In Vitro Degradation of Commercially Available Collagen-Based Membranes for Dental Applications: A Comparative Study

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This study (P16) will be presented in E-Poster session at 12:20-12:30 pm on Thursday, March 14 (Monitor 4).

- One advantage of using a resorbable membrane is that the second surgery for membrane removal can be avoided. However, the membrane resorption time should be sufficiently long to keep its functionality.
- By carefully selecting the tissue source as well as fabrication technology, thickness, preservation and sterilization methods, resorption rate of the membranes can be adjusted to meet different clinical needs.

Membrane	Source	Preservation	Technology
Puros® Pericardium	Allogenic Pericardium	Solvent dehydration	Tissue based
CopiOs Extend®	Porcine Dermis	Freeze-drying	Tissue based
OsseoGuard®	Bovine Tendon	Freeze-drying	Fiber reconstitution
OsseoGuard Flex®	Bovine Dermis	Freeze-drying	Tissue based
BioMend®	Bovine Tendon	Freeze-drying	Fiber reconstitution
BioMend Extend™	Bovine Tendon	Freeze-drying	Fiber reconstitution

Table 1: Membranes tested in the study.

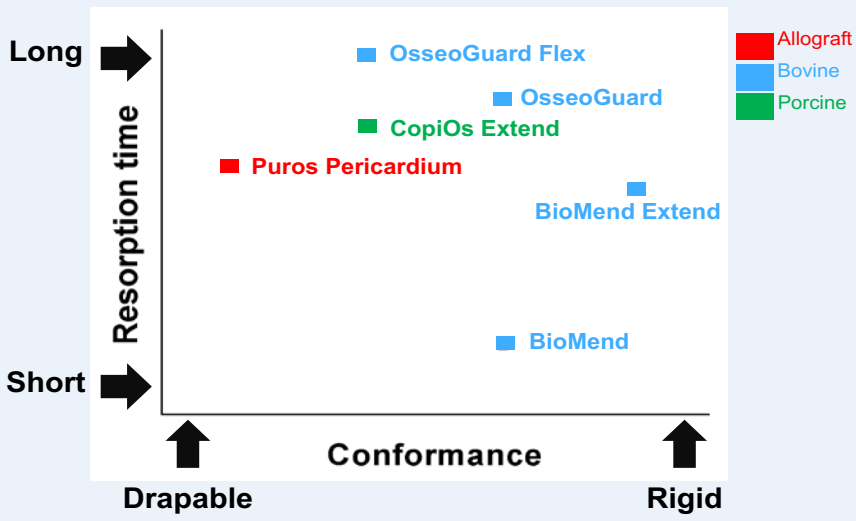

Figure 1. Comparison of resorption time and conformance of the membranes. The conformance was blindly assessed by two individuals.

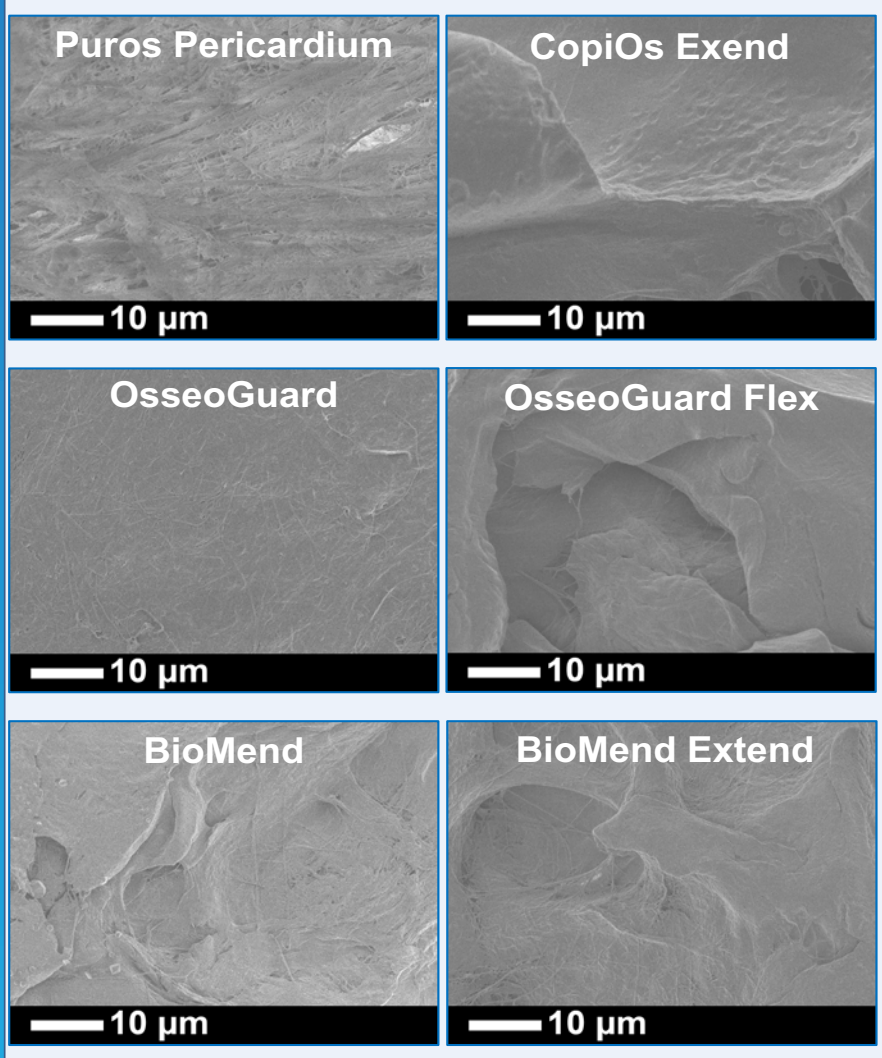

Figure 2. Field-emission scanning electron microscope images of the membranes examined in this study.

Surface Structure of Commercially Available Allografts: A Comparative Study

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- Different processing techniques including cleaning, preservation, and sterilization can affect physiochemical properties of the allografts, including surface morphology and structure.
- The Tutoplast® processed allograft has been shown to promote cell adhesion, metabolic activity and gene expression. In addition, it performs almost equally to fresh frozen bone in terms of new bone formation, indicating that this type of manufacturing process may improve the osteoconductivity properties of the allograft [1-2].
- The Puros® allograft exhibited more porous structure and higher surface area as compared to the freeze-dried allografts. This may be associated with an increased cellular activity and enhanced bone regeneration.

Allograft	Information	Preservation
Puros Allograft	Mineralized, cancellous, 0.25 - 1 mm	Solvent dehydration
Comparative Allograft-1 (CA-1)	Mineralized, cancellous, 0.25 - 1 mm	Freeze-drying
Comparative Allograft-2 (CA-2)	Mineralized, cancellous, 0.25 - 1 mm	Freeze-drying
Comparative Allograft-3 (CA-3)	Mineralized, cancellous, 0.3 - 1 mm	Freeze-drying

Table 2: Allografts tested in the study.

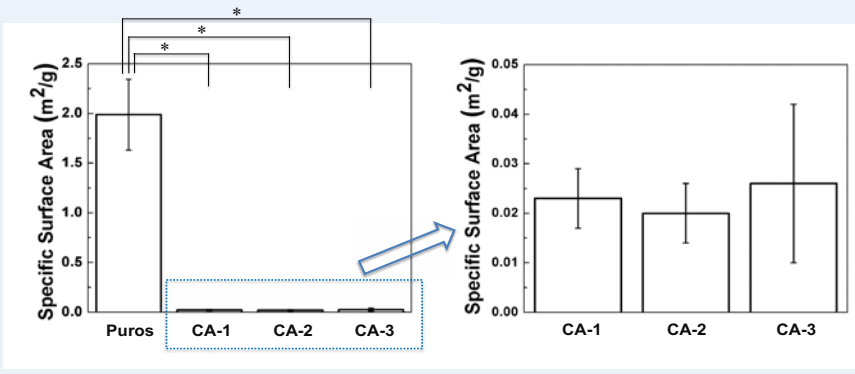

Figure 3. Surface area comparison from BET analysis. Puros allograft exhibited two orders of magnitude higher specific surface area as compared to other allografts, which confirmed the porous structure of Puros allogfraft.

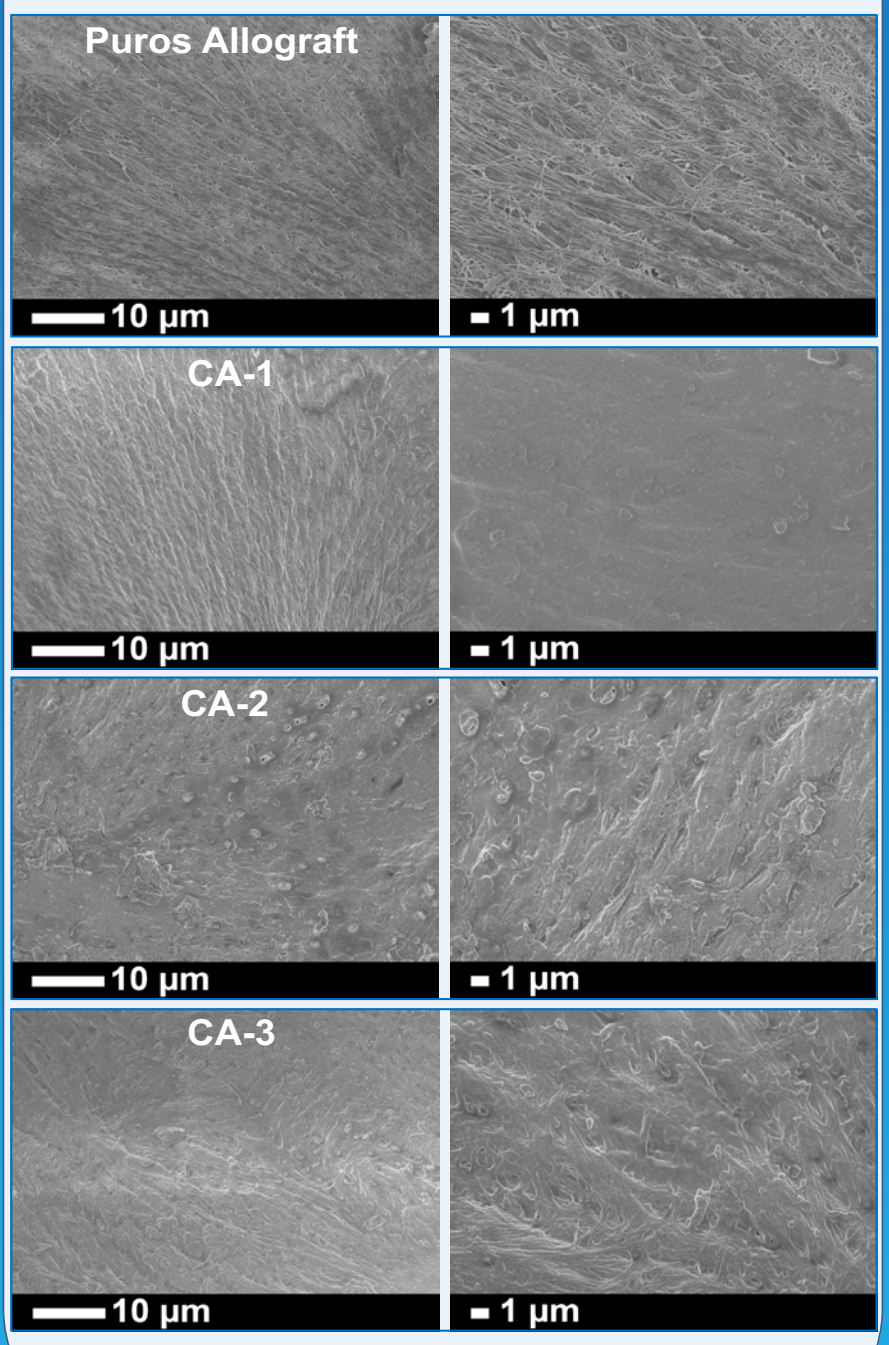

Figure 4. Field-emission scanning electron microscope images indicated porous surface structure of Puros allograft.

References
[1]. Seebach C, *et al.*, Injury. 2010; 41:731. [2]. Coquelin L, *et al.*, Tissue Eng Part A. 2011; 18:1921.