

Temporomandibular Arthritis in Association with Rheumatoid Arthritis - a Differential Diagnostic Approach to Temporomandibular Pain in Dental Practice

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Summary

Rheumatoid arthritis is a chronic systemic disease, which often also affects temporomandibular joints. Occasionally such a sign may indicate the first symptom of the commencement of the disease. A dentist in practice can encounter such casuistics.

The paper presents a review of symptoms and clinical signs manifesting in a patient with rheumatoid arthritis, particularly in the area of the temporomandibular joint. Other differential diagnostic causes of pain in the area of temporomandibular joint are also mentioned.

Key words: *temporomandibular joint, rheumatoid arthritis, temporomandibular pain.*

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Introduction

Rheumatoid arthritis (RA) is a systemic chronic inflammatory disease which dominantly affects the joints. The disease usually starts in the third or fourth decade of life, although it may start at any age. The majority of joints, particularly of the extremities, are affected symmetrically during the disease. The course of the disease varies, including different periods of remission and exacerbation, while the spectrum of clinical manifestations is wide, from hardly recognisable to destructive and mutilating forms of the disease. Diagnosis in the early stage of the disease is neither easy nor simple. Histopathological findings are useful but not conclusive, because of their possible overlapping with other, similar diseases.

Rheumatoid arthritis has no specific biological markers, although positive rheumatoid factor is found in the serum of the majority of patients. Thus, as rheumatoid arthritis is a clinically defined disease without specific biological markers, diagnosis primarily depends on a clinical examination of the patient and fulfilment of a sufficient number of clinical criteria (Table 1). The incidence of the disease varies in accordance with the applied criteria, and today, according to the generally accepted criteria of the American Rheumatological Society of 1987, it amounts to approximately 1% of the adult population (1). Women are predominant in all series, usually in the ratio 3.1.

Four positive criteria are necessary for a diagnosis of rheumatoid arthritis. The first four criteria must last for at least 6 weeks.

Etiopathology

The aetiology of the disease is still unknown. It is possible that some arthritogenic factors only serve as triggers of the immunological process in immunologically predisposed persons, creating autoantibodies to own immunoglobulins. The following are mentioned as possible agents: Epstein-Barrow virus, parvo virus B19, and some super antigens from the group of so-called heat shock proteins (proteins induced during stress), which were cleared/extracted? from *Mycobacterium tuberculosis* and *Escherichia coli* (2). On the other hand there is no proof that immune response to collagen has primary significance in the aetiology of rheumatoid arthritis, although anticollagenous antibodies can play the role of a secondary amplifying agent in the patient with rheumatoid arthritis.

Pathological and pathoanatomical changes

The primary pathological process takes place in the area of the synovial membrane, which due to inflammation (synovitis), thickens severalfold, becoming adematous with ingrowth of new blood vessels and infiltration of mononuclear cells. Formation of connective and granulation tissue results in panus, which gradually erodes the bone and cartilage from the periphery, creating irreversible changes in the joint morphology. Concurrent synovial extravasation is often created within the affected joints, which gradually stretches the joint capsule, ligaments and tendons, changing the normal biomechanics of the joint. As a consequence, instability of the joint occurs, leading to progressive development of deformations typical for rheumatoid arthritis (3). The most frequent extra-articular manifestations are: rheumatoid nodes, vasculitis of the small blood vessels, ocular and pulmonary changes.

Clinical status

The commencement of rheumatoid arthritis is usually gradual with symmetric involvement of the hand and feet joints, and later the other joints. Practically all joints with synovial membrane can be affected, including the small joints of the spine and

for example the cricoarytenoid joint in the area of the larynx. On rare occasions the disease starts acutely with raised temperature and other general symptoms which, in such cases, usually indicates a more severe form of the disease.

The disease typically affects women of generative age, between 35 and 55 years. In some patients external factors such as bacterial and viral infections, surgical interventions, trauma, childbirth, mental stress, coincide with the commencement of the disease. How this happens, pathogenetically, is not known. Simultaneous affection of the small and large joints does not occur frequently in RA. Monoarticular form of the disease occurs rarely, in approximately 10% of patients. The spine is not usually affected, in contrast to spondylarthritis, apart from the cervical part, particularly of the atlantoaxial joint (4).

The gradual occurrence of polyarthritis of the hands and feet is most frequent, with characteristic morning stiffness of all affected joints. Morning stiffness is connected with the longer period of rest of the affected joints during the night or during the day because of pain. In rheumatoid arthritis morning stiffness usually lasts for more than one hour, and occasionally for several hours. At the commencement or remission of the disease pain may last for less than one hour. Older patients with degenerative joint disease may also experience morning stiffness, which is usually shorter than one hour, often lasting 15-30 minutes.

Clinical signs of the disease include painful swelling of the joints, hyperthermia of the joint, with absence of skin redness and impaired joint function. More severe contractures, joint instability, deformation with degeneration of the periarticular musculature and consequent muscle weakness, appear later. Joint swelling, the most important early sign of the disease, occurs due to thickening, oedema, increased vasculisation of the synovial membrane, or because of (discharge) within the joint or due to a combination of these factors. A careful clinical examination enables differentiation of synovial discharge from the thickened synovial membrane. Classically, the joints are affected symmetrically, although the identical small joints of the hands and feet are not necessarily affected bilaterally.

With progression of the disease all large and small joints become affected, creating deformations

typical for rheumatoid arthritis, which are a consequence of joint instability and changed biomechanical relations within the joint and periarticular muscles, ligaments and tendons. The final stage of RA is referred to as the mutilating form of the disease, with inability to maintain primary hand function, i.e. grip, jeopardising the usual daily activities of the patient. Consequently they become dependent on the help and care of others (e.g. cutting bread, opening jars, combing their hair, washing, etc.) (3).

Affection of the axial skeleton, i.e. the spine, is uncommon in RA, apart from the cervical spine, which is affected in approximately one quarter of patients with RA of longer duration. The most frequent occurrence is anterior atlantoaxial dislocation, when there is a pathoanatomical shifting of the dens axis? towards the back with compression of the medulla spinalis and development of neurological complications, which are fortunately quite rare.

Other smaller joints may be affected such as the temporomandibular (TM), sternoclavicular (local thickening, swelling and often subluxation and luxation), cricoaritenoidic joints (sudden hoarseness in RA of longer duration).

According to different statistics average affection of temporomandibular joints ranges from 50 to 75%, very early in the course of the disease, although approximately 25% of patients have marked symptoms (5). It is possible for the disease to start with affection of the aforementioned joints as the first symptom of RA (6). The disease starts unilaterally or bilaterally. No more than 3-4% of affected patients require treatment.

Clinically affection of the TM joints is manifested by stiffness and pain, which are more marked during mastication, and opening and closing of the mouth. Pain on palpation of the TM joints is also present and very often painful dysfunctional syndrome of the mandible. In the advanced stage of the disease, with developed joint destruction, crepitation can be heard during movements, and impaired occlusion occurs due to height loss of the mandibular condyles (7). Pain is not only restricted to the confined area of the joint, it can also extend temporally, frontally and orbitally, and to the area of the ear or mouth on the affected side (8). Various degrees of difficulty are experienced when eating. Rarely, swell-

ing in the area of the affected TM joint may also be present.

Radiological changes of the TM joints in RA consist of: constriction of the articular area, increased sclerosing of joint surfaces, the presence of erosive, and less frequently, destructive, changes in the articular bodies (as well as in other affected joints in RA), and subluxation, or not infrequently, luxion, of the joint (9).

As a rule affection of the TM joints nearly always occurs in juvenile chronic arthritis (JCA) (equivalent to RA in children and adolescents), particularly in the polyarticular form of the disease, which leads to microgenia, and very often to destruction and ankylosis of the aforementioned joints (10). The TM joints are less frequently affected in the remaining two forms of juvenile chronic arthritis: systemic and oligoarticular forms of the disease.

Differential diagnosis

In differential diagnosis of temporomandibular arthritis in association with RA the temporomandibular pain syndrome (TMPS) is most important, which occurs predominantly in younger people. It is considered that this pain syndrome is one of the most frequent causes of pain in younger people, immediately after headache and toothache. TMPS manifests with pain on palpation in the relevant muscles, limited or irregular movement of the TM joint, clicking of the joint and headache. Synonyms for TMPS are: Costen's syndrome, TM painful dysfunctional syndrome, craniomandibular dysfunction, facial anthromyalgia, psychogenic facial pain (5-9). TMPS has many points of contact with fibromyalgia, a well-known syndrome in rheumatology, which, as in TBPS involves the presence of fibromuscular pain without a clear pathological correlation. TBPS appears dominantly in younger women in the ratio 5:1.

Additional diagnostic tests are not usually necessary to enable differentiation of classical TBPS from, for example, affection of the TM joints in RA (11). It is occasionally necessary to exclude extra-articular pathology or changes in the TM joint itself in association with other diseases. The initial orthopantograph (OPG) is used to exclude dental or

oral pain. Periapical radiographs are necessary when specific problems are present with some teeth. OPG enables visualisation of the TM joints, and cautious interpretation of changes, as only the more extensive changes of the joint are visible.

Classical radiography helps in the exclusion of osteoarthritis of TM joints as a possible cause of pain. Thus, the use of transcranial radiographs (open and closed), or the use of transpharyngeal radiographs, is useful. Tomography of the TM joints shows articular bodies very well (which are usually normal in TBMS, and very often changed in RA). Radiograms of the sinuses help to exclude sinus pathology as the cause of pain. CT and MR imaging techniques represent the most sensitive non-invasive techniques today. By applying three-dimensional reconstruction, it is possible to show the joint in different projections with presentation of the finest details of the joint. The aforementioned techniques have an exceptionally important role in cases of suspected internal damage to the meniscus in the TM joint. Arthrography gives the best dynamic information in the joint itself, but represents an invasive method. It is reliable for presentation of meniscus damage, particularly in the case of anterior movement. Arthroscopy of the TM joints has rapidly developed, due to accessibility of arthroscopes of very small diameter, which enable examination of the TM joint, under general or local anaesthesia (12). Although electromyographic studies of the mastication muscles are not widely used, they can show the level of muscular activity and uncoordinated muscle movements.

Local injections of anaesthetics in the area of the TM joints are sometimes useful for confirmation of the cause of pain.

Other differential diagnostic causes of pain in the area of the TM joint include (11):

1. Atypical facial pain - usually dull, tedious, and occasionally severe in the area of a cheek. It affects the non-muscular structure of the face bilaterally or unilaterally, without a visible provocative agent, and with a poor response to the application of analgetics. Case histories often provide data on previous ORL or dental operations or treatment.
2. Neuralgia n. trigemina - a typical, severe sharp pain, which lasts for not more than a few seconds, in the area of the maxillary or mandibular branch of the trigeminal nerve. The pain is well localised and reacts to the administration of carbamazepine. It does not usually represent a significant differential diagnostic problem.
3. Osteoarthritis of the TM joint (earlier arthrosis) - usually occurs after 40 years of age. The pain is localised in the area of the joint itself, and worsens during movement, with crepitation and clicking. Later opening of the mouth is difficult. Spasm of the relevant muscles rarely occurs, in contrast to TBPS.
4. Psoriatic arthritis - symptoms as in RA, with more marked destruction and degeneration of the joint itself. The presence of psoriasis and other articular symptoms help in differentiation of the cause of pain.
5. Still's disease (systemic form of juvenile RA) - the TM joint is affected in approximately 50% of patients. Marked destruction of the TM joint is dominant with secondary dental effects in the region of dental occlusion and limitation of mouth opening.
6. Temporal arthritis (giant cell arthritis) - marked sharp pain usually in the temporal region and adjacent structures. Mastication may be painful with pain on palpation of the temporal region. It occurs at a later age with raised sedimentation and symptoms of polymyalgia rheumatica.
7. Fibromyalgia - there is considerable overlapping of symptoms of TMPS, with similar accompanying problems such as depression, colon irritation and irritability. Treatment the same as for TMPS.
8. Salivary glands - sensitivity to palpation with swelling in the affected area, which worsens when eating, particularly during gland obstruction. Malignoma of the parotid gland may be manifest with pain in the area of the relevant TM joint.
9. ORL causes of pain include: infections and tumours of the sinuses (most frequently maxillary): otogenic causes of pain; infections, tumours, etc.
10. Central causes of pain - very rarely tumours of the CNS may be the cause of pain in the TM

joint. Exclusion of the most frequent causes of pain in the area of the TM joint and ineffective therapy is indication for CT of the cranium/head.

11. Psychogenic pain - diagnosis *per exclusionem*, difficult treatment.
12. Odontogenic pain - very often specific, but with possible extension towards the TM joint (acute and chronic pulpitis, dental abscesses).

Diagnosis

The prognosis and course of RA vary. It should be stressed that the lack of specific biological markers can make diagnosis of RA difficult. By careful examination and integration of clinical and laboratory indicators, consistent with existing criteria of the American Rheumatological Society, it is possible to reach a diagnosis (1). Occasionally even the experienced clinician may have difficulty deciding on the diagnosis in spite of the clear clinical RA status, because it can imitate related inflammatory rheumatic diseases such as systemic lupus erythematosus, which requires a different therapeutic approach. In some patients, additional superinfection by infective agents can considerably jeopardise and hinder the existing articular disease.

The diagnosis of temporomandibular arthritis and affection of the cervical spine in RA do not represent a serious diagnostic problem, when they are carefully analysed .

Treatment

Treatment of temporomandibular pain in RA presupposes the use of medicamental treatment, mainly with analgetics or nonsteroid antirheumatics. Various physical and electroanalgetic procedures are also used with different effects, such as modulated currents, short frequency wave, interference currents etc. The great majority of patients with temporomandibular pain in general respond favourably to such treatment. However, approximately 5% of patients, who are classified as a refractory group, do not respond to classical treatment. Undoubtedly, such patients require additional therapy, such as arthroscopy or arthrography, particularly when

anterior shift of the meniscus inside the TM joint is suspected. It is believed that internal shifting of the meniscus in fact represents the terminal stage of TMBS. Treatment is successful with the application of arthroscopic lysis, or open surgery of the joint, for repositioning the meniscus. The American Society of Dentists only recommends reversible methods of treatment (13).

Intraarticular application of medications, particularly anaesthetics and corticosteroids, can result in irreversible damage, particularly in the area of the articular cartilage, and it is not recommended for routine treatment of TM pain, except in cases of osteoarthritis in the TM joint (14). In the acute phase, when pain is extremely severe, local blockade by an anaesthetic in the area of the auriculotemporal nerve can result in an immediate reduction in pain, while the usual methods of treatment take longer to become fully effective. Furthermore, there is a small group of patients who require psychiatric support and treatment (15).

Problems with teeth can be a contributory agent in the occurrence of TM pain and articular dysfunction. Consequently, they must be eliminated, including conservative, surgical and prosthetic interventions. There are several kinds of occlusal aids (teeth guards, splints) available for the treatment of TBPS and pain in association with RA. There are several theories on the effects of occlusal aids: disburdening of occlusion, reduced loading of the TM joint, adaptation of inter-jaw relations, and enabling the return of the shifted meniscus to the normal position (7). Aids also reduce muscular activity and are indicated for reducing pain in cases of concomitant headache and pain in the masticatory muscles. Soft guards are similar to the rubber guards seen today in sports. They are cheap, useful and easy to use. Occasionally a period of 6 weeks is needed for adaptation to such occlusal aids. Hard acrylic splints are recommended only when the softer form has proved satisfactory, and in cases when they have to be worn for longer periods. Hard acrylic splints are widely used for correction of occlusion and can also be applied for repositioning of the mandible (16).

It is important for the patient to be advised of the benign nature of the disease in the majority of cases. Explanation of the origin of the pain from constantly

tense muscles, which results in stiffness and limited mobility of the TM joint, can calm worried patients. Knocking and clicking noises inside the joint originate from the irregular muscular spasms which in turn cause irregular movements of the meniscus. Avoidance of non-functional movements of the TM joint, such as chewing the end of a pencil, or nail biting, is helpful.

Conclusion

Of the large number of differential diagnostic causes of pain in the area of the TM joint, the most frequent is TMPS in young people with a relatively

good prognosis, and frequently pain in association with RA, due to changed morphology of the TM joint in association with the basic disease.

The dentist must consider this possibility when confronted with a patient who complains of pain in the TM joint. Particularly because pain in the TM joint is often the first sign of rheumatoid arthritis. Therefore, positive case history data can lead to the correct diagnosis and aetiology of TM pain. It should also be mentioned that patients with RA can also have considerable difficulties with cervical spine mobility, particularly with regard to reclination or extension and rotation, and this fact should be taken into consideration when evaluating a patient with dental pathology.