

## PRACTICE GUIDELINE

*For occupational physicians on the management of employees with*

# COMPLAINTS OF ARM, SHOULDER OR NECK



Nederlandse  
Vereniging voor **nvab**  
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NVAB

### **NVAB Centre of Excellence**

P.O. box 2113

3500 GC Utrecht

PHONE 030 284 57 50

EMAIL [kwaliteitsbureau@nvab-online.nl](mailto:kwaliteitsbureau@nvab-online.nl)

WEBSITE [www.nvab-online.nl](http://www.nvab-online.nl)

### *Authors*

J.H.A.M. Verbeek, Occupational physician

C.W. Broekkamp, Occupational physician

L.C. van Cuilenburg, Occupational physician

A.J.P. van Heijst, Occupational physician

E. Kramer, Occupational physician

E.A.J.M. Kremer, Occupational physician

R.G.H.M. Rutten, Occupational physician

J.J. Tellekamp, Occupational physician

A.C.L.P.J. Verhoeven, Occupational physician

### *Coordination and editorial board*

C.D. de Buissonjé, Member of staff

J.H.A.M. Verbeek, Occupational physician

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### *Design and layout*

CO3 (T. van Lieshout)

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# INTRODUCTION

*The aim of the guideline is to support the occupational physician in the prevention of unnecessary sickness absence and occupational disability as a result of complaints of arm, shoulder and neck and to promote the maintenance of working ability as much as possible.*

*The guideline consists of three parts, a short summary, the guideline text with the recommendations and a background document. The background document comprises the concepts and detailed evidence for the recommendations and can be found (in Dutch) at [www.nvab-online.nl](http://www.nvab-online.nl).*

# 1 PROBLEM ORIENTATION AND DIAGNOSIS

## 1.1 HISTORY

### Ask an employee with complaints of the arm, shoulder or neck about:

- the nature of the complaints: pain, cramps, tingling (pins and needles), sensory impairments, crepitations, radiation of the pain, stiffness, clumsiness, loss of coordination, loss of strength, skin discoloration, changes in temperature
  - the presence of other complaints or complaints located elsewhere
  - exposure to hand-arm vibration
  - exposure to physically demanding working conditions for the arm, shoulder, or neck such as the combination of non-neutral postures, repetitive movement, and exerted forces

> *distinguish between exposure with a high and a low risk based on the intensity and duration of the exposure on the basis of the Checklist:  
Evaluation of physical load (for use in the consulting room) (Annexe 1)*
- Irrational beliefs on the complaints such as a fear to move, perfectionism or catastrophizing thoughts
  - Stressors at work such as job load, lack of decision latitude, and lack of social support.

## 1.2 PHYSICAL EXAMINATION

### Consider

- in case of other complaints or complaints located elsewhere
  - a systemic or more central neurological disorder > perform a structured neurological examination and/or refer to a specialist for further examination
- in case of the presence of tingling, cramps, or sensory impairments
  - carpal tunnel syndrome or cervical herniated disc > perform a structured neurological examination
- in case of swelling of the lower arm
  - tenosynovitis or tendonitis > perform a local physical examination.  
(Please refer to Annexe 2)

### 1.3 DIAGNOSIS

#### Classify as

- non-specific complaints of the hand, lower arm, upper arm, shoulder, or neck in the absence of symptoms or findings of a specific disorder
- carpal tunnel syndrome in the presence of of nightly pain and/or tingling in the wrist, hand or lower arm, a classic or probable complaint pattern according to the Katz hand diagram and a positive Phalen's and/or Tinel's sign.
- hand-arm vibration syndrome in the presence of Raynaud's phenomenon or sensory disturbances or osteoarthritis in the upper extremity and sufficient exposure to hand-arm vibration
- tenosynovitis or tendonitis in the presence of pain and localised swelling of the lower arm and reduced movement in one or more fingers
- lateral or medial epicondylitis in the presence of pressure pain at the lateral or medial epicondyl and pain on either dorsal or palmar flexion of the wrist against resistance
- shoulder complaints in the presence of pain in the shoulder on active or passive abduction or exorotation
- cervical radiculopathy in the presence of pain radiating from the neck and sensory disturbances, tingling or loss of strength in the arm roughly in the area innervated by a nerve root
- another specific complaint in the presence of typical signs and symptoms.

#### Classify as

- occupational disease or work-related disorder if the condition and exposure comply with the criteria of the Dutch Centre for Occupational Diseases.

# 2 INTERVENTION

## 2.1 TREATMENT

### In terms of coping with the complaints, advise

- to continue functioning, but temporarily refraining from tasks that are very painful (D)\*.  
Regarding treatment, advise
- in the case of carpal tunnel syndrome, tendonitis, epicondylitis, and shoulder complaints
  - about possible surgery or injections (A1, A2).

### Refer

- in the case of non-specific complaints
  - reservedly, to the physiotherapist, even in case of more serious complaints because effectiveness has not been established.  
In case of referral > preferably to a physiotherapist specialized in activating counselling like Mensendieck (B)
- in the case of neck complaints
  - after a few weeks to a manual therapist (A2)
- in case of other specific complaints
  - reservedly to a physiotherapist because the effectiveness has not been established (A2).

**When advising on treatment and when referring, follow the guideline on collaboration between occupational physicians and general practitioners.**

- *The level of evidence is shown between brackets following each intervention. The letters should be interpreted as shown below, somewhat adjusted based on Van Everdingen.157) Note that there can be evidence in favour as well as against the effectiveness of an intervention.*
  - *A1: strong evidence from meta-analysis or systematic review of at least several studies at A2 level, with homogeneous results among studies*
  - *A2: strong evidence from one randomized clinical trial of sound quality and size*
  - *B: moderate evidence from one randomized clinical trial of moderate quality or insufficient size or other comparative study or a systematic review of such studies*
  - *C: limited evidence from non-controlled studies or analogy from other disorders*
  - *D: expert opinion or consensus in the project group.*
- Please refer to Annexe 3 of the Background document table: Processing evidence.*

## 2.2 WORK FACTORS

### **In terms of working conditions, advise**

- if the history reveals a high exposure
  - a workplace examination to assess vibration exposure that is exceeding the limit value or to assess unfavourable working conditions (D); See checklist: Evaluation of physical load in Annex 1.

### **In terms of adaptation of the working conditions, advise**

- if the hand-arm vibration limit values is exceeded
  - to reduce the level of vibration or to change of job to prevent an increase of the disorder and to possibly reduce the complaints (B).
- in the case of unfavourable ergonomic conditions
  - a combination of work-related and individual interventions (B)
- in case of stressors at work
  - to change the organisation of the work and working conditions (D).

## 2.3 INDIVIDUAL FACTORS

### **In relation to individual factors, advise**

- in the presence of irrational beliefs
  - about the good prognosis and multicausal origin > refer to a psychologist if necessary (C).

## 2.4 ADVICE ON RETURN TO WORK

### **Always advise on return to work, namely**

- if there is a strong desire to continue working
  - temporarily refrain from the tasks that are painful (D)
- in the case of sickness absence
  - return to work on a gradual time-contingent basis, with the duration of the gradual resumption depending on the seriousness of the complaints and the workload (C).



# 3 EVALUATION

## **Evaluate**

- within three weeks whether the interventions have been successful (C).

## **Repeat**

- when in doubt about the diagnosis
  - the physical examination, and, if necessary, confer with the general practitioner on referral to a neurologist, rheumatologist, rehabilitation specialist, or orthopaedic surgeon.

## **Consider a number of less frequently occurring medical diagnoses**

- in the presence of cramps in the hand, problems specifically related to writing or playing an instrument
  - focal dystonia
- in the presence of loss of motor function solely in the extensor muscles of the middle finger
  - nerve entrapment of the radial nerve in the radial tunnel
- in case of paraesthesia or tingling in the fourth and fifth finger
  - nerve entrapment of the ulnar nerve.

## **Refer**

- in case of non-specific complaints of pain and no resumption of work after three months of sickness absence
    - to a centre for multidisciplinary treatment (B).
- (Please refer to Annexe 3)

## ANNEXE 1

### CHECKLIST: EVALUATION OF PHYSICAL LOAD (FOR USE IN THE CONSULTING ROOM)

If *one or more of the following questions are answered positively*, there is an increased risk of workrelatedness of the complaints. In such case, have a *workplace examination* carried out to objectively assess the working conditions.

#### **In general ask if**

- 1 vibrating tools are used that could cause hand-arm vibration
- 2 repetitive movements are made: i.e. movements that occur more than twice per minute for longer periods of time
- 3 breaks that allow a change to the working position and/or the repetitive movements are possible for less than 10 minutes per hour
- 4 there is pressure exerted on the arm during work.

#### **in case of complaints of the *hand or wrist* ask if for more than two hours per day**

- 1 the wrist deviates more than 30 degrees from the neutral position
- 2 the hand is used to grab or pinch
- 3 the amount of force used exceeds 4 kg (e.g. necessary to lift 1 one-litre cartons of milk)
- 4 the mouse or keyboard is used continuously to input data
- 5 the work has to be performed in cold conditions.

#### **in case of complaints of the *elbow* ask if for more than two hours per day**

- 1 the elbow is bent 90 degrees or completely stretched for more than 4 hours
- 2 the lower arm is turned more than 40 degrees (pronation/supination)
- 3 the amount of force used exceeds 4 kg (4 one-litre cartons of milk).

#### **in case of complaints of the *shoulder* ask if for more than two hours per day**

- 1 the hand is above shoulder level
- 2 the arm is held away from the body unsupported
- 3 the arm is behind the body
- 4 the arm is at the other side of the body
- 5 the lower arm is turned outwards more than 30 degrees

#### **in case of complaints of the *neck* ask if for more than two hours per day**

- 1 the head is strongly bent forward
- 2 work has to be done while seated continuously.

#### *References:*

- Sluiter JK, Rest KM, Frings-Dresen MHW. *The Saltsa report: Guidelines for the determination of the relationship of work to complaints of the locomotor apparatus in the upper extremity (Dutch abbr. ABBEs)*. Amsterdam: AMC/Coronel Institute for Labour, Environment, and Health, 2000, Report nr 00-05
- Douwes et al. *RSI measures for screen work*. Elsevier bedrijfsinformatie BV, Doetinchem 2001.

## ANNEXE 2

### CHECKLIST: PHYSICAL EXAMINATION IN CASE OF COMPLAINTS OF ARM, SHOULDER, OR NECK

- 1 Judge appearance and shape to determine if there is any muscle atrophy, swelling, or deviation of posture.**
- 2 In the case of localised complaints, assess the presence of restrictions in movement of the**
  - a fingers: flexion, extension, spreading
  - b wrist: flexion, extension, and radial and ulnar flexion
  - c elbow: flexion and extension
  - d shoulder: abduction, adduction, endorotation, and exorotation
  - e neck: flexion, extension, lateroflexion, and rotation.
- 3 Hand and wrist**
  - In the case of suspicion of carpal tunnel syndrome
    - a Test sensory function of the fingers; compare the experience of a painful stimulus on the palmar side of the index finger with that of the little finger. Outcome: hypalgesia if there is a discrepancy between the two fingers.
    - b Perform Phalen's test (Figure 1): place the wrist in 90 degree palmar flexion for 60 seconds. Outcome positive if pain or paraesthesia in the first three fingers is indicated.
    - c Perform Tinel's test (Figure 2): tap a finger on the medial nerve at the most distal wrist fold on the palmar side of the wrist. Outcome: positive if there is paraesthesia in the distal medial nerve area.
    - d Make a Katz hand diagram of the complaints (Figure 3): chart the localisation of the complaints for each finger and for each hand. Outcome: classic, probable, improbable CTS diagnosis.
  - In the case of suspicion of tendonitis in thumb abductors and/or extensors
    - a Perform Finkelstein's test (Figure 4): have the patient make a fist whereby the thumb is clasped inside the fingers. Bring the wrist in extension and ulnar flexion. Outcome: positive if pain is indicated across the thumb extensors.
- 4 Elbow**
  - a Press onto the medial or lateral epicondyl. Outcome: positive if pain is indicated.
  - b Extension of the wrist against resistance. Outcome: positive if pain is indicated across the lateral epicondyl. (Figure 5)
  - c Flexion of the wrist against resistance. Outcome: positive if pain is indicated across the medial epicondyle. (Figure 6)

## 5 Shoulder

- A Active abduction: have patient elevate the arm until it is beside the head. Determine whether this is impaired, painful or if there is a 'painful arc.' (Figure 7)
- B Passive abduction: take the arm at the elbow and elevate the extended arm sideways until it is next to the head. Outcome: positive if this is impaired or painful.
- C Passive exorotation: take the lower arm at the wrist, fixate the elbow in 90 degrees flexion, and rotate the arm outwards. Outcome: positive if this is impaired or painful.

## 6 Radiating neck pain

- a Perform the Spurling test: the neck is placed in lateral flexion and extension, and the examiner exerts axial pressure. Outcome: positive if pain or tingling occurs in the shoulder radiating towards the elbow. (Figure 8)
- b Determine if the localisation of the pain corresponds with the course of the dermatomes. (Figure 9)
- c Determine if there is paraesthesia.
- d Determine if there is loss of strength in shoulder, biceps, extensors of the wrist, triceps or intrinsic finger muscles.
- e Provole the biceps and triceps tendon reflexes.

Outcome positive if location conforms to the table

Root	Localisation of pain	Paraesthesia	Paresis	Reflex
C5	Shoulder and upper arm	None	Deltoid muscle	Biceps
C6	Radial side lower arm	Thumb	biceps, brachioradial and wrist extensor muscles	Biceps
C7	Dorsal side lower arm	Index finger and middle finger	Triceps muscle	Triceps
C8	Ulnar side lower arm	Ring finger and little finger	Intrinsic finger muscles	Triceps

### Literature <sup>1,2)</sup>:

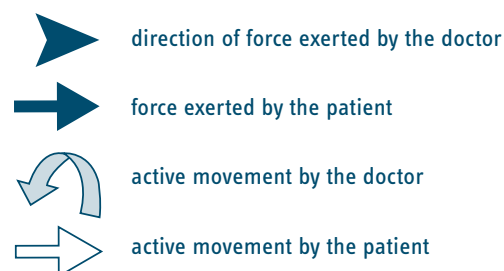
1. Sluiter JK, Rest KM, Frings-Dresen MH. Criteria document for evaluating the work-relatedness of upper-extremity musculoskeletal disorders. *Scand.J.Work Environ. Health* 2001; 27 Suppl 1:1-102.
2. Palmer K, Walker-Bone K, Linaker C, Reading I, Kellingray S, Coggon D et al. The Southampton examination schedule for the diagnosis of musculoskeletal disorders of the upper limb. *Ann. Rheum Dis.* 2000; 59:5-11.

## FIGURES WITH ANNEXE 2

### CHECKLIST: PHYSICAL EXAMINATION IN CASE OF COMPLAINTS OF ARM, SHOULDER, OR NECK

#### Explanation:

- *The various arrows used in the figures mean:*



- *Right (=R) / Left (=L) comparison*

In order to decide if a test is positive or not, the comparison of the right (=R) and left (=L) is of importance during most tests. It is also customary to start a test on the asymptomatic side when dealing with unilateral complaints.

- *Force exerted by the doctor during the resistance test*

During the resistance tests the doctor exerts force in the opposite direction of the muscular activity being tested. For example, during the elbow flexion resistance test, the doctor *increases force in the direction of the elbow extension so that the patient's elbow flexor should tighten.*

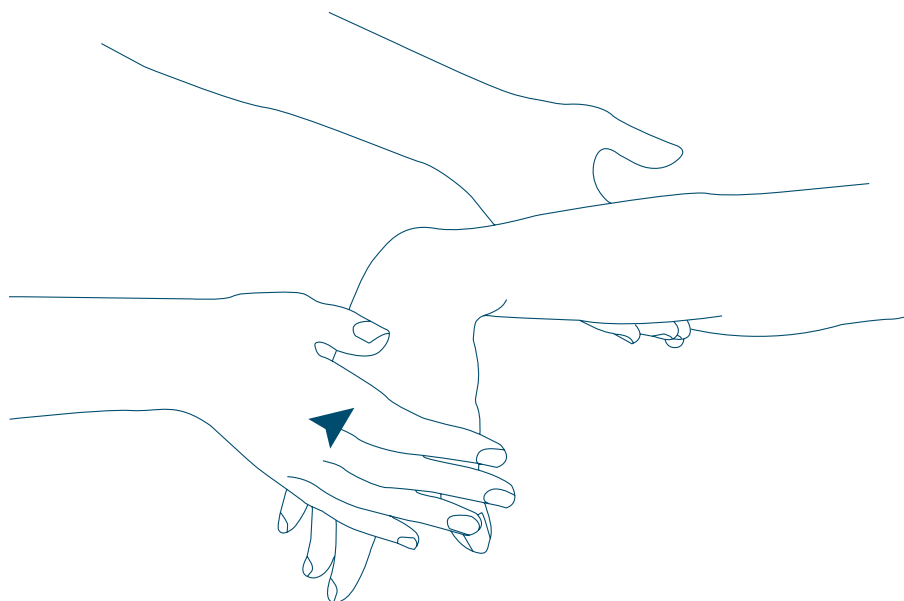
- *Added tests*

A test is called an added test when it does not customarily belong to the basic function examination.

#### Acknowledgement of the sources:

- Figure 1, 2 + 4 - 7 derived from Sluiter JK, Rest KM, Frings-Dresen MHW. The Saltsa report: Guidelines for the determination of the relationship of work to complaints of the locomotor apparatus in the upper extremity (Dutch abbr. ABBEs). Amsterdam: AMC/Coronel Institute for Labour, Environment and Health, 2000, report nr 00-05:67-84.
- Figure 3 derived from D'Arcy CA, McGee S. Does this patient have Carpal Tunnel Syndrome?; JAMA 2000;280:3110- 3117
- Figure 8 derived from Tong HC, Haig AJ, Yamakawa K. The Spurling test and cervical radiculopathy Spin 2002;27:156-9.
- Figure 9 derived from Ellenberg MR, Honet JC, Treanor WJ. Cervical radiculopathy. Arch. Phys. Med. Rehabil. 1994;75:342-52

**FIGUUR 1 PHALEN'S TEST R/L**



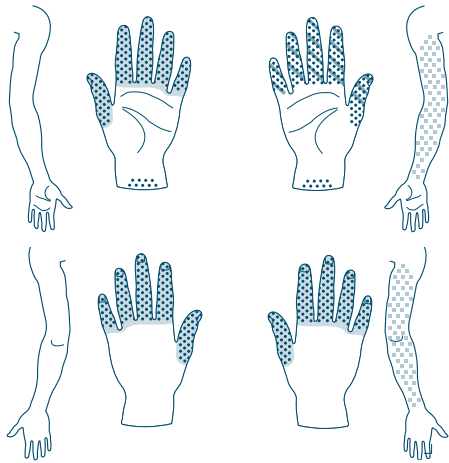
Type of test	added compression test of the medial nerve for Carpal Tunnel Syndrome
Starting position patient	seated, elbow in 90 degrees flexion, lower arm prone, wrist and fingers relaxed in flexion position
Starting position doctor	seated or standing; the L hand stabilises the lower arm, the R hand performs the test
Description (for R) NB!	R wrist is moved passively to the maximum palmar flexion and this position is maintained for 60 seconds. Instead of the traditional active, double-sided version of the test, the passive version is selected so that differentiation with the thoracic outlet syndrome remains possible
Positive if	pain or paraesthesia in the thumb, index finger, and/or other fingers is indicated (note the time after which the test is positive)
Reference	Starkey & Ryan 1996

**FIGURE 2 TINEL'S SIGN**



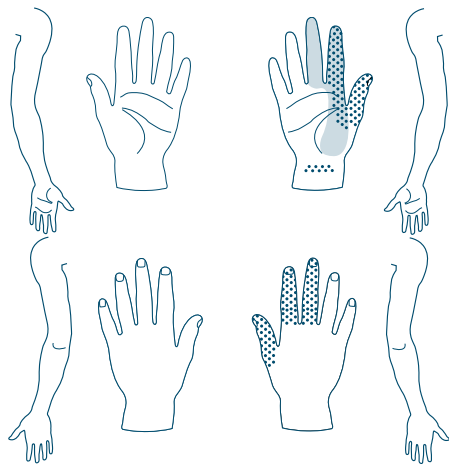
Type of test	added provocation test of the medial nerve, for Carpal Tunnel Syndrome
Starting position patient	seated, lower arm is supine, wrist rests in neutral position
Starting position doctor	seated or standing in front of the patient; the R hand stabilises the hand; the test is performed with the L hand
Description (for L)	a quiet percussion is performed 4-6 times with the tip of the index and middle finger (or with the dull end of a percussor) on the volar part of the carpal ligament
Positive if	paraesthesia or hyperaesthesia is indicated distally from the wrist
Reference	Loudon, Bell, & Johnston 1998; Alfonso & Dzwierzynski 1998; del Pino et al. 1997

**FIGUR 3 KATZ HAND DIAGRAM FOR CARPAL TUNNEL SYNDROME**



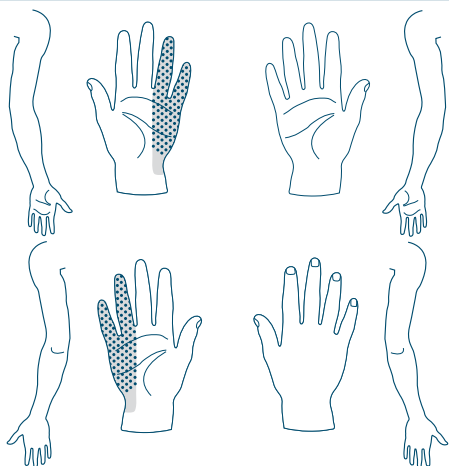
**A Classic pattern**

Symptoms in at least two of the fingers 1, 2, or 3. The classic pattern comprises symptoms in the fourth and fifth finger, pain in the wrist, and radiation of the pain to the proximal from the wrist. There are no symptoms on the palmar or dorsal side of the hand.







**B Probable pattern**

The same complaints and symptoms pattern as with the classic pattern, but palmar symptoms are allowed in this case if they are at least limited to the ulnar side. With the probable pattern however, only 1 finger of the fingers 1, 2 or 3 is affected.



**C Improbable pattern**

No symptoms in the fingers 1, 2 or 3.

-  pain
-  tingling
-  stiffness
-  sensory impairment

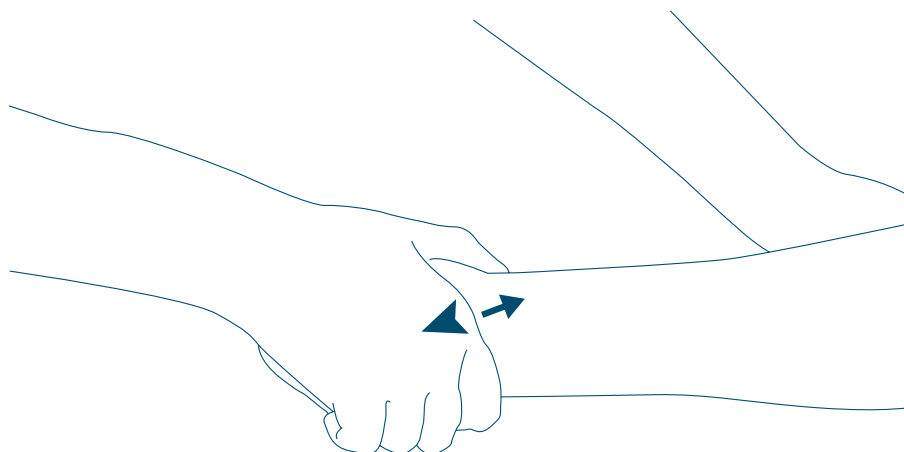


**FIGUUR 4 THE FINKELSTEIN TEST R/L**



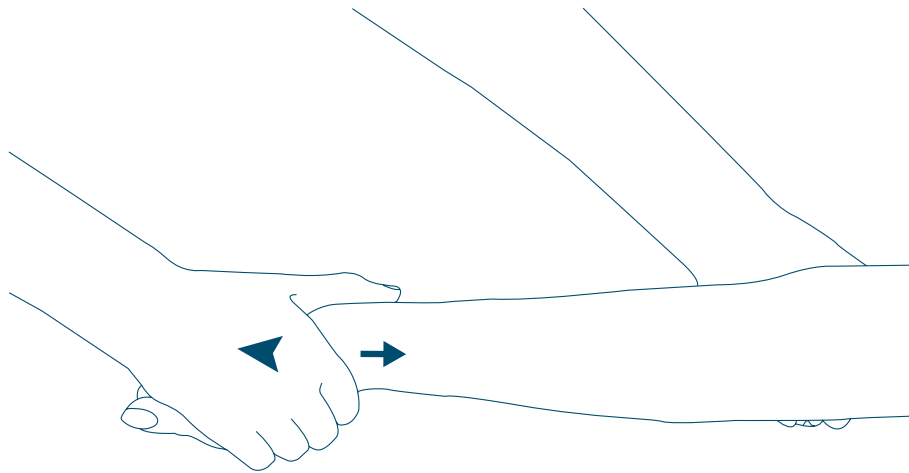
Type of test	added passive stretch test, for de Quervain's syndrome
Starting position patient	seated, lower arm rests (on the table) in a prone position, the wrist is kept approximately 20 degrees in dorsal flexion, a fist is made whereby the thumb is enclosed by the fingers
Starting position	seated or standing
Description (for R)	L hand stabilises the distal part of the lower arm starting from the ulnar side, the R hand encloses the fist from the radial side; passively the fist is calmly moved in the direction of the ulnar abduction
Positive if	pain at the side of the first extensor compartment (APL and EPB tendons)
Reference	Loudon, Bell, & Johnston 1998; Hoppenfeld 1976

**FIGUUR 5 EXTENSION RESISTANCE TEST WRIST R/L**



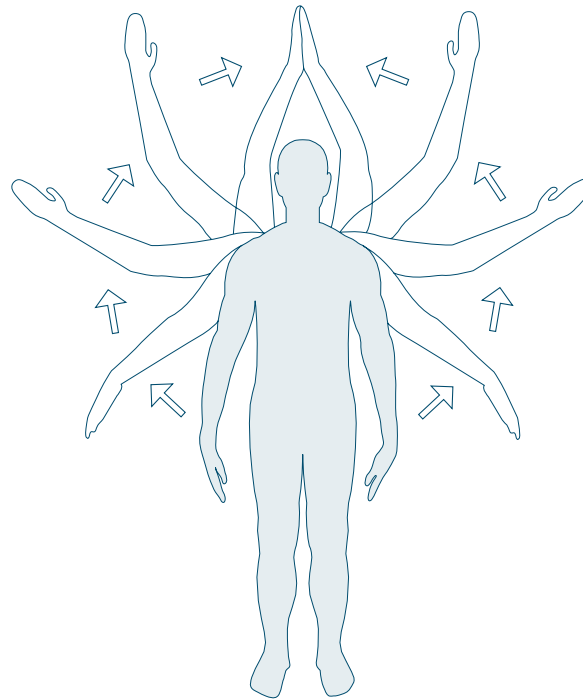
Type of test	isometric resistance test of the wrist extensors, for extensor tendonitis of the lower arm/wrist
Starting position patient	seated; elbow is bent approximately 30 degrees, lower arm rests on the table in prone position; the wrist is kept in dorsal flexion
Starting position doctor	seated or standing
Description (for L)	L hand stabilises upper arm; R hand is placed against the dorsal side of the hand and force is increased in the direction of the palmar flexion
Task	“Keep your wrist in this position by resisting my pressure”
Positive if	pain is felt in the dorsal wrist/lower arm region
Reference	Starkey & Ryan 1996

**FIGUR 6 FLEXION RESISTANCE TEST WRIST R/L**



Type of test	Isometric resistance test of the wrist flexors, for flexor tendonitis of lower arm/wrist
Starting position patient	seated; elbow is bent approximately 30 degrees, lower arm rests on the table in supine position; the wrist is kept in palmar flexion
Starting position doctor	Seated or standing
Description (for L)	L hand stabilises the upper arm; R hand is placed against the palmar side of the hand and force is increased in the direction of the dorsal flexion
Task	“Keep your wrist in this position resisting my pressure”
Positive if	pain is felt in the ventral wrist/lower arm region
Reference	Starkey & Ryan 1996

**FIGUR 7 PAINFUL ARC TEST (ABDUCTION/ELEVATION) R+L**

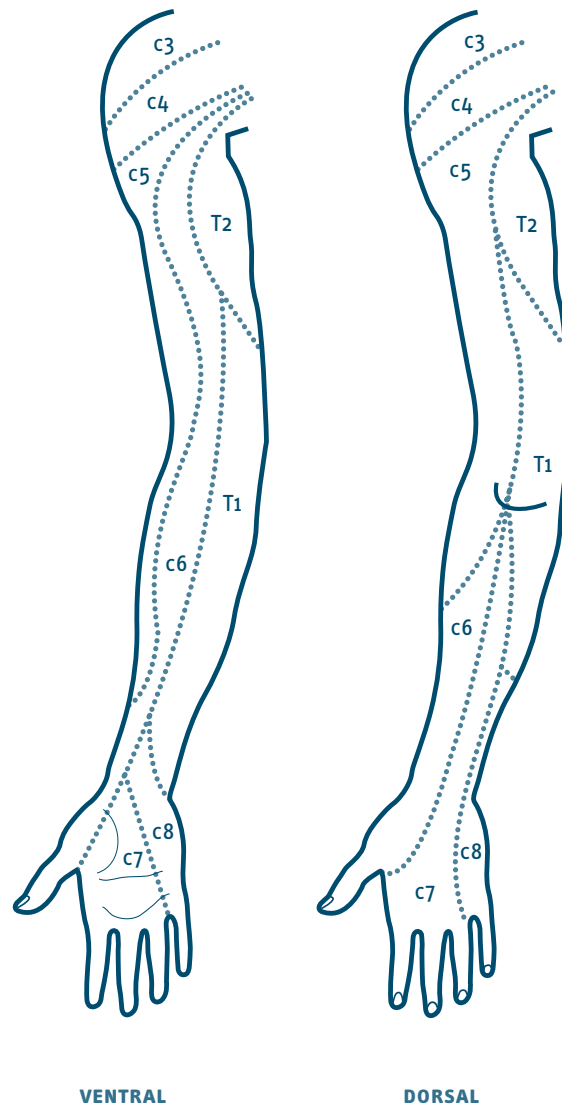


Type of test	active pectoral arch test, for rotator cuff syndrome
Starting position patient	standing, with the arms hanging along the trunk and the thumbs towards the ventral
Starting position doctor	Standing in front of the patient
Description of the task	“Elevate your outstretched arms sideways to shoulder height, then turn the palms of your hands to the ceiling, and move your arms further upwards until your hands meet above your head”
Positive if	pain is felt during a part of the movement and then disappears again (somewhere between 60 and 120 degree abduction/elevation)
Reference	Hoppenfeld 1976

**FIGUUR 8 THE SPURLING TEST**

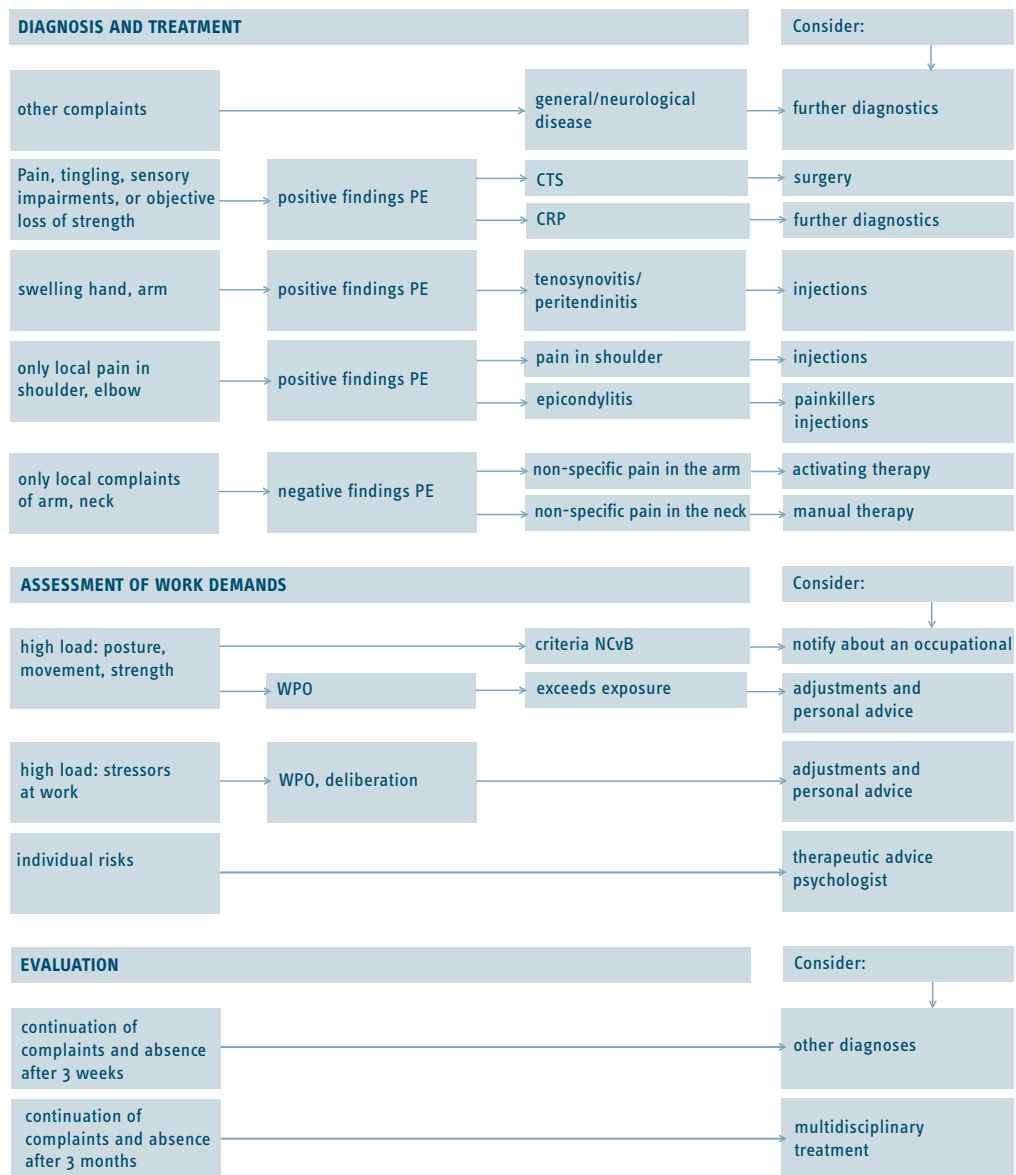


**FIGUUR 9 COURSE OF THE DERMATOMES**



# ANNEXE 3

## ACTIONS FOR COMPLAINTS OF ARM, SHOULDER, OR NECK



## ANNEXE

## GLOSSARY OF TERMS

<b>Crepitus</b>	crackling sound caused by rough surfaces rubbing against one another.
<b>Carpal tunnel syndrome</b>	especially in case of nightly pain and/or tingling in the wrist, hand or lower arm, a classic or probable result in the Katz hand diagram and positive Phalen's and/or Tinel's sign.
<b>Cervical radicular syndrome</b>	(cervical herniated disc) in case of complaints of pain in the neck followed by symptoms of numbness, tingling or loss of strength in the arm corresponding to the area of a cervical root
<b>Lateral epicondylitis</b>	disorder of the origin of the wrist and finger extensors accompanied by pressure pain to the lateral epicondyl and pain during dorsal flexion of the wrist against resistance.
<b>Medial epicondylitis</b>	disorder of the origin of the wrist and finger extensors accompanied by pressure pain to the medial epicondyl and pain during palmar flexion of the wrist against resistance.
<b>Focal dystonia</b>	in case of cramps during fine-motor actions (writers or musicians cramp) and the exclusion of other neurological complaints.
<b>Hand-arm vibration syndrome</b>	in case of Raynaud's phenomenon or sensory impairments or osteoarthritis at the upper extremity and sufficient exposure to hand-arm vibrations and absence of other explanations for the complaints
<b>Shoulder complaints</b>	the result of systemic complaints or complaints localised elsewhere with pain in the shoulder during active or passive abduction or exorotation.
<b>Tenosynovitis</b>	in case of pain and local swelling of the lower arm and reduced movement in one or more fingers (painful resistance test or positive proof of Finkelstein). Please also refer to Tendonitis.
<b>Tendonitis</b>	in case of pain and local swelling of the lower arm and reduced movement in one or more fingers (painful resistance test or positive proof of Finkelstein). Please also refer to Tenosynovitis.
<b>Time-contingent return to work</b>	After a period of sickness absence return to work according to a time-contingent work resumption plan with a gradual increase in activities.