

Pagliani L, Andersson P, Lanza M, Nappo A, Verrocchi D, Volpe S & Sennerby L, 2010. 'A Collagenated Porcine Bone Substitute for Augmentation at Neoss Implant Sites: A Prospective 1-Year Multicentre Case Series Study with Histology', Clin Implant Dent Relat Res [epub ahead of print].

# A Collagenated Porcine Bone Substitute for Augmentation at Neoss Implant Sites: A Prospective 1-Year Multicenter Case Series Study with Histology

Luca Pagliani, MD, DDS;<sup>\*†</sup> Peter Andersson, DDS;<sup>\*‡§</sup> Massimiliano Lanza, DDS;<sup>\*¶</sup> Antonio Nappo, DDS;<sup>\*\*</sup> Damiano Verrocchi, DDS;<sup>\*§¶</sup> Stefano Volpe, DDS;<sup>\*††</sup> Lars Sennerby, DDS, PhD<sup>\*‡‡‡</sup>

---

## ABSTRACT

*Background:* The presence of localized defects and/or small amounts of bone below the maxillary sinus is a common finding, which may compromise implant placement. There is therefore a need for predictable techniques for bone augmentation in such situations.

*Purpose:* The study aims to clinically and histologically evaluate a porcine bone (PB) substitute used for augmentation of the alveolar crest or the maxillary sinus floor prior to or in conjunction with implant placement.

*Materials and Methods:* Nineteen patients were treated with a porcine bone substitute and barrier membranes (OsteoBiol, TecnoDental, Turin, Italy) for lateral bone augmentation (Group 1a) and healing of bone defects (Group 1b) or for augmentation of the maxillary sinus floor using either a replaceable (Group 2a) or an infrafractured bone window (Group 2b). A total of 34 implants (Neoss Ltd., Harrogate, UK) were placed in conjunction or 5 to 7 months after the procedure. Implants were followed with implant stability measurements at placement and abutment connection, and with intraoral radiographs at abutment connection and after at least 1 year of loading. A biopsy for histology and morphometry was taken at the first reentry operation.

*Results:* All but one of the procedures was successful (94.7%) as one maxillary sinus procedure (Group 2a) resulted in insufficient bone for implant placement. One of the 34 implants failed, giving an implant survival rate of 97.1% after 1 year. Implant stability measurements showed a mean stability of  $71.9 \pm 7.7$  implant stability quotient (ISQ) at placement, which significantly increased to  $75.3 \pm 6.8$  ISQ at abutment connection ( $p = .03$ ). The average bone loss was  $0.5 \pm 0.7$  mm during 1 year.

Histology revealed new bone formation at the PB surface, which formed bridges between particles and between particles and preexisting bone. The presence of scalloped resorption lacunae and new osteons inside the particles indicated ongoing resorption/remodeling of the particles. The histomorphometric analyses showed that the total specimen area consisted of, in average,  $56.5 \pm 15.7\%$  mineralized tissue of which  $24.8 \pm 13.9\%$  of the total area was PB particles.

*Conclusion:* This study showed good clinical results when using a PB substitute and barrier membranes for augmentation of the alveolar crest and maxillary sinus. Histology revealed bone condensation properties and indicated that the material can be resorbed with time.

**KEY WORDS:** bone defects, bone substitute, clinical study, dental implants, histology, maxillary sinus floor augmentation

---