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Comparative Evaluation of the Possible Effects of Platelet Rich Plasma (Prp) and Low Level Laser (Biolase) on Postoperative Complications and Wound Healing After Extraction of Impacted Wisdom Teeth

Study Protocol

The study was conducted on a total of 30 patients aged between 18 and 40 years who applied to the XXX Oral and Maxillofacial Surgery Department Clinic for bilateral, similar position, half mucosa and bone retention lower impacted wisdom teeth extraction. First, clinical and radiological evaluations were performed on the patients. In the clinical evaluation, systemic status, tooth deficiency, occlusion and the status of the impacted tooth were evaluated. Panoramic film was taken for radiographic evaluation.

Inclusion criteria;

● Individuals aged 18 years and over,

● Patients with partially impacted wisdom teeth,

● Individuals with systemic status according to ASA classification as ASA0 and ASA1,

● Individuals who have not used any medication in the last two weeks,

● Individuals who do not have a missing lower second molar.

Exclusion criteria for the study;

● Individuals with mouth opening less than 25 mm for various reasons,

● Pregnant and breastfeeding individuals,

● Individuals who do not come to postoperative check-ups,

● Individuals using different medications other than the recommended medication.

Individuals who were allergic to the study drugs and the materials to be used were excluded from the study. All patients were included in the study after detailed information about the study was provided and a consent form was signed by the patient. The study was initiated after permission was obtained from the XXX University Ethics Committee. (Decision No:) All operations were performed by the same physician in the operating room of the XXX University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, adhering to surgical principles and sterilization rules, under equal operating conditions.

Study groups; Randomized, prospective, split mouth and single core, 30 patients in total were divided into two groups.

Study groups were determined as follows:

● A. Platelet-rich plasma (PRP) applied group.

● B. Low-level laser therapy (LLLT) applied group.

First group (one side of the same patients): Platelet-rich plasma (PRP, initially 1200 revolutions per minute (rpm), 10 minutes later 2000 rpm for 10 minutes); second group (other side of the same patient): low-level laser treatment, diode laser (Ezlase 940; Biolase Technology, Inc., Irvine, CA) 100 mW (0.1 W) was applied for a total of 120 seconds. After the surgery, these two groups (methods) were applied to the extraction socket at different times (with a 2-week interval between each surgery). Both surgical sites were sutured with 3/0 silk suture (18 mm, 3\8 sharp, 75 cm black, Dağsan Silk Suture). It was randomly determined which material would be used first on which side. The other side was operated on after 2 weeks. Using an automatic centrifuge machine, PRP was initially prepared at 1200 rpm for 10 minutes and then 3 layers were created. 1) An upper straw-colored PPP (platelet-poor plasma). 2) A middle cloudy layer rich in platelets. 3) A lower layer rich in red blood cells. The straw-colored upper layer was collected together with the cloudy layer and centrifuged again at 2000 rpm for 10 minutes. Leukocyte-rich PRP was formed at the bottom of the test tube; the upper PPP was discarded using a pipette. 1 ml (10%) calcium chloride was added to the Platelet Rich Plasma for activation. (50 microliters of 10% calcium chloride is added for 1.0 mL of PRP). Gel was formed after 10 minutes. This layer consisting of approximately 2 ml of PRP was then placed in the extraction socket within 2 minutes after surgical removal of the mandibular third molar. The second group received a single session of intraoral 940 nm diode laser (BIOLASE) for 120 seconds immediately after suturing.

The patients were checked in the first session they came to, and on the 2nd and 7th days after the operation. After the operation in all patients; Amoxicillin 1000mg (Largopen 1000mg,2*1 (Bilim Ilac Sanayii Ve Ticaret A.S. Istanbul, Turkey), Dexketoprofen 25mg (Arveles 25mg, 2*1 (Menarini, Istanbul, Turkey)), benzydamine HcL + chlorhexidine gluconate gargle (Andorex 200ml gargle, 3*1 (Humanis Sağlık A.S. Istanbul, Turkey) were used routinely. Sutures were removed after 1 week. Pain was assessed with Visual Analog Scale (VAS) at 3, 6, 9, 12 and 24 hours and on days 2, 3, 4, 5, 6 and 7. Angulus-tragus, angulus-lateral canthus, angulus-nasalis, angulus-labial commissure and angulus-pogonion points were used to evaluate edema. Measurements were made immediately before, 2 days after and 7 days after the operation. For the evaluation of trismus, mouth opening - the distance between the incisal edges of the central teeth during maximum mouth opening - was measured immediately before, 2 days after and 7 days after the operation. As a result, statistical analysis was performed and interpreted for the

obtained data. Before surgical extraction of the impacted tooth, the inferior alveolaris and buccal nerve were local anesthetized and the buccal flap was elevated mucoperiosteally with a 'Winter' incision using a scalpel number 15. A 1.6 mm diameter steel carbide round cutter, fissure cutter burs, a surgical micromotor operating at 1400 rpm and serum irrigation were used to remove the bone. The teeth were exposed. The teeth were then divided into two by bur and extracted with the help of a dental elevator. During the operation, 2 ampoules of local anesthetic (Ultracain 69 DS forte-Aventis İlaç Sanayi Tic. A1, Turkey) containing 40 mg/ml articaine HCl and 0.012 mg/ml epinephrine HCl were used as local anesthetic solution in all groups. The flap was closed primarily with 3/0, 19 mm atraumatic silk sutures and 3/8 round needles. The time between the first incision and the last suture was calculated and recorded.

Statistical Analysis Plan

All statistical analyses were performed in a statistical software program (SPSS version 26.0, IBM Corp.). Mean, standard deviation, median, minimum and maximum values were calculated for descriptive statistics. Categorical data were shown with frequency and percentage. The conformity of the data to normal distribution was evaluated by examining the Shapiro-Wilk test and histograms. Comparisons between the two treatment groups were made with the Student-T test for data suitable for normal distribution, while the Mann-Whitney U test was used for data not suitable for normal distribution. In order to find statistical differences in the time-dependent changes in the measured data in both treatment groups, repeated measures ANOVA test was used for normally distributed data and Bonferroni test was used for post-hoc comparisons. Friedman test was applied to non-normally distributed data and Dunn-Bonferroni test was used for post-hoc comparisons. Chi-square test was applied for comparison of categorical data. Significance level was determined as $p<0.05$.