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ROOT PARALLELISM IN INVISALIGN™ TREATMENT

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Aim: To assess root parallelism after Invisalign™ treatment.

Materials and Methods: The sample consisted of 101 patients (mean age: 22.7 years, 29 males, 72 females) treated non-extraction with Invisalign™ by one orthodontist. Root angulations were assessed using the 4-point angulation tool (Dolphin imaging™); the long axes of adjacent teeth were traced, yielding a convergence/divergence angle. Acceptable root parallelism was assessed if the root angulation did not converge/diverge more than 7 degrees. Sites evaluated: between 1st molars and 2nd premolars, 2nd and 1st premolars, lateral and central incisors, and between central incisors in all four quadrants. The average change in mesio-distal root angulation was assessed between pre- and post-treatment panoramic radiographs.

Results: Paired t-tests were used to analyze the average change in mesio-distal root angulation. Statistically significant differences were obtained indicating a reduction in the convergence/divergence angles between teeth #16-15, #15-14, #11-21, #24-25, #25-26, #45-44, #42-41, #41-31, #31-32, and #34-35 (at p-value <0.05). The average change in root angulation was not affected ($p>0.05$) by age (Pearson correlation coefficient), gender, occlusion type (I, II, or III), or elastic use (unpaired, 2 sample t-test at $p<0.05$). Intra and inter-rater reliability for 20% of the studied sample was assessed using the interclass correlation coefficient test. All measured areas except teeth #16-15, #26-25, and #36-35 yielded good ICC reliability scores above 0.7.

Conclusion: Root parallelism was improved post-Invisalign™ treatment in ten of the fourteen areas evaluated. Thus, Invisalign™ treatment may be an effective treatment modality in controlling root angulation in non-extraction cases.