A radiographic study on the visualization of the anterior loop in dentate subjects of different age groups

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Abstract: The anterior loop is defined as where the mental neurovascular bundle crosses anterior to the mental foramen then doubles back to exit the mental foramen. It cannot be seen clinically but can be detected in 11-60% of panoramic radiographs. As this anatomical structure is important in determining the placement position of endosseous implants in the mandibular premolar region, a pilot study was undertaken to determine its visibility on dental panoramic radiographs in dentate subjects of various age groups. One or more anterior loops were visible in 39 (40.2%) radiographs encompassing 66 sites (34.4%). Interestingly, anterior loops were most commonly observed bilaterally, followed by on the right side of the mandible only. An anterior loop on the left side only was observed in just 1 radiograph. Visibility of anterior loops reduced as the age of subjects increased. More than half (58.1%) of subjects aged 20-29 years exhibited at least one anterior loop; this gradually reduced to only 15 percent of subjects aged 50 and older. There was no association between visualization of the anterior loop and subject gender. (J Oral Sci 51, 231-237, 2009)

Keywords: anterior loop; mandible; dental panoramic radiographs; age; gender.

Introduction

Sicher’s Oral Anatomy describes the anterior loop as “the mental canal which rises from the mandibular canal and runs outward, upward and backward to open at the mental foramen” (1). A more precise description is reported by Bavitz: “where the mental neurovascular bundle crosses anterior to the mental foramen then doubles back to exit the mental foramen” (2). Several studies have shown wide variations in anterior loop length (1,3-5). Because of this, it is not advisable to assume that a fixed distance mesially from the mental foramen will be safe for the placement of an endosseous implant, even with the current recommendation of a safety margin of 4-6 mm (3,6). The anterior loop cannot be seen clinically, but can be detected in radiographs, which include dental panoramic radiographs and magnetic resonance imaging (MRI) and (computed tomography) CT scans.

Dental panoramic radiographs are now widely used to locate anatomic landmarks in planning for the placement of endosseous implants in the jawbones. The mental foramen is commonly used as the boundary of the inferior alveolar nerve in the mandible when planning for the placement of dental implants in the anterior mandible (7,8). The mental nerve, however, may extend beyond the mental foramen boundary as an intraosseous anterior loop (Fig. 1). This structure has a high prevalence (61.5% - 96%) in cadaveric studies, with symmetric occurrence a common finding (76.2%) (1,4,9,10). Hence, its existence should not be underestimated even though its visualization on dental panoramic radiographs is not consistent.

Yosue and Brooks (11) noted that an anterior loop (termed continuous type mental foramen in their study) was present in 21% of the 297 radiographs studied, while Jacobs et al. (12) noted that it was present in 11% of panoramic radiographs, but was well visualized in only 3%. Similarly, Arzouman reported the structure in 12% of dental panoramic radiographs (1).