

Differential Diagnosis of TMJ Diseases and their Allied Conditions



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Various conditions require discrimination between diseases of the maxillo-facial and cervical regions. Above all, diseases related to the temporomandibular joint (TMJ) appear as disorders of function rather than tissue obstacles, and are thus represented by TMD. Difficulties in differentiation are not uncommon, partly because of the addition of psychogenic ornamentation.^{1, 2)}

In recent years, advances in diagnostic imaging have facilitated great progress in TMJ diseases, yielding useful information for differential diagnosis. However, making suitable use of the available information is important for correct diagnosis, requiring appropriate choices of examination based on detailed history and careful inspection of existing symptoms. Experience and knowledge are also known to exert a significant influence.

Differential diagnosis of TMJ diseases by signs and symptoms and related or associated disease of the TMJ are presented herein, mainly based on cases.

1. Essential points to distinguish diseases of the TMJ

Although observations of each image on radiographic views are important, attention must be paid to making a diagnosis that puts all findings together, such as the past history, present status and progress of symptoms. Furthermore, differential diagnosis tends to be difficult when patient condition involves psychogenic factors compounding physical findings.³⁾ Essential conditions for differential diagnosis peculiar to the TMJ itself are as follows:

- 1) Does imaging diagnosis conform with morphological tissue changes in the TMJ lesion? Investigations with radiography (CT, arthrography) and magnetic resonance (MR) imaging are necessary. Occasionally, biochemical investigations and RI scans are helpful.
- 2) Is obstacle accompanied by functional disturbances of jaw movements such as deviation of the jaw on opening, chewing pain and trismus?
- 3) Do changes of the TMJ on imaging correspond to functional disturbances?
- 4) Are functional disturbances linked with pain?

5) Can psychogenic factors be ruled out?

2. Diseases of the TMJ not peculiar to the TMJ itself

1) Disturbance of mouth opening (trismus)

Various organs and tissues are relevant to opening and closing of the mouth, and transient and sustained disturbances of these can produce disturbances in opening movements. Opening disorders can involve various components, including masticatory muscles, the nervous system, and hard tissue of the maxilla and mandible. Obstacles can thus comprise soft tissues in addition to the TMJ itself.

Disturbance of mouth opening as the main sign

Square-shaped mandible^{4, 5)}.

Manifestation of this disease, named by Isberg (1990), is characterized by severe disturbance of mouth opening and increased width of the mandibular ramus, which seems square in appearance. Cephalometric analysis reveals a small gonial angle and small angles between the SN and mandibular planes. No evidence of adhesions is seen in the TMJ joint cavity.

Elongation of the coronoid process (Trismus-pseudo-camptodactyly syndrome)⁶⁾

Elongation of the coronoid process collides with the maxillary or zygomatic bone and causes disturbance of mouth opening. As only partial symptoms of the syndrome may be present, attention is necessary to identify any sign of a hereditary background.

Tetanus

Clostridium tetani entering from a deep wound can produce neurotoxin that exerts actions on the central nervous system, causing spasm of the masticatory muscles. Strong opening obstacle (trismus) is characteristic.

Other disturbances of mouth opening by disease, not primarily originating from the TMJ itself:

Inflammatory: Acute (osteomyelitis, periosteitis and cellulitis of the maxillofacial region) and chronic (osteomyelitis, actinomycosis of the maxillofacial region).

Contracture of scar tissue: Following trauma, operation or radiation to the maxillofacial region

Tumor invasion to TMJ, masseter or adjacent tissues of the TMJ.

Masticatory muscle diseases: Difficulty of mouth opening caused by diseases of muscle itself, such as dermatomyositis and muscular dystrophy

Psychiatric diseases: Epilepsy, clonic and tonic convulsions

Drug induced: Oral dyskinesia, an adverse effect of psychiatric drugs

Trauma: Fractures of the mandible, contusion of the maxillofacial region

3. Pain in the cervical, TMJ and temporal regions not originating from the TMJ itself

Distinguishing whether a pain might originate from a disease of the TMJ itself or not is very important in differential diagnosis. Strict attention must be given to the course, properties, and presence of triggers of pain in connection with jaw movements. The following diseases that involve pain in the maxillofacial region must be distinguished:

Diseases of the teeth: pulpitis, periodontitis, pericoronitis of molars

Trigeminal neuralgia (including post-herpetic neuralgia): produces pain in the cervical region bilaterally, glossopharyngeal neuralgia

Diseases of the ears, nose and paranasal sinuses: otitis media and inflammation of the external auditory meatus

Salivary gland disease (sialoadenitis)

Lymphadenitis: anterior and posterior auricular lymph nodes, parotid lymphadenitis

Various headaches⁷⁾:

Muscle-contraction headache (MCH)

Migraine headache, cluster headache

Tumor (tumor in the skull or central nervous system)

Blood vessel disorder (carotidynia, temporal arteritis)

Elongation of the styloid process (Eagle syndrome)

Pain around the angle of the mandible and noise on mouth opening due to pseudarthrosis of the elongated styloid process.

Carotidynia⁸⁾

Carotidynia is characterized by intense pain in the carotid artery region and sometimes face and mandible, and was described by Fay in 1927. This condition is thought to be caused by stimulation of sympathetic nerves of the blood vessels, and can be categorized as type I, II or III.

4. Diseases of the TMJ diagnosed according to conditions peculiar to the TMJ itself

1) Inflammation-related disease

Suppurative arthritis of the TMJ⁹⁾: Primary suppurative arthritis of the TMJ is very rare, and typically involves extension from suppurative inflammation of adjacent organs and tissues.

Rheumatoid arthritis of the TMJ¹⁰⁾

Rheumatoid arthritis in the TMJ appears as

local symptoms of connective tissue disease of the whole body. Initial manifestations in the TMJ are uncommon, but morbidity rate of the TMJ is high when symptoms appear in the other joint (the hands).

Crystal-induced inflammation - gout and pseudogout of the TMJ

Accompanied by joint sharp pain and formation of a gout node causing characteristic repeated acute joint pain as a first symptom. Symptoms are caused by hyperuricemia, due to abnormalities of uric acid metabolism. Family history may be present.

Gouty arthritis and gout nodes may be apparent in the first metatarsophalangeal joint, but are extremely rare in the TMJ.

Pseudogout of the TMJ - calcium pyrophosphate deposition disease (CPPD)¹¹⁾

Deposition of crystal of calcium pyrophosphate in joint tissue causes pseudogout, with deformative changes and spot-like and linear calcification images, and sometimes mass depositions, in the joint tissue. (Fig1-3) Few cases involving the TMJ have been reported. Findings of polarized light microscopy and electron microprobe analysis (EMPA) of joint fluid are useful for differential diagnosis from suppurative arthritis.

2) Tumor and tumorous conditions of the TMJ

Osteochondroma and chondroma: These are relatively frequent in the TMJ, involving enlargement of the condyle, and hyperplasia of condyle, growth abnormality and osteoma are also not particularly rare. Having both characteristics (hyperplasia and tumor) distinguishing enlargement from osteoma is difficult.

Fibrous dysplasia of bone: Usually the maxillary or mandibular body are affected, but invasion to the mandibular condyle is rare. In rare cases, this is accompanied by deformation of the condyle or temporal bone and an opening disorder can result.

Synovial (oste)chondromatosis of the TMJ¹²⁾: Metaplasia of cells in the synovial membrane produces a cartilaginous mass and lump in the joint cavity. (Fig.4)

Osteoid osteoma of the condyle¹³⁾

This is rare in long bones, and development in the TMJ is extremely rare. The tumor forms rich osteoid tissue, and the main signs are nidus formation and a bone hardening image of the circumference on radiography, with a characteristic of sharp pain in the night. (Fig.5) Eosinophilic granuloma of the condyle may rarely occur in the TMJ, appearing with sharp pain and the appearance of bone destruction on radiography.

3) Others

Avascular necrosis (AVN) of the condyle^{14, 15)}

Disturbance of a nutrient artery at the condyle, first reported in the TMJ by Schellhas (1989), shows as severe destruction of the condyle on radiography and MR imaging.

Summary

Numerous conditions and cases involving facial pain, including the TMJ, and masticatory disturbances, mainly as disturbance of mouth opening, have been identified using regional diagnostic approaches. The main signs and symptoms in TMJ diseases are pain and functional disturbance of the masticatory system. Careful evaluation of the history, characteristics of pain and trismus may reduce the number of etiological possibilities in differential diagnosis. Furthermore, image diagnosis and even biochemical investigations can assist in the differential diagnosis. Evaluation of mental factors that may contribute to the problem is also important, since the signs and symptoms of the maxillofacial region are readily affected by emotional influences. Most important are knowledge and awareness of the various conditions that may cause pain and functional disturbances, so that serious problems are not carelessly overlooked.

REFERENCES

1. Block, S. L. : Differential diagnosis of craniofacial Cervical pain. In "The biological basis for clinical practice" 3rd ed. Charles C Thomas Pub. Springfield Illinois 1979, 348-421.
2. McNeil, C., ed: Temporomandibular disorders Guidelines for Classification, Assessment, and Management. Quintessence, Chicago, 1993. 45-46.
3. Rugh, J. D., Davis, D. E. : Temporomandibular disorders: Psychological and behavioral aspect In Sarnat BG, Laskin, DM. Ed. The Temporomandibular Joint: A Biological Basis for Clinical Practice. 4th ed., WB Saunders Co, Philadelphia, 1992, 329-345
4. Isberg, A, Ellasson, S. : A cephalometric analysis of patient with coronoid process enlargement and locking, Am. J. Orthod. Dentofac. Orthop. 97(1):35-40, 1990Schellhas, K. P., 5.
5. Asada, K., Toyoda, N. et al: A clinical study of limited mouth opening in four patients with mandibular ramus enlargement. JJOMS. 43(9):682-688, 1997
6. Spiro C, Karras. Larry M Wolford: Trismus-Pseudocamptodacty Syndrome: Report of a case J. oral maxillo facial surg. 53(1):80-84, 1995
7. Headache Classification Subcommittee of the International Headache Society: The International Classification of Headache Disorders ;2nd ed. Cephalalgia 2004: (Suppl 1)24:1-160.
8. Murry, T. J: Carotidynia: a cause of neck and face pain, CMA J. 120:441-443, 1979
9. Usui, H. Asada, K. et al: A case of acute suppurative arthritis of temporomandibular joint, JJOMS. 41(10):887-889, 1995
10. Dolwick, M. F : Temporomandibular Disorders. In Arthritis and Allied Conditions. A textbook of Rheumatology. vol 2., 15 ed. Lippencott Wiliams & Wilkins Philadelphia 2005. 2065-2071.
11. Nakagawa, Y., Shimoda, S. et al: Diagnosis of crystal deposition disease of the temporomandibular joint. J. Jpn. Soc. TMJ. 13(2):282-290, 2001
12. Igarashi, T., Kobayashi, K. et al: Image findings of Synovial Chondromatosis of Temporomandibular joint: Report of eight cases and review of literature, J. Jpn. Stomatol. Soc. 45(2):462-469. 1996.
13. Tochihara S., Satoh, T. et al : Osteoid Osteoma in the mandibular Condyle, Int. J. Oral Maxillofac. Surg. 30(5), 455-457, 2001
14. Wilkes, C. H. et al: MR of osteochondritis dissecans and avascular necrosis of the mandibular condyle. AJR, 152:551-560, 1989
15. Jibiki, M., Asada, K. et al : A follow-up study on the patents with low density area lesion of the condyle detected by MR T1-weightend images, J. Jpn. Soc. TMJ. 7(1):147-157, 1995



Fig. 1 CPPD of the TMJ: Axial CT image reveal a large nodular mass around the right TMJ.

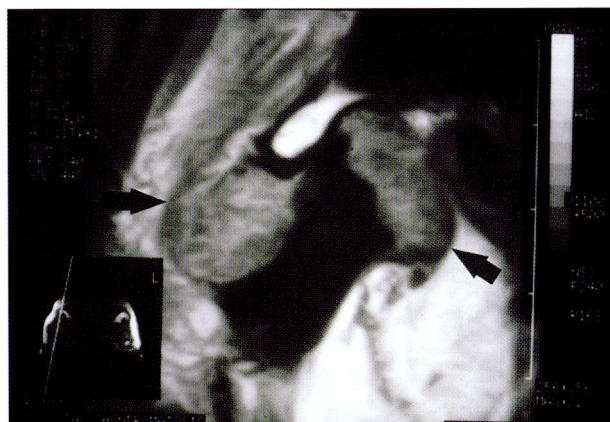


Fig. 2 CPPD:T1 MR image of the right TMJ shows amorphous mass surrounding the condyle.

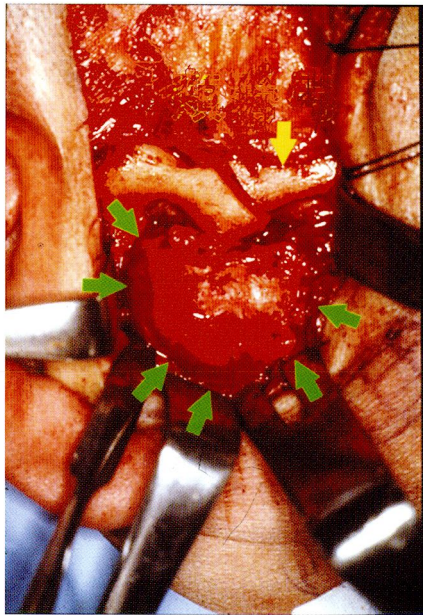


Fig. 3 CPPD:Excision of the tumor (arrows) at surgery



Fig. 5 Soft X-ray imaging of Osteoid osteoma (amputated specimen)

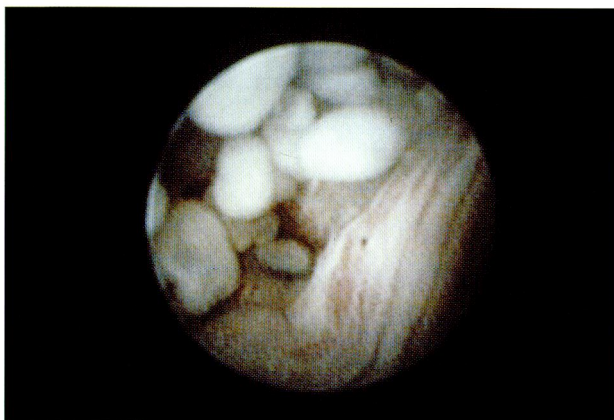


Fig. 4 Chondromatosis of the TMJ (arthroscopic finding in the joint cavity)

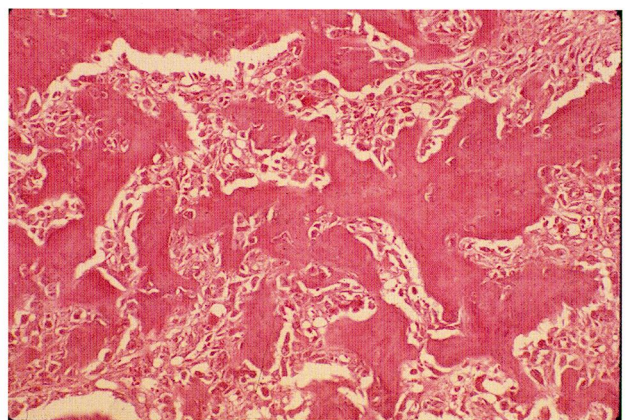


Fig. 6 Histopathological finding of osteoid osteoma.