The impact of different augmentative methods on the expression of inflammatory factors.

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Background

Many animal studies show that an intact periosteum plays an important role in osseous regeneration. The potential effect of an in vivo periosteal barrier membrane on the expression of specific proteins has not been examined sufficiently.

Objectives

The aim of the present study is to investigate the influence of flap preparation method and collagen membrane on the emission of inflammatory factors.

Materials and Methods

This study examines 20 patients with dental implants who had previously undergone an augmentation. A soft tissue sample was taken during augmentation (1) and three months later (2) from the same location. Samples were always taken from the margins of a previously prepared mucoperiosteal flap. The flap was raised with a conventional periosteal elevator in the control group (R) and with a piezoelectric device in the test group (P) (Fig. 1). In both groups, we covered half of the augmented bone with a native collagen membrane (NCM; Geistlich Bio-Gide). This allowed us to examine the same incision area with (m) and without a membrane. An immunohistochemical analysis was performed for collagen IV, fibronectin and inflammatory factors such as CD31, COX-2 and IL-6.

Results

There was a clear difference in the expression of specific proteins after the piezoelectric device and the periosteal elevator were used. The expression of fibronectin (Fig. 2), IL-6 (Fig. 3) and COX-2 (Fig. 4)was higher after preparation with the periosteal elevator than after piezoelectric periosteum dissection. The expression of collagen IV was higher after the piezoelectric procedure. No difference was observed for CD31 (Fig. 5). The membrane had no effect on the expression of collagen IV (Fig. 6), fibronectin, IL-6 and COX-2.

Conclusion

The type of periosteal preparation influences the expression of specific proteins. With regard to the factors examined here, NCM did not appear to influence the wound healing cascade.

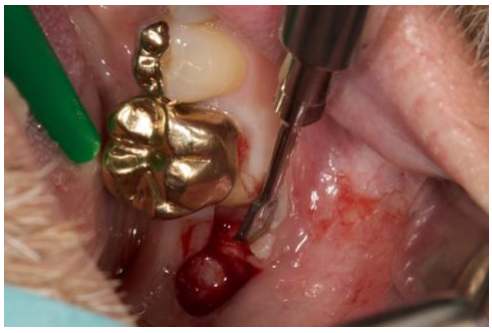

Fig. 1: Soft tissue preparation using piezoelectric device

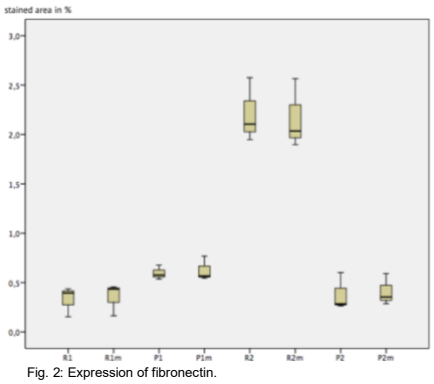

Fig. 2: Expression of fibronectin.

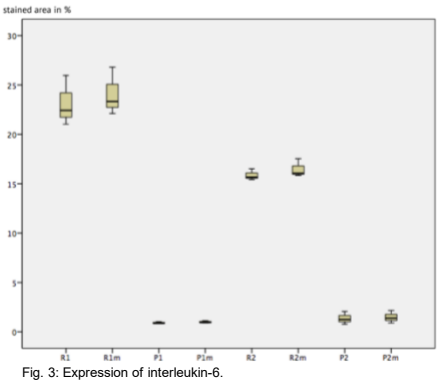

Fig. 3: Expression of interleukin-6.

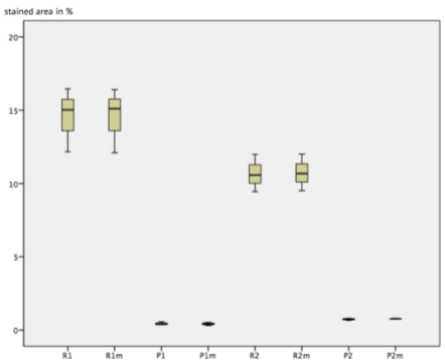

Fig. 4: Expression of COX-2.

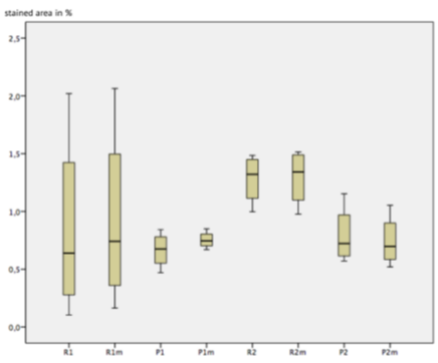

Fig. 5: Expression of CD31.

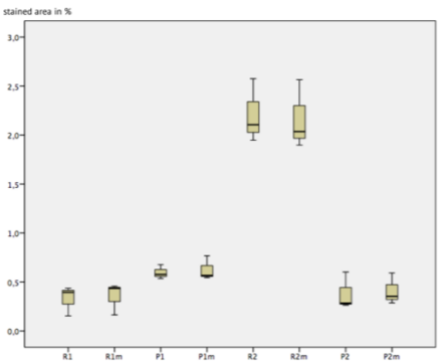

Fig. 6: Expression of collagen IV.

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