Neodent® NeoArch® Zygoma-S Solution

Surgical and Prosthetic Manual

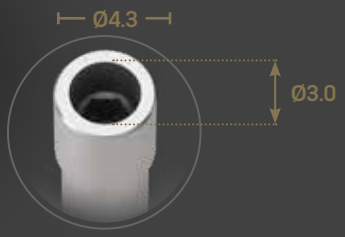
NEODENT®
A Straumann Group Brand


A SMILE FOR EVERYONE
NEODENT® NEOARCH®
ZYGOMA-S SOLUTION.
GM
Grand Morse™
Connection
Helix®
Implant
NeoArch®
Solution

CONTENTS

Zygoma-S

GRAND POSSIBILITIES IN SEVERELY ATROPHIC MAXILLAE CASES

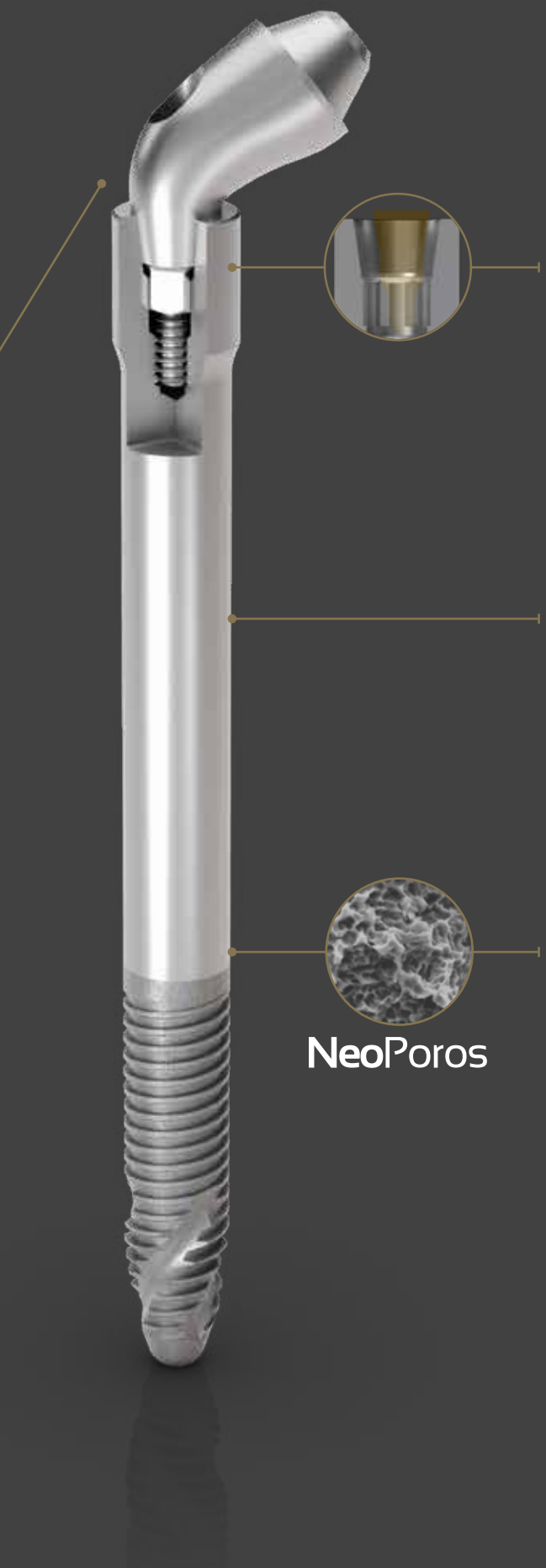


GRAND MORSE™ CONNECTION

Meeting edentulous patients' expectations of shorter treatment times and immediate aesthetic and functional improvements present significant challenges for clinicians, especially in patients with anatomical deficiencies. Neodent® GM Zygoma-S Implant System is part of the NeoArch® Grand Morse solution, and offers an optimized solution for immediate fixed treatment protocols in edentulous patients with severe atrophic maxilla, aiming to improve patient satisfaction[4].

Visit our website to get further information about **Zygoma-S.**

neodent.us/zygoma-s



GRAND MORSE™ CONNECTION: A STABLE AND STRONG FOUNDATION DESIGNED FOR LONG TERM SUCCESS.

- One prosthetic connection for all Grand Morse Implants.
- 16º Morse Taper connection: designed to ensure a tight fit for an optimal connection seal.
- Platform switching morse taper connection: fulfills the platform switching concept.
- Deep Morse taper connection: designed for optimal load distribution.
- Internal Indexation: precise abutment positioning, protection against rotation and easy handling.

IMPLANT DESIGNED TO PROVIDE STABILITY IN SEVERELY ATROPHIC MAXILLAE,[5] RESULTING IN ANATOMICAL EFFICIENCY

- Implant designed for an extrasinus path.
- Associated with regular implants or Quad Z placement.
- 3.5mm and 3.75mm of diameter.
- Smooth Machined Surface in the implant body aimed at maintaining soft-tissue preservation.
- Coronal portion with 4.3mm of diameter designed to ensure resistance and a tight fit for an optimal connection seal.
- Ten different lengths: 30 / 35 / 37.5 / 40 / 42.5 / 45 / 47.5 / 50 / 52.5 / 55 mm.

HELIX™ GRAND MORSE™: UNBEATABLE VERSATILITY.

- Progressive depth threads at the apical area allow under-prepping of the osteotomy.
- Apex with Neoporos surface, with the potential of osseointegration to enhance the zygomatic anchorage.
- Hybrid contour: enable stability with vertical placement flexibility.
- Dynamic progressive thread design designed to achieve high primary stability in all bone types.
- Active apex: self-tapping.

A SMILE FOR **EVERYONE**

PRE-OPERATIVE PLANNING

ANATOMICAL CONSIDERATIONS

High success rates have in recent years been reported with the use of four implants in the rehabilitation of edentulous patients[2-4,6]. However, certain technical aspects have to be considered before surgery in order to help ensure treatment success[7,8]. All full-arch reconstruction starts with a clear and previously-defined prosthetic plan, developed according to the patient's remaining structures, including residual alveolar bone and smile line.

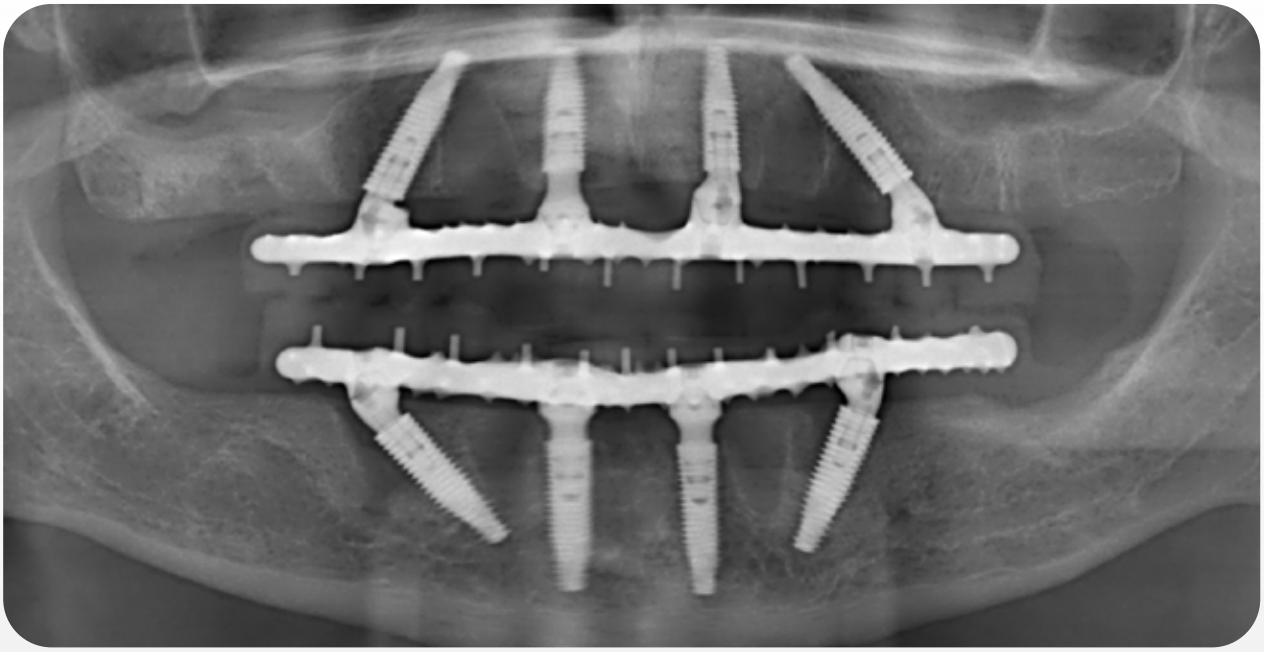
Residual Alveolar Bone

The residual alveolar ridge undergoes physiological resorption after complete tooth loss. This resorption can be located in different zones in the arch. Patients presenting atrophic conditions are indicated to receive fixed full-arch rehabilitations. Therefore, the use of implants became important to retention and stability of the entire system.

Mandible and maxilla bone resorption after complete tooth loss.

ANATOMICAL CONSIDERATIONS

The maxilla has a lower bone density than the mandible, especially when compared at the anterior mandible region between the mental foramen region. Therefore, bicorticalization is a good method for achieve high primary stability of implants in maxilla. In addition, tilted distal implants, zygomatic, or long implants are an effective strategy to enhance contact area with remaining bone avoiding anatomical challenging structures and allowing bicorticalization. At the same time, anterior implants are limited by the nasal cavity and sometimes can be placed in a tilted fashion, also with the apex distally angled, which results in the same benefits, and is known as the M-4 treatment[9]. Thus, if there is sufficient residual bone structure at the anterior region, it may be used long implants to achieve bicorticalization further then the alveolar ridge.



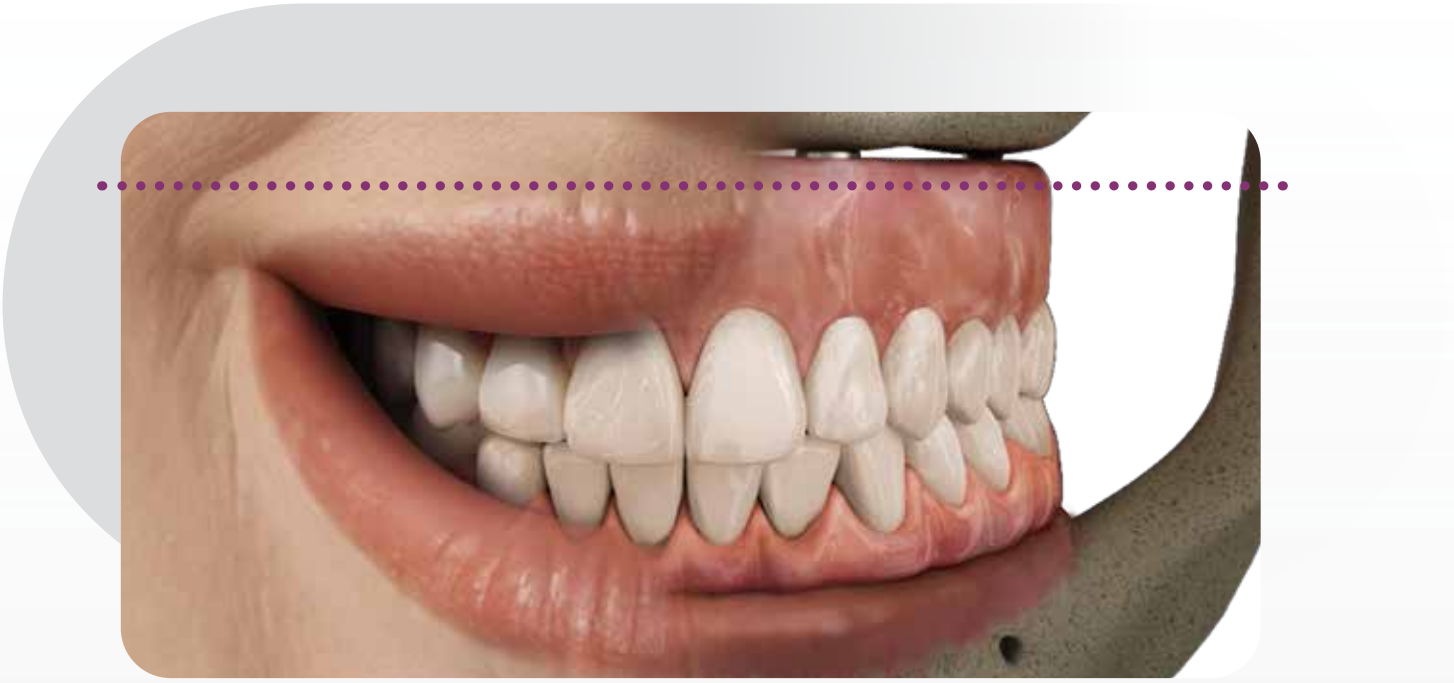
* Patient treatment data authorized for publish.

Higher bone density for positioning implants on sinus and nasal cavity walls.

ANATOMICAL CONSIDERATIONS

Smile Line

The patient's smile line determines the esthetic challenges that will drive important surgical and prosthetic procedures when the aim is a natural looking solution. Both characteristics, the smile line combined with the residual alveolar ridge height, dictate bone horizontal osteotomy, implant positioning and prosthetic extension (with or without "pink esthetic") based on esthetics space for the restoration, and hygiene of the final prosthesis.



Rehabilitation extension according to patient's structures.

The upper lip defines the patient's smile line and the contact between bridge and remaining mucosa should never be exposed, otherwise there will be esthetical problems in the final restoration. The upper lip must cover the transition line between bridge and remaining mucosa independent of the residual bone structure.

ANATOMICAL CONSIDERATIONS

During the planning stage, it is important to evaluate the volume of patient's residual alveolar bone.

VOLUME OF RESIDUAL ALVEOLAR BONE

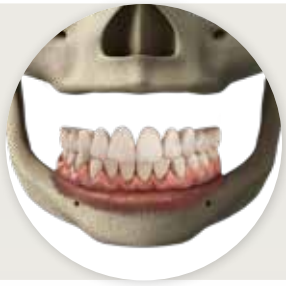
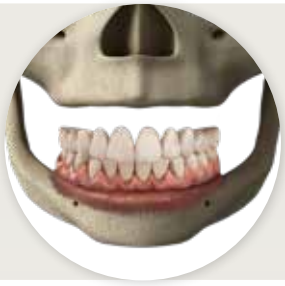
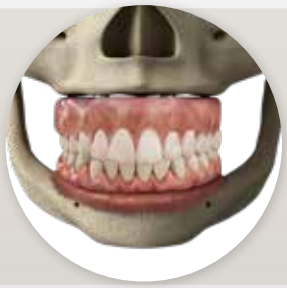
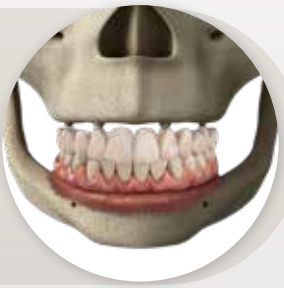
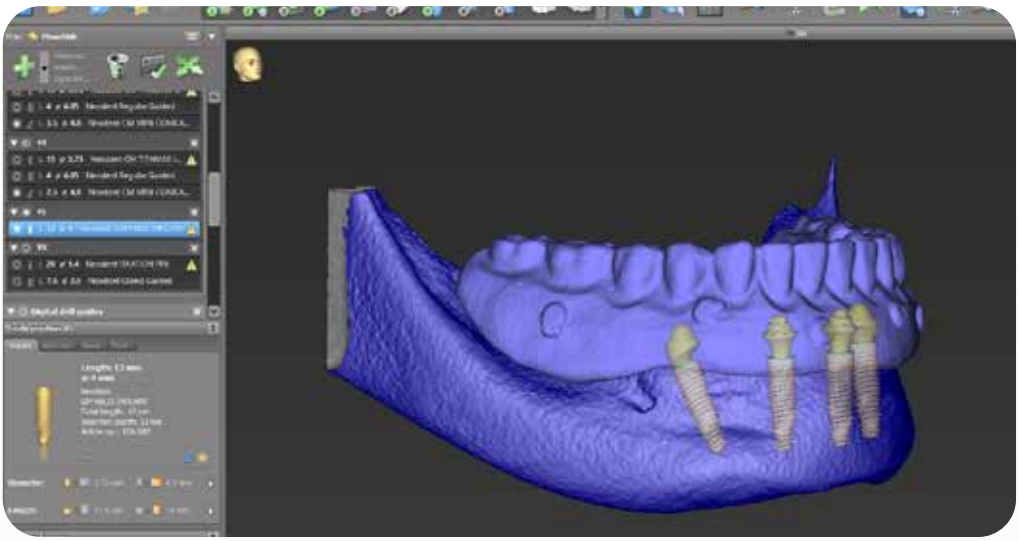
	small	mid	high
BEFORE			
Indication for horizontal osteotomy	Not indicated if the bone is in harmony with the upper lip and even.	Indicated to flat the bone to avoid esthetics and functional problems.	Not indicated if the bone is in harmony with the upper lip and there is prosthetic space for the restoration (see also smile line).
Smile Line High	No osteotomy if the remaining bone is parallel to the upper lip, even and covered by the upper lip.	No osteotomy if the remaining bone is parallel to the upper lip, even and covered by the upper lip.	No osteotomy if the remaining bone is parallel to the upper lip and even. Osteotomy is only indicated if the remaining bone isn't in harmony with the upper lip.
Smile Line Low	No osteotomy if the remaining bone is even.	No osteotomy if the remaining bone is even.	No osteotomy if the remaining bone is covered under the upper lip, even and there is space for the prosthesis.
AFTER			
Type of restoration	Large amount of pink esthetic in the restoration.	Small amount of pink esthetic in the restoration.	No pink esthetic.

Table 1. Previously uneven smile line between crowns and mucosa due to bone extrusion and smile line after osteotomy for fixed full-arch rehabilitation.

DIGITAL 3D PLANNING

For a successful full-arch rehabilitation, the initial prosthetic planning constructed with the aid of a tomography guide according to proper occlusion using Cone Bean Computed Tomography (CBCT) images will define the proper position of implants, and takes into consideration anatomical structures, especially for complex rehabilitation. If the patient presents a well-established conventional complete denture, it also can be used as a guide and as an immediate provisional implant-supported prosthesis. In addition, specific planning software can be used to determine implant positions.



*Data extracted from coDiagnostiX® software.
*Patient treatment data authorized for publish.

Implant distribution according to bone availability and prosthetic planning.

IMPLANT DISTRIBUTION AND PROSTHESIS DEFINITION

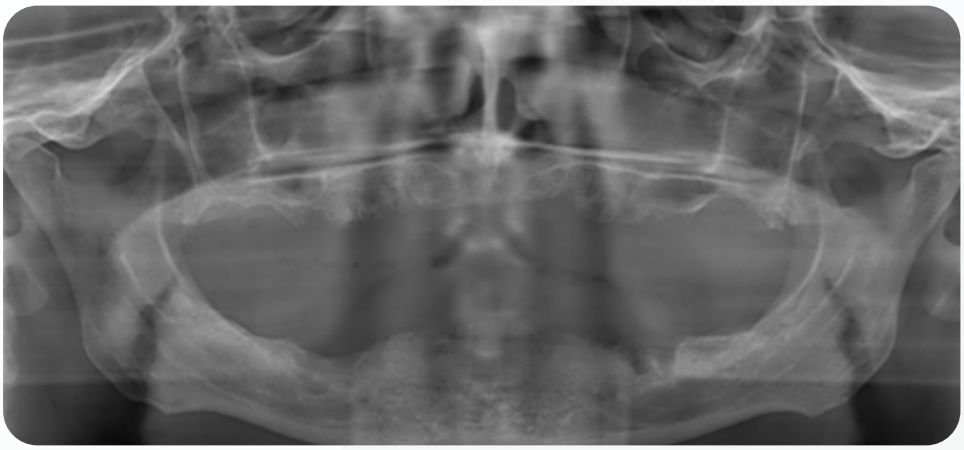
Implant distribution is an important factor to be considered in full-arch bridges as it supplies mechanical result on the system. Anteroposterior implants placement and occlusion should be balanced to avoid stress concentrations[9,10]. Bone condition, such as density, thickness, and anatomical structures are responsible for the implant distribution planning. Therefore, the posterior maxilla is considered the most difficult and problematic intraoral area for treatment with osseointegrated implants, presenting deficient bone quality and quantity, surgical access, and biomechanics (greater masticatory forces) [11,12].

There are many options for rehabilitating a fixed full-arch, and according to remaining structures and the professional preferences, from 4 to 8 regular straight or tilted implants, long implants, or the addition of zygomatic implants can be used to provide a fixed solution and enhance patient masticatory performance and quality of life. The use of only four regular implants with the distals tilted allows more options for the final position and anteroposterior distribution when planning the rehabilitation[9,10] and is normally used when facing a high residual alveolar ridge. For extremely atrophic ridges in maxillary bone,

IMPLANT DISTRIBUTION AND PROSTHESIS DEFINITION

implant placement on denser cortical bone such as pterigomaxillary and zygomatic regions can provide adequate implant support and eliminate procedures such as sinus augmentation, supplementals bone block grafts, and the use of a large number of implants[13,14].

Clinicians can define implant distribution based on the size of the cantilever where distal implants are initially determined. The medial implants can then be placed as far anterior as possible to spread the implants along the arch and distribute forces equally across the entire arch and implants. The use of only four implants allows more options for the final position and anteroposterior distribution when planning the rehabilitation[9,10] and is normally used when facing a high residual alveolar ridge.



*Patient treatment data authorized for publish.

Panoramic radiography of an edentulous patient.

Note: Anterior/posterior implant distribution on the arch should be carefully evaluated because this determines stress distribution of the system.

Distal implants should be placed before anterior implants as they determine the posterior limits of implant distribution and are closer to key anatomical structures that must be avoided, such as the mental foramen in the mandible, nasal cavity and sinus for the maxilla. Because the posterior tilted implants installation occurs around the 1st and 2nd pre-molar region, a short cantilever is indicated to extend until the 1st molar, which decreases stress on the peri-implant cortical bone and increases the rehabilitation's longevity. Therefore, the prosthesis should extend to a maximum of 12 teeth.

In addition, with immediately loaded full-arch implant restorations, a fully balanced occlusal scheme is recommended to achieve a physiological occlusion. It is suggested that the cusps are flattened, and the articulation is balanced. This spreads the load on all implants and reduces risks of technical fractures. Balanced occlusion implies bilateral simultaneous anterior and posterior contact in centric and eccentric positions, in which the loading forces are distributed over a large area. If the full arch opposes natural teeth, it is recommended that the natural teeth are adjusted to obtain group function and not canine guidance." [35]

NEOARCH®

NeoArch® fixed full-arch solutions brings from planning phase through final restoration a clear and complete portfolio workflow to aid the clinician in different bone availability and surgical techniques. Find a proposition of workflow for all treatments options:

1 4 TO 8 REGULAR IMPLANTS*

- *Helix GM implants - designed to achieve immediacy*
- *Surgical procedures and implant placement*
- *Prosthetic options and procedures*

2 LONG IMPLANTS*

- *Helix GM Long implants*
- *Surgical procedures and implant placement*
- *Prosthetic options and procedures*

3 ZYGOMATIC IMPLANTS

- *Zygoma GM Implants*
- *Zygoma-S implants*
- *Surgical procedures and implant placement*
- *Prosthetic options and procedures*

*See USLIT.2039 for full NeoArch information.

3 ZYGOMATIC IMPLANTS

In a clinical scenario of severe maxillary osteomalacia, atrophy, surgical resection, or trauma, conventional implant placement may require different approaches. The resorption of the maxilla in a posterior/superior direction results in a smaller osseous base that necessitates a larger volumetric replacement of the dentoalveolar complex, added to the fact that the complications of sinus disease and enlarged pneumatized sinuses may create the need for multiple grafting procedures to develop suitable osseous tissue and may not present the most desirable pathway for patients.

The use of zygomatic implants avoid the need of bone block grafts, reducing healing period and consequently clinical time for final fixed restoration. The installation protocol , for the Zygoma GM, implies in the placement of two zygomatic implants and additional regular or long implants in the anterior maxilla splinted together, to support a screw-retained fixed dental prosthesis.

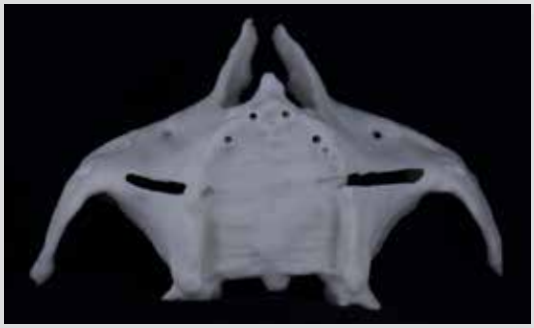
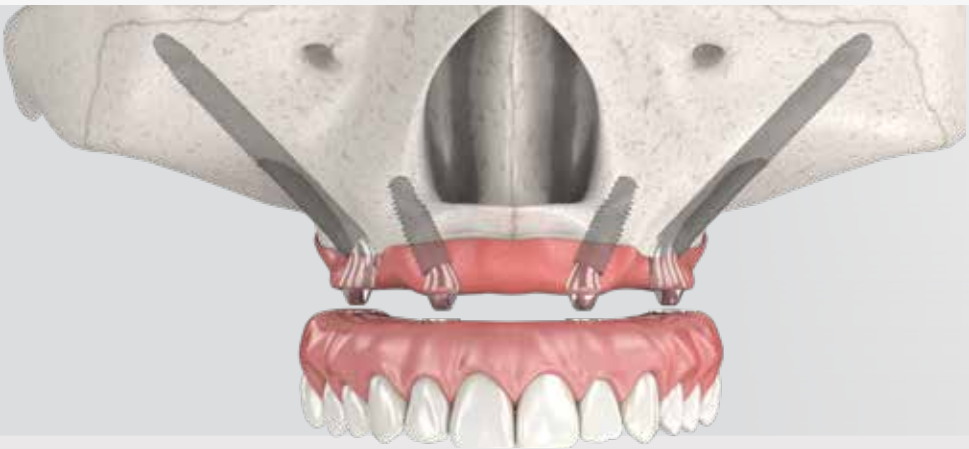


Illustration of anatomical structures.



Implant positioning on a full-arch rehabilitation with 2 Zygoma GM™ implants and 2 regular implants.

ZYGOMATIC IMPLANTS

For the Zygoma-S implants, the installation protocol could be with placement of two zygomatic implants and additional regular or long implants in the anterior maxilla splinted together, or with the placement of 4 zygomatic implants, without the use of regular implants, to support a screw-retained fixed dental prosthesis.

Implant positioning on a full-arch rehabilitation with 2 GM Zygoma-S implants and 2 regular implants.

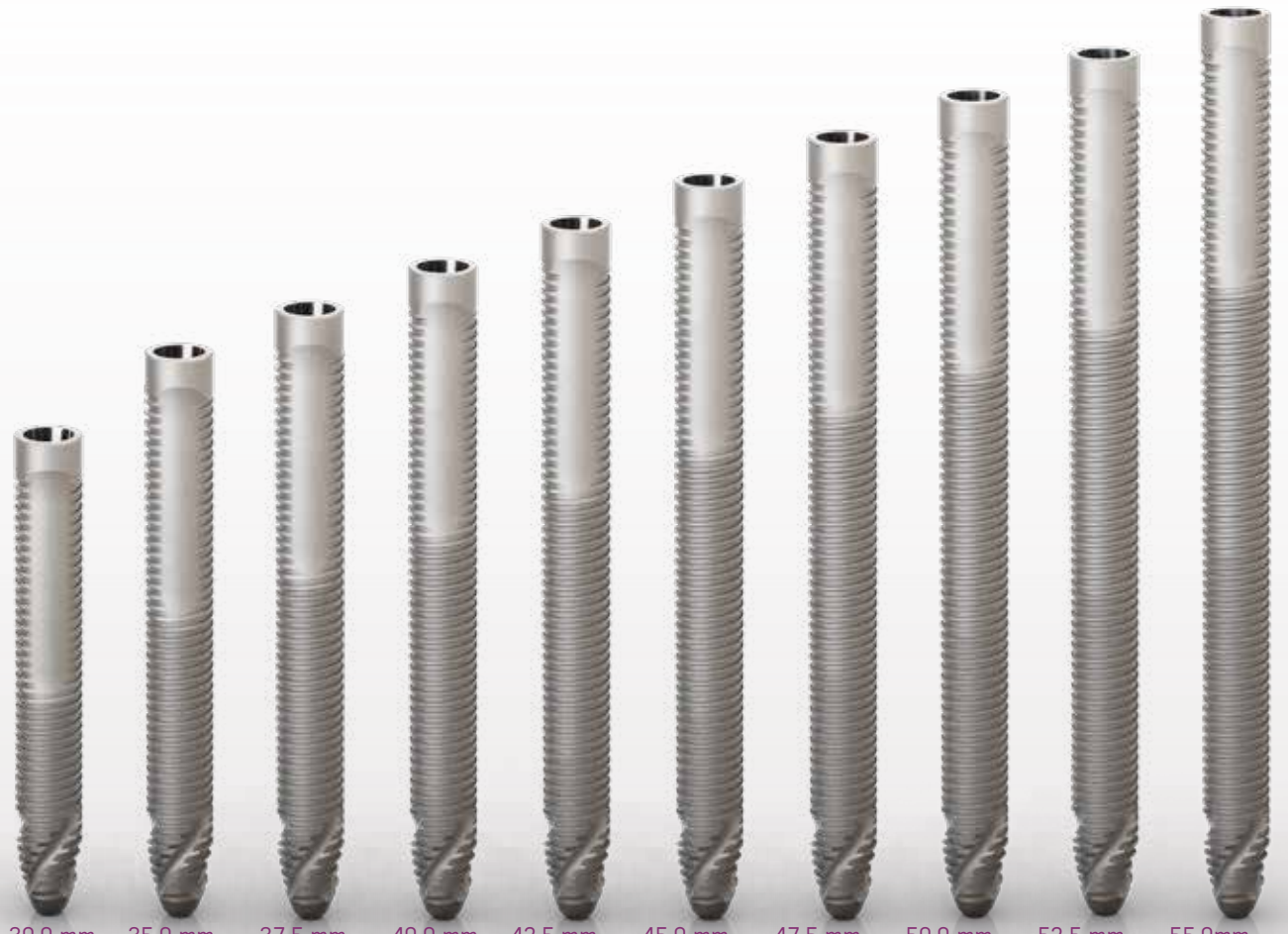
Implant positioning on a full-arch rehabilitation with 4 GM Zygoma-S implants.

Zygoma GM

IMPLANT FOR ZYGOMATIC ANCHORAGE

Indicated for surgical placement in the zygoma region, in cases of severe bone jaw resorption, in order to restore patient esthetics and chewing function. Zygomatic Implants are recommended for the posterior maxilla region. Neodent® Zygoma GM Implants may be loaded immediately when good primary stability is achieved and with appropriate occlusal loading.

- *GM prosthetic connection;*
- *Diameter of 4.0 mm;*
- *Lengths from 30.0 to 55.0 mm;*
- *Tissue protect portion without threads near to the cervical region, for a friendly contact with the mucosa;*
- *Special Lateral direction drill designed to avoid soft tissue damaging;*
- *Neoporos Surface;*



	30.0 mm	35.0 mm	37.5 mm	40.0 mm	42.5 mm	45.0 mm	47.5 mm	50.0 mm	52.5 mm	55.0mm
Ø4.0 mm	109.1049	109.1050	109.1051	109.1052	109.1053	109.1054	109.1055	109.1056	109.1057	109.1058

Table 8. Zygoma GM implant lengths.

There are specific techniques used in order to promote zygomatic implants installations on the atrophic maxilla. From conventional through the full exterior implant position, or even Stella Sinus Slot technique[22], the surgical approach is considered advanced and requires a specific dental training program.

Due to the long drilling distance to the zygomatic bone and in order to protect critical adjacent anatomical structures, placement of zygomatic implants requires considerable surgical training and experience diagnostic planning. To receive an adequate overview over the anatomical structures, presurgical 3D planning with Cone Bean Computer Tomography scans and a biomodel is strongly recommended.

The drills have a longer lengths when compared to drills for conventional implants. The set of drills for implants placement is composed of six drills; one for guided surgical procedure, one for the exteriorized technique and the others to complete the procedure.

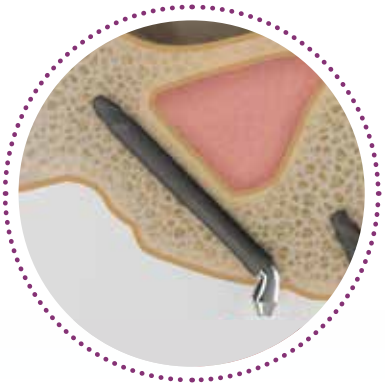
	Ø2.35*	Lateral directional Ø4.0	Pilot Ø2.3/3.2	Ø3.75	Ø4.0
	103.455	103.458	103.465	103.456	103.457
Ø4.0 mm	✓	Optional	Optional	✓	✓

* Drill available for both conventional and Guided Surgery procedures.

Table 9. Zygoma GM drill sequence.

Surgical technique

When performing the technique of implantation in the extra-sinus zygomatic[24], the implant insertion should be guided by the local anatomical conditions, respecting the integrity of the infraorbital nerve, the orbit and the infraorbital fossa. The osteotomy should be performed as posteriorly as possible, maintaining a safe distance of 3 mm from the posterior vertical border of the zygomatic bone. When the trajectory of the zygomatic implant is visualized, surgical drills should be used to create a canal from the residual ridge and continue on the buccal surface of the maxillary body.



Once the sinus membrane is exposed, manual instruments should be used to push it inward in order to preserve its integrity and create space for the drills. Zygomatic implants should be placed in a space created between the membrane and the zygomatic bone, with its body located in the sinus cavity. Neodent® developed The Lateral Direction Drill specially to respect soft tissue, avoiding tissue damage.

The position of the platform regarding the residual ridge should be determined by the surgeon according to prosthetic needs. With this technique, posterior implants usually emerge at the level of the second premolar, while the anterior ones lie on the level of the lateral incisor.

GM Zygoma-S

IMPLANT FOR ZYGOMATIC ANCHORAGE

The Neodent® GM Zygoma-S Implant is indicated for surgical intraoral installation and must be inserted in the posterior maxilla region and in the zygoma. It is indicated for multiple prostheses in cases of severe maxilla re-absorption and total edentulism and could be paced associated with conventional implants or only with zygomatic implants.

The Neodent GM Zygoma-S Implants may be loaded immediately when good primary stability is achieved with appropriate occlusal loading.

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- *GM prosthetic connection;*
- *Coronal diameter of 4.3 mm;*
- *Body diameters of 3.5 and 3.75 mm;*
- *Lengths from 30.0 to 55.0 mm*
- *Smooth Machined Surface at the implant body, developed to promote a friendly soft tissue interaction to long-term treatment success and preservation[34];*
- *Apex with Neoporos surface, potentializing the osseointegration to enhance the zygomatic anchorage;*
- *A new initial lateral cutting drill: More precision for the initial osteotomy*

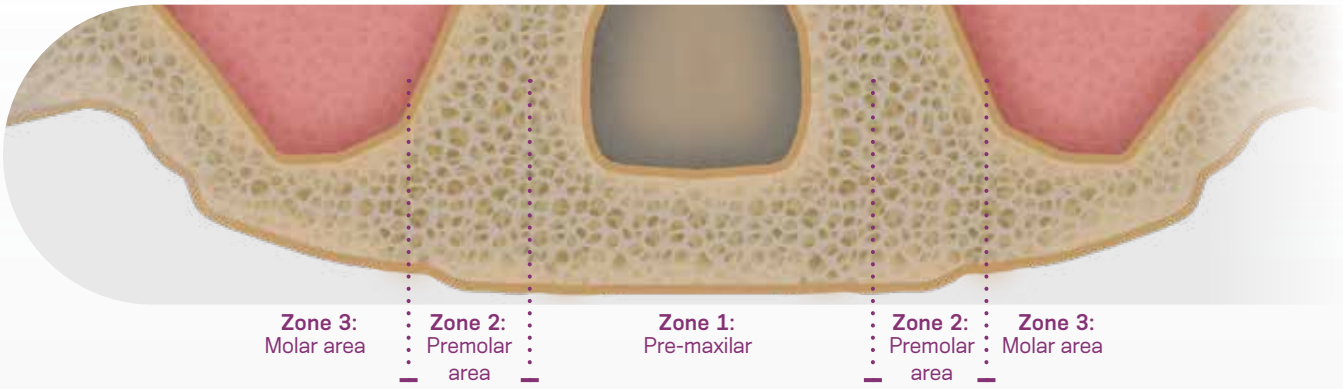
	30.0 mm	35.0 mm	37.5 mm	40.0 mm	42.5 mm	45.0 mm	47.5 mm	50.0 mm	52.5 mm	55.0mm
Ø3.5 mm	109.1086	109.1087	109.1088	109.1089	109.1090	109.1091	109.1092	109.1093	109.1094	109.1095
Ø3.75 mm	109.1096	109.1097	109.1098	109.1099	109.1100	109.1101	109.1102	109.1103	109.1104	109.1105

Table 8. Zygoma-S implant lengths.

According to Aparicio et al [26], there are specific techniques used in order to promote zygomatic implants installations on the atrophic maxilla.

Due to the long drilling distance to the zygomatic bone and in order to protect critical adjacent anatomical structures, placement of zygomatic implants requires considerable surgical training and experience diagnostic planning. To receive an adequate overview over the anatomical structures, presurgical 3D planning with Cone Bean Computer Tomography scans and a biomodel is strongly recommended to verify adequate zygomatic dimension and contour to permit placement of the threaded length of the implant entirely in bone. Preoperative medical assessment is also strongly recommended.

According to Bedrossian et al. [27] the maxilla can be divided into three zones: zone 1, the premaxilla; zone 2, the premolar area; and zone 3, the molar area.



The general guidelines for zygomatic implants[28] are as follows:

- Adequate bone in zone 1 for two to four axial implants, and bilateral lack of bone in zones 2 and 3. Typically, two to four routine implants are distributed in the anterior maxilla plus one zygomatic implant on each premolar/molar side.
- Lack of bone in all three zones of the maxilla. Four zygomatic implants can be used for rehabilitation.
- A rescue solution for patients in whom either regular implants and/or the maxillary bone-aumentation procedure have failed.

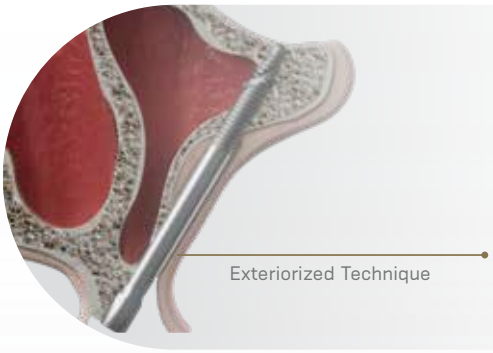
The drills have a longer lengths when compared to drills for conventional implants. The set of drills for Zygoma-S implants placement and the drilling sequence is shown in the image below:

	Initial Drill	Initial lateral cutting drill	Ø2.35	Lateral cutting drill Ø4.0	Ø3.5	Ø3.75	Pilot drill Ø4.0
	103.453	103.613	103.454 □ guided 103.455 ○ 71 mm 103.614 △ 100 mm	103.619	103.615 ○ 71 mm 103.616 △ 100 mm	103.617 ○ 71 mm 103.618 △ 100 mm	103.620
Ø3.5 mm	Optional	Optional	✓	Optional	✓	----	Optional
Ø3.75 mm	Optional	Optional	✓	Optional	✓	✓	Optional

Surgical technique

In the original technique, the path of the zygomatic implant was inside the maxillary sinus. The emergence of the head of the implant in the alveolar crest (typically in the palatal aspect of the second premolar region) is dependent on the spatial relationship of the zygomatic bone, the maxillary sinus, and the alveolar crest.[26]

The Neodent® GM Zygoma-S was designed to achieve better results with exteriorized technique (ZAGA-4).



EXTERIORIZED TECHNIQUE (EXTRA-ALVEOLAR)

The maxilla and alveolar bone show extreme vertical and horizontal atrophy. The Coronal portion of the implant is located buccally of the alveolar crest. There is no minimum osteotomy at this level. The drill has arrived at the apical zygomatic entrance following a path outside the sinus wall. The implant contacts bone in the zygoma and part of the lateral sinus wall.

Drilling Sequence – Exteriorized Technique - Extra-alveolar

STEP 01 (OPTIONAL) – INITIAL DRILL

The initial drill could be used to start the de bone bed preparation, at the alveolar crest.

Attach the Drill to the Contra-Angle and set the surgical motor to a speed between 600-1200 rpm, 20:1 ratio, 50 Ncm of torque.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

STEP 02 (OPTIONAL) – INITIAL LATERAL CUTTING DRILL

The Initial Lateral Cutting Drill is used for initiating the drilling on the zygomatic bone during surgeries with the extra sinus technique. During osteotomy, the drill reaches the zygomatic bone through the outer part of the sinus wall. They are indicated for facilitating the entry and for preventing slides from the following drill thanks to their inclined plane in relation to the drill axis.

Attach the Drill to the Straight Hand piece and set the surgical motor to a speed of 20,000 rpm, 1:1 ratio, and 50 Ncm of torque.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

Drilling Sequence – Exteriorized Technique - Extra-alveolar

STEP 03 – Ø2.35 DRILL

Attach the Drill to the Contra-Angle and set the surgical motor to a speed between 600 and 1200 rpm.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

STEP 04 - DEPTH PROBE 2.35

After the initial drilling at the planned location with the 2.35 drill, insert the metallic rod of the 2.35 Probe for Zygoma-S into the cavity and use the L-shaped end to measure the implant length using the laser markings indicated on the rod.

Drilling Sequence – Exteriorized Technique - Extra-alveolar

STEP 05 (OPTIONAL)– LATERAL CUTTING DRILL Ø4.0

Is used to create a cavity in the external sinus wall and/or maxilla to correctly accommodate the medium and/or cervical parts of the implant. Attach the Drill to the Contra-Angle and set the surgical motor to a speed between **600 and 800 rpm.**

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

STEP 06 – Ø3.5 DRILL

Attach the Drill to the Contra-Angle and set the surgical motor to a speed between 600 and 1200 rpm.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

Drilling Sequence – Exteriorized Technique - Extra-alveolar

STEP 07 - DEPTH PROBE 3.5

After the drilling at the planned location with the Ø3.5 drill, insert the metallic rod of the Ø3.5 Probe for Zygoma-S GM into the cavity. Check the deep of the perforation using the laser markings indicated on the rod.

For Ø3.5 implant placement move forward direct to the pilot drill is necessary.

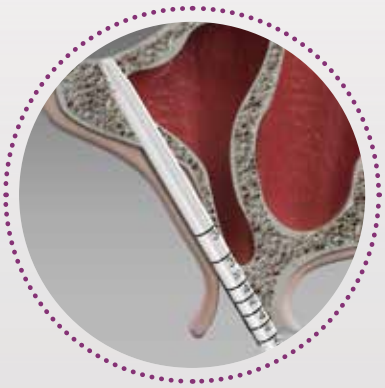
STEP 08 – Ø3.75 DRILL

Attach the Drill to the Contra-Angle and set the surgical motor to a speed between 600 and 1200 rpm.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation.

This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.



STEP 09 - DEPTH PROBE 3.75

After the drilling at the planned location with the Ø3.75 drill, insert the metallic rod of the Ø3.75 Probe for Zygoma-S GM into the cavity. Check the deep of the perforation using the laser markings indicated on the rod.

Drilling Sequence – Exteriorized Technique - Extra-alveolar

STEP 10 - PILOT DRILL 4.3 (OPTIONAL)

Use the Pilot Drill Ø4.3 for the osteotomy in the alveolar crest for the cervical region of the implant.
Attach the Drill to the Contra-Angle and set the surgical motor to a speed between 600 and 1200 rpm.

Start the motor and perform bone bed drilling with continuous movements of insertion and removal, under abundant irrigation. This irrigation can be either manual or combined with the irrigation from the motor. During drilling, pressure cannot be excessive. The insertion depth must be in accordance with the planning for the final position of the implant until the laser mark.

Do not interrupt the rotation of the motor while the drill is inside the surgical cavity, as this may impede its removal or cause it to break.

STEP 11 – IMPLANT PLACEMENT

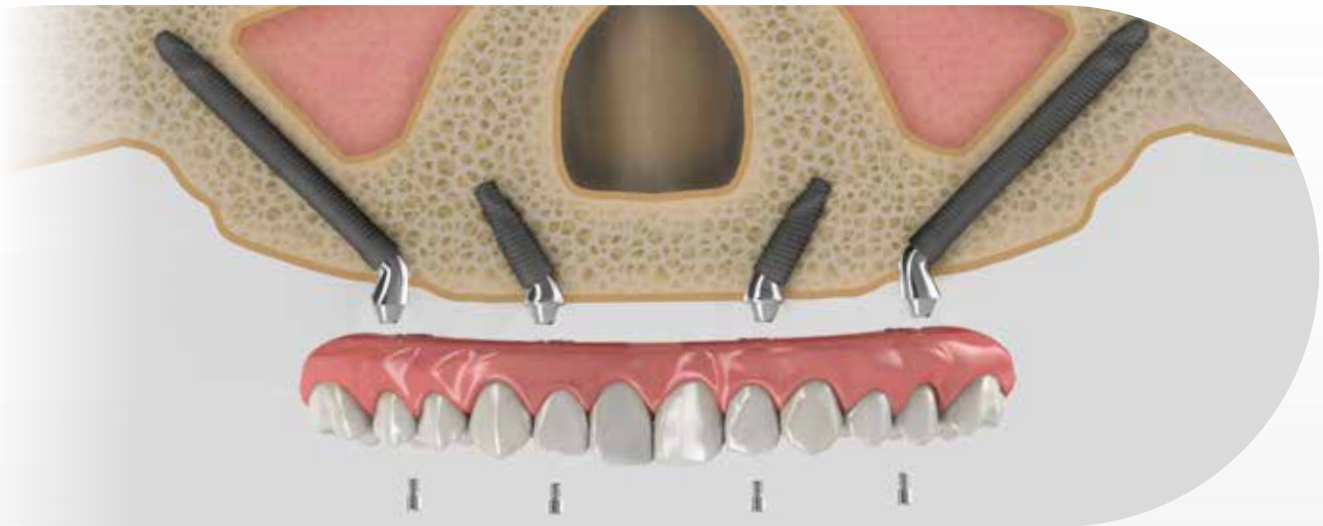
Capture the implant with the GM Implant Driver - Contra-angle, maintaining the driver still and gently spinning the internal support. Look for the perfect fit between the driver and the implant.

Transport the implant to the surgical cavity. Use a maximum torque of 35 Ncm and 30 rpm rotation in the surgical motor. Use the torque wrench connected to the GM Implant Driver Torque Wrench to finish the installation of the dental implant. Apply torque until the implant reaches its final position. All torque wrenches show torque levels. A value above 60 Ncm is contraindicated.

Abutment selection, provisional, and final restoration

Zygomatic implants placement over the crest ridge allows traditional prosthetic reconstruction, in contrast to the challenge of palatally positioned implants. Thus, the use of angle measures helps to select the proper abutment angle according to the alveolar ridge conformity.

For extreme angled positions, the prosthetic portfolio offers the GM Mini Conical Abutment with 45º, 52º and 60º of inclination. They are available with gingival heights of 1.5 or 2.5 mm.
The GM Mini Conical Abutment with 45º, 52º or 60º has a anti-rotational fitting with GM implant interface while a rotational fitting format for the upper prosthetic interface. They are indicated and developed to receive screw-retained multi-unit prosthesis, in immediate or conventional rehabilitation procedure.



GM Exact Mini Conical Abutment

	17°	30°	45° Slim**	45°**	52°**	60°**
1.5 mm	115.275	115.278	115.302	115.281	115.300	115.285
2.5 mm	115.276	115.279	115.303	115.282	115.301	115.286
3.5 mm	115.277	115.280				

**The 45º Mini Conical Abutment, 45º Mini Conical Abutment Slim, the 52º Mini Conical Abutment and 60º Mini Conical Abutment are indicated for use only with Zygoma GM and Zygoma-S.

GM Angle Measurer

17°	30°	45°	52°	60°
128.032	128.033	128.034	128.043	128.035

Table 11. GM Angle Measurers.

PROVISIONAL AND FINAL RESTORATION

For use of the Mini Abutment in two-stage procedures, a prior preparation can be done on the soft tissues with the use of a healing abutment. The abutment must be selected according to the planning and placed on the implant according to the recommended torque and connection. The proper fit should be ensured and the compatible Neo Mini Conical Abutment Protection Cylinder can be installed.

Neo Mini Conical Abutment Protection Cylinder.

The new Wide Abutment Protection Cylinder is indicated to protect the Mini Conical Abutment (regular platform) during the prosthesis development and prepares the gingiva for the prosthetic workflow. The protective cylinder maintains free space around the mini abutment platform, facilitating the prosthetic working flow.

Neo Wide Abutment Protection Cylinder.

The process follows with the impression technique: fit the corresponding Impression Coping onto the abutment, ensure the proper fit and perform the impression. Once the plaster model is ready, the prosthesis can be produced, using the Cylinders of the Mini Conical Abutment according to appropriate laboratory techniques or the one step hybrid solution, for more information regarding this technique see next page. Tests must be carried out on passivity and the fit of the prosthesis's structure.
For installation of the prosthesis, remove the Protection Cylinder and install it with the indicated torque over the prosthetic abutment. To conclude the process, protect the access of the screw.

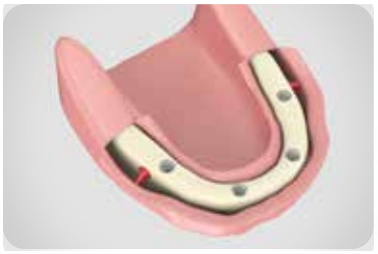
Neo Mini Conical Abutment Titanium Coping and Neo Mini Conical Abutment Coping Base.

ONE STEP HYBRID TECHNIQUE

The One Step Hybrid technique allows the passive fitting of prosthesis, without the need for weld procedure, by cementing the neo micro/mini titanium abutment coping base into the metal structure. This technique allows as well through a digital workflow, milled dental structure to be cemented on top of this titanium abutment coping. It is indicated for multi-unit screw-retained prosthesis and results in reduced laboratory work times. It can be performed over GM Mini Conical Abutments or GM Micro Abutments. The sequence to perform the One Step Hybrid technique is described in the following pictures:

1) Regularize the alveolar ridge.

2) Surgical drilling completed, obtaining adequate distance from distal implant in relation to the mental foramen with 7 mm Space Planning Instrument.



3) Placement of 4 Neodent® implants, according to their indication.

4) Placement of corresponding Neodent® Abutments.

5) Placement of Impression Copings, splinted with acrylic resin.

6) Positioning of Multifunctional Guide to obtain intermaxillary correlation. Soft silicone is injected to take the soft tissue impression.

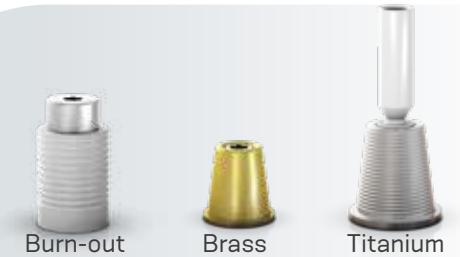
7) Removal of Multi-Funcional Guide and placement of Analogs to the impression copings.

8) Working model with artificial gum.

ONE STEP HYBRID TECHNIQUE

Option 1 -Conventional Workflow for cast framework

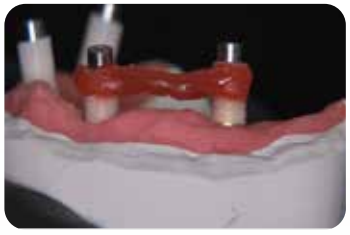
Neo Mini Abutments Copings
One Step Hybrid Technique



Burn-out	Brass	Titanium
118.340	118.331	118.382

1) Working model with artificial gum.

2) Brass Copings are placed over analogs, then Burn-out Copings are fixed by working screws.



3) Wax-up the framework.

4) Cast framework. If necessary, provide internal wear in the regions corresponding to the castable copings.

5) Placement of both the Neo Mini Conical Abutment Coping Base and the sealing pin on top of the analog.

6) Apply a specific primer and proceed with the cementation according to the cement manufacturer.

7) Press the infrastructure over the coping base and immediately remove any overflown cement excess as well as the sealing pin.

8) Unscrew the infrastructure from the model. Final framework with ensured passivity.

ONE STEP HYBRID TECHNIQUE

Option 2- Digital Workflow for milled Zirconia Bar

Neo Mini Conical Coping Base

Titanium

118.382

1) Working model with artificial gum.

2) Install the GM Mini Conical Abutment Scanbody on the model and proceed with the scanning.

3) Design the zirconia bar in the CAD/CAM software.

4) Mill the zirconia bar.

5) Placement of both the Neo Mini Conical Abutment Coping Base and the sealing pin on top of the analog.

6) Apply a specific primer and proceed with the cementation according to the cement manufacturer.

7) Press the infrastructure over the coping base and immediately remove any overflown cement excess as well as the sealing pin.

8) Unscrew the infrastructure from the model. Final framework with ensured passivity.

9) Final framework.

COMPREHENSIVE RESTORATIVE SOLUTIONS: DESIGNED TO MEET THE PATIENTS' EXPECTATIONS

Meet patient stability and comfort expectations thanks to comprehensive custom made milled frameworks for provisional or final restoration at the abutment level using a broad range of material and any workflows.

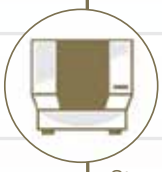
Provisional fixed prosthesis		Final fixed prosthesis
	Straumann® CARES®/Createch Medical Milling center solution	
Provisional fixed prosthesis		Final fixed prosthesis
	Straumann® M series/Zirkonzahn M4 In-house milling solution	
Provisional fixed prosthesis Mini Conical temporary coping/ Mini Conical distal bar coping		Final fixed prosthesis One Step Hybrid
	Conventional manufacturing solution	

Table 12. Framework for provisional and final fixed prosthesis.

Illustration of final prosthesis on a milled bar.

ZYGOMA GM, ZYGOMA-S AND HELIX GM LONG IMPLANT PACKAGING

Neodent® packaging has been specially updated for easy handling and safe surgical procedures, providing safety from implant stocking to the capture and transport to implant bed. The implant's features, such as type, diameter and length, are identifiable on the outside of the packaging.

Three self-adhesive labels are provided for recording in the patient's medical records and for reporting to the prosthesis team. They also allows traceability for all articles.

After opening the blister, note that the implant will remain attached at the lid. In order to break the base holder of the implant, hold the lid and apply a contra-torque with the GM Connection for contra-angle (a maximum torque of 20 Ncm). Or for manual installation, use the Zygoma GM Implant Driver with the Neo Screwdriver Torque Connection. Finish the implant placement with the aid of the Torque Wrench.

Instructions for opening and carring the implant packaging.

Note: The holder is integrated to the implant body, but is designed to be removed from the blister without any apical burr.

FOLLOW-UP

CLEANING AND CARE

For long-term success and proper fit of the fixed bridge, comprehensive patient instruction and periodic check-ups (at least once a year) are recommended. During these visits, you should carefully examine the:

1. Condition of the peri-implant tissues with regard to oral diseases such as plaque and calculus, bleeding, recession, and bone loss, by taking regular periapical radiographs.

2. Superstructure and prostheses occlusion, proper fit of the fixed bridge, wear of occlusal surface, retention, screw loosening, and abutment status.

3. Function of the prostheses.

Provide professional cleaning with the aid of ultrasonic or periodontal curettes, removing the prosthesis if necessary, and use cleaner prostheses agents. If a proper maintenance of the fixed restoration is provided, it is not necessary to exchange the occlusal screws at each check-up visit.

A full-arch prosthesis requires spaces for the framework and the esthetical veneering (can be either ceramic or acrylic). Also, from a functional point of view, full-arch bridges should allow for the patient's future hygiene and should never cover the remaining tissue, which will facilitate the patient's cleaning of the bridge.

For proper care at home, instruct the patient to clean the space between gingiva and fixed bridges, especially around the implants on a regular basis. Dental floss or interdental brushes are recommended.

REFERENCES

(1) World Health Organization 2012: World Health Survey (WHS). Geneva: WHO - World Health Organization.

(2) Agliardi E, Clericò M, Ciancio P, Massironi D. Immediate loading of full-arch fixed prostheses supported by axial and tilted implants for the treatment of edentulous atrophic mandibles. Quintessence Int. 2010;41(4):285-93.

(3) Maló P, de Araújo Nobre M, Lopes A, Moss SM, Molina GJ. A longitudinal study of the survival of All-on-4 implants in the mandible with up to 10 years of follow-up. J Am Dent Assoc. 2011;142(3):310-20.

(4) Babbush CA. Posttreatment quantification of patient experiences with full-arch implant treatment using a modification of the OHIP-14 questionnaire. J Oral Implantol. 2012;38(3):251-60.

(5) Sartoretto SC, Alves ATNN, Zarranz L, Jorge MZ, Granjeiro JM, Calasans-Maia MD. Hydrophilic surface of Ti6Al4V-ELI alloy improves the early bone apposition of sheep tibia. Clin Oral Implants Res. 2017;28(8):893-901.

(6) Maló P, de Araújo Nobre M, Lopes A, Ferro A, Gravito I. All-on-4® Treatment Concept for the Rehabilitation of the Completely Edentulous Mandible: A 7-Year Clinical and 5-Year Radiographic Retrospective Case Series with Risk Assessment for Implant Failure and Marginal Bone Level. Clin Implant Dent Relat Res. 2015;17(2):531-41.

(7) Bedrossian E et al. Fixed-prosthetic Implant Restoration of the Edentulous Maxilla: A Systematic Pretreatment Evaluation Method. J Oral Maxillofac Surg 2008;66:112-22.

(8) Maló P et al. The rehabilitation of completely edentulous maxillae with different degrees of resorption with four or more immediately loaded implants: a 5-year retrospective study and a new classification. Eur J Oral Implantol 2011;4(3):227-43.

(9) Jensen OT, Adams MW. Secondary stabilization of maxillary m-4 treatment with unstable implants for immediate function: biomechanical considerations and report of 10 cases after 1 year in function. Int J Oral Maxillofac Implants. 2014,29(2):232-40.

(10) Brunski JB. Biomechanical aspects of the optimal number of implants to carry a cross-arch full restoration. Eur J Oral Implantol. 2014;7(2):S111-31.

(11) Zarb GA, Zarb FL, Schmitt A. Osseointegrated implants for partially edentulous patients. Dent Clin North Am 1987;31:457–472.

(12) Balshi TJ. Single tuberosity osseointegrated implant support for a tissue integrated prosthesis. Int J Periodontics Restorative Dent 1992;12:345–357.

(13) Reiger MR. Loading considerations for implants. Oral Maxillofac Clin North Am 1991;3:795–804.

(14) Balshi TJ, Wolfinger GJ, Slauch RW, Balshi SF. Brånemark system implant lengths in the pterygomaxillary region: a retrospective comparison. Implant Dent. 2013;22(6):610-2.

(15) Takahashi T, Shimamura I, Sakurai K. Influence of number and inclination angle of implants on stress distribution in mandibular cortical bone with All-on-4 Concept. J Prosthodont Res. 2010;54(4):179-84.

(16) Jensen OT, Cottam JR, Ringeman JL, Adams MW. Transsinus dental implants, bone morphogenetic protein 2, and immediate function for all on four treatment of severe maxillary atrophy. J Oral Maxillofac Surg 2012;70:141–148.

(17) Graves S, Mahler BA, Javid B, Armellini D, Jensen OT. Maxillary all-on-four therapy using angled implants: a 16-month study of 1110 implants in 276 jaws. Dent Clin North Am 2011;55:779–794.

(18) Romanos GE, Nentwig GH. Immediate functional loading in the maxilla using implants with platform switching: five-year results. Int J Oral Maxillofac Implants 2009;24:1106–1112.

(19) Barewal RM, Stanford C, Weesner TC. A randomized controlled clinical trial comparing the effects of three loading protocols on dental implant stability. J Oral Maxillofac Implants 2012;27:945–956.

(20) Jensen OT, Cottam JR, Ringeman JL, Adams MW. Angled dental implants placement into the vomer/nasal crest of atrophic maxillae for Allon-Four immediate function: a 2-year clinical study of 100 consecutive patients. Oral Craniofac Tissue Eng 2012;2:66–71.

(21) Ivanoff CJ, Gröndahl K, Bergström C, Lekholm U, Brånemark PI.Influence of bicortical or monocortical anchorage on maxillary implant stability: a 15-year retrospective study of Brånemark System implants. Int J Oral Maxillofac Implants. 2000 Jan-Feb;15(1):103-10.

(22) Stella JP, Warner MR. Sinus slot technique for simplification and improved orientation of zygomaticus dental implants: a technical note. Int J Oral Maxillofac Implants. 2000;15(6):889-93.

(23) Jensen OT, Adam MW, Smith E. Paranasal bone: the prime factor affecting the decision to use transsinus vs zygomatic implants for biomechanical support for immediate function in maxillary dental implant reconstruction. The International Journal of Oral & Maxillofacial Implants. 2014;29:e130–e138.

(24) Agliardi, E. L., Romeo, D., Panigatti, S., de Araújo Nobre, M., & Maló, P. (2017). Immediate full-arch rehabilitation of the severely atrophic maxilla supported by zygomatic implants: a prospective clinical study with minimum follow-up of 6 years. International journal of oral and maxillofacial surgery, 46(12), 1592-1599.

REFERENCES

(25). Bothur S, Jonsson G, Sandahl L. Modied technique using multiple zygomatic implants in reconstruction of the atrophic maxilla: a technical note. Int J Oral Maxillofac Implants 2003: 18: 902–904.

(26) Aparicio C, López-Piriz R, Albrektsson T. ORIS Criteria of Success for the Zygoma-Related Rehabilitation: The (Revisited) Zygoma Success Code. Int J Oral Maxillofac Implants 2020;35:366–378.

(27). Bedrossian E. Rehabilitation of the edentulous maxilla with the zygoma concept: a 7-year prospective study. Int J Oral Maxillofac Implants 2010: 25: 1213–1221.

(28). Lesley D, Aparicio C. Indications and contra-indications for the use of the zygomatic implant. In: Aparicio C, editor. The anatomy guided approach. Berlin: Ed. Quintessence, 2012:79–87.

(29). Al-Nawas B, Wegener J, Bender C, Wagner W. Critical soft tissue parameters of the zygomatic implant. J Clin Periodontol 2004: 31: 497–500.

(30). Becktor JP, Isaksson S, Abrahamsson P, Sennerby L. Evaluation of 31 zygomatic implants and 74 regular dental implants used in 16 patients for prosthetic reconstruction of the atrophic maxilla with cross-arch xed bridges. Clin Implant Dent Relat Res 2005: 7: 159–165.

(31). Boyes-Varley JG, Howes DG, Lownie JF, Blackbeard GA. Surgical modications to the Branemark zygomaticus protocol in the treatment of the severely resorbed maxilla: a clinical report. Int J Oral Maxillofac Implants 2003: 18: 232–237.

(32). Farzad P, Andersson L, Gunnarsson S, Johansson B. Rehabilitation of severely resorbed maxillae with zygomatic implants: an evaluation of implant stability, tissue conditions, and patients opinion before and after treatment. Int J Oral Maxillofac Implants 2006: 21: 399–404.

(33). : Book Contemporary Implantology, Ivete Mattias Sartory, Elisa Mattias Sartori, Geninho Thomé, 2021 1st ed., Napoleão Chapter 16

(34). : “Steigenga J, Al-Shammari K, Misch C, Nociti FH Jr, Wang HL. Effects of implant thread geometry on percentage of osseointegration and resistance to reverse torque in the tibia of rabbits. J Periodontol. 2004;75(9):1233-41.

(35). Morneburg TR, Proschel PA. In vivo forces on implants influenced by occlusal scheme and food consistency. Int J Prosthodont 2003: 16: 481–486.

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