CASE REPORT
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Mandibular Ramus Osteochondroma-A Rare Cause of Chronic Mouth Opening Limitation: A Case Report

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Osteochondroma, the most common benign bone tumor, rarely occurs in the craniofacial region. This case report presents a sporadic osteochondroma found in the posterior mandibular ramus of a 56-year-old woman, resulting in chronic restricted mouth opening and facial asymmetry persisted over 20 years. Clinical and radiographic examinations, including panoramic and cone-beam computed tomography, revealed a large radiopaque mass causing mechanical locking. Surgical excision of the mass resolved the symptoms without recurrence for 5.5 years. This case underscores the importance of considering osteochondromas in the differential diagnosis of temporomandibular disorders with restricted mouth opening. It emphasizes the necessity for thorough clinical evaluation and careful radiographic interpretation of extraoral findings. [J Korean Dent Sci. 2024;17(3):138-44]

Key Words: Osteochondroma; Mandibular ramus; Limitation of mouth opening; Facial asymmetry; Temporomandibular disorder

Introduction

Osteochondroma is the most prevalent benign bone tumor, characterized by a bony outgrowth capped with a cartilaginous cap. Although osteochondromas can develop in any bone, they primarily affect the metaphyses of long bones such as femur and tibia[1,2]. However, their occurrence in the craniofacial region is rare, accounting for only about 1% of cases[3]. Within the craniofacial area, osteochondromas in the mandibular ramus is exceptionally rare, with most located in the mandibular condyle and coronoid process[4,5].

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Most osteochondromas are solitary lesions and usually asymptomatic, often found incidentally on radiographic exams. However, depending on their location, they can cause various symptoms[1]. In the mandible, they can lead to pain, facial asymmetry, malocclusion, and restricted mandibular movement, necessitating differential diagnosis as these symptoms are similar to those of temporomandibular disorders (TMDs)[4,6].

For symptomatic osteochondromas, complete surgical removal is typically required; otherwise, regular follow-up is sufficient. Solitary lesions have very low rates of malignanct transformation and recurrence, but regular follow-up is still necessary. Multiple lesions are strongly associated with autosomal dominant diseases and have significantly higher rates of malignanct transformation, recurrence, and systemic complications. In addition to the presence of symptoms and the number of osteochondromas, the location of occurrence may also be an important factor in diagnosis and treatment[1].

In this report, we present a unique case of a long-lasting undetected giant solitary osteochondroma located in the posterior mandibular ramus, which caused mechanical locking and limited mouth opening and was successfully treated with complete excision.

Case Report

A 56-year-old woman presented at Dankook University Dental Hospital with complaints of limited mouth opening and progressive facial asymmetry, symptoms had persisted for over 20 years. Additionally, she reported experiencing pain and a clicking sound in the left temporomandibular joint (TMJ) during mouth opening. Despite previous consultations at various clinics, the cause had not been identified. Conservative treatments, including oral appliances and botulinum toxin injections on both sides of masseter muscles, had been ineffective. The patient's medical history was significant only for hypertension.

During the clinical examination, the patient demonstrated a 30 mm unassisted maximal mouth opening with a hard end feel, and reported pain rated at 3 on the Visual Analogue Scale. Excursive movements were measured 10 mm to the left, and 8 mm to the right, with a protrusive movement of 5 mm, accompanied by a slight deflection to the right side. A small click was detected in the left TMJ during mouth opening and right lateral movement. Palpation of the masticatory muscles and TMJs did not provoke pain. The patient exhibited stable occlusal contact with a normal range of overbite (2 mm) and overjet (1 mm). Additionally, facial asymmetry was noted, characterized by a palpable hard mass on the left posterior mandible and a 2 mm dental midline shift to the right side (Fig. 1).

Panoramic radiography, computed tomography (CT) scans, and magnetic resonance imaging (MRI) were all taken on the day of the initial visit. Panoramic radiograph revealed a diffuse radiopaque mass at the left posterior mandibular ramus (Fig. 2). Cone-beam CT (CBCT) and three-dimensional CT scans provided a clear depiction of the mass, indicating dense radiopacity and continuity with the mandibular surface. The condyle heads displayed normal anatomic structures; however, the left condyle was positioned anteriorly in centric occlusion due to the lesion (Fig. 3). MRI confirmed that the articular discs of both TMJs remained their normal positions and shapes (Fig. 4).

Based on these findings, a provisional diagnosis of chronic mouth opening limitation due to the bony mass in the mandibular ramus was established. A total excision of the mass was performed, and subsequent histological analysis confirmed the presence of osteochondroma.

Three weeks post-operation, the patient demonstrated improved unassisted mouth opening, which increased to 45 mm, and left lateral movement increased to 15 mm, both occurring without TMJ noise. Both panoramic radiograph and CBCT taken on this day confirmed the complete excision of the mass and correct positioning of the left condyle (Fig. 5). However, the patient developed facial nerve paresis, resulting in

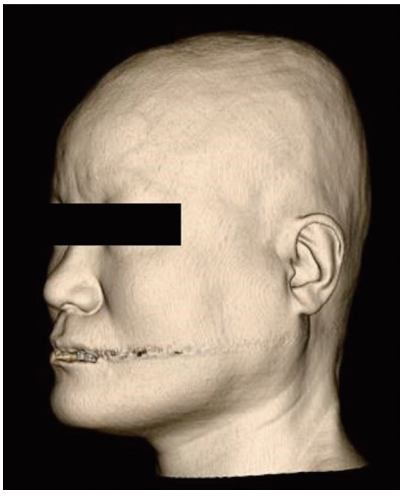

Fig. 1. At the initial visit, soft tissue reconstruction image of three-dimensional computed tomography reveals enlargement of the posterior region of the left mandible.

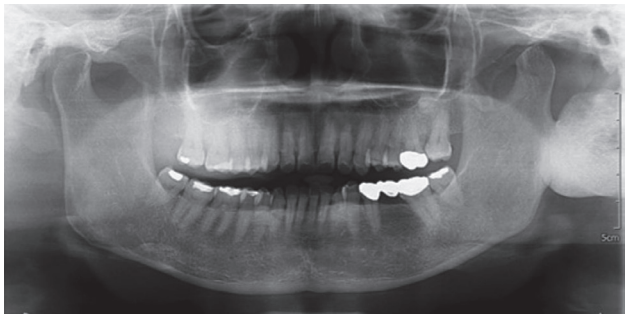

Fig. 2. At the initial visit, panoramic radiograph shows a giant diffuse radiopacity located at the left posterior ramus of the mandible.

slight sagging of the left mouth corner during smiling.

Three months post-operation, joint sound, and pain had nearly disappeared. By five months post-operation, unassisted mouth opening had improved to 50 mm, though mild symptoms of lower lip sagging during smile persisted. The patient was followed up for 5.5 years with no signs of recurrence.

This case study received approval from the Institutional Review Board of Dankook University Dental Hospital (DKDH IRB 2024-04-007), and written informed consent was waived by the committee.

Discussion

Osteochondroma is the most prevalent benign bone tumor, accounting for 8 - 15% of all bone tumors and 35 - 50% of all benign bone tumors[1,7]. Osteochondromas typically characterized by a cartilaginous cap covered by periosteum that is continuous with one of the underlying bone[8,9]. Diagnosis is primarily based on clinical evaluation and radiologic imaging, including plain radiographs, MRI, and CT scans[1]. Diagnostic criteria include a cartilaginous cap less than 2 cm thick, along with characteristics such as a growth plate-like architecture (in children) or extensive calcification

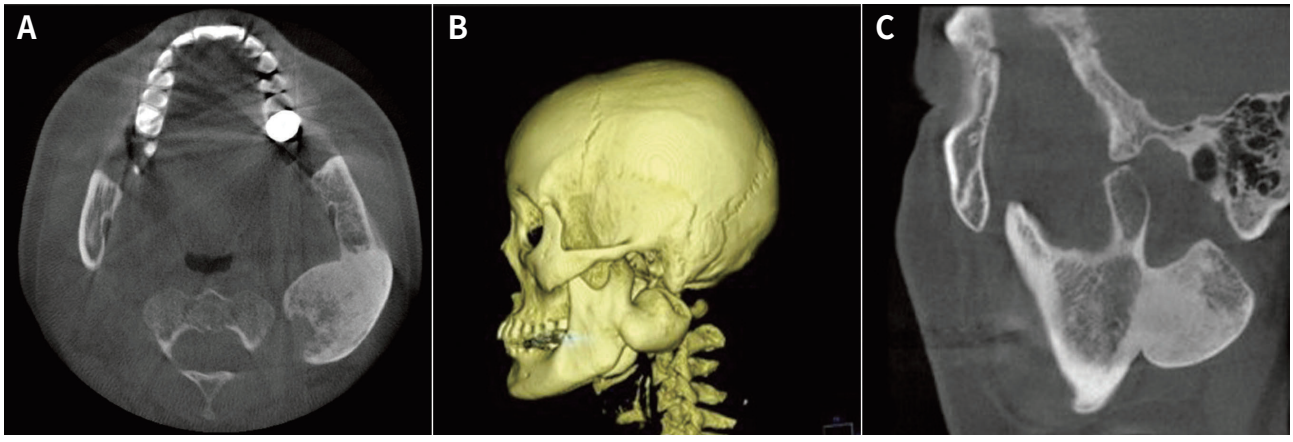

Fig. 3. At the initial visit, cone-beam computed tomography (CBCT) and three-dimensional computed tomography (CT). (A) Axial section of CBCT and (B) Three-dimensional CT demonstrates a well-defined dense radiopaque mass with continuity to the posterior surface of left posterior mandibular ramus. (C) Sagittal section of CBCT of left temporomandibular joint reveals an anteriorly positioned left condyle head in its normal shape.

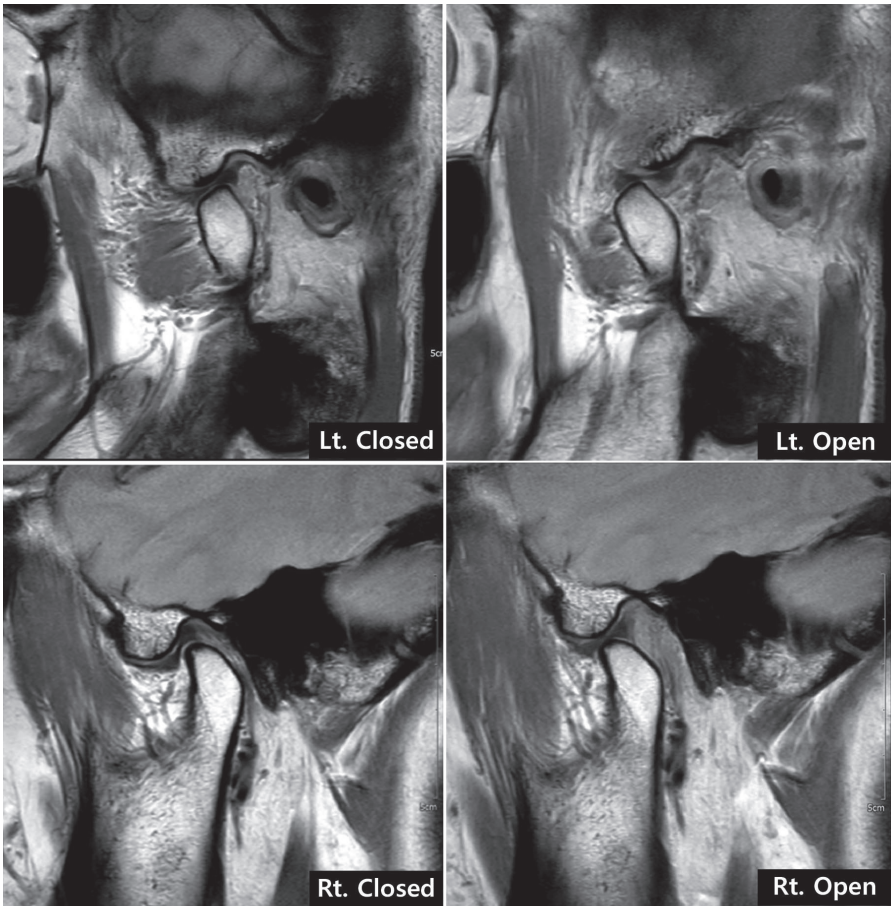

Fig. 4. At the initial visit, sagittal oblique proton density-weighted magnetic resonance imaging (MRI) of the temporomandibular joints (TMJs) shows the articular discs of both TMJs maintaining their normal positions and shapes in both closed and open-mouth positions. The condyle heads exhibit a normal shape, but the left condyle is positioned anteriorly in the closed-mouth position. A broad bony mass, displaying low intensity similar to that of cortical bone, is observed in the left posterior mandibular ramus. Lt: left; Rt: right.

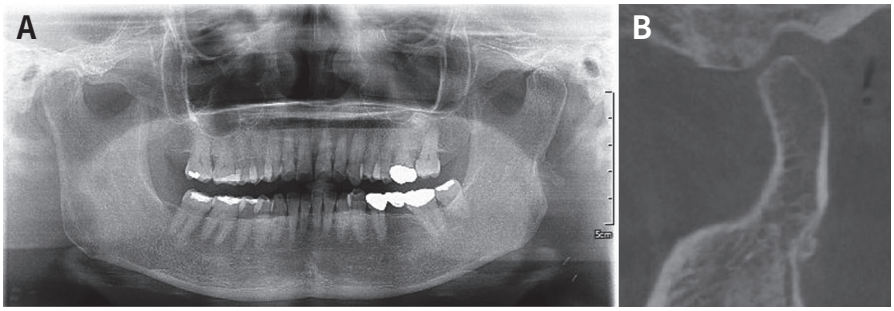

Fig. 5. Radiographs taken three weeks post-operatively show complete excision of the mass and correct positioning of the left condyle. (A) Panoramic radiograph. (B) Sagittal cone beam conputed tomography image of the left temporomandibular joint.

with age, and an underlying stalk showing medullary and cortical continuity with the underlying bone[9].

Osteochondromas most commonly arise in the metaphyses of long bones undergoing endochondral ossification[1]. However, their occurrence in the craniofacial region is exceptionally rare, primarily due to the prevalence of intramembranous ossification in these bones[4]. In the craniofacial region, most osteochondromas are believed to originate from pre-existing cartilage models during embryonic development[10]. They can be found in various anatomical locations, including the condyle[6,7], coronoid process[2], mandibular body[8], symphysis[3], zygomatic arch[11], cranial base[12], maxilla[13], maxillary sinus[14], and nasal septum[15]. Nonetheless, approximately 97% of craniofacial osteochondromas occur in the condyle and coronoid process, with extremely rare cases reported in the mandibular ramus[4].

Osteochondromas predominantly present as solitary lesions in 75 - 85% of cases, while 15 - 25% appear as multiple lesions associated with hereditary multiple exostosis (HME)[1,8]. Both types are commonly found in young individuals and exhibit a male predilection, however, HME may even appear in infants and newborns[1,9]. Osteochondromas typically exhibit slow growth, which generally ceases upon reaching skeletal maturity[4,9]. While many cases remain asymptomatic, some can cause symptoms such as swelling, deformity, restricted movement, pain, or sensory disturbances by affecting surrounding tissues[3,9]. Notably, osteochondromas in the mandible can present symptoms similar to those of TMDs, including restricted mandibular movement, pain in the TMJ, malocclusion, and facial asymmetry[4,6].

For asymptomatic or mildly sympomatic solitary osteochondromas, regular observation is recommended. Surgery should be reserved for cases where there is pain, complications, cosmetic concerns, or suspected malignant transformation. Complete excision is typically recommended, occasionally supplemented by reconstruction surgery[1,16]. Solitary osteochondromas have a low recurrence rate (2%) and a malignant transformation rate (1 - 4%), compared to multiple lesions (11% and 1 - 25%, respectively), which are often accompanied by systemic complications such as deformities or developmental abnormalities, juvenile arthritis, and joint dislocations or subluxations[1,3,4,7-9].

In this report, we presented an extraordinarily rare case of osteochondroma located in the posterior mandibular ramus, which resulted in mechanical lock and restricted mouth opening. Although numerous cases have documented limited mouth opening due to osteochondromas in the condyles and coronoid process of the mandible, to the best of our knowledge, only four cases involving the mandibular ramus have been reported (Table 1). Among these, only one exhibited chronic mouth opening limitation due to a mechanical lock related to the mass similar to our case[4]. Another case involved an osteochondroma on the medial surface of the mandibular ramus, which caused only pain and swelling without leading to restricted mouth opening[5]. Two other cases presented with mandibular pain and limited mouth opening, but these involved osteochondromas occurring simultaneously on both the mandibular ramus and condyle[10,16].

Remarkably, the lesion remained undetected and misdiagnosed for an extended period during routine dental examinations and treatments for TMD, despite being visible as an abnormal finding on a panoramic radiograph. This oversight may be due to dentists' neglect of extraoral findings. This case emphasizes the need for increased awareness and careful consideration of rare extraoral findings in panoramic radiographs during routine dental examinations and evaluations of TMD.

In this case, an MRI was performed to rule out disc displacement as a cause of the chronic mouth opening limitation. Notably, despite the long-standing anterior positioning of the left condyle, the MRI results showed the discs in both TMJs maintained their normal positions and shapes. We speculate this is due to the lesion being located away from the condyle head and the slow-growing nature of the osteochondroma,

Table 1. Description of osteochondroma cases occurring in mandibular ramus

Authors	Location	Symptoms	Duration	Treatment method	Follow-up period
Kumar et al.[4]	Posterior border of mandibular ramus	Swelling over the left middle one-third of the face, facial asymmetry, limited mouth opening	6 years	Surgical excision	1 year with no recurrence
Anupam et al.[5]	Medial surface of mandibular ramus	Pain and swelling in the right tonsilo-molar area of the upper jaw	Not clear	Surgical excision	5 years with no recurrence
Gopinath et al.[10]	Posterior border of mandibular ramus and condyle head	Pain and swelling below right side of ear, limited mouth opening	2 years	Surgical resection with condylectomy	18 months with no recurrence
Martinovic et al.[16]	Medial surface of mandibular ramus and condylar neck	Pain on the left side of mandible, limited mouth opening	6 months	Surgical resection with reconstruction with a customized alloplastic joint prosthesis	6 months with no recurrence

which allowed the formation of a pseudoarticulation that kept the discs unaffected. Such pseudoarticulations are often observed in various parts of the body, such as in the vertebrae (Bertolotti syndrome)[17] or the coronoid process of the mandible (Jacob's disease)[18]. A similar case has been reported involving an osteochondroma of the mandibular condyle head[19].

Conclusion

Our case highlights the importance of including osteochondromas in the differential diagnosis of TMDs with restricted mouth opening. Although typically found in the condyle and coronoid process, osteochondromas can also occur in the mandibuar ramus and cause mechanical locking on mouth opening. Increased awareness and metriculous assessment of intraoral and extraoral findings in routine dental panoramic radiographs are crucial for timely diagnosis and effective management of these rare but significant lesions.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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