

# Stafne bone cavity – Magnetic resonance imaging

Yoram Segev<sup>1</sup>, Max Puterman<sup>2</sup>, Lipa Bodner<sup>3</sup>

(1) Senior Staff, Department of Diagnostic Radiology

(2) Senior Lecturer, Department of Otolaryngology Head and Neck Surgery

(3) Associate Professor and Chairman, Department of Oral and Maxillofacial Surgery, Soroka University Medical Center and Ben Gurion University of the Negev, Beer-Sheva, Israel

*Correspondence:*

Prof. Lipa Bodner,

Department of OMF Surgery,

Soroka University Medical Center,

P.O. Box 151,

Beer-Sheva 84101, Israel.

Fax: 972-8-6403651

E-mail: lbodner@bgu.ac.il

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## ABSTRACT

A case of Stafne bone cavity (SBC) affecting the body of the mandible of a 51-year-old female is reported. The imaging modalities included panoramic radiograph, computed tomography (CT) and magnetic resonance (MR) imaging.

Panoramic radiograph and CT were able to determine the outline of the cavity and its three dimensional shape, but failed to precisely diagnose the soft tissue content of the cavity. MR imaging demonstrated that the bony cavity is filled with soft tissue that is continuous and identical in signal with that of the submandibular salivary gland.

Based on the MR imaging a diagnosis of SBC was made and no further studies or surgical treatment were initiated. MR imaging should be considered the diagnostic technique in cases where SBC is suspected. Recognition of the lesion should preclude any further treatment or surgical exploration.

**Key words:** Mandible, lingual bone cavity, Stafne bone cavity, CT, MR, imaging.

## INTRODUCTION

Stafne bone cavity (SBC), also known as lingual mandibular bone defect, is a bony cavity of the mandible containing salivary gland. This cavity has a cystlike appearance on plain film radiographs. It was described for the first time by in 1942 by Stafne, who reported on 35 cases appearing as round or ovoid, well-defined, unilocular radiolucencies, located below the mandibular canal, between the first molar and the angle of the mandible. A SBC is usually an asymptomatic incidental radiologic findings, and mostly affect males in their fifth to seventh decade of life. Surgical exploration has shown salivary gland tissue in the concavity, often in continuity with the submandibular gland (1,2). There has been some debate regarding the nature of the lesion, whether a congenital or a developmental in origin (3,4).

Although the radiologic features of SBC have been widely reported, these include mainly the plain film and CT appearance. The MR imaging has been reported only scarcely

(5-7). The purpose of the present report is to describe a case occurring in the body of mandible with focus on the role of MR imaging in establishment of the final diagnosis.

## REPORT OF CASE

A 51-year-old female was referred by her dentist with an asymptomatic "lesion" in the mandible, discovered incidentally on a panoramic radiograph done for routine dental treatment. There was no previous trauma to the mandible or contributory medical history. Extraoral and intraoral examination revealed no remarkable findings.

There was no cervical lymphadenopathy and the laboratory data were unremarkable.

Panoramic radiograph revealed a unilocular, oval radiolucent lesion with well defined sclerotic borders, situated at the second and third molar region, below the mandibular canal. The cortical outline of the mandibular canal was clearly visible anterior and

posterior to the lesion, with no sign of displacement. (Fig 1a). Axial CT scan of the mandible with bucco-lingual reconstruction program (DentaScan, General Electric, Milwaukee, USA), revealed discontinuity in the lingual cortex and some erosion in the buccal cortex (Fig 1b). The content of the lesion appeared to be a soft tissue mass.

MR imaging of the mandible disclosed that the bone cavity is filled with soft tissue that is continuous and identical in signal with that of the submandibular gland. This could be seen in all types of sequences and in various plains (Fig 1c, 1d). A diagnosis of SBC was made and no further investigations or therapy were initiated.

## DISCUSSION

The SBC was first described by Stafne in 1942. Since then numerous cases of the entity have been reported (1,2,5,8-12). The exact pathogenesis is still obscure. Stafne suggested that the cavity could result from a failure of normal bone deposition in the region formerly occupied by cartilage (1,8). However, the most widely accepted view is that the cavities develop as a result of a localized pressure atrophy of the lingual surface of the mandible from the adjacent salivary gland (9).

This theory is supported by findings of radiolucencies in association with both submandibular and sublingual salivary glands (10). Surgical series, following exploration of the mandibular bony defect, have noted salivary tissue within the bony defect, however, non salivary tissue, such as lymphatic tissue, muscle and blood vessels have also been reported. The non salivary gland tissue findings in the surgical reports may be explained by intermitted gland herniation, regression of the herniated gland or surgical disruption of the cavity content (13). Most reports on SBC, are case reports and have discussed their findings on intraoral dental films, plain films of the mandible or panoramic radiographs. Although these imaging techniques may be sufficient for diagnosis in some cases, they may not be enough for a definitive diagnosis in many other cases, especially, where the lesion is atypical, such as lobulated, incomplete sclerotic margins, multiple, or unusual location (6,13).

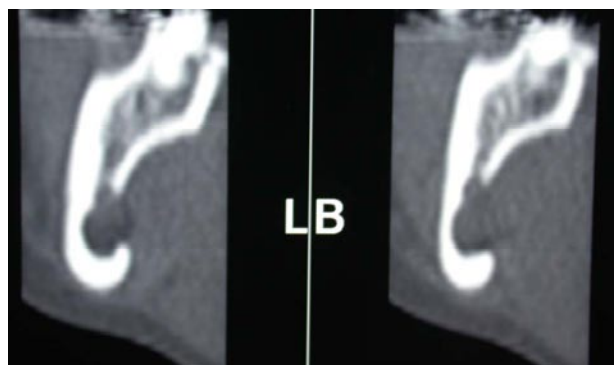
The differential diagnosis of SBC includes benign and malignant jaw lesions such as: odontogenic cystic lesion, nonossifying fibroma, fibrous dysplasia, vascular malformation, focal osteoporotic bone marrow defect, brown tumor of hyperparathyroidism, ameloblastoma, basal cell nevus syndrome, giant cell tumor or a metastasis from a primary malignant tumor. Therefore, in some cases more confirmatory diagnostic tools are mandatory. Sialography is able to depict salivary tissue in the bony cavity and has been used to confirm the diagnosis (14). However, there were case reports of surgically proved SBC with negative results in sialography (15).

Some CT evaluations of SBC were able to show salivary tissue within the bone defect (14,16, 17).

**Fig. 1 (a-d).** Stafne bone cavity. An incidental finding on a panoramic radiograph of a 51-year-old female.

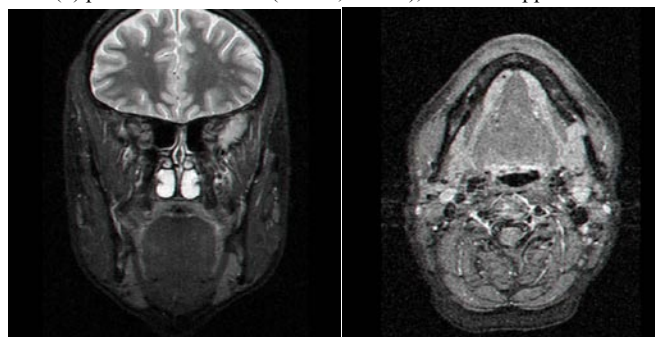


**(a)** Panoramic radiograph showing a well defined, oval, radiolucent lesion, affecting the left body of mandible below the mandibular canal, and involving it.



**(b)** Axial CT scan of the mandible with bucco-lingual reconstruction program is showing the sharply demarcated lesion, affecting the lingual surface of the mandible (L- lingual, B- buccal).

**(c-d)** MR images are showing that the mandibular bone cavity is filled with tissue that is continuous and identical in signal with that of the submandibular gland. Coronal view (c), STIR (2721/15/160, TR-TE-TI) and axial view (d) post contrast SE T1 (575/10, TR-TI), with fat suppression.



**(c)** Coronal

**(d)** Axial

The fact that CT is more specific to bone lesions of the jaws and much less so to soft tissue have led some authors to advocate MR imaging as the primary diagnostic technique (5-7). Some authors however, have advocated MR imaging only after they had exposed their patients to unnecessary surgical exploration (5,6). The main advantage of MR imaging is its superior soft tissue characterization and discrimination. The superior soft tissue contrast of MR imaging should be adequate to make the diagnosis of SBC, even without any intravenous contrast material. Its major disadvantage is the high cost and the distortion artifacts produced by dental material. Branstetter et al (7) were the first to establish a diagnosis of SBC merely on MR imaging with no further treatment. Our case is apparently the second one. In the present case MR imaging was performed only after panoramic radiograph and Dental CT scan were unable to establish a precise diagnosis, regarding the content of the bony cavity. MR imaging, by demonstrating that the cavity is occupied by extension of the submandibular gland, established a definitive and solid diagnosis of SBC. In agreement with Branstetter et al (7), MR imaging should be considered a primary diagnostic technique in cases where SBC is suspected.

Recognition of the lesion should preclude any treatment or surgical exploration.

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