Radiological Assessment of Type II Stafne Idiopathic Bone Cyst in a Patient Undergoing Implant Therapy

A Case Report

C Ogunsalu[1], K Pillai[1], S Barclay[1]

ABSTRACT

This paper is intended to describe the confirmative role of radiology in the diagnosis of Stafne Idiopathic bone Cyst (SIBC) without the need for histopathology especially when dental implants are considered so as to avoid unnecessary invasive surgical exploration of this benign pathology. Other pathologies may present not unlike SIBC and as such it is mandatory to rule out such possibilities especially prior to dental implant therapy. The use of orthopanthomogram and non-sialographic computed tomography (CT) scan in the reported case together with a review of CT scan confirmatory role in the diagnosis of SIBC from the literature was the basis for this clinical report. Based on the CT scan findings of the jaw in this case and review of the literature, the implant procedure was commenced without the need of histopathology and/or for invasive surgical exploration of this pathology. All pathologic lesions of the jawbone seen on the orthopanthomogram should be confirmed prior to commencement of implant procedure even when such pathologies are seen in areas remote from the proposed implant site. The pre-implant radiological assessment utilizing non-sialographic CT scan alone is confirmatory of SIBC.

Evaluación Radiológica del Quiste óseo Idiopático de Stafne de Tipo II en un Paciente Sometido a una Terapia de Implante

Reporte de un Caso

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RESUMEN

Este trabajo tiene por objeto describir el papel confirmativo de la radiología en el diagnóstico del quiste óseo idiopático de Stafne (QOIS), sin necesidad de histopatología, especialmente cuando se consideran los implantes dentales con el fin de evitar una innecesaria exploración quirúrgica invasiva de esta patología benigna. Pueden presentarse otras patologías no muy diferentes del QOIS, y por consiguiente resulta imperativo descartar tales posibilidades, especialmente antes de proceder a la terapia de implante dental. El uso del ortopantomograma y la tomografía computarizada (CT) no sialográfica en el caso reportado, junto con una revisión del papel confirmativo del escáner CT en el diagnóstico del QOIS de la literatura, constituyó la base de este reporte clínico. Sobre la base de los hallazgos realizados en el maxilar mediante el escáner CT en este caso, y la revisión de la literatura, se comenzó el procedimiento del implante sin necesidad de histopatología y/o exploración quirúrgica invasiva de esta patología. Todas las lesiones patológicas del hueso del maxilar vistas en el ortopantomograma deben ser confirmadas antes de comenzar con el procedimiento del implante, aún cuando tales patologías se vean en áreas remotas del sitio propuesto para el implante. La evaluación radiológica previa al implante, utilizando el escáner CT no sialográfico es confirmatoria del QOIS.

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INTRODUCTION

Before any dental implant procedure is undertaken, the patient must be adequately assessed clinically and radiologically. It is important to confirm any jaw pathologies seen on radiograph before dental implant treatment is commenced

even when the pathology is remote from the intended site, as failure to make a satisfactory initial radiological assessment could lead to a charge of negligence if the dental pathology is neither treated nor monitored. Also in implantology, the remote site may be a site for harvesting of autogeneous bone graft that may be needed for the implantation to be successful.

Stafne's idiopathic bone cyst (SIBC) was first described in 1942 by Stafne. Controversies still exist as to its origin, nature and content. It presents usually as a well defined oval or elliptical radiolucency situated below the inferior dental canal and above the lower border of the mandible between the angle and third molar region. This lesion has also been reported in other areas of the mandible such as the ascending ramus and anterior mandible (1–7).

One of the primary radiological diagnostic features of SIBC is the characteristic location below the mandibular canal (8). If radiological investigation is not comprehensive and conclusive, unnecessary bone trephining and bone exploration may be conducted which may make pre-implant management more complex.

The classical CT scan presentation of SIBC should be used as the modality for non-invasive diagnosis and follow-up.

Case Report

A 75-year old completely edentulous Trinidadian male patient of East Indian origin presented at the Dental school in Trinidad requesting implant retained upper and lower full prosthesis. Clinical examination revealed a healthy looking patient with no facial asymmetry and no lymphadenopathy. Intra-oral examination revealed grossly atrophic maxilla and mandible. The initial radiographic assessment with the dental panoramic tomogram (DPT) revealed an atrophic mandible and maxilla. Of significance in the mandible, were mental foramina which were close to the alveolar ridge and a well defined, moderately well corticated radiolucency in the angle of the left mandible located below the inferior alveolar canal (Fig.1). The diagnosis was that of SIBC.

To avoid unnecessary invasive exploration of this radiographic lesion, prior to implant therapy, a CT scan (Fig. 2) was requested to confirm the diagnosis of SIBC. The report from the CT scan is as follows: "4 mm thick axial slices at 4 mm intervals through the mandible were obtained. Scan 2a and 2b, revealed an 8 mm defect of the medial aspect of the left mandibular ramus at the level of the angle of the mandible. No evidence of associated soft tissue mass lesion or other bony abnormality was present. Appearances most likely represent a small bony cyst, not unlike Stafne's idiopathic bone cyst."

A routine post surgical dental panoramic tomogram (Fig. 3) was taken and kept as a reference for radiological follow-up.

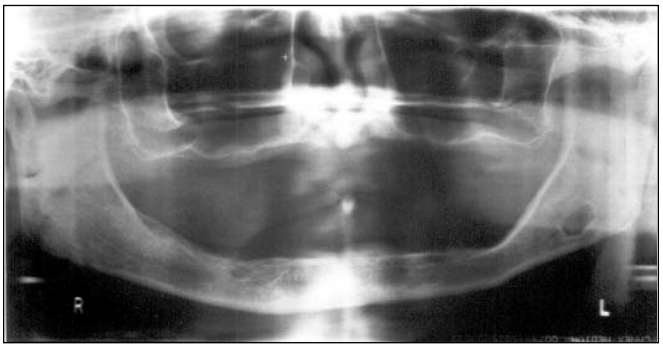

Fig. 1: Dental panoramic tomogram showing well defined moderately well corticated lesion of the angle of the mandible (left side).

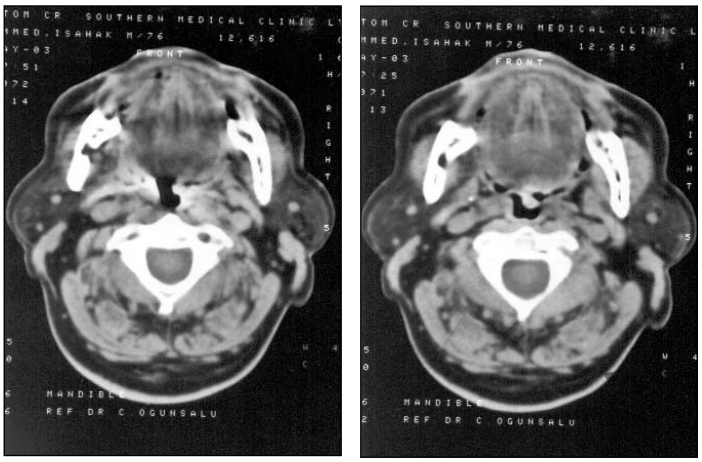

Fig 2a/b: Buccolingual CT scan showing lingual concavity consistent with a SBC.

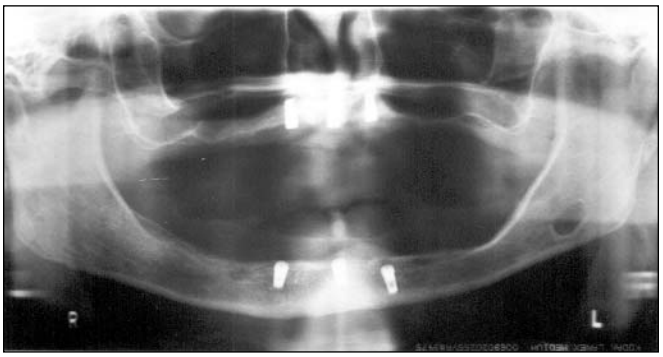

Fig 3: DPT post implant placement (a reference for radiographic follow-up).

DISCUSSION

Apart from utilizing radiological assessment of a dental implant patient for bone height determination and choice of the size of the implants to be placed, it is important to critically view the films for detection of previously unsuspected pathologies. This is necessary for the following reasons: the possibility of placing the dental implant into or close to the patho-

logic site which may lead to implant failure; the need for histopathological confirmation of the pathology to avoid unnecessary litigation and medico-legal implication of detecting the pathology only after implant procedure has been completed (*ie* radiological and histopathological confirmation of pathology must be documented prior to dental implant placement).

Biopsy was not performed in this case because of the following reasons: the lesion was located in non-tooth bearing area; it was below and intimately related to the inferior dental nerve; literature review supports the diagnosis of SIBC based on the CT scan finding of classical lingual concavity and the need to simplify therapy (less invasive implant therapy).

Surgical explorative procedures have shown that this bony configuration represents a focal concavity of the cortical bone on the lingual surface of the mandible (1–8). Normal salivary gland tissue was the most common histological finding, suggesting a developmental origin during which a portion of the submandibular gland was entrapped in the lingual mandibular cortex. In a minority of cases, muscles, fibrous connective tissue, blood vessels, fat or lymphoid tissue have also been reported. The incidence of Stafne idiopathic bone cyst ranges from 0.1–1.2% (8).

The use of dental CT is non-invasive, easy to perform and enables both diagnosis and follow-up. Radiographic features of SIBC are well seen on reformatted CT images (8). A key feature demonstrated by the buccolingual CT images is that the defect in the mandible is a concavity open on its lingual cortical margin. Whilst most studies agree that surgery is not indicated, superimposed pathology such as pleomorphic adenoma can develop in the entrapped salivary gland (9). It is for this reason that it is not only necessary to confirm this non-progressive bone cyst to prior implant therapy, but to utilize orthopantomogram for long term follow-up.

The literature has featured the CT scan findings of Staphne bone cysts. Computed tomography scans demonstrate the concavity on the posterior lingual surface of the mandible. The concavity usually opens on the lingual surface within an area surrounded by the mylohyoid line, the anterior attached portion of the medial pterygoid muscle and the inferior border of the mandible.

Based on previous reports, the depth and width of the concavities can average 7.9 and 16.3mm respectively (10). According to their outline and relationship to the buccal cortical plate, these concavities can be divided into three types (Fig. 4).

Type I : The base of the concavity did not reach the buccal cortical plate

Type II : The base of the concavity reached the buccal cortical plate but no expansion or distortion of the plate is seen

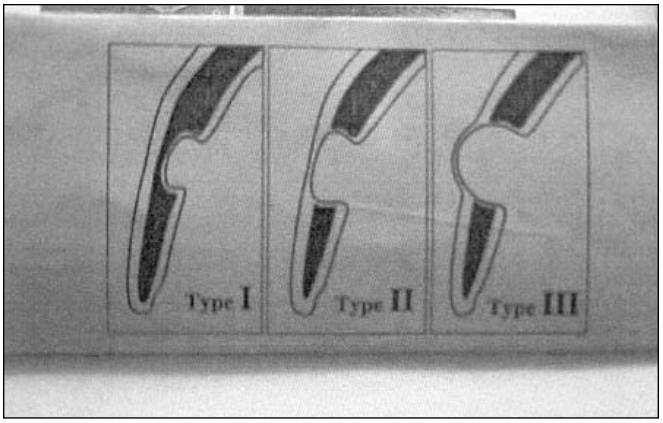

Fig. 4: Schematic diagram of the classification of SBC.

Type III: The base of the concavity is characterized by a buccal expansion of the cortical plate.

As can be seen, the CT scan finding on the index patient fits into Type II.

The concavities of SIBC can also be divided into three types according to their contents as determined by axial CT analysis. Type F, if it is filled only with fat density (the CT values varied from – 50 to 200 HU). Type S with density of soft tissue structure suggesting a lymph node, vessel, connective tissue or others. Type G, if the submandibular gland was entrapped in or was located close to the concavity. The special relationship between the submandibular gland and the concavity can be confirmed by CT sialography, if necessary (10). More recently, the use of MRI to confirm the content of SIBC has been utilized to obviate the need for surgical exploration (11). The literature recently featured a case of ossifying fibroma presenting as SIBC (12). It was further investigated with CT scan which demonstrated that the lesion was centrally placed and caused slight bony expansion but no invagination of the lingual cortical plates as expected for SIBC.

In summary, unnecessary invasive explorative procedures should be avoided when radiographic pre-implant evaluation suggest SIBC. The size and outline of the concavities on axial CT image can be investigated in relation to the surrounding structures. The depth can be measured as the maximum distance from the lingual surface to the bottom of the concavity and the width as the maximum mesiodistal distance. The contents of the concavities can be examined with respect to CT valve (Hounsfield units, HU) and the findings of CT sialography. Finally, medicolegal charges may be avoided by confirming this pathology before implant therapy is commenced.

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