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Stafne Mandıbular Bone Cavıty: Case Serıes

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Abstract

Stafne Mandibular Bone Cavity (SMBC) is an asymptomatic bone depression typically seen on the lingual surface of the mandible, often in the posterior region. It was first described by Edward C. Stafne in 1942. Although the etiology is not definitively known, it is thought that the submandibular salivary gland (at the posterior region) or the sublingual salivary gland (at they anterior region) causes bone resorption by exerting pressure on the mandible. SMBC is typically found in males, between the ages of 50-70 and is often detected incidentally on panoramic radiographs. In the case series, radiolucent areas were observed below the mandibular canal in 9 patients; 1 was irregular, 2 were round and 6 were oval in shape, all with well-defined borders. These structures do not require treatment and are monitored with regular clinical and radiological follow-ups.

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Keywords: Bone, Case Series, Mandible.

INTRODUCTION

In 1942, Edward C. Stafne first described a series of asymptomatic radiolucent lesions in a region near the mandibular angle. Similar lesions have since been documented and are visualized as round or oval depressions on the lingual surface of the mandible. This bony depression has been variously labeled in the literature as “Stafne bone cyst,” “Stafne bone cavity,” “latent bone cyst,” “developmental bone defect of the mandible,” “idiopathic bone cavity,” “lingual cortical mandibular defect” and “lingual mandibular salivary gland depression” (1). Unlike true cysts, these lesions lack an epithelial lining. Various components, such as salivary gland tissue, muscle, lymphatic tissue, blood vessels, adipose tissue, and connective tissue, may be identified within these pseudocysts or bone cavities. To avoid confusion with true cysts, the lesion was classified as “Stafne mandibular bone cavity (SMBC)” in the 11th edition of the International Classification of Diseases (2). While the etiology of SMBC remains uncertain, several hypotheses have been proposed (3). The most widely accepted theory posits that the salivary gland exerts pressure on the lingual surface of the mandible, creating a depression in this region (4,5). Other theories suggest that SMBC is a developmental anomaly, with hypoplasia in the affected area of the mandible during growth, or associate it with abnormal vascular pressure from the facial artery (6,7). SMBC can be classified into four types: posterior lingual, anterior lingual, lingual ramus, and buccal ramus depressions (8,9). The posterior type typically presents as an oval or round radiolucent defect

with smooth, well-defined radiopaque borders, situated distally on the mandibular corpus between the first molar and the mandibular angle, below the mandibular canal (1,6). The anterior type is observed as a radiolucent defect between the canine and premolar regions of the mandible, above the mylohyoid muscle. While the characteristic radiographic features of the posterior type facilitate diagnosis, the anterior type's location may lead to misdiagnosis or confusion with other pathologies (10). The posterior lingual type is the most common, with the anterior type occurring less frequently, and the ramus type being the rarest (11). SMBC which can appear round, oval, or elliptical, are most commonly observed as unilocular; however, cases of multilocular formations have also been reported. While unilateral defects are more frequently encountered, bilateral cases are also documented in the literature.(12)

SMBC is most commonly seen in adults aged 50-70, rarely in individuals under 20, and predominantly in males (13). Due to its typical presentation on panoramic radiographs, SMBC is often incidentally detected (14). However, when atypical features are present, advanced imaging techniques, such as computed tomography (CT), cone-beam computed tomography (CBCT), magnetic resonance imaging (MRI), and sialography, may be required for differential diagnosis (15,16). Surgical intervention or biopsy is not indicated for these asymptomatic, non-progressive structural lesions; rather, regular clinical and radiological follow-up suffices. This case series discusses SMBCs incidentally identified in radiographs of nine patients who presented to our clinic at different times for various complaints.

CASE SERIES

All cases were asymptomatic, with radiolucent areas situated below the mandibular canal in the posterior mandibular region, consistent with a diagnosis of SMBC. Of the patients, seven were male and two were female, with an average age of 49.7 years. Four SMBC cases were on the right side, and five on the left; one was irregular in shape, two were round, and six were oval.

Case 1

A 57-year-old female patient with a history of diabetes presented to our clinic for prosthetic treatment. Panoramic radiography revealed an oval radiolucent area measuring 12.2 mm x 7.87 mm, located below the left mandibular canal with well-defined borders.

(Figure 1: Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 12.2 mm x 7.87 mm)

Case 2

A 47-year-old male patient with no systemic disease history presented for a routine check-up. Panoramic radiography revealed an oval radiolucent area measuring 15.73 mm x 10.27 mm, located below the left mandibular canal with well-defined borders.

(Figure 2: Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 15.73 mm x 10.27 mm)

Case 3

A 59-year-old male patient with hypertension and diabetes presented with periodontal disease. Panoramic radiography showed a radiolucent area of 30.97 mm x 14.7 mm located below the right mandibular canal with well-defined borders. Comparison with a previous panoramic radiograph taken two years earlier showed no change in size; hence, further imaging was not pursued. The lesion was monitored as an irregular Stafne bone cavity.

(Figure 3: Panoramic radiograph: at the right mandible showing an irregular radiolucent area measuring 30.97 mm x 14.7 mm)

Case 4

A 58-year-old male patient with a history of cardiac disease presented with pain in the lower right jaw. Panoramic radiography revealed an oval radiolucent area of 14.03 mm x 9.57 mm located below the left mandibular canal with well-defined borders.

(Figure 4: Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 14.03 mm x 9.57 mm)

Case 5

A 50-year-old male patient with no systemic disease history was referred for tomography for retreatment. Panoramic reformatted imaging showed an oval radiolucent area measuring 14.6 mm x 8.9 mm located below the right mandibular canal with well-defined borders.

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(Figure 5: Panoramic reformatted image: at the right mandible showing an oval radiolucent area measuring 14.6 mm x 8.9 mm)

Case 6

A 46-year-old female patient with no systemic disease history presented for tomography for an upper jaw implant. Panoramic reformatted imaging revealed an oval radiolucent area measuring 13.8 mm x 8.8 mm located below the right mandibular canal with well-defined borders.

(Figure 6: Panoramic reformatted image: at the right mandible showing an oval radiolucent area measuring 13.8 mm x 8.8 mm)

Case 7

A 31-year-old male patient with no systemic disease history presented for a routine check-up. Panoramic radiography showed an oval radiolucent area measuring 9.74 mm x 7.2 mm located below the left mandibular canal with well-defined borders.

(Figure 7: Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 9.74 mm x 7.2 mm)

Case 8

A 49-year-old male patient with diabetes and gastritis presented with tooth mobility. Panoramic radiography revealed a round radiolucent area measuring 6.5 mm x 4.62 mm located below the right mandibular canal with well-defined borders.

(Figure 8: Panoramic radiograph: at the right mandible showing a round radiolucent area measuring 6.5 mm x 4.62 mm)

Case 9

A 51-year-old male patient with no systemic disease history presented with pain in the right wisdom tooth area. Panoramic radiography revealed a round radiolucent area measuring 10.03 mm x 8.04 mm located below the left mandibular canal with well-defined borders.

(Figure 9: Panoramic radiograph: at the left mandible showing a round radiolucent area measuring 10.03 mm x 8.04 mm)

Figure 1. Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 12.2 mm x 7.87 mm.

Figure 2. Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 15.73 mm x 10.27 mm.

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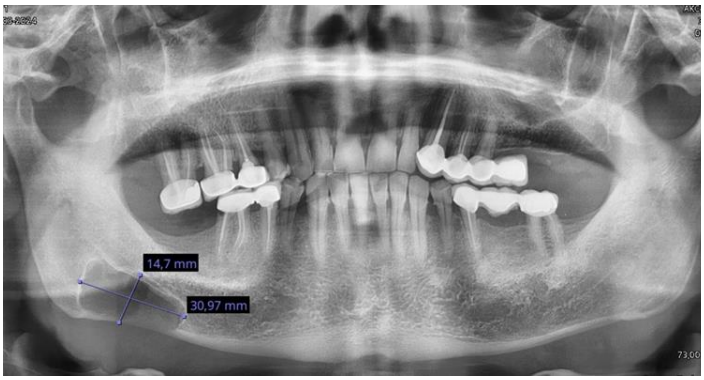

Figure 3. Panoramic radiograph: at the right mandible showing an irregular radiolucent area measuring 30.97 mm x 14.7 mm.

Figure 4. Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 14.03 mm x 9.57 mm.

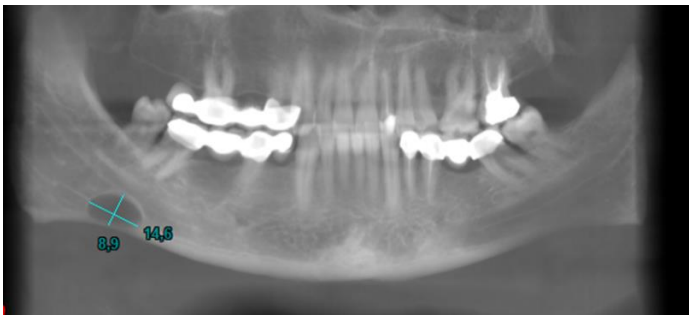

Figure 5. Panoramic reformatted image: at the right mandible showing an oval radiolucent area measuring 14.6 mm x 8.9 mm.

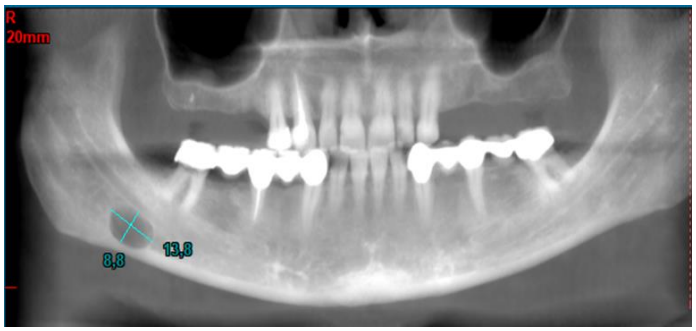

Figure 6. Panoramic reformatted image: at the right mandible showing an oval radiolucent area measuring 13.8 mm x 8.8 mm.

Figure 7. Panoramic radiograph: at the left mandible showing an oval radiolucent area measuring 9.74 mm x 7.2 mm.

Figure 8. Panoramic radiograph: at the right mandible showing a round radiolucent area measuring 6.5 mm x 4.62 mm.

Figure 9. Panoramic radiograph: at the left mandible showing a round radiolucent area measuring 10.03 mm x 8.04 mm.

DISCUSSION

SMBC is generally an asymptomatic, rare lingual bony depression located in the posterior mandible below the mandibular canal. Often incidentally identified during routine radiographic examinations, it predominantly affects males, particularly those aged 50-70 (4,17). In alignment with the literature, our case series included patients with lesions localized in the posterior mandible, all asymptomatic. The cases predominantly involved male patients, with an average age of 49.7 years (range: min 31- max 59 years).

In a retrospective study by Yüksel Kaya et al. (2023), 16,115 panoramic radiographs were examined, identifying 15 patients (0.09%) with SMBC, most of which were oval with thick sclerotic borders and heterogeneous radiolucent content (18). Similarly, in the study by Bağcı and Peker (2024), retrospective CBCT images from 1,664 patients revealed SMBC in 8 patients (0.48%), all of which were unilateral, oval, and located in the posterior mandible (19). A study by Son et al. (2024) of 32 SMBC patients imaged via panoramic radiography and CBCT found that SMBC is commonly located in the posterior mandibular body and is predominantly observed in males (2).

Although the precise etiology of SMBC is unclear, the most widely accepted theory suggests that pressure from the submandibular gland (posterior region) or sublingual salivary glands (anterior region) on the lingual cortex of the mandible leads to localized bone resorption (18,12). In a case series by Öztürk et al. (2023), SMBC was frequently reported to contain salivary gland tissue and was characterized as a developmental anomaly resulting from pressure on the lingual mandibular cortex (12). Son et al. (2024) proposed that SMBC formation may involve salivary gland tissue becoming embedded within the lingual region during mandibular development or bone resorption. Other hypotheses suggest that SMBC may develop over time, with factors like the pulsation of the facial artery leading to bone resorption on the mandible's lingual surface (2) The formation mechanism of Stafne bone cavities is generally thought to be related to the pressure exerted by salivary glands on the mandible. While major salivary glands, such as the submandibular gland, are anatomically adjacent to the posterior mandible, no such anatomical relationship exists in the ramus region. The absence of structures such as salivary glands capable of exerting pressure in the ramus area may limit the formation of lesions in this region. Similarly, the anterior variant, which is thought to be associated with the sublingual gland, may be rarer due to the less pronounced salivary gland pressure in this region and the lower incidence of developmental tissue entrapment. (2,12,19)

Although SMBC sizes generally range from 0.5 to 2 cm, with an average of 1.2 cm, defects as large as 9 cm have been documented (12). In our case series, the mean horizontal dimension was calculated as 14.8 mm and the mean vertical dimension as 8.89 mm.

The differential diagnosis for SMBC includes a range of radiolucent mandibular pathologies, such as periapical cysts, simple bone cysts, traumatic bone cysts, odontogenic keratocysts, dentigerous cysts, giant cell tumors, metastases, non-ossifying fibromas, ameloblastomas, vascular malformations, basal cell nevus syndrome, fibrous dysplasia, focal osteoporotic bone defects, and Brown tumors associated with hyperparathyroidism (12). Advanced imaging modalities such as sialography, CT, CBCT, or MRI may aid in distinguishing SMBC from other pathologies and in examining its relationship to adjacent anatomical structures (18).

A limitation of this study is the necessity for periodic follow-up to assess whether there are any changes in the size of SMBCs to ensure the validity of diagnostic accuracy. In cases of potential changes, the use of advanced imaging modalities could be required and this study is limited to only 9 cases, and studies conducted

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with a larger sample group will enhance the generalizability of the results.

Regular clinical and radiological follow-up is sufficient for SMBC management. However, if alterations in lesion size or morphology are noted during follow-up, surgical intervention and tissue biopsy are recommended to differentiate SMBC from other potential lesions.

Contribution of the authors:

The authors confirm the compliance of their authorship with the international ICMJE criteria (all authors made a significant contribution to the development of the concept, preparation of the article, reviewed and approved the final version before publication).

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