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Incidental Detection of Bilateral Stylohyoid Ligament Ossification on Cone-Beam Computed Tomography: A Case Report

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Abstract

Stylohyoid ligament ossification is a heterotopic ossification characterized by the ossification of the stylohyoid ligament as a result of its mineralization. Although it is asymptomatic in most cases, it may cause various clinical manifestations in some patients. The aim of this case report is to emphasize the radiological features and clinical significance of incidentally detected bilateral stylohyoid ligament ossification during cone-beam computed tomography examination. A 22-year-old Turkish male patient presented to our clinic with swelling and pain in the right mandibular posterior region. Following clinical and panoramic radiographic examinations, cone-beam computed tomography was performed to evaluate the relationship of the lesion with the surrounding anatomical structures in detail. Cone-beam computed tomography revealed a large corticated hypodense lesion associated with teeth 46 and 47, as well as incidentally detected bilateral stylohyoid ligament ossification measuring 41.2 mm on the right side and 44.7 mm on the left side. No additional pathological findings were observed in the maxillary sinuses or temporomandibular joints. Stylohyoid ligament ossification may be overlooked during routine radiographic examinations; however, cone-beam computed tomography enables detailed three-dimensional evaluation of its length, localization, and relationship with adjacent anatomical structures. Recognition of this anatomical variation by dentists is of considerable clinical importance for the accurate assessment of asymptomatic cases, differential diagnosis in symptomatic patients, and the prevention of unnecessary treatment.

Keywords: Cone-beam computed tomography, Eagle syndrome, Soft tissue ossification, Stylohyoid ligament ossification, Three-dimensional imaging

1. Introduction

Soft tissue calcifications and ossifications occur as a result of the deposition of mineral salts in any soft tissue of the human body. These calcifications and ossifications may develop as a consequence of inflammatory processes or metabolic disorders. These conditions are classified into different groups according to their etiology, the mechanisms involved in their formation, and their anatomical location. Heterotopic calcifications occur as a result of the irregular deposition of mineral salts within soft tissues. According to their etiology, heterotopic calcifications are classified into three main groups. The first group consists of idiopathic calcifications, which develop as a result of the deposition of mineral salts in healthy tissues despite normal serum calcium and phosphate levels. The second group comprises

dystrophic calcifications, which are characterized by the deposition of mineral salts in damaged tissues despite normal serum calcium and phosphate levels. The third group consists of metastatic calcifications, which develop as a result of the deposition of mineral salts in soft tissues secondary to elevated serum calcium and phosphate levels. Heterotopic ossifications, on the other hand, occur as a result of the organized deposition of mineral salts within soft tissues. Stylohyoid ligament ossification (Eagle syndrome) is included in this group [1-6].

These ossifications and calcifications, which result from the deposition of mineral salts in soft tissues, may be detected incidentally during routine radiographic examinations. The detection rate of these conditions on panoramic radiographs is generally approximately 4%. However, the detection rate increases with the use of advanced three-dimensional imaging modalities such as cone-beam computed tomography. The identification of these soft tissue calcifications and ossifications facilitates an accurate diagnosis and helps prevent unnecessary treatment procedures. Furthermore, although calcified soft tissue structures are often asymptomatic, they may produce various clinical symptoms in some cases. Therefore, the identification of these mineralizations by clinicians is of considerable clinical importance [4, 7-10]. The aim of this case report is to emphasize the presence and clinical importance of stylohyoid ligament ossification that was detected incidentally during the evaluation of cone-beam computed tomography images.

2. Case History

A 22-year-old Turkish male patient presented to our clinic with complaints of swelling and pain in the right mandibular posterior region. A detailed medical history revealed no systemic disease, previous surgical history, or history of drug allergy.

Clinical findings: Mild swelling was detected in the right mandibular region. Temporomandibular joint examination revealed no joint sounds, limitation of mouth opening, or mandibular deviation. Intraoral examination demonstrated the absence of tooth 14. Restorative dental filling materials were present in teeth 15, 16, 25, 27, 36, and 46. A discrepancy between the restoration and the tooth structure was observed in tooth 27. Calculus deposits were detected on the lingual surfaces of the mandibular anterior teeth, and generalized signs of gingivitis were observed throughout the oral cavity. Swelling was confirmed in the right mandibular posterior region. Percussion of tooth 46 elicited pain. Lymph node examination revealed enlargement of the right submandibular lymph nodes. A panoramic radiographic examination was requested for further evaluation of the patient.

Radiographic examinations: The panoramic radiograph and cone-beam computed tomography images were evaluated by the author of this case report.

Panoramic radiographic evaluation: Root canal filling materials were detected in teeth 16, 25, and 27. The panoramic radiographic findings related to the teeth and restorations were consistent with the clinical findings. Dental caries was detected in tooth 28. Secondary caries was observed in teeth 27 and 36. A well-defined, corticated radiolucent lesion was detected around the apices of teeth 46 and 47. The inferior border of the lesion was observed to be associated with the mandibular canal. Cone-beam computed tomography examination was requested to determine the relationship of the lesion with the adjacent anatomical structures more accurately and to facilitate surgical treatment planning.

Cone-beam computed tomography evaluation: Cone-beam computed tomography examination was performed using an exposure protocol of 110 kilovoltage peak, 4.53 milliampere-seconds, and a slice thickness of 0.3 mm with NNT Viewer 16.9 software. A 15.6-inch monitor with a maximum screen

resolution of 1920 × 1080 pixels was used for image evaluation. An area of radiopacity consistent with extruded root canal filling material and a surrounding hypodense area were observed in the palatal root of tooth 27. Similarly, areas of radiopacity consistent with extruded root canal filling material and surrounding hypodense areas were detected in the palatal and distal roots of tooth 16. A well-defined, corticated hypodense lesion measuring approximately 22.0 × 16.5 × 12.2 mm at its greatest dimensions was identified in association with the apices of teeth 46 and 47. The lesion was found to cause resorption of the mandibular lingual cortical bone. Expansion of both the buccal and lingual cortical plates of the mandible was also observed. The lesion displaced the mandibular canal inferiorly and was in contact with the superior cortical wall of the mandibular canal. No pathological findings were detected in the maxillary sinuses or temporomandibular joints. Bilateral stylohyoid ligament ossification was identified, measuring 44.7 mm on the left side and 41.2 mm on the right side (Figure 1).

Figure 1. Oblique cone-beam computed tomography images demonstrating stylohyoid ligament ossifications. White arrowheads indicate the ossified stylohyoid ligaments: (a) right side and (b) left side.

3. Discussion

Soft tissue calcifications and ossifications occur as a result of the deposition of calcium and phosphate salts within soft tissues. Soft tissue ossifications develop through the organized deposition of calcium and phosphate minerals in soft tissues. Therefore, they are also referred to as heterotopic ossifications. The term *heterotopic* indicates that bone is formed outside its normal anatomical location. These ossifications may exhibit different structural characteristics. They may consist entirely of compact bone or may also contain trabecular bone and bone marrow. When this process occurs within the stylohyoid ligament, it is referred to as stylohyoid ligament ossification. A stylohyoid complex measuring more than 30 mm is generally considered to represent stylohyoid ligament ossification. These ossifications are usually bilateral. Although the etiology of stylohyoid ligament ossification remains unclear, it is thought to be associated with advanced age and trauma. In most cases, ossification originates from the skull base; however, in some cases, it may also originate from the hyoid bone or the middle portion of the

ligament. Stylohyoid ligament ossification can be classified using different classification systems. One of the most commonly used classifications is based on the number of ossified segments. According to this classification, the ossification may be described as a single uninterrupted segment, two segments connected by one pseudoarticulation, or multiple ossified segments. Although stylohyoid ligament ossification is generally asymptomatic, it may be palpated as a hard and pointed structure. When clinical symptoms are present, the condition is referred to as Eagle syndrome. In such cases, compression of the cranial nerves or the carotid artery may occur. Symptoms of Eagle syndrome include pain in the affected region during speaking, yawning, chewing, and head movements. A foreign body sensation in the throat, tinnitus, and otalgia are other reported symptoms. Compression of the internal or external carotid artery may result in headache, ocular pain, visual disturbances, vertigo, and syncope. Only 1% to 10% of patients with stylohyoid ligament ossification develop symptoms, and the condition is generally asymptomatic. Panoramic radiographs, which are routinely requested by dentists, may facilitate the detection of asymptomatic cases. However, superimposition of adjacent anatomical structures and imaging artifacts may reduce the diagnostic accuracy of panoramic radiography by causing loss of information. Therefore, three-dimensional imaging may be requested in suspicious cases [4, 11-16].

Cone-beam computed tomography is widely used in dentistry for the evaluation of hard tissues. Cone-beam computed tomography is also a highly useful imaging modality for the assessment of stylohyoid ligament ossification because of its relatively low radiation dose and high geometric resolution [17, 18]. The identification of stylohyoid ligament ossification is of considerable clinical importance, both for monitoring ossification in asymptomatic patients and for determining the underlying cause of unexplained symptoms in symptomatic patients. Therefore, dentists should have adequate knowledge of stylohyoid ligament ossification and its clinical significance.

4. Conclusion

Stylohyoid ligament ossification is a condition characterized by ossification of the stylohyoid ligament. Although it is generally asymptomatic, it may occasionally present with various clinical symptoms. Imaging modalities should be used to monitor ossification in asymptomatic patients and to establish an accurate diagnosis in symptomatic patients. Cone-beam computed tomography is an imaging modality that enables detailed evaluation of stylohyoid ligament ossification. Dentists should have adequate knowledge of this condition and utilize appropriate radiological imaging methods when necessary.

5. References

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