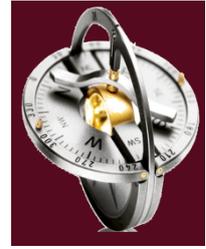


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## Case Report

# A case of Stafne defect of the mandible

Anastasios Vasilopoulos<sup>1</sup>, Gregory Tsoucalas<sup>1</sup> , Eleni Panagouli<sup>2</sup>, Achilleas Siozopoulos<sup>1</sup>, Vasilios Thomaidis<sup>1</sup>

<sup>1</sup>Department of Anatomy, School of Medicine, Democritus University of Thrace, Alexandroupolis, Greece

<sup>2</sup>Department of Anatomy, Medical School, National and Kapodistrian University of Athens, Athens, Greece

Received: 06 October 2019 / Accepted: 26 October 2019

## Abstract

Stafne bone defect (SBD) or as sometimes called "cavity", is a rare, unilateral, mostly unilocular, asymptomatic bone depression found at the posterior part of the mandible, below the mandibular canal at the level of the molars. It is usually being depicted at plain radiographs as a round-shaped or oval-shaped radiolucency. It is diagnosed in adults between the fifth and seventh decade of life, with a male to female ratio of 6:1 and with a prevalence of 0.10%-0.48%. The differential diagnoses include a plethora of benign or malignant conditions. Thus, multilevel radiological methods such as computed tomography (CT), cone beam CT (CBCT) or magnetic resonance imaging (MRI) may help establish its diagnosis. Soft tissues are usually contained inside an SBD, including salivary gland tissue, fat, blood vessels, fibrous tissue and nerve bundles. The main purpose of the present article is to introduce SBD not as a pathology but as an anatomical variant, to present a case of an SBD found on a dry mandible during skeletal examinations, reviewing meanwhile the available international literature.

Keywords: anatomy, dry bone, radiology

## Introduction

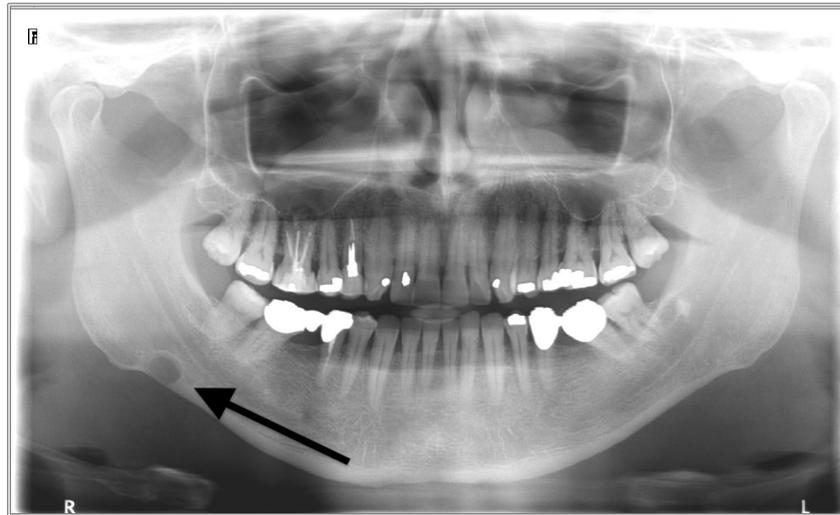
Stafne bone defect (SBD) was firstly described in 1942 by Edward C. Stafne. He described a series of thirty-five cases of round or oval cavities of the mandible found incidentally in radiologic examination with intraoral films. They were discovered inferiorly to the mandibular canal and anteriorly to the angle of the mandible at the level of the third molar. Stafne also performed a follow-up of five to eleven years and reported no change in the size of the cavities [1].

SBD is an asymptomatic, round or oval-shaped, radiolucent, localized bone depression of the mandible. The most frequent locations of an SBD agree with the findings originally made by Stafne [2,3] [Figure 1]. These cystic-like lesions are referred as pseudo-cysts, as they lack an epithelial lining [2,4]. This bony defect has been described with various terms, including idiopathic or latent bone cavity, static bone cavity or defect, lingual mandibular bone depression and Stafne bone defect, cavity or cyst [3,4]. Although there have been multiple reports in the literature about this condition, mainly as an incidental finding on living patients, a much smaller number of reports on dry bones do exist [5]. To our knowledge, no such report was made in the Greek (Hellenic-Caucasian) population.

Address for Correspondence: Gregory Tsoucalas, Ierolochiton str 155, P.C. 38334, Agioi Anargyroi, Volos, Greece.  
E-mail: [gregorytsoucalas@yahoo.gr](mailto:gregorytsoucalas@yahoo.gr)

DOI: 10.5455/im.68512

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**Figure 1.** SBD found on a male patient during a routine radiographic examination (black arrow). It is depicted as an oval-shaped radiolucency, with well-defined borders.

Thus, the purpose of the present study is to add to the literature a case of a Stafne bone depression found on a dry mandible during skeletal examinations, pinpointing that an SBD is not really a bony pathology but a variant of skeletal anatomy. A review of the literature after thorough research on PubMed, MedLine and Scopus databases was conducted, with the terms "stafne", "bone cyst", "mandible", as keywords.

### Case

During skeletal examinations at the local cemetery under the license of the "Alexandroupolis Municipal Authorities", a mandible depicting a bone depression was detected at a male 67 year if age skeleton of Hellenic-Caucasian origin. It was located at the lower part of the mandible, near its lower edge, below the alveolar canal, anteriorly to the angle of the mandible at the level of the third molar [Figure 2]. The whole skeleton was thoroughly examined for any other pathological lesions or variants such as osteoporosis or arthritis, pathological fractures, skeletal deformities or bone variants. After no evidence of pathology was found on the skeleton, the mandible was sent for radiological evaluation.



**Figure 2.** A bone depression found on a dry mandible (arrow).

A plain radiograph depicted the cavity as an ovoid radiolucent unilocular lesion. The borders of the defect were osteosclerotic and well defined [Figure 3]. CBCT revealed a hypodense cortical lesion at the lingual surface of the mandible. The lingual cortical plate was thinned but not disrupted. The margins of the deformity were well defined and osteosclerotic [Figure 4]. Those findings agree with the SBD definition.



Figure 3. The depression depicted in a plain radiograph as an oval-shaped radiolucency with well-defined and osteosclerotic borders.

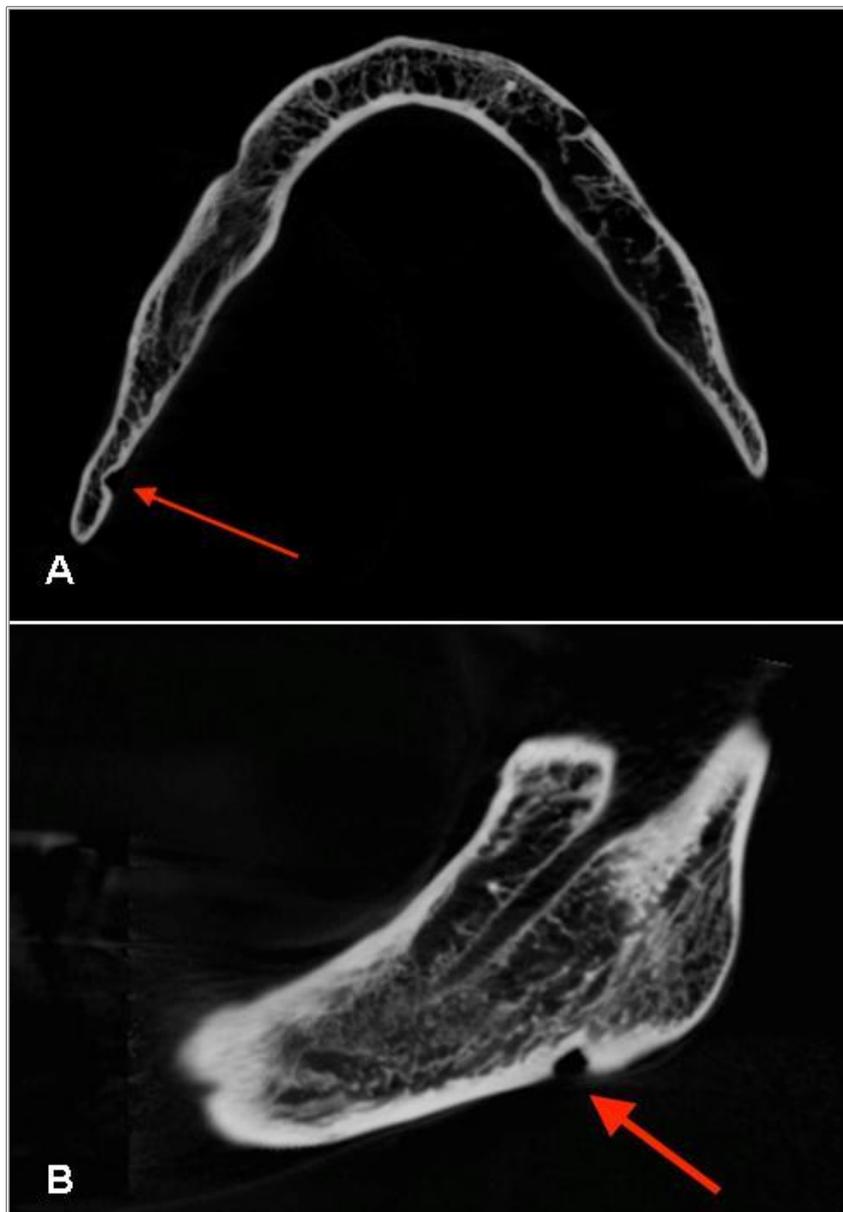
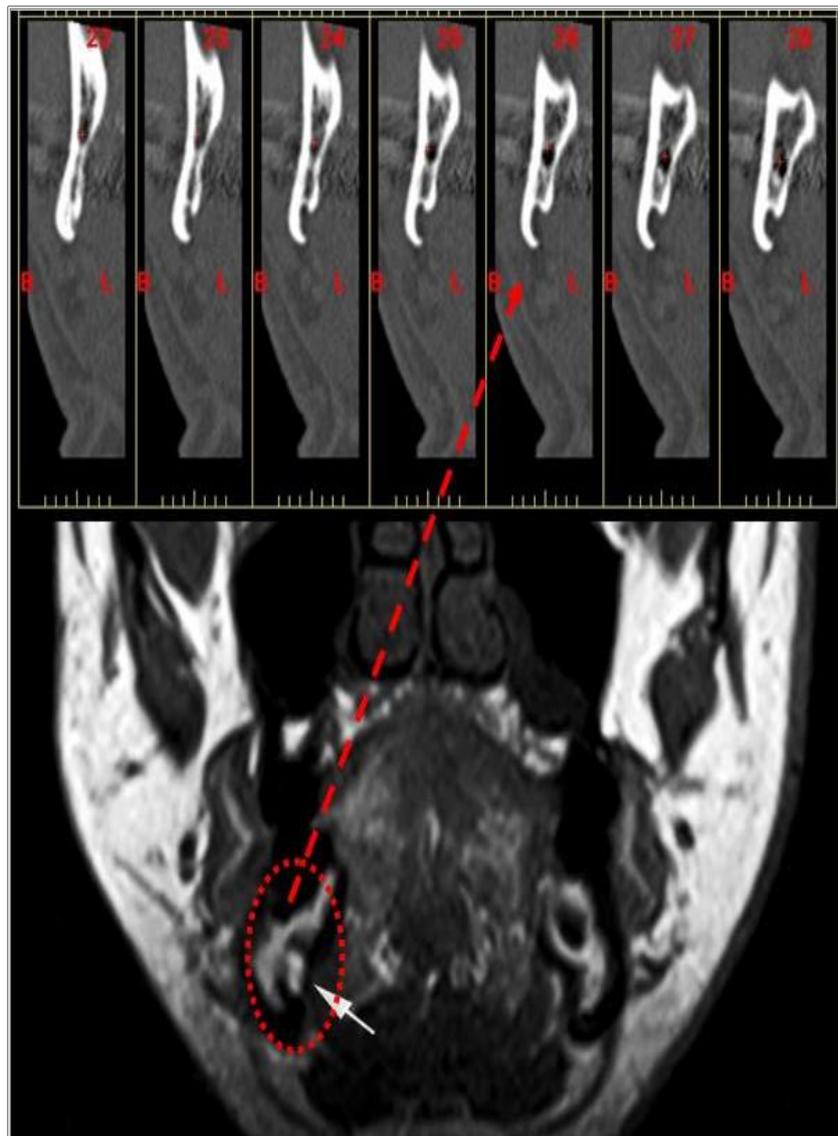


Figure 4. The defect depicted in CBCT. The lingual cortical plate is thinned but remains intact (arrow). (A) axial view of the mandible, (B) sagittal view.

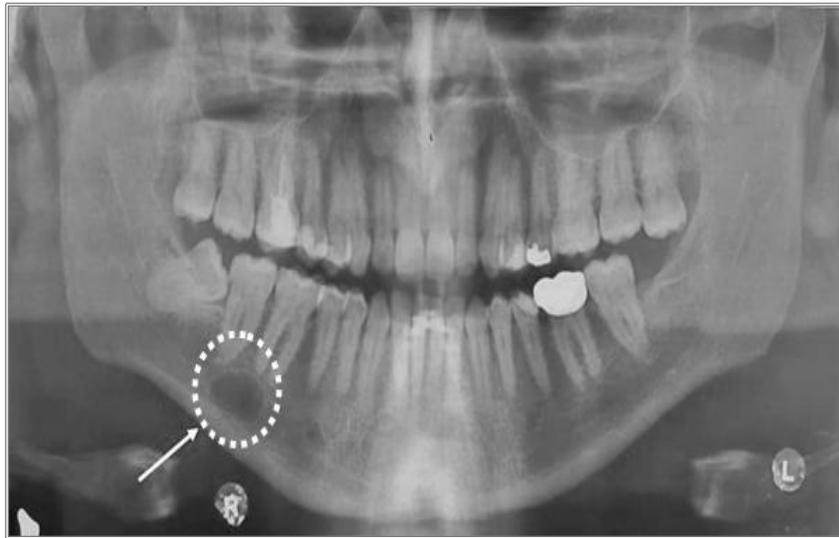
**Discussion**

The pathogenesis of the SBD deformity still remains a debate. Stafne in 1942 suggested that such cavities might be created due to a failure of bone formation in a formerly cartilaginous region. According to this theory, such lesions may be the result of the entrapped of the salivary gland during the development, resulting in a bone deposition from the mandible [6-9]. However, SBD is being diagnosed in adults, long after the completion of the bone formation of the mandible [6,10]. Ischemia has also been proposed as a possible cause of such depressions by Lello and Makek in 1985 [10,11]. The most common theory suggested that an SBD may be created through mechanical pressure caused by the adjacent salivary gland [3,6,10-12]. A study of Sandy and Williams in 1980, proposed that the mechanical pressure derived from the adjacent salivary gland results in focal bone resorption, causing bone depressions. Only when the bone resorption on the lingual cortical plate of the mandible is sufficient the radiolucency presented by Stafne can be visible in radiology methods. Thus, an SBD could be more frequent than described in the cases when the bone resorption is not extensive enough to be depicted radiographically. For that reason, SBD should be considered as an anatomical variation. Given the fact that resorption is progressive, allows us to assume the reason why SBD is being detected on middle-aged individuals [13]. The authors of the present study support exactly this theory, considering SBD as a skeletal variant rather than a pathology. We stand by this angle, as an SBD is an asymptomatic incidental finding, without a pathological underlying cause, remaining unchanged with time. We do not wish to patronize such a concept, as other authors also consider SBD as an anatomical variation. However, we do emphasize a matter trying to solve an endless scientific debate [4,5,14].



**Figure 5.** MRI image-Coronal T1, a corticated defect on the lingual surface of the mandible, anterior to the right mandibular angle and below the alveolar canal filled with fatty tissue (bottom side). The defect depicted in CBCT (top side).

The SBD depressions are mostly found between the fifth and seventh decade of life and are more frequent in males, with a male to female ratio of 6:1 and prevalence ranging between 0.10% and 0.48% [6,16]. An SBD may contain normal salivary gland tissue or fat [Figure 5]. Lymphoid tissue, muscle, blood vessels, fibrous tissue [3,4,16] and bundles of peripheral nerves may also be met intruding inside an SBD [5], as well as an ectopic parotid gland [4]. Moreover, cavities with no content have been also reported [17]. The SBD has been reported having four variants, depending on the location of the defect; posterior lingual, anterior lingual [Figure 6], buccal aspect of ascending ramus and lingual aspect of ascending ramus [3,18]. The anterior variant was firstly described in 1957 by Richard and Ziskind and is seven times less common than the posterior one [5,19,20]. However, when the term SBD is used, is usually being referred to the posterior lingual variant [19]. SBD is usually unilocular, with multilocular variants to have been also reported as extremely rare ones [16].



**Figure 6.** An anterior variant of the Stafne bone defect depicted in a panoramic radiograph.

SBDs are incidental radiology findings on routine panoramic radiographs. In plain radiographs, they appear as a unilocular round or oval-shaped radiolucency, usually located near the angle of the mandible [3,5,15]. The borders of the lesion may be sharp or ill-defined [6,12], and vary from a few millimeters up to depressions of 35x20 mm [5]. The differential diagnosis includes quite extensive pathology entities, including both benign and malignant conditions. Thus, multilevel radiologic imaging techniques, such as CT or CBCT are useful for a diagnosis to be confirmed [3,4,6,11,12]. Given the fact that SBD contains salivary gland tissue or other soft tissues, MRI could provide more information about the lesion and reveal its content [3,12] without any radiation exposure of the patient [12]. The diagnosis can be reached considering the clinical presentation, the asymptomatic character and the typical radiographic findings. As an SBD is purely a skeletal variant, neither a biopsy nor a surgical treatment is required. However, a radiology follow-up should be recommended [4,5].

## Conclusion

SBD gives no signs of pathology, reveals no pain incidents, causes no emergencies, presents no alternations of its boundaries. Can such an entity be classified as a pathology? We support that this is not the case. Radiology with a CT or an MRI can set the diagnosis. Invasive procedures including surgery or biopsy are not required, while an imaging follow-up could be advised.

## Conflict of interest

The authors declare no conflict of interest.

## Funding

No financial support was provided for this study by any sponsoring organization or any for-profit product companies.

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