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**Study:**



# The use of leucocyte and platelet-rich fibrin in socket management and ridge preservation: a split-mouth, randomised, controlled clinical trial

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**Relevant background:**

Socket preservation techniques are widely used treatment options to compensate the vertical and horizontal resorption process after tooth extraction. The application of grafting biomaterials into extraction sockets has been extensively investigated

with promising results. The use of biological additives, such as leucocyte and platelet rich fibrin (L-PRF), may enhance wound healing and regulate inflammation and angiogenesis.

**Aims:**

This split-mouth, randomised, controlled clinical trial aimed to evaluate the benefits of L-PRF in ridge-preservation procedures.

**Methods:**

Twenty-two patients in need of a single symmetrical bilateral tooth extraction in the maxilla or in the mandible were randomly allocated to the control site (natural healing) or the test site (L-PRF socket filling) in a split-mouth design. A flapless extraction was done, placing the L-PRF clots covered by the membranes obtained from the patient's blood in the test sites. Sutures were performed to stabilise the coagulum of the material in both the control and test sites, without an attempt to close the wound.

After tooth extraction and at three months, a Cone Beam Computed Tomography (CBCT) scan was done, which was superimposed using original Digital Imaging and Communications in Medicine (DICOM) data. Changes in buccal plate width and horizontal width ridge at three levels below the crest (-1mm, -3mm, and -5mm), as well as vertical resorption at the lingual and buccal side, and socket fill were measured. Postoperative pain and swelling were assessed daily until day seven, according to the Visual Analogue Scale (VAS) score.

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**Results:**

In total, 22 patients (bilateral extractions) were included in this study. Three dehiscences of approximately 6 mm on the buccal side occurred in the test group. One dehiscence of approximately 3 mm occurred in the control group. All patients received two CBCT scans and completed the study protocol. The mean vertical resorption height changes at the buccal aspect – excluding all sites with dehiscence – were -1.6 mm ( $\pm 1.2$ ) for control sites and -0.1 mm ( $\pm 1.6$ ) for test sites, reaching statistically significant differences ( $p=0.0002$ ). For the lingual aspect, no statistical differences were reached. The mean horizontal resorption changes at the buccal aspect at the three levels – excluding all sites with dehiscence – were -3.3 mm ( $\pm 2.6$ ), -1.0 mm ( $\pm 1.1$ ), and -0.5 mm ( $\pm 0.7$ ) for the control sites and -1.2 mm ( $\pm 2.6$ ), -0.8 mm ( $\pm 0.9$ ), and -0.5 mm ( $\pm 0.6$ ) for the test sites. Statistically significant differences between test and control sites were reached at the 1 mm ( $p=0.005$ ) and 3 mm levels ( $p=0.03$ ).

At the lingual aspect, measurements were -2.0 mm ( $\pm 2.6$ ), -0.2 mm ( $\pm 0.3$ ), and -0.1 mm ( $\pm 0.3$ ) for the control sites and -0.3 mm ( $\pm 1.9$ ), 0.1 mm ( $\pm 0.3$ ), and 0.0 mm ( $\pm 0.1$ ) for the test sites, and statistically significant differences between test and control sites were reached at the 1 mm level ( $p=0.009$ ).

The mean ridge width changes at the three levels below the crest amounted to -5.4 mm ( $\pm 4.4$  mm), -1.2 mm ( $\pm 1.1$  mm), and -0.5 mm ( $\pm 0.5$  mm) for the control sites and -2.4 mm ( $\pm 2.3$  mm), -0.6 mm ( $\pm 0.7$  mm), and -0.4 mm ( $\pm 0.5$  mm) for the test sites, with statistically significant difference at the three levels ( $p = 0.0004$ ;  $p = 0.007$ ;  $p = 0.02$ ). Statistically significant differences ( $p = 0.004$ ) were found in the percentage of socket fill between test (94.7% /  $\pm 26.9$ ) and control sites (63.3% /  $\pm 31.9$ ). Statistically significant differences in reduced postoperative pain sensation were observed at day three, four, and five in the test sites ( $p < 0.005$ ).

**Limitations,  
conclusions  
and impact:****Limitations:**

The low sample size might have affected the strength of the findings. Also, the VAS pain questionnaire of patients who received adjacent extractions (1.1-2.1/4.1-3.1) is not reliable because of the proximity of the studied areas. A histological confirmation of the bone preservation would be desirable.

**Conclusions:**

The use of L-PRF as a socket-filling material for ridge preservation is beneficial, at a three-month evaluation, when compared with natural healing. Moreover, less postoperative discomfort and pain for the patient was observed.

**Impact:**

Leucocyte and platelet-rich fibrin (L-PRF) is a second-generation biological additive, which is simple to prepare, making it usable on a routine basis in daily practice. It seems to counteract the dimensional changes of the ridge after tooth extraction and reduce postoperative discomfort. However, additional long-term studies are needed to validate these results. L-PRF seems to partially overcome the need of biomaterials.