CASE REPORT

Osteochondritis dissecans of the temporomandibular joint

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A case is reported of a 43-year-old female patient presenting bilateral osteochondritis dissecans (OCD) of the temporomandibular joint (TMJ), in different stages for each side, associated with avascular necrosis (AVN) of the right condyle. Additionally observed was anterior disk displacement without reduction for both sides. We have proposed an adaptation of the previous classification of OCD for cases affecting the TMJ. We have also stressed the fundamental role of panoramic radiography on the diagnosis of stage 3 and stage 4 OCD of the TMJ. In relation to MRI, we have recommended sagittal (slice thickness of 2 mm) and coronal (slice thickness of 1 mm) fast spin-echo proton density-weighted sequences to better identify bone lesions (stage 1 and 2) and also localize osteochondral loose bodies; and coronal (slice thickness of 1 mm) fat-suppressed fast spin-echo T_2 weighted sequence to better evaluate OCD (stable or unstable) and the features of the occasionally associated AVN (acute or chronic).

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Case report

A 43-year-old female patient was referred to a private clinic in order to undergo magnetic resonance imaging (MRI) of the temporomandibular joint (TMJ). She had no history of trauma, steroid therapy, or relevant diseases. She complained of headaches and articular pain on the right side caused by mandibular movements, as well as articular clicking on the left side. Upon examination we could not confirm the articular clicking; however, we did observe joint crepitus on the left side and jaw opening limitation.

The prior panoramic radiography (Figure 1) showed morphological change of the left condyle, as if part of it was dislodged into the anterior recess of the lower joint space (the irregular radiopaque fragment). In addition, we could perceive two rounded fragments apparently detaching from the superior aspect of the right mandibular condyle.

The closed-mouth T_1 weighted MR images (repetition time (TR) = 400 ms, echo time (TE) = 13 ms, number of excitations (NEX) = 4, 14 cm field of view (FOV), 256×256 matrix, 2 mm thick [no gap]) (Figure 2)

displayed, for the right side, posterior position of the condyle, an extensive area of decreased condylar marrow signal, suggesting either bone marrow oedema, fibrosis or sclerosis and anterior disk displacement (below the articular eminence). For the left side, the images showed an eroded-like condyle appearance (resembling osteoarthritis) and an area of low signal intensity corresponding to the irregular mineralized fragment in the lower joint space (resembling osteochondral intracapsular fracture) right below the anterior band of the articular disk, displaced anteriorly. In contrast to the opposite side, the bone marrow of the left condyle displayed a normal high signal intensity. Although near each other, due to the limited dimensions of the lower joint space anterior recess, it was possible to distinguish the anterior band of the disk (low to intermediate signal intensity) from the mineralized fragment (low signal intensity). Thus, we could exclude calcification of the anterior band of the disk from the differential diagnosis.

The open-mouth images (Figure 3) revealed limited translation of the condyles during jaw opening and showed non-reduction for both anterior disk displacements.

These imaging features led us to the diagnosis of bilateral osteochondritis dissecans (OCD) stage 3 on the

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Figure 1 Panoramic radiograph displaying two osteochondral rounded fragments apparently detaching from the right condyle (stage 3 osteochondritis dissecans (OCD)) and one osteochondral loose body in the lower joint space associated to the corresponding morphological alteration of the left condyle (stage 4 OCD)

Figure 2 The closed-mouth T_1 weighted MR images showing (a and b) for the right side, extensive area of decreased condylar marrow signal and anterior disk displacement; (c and d) for the left side, morphological alteration of the condyle, anterior disk displacement, and the osteochondral loose body in the lower joint space

Figure 3 The open-mouth T_1 weighted MR images reveal (a and b) for the right side, a decreased condylar marrow signal, anterior disk displacement without reduction, and limitation of condylar translation; (c and d) for the left side, the images show an eroded-like condyle appearance, the mineralized fragment right below the anterior band of disk (due to the limited dimensions of the lower joint space anterior recess), anterior disk displacement without reduction, and limitation of the condyles translation

right side and stage 4 on the left side. Additionally, the condition was associated with early/late avascular necrosis on the right side.

Discussion

Osteochondritis dissecans (OCD) is characterized by bony necrosis followed by healing. It mostly affects male patients and up to half of the cases are associated with trauma history, although there is familial history in some cases.¹ Sometimes, however, the necrotic bony part may not heal, and thus, become a loose body inside the articular space.² The condition may be bilateral³ and, as it is frequently found in children who are active athletically, repetitive microtrauma is thought to be related to its manifestation.⁴ OCD patients may either be entirely asymptomatic or not only complain of pain aggravated by articular movements, but also present limitation of motion, clicking, locking, and swelling may be apparent.¹

Sometimes OCD may be part of more complex conditions like Legg-Calvé-Perthes disease or Preiser's syndrome.^{5,6}

Characteristically, OCD may affect younger or older patients. Juvenile osteochondritis dissecans (JOCD) has a better potential for healing.⁷ In younger patients, if there are no osteochondral loose bodies in the articular space and if treated by reducing loading, the lesion usually evolves to a stable stage in which the necrotic area heals. In contrast, with older patients the lesion is frequently unstable and the presence of osteochondral loose bodies in the articular space is more common.²

Joint diseases producing osteochondral loose bodies, besides OCD, include intracapsular fractures, osteoarthritis, synovial chondromatosis, tuberculosis or pyogenic arthritis, rheumatoid arthritis, neurotrophic arthritis,⁸ as well as syphilis.⁹ Indeed, OCD and synovial chondromatosis are considered the most common causes of loose bodies within the joints of the body.¹⁰

According to the disease's evolution, OCD could be diagnosed in four different stages¹¹ which we have adapted to the TMJ:

- Stage 1: bone lesion without jeopardizing the articular fibrocartilaginous cover;
- Stage 2: defect on the articular fibrocartilaginous cover, but no osteochondral loose body in the articular space;
- Stage 3: osteochondral fragment partially detached from the articular surface; and
- Stage 4: osteochondral loose body in the articular space and corresponding bone defect.

The first case of OCD affecting the TMJ was reported by Olley and Leopard.⁹ The patient complained of discomfort from the right side, reported several episodes of locking, and the radiographs (Towne projection and transcranial view) showed widening of the joint space and one loose body in the lower joint space. There was no history of trauma and, upon examination, malocclusion was observed. Although considering synovial chondromatosis as the first condition to take into account in the differential diagnosis, the authors stressed that metaplasia of the synovium gives rise to formation of many osteochondral loose bodies. We add to this comment that the several loose bodies related to synovial chondromatosis are regular in shape and there are no condylar defects that correspond to the loose bodies.

Still with regard to the case reported by Olley and Leopard,⁹ it is also interesting to note that the corresponding condylar defect was detected only upon surgical exploration, which demonstrates the limitation of the radiographs used in the patient's evaluation to clearly delineate the osseous components of the TMJ.

To Schellhas *et al.*,¹² OCD and avascular necrosis (AVN) are similar conditions that may represent a spectrum of the same pathophysiology (bone necrosis) and they are secondary to internal derangement of the TMJ. Considering OCD and AVN as common disorders which are clinically significant but generally not recognized, the authors pointed out the MR features of OCD and AVN affecting the TMJ. Their study was based upon 23 cases of localized or subarticular AVN, 7 cases of AVN of entire condyle, and 10 cases of OCD, 4 of them presented in association with AVN.

Rowe *et al.*,⁵ on the other hand, stressed the capacity of computed tomography (CT) and three-dimensional reconstruction (3D-CT) to give more precise information on the extent of the involvement, the degree of healing, the stability of the osteochondral fragment, and the location of the dislocated loose body.

Confirming the limitation of plain films, Boutin *et al.*¹³ assured that, depending on the affected bone, OCD may be inconspicuous upon radiography. Thus, they recommended fast spin-echo proton density-weighted and T_2 weighted MR sequences to evaluate the articular cartilage integrity and lesion stability. On the other hand, Wirth *et al.*¹⁴ demonstrated that MR enabled the detection of an OCD case (confirmed upon arthroscopy) not diagnosed on plain films, although a superficial cartilage defect, as shown on arthroscopy, was not detected on the MR.

Based on our patient's case, we consider that panoramic radiography plays a fundamental role in the diagnosis of late stage (3 and 4) OCD of the TMJ, as it is one of the most employed dental radiographic methods and can exhibit a good image of the mandibular condyles. Even though MR is not able to detect superficial cartilage defects, MR sequences, better than CT, give more precise information concerning the degree of healing and the stability of the osteochondral fragment, due to the possibility of identification, through MR images, of the type of tissue between the necrotic fragment and the normal adjacent bone. Thus, one can employ sagittal (slice thickness of 2 mm) and coronal (slice thickness of 1 mm) fast spin-echo proton density-weighted sequences to better identify bone lesions (stage 1 and 2) as well as to localize osteochondral loose bodies. Then, coronal (slice thickness of 1 mm) fat-suppressed fast spin-echo T_2 weighted sequence would make it possible for a better assessment of OCD (stable – healed; or unstable – not healed) and the features of the occasionally associated AVN (early – bone marrow oedema, ischaemic necrosis, occasionally joint destruction; or late – resolution of the bone marrow oedema and eventual sclerosis²). In this type of image sequence, a high signal intensity halo around the necrotic fragment corresponds to liquid or granulation tissue and signifies that there may be a defect on the articular fibrocartilaginous cover, which means the lesion is active and unstable. On the other hand, as the interface necrotic fragment/normal bone displays a low signal intensity halo means that there is no activity and the lesion is stable.²

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