Evaluation of Low Level Laser Therapy on the Stability of Orthodontic Miniscrews Using Cone Beam Computed Tomography

(Randomized Clinical Trial)

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Thesis

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Abstract

Objectives: The aim of this randomized clinical trial is to evaluate the influence of low level laser therapy on the stability of immediately loaded miniscrews during canine retraction by assessing; the degree of miniscrews mobility, the displacement of the miniscrews using CBCT and the gingival inflammation surrounding miniscrews. Methods: Twenty-four miniscrews (Absoanchor) were assessed, they were inserted into the buccal alveolar bone between the second premolar and first molar on the right and left side of twelve patients. They were randomly divided into 2 sides; test side and control side, the test side received 4 applications of low level laser therapy during the first 12 days of insertion with 60 seconds for each application, while the control side did not receive any laser application. Both groups were immediately loaded with a horizontal force of 150g for canine retraction. The miniscrew mobility and the gingival index were assessed at the day of insertion and at monthly intervals until the end of canine retraction. CBCT was performed twice: before force application (T0) and 6 months later (T1). For miniscrew displacement assessment, the distance of mini-implants’ head (HMI) and tail (TMI) to posterior nasal spine was measured at T0 and T1. Results: There was a statistically significant difference between mean measurements of periotest values of both sides after the 2nd and 6th month (P<0.05). There was no statistically significant difference of miniscrew head and tail displacements of both the test and the control sides when compared to baseline. The gingival index was significantly better for the test then control side after 1 month. Conclusion: Low level laser therapy was capable of improving the stability of orthodontic miniscrews and reducing the gingival inflammation surrounding the miniscrews while there was no significant effect on displacement in any of the groups.

(Keywords: stability - low level laser - miniscrews - gingival inflammation - CBCT)