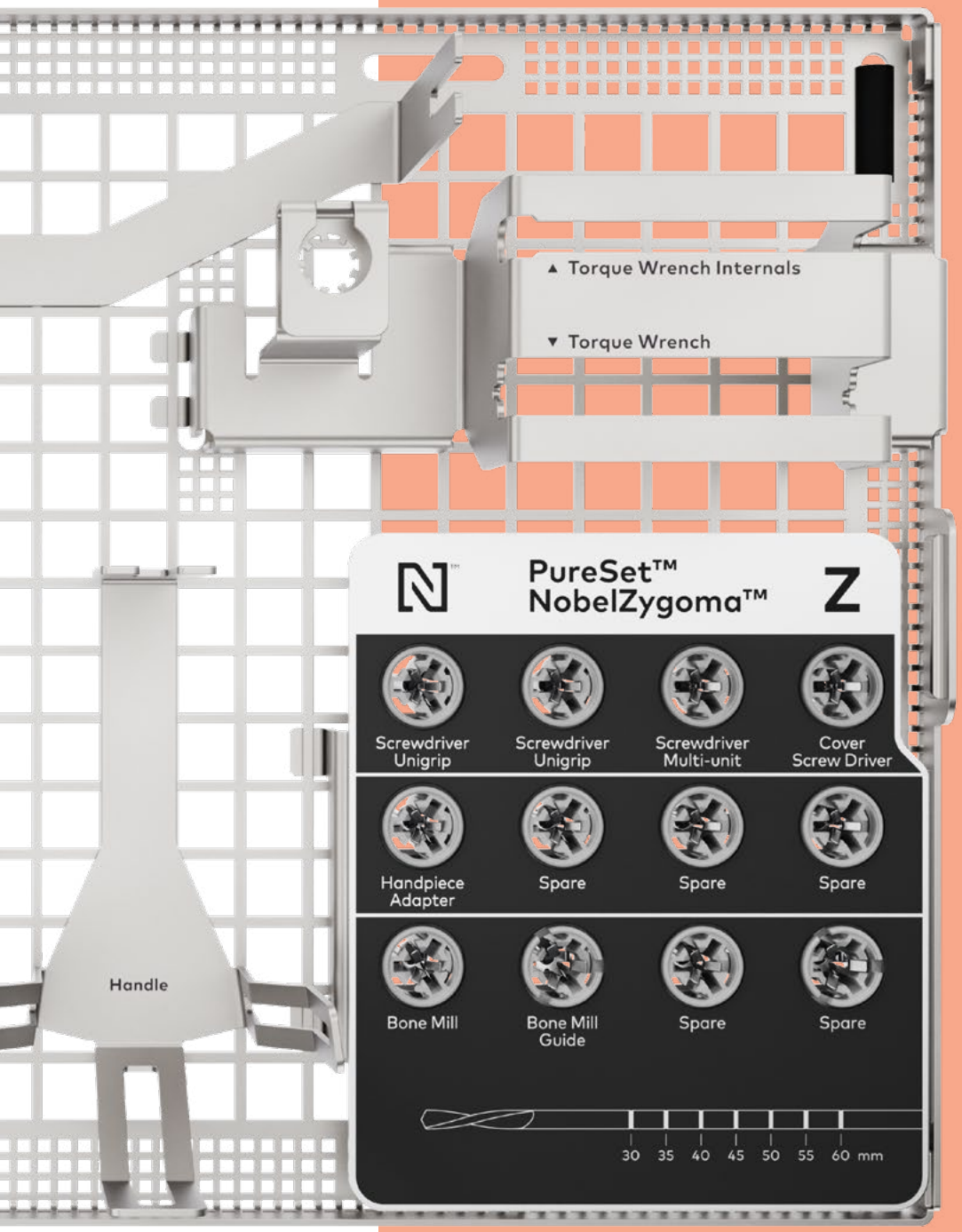
NobelZygoma™ TiUltra PureSet
108236

NobelZygoma PureSet Tray
PUR1000

NobelZygoma Handle
301582

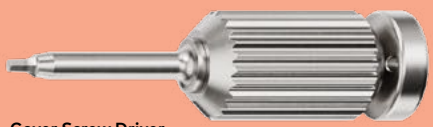
Manual Torque Wrench Adapter Prosthetic
29167

Manual Torque Wrench Prosthetic
29165



Screwdriver
29149 Manual 28 mm
29152 Machine 25 mm

Screwdriver Multi-unit
29156 Manual 25 mm
29158 Machine 21 mm

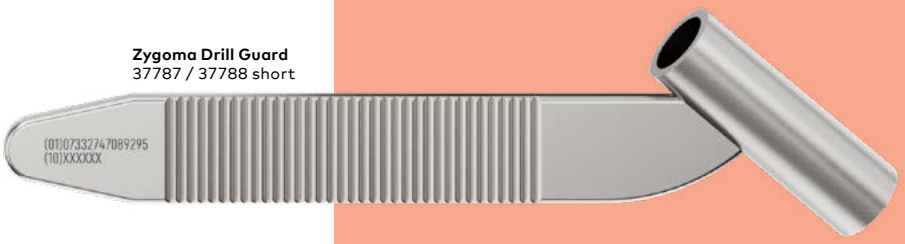


Cover Screw Driver Bmk Syst Hexagon
DIB 097-0

NobelZygoma Handpiece Adapter
301583

NobelZygoma Bone Mill
301658 CC
301659 Ext Hex

NobelZygoma Bone Mill Guide
301584 Ext Hex
301660 CC



Zygoma Drill Guard
37787 / 37788 short

Manual torque wrench

For the surgeon, the torque required to place implants provides insight into the primary stability of the implant. For restorative procedures, tightening the abutment and prosthetic screws to the recommended torque specifications will more effectively control screw-joint integrity during patient function.

Manual torque wrench – surgical

Manual Torque Wrenches Surgical are indicated for use with Nobel Biocare dental implant drivers to ensure that the desired torque is achieved during implant placement. They are also indicated to be used with implant retrieval instruments and abutment screw retrieval instruments. Manual Torque Wrenches Surgical can be used as an alternative to machine torque wrenches.

- Indicating torque values 15 Ncm, 35 Ncm and 45 Ncm
- Insert Implant Driver Conical Connection or external hexagon

Manual torque wrench – prosthetic

Manual Torque Wrenches Prosthetic are indicated for use with Nobel Biocare abutments and abutment screws to ensure that the desired torque is achieved during placement or removal of the abutment or screw. Manual Torque Wrenches Prosthetic can be used as an alternative to machine torque wrenches.

- Indicating torque values 15 Ncm and 35 Ncm
- Compatible with all machine screwdrivers
- Insert the applicable driver

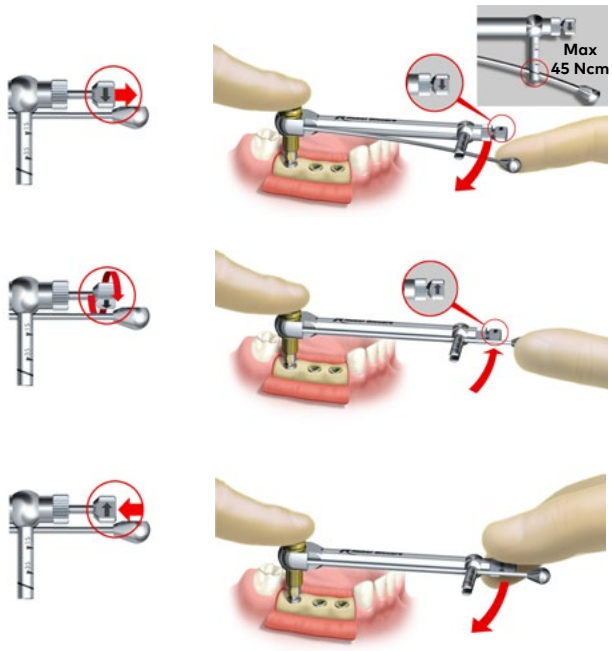
Use of the Manual Torque Wrench Surgical

- Select the corresponding Manual Torque Wrench Adapter Surgical and insert the corresponding implant driver into the adapter.
- To tighten an implant, adjust the direction indicator so that the arrow is pointing toward the level arm and rotate clockwise.
- To loosen an implant, adjust the direction indicator so that the arrow is pointing away from the level arm, and rotate counterclockwise.

Warning If force is applied to the main body of the Manual Torque Wrench Surgical and not to the lever arm, the applied torque cannot be measured. High forces may cause over compression of the bone leading to bone resorption, especially in case of a thin buccal/lingual marginal bone crest.

After use, disassemble the manual torque wrench by removing the adapter and the rod from the wrench body. Please follow the steps described in the IFU for Manual Torque Wrenches Surgical and Prosthetic.

Refer to Nobel Biocare IFU1085 for information regarding the screwdrivers, and IFU1098 for information regarding the Manual Torque Wrench Prosthetic.



Cleaning and sterilization

Sterile components

Refer to the Instructions For Use (IFU1103) for NobelZygoma TiUltra system for detailed cleaning and sterilization instructions.

ifu.nobelbiocare.com

Note Implants must never be resterilized or reused.

Warning Do not use device if the packaging has been damaged or previously opened.

Warning Use of non-sterile device may lead to infection of tissues or infectious diseases.

Caution NobelZygoma TiUltra implants, Xeal Multi-Unit Abutments and replacement abutment screws are delivered sterile and are single use products. Do not use after the labeled expiration date. Do not reprocess these devices. Reprocessing could cause loss of mechanical, chemical, and/or biological characteristics. Reuse could cause local or systemic infection.

Drills

Delivered sterile and for single use only:

- NobelZygoma Precision Drill
- NobelZygoma Round Bur
- NobelZygoma Lateral Bur Coarse
- NobelZygoma Lateral Bur Fine
- NobelZygoma Twist Drills Ø2.9 mm
- NobelZygoma Twist Drills Ø3.5 mm
- NobelZygoma Pilot Drills

Non-sterile components

Caution Care and maintenance of sterile instruments are crucial for a successful treatment. Sterilized instruments not only safeguard your patients and staff against infection but are also essential for the outcome of the total treatment.

Refer to the Instructions For Use (IFU1067) for PureSet for detailed cleaning and sterilization instructions.

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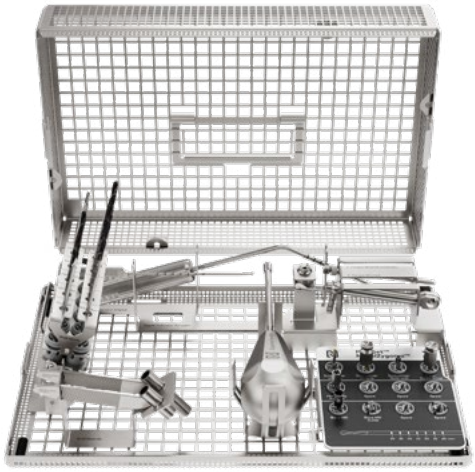

Abutments and copings

Refer to the Instructions For Use (IFU1093) for the abutment or coping for detailed cleaning and sterilization instructions.

ifu.nobelbiocare.com

Note If modifications have been made to the abutment, clean the abutment prior to sterilization.

Caution Plastic copings is a single use product and must not be reprocessed. Reprocessing could cause loss of mechanical, chemical and/or biological characteristics. Reuse could cause local or systemic infection.

Order online

Order our complete range of implants and prefabricated prosthetics 24 hours a day through the Nobel Biocare online store.

store.nobelbiocare.com

Order by phone

Call our customer service team or contact your sales representative.

nobelbiocare.com/contact

Lifetime warranty

The warranty covers all Nobel Biocare implants including prefabricated prosthetic components.

nobelbiocare.com/warranty

nobelbiocare.com/nobelzygoma

Nobel Biocare™