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Fracture of the tympanic plate with soft tissue extension into the auditory canal resulting from an unfavorable chewing experience

CASE REPORT

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Abstract – We present a case where a patient sustained a tympanic plate fracture of the right side while chewing a sandwich. Intense pain with temporomandibular joint (TMJ) symptoms such as restrained painful mouth opening and functional pain in full occlusion followed the incident and the fracture was diagnosed after ocular and CT-examination of the right external auditory canal. Non-ruptured soft tissue could be seen protruding into the external auditory canal and the size of the mass changed during movement of the TMJ. Treatment was not needed to resolve the situation and at 3-year follow-up the patient has no clinical symptoms.

Traumatic fractures of the tympanic plate are rare and usually associated with direct trauma to the region of the mandibular symphysis with posterior dislocation of the condylar process (1–3). The temporomandibular joint (TMJ) is intimately related to the external auditory canal and only separated from it by a thin layer of tympanic bone (1, 4). Usually the soft tissue posterior to the condyle and the fracture itself absorb the force of any posterior movement and in these cases the adjacent structures remain intact (4). But if the impact exceeds the capacity of the articular structures, TMJ herniation/soft tissue extension into the external auditory canal may occur due to the intimate topographic relationships. We report a case where unfavourable chewing was the cause of a tympanic plate fracture with subsequent soft tissue herniation into the external auditory canal – an injury that, to our knowledge, has not previously been reported in the literature.

Case report

We report a case where an otherwise healthy 25-year-old female one morning while chewing a sandwhich suddenly experienced an immense pain from her right TMJ-region. Primarily seeing an ENT-specialist she was referred to the Oral and Maxillofacial unit at Uppsala University Hospital. Part from intense pain, TMJ symptoms such as restrained painful mouth opening and functional pain in full occlusion was observed. Upon inspection of the right external auditory canal, the eardrum was seen unaffected, but a non-ruptured light-colored soft tissue was seen protruding into the external auditory canal lateral to the eardrum. The size of the mass changed during movement of the TMJ so the differential diagnosis of an exostosis was ruled out at clinical inspection. No bleeding was seen in the auditory canal. Extraoral examination revealed a correct straight mouth opening but pain on palpation in the right TMJ-region was experienced by the subject. Hearing was unaffected. A fracture of the tympanic plate was suspected after ocular examination. A CT-examination was performed and a fracture of the tympanic plate was confirmed (Fig. 1). No treatment, except pain relief with NSAID for 4 days, was needed to resolve the situation. After 10 days the patient could open 30 mm without pain and eventually the mouth opening returned to normal. The patient showed no clinical symptoms with normal range of motion (50 mm) at the 3-year follow-up.

Discussion

The common cause of fractures of the tympanic plate is direct mandibular trauma to the symphysis with posterior dislocation of the condyle. The soft tissue posterior to the condyle and the fracture itself usually absorb the force of any posterior movement and in these cases the adjacent structures remain intact (4). But, if the impact exceeds the capacity of the articular structures TMJ herniation/soft tissue extension into the external auditory canal may result due to the intimate topographic relationships. Inflammatory (5) and spontaneous (6) lesions are also known to be potential causes of TMJ herniation into the external auditory canal. Herniation may also be facilitated by an incomplete closure of Huschkes foramen (6), a bony dehiscence in the anterior wall of the tympanic bone,

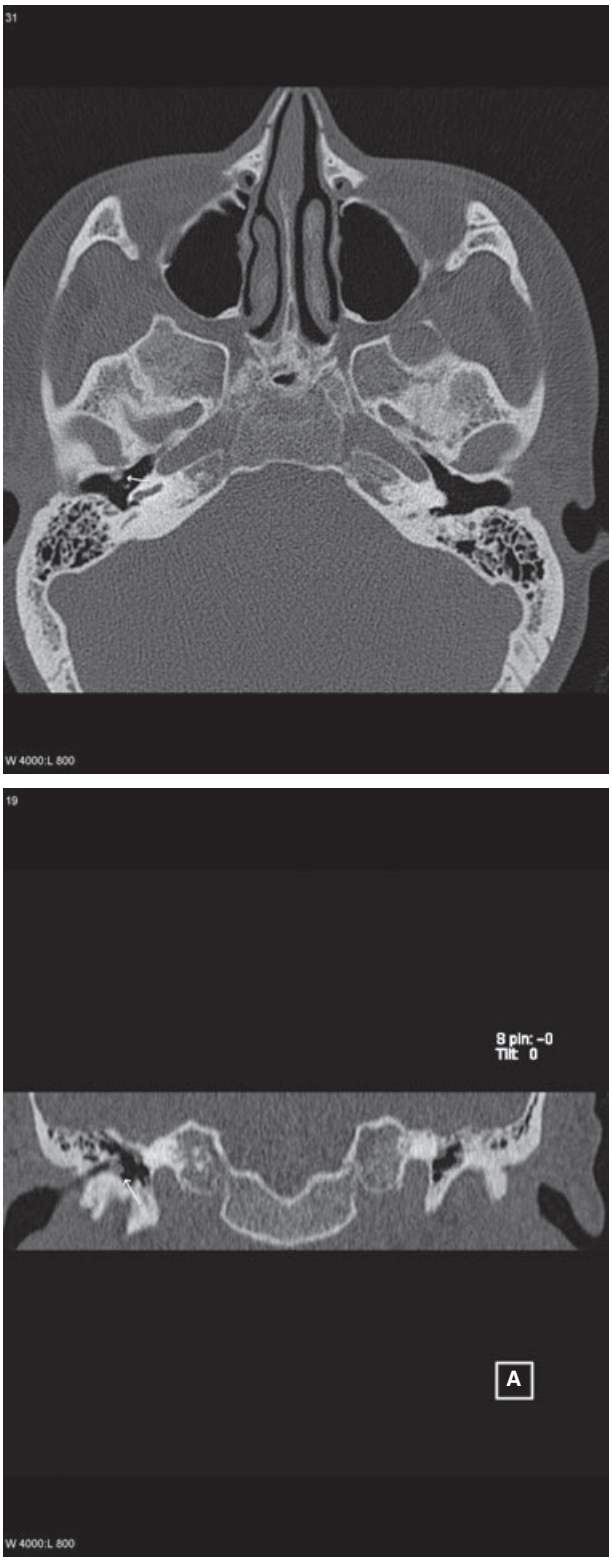

Fig. 1. The arrows indicate a fracture in the posterior part of the glenoid fossa. There is also a soft tissue component that extends into the auditory canal.

which is normally closed in adults. This sort of persistent opening was excluded in our patient by computerized tomography.

The clinical findings of tympanic plate fracture are usually manifest immediately and include: hemorrhage of the external auditory canal (2, 7, 8), associated with neuro-otologic findings like hypoacusis (7, 9), stenosis of the external auditory canal (7, 8), limitation of mouth opening (1, 7–9) and a history of mandibular trauma (1, 2, 4, 9). In our case, none of these symptoms were observed. Only on inspection of the auditory canal was non-ruptured soft tissue seen to be protruding into the external auditory canal, whereby the size of the mass changed during TMJ movement. Excursive mandibular movement with maximum posterior dislocation of the condyle while chewing the sandwich combined with high masticatory pressure probably led to the impact that pressed articular tissue towards the tympanic plate with sufficient force to cause fracture. To our knowledge, findings of this nature, which indicate the conditions responsible for fracture of the tympanic plate due to unfavourable chewing, have not been previously described in the literature.

Radiographic imaging is necessary to confirm the diagnosis of a tympanic plate fracture. Superimpositions seen with conventional radiography and anatomical variations make it difficult to identify fractures in the tympanic area and nowadays computerized tomographic scanning is the technique of choice to visualize the fracture line or displacement of bone fragments (3, 9). In the absence of mandibular fractures and neuro-otologic complications, a conservative therapy was chosen in the case presented here and was effective in improving the patient's condition. Cone beam computed tomography (CBCT) gives a much lesser dose than regular CT and as only pain relief is enough as treatment for these patients CBCT, where available, will probably take over as the golden standard examination in the future.

In summary, any injury in the temporomandibular region should be addressed by thorough clinical examination with inspection of the external auditory canal. Computerized tomographic scanning is the technique of choice. Surgical treatment is not necessary in the absence of mandibular fractures and neuro-otologic complications.

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