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Molecular, cellular and pharmaceutical aspects of bone grafting materials and membranes during maxillary sinus-lift procedures. Part 2: detailed characteristics of the materials

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ABSTRACT

Bone substitute materials (BSBs) can be classified into four groups according to their origin: autogenic (bone originating from the same patient), allogenic (bone originating from another person), xenogenic (bone originating from another species) and synthetic (with no biological origin). Their use in bone tissue regeneration has been widely validated and various grafts or combination of bone substitute materials have been used in sinus lift procedures. Knowing the properties of each graft enables individual treatment concepts as the choice of the best BSB is crucial for success in maxillary sinus augmentation procedures. In this article, the aim of the Authors is to provide an overview of most of the materials currently available for sinus lift, with a specific focus on their histological, molecular, cellular and pharmaceutical aspects.
In their overview, the Authors examined collagenated BSB of porcine origin too (OsteoBiol®, Tecnoss®, Giaveno, Italy). In the literature review, porcine bone has been reported to have a microstructure similar to human bone. Most of the grafted porcine bone particles were surrounded by newly formed bone with large osteocyte lacunae and the newly formed bone was always in tight contact to the grafted particles, and no gaps were evident at the bone-particles interface. No inflammatory cells and multinucleated giant cells were detected around the particles or at the interface with bone. No osteoclasts were evident around the graft particles. Moreover, porcine bone has been demonstrated to be osteoconductive, with no adverse reactions, no inflammatory infiltrate and this material has been described as a resorbable graft material, with clear active resorption signs of its particles.

CONCLUSIONS

Following a detailed description of the different BSBs, the Authors concluded that: *"the results of the present overview showed that all these BSBs can be used with success in maxillary sinus augmentation procedures presenting good biocompatibility and osteoconductive properties, with osteoblastic cells forming bone directly in contact with the material surface and without histological signs of adverse reactions. Most of these biomaterials seem to be gradually resorbed, and partially replaced by newly formed bone"*.

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