Introduction

The introduction of foreign material placed near or into the inferior alveolar nerve during implant placement or root canal therapy can result in altered nerve sensation (paresthesia) or continual pain (dysesthesia). The inferior alveolar nerve is housed in the mandibular canal of the lower jaw (mandible) providing innervations to the lower teeth, and is sensitive to changes in the environment1. The aim of our study is to measure the distance between the inferior alveolar nerve and the apical roots of the second premolar, first molar and second molar, and compare the results amongst three age groups: young, middle-age, and older patients. Distances were measured using cone beam computed tomography (CBCT) radiographs. Cross-sectional images allow visualization of a third dimension, thus providing a more accurate measurement than a two-dimensional radiograph2. This data will help dentists avoid surgical complications and better prepare for dental procedures.

Methods

Cone beam computed tomography (CBCT) scans were randomly selected from 85 patients and divided as follows: 51 young (<18 years of age) patients, 27 middle-age (18-49 years of age) patients, and 7 older (>49 years of age) patients. Measurements were taken from cross-sectional CBCT scans of teeth most reported to be involved with nerve injury, which includes mandibular 1st and 2nd molars and mandibular 2nd premolars2. The shortest distance from the superior border of the inferior alveolar nerve to the root apices was measured for each tooth. Data was statistically analyzed using t-tests to determine if age was a factor in the distance between the apical roots of teeth and the inferior alveolar canal.

Results

Distance from Root Apex to Mandibular Canal by Age Group

Average Distance Between Root Apex and Mandibular Canal

Summary and Conclusions

- Cone beam CT is an accurate non-invasive method to evaluate the proximity of the apices of teeth to the inferior alveolar canal.
- Teeth apices from younger patients were significantly closer to the inferior alveolar nerve than those from middle-age patients in the mandibular 2nd premolar and 1st molar.
- When all cases were examined, the 2nd molar root apices were closest to the inferior alveolar nerve, which may explain the fact that most reports of nerve injury from root canal overfilling are reported for this tooth.
- With increasing numbers of patient receiving implant for tooth replacement, recommendations for cone beam CT scans may soon be recommended in the posterior mandible, where injury to the nerve could occur.

References