A rare observation of mandibular buccal ramus variant of stafne bone defect

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ABSTRACT

The characteristically incidental finding of a mandibular bone depression, most commonly known as Stafne defect, typically presents as an asymptomatic, radiolucent lesion. Classically observed on the lingual surface of the mandibular angle, below the level of the inferior alveolar icanal, these rare idiopathic bone cavities may carry significant management implications for the treating dentist and can be difficult to diagnose in the setting of an atypical presentation. The present report describes one such unusual presentation of a Stafne bone defect identified in the mandible of an 89-year-old African-American male donor during routine anatomical dissection.

Key Words: *Stafne defect; Anatomy; Oral surgical management*

INTRODUCTION

In "Bone cavities situated near the angle of the mandible", published in The Journal of the American Dental Association, Edward C. Stafne described the incidental finding of thirty-five bone cavities observed during "complete roentgenologic examination" of thirty-four patients. Due to the distinct absence of an epithelial lining, the asymptomatic cavities, which now bear his name, can usually be identified as well-circumscribed mandibular radiolucencies of non-cystic origin.

Although the pathogenesis is yet unclear, suggested origins for these defects include, failure of normal bone development (1-6), entrapment of salivary gland tissue during mandibular development (7-13), neural or vascular neoplasms (14,15), or localized pressure atrophy (3,16-18).

A variety of reports point to several locations where Stafne defect may be observed in the mandible including, the ramus, angle, and anterior regions (4,10,19-30). Three lingual variants of these "mandibular bone depression(s)" (18) anterior, posterior, and ramus (4,6,11,12,31) are well documented. The present report describes a cadaveric observation of the extremely rare buccal ramus variant first described by Edward D. Shields in 2000.

CASE REPORT

During routine cadaveric dissection of the deep face and temporal fossa regions of an 89-year-old African-American male donor, the student dissection team encountered a soft tissue mass, initially thought to be a benign or malignant tumor (Figure 1). The structure was definitively identified as an unusually large parotid gland located in the expected anatomical position, i.e., against the lateral aspect of the ascending mandibular ramus (Figure 1). As anticipated, Stensen duct emerged from the substantially sized gland, and was observed travelling in an anterior direction, ultimately piercing the buccinator muscle to gain access into the oral cavity. Anterior reflection of the grossly dissected parotid gland with its surrounding connective tissue capsule revealed a large bony depression along the lateral aspect of the ramus (Figures 2 and 3). The depression measured approximately 5 cm x 8 cm x 3 cm and was bound by prominent bony ledges creating a 'V'-shape (Figure 3– metal probe indicates lower tip of the 'V'-shaped depression). The associated cortical bone was intact, with no visible signs of erosion. The presence of the bony defect seemed to indicate an alternate diagnostic possibility. The defect was subsequently photographed and a thorough literature review undertaken to identify the defect, understand its pathogenesis, and uncover clinical implications. Here, we report on the extremely rare buccal ramus variant of Stafne bone defect, associated with the parotid gland. In addition to the review of literature, we also discuss the possible clinical implications of such defects in the dental patient.

DISCUSSION

Stafne defect is a rare, localized, asymptomatic, non-progressive, and

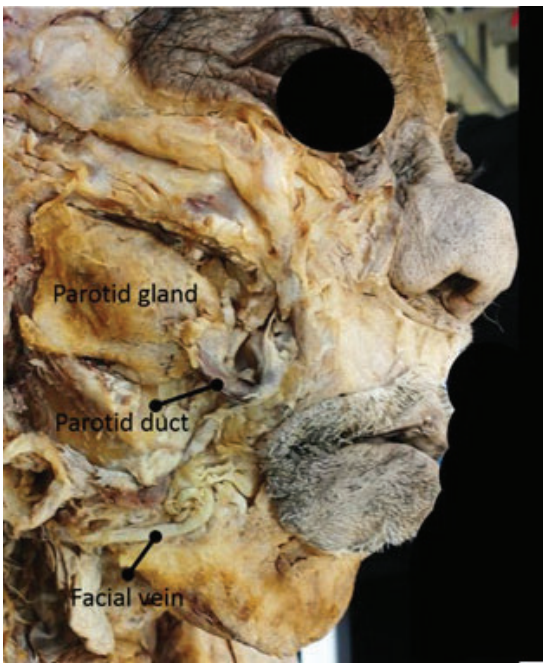

Figure 1) *Location of right parotid gland. The dissection image shows the right parotid gland located against the lateral aspect of the ascending mandibular ramus. A large parotid duct is clearly visible as it travels in an anterior direction to pierce through the buccinator muscle and enter the oral cavity.*

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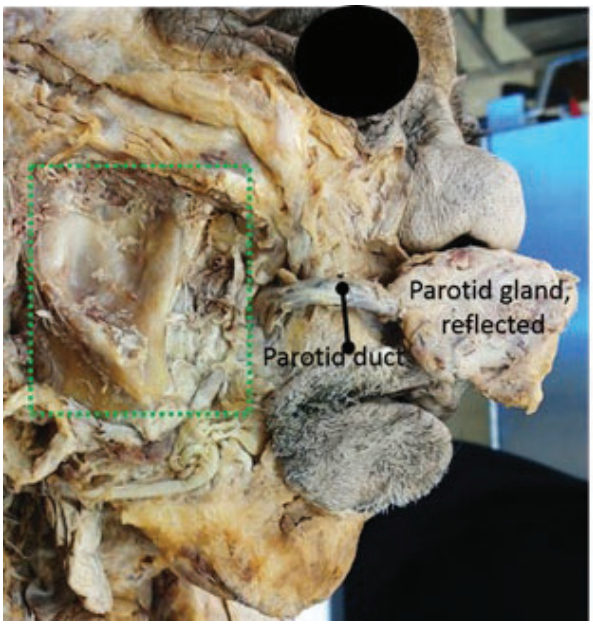

Figure 2) *Stafne's bone defect on the mandibular buccal ramus. On reflecting the parotid gland, a large bony defect is visible on the lateral aspect of the mandibular ramus. The cortical bone is intact, with no erosion visible. The parotid gland seems to have been located within the bony cavity.*

Figure 3) *Stafne's bone defect on the mandibular buccal ramus. A closer view of the bony defect confirms the absence of erosion. It also confirms that the lateral extent of the defect is larger than its depth, with the defect measuring approximately 5 cm x 8 cm x 3 cm.*

non-healing bony defect seen in the mandible. The original pathogenesis was attributed to entrapment of salivary gland tissue within the developing mandibular bone (4), or due to a failure of ossification of Meckel's cartilage (4,6). Later, evidence of salivary gland inclusions within these defects (7,8,13,32,33), together with development of these defects in older patients (34) seemed to indicate a defect caused as a consequence of salivary gland inclusions, especially the submandibular gland, during ossification rather than during mandible development (3). Cases reported in literature typically indicate diagnosis of this defect in patients older than 40 years of age (15,30), further strengthening a non-developmental origin for this cavity.

The appearance of a bony defect later in age could also be explained by pressure exerted on the bone by neighboring anatomical structures, especially the major salivary glands that are often associated with these defects (18,35). In the current case, an unusually large parotid gland was located in close proximity to the bony defect. With increasing age, non-specific inflammatory infiltration with fibrosis of major salivary glands is a common finding. This fibrosis could result in hypertrophy and/or hyperplasia of glandular tissue resulting in transformation of glandular tissue to a fibrotic mass. In addition, an intact connective tissue capsule around the parotid gland allows the gland to slide against the mandibular surface without exerting pressure. However, large masses when coupled with capsular breakdown could exert enough pressure resulting in pressure resorption in the underlying bone that can manifest as bony cavities during radiographic examinations (23,30,36). We speculate that in the current case, such a pathogenesis most likely occurred to result in the bony cavity that is documented.

Literature reports that Stafne defects seem to occur more commonly in the lingual aspect of the mandible, and may be associated with the anterior, posterior, or ramus regions. Irrespective of location, these defects are asymptomatic and are diagnosed during incidental radiographic observations (21,37-39). Both lingual anterior and lingual posterior variants are seen on radiographs as well-circumscribed circular or ovoid radiolucencies. The defects seem to always be located inferior to the mandibular canal, with no evidence of erosion of the mandibular canal, or involvement of the neurovascular structures within the mandibular canal. The defects also do not affect the integrity of the inferior mandibular border, as they are situated above the inferior margin of the mandible.

Depending on whether the defects are located on the lingual or buccal aspect of the mandible, these defects are further classified as lingual anterior variants, lingual posterior variants, lingual ramus variants, and buccal ramus variants. The lingual variants are almost always associated with the submandibular gland, while the parotid gland is associated with the buccal ramus variant and is extremely rare (12,13,31,40). With the lingual anterior variant, the concavity is usually noticed in relation to the roots of the mandibular anterior teeth and can mimic the radiographic appearance of a periapical lesion (21).

Clinical implications of Stafne defect can include diagnostic difficulties wherein, the defect can mimic cystic lesions or other bony lesions (8,41-44). To confirm diagnoses, often conventional radiography may need to be supplemented with computed tomography and other imaging modalities, including sialograms (2,8).

In addition to diagnostic complications, Stafne defects can have clinical implications for the practicing dentist. The buccal or lingual variants of Stafne defect can have dental implications depending on their proximity to the alveolar arch. Defects located in the region of the premolars and molars could potentially compromise bone integrity as related to surgical procedures and implant placement. A defect very close to teeth roots could result in variations of root/root canal morphology, with implications for various dental procedures (21). In addition, depending on location and size of the concavity in the mandible, surgical procedures, including dental implant placement can be adversely affected due to lack of bone structure. It is therefore important for the dentist to be aware of this condition, which might warrant a thorough radiographic evaluation before surgical procedures and implant procedures are planned for a patient.

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