

Title: Influence of local injection of platelet rich fibrin and osteoprotegerin On orthodontic relapse in a rabbit model

Hakam H. Al-Fakhry, Nada M. Al-Sayagh

University of Mosul, Iraq, IRAQ

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Introduction: Relapse in orthodontic treatment remains a challenging and undesirable consequence of orthodontic treatment, Hence, a variety of biomedical agents, methods, and techniques have been investigated to reduce post-orthodontic relapse.

Aims: This study sought to determine whether the local injection of injectable platelet rich Fibrin (i-PRF) or recombinant Osteoprotegerin (OPG-FC) could reduce orthodontic relapse by increasing bone density. It is also intended to further investigate the role of periodontal ligament and alveolar bone remodeling in rabbits and how they interplay during relapse.

Materials and Methods: Sixty-five adult male albino rabbits were randomly divided into 5 groups. Group I served as the base line group (control -ve) of 5 rabbits, and four experimental groups of 15 rabbits each including, group II (control + ve), which served as the appliance control group and was injected with a 200 µl of phosphate-buffered saline (PBS), group III, which was injected with 200 µl of injectable platelet rich fibrin (i-PRF), group IV, which was injected with 400 µl of i-PRF and group V, which was injected with a 200 µl Osteoprotegerin-Fc (OPG-FC). Furthermore, each experimental group was subdivided into three subgroups of 5 rabbits each according to time of sacrifice (0, 10, and 20 days). For all experimental groups, the lower incisors of rabbits were moved distally by a modified orthodontic appliance with nickel-titanium open coil springs for 2 weeks, and then the appliance was maintained in position to retain the gained space for 2 weeks. During the retention period, each group was injected with its specific drug every 7 days. After the retention period, teeth are allowed to relapse. The results were evaluated by measuring the amount of relapse by direct measurement with a digital vernier.

Results: Relapse distance (RD) for i-PRF groups and OPG-Fc group showed a significant decrease at 10, 13, 17, and 20 days compared to the control group. At the same time, the OPG-FC group had a significantly higher RD than the i-PRF groups at days 17 and 20 in the upper region. Histologically, the i-PRF groups in the cervical region had a significantly narrower PDL width, higher percentage of NBA, higher Ob. N and blood vessels than groups II and V at 0 day.

Conclusions: Findings imply that i-PRF and OPG-FC have the potential to improve tooth stability following orthodontic tooth movement, most likely by increasing alveolar bone density and inhibiting alveolar bone resorption. Also, i-PRF showed an effect on the inhibition of relapse for a longer time than OPG-FC.

Biography

Hakam Fakhry has the following qualifications: 29/6/1996 Bachelor of Science in Dentistry/College of Dentistry/University of Mosul, then at 15/10/2001 M.Sc. Orthodontics/College of Dentistry/University of Baghdad and 17/5/2022 PhD in general dentistry from the College of Dentistry/University of Mosul.