

3-D CT Scan Images for Elective Mandibular Surgeries

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Abstract: Dental implants, orthognathic surgeries involving mandible, impacted wisdom teeth removal, cyst enucleation are routinely performed procedures. Post operative permanent or transient neurosensory deficit is one of the common complications arising after surgeries involving mandible. Preoperative accurate identification of inferior alveolar nerve course can eliminate or reduce the post operative neurosensory deficit.

Keywords: 3-D CT, mandibular canal, neurosensory defecit

1. Introduction

Mandibular canal and the inferior alveolar neurovascular bundle shows great variation in its course in mandibular ramus and its body as described by Nortje et al(1977) and Langlais et al (1985).

The most common complication that arise after BSSRO, enucleation of cyst involving mandibular canal, removal of impacted mandibular third molar closer to mandibular canal, implants replacing mandibular molar and premolars is postoperative neurosensory deficit.

This neurosensory deficit can be due to direct or indirect trauma to the inferior alveolar nerve.

Three dimensional studies(3-D) studies in medicine began in the early 1970s presented by Ferencz and Graco. Poor two dimensional view, unequal magnification of the IAN course in the mandible and the high incidence of postoperative neurosensory deficit of the IAN during mandibular surgery has necessitated for three dimensional reconstruction of CT

of the mandible and analysing the IAN course in it for the patients who are planned for elective mandibular surgery.

Preoperative CT scan images can be processed using CT image processing software such as MIMICS and much other commercially available CT image processing software. Using these saoftware the 2D CT images can be converted into 3D images, these images can be sectioned and analysed. MIMICS software is an image-processing package with 3D visualization functions that interfaces with common scanner formats. It is an interactive tool for the visualization and segmentation of CT images. Measurement with the MIMICS program is a measurement on both 2D and 3D images by identifying landmarks points on a 3D reconstructed model or on CT-scanning images. This method is quite accurate and a comfortable method in comparison with 2D or other measurement methods in the past.

2. Figures

Measurements made in 3D CT scan images using MIMICS software

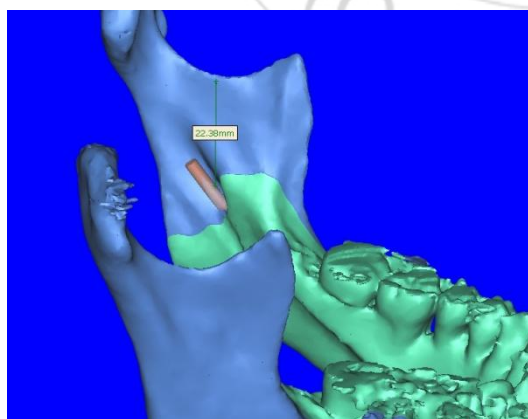


Figure 1

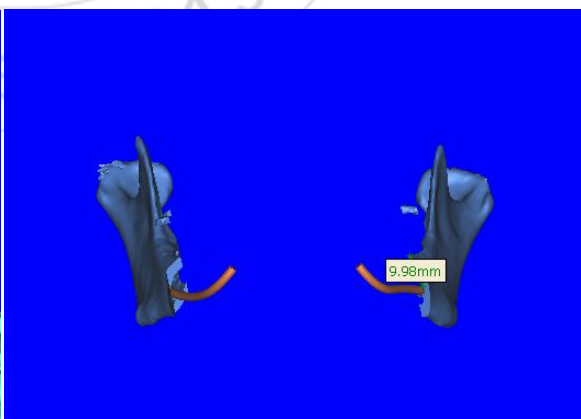


Figure 2

3. Conclusion

For mandibular surgeries the mandibular canal and its course can be exactly identified, measured and analysed from different anatomical points. Preoperative identification and evaluation of IAN course can give the surgeon greater

confidence while performing the surgery and accurate identification of the course of Inferior alveolar nerve significantly reduces the incidence of neurosensory deficit.

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References

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