SURGICAL MANUAL

GRAND MORSE®

NEODENT®
A Straumann Group Brand

THE GRAND MORSE® IMPLANT SYSTEM

CONTENTS

1. BASIC INFORMATION ON SURGICAL PROCEDURE

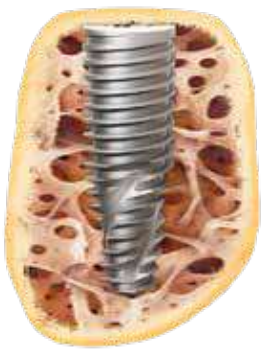
The modern era of implant dentistry, based on the clinical results of osseointegration, was originally published in English journals in 1977[1]. Since then, dentistry has undergone significant changes. The current treatment plan for patients usually offers implant-retained and/or implant-supported prostheses as an accessible and reliable solution. The number of dental implants has increased rapidly in recent years,[2,3] and this form of treatment requires specific knowledge and skills, such as the surgeon's learning curve, which are relevant to the results.[4] Based on these facts, the objective of these guidelines is to provide dental surgeons and specialists with basic information and guidelines on planning, surgical procedures and treatment options.

These guidelines do not substitute each product's instructions for use (IFU). These can be found at our website: www.ifu.neodent.com.br. It is the surgeon's sole responsibility to analyze the patients' general health, the viability of the surgical procedure and the most appropriate products for each clinical situation.

2. NEODENT® GRAND MORSE IMPLANT SYSTEM

Neodent® Grand Morse® (GM) Implant System presents the Helix® Implant, which can be placed in all types of bone density and has two types of surface treatment. Neodent® philosophy is to offer an implant solution suited to each specific indication, including bone density, lenght and surgical technique. The procedures are standardized and have sequential steps.

Helix GM®



Bone types I, II, III and IV*

FIGURE 1. Neodent® Helix Grand Morse® implant according to its indication. *Helix GM® Ø 6.0mm and Ø 7.0mm are not indicated for bone type I and II.

The Helix GM®, has the same prosthetic connection, regardless of the implant diameter (figure 2), with an internal angle of 16°. The implant's thicker inner walls give it greater mechanical resistance and superior results when compared with various internal connections[5,6] and have been strategically designed for the Grand Morse® portfolio.

FIGURE 2. The connection of the Neodent® Grand Morse® implant system has the same width, regardless of the implant's diameter.

FIGURE 3. Neodent® Helix® Grand Morse® implant features a deep connection in its interior, designed to increase the contact area between the implant and the prosthetic abutment.

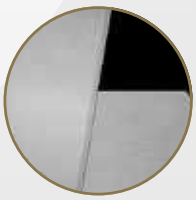
The Grand Morse® conical connection features an internal hexagon index in the lower portion called the GM Exact. GM Exact is used to surgically position the implant and reposition prosthetic abutments when working at implant level.

FIGURE 4. Internal hexagon index, createdto surgically guide the implant and mold the implant during the prosthetic phase.

The connection also has:

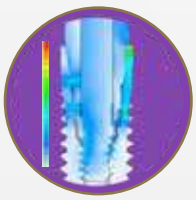
Platform Switching

Abutment design with a narrower diameter than the implant coronal area, enabling the platform switching concept[1-5].



Deep Connection

Allowing a large contact area between the abutment and the implant for an optimal load distribution.



Internal Indexation

Precise abutment positioning, protection against rotation and easy handling.

16° Morse Taper Connection

Designed to ensure tight fit for an optimal connection sealing.

3. IMPLANT DESIGN

3.1. Helix®

Neodent® Helix® Grand Morse® is a fully tapered implant, with cutting and compacting threads, with chambers designed to optimize secundary stability.

Fully tapered body design

- Coronal: 2° - 12°
- Apex: 16°

» Allowing under-osteotomy

Hybrid contour

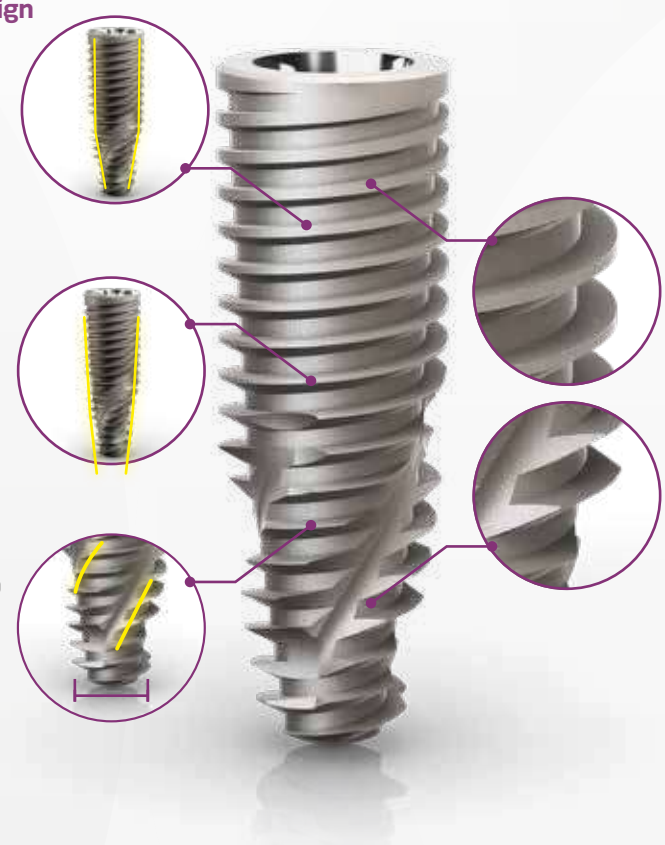
- Coronal: Cylindrical
- Apex: Conical

» For stability with vertical placement flexibility

Active apex

- Soft rounded small tip
- Helical flutes

» Enabling immediate loading



Dynamic progressive thread design

- Coronal: Trapezoidal > Compressing
- Apex: V-Shape > Self-tapping

» Achieving high primary stability in all bone types

The following table show the lenghts and diameter of Helix GM® implants.

Lenghts (mm) \ Diameters (mm)	3.5	3.75	4.0	4.3	5.0	6.0	7.0
8	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓
11.5	✓	✓	✓	✓	✓	✓	✓
13	✓	✓	✓	✓	✓	✓	✓
16	✓	✓	✓	✓	✓		
18	✓	✓	✓	✓	✓		

HELIX GM® MAIN CHARACTERISTICS

- Acqua® or NeoPoros® surface.
- Fully tapered implant.
- Compacting trapezoidal screw threads with a thread pitch from 1.2 to 1.5 mm (depending on the implant diameter).
- Implant with dual screw threads for minimal trauma and faster placement[17].
- Conical apex with low-activity chambers and helical chambers designed to optimize secondary stability.
- Indicated for all bone density types and post-extraction placement.
- Tapered contour drill is required if used in bone types I and II.
- Same prosthetic connection for all implant diameters.
- Final pilot drills highly recommended for bone types I and II.
- The implant should be positioned 1-2 mm below bone level for best results[17].
- Drilling speed: 800-1200 rpm for bone types I and II | 500-800 rpm for bone types III and IV.
- Insertion speed: 30 rpm.
- Maximum insertion torque: 60 N.cm.

3.2. Screw Threads

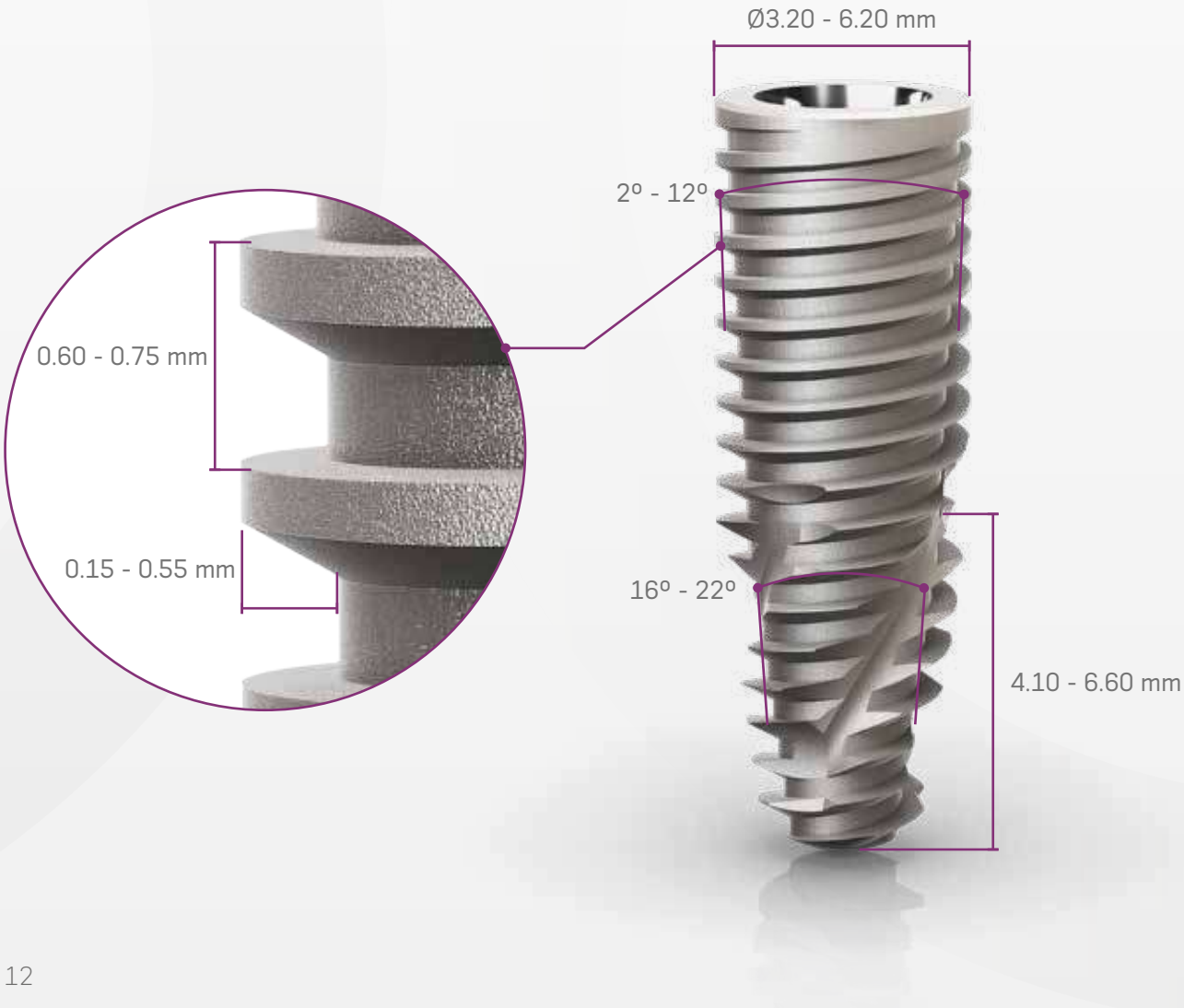
On the Helix® implant there are cutting and compacting threads, which allows its installation in all types on bones densities.

Cervical and middle third of the implant:

Trapezoidal thread profile - allows the achievement of torque on bone types with less density.

Apex of the implant:

Cutting flutes that have helical-shaped geometry – similar to a propeller.



3.3. Surface Treatments

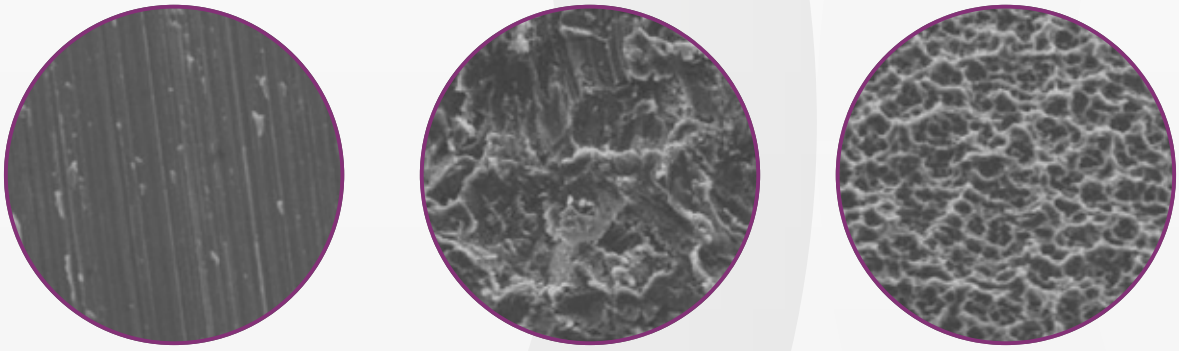
Neodent® implants are available in two types of surface treatment, as shown below. The decision regarding each surface should be guided by the clinical indication.

3.2.1. NeoPoros®

Based on the abrasive sandblasting concept followed by acid etching, the NeoPoros® surface promotes, by using controlled grain oxides, cavities on the implant surface that then are uniformed with the acid etching technique.

The whole process of obtaining this surface is guaranteed due to automated time, speed, pressure and particle size control.

Several scientific studies continue to be performed so that the NeoPoros® surface may be always evolving and promoting much more reliability for you.



Machined
Sa= 0.26 µm

Sandblasting
Sa= 0.67 µm

Sandblasting + Acid etching
Sa= 0.93 µm

FIGURE 5. Physical manufacturing process for the Neodent® surface treatment.

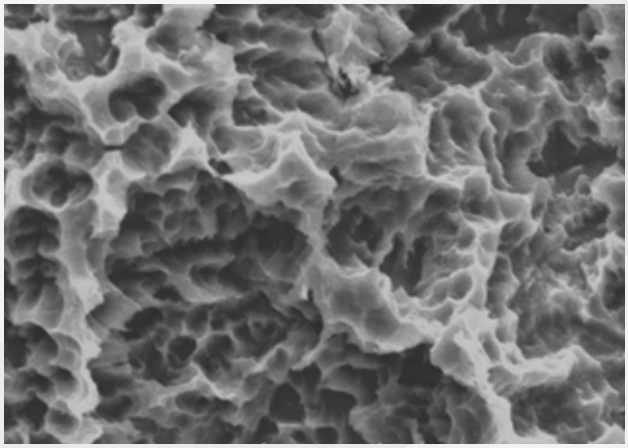


FIGURE 6. Micro (0.3 - 1.3 µm) and macro (15 - 30 µm) roughness for Acqua® and NeoPoros®.

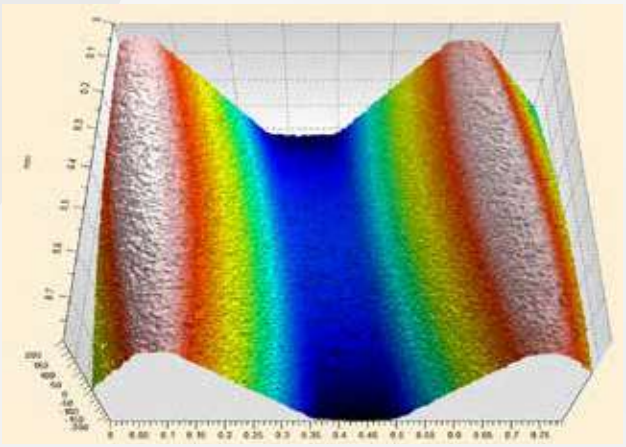


FIGURE 7. Confocal laser scanning microscopy in the screw thread region[14].

3.2.2. Acqua®

Acqua® is a hydrophilic implant with surface-modified titanium. The physical process of the NeoPoros® surface is performed on the Acqua® implants, however, the Acqua® surface is obtained in a special area of the production center where all the implants are packaged and stocked in liquid thus preventing contact with the atmosphere. This isolation results in wettability (presenting a contact angle <5°) and a polarised surface with positive ions[14].

The hydrophilic surface (figure 9) presents a smaller contact angle when in contact with organic fluids. This provides greater accessibility of blood to the implant surface[14]. Implants with the Acqua ® surface are indicated for implantation in grafted areas, in combination with bone graft procedures, post- extraction placement and sites with low bone density.[15,16]

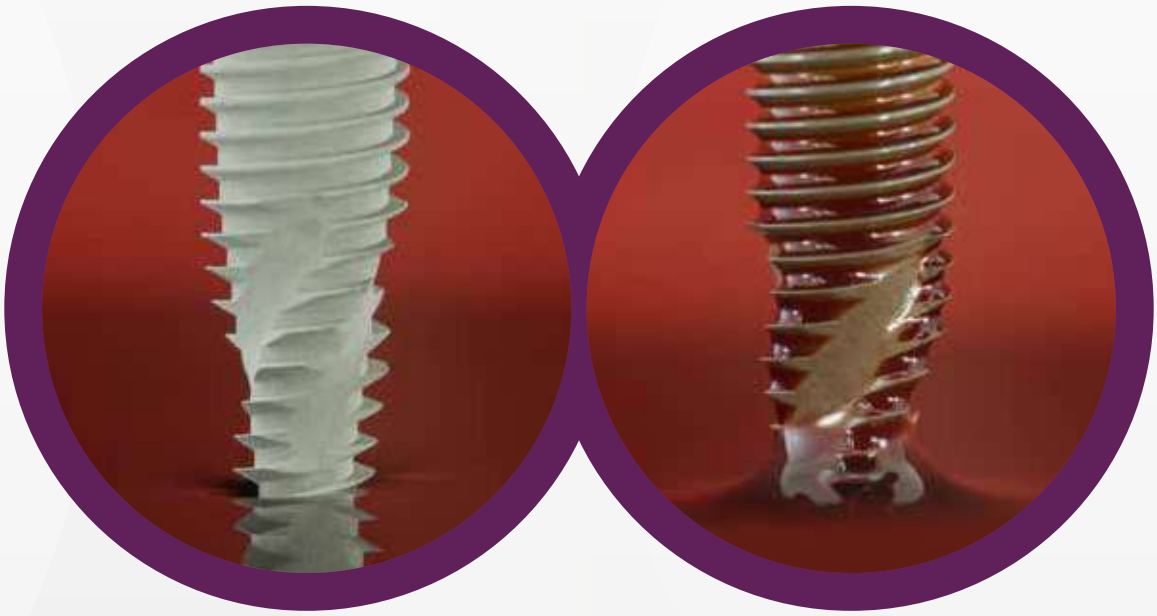


FIGURE 8. Comparison between NeoPoros surface and the Acqua hydrophilic surface.

Note: Chemical composition analysis of the NeoPoros® and Acqua® surfaces using the XPS method

	NeoPoros® (Atom %)	Acqua®(Atom %)
Oxygen O	55.9 ± 0.9	59.3 ± 0.2
Titanium Ti	21.1 ± 0.7	22.7 ± 0.3
Nitrogen N	0.4 ± 0.6	0.6 ± 0.4
Carbon C	22.7 ± 2.0	15.3 ± 1.0

4. INDICATIONS AND CONTRAINDICATIONS

Neodent® Helix Grand Morse® implants are manufactured with cold-worked grade 4 titanium to increase the product's mechanical resistance. All posts and abutments are made of titanium alloy (TAV). The following table lists the specific measurements.

Helix GM®	General indication	Minimum width of alveolar ridge*	Minimum width of the gap**	Available lengths
	All clinical cases and different bone densities. Placement in bone types III and IV (with the possibility of sub-instruments) and I and II with use of a tapered contour drill.	5.5 mm	5.5 mm	8/10/11.5/13/16***/18*** mm

*Minimum width of the alveolar ridge: minimum vestibulolingual width of the alveolar ridge, rounded to 0.5 mm.
**Minimum width of the gap: minimum mesiodistal width of a single tooth gap restoration, between adjacent teeth, rounded to 0.5 mm.
***Helix® Ø6.0 and Ø7.0 mm are not available in lengths 16 or 18 mm and are not indicated for bone type I and II.

For more information on indications and contraindications for each implant, consult the corresponding instructions for use. The instructions can also be found at ifu.neodent.com.br.

5. PREOPERATIVE PLANNING

5.1. Implant positioning and peri-implant tissue

Positioning the implant is the key for obtaining the correct positioning of the prosthetic restoration and is the basis for the surgical plan. Proper communication between the patient, surgeon, prosthetist and dental prosthesis technician is essential for achieving the desired prosthetic results.

To establish the correct plan, with proper spatial positioning and design choice (diameter and length) and the correct number and distribution of implants, the following steps are recommended:

- Perform the wax-up in the patient's study model
- Define the edentulous gap to be restored
- Define the type of superstructure
- Perform computed tomography and radiography
- Perform intraoral or model scanning

The wax-up can be used to make the tomographic and/or surgical guide and as the provisional restoration. Physiological occlusion is essential for the short- and long-term success of the implant. Immediate loading procedures should not be performed on patients with occlusion problems.

Notes: Prosthetic abutments should always receive axial loads, and the implant's long axis should be aligned with the cusps of the opposing teeth. The extreme anatomy of the cusps should be avoided, because it can lead to pathological overload.

The diameter, type, position and number of implants should be decided on an individual basis for each patient, taking into consideration the anatomy and prosthetic gap. Poorly positioned or angled teeth should be considered and analyzed. The recommendations in these guidelines should be considered a basic guide for proper biological healing, adequate restorations and for the patient to have efficient hygiene in that area. The design of the restoration has a strong effect on occlusion and hygiene and should be considered.

The final response of soft and hard tissue is highly influenced by the position of the abutment; therefore, three-dimensional positioning of the implant needs to be studied and consists of the following:

- Mesiodistal
- Vestibulolingual
- Cervicoapical

5.1.1. Mesiodistal positioning of the implant

The mesiodistally available bone is an important factor in choosing the diameter and number of implants. Mesiodistal gap is the distance between the implant and the teeth or between implants, when multiple implants are necessary. The point of reference is the measurement of the largest mesiodistal width of the implant, usually in the cervical regions. Implants generally require a minimum of adjacent bone surrounding them of 1-1,5 mm. The distances listed here are rounded to a minimum of 0.5 mm of bone. However, in preclinical studies, Cone Morse implants placed below bone level present bone and soft tissue maintenance up to an interimplant distance of 2.0 mm.

The basic rules are as follows:

Rule 1 - Ideally, the distance from the implant to the adjacent teeth should be at least 1.5 mm between the largest portion of the implant and the teeth, in both the mesial and distal aspects.

Rule 2 - Given that the implants require a minimum adjacent bone of 1 mm, the minimum distance to other implants is 2 mm.

5.1.1.1. Examples of single tooth gaps

For single tooth restorations, the implant should be placed in the center of the gap. The following example shows how to follow Rule 1.

For all Neodent® Helix Grand Morse® implants, the gap size needs to be considered when selecting the implant diameter. To position an implant within the gap according to Rule 1, the following aspects may be used as an approximation:

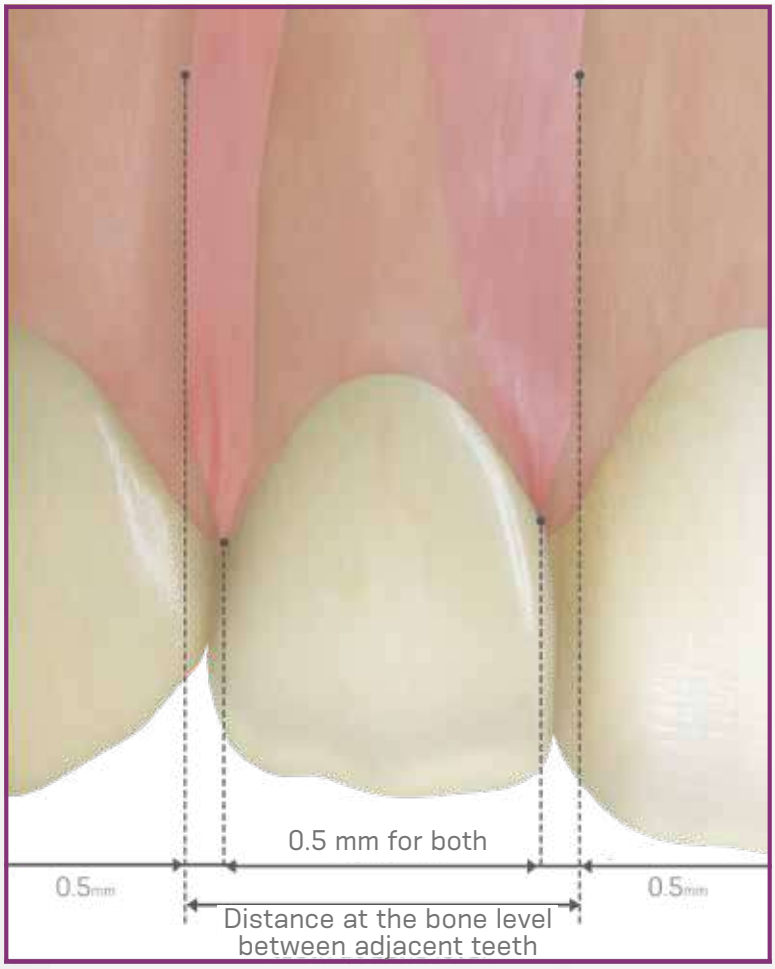
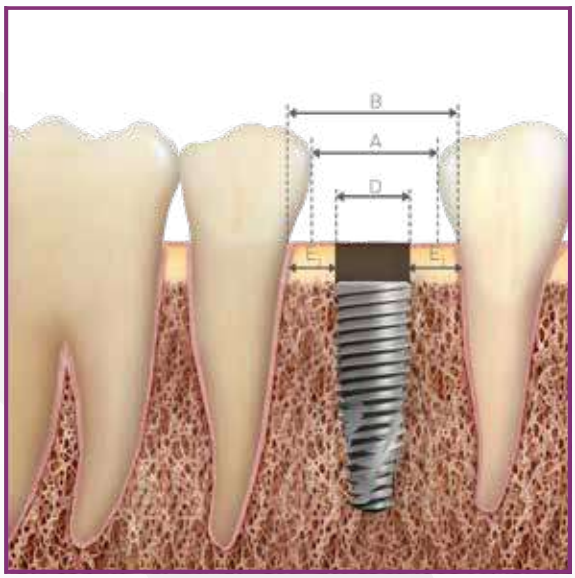


FIGURE 9. The distance between adjacent teeth is approximately 1.0 mm greater at the bone level due to the dental anatomy and the interproximal contact point, when compared with the actual bone width of the gap (2 x 0.5 mm). Therefore, applying Rule 1, the gap must be 2.0 mm wider than the width of the implant.

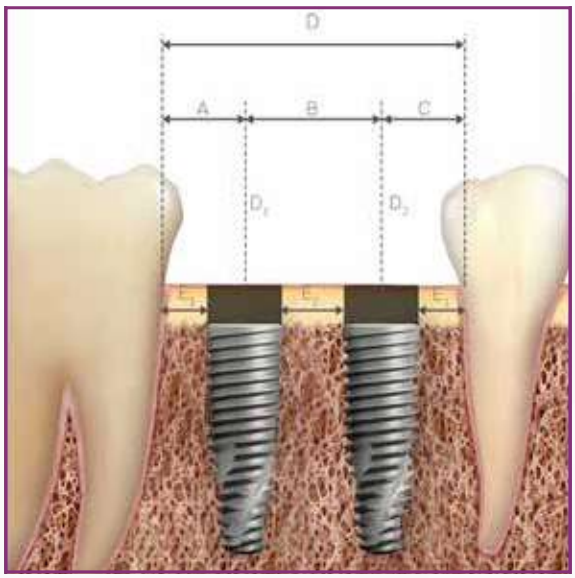


D - Diameter of the Implant (mm)	A - Width of the Gap (mm)	B - Distance between the adjacent teeth at the bone level (mm)	E_1 - Tooth-implant distance (mm)
3.5	5.5	6.5	1.5
3.75	5.75	6.75	
4.0	6.0	7.0	
4.3	6.3	7.3	
5.0	7.0	8.0	
6.0	8.0	9.0	
7.0	9.0	10.0	
Rule	D + 2 mm	D + 3.0 mm*	

*Rule 1 applied on both sides of the implant.

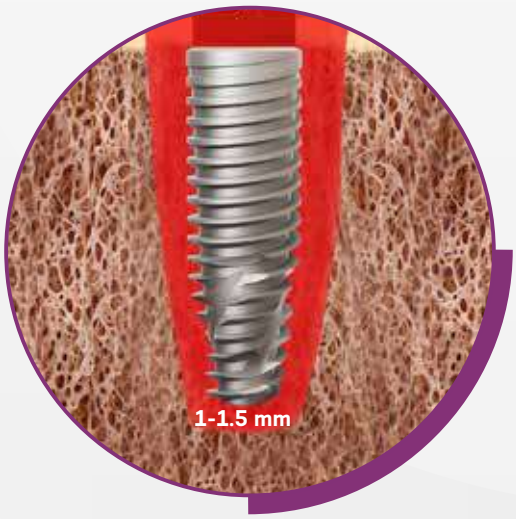
5.1.1.2. Examples of multiple tooth gaps

The examples below show how Rules 1 and 2 are applied to multiple tooth gaps. The measurements are performed in the bone crest of the tooth adjacent to the center of the implant and between the centers of the implants. The center of the implant should be considered due to the initial drilling during the osteotomy. The minimum distance of 2 mm should be followed between the cervical regions of the implants in Rule 2, which is important for flap closure, to avoid proximity of the abutments and provide adequate space for maintenance, emergency restoration profile and oral hygiene.



D_1 - Diameter of the Implant (mm)	D_2 - Diameter of the Implant (mm)	A	B	C	D	E_1 - Tooth-implant distance (mm)	E2 - Implant-implant distance (mm)
3.5	3.5	3.3	5.5	3.3	12	1.5	2.0
3.75	3.75	3.4	5.8	3.4	12.5		
4.0	4.0	3.5	6.0	3.5	13		
4.3	4.3	3.7	6.3	3.7	13.6		
5.0	5.0	4.0	7.0	4.0	15		
6.0	6.0	4.5	8.0	4.5	17		
7.0	7.0	5.0	9.0	5.0	19		

Normally, clinical cases have different gaps and consequently D1/D2 can be different. Factors such as the timing of implant placement and/or implant restoring, platform-switching, and the material and shape of the abutment also play a crucial role in the inter-implant mucosa fill and should be carefully considered[18]. It has been demonstrated that platform-switched implants with internal conical abutment connections minimize crestal bone loss and may be placed 2 mm apart[19,20,21,22] The implants should therefore be adapted for each situation.



In search of a simpler rule, the dentist should consider that each implant requires a minimum of 1 mm of adjacent bone, regardless of the implant's diameter when working between implants, and a minimum of 1.5 mm between the largest portion of the implant and the teeth.

5.1.2. Vestibulolingual implant position

The buccal and palatal bone plate should be at least 1 mm thick to ensure the stability of the bone tissue and the condition of the soft tissue. The minimum vestibulolingual width for each implant diameter is listed in Table 1. Within this limitation, the vestibulolingual position and the long axis of the implant should be chosen to provide the best possible restorative results. The surgeon also needs to know whether the plan is to place a screw-retained or cement-retained prosthesis.

WARNING: Bone graft techniques are highly advisable in the alveolar ridges in which the buccal bone plate is 1 mm thick or less or when bone is lacking on one of the sides. These procedures should be conducted only by surgeons with advanced experience in bone regeneration with grafts.

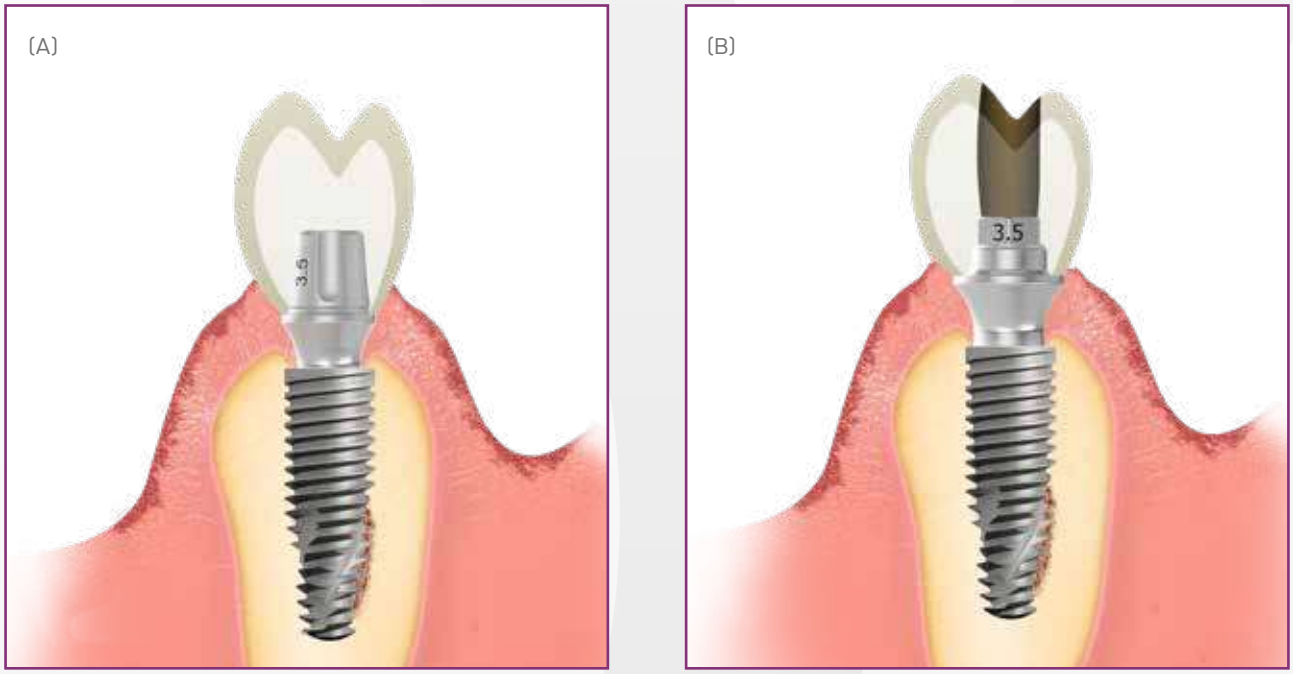
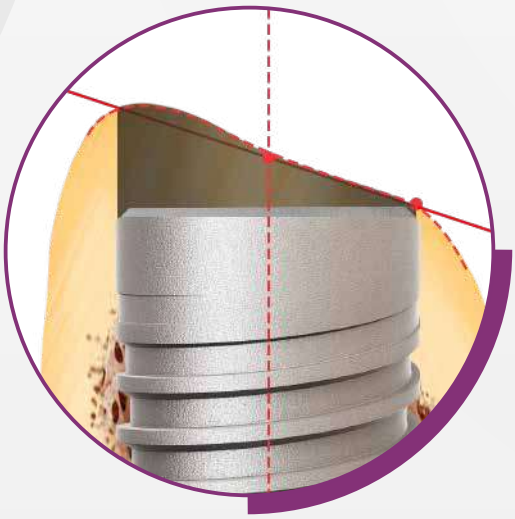


FIGURE 10. Example of implant positioned for cement-retained prosthesis (A) and screw-retained prosthesis (B), where there is access to the retaining screw.

5.1.3. Cervicoapical position of the implant

Neodent® Helix® Grand Morse® implants were designed for placement up to 2 mm below the bone crest to enhance hard and soft tissue stability and improve esthetic outcomes, particularly in anterior regions (teeth 6–11). This recommendation is supported by evidence indicating that subcrestal implants often undergo crestal bone remodeling and are associated with increased probing depth and greater peri-implant soft tissue height compared to crestal placement.[23]



That said, the relationship between an implant's vertical position, soft tissue thickness, and marginal bone loss is multifactorial and complex. [24] Deeper mucosal tunnels may compromise the effectiveness of biofilm removal during both home care and professional maintenance.[25] Additionally, when the keratinized mucosa is ≥1 mm thick, there is a tendency toward reduced marginal bone loss. [26]

These findings suggest that while certain features of subcrestal placement may be beneficial in specific clinical contexts, they may not be ideal in others. For this reason, Neodent implants are engineered to support versatile positioning strategies, allowing clinicians to adapt placement according to individual patient needs and clinical judgment. For situations with uneven ridges, position the implant at the bone level corresponding to the most apical bone wall. Depending on the clinical case, some osteotomy might be required, given that the abutments have limitations in the transmucosal height. The implant should be completely covered with bone or graft with biomaterials to prevent titanium dehiscence.

5.2. Planning Aids

5.2.1. Space Planning Instrument for assisting in the diagnosis and positioning of implants

When using the 7/9 mm Space Planning Instrument in the patient's mouth or in the study model, an initial analysis of the spatial relationships can be performed, in order to select the implant diameter and the prosthetic reconstruction. The Space Planning Instrument has two ends measuring 7 and 9 mm in diameter, with a mark exactly in the middle of each end (3.5 and 4.5 mm); this acts as a reference for the surgeon to position the implant, respecting the rule of a 1.5 mm minimum adjacent peri-implant bone thickness.

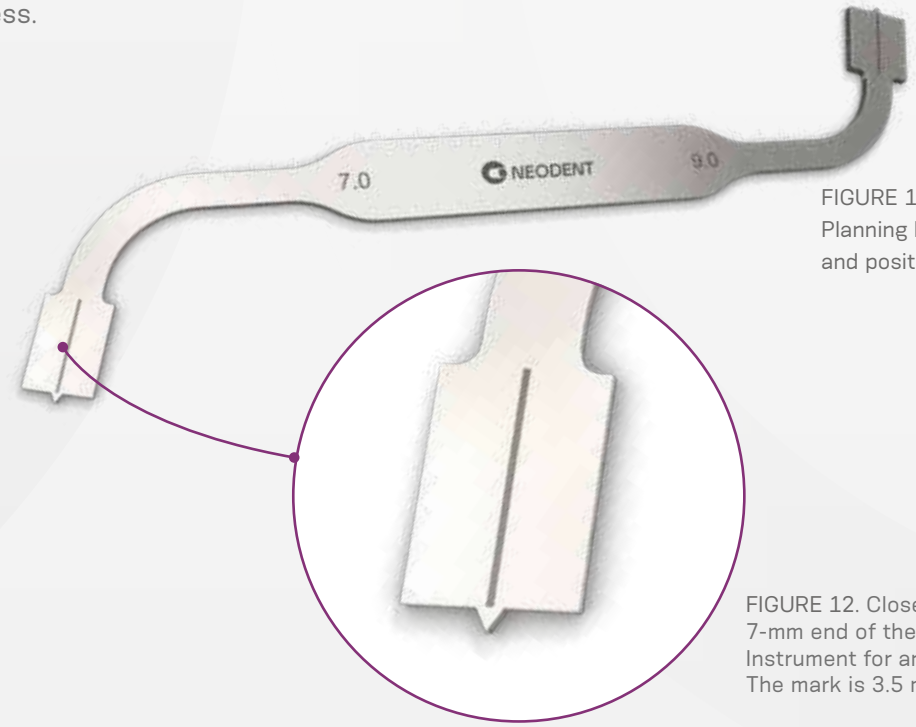


FIGURE 11. Diagnostic Space Planning Instrument for gaps and positioning of implants.

FIGURE 12. Close-up of the 7-mm end of the Space Planning Instrument for analyzing the gaps. The mark is 3.5 mm from the edge.

The 1.5 mm rule is important for placing the implant based on the position of the teeth, implants and anatomical structures, such as nerves. The Space Planning Instrument can help with the positioning of an implant close to a foramen.

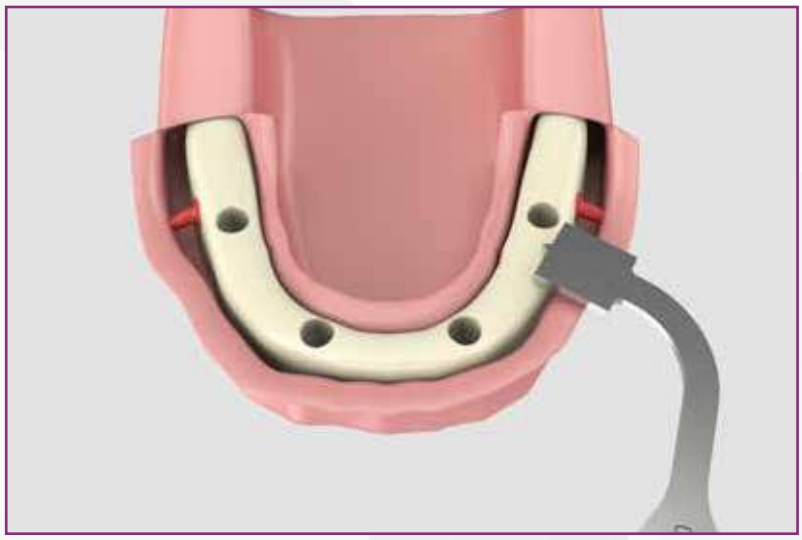


FIGURE 13. Using the Space Planning Instrument for the positioning of the osteotomy for implant placement.

5.2.2. Direction indicators for diagnosing the adjacent bone

All Neodent® Direction Indicators have different designs for analyzing the amount of bone surrounding the osteotomy. All indicators have the following parts: lower, middle and upper.

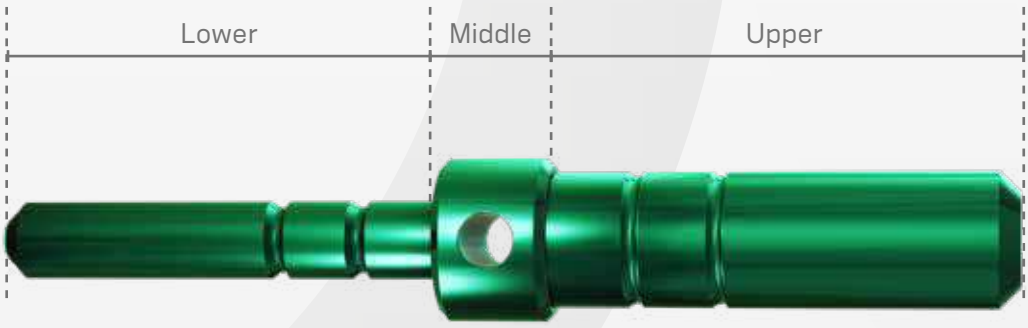


FIGURE 14. The lower (2 mm), middle (diameter of the implant) and upper (diameter of the last drill used in the basic osteotomy) parts of the Direction Indicator.

The lower part of all Direction Indicators is 2.0 mm in diameter, to be adjusted after the initial osteotomy. The middle part of the Direction Indicator has the diameter of the respective implant. All diameters are color coded and are listed in Table 1.

	Diameters	
Direction Indicator	Middle	Upper
	3.5	2.8
	3.75	3.0
	4.0	3.3
	4.3	3.6
	5.0	4.3

TABLE 1. Options for Colored Direction Indicators. The center part of the direction indicator has the same width as the implants, based on the measurements marked on the upper part.

The upper part of each direction indicator has the same diameter as the last drill used before the placement of the implant, according to the Neodent® osteotomy protocols. The positioned Direction Indicator allows the surgeon to check the adjacent bone, as illustrated below.

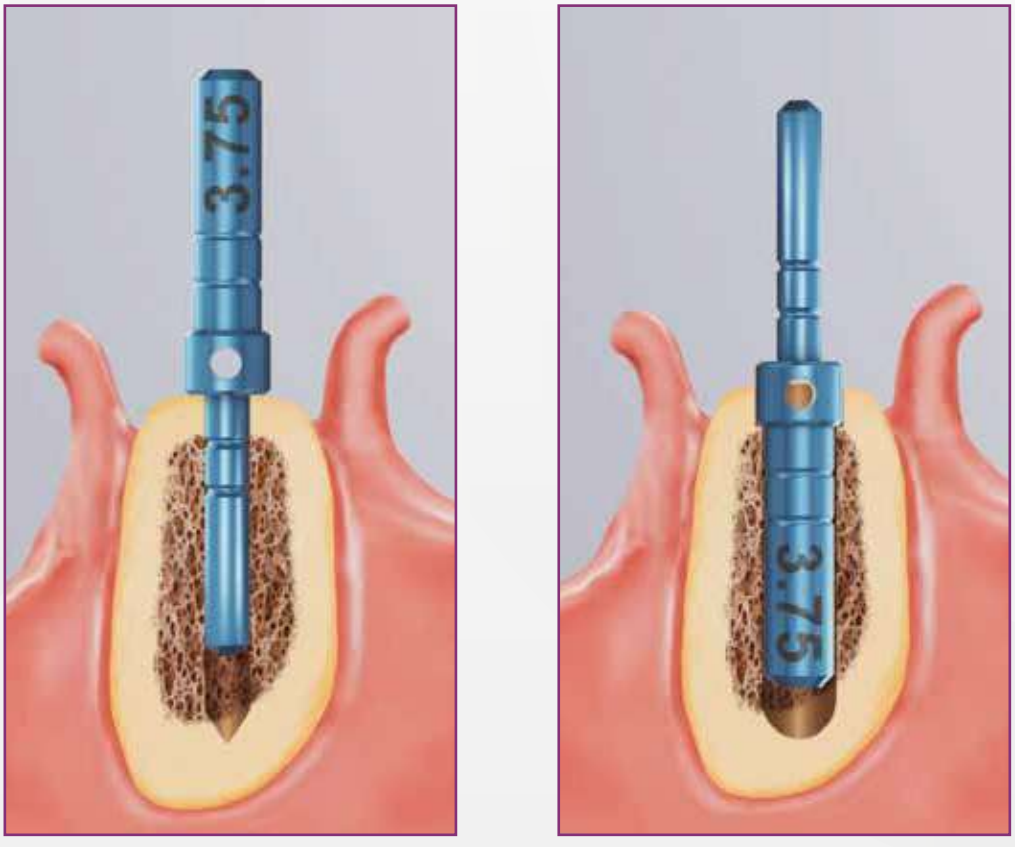


FIGURE 15. Direction Indicator inserted after the initial drilling and fitted inside the osteotomy according to the drill protocol. The indicator helps analyze the remaining adjacent bone when positioned.

There are also Angle Measurement guides that help the surgeon assess the angulation of abutments before the implant placement. These measurement guides are available in two angles (17° and 30°) and are inserted in the 2.0 mm osteotomy.

FIGURE 16. Angle measurement guides for selecting abutments.

6. SURGICAL PROCEDURES

6.1. Implant bed preparation

The diameter, position and number of implants should be selected based on the anatomy and spatial circumstances. The measurements should be performed according to the basic guidelines.
The basic preparation of the implant bed involves preparing the ridge and perforating with an initial drill under irrigation, for which the diameter and design (if cylindrical or tapered) of the selected implant will determine the instruments to be used.

The refined implant bed preparation involves the instruments that conform to the emergence profile and the bone. For this, the implant type and bone density determine the instruments to be used.

Steps	Instruments
1. Basic implant bed preparation	
Preparation of the ridge	Initial Drill
2.0 drilling	2.0-mm twist drill; Direction Indicator; Depth Probe with millimeter markings
2. Refined implant bed preparation	
Conical or cylindrical drills and bone profile drills	Drill format is defined according to the implant design, and the sequence and diameter defined by its width
Tapered Contour Drill+	For bone types I and II.

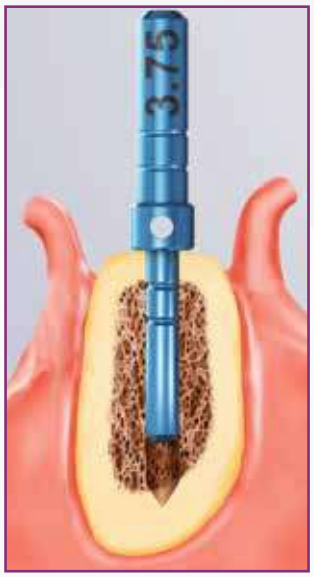
6.1.1. Basic implant bed preparation

After opening the flap and exposing the bone tissue, the preparation of the alveolar ridge begins. Once the implant's position has been established and with the aid of surgical guides, the cervical cortical layer is drilled with the Initial Drill (step 1), and the spatial positioning of the implant is checked visually. The indicated number of rotations per minute (rpm) for drilling is based essentially on bone density, whereby 800-1200 rpm will be applied in bone types I and II, and 500-800 rpm in bone types III and IV. Subsequently, the 2.0 mm drill is used to establish the desired height for the selected implant, always keeping in mind that the placement of the Grand Morse® implant is at bone level, 1 or 2 mm below bone level. Consequently, a subsequent drill is employed to prepare the osteotomy, following the sequence based on the implant type and diameter, as chosen in the preoperative plan. All drills are fitted to the contra- angle handpiece according to ISO 1797-1 – Dentistry – Shanks for rotary instruments.

Step 1 – Preparing the site of the implant and initial drilling with the Initial Drill

Carefully reduce and regularize the bone surface before marking the position of the implant with the initial drill. Insert the drill to approximately 5-7 mm with a drill speed consistent with the bone density.

Note: Bone reduction/preparation should be considered in the preoperative plan, because it affects the choice of implant diameter and length.



Step 2 – Checking the long axis of the implant

After using the initial drill, check the long axis of the implant using the direction indicator. The implant diameters and measurements of adjacent bone can be checked as described in 3.2.2.

Step 3 – Drill 2.0 mm

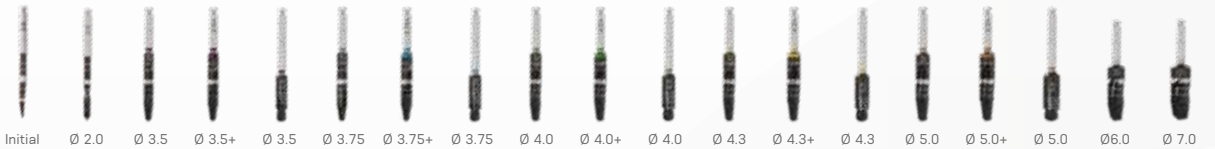
Use the 2.0 mm twist drill to reach the planned drilling length. Use of the depth gauge is recommended for controlling the depth.

Note

- Periapical radiography is recommended at this point to check for available vertical bone or to verify the long axis of the drilling in relation to the adjacent roots, for example. The Direction Indicator should be completely inserted into the instrumented area, allowing for visualization of the entry of the drilling in relation to the anatomical structures.

- The 2.0 mm Neodent® drill has an active apex that can be used as an initial drill. For flat bony ridges, this drill can replace the initial drill.

6.1.1.1. Implant bed preparation for Helix GM®



	Initial	Ø 2.0	Ø 3.5	Ø 3.5+	Ø 3.5	Ø 3.75	Ø 3.75+	Ø 3.75	Ø 4.0	Ø 4.0+	Ø 4.0	Ø 4.3	Ø 4.3+	Ø 4.3	Ø 5.0	Ø 5.0+	Ø 5.0	Ø6.0	Ø 7.0
	103.170	103.425	103.561	103.578	103.513	103.564	103.579	103.514	103.567	103.580	103.515	103.570	103.581	103.516	103.573	103.582	103.517	103.576	103.577
Ø 3.5	✓*	✓		✓	✓														
Ø 3.75	✓*	✓	✓				✓	✓											
Ø 4.0	✓*	✓	✓			✓				✓	✓								
Ø 4.3	✓*	✓	✓			✓			✓				✓	✓					
Ø 5.0	✓*	✓	✓			✓			✓*			✓				✓	✓		

*Optional / Bone types I and II

Ø 3.5	✓*	✓	✓																
Ø 3.75	✓*	✓	✓			✓*													
Ø 4.0	✓*	✓	✓						✓*										
Ø 4.3	✓*	✓	✓			✓						✓*							
Ø 5.0	✓*	✓	✓									✓			✓*				
Ø 6.0	✓*	✓	✓			✓						✓			✓			●	
Ø 7.0	✓*	✓	✓									✓			✓			●	●*

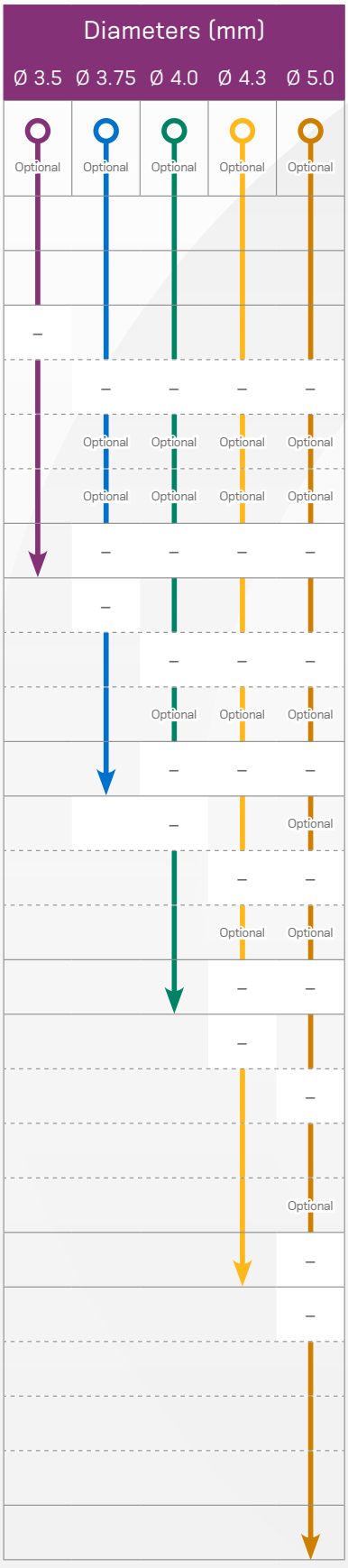
*Optional / Bone types III and IV

1: All tapered drills have similar marks related to each implant length, regardless of diameter.
2: All drills are available in the short version, and some are available in the long version.
3: The implants in the image are 13 mm long.

Note: Periapical radiography is recommended after the use of conical drills to check for available bone or to verify the long axis of the drilling in relation to the adjacent roots. A radiographic positioner should be inserted in the instrumented area.

Helix GM® - For bone types I and II

Instruments for basic bone implant preparation				
Step	Code	Product	Max. RPM	Image
1 – Prepare the implant bed and initial drilling	103.170	Initial Drill	1200	
2 – Check the long axis of the implant	128.019	Direction indicator 2.8/3.5	–	
3 – Taperd Drill 2.0*	103.425	Tapered Drill 2.0	1200	
4 – Tapered 3.5	103.561	Tapered Drill 3.5	1200	
	103.578	Tapered Contour Drill 3.5	1200	
	128.019	Direction indicator 2.8/3.5	–	
	129.009	Tapered X-Ray Positioner 3.5	-	
5 – Pilot Drill 2.8/3.5	103.513	Pilot Drill 2.8/3.5	1200	
6 – Tapered 3.75	103.564	Tapered Drill 3.75	1200	
	103.579	Tapered Contour Drill 3.75	1200	
	128.020	Direction indicator 3.0/3.75	-	
7 – Pilot Drill 3.0/3.75	103.514	Pilot Drill 3.0/3.75	1200	
8 – Tapered 4.0	103.567	Tapered Drill 4.0	1200	
	103.580	Tapered Contour Drill 4.0	1200	
	128.021	Direction indicator 3.3/4.0	-	
9 – Pilot Drill 3.3/4.0	103.515	Pilot Drill 3.3/4.0	1200	
10 – Tapered 4.3	103.570	Tapered Drill 4.3	1200	
	103.581	Tapered Contour Drill 4.3	1200	
	128.022	Direction indicator 3.6/4.3	-	
	129.013	Tapered X-Ray Positioner 4.3	-	
11 – Pilot Drill 3.6/4.3	103.516	Pilot Drill 3.6/4.3	1200	
12 – Tapered 5.0	103.573	Tapered Drill 5.0	1200	
	103.582	Tapered Contour Drill 5.0	1200	
	128.023	Direction indicator 4.3/5.0	-	
	129.014	Tapered X-Ray Positioner 5.0	-	
13 – Pilot Drill 4.3/5.0	103.517	Pilot Drill 4.3/5.0	1200	



*The sequence can be started directly with the 2.0 drill if the bone bed is flat.

Helix GM® - For bone types III and IV

Instruments for basic bone implant preparation					Diameters (mm)						
Step	Code	Product	Max. RPM	Image	Ø 3.5	Ø 3.75	Ø 4.0	Ø 4.3	Ø 5.0	Ø 6.0	Ø 7.0
1 – Prepare the implant bed and initial drilling	103.170	Initial Drill	800		Optional	Optional	Optional	Optional	Optional	Optional	Optional
2 – Check the long axis of the implant	128.019	Direction indicator 2.8/3.5	–								
3 – Taperd Drill 2.0*	103.425	Tapered Drill 2.0	800								
4 – Tapered 3.5	103.561	Tapered Drill 3.5	800								
	103.578	Tapered Contour Drill 3.5	800		–	–	–	–	–	–	–
	128.019	Direction indicator 2.8/3.5	–			Optional	Optional	Optional	Optional	Optional	Optional
	129.009	Tapered X-Ray Positioner 3.5	-			Optional	Optional	Optional	Optional	Optional	Optional
5 – Pilot Drill 2.8/3.5	103.513	Pilot Drill 2.8/3.5	800			–	–	–	–	–	–
6 – Tapered 3.75	103.564	Tapered Drill 3.75	800			Optional	–		–		–
	103.579	Tapered Contour Drill 3.75	800			–	–	–	–	–	–
	128.020	Direction indicator 3.0/3.75	-				–	Optional	Optional	Optional	Optional
7 – Pilot Drill 3.0/3.75	103.514	Pilot Drill 3.0/3.75	800				–	–	–	–	–
8 – Tapered 4.0	103.567	Tapered Drill 4.0	800				Optional	–	–	–	–
	103.580	Tapered Contour Drill 4.0	800				–	–	–	–	–
	128.021	Direction indicator 3.3/4.0	-					Optional	–	–	–
9 – Pilot Drill 3.3/4.0	103.515	Pilot Drill 3.3/4.0	800					–	–	–	–
10 – Tapered 4.3	103.570	Tapered Drill 4.3	800					Optional			
	103.581	Tapered Contour Drill 4.3	800					–	–	–	–
	128.022	Direction indicator 3.6/4.3	-						Optional	Optional	Optional
	129.013	Tapered X-Ray Positioner 4.3	-						Optional	Optional	Optional
11 – Pilot Drill 3.6/4.3	103.516	Pilot Drill 3.6/4.3	800						–	–	–
12 – Tapered 5.0	103.573	Tapered Drill 5.0	800						Optional		
	103.582	Tapered Contour Drill 5.0	800						–	–	–
	128.023	Direction indicator 4.3/5.0	-							Optional	Optional
	129.014	Tapered X-Ray Positioner 5.0	-							Optional	Optional
13 – Pilot Drill 4.3/5.0	103.517	Pilot Drill 4.3/5.0	800							–	–
14 – Tapered 6.0	103.576	Tapered Drill 6.0	800								
15 – Tapered 7.0	103.577	Tapered Drill 7.0	800								Optional

*The sequence can be started directly with the 2.0 drill if the bone bed is flat.

6.1.2. Details on special implant bed preparation

The special implant bed preparation considers the use of the pilot drill and the tapered contour drill (+) when necessary. The instruments depend on the implant type and diameter and bone type. Osteotomies in bone types I and II need final pilot drills for the final positioning of the implant. Tapered contour drills (+) are required only for the use of the Helix GM® implant in regions of high bone density.

6.1.2.1. Tapered Contour Drills (+)

Tapered Contour Drills are especially indicated as supplementary instruments for osteotomy when implanting Helix GM® implants in bone types I and II. There are different tapered contour drills (+) selected according to the implant diameter. The drills are used only on bone types I and II, connected to the contra-angle handpiece, with a rotation speed of approximately 800-1200 rpm. This step is intended to keep the insertion torque at a desirable level in bone types I and II.

Note: The Tapered Contour Drills have the "+" symbol to indicate that they are supplementary instruments.

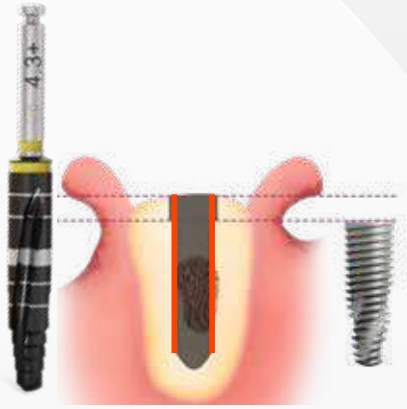
6.1.2.2. Pilot Drill

Pilot drills are employed to prepare the implant bed to widen the diameter of one twist or tapered drill to another, in the basic instrumentation procedure. For the special bone preparation, pilot drills help position the platform of the Helix® Grand Morse® implants according to the bone bed, if there is a denser cortical bone bed of 1, 2 or 3 mm below bone level. Pilot drills are generally used in this manner in bone types I and II and are indicated as optional in bone types III and IV. The maximum rotation speed used for these drills is 800 rpm for bone types III and IV and 1200 rpm for bone types I and II.

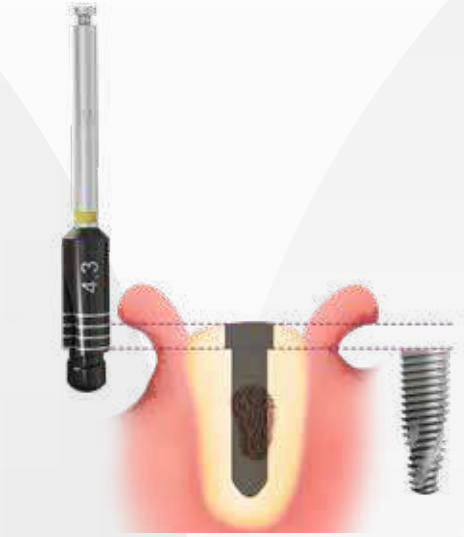
Pilot Drill for the refined implant bed preparation for the implant. The drill helps in the cervical positioning of the implant in areas of greater bone density: if at bone level, 1, 2 or 3 mm below bone level.

6.1.2.3. Example of special implant bed preparation

The following is an example of the special preparation of the implant bed for a Helix GM® implant (Ø 4.3 mm and 13 mm long) in bone type I or II, making the use of contour (+) and pilot drills necessary. The steps described follow the basic preparation of the implant bed (6.1.1.1).



Step 1 - Drilling in dense bone
Use the tapered contour (+) drill across the entire length of the planned implant.



Step 2 - GM Pilot Drill
Perform the osteotomy with the tapered drills. Depending on the level of the final positioning of the implant (bone level, 1 or 2 mm below bone level), use the pilot drill for the final positioning of the implant.

6.1.2.4. Options for drills

Neodent® drills are available in short (31 mm), standard (35 mm) or long (43 mm) formats to cater for limitations in mouth opening or for use between two teeth. In case of necessity a Drill Extension can also be used.

FIGURE 16. Length options for Grand Morse® drills (31 mm, 35 mm and 43 mm).

FIGURE 17. Drills fit inside the Neodent® Drill Extension.

The surgical procedure for implant placement can be perceived as complex, especially when performed in the posterior regions with limited visibility, or in proximity with anatomical structures such as nerve canals. The Neodent® Control System brings confidence and efficiency building trust during the surgical procedure.

Neodent® Control System is composed by:

1

Neodent® Control Stop Drills.

2

Neodent® Control Drill Stops.

3

Neodent® Control System Kit and
Neodent® Helix GM® Compact Surgical Kit

Drill Sequence with Neodent® Control System

	Initial	Ø 2.0	Ø 3.5	Ø 3.5+	Ø 3.5	Ø 3.75	Ø 3.75+	Ø 3.75	Ø 4.0	Ø 4.0+	Ø 4.0	Ø 4.3	Ø 4.3+	Ø 4.3	Ø 5.0	Ø 5.0+	Ø 5.0	Ø6.0	Ø 7.0
	103.170	103.492	103.493	103.500	103.513	103.494	103.501	103.514	103.495	103.502	103.515	103.496	103.503	103.516	103.497	103.504	103.517	103.498	103.499
Ø 3.5	✓*	✓		✓	✓														
Ø 3.75	✓*	✓	✓				✓	✓											
Ø 4.0	✓*	✓	✓			✓				✓	✓								
Ø 4.3	✓*	✓	✓			✓			✓				✓	✓					
Ø 5.0	✓*	✓	✓			✓			✓*			✓				✓	✓		

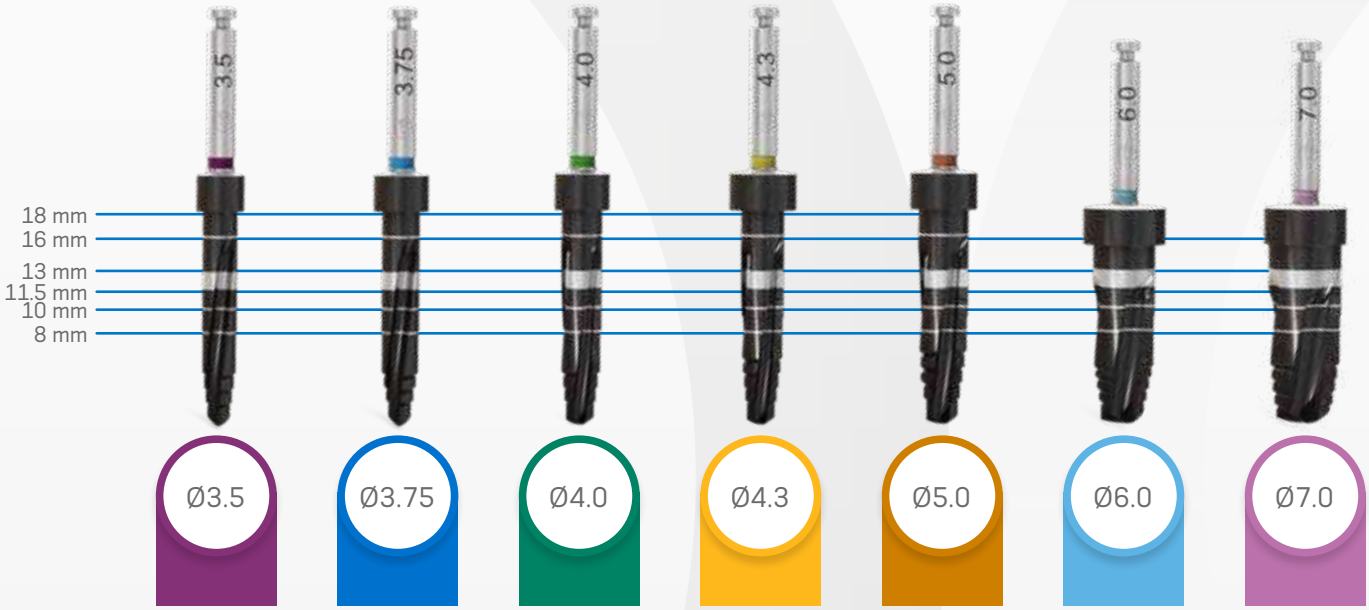
*Optional / Bone types I and II

Ø 3.5	✓*	✓	✓																
Ø 3.75	✓*	✓	✓			✓*													
Ø 4.0	✓*	✓	✓						✓*										
Ø 4.3	✓*	✓	✓			✓						✓*							
Ø 5.0	✓*	✓	✓									✓			✓*				
Ø 6.0	✓*	✓	✓			✓						✓			✓			●	
Ø 7.0	✓*	✓	✓									✓			✓			●	●*

*Optional / Bone types III and IV

Neodent® Control Stop Drills

Neodent® Tapered Control Stop Drills are available for bed preparation for Helix GM® implants in all bone types, from Ø 2.0 to Ø 7.0 mm. They were designed to be used with stops, but the laser marks on the drills also enable their use without them. The drills are connected to the contra-angle handpiece, with a rotation speed of approximately 500-800 rpm in bone types III and IV and 800-1200 rpm in bone types I and II. They have a color code according to the diameter, as shown below, and a total length of 35 mm. For diameters Ø 6.0 mm and Ø 7.0 mm, the drills are available with 32 mm in length.



Neodent® Tapered + Control Stop Drills are especially indicated as supplementary instruments for osteotomy when implanting Helix GM® in bone types I and II. This step is intended to keep the insertion torque at a desirable level in harder bones. They follow the same color code as the Neodent® Tapered Control Stop Drills and have two stripes of color, and the "+" laser-marked.

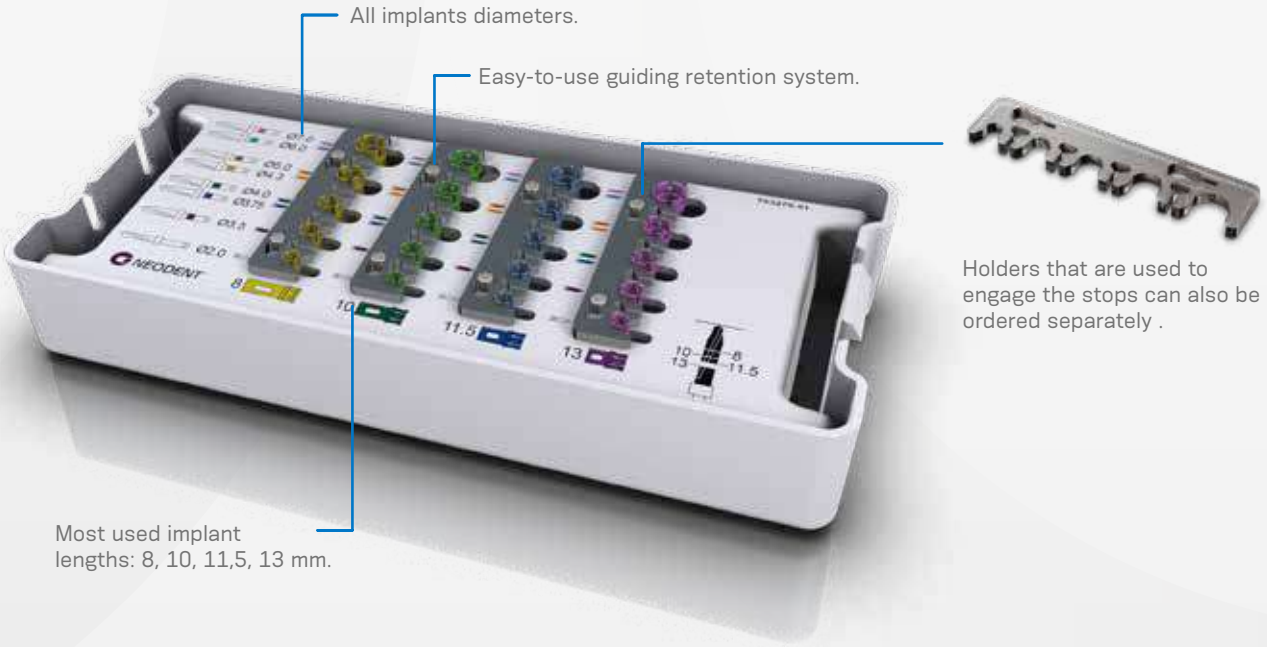
Differentiation for Tapered + drills:

Neodent® Control Drill Stops

Attached to the Stop Drills, Neodent® Control Drill Stops allow easy depth control during the osteotomy. They come in different diameters and lengths, to be selected according to the implant to be placed and related drilling sequence. Neodent® Control Drill Stops are reusable and made of titanium.

Neodent® Control Stop Kit

The kit is used for storage and sterilization procedure for Neodent® Control Drill Stops. During surgery, it allows easy engagement and disengagement of the stops on the stop drills. The holders can be purchased separately, in the case they need to be replaced.



Neodent® Control Stop Kit

To capture the stop in the Control Drill Stop Kit, follow the steps below:

1 Initially position the Tapered Control Stop Drill inside the Stop.

2 Slide it to the right.

3 Remove the set Tapered Control Stop Drill and Stop from the case.

To remove the stop in the Control Drill Stop Kit, follow the steps below:

1 Initially position the set Tapered Control Stop Drill and Stop on the right.

2 Slide to the left.

3 Pull the Drill so that it can be removed from the Stop.

6.2. Neodent® Implant Packaging

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

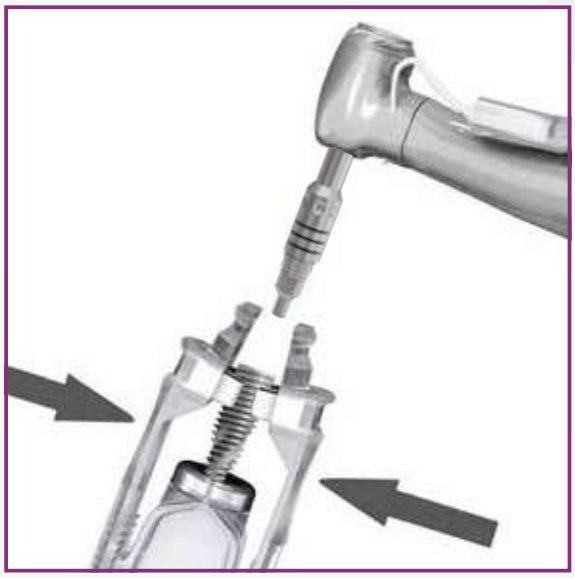
Instructions for opening the implant packaging		
Step 1	Open the blister and place the vial on a sterile surface.	
Step 2	After breaking the blister's sterile seal, hold the primary packaging (vial) in one hand and open the lid. Note: For Acqua implants, hold the bottle in the vertical position to avoid spilling the liquid.	
Step 3	Remove the holder containing the implant from the vial along with the lid. Note: For Acqua implants, hold the bottle in position.	
Step 4	Keep the support pressed and remove the lid.	
Step 5	With the support pressed, capture the implant with the contra-angle driver, moving the support until the perfect fit is found between the driver and the implant. Check that the driver is completely fitted to the implant.	
Step 6	Carry the implant to the implant bed.	

6.3. Placing of the Helix® Grand Morse® Implant

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

6.3.1. Placing of the implant with the contra-angle handpiece

The following instructions show the steps for handling the Neodent® Helix® Grand Morse® implant for placement with the contra-angle handpiece.



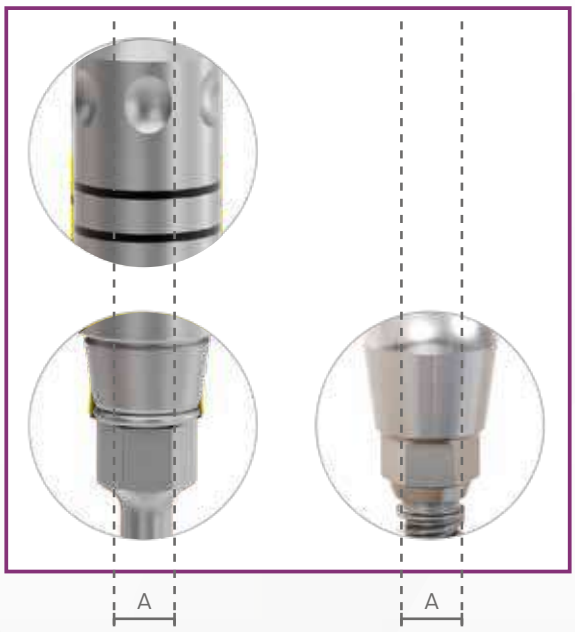
Step 1 - Adapt contra-angle implant driver.

Hold the implant through the blister, and attach the contra-angle implant driver to the Helix® Grand Morse® implant. All drivers for the contra-angle handpiece have metal tweezers in the active apex to keep the implant stable during transport. The torque wrench drivers do not have tweezers to keep the implants in position for transport.

Step 2 – Place the implant with the contra-angle handpiece in the implant bed

Place the implant to its final position with a maximum torque of 32 N.cm and speed of 30 rpm, clockwise.

Warning: Corrections in the vertical position by means of reverse rotations during surgery can lead to reduced primary or mechanical stability.



Manual placement of the implant

FIGURE 18. All instruments for contra-angle handpieces can be fitted to the Manual Implant Driver - Contra-angle.

The entire sequence described above can be repeated manually, using the Manual Implant Driver - Contra-angle instead of the contra-angle handpiece.

Step 3 – Final positioning of the implant

Neodent® Grand Morse® implants have an internal hexagon index known as Exact. Ensure that the final position of the implant shows one of the prosthetic orientation marks facing the oral cavity.

The implant drivers have six marks that line up with the six sides of the GM Exact. Position one of the driver marks towards the oral cavity to ensure the optimal positioning of the indexed abutments with GM Exact.

GM Driver for Contra-Angle Handpiece

GM Driver for Torque Wrench Long Short

Note 1: There are 3 similar markings at 1 mm intervals in the Drivers for the Contra-angle handpiece and Torque Wrench. These markings guide the depth of the final positioning of the implant in the following way: first stripe for 1 mm below bone level, second for 2 mm and third for 3 mm. Each full turn of the implant results in 1.4 mm on average for the Helix® implants.

Note 2: An important difference between the contra-angle driver and the torque wrench driver is that the contra-angle handpiece driver features metal tweezers in the apex to keep the implant in position. Torque Wrench drivers are therefore not indicated for transporting the implant from the blister to the patient's mouth.

6.3.2. Completing the positioning of the implant with the Torque Wrench

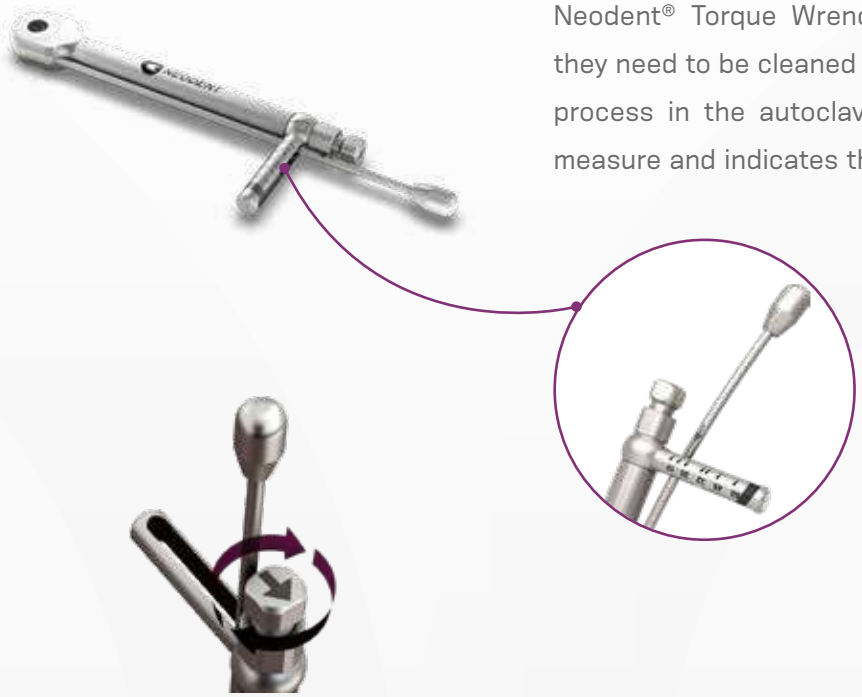
GM Short Torque Wrench Driver

GM Long Torque Wrench Driver

Remove the Grand Morse® contra-angle handpiece driver from the implant, and fit the torque wrench driver for the final positioning of the implant and torque measurement. There are two torque wrench driver options: short and long. First, use the fingers to fit the driver to the interior of the implants and then hitch the torque wrench onto the driver. The torque wrench drivers should not be used to transport the implant from one place to another because the product can fall out. Apply torque until the implant reaches its final position. All torque wrenches show torque levels a value above 60 N.cm is contraindicated.

Warning: Corrections in the vertical position by means of reverse rotations during surgery can lead to reduced primary or mechanical stability.

6.3.3. Torque Wrench



Neodent® Torque Wrenches are demountable because they need to be cleaned internally before the sterilization process in the autoclave. The thinnest rod is used to measure and indicates the torque value when handled.

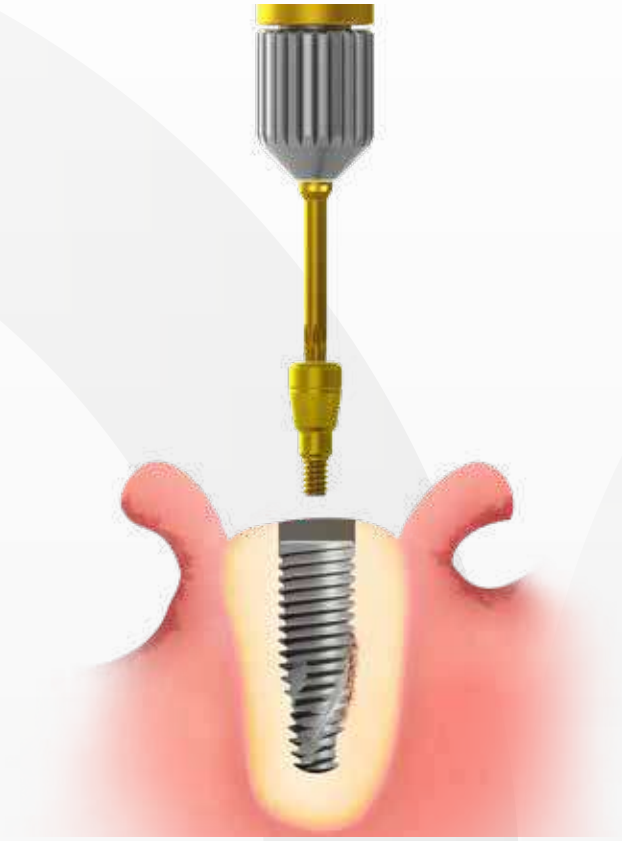
Note: Implants can be placed with these drivers fitted to a Handle Implant Driver. However, this does not allow the surgeon to apply the final torque for the implant and thus is only indicated for the initial positioning of the implant with the Handle Implant Driver.

6.4. Handling soft tissue

After the placement, the implant is covered with a cover screw or healing abutment to protect it. The surgeon may choose between submucosal or transmucosal healing and has all available options for handling soft tissue by means of a secondary healing component kit.

6.4.1. Two-step/submucosal healing

For submucosal healing (under a closed mucoperiosteal flap), the use of the GM Cover Screw is indicated. A second surgical procedure is necessary to reveal the implant and insert the desired abutment. The Neodent® system has two cover screws, which are sold separately and sterile packed, at the implant level and 2 mm (above the implant shoulder) for positioning below bone level.

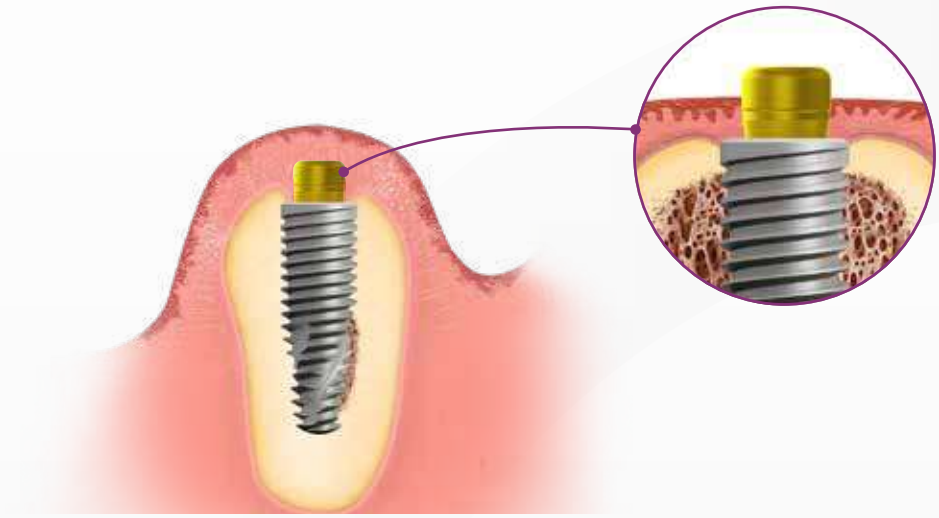


Step 1 – Inserting the cover screw

Ensure that the internal configuration is clean and free of blood residue. Capture the GM Cover Screw with the Neo Manual Screwdriver. A perfect fit ensures the transport for the implant, and manually tighten the screw.

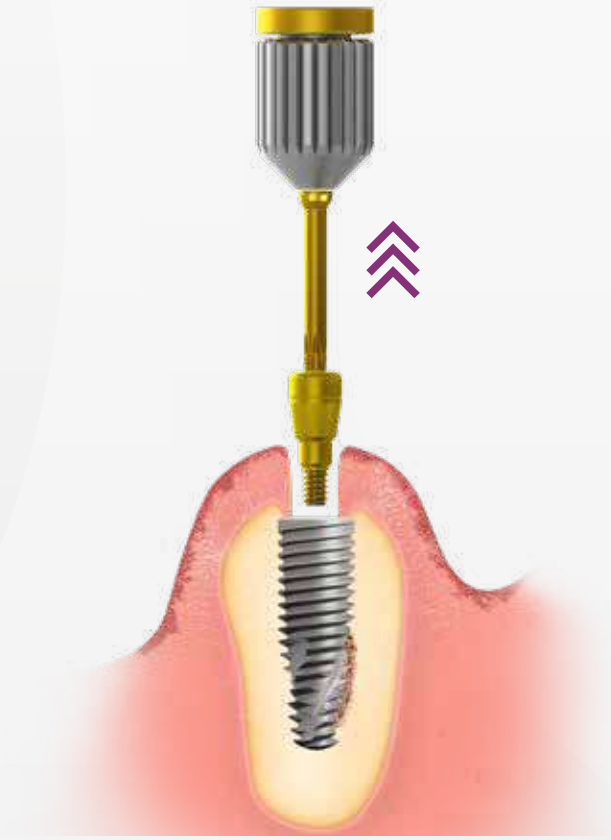
Step 2 – Close the incision

Adjust the edges of the flap and suture with tension-free stitches.



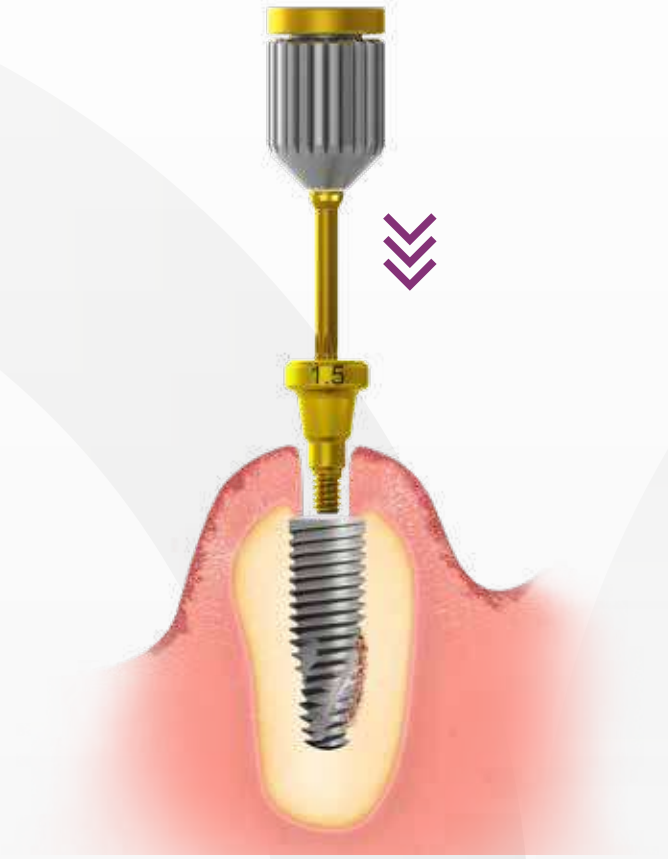
Step 3 – Regeneration period

Remove the suture after approximately 7 days or once it has lost its function and wait for the bone regeneration phase.



Step 4 – Reopening and removal of the GM Cover Screw

Second surgery – after the bone regeneration period for each type of implant and bone, locate the implant with the help of the surgical guide, X-rays or measurements, and, with the desired technique, make an incision to reach the implant, and remove the GM Cover Screw with the Neo Manual Screwdriver.



Step 5 – Insertion of healing abutment

Irrigate the implant's exposed internal connection with sterile saline solution, insert the healing abutment (or an abutment, if applicable). Adjust the soft tissue and suture around the healing abutment. Most information on healing abutments can be found in 6.5 (page 45).

Step 6 – Close the wound

Adjust the soft tissue and suture around the healing abutment.

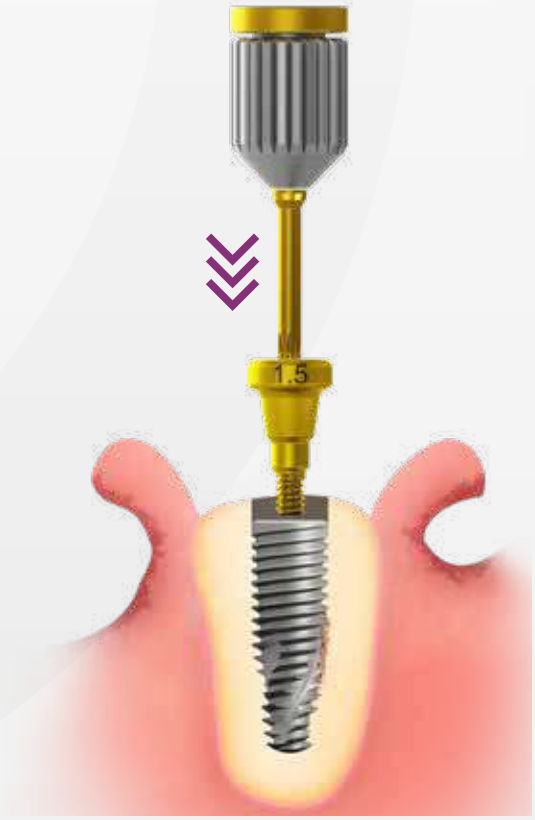
6.4.2. Transmucosal healing: one-step or immediate loading

A variety of healing abutments and abutments are available for the Neodent® Grand Morse® system, shaping the soft tissue during the transmucosal healing after placing the implant. The abutments can be used provisionally (to be replaced in the final restoration phase), or a definitive abutment can be used along with a provisional restoration. This phase can be defined as a one-step operation (if the healing abutment is chosen after the surgical procedure) or immediate loading (if a definitive abutment is selected).

The implant's final placement torque determines the protocol. Correct and physiological occlusion is also a determinant in the definition. Patients deprived of a balanced occlusion are not good candidates for the immediate loading protocol. Table 2 lists the criteria to be observed for the use of the immediate loading protocol.

Torque (N.cm)	Healing Protocol	General Characteristics
≥ 32 to ≤ 60 N.cm	Immediate loading or selection of abutment.	• Lateral mechanical load on provisional crowns is contraindicated. • Patients should present a balanced or physiological occlusion. • Periodontally compromised patients should have their condition controlled prior to treatment, especially when a component is exposed to the oral environment.

6.4.2.1 Transmucosal healing: one-step



Step 1 – Insertion of healing abutment after implant
Ensure that the internal configuration is clean and free of blood. Insert the healing abutment manually with the Neo Manual Screwdriver.

Step 2 – Close the wound

Adjust the soft tissue to the component, and suture with tension-free sutures.

6.5. Overview of the healing abutments

The Neodent® system has a variety of healing abutments, with various diameters and transmucosal heights to correspond to the definitive abutment. Choosing the correct healing abutment is therefore extremely important to ensure proper healing of soft tissue, with controlled pressure and respect for biological distances.
Basically, there are various formats of Grand Morse® healing abutments to be adapted to the surgeon's needs:

Healing Abutments

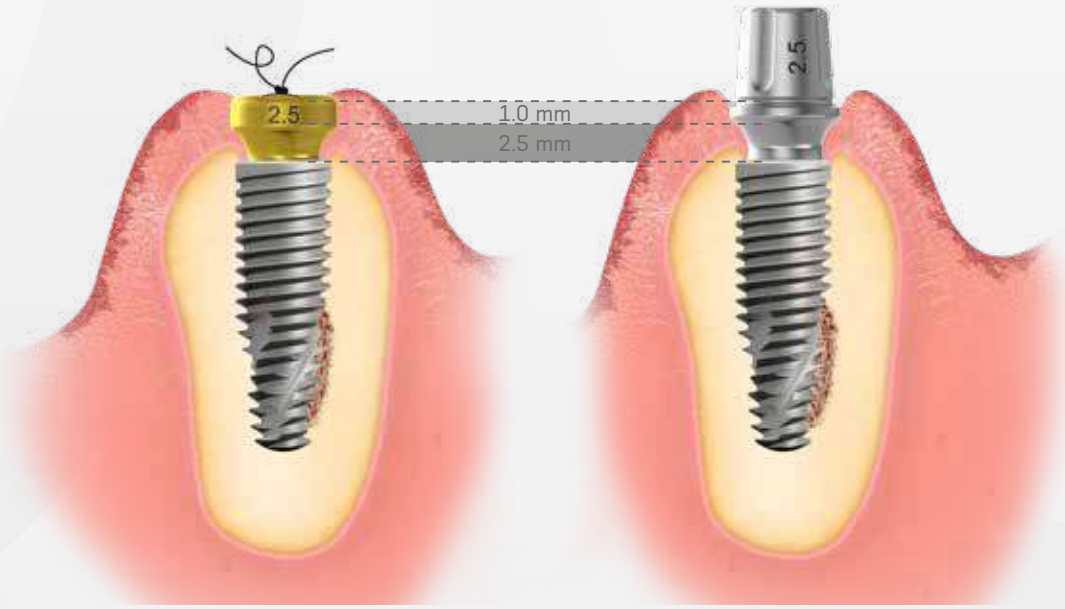
	Ø 3.3	Ø 4.5	Ø 5.5	Ø 6.5
Transmucosal height	0.8 mm	0.8 mm	-	-
	1.5 mm	1.5 mm	1.5 mm	1.5 mm
	2.5 mm	2.5 mm	2.5 mm	2.5 mm
	3.5 mm	3.5 mm	3.5 mm	3.5 mm
	4.5 mm	4.5 mm	4.5 mm	4.5 mm
	5.5 mm	5.5 mm	-	-

To select the correct prosthetic abutment and check the thickness of the remaining mucosa, there is the Grand Morse® Height Measurer, which can be fitted to the implants and serves as a reference for selecting the most suitable abutment.

GM Height Measurer

The height of the abutments varies from 0.8 to 5.5 mm and should be chosen based on the gingival height. Given that the healing abutment's internal design is identical to that of the definitive abutment, if the height of the chosen healing abutment is very high, the soft tissue will heal this way as well. If the height of the chosen definitive abutment is not compatible (lower, for example), it will exert great pressure on the soft tissue, and the patient will complain of compression pain. It is therefore advisable to choose an abutment with the same transmucosal width and height as the healing abutment. If the definitive abutment needs to be replaced, the patient should be anesthetized, and the tissue should be given time to readapt.

All Neodent® healing abutments have been strategically designed to create a proper emergence profile, adjusted to the margin of all abutments in such a way that they remain 0.9 mm under the mucosa.



6.5.1. Overview of Grand Morse® abutments and corresponding healing abutments

Grand Morse® Screw-retained Options

	Type	GM Mini Conical Abutment	GM Exact Angled Mini Conical Abutment	GM Micro Abutment	GM Exact Abutment
Abutment	Ø Available	4.8 mm	4.8 mm	3.5 mm	4.8 mm
	Gingival height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	1.5 mm 2.5 mm 3.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm
Corresponding healing abutment	Ø Available	4.5 mm	4.5 mm	3.3 mm	4.5 mm
	Gingival height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	1.5 mm 2.5 mm 3.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm

	Type	GM Titanium Base				GM Titanium Base AS			GM Titanium Base for Bridge		
Abutment	Ø Available	3.5 mm	4.5 mm	5.5 mm	6.5 mm	4.0 mm	4.5 mm	5.0 mm	3.5 mm	4.5 mm	5.5 mm
	Gingival height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm	0.8 mm 1.5 mm 2.5 mm	0.8 mm 1.5 mm 2.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm
Corresponding healing abutment	Ø Available	3.3 mm	4.5 mm	5.5 mm	6.5 mm 7.0 mm	4.0 mm	4.5 mm	5.0 mm	4.0 mm	4.5 mm	5.0 mm
	Gingival height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	1.5 mm 2.5 mm 3.5 mm 4.5 mm	1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm	0.8 mm 1.5 mm 2.5 mm	1.5 mm 2.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm	1.5 mm 2.5 mm 3.5 mm 4.5 mm

Grand Morse® Cement-retained Options

	Type	GM Universal Abutment (straight)	
Abutment	Ø Available	3.3 mm	4.5 mm
	Transmucosal height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm
Corresponding healing abutment	Ø Available	3.3 mm	4.5 mm
	Gingival height	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm	0.8 mm 1.5 mm 2.5 mm 3.5 mm 4.5 mm 5.5 mm

Note: GM Angled Universal Abutments are only available with transmucosal heights of 1.5, 2.5 and 3.5 mm.

6.5.2. Grand Morse® Customizable Healing Abutments

The Grand Morse® line also features customizable healing abutments. They are produced in titanium, with a customizable portion made of Peek. The available diameters and transmucosal heights are presented below. It is also important to notice the height of the parallel portion, which is of 1.5 mm for all options, with the exception of the 7.0 x 5.5 mm (with a 2.5 mm high parallel portion) and the 7.0 x 6.5 mm (with a 3.5 mm high parallel portion). In all cases, there is the possibility of customizing the upper and lateral portions of the product. A minimum thickness of 0.5 mm is recommended to be maintained between the screw and the lateral and upper portions.

Customizable Healing Abutments

Transmucosal height	Ø 5.5	Ø 7.0
	1.5 mm	1.5 mm
	2.5 mm	2.5 mm
	3.5 mm	3.5 mm
	4.5 mm	4.5 mm*
	5.5 mm	5.5 mm**

*parallel portion of 2.5 mm
**parallel portion of 3.5 mm

7. HEALING PHASE

The healing protocol depends on:

- The implant's final placement torque or primary stability, as measured with the Torque-indicating Ratchet Wrench.
- The Bone Type.

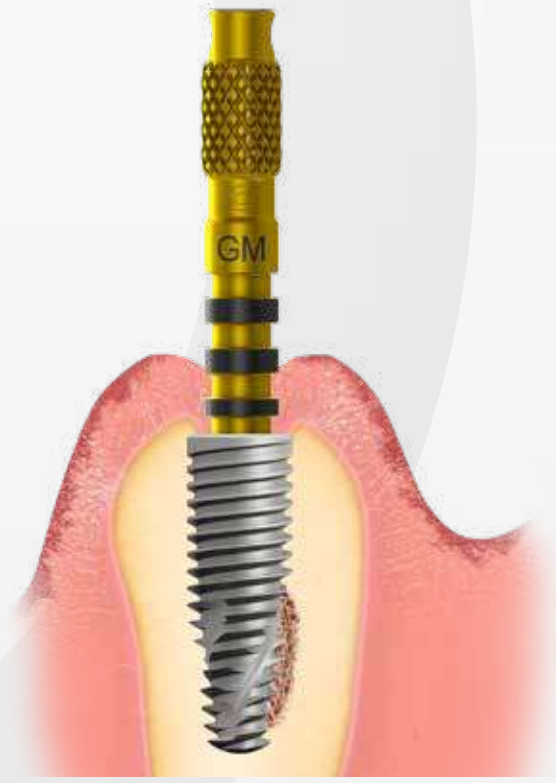
More time is needed when low torque values are reached. Immediate loading procedures may also be applied in cases of minimum placement torque of 32 N.cm.

8. GENERAL PROSTHETICS GUIDELINES

Once this stage has been reached, the definitive prosthetic abutment should be chosen for the final restoration. This step can be conducted in the healed mucosa (submucosal healing, conventional protocol) or during surgery for protocols such as one-step/transmucosal healing or immediate loading. To help with the selection of abutments, Neodent® offers the GM Height Measurer, which can also be sterilized and visualized in X-rays.

The following features should be considered:

- Single tooth or multiple tooth restoration
- Screw-retained or cement-retained restoration
- Interocclusal gap, height and width
- Gingival height (transmucosal height)
- Biological distance (distance from abutment to bone crest)
- Whether the implant angulation needs to be corrected for the abutment or whether adjacent abutments are parallel.



The GM Height Measurer helps determine the gingival height.

The positioning below bone level of implants results in a certain amount of bone over their cervical region. This tissue can collide with abutments fitted on the implant. For these situations, Neodent® provides a GM Bone Profile Drill.

9. NEODENT® KITS

Neodent® Kits are available in cassettes to help keep the instruments organized and sterile. The cassette is manufactured with a heat-resistant polymer and is indicated for frequent sterilization in an autoclave.

The Grand Morse® Compact Surgical Kit is intuitive and functional and features exclusive instruments for placing Helix GM® implants.

There is also a drill stop kit, the Grand Morse® Control Stop Compact Kit.

10. SANITATION

This product must be correctly cleaned after each use. Proceed as follows:

10.1. Manual cleaning and disinfection

Cleaning

1. Disassemble the instruments if possible (see specific disassemble instructions for each instrument, when applicable).
2. Soak the disassembled instruments for at least 1 minute in the cleaning solution (CIDEZYME®, 1.6 % v/v) so that the instruments are sufficiently covered. Pay attention that there is no contact between the instruments. Assist cleaning by carefully brushing with a soft brush. Sway movable parts several times during cleaning. If applicable, rinse all lumens of the instruments for, at least, five times using a single-use syringe (minimum volume of 10 mL).
3. Soak the disassembled instruments for 15 minutes in the cleaning solution (CIDEZYME®, 1.6% v/v) with ultrasonic treatment so that the instruments are sufficiently covered. Pay attention that there is no contact between the instruments.
4. Remove the instruments from the cleaning solution and intensively post-rinse them for, at least, 3 times (for the minimum time of 1 minute) under running water. If applicable, rinse all lumens of the instruments for, at least, five times at the beginning of the soaking time using a single-use syringe (minimum volume of 10 mL).

Disinfection

1. Soak the disassembled instruments for 12 minutes in the disinfectant solution (CIDEX® OPA - OPA Solution -, undiluted) so that the instruments are sufficiently covered. Pay attention that there is no contact between the instruments. If applicable, rinse all lumens of the instruments for, at least, five times at the beginning of the soaking time using a single-use syringe (minimum volume of 10 mL).

2. Remove the instruments from the disinfectant solution and post-rinse them according to the instructions of the manufacturer of CIDEX® OPA - OPA Solution-:

Rinsing Instructions
• Following removal of the instruments from CIDEX® OPA - OPA Solution - Solution, thoroughly rinse the medical device by immersing it completely in a large volume of water. Use sterile water unless potable water is acceptable (maximum of 10 germs/mL, maximum of 0.25 endotoxin/mL).
• Keep the device totally immersed for, at least, 1 minute.
• Manually flush all lumens with large volumes (not less than 100 mL) of rinse water.
• Remove the device and discard the rinse water. Always use fresh volumes of water for each rinse. Do not reuse the water for rinsing or any other purpose.
• Repeat the procedure for 2 additional times, concluding A TOTAL OF 3 RINSES, with large volumes of fresh water to remove CIDEX® OPA - OPA Solution - solution residues. Residues may cause serious side effects.

3. Check and pack the instruments immediately after the removal.

10.2. Automated cleaning/disinfection (WD (Washer-Disinfector))

Use neodisher® MediZym.

1. Disassemble the instruments if possible (see specific disassemble instructions for each instrument, when applicable).
2. Transfer the disassembled instruments to the WD (pay attention that the instruments are not in contact with each other).
3. Start the program.
4. Remove the instruments from the WD after the end of the program.
5. Check and pack the instruments immediately after the removal.

NOTE:

1. Pay attention to the following points during the selection of the WD:
• approved efficiency of the WD (e.g. CE marking according to EN ISO 15883 or DGHM or FDA approval/clearance/registration);
• possibility of an approved program for thermal disinfection (A0 value > 3000 or – in case of older devices - at least 5 minutes at 90 °C/194 °F; in case of dangerous chemical disinfection of disinfectant remnants on the instruments);
• use appropriate program for instruments, as well as sufficient information on rinsing in the program;
• post-rinsing only with sterile or low contaminated water (e.g. maximum of 10 germs/mL, maximum of 0.25 endotoxin/mL);
• use only filtered air (oil-free, low contamination with microorganisms and particles) for drying;
• regular maintenance and check/calibration of the WD.
2. Please do not clean any instruments using metal brushes or steel wool.
3. After cleaning and disinfection, check all instruments on corrosion, damaged surfaces, and impurities. Do not use damaged instruments. Instruments that are still contaminated must be cleaned and disinfected again.
4. Packaging: insert the cleaned and disinfected instruments on the corresponding sterilization trays, in single-use sterilization packagings (single or double packaging) and/or sterilization containers, which fulfill the following requirements:
• EN ISO/ANSI AAMI ISO 11607 (for USA: FDA clearance);
• suitable for steam sterilization;
• sufficient protection for instruments as well as for maintenance of sterilization packagings against mechanical damage;
5. After using the instruments, it is recommended to remove coarse impurities, performing the pre-treatment, before cleaning and disinfection (within a maximum deadline of 2 hours).
The pre-treatment step must be performed for both cases of cleaning and disinfection (automated and manual).
a. Disassemble the instruments if possible;
b. Rinse the instruments for, at least, 1 minute under running water (temperature <35 °C);
c. If applicable, rinse all lumens of the instruments five times per application using a single-use syringe (minimum volume of 10 mL). Sway movable parts several times during pre-treatment;
d. Remove manually all visible impurities by using a clean and soft brush (or a clean, soft, and lint-free cloth). In no case use metal brushes or steel wool;
e. Rinse again for, at least, 1 minute under running water.
6. If the cleaning/disinfection products mentioned cannot be found, make sure to use similar products to those indicated. This replacement is the owner's responsibility.
7. The drying of the parts is of utmost importance before storage and sterilization, because the accumulation of moisture on the products is harmful and may cause oxidation.

10.3. Presentation and Sterilization

For traceability, each cassette presents on its tray the laser engraving of the UDI code (Unique Device Identification). This product is reusable and supplied non-sterile, being unitarily packaged. This product must be correctly sanitized and sterilized before each use. Sterilize the products on the day before or on the day of the procedure.

WARNING: This product cannot be autoclaved in its original packaging. Please use for sterilization only the steam sterilization according to the following parameters:

	Fractionated Vacuum / Dynamic Air Removal[1]	Gravity Displacement
Sterilization Time	4 minutes	15 minutes
Sterilization Temperature[3]	132°C/270°F	132°C/270°F
Drying Time	At least 20 minutes[2]	At least 20 minutes[2]

[1] At least three vacuum steps.

[2] The effectiveness required in drying time depends directly on the parameters of sole responsibility of the user (density and load configuration, sterilizing conditions, which must be determined by the user). Nevertheless, a drying time shorter than 20 minutes cannot be applied.

NOTE: After sterilization, package the instruments at a dry and dust-free place.

11. CLINICAL CASES

11.1. Helix GM®: Immediate replacement of fractured element in esthetic region

11.1.1. Surgeon information

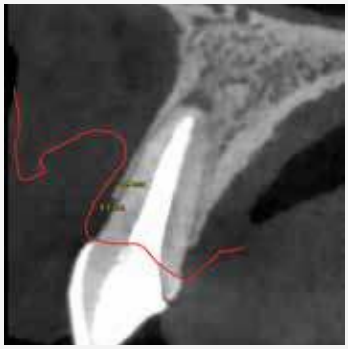
Dr. Marcelo Herrera Robayo - Ecuador

- Dentist graduated from the Central University of Ecuador
- Periodontist graduated from the San Francisco University of Quito
- Specialist in dental prosthetics
- Professor of the Department of Periodontology and Implantology at USFQ

11.1.2. Patient medical history

The patient suffered an accidental blow from her newborn son, resulting in the fracture of tooth 21, which had already undergone root canal treatment. Given the need for rehabilitation of the fractured element and the high aesthetic demand of the region, the option was to install an implant with immediate loading.

11.1.3. Planning



The planning began with a computed tomography scan, in which the sagittal section revealed a fracture extending from the cervical third to the middle third of the root. Intraoral and extraoral photographs were taken, as well as intraoral scanning and digital waxing.

Images provided by Dr. Marcelo Herrera Robayo.

11.1.4. Procedure and prosthetic description

After the administration of anesthesia, the fractured element was removed without the need for a flap. The drilling sequence followed the manufacturer's guidelines, allowing for the installation of the implant through guided surgery. A Helix GM® Acqua® 3.75 x 13 mm implant was installed, and the achieved torque was 60 N.cm. Bovine xenograft was used to fill the gap, along with a suture to secure the connective tissue graft. Immediate provisional loading was applied.

The rehabilitation was done at the implant level, and we always maintained a provisional restoration. After 3 months, we made an open tray impression directly on the implant using a customized transfer. We used a Titanium Base with a diameter of 3.5 mm, a transmucosal height of 2.5 mm, and a cementable area of 4 mm. The final restoration was made of zirconia with a buccal cutback for feldspathic porcelain.

11.1.5. Materials

Helix GM®

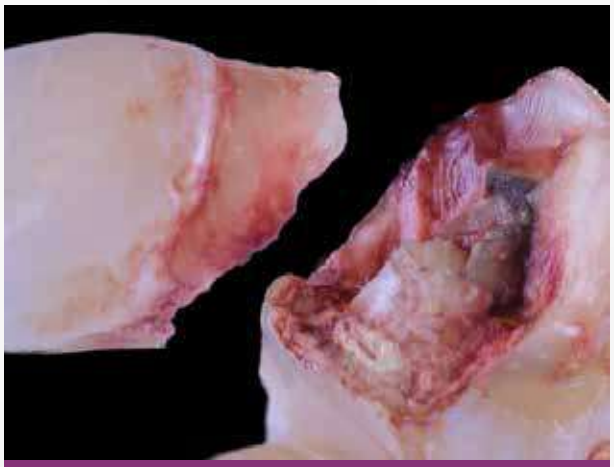
GM Exact
Titanium Base

Straumann®
Xenograft®

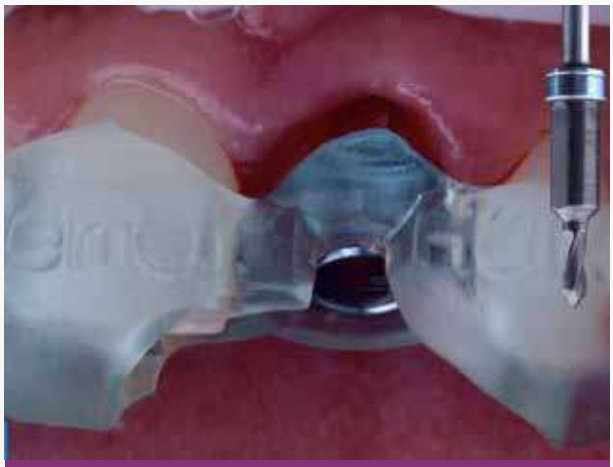
11.1.6. Step-by-step

1 Initial clinical aspect.

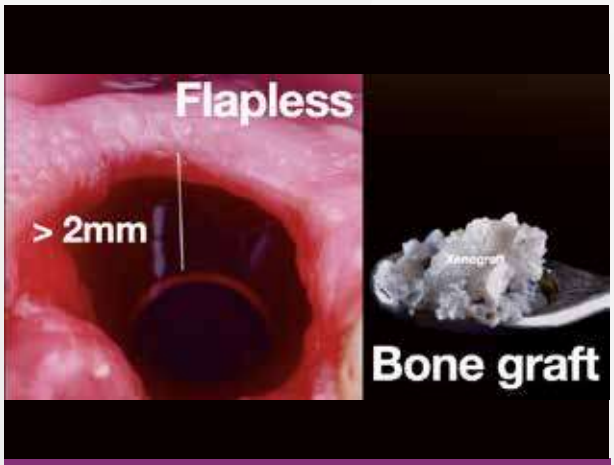
2 Initial tomographic aspect.



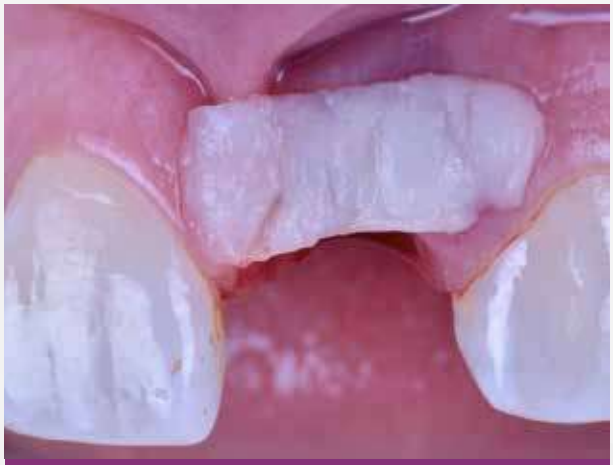
3 Clinical aspect of the fractured element



4 Intraoral aspect after fitting the surgical guide.



5 Intraoral aspect of filling the gap with bone substitute.



6 Clinical aspect of connective tissue gingival grafting.

 Images provided by Dr. Marcelo Herrera Robayo.

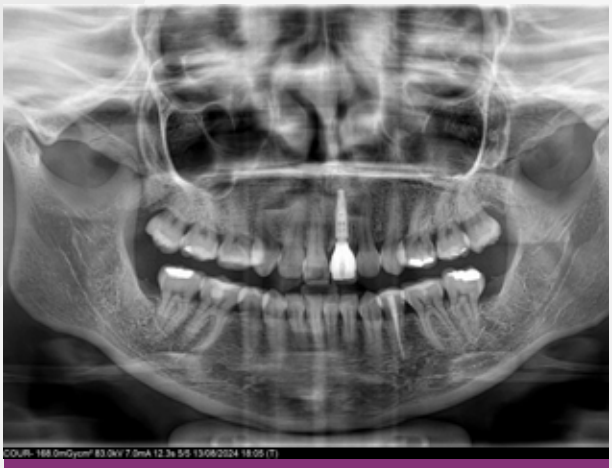
7 Clinical and radiographic aspect after the installation of the provisory prosthesis.

8 Clinical aspect three months after the surgical procedure.

9 Clinical aspect of the emergency profile 03 months after the surgical procedure.

10 Clinical aspect during the installation of the definitive prosthesis.

11 Clinical aspect after the installation of the definitive prosthesis.



12 Radiographic aspect after installation of the definitive prosthesis.

Images provided by Dr. Marcelo Herrera Robayo.

11.1.7. Case outcomes

Professional opinion of the product and procedure, focusing on the learning from the case.

First, I want to talk about the Helix® implant. It has given me the confidence to perform immediate loading, as I always achieve an adequate torque of more than 32 N.cm to place immediate provisionals. Speaking of the prosthetic part, the Titanium Base option has allowed me, even without having a scanner at that time, to send the case to the lab and complete it digitally. Additionally, it provides me with the precision of being milled and the passivity it offers when cementing a crown, making it reversible as it is cement-retained and screwable.

What were the other treatment options? Why choose this solution?

I could have used an abutment for a cement-retained prosthesis, but I prefer the idea of working in a reversible way. I see some difficulty in working digitally with prefabricated abutments. The Titanium Base gives me the ease of making the rehabilitation perfect digitally.

What were the challenges during treatment and how were they resolved?

I did not have any problems.

Tips and learning outcomes.

I have several pieces of advice, one of them is to always think about immediacy, taking advantage of all the original architecture we have. By utilizing immediacy, we can offer greater comfort to our patients and significantly reduce our time in the office.

11.2. Rehabilitation of full-arches using a 6-impant supported fixed prostheses technique.

11.2.1. Surgeon information

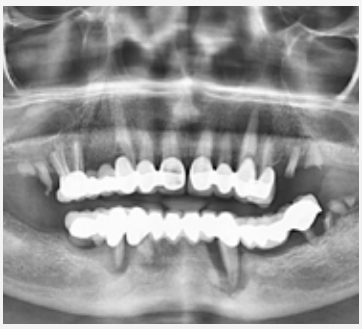
Dr. Ahmed Arnab - Syria

- PhD in Oral and Maxillofacial Surgery
- Member of the German Board of Oral Implantology

11.2.2. Patient medical history

A controlled diabetic patient sought to restore his quality of life. The upper and lower dentition exhibited grade 2 mobility with pus formation upon pressing the sites of the teeth. After clinical and radiographic examinations, significant lesions were identified, resulting in minimal bone available for implant placement.

11.2.3. Planning



We decided to proceed with a full rehabilitation by extracting the upper and lower teeth. All lesions were removed, and we opted for a 6-impant supported fixed prostheses technique due to the low quality and availability of bone.

Images provided by Dr. Ahmed Arnab

11.2.4. Procedure and prosthetic description

A total rehabilitation of the lower jaw was performed. In the lower arch, the surgery included anesthesia infiltration throughout the mandible. All lower teeth were extracted. Extensive lesions at the sites of teeth 32, 33, 43, and 44 were curetted. Soft tissue management was performed following Istvan Urban's techniques. Alveoloplasty and reshaping of the bone ridges were carried out, and Helix GM® implants were placed in the same surgical procedure.

Xenogeneic and allogeneic bone grafts were used. All grafts were covered with Jason membrane, a pericardium collagen membrane, which was secured using Healing Abutments. Fibrin sponges were placed at the mental foramen sites at the positions of teeth 45 and 35.

In the upper arch, the procedure began with extractions followed by the placement of Helix GM® implants.

The implants achieved great primary stability with a high insertion torque, exceeding 50 N.cm. The dual-zone technique and socket preservation were applied at all sites. Tooth 25 was retained for bite registration. The Mini Conical Abutments were covered with Protection Cylinders, and the procedure was completed with horizontal and interlocking sutures.

After clinical and radiographic examination, the implants were found to be osseointegrated and ready for prosthesis. Digital scanning was performed for the upper and lower implants using Mini Conical Scanbodies. The final outcome was achieved through the installation of a screw-retained zirconia prosthesis over the Mini Conical Abutments.

11.2.5. Materials

Helix GM®

GM Mini
Conical Abutment

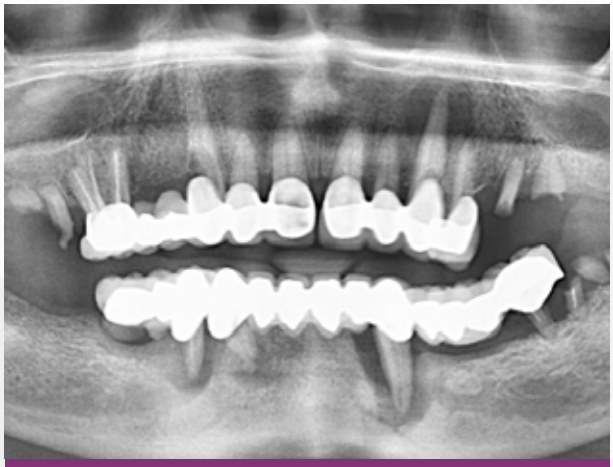
GM Exact 17º Angled Mini
Conical Abutment

Protection Cylinder for Neo
Conical Mini Abutment

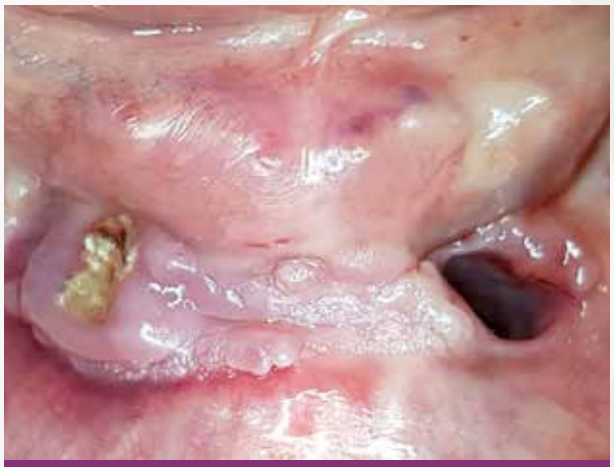
GM Healing
Abutment

Scanbody for
Mini Conical Abutment

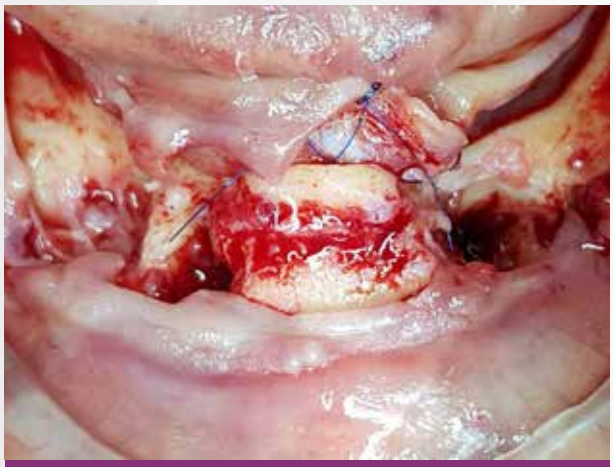
1 Initial clinical aspect.



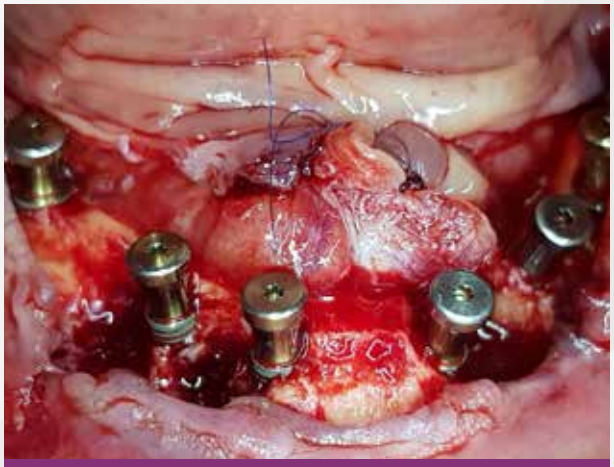
2 Initial radiographic aspect



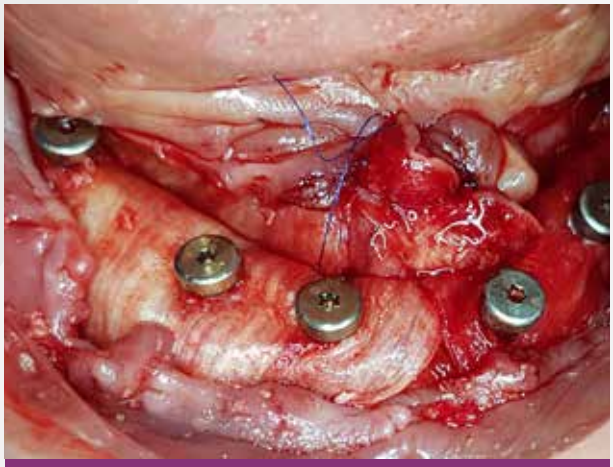
3 Clinical aspect after the removal of the lower prosthesis.



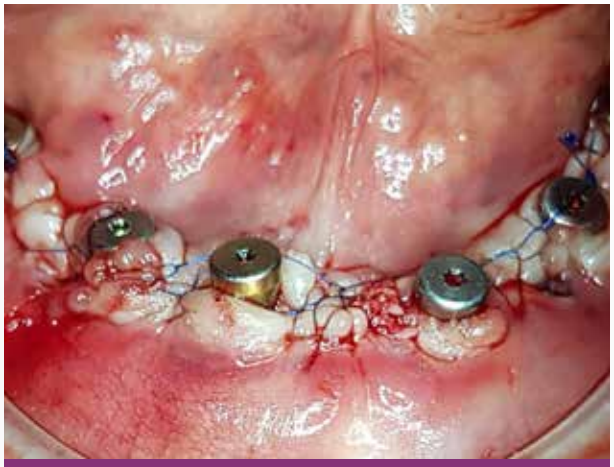
4 Clinical aspect after the extractions of the lower teeth.



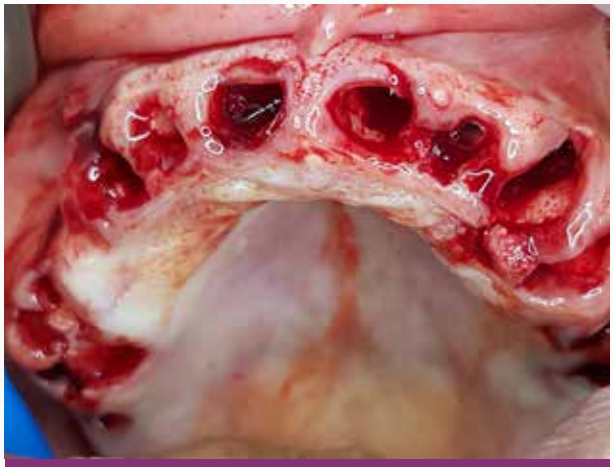
5 Lower implants installed and healing abutments placed.



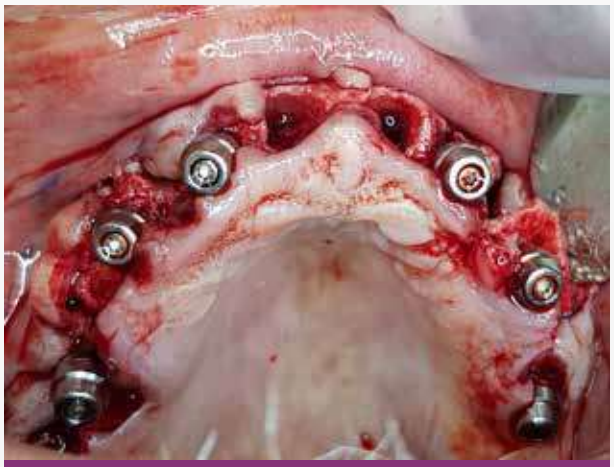
6 Bone grafts positioned and covered by Jason membrane, a pericardial collagen membrane.



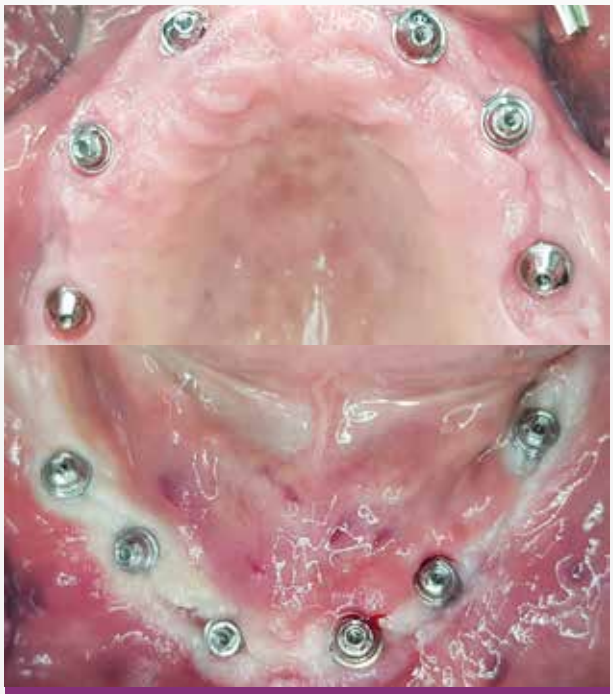
7 Clinical aspect after suture.



8 Clinical aspect of the upper arch after extractions.



9 Implants placed in the upper arch.

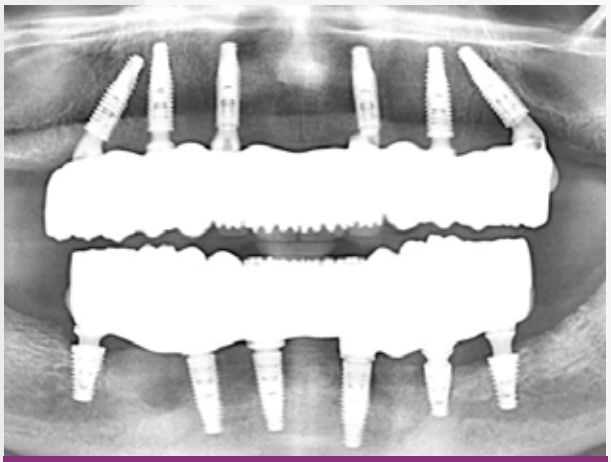


10 Intraoral aspect of the upper and lower arches after suture removal.

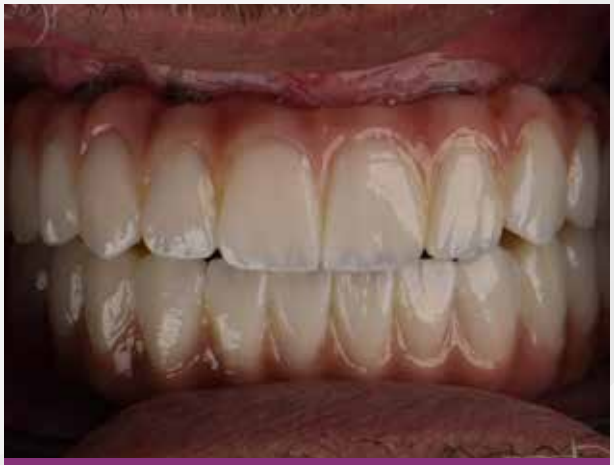
11 Completed Mock-up

12 Mock-up try-in

13 Zirconia prosthesis installed.



14 Final radiographic aspect.



15 Final clinical aspect

16 Smile with the rehabilitation installed.

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