



Original Article

# Stafne bone defect of the molar region of the mandible



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## KEYWORDS

Stafne bone defect;  
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**Background/purpose:** The classic Stafne bone defect (SBD) is a rare small well-demarcated radiolucent lesion in the molar region of the mandible near the mandibular angle. This study reported a series of 5 SBD cases.

**Materials and methods:** This study reviewed 4000 consecutive panoramic radiographs from February 2017 to May 2017 and found 5 classic SBD cases. The clinical and radiographic findings of these 5 SBD cases were reported.

**Results:** We found 5 SBD cases presenting as small, well-defined, and radiolucent lesions at the typical first molar to third molar region of the mandible near the mandibular angle and below the mandibular canal. The mean age of the 5 patients at the time of diagnosis was 53.4 years (range, 45–69 years). All the 5 SBD cases occurred in male patients, 3 were on the right side and 2 were on the left side of the mandible. The mean greatest dimension of the 5 SBDs was 1.5 cm (range, 1.2–1.9 cm). All the 5 SBD cases were found incidentally on the panoramic radiographs and two of them were confirmed by cone-beam computed tomography. No surgical intervention was performed for these 5 SBD cases.

**Conclusion:** The classic SBDs occur most frequently in male patients in the age group between 40 years and 60 years. For the SBDs at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal, these lesions can be monitored by panoramic radiography once per one or two years.

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## Introduction

The classic Stafne bone defect is a rare developmental mandibular defect that commonly presents as a small well-demarcated radiolucent lesion at the molar region of the mandible near the mandibular angle and below the mandibular canal.<sup>1–3</sup> Most of these cases are discovered during routine oral radiographic examination because they are often asymptomatic. Diagnosis is often made by plain radiography only, but use of more accurate imaging such as computed tomography (CT) scanning, cone-beam CT (CBCT), and magnetic resonance imaging (MRI) is required for atypical cases.<sup>4–8</sup>

In 1942, Stafne reported 35 asymptomatic, well-circumscribed, round or ovoid radiolucency near the angle of the mandible based on radiographic findings.<sup>1</sup> He followed 5 of these defects for 5–11 years and did not notice any change in the size and characteristic features of these cavities. The cavity was then found to be a depression in the lingual cortical plate of the mandible, indented mainly by the submandibular gland.<sup>1</sup> Up to date, Stafne bone defect is considered to be a clinical entity.<sup>1–8</sup> Other names for the Stafne bone defect include Stafne bone cyst, latent bone cyst, static bone cyst, static bone defect, lingual cortical mandibular defect, and lingual mandibular salivary gland depression.<sup>2</sup>

The classic Stafne bone defects in the molar region of the mandible have been reported in 0.08%–0.48% of panoramic radiographs. They have a significant male predilection with 80%–90% of all cases seen in men.<sup>2</sup> In our dental clinic, odontogenic cysts or tumors and oral mucosal diseases are frequently encountered.<sup>9–25</sup> However, the classic Stafne bone defect is rarely seen. The incidence of the classic posterior Stafne bone defect has not been reported in panoramic radiographs taken from Taiwanese dental patients. In this study, 4000 consecutive panoramic radiographs taken from Taiwanese dental patients were examined to find out the prevalence of classic Stafne bone defect in the posterior mandible of Taiwanese dental patients and to assess whether these Stafne bone defects occurred more commonly in middle-aged male Taiwanese dental patients.

## Materials and methods

In this study, 4000 consecutive panoramic radiographs were reviewed from the archives of Department of Oral and Maxillofacial Radiology, National Taiwan University Hospital from February 2017 to May 2017. All the panoramic radiographs were taken consecutively from patients who came to Department of Dentistry, National Taiwan University Hospital for treatment of diseases of the oral and maxillofacial regions from February 2017 to May 2017. The diagnosis of classic Stafne bone defect was made based on the finding of a small well-demarcated radiolucent lesion at the molar region of the mandible near the mandibular angle and below the mandibular canal.<sup>1–3</sup> Data on patients' age and gender as well as the size, location, and treatment of lesions were obtained by reviewing the dental charts.

## Results

In this study, 4000 consecutive panoramic radiographs were examined to find out the presence of classic Stafne bone defect at the molar region of the mandible near the mandibular angle. The 4000 consecutive panoramic radiographs were taken from 1891 male and 2109 female dental patients. The age distribution of the 4000 dental patients is shown in Table 1. Approximately three quarters (75.4%) of the 4000 patients were in the age group between 20 years and 69 years. Five classic unilateral Stafne bone defects were discovered at the first molar to third molar region of the mandible near the mandibular angle and below the mandibular canal (Table 2 and Fig. 1). Thus, the incidence of classic Stafne bone defect in panoramic radiographs of Taiwanese dental patients was 0.125%. The clinical data including the patients' age and sex as well as the size and location of 5 classic Stafne bone defects are presented in Table 2. The mean age of 5 patients at the time of diagnosis was 53.4 years (range, 45–69 years). All the 5 Stafne bone defects were found in male patients and 3 were on the right side and 2 were on the left side of the mandible (Table 2 and Fig. 1). The mean greatest dimension of the bone lesions was 1.5 cm (range, 1.2–1.9 cm). All the 5 classic Stafne bone defects were asymptomatic and found incidentally on the panoramic radiographs and no surgical intervention was performed for these 5 cases. Two of the 5 Stafne bone defects were confirmed by CBCT as a radiolucent lesion with lingual opening near or at the inferior border of the mandible (Fig. 1D2 and E2).

## Discussion

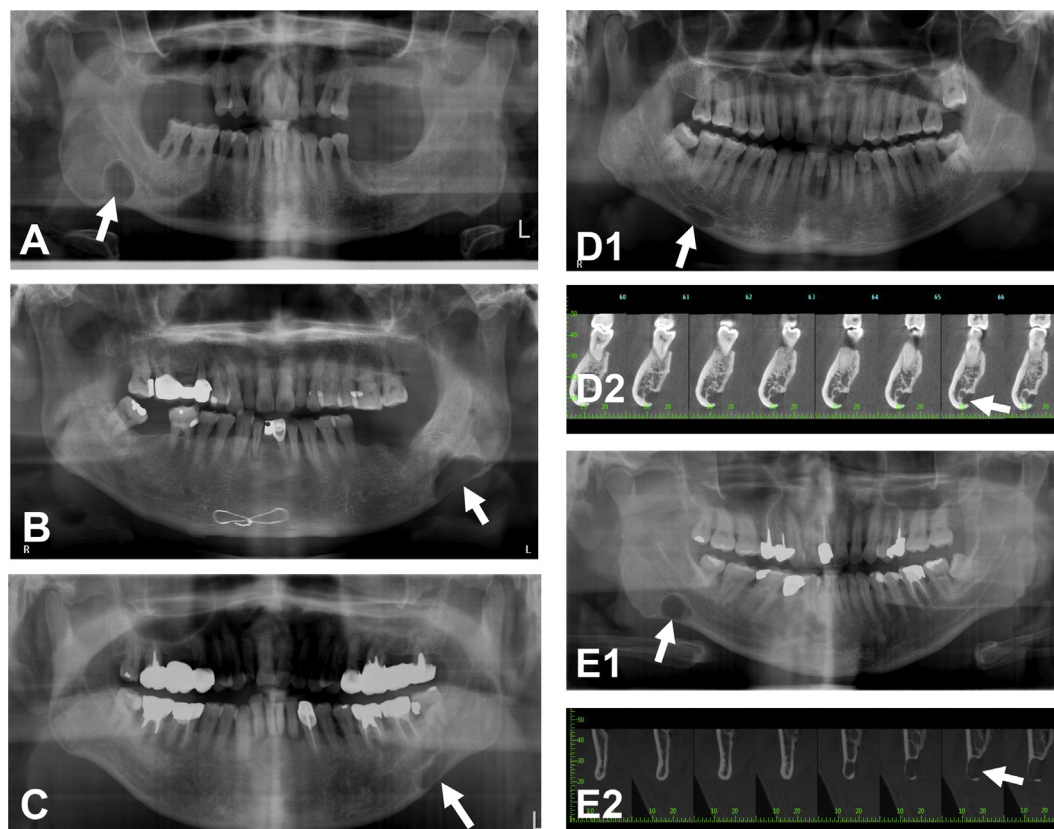
In the present study, plain panoramic radiographs and CBCT images (for 2 cases only) were used for the diagnosis of classic Stafne bone defect. All the 5 Stafne bone defects showed the unilocular, well-demarcated and ovoid radiolucency at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal on the panoramic radiographs and two of them showed radiolucent lesions with lingual opening near or at the inferior border of the mandible on the CBCT

**Table 1** Age distribution of 4000 patients whose panoramic radiographs were reviewed.

Age (years)	Patients' number (%)
0–9	195 (4.9)
10–19	235 (5.9)
20–29	564 (14.1)
30–39	439 (11.0)
40–49	491 (12.3)
50–59	782 (19.5)
60–69	742 (18.5)
70–79	375 (9.4)
80–89	154 (3.8)
90–99	23 (0.6)
Total	4000 (100.0)

**Table 2** Patients' age and sex as well as size and location of 5 cases of Stafne bone defect in the molar region of the mandible.

Case number	Age (years)	Sex	Size (cm)	Location
1	50	Male	1.5 × 0.9	Right mandibular third molar region
2	51	Male	1.9 × 0.8	Left mandibular third molar region
3	69	Male	1.6 × 0.3	Left mandibular second and third molar region
4	52	Male	1.5 × 0.6	Right mandibular first molar region
5	45	Male	1.2 × 0.9	Right mandibular third molar region



**Figure 1** Panoramic radiographs and cone-beam computed tomography (CBCT) images of our 5 cases of Stafne bone defect (SBD). (A) A SBD showing an ovoid radiolucent lesion at the right mandibular third molar region of the mandible (arrow). (B) A SBD exhibiting an ovoid radiolucent lesion at the left mandibular third molar region of the mandible (arrow). (C) A SBD demonstrating an elongated ovoid radiolucent lesion at the left mandibular second and third molar region of the mandible (arrow). (D1) A SBD showing an ovoid radiolucent lesion at the right mandibular first molar region of the mandible (arrow). (D2) A CBCT image of the SBD in (D1) showing a radiolucent lesion with lingual opening near the inferior border of the mandible (arrow). (E1) A SBC exhibiting a round radiolucent lesion at the right mandibular third molar region of the mandible (arrow). (E2) A CBCT image of the SBD in (E1) revealing a radiolucent lesion with lingual opening at the inferior border of the mandible (arrow).

images. All the 5 lesions occurred in men between the age of 45 years and 69 years with the mean age of 53.4 years. The clinical and radiographic findings of our 5 cases of Stafne bone defect were consistent with those reported by others in the literature.<sup>1–3,8</sup> Although no surgical treatment was performed in our 5 Stafne bone defects to further show the tissue contents in the defects, we suggest that the pathogenesis of these 5 classic Stafne bone defects may be due to the compression by a hyperplastic or hypertrophic lobe of the submandibular gland on the lingual cortical plate of the molar region of the mandible to create a focal bony resorption with resultant bone defect below the mandibular canal.<sup>1–3,8</sup>

It has been discussed that the Stafne bone defect is either congenital or developmental in nature. Stafne, the first discoverer of the classic Stafne bone defect, suggested that the bone defects are congenital and are caused by a failure of fusion in the areas formerly occupied by Meckel's cartilage.<sup>1</sup> Other authors who favored the congenital origin believed that the Stafne bone defect is a congenital defect due to the entrapment of a portion of the glandular tissue during mandibular development.<sup>7</sup> Because the lesions are usually located near the major salivary glands, the contents in the defects are histologically proven to be salivary glandular tissues in majority of the cases with surgical intervention, most of these lesions affect middle-aged

men, and none of the defects are found in newborns, the most popular pathogenesis of the Stafne bone cyst is "glandular" hypothesis, suggesting that the lesion is originated from compression of the lingual surface of the mandible mainly by the submandibular or sublingual gland, followed by the resorption of the lingual cortical plate and finally resulting in a depression or a defect on the lingual aspect of the mandible.<sup>3,7,8</sup>

There are four types of Stafne bone defects.<sup>3</sup> The majority (80–90%) of the Stafne bone defects reported in the literature are found at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal.<sup>3,8</sup> However, some Stafne bone defects can be discovered in the incisor-canine-premolar region of the mandible above the mylohyoid muscle.<sup>3,7</sup> These cases are sometimes called as lingual mandibular salivary gland depression in the anterior mandible. Thus, they are supposed to be caused by the compression by a hyperplastic or hypertrophic lobe of the sublingual gland on the anterior lingual surface of the mandible.<sup>3,7</sup> Few cases of Stafne bone defect are found at the lingual surface of the mandibular ascending ramus, posterior to the mandibular foramen and just below the neck of the condyle.<sup>3</sup> An excessively rare fourth variant of Stafne bone defect demonstrates a depression at the buccal aspect of the ascending ramus of the mandible.<sup>3</sup>

The management of Stafne bone defects was described as follows. The majority of Stafne bone defects are usually asymptomatic, non-progressive, and located at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal. These cases can be monitored by panoramic radiography once per one or two years to see whether there are some further changes of the lesion.<sup>3–8</sup> If the lesion is static, no treatment is required. For the Stafne bone defects located in the anterior mandible or in the lingual or buccal cortical plates of the mandibular ascending ramus, the use of CT, CBCT, and MRI is often needed to differentiate the defect from a centrally occurring lesion.<sup>3–8</sup> If there is a suspicion of lesion other than Stafne bone defect or there is a progressive enlargement of the lesion, surgical excision of the lesion and subsequent histological examination of the specimen are necessary for diagnostic confirmation.<sup>4–6</sup>

In summary, this study found the incidence of classic Stafne bone defect in panoramic radiographs of Taiwanese dental patients to be 0.125% after reviewing 4000 consecutive panoramic radiographs. All the 5 cases of Stafne bone defect occurred in men in the age group between 40 years and 69 years and were located at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal. Two of the 5 Stafne bone defects were confirmed by CBCT as radiolucent lesions with lingual opening near or at the inferior border of the mandible. Although no surgical intervention is performed to obtain the contents of the defects for tissue proof, we suggest that the defects are caused by the compression by a hyperplastic or hypertrophic lobe of the submandibular gland, resulting in resorption of the lingual cortical plate and subsequent development of the Stafne bone defects.<sup>3,7,8</sup> For the classic Stafne bone defects at the typical site of the molar region of the mandible near the mandibular angle and below the mandibular canal, the lesions can

be monitored by panoramic radiography once per one or two years. For the Stafne bone defects in other locations, the use of CT, CBCT, and MRI is often needed to differentiate the defects from centrally occurring lesions such as odontogenic cysts or tumors and metastatic lesions.<sup>3–8</sup>

## Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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