

تحلیل تنش دندان های قدامی ماگزایلا به هنگام اعمال نیروی اینتروزویو بین لترال و کانین

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Title: Stress analysis of anterior maxillary teeth by applying intrusive forces between lateral and canine

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Introduction:

One of the precise methods for evaluating periodontal responses to orthodontic forces is finite element method (FEM). In the following study PDL of anterior maxillary teeth (central, lateral, canine) has been analysed by FEM after applying intrusive forces. The Aim of this study was to evaluate induced stresses in PDL of anterior teeth by application of intrusive forces between lateral incisor and canine.

Materials & Methods:

Solid works software was used to translate bidimensional images of the maxillary anterior teeth (central, lateral, canine) into three dimensional images. PDL and alveolar bone around these teeth were simulated and anterior teeth were positioned in an ideal arch with appropriate tip and torque, and rectangular wire was stabilised rigidly on labial surfaces of the teeth. Models were modified to "Finite element model" by means of MSC-NASTRAN software. Intrusive forces (35 gr) were applied on the wire between lateral and canine and induced stresses was analyzed by means of MSC-PATRAN.

Results:

By delivery of intrusive forces between lateral and canine, maximum stresses were found in PDL of lateral incisor ($4.23 \times 10^{-3} \text{ N/mm}^2$) and minimum stresses were observed in PDL of central incisor ($2.02 \times 10^{-6} \text{ N/mm}^2$).

Conclusion:

By application of intrusive forces between lateral incisor and canine, maximum stresses were focused at the apex of lateral incisor and minimum stresses were in apical third of central's root.

Key words:

Maxillary anterior teeth, intrusion, finite element method.

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چکیده

مقدمه:

روش اجزاء محدود یکی از روش های دقیق جهت درک پاسخ های دندان به نیروهای ارتودنتیک است. در این مطالعه، بوسیله این روش PDL دندان های قدامی ماگزایلا (سانترال، لترال، کانین) به هنگام اعمال نیروی اینتروزویو مورد تحلیل قرار گرفت. هدف تحقیق حاضر تعیین تنش ایجاد شده در PDL دندان های قدامی هنگام اعمال نیروی اینتروزویو بین لترال و کانین ماگزایلا می باشد.