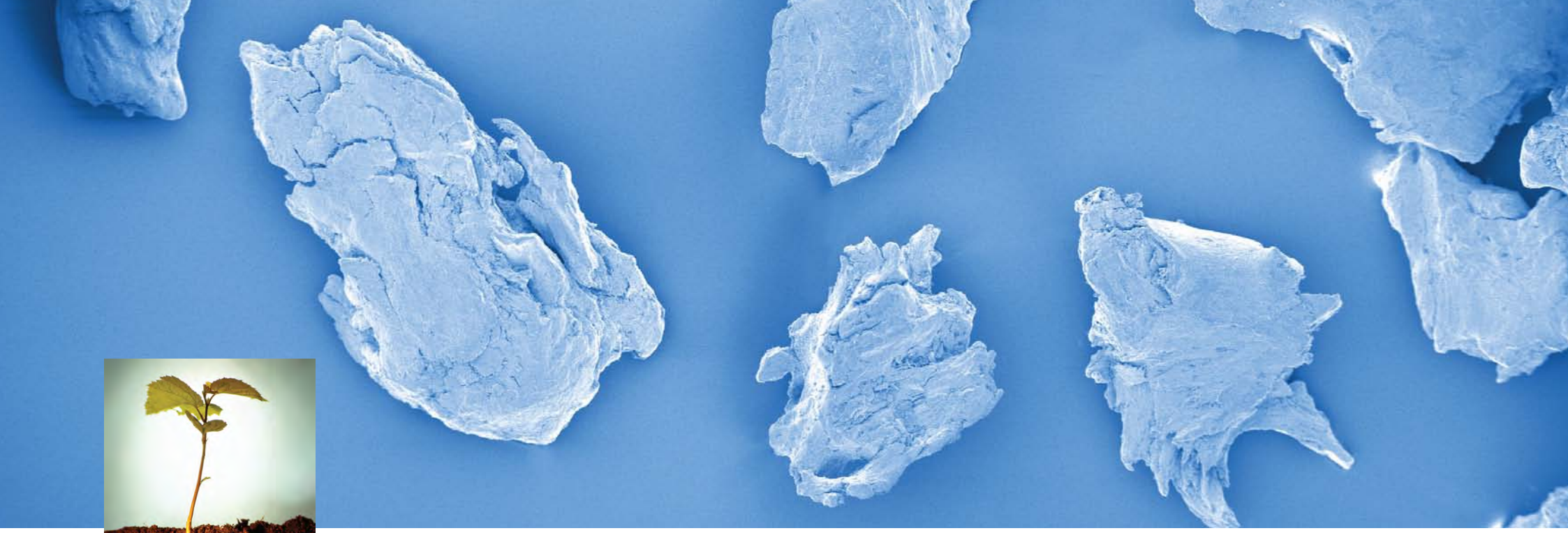


OsteoBiol® by Tecnoss

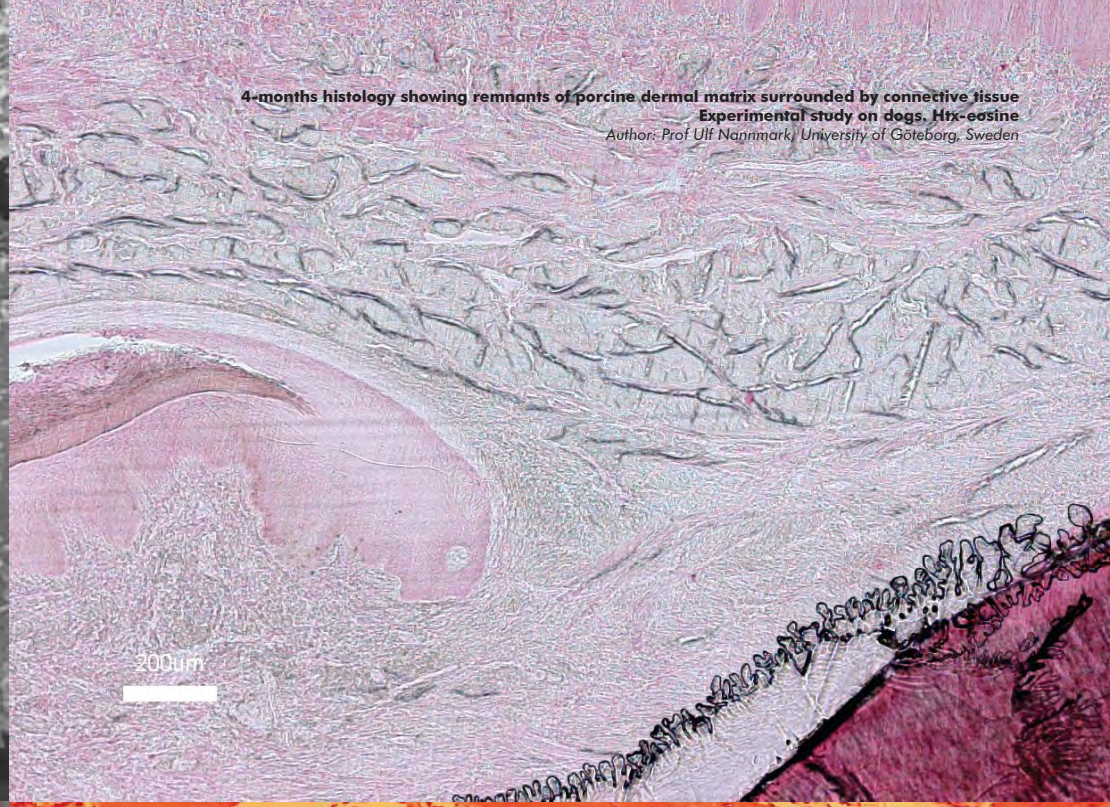
YEARS 20 ANNIVERSARY

Bone Grafting Materials

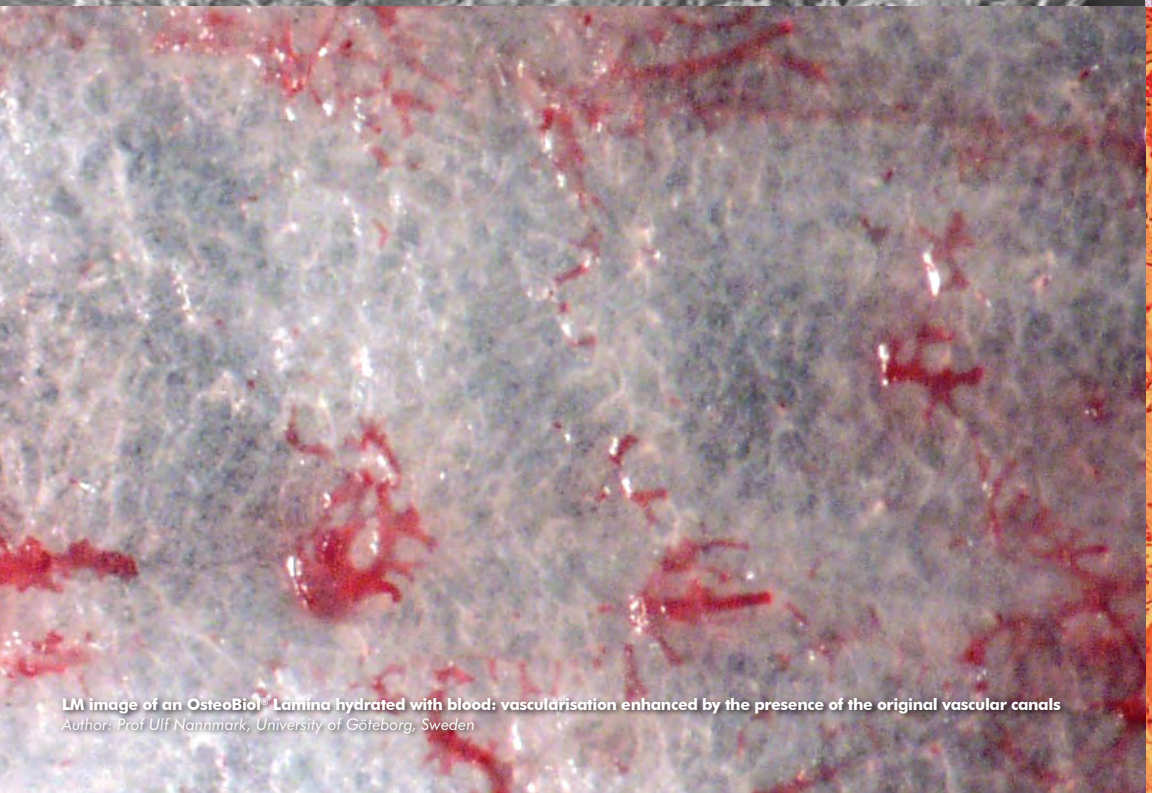
REGENERATION SCIENCE

INSPIRED BY NATURE

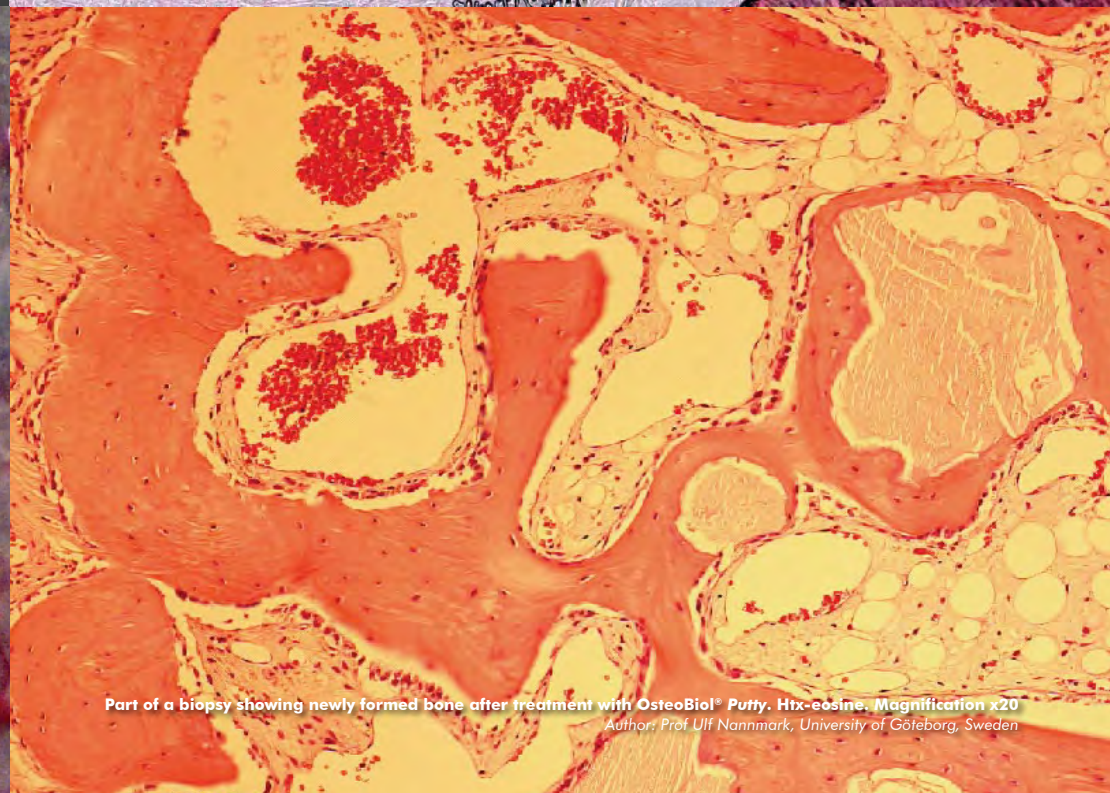
SEM image of an OsteoBiol® Gen-Os® granule colonised by osteoblasts
Author: Prof Ulf Nannmark, University of Göteborg, Sweden



4-months histology showing remnants of porcine dermal matrix surrounded by connective tissue Experimental study on dogs. Htx-eosine
Author: Prof Ulf Nannmark, University of Göteborg, Sweden



LM image of an OsteoBiol® Lamina hydrated with blood: vascularisation enhanced by the presence of the original vascular canals
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

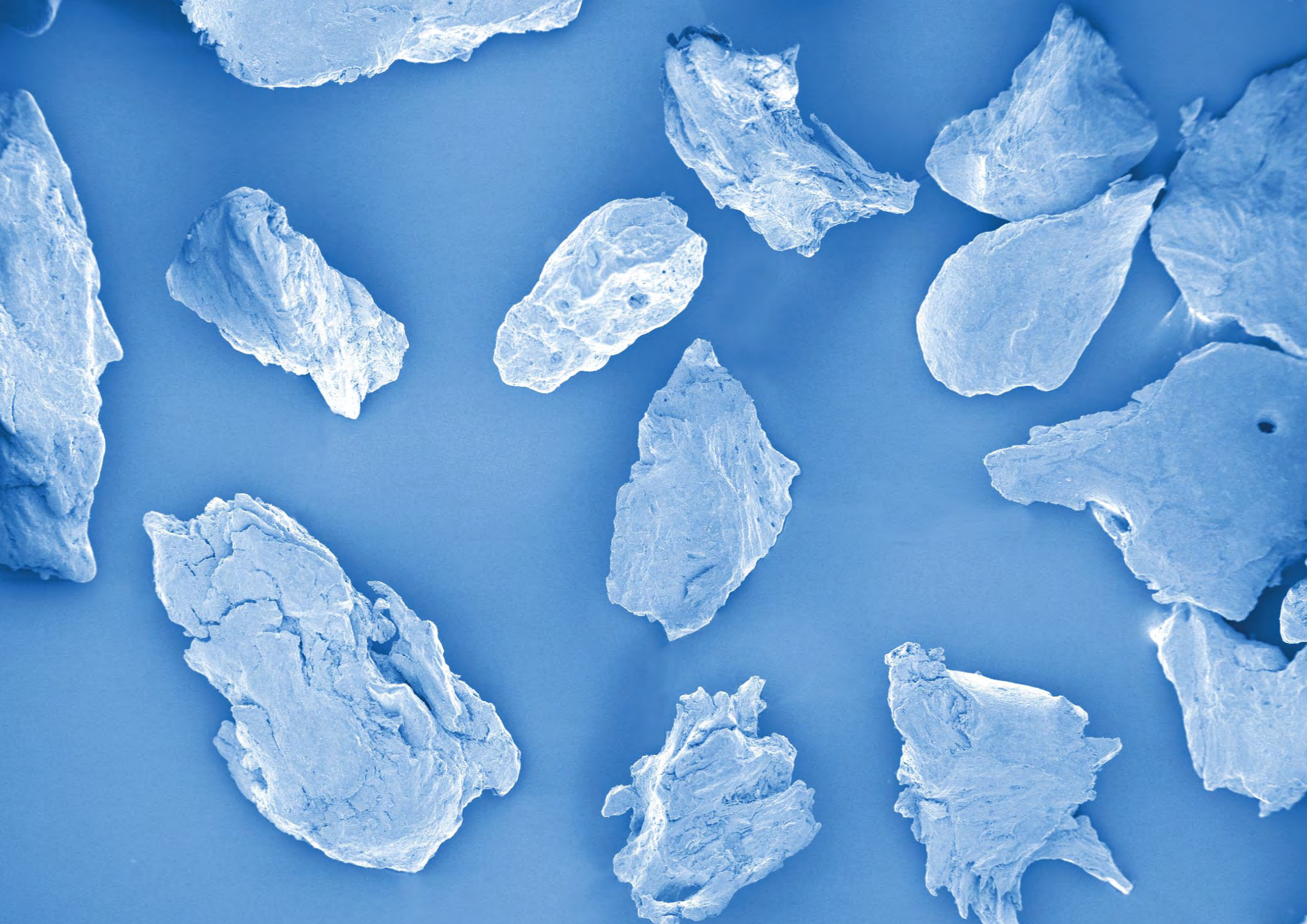


Part of a biopsy showing newly formed bone after treatment with OsteoBiol® *Putty*. Htx-eosine. Magnification x20
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

OUR MISSION

«To produce a xenogenic bone substitute as similar as possible to autogenous bone»

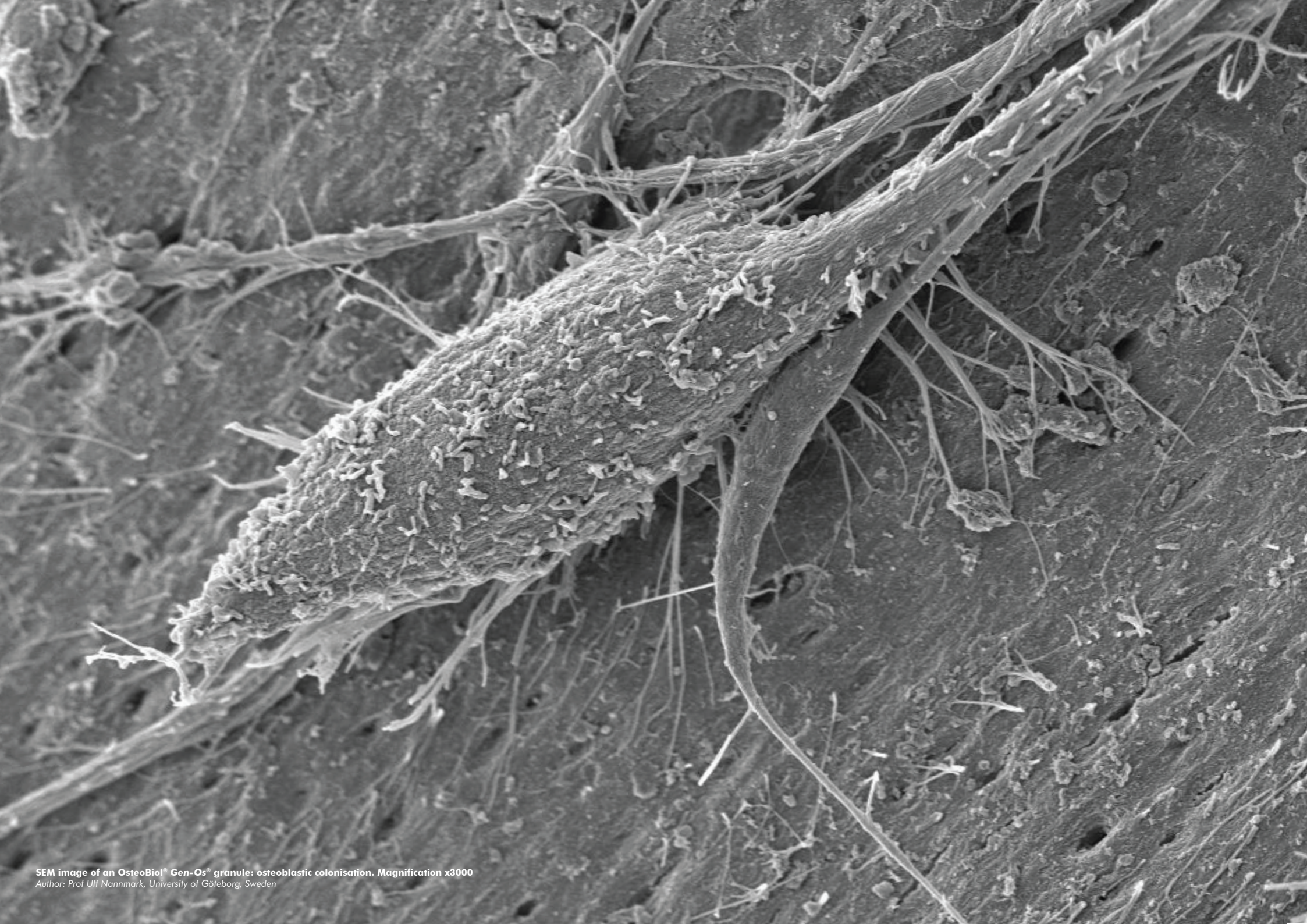
Giuseppe Oliva MD
R&D Director
Tecnoss S.r.l.



THE OSTEOBIOL® DUAL-PHASE HETEROLOGOUS BONE MATRIX

OsteoBiol® is the family of biomaterials produced by Tecnoss® for the dental and maxillo-facial surgeons.
In each OsteoBiol® granule, besides its mineral phase, the Tecnoss® process retains the xenogenic collagen phase with its precious biological properties, making it biocompatible and ideal for grafting and augmentation purposes.
Avoiding high process temperatures, the OsteoBiol® bone matrix prevents ceramization, maintaining a chemical composition extremely similar to autogenous bone[(1)], and therefore gradually resorbable and replaceable by newly formed bone.

(1) Figueiredo M, Henriques J, Martins G, Guerra F, Judas F, Figueiredo H
Physicochemical characterization of biomaterials commonly used in dentistry as bone substitutes - comparison with human bone
Journal of Biomedical Materials Research Part B: Applied Biomaterials, 2010 Feb; 92(2):409-19

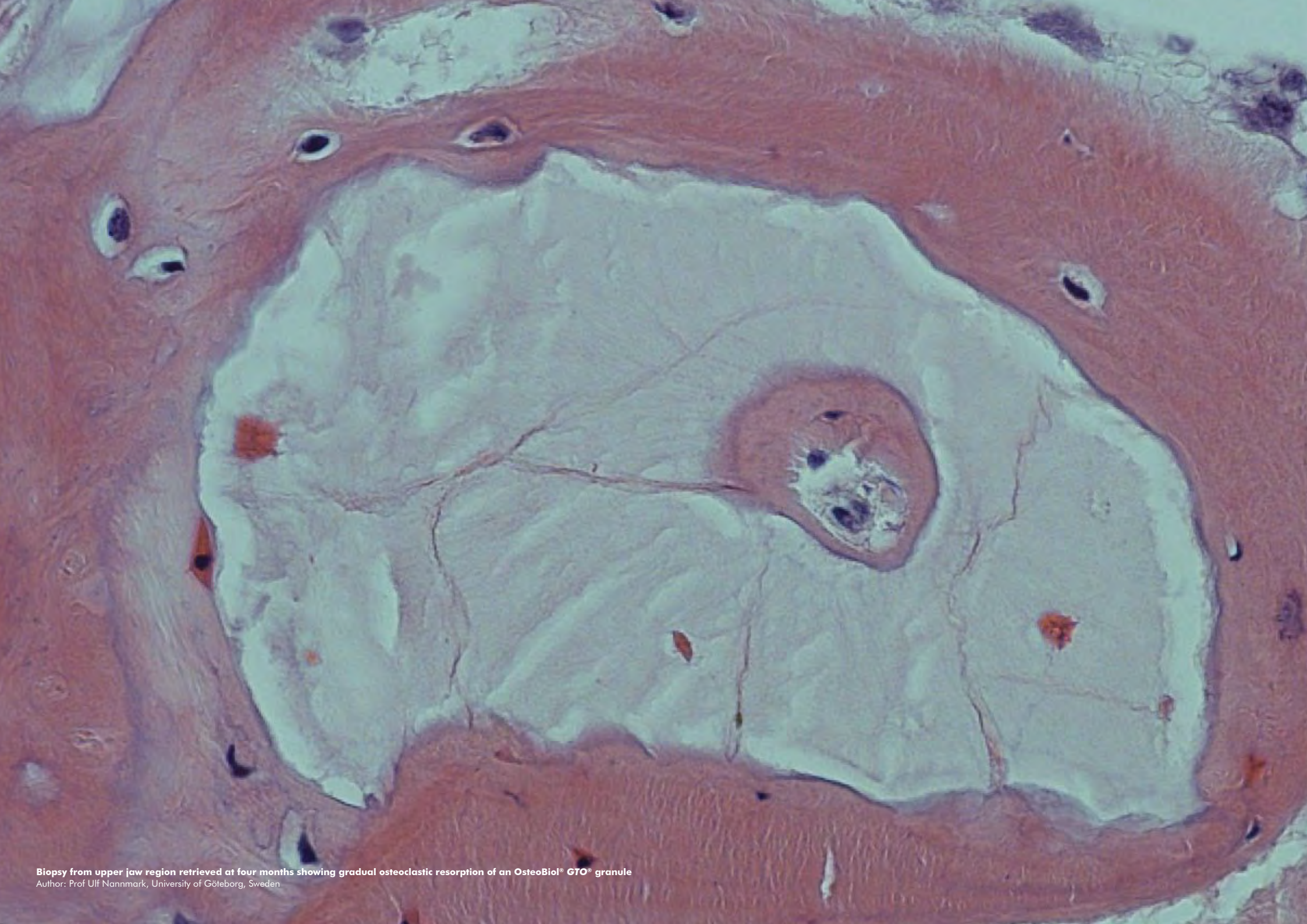


SEM image of an OsteoBiol® *Gen-Os*® granule: osteoblastic colonisation. Magnification x3000
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

HIGH BIOCOMPATIBILITY

The chemical structure of each OsteoBiol® dual-phase granule, its ideal porosity and collagen content, make it a valid scaffold and substrate for osteoblasts anchorage, proliferation and new bone apposition[(2)].

(2) Nannmark U, Sennerby L
The bone tissue responses to prehydrated and collagenated cortico-cancellous porcine bone grafts: a study in rabbit maxillary defects
Clinical Implant Dentistry and Related Research, 2008 Dec;10(4):264-70



Biopsy from upper jaw region retrieved at four months showing gradual osteoclastic resorption of an OsteoBiol® *GTO*® granule
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

GRADUAL RESORPTION

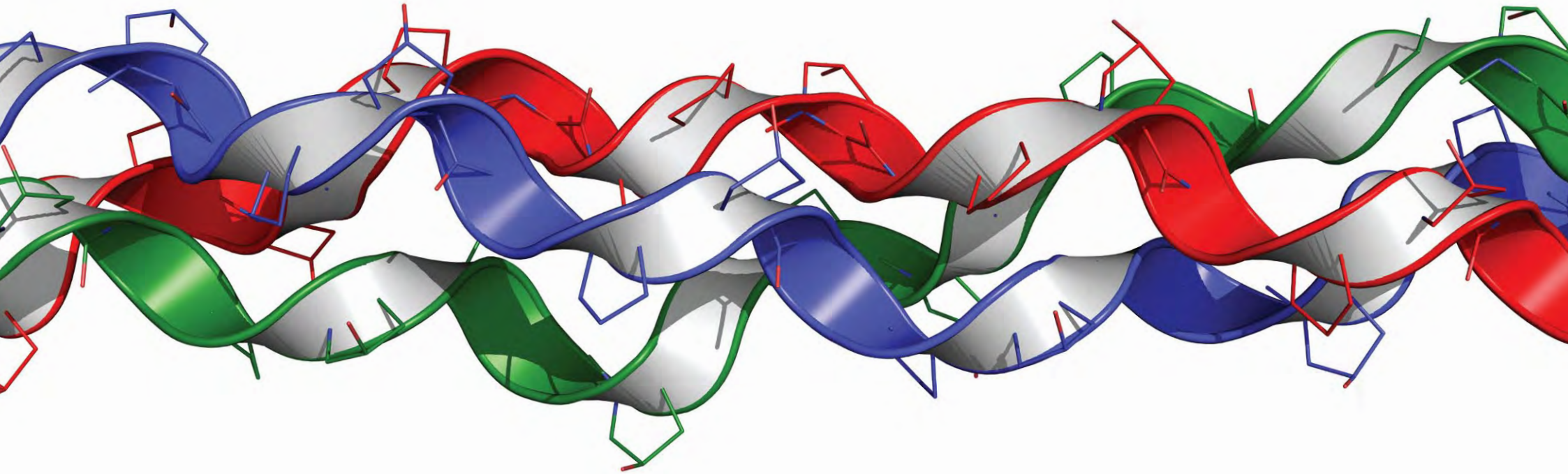
Autogenous bone is gradually replaced by newly formed bone: similarly, the OsteoBiol® bone matrix allows progressive osteoclastic resorption, with simultaneous new bone apposition.
Cells receive nutrients from newly formed vessels, that are able to colonize adequately the grafted site.
New bone grows in and around the OsteoBiol® granules[(3)], which are partially but significantly replaced by vital bone at re-entry time.

(3) Giuliani A, Iezzi G, Mazzoni S, Piattelli A, Perrotti V, Barone A
Regenerative properties of collagenated porcine bone grafts in human maxilla: demonstrative study of the kinetics by synchrotron radiation microtomography and light microscopy
Clinical Oral Investigations, 2018 Jan;22(1):505-513

VASCULARIZATION IS THE KEY FOR CLINICAL SUCCESS

Dual-phase biomaterials are progressively resorbed by osteoclasts and replaced by new vital bone produced by osteoblasts, similarly to autogenous bone grafts. Both types of cells live thanks to blood supply, which is critical and essential for the success of any bone regeneration procedure.
The progressive resorption of OsteoBiol® granules allows an adequate colonization of the grafting site by new vessels, and is therefore a positive and significant factor within the regenerative process[(4)].

(4) Rombouts C, Jeanneau C, Camilleri J, Laurent P, About I
Characterization and angiogenic potential of xenogeneic bone grafting materials: Role of periodontal ligament cells
Dental Materials Journal, 2016 Dec 1;35(6):900-907



THE ROLE OF COLLAGEN

Collagen favours MSC differentiation and enhances osteoblasts proliferation[5,6]: it is considered as the ideal substrate for bone forming cells. OsteoBiol® dual-phase particulate bone substitutes contain approximately 22% collagen.
Furthermore, collagen gel mixed with dual-phase collagenated granules packed in syringes improves the handling and the stability of the graft, reducing also operatory time and risk of contamination.

(5) Brunelli G, Sollazzo V, Carinci F, Palmieri A, Girardi A, Monguzzi R
OsteoBiol® influences osteogenic differentiation of adipose derived stem cells
European Journal of Inflammation, 2011, Vol. 9, no. 3 (S), 103-107

(6) Jeanneau C, Le Fournis C, About I
Xenogeneic bone filling materials modulate mesenchymal stem cell recruitment: role of the complement c5a
Clinical oral investigations; 2019 oct 23

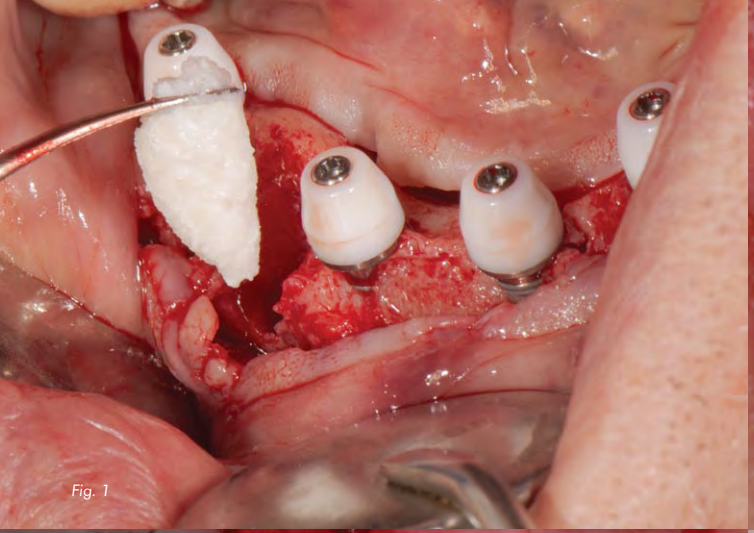


Fig. 1

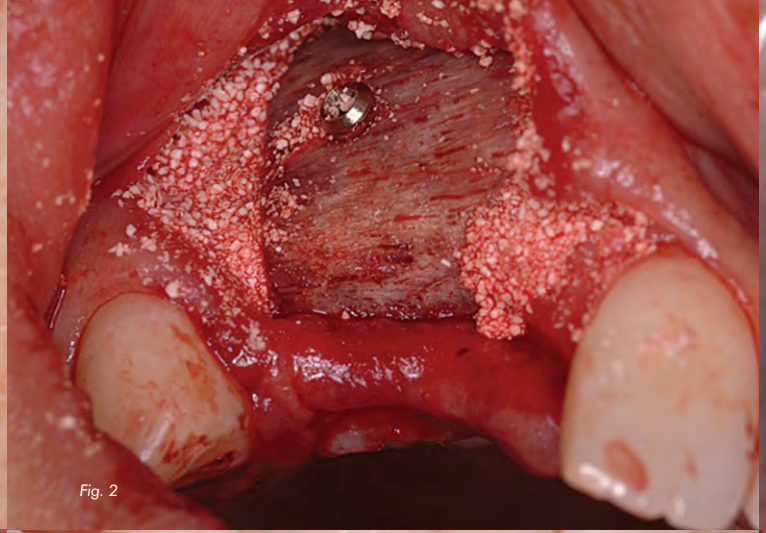


Fig. 2

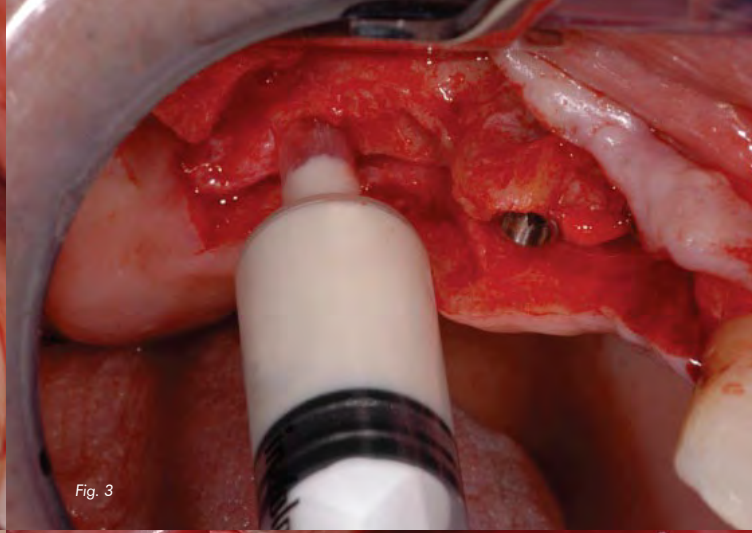


Fig. 3

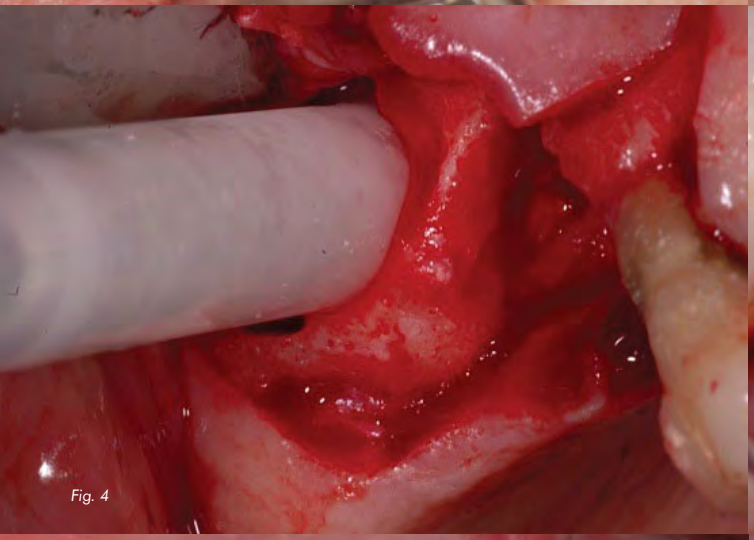


Fig. 4

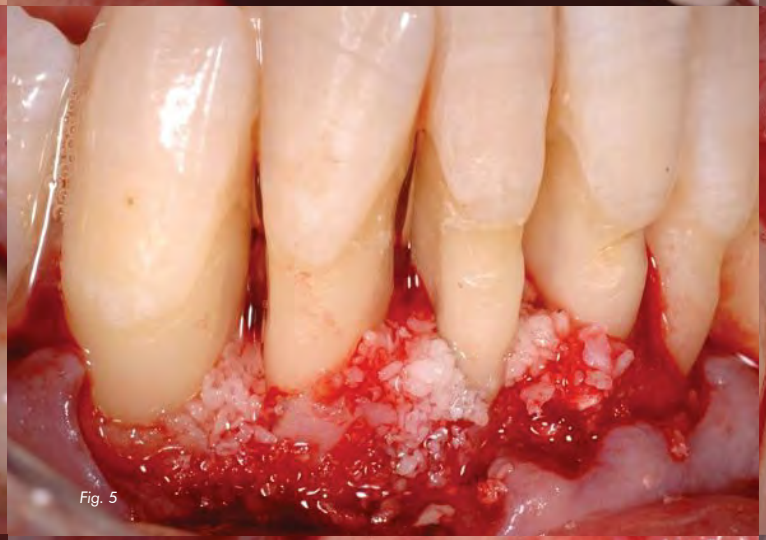


Fig. 5

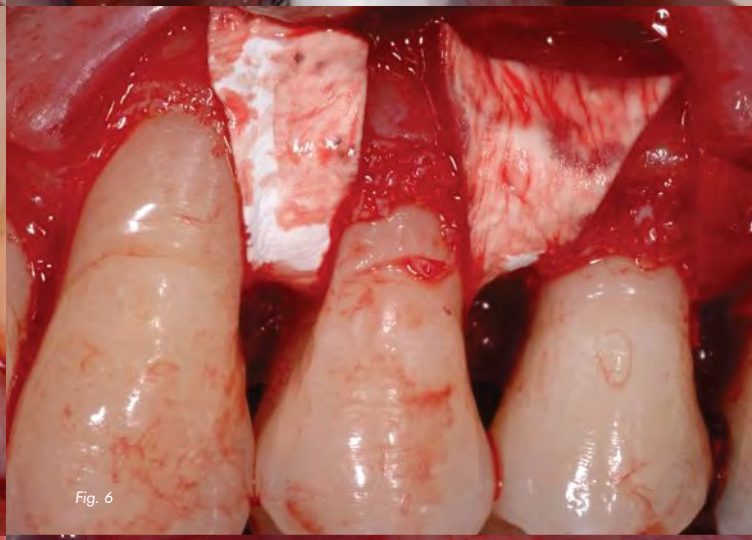


Fig. 6

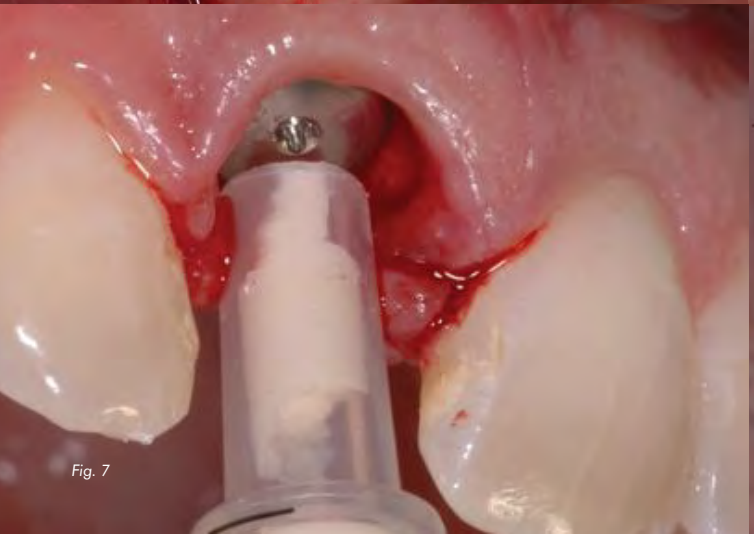


Fig. 7

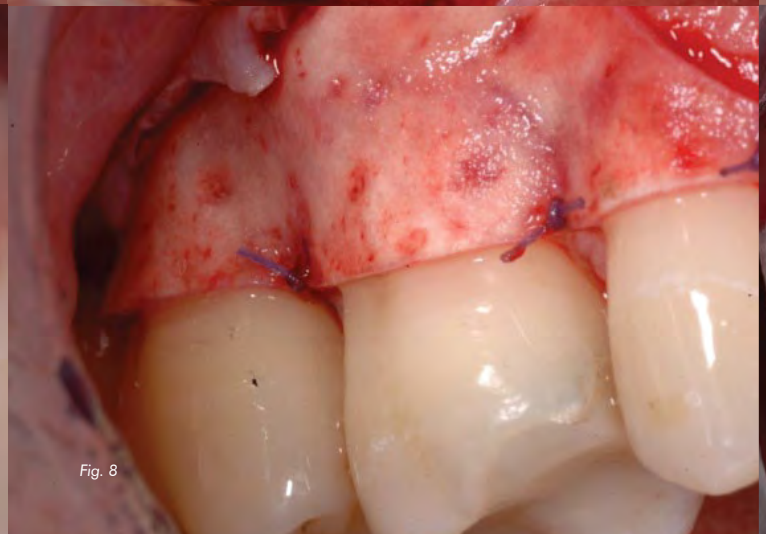


Fig. 8

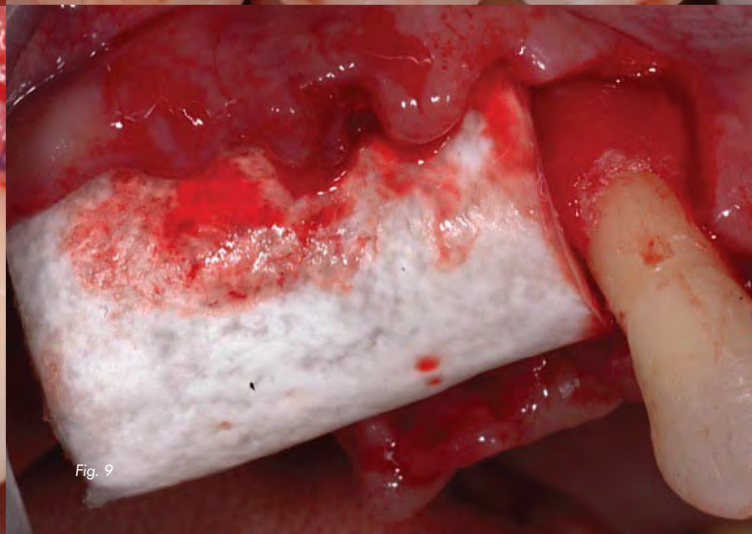


Fig. 9

A SPECIFIC PRODUCT FOR EVERY CLINICAL INDICATION

OsteoBiol® is not only a marvellous collagenated bone matrix: it is a complete family of biomaterials specifically designed for bone and soft tissue augmentation in dentistry. For every clinical indication a dedicated product has been developed, with the goal of providing the best handling, the ideal granulometry and consistency, and finally optimal regenerative results in adequate re-entry time.
Enjoy one of the widest and most complete product ranges, with the security and support of 15 years of clinical research: you will experience that today it is finally possible to achieve predictable clinical success[7] without the availability limitations of autogenous bone.

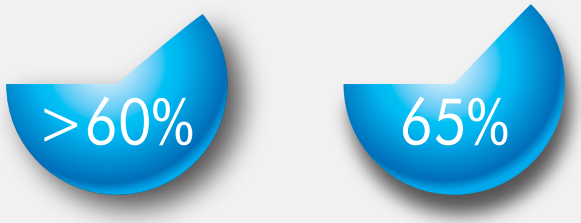
(7) Checchi V, Felice P, Zucchelli G, Barausse C, Piattelli M, Pistilli R, Grandi G, Esposito M
Wide diameter immediate post-extractive implants vs delayed placement of normal-diameter implants in preserved sockets in the molar region: 1-year post-loading outcome of a randomised controlled trial
European Journal of Oral Implantology, 2017;10(3):263-278

Images authors pag 14: Fig.1, Dr Patrick Palacci, Marseille, France | Fig. 2-9, Dr Roberto Rossi, Genova, Italy

OsteoBiol® and natural human bone have the same density and very similar physico-chemical properties

Figueiredo et al. J Biomed Mater Res B: Appl Biomater, 2010 Feb; 92(2):409-19

Mineral content

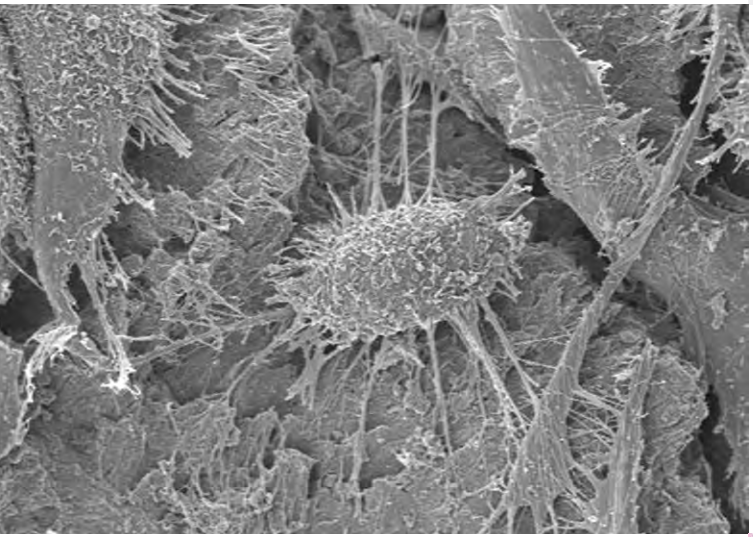


Gen-Os® Natural Human Bone

Figueiredo et al. J Biomed Mater Res B: Appl Biomater, 2010 Feb; 92(2):409-19

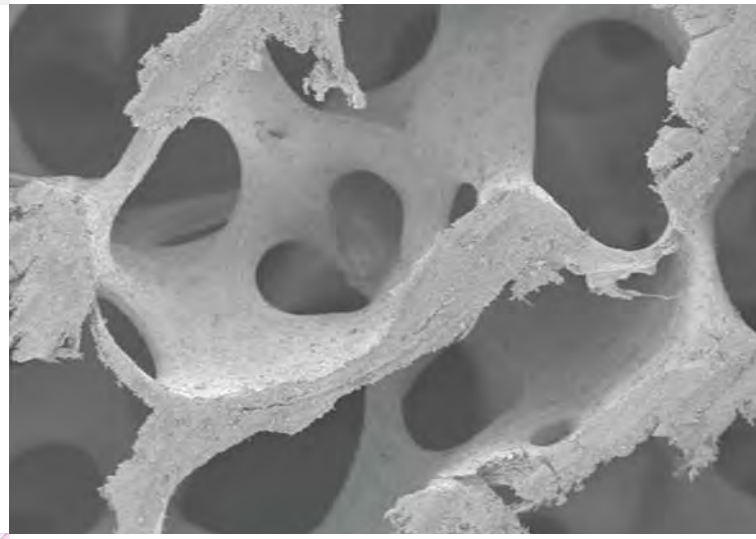
Gen-Os® has a higher angiogenic potential compared to anorganic xenografts

Rombouts et al. Dent mater J, 2016 Dec 1;35(6):900-907



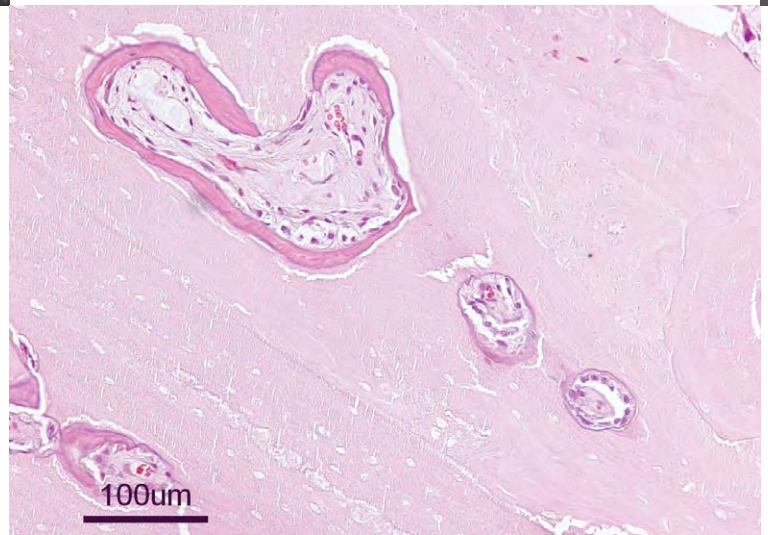
In ridge preservation collagenated biomaterials show significant smaller volume reduction and basal area shrinkage compared to slowly resorbable xenografts

Barone et al. Clin Oral Implants Res, 2016 Nov;27(11):E105-E115



OsteoBiol® bone matrix promotes osteoblast differentiation and bone regeneration

Brunelli et al. Eur J Inflamm, 2011, Vol. 9, no. 3 (S), 103-107



OsteoBiol® bone scaffolds absorb growth factors secreted by MSCs and improve bone tissue repair

Mijiritsky et al. Materials, 2017 Sep 8;10(9)

KEY SCIENTIFIC DATA

Over 190 articles have been published on peer-reviewed journals during the last 15 years, proving with in-vitro, experimental and clinical studies the outstanding biological properties and clinical performance of the OsteoBiol® collagenated biomaterials.

For further information see the complete literature on p. 92

Images author pag 16: Fig.1, 2, 3 - Prof Ulf Nannmark, University of Göteborg, Sweden

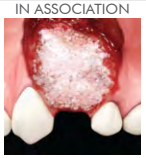
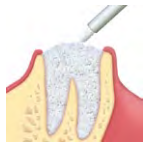
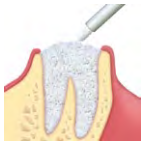
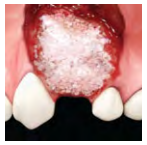
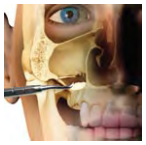
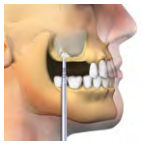
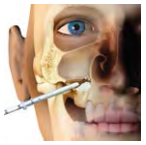
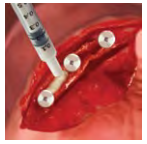
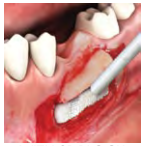
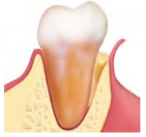
PATIENTS FIRST

Combining the best skills and the best materials, within the limits and guidelines provided by scientific evidence, is the key for clinical success: however let us all remember that the patients are and will always be the center of all our attentions.
Meeting their expectations, helping them to recover function and aesthetics with long term success[8,9] is the greatest reward for any surgeon and fulfillment of our company mission.

(8) Barone A, Orlando B, Tonelli P, Covani U
Survival rate for implants placed in the posterior maxilla with and without sinus augmentation: a comparative cohort study
Journal of Periodontology, 2011 Feb; 82(2):219-26

(9) Scarano A, Piattelli A, Assenza B, Quaranta A, Perrotti V, Piattelli M, Iezzi G
Porcine bone used in sinus augmentation procedures: a 5-year retrospective clinical evaluation
Journal of Oral and Maxillofacial Surgery, 2010 Aug;68(8):1869-73

OsteoBiol® products clinical evidence*

	Gen-Os®	mp3®	GTO®	Putty	Gel 40
	Collagenated heterologous cortico-cancellous bone mix *Granulometry 250-1000 µm* **For information on OsteoBiol® *Gen-Os*® see page 24**	Pre-hydrated collagenated heterologous cortico-cancellous bone mix *Granulometry 600-1000 µm* **For information on OsteoBiol® *mp3*® see page 32**	Pre-hydrated collagenated heterologous cortico-cancellous bone mix *Granulometry 600-1000 µm* **For information on OsteoBiol® *GTO*® see page 36**	Pre-hydrated collagenated heterologous cortico-cancellous bone paste *Granulometry up to 300 µm* **For information on OsteoBiol® *Putty* see page 40**	Pre-hydrated collagenated heterologous cortico-cancellous bone gel *Granulometry up to 300 µm* **For information on OsteoBiol® *Gel 40* see page 44**
ALVEOLAR REGENERATION	  IN ASSOCIATION WITH TSV GEL		 		
MAXILLARY SINUS LIFT	 				CRESTAL ACCESS ONLY 
PERI-IMPLANT DEFECTS				IF DEFECT WALLS  ARE PRESERVED	
HORIZONTAL AUGMENTATION	IN ASSOCIATION  WITH LAMINA AND TSV GEL	IN ASSOCIATION  WITH LAMINA	IN ASSOCIATION  WITH LAMINA		
VERTICAL AUGMENTATION INLAY TECHNIQUE	IN ASSOCIATION  WITH SP-BLOCK				
PERIODONTAL REGENERATION					3-WALL DEFECTS 
SOFT TISSUE AUGMENTATION					

* Based on published scientific literature and clinical experience of expert surgeons.

Apatos

Cortico-cancellous and cortical bone
Granulometry 600-1000 µm
For information on OsteoBiol® *Apatos*
see page 48

Sp-Block

Collagenated heterologous cancellous block
For information on OsteoBiol® *Sp-Block*
see page 54

Evolution

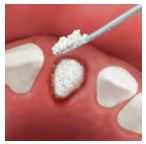
Heterologous collagen membrane
For information on OsteoBiol® *Evolution*
see page 62

Lamina

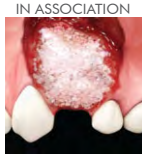
Collagenated heterologous cortical bone
For information on OsteoBiol® *Lamina*
see page 70

Derma

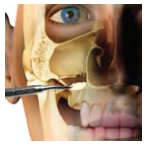
Collagen dermal matrix
For information on OsteoBiol® *Derma*
see page 66

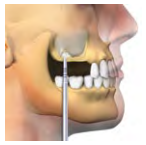


IN ASSOCIATION



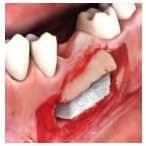
WITH TSV GEL

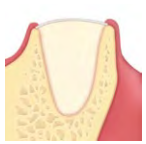


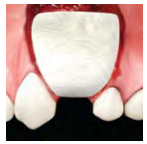


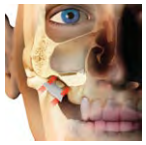
IN ASSOCIATION

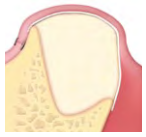
WITH LAMINA AND TSV GEL

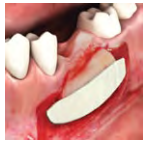


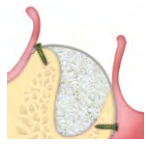




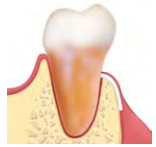








BONE LAYER TECHNIQUE



BONE SUBSTITUTES


Fig. 1

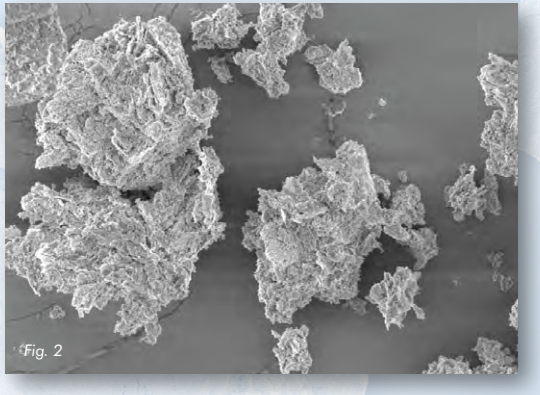


Fig. 2

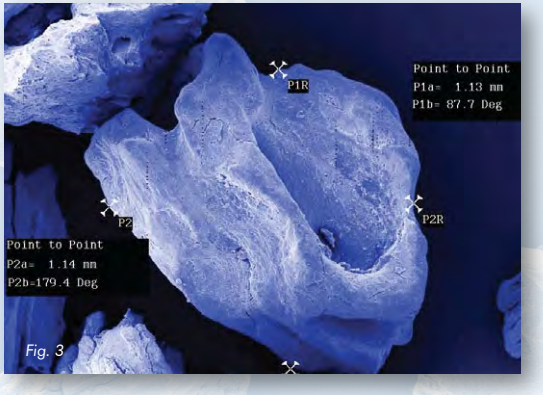


Fig. 3

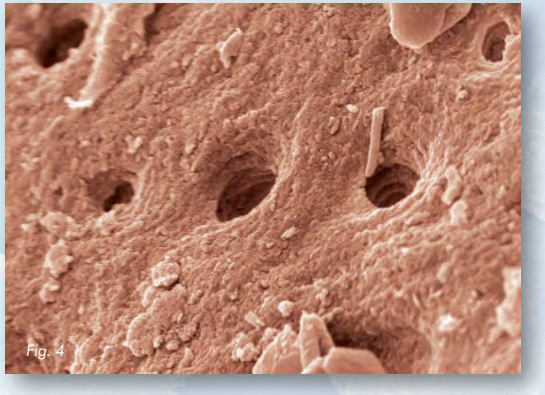


Fig. 4

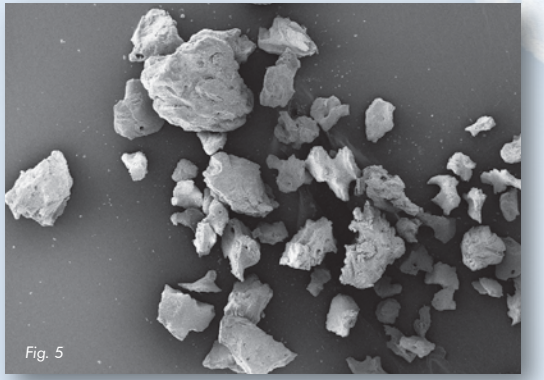


Fig. 5


Fig. 6

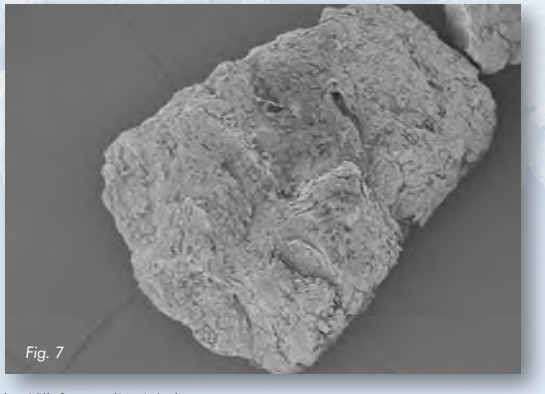


Fig. 7

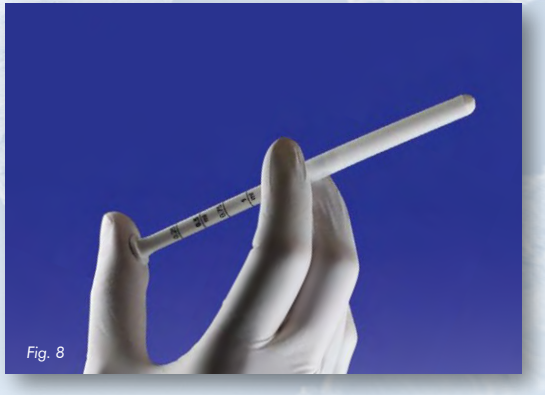
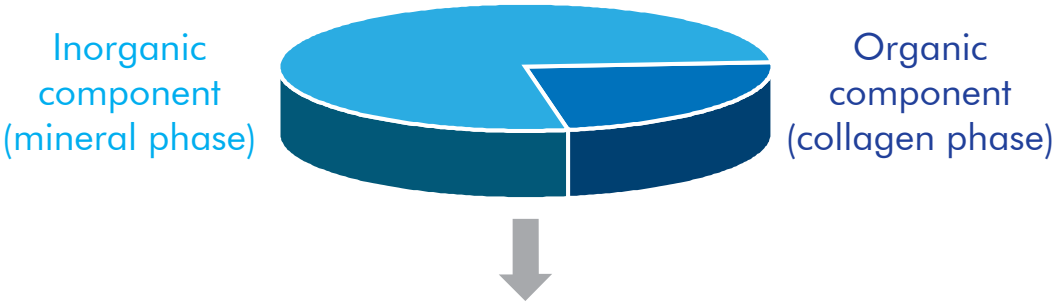


Fig. 8

Fig. 1,6,8 Source: Tecnoss® Dental Media Library | Fig. 2,4,7 Author: Prof Ulf Nannmark, University of Göteborg, Sweden | Fig. 3,5 Source: Nobil Bio Ricerche, Villafranca d'Asti, Italy

OsteoBiol® Dual-Phase bone substitutes

HETEROLOGOUS BONE MATRIX

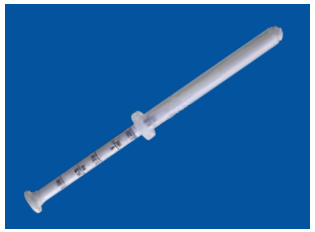


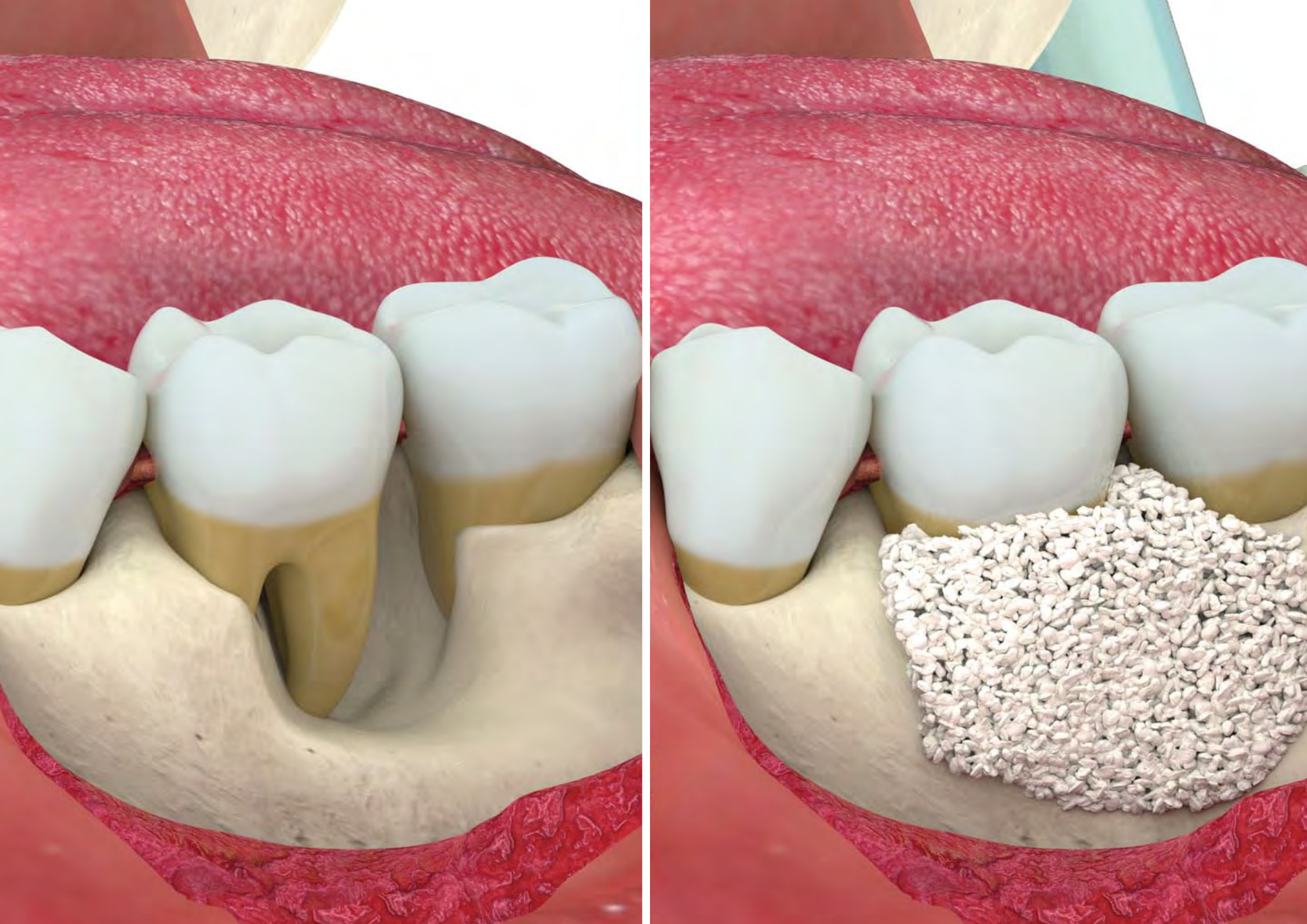
Cortico-cancellous collagenated matrix

TSV Gel | Collagen gel

Apatos Cortical

cortical bone

Gen-Os®	GTO® (Pre-hydrated)	mp3® (Pre-hydrated)	Putty (Pre-hydrated)	Gel 40 (Pre-hydrated)	Apatos Mix
100% collagenated bone mix	*~80% collagenated bone mix ~20% TSV Gel*	*~90% collagenated bone mix ~10% collagen gel*	*~80% collagenated bone mix ~20% collagen gel*	*~60% collagenated bone mix ~40% collagen gel*	*cortico-cancellous bone mix*
					
Heterologous cortico-cancellous collagenated bone mix	**Heterologous cortico-cancellous collagenated pre-hydrated bone mix**	**Heterologous cortico-cancellous collagenated pre-hydrated bone mix**	**Heterologous cortico-cancellous collagenated pre-hydrated bone paste**	**Heterologous cortico-cancellous collagenated pre-hydrated bone gel**	**Heterologous microcrystalline hydroxyapatite**
For more information on OsteoBiol® *Gen-Os*® see page 24	For more information on OsteoBiol® *GTO*® see page 36	For more information on OsteoBiol® *mp3*® see page 32	For more information on OsteoBiol® *Putty* see page 40	For more information on OsteoBiol® *Gel 40* see page 44	For more information on OsteoBiol® *Apatos* see page 48



Gen-Os®

The advantages of a dual-phase biomaterial

Collagenated heterologous cortico-cancellous bone mix

Tissue of origin
Cortico-cancellous heterologous bone mix

Tissue collagen
Preserved

Physical form
Slightly radiopaque granules

Composition
100% granulated mix

Granulometry
250-1000 μm
1000-2000 μm

Re-entry time
4/5 months, depending on grafting site characteristics

Packaging
Vial: 0.25 g, 0.5 g, 1.0 g, 2.0 g

Product codes
250-1000 μm
M1052FS | 1 Vial | 0.25 g | Porcine
M1052FE | 1 Vial | 0.25 g | Equine
M1005FS | 1 Vial | 0.5 g | Porcine
M1005FE | 1 Vial | 0.5 g | Equine
M1010FS | 1 Vial | 1.0 g | Porcine
M1010FE | 1 Vial | 1.0 g | Equine
M1020FS | 1 Vial | 2.0 g | Porcine
M1020FE | 1 Vial | 2.0 g | Equine

1000-2000 μm
M0210FS | 1 Vial | 1.0 g | Porcine
M0220FS | 1 Vial | 2.0 g | Porcine

GMDN code
46425

CND code
P900402

Characteristics and handling

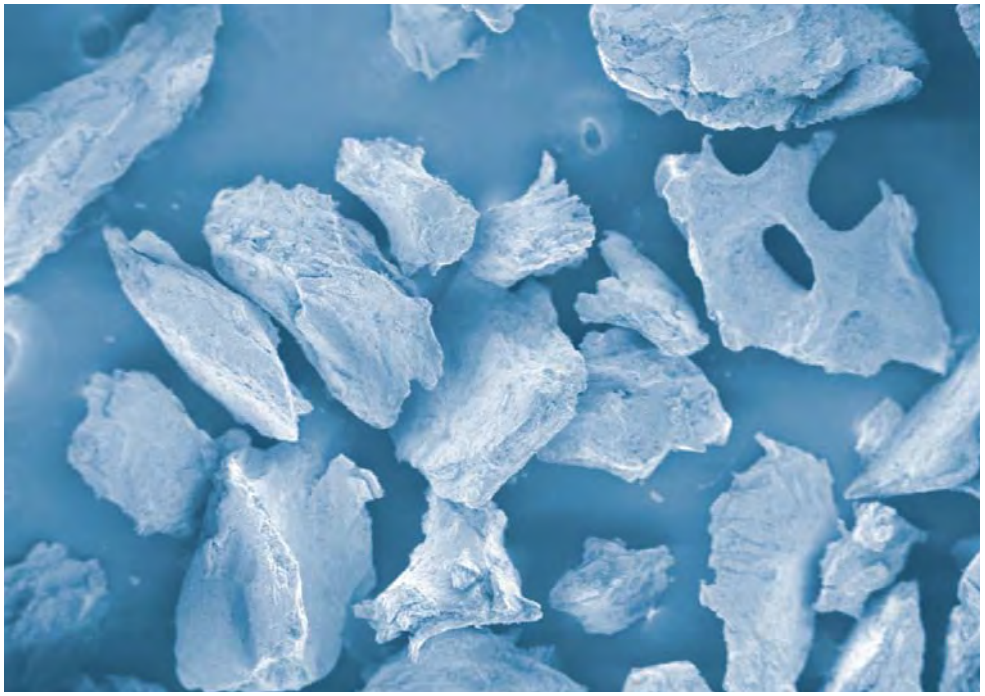
CHARACTERISTICS

A natural replicate of autologous bone, *Gen-Os*® conserves the same intimate structures[1] (matrix and porous form) and presents highly osteoconductive properties[2,3]. It is biocompatible and bioavailable, as recognized by tests made according to the ISO 10993 method conducted at Eurofins Biolab. *Gen-Os*® is gradually resorbable and provides support in bone neoformation helping to preserve the original graft shape and volume[4].

Moreover, thanks to its collagen content, the product facilitates blood clotting and the subsequent invasion of repairing and regenerative cells, favouring *restitutio ad integrum* of missing bone. Because of its marked hydrophilia[5], it can function as a carrier for selected medications and drugs[6] and it is ideal to mix with GFs[7].

HANDLING

Gen-Os® must always be hydrated and thoroughly mixed with either a few drops of sterile physiological solution (or patient's blood) to activate its collagen matrix and to enhance its adhesivity or with *TSV Gel* to increase graft stability in not self-contained defects. If necessary, it can as well be mixed with the drug selected for surgery.



SEM image of OsteoBiol® *Gen-Os*® granules. Magnif. x50
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

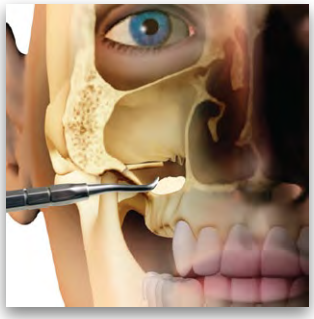
Source: Tecnoss® Dental Media Library

Clinical Information

free animated videos
on OsteoBiol® APP

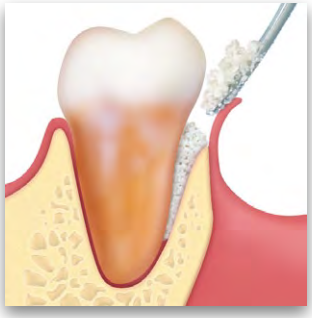
Available on the App Store | Get it on Google play

Gen-Os®, a cortico-cancellous bone mix, has been the first product developed with the Tecnoss® innovative biotechnology and, due to its universal use, still is today the most demanded from the market. *Gen-Os*® has been successfully used and documented for alveolar ridge preservation[8] in combination with *Evolution* membranes: the application of this biomaterial limits the alveolar ridge width reduction that would naturally occur with spontaneous healing, preserving thus the alveolar ridge volume and allowing a correct second stage implant placement[9]. *Gen-Os*® has been used for lateral access maxillary sinus lift[3] and dehiscence regeneration[10], always in association with *Evolution* membranes.
Gen-Os® has been documented in periodontal regeneration of deep infrabony defects[11]. Due to its collagen content, once hydrated *Gen-Os*® becomes very sticky and hydrophilic[5]: it combines therefore extremely well with blood and is very stable once applied into the grafting site.
Its cortico-cancellous composition allows a progressive resorption of osteoclastic type, with in parallel a similar rate of new bone formation[2]: these unique properties allow a very good graft volume preservation, a healthy and well vascularized new bony tissue and, ultimately, a successful implant rehabilitation. *Gen-Os*® is in fact able to boost vascularization: in vitro[12] assays proved an increase in the secretion of VEGF by periodontal ligament cells (PDL) in the presence of *Gen-Os*®, as well as an enhanced proliferation of endothelial cells.

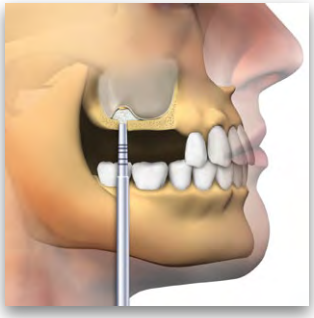


LATERAL ACCESS SINUS LIFT
maxillary sinus floor augmentation

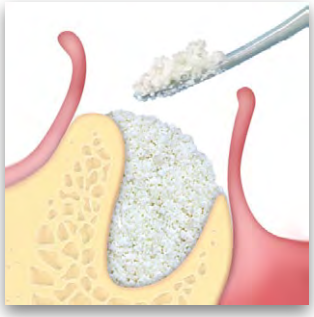
DEHISCENCES AND FENESTRATIONS
peri-implant lesions



PERIODONTAL REGENERATION
intrabony defects



CRESTAL ACCESS SINUS LIFT
osteotome technique



HORIZONTAL AUGMENTATION
two-wall defects

ALVEOLAR REGENERATION
socket preservation

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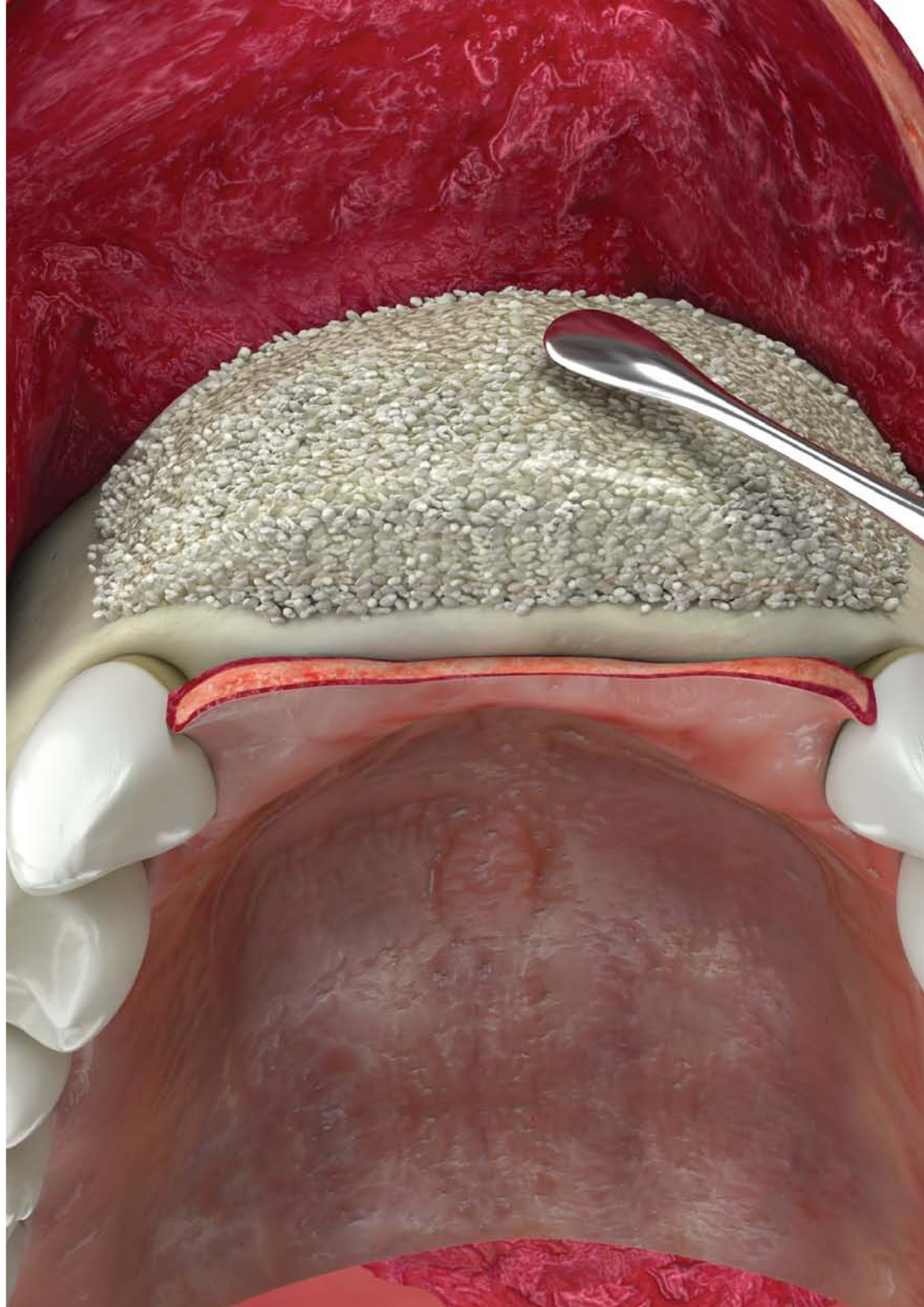
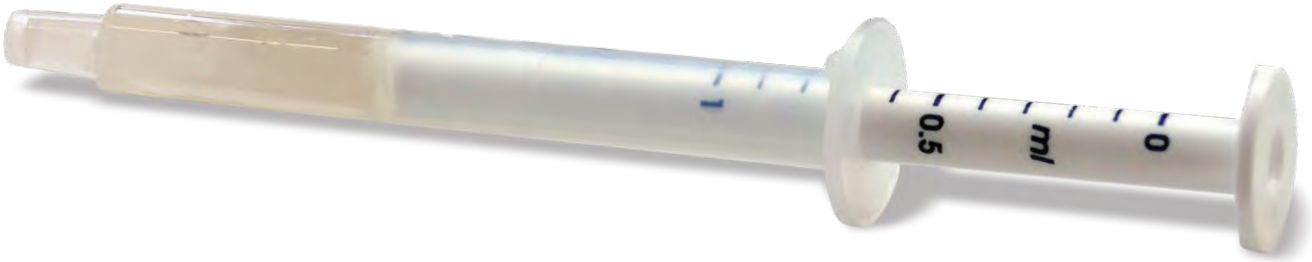
For further information see the complete literature on p. 92



TSV Gel



The resorbable solution for ideal graft stability

Thermosensitive resorbable gel for graft stabilization

Composition
Heterologous type I and III collagen gel
Thermogelling synthetic biocompatible copolymer

Physical form
LV phase at <8°C
Gel viscosity at >13°C

Packaging
Syringe: 0.5 cc, 1.0 cc

Available only in combination with OsteoBiol® *Gen-Os*® and *Apatos*
0.5 g, 1.0 g

Product codes
TSV005S | 1 Syringe | 0.5 cc | Porcine
TSV005E | 1 Syringe | 0.5 cc | Equine
TSV010S | 1 Syringe | 1.0 cc | Porcine
TSV010E | 1 Syringe | 1.0 cc | Equine

GMDN code
46425

CND code
P900402

Characteristics and handling

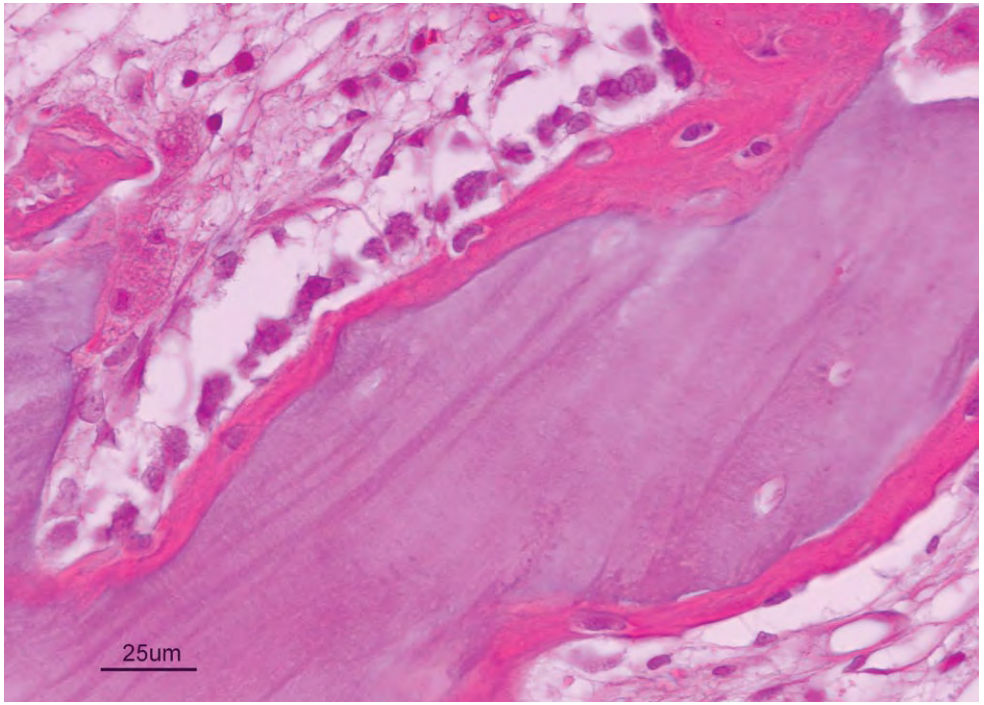
CHARACTERISTICS

The purpose of *TSV Gel* is to provide mechanical stability to bone substitutes and barrier membranes.

TSV Gel is sterilized by Gamma irradiation and is radio-transparent. It contains heterologous type I and III collagen gel with polyunsaturated fatty acids diluted in aqueous solution containing a biocompatible synthetic copolymer that gives *TSV Gel* thermo-reversible and thermo-gelling properties. At low temperature (+4°C) the gel is relatively flowable and easy to mix and manipulate with the graft but it becomes more viscous when *in situ* and exposed to body temperature.

HANDLING

TSV Gel must be refrigerated for at least 20 minutes at +4°C before use, in order to reach the low viscosity (LV) phase, which makes it easier to mix with *Gen-Os*® or *Apatos*.
At room temperature, the product remains at LV phase for few minutes, whereas once *in situ* its viscosity quickly increases with body temperature. *TSV Gel* in LV phase can be used instead of saline for hydrating and mixing with *Gen-Os*® *or Apatos*. The result will be a sticky mixture easy to place and extremely stable once *in situ*.
TSV Gel can also be applied to the rough side of the *Evolution* membrane to stabilize it during graft covering and whilst suturing.



Part of a biopsy showing newly formed bone around a particle of OsteoBiol® *Gen-Os*® mixed with OsteoBiol® *TSV Gel* two weeks after grafting in rabbit. Htx-eosine.
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

Source: Tecnoss® Dental Media Library

Source: Tecnoss® Dental Media Library

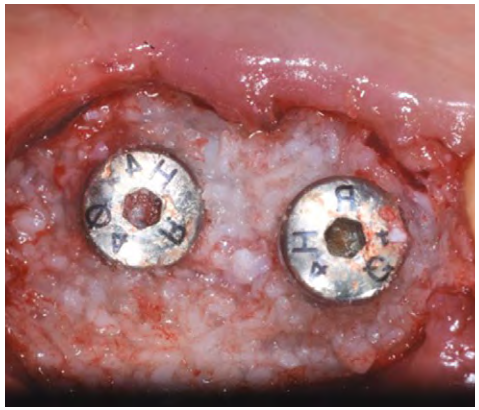
Clinical Information

free animated videos
on OsteoBiol® APP

Available on the App Store | Get it on Google play

TSV Gel can be used in GBR procedures together with OsteoBiol® bone substitutes and membranes to enhance graft stability. The viscosity reached by *TSV Gel* at body temperature improves the stability of *Gen-Os*® or *Apatos* granules and has proven particularly beneficial in cases where there is little bony support around the defect *i.e.* lateral augmentation, sockets with a compromised buccal wall, dehiscences and periodontal two and one wall defects.
Additionally, the viscosity of OsteoBiol® *TSV Gel* improves the stability and handling of *Evolution* membranes, particularly during the delicate phase of flap closure.

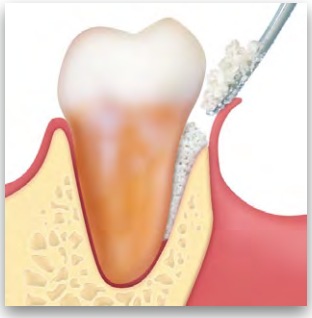
The above clinical information is based on the experience of expert surgeons



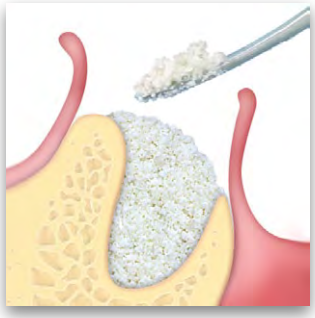
Peri-implant defect treated with OsteoBiol® *Gen-Os*® mixed with *TSV Gel*
Author: Dr Roberto Rossi, Genova, Italy

DEHISCENCES AND FENESTRATIONS
peri-implant lesions

ALVEOLAR REGENERATION
socket preservation

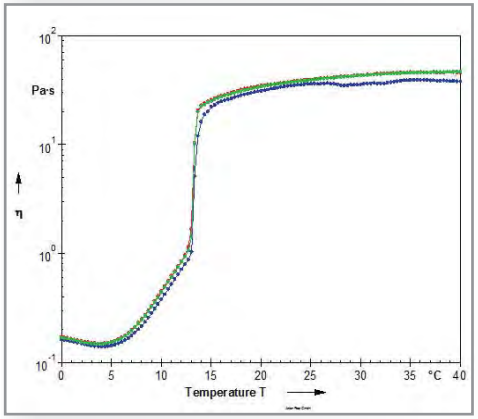


PERIODONTAL REGENERATION
intrabony defects



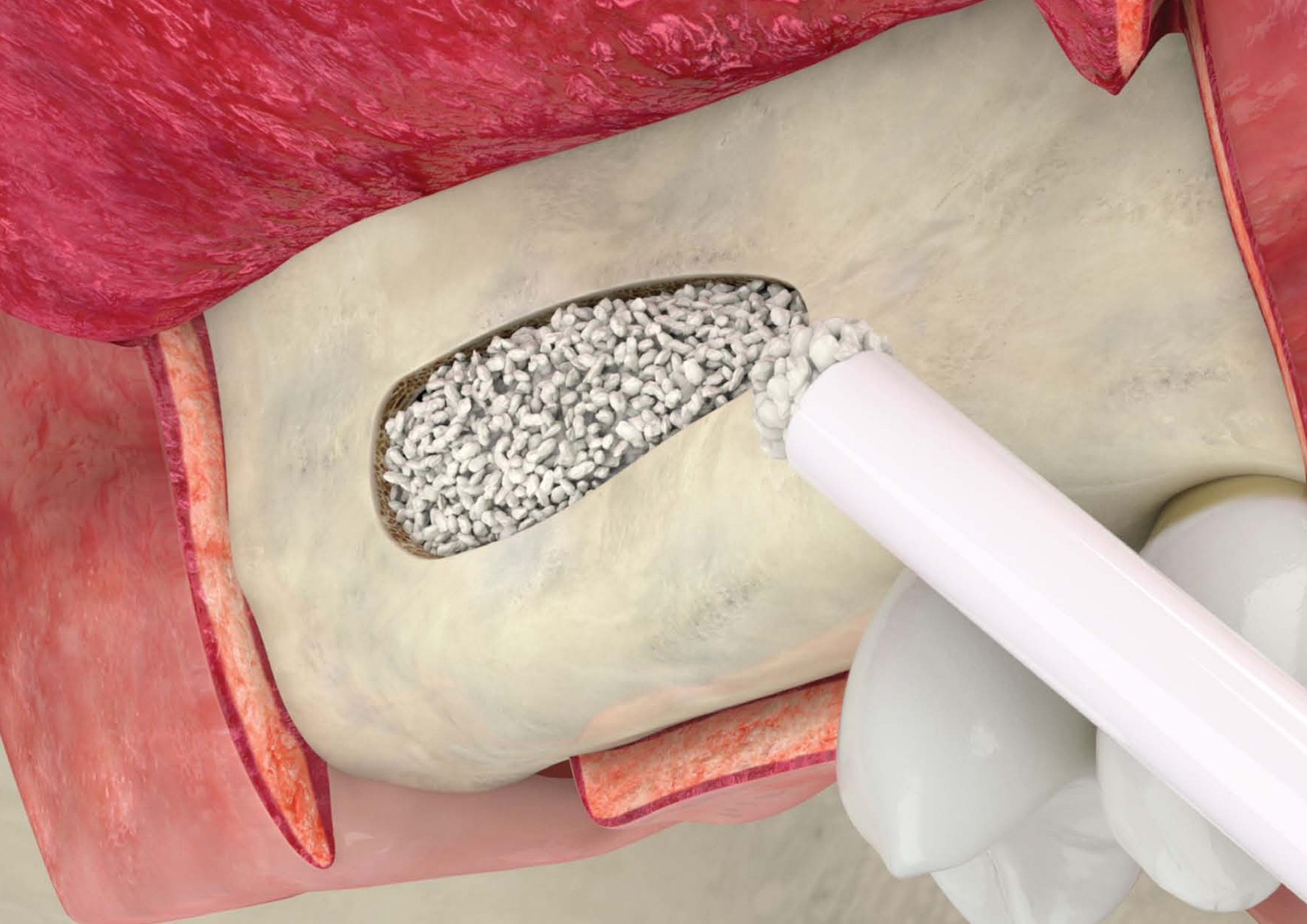
HORIZONTAL AUGMENTATION
two-wall defects

OsteoBiol® *TSV Gel* GELIFICATION KINETICS



Source: Politecnico di Torino, Italy

The graph shows the effect of temperature change on 3 *TSV Gel* samples.
As temperature increases from 0°C (1°C/min), the viscosity of the gel reaches its minimum at 4°C.
It then increases rapidly until it plateaus at 13°C. At room and body temperature *TSV Gel* is gel-like. It does not harden but keeps a soft consistency that allows the mixture with *Gen-Os*® or *Apatos* granules. Thanks to the hydrophilic properties of OsteoBiol® bone substitutes, the mixture becomes a sticky, stable conglomerate that can easily be placed in the defect site.
TSV Gel is biocompatible and rapidly resorbed.



mp3®

Ultimate performance and handling

Pre-hydrated collagenated heterologous cortico-cancellous bone mix

Tissue of origin
Cortico-cancellous heterologous bone mix

Tissue collagen
Preserved plus an additional 10% collagen gel

Physical form
Pre-hydrated granules and collagen gel

Composition
90% granulated mix, 10% collagen gel

Granulometry
600-1000 μm
1000-2000 μm

Re-entry time
About 5 months

Packaging
Syringe: 0.5 cc,1.0 cc, 3x0.25 cc, 3x0.5 cc, 3x1.0 cc
Wide tip syringe: 2.0 cc

Product codes
600-1000 μm
A3095FS | 1 Syringe | 0.5 cc | Porcine
A3095FE | 1 Syringe | 0.5 cc | Equine
A3005FS | 1 Syringe | 1.0 cc | Porcine
A3005FE | 1 Syringe | 1.0 cc | Equine
A3075FS | 3 Syringes | 3x0.25 cc | Porcine
A3015FS | 3 Syringes | 3x0.5 cc | Porcine
A3015FE | 3 Syringes | 3x0.5 cc | Equine
A3030FS | 3 Syringes | 3x1.0 cc | Porcine
A3030FE | 3 Syringes | 3x1.0 cc | Equine
A3010FS | 1 Wide tip syringe | 2.0 cc | Porcine
A3010FE | 1 Wide tip syringe | 2.0 cc | Equine
1000-2000 μm
A3210FS | 1 Wide tip syringe | 2.0 cc | Porcine
A3210FE | 1 Wide tip syringe | 2.0 cc | Equine

GMDN code
46425

CND code
P900402

Characteristics and handling

CHARACTERISTICS

Heterologous origin biomaterial made of 600-1000 μm or 1000-2000 μm pre-hydrated collagenated cortico-cancellous granules, properly mixed with collagen gel. Thus, it is possible both skipping the hydration phase and decreasing the risk of accidental exposure of the material to pathogens during manipulation and grafting phases; furthermore, the syringe is flexible and ideal to simplify grafting in the receiving site.

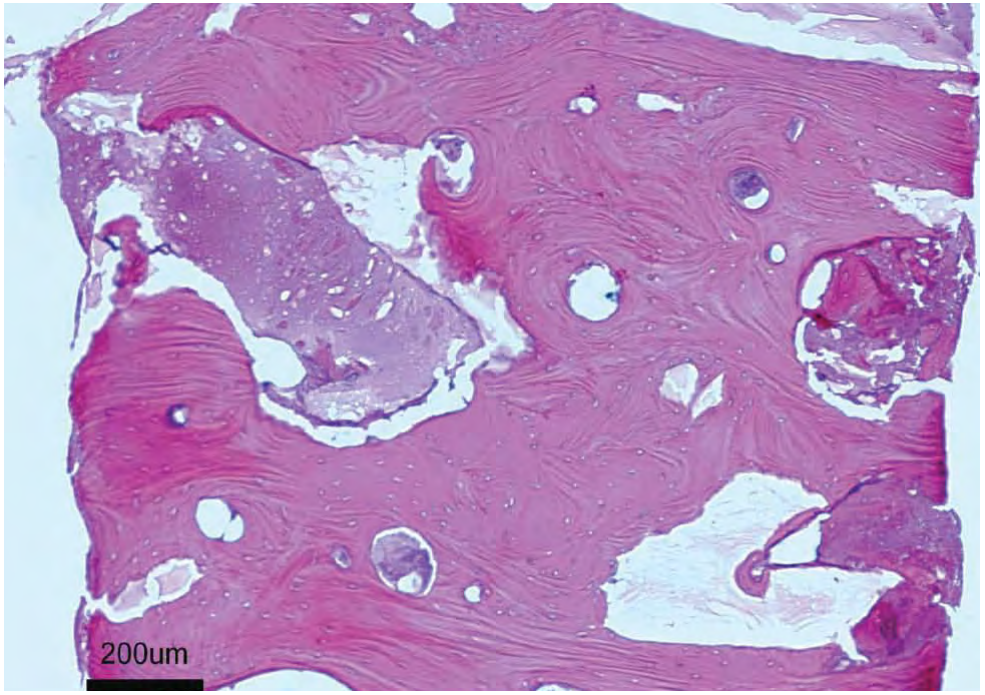
The granules are endowed with characteristics very similar to human mineral bone, and can be used as an alternative to autologous bone.

Their natural micro-porous consistency facilitates new bone tissue formation[1] in defect sites and accelerates the regeneration process.

Gradually resorbable[2,3], it preserves the original graft shape and volume (osteoconductive property)[4,5].
Moreover, thanks to its collagen content, the product facilitates blood clotting and the subsequent invasion of repairing and regenerative cells.

HANDLING

mp3® is available in ready-to-use syringes and can be easily grafted avoiding the hydration and manipulation phases.
After adapting the material to the defect shape, it is necessary to remove non-stable residues before proceeding to soft tissue suture. It is recommended to always compact *mp3®* after grafting to achieve optimal stabilization.



Histology on maxillary sinus biopsy taken at 24 months. 48% new bone formation, 13% residual granules
Author: Biopsy by Dr Roberto Rossi, Genova, Italy. Histology by Prof Ulf Nannmark, University of Göteborg, Sweden

Source: Tecnoss® Dental Media Library

Clinical Information

free animated videos
on OsteoBiol® APP

Available on the App Store | Get it on Google play

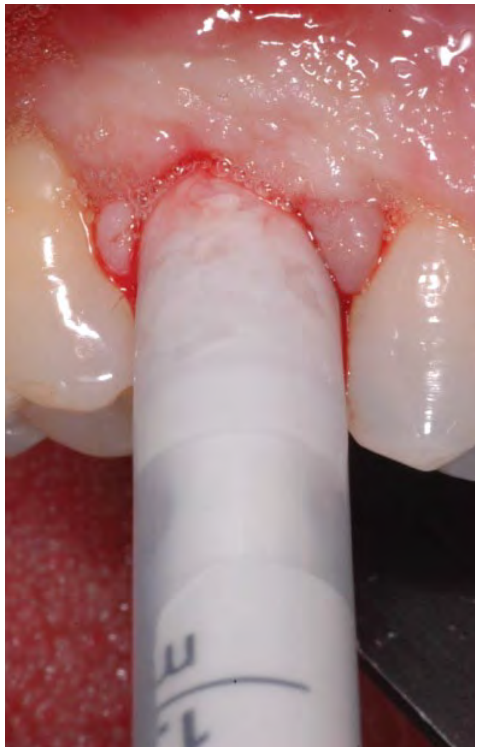
mp3® is a pre-hydrated cortico-cancellous bone mix with 10% collagen gel. It has been developed with this innovative biotechnology and is a "ready-to-use" product.

mp3® is commonly used for lateral access maxillary sinus lift[1,6], always in association with *Evolution* membranes, to cover the antrostomy: the *mp3*® syringe can be directly applied into the bony window without having to mix the *mp3*® granules with saline.

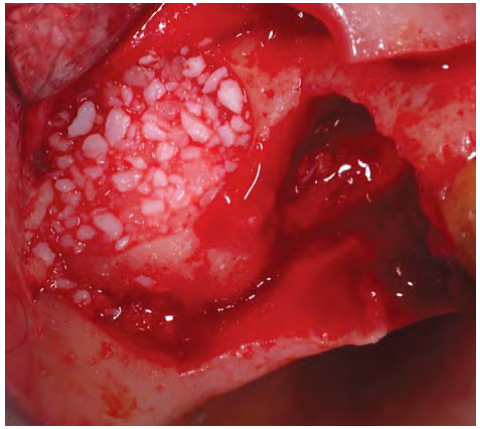
Due to its collagen gel content, *mp3*® allows an excellent graft stability while its hydrophilia guarantees quick blood absorption and therefore the necessary graft vascularization. *mp3*® has also been successfully used in combination with *Evolution* membranes for alveolar ridge preservation[3,7,8]: the application of this biomaterial limits the alveolar ridge width and height reduction that would naturally occur with spontaneous healing, preserving thus the alveolar ridge volume and allowing a correct second stage implant placement.

mp3® has been documented for horizontal augmentation (two wall defects) in combination with autogenous bone blocks or with OsteoBiol® *Lamina*[9,10]: its cortico-cancellous composition allows a progressive resorption of osteoclastic type, and in parallel a similar rate of new bone formation[2].

These unique properties allow a very good graft volume preservation[11], a healthy new bony tissue and ultimately, a successful implant rehabilitation.

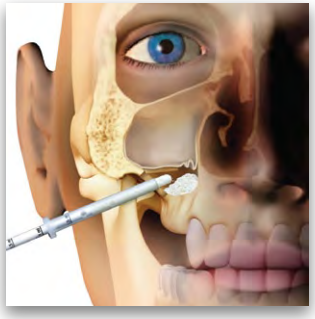


Socket grafted with OsteoBiol® *mp3*®

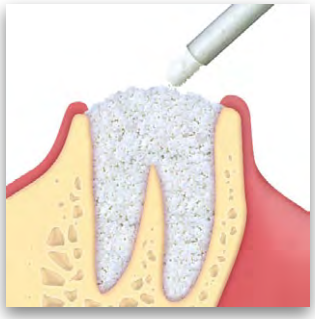


Periodontal defect grafted with OsteoBiol® *mp3*®

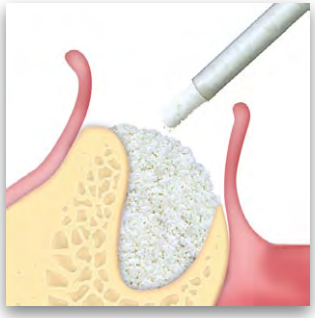
Author: Dr Roberto Rossi, Genova, Italy



LATERAL ACCESS SINUS LIFT
maxillary sinus floor augmentation



ALVEOLAR REGENERATION
post-extractive sockets



HORIZONTAL AUGMENTATION
two-wall defects

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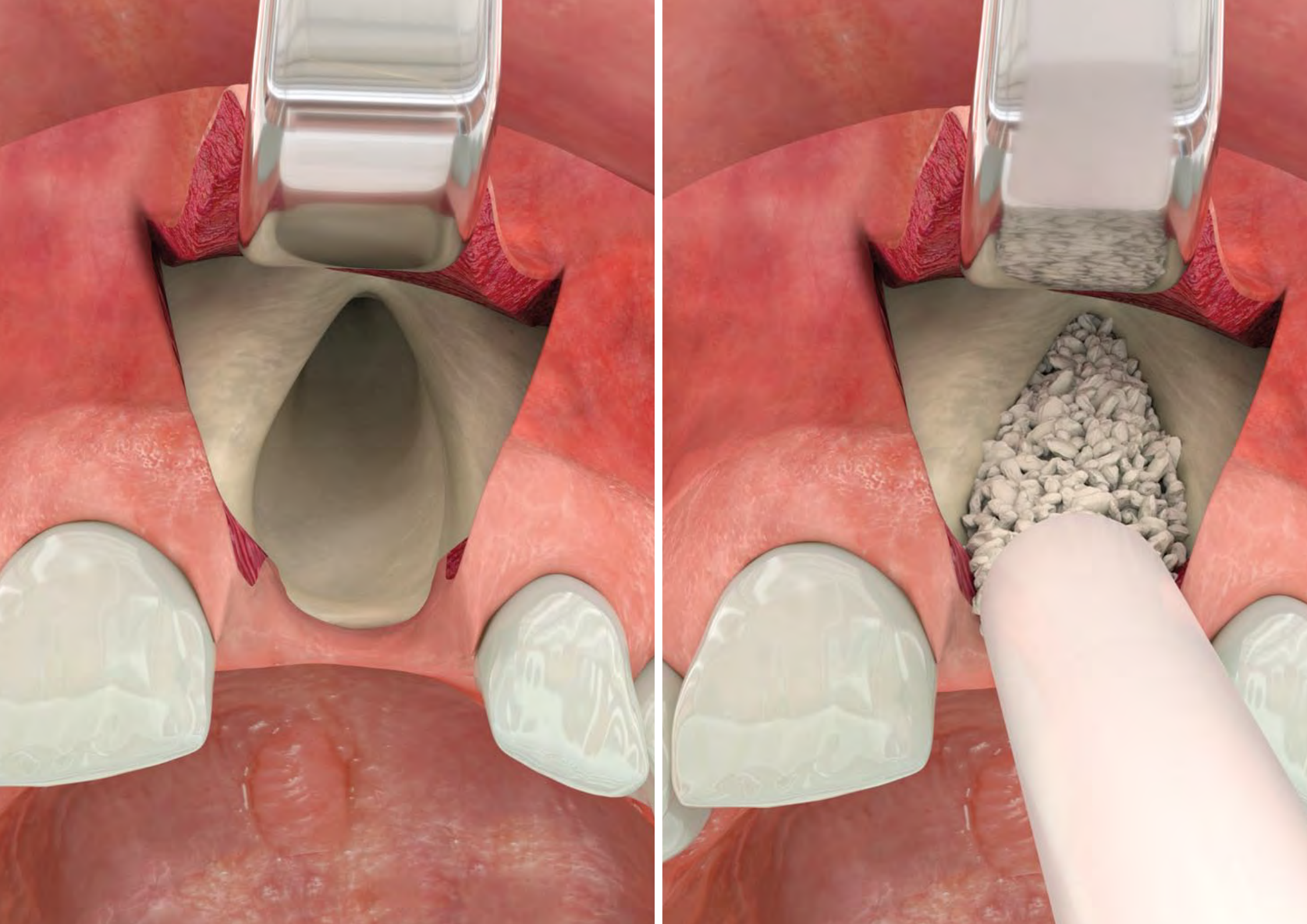
For further information see the complete literature on p. 92



GTO®

The new standard of excellence in biomaterials

Collagenated heterologous cortico-cancellous bone mix + TSV Gel

Tissue of origin
Cortico-cancellous heterologous bone mix

Tissue collagen
Preserved

Physical form
Pre-hydrated granules and *TSV Gel*

Composition
80% granulated mix, 20% *TSV Gel*

Granulometry
600-1000 μm

Re-entry time
About 5 months

Packaging
Syringe: 0.5 cc
Wide tip syringe: 2.0 cc

Product codes

MU0005S | 1 Syringe | 0.5 cc | Porcine
MU0005E | 1 Syringe | 0.5 cc | Equine

MU0020S | 1 Wide tip syringe | 2.0 cc | Porcine
MU0020E | 1 Wide tip syringe | 2.0 cc | Equine

GMDN code
46425

CND code
P900402

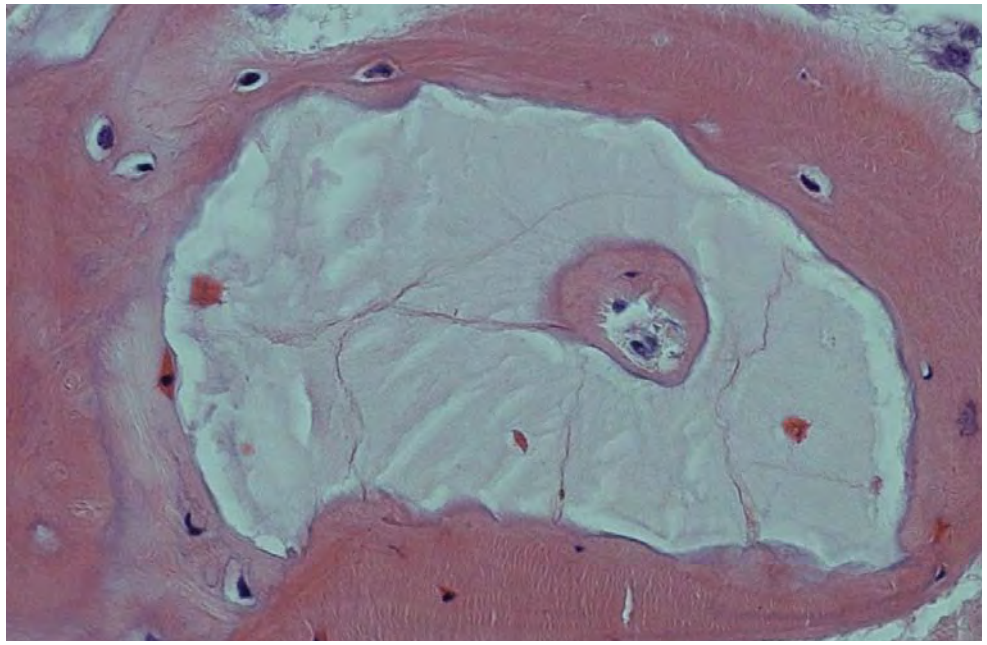
Characteristics and handling

CHARACTERISTICS

Heterologous bone grafting material made of a mix of collagenated cortico-cancellous granules of size ranging from 600 to1000 μm, properly blended with *TSV Gel*, which is a mixture of heterologous type I and III collagen gel with polyunsaturated fatty acids and a biocompatible synthetic copolymer diluted in aqueous solution. *GTO®* is gradually resorbed and it is extremely osteoconductive. Moreover, the preserved collagen matrix characterizing the granules facilitates blood clotting and the subsequent invasion of repairing and regenerative cells. These unique properties guarantee an excellent rate of new bone formation, delivering adequate graft volume preservation, a healthy new bony tissue and, ultimately, a successful implant rehabilitation. The presence of the same kind of granules of its progenitor, *mp3®*, which are very similar to human mineral bone, assures a similar biological response of the host tissue. *GTO®* can be used as alternative to autologous bone.

HANDLING

GTO® is available in two sizes (0.5 and 2.0 cc) as ready-to-use pre-hydrated biomaterial and can be easily grafted to the defect site. Thus, clinicians can skip the hydration step with saline or blood, saving time and decreasing the risk of accidental exposure to pathogens. The presence of *TSV Gel* ensures optimal stickiness of the material, which is also easily adaptable to the recipient site and extremely stable.



Part of a biopsy showing newly formed bone 4 months after treatment with OsteoBiol® *GTO®*
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

Source: Tecnoss® Dental Media Library

Author: Dr Patrick Palacci, Marseille, France

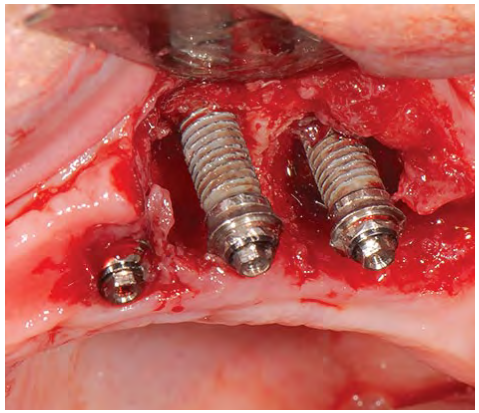
Clinical Information

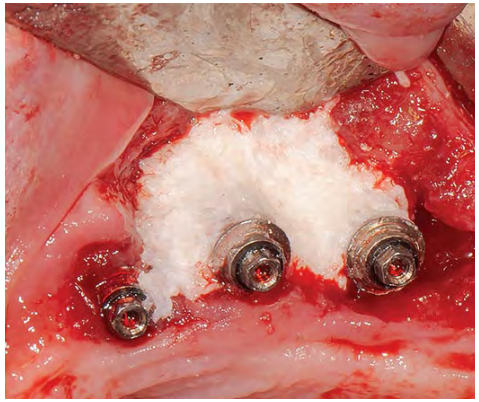
free animated videos
on OsteoBiol® APP

Available on the App Store | Get it on Google play

GTO® has been conceived as a universal biomaterial, easily adaptable to any bone defect, in association with *Evolution* membranes or *Lamina* to protect the graft. Nonetheless, thanks to its stickiness, has proved particularly effective for horizontal augmentation procedures (e.g.: two-walls defects, when the crest is resorbed) and for socket preservation cases with compromised buccal plate.
GTO® can also be successfully used to treat peri-implant lesions.
In case of open defects, *GTO*® should be grafted in consecutive layers compacting each layer with a sterile gauze.

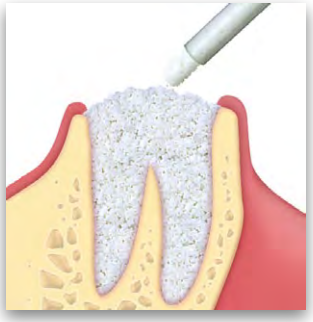
The above clinical information is based on the experience of expert surgeons



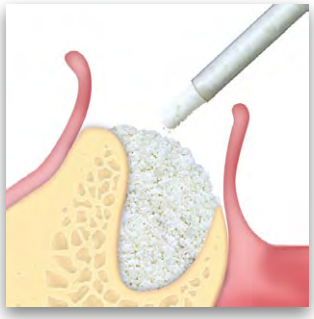


Peri-implant defect treated with OsteoBiol® *GTO*®
Author: Dr Patrick Palacci, Marseille, France

DEHISCENCES AND FENESTRATIONS
peri-implant grafting

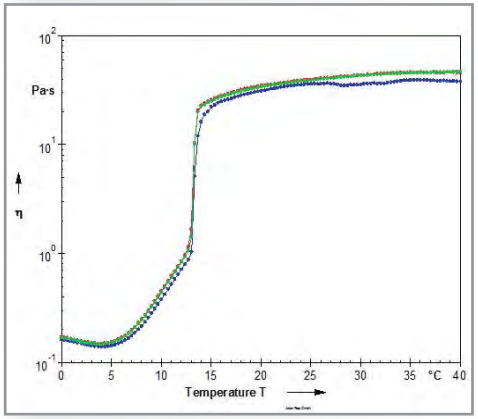


ALVEOLAR REGENERATION
post-extractive sockets



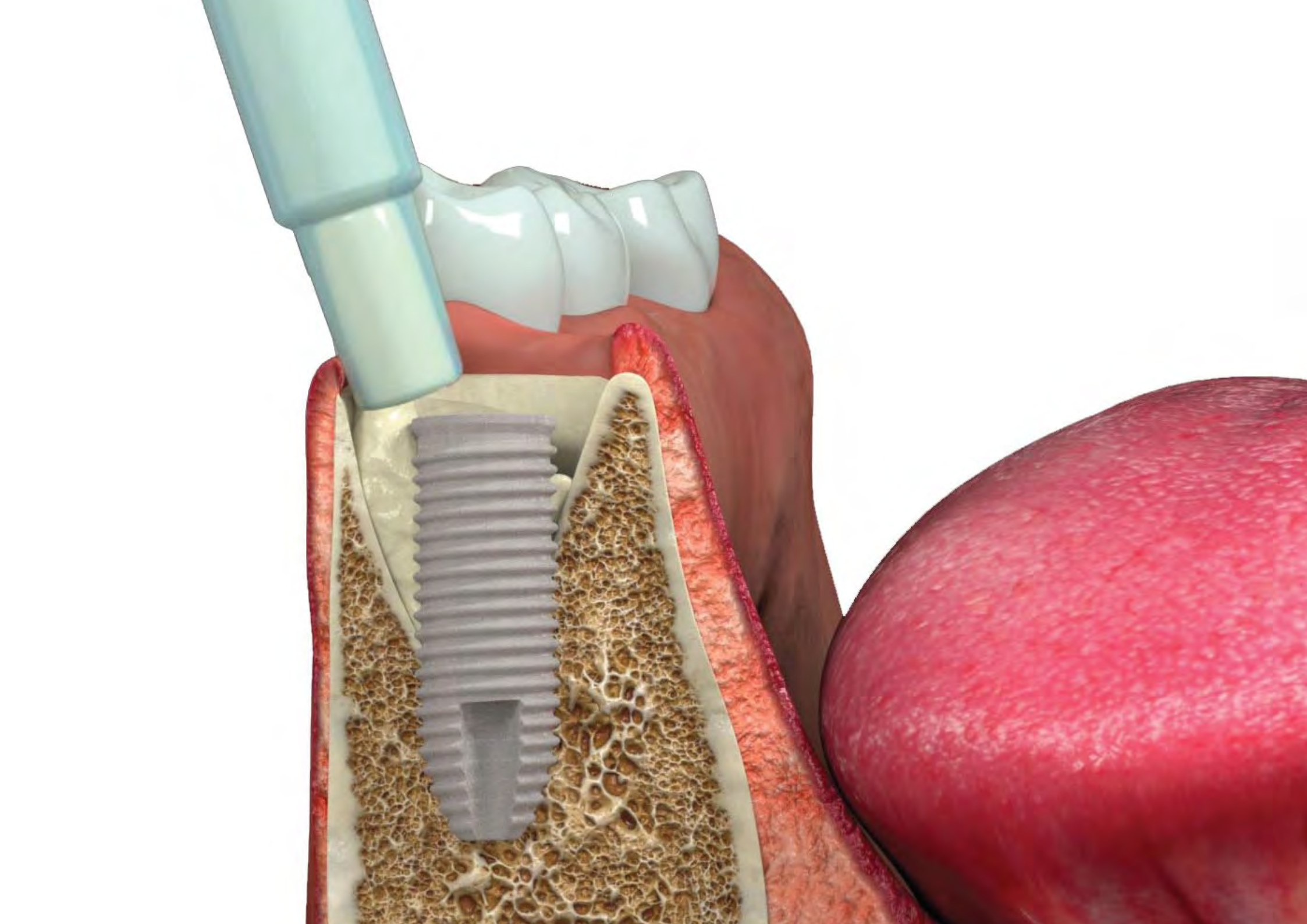
HORIZONTAL AUGMENTATION
two-wall defects

OsteoBiol® *TSV Gel* GELIFICATION KINETICS



Source: Politecnico di Torino, Italy

The graph shows the effect of temperature change on 3 *TSV Gel* samples.
As temperature increases from 0°C (1°C/min), the viscosity of the gel reaches its minimum at 4°C.
It then increases rapidly until it plateaus at 13°C. At room and body temperature *TSV Gel* is gel-like. It does not harden but keeps a soft consistency that allows the mixture with *Gen-Os*® or *Apatos* granules. Thanks to the hydrophilic properties of OsteoBiol® bone substitutes, the mixture becomes a sticky, stable conglomerate that can easily be placed in the defect site.
TSV Gel is biocompatible and rapidly resorbed.



Putty

Engineered for peri-implant defects

Pre-hydrated collagenated heterologous cortico-cancellous bone paste

Tissue of origin
Cortico-cancellous heterologous bone mix

Tissue collagen
Preserved plus an additional 20% collagen gel

Physical form
Plastic consistency composed of collagen gel loaded with 80% micronized bone mix

Composition
80% granulated mix, 20% collagen gel

Granulometry
Up to 300 μm

Re-entry time
About 4 months

Packaging
Syringe: 0.25 cc, 0.5 cc, 3x0.5 cc, 3x0.25 cc
Wide tip syringe: 1.0 cc

Product codes

HPT52S | 1 Syringe | 0.25 cc | Porcine
HPT09S | 1 Syringe | 0.5 cc | Porcine
HPT09E | 1 Syringe | 0.5 cc | Equine
HPT32S | 3 Syringes | 3x0.25 cc | Porcine
HPT32E | 3 Syringes | 3x0.25 cc | Equine
HPT35S | 3 Syringes | 3x0.5 cc | Porcine
HPT35E | 3 Syringes | 3x0.5 cc | Equine

HPT61S | 1 Wide tip syringe | 1.0 cc | Porcine
HPT61E | 1 Wide tip syringe | 1.0 cc | Equine

GMDN code
46425

CND code
P900402

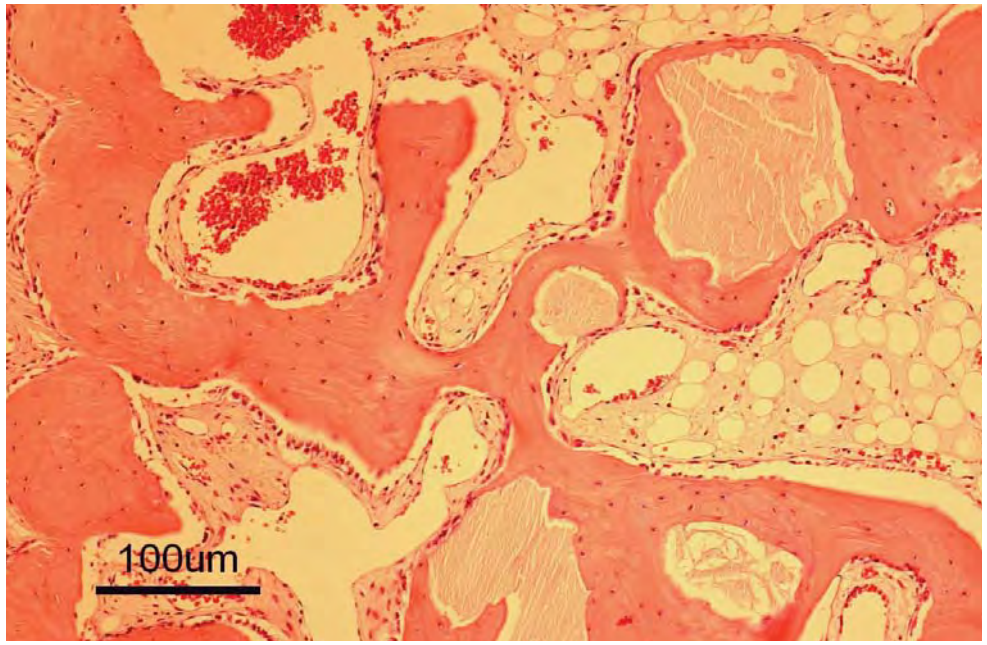
Characteristics and handling

CHARACTERISTICS

Putty is a bone paste with at least 80% micronized heterologous bone (granulometry up to 300 μm) and collagen gel. It is made with an exclusive process that provides the product with exceptional malleability and plasticity, making it easy to apply into peri-implant defects with walls. Thanks to its collagen component, the product facilitates blood clotting and the subsequent invasion of repairing and regenerative cells, showing an osteoconductive behaviour[1]. Successful grafting needs complete stability of the biomaterial: for this reason *Putty* must be used only in cavities able to firmly contain it. Therefore, *Putty* must not be grafted in two wall defects or in lateral access sinus lift procedures.

HANDLING

Inject the product and adapt it to defect morphology without compression; any non-stable residue must be removed before soft tissue suture. An *Evolution* membrane is recommended to protect *Putty* grafted in peri-implant defects.



Part of a biopsy showing newly formed bone after treatment with OsteoBiol® *Putty*
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

Source: Tecnoss® Dental Media Library

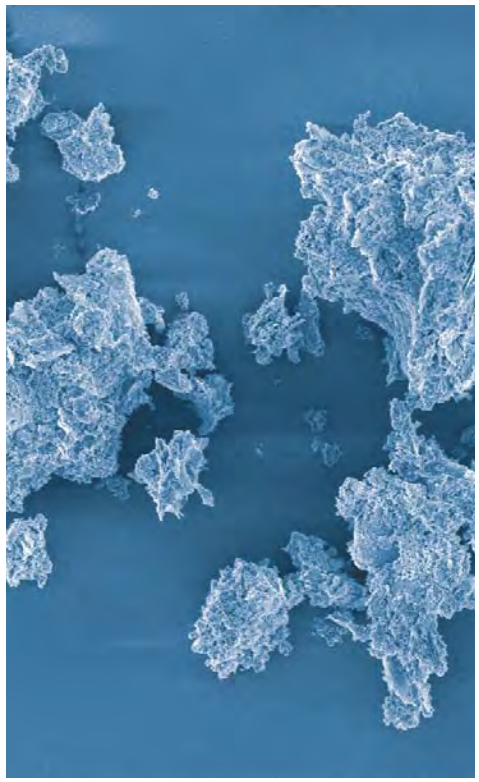
Clinical Information

free animated videos
on OsteoBiol® APP

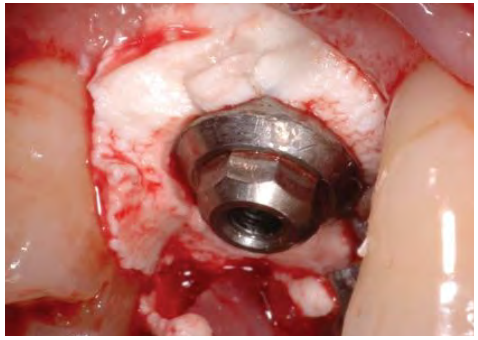
Available on the App Store | Get it on Google play

The extraordinary handling properties of *Putty* syringe make this product the ideal choice for self-contained peri-implant defects[2] and all small defects that present a self-contained cavity. Furthermore, the Tecnoss® manufacturing process avoids granules ceramization, allowing a progressive resorption of the biomaterial and, at the same time, an adequate new-bone formation rate[3]. *Putty*'s "soft" consistency also guarantees an easy and healthy soft-tissues healing. Thanks to these unique characteristics, *Putty* has been effectively used for peri-implant defects regeneration: following immediate post-extractive implants placement, *Putty* can be injected between the defect walls and the implant, guaranteeing a perfect filling of the entire defect volume[4].

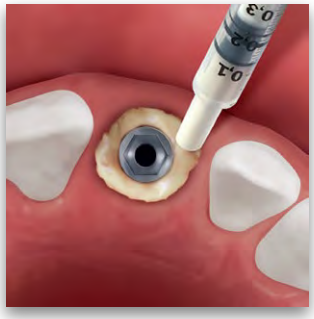
The product versatility also makes *Putty* the ideal solution when bone tissue has been lost due to peri-implantitis as long as the containing walls are present. In fact, the primary condition for gaining a successful regeneration is to achieve the biomaterial initial stability. Therefore, *Putty* must be used only in defects where the surrounding walls guarantee such condition: for example inside the bone crest when ridge-split technique is adopted[5], or with horizontally resorbed crests, in association with OsteoBiol® *Lamina* (Bone Layer technique)[6].



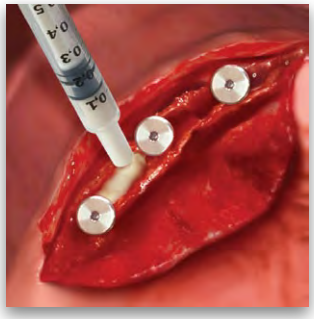
SEM image of OsteoBiol® *Putty*
Author: Prof Ulf Nannmark, University of Göteborg, Sweden



Peri-implant lesion grafted with OsteoBiol® *Putty*
Author: Dr Roberto Rossi, Genova, Italy



DEHISCENCES AND FENESTRATIONS
peri-implant defects



HORIZONTAL AUGMENTATION
ridge split

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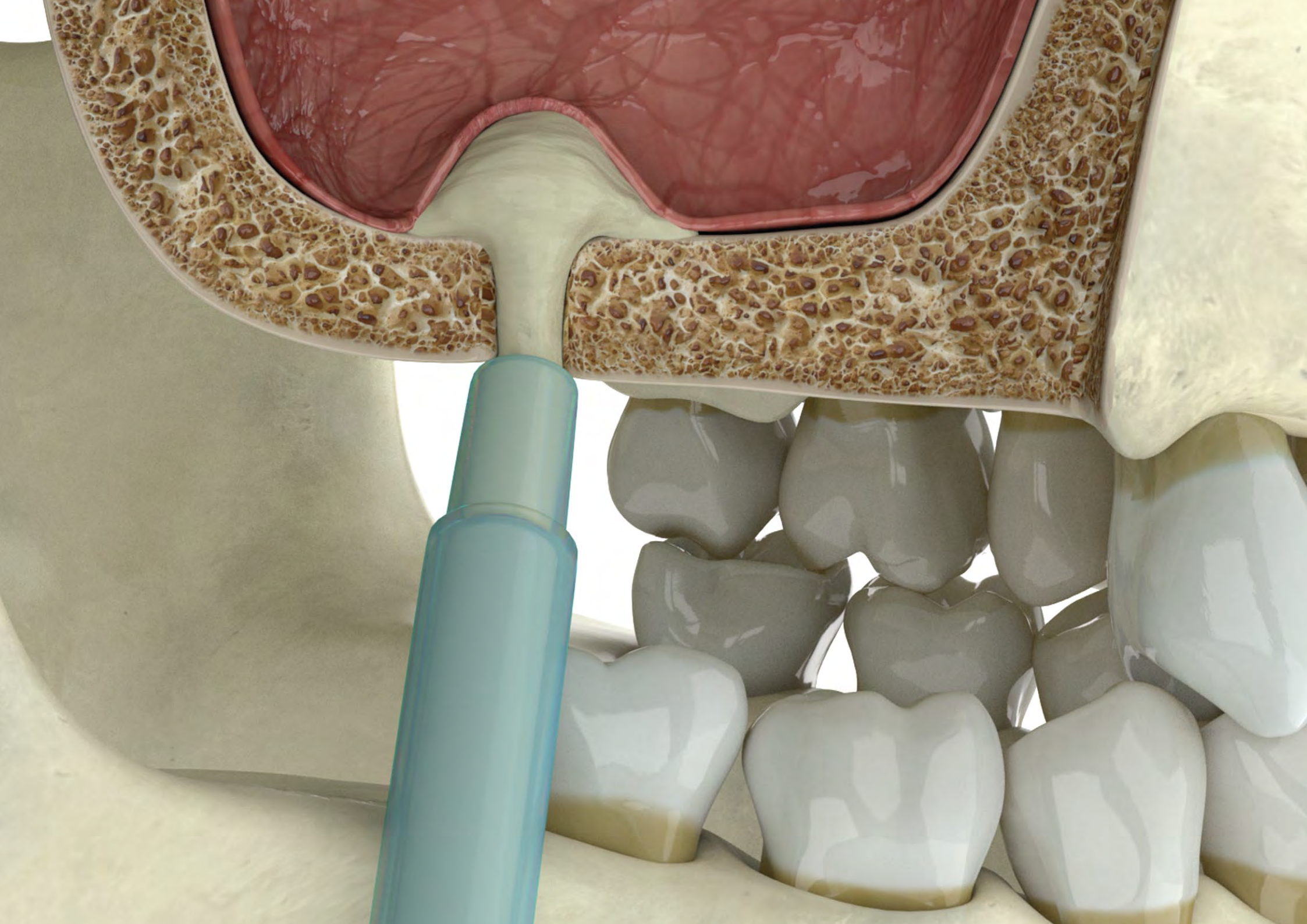
For further information see the complete literature on p. 92



Gel 40

A unique heterologous bone gel

Collagenated heterologous cortico-cancellous bone mix

Tissue of origin
Cortico-cancellous heterologous bone mix

Tissue collagen
Preserved plus an additional 40% collagen gel

Physical form
Collagen gel type I and III loaded with 60% bone mix

Composition
60% granulated mix, 40% collagen gel

Granulometry
Up to 300 μm

Re-entry time
About 4 months

Packaging
Syringe: 0.5 cc, 3x0.5 cc

Product codes
05GEL40S | 1 Syringe | 0.5 cc | Porcine
05GEL40E | 1 Syringe | 0.5 cc | Equine
15GEL40S | 3 Syringes | 3x0.5 cc | Porcine
15GEL40E | 3 Syringes | 3x0.5 cc | Equine

GMDN code
46425

CND code
P900402

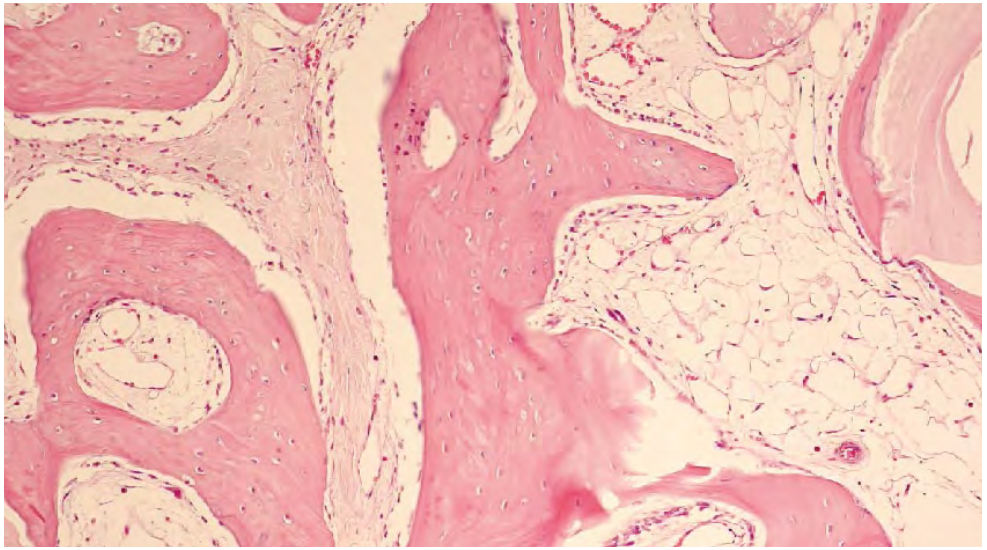
Characteristics and handling

CHARACTERISTICS

Gel 40 is made of a collagen matrix (type I and III) obtained using an exclusive Tecnoss® process, loaded for 60% of its volume with micronized heterologous bone (granulometry up to 300 μm). Thanks to its collagen component, *Gel 40* facilitates the formation of primary blood clot and the subsequent invasion of repairing and regenerative cells; moreover, the cortico-cancellous component provides the necessary scaffold function.
The collagen gel component contained in *Gel 40* is rapidly and totally resorbed; it is also endowed with exceptional anti-inflammatory, eutrophic and cicatrizing properties. This lipophilia is due mainly to a percentage of polyunsaturated fatty acids of the oleic-linoleic series (to which Omega 3 also belongs) directly derived from the raw material. Such components possess a valuable antioxidant action on the free radicals and therefore aid tissue regeneration.

HANDLING

The distinctive characteristics of viscosity and density of *Gel 40* facilitate the handling of the product by the operator, providing a glue-like support. If viscosity is excessive, add a few drops of sterile lukewarm saline and then re-mix thoroughly to obtain the desired density.



Part of a biopsy showing newly formed bone after treatment with OsteoBiol® *Gel 40*. Biopsies were taken 5 weeks after implantation in rabbit maxillae. Htx-eosine. Original magnification x20
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

Source: Tecnoss® Dental Media Library

Clinical Information

free animated videos
on OsteoBiol® APP

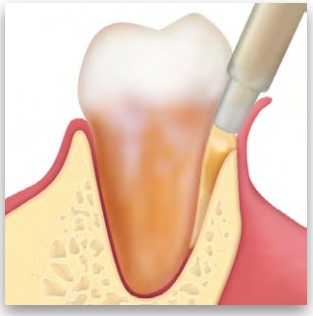
Available on the App Store | Get it on Google play

The exclusive Tecnoss® manufacturing process guarantees an exceptional malleability and plasticity: furthermore, the syringe packaging provides *Gel 40* extraordinary handling properties making this product the ideal choice for crestal access sinus lift[1,2], deep and narrow peri-implant defects[3], three-wall intrabony defects and, in combination with *Evolution* membranes, for treating gingival recessions[4].

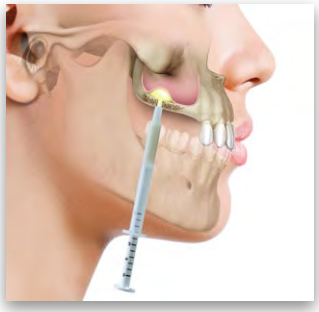
Furthermore, the Tecnoss® manufacturing process avoids granules ceramization, allowing a progressive resorption of the biomaterial and, at the same time, an adequate new-bone formation rate[5,6].

Gel 40 "soft" consistency also guarantees an easy and healthy soft-tissues healing.

Crestal access sinus lift with OsteoBiol® *Gel 40*
Source: Tecnoss® Dental Media Library



PERIODONTAL REGENERATION
intrabony defects and gingival recessions



CRESTAL ACCESS SINUS LIFT
crestal sinus floor augmentation

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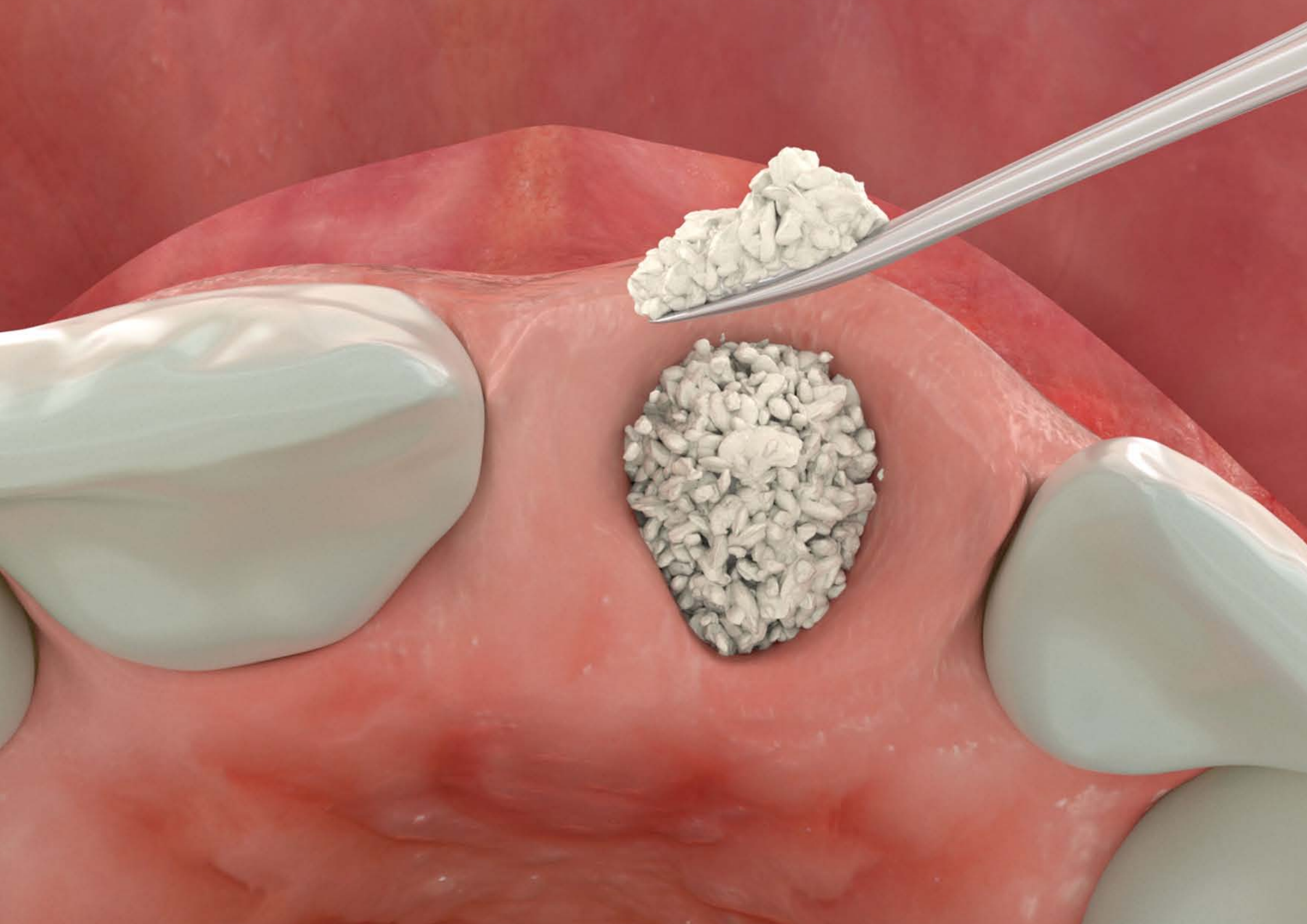
For further information see the complete literature on p. 92



Apatos

Microcrystalline hydroxyapatite

Heterologous cortico-cancellous and cortical bone

Tissue of origin
Apatos Mix: cortico-cancellous heterologous bone mix
Apatos Cortical: heterologous cortical bone

Tissue collagen
Degraded

Physical form
Radiopaque granules of mineral hydroxyapatite

Composition
Apatos Mix: 100% cortico-cancellous mix
Apatos Cortical: 100% cortical bone

Granulometry
600-1000 μm
1000-2000 μm

Re-entry time
About 5 months

Packaging
Mix | Vial: 0.5 g, 1.0 g, 2.0 g
Cortical | Vial: 0.5 g, 1.0 g

Product codes
600-1000 μm
Mix | A1005FS | 1 Vial | 0.5 g | Porcine
Mix | A1005FE | 1 Vial | 0.5 g | Equine
Mix | A1010FS | 1 Vial | 1.0 g | Porcine
Mix | A1010FE | 1 Vial | 1.0 g | Equine
Mix | A1020FS | 1 Vial | 2.0 g | Porcine
Mix | A1020FE | 1 Vial | 2.0 g | Equine
Cortical | AC1005FS | 1 Vial | 0.5 g | Porcine
Cortical | AC1010FS | 1 Vial | 1.0 g | Porcine

1000-2000 μm
Mix | A0210FS | 1 Vial | 1.0 g | Porcine
Mix | A0210FE | 1 Vial | 1.0 g | Equine

GMDN code
46425

CND code
P900402

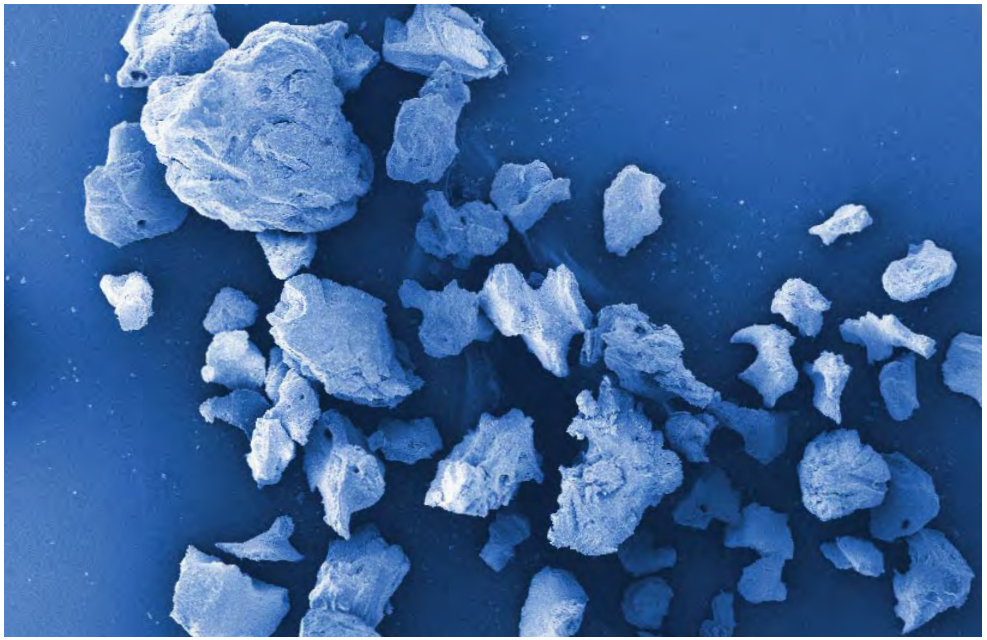
Characteristics and handling

CHARACTERISTICS

Apatos is a biocompatible[1,2], osteoconductive[3,4] biomaterial of heterologous origin with characteristics similar to mineralized human bone[5]; it can therefore be used as an alternative to autologous bone. The natural microporous consistency of *Apatos* facilitates the formation of new bone tissue in bone defect area[6], accelerating the process. *Apatos* microcrystalline hydroxyapatite is available in cortical and mixed granules.

HANDLING

Apatos must always be hydrated and thoroughly mixed with a few drops of sterile saline or with *TSV Gel* to increase graft stability in not self-contained defects; it can also be mixed with patient's blood. Finally it can be mixed if necessary with the drug selected for surgery; the mixture thus obtained should be positioned with a sterile spatula or syringe for biomaterials.



SEM image of OsteoBiol® Apatos, cancellous granules
Source: Nobil Bio Ricerche, Villafranca d'Asti, Italy

Source: Tecnoss® Dental Media Library

Clinical Information

free animated videos
on OsteoBiol® APP

Available on the App Store | Get it on Google play

Apatos is a universal filler, that can be used to treat peri-implant defects and two-wall defects[7,8]. Because of its granulometry, *Apatos* cannot be used in narrow defects, but it fits well in big sockets, e.g. after molar extractions[9]. Both sinus lift procedures (with crestal or lateral access)[2,10] can be performed with *Apatos* as bone substitute, as well as surgeries for horizontal regenerations.

Apatos Cortical is characterized by a very long resorption time[11], guaranteeing adequate preservation of the grafted volume.

When needed, *Apatos* grafts can be protected with OsteoBiol® *Evolution* membrane[12] or stabilized with *Cortical Lamina*.

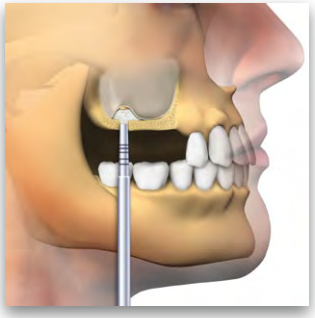
The above clinical information is based on the experience of expert surgeons

Source: Tecnoss® Dental Media Library

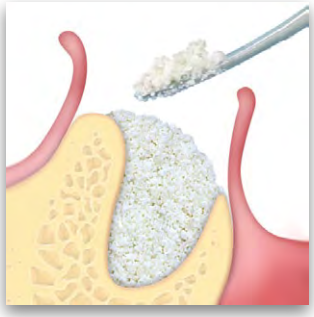
LATERAL ACCESS SINUS LIFT
maxillary sinus floor augmentation

DEHISCENCES AND FENESTRATIONS
peri-implant grafting

ALVEOLAR REGENERATION
socket preservation



CRESTAL ACCESS SINUS LIFT
osteotome sinus floor augmentation



HORIZONTAL AUGMENTATION
two-wall defects

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CLIN IMPL DENT RELAT RES, 2018 Dec;20(6):906-914

For further information see the complete literature on p. 92

BLOCKS

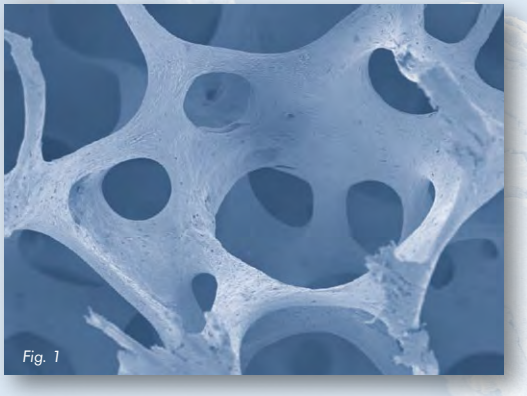


Fig. 1


Fig. 2

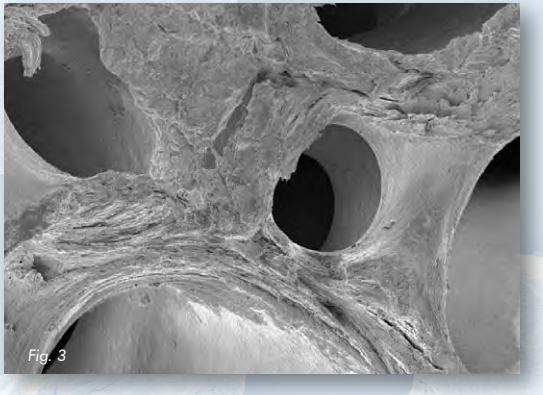


Fig. 3

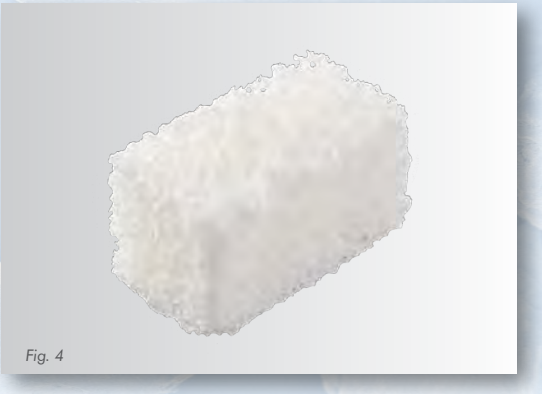


Fig. 4


Fig. 5


Fig. 6


Fig. 7

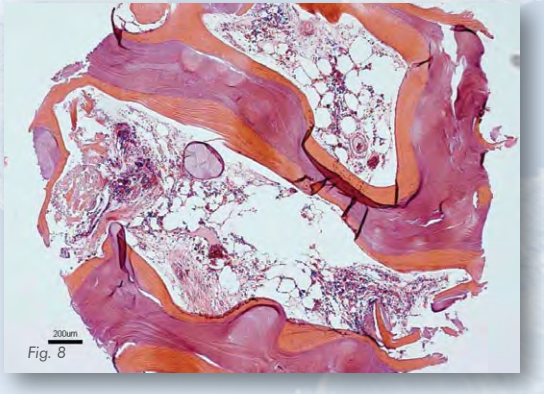


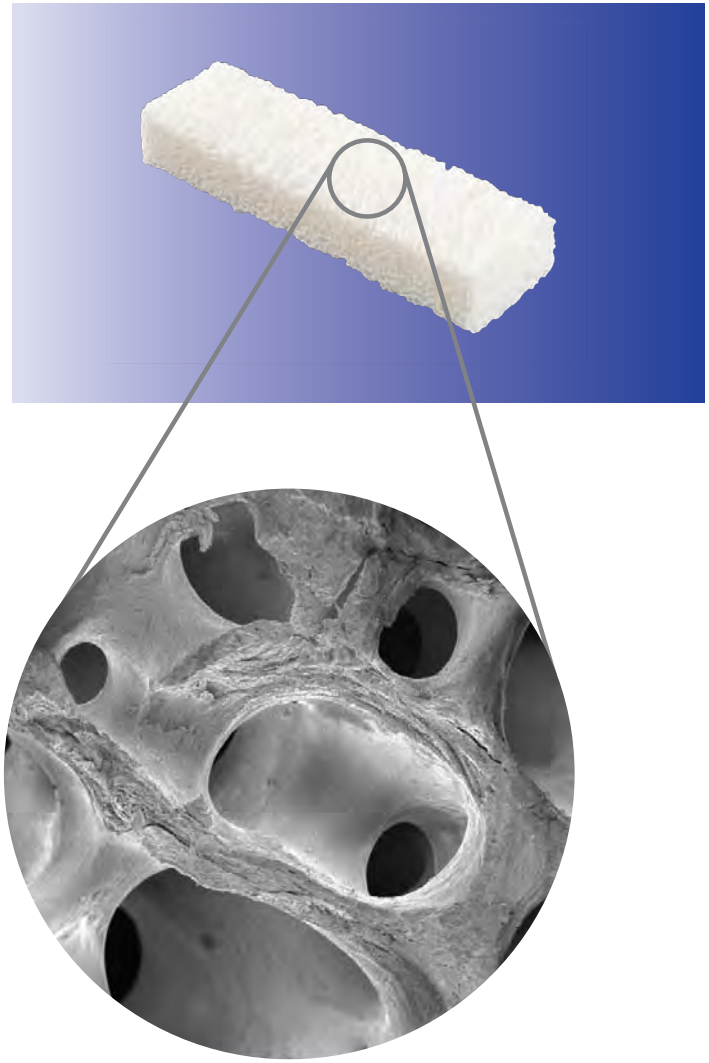
Fig. 8

Fig. 1,8 Prof Ulf Nannmark, University of Göteborg, Sweden | Fig. 2,4,5,7 Source: Tecnoss® Dental Media Library | Fig. 3,6 Source: Politecnico di Torino, Italy

OsteoBiol® bone blocks

Sp-Block

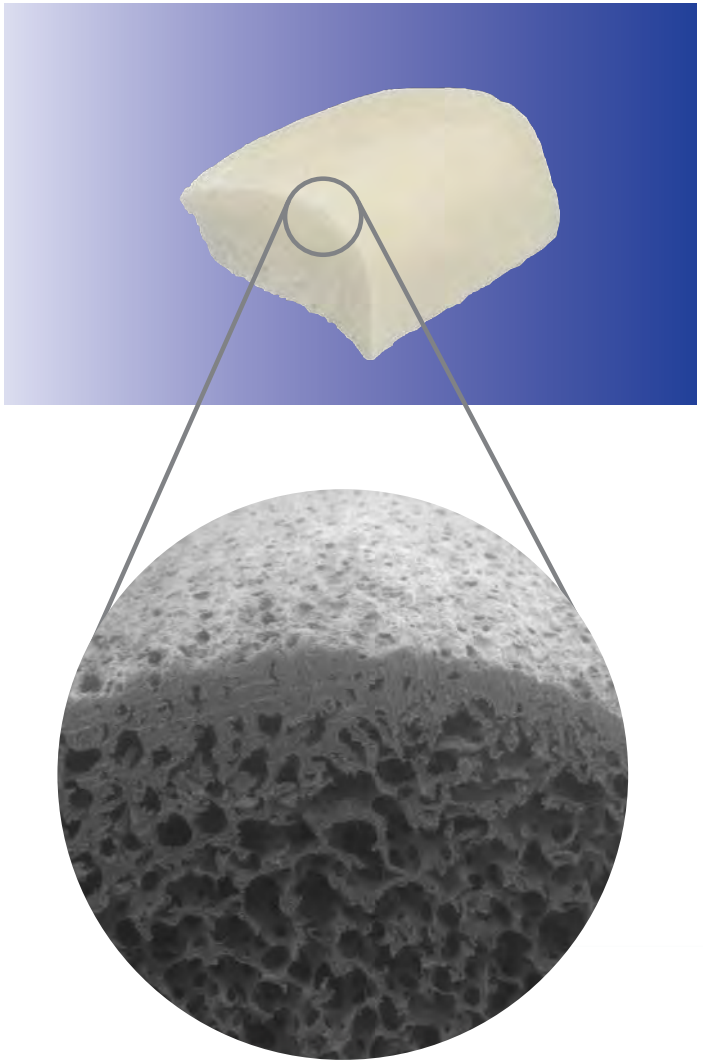
collagenated cancellous bone



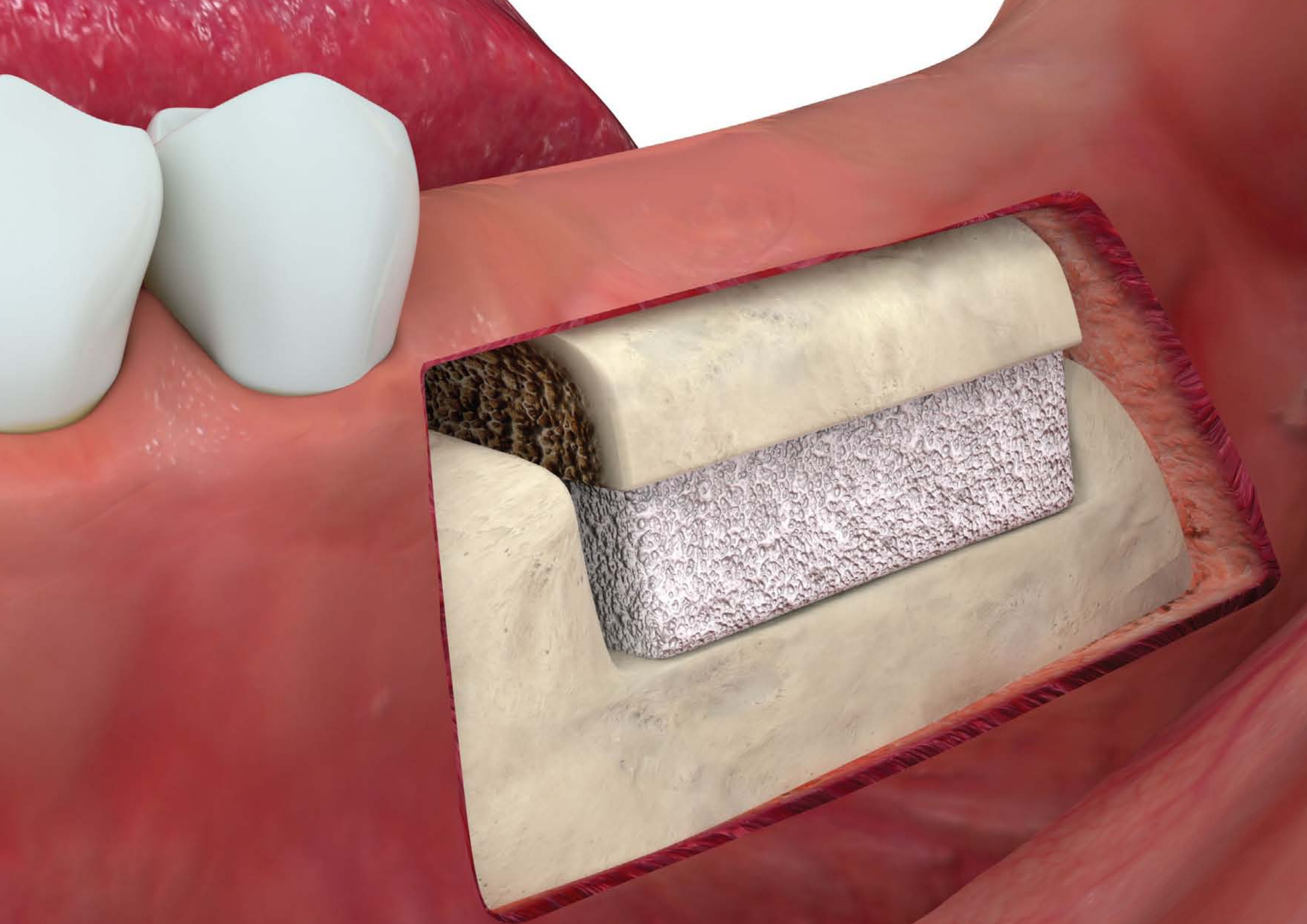
SEM image of OsteoBiol® *Sp-Block*. Magnification 200x.
Source: Politecnico di Torino, Italy
For more information on OsteoBiol® *Sp-Block* see page 54

Dual-Block

collagenated cortico-cancellous bone



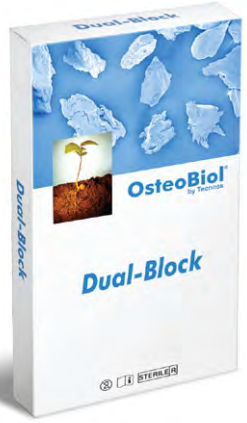
SEM image of OsteoBiol® *Dual-Block*. Magnification 20x.
Source: Politecnico di Torino, Italy
For more information on OsteoBiol® *Dual-Block* see page 54



Sp-Block

Cancellous block for the inlay technique in the mandible

Highly osteoconductive properties



Dual-Block

Cortico-cancellous scaffold for horizontal augmentation in the maxilla

Tissue of origin
Cancellous bone

Tissue collagen
Preserved

Physical form
Rigid dried block

Composition
Collagenated cancellous bone

Re-entry time
About 8 months, variable depending on characteristics and irroration grade of grafting site and on clinical conditions of the patient

Packaging
Sterile blister

Product codes
BN0E | 10x10x10 mm | Equine
BN1E | 10x10x20 mm | Equine
BN2E | 10x20x20 mm | Equine
BN8E | 35x10x5 mm | Equine

GMDN code
46425

CND code
P900402

Characteristics, handling and clinical information

free animated videos on OsteoBiol® APP

Available on the App Store | Get it on Google play

CHARACTERISTICS

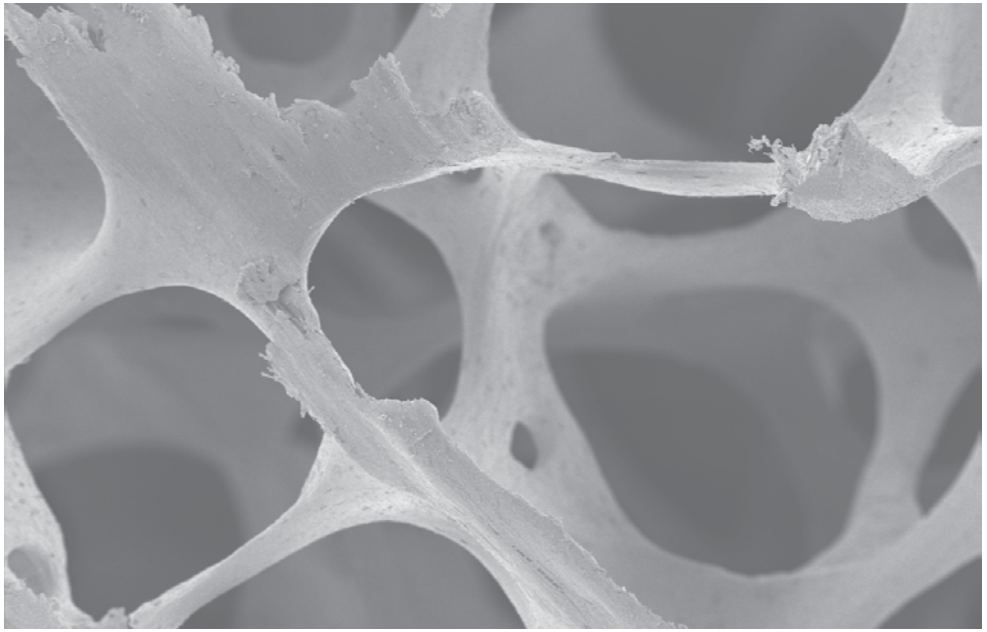
Sp-Block is a cancellous block of xenogenic bone produced with an exclusive Tecnoss® process which avoids ceramization of the hydroxyapatite crystals, thus accelerating physiological resorption. *Sp-Block* supports new bone formation[1]: thanks to its rigid consistency it is able to maintain the original graft volume, which is particularly important in case of large regenerations. Moreover, its collagen content facilitates blood clotting and the subsequent invasion of regenerative and repairing cells, favoring the *restitutio ad integrum* of missing bone.

HANDLING

Sp-Block must be hydrated before use for 5/10 minutes with sterile lukewarm physiological solution or with antibiotics. Afterwards, it can be adapted to the receiving site; the block must always be fixed with osteosynthesis microscrews and should be protected with a resorbable membrane (*Evolution*).

CLINICAL INFORMATION

Sp-Block has been documented in cases where a vertical gain in the posterior mandible is required, to achieve an augmentation of maximum 5 mm, by means of the inlay technique[2-4]. The gaps around the block can be filled with a biomaterial in granules; the augmented area in stabilized with mini-plates and screws and covered with an *Evolution* membrane.



SEM image of OsteoBiol® cancellous block
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

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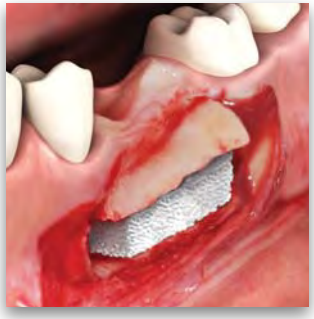
J CRANIO-MAXILLOFAC, 2017 SEP;45(9):1438-1447



VERTICAL AUGMENTATION
inlay technique

Characteristics, handling and clinical information

free animated videos on OsteoBiol® APP

Available on the App Store | Get it on Google play

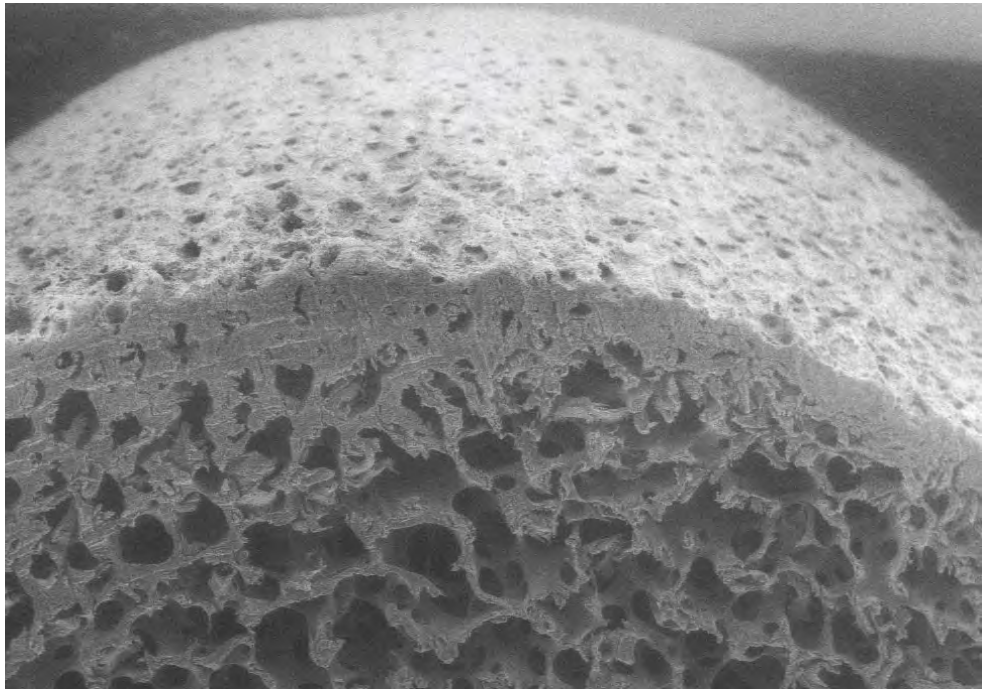
CHARACTERISTICS

Dual-Block is a cortico-cancellous block of xenogenic bone with osteoconductive characteristics. It can be used when the regeneration of big volumes is needed: thanks to the collagen content that promotes blood clotting and migration of regenerative and repairing cells[1], the graft offers an adequate support for tissue reconstruction and is gradually resorbed, while new bone is produced by osteoblasts.

HANDLING

Dual-Block must be hydrated before use with sterile lukewarm physiological solution or with antibiotics (5/10 minutes for Soft version; up to 40 minutes for Norm version). Afterwards, the block can be adapted to the receiving site which must be accurately decorticated in order to guarantee maximum contact; the block should always be fixed with osteosynthesis microscrews and protected with *Evolution* membrane.

OsteoBiol® *Dual-Block*
Source: Tecnoss® Dental Media Library

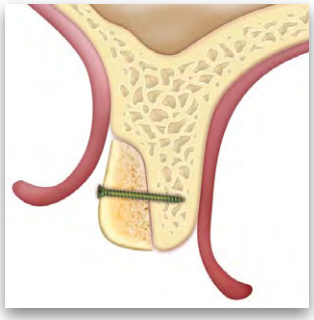


SEM image of OsteoBiol® *Dual-Block*
Source: Politecnico di Torino, Italy

CLINICAL INFORMATION

Dual-Block can be grafted with the onlay technique only to augment horizontally heavily resorbed maxilla.
The gaps around the block can be filled with a biomaterial in granules to achieve the desired volume and contour of the augmented recipient site.

The above clinical information is based on the experience of expert surgeons



HORIZONTAL AUGMENTATION
onlay technique

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J PERIODONTAL RES, 2016 Feb;51(1):112-24

Tissue of origin
Cortico-cancellous bone

Tissue collagen
Preserved

Physical form
Rigid dried block

Composition
Collagenated cortico-cancellous bone

Re-entry time
About 8 months, variable depending on characteristics and irroration grade of grafting site and on clinical conditions of the patient

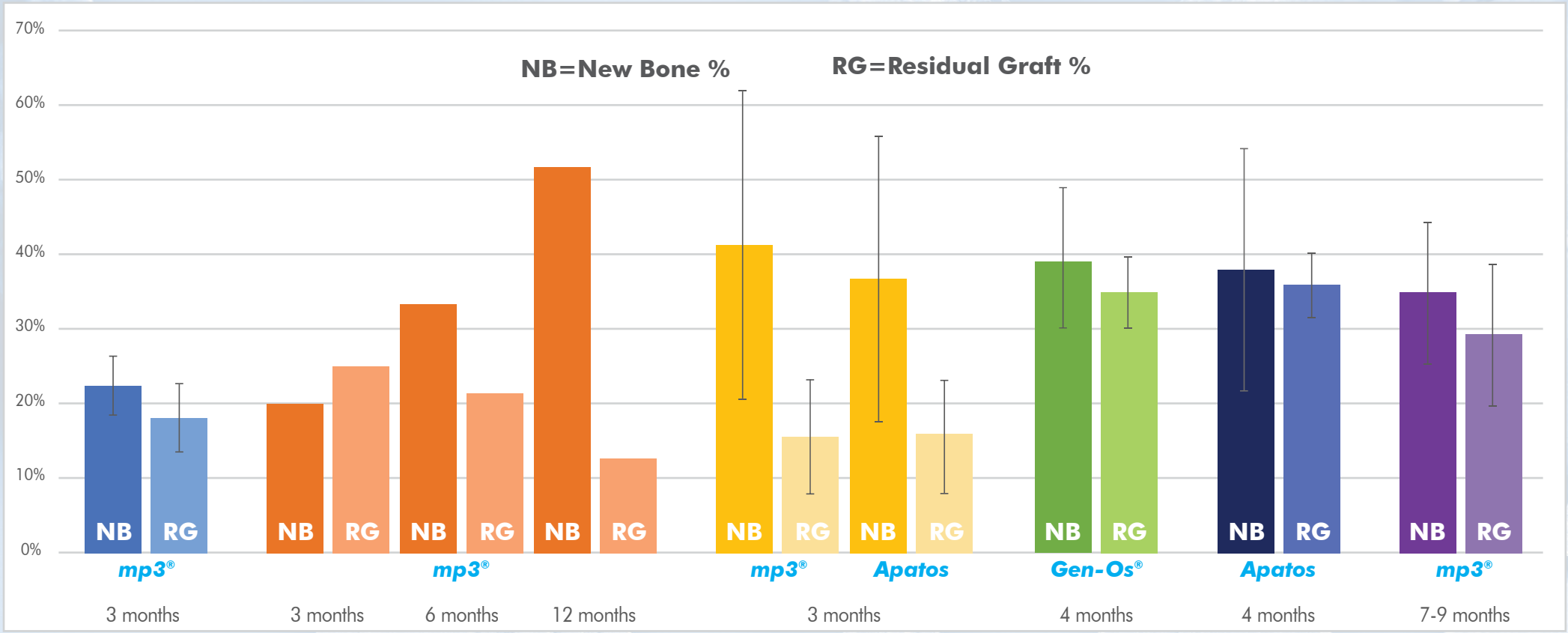
Packaging
Sterile blister

Product codes
STS7S | 20x15x5 mm | Soft | Porcine curved
STN5S| 20x10x5 mm | Norm | Porcine curved

GMDN code
46425

CND code
P900402

Histological results in alveolar regeneration



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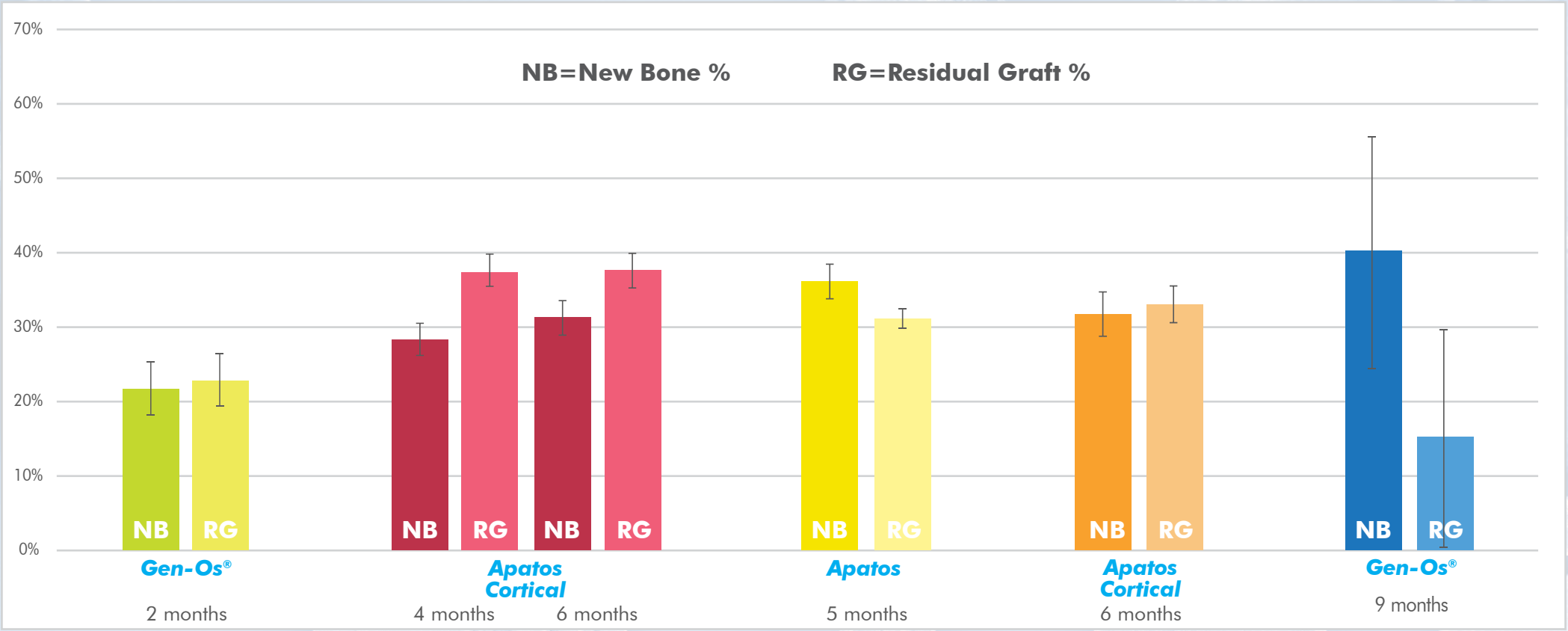
Histological results in sinus lift



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MEMBRANES AND BARRIERS


Fig. 1

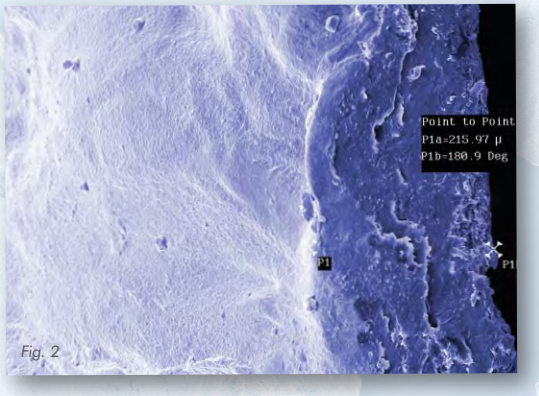


Fig. 2


Fig. 3


Fig. 4

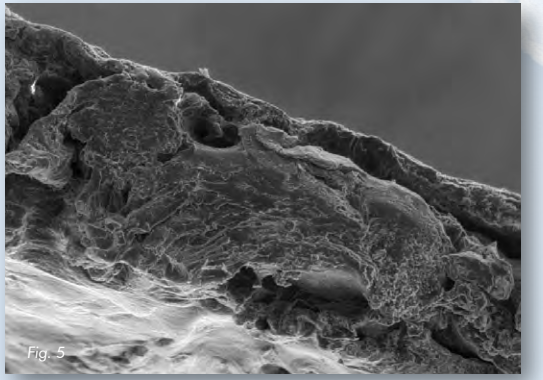
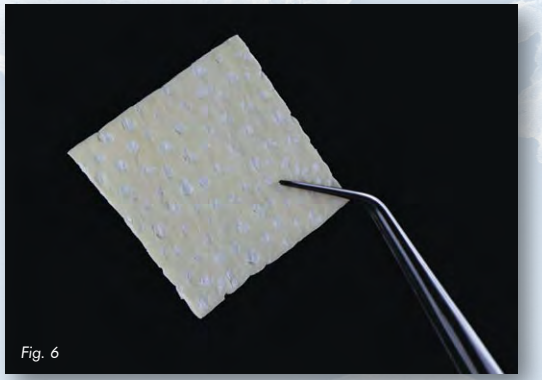


Fig. 5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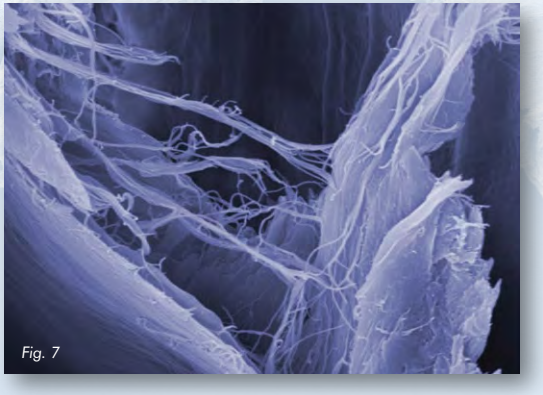
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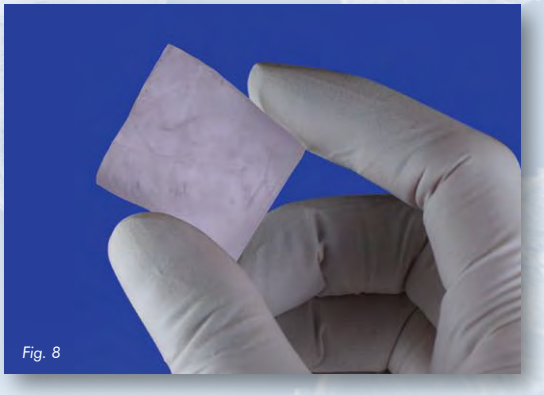


Fig. 8

Fig. 1,3,6,8 Source: Tecnoss® Dental Media Library | Fig. 2,4,7 Source: Nobil Bio Ricerche, Villafranca d'Asti, Italy | Fig. 5 Source: Politecnico di Torino, Italy

OsteoBiol® membranes and barriers

MEMBRANES

Evolution

Heterologous mesenchymal tissue

Dried membrane with one smooth side and one micro-rough side

For more information on OsteoBiol® *Evolution* see page 62

Derma

Porcine derma

Dried membrane

For more information on OsteoBiol® *Derma* see page 66

Special

Heterologous pericardium

Translucent dried membrane

For more information on OsteoBiol® *Special* see page 74

BARRIERS

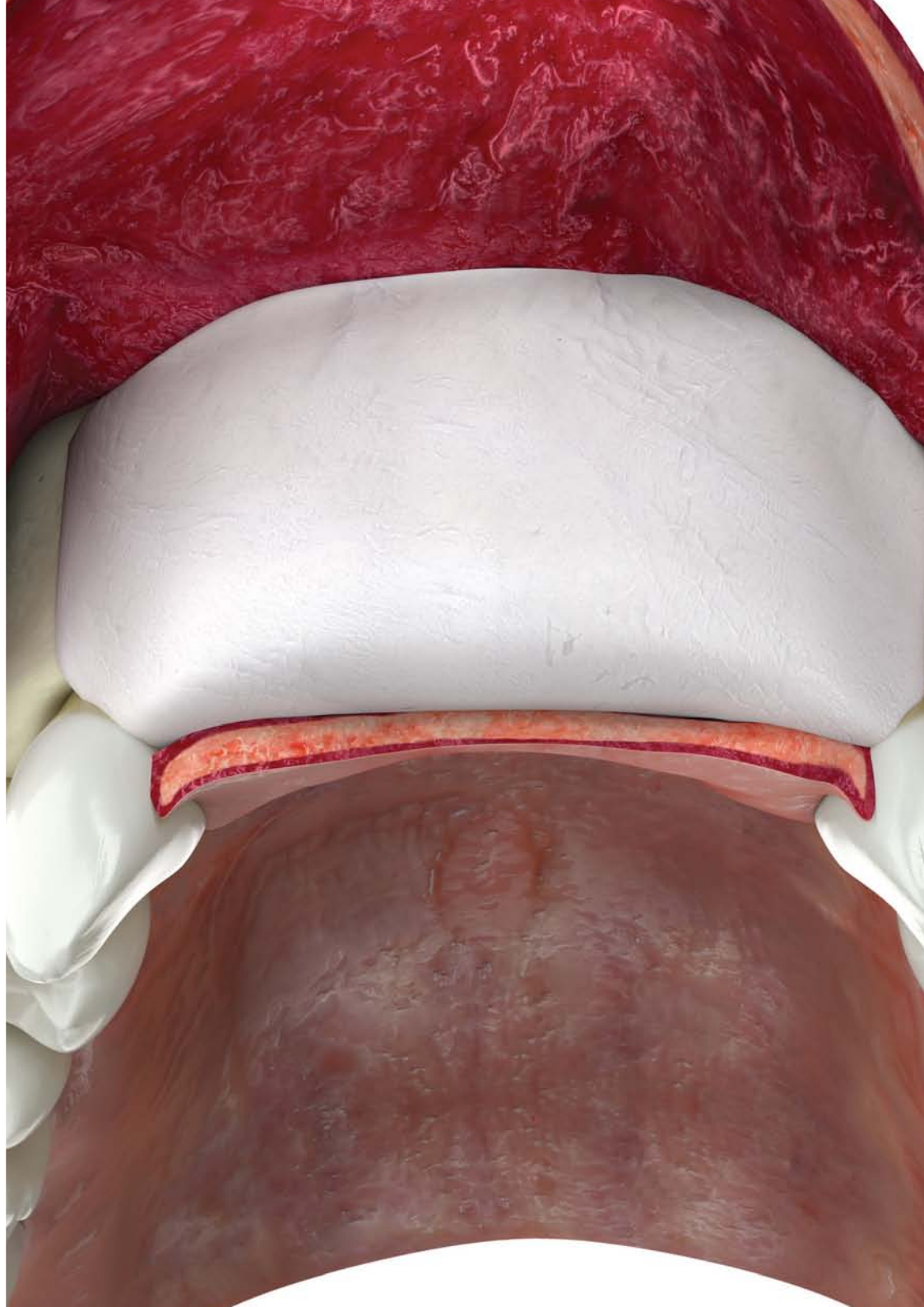
Lamina

Cortical bone

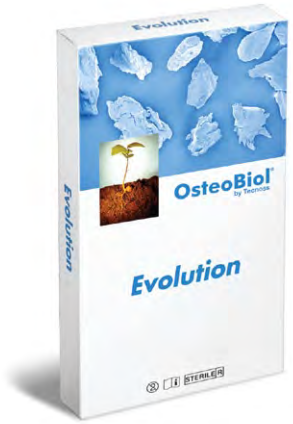
Semi-rigid and rigid dried lamina

For more information on OsteoBiol® *Lamina* see page 70

SEM image showing collagenic matrix of OsteoBiol® membranes
Source: Courtesy of Nobil Bio Ricerche, Villafranca D'Asti, Italy



Evolution



The natural Evolution of collagen membranes

Heterologous mesenchymal tissue

Tissue of origin
Heterologous mesenchymal tissue

Tissue collagen
Preserved

Physical form
Dried membrane with one smooth side and one micro-rough side

Thickness
X-Fine: 0.2 mm
Fine: 0.3 mm
Standard: 0.4 mm

Estimated resorption time
X-Fine: about 2 months
Fine: about 3 months
Standard: about 4 months

Size
20x20 mm, 30x30 mm, 25x35 mm (oval), 40x40 mm, 80x60 mm

Product codes
EM33XS | 3 pcs | 30x30 mm | X-Fine | Porcine
EV02LLE | 20x20 mm | Fine | Equine
EV03LLE | 30x30 mm | Fine | Equine
EVOLLE | 25x35 mm (oval) | Fine | Equine
EV04LLE | 40x40 mm | Fine | Equine
EV06LLE | 80x60 mm | Fine | Equine
EM02HS | 20x20 mm | Standard | Porcine
EV02HHE | 20x20 mm | Standard | Equine
EM03HS | 30x30 mm | Standard | Porcine
EV03HHE | 30x30 mm | Standard | Equine
EM00HS | 25x35 mm (oval) | Standard | Porcine

GMDN code
47184

CND code
P900402

Characteristics and handling

CHARACTERISTICS

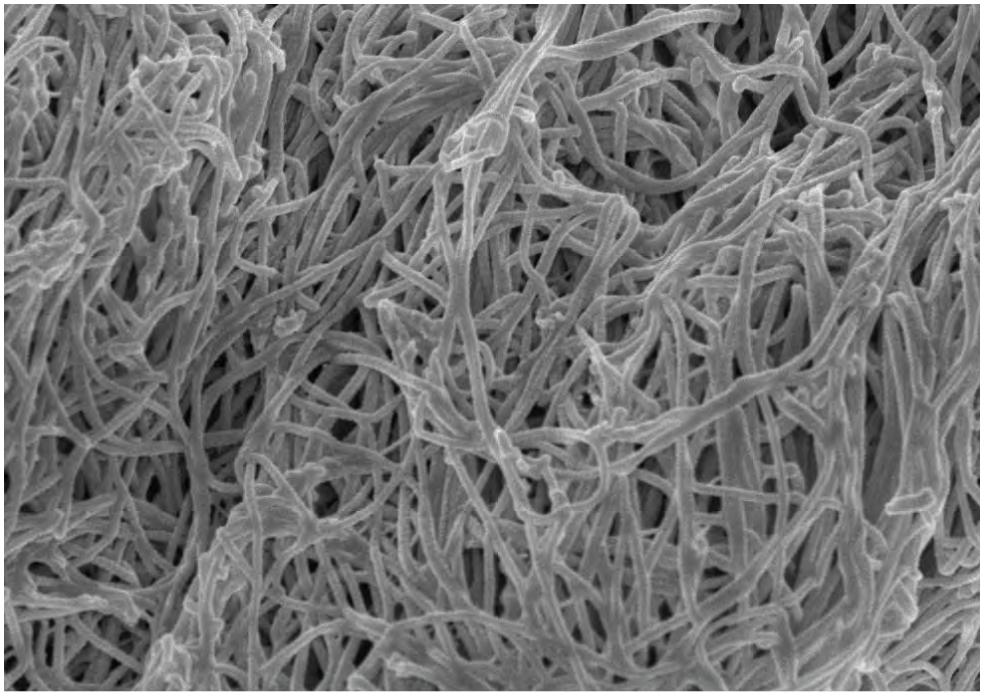
Obtained from heterologous mesenchymal tissue, the *Evolution* membrane is gradually resorbable[1]. Its structure is made of dense collagen fibers of high consistency and of extraordinary resistance that offer the specialist surgeon:

- maximum adaptability to bone tissue and soft tissues
- easy and secure suturability to nearby tissues
- best membrane-bone and membrane-periosteum interface
- stability and prolonged protection of the underlying graft
- clot stabilization and isolation[2]

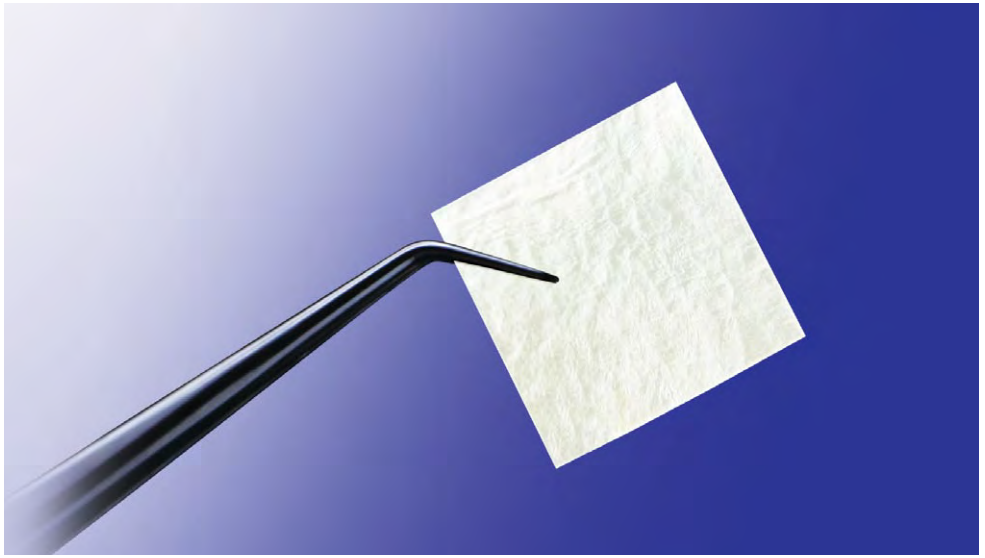
HANDLING

The membrane can be shaped with sterile scissors until the desired size is reached; unless the grafting site is already bleeding, the membrane should be rehydrated with lukewarm physiological solution. Once it acquires the desired plasticity, it must be adapted to the grafting site.

NB: in case of accidental exposure, the dense collagenic matrix of *Evolution* protects the graft from infection; the membrane itself will also not be infected, allowing second intention healing[3-5].



SEM image of an OsteoBiol® *Evolution standard* membrane
Source: Politecnico di Torino, Italy



Source: Tecnoss® Dental Media Library

Clinical Information

free animated videos
on OsteoBiol® APP

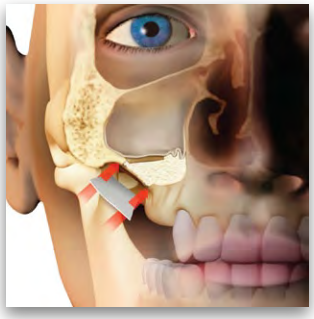
Available on the App Store | Get it on Google play

Evolution is obtained from heterologous mesenchymal tissue and is completely resorbable. Experimental studies have shown histological evidence of the prolonged barrier effect of this membrane, which lasts at least eight weeks[1], protecting the graft from external agents.

This property is particularly important in case of flapless regeneration[3] of large posterior sockets[5]: in these cases, the standard model has proved to be the most effective.

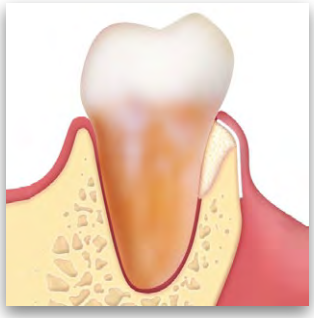
In lateral access sinus lift, *Evolution* membranes have been documented for antrostomy coverage (standard model)[6,7] and for protection of the sinus membrane from cutting risk due to graft pressure (fine model)[8].

Evolution can be used to protect peri-implant regenerations[9] and periodontal grafts[10]. Furthermore, *Evolution* fine has been successfully used to protect *Sp-Block* in vertical augmentation with the inlay technique[11].

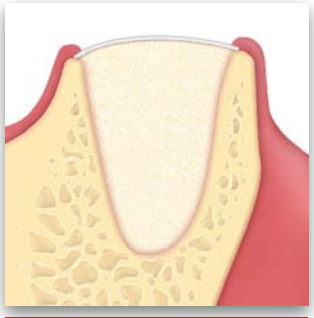


LATERAL ACCESS SINUS LIFT
maxillary sinus floor augmentation

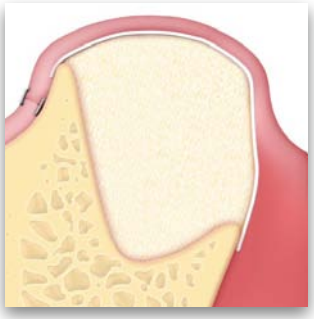
DEHISCENCES AND FENESTRATIONS
peri-implant lesions



PERIODONTAL REGENERATION
intrabony defects



ALVEOLAR REGENERATION
graft protection



HORIZONTAL AUGMENTATION
two-wall defects

VERTICAL AUGMENTATION
inlay technique

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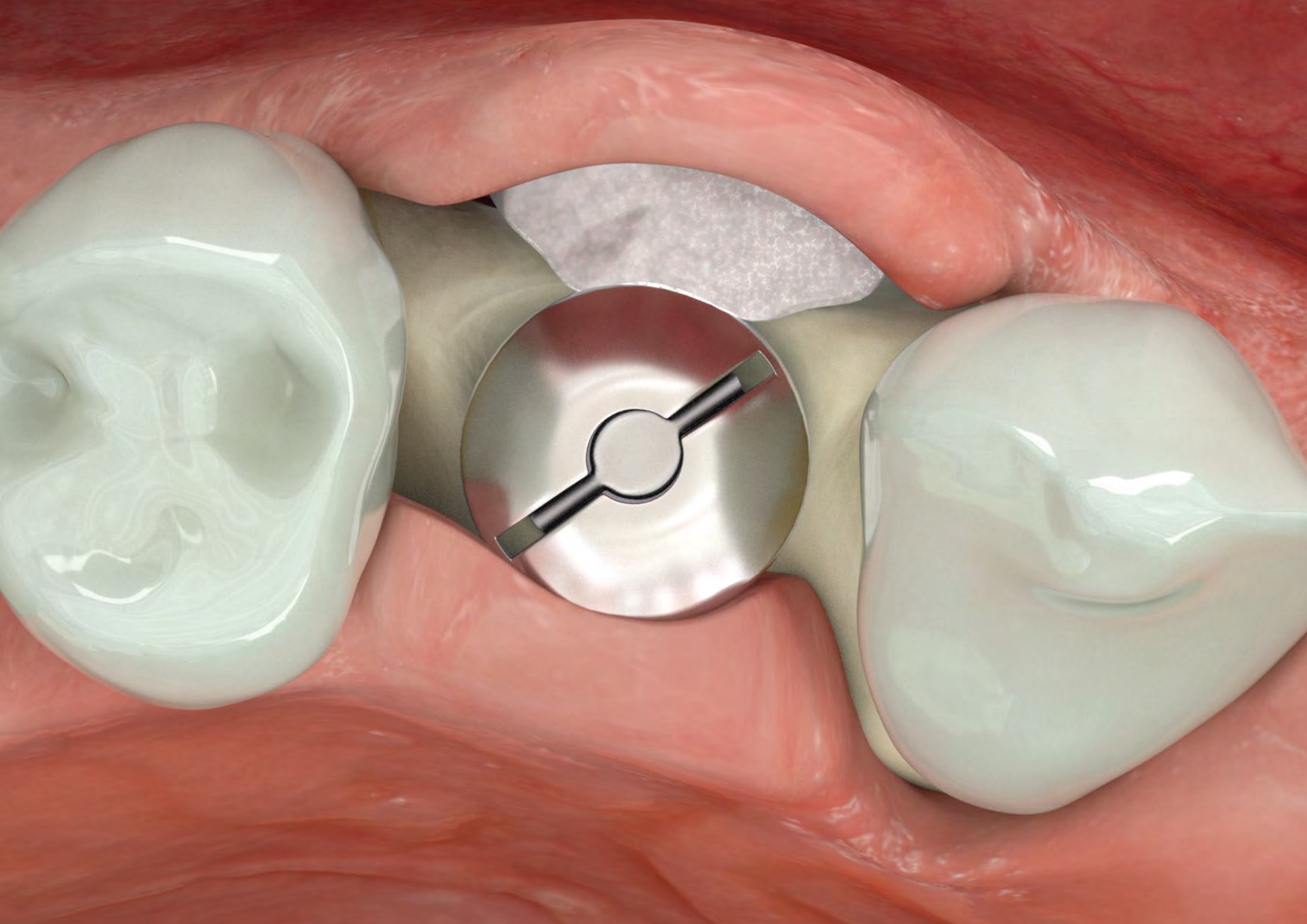
INT J PERIODONTICS RESTORATIVE DENT, 2013 MAR;33(2):159-66

For further information see the complete literature on p. 92



Derma

A xenogenic matrix for soft tissue augmentation

Collagen dermal membrane

Tissue of origin
Porcine derma

Tissue collagen
Preserved

Physical form
Dried membrane

Composition
100% derma

Thickness
0.5 mm (±0.1 mm)
0.9 mm (±0.1 mm)
2.0 mm (±0.2 mm)

Estimated resorption time
0.5 mm: about 1 month
0.9 mm: about 3 months
2.0 mm: about 5 months

Size
0.5 mm: 20x20 mm
0.9 mm: 25x25 mm, 12x8 mm, 50x50 mm
2.0 mm: 7x5 mm, 15x5 mm, 30x30 mm, 50x50 mm

Product codes
ED02LS | 20x20 mm | 0.5 mm | Porcine
ED21FS | 12x8 mm | 0.9 mm | Porcine
ED25FS | 25x25 mm | 0.9 mm | Porcine
ED05FS | 50x50 mm | 0.9 mm | Porcine
ED75SS | 7x5 mm | 2.0 mm | Porcine
ED15SS | 15x5 mm | 2.0 mm | Porcine
ED03SS | 30x30 mm | 2.0 mm | Porcine
ED05SS | 50x50 mm | 2.0 mm | Porcine

GMDN code
47184

CND code
P900402

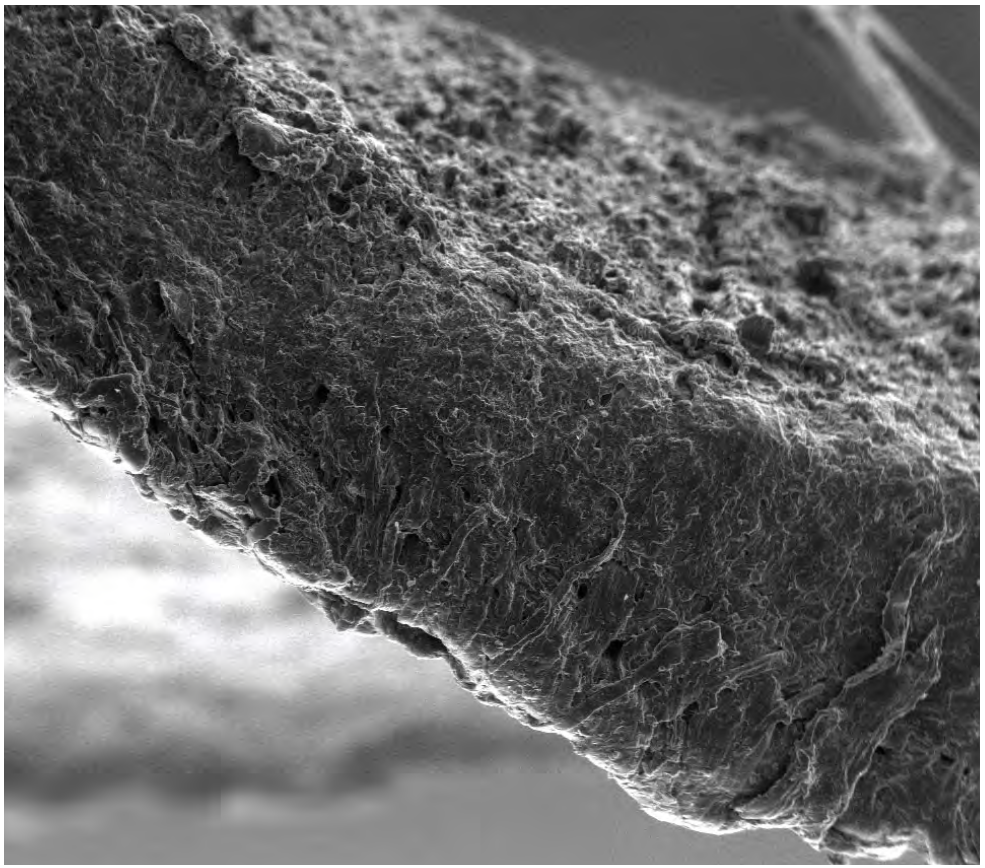
Characteristics and handling

CHARACTERISTICS

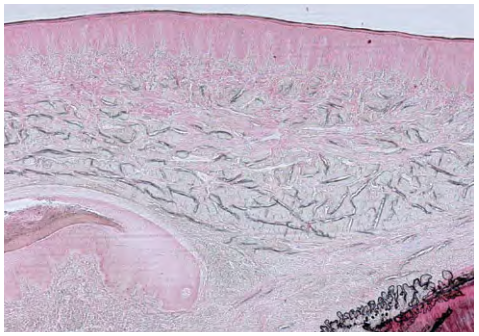
Obtained from derma of porcine origin, using an exclusive Tecnoss® process that preserves the natural collagen fibers[1], *Derma* membranes are gradually integrated[2] with the autologous soft tissues. Their strong consistency and resistance allow a perfect stabilization and a prolonged protection of the underlying graft[3] in socket regeneration procedures, together with a strong barrier action to guide the growth of epithelium and preventing its invagination.

HANDLING

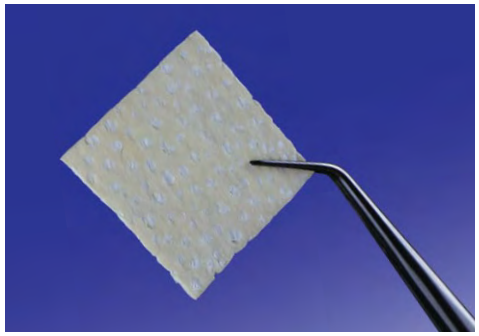
Derma membrane can be shaped with scissors until the desired size is reached; then it must be thoroughly hydrated in sterile lukewarm physiological solution until the desired consistency is obtained. Once it acquires the desired plasticity, it must be adapted to the grafting site. It is always recommendable to prepare a pocket with an elevator in order to stabilize the membrane in the site after stitching the flaps.



SEM image of OsteoBiol® *Derma*
Source: Politecnico di Torino, Italy



4-months histology showing remnants of porcine dermal matrix surrounded by connective tissue. Experimental study on dogs. Htx-eosine
Author: Prof Ulf Nannmark, University of Göteborg, Sweden

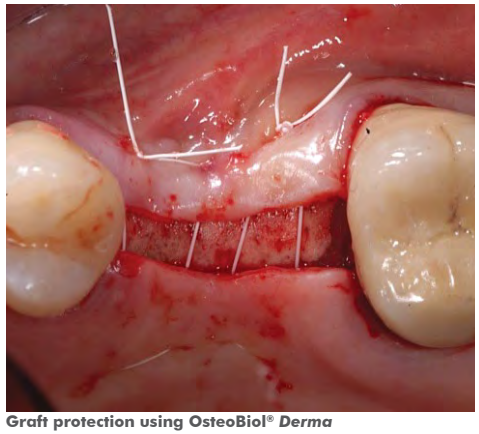


Source: Tecnoss® Dental Media Library

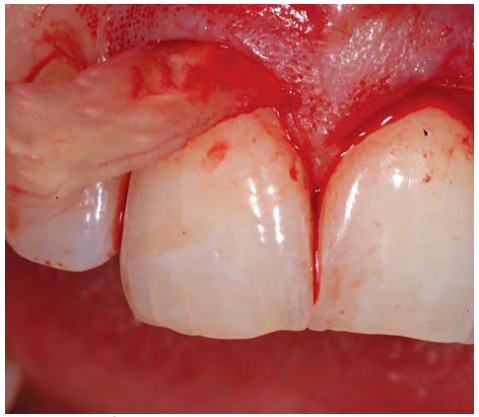
Clinical Information

Derma membrane is a collagen resorbable matrix useful to augment soft tissues and to protect and stabilize bone grafting materials; only in this specific indication it can be used also in open healing[3] situations due to its perfect tissue integration characteristics.

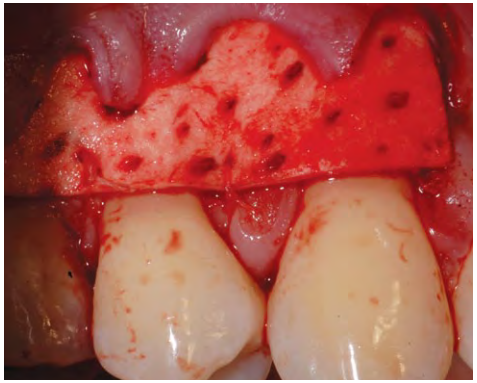
If a residual band of keratinized tissue is still present around teeth or implants, *Derma* membrane can be used as an alternative to connective tissue graft[2] to improve the quality of keratinized tissues[4]. *Derma* has been also documented for horizontal soft tissue augmentation around implants[5,8].
Mild gingival recessions[6,7] can be treated with *Derma* to avoid patient morbidity and discomfort due to connective tissue graft harvesting. To avoid membrane exposure, usually Derma is completely covered by the coronally advanced flap. A properly shaped *Derma* membrane with rounded edges has been also documented for the tunnel technique[6].



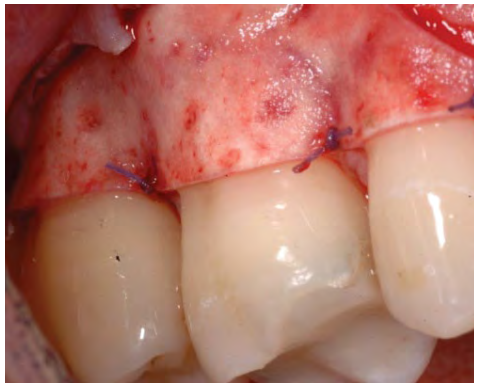
Graft protection using OsteoBiol® *Derma*



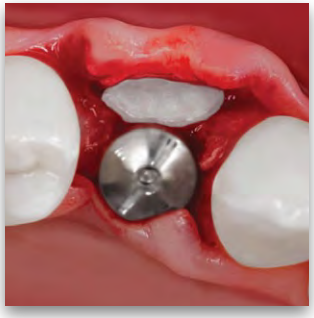
Positioning of OsteoBiol® *Derma* with the tunneling technique



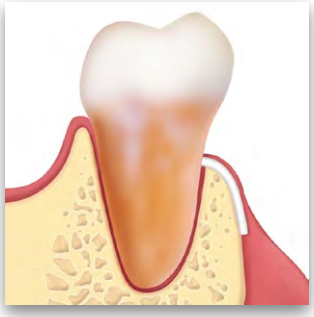
OsteoBiol® *Derma* shaped for a gingival recession treatment



Treatment of a gingival recession using OsteoBiol® *Derma*
Author: Dr Roberto Rossi, Genova, Italy



SOFT TISSUE AUGMENTATION
soft tissue improvement



PERIODONTAL REGENERATION
gingival recessions

ALVEOLAR REGENERATION
graft protection

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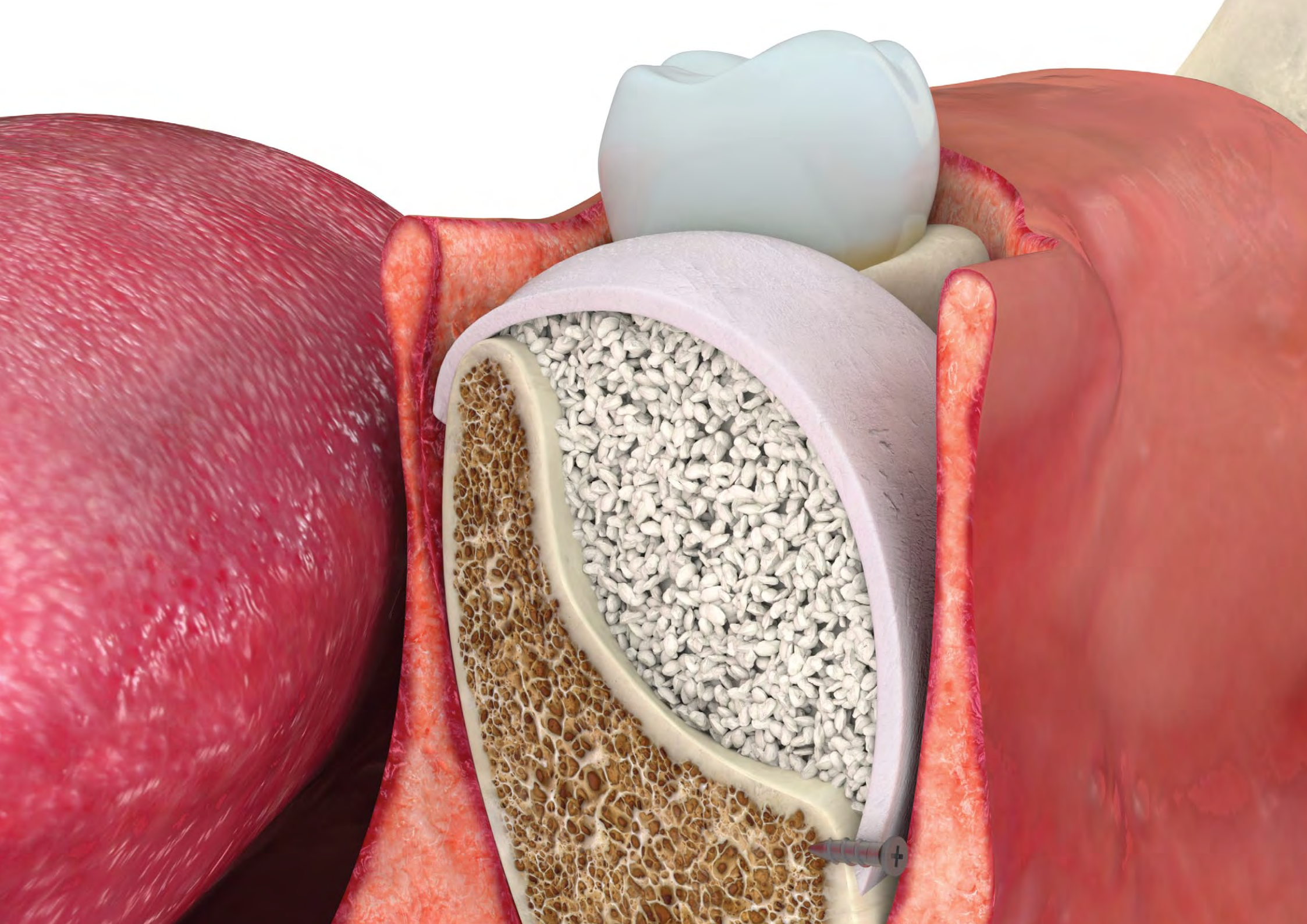
J PERIODONTOL. 2020; ACCEPTED, IN PUBLICATION

For further information see the complete literature on p. 92



Lamina

A unique cortical bone barrier

Heterologous collagenated cortical bone

Tissue of origin
Cortical bone

Tissue collagen
Preserved

Physical form
Lamina soft: semi-rigid flexible dried lamina
Lamina: rigid dried lamina, flexible after re-hydration

Composition
100% cortical bone

Thickness
0.5 mm (±0.1 mm)
0.7 mm (±0.1 mm)
1.0 mm (±0.1 mm)
3.0 mm (±1 mm)

Estimated re-entry time
0.5 mm: about 5 months
0.7 mm: about 7 months
1.0 mm: about 6 months
3.0 mm: about 8 months

Size
0.5 mm: 25x25 mm, 25x35 mm (oval)
0.7 mm: 35x15 mm
1.0 mm: 35x35 mm (Curved), 20x40 mm
3.0 mm: 30x30 mm

Product codes
LS25FS | 25x25 mm | 0.5 mm | soft | Porcine
LS25FE | 25x25 mm | 0.5 mm | soft | Equine
LS23FS | 25x35 mm (Oval) | 0.5 mm | soft |Porcine
LS23FE | 25x35 mm (Oval) | 0.5 mm | soft |Equine
LS24LS | 20x40 mm | 1.0 mm | soft | Porcine
LS10HS | 35x35 mm (Curved) | 1.0 mm | soft | Porcine
LS10HE | 35x35 mm (Curved) | 1.0 mm | soft | Equine
LS03SS | 30x30 mm | 3.0 mm | soft |Porcine
LS03SE | 30x30 mm | 3.0 mm | soft |Equine
LS15LS | 35x15 mm | 0.7 mm | rigid | Porcine
LS35LS | 35x35 mm | 1.0 mm | rigid | Porcine

GMDN code
46425

CND code
P900402

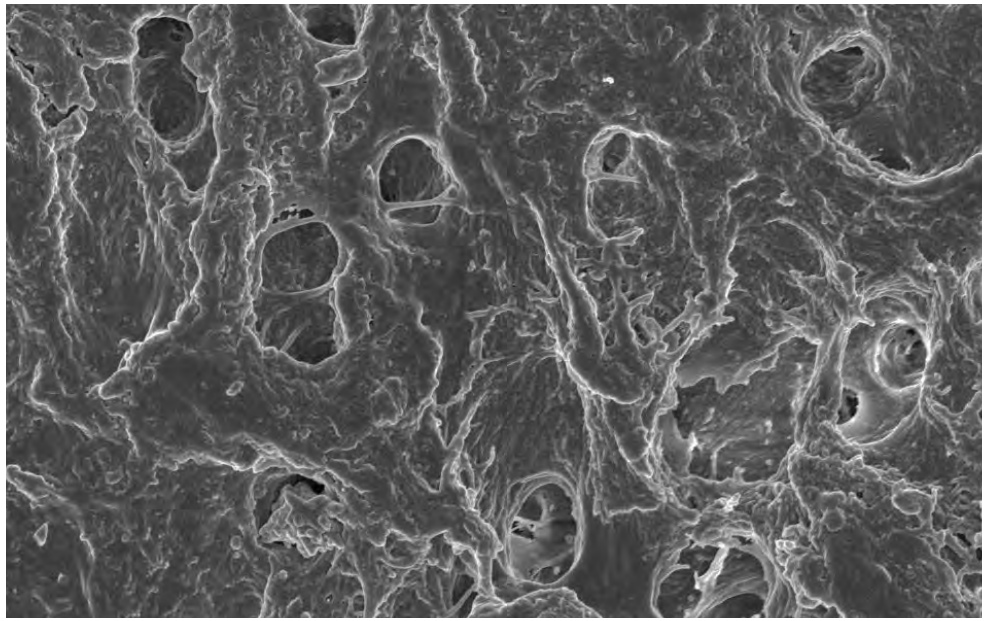
Characteristics and handling

CHARACTERISTICS

Lamina barriers are made of cortical bone of heterologous origin produced with an exclusive Tecnoss® process that avoids the ceramization of hydroxyapatite crystals, thus allowing gradual resorption. After a process of superficial decalcification, *Lamina soft* acquires an elastic consistency, nevertheless maintaining the typical compactness of the bone tissue from which it originates; the margins are soft in order not to cause micro-traumas to the surrounding tissues. *Curved soft Lamina* has a semi-rigid consistency and should be grafted without hydration, provided that it is previously shaped to fit the defect morphology. *Rigid Lamina* undergoes a process of superficial semi-decalcification (50% vs *Lamina soft*) therefore increasing its consistency, typical of the cortical bone tissue[1-2].

HANDLING

Lamina soft can be shaped with sterile scissors until the desired size is reached, then it must be hydrated for 5/10 minutes in sterile physiological solution. Once it acquires the desired plasticity, it must be adapted to the grafting site; it should always be immobilized either with titanium microscrews or sutured (fine model) directly to the surrounding tissues with a triangular section non-traumatic needle. *Curved soft Lamina* **should not be hydrated** in order to maintain its tenting effect but can also be shaped with sterile scissors, and must be fixated with osteosynthesis screws. In case of exposure, *Lamina* should only be removed if there is a clear suprainfection, because its consistency allows to achieve a complete second intention healing of the wound.



SEM image of OsteoBiol® *Lamina*
Source: Politecnico di Torino, Italy

Source: Tecnoss® Dental Media Library

Clinical Information

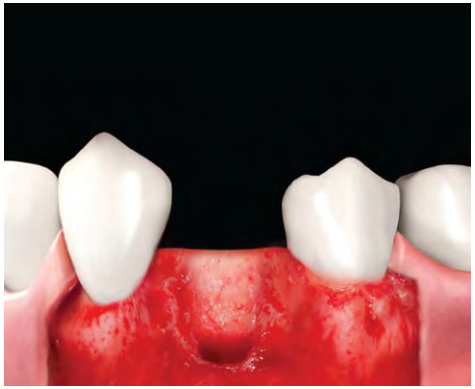
free animated videos on OsteoBiol® APP

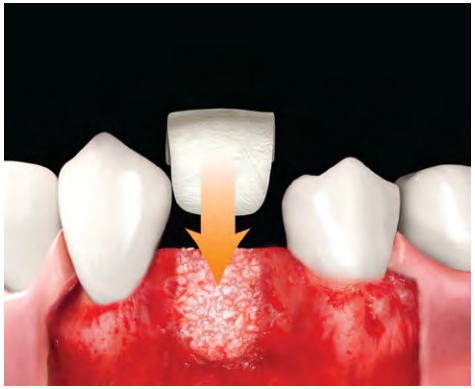
Lamina soft becomes flexible after hydration and can be shaped[3] and adapted to the defect morphology creating, once fixated with osteosynthesis screws, a semi-rigid covering to the underlying graft[4-6]. This property is particularly useful when it is necessary to maintain the graft volume in aesthetic areas, as well as in horizontal augmentation[6-8] of two wall defects and in lateral access sinus lift procedures[5,9,10]. *Lamina* can also be used in regenerations with risks of exposure. *Curved soft Lamina* has a ~1.0 mm thickness and must be directly grafted without hydration[11]: it can be particularly effective in association with *GTO*® for regeneration of ridges with compromised buccal plate.

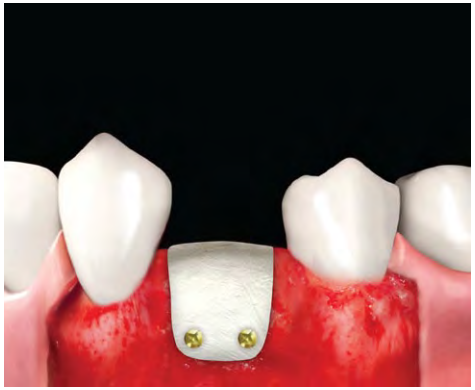
Rigid Lamina (ref. LS35LS) has been documented for orbital floor and wall reconstruction[12].

The new 0.7 mm thickness rigid Lamina (ref. LS15LS) represents a viable alternative to autogenous cortical bone plates in the reconstruction of three-dimensional crestal defects with the shell technique.

The above clinical information is based on the experience of expert surgeons



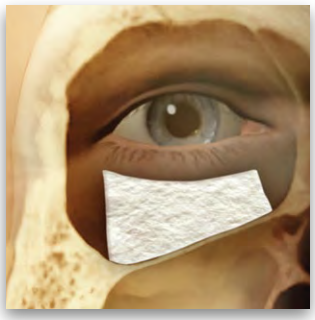




OsteoBiol® *Lamina* positioning
Source: Tecnoss® Dental Media Library

HORIZONTAL AUGMENTATION
two-wall defects

HORIZONTAL AUGMENTATION
bone-layer technique



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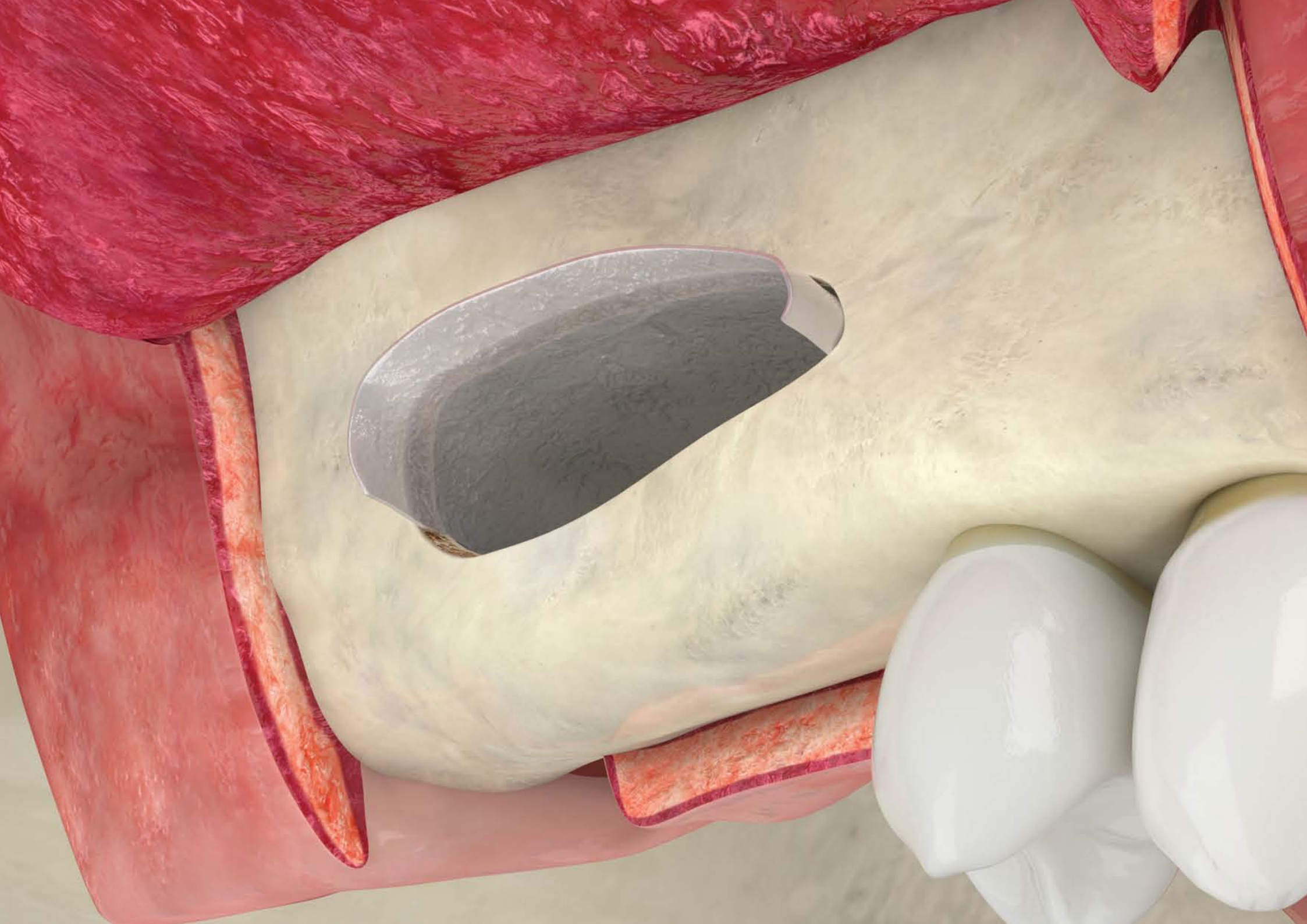
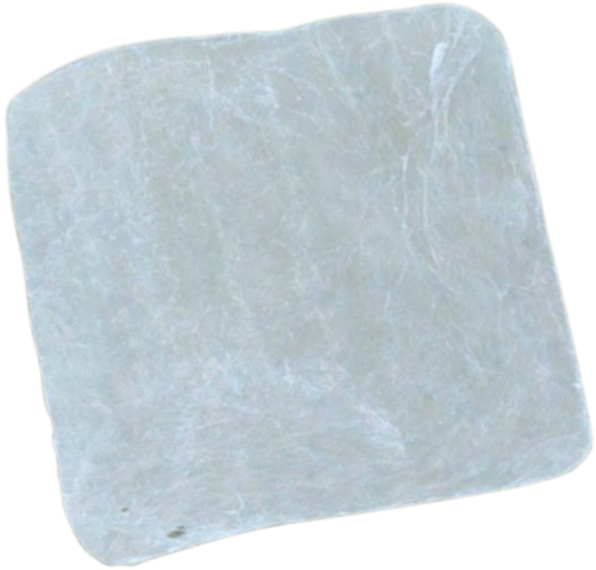


Special



A translucent membrane to separate bone and soft tissues

Engineered to protect hard and soft tissue grafts

Tissue of origin
Heterologous pericardium

Tissue collagen
Preserved

Physical form
Translucent dried membrane

Composition
100% pericardium

Thickness
0.2 mm

Resorption time
About 40 days

Size
20x20 mm, 30x30 mm

Product codes
EM02LE | 20x20 mm | Equine
EM03LE | 30x30 mm | Equine

GMDN code
47184

CND code
P900402

Characteristics, handling and clinical information

CHARACTERISTICS

Obtained from pericardium of heterologous origin, using an exclusive Tecnoss® process, the dried *Special* membranes are completely resorbable. Once hydrated, they become translucent and flexible, guiding the growth of epithelium and preventing its invagination: their action favors therefore an optimal regeneration of the underlying bone tissue.

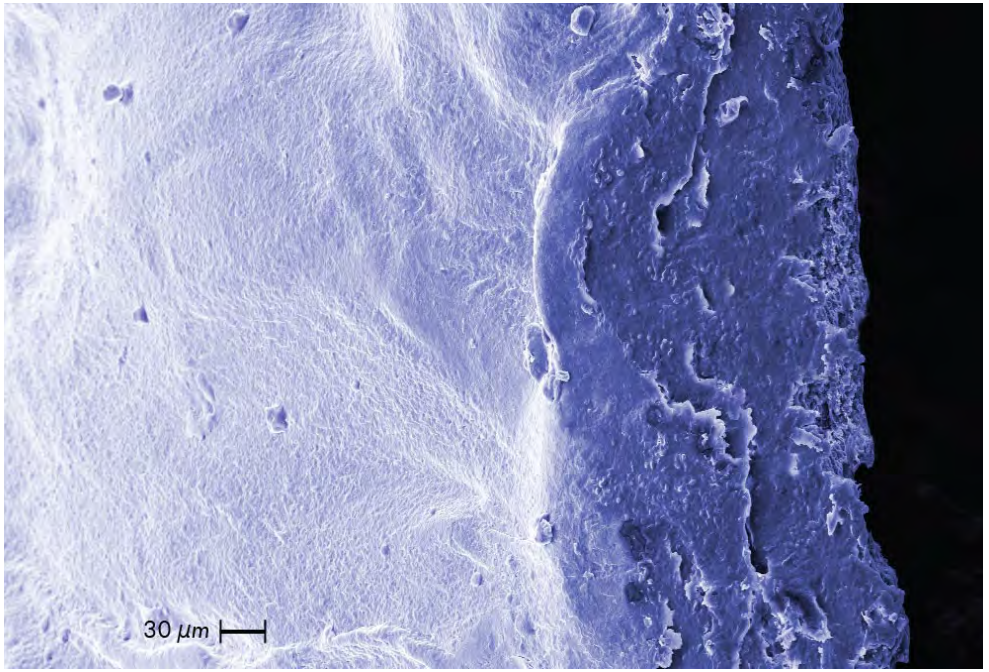
HANDLING

The membrane can be shaped with sterile scissors until the desired size is reached; it must then be rehydrated with lukewarm physiological solution. Once it acquires the desired plasticity, it must be adapted to the grafting site. It is recommended to prepare a pocket with an elevator in order to stabilize the membrane in the site after stitching the flaps. If this is not possible, the membrane can be stabilized with envelope sutures which bridle it with the gingival flaps.

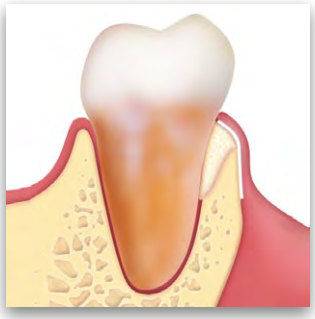
CLINICAL INFORMATION

In periodontology, the *Special* membrane can be used to protect and stabilize the biomaterial in the treatment of intrabony defects.
Special can be used to protect the sinus membrane before the insertion of the grafting material, to close sinus membrane perforations. Grafts placed in post-extractive sockets with closed healing procedure can also be protected with this membrane.

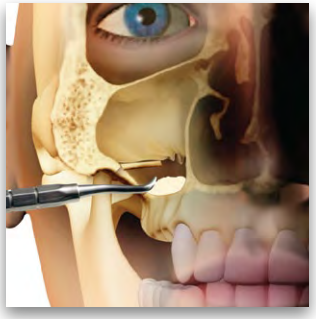
The above clinical information is based on the experience of expert surgeons



SEM images of OsteoBiol® *Special*
Source: Nobil Bio Ricerche, Villafranca d'Asti, Italy



PERIODONTAL REGENERATION
intrabony defects



LATERAL ACCESS SINUS LIFT
Schneider membrane protection

Bone, Biomaterials & Beyond

Prof Antonio Barone, Prof Ulf Nannmark

CONTENTS

The introduction of osseointegrated dental implants soon 50 years ago has indeed revolutionized dentistry.

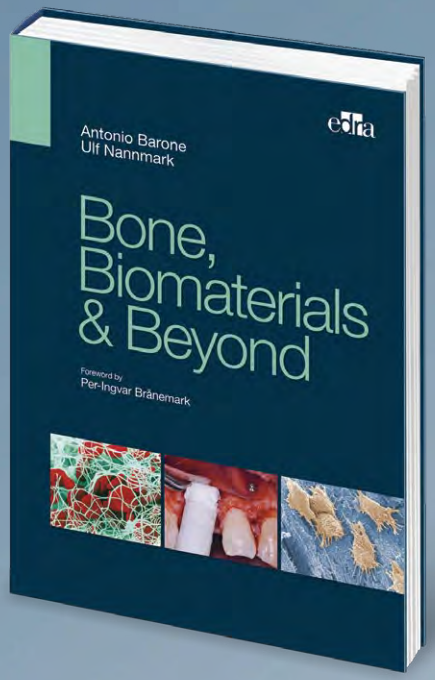
The scientific evaluation of their use has shown good and increasingly successful treatment outcomes.

A prerequisite though is the availability of sufficient bone volumes to ensure integration and acceptable aesthetic results.

In this book, various surgical techniques using different augmentation materials are described and explained.

The aim is to highlight minimally invasive surgical techniques, which lead to less risk of morbidity and reduce treatment time.

Readers will enjoy a comprehensive atlas providing some practical advice for every day surgical practice based on solid scientific evidence.



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1 2 8 12 19 28 41 44

Publications on international journals

history of the OsteoBiol® by Tecnoss brand

Putty

Evolution

mp3®

TSV Gel

GTO®

Lamina
for shell technique

INNOVATION

Tecnoss® bone vs human bone

Studies and researches have demonstrated that gold standard in bone regeneration is autologous bone[1,2].
It is also well known, though, what disadvantages are related to the harvesting and grafting of autogenous bone[2-4].
The goal of bone regeneration is to heal bone deficits with newly-formed quality tissue, in order to achieve a functional recovery and esthetics. To obtain these results, hundreds of studies have been conducted about the clinical performance of biomaterials.
The examination of clinical results and the commercial diffusion of various kinds of products developed by the biomedical industry show a clear superiority of products of natural origin over those of synthetic derivation.
The structure of animal bone is morphologically more similar to human bone than any synthesized product, the latter presenting a morphological pattern and properties artificially created, which differ in various ways from the structure of natural bone[5].
Over the last thirty years several processes have been developed to allow the grafting of heterologous origin products in the human body without adverse reaction[6,7].
The first products developed through these technologies have shown encouraging clinical results, even if made of bone mineral matrix only.
The OsteoBiol® new generation of biomaterials, thanks to a revolutionary technology, goes beyond the simple role of aiding natural bone regrowth by stimulating and accelerating contact osteogenesis, with a behaviour similar to that of autogenous bone[8-10].

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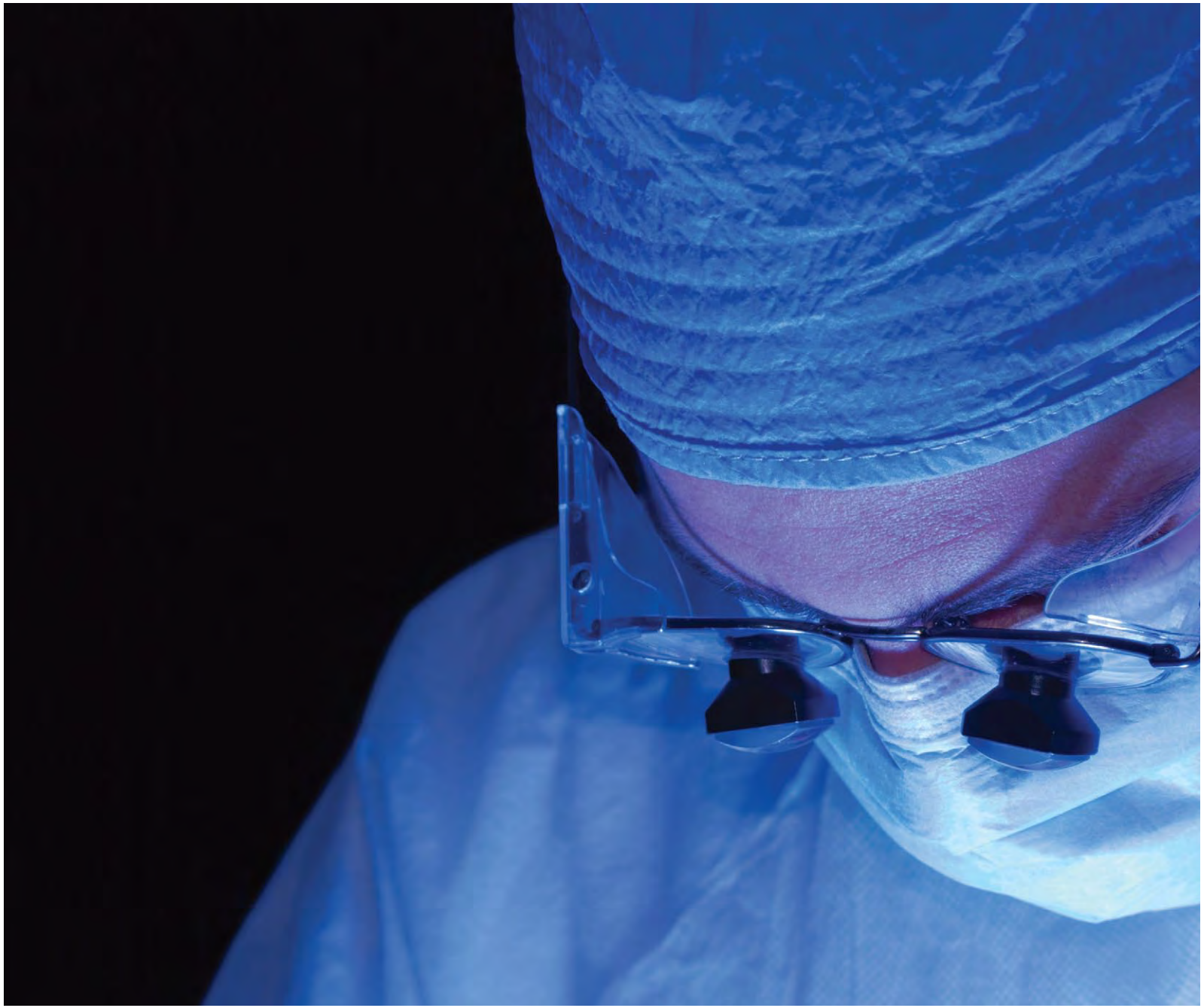
XENOGENEIC BONE FILLING MATERIALS MODULATE MESENCHYMAL STEM CELL RECRUITMENT: ROLE OF THE COMPLEMENT C5A
CLINICAL ORAL INVESTIGATIONS, 2019 OCT 23

Why xenografts?



Xenografts are the most used biomaterials worldwide.

This is because:

- tissues of origin are extremely safe and available in unlimited quantities
- xenogenic bone surface and porosity are extremely similar to autogenous bone
- there is no need to harvest autogenous bone in extraoral sites, with the related risk of morbidity and post-operative complications
- sterile xenografts are completely biocompatible and safe
- no adverse reactions after grafting deriving from biomaterial degradation
- easy to handle, quick learning curve
- collagenated xenografts enhance osteoblasts and osteoclasts activity
- wide scientific documentation
- excellent clinical performance
- storage can be done at room temperature
- long shelf life (5 years from production date)
- excellent price/quality ratio

Characteristics of Tecnoss® process

Tecnoss® has developed manufacturing processes for the treatment of tissues from various animal species, allowing to obtain the biocompatibility of these tissues, preserving at the same time their collagen matrix[1].
The protein components of animal tissues are determinant to make every individual unique. They activate the cells of the immune system of the receiving organism by interacting with receptors of the Major Histocompatibility Complex (MHC).
Their neutralization/denaturation allows collagen mineral bone matrix to be transferred from animal to man without any dangerous adverse reaction outbreak.
Successful Guided Bone Regeneration (GBR) depends both on stimulation of tissues involved in new bone formation and on the characteristics of grafted biomaterials, which can determine the quality of bone/graft interface. The development of OsteoBiol® product line has thus been driven by the ideal biomaterial concept: a material with the highest affinity to the new endogenous bone.
To pursue this aim, Tecnoss® developed a biotechnology able to preserve the structure of natural hydroxyapatite, avoiding the high temperature ceramization phase, therefore allowing a bone turnover time of the grafted site similar to the one of the physiologic natural process[2].
Thanks to this innovative technology, the OsteoBiol® line has the following important characteristics:

1. Cell growth support and differentiation[3]
2. Absence of a foreign body response[4,5]
3. Gradual resorption over time[2,6]
4. Stimulation of the physiological tissue regeneration process[7,8]
5. Protection of the grafting site from infection (membranes)[5,9]
6. Capability of carrying medication to the surgical site[10]
7. Absorption and release over time of growth factors [11]
8. Enhancement of endothelial cells proliferation [7]

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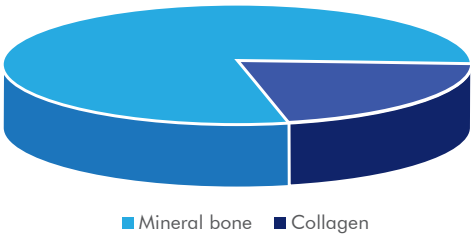
MATERIALS, 2017 SEP 8;10(9)

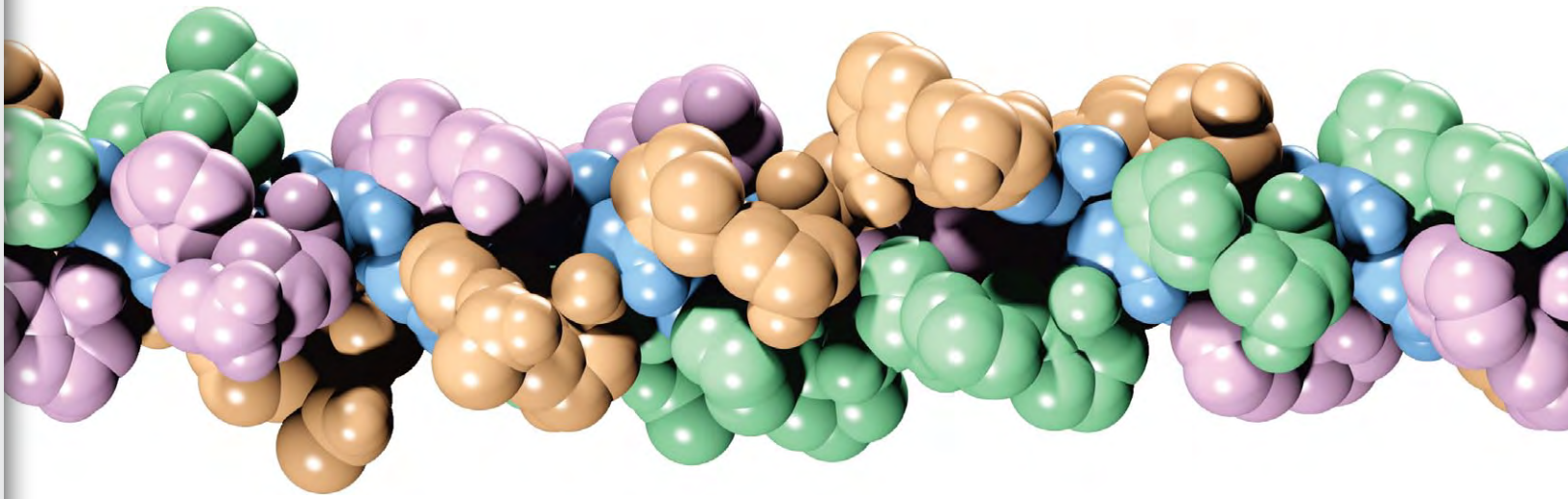
Collagen: a key factor for clinical success

Tecnoss® exclusive manufacturing process is able to neutralize the antigenic components present in heterologous bone achieving biocompatibility and preserving the collagen matrix inside the biomaterial.
Moreover, the molecular structure of natural hydroxyapatite is not significantly altered thanks to the mild process temperature[1].
These characteristics of OsteoBiol® products allow a consistent bone neo-formation and a close contact between mature neo-formed bone and biomaterial particles[2-5].
Collagen has a key role in bone regeneration process in that:
• it acts as a valid substrate for platelet activation and aggregation
• it serves to attract and differentiate the mesenchymal stem cells present in the bone marrow[6]
• it increases the proliferation rate of the osteoblasts up to 2/3 times[7]
• it stimulates the activation of the platelets, osteoblasts and osteoclasts in the bone healing process[8].
The presence of collagen inside each granule makes OsteoBiol® *Gen-Os*® hydrophilic and facilitates further mixing with collagen gel and *TSV Gel*.
This technology has permitted the development of several versatile and innovative products: OsteoBiol® *GTO*®, OsteoBiol® *mp3*®, OsteoBiol® *Putty* and OsteoBiol® *Gel 40*. Their consistency allows an ideal filling of bone defects and guarantees simple handling and fast application.
The OsteoBiol® new generation of biomaterials, thanks to a revolutionary technology, goes beyond the simple role of aiding natural bone regrowth by stimulating and accelerating this vital physiological process[9,10].

Composition of **OsteoBiol® *Gen-Os*®**



Source: University of Duisburg-Essen, Germany



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CLINICAL ORAL INVESTIGATIONS, 2019 OCT 23

Collagen and bone regeneration

Guided bone regeneration (GBR) is necessary to treat bone deficits due to lesions or bacterial infections.
Bone defect recovery occurs through the general mechanisms of tissue healing: complex dynamic mechanisms directed towards the repair of tissue function and anatomic integrity.
The discovery of the events pathway leading to tissue healing has helped to clearly identify the main actors in bone healing process; the concomitant presence of the following three components is necessary for the formation of "*de novo*" bone tissue:

- the platelets represent the principal actors during the first phase of the healing process, when, subsequent to a lesion, an initial deposition of fibrin and the formation of blood clot take place. This phase is characterized by significant activation of the chemical signals mediated by cytokines and growth factors.
In fact, the primary post-haemorrhagic clot formation process through platelet aggregation and lysis causes the release of both the coagulation cascade factors and growth factors, such as PDGF, IGF 1, IGF 2 and VEGF which are known for their activating effect on osteoblasts and osteoclasts, and TGF-β (Bone Morphogenetic Proteins belong to this superfamily) which starts bony callus formation.
- the osteoblastic precursors deriving from bone marrow mesenchymal stem cells are responsible, after cell differentiation in osteoblasts, for the second phase of the healing process (enchondral and/or intramembranous ossification) thanks to the synthesis of collagen and other components of the extracellular matrix.
- an insoluble substrate, suitable carrier for osteoinductive signal and able to support and guide new bone tissue formation. Sampath and Reddi (1980) demonstrated crosslinked type I collagen to be the most appropriate carrier for promoting osteoinductive signal activity.
The continuous progresses in comprehension of biological mechanisms regulating bone tissue morphogenesis can be exploited also for elaboration of natural or artificial products able to restore or maintain the function of damaged tissues and organs (tissue engineering)[1-3].
In vitro studies demonstrated that heterologous collagen is able to induce differentiation of mesenchymal osteoprogenitor stem cells into osteoblasts[4], and that association of collagen type I with a scaffold of hydroxyapatite significantly enhances osteoblasts proliferation rate.
This important scientific evidence provides the rationale behind OsteoBiol® product line: a complete series of biomaterials with collagen base.
Collagen, in addition to its well-known structural action carried on connective tissues, is endowed with the following important properties, useful in tissue reparation processes:

1. Haemostasis
Collagen is able to activate the receptors present on cellular membranes of platelets, responsible for their aggregation and lysis process; moreover, during the first week, it reinforces the action of fibrin in the formation of the primary clot, and then, in the second week, it replaces the function of fibrin.

2. Debridement
Collagen has a chemotactic action on monocyte/macrophage cell lines, from which osteoclasts derive; these cells, through their action on mineral component resorption of both bone tissue and OsteoBiol® biomaterials, can draw, activate and collaborate with osteoblasts in bone rearranging and remodeling.

3. Angiogenesis
The drawn monocytes/macrophages, in their turn, stimulate both osteoblastic activity and angiogenesis process in grafting site.

4. Osteoblastic activity
Collagen, binding to fibronectin, promotes the anchorage of mesenchymal stem progenitors, on which it exerts its chemotactic action, and induces differentiation into osteoblasts[4,5].

5. Receiving site remodeling
Exogenous collagen grafting can contribute in decreasing remodeling times of immature bone tissue.

6. Osteoconduction and guided regeneration
Naturally integrated with mineral component, collagen is able to increase osteoblasts proliferation rate while as a resorbable membrane it is able to guide connective tissue regeneration.

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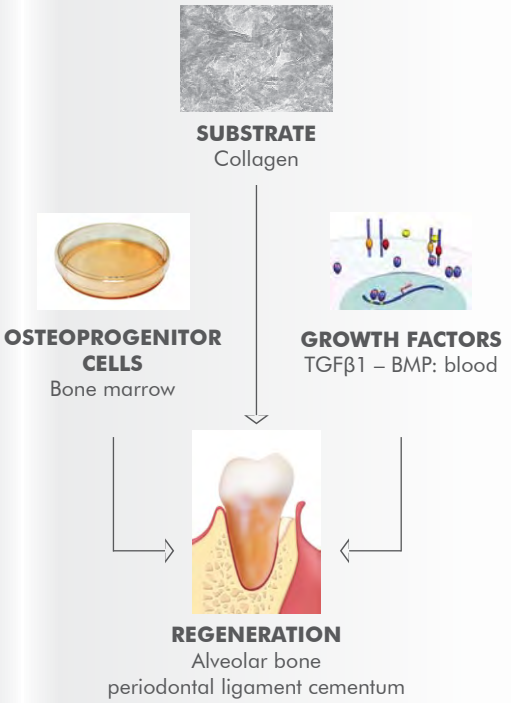

From heterologous bone to biomaterial

RESULTS OF INORGANIC CHEMICAL ANALYSES PERFORMED ON OSTEOBIOL® GEN-OS®

Chemical element	OsteoBiol® *Gen-Os*® (% in weight)
Ca	25.7%
PO_4^{3-}	35.2%
C	13.6%
H	2.2%
N	2.9%
O (not in PO_4^{3-})	20.4%
TOTAL	**100.0%**
Ca/P (n:n)	1.73

Mineral component 73.6%

Organic matrix 22.4%

Water 4.0%

Inorganic chemical analyses results
Source: University of Duisburg-Essen, Germany

RESULTS OF ORGANIC CHEMICAL ANALYSES PERFORMED ON OSTEOBIOL® GEN-OS®

"The separated proteins (one lane) were fractionated in ten portions and analysed with nano-LC-ESI MS/MS. In the fractions 1-5 in the range from 20-200kDa we found ONLY COLLAGEN. In the fractions 6-10 we identify NO PROTEIN"

Organic chemical analyses results
Source: Proteome Factory, Germany

A biomaterial for the reconstruction of bone defects must be biocompatible and have good handling and modeling properties; in specific clinical situations, it must also provide sufficient mechanical resistance. Tecnoss® laboratories are specialized in processing heterologous bony and collagenic tissues. OsteoBiol® bone process, in particular, has been developed to modify while preserving the original collagen matrix of heterologous tissue, in order to maintain its positive biological functions, and complete biocompatibility(1).
Most biomaterials are inert products that do not interfere, or rather, do not take part in the physiology of bone remodeling: since they have been developed according to the sole concept of biocompatibility, their function is limited to the preservation of the graft volume (scaffold). The biocompatibility concept has an essential purpose in the implant of permanent prosthetic elements inside the human body, but it is extremely restrictive in case of materials used for bone reconstruction.
OsteoBiol® biomaterials, being gradually resorbed and replaced by abundant newly formed bone over time, create the ideal conditions for the osseointegration of dental implants at re-entry(2).

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EUR J ORAL IMPLANTOL, 2017;10(3):263-278

OsteoBiol®: the most complete products range

The extensive OsteoBiol® range of products are engineered to help surgeons making the right decision when it comes to choose the perfect product for a specific clinical indication, both in dental and maxillofacial surgery.

Tecnoss® development of new products or improvement of existing ones, is focussed on supporting the technical capabilities of the practitioner to improve both intraoperative techniques and clinical results.

Specialists and researchers share their experience, blending clinical background and hands-on experience with the most advanced bio-technologies: the main goal is to obtain a specific solution to satisfy each clinical need.

OsteoBiol® collagenated grafting materials contribute to mineral deposition, vascular ingrowth and growth factor binding, thus providing a favourable environment for bone regeneration. The scientific literature has demonstrated that OsteoBiol® bone matrix is similar to human bone, and it has been reported in humans to be osteoconductive, well integrated in the host site and partially resorbed after 3-6 months, with no signs of adverse reaction[1].

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CERTIFICATIONS

Certifications


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[1] CERTIFICATO DI APPROVAZIONE / *APPROVAL CERTIFICATE*

[2] Direttiva Dispositivi Medici 93/42/CEE e s.m.i. / *Medical Devices Directive 93/42/EEC and subsequent amendments and upgrades (s.a.u.)*

[3] Certificato No/ *Certificate No.* EPT 0477.MDD.19/3209.1

[4] Dispositivo Medico/ *Medical Device* Matrice ossea e collagenica *Collagenic bone matrix*

[5] Classificazione / *Classification* III

[6] Fabbricato da / *Manufactured by* TECNOSS S.r.l. Via Nurivalle, 8 – 10094 Giaveno (TO) - Italy

[7] Nome commerciale / *Commercial name* OsteoBiol Gen-Os, OsteoBiol Putty, OsteoBiol Lamina, OsteoBiol V-Block, OsteoBiol Cortical-Teck, OsteoBiol GTO, OsteoBiol Apatos, OsteoBiol Sp-Block, OsteoBiol Dual-Block, OsteoBiol mp3, OsteoBiol TSV Gel, OsteoBiol C-Block, OsteoBiol Gel

[8] Scopo / *Scope* Eurofins Product Testing Italy S.r.l. certifica che il fabbricante è in possesso di un sistema completo di garanzia di qualità conforme all'Allegato II della Direttiva 93/42/CEE e s.m.i.

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APPROVAL CERTIFICATE Bone Matrix
Source: Tecnoss® s.r.l.


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[4] Dispositivo Medico/ *Medical Device* Membrane e feltri collagenati *Collagenated membranes and felts*

[5] Classificazione / *Classification* III

[6] Fabbricato da / *Manufactured by* TECNOSS S.r.l. Via Nurivalle, 8 – 10094 Giaveno (TO) - Italy

[7] Nome commerciale / *Commercial name* OsteoBiol Evolution, OsteoBiol Duo-Teck, OsteoBiol Special, OsteoBiol Duo-Teck Felt, OsteoBiol Derma

[8] Scopo / *Scope* Eurofins Product Testing Italy S.r.l. certifica che il fabbricante è in possesso di un sistema completo di garanzia di qualità conforme all'Allegato II della Direttiva 93/42/CEE e s.m.i.

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APPROVAL CERTIFICATE Membranes
Source: Tecnoss® s.r.l.


CERTIFICATE

kiwa

10776 - M | 2019-02-21
2007-01-15 | 2019-02-21
2022-01-14

Quality Management System Certificate
ISO 13485:2016

We certify that the Quality Management System of the Organization:
TECNOSS S.r.l.
is in compliance with the standard UNI CEI EN ISO 13485:2016 for the following products/services:

Design and manufacturing of bone substitutes, membranes and collagen felts for bone and tissue regeneration.

Chief Operating Officer
Giampiero Belcredi

TECNOSS S.r.l.
Registered Headquarters
Via Morghen 34 10146 TORINO Italia
Certified Sites
Via Monte Nero 13 10050 Coazze (TO) Italia
Nurivalle 8 10094 Giaveno (TO) Italia

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UNI EN ISO 13485 KIWA CERMET quality certificate
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[1] CERTIFICATO DI ESAME CE DELLA PROGETTAZIONE
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[2] Direttiva Dispositivi Medici 93/42/CEE e s.m.i. / *Medical Devices Directive 93/42/EEC and subsequent amendments and upgrades*

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[4] Dispositivo Medico *Medical Device* Matrice ossea e collagenica *Collagenic bone matrix*

[5] Classificazione *Classification* III

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[8] Estensione della progettazione: *Design extension:* I limiti di applicazione sono contenuti nella documentazione tecnica esaminata *The limits of application are contained in the technical documentation examined*

Data di prima emissione: *First issue date:* 2019 – 04 - 30 | Luogo e data di emissione: *Place and date of issue:* Torino, 2019 – 04 - 30 | Il Certificato è valido fino al: *The Certificate is valid until:* 2024 – 04 - 29

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EC DESIGN-EXAMINATION CERTIFICATE Bone Matrix
Source: Tecnoss® s.r.l.


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[2] Direttiva Dispositivi Medici 93/42/CEE e s.m.i. / *Medical Devices Directive 93/42/EEC and subsequent amendments and upgrades*

[3] Certificato No *Certificate No* EPT 0477.MDD.19/3206

[4] Dispositivo Medico *Medical Device* Membrane e feltri collagenati *Collagenated membranes and felts*

[5] Classificazione *Classification* III

[6] Fabbricato da *Manufactured by* TECNOSS S.r.l. Via Nurivalle, 8 – 10094 Giaveno (TO) - Italy

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REGENERATION SCIENCE
INSPIRED BY NATURE
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LASL
LAS
ALR

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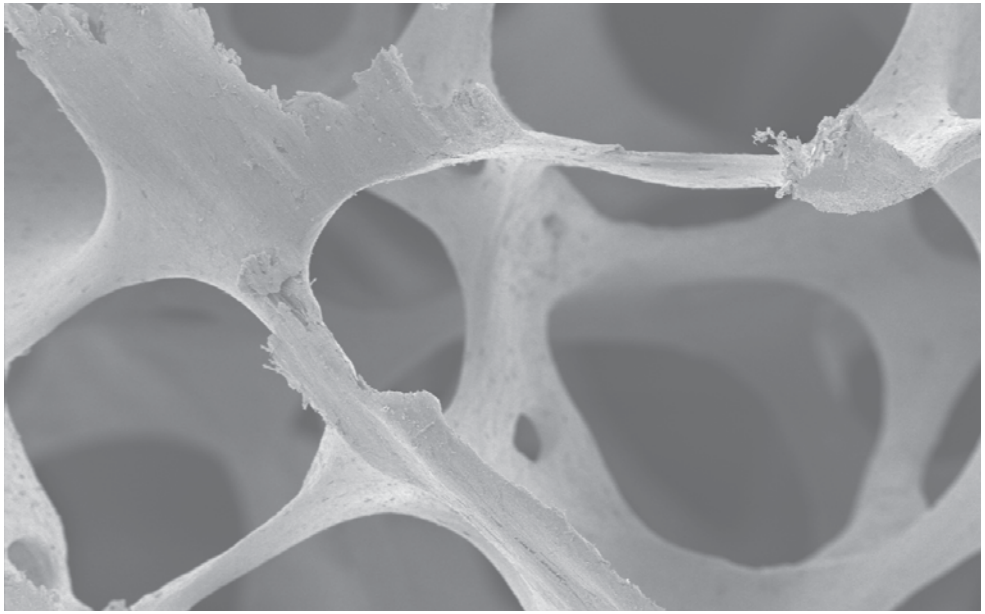

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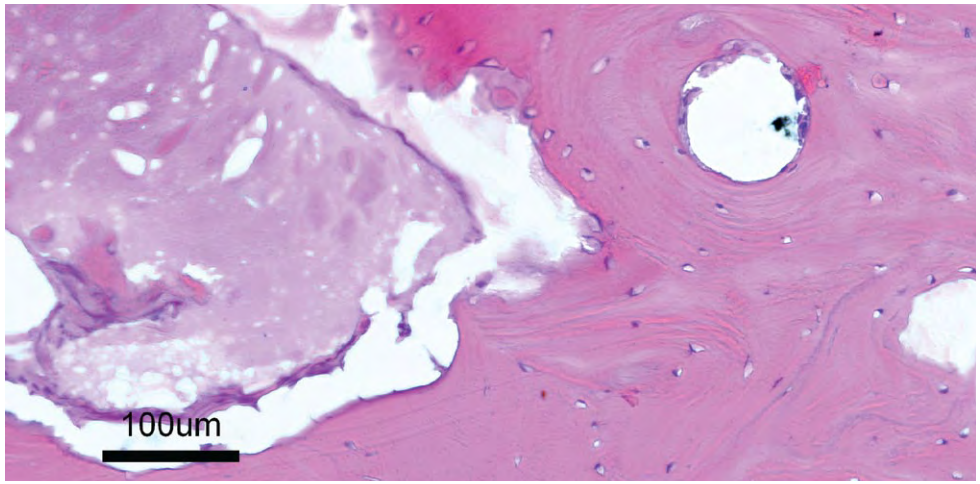

Histology showing a granule of OsteoBiol® *mp3*® partially resorbed and in contact with new bone tissue. Htx-eosine
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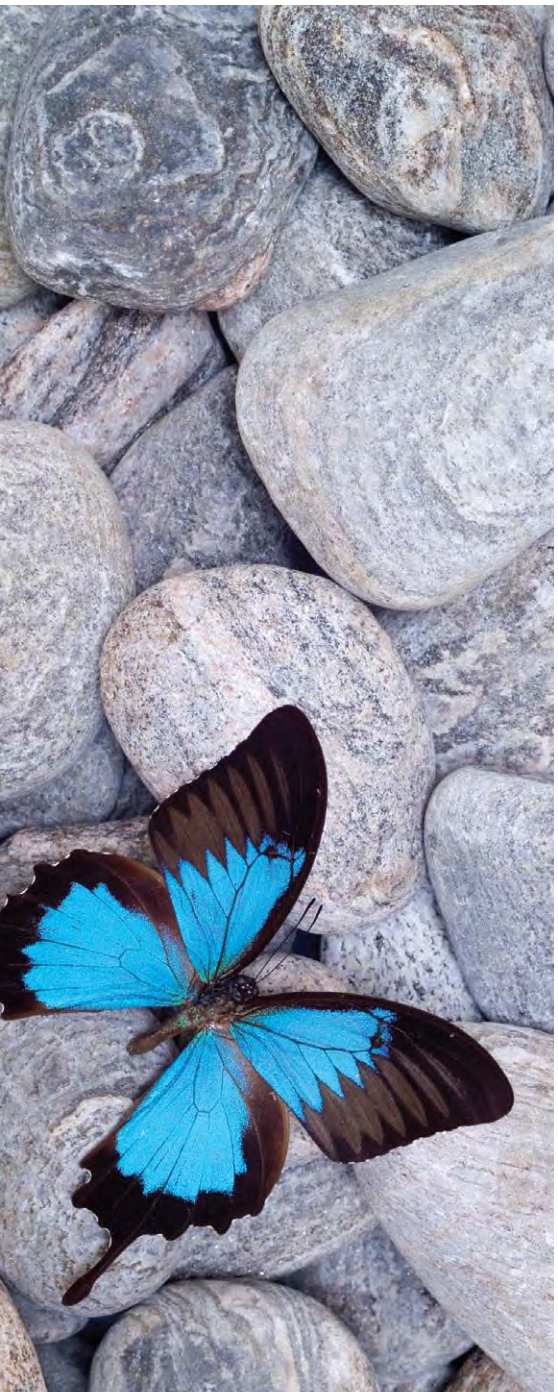
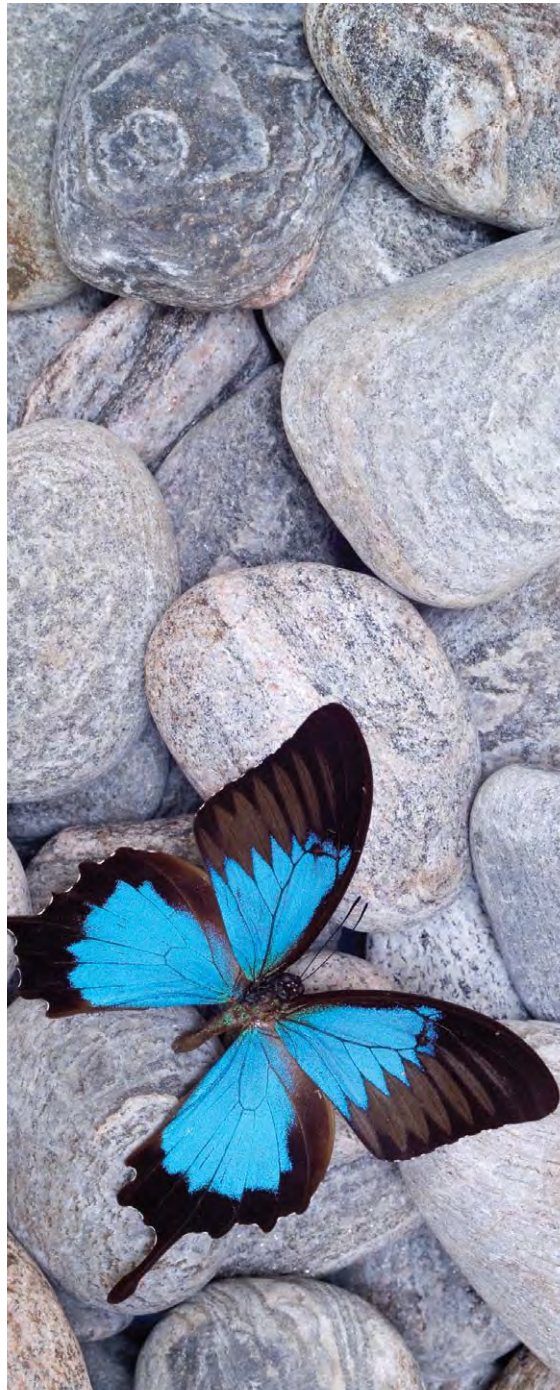


PRODUCT	PACKAGING	TYPE	SIZE	PORCINE CODE	EQUINE CODE
BONE SUBSTITUTES					
Gen-Os®	1 Vial	DRIED GRANULES	0.25 g	M1052FS	M1052FE
Gen-Os®	1 Vial	DRIED GRANULES	0.5 g	M1005FS	M1005FE
Gen-Os®	1 Vial	DRIED GRANULES	1.0 g	M1010FS	M1010FE
Gen-Os®	1 Vial	DRIED GRANULES	2.0 g	M1020FS	M1020FE
Gen-Os® 1000-2000	1 Vial	DRIED GRANULES	1.0 g	M0210FS	
Gen-Os® 1000-2000	1 Vial	DRIED GRANULES	2.0 g	M0220FS	
TSV Gel	1 Syringe	TSV GEL	0.5 g	TSV005S in kit with M1005FS or A1005FS	TSV005E in kit with M1005FE or A1005FE
TSV Gel	1 Syringe	TSV GEL	1.0 g	TSV010S in kit with M1010FS or A1010FS	TSV010E in kit with M1010FE or A1010FE
mp3®	1 Syringe	BONE MIX	0.5 cc	A3095FS	A3095FE
mp3®	1 Syringe	BONE MIX	1.0 cc	A3005FS	A3005FE
mp3®	3 Syringes	BONE MIX	3x0.25 cc (0.75 cc)	A3075FS	
mp3®	3 Syringes	BONE MIX	3x0.5 cc (1.5 cc)	A3015FS	A3015FE
mp3®	3 Syringes	BONE MIX	3x1.0 cc (3.0 cc)	A3030FS	A3030FE
mp3®	1 Syringe (wide tip)	BONE MIX	2.0 cc	A3010FS	A3010FE
mp3® 1000-2000	1 Syringe (wide tip)	BONE MIX	2.0 cc	A3210FS	A3210FE
GTO®	1 Syringe	BONE MIX + TSV Gel	0.5 cc	MU0005S	MU0005E
GTO®	1 Syringe	BONE MIX + TSV Gel	2.0 cc	MU0020S	MU0020E
Putty	1 Syringe	BONE PASTE	0.25 cc	HPT52S	
Putty	1 Syringe	BONE PASTE	0.5 cc	HPT09S	HPT09E
Putty	3 Syringes	BONE PASTE	3x0.25 cc (0.75 cc)	HPT32S	HPT32E
Putty	3 Syringes	BONE PASTE	3x0.5 cc (1.5 cc)	HPT35S	HPT35E
Putty	1 Syringe (wide tip)	BONE PASTE	1.0 cc	HPT61S	HPT61E
Gel 40	1 Syringe	BONE GEL	0.5 cc	05GEL40S	05GEL40E
Gel 40	3 Syringes	BONE GEL	3x0.5 cc (1.5 cc)	15GEL40S	15GEL40E
Apatos Mix	1 Vial	DRIED GRANULES	0.5 g	A1005FS	A1005FE
Apatos Mix	1 Vial	DRIED GRANULES	1.0 g	A1010FS	A1010FE
Apatos Mix	1 Vial	DRIED GRANULES	2.0 g	A1020FS	A1020FE
Apatos Cortical	1 Vial	DRIED GRANULES	0.5 g	AC1005FS	
Apatos Cortical	1 Vial	DRIED GRANULES	1.0 g	AC1010FS	
Apatos Mix 1000-2000	1 Vial	DRIED GRANULES	1.0 g	A0210FS	A0210FE

OsteoBiol® product codes

PRODUCT	PACKAGING	TYPE	SIZE	PORCINE CODE	EQUINE CODE
BLOCKS					
Sp-Block	1 Blister	DRIED BLOCK / NORM	10x10x10 mm		BN0E
Sp-Block	1 Blister	DRIED BLOCK / NORM	10x10x20 mm		BN1E
Sp-Block	1 Blister	DRIED BLOCK / NORM	10x20x20 mm		BN2E
Sp-Block	1 Blister	DRIED BLOCK / NORM	35x10x5 mm		BN8E
Dual-Block CURVED	1 Blister	DRIED BLOCK / SOFT	20x15x5 mm	STS7S	
Dual-Block CURVED	1 Blister	DRIED BLOCK / NORM	20x10x5 mm	STN5S	
MEMBRANES AND BARRIERS					
Evolution	3 Blister	DRIED / X-FINE	30x30x (0.2) mm	EM33XS	
Evolution	1 Blister	DRIED / FINE	20x20x (0.3) mm		EV02LLE
Evolution	1 Blister	DRIED / FINE	30x30x (0.3) mm		EV03LLE
Evolution	1 Blister	DRIED / FINE	Oval 25x35x (0.3) mm		EVOLLE
Evolution	1 Blister	DRIED / FINE	40x40x (0.3) mm		EV04LLE
Evolution	1 Blister	DRIED / FINE	80x60x (0.3) mm		EV06LLE
Evolution	1 Blister	DRIED / STANDARD	20x20x (0.4) mm	EM02HS	EV02HHE
Evolution	1 Blister	DRIED / STANDARD	30x30x (0.4) mm	EM03HS	EV03HHE
Evolution	1 Blister	DRIED / STANDARD	Oval 25x35x (0.4) mm	EM00HS	
Derma	1 Blister	DRIED	20x20x (0.5) mm	ED02LS	
Derma	1 Blister	DRIED	Oval 12x8x (0.9) mm	ED21FS	
Derma	1 Blister	DRIED	25x25x (0.9) mm	ED25FS	
Derma	1 Blister	DRIED	50x50x (0.9) mm	ED05FS	
Derma	1 Blister	DRIED	7x50x (2.0) mm	ED75SS	
Derma	1 Blister	DRIED	15x5x (2.0) mm	ED15SS	
Derma	1 Blister	DRIED	30x30x (2.0) mm	ED03SS	
Derma	1 Blister	DRIED	50x50x (2.0) mm	ED05SS	
Soft Cortical Lamina	1 Blister	DRIED	25x25x (0.5) mm	LS25FS	LS25FE
Soft Cortical Lamina	1 Blister	DRIED	Oval 25x35x (0.5) mm	LS23FS	LS23FE
Soft Cortical Lamina	1 Blister	DRIED	20x40x (1.0) mm	LS24LS	
Curved Lamina	1 Blister	DRIED	35x35x (1.0) mm	LS10HS	LS10HE
Soft Cortical Lamina	1 Blister	DRIED	30x30x (3.0) mm	LS03SS	LS03SE
Cortical Lamina	1 Blister	DRIED	35x15x (0.7) mm	LS15LS	
Cortical Lamina	1 Blister	DRIED	35x35x (1.0) mm	LS35LS	
Special	1 Blister	DRIED	20x20x (0.2) mm		EM02LE
Special	1 Blister	DRIED	30x30x (0.2) mm		EM03LE



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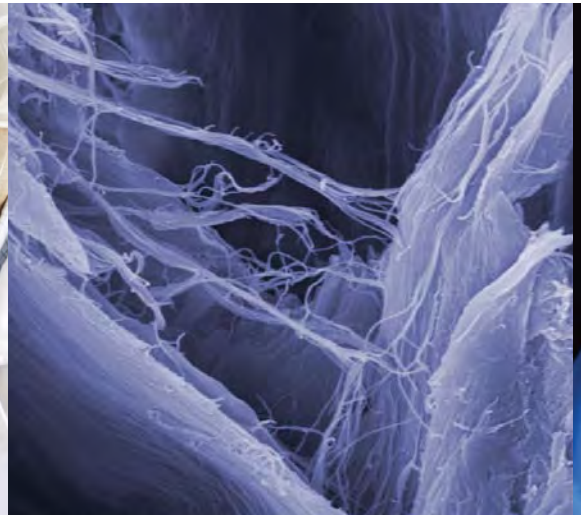

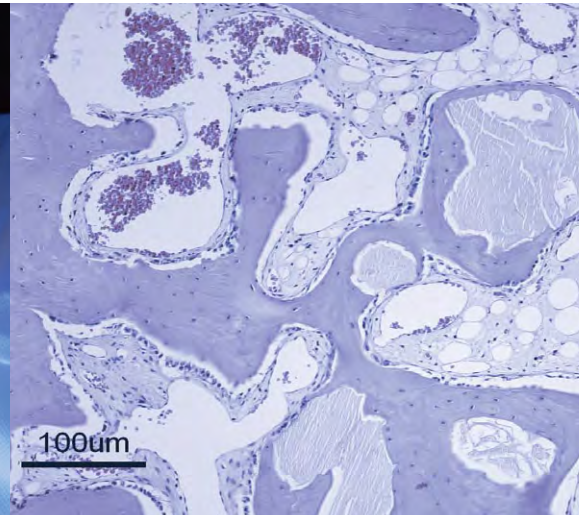

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