

Allograft Pericardium Membrane; An Appropriate Dressing for Periodontology Surgeries

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Background:

Essential mediatory functions have been performed by barrier membranes for the aim of regenerating the defects in periodontology surgeries. Therefore, several types of membranes are used in this regard. Among them, allograft pericardium membrane has gained attentions due to its remarkable biocompatibility as well as its optimum biodegradation rate concerning the required time of new tissue formation in the surgical area. In this project, an allograft pericardium membrane fabricated by Iranian Tissue Product company was evaluated in case of its clinical performance.

Hypothesis:

It was assumed that the pericardium membrane would present appropriate structural characteristics and operational performance. Also, the membranes would not be expected to cause any immune reactions.

Method:

After completion of donor screening, the pericardium tissue was dissected for removing any additional tissue such as fat. Then, it was decellularized using H₂O₂ and segmented into certain dimensions. Finally, the samples were lyophilized by freeze-dryer and gamma irradiated with the dose of 25 kGy. For validation of the decellularization process, hematoxylin and eosin (H&E) colorimetric staining was used.

Furthermore, to investigate the clinical performance of the product, qualitative parameters were defined based on the important factors for a suitable barrier membrane. This information was gathered in a questionnaire form (the parameters are also presented in Fig 2-A). The forms were distributed between the surgeons who utilized the product in their surgeries. The surgeons were asked to rate the membrane in each qualification and report any observation of immune reactions up to 4 months. The obtained results were analyzed statistically and reported as relative percent frequency.

Result:

The final product and the result of H&E staining could be observed in Fig 1 Prior to decellularization (Fig 1-b), Numerous thick bundles of mature collagen fibers admixed with several fibroblasts and fibrocytes are obvious in the tissue. In the decellularized tissue, some bundles of collagen fibers admixed with

some scattered fibroblasts and fibrocytes can be observed. Therefore, the acceptable decellularization of the pericardium tissue without destructive impact on its native structure was validated.

Fig 1. a) The prepared pericardium membrane, b) H&E staining before decellularization, c) H&E staining after decellularization.

Concerning the clinical investigation, 50 surgeons participated in the project and based on the results, none of them evaluated the performance of pericardium membrane as “failed”. Moreover, there were not any observation of infection, inflammation, rejection, or other side effects after the transplantation. The outcomes are summarized in Fig 2-A.

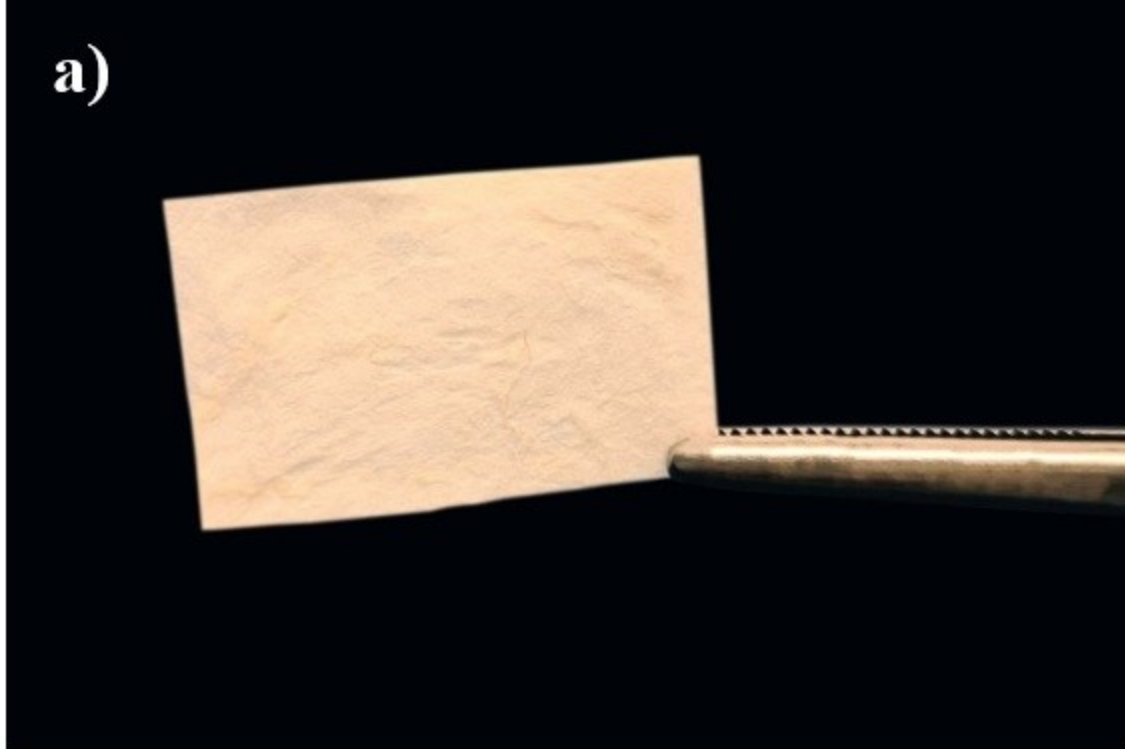
Also, the process of utilization of the product for root coverage which was prepared by one of the surgeons could be seen in Fig 2-B.

Fig 2. A) Performance evaluation of allograft pericardium membrane, reported as percent frequency, B) Root coverage by pericardium membrane; 1) Incision on the gum, 2) Root covering by the membrane, 3) Suturing, and 4) The healed defect.

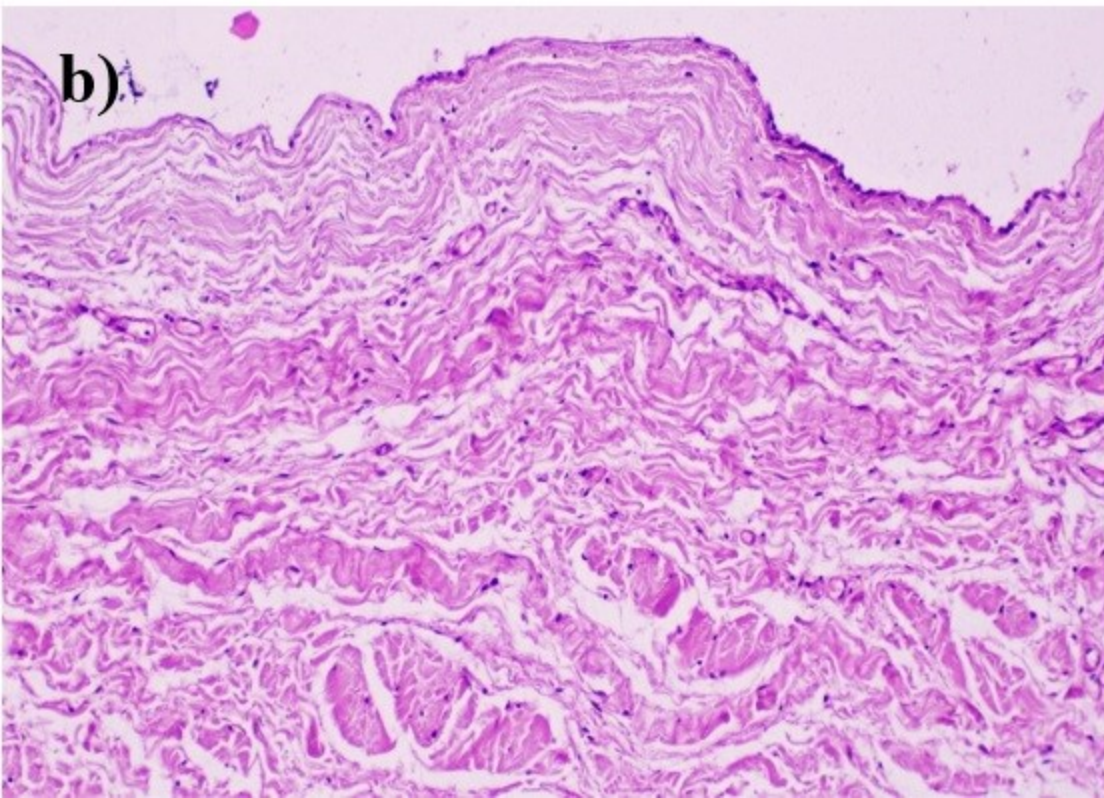
Conclusion:

Regarding the notable results of the structural and biological performance of the decellularized product, it can be claimed that the prepared allograft pericardium is a desirable candidate for dressing the defects in periodontological surgeries with minimum risks of immunogenicity.

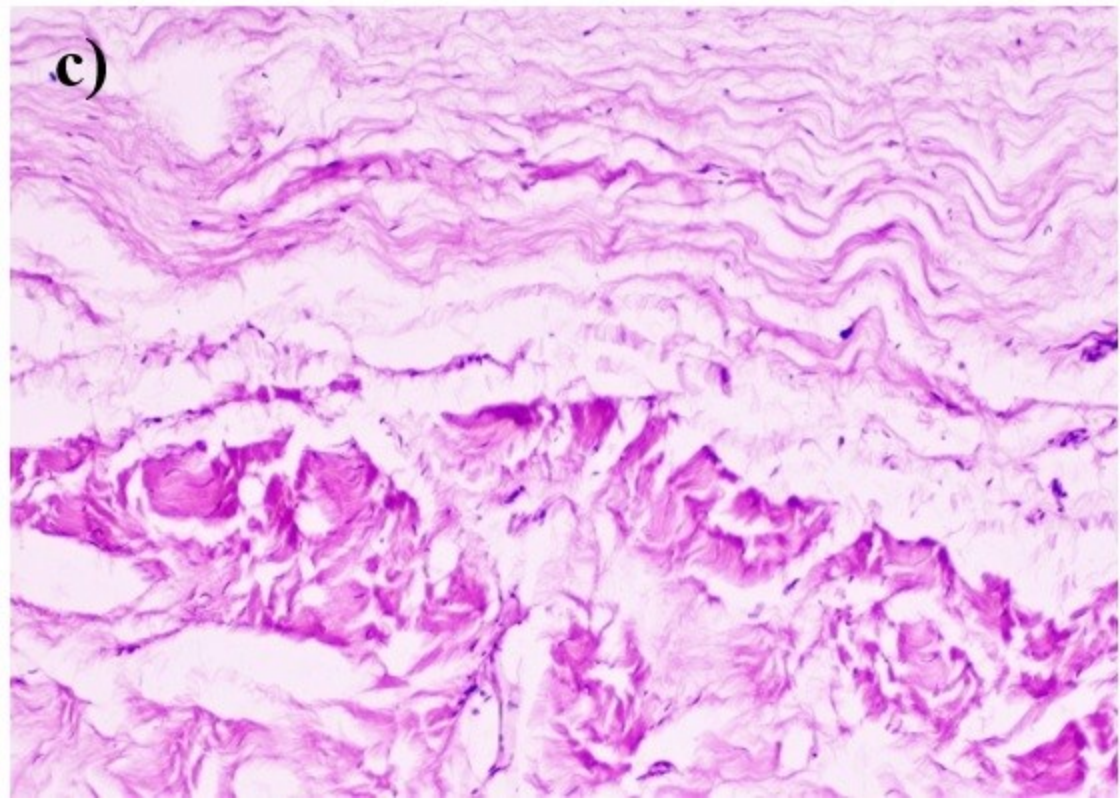
a)



b)



c)



A)



B)

