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Examination of the rheumatoid hand and wrist

Alberto Lluch *

Institut Kaplan, Paseo Bonanova, 9, 08022 Barcelona, Spain

Abstract. Rheumatoid disease affects almost all of the musculoskeletal system as well as some internal organs, such as the heart and lungs, pleura, eyes, lymph nodes and vessels. In the case of the upper extremity, we should know the time of onset and type of disease, as the extent and degree of tissue involvement varies among the different types of rheumatoid disease. Surgical treatment and postoperative management will vary significantly in patients suffering from sclerodermia to those of systemic lupus erythematosus. This can also be said about the type of medication used for treating the disease, as more recent medications may alter collagen synthesis and infection rates. Before examining the hand, shoulder and elbow function should also be assessed. Clinical examination of the hand joints is most important, as all deformities, including most tendon ruptures and tendon dislocations are secondary to joint involvement. We should carefully examine for the presence and intensity of joint synovitis, and the degree of joint deformity and record the range of active and passive joint mobility. Radiological examination should be done in all cases to determine the degree of joint cartilage destruction, joint subluxation, and even joint ankylosis which is some times difficult to asses on clinical examination due to a fixed joint deformity from extraarticular causes. CAT scan examination can be useful for wrist joint assessment. Magnetic resonance examinations may be required only in certain circumstances, i.e. to determine the presence of joint or tendon synovitis not clearly assessed by clinical exploration, and the location of a flexor tendon rupture.

Keywords: Rheumatoid hand; Rheumatoid wrist; Clinical examination

1. Clinical examination

1.1. Skin examination

First the skin should be examined, to determine its thickness and texture, presence of ecchymosis or petechial hemorrhages, rheumatoid nodules, vasculitis, Raynaud's

* Tel.: +34 93 417 84 84; fax: +34 93 211 04 02.
E-mail addresses: albertolluch@infonegocio.com, alluch@telefonica.net.

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phenomenon, etc. The presence and extent of psoriatic lesions, in both skin and nails should also be recorded.

1.2. Nerve examination

Possible sites of nerve compression are found at the ulnar nerve in the elbow, the median nerve at the wrist and the radial nerve at the proximal forearm, underneath the aponeurotic origin of the supinator muscle, known as the arcade of Frohse. The clinical manifestations of sensory nerve compressions are pain, paraesthesia, hyposthesia and anesthesia. Clinical manifestations of motor nerve compressions are pain, muscle weakness, muscle paralysis and muscle atrophy depending on the degree and duration of the compression.

Compression of the median nerve, carrying both sensory and motor fibers, can be experienced at the onset of the disease, but it becomes rare at later stages, due to the fact that the hypertrophic synovium around the finger flexor tendons will attenuate the flexor retinaculum, thus enlarging the dimension of the carpal tunnel and releasing nerve compression.

Compression of the ulnar nerve at the elbow, carrying both sensory and motor fibers, is also rare, even in cases of severe elbow joint involvement, due to similar anatomical changes caused by the underlying joint synovitis.

The radial nerve at the arcade of Frohse contains only motor fibers, except for those of the distal posterior interosseous nerve supplying propioceptive fibers to the dorsal wrist capsule; therefore, a sensory deficit should not be expected. Compression will only cause loss of active finger extension, as wrist extensors are innervated more proximally. Inability to actively extend the fingers can be confused with a tendon rupture or dislocation of the tendons to the ulnar side of the metacarpophalangeal joints. Under normal circumstances, passive flexion and extension of the wrist causes opposite mobility at the metacarpophalangeal joints from what it is known as a tenodesis effect. In the presence of radial nerve palsy the tenodesis maneuver can be reproduced, as the muscle–tendon unit remains intact. Differential diagnosis of a tendon rupture or dislocation will be discussed in the following section.

1.3. Tendon–muscle examination

Examination of the tendon–muscle unit is essential in the rheumatoid hand as it is the most important cause of deformities. Joint synovitis will destroy the stabilizing structures and the pull of the muscles will be responsible for the deformities.

Joint assessment can be done radiographically, but muscle function can only be assessed by careful clinical examination. Muscle tissue alterations are mainly those of atrophy due to the lack of use, and shortening or retraction after prolonged periods of immobilization.

Tendon synovitis is quite frequent in rheumatoid disease, causing pain, loss of gliding, adhesions and even ruptures. In the following sections, we will describe the clinical manifestations of tendon synovitis, ruptures, dislocations, elongations and imbalance leading to boutonnière and swan neck deformities of the fingers.

Although the intrinsic muscles are not directly affected by joint or tendon synovitis, they are frequently involved in the form of retraction.