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Initial stress differences between tipping and torque movements. A three-dimensional finite element analysis

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ABSTRACT

The aim of this study was to analyse the distribution of the stress on dental and periodontal structures when a simple tipping dental movement or torque movement is produced. A tridimensional computer model based on finite element techniques was used for this purpose. The model of the lower canines was constructed on the average anatomical morphology and 396 isoparametric elements were considered. The three principal stresses (maximum, minimum and intermediate) and Von Mises stress were determined at the root, alveolar bone and periodontal ligament (PDL). It was observed how the distribution of stress is not the same for the three structures studied. In all loading cases for bucco-lingually directed forces, the three principal stresses were very similar in the PDL. The dental apex and bony alveolar crest zones are the areas that suffer the greatest stress when these kind of movements are produced.

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