ABSTRACT

AIM: The aim of the present study is to assess the accuracy of three dimensional bracket positioning with special consideration to root axes.

MATERIALS AND METHODS: A total of 10 patients were used for the present study. Selection was done according to the exclusion and inclusion criteria. Patients were randomly divided into 2 groups, group A and group B. In group A (study group, indirect bonding) 3 patients were included and 7 patients for group B (control group, direct bonding). Conventional bracket positioning was done in group B, photographs and models taken to assess the bracket positioning error. In group A (indirect group) CBCT, model scanning and bracket positioning was done with the help of mimics software before bonding. After bonding photographs and models were taken to assess the errors in bracket positioning. Out of 8 variables vertical measurement, mesiodistal, long axis, paralleling error, thickening error were statistically compared in both groups and descriptive statistics were done for other 3 variables including total clinical crown height, marginal ridge to center of bracket and marginal ridge to FACC.

RESULTS: When comparing both techniques there is a statistically significant difference between both the groups (< 0.05). Out of all 5 variables vertical measurements showed better precision with indirect bonding technique and thickening error alone showed no significant difference between both groups. Mean total error in the indirect bonding technique is (0.463) less when compared with the direct bonding technique (0.557) and also three dimensional visualization of the root apex provide a better way to locate the long axis of the tooth and that enable the clinician to minimize the axial inclination error in indirect method when compared with the direct bonding method.

CONCLUSION: The outcome of this study reveals that the accuracy of bracket positioning using three dimensional imaging techniques allow for precision in bracket placement when compared to the conventional bonding technique.

KEY WORDS: Indirect bonding, Cone Beam Computer Tomography, Facial axis of clinical crown, Digital model, Mimics software and 3D printing.