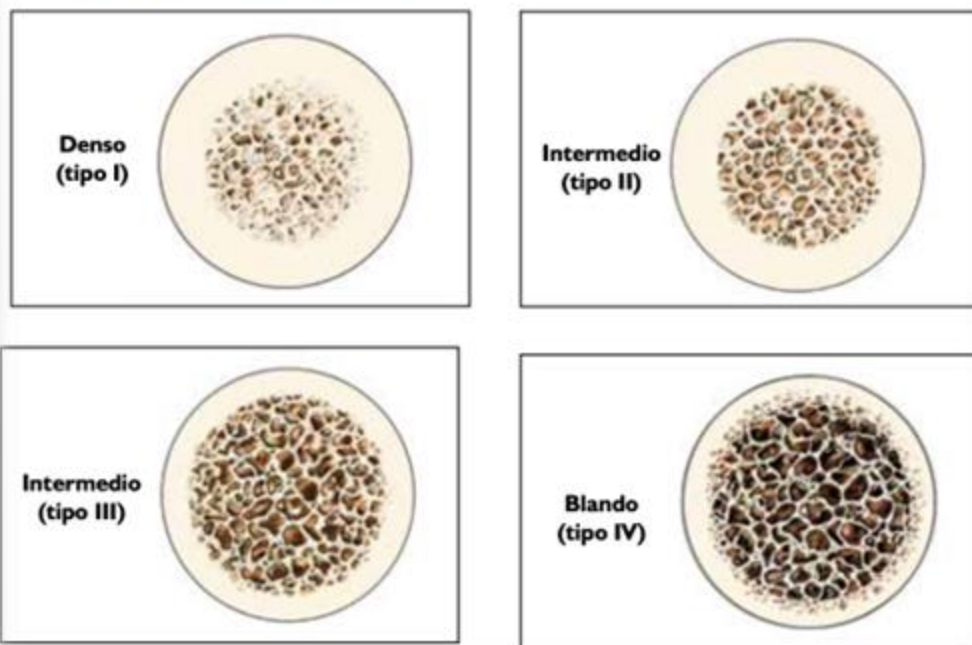




OSEODENSIFICACIÓN Y ELEVACIÓN SINUSAL



Densidad ósea



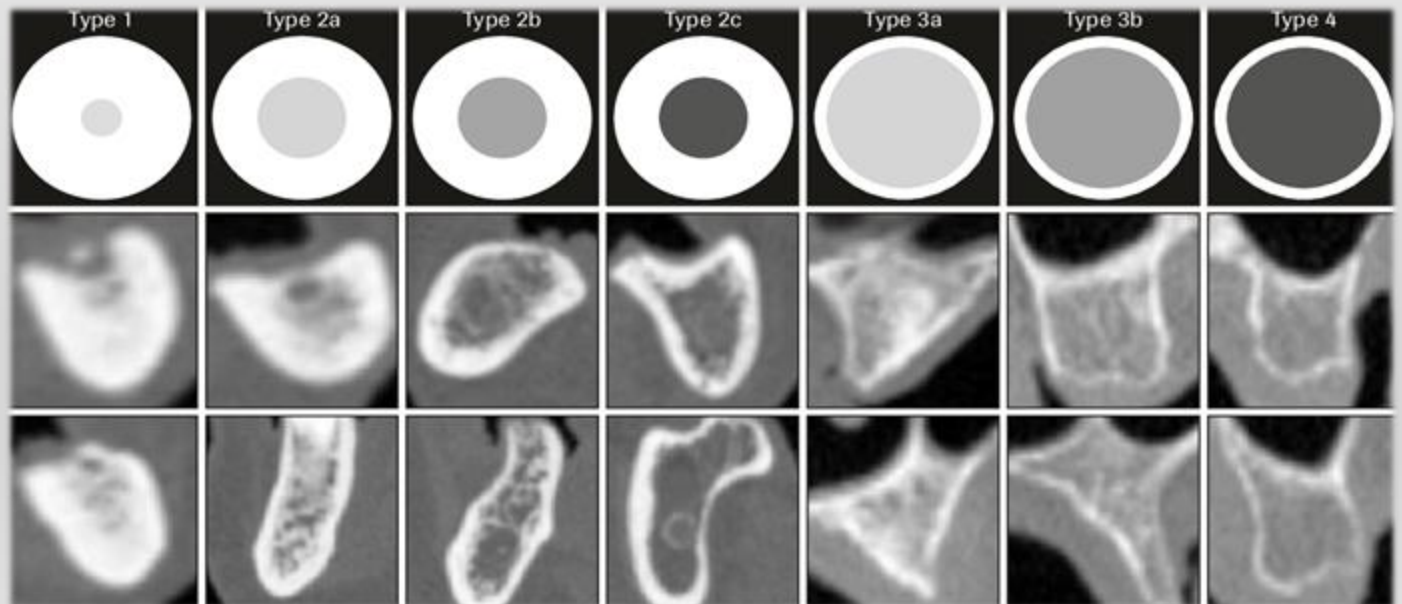
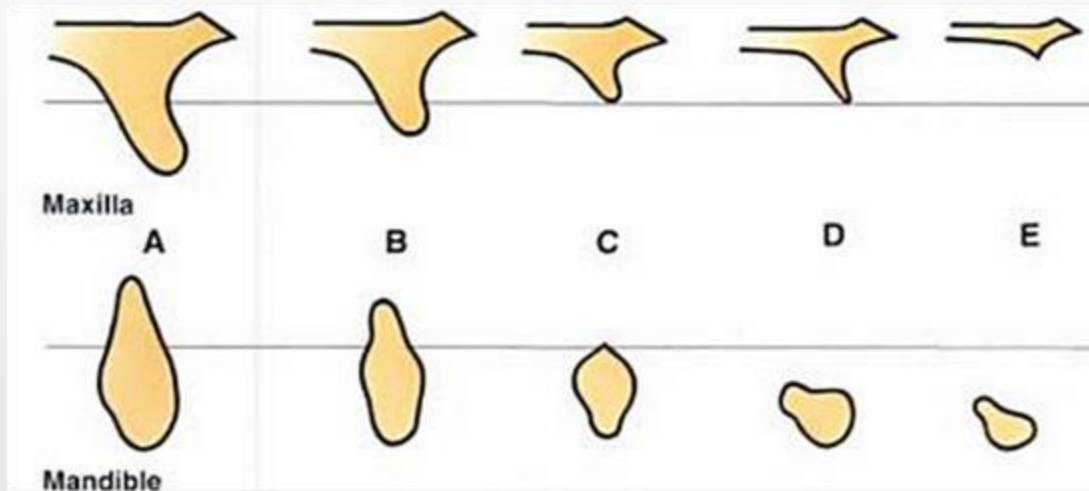
Hueso denso (tipo I): una capa cortical gruesa y un núcleo medular de muy alta densidad.

Hueso de densidad media (tipos II y III): una capa cortical de grosor moderado con un núcleo medular moderadamente denso.

Hueso blando (tipo IV): una capa cortical fina y un núcleo medular de baja densidad.

Calidad (Lekholm y Zarb)	UH (Norton y Gamble)	Región de interés
Tipo 1	>+850 UH	Mandíbula anterior
Tipo 2/3	+500 y 850 UH	Mandíbula posterior/Maxilar anterior
Tipo 4	0 – 500 UH	Maxilar posterior
Tipo 4*	<0 UH	Tuberosidad



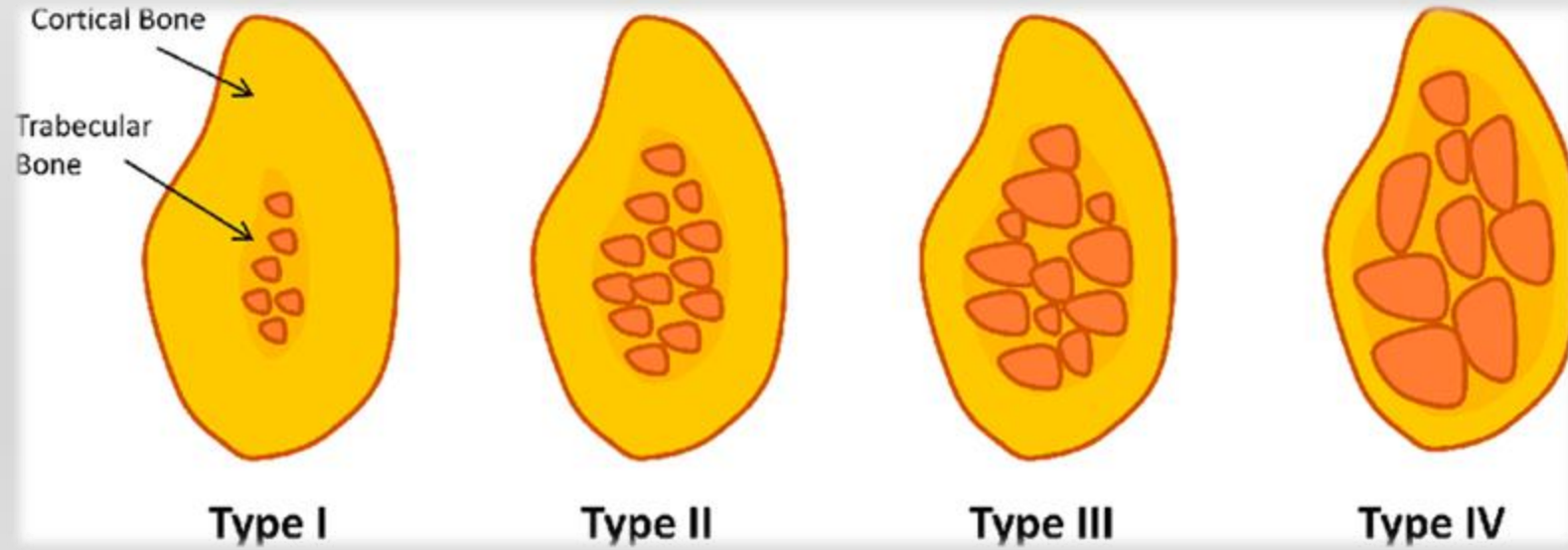
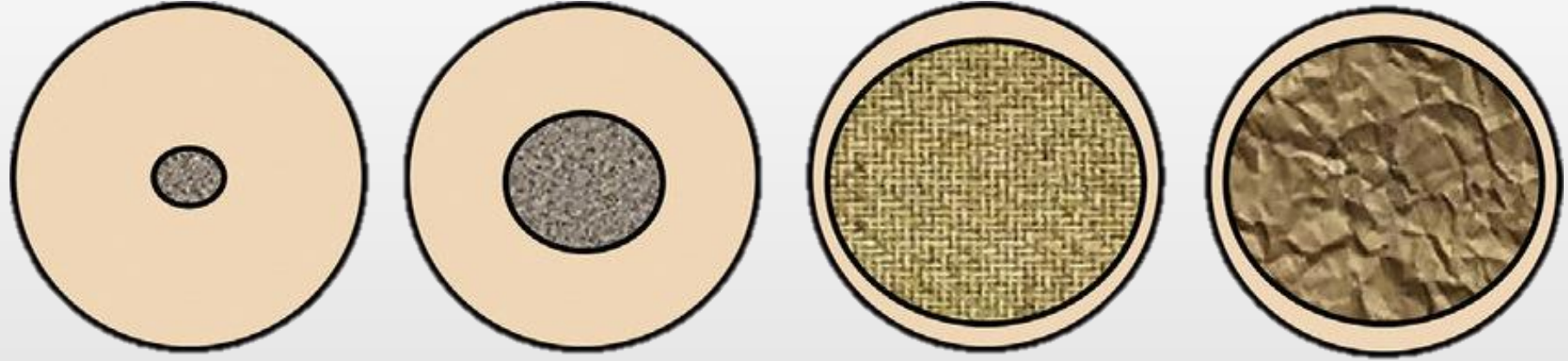


> [Int J Prosthodont. 2018 Jul/Aug;31\(4\):342-345. doi: 10.11607/ijp.5714.](#)

Revised, Computed Tomography-Based Lekholm and Zarb Jawbone Quality Classification

Asma'a A Al-Ekrish, Gerlq Widmann, Sara A Alfadda





MANEJO CLÍNICO DE LA DENSIDAD ÓSEA



OSEODENSIFICACIÓN CON FRESAS DENSAS[®]



Contraindicaciones

1. La oseodensificación no funciona en hueso cortical. En (Tipo I/hueso denso); utilizar las fresas Densah en modo Corte (sentido horario) e inverso (sentido antihorario) para reinjertar. (Densificar-Preservar) después del protocolo de corte.
2. La cirugía guiada tradicional puede presentar un riesgo mayor de fallo en el implante debido a su limitación para permitir la técnica de rebote necesaria y la irrigación adecuada.
3. Evite el xenoinjerto densificador.

CIÓN
del hueso

Autoinjerto por compactación / Condensación

Mantener la masa ósea produce un BIC más alto

Mejora la densidad ósea

Acelera la consolidación ósea

Aumenta la tensión residual

Mejora la actividad osteogénica a través de la mecanobiología

Aumenta la estabilidad del implante

Percepción del torque más alta y reducción del ISQ del micromovimiento



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

www.elsevier.com/locate/jmbbm



in implant dentistry

Varishma S Talreja, Mahesh Mundathaje

BMC Oral Health

Research Paper

Frizzera et al. *BMC Oral Health* (2022) 22:233
<https://doi.org/10.1186/s12903-022-02242-x>

Biomechanical and histologic basis of osseodensification drilling for endosteal implant placement in low density bone. An experimental study in sheep

RESEARCH ARTICLE

Open Access

Effect of osseodensification on the increase in ridge thickness and the prevention of buccal peri-implant defects: an in vitro randomized



Alveolar Ridge
of Osseodensification

CASE STUDY

Osseodensification facilitates ridge expansion with enhanced implant stability in the maxilla: part II case report with 2-year follow-up

Drs. Ann Marie Hofbauer and Salah Huwais offer another case study using a novel biomechanical site preparation technique

CASE REPORT

Osseodensified Crestal Sinus Window: An Alternative Procedure to

Nilesh Salgar, DDS

A novel minimally invasive technique, osseodensification, is proposed to facilitate maxillary sinus bone. Osseodensified crestal sinus window overcomes the previous limitations of traditional crestal approaches with a residual bone height (RBH) of ≤ 1.5 mm as well as vertical height of augmentation (>10 mm). Three patients, healthy and difficult clinical situations requiring sinus augmentation and having a maximum of 1.5 mm RBH (0.4 mm procedure. Edentulous sections were large (entire posterior sextant, with and without sinus septa), a maxillary molar site). All healing was rapid and uneventful with no instances of sinus membrane perforation. The vertical increase in sinus bone height ranged from 10.3 mm to 13.6 mm. The increase in bone height with lateral window procedures. The osseodensified crestal sinus window technique may be thus be a procedure for the lateral sinus window technique for maxillary sinus bone augmentation.

*Corresponding author.
E-mail address: pc92@nyu.edu (P.G. Coelho).

<http://dx.doi.org/10.1016/j.jmbbm.2016.06.007>
1751-6161/© 2016 Elsevier Ltd. All rights reserved.

contact (BIC) for both osseodensification techniques ($p < 0.05$). There was no statistical difference in BIC as a function of bone-area-fraction occupancy (BAFO) as a function of time but there were higher levels of BAFO for parallel than conical sites after surgery, new bone formation along with remodeling of bone chips in proximity with the implants were seldom observed.

Keywords: Osseodensification, Bone augmentation, Prevention, Dental implants, Alveolar ridge expansion

*Correspondence: faustofrizzera@yahoo.com.br

¹FAESA University Center, Vitória, Brazil
Full list of author information is available at the end of the article



© The Author(s) 2022. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Frizzera¹, Bruna Ghiraldini⁵, Fábio Bezerra⁶ and

the buccal bone defects in areas of limited ridge expansion, preventing buccal bone defects in these situations. The increase in alveolar ridge thickness and the

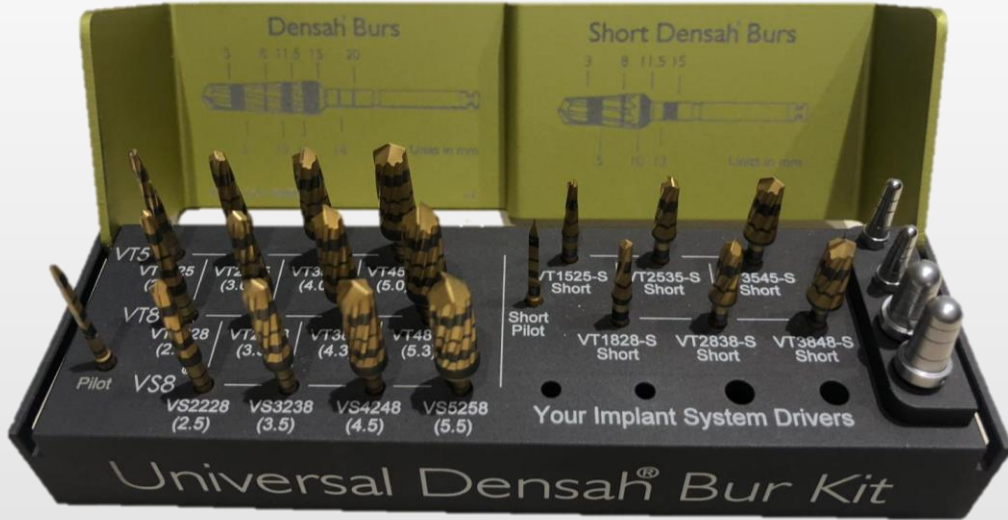
selected for use in an experimental randomized controlled trial. Conventional drilling with cutting burs (CTL, n = 10) and osseodensification (OD, n = 10) were performed. After preparation, 20 implants (4.5 x 10 mm) were placed. Clinical and photographic analysis evaluated the implants. STL files to analyze the increase in ridge thickness in the buccal and lingual bone walls followed. The height of the buccal bone defect was measured. The implant insertion torque, and linear buccal ridge expansion were measured. Non-parametric evaluations were carried out.

implants in the baseline ridge thickness. OD prevented the buccal and lingual bone defect width, in

implantation and implant placement was significantly different. Ridge thickness through expansion and reduced





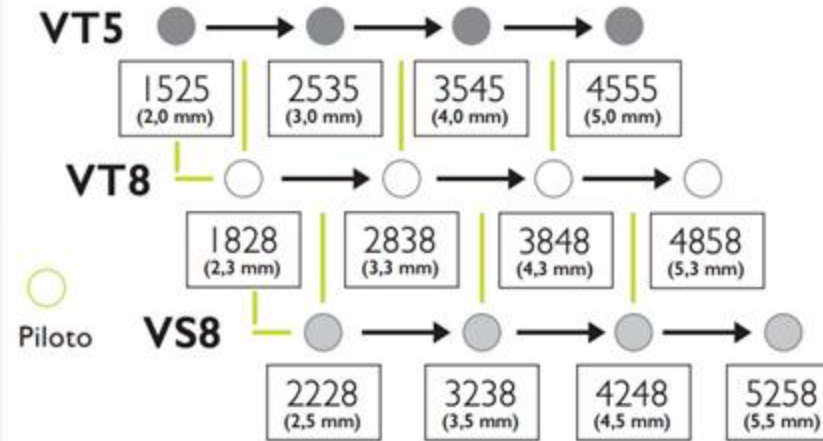
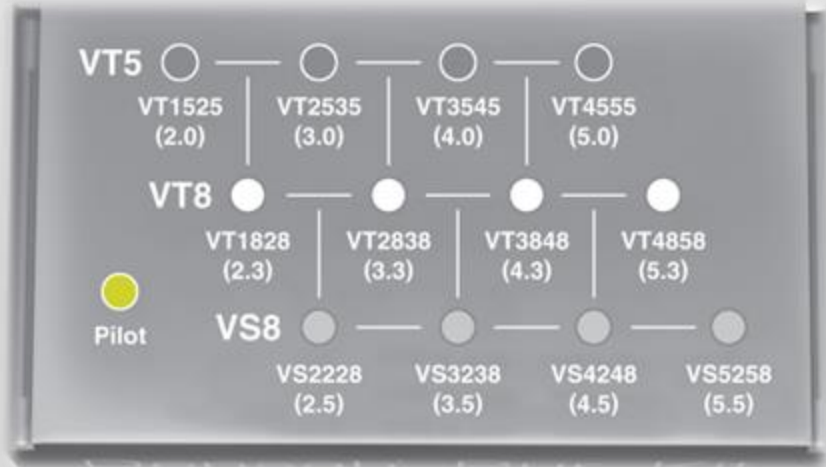
PROTOSCOLOS DE FRESADO



Fresas VT5			
VT1525	VT2535	VT3545	VT4555
			
(2,0 mm)	(3,0 mm)	(4,0 mm)	(5,0 mm)
Diámetro promedio			

Fresas VT8			
VT1828	VT2838	VT3848	VT4858
			
(2,3 mm)	(3,3 mm)	(4,3 mm)	(5,3 mm)
Diámetro promedio			

Fresas VS8			
VS2228	VS3238	VS4248	VS5258
			
(2,5 mm)	(3,5 mm)	(4,5 mm)	(5,5 mm)
Diámetro promedio			

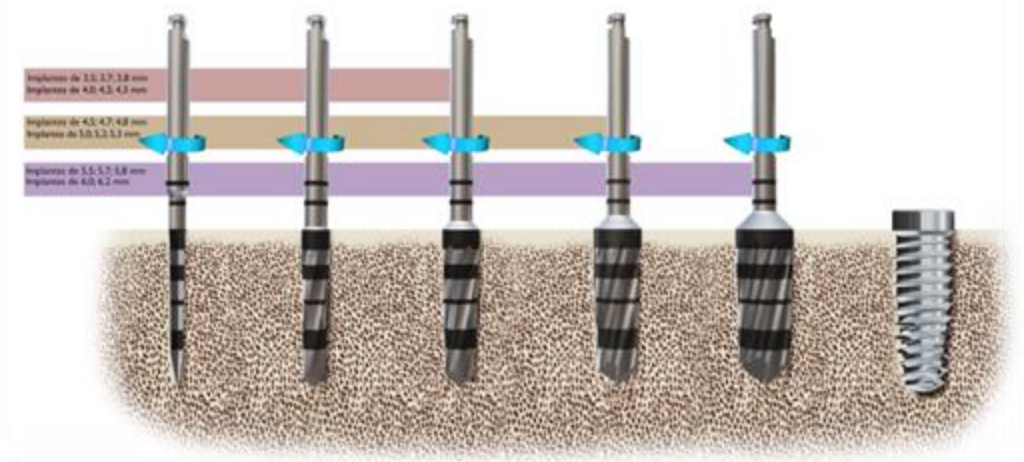


| Pasos de preparación sugeridos para una osteotomía en hueso duro
 → Pasos de preparación sugeridos para una osteotomía en hueso blando



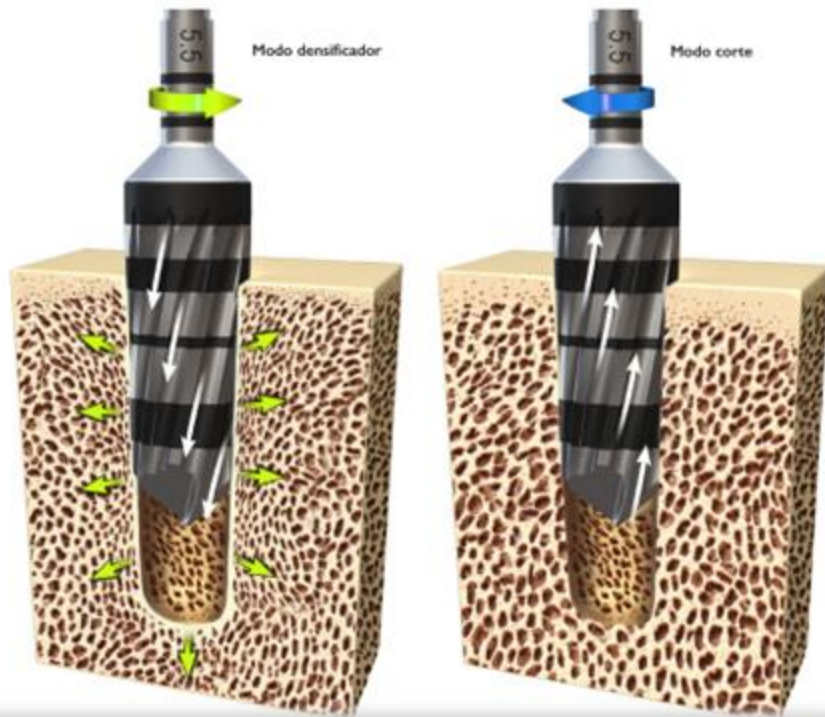
I. Uso del modo Corte en la mandíbula en hueso "Tipo I" y abundante hueso "Tipo II" con trabécula densa.

Sentido horario



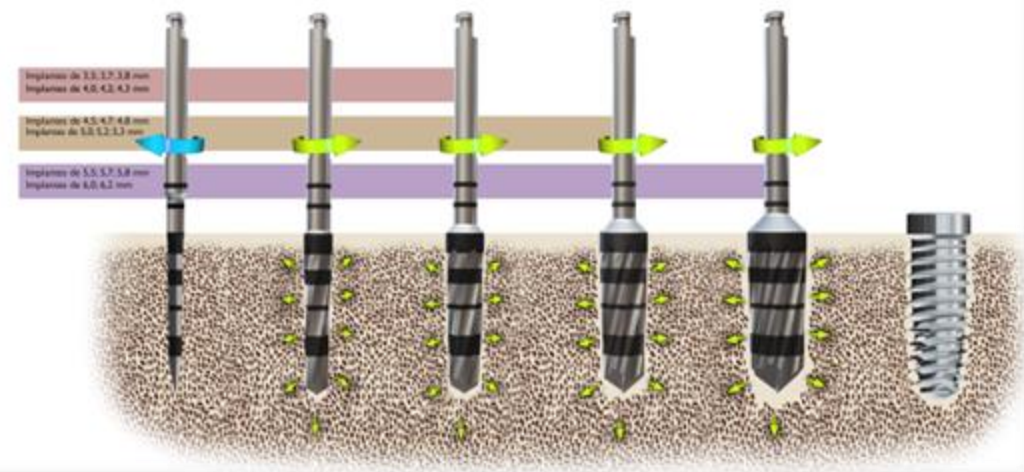
Sentido antihorario no cortante

Sentido horario
Dirección cortante



II. Modo densificador

Sentido antihorario



Densifying Mode CCW (800-1500) RPMs / Cutting Mode CW (800-1500) RPMs																	
Zimmer Biomet		Tapered Screw-Vent Implant - Model TSV															
		Soft Bone							Hard Bone (Mandible)								
		In densifying mode make sure your osteotomy is 1.0 mm deeper than the actual implant final length. In extreme hard bone, utilize DAC (Densify After Cut) Protocol. Find protocol in IFU.															
Geometry	Major Ø	Minor Ø	Pilot	Bur 1	Bur 2	Bur 3	Bur 4	Densah® Bur Block Display	Pilot	Bur 1	Bur 2	Bur 3	Bur 4	Bur 5	Bur 6	Bur 7	Densah® Bur Block Display
Taper	3.7	3.1	Pilot	VT1525 (2.0)	VT2535* (3.0)	—	—		Pilot	VT1525 (2.0)	VT2535 (3.0)	VT2838* (3.3)	—	—	—	—	
Taper	4.1	3.5	Pilot	VT1828 (2.3)	VT2838* (3.3)	—	—		Pilot	VT1828 (2.3)	VT2838 (3.3)	VS3238* (3.5)	—	—	—	—	
Taper	4.7	3.9	Pilot	VT1525 (2.0)	VT2535 (3.0)	VT3545* (4.0)	—		Pilot	VT1525 (2.0)	VT2535 (3.0)	VT2838 (3.3)	VT3545 (4.0)	VT3848* (4.3)	—	—	
Taper	6.0	5.2	Pilot	VT1828 (2.3)	VT2838 (3.3)	VT3848 (4.3)	VT4858* (5.3)		Pilot	VT1828 (2.3)	VT2838 (3.3)	VT3545 (4.0)	VT3848 (4.3)	VT4555 (5.0)	VT4858 (5.3)	VS5258* (5.5)	

*Denotes implant placement.

* Clinician judgement and experience should be applied in conjunction with this suggestive Implant System Drilling Protocol

* Clinician must follow their implant systems recommended insertion torque guidelines.

Hueso blando trabecular — Implantes cónicos

Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	
3,5; 3,7; 3,8	Piloto	VT 1525 (2.0)	VT 2535* (3.0)	—	—	
4,0; 4,2; 4,3	Piloto	VT 1828 (2.3)	VT 2838* (3.3)	—	—	
4,5; 4,7; 4,8	Piloto	VT 1525 (2.0)	VT 2535 (3.0)	VT 3545* (4.0)	—	
5,0; 5,2; 5,3	Piloto	VT 1828 (2.3)	VT 2838 (3.3)	VT 3848* (4.3)	—	
5,5; 5,7; 5,8	Piloto	VT 1525 (2.0)	VT 2535 (3.0)	VT 3545 (4.0)	VT 4555* (5.0)	
6,0; 6,2	Piloto	VT 1828 (2.3)	VT 2838 (3.3)	VT 3848 (4.3)	VT 4858* (5.3)	

*Indica la colocación del implante.

Continúa en la siguiente página

Hueso duro trabecular — Implantes cónicos

Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	Fresa 5	Fresa 6	Fresa 7	
3,5; 3,8	Piloto	VT 1525 (2.0)	VT 1828 (2.3)	VT 2535* (3.0)	—	—	—	—	
4,0; 4,2; 4,3	Piloto	VT 1525 (2.0)	VT 1828 (2.3)	VT 2535 (3.0)	VT 2838 (3.3)	VS 3238* (3.5)	—	—	
4,5; 4,7; 4,8	Piloto	VT 1525 (2.0)	VT 2535 (3.0)	VT 2838 (3.3)	VT 3545* (4.0)	—	—	—	
5,0; 5,2; 5,3	Piloto	VT 1828 (2.3)	VT 2535 (3.0)	VT 2838 (3.3)	VT 3545 (4.0)	VT 3848 (4.3)	VS 4248* (4.5)	—	
5,5; 5,7; 5,8	Piloto	VT 1525 (2.0)	VT 2535 (3.0)	VT 2838 (3.3)	VT 3545 (4.0)	VT 3848 (4.3)	VT 4555* (5.0)	—	
6,0; 6,2	Piloto	VT 1828 (2.3)	VT 2838 (3.3)	VT 3545 (4.0)	VT 3848 (4.3)	VT 4555 (5.0)	VT 4858 (5.3)	VS 5258* (5.5)	

*Indica la colocación del implante.

Continúa en la siguiente página

Hueso blando trabecular — Implantes rectos

Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	Fresa 5
3,0	Piloto	VT 1828 (2,3)	VS 2228* (2,5)	—	—	—
4,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VS 3238* (3,5)	—	—
5,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3848 (4,3)	VS 4248* (4,5)	—
6,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3848 (4,3)	VT 4858 (5,3)	VS 5258* (5,5)



*Indica la colocación del implante.

Continúa en la siguiente página

Hueso duro trabecular — Implantes rectos

Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	Fresa 5	Fresa 6	Fresa 7
3,0	Piloto	VT 1525 (2,0)	VT 1828 (2,3)	VS 2228* (2,5)	—	—	—	—
4,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VS 3238* (3,5)	—	—	—	—
5,0	Piloto	VT 1828 (2,3)	VT 2535 (3,0)	VT 2838 (3,3)	VT 3545 (4,0)	VT 3848 (4,3)	VS 4248* (4,5)	—
6,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3545 (4,0)	VT 3848 (4,3)	VT 4555 (5,0)	VT 4858 (5,3)	VS 5258* (5,5)



*Indica la colocación del implante.

PRÁCTICAS



PARTE I:



Zimmer Biomet			Tapered Screw-Vent Implant - Model TSV					
			Soft Bone					
Geometry	Major Ø	Minor Ø	Pilot	Bur 1	Bur 2	Bur 3	Bur 4	Densah® Bur Block Display
Taper	3.7	3.1	Pilot	VT1525 (2.0)	VT2535* (3.0)	—	—	
Taper	4.1	3.5	Pilot	VT1828 (2.3)	VT2838* (3.3)	—	—	
Taper	4.7	3.9	Pilot	VT1525 (2.0)	VT2535 (3.0)	VT3545* (4.0)	—	
Taper	6.0	5.2	Pilot	VT1828 (2.3)	VT2838 (3.3)	VT3848 (4.3)	VT4858* (5.3)	

Hueso blando trabecular — Implantes rectos

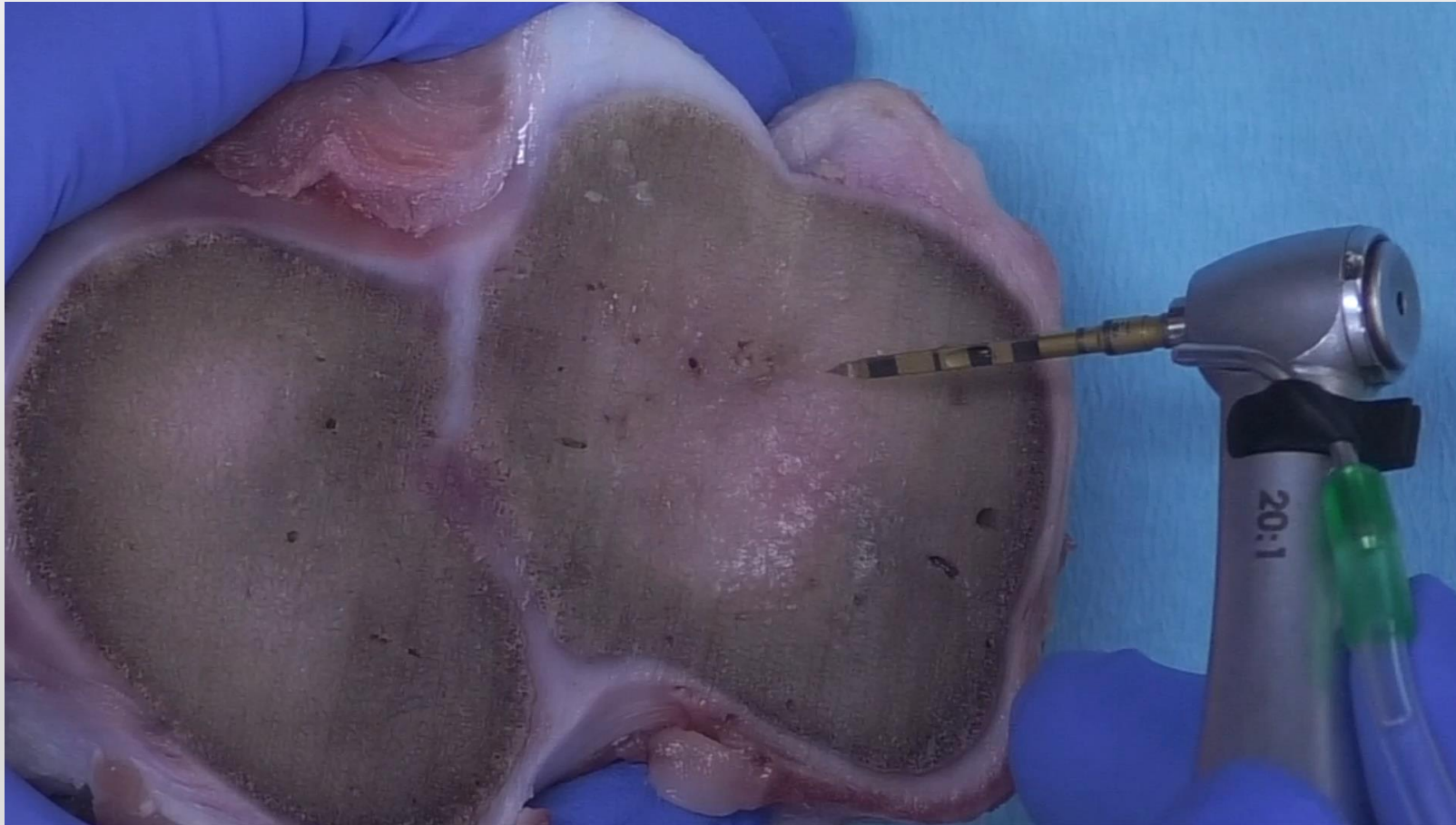
Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	Fresa 5	
3,0	Piloto	VT 1828 (2,3)	VS 2228* (2,5)	—	—	—	
4,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VS 3238* (3,5)	—	—	
5,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3848 (4,3)	VS 4248* (4,5)	—	
6,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3848 (4,3)	VT 4858 (5,3)	VS 5258* (5,5)	

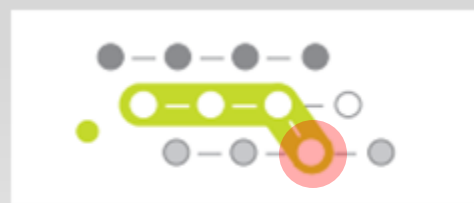


Tibia:

Fresado hueso blando

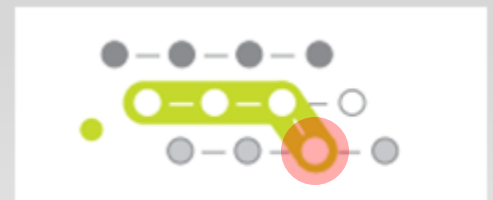
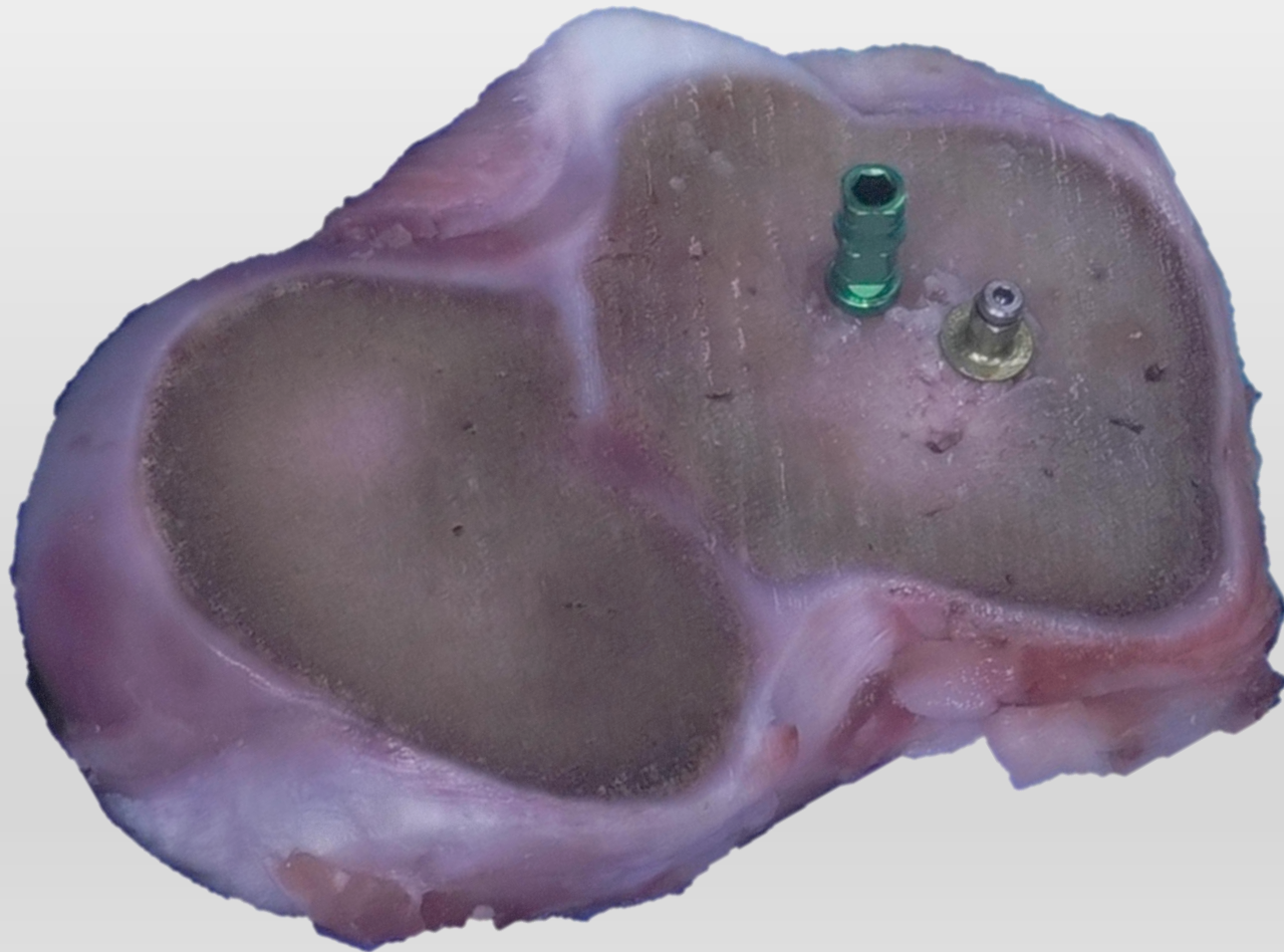








Protocolo de fresado hueso blando



PARTE II:



Hard Bone (Mandible)								
In densifying mode make sure your osteotomy is 1.0 mm deeper than the actual implant final length. In extreme hard bone, utilize DAC (Densify After Cut) Protocol. Find protocol in IFU.								
Pilot	Bur 1	Bur 2	Bur 3	Bur 4	Bur 5	Bur 6	Bur 7	Densah® Bur Block Display
Pilot	VT1525 (2.0)	VT2535 (3.0)	VT2838* (3.3)	—	—	—	—	
Pilot	VT1828 (2.3)	VT2838 (3.3)	VS3238* (3.5)	—	—	—	—	
Pilot	VT1525 (2.0)	VT2535 (3.0)	VT2838 (3.3)	VT3545 (4.0)	VT3848* (4.3)	—	—	
Pilot	VT1828 (2.3)	VT2838 (3.3)	VT3545 (4.0)	VT3848 (4.3)	VT4555 (5.0)	VT4858 (5.3)	VS5258* (5.5)	

Hueso duro trabecular — Implantes rectos

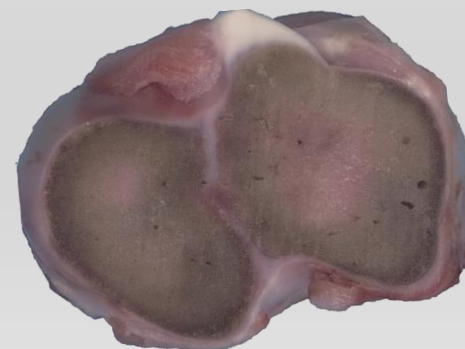
Diámetro del implante		Fresa 1	Fresa 2	Fresa 3	Fresa 4	Fresa 5	Fresa 6	Fresa 7
3,0	Piloto	VT 1525 (2,0)	VT 1828 (2,3)	VS 2228* (2,5)	—	—	—	—
4,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VS 3238* (3,5)	—	—	—	—
5,0	Piloto	VT 1828 (2,3)	VT 2535 (3,0)	VT 2838 (3,3)	VT 3545 (4,0)	VT 3848 (4,3)	VS 4248* (4,5)	—
6,0	Piloto	VT 1828 (2,3)	VT 2838 (3,3)	VT 3545 (4,0)	VT 3848 (4,3)	VT 4555 (5,0)	VT 4858 (5,3)	VS 5258* (5,5)

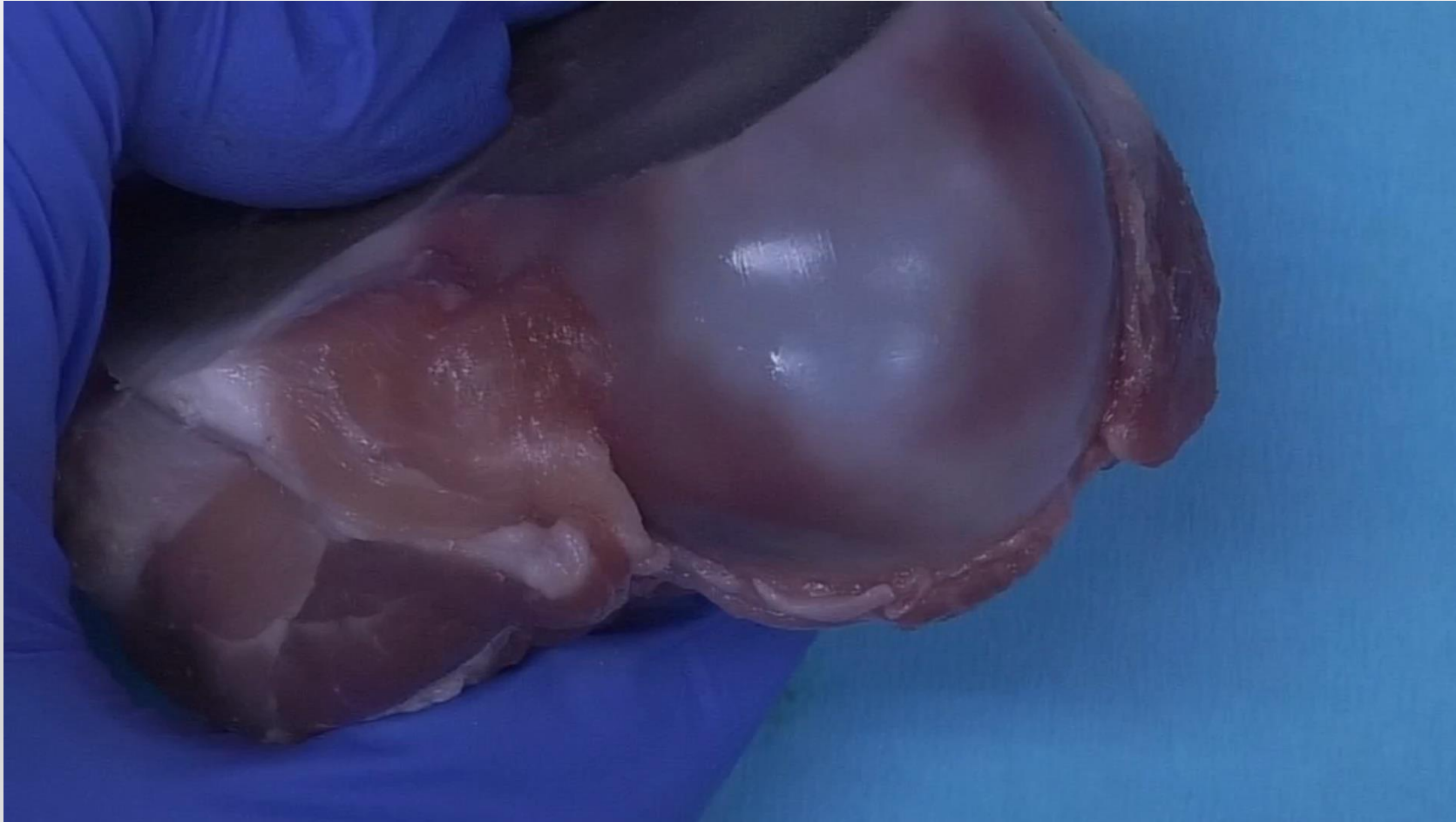
*Indica la colocación del implante.

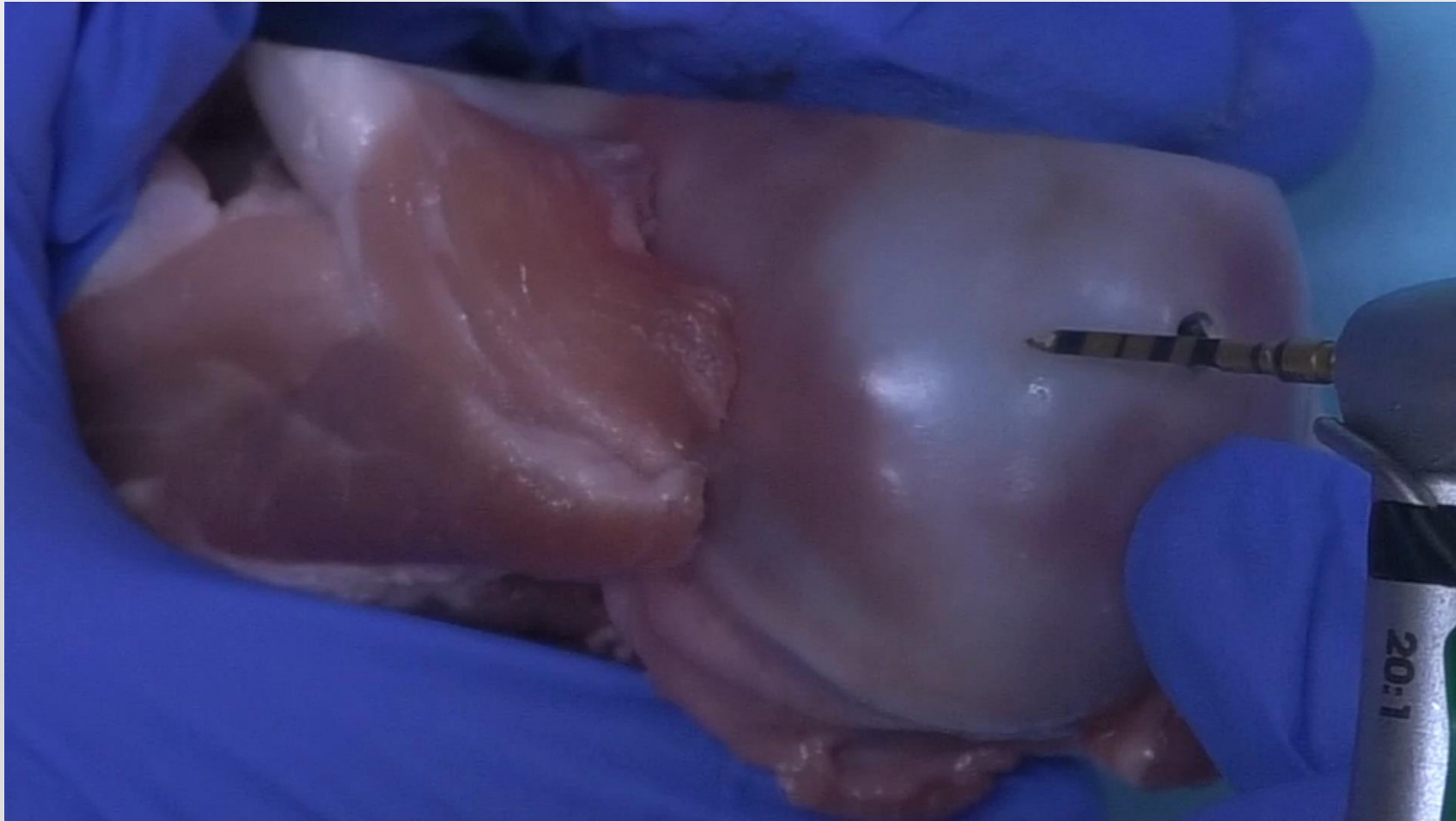


Tibia:

Fresado hueso duro

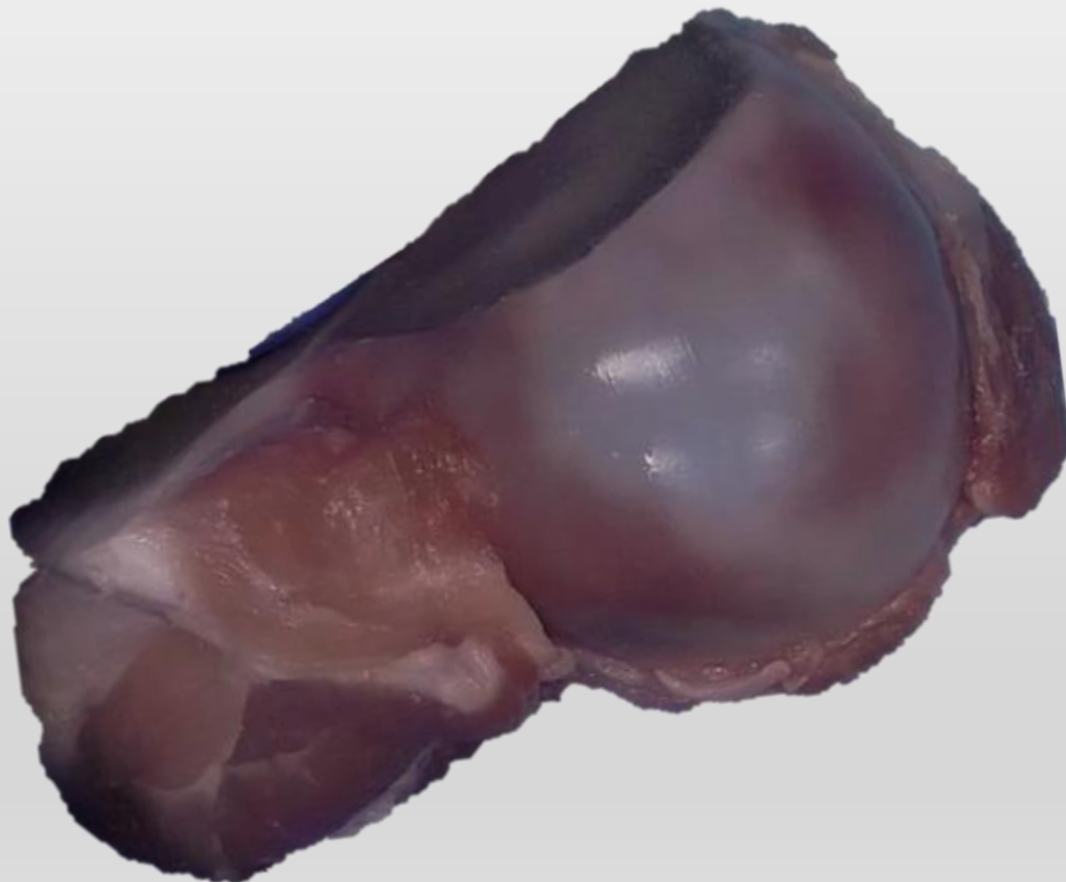








Protocolo de fresado hueso duro



PARTE V:



Zona posterior II:

Elevación de seno atraumática.

Protocolos I y II.

PROTOCOLO DENSAB[®] DE ELEVACIÓN SINUSAL I:



* ALTURA MÍNIMA HUESO RESIDUAL \geq 6mm

* ANCHURA MÍNIMA NECESARIA = 4mm

- Medir altura ósea hasta el suelo del seno.
 - Fresa Densah[®] Piloto 1 mm por debajo del suelo del seno.
 - Fresa Densah[®] (2.0) en modo OD hasta el suelo del seno.
 - Fresa Densah[®] (3.0) en modo OD hasta pasar 3mm el suelo del seno.
 - Si es necesario, pasar las fresas Densah[®] (4.0), (5.0) en modo OD hasta pasar 3 mm el suelo del seno.
- USAR LAS FRESAS EN INCREMENTOS COMPLETOS: (2.0), (3.0), (4.0),(5.0).**



PROTOCOLO DENSAB® DE ELEVACIÓN SINUSAL II:

* ALTURA MÍNIMA HUESO RESIDUAL 4-5 mm

* ANCHURA MÍNIMA NECESARIA = 5 mm



- Medir altura ósea hasta el suelo del seno.
- NO usar fresa piloto.
- Fresa Densah® (2.0) en modo OD hasta el suelo del seno.
- Fresa Densah® (3.0) en modo OD hasta pasar 3mm el suelo del seno.
- Si es necesario, pasar las fresas Densah® (4.0), (5.0) en modo OD hasta pasar 3 mm el suelo del seno para ampliar aún más la osteotomía y en incrementos suaves de 1mm.
- USAR LAS FRESAS EN INCREMENTOS COMPLETOS: (2.0), (3.0), (4.0),(5.0).
- Usar la última fresa a baja velocidad (150–200 rpm sin irrigación) para impulsar el material de injerto.

