

Epidemiologic screening of occupational neck and upper limb disorders

Methods and criteria

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WARIS, P., KUORINKA, I., KURPPA, K., LUOPAJÄRVI, T., VIROLAINEN, M., PESONEN, K., NUMMI, J. and KUKKONEN, R. Epidemiologic screening of occupational neck and upper limb disorders: Methods and criteria. *Scand. j. work environ. & health* 5 (1979): suppl. 3, 25—38. A method for screening occupational neck and upper limb disorders and criteria for diagnosis are presented.

Key words: epicondylitis, neck-shoulder disorders, occupation, peritendinitis, screening method, tendinitis, tenosynovitis.

The methods and criteria presented in this article are intended for use in epidemiologic surveys of neck and upper limb disorders in an occupational health setting. The method has been used in two of the studies (25, 33) presented in this issue of the *Scandinavian Journal of Work, Environment & Health*.

We have not intended this method as a substitute for the clinical examination of patients. It should be used only by those occupational health professionals who have sufficient competence and can judge whether other examinations are needed.

The nature of the screening principle and procedure limits the number and type

of tests and examinations that can be applied in this kind of survey. Therefore all the disease and disorder items presented should be considered with respect to the tests and criteria used in each case. Although our diagnostic criteria fit the criteria used in clinical practice well, there are some differences.

The diseases and disorders included in this survey have been selected on the basis of a known or anticipated relation to work. Therefore inflammatory diseases such as rheumatoid arthritis have not been included. Because of a lack of appropriate screening methods, we have not included chronic arthrosis either. The chosen disease and disorder items thus primarily concern ailments of the muscle-tendon units. A group of specialists, comprised of a clinical orthopedist, a clinical physiatrist, an occupational physiotherapist, and physicians specialized in occupational

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health and ergonomics, defined the disease entities to be included. They also selected the diagnostic criteria according to a literature review and their own clinical experience.

on a special form, which also provided her with the sequence and order in which to work.

The symptoms of each disorder tested and examined for are presented in tables 1—8.

EXAMINATION PROCEDURE

The examination consisted of functional tests, measurements, and an interview. It was carried out by a specially trained physiotherapist and lasted about 1 h.

In a quiet isolated room, the physiotherapist examined five to six workers daily.

The following functional examination methods were used: observation, assessment of active and passive movements, some special test movements, isometric muscle contraction against resistance, muscle stretching, and palpation for muscle tone, hardenings and sore spots. The hand grip power was measured with a Martins Vigorimeter. This test was performed twice with a straight elbow and twice with the elbow flexed. The highest recorded values were chosen as the measure of the respective function.

After the functional examination the physiotherapist interviewed the worker about his or her previous diseases and subjective symptoms. In both the examination and the interview she recorded the results

TREATMENT OF THE RESULTS

With the exception of grip force, all test results, including the anamnestic ones, were dichotomized into the category of normal (negative) or abnormal (positive). This procedure was taught to the physiotherapist during the training period.

The physiotherapist did not diagnose disorders on the spot. Instead each form was later analyzed, and the number and type of "positive" symptoms and signs were checked and compared to the predetermined set of criteria to ascertain the presence of a disorder. The number of "positive" signs was used as a general parameter per se for the illness.

The specialists who had designed the set of diagnostic criteria dealt with the cases in which an evident clinical diagnosis and the result from the survey did not match.

We regarded the separation of the examination and the diagnostics as necessary because the subjective confounding component of clinical examinations is considerable and the separation should add to the objectivity of the examination.

Table 1. The tension neck syndrome. (Continued on the next page.)

Study	Subjective symptoms							
	Neck pain/ache	Neck stiffness	Headache	Fatigue/weakness	Pares-thesis	Dizzi-ness	Insomnia	Tremor
Bonica (3)	×	×	×	×	×			
Booth & Marvel (4)	×							
Cailliet (5)	×		×					
Ferguson (11)	×	×		×	×			×
Komoike et al. (24)	×	×	×	×	×			
Maeda (34)	×	×	×	×	×	×		
Ohara et al. (33)	×	×	×		×	×	×	×
Schröter (45)	×	×		×		×		
Simons (47)	×	×	×	×			×	
Valtonen (55)	×		×					
Present study ^a	×	(×)	×	(×)				

^a Items necessary for diagnosis are in parentheses.

TENSION NECK SYNDROME

Review of diagnostic criteria

The diagnostic features of the tension neck syndrome are confusing because there are no generally accepted criteria to follow. Tension myalgia, nuchitis, and the occupational cervicobrachial syndrome are some of the terms used to describe the same type of disorder. The diagnosis is often made by the exclusion of the other common causes of pain in the neck and shoulder area, for example, cervical spondylarthritis and humeral tendinitis.

Table 1 lists the subjective and objective signs of tension neck according to ten recent studies.

Pain in the region of the neck and shoulders during rest was the most constant *subjective symptom* in all of the ten reviewed studies. A subjective feeling of muscle stiffness and headache originating in the cervicobrachial area were reported in seven studies. Muscle weakness, fatigability and reflectory symptoms in an upper limb (numbness and paresthesia) were almost as common. In most studies gross neurological deficiencies due to cervical spine degeneration or thoracic outlet compression were excluded. Symptoms of minor importance seemed to be vertigo, tremor and insomnia.

The *objective signs* of the tension neck syndrome vary. Muscle tenderness is an important one, but, since it is also subjec-

tive, it is a poorly controllable item for diagnosis. Such tenderness is mainly concentrated in the upper part of the trapezius, and it has trigger areas in the insertion or along the margin of the muscle (3, 46). Tenderness at the site of muscle motor points has been noted to accompany cervical radiculopathy due to cervical spine degeneration (18).

Muscle spasm is another important diagnostic sign. Most authors have considered it to be mainly local and often associated with muscle nodules and swellings (3, 24, 47). Miehlke et al. (35) found muscle spasms to be generalized, even to muscle groups.

Muscle tone varies, however, in different individuals and different muscle sites and is often unrelated to subjective symptoms. The determination of tone by palpation is unreliable (50).

Other inconsistently reported clinical findings related to tension neck are postural changes such as drooping shoulder or straightening of the cervical spine. These symptoms are however common in healthy persons also (22).

Diagnostic criteria of the present survey

In our survey we considered the following *subjective symptoms* to be suggestive of the tension neck syndrome: neck pain, feeling of fatigue or stiffness in the neck, and headache radiating from the neck.

The recorded *objective items* were

Table 1. (continued)

Study	Objective symptoms							
	Muscle tenderness	Muscle spasm, tightness	Muscle hardenings	Muscle swelling	Muscle weakness	Limitation of movement	Decreased lordosis	Drooping shoulder
Bonica (3)	×	×		×	×	×		×
Booth & Marvel (4)	×	×	×		×	×		
Cailliet (5)	×	×						×
Ferguson (11)								
Komoike et al. (24)	×	×		×	×			
Maeda (34)	×				×			
Ohara et al. (33)	×	×	×	×	×	×		
Schröter (45)		×					×	
Simons (47)	×	×	×	×				
Valtonen (55)	×	×					×	
Present study ^a	(×)	(×)	(×)				×	

^a Items necessary for diagnosis are in parentheses.

muscle tightness, palpable hardenings and tender spots in muscles, and straightening of the cervical spine (table 1).

Tension neck was diagnosed if the examinee had a constant feeling of fatigue and/or stiffness in the neck plus one more subjective symptom; in addition objective signs of at least two tender spots and/or palpable hardenings plus muscle tightness in neck movements had to be present.

Examinees having a cervical syndrome or glenohumeral joint symptoms and signs were placed in their respective categories.

The diagnostic criteria recorded in our survey seems to coincide with the set of criteria presented in the reviewed literature. The necessary criteria for diagnosis is also congruent, but a stricter set of criteria could be justified.

CERVICAL SYNDROME

Review of diagnostic criteria

Osteoarthritis of the cervical spine is one of the most frequent causes of upper extremity pain in middle-aged persons (39). The main *subjective symptoms* noted in all the reviewed studies were pain in the neck during rest, pain radiating down to the upper extremities, and numbness and paresthesia in an upper extremity. Pain

during movement, headache, and neck stiffness were almost as common (table 2).

Three studies also reported vertebrobasilar autonomic symptoms such as vertigo, tinnitus, or diplopia.

The clinical *objective signs* included neurological disturbances of the affected cervical roots, disturbances originating from the cervical cord and vertebral arteries, and decreased function of the cervical spine.

Nerve root disturbances were the dominant symptoms of the cervical syndrome. Decreased sensation in some of the upper extremity dermatomes with adjacent muscle weakness or atrophy was reported by all eight of the reviewed authors. Myelopathy due to cervical spondylosis is often a separate, relatively painless entity; it was referred to in six of the eight reviewed studies.

Limited or painful neck movements with local tenderness and muscle spasm are signs of cervical spondylarthrosis. They were recorded by six of the eight studies reviewed. Exaggeration of the pain by coughing was presented in half of the studies, whereas provocative tests such as cervical compression were listed inconsistently.

Diagnostic criteria of the present survey

The following *subjective symptoms* of the cervical syndrome were recorded in our study: neck pain radiating to one or both arms and numbness in the hands.

Table 2. The cervical syndrome. (Continued on the next page.)

Study	Subjective symptoms						
	Pain during rest	Radiating pain	Numbness	Stiffness	Paresthesia	Pain during movement	Headache
Booth & Marvel (4)	×	×	×	×	×	×	×
Cailliet (5)	×	×	×	×	×	×	×
Cyriax (8)	×	×	×	×	×	×	×
Frykholm (14)	×	×	×	×	×		
Gunn & Mildbrandt (18)	×	×	×		×	×	
Heiskanen (19)	×	×	×		×		×
Overton (39)	×	×	×	×	×	×	×
Turek (52)	×	×	×	×	×	×	×
Present study ^a	×	(×)	×			×	

^a Item necessary for diagnosis is in parentheses.

The recorded *objective items* included limitation of neck movement and radiating pain provoked by test movements, as well as diminished muscle force of the deltoid, triceps and biceps muscles, as judged by the observer's manual test.

A *diagnosis of cervical syndrome* was assured if the examinee experienced pain radiating from the neck to the upper extremities, and limited neck movement and radiating pain provoked by test movements were recorded in the functional examination.

The cervical syndrome is a well-defined clinical entity in contrast to tension neck. The symptoms and signs recorded in our study, as well as the items necessary for a diagnosis, were coherent with the literature reviewed.

THORACIC OUTLET SYNDROME

Review of diagnostic criteria

The thoracic outlet syndrome contains at least three different pathological conditions, namely, the anterior scalene, hyperabduction and costoclavicular syndromes. They have however common cardinal symptoms and signs and were therefore considered as a unit in the survey. The *subjective symptoms* are predominantly neurological — pain and paresthesia radiating to an upper extremity (table 3).

These symptoms, as well as fatigability or weakness in the arms, were noted in all ten of the studies reviewed. Vascular symptoms, coolness and Raynaud-like autonomic vasomotor changes were almost as common and were reported in eight studies. Numbness, swelling, and stiffness are reflectory neurogenic complaints, or are caused by impaired venous backflow; they were reported in half of the reviewed studies, as was upper extremity claudication.

The *objective clinical signs* of the thoracic outlet syndrome are also relatively consistent. The most important of these are reduced sensibility, muscle weakness or atrophy, and a positive Adson's maneuver, all of which were reported in nine of the ten reviewed investigations. The other provocative tests, Allen's hyperabduction maneuver and the costoclavicular compression test, were considered to be almost as important. However, these tests can also be positive in 15–82 % of normal, asymptomatic persons (59, 62), and a weakening of the radial pulse during the maneuver is not sufficient for diagnosis.

Supraclavicular bruit in the test maneuvers and Morley's sign of tenderness in the scalenic pouch are additional criteria. Postural changes were considered to be of importance by six authors.

Diagnostic criteria of the present survey

From the *subjective symptoms* relative to the superior thoracic aperture we recorded

Table 2. (continued)

Study	Objective symptoms									
	Hypoesthesia	Muscle weakness/atrophy	Limitation of movement	Pain during movement	Muscle spasm	Autonomic symptoms	Local tenderness	Pain during straining	Pain during compression	Myelopathy
Booth & Marvel (4)	×	×	×	×	×		×		×	×
Cailliet (5)	×	×	×	×	×		×	×		×
Cyriax (8)	×	×	×	×		×	×			×
Frykholm (14)	×	×			×	×				
Gunn & Mildbrandt (18)	×	×	×		×	×	×			×
Heiskanen (19)	×	×	×	×				×		×
Overton (39)	×		×	×	×		×	×		
Turek (52)	×	×	×	×	×			×	×	×
Present study ^a	×	×	(×)	(×)						

^a Items necessary for diagnosis are in parentheses.

Table 3. The thoracic outlet syndrome. (Continued on the next page.)

Study	Subjective symptoms								
	Pares- thesia	Radiat- ing pain	Weak- ness/ fatigue	Cool- ness	Ray- naud's pheno- menon	Numb- ness	Claud- ication	Swell- ing	Stiff- ness
Bergentz et al. (1)	×	×	×		×	×	×		
Cailliet (5)	×	×	×			×			
Lascelles et al. (30)	×	×	×	×	×				
Nelson (36)	×	×	×	×	×	×		×	×
Overton (39)	×	×	×	×	×	×			×
Roos & Owens (44)	×	×	×	×	×	×	×	×	×
Strukel & Garrick (49)	×	×	×	×	×	×	×	×	×
Tyson & Kaplan (53)	×	×	×	×	×	×	×	×	
Urschell et al. (54)	×	×	×	×	×			×	
Woods (60)	×	×	×	×					×
Present study ^a		(×)	×			×	×		×

^a Item necessary for diagnosis is in parentheses.

Table 4. Supraspinous tendinitis. (Continued on the next page.)

Study	Subjective symptoms				
	Local pain	Radiating pain	Nocturnal pain	Pain during movement	Reflexory splinting
Bland et al. (2)	×		×	×	×
Booth & Marvel (4)			×	×	×
Cailliet (5)	×			×	×
Pasila (40)	×	×	×	×	
Simon (46)	×	×	×	×	×
Wilson (58)		×		×	×
Present study ^a	(×)		×		

^a Item necessary for diagnosis is in parentheses.

Table 5. Bicipital tendinitis. (Continued on the next page.)

Study	Subjective symptoms				
	Local pain	Radiating pain	Nocturnal pain	Reflexo- ry splint- ing	Pain during move- ment
Bland et al. (2)	×	×			
Booth & Marvel (4)	×	×	×	×	
Cailliet (5)	×	×			
Grenshaw & Kilgore (7)	×	×			
Pasila (40)	×	×	×		
Simon (46)	×	×		×	
Present study ^a	(×)				×

^a Item necessary for diagnosis is in parentheses.

Table 3. (continued)

Study	Objective symptoms								Occlusion test
	Hypoesthesia	Weakness/atrophy	Adson's maneuver	Allen's hyperabduction maneuver	Costoclavicular compression	Supraclavicular bruit	Drooping shoulder	Morley's sign of tenderness	
Bergentz et al. (1)	×	×	×	×		×		×	
Cailliet (5)	×	×	×	×	×		×		
Lascelles et al. (30)	×	×	×	×	×	×			
Nelson (36)	×	×	×	×	×		×	×	
Overton (39)	×	×	×	×	×	×	×	×	
Roos & Owens (44)	×	×	×		×	×		×	×
Strukel & Garrick (49)	×		×	×	×	×		×	
Tyson & Kaplan (53)	×	×		×	×		×		
Urschell et al. (54)	×	×	×	×	×	×	×		
Woods (60)	×	×	×			×			
Present study ^a	×	(×)	(×)				(×)	(×)	

^a Items necessary for diagnosis are in parentheses.

Table 4. (continued)

Study	Objective symptoms								Limited active abduction
	Local tenderness	Pain during abduction	Painful arc	Pain during isometric abduction	Re-flectory splinting	Muscle spasm	Local swelling	Atrophy	
Bland et al. (2)	×	×	×	×	×	×	×		
Booth & Marvel (4)	×	×	×		×	×		×	
Cailliet (5)	×	×	×	×	×	×			×
Pasila (40)	×	×	×	×			×		×
Simon (46)	×	×			×		×		
Wilson (58)	×				×	×	×	×	×
Present study ^a	(×)	(×)	×	×					(×)

^a Items necessary for diagnosis are in parentheses.

Table 5. (continued)

Study	Objective symptoms								Weakness/atrophy
	Local tenderness	Yergason's sign	Abduction-rotation pain	Limited active abduction, rotation	Speed's sign	Lippmann's sign	Ludington's sign	Muscle spasm	
Bland et al. (2)	×	×	×		×			×	
Booth & Marvel (4)	×	×				×	×		×
Cailliet (5)	×	×				×			
Grenshaw & Kilgore (7)	×			×	×				
Pasila (40)	×	×	×	×		×			
Simon (46)	×	×	×	×	×				
Present study ^a	(×)								

^a Item necessary for diagnosis is in parentheses.

pain radiating down to the upper extremities, weakness of the hands in carrying burdens, and numbness of an upper limb while sleeping.

The recorded *objective items* were tenderness in the shoulder pouch (Morley's sign), Adson's test, and asymmetric brachial posture. Limited movements of the neck and glenohumeral joint were ruled out.

A *diagnosis of thoracic outlet syndrome* was accepted if the examinee reported pain radiating to an upper extremity and Morley's sign was positive; in addition Adson's test had to be positive or drooping shoulder present.

Our study ignored the hyperabduction (Allen's) test, known to be the most non-specific of the provocative maneuvers (57). Again, examinees with cervical and glenohumeral joint disorders were ruled out by specific tests for these illnesses.

HUMERAL TENDINITIS (SUPRASPINOUS AND BICIPITAL TENDINITIS)

Review of diagnostic criteria

The main symptoms and signs of humeral tendinitis are listed in tables 4 and 5. The *subjective symptoms* of the two syndromes involved are much the same. The patients experience local pain that is often bothersome at night. Pain is exaggerated by glenohumeral movements, which result in reflectory splinting of the humerus. The pain in bicipital tendinitis seems to radiate more commonly to the anterior aspect of the arm (4). Local tenderness on the supraspinous or bicipital tendon is the principal diagnostic criterion. In supraspinous tendinitis an important additional symptom is pain during the abduction or elevation of the arm. This response was noted in five of the six reviewed studies. A painful abduction arc or pain during isometric abduction stress was noted in 75 % of the studies reviewed.

Most investigators differentiate between degenerative and calcific tendinitis, the latter being more acute and painful. In these acute cases also secondary muscle

spasm and reflectory splinting can sometimes be noticed. Muscle weakness is generally a reflection of pain, and muscle atrophy occurs only in the most chronic cases. The diagnosis of bicipital tendinitis is based primarily on local tenderness in the intertubercular sulcus. Yergason's sign of resisted supination with the elbow flexed 90° was mentioned as an additional important sign by five of the six reviewed studies. Abduction with the arm in external rotation compresses the tendon of the biceps and is painful or limited in some cases. Speed's test — resisted flexion of the shoulder with a supinated arm — was recommended by three investigators. Other specific tests for bicipital tendinitis are inconsistently referred to in the literature.

Diagnostic criteria of the present survey

In our survey we recorded local pain in the shoulder joint and pain during shoulder movements as *subjective symptoms*.

The recorded *objective items* were limited, painful active movements, painful arc during abduction, pain during resisted abduction, and tenderness in the bicipital or supraspinous tendon during palpation.

Our set of items necessary for a *diagnosis of humeral tendinitis* was pain in the shoulder joint region, limited active movement because of pain, and local tenderness.

To distinguish supraspinous tendinitis and bicipital tendinitis, we should have used additional specific test movements, for instance, Yergason's maneuver. However symptoms of the cervical spine or superior thoracic aperture were ruled out. Humeral tendinitis might overlap with another entity, that of the acute stage of frozen shoulder.

FROZEN SHOULDER SYNDROME (Shoulder joint capsular contractura)

Review of diagnostic criteria

The frozen shoulder syndrome is the outcome of several pathological conditions leading to a stiff and painful shoulder (4,

46). Also an idiopathic type without any recognizable cause is common (40). The principal *subjective symptom* is pain, often nocturnal and related to activity (table 6). The *objective signs* include loss of active and passive movements, especially abduction and external rotation, and atrophy of the shoulder muscles. In the initial phase both muscle spasm and anterior capsular tenderness have been noted by two of the investigators, but in the chronic stage the shoulder is relatively painless when immobile (4, 5, 40).

Diagnostic criteria of the present survey

As the *subjective symptom* for frozen shoulder we defined a progressive ache and stiffness of the shoulder joint within the last three to four months.

The *objective items* recorded were limitation and pain during active and passive movements of the shoulder joint. In addition the shoulder had to show a loss of cutaneous lateral folds when inspected from behind.

Capsular contractura was diagnosed if the examinee had had progressive pain and shoulder stiffness during the last three to four months, and both active and passive outward rotation were limited.

ACROMIOCLAVICULAR SYNDROME

Review of diagnostic criteria

Arthrosis of the acromioclavicular joint is relatively common, but often symptomless

Table 6. The frozen shoulder syndrome.

Study	Subjective symptoms			Objective symptoms				
	Shoulder pain	Nocturnal pain	Pain during effort	Limitation of active and passive movements	Atrophy	Anterior tenderness	Muscle spasm	Loss of cutaneous fold
Bland et al. (2)	×	×		×	×	×		
Booth & Marvel (4)	×	×	×	×	×		×	
Cailliet (6)	×		×	×	×		×	
Pasila (40)	×	×	×	×				
Simon (46)	×		×	×	×	×		
Present study ^a	(×)			(×)				×

^a Items necessary for diagnosis are in parentheses.

Table 7. Acromioclavicular syndrome.

Study	Subjective symptoms			Objective symptoms					
	Local pain	Pain during motion	Radiating pain	Local tenderness during palpation/percussion	Adduction pain	Abduction pain	Pain during elevation	Crepitation	Telescoping pain
Bland et al. (2)	×	×	×	×	×	×			
Booth & Marvel (4)	×	×		×	×	×		×	×
Cailliet (6)	×	×	×	×	×	×	×		
Pasila (40)	×	×		×			×	×	
Worcester & Green (61)	×	×	×	×	×				
Present study ^a	(×)			(×)					

^a Items necessary for diagnosis are in parentheses.

(5, 9, 40). When symptomatic, it generally causes local pain and tenderness, with or without radiation proximally to the neck or distally to the deltoid area (2, 61). Pain during movement, especially during abduction and/or elevation, was recorded in half of the studies we reviewed (table 7). Adduction of the arm across the chest compresses the joint, thus producing pain, and was considered a sign of the acromioclavicular syndrome by three investigators. Additional criteria were crepitation of the joint and pain during the telescoping of the clavicle.

Diagnostic criteria of the present survey

We recorded local pain at the acromioclavicular joint as the *subjective symptom* of the acromioclavicular syndrome in our survey.

The *objective sign* was local pain during percussion on the clavicle while the examinee pushed straight downward against resistance. According to the literature, the joint could have been examined by an additional specific test, e.g., an adduction or abduction test.

For clinical practice, most of the investigations consulted also recommended diagnostic anesthesia as an important part of examining the shoulder joint, both for tendinitis (2, 4, 40) and other clinical entities (6, 61).

LATERAL EPICONDYLITIS (TENNIS ELBOW) AND MEDIAL EPICONDYLITIS

Review of diagnostic criteria

The most common *subjective symptom* of lateral epicondylitis found in the literature was pain in the elbow during hand movements; it was met in all of the articles reviewed (table 8). The next common symptom was pain during rest; it was present in five of the articles.

The most common functional *objective sign* was local tenderness at the epicondyle during palpation, also reported in all ten

of the investigations consulted. Pain during resisted movements of the wrist and fingers was reported in nine of the ten investigations. Also a decrease in hand grip power and local swelling at the elbow were common signs. Radiographic changes at the epicondyles were reported in five investigations, but muscle atrophy was found in only two.

Diagnostic criteria of the present survey

In our survey one *subjective symptom* of lateral epicondylitis was recorded, i.e., pain at the epicondyle either during rest or motion.

The following *objective items* were also recorded: local tenderness at the lateral epicondyle, pain during resisted extension of the fingers and wrist with the elbow straight, palpated local tenderness at the medial epicondyle, pain during resisted flexion of the fingers and wrist with the elbow flexed, and swelling at the medial epicondyle. Hand grip power was measured with the elbow straight and flexed.

A *diagnosis of lateral epicondylitis* was made if palpated tenderness at the lateral epicondyle and pain during resisted extension of the wrist and fingers were found. A *diagnosis of medial epicondylitis* required palpated tenderness at the medial epicondyles and pain during resisted flexion of the fingers and wrist. The necessary *subjective symptom* in both lateral and medial epicondylitis was local pain during rest and/or active movements of the wrist and fingers.

PERITENDINITIS AND TENOSYNOVITIS

Review of diagnostic criteria

The principal symptoms and signs of peritendinitis and tenosynovitis are well documented and agreed upon in the literature (table 9). The different names for these two variants of the muscle-tendon syndrome originate from the location of the disease, not from the clinical picture, which is essentially the same for both (26).

The most constant symptom, and usually the first one, is pain over the muscle-tendon structures involved. The pain is felt as a dull ache at rest. It is greatly exaggerated on motion of the tendon and may sometimes be neuralgic in character. There is often an associated weakness of the extremity because of the pain.

Swelling that is fusiform in shape appears in more severe cases. The swelling is localized if the condition affects ten-

dons with a definite sheath. When it affects the peritendinous tissue of tendons which have no sheath, the swelling is diffuse (17). The swelling may be tender to the touch and covered by hot and reddened skin.

Crepitation may appear simultaneously with the swelling or after it. In character it has been compared to the creaking of a chamois skin or to the crunching sound of dry snow (51). Crepitation is usually pal-

Table 8. The epicondylitis syndrome.

Study	Subjective symptoms			Objective symptoms							
	Pain during movement	Pain during rest	Limitation of movement	Local tenderness	Local swelling	Pain during resisted extension/flexion	"Chair" test	Decreased hand grip power	Pain during pronation-supination	Muscle atrophy	Radio-graphic findings
Friedlander et al. (13)	×	×	×	×	×	×		×	×		
Gardner (15)	×			×	×	×	×	×	×		×
Goldie (16)	×			×	×	×			×		
Kivi et al. (23)	×	×		×	×	×		×		×	×
Lambrech (27)	×	×	×	×	×	×	×	×			×
Lapidus (29)	×	×		×	×	×	×				×
Lehman & Saxer (31)	×		×	×	×	×			×		
Penners (41)	×		×	×	×	×	×	×			×
Steiner (48)	×		×	×	×			×			
Van Demark & Myrabo (56)	×	×	×	×	×	×				×	
Present study ^a	(×)	(×)		(×)	×	(×)		×			

^a Items necessary for diagnosis are in parentheses.

Table 9. Peritendinitis and tenosynovitis.

Study	Subjective symptoms			Objective symptoms				
	Local ache	Pain during movement	Tenderness	Swelling	Crepitation	Weakness	Local heat	Reddened skin
Ellis (10)	×	×	×	×	×	×	×	
Flowerdew & Bode (12)		×	×	×	×			
Griffiths (17)	×	×		×	×			
Howard (20, 21)		×	×	×	×	×	×	×
Lanfear & Clarke (28)	×	×		×	×	×		
Lipscomb (32)	×	×		×	×	×	×	×
Obolenskaja & Goljanitzki (37)	×		×	×	×			
Pozner (42)	×	×	×	×	×	×		
Reed & Harcourt (43)	×	×	×	×	×			×
Thompson et al. (51)	×	×	×	×	×	×	×	×
Present study ^a	×	×	×	×	×	×		

^a Items necessary for diagnosis are presented in the text on page 36.

pable, but in some cases it can only be detected during auscultation with a stethoscope. Although crepitation can be verified in the majority of acute cases, it by no means is always found in every case of tenosynovitis (10, 32).

Diagnostic criteria of the present survey

The *subjective symptoms* recorded in our survey were muscle pain during effort, local swelling, and local ache at rest.

The recorded *objective signs* were tenderness along the course of the tendon or on the muscle-tendon junction, swelling, crepitation, pain during movement, weakness in gripping (less than 70 kPa or an asymmetry of more than 33 %), and sausage-like thickening along the course of the tendon.

The *diagnosis* for a current case of *peritendinitis* or *tenosynovitis* was made if all of the aforementioned criteria were found except crepitation and thickening along the tendon course. A distinct thickening along the course of the muscle-tendon unit, associated with a history of pain in the respective area, was considered as sufficient evidence of *past tenosynovitis* or *peritendinitis*.

OTHER DISORDERS

In our survey we also included the following upper limb diseases:

- pronator teres syndrome
- carpal tunnel syndrome
- de Quervain's disease

Both the pronator teres syndrome and the carpal tunnel syndrome had a definite set of criteria based on clinical experience and textbook sources. Since we found only a few cases, no review has been presented. The third disorder listed, de Quervain's disease (stenosing tenosynovitis of the thumb extensor, abductor tendon), was included with the other dorsal tendinitises.

CONCLUSIONS

In this paper we have presented the clinical epidemiologic screening method employed in the investigation of occupational neck and upper limb disorders in a working population.

The main features of the method are as follows:

1. A predetermined set of tests and other diagnostic inquiries for each disease or disorder are included in the survey.
2. A preplanned examination procedure is applied by a specially trained physiotherapist.
3. A set of diagnostic criteria must be fulfilled in each case of disease or disorder.
4. A group of specialists handles the problem cases.

Our method differs from a clinical examination of patients in many respects. The most important deviation is the separation of the clinical examination and the making of the diagnosis. This division was made in order to lessen the subjective component and to add to the reliability and comparability between studies.

A critical review has been presented for each disease and disorder entity; in it our diagnostic criteria are compared with those found in literature dealing mostly with clinical signs and symptoms. An overview of the comparison shows that the criteria we have used match fairly well with the clinical signs and symptoms presented in earlier reports. There are some deviations, however. Our criteria for tension neck and chronic tenosynovitis might yield more positive findings in comparison to restrictive clinical diagnoses. According to our estimation the difference should not exceed (at worst) 25 % of false positives.

The different maneuvers and tests used in our survey have been called by the names commonly found in most textbooks and related sources. Because no generally accepted code exists for the performance of these maneuvers, they may yield differing results for persons with different teaching backgrounds, and thus the comparability of one study to another is lessened. The combination of several tests should, however, alleviate this drawback.

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