The Compensation
Commissioner's Guidelines for
Health Practitioners & Employers
to manage

Work-related Upper Limb Disorders

WRULDs





in terms of Circular Instruction 180
regarding compensation for work-related
upper limb disorders (WRULDs)
(Compensation for Occupational Injuries
and Diseases Act, 1993
(Act No 130 of 1993), as Amended)

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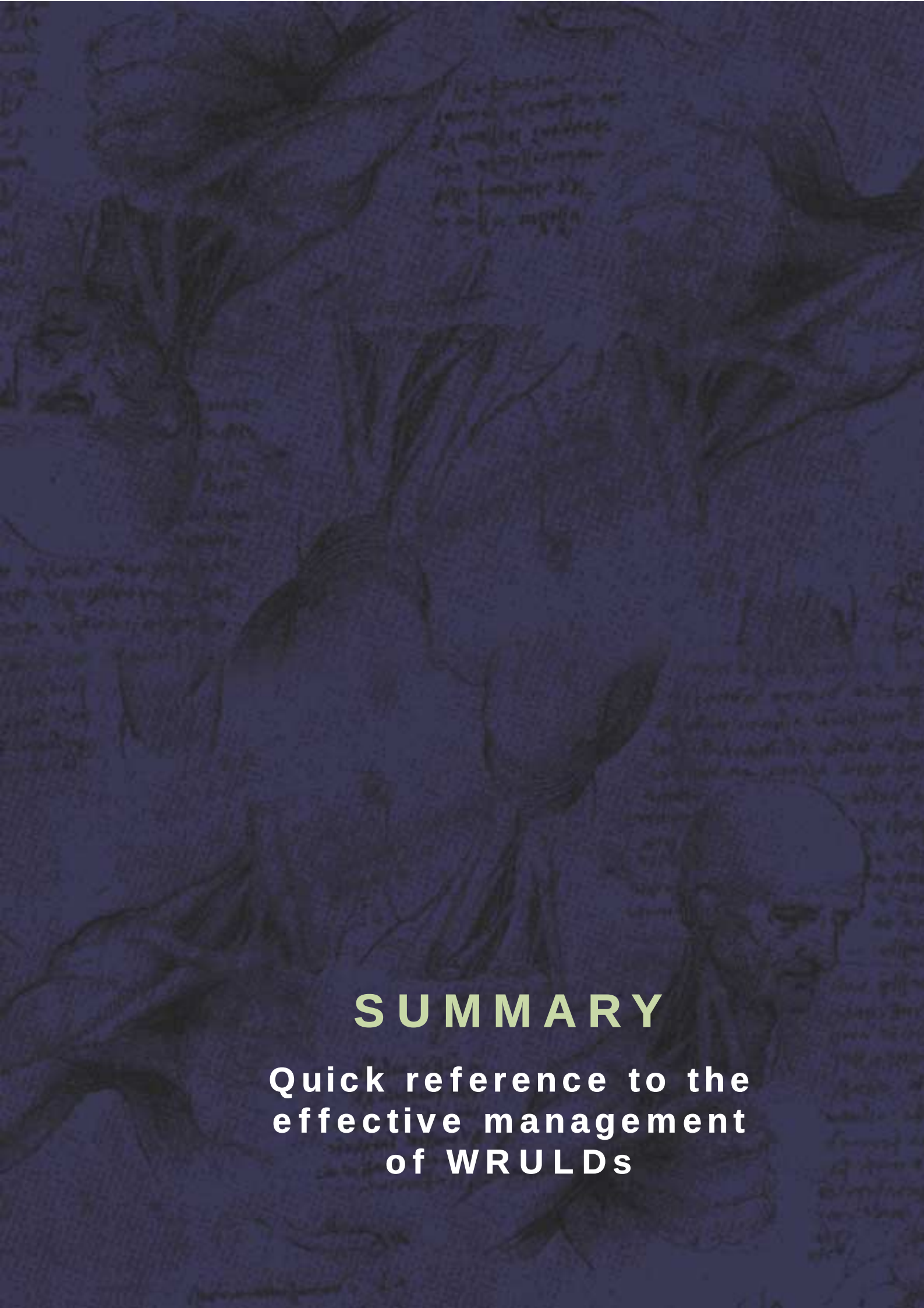
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Any comments or additional information which can assist the Compensation Commissioner in updating and improving these guidelines, are being welcomed. Please submit comments in electronic format to the medical officers of the Compensation Commissioner (info@wcomp.gov.za).

DR MMUSO RAMANTSI
Chief Medical Officer
Compensation Commissioner

9 April 2004
Pretoria



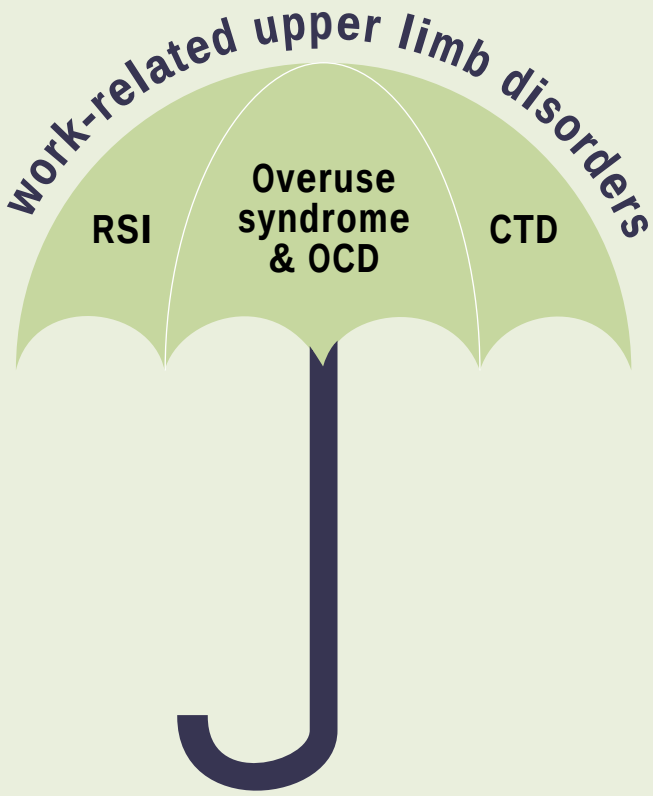
SUMMARY

Quick reference to the effective management of WRULDs

1. What are work-related upper limb disorders (WRULDs)?

Definition

WRULDs is a collective term for a group of occupational diseases that comprise musculo-skeletal disorders caused by exposure in the workplace affecting the muscles, tendons, nerves, blood vessels, joints and bursae of the hand, wrist, arm and shoulder. These are syndromes associated with characteristic symptoms and physical signs (e.g. rotator cuff syndrome, epicondylitis at the elbow, tenosynovitis and nerve entrapments such as carpal tunnel syndrome)



Classification of WRULDs according to the effect on specific tissue

- Tendon-related disorders
- Nerve-related disorders
- Bursa-related disorders
- Blood vessel disorders
- Other

2. Some definitive diagnoses of WRULDs*

Shoulder conditions

- Fractures around the shoulder joint
- Levator scapulae syndrome
- Pectoralis major strains
- **Rotator cuff syndrome** (Impingement syndrome, bicipital tendinosis, infraspinatus tendinosis, partial tear of the rotator cuff, subacromial bursitis, subdeltoid bursitis, subscapularis tendinosis, supraspinatus tendinosis)
- Rupture of the long head of the biceps

Elbow conditions

- Cubital tunnel syndrome
- **Lateral humeral epicondylitis ('tennis elbow')**
- **Medial numeral epicondylitis ('golfer's elbow')**
- Olecranon bursitis ('beat elbow')

Forearm, wrist, hand and finger conditions

- Anterior & posterior interosseous syndrome
- **Carpal tunnel syndrome**
- **De Quervain's tenosynovitis**
- Guyon (ulnar) tunnel syndrome
- Intersection syndrome
- Pronator teres syndrome
- Radial tunnel syndrome
- **Tendinosis / Tenosynovitis of extensor/flexor tendons**
- **Trigger finger / thumb**
- **White finger** (Raynaud's syndrome, vibration syndrome)

(* those marked bold are the more common conditions)

3. Principles in the diagnosis of WRULDs

Section 65 (1) (a) of the Compensation for Occupational Injuries and Diseases Act, (No. 130 of 1993) states that an employee will be entitled to compensation if it is proven to the satisfaction of the Director General that the employee has contracted a disease mentioned in Schedule 3 and that such a disease has arisen out of and in the course of his or her employment. Schedule 3 states that musculo-skeletal conditions caused by specific work activities or a work environment where particular risk factors are present will be regarded as an occupational disease. Examples of such activities or environment include:

(a) rapid or repetitive motion

(b) forceful exertion

(c) excessive mechanical force concentration

(d) awkward or non-neutral postures

(e) vibration

Compensation for WRULDs caused by exposure to these risk factors are covered in Circular Instruction 180.

Musculo-skeletal diseases which are not of the upper limbs (e.g. neck, lower limbs, etc.) are not covered in the Compensation Commissioner's guidelines or in Circular Instruction 180, but can still be reported in terms of Section 65 (1) (a) of the Compensation for Occupational Injuries and Diseases Act, 1993.

4. The Medical Officers in the Compensation Office will determine if a diagnosis of a WRULD was made according to the acceptable medical standards:

Relevant symptoms

Although symptoms will vary according to the type of disorder, common symptoms include the following:

- Burning sensation
- Fatiguability
- Loss of grip strength
- Loss of normal sensation
- Stiffness and cramps
- Muscle weakness
- Pain
- Paraesthesia (tingling)
- Sensation of cold
- Swelling

Family, medical and social history

Progression of WRULDs

WRULDs tend to be progressive and the development of these disorders can be divided into three broad stages:

Stage 1 Pain, aching and tiredness of the limb are experienced during work, but these symptoms improve overnight. This stage is most often reversible with rest alone. Sometimes guided exercise and treatment to address muscular problems are required for a cure

Stage 2 Recurrent pain, aching and tiredness of the limb occur earlier in the day, persist at night and may disturb sleep. Physical signs of the specific disorder (e.g. swelling) may be visible. These patients should be referred for physiotherapy and ergonomic assessment to prevent recurrence

Stage 3 Persistent pain, aching, weakness and fatigue of the limb are experienced even if the person had not been working for some time. Sleep is often disturbed. This can be irreversible if not treated appropriately

History of occupational exposure to risk factors

- Rapid or repetitive motion
- Movements requiring force exertion
- Excessive mechanical force concentration
- Awkward or non-neutral postures (movements at extremes of reach, static muscle loading, awkwardly sustained postures, contact stress)
- Cold environment or handling chilled or frozen products
- Vibration
- Gender (Females are more at risk)
- Age (Older employees are more at risk)
- Abnormal body mass index
- Prolonged duration of exposure
- Poor work organisation (low level of control over work rate, no breaks, etc.)
- Psychosocial stress at work and fatigue

Clinical signs

Although clinical signs will vary according to the type of disorder, common signs include the following:

- Crepitus (crackling sound in subcutaneous tissue)
- Muscle spasm
- Muscle weakness
- Reduction in range of movement
- Swelling
- Tender trigger points in muscles
- Tenderness

Please note that:

- ***Symptoms may not always be accompanied by objective signs.***
- ***Any one symptom or sign on its own is not indicative of WRULDs and some may be common with normal function.***
- ***Very few sufferers experience all the symptoms.***
- ***The symptoms do not appear in any particular order.***

Health risk assessment supporting the clinical findings

Special investigations

Perform special investigations

- if it is essential for the accurate diagnosis and treatment of the disorder
- to investigate and eliminate other causes

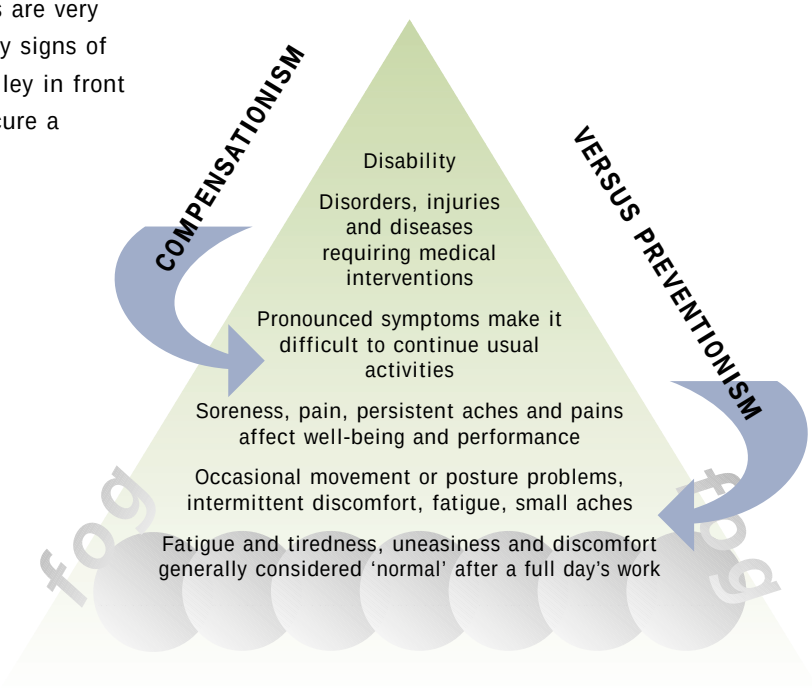
Examples

- High resolution ultrasound, X-rays, strength testing, range of motion testing, electromyography (EMG) analysis, isokinetic dynamometry

Get prior authorisation for MRI scans from the Compensation Commissioner

5. The importance of preventative strategies

Early detection and prevention of WRULDs are very important – Koemar (1994) described early signs of WRULDs as the 'fog' slumbering in the valley in front of the mountain. The 'fog' may partly obscure a volcano of WRULDs ready to explode!



6. Reporting to the Compensation Commissioner

The following documentation should be submitted to the Compensation Commissioner, or the employer individually liable, or the mutual association concerned:

W. CL. 1	EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE **OR**
W. CL. 305	EMPLOYEE AFFIDAVIT FOR AN OCCUPATIONAL DISEASE (WHEN THE EMPLOYER DOES NOT TIMEOUSLY SUBMIT THE EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE (W. CL.1))
W. CL. 14	NOTICE OF AN OCCUPATIONAL DISEASE AND CLAIM FOR COMPENSATION (SIGNED BY THE EMPLOYEE)
W. CL. 110	EXPOSURE HISTORY OR AN APPROPRIATE EMPLOYMENT HISTORY (PLEASE NOTE THAT THE NEW W. CL. 110 FORM SHOULD BE USED)
W. CL. 301	FIRST MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD) WHEN WRULDS ARE REPORTED, W. CL. 301 MUST BE USED INSTEAD OF THE USUAL W. CL. 22 (FIRST MEDICAL REPORT IN RESPECT OF AN OCCUPATIONAL DISEASE)
ALL OTHER REPORTS	THAT MAY BE RELEVANT TO THE DIAGNOSIS AND TREATMENT OF THE CONDITION (E.G. AN ERGONOMIC ASSESSMENT SUPPORTED BY PHOTOGRAPHS, VIDEO CLIPS, ETC.)

As long as the case is open, the employer must **submit the following reports on a monthly basis** to the Compensation Commissioner or Mutual Association or employer individually liable, as the case may be, until the employee's condition has become stabilised, when a **Final Medical Report (W.Cl. 302)** should be submitted.

W. CL. 6	RESUMPTION REPORT (EVEN IF THE EMPLOYEE IS AT WORK)
W. CL. 302	PROGRESS/FINAL MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD) WHEN WRULDS ARE REPORTED, W. CL. 302 MUST BE USED INSTEAD OF THE USUAL W. CL. 26 (PROGRESS/FINAL MEDICAL REPORT IN RESPECT OF AN OCCUPATIONAL DISEASE)

7. Treatment modalities

Various treatment modalities can be utilised, depending on the status of the disorder. The Compensation Commissioner will pay for reasonable medical costs once a case has been accepted. A full motivation of the diagnosis will prevent unnecessary correspondence and delays in adjudication of claim. Health professionals are encouraged to follow the *Compensation Commissioner's algorithms in managing WRULDs.* (See the Compensation Commissioner's 'Guideline for occupational health practitioners & employers to manage work-related upper limb disorders (WRULDs)' in terms of Circular Instruction 180)

A. EMPLOYEE EDUCATION

B. ANTI-INFLAMMATORY STRATEGIES

- CRYOTHERAPY (ICE)
- NON-STEROID ANTI-INFLAMMATORY DRUGS
- ELECTROTHERAPEUTIC MODALITIES (PHYSIOTHERAPY)
- INFILTRATION WITH CORTICOSTEROIDS (DUBIOUS VALUE)

C. THERAPEUTIC STRATEGIES

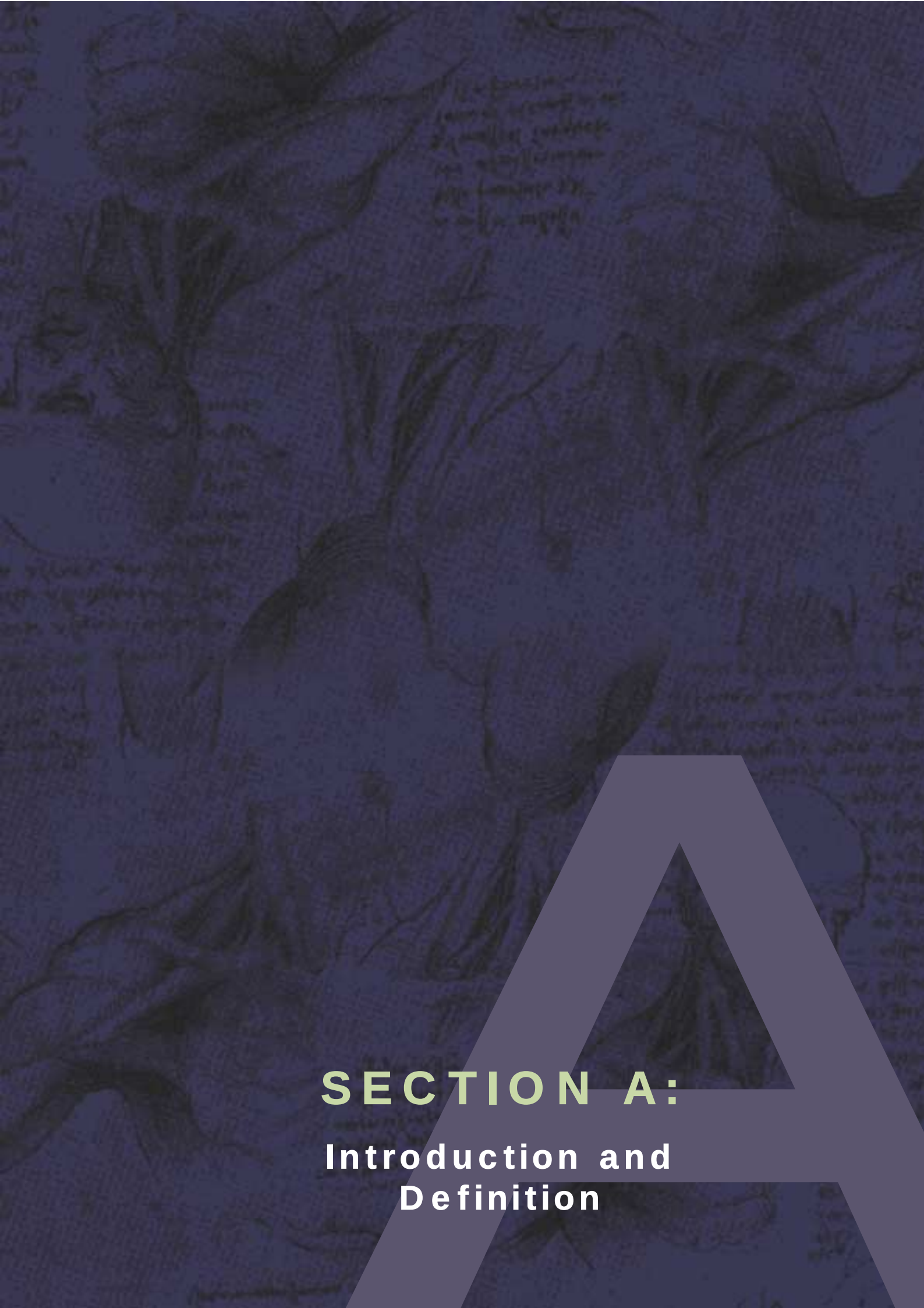
- INITIAL TREATMENT MAY INCLUDE REST
- IMMOBILISE – SPLINTAGE (OCCUPATIONAL THERAPY)
- MOBILISE (PHYSIOTHERAPY)
- MOBILISE – EXERCISE TO APPROPRIATELY STRENGTHEN MUSCLES (WORKING IN A PROPER WAY WILL ALSO STIMULATE COLLAGEN FORMATION)
- EDUCATION – GOOD WORK HABITS, PACING, JOINT CONVERSATION TECHNIQUES AND SELF-MANAGEMENT (OCCUPATIONAL THERAPY)

D. REASONABLE JOB ACCOMODATION

- TEMPORARY JOB CHANGE
- WORK STATION REDESIGN (LAYOUT, HEIGHTS, ETC.)
- TOOL AND EQUIPMENT ADAPTATION (CHANGE HANDLE DESIGN, USE OF JIGS, ETC.)
- JOB TASK MODIFICATIONS
- RETRAINING AND REASSIGNMENT
- WORK SCHEDULE MODIFICATIONS
- JOB ENLARGEMENT
- ROTATION

E. PSYCHOLOGICAL EVALUATION

F. SURGERY (AS LAST RESORT)



SECTION A:

Introduction and Definition

1. Introduction

1.1 Aim

The aim of these guidelines is to give the office of the Compensation Commissioner and health professionals dealing with work-related upper limb disorders (WRULDs) guidance on how to define, diagnose, manage and report these disorders. It also advises employers on preventative measures to be taken where such disorders occur in the workplace and how to report these to the Department of Labour.

1.2 History

Work-related upper limb disorders (WRULDs) are not a new phenomenon. They were identified as long ago as 1713 by Ramazzini, an Italian doctor generally regarded as the father of occupational medicine, who recognised that serious disease could be caused by "violent and irregular motions and unnatural postures of the body". Ramazzini described symptoms of WRULD in scribes and clerks, noting that the "incessant driving of the pen over paper causes intense fatigue of the hand and the whole arm because of the continuous strain of the muscles and tendons." In the 19th century the condition was recorded amongst artists, musicians, seamstresses, milkmaids and smiths. A range of popular terms exists to describe musculo-skeletal problems associated with particular occupations: telegraphist's cramp, hop picker's gout, fisherwoman's finger, upholsterer's hand, gamekeeper's thumb, cotton-twister's hand, tennis elbow and, more recently, pizza-cutter's wrist and Nintendonitis.[1] More recently alternative terms have been used, i.e. overuse syndrome, repetitive strain injury (RSI) and cumulative trauma disorder (CTD). Circular Instruction 180 uses the umbrella term, work-related upper limb disorders.

Recently musculo-skeletal disorders affecting the upper limbs have received considerable attention around the world, following financial claims for damages from employees considered to have developed WRULDs. Important differences of opinion still exist, for instance as to how the disorders should be defined. The term 'repetitive strain injury' (RSI) is medically imprecise. A more descriptive title would be 'regional pain syndrome'.[2] Controversy also arises as to whether certain disorders, such as carpal tunnel syndrome, are related to workplace ergonomic factors. Although some of these conditions are known to be related to non-occupational causes, such as pregnancy or rheumatoid arthritis, occupational factors play an important aetiological role in other cases.[3]

Most of the information regarding WRULDs is available from developed countries and although many recommendations will be applicable to developing countries, there is a need for research on WRULDs in the South African context. This is particularly pertinent in industrially developing countries (IDCs) where there is a high prevalence of manual labour. This is likely to result in more musculo-skeletal disorders than is reported in advanced countries.[4]

1.3 The impact of WRULDs on the economy

No statistics are available for South Africa regarding the impact of WRULDs on health care and the economy.[5] However, internationally WRULDs are having an alarming impact, causing significant occupational health problems, estimated to affect many millions of employees annually.[6]

The Unites States of America's Bureau of Statistics (1999) reported that among major disabling injuries and illnesses, the average days away from work were highest for carpal tunnel syndrome (27 days), fractures (20 days), and amputations (18 days). Among the leading events and exposures, repetitive motion such as grasping tools, lifting bricks and typing, resulted in the longest absences from work – an average of 17 days. Conservative estimates calculate the cost of work-related musculo-skeletal disorders in the USA at between $13 and $20 billion annually.[7]

There is substantial evidence within the European Union that WRULDs are a significant problem with respect to ill health and associated costs within the workplace. It is likely that the size of the problem will increase as more employees are becoming exposed to

1 *London Hazard Centre (1997). Ch 4, p1.*
2 *NIOSH (1997). p 23.*
3 *HSE (1996). Introduction, p 1.*
4 *Scott P et al. (2002)*
5 *SAMOSA (2002)*
6 *Personal communication – Prof PA Scott, Department of Human Kinetics and Ergonomics, Rhodes University, South Africa*
7 *NIOSH (1997)*

workplace risk factors for these disorders within the European Union.[8]

Where data do exist (e.g. in the Nordic countries and the Netherlands) the cost has been estimated at between 0.5% and 2% of Gross National Product.[9]

In Britain, the Health and Safety Executive (HSE) estimated that WRULDs incurred approximate costs of £1.25 billion per year[10].

Although there are limited records on the incidence of WRULDs in South Africa, it is very likely to be substantially higher than that reported for the USA and Europe. This is due to the excessive physical demands placed on employees in industrially developing countries.

The direct costs for compensation of musculo-skeletal disorders are appreciated far more than the indirect costs associated with disruptions in productivity and quality, worker replacement costs, training and other work absence costs. It is believed that the direct costs due to compensated work-related musculo-skeletal disorders are a relatively low proportion of the total costs.[11]

1.4 Why it is important to prevent WRULDs

WRULDs may have severe consequences if prompt action is not taken, such as:

- Decreased productivity due to pain and increased fatigue.
- Inability to work. Well motivated and productive people have had to give up work because of pain and disablement from WRULDs. Others have been so badly affected that simple household tasks become difficult.
- Lost production when employees take time off sick.
- Compensation claims from those who have to stop working because of WRULDs.
- The Occupational Health and Safety Act and the Mine Health and Safety Act require employers to assess health and safety risks, and to put measures in place to ensure the health and safety of employees.

  Failure to comply could lead to legal action against the employer by the Department of Labour, who administers the Occupational Health and Safety Act, or the Department of Minerals and Energy, who administers the Mine Health and Safety Act.

1.5 What is covered by Circular Instruction 180 and what not?

Section 65 (1) (a) of the Compensation for

Table 1. Direct and indirect costs associated with WRULDs

DIRECT COSTS	▪ MEDICAL EXPENSES ▪ EMPLOYEES COMPENSATION PREMIUMS ▪ LOST WORKDAYS ▪ PAID LEAVE	±20%
INDIRECT COSTS	▪ LOSS OF INJURED WORKER'S PRODUCTION ▪ TIME LOST BY UNINJURED EMPLOYEES ▪ TEMPORARY RE-PLACEMENT ▪ TRAINING AND RE-TRAINING ▪ REPORTING AND CLAIMS ▪ MANAGEMENT TIME ▪ WORKER / MANAGEMENT DISCUSSIONS ▪ LITIGATION PROCESSES	±80%

8 European Agency for Safety and Health at Work (1999). Summary p. 7
9 European Agency for Safety and Health at Work (1999). Ch 2.3, p. 23
10 HSE (1996). Ch 2.3, p. 23
11 Hagberg M et al. (1995).

Occupational Injuries and Diseases Act, (No. 130 of 1993) states that an employee will be entitled to compensation if it is proven to the satisfaction of the Director General that the employee has contracted a disease mentioned Schedule 3 and that such a disease has arisen out of and in the course of his or her employment. Schedule 3[12] states that *musculo-skeletal diseases caused by specific work activities or work environment where particular risk factors are present* will be regarded as an occupational disease. *Examples of such activities or environment include:*

(a) rapid or repetitive motion

(b) forceful exertion

(c) excessive mechanical force concentration

(d) awkward or non-neutral postures

(e) vibration

Compensation for WRULDs caused by exposure to these risk factors are covered in Circular Instruction 180.

Musculo-skeletal diseases which are not of the upper limbs (e.g. neck, lower limbs, etc.) are not covered in these guidelines or in Circular Instruction 180, but can still be reported in terms of Section 65 (1) (a) of the Compensation for Occupational Injuries and Diseases Act, 1993.

It is necessary to emphasise the importance of referring employees to adequately trained and experienced health professionals when a WRULD is suspected. These include occupational medicine practitioners, physiotherapists, occupational therapists, ergonomists, and orthopaedic specialists, amongst others.

1.6 Occupational injuries vs. diseases

A case of WRULD will be regarded as an occupational disease and not as an 'injury' – and should therefore be reported as such.

However, if a case of WRULD develops as a result of an occupational injury (e.g. a fracture into the wrist joint with the consequent development of carpal tunnel syndrome), the WRULD should be considered part of the injury and the Compensation Commissioner should be notified in the subsequent progress reports of the occupational injury.

1.7 Compensation and prevention (COIDA & OHSA/MHSA)

WRULDs must be reported to the Compensation Commissioner so that payment of medical costs, sick leave and compensation can be considered in terms of the COID Act (Table 20, p. 43).

WRULDs should also be reported to the Provincial Executive Manager of Labour (in terms of the Occupational Health and Safety Act) or to the Regional Principal Inspector of Mines (in terms of the Mine Health and Safety Act) so that they can ascertain whether the health hazards causing this disease were reduced through ergonomic improvement.

Useful forms and templates are included as addenda to these guidelines. These templates may be used or adapted to suit individual circumstances. It is not compulsory to use these forms or templates, but it is highly recommended.

12 Amendment of Schedule 3 as published in Government Gazette [Number 26302 – 30 April 2004]

2. Definition

Work-related upper limb disorders are occupationally-induced conditions that develop over time to affect the musculo-skeletal and peripheral nervous system of the upper limbs.

Previously a number of other terms have been used which probably describe the same entities, but in the strictest sense do not overlap completely,[13] such as *repetitive strain injury* (RSI), *cumulative trauma disorder* (CTD), *occupational overuse syndrome* (OOS), *occupational cervico-brachial disorder* (OCD), etc. For the purpose of this instruction the umbrella term, *work-related upper limb disorders* (WRULDs), will be used. This can be represented simply by Figure 1 (HSE, 1996) shown below.

The symptoms of pain and loss of motion can be the result of fatigued muscles, overloaded muscles, muscle imbalances, degeneration of tendons and their attachments, inflamed tendon sheaths or compressed nerves.

There is controversy surrounding the work-relatedness of many musculo-skeletal disorders, and it is likely that many of those reported in the workplace have a multifactorial origin with psychosocial and contributing individual factors. There is, however, strong evidence of a causal relationship between at least some of these conditions, and repetitive, forceful work involving the body parts affected and/or the sustained postures adopted during work.

Circular Instruction 180 states that WRULDs are caused, aggravated or precipitated by one or more of the following risk factors, singly or in combination:

- Highly repetitive movements
- Movements requiring force
- Movements at the extremes of reach
- Static muscle loading
- Awkwardly sustained postures
- Contact stress (e.g. uncomfortable gripping and twisting, sharp edges to hand tools, desk edges, etc.)
- Vibration

In terms of this instruction, upper limb musculo-skeletal disorders will be presumed to be work-related (Table 3, p. 17) if the nature of the work performed includes exposure to the relevant risk factors.

Work-related musculo-skeletal disorders of body parts other than the upper limbs are not covered in Circular Instruction 180 or these guidelines, but it will be considered in terms of Section 65 (1) (b) of the Compensation for Occupational Injuries and Diseases Act.

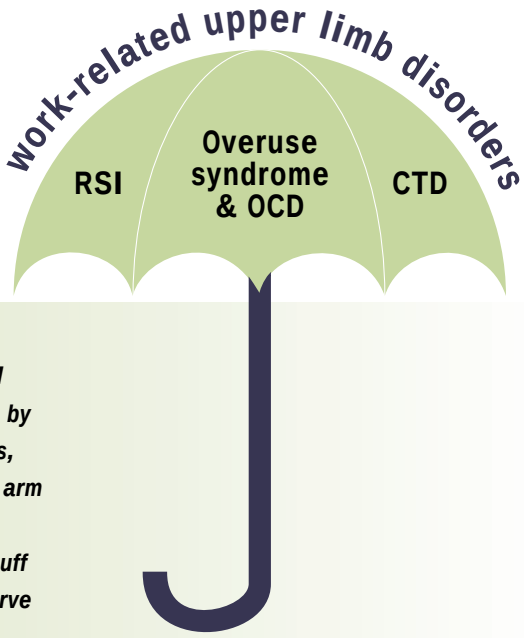


Figure 1. WRULDs is an umbrella term

WRULDs is a collective term for a group of occupational diseases that comprise musculo-skeletal disorders caused by exposure in the workplace affecting the muscles, tendons, nerves, blood vessels, joints and bursae of the hand, wrist, arm and shoulder. These are syndromes associated with characteristic symptoms and physical signs (e.g. rotator cuff syndrome, epicondylitis at the elbow, tenosynovitis and nerve entrapments such as carpal tunnel syndrome).

13 HSE (1996). Section 1, p 1.

B

SECTION B-1:

For healthcare workers

Classification

3. The classification of WRULDs according to specific types of body tissue

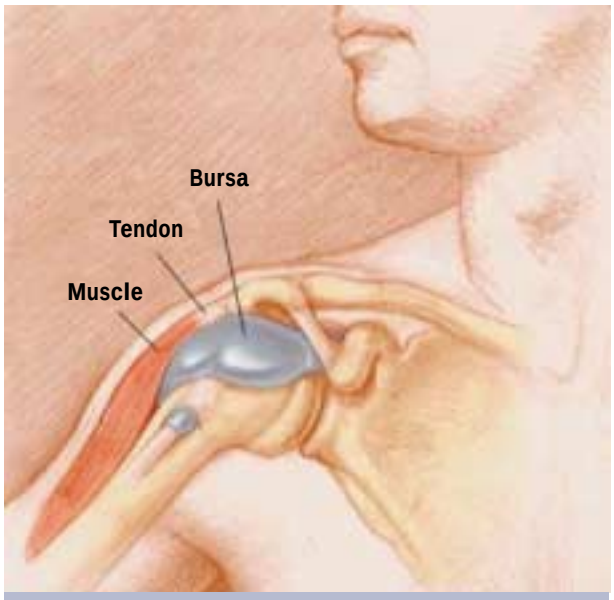
WRULDs can be classified according to the specific types of body tissue that are involved.[14] Various degrees of, and variations of the following conditions can be the result of overuse:

- Tendon-related disorders
- Nerve-related disorders
- Bursa-related disorders
- Blood vessel disorders
- Other

3.1 Tendon-related disorders (tendinopathies)

Khan (2000) and Noakes (2002)[15] stated that numerous investigators worldwide have shown that the pathology underlying overuse tendinopathies is primarily tendinosis (i.e. collagen degeneration).

Figure 2. Tendinosis is the painful degeneration of a tendon, typically caused by overuse (e.g. repetitive movements, etc.), injury or aging[16]



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One factor that may interfere with optimal treatment is that common tendinopathies may be mislabelled as tendonitis. Advances in the understanding of tendon pathology indicate that conditions that have been traditionally labelled as lateral epicondylitis, rotator cuff tendonitis, etc., are in fact tendinosis. An increasing body of evidence supports the notion that these overuse tendon conditions do not involve inflammation ("-itis"), but collagen degeneration ("-osis"). If this is correct, then the traditional approach to treating tendinopathies as an inflammatory tendonitis is likely to be flawed.[17]

Tendinosis is intratendinous collagen degeneration commonly due to aging, microtrauma (e.g. chronic overuse with repetitive movements), or vascular compromise.

The term tendinosis was first used by German researchers in the 1940s. Perugia[18] noted the 'remarkable discrepancy between the terminologies generally adopted for these conditions (which are obviously inflammatory since the ending *itis* is used) and their histopathologic substratum, which is largely degenerative.'

Thus, occupational health practitioners must shift their perspective and acknowledge that tendinosis is the pathology being treated in most cases and that treatment needs to combat collagen breakdown rather than inflammation. Tendinosis may require a reasonable period of relative rest and attention to strengthening with the aim of first breaking the tendinosis cycle. Once this is done, the patient uses modalities that optimise collagen production and maturation so that the tendon achieves the necessary tensile strength for normal function.

Examples: Epicondylitis (tennis and golfer's elbow), rotator cuff impingement syndrome of the shoulder, etc.

Tenosynovitis: Rapid, repetitive movements of the upper extremities, particularly the hands and fingers, can cause inflammation of the synovial lining of the tendon sheath.[19] The consequent swelling causes pain and impedes movement of the tendon in the sheath.

14 European Agency for Safety and Health at Work (1999). Ch 2.1, p 16.
15 Personal communication with Prof Tim Noakes (UCT Sports Science Institute)
16 Used with the permission of Mayo Foundation for Medical Education and research (© 1998–2002)
17 Khan, K (2000).
18 Perugia L et al (1986)
19 Evans, G (1997)

Table 2. Bonar's classification of overuse tendon conditions

PATHOLOGIC DIAGNOSIS	MACROSCOPIC PATHOLOGY	HISTOLOGICAL FINDING
TENDINOSIS	INTRATENDINOUS DEGENERATION COMMONLY DUE TO AGING, MICRO-TRAUMA, OR VASCULAR COMPROMISE	COLLAGEN DISORIENTATION, DISORGANISATION, AND FIBRE SEPARATION BY INCREASED MUCOID GROUND SUBSTANCE, INCREASED PROMINENCE OF CELLS AND VASCULAR SPACES WITH OR WITHOUT NEOVASCULARISATION, AND FOCAL NECROSIS OR CALCIFICATION
PARTIAL RUPTURE OR TENDINITIS	SYMPTOMATIC DEGENERATION OF THE TENDON WITH VASCULAR DISRUPTION, INFLAMMATORY REPAIR RESPONSE	DEGENERATIVE CHANGES AS NOTED ABOVE WITH SUPER-IMPOSED EVIDENCE OF TEAR, INCLUDING FIBROBLASTIC AND MYOFIBROBLASTIC PROLIFERATION, HAEMORRHAGE, AND ORGANISING GRANULATION TISSUE
PARATENDONITIS (INCLUDING TENOSYNOVITIS)	INFLAMMATION OF THE OUTER LAYER OF THE TENDON (PARATENDON) ALONE WHETHER OR NOT THE PARATENDON IS LINED BY SYNOVIAL	MUCOID DEGENERATION IS SEEN IN THE AREOLAR TISSUE: A SCATTERED MILD MONONUCLEAR INFILTRATE WITH OR WITHOUT FOCAL FIBRIN DEPOSITION AND FIBRINOUS EXUDATE
PARATENDONITIS (INCLUDING TENOSYNOVITIS) WITH TENDINOSIS	PARATENDONITIS ASSOCIATED WITH INTRATENDINOUS DEGENERATION	DEGENERATIVE CHANGES AS NOTED IN TENDINOSIS WITH MUCOID DEGENERATION WITH OR WITHOUT FIBROSIS AND SCATTERED INFLAMMATORY CELLS IN THE PARATENON ALVEOLAR TISSUE

Source: Khan (2000)

It is called tenosynovitis. Repeated exposure ultimately causes the growth of scar tissue and results in pain, reduced mobility and weakness. [20]

Examples: Trigger finger, De Quervain's tenosynovitis, etc.

Tendonitis is inflammation of tendons and of tendon-muscle attachments.[21] It is a rather rare condition, but may occur occasionally in the Achilles tendon in conjunction with a primary tendinosis.[22] Many clinicians and medical publications still mistakenly use the term tendonitis (inflammation), when they actually mean tendinosis (degeneration).

3.2 Nerve-related disorders

Repeated or prolonged pressure or irritation can cause damage to the nerve that supplies the muscle or passes through it. The nerve irritation causes paraesthesia (numbness, tingling) and changes in sensation in the areas supplied by the nerve.[23]

Examples: Carpal tunnel syndrome (by far the most common), cubital tunnel syndrome, Guyon tunnel syndrome, pronator teres syndrome, radial tunnel syndrome, anterior interosseous nerve syndrome, posterior interosseous nerve entrapment etc.

3.3 Bursa-related disorders

Bursas are 'cushions' which protect muscles, tendons and skin from friction against bones (e.g. at the elbow and shoulder, during movements of the joints).[24] (See Figure 2). Overexertion can lead to inflammation in these bursas and causes a dull aching pain, called bursitis.[25] It can also cause an effusion within the sac of the bursa.

Examples: Olecranon bursitis (beat elbow), subacromial burisits, subdeltoid bursitis, etc.

3.4 Blood vessel disorders

Work-related blood vessel disorders are usually due to vibration or hammering. Exposure to vibration at the hand interface and its effects on biological tissues are well established and it is generally recognised that excessive exposure may result in disturbances to

20 Bridger, RS (1995). p. 135
21 HSE (1996). Ch 3, p. 5
22 Khan, K (2000)
23 Bridger, RS (1995). p. 136
24 Bridger, RS (1995). p. 136
25 House of Commons (1998). p. 12

finger blood circulation and also neurological and locomotor functions of the hand and arm.[26&27]

Examples: Raynaud's phenomenon, hand-arm vibration syndrome, hypothenar hammer syndrome, etc.

3.5 Other

The effect of work on muscles and joints are problematic (e.g. static loading can cause muscle imbalances[28] and trigger points[29]). (Keep in mind that static loading of proximally situated muscles may be more affected than tendons situated more distally). Muscles and joints form, per definition, part of upper limb disorders, such as tension neck syndrome, muscle sprain and strain (biceps strain, torn muscles), myalgia and myositis, and osteoarthritis. But the effect of work on muscles and joints are very controversial and fall outside the scope of these guidelines. The same applies to musculo-skeletal 'injuries', because in these guidelines we are only dealing with 'occupational diseases/disorders' of the upper limb.

26 European Agency for Safety and Health at Work (1999). Ch 5.6, p. 70
27 Mennen (1999)
28 Pheasant et al. (1991)
29 MacKinnon et al. (1997)

B

SECTION B-2:

For healthcare workers

Shoulder, Elbow, Wrist, Hand and Fingers

4. Shoulder

4.1 Relevant anatomy

Healthy shoulder function is essential for many working tasks. Manual materials handling (MMH) tasks, particularly those involving lifting and lowering of loads, may place considerable cumulative stress on the shoulder joint. Sound knowledge of the functional anatomy and dynamic forces acting around the shoulder joint is important to understand the pathological processes that commonly affect this area. The shoulder (glenohumeral) joint is a ball and socket joint and stability of this joint is provided by static and dynamic constraints. Static constraints include the glenohumeral ligaments, glenoid labrum and capsule. The dynamic constraints are predominantly the rotator cuff musculature (refer Figure 3. p.17 and Figure 4, p. 18). An understanding of the musculature involved in certain shoulder movements will help to determine the structures likely to be more strained. Presented in Table 4 are movements of the shoulder complex and the muscles involved in these movements.

Table 3. The work-relatedness of musculo-skeletal disorders: Physical work risk factors

BODY PART RISK FACTOR	STRONG EVIDENCE	EVIDENCE	INSUFFICIENT EVIDENCE	EVIDENCE OF NO EFFECT
NECK AND NECK/SHOULDER				
REPETITION		*		
FORCE		*		
POSTURE	*			
VIBRATION			*	
SHOULDER				
REPETITION		*		
FORCE			*	
POSTURE		*		
VIBRATION			*	
ELBOW				
REPETITION			*	
FORCE		*		
POSTURE			*	
COMBINATION	*			
HAND/WRIST				
CARPAL TUNNEL SYNDROME				
REPETITION		*		
FORCE		*		
POSTURE			*	
VIBRATION		*		
COMBINATION	*			
TENDINOSIS				
REPETITION		*		
FORCE		*		
POSTURE		*		
COMBINATION	*			
HAND-ARM VIBRATION SYNDROME				
VIBRATION	*			

Source: NIOSH (1997)

Table 4. Muscles involved in shoulder (glenohumeral and scapular) movements

	MOVEMENT	PRIME MOVERS	SECONDARY MOVERS
GLENOHUMERAL	FLEXION	ANTERIOR DELTOID CORACOBRACHIALIS	PECTORALIS MAJOR (CLAVICULAR HEAD)
	EXTENSION	LATISSIMUS DORSI TERES MAJOR POSTERIOR DELTOID	TERES MINOR TRICEPS
	ABDUCTION	MID DELTOID SUPRASPINATUS	ANTERIOR/POSTERIOR DELTOID SERRATUS ANTERIOR
	ADDUCTION	PECTORALIS MAJOR LATISSIMUS DORSI	TERES MAJOR
	EXTERNAL ROTATION	INFRASPINATUS TERES MINOR	POSTERIOR DELTOID
	INTERNAL ROTATION	SUBSCAPULARIS PECTORALIS MAJOR LATISSIMUS DORSI TERES MAJOR	ANTERIOR DELTOID
SCAPULAR	RETRACTION	RHOMBOID MAJOR/MINOR TRAPEZIUS	
	PROTRACTION	SERRATUS ANTERIOR	PECTORALIS MINOR
	UPWARD ROTATION	TRAPEZIUS SERRATUS ANTERIOR	
	DOWNWARD ROTATION	RHOMBOIDS	LATISSIMUS DORSI PECTORALIS MINOR
	ELEVATION	TRAPEZIUS LEVATOR SCAPULAE RHOMBOIDS	
	DEPRESSION	LATISSIMUS DORSI PECTORALIS MINOR	

Source: Scott, P. et al. (2002)

4.2 Rotator cuff syndrome (impingement syndrome)

The shoulder is particularly prone to damage where persons are executing repetitive overhead movements.[30] The same applies to static loading and/or sustained postures. They are prone to develop bursal side tears secondary to impingement in the rotator cuff region.[31] (See Figure 2, p.14)

Table 5. Job activities and tasks typically associated with rotator cuff syndrome

BELT CONVEYOR ASSEMBLY	OVERHEAD ASSEMBLY	REACHING
LIFTING	PUNCH PRESS OPERATION	ELECTRICAL WORK
PACKING	CONSTRUCTION WORK	OVERHEAD WELDING
CARRYING LOAD ON SHOULDERS	OVERHEAD PAINTING	WORK WITH THE ARMS AWAY FROM THE BODY

Source: Guild R, et al. (2001)

30 *Bridger RS. (1995). Ch 5, p. 140*

31 *Uhthoff HK et al. (1991)*

Shoulder pain exacerbated by abduction against resistance is a sign of rotator cuff lesions. Although an active range of movement of the joint is limited by pain, passive range of motion remains approximately normal.[32] Acute rotator cuff tendinosis is diagnosed if the symptoms are of 12 weeks duration or less. Chronic rotator cuff rupture presents a marked difficulty initiating abduction with weakness and limitation of movement.[33] Pain is usually experienced towards the end of the active range of movement.[34] An understanding of the 'painful arc' is a useful diagnostic tool. Pain is usually reproduced in the range of 70° to 120° abduction.

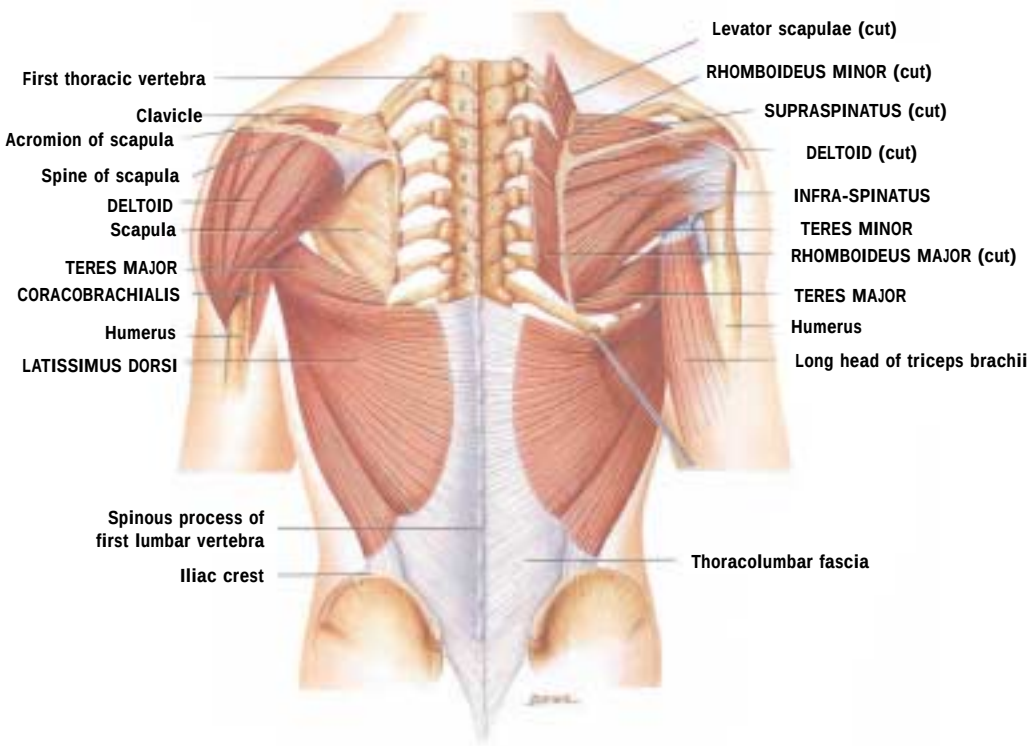
Rotator cuff syndrome (impingement syndrome) includes the following conditions:

- Bicipital tendinosis
- Infraspinatus tendinosis
- Partial tear of the rotator cuff
- Subacromial bursitis
- Subdeltoid bursitis
- Subscapularis tendinosis
- Supraspinatus tendinosis
- Tendonisis of the shoulder

4.3 Other work-related shoulder conditions

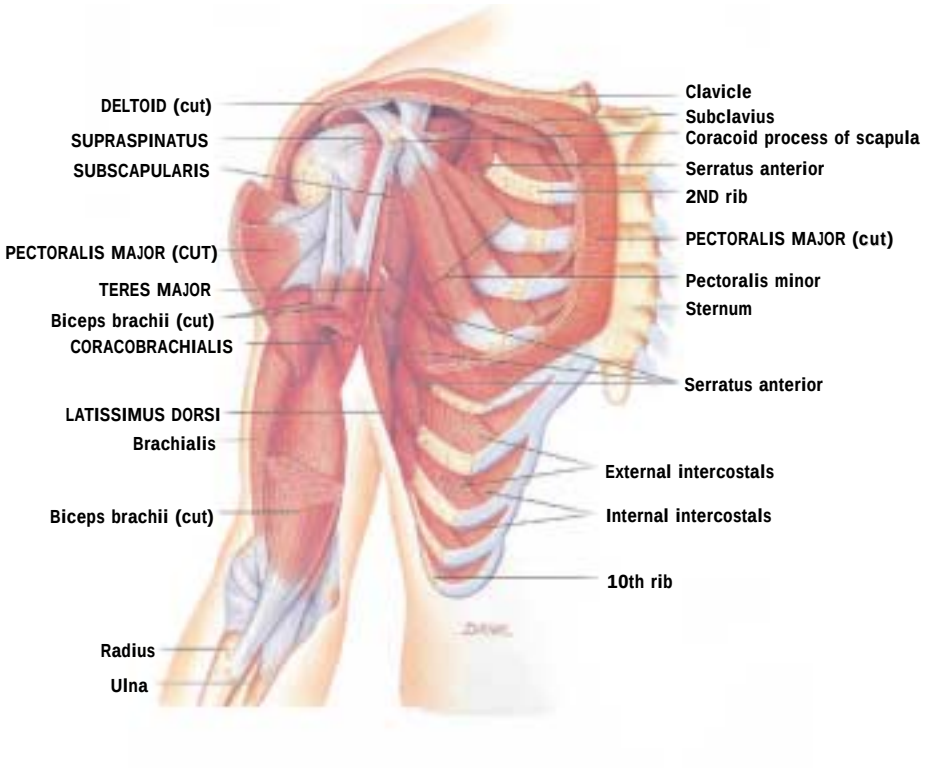
- Rupture of the long head of the biceps
- Pectoralis major strains
- Levator scapulae syndrome
- Fractures around the shoulder joint

Figure 3. Posterior view of the shoulder complex[35]



32 Cyriax J (1988)
33 Vecchio P et al. (1995)
34 Cyriax J (1988)
35 Taken from Tortora (2002)

Figure 4. Anterior view of the shoulder complex[36]



36 Taken from Tortora (2002)

5. Elbow

5.1 Anatomy of the elbow

Use of the upper limb during many work activities demands a well-functioning elbow. Refer to Figure 3, Figure 4, Figure 5 and Figure 6 while reading through the table below which lists the muscles involved in the movement of the humerus, radius and ulna.

Epicondylitis is a common and well-defined clinical entity affecting the elbow. It is a tendinosis characterised by pain at the epicondyle, due to intratendinous degeneration of the tendon-bone attachment. It is more frequent laterally ('tennis elbow') than medially ('golfer's elbow'). Epicondylitis is due to unusual force, repetition, forceful gripping or repeated supination and pronation.[37]

Entrapment neuropathies of the forearm should always be suspected with 'resistant' tennis elbow (e.g. radial tunnel syndrome can mimic lateral epicondylitis).[38]

Table 6. Muscles that move the humerus, radius and ulna

	MOVEMENT	PRIME MOVERS	SECONDARY MOVERS
HUMERUS	FLEXION	PECTORALIS MAJOR (CLAVICULAR HEAD) ANTERIOR DELTOID CORACOBRACHIALIS	
	EXTENSION	PECTORALIS MAJOR (STERNOCOSTAL HEAD) LATISSIMUS DORSI POSTERIOR DELTOID TERES MAJOR TERES MINOR	
	ABDUCTION	LATERAL DELTOID	SUPRASPINATUS
	ADDUCTION	PECTORALIS MAJOR LATISSIMUS DORSI TERES MINOR CORACOBRACHIALIS	INFRASPINATUS TERES MAJOR
	MEDIAL ROTATION	PECTORALIS MAJOR LATISSIMUS DORSI ANTERIOR DELTOID SUBSCAPULARIS	TERES MAJOR
	LATERAL ROTATION	POSTERIOR DELTOID INFRASPINATUS TERES MINOR	
RADIUS AND ULNA	FLEXION	BICEPS BRACHII BRACHIALIS BRACHIORADIALIS	
	EXTENSION	TRICEPS BRACHII ANCONEUS	
	PRONATION	PRONATOR TERES PRONATOR QUADRATUS	
	SUPINATION	SUPINATOR	

Source: Scott et al. (2002)

37 HSE (1996). Ch 4, p. 1

38 HSE (1996)

5.2 Lateral humeral epicondylitis ('tennis elbow')

Lateral elbow pain is very common in manual employees with the most common cause being overuse. This condition has traditionally been referred to as 'lateral epicondylitis'. The primary pathological process involved in this condition is degeneration of the extensor carpi radialis brevis (refer Table 6 and Table 8). Although a common disorder, there are many other injuries which can affect the elbow and which impede movements of the humerus, radius and ulna.[39]

Wrist dorsiflexion, such as in the power grasp, and exposure of the arms to high forces and repetitive tasks can lead to degeneration at the attachment of the extensor muscles of the wrist to the lateral humeral epicondyle.

This condition also often starts with an acute direct injury to the site of the muscle origin which progresses to an epicondylitis.

5.3 Medial epicondylitis ('golfer's elbow')

Overuse of the finger flexors and the wrist flexors/pronators, as in repetitive work with the elbow flexed, leads to pain in the common proximal flexor origin on the medial aspect of the elbow.[40]

5.4 Other elbow conditions

- Olecranon bursitis (beat elbow)[41]
- Cubital tunnel syndrome

Table 7. Job activities and tasks typically associated with elbow conditions

EPICONDYLITIS	DRILLERS	HAMMERING
	CARPENTERS	REPETITIVE WRIST EXTENSION
	POLISHERS	REPETITIVE WRIST GRASP
	TURNING SCREWS	COMPUTER USERS
	SMALL PARTS ASSEMBLY	
CUBITAL TUNNEL SYNDROME	RESTING FOREARM NEAR ELBOW ON A HARD SURFACE	
	RESTING FOREARM NEAR ELBOW ON SHARP EDGE	
	RESTING FOREARM NEAR ELBOW WHILE REACHING OVER OBSTRUCTION	
	REPETITIVE OR STATIC ELBOW FLEXION	

Source: Bridger (1995); Guild et al. (2001)

39 Scott, P. et al (2002)
40 Williams N (1993)
41 HSE (1996). Ch 4, p. 11

6. Wrist, hand and finger disorders

6.1 Anatomy

Although the wrist and hand are frequently traumatised during work, there is a tendency to overlook the severity of the injuries to these areas, with the result that a number of important conditions are not diagnosed. Overuse conditions to the wrist are common, while direct trauma to the hand and digits is another concern. Presented in Figure 5 (p. 24) and Figure 6 (p. 25) are the musculature of the wrist, hand and digits. The anterior compartment muscles function as flexors, and the posterior compartment muscles function as extensors. Outlined below in Table 8, are the muscles involved in various wrist, hand and digit movements.

6.2 De Quervain's tenosynovitis

De Quervain's tenosynovitis is sometimes called stenosing tenosynovitis of the abductor pollices longus and extensor pollices brevis tendons. The patient presents with pain over the styloid process of the radius. A common and well-recognised variant of De Quervain's tenosynovitis is characterised by a localised swelling at the base of the thumb and thickening of the fibrous sheath or reticulum. Sometimes a palpable nodule, of which the precise cause is unknown, can be felt in the course of the abductor pollicis longus and extensor pollicis brevis tendons.[42]

This condition can result from overuse of the thumb, such as in the repetitive grasping of a straight handled

Table 8 Muscles involved in hand, wrist and digit movements

	MOVEMENT	PRIME MOVERS	SECONDARY MOVERS
THE WRIST AND HAND	FLEXION	FLEXOR CARPI RADIALIS FLEXOR CARPI ULNARIS FLEXOR DIGITORUM PROFUNDUS	PALMARIS LONGUS
	EXTENSION	EXTENSOR CARPI RADIALIS EXTENSOR CARPI RADIALIS BREVIS EXTENSOR DIGITORUM EXTENSOR CARPI ULNARIS EXTENSOR POLLICIS BREVIS EXTENSOR INDICIS	
	ABDUCTION	ABDUCTOR POLLICIS LONGUS	FLEXOR CARPI RADIALIS EXTENSOR CARPI RADIALIS EXTENSOR POLLICIS LONGUS
	ADDUCTION	FLEXOR CARPI ULNARIS EXTENSOR CARPI ULNARIS	
DIGITS	FLEXION	FLEXOR DIGITORUM SUPERFICIALIS (MIDDLE PHALANX) FLEXOR POLLICIS LONGUS (THUMB) FLEXOR DIGITORUM PROFUNDUS	
	EXTENSION	EXTENSOR DIGITORUM EXTENSOR DIGITI MINIMI (LITTLE FINGER) EXTENSOR POLLICIS BREVIS (THUMB) EXTENSOR POLLICIS LONGUS (THUMB) EXTENSOR INDICIS (INDEX FINGER)	ABDUCTOR POLLICIS BREVIS (THUMB)
	ABDUCTION	ABDUCTOR POLLICIS LONGUS (THUMB)	

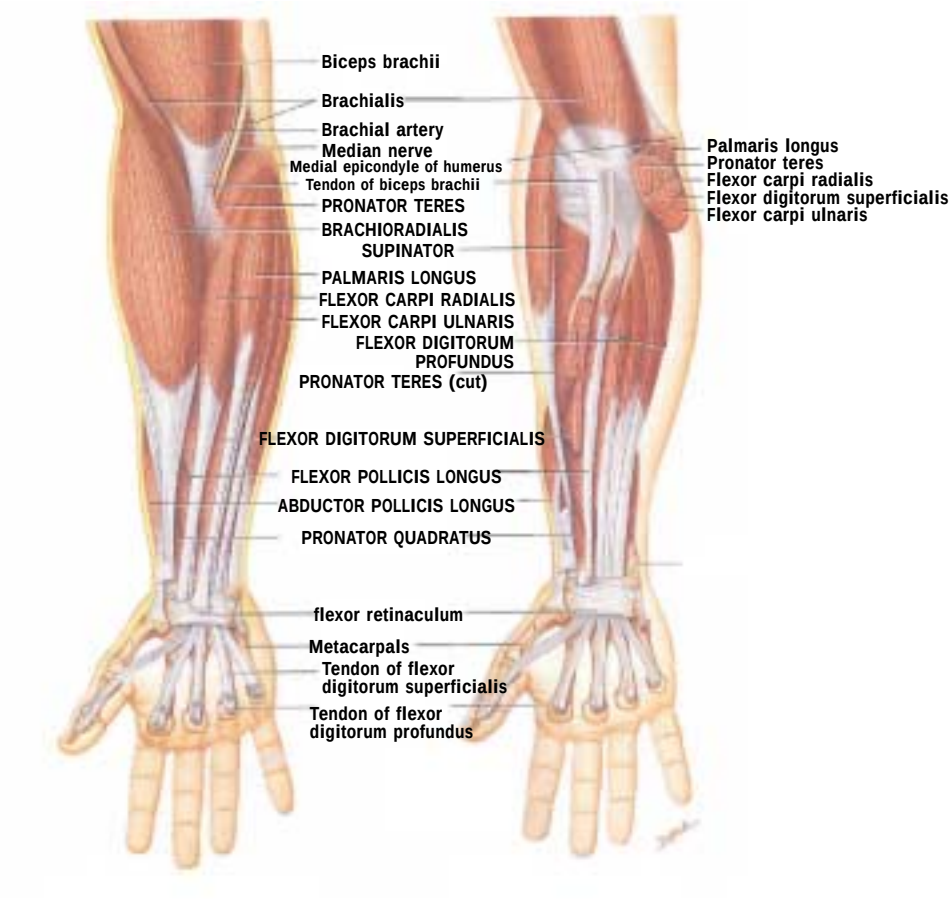
Source: Scott et al. (2002)

42 HSE (1996). Ch 4, p. 6

tool (e.g. screwdriver, endo files of dentist). The tendons of the muscles of the forearm are stretched and rub against the radial styloid, causing inflammation of the tendon sheath and leading to pain and localised swelling (tenosynovitis of the first dorsal compartment of the wrist) over the lateral aspect of the distal radius.[43] Incidentally, this condition is also common in post-partum women.

Diagnostic criteria suggest pain and tenderness localised to the radial aspect of the wrist plus a positive Finkelsteins's test (ask patient to make a fist over his thumb, and ulnarly deviating wrist – sharp pain at this site is produced by active extension and abduction of the thumb against resistance).[44]

Figure 5. Anterior view of the muscles that move the wrist, hand and digits[45]



(a) Anterior superficial view **(b) Anterior deep view**

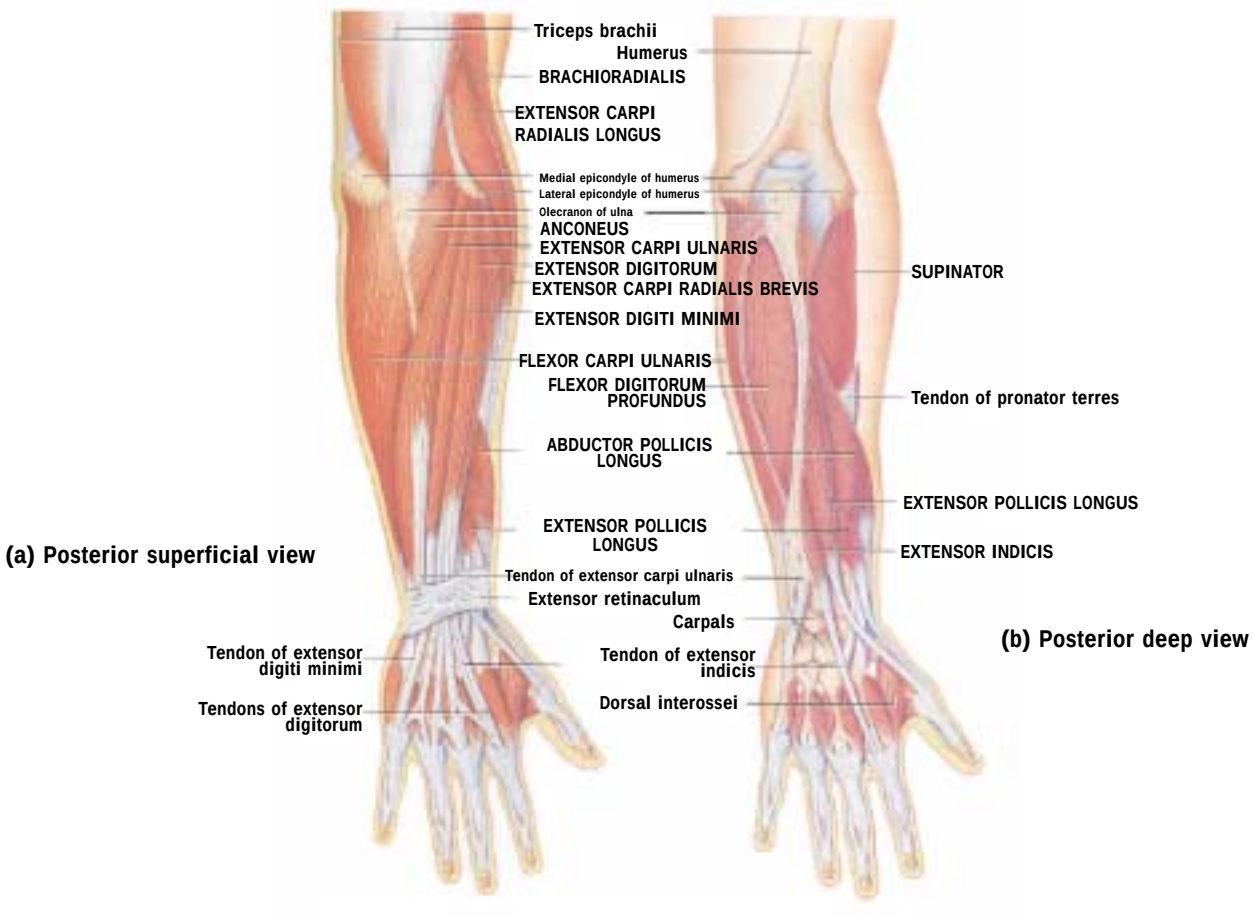
Table 9. Job activities and tasks typically associated with De Quervain's tenosynovitis

BUFFING	PUSHING	USE OF SMALL TOOLS
GRINDING	PRESSING	'TURNING' CONTROLS AS ON MOTORCYCLE
POLISHING	SAWING	INSERTING SCREWS IN HOLES
SANDING	USE OF PLIERS	FORCEFUL HAND WRINGING
ENDO FILING (DENTIST)		

Source: Guild et al. (2001)

43 Bridger RS (1995). p. 145
44 HSE (1996). Ch 4, p. 6
45 Taken from Tortora (2002)

Figure 6. Posterior view of the muscles that move the wrist, hand and digits[46]



De Quervain's tenosynovitis must be differentiated from degenerative arthritis of the trapeziometacarpal joint. The Grind Test is used to differentiate, which will usually be negative in De Quervain's, but positive in degenerative arthritis. (The Grind Test is performed by holding the thumb's proximal phalanx and the metacarpal phalangeal joint in the examiner's hands and forcefully pushing against trapeziometacarpal joint, while also rotating it slightly, to cause a grinding motion).[47] It must also be differentiated from Intersection[48] and Wartenberg's syndromes.[49]

6.3 Trigger finger / thumb

Trigger finger or thumb is tenosynovitis and/or tendinosis of the finger's or the thumb's flexor tendons, causing an inability to move the fingers or thumb smoothly and the locking of the affected digit, with or without pain. This stenosing tenosynovitis can be caused by using hand tools that have sharp edges pressing into the tissue or whose handles are too far apart for user.[50] Repetitive movements with repeated or prolonged gripping or pinching can also cause operating trigger finger. [51]

Concomitant diseases and/or reasons for trigger finger (e.g. rheumatoid arthritis, diabetes, etc.) should be investigated as part of the differential diagnosis.[52]

6.4 Carpal tunnel syndrome

A totally different range of conditions that are loosely associated with the overuse syndromes, are the conditions which result from direct or indirect pressure on nerves, of which carpal tunnel syndrome is the most frequently encountered.

46 Taken from Tortora (2002)

47 Wheeless CR (1996)

48 Intersection syndrome is a painful condition that affects the thumb side of the forearm where two muscles (abductor pollicis longus and extensor pollicis brevis) cross over – or intersect – two underlying wrist tendons (extensor carpi radialis longus and brevis)

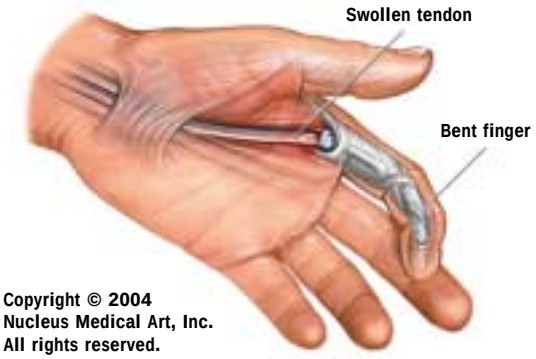
49 Wartenberg's syndrome: Radial sensory nerve entrapment causing significant pain in the lower third of the forearm.

50 Guild R, et al. (2001)

51 House of Commons (1998). p. 13

52 Channas M, et.al. (1995)

Figure 7. Trigger finger generally results from swelling within a tendon sheath, restricting tendon motion. A bump (nodule) may also form[53]



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Carpal tunnel syndrome is a common ailment affecting the wrist and hand. The majority of cases of carpal tunnel syndrome are not caused by work. Carpal tunnel syndrome can have many non-occupational causes and is more prevalent in women than in men. It is common during pregnancy.[54] It was also found to occur twice as often in both hands as in either the dominant or non-dominant hand alone.

There is evidence that there are specific occupations where the wrists are positioned in abnormal positions for prolonged periods, and also in highly repetitive wrist movements where tenosynovitis of the flexor tendons can exert pressure on the median nerve in the carpal tunnel. These symptoms start with a gradual onset of tingling and numbness in the fingers and can progress to pain, clumsiness and muscle atrophy in the hand.[55]

The clinical diagnosis is made with a positive Tinel's sign (pain, numbness, or tingling in the median nerve distribution resulting from tapping over the proximal wrist crease) and a positive Phalen's sign or reverse Phalen's sign (pain, numbness, or tingling in the median nerve distribution resulting from complete palmar flexion and dorsiflexion respectively, of the wrist for 60 seconds).[56]

It should not be forgotten that a direct injury to the wrist area can also cause the same condition, acutely (haematoma causing pressure on the nerve) or more subacutely, like a fracture, which may cause swelling or cause a deformity.

Figure 8. The carpal tunnel[57]

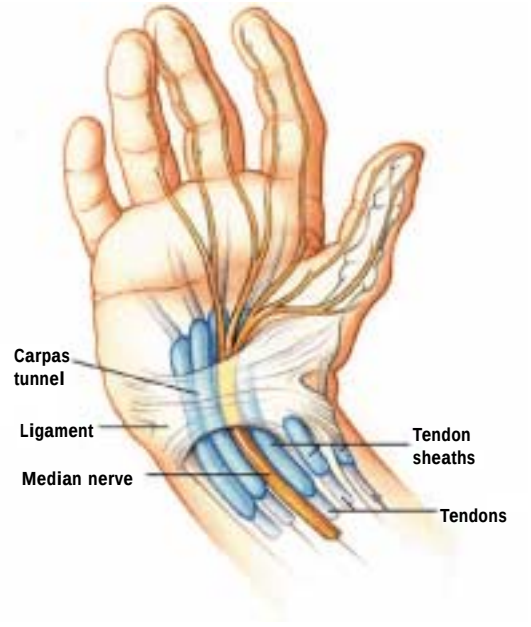


Table 10. Job activities and tasks typically associated with carpal tunnel syndrome

PREHENSILE TASK ESPECIALLY IN EXTREMES OF FLEXION, EXTENSION AND ULNAR DEVIATION		
BUFFING	PACKING	COMPUTER WORK
GRINDING	SCRUBBING	POLISHING
ASSEMBLY WORK	HAMMERING	SANDING
TYPING	REPETITIVE OR FORCEFUL GRIP	

Source: Guild et al. (2001)

53 Used with the permission of Nucleus Medical Art, Inc., www.nucleusinc.com
54 Souhami RL et al. (1990), p.1033
55 Bridger RS (1995). p. 138
56 NIOSH (1989)
57 Used with the kind permission of Medem Inc. and the American Medical Society

6.5 Tendinopathy of the common flexors / extensors of the forearm

Table 11. Job activities and tasks typically associated with tendinopathy of the common flexors / extensors of the forearm

TENDINOPATHY (E.G. TENDINOSIS, TENOSYNOVITIS)	■ PUNCH PRESS OPERATION ■ ASSEMBLY WORK ■ WIRING ■ PACKAGING ■ USE OF PLIERS ■ BUFFING ■ GRINDING ■ 'TURNING' CONTROLS SUCH AS ON MOTORCYCLE	■ POLISHING ■ SANDING ■ PUNCH PRESS OPERATION ■ SAWING ■ CUTTING ■ USE OF PLIERS ■ FORCEFUL HAND WRINGING ■ INSERTING SCREWS IN HOLES

Source: Guild et al. (2001)

Table 12. Job activities and tasks typically associated with hand and wrist conditions

GUYON TUNNEL SYNDROME (BIKER'S FINGER)	■ REPEATED/PROLONGED PRESSURE ONTHE OUTSIDE OF THE PALM ■ CARPENTRY ■ USE OF PLIERS	■ PROLONGED FLEXION OF AND EXTENSION OF THE WRIST ■ BRICK LAYING ■ SOLDERING ■ HAMMERING
PRONATOR TERES SYNDROME	■ SOLDERING ■ SANDING ■ POLISHING	■ BUFFING ■ GRINDING
WHITE FINGER (RAYNAUD'S SYNDROME, VIBRATION SYNDROME)	■ WORKING WITH CHAIN SAW, JACKHAMMERS, USING VIBRATING TOOL THAT IS TOO SMALL FOR THE HAND, OFTEN IN A COLD ENVIRONMENT	

Source: Guild et al. (2001)

6.6 Other work-related hand and wrist conditions

- Radial tunnel syndrome
- Guyon (ulnar) tunnel syndrome
- Pronator teres syndrome
- Anterior and posterior interosseous syndrome
- Intersection syndrome

SECTION C-1:

For healthcare workers

Diagnosis, management & evaluation of impairment

7. Principles of Diagnosis

WRULDs caused by rapid or repetitive motion, forceful exertion, excessive mechanical force concentration, awkward or non-neutral postures and vibration have been included in Schedule 3 of the Compensation for Occupational Injuries and Diseases Act, 1993.

In Circular Instruction 180 these risk factors are mentioned in more detail, namely highly repetitive movements, movements requiring force, movements at the extremes of reach, static muscle loading, awkwardly sustained postures, contact stress (e.g. uncomfortable gripping and twisting, sharp edges to hand tools, desk edges, etc.) and vibration. (See 14.7, p. 53 on how to assess for these risk factors.)

The implication is that employees only have to prove that they are exposed to these risk factors at work and it will be presumed that they developed the specific WRULD as a result of their work, provided investigations for potential other causes have been reasonably excluded. This will have to correlate with their job and the specific condition – employees cannot claim they have tendinosis of the elbow if they do repetitive movements with their legs!!

According to Circular Instruction 180 the following criteria should be applied to confirm the diagnosis:

a. A diagnosis of a WRULD by the medical practitioner.

b. Medical history and clinical signs indicating –
   - site and distribution
   - quality (type, character)
   - severity (intensity, frequency, duration) and
   - progression of the symptoms according to the type of disorder

c. Functional ability report by an occupational therapist and / or physiotherapist, where necessary.

d. Occupational exposure to known risk factors and a chronological relationship between the WRULD and the work environment.

e. Confirmatory tests/investigations (e.g. X-rays, strength testing, range of motion testing, nerve conduction tests), where appropriate.

The medical officers in the Compensation Office will determine whether the diagnosis of WRULD was made according to acceptable criteria.

7.1 Occupational (and other relevant) history, symptoms, signs and special investigations

7.1.1 Relevant symptoms, clinical signs and progression of the disorder

The presence of specific symptoms and objective signs (accurately described and evaluated) associated with this alleged, specific disorder is necessary to make a definitive diagnosis. Pain, swelling and function should be evaluated.

The progression of the injury over a period of time is important to help determine the prognosis.

When the worker is examined, there must be an examination routine. It is important that both the uninjured and injured sides are examined. Try and reproduce the symptoms, assess for referred pain, examine the spine and perform functional testing. It is important that the area be palpated, that ligaments are tested and that nerve function be assessed.

It is not the purpose of these guidelines to go into depth on how to examine the upper limb. However, occupational health practitioners are advised to familiarise themselves thoroughly with the Southampton examination schedule for the diagnosis of musculoskeletal disorders of the upper limb.[58]

58 Palmer K et al. (2000)

Table 13 – Symptoms and signs of WRULDs

Although symptoms will vary according to the type of disorder, common symptoms and signs include the following:

SYMPTOMS	SIGNS
BURNING SENSATION	CREPITUS (CRACKLING SOUND IN SUBCUTANEOUS TISSUE)
FATIGUABILITY	MUSCLE SPASM
LOSS OF GRIP STRENGTH	MUSCLE WEAKNESS
LOSS OF NORMAL SENSATION	REDUCTION OF RANGE MOVEMENT
STIFFNESS AND CRAMPS	SWELLING
MUSCLE WEAKNESS	TENDER TRIGGER POINTS IN MUSCLES
PAIN	TENDERNESS
PARAESTHESIA (TINGLING)	
SENSATION OF COLD	
SWELLING	

Please note that:

- Symptoms may not always be accompanied by objective signs.
- Any one symptom or sign on its own is not indicative of WRULDs and some may be common with normal function.
- Very few sufferers experience all the symptoms.
- The symptoms do not appear in any particular order.

Table 14. Progression of WRULDs – WRULDs tend to be progressive and the development of the disorder can be divided into three broad stages

STAGE 1	PAIN, ACHING AND TIREDNESS OF THE LIMB IS EXPERIENCED WHEN WORKING, BUT THESE SYMPTOMS IMPROVE OVERNIGHT. THIS STAGE IS MOST OFTEN REVERSIBLE WITH REST ALONE. SOMETIMES GUIDED EXERCISE AND TREATMENT TO ADDRESS MUSCULAR PROBLEMS ARE REQUIRED FOR A CURE.
STAGE 2	RECURRENT PAIN, ACHING AND TIREDNESS OF THE LIMB OCCUR EARLIER IN THE DAY, PERSIST AT NIGHT AND MAY DISTURB SLEEP. PHYSICAL SIGNS OF THE SPECIFIC DISORDER (E.G. SWELLING) MAY BE VISIBLE. THESE PATIENTS SHOULD BE REFERRED FOR PHYSIOTHERAPY AND WORK ASSESSMENT TO PREVENT RECURRENCE.
STAGE 3	PERSISTENT PAIN, ACHING, WEAKNESS AND FATIGUE OF THE LIMB ARE EXPERIENCED EVEN IF THE PERSON HAD NOT BEEN WORKING FOR SOME TIME. SLEEP IS OFTEN DISTURBED. THIS CAN BE IRREVERSIBLE IF NOT TREATED APPROPRIATELY.

Source: London Hazard Centre (1997)

7.1.2 *The history of occupational exposure to the risk factors*

A summary is needed of the current working environment with respect to the flow of work and the actions required by the employee to complete the work. Summarise the exposure to the risk factors (See Table 16 and 17). The summary table should be completed by the medical practitioner when completing the Medical Reports for WRULDs (W.CI. 301 & W.CI. 302 forms).

Refer to the posture/s adopted by the employee to conduct the work, the force and motion required, and the exposure to vibration. Consider which of these factors contributed to the alleged upper limb disorder in relation to the frequency of the movements, duration, strength and range of movement.

Table 15. The risks associated with the development of WRULDs are increased by the following home or work-based activities

- RAPID OR REPETITIVE MOTION
- MOVEMENTS REQUIRING FORCE EXERTION
- EXCESSIVE MECHANICAL FORCE CONCENTRATION
- AWKWARD OR NON-NEUTRAL POSTURES (MOVEMENTS AT EXTREMES OF REACH, STATIC MUSCLE LOADING, AWKWARDLY SUSTAINED POSTURES, CONTACT STRESS)
- COLD ENVIRONMENT OR HANDLING CHILLED OR FROZEN PRODUCTS
- VIBRATION
- GENDER (FEMALES ARE MORE AT RISK)
- AGE (OLDER EMPLOYEES ARE MORE AT RISK)
- ABNORMAL BODY MASS INDEX
- PROLONGED DURATION OF EXPOSURE
- POOR WORK ORGANISATION (LOW LEVEL OF CONTROL OVER WORK RATE, NO BREAKS, ETC.)
- PSYCHOSOCIAL STRESS AT WORK AND FATIGUE

Table 16. Example of a template to summarise the exposure to risk factors

RISK FACTOR	PERCENTAGE OF WORKING DAY	BRIEFLY DESCRIBE THE JOB TASK WHERE THIS RISK FACTOR OCCURS AND QUANTIFY IN TERMS OF REPETITIONS/DURATION/ STRENGTH REQUIRED/RANGE OF MOVEMENT, ETC.
REPETITIVE MOVEMENTS		
MOVEMENTS REQUIRING FORCE		
MOVEMENTS AT THE EXTREMES OF REACH		
STATIC MUSCLE LOADING		
AWKWARDLY SUSTAINED POSTURES		
CONTACT STRESS		
VIBRATION		
LOW TEMPERATURES (COLD)		

Table 17. Work system factors to be assessed

PHYSICAL POSTURE	PROPERTY		
	STRENGTH & RANGE OF MOVEMENT (AMPLITUDE / MAGNITUDE)	REPETITION/ FREQUENCY	DURATION
FORCE	FORCE GENERATED OR APPLIED	FREQUENCY OF APPLICATION	TIME THAT FORCE IS APPLIED
POSTURE	JOINT ANGLE	FREQUENCY	TIME HELD
MOTION	VELOCITY, ACCELERATION	FREQUENCY OF MOTION	TIME OF MOTION EXPOSURE
VIBRATION	ACCELERATION	FREQUENCY WITH WHICH VIBRATION OCCURS	TIME OF VIBRATION EXPOSURE

Source: European Agency for Safety and Health at Work (1999)

Note:

- *Acute injuries can develop into chronic injuries if there is inadequate rehabilitation before returning to work.*
- *When this progression of an acute injury is reported to the Compensation Commissioner, one must continue to handle it as an occupational injury and not as an occupational disease (WRULD), because it was reported as an injury in the first place (thus use W. CI. 5 to complete progress medical reports).*

State the period(s) the employee worked in previous environments with exposures related to his/her disease (start with the most recent employer mentioning the period of exposure, the occupation, the type of exposure, the year first exposed, the duration / years of exposure (which may not be the same as the years in an occupation), the frequency of exposure (e.g. once per week for an hour or 8 hours every day).

If necessary, attach photos, diagrams and/or extra reports to explain the employee's work actions.

7.1.3 Relevant facts from the medical, family and social history as well as the investigation of other potential causes

It is important that all non-vocational activities (e.g. sport) are investigated to determine how these conditions contribute to the development of any of the symptoms. An upper limb disorder may be seen as a consequence of activities performed at work, but it could also be caused by the worker's domestic or recreational activities and not work.

Previous injuries, leisure activities, lifestyle issues and other non work-related activities which could lead to the development of this disorder, should thus be determined.

Proof should also be given that other potential causes have been investigated, where appropriate (e.g. hypothyroidism, diabetes, pregnancy, rheumatologic disorders, etc., in the case of carpal tunnel syndrome; and X-rays to exclude neck pathology where indicated).

7.1.4 Health risk assessment

The medicine practitioner who makes the definitive diagnosis should familiarise himself with the alleged work environment, work process and work actions.

7.1.5 Special investigations

Special investigations should be carried out if considered essential for the accurate diagnosis and treatment of the injury (e.g. high resolution ultrasound X-rays, strength testing, range of

motion testing, electromyography (EMG) analysis, isokinetic dynamometry, etc.). The Compensation Commissioner will not pay for magnetic resonance imaging (MRI) scan if prior authorisation had not been obtained from the medical officers in the Compensation Commissioner's office.

7.2 Duration of exposure

WRULDs take a period of time to develop and generally a job which involves exposure to the mentioned risk factors, should be performed for more than 6 months before the condition develops. However, each case should be evaluated on its own merit.

8. Management OF WRULDs

Definitions:

- **Occupational health practitioner (OHP):** A registered nursing sister with an extra qualification in occupational health, also often referred to as the **occupational health nurse (OHN)**.
- **Occupational medicine practitioner (OMP):** A medical doctor with an extra qualification in occupational health.

8.1 Clinical significance of the diagnosis of tendinosis

Evidence supports the notion that overuse tendon conditions do not primarily involve inflammation, but degeneration.[59] If this is correct, then the traditional approach to treating tendinopathies as an inflammatory 'tendonitis' is likely flawed. Current scientific data (Table 18) will help physicians avoid common misconceptions about tendinopathies and their management.[60]

If we accept that a worker with overuse tendinopathy has a disorder that is due to collagen degeneration, then the diagnosis has various implications for the management of these disorders (Table 19).[61]

Table 18. Common misconceptions about tendinopathies and its management

MISCONCEPTION	EVIDENCE-BASED FINDING
TENDINOPATHIES ARE SELF-LIMITING CONDITIONS THAT TAKE ONLY A FEW WEEKS TO RESOLVE	TENDINOPATHIES OFTEN PROVE RECALCITRANT TO TREATMENT AND MAY TAKE MONTHS TO RESOLVE
IMAGING APPEARANCE CAN PREDICT PROGNOSIS	IMAGING DOES NOT PREDICT PROGNOSIS; IT ADDS TO THE LIKELIHOOD OF A DIAGNOSIS OF TENDINOPATHY BUT DOES NOT PROVE IT
CYST-LIKE ULTRASONOGRAPHIC ABNORMALITIES IN TENDONS ARE INDICATIONS FOR SURGERY	SURGERY IS GENERALLY NOT INDICATED. AS LAST RESORT, SURGERY SHOULD BE BASED ON CLINICAL GROUNDS; CYST-LIKE ULTRASONOGRAPHIC FINDINGS CAN BE FOUND IN ASYMPTOMATIC EMPLOYEES
SURGERY PROVIDES RAPID RELIEF OF SYMPTOMS IN ALMOST ALL SUBJECTS	AFTER SURGERY (WHERE IT WAS CLINICALLY INDICATED AS LAST RESORT), RETURN TO REPETITIVE WORK TAKES A MINIMUM OF 4-6 MONTHS; NOT ALL PATIENTS DO WELL

Source: Khan K (2000)

59 Personal communication with Prof Tim Noakes (UCT Sport Science Institute)
60 Khan K (2000)
61 Khan K (2000)

Table 19. Implications of the diagnosis of tendinosis compared with tendonitis

TRAIT	OVERUSE TENDINOSIS	OVERUSE TENDONITIS
PREVALENCE	COMMON	RARE
TIME FOR RECOVERY, EARLY PRESENTATION	6-10 WEEKS	SEVERAL DAYS TO 2 WEEKS
TIME FOR FULL RECOVERY, CHRONIC PRESENTATION	3-6 MONTHS	4-6 WEEKS
LIKELIHOOD OF FULL RECOVERY FROM CHRONIC SYMPTOMS TO RESUME REPETITIVE WORK	~80%	99%
FOCUS OF CONSERVATIVE THERAPY	ENCOURAGEMENT OF COLLAGEN-SYNTHESIS MATURATION AND STRENGTH	ANTI-INFLAMMATORY MODALITIES AND DRUGS
ROLE OF SURGERY AS LAST RESORT	EXCISE ABNORMAL TISSUE	NOT KNOWN
PROGNOSIS FOR RECOVERY AFTER SURGERY	70%-85%	95%
TIME TO RECOVER FROM SURGERY	4-6 MONTHS	3-4 WEEKS

Source: Khan K (2000)

8.2 Treatment modalities

Khan (1998) presented a new paradigm in the management of tendinopathies in sports medicine. This approach has a record of clinical effectiveness and recent research adds further scientific support.[62]

This approach in sports medicine was therefore adapted for these guidelines to fit occupational health and the management of WRULDs, since the underlying mechanism of tissue damage is presumably the same, namely repetitive movements, overuse, excessive force and overloading.

Prof Tim Noakes (2002) of the Sport Science Institute (University of Cape Town) agrees that this assumption is justified and that it is supported by sound scientific research.[63]

Tendinopathies have caused long-lasting frustration for employees, employers and occupational health practitioners, because they attributed the pathology to tendonitis, rather than tendinosis. Occupational health practitioners should acknowledge that the cause is most often due to tendinosis, rather than tendonitis, and treat the problem using a fundamentally different paradigm. Advice and suggestions for employees along these lines of clinical thought can help them recover more quickly and prevent surgery.

8.2.1 Employee education

The occupational health practitioner should take the time to explain and illustrate the pathology of tendinosis, especially since textbooks and websites have yet to embrace this pathology and its clinical implications. Employees who have symptoms of short duration, but are still able to engage in work, are the ones who need the most education. They are likely to continue to do repetitive work without undergoing appropriate treatment, and thus worsen the tendinosis.[64]

62 Khan (1998)

63 Personal communication with Prof Tim Noakes (December 2002)

64 Khan (2000)

Table 20. The following treatment modalities can be utilised depending on the status of the disorder

A. EMPLOYEE EDUCATION

B. INFLAMMATORY STRATEGIES

- CRYOTHERAPY (ICE)
- NON-STEROID ANTI-INFLAMMATORY DRUGS
- ELECTROTHERAPEUTIC MODALITIES (PHYSIOTHERAPY)
- INFILTRATION WITH CORTICOSTEROIDS

C. THERAPEUTIC STRATEGIES

- INITIAL TREATMENT MAY INCLUDE REST
- IMMOBILISE – SPLINTAGE (OCCUPATIONAL THERAPY)
- MOBILISE (PHYSIOTHERAPY)
- MOBILISE – EXERCISE TO APPROPRIATELY STRENGTHEN MUSCLES
- EDUCATION – GOOD WORK HABITS, PACING, JOINT CONVERSATION TECHNIQUES AND SELF-MANAGEMENT (OCCUPATIONAL THERAPY)

D. REASONABLE JOB ACCOMODATION

- TEMPORARY JOB CHANGE
- WORK STATION REDESIGN (LAYOUT, HEIGHTS, ETC.)
- TOOL AND EQUIPMENT ADAPTATION (CHANGE HANDLE DESIGN, USE OF JIGS, ETC.)
- JOB TASK MODIFICATIONS
- RETRAINING AND REASSIGNMENT
- WORK SCHEDULE MODIFICATIONS
- JOB ENLARGEMENT
- ROTATION

E. PSYCHOLOGICAL EVALUATION

F. SURGERY (AS LAST RESORT)

8.2.2 Anti-inflammatory strategies

Common anti-inflammatory strategies include:

- Cryotherapy (ice)
- Electrotherapeutic modalities (physiotherapy)
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Corticosteroid injections

Employees with tendinosis may benefit from cryotherapy, because ice has a vasoconstrictive role, and abnormal neovascularisation is a feature of the pathology. Because a strong clinical impression exists that ice is helpful in tendinopathies, this modality should not be discarded.[65]

Limited evidence exists to support the use of NSAIDs and corticosteroids in treating tendinosis.[66, 67] NSAIDs on the other hand are effective in the treatment of tenosynovitis, which is an inflammatory condition.

Corticosteroid injection has lost favour in managing tendinosis, because tendinosis is not an inflammatory condition.[68, 69] It may still have a role to play in the treatment of tenosynovitis.

8.2.3 Therapeutic strategies

Therapeutic strategies are used to improve the individual's functional capacity and some of the modalities which are used, include:

- Initial treatment may include rest
- Immobilise – splinting (occupational therapy)
- Physiotherapy modalities, e.g. ultrasound for tenosynovitis
- Mobilise – stretches to improve flexibility (physiotherapy)
- Mobilise – exercise to appropriately strengthen muscles (physiotherapy)
- Education – good work habits, pacing, joint conservation techniques and self-management (occupational therapy)

8.2.4 Reasonable job accommodations

- Temporary job change
- Work station redesign (layout, heights, etc)

65 Khan (2000)
66 Almekinders et al. (1998)
67 Khan(2000)
68 Shrier et al. (1996)
69 Khan(2000)

- Tool and equipment adaptation (change handle design, use of jigs etc)
- Job task modification
- Retraining and reassignment
- Work schedule modifications (half day initially, build up to full day)
- Job enlargement (inclusion of additional duties to reduce repetitiveness of performing a single task only)
- Rotation

8.2.5 Surgery as a last resort

Surgery has been considered the treatment of last resort for tendinopathies, and this certainly applies, if not more so, for a confirmed case of tendinosis. Surgery can be used to excise tissue affected by tendinosis, but surgery has not been proven to stimulate collagen synthesis or maturation. Reviews suggest that surgery in tendinosis has a 75% to 85% success rate.[70, 71]

Therefore, an important implication of tendinopathy's underlying pathology being tendinosis is that conservative management must progress slowly. Because surgical treatment of tendinosis is not without failure, and recovery takes a minimum of 4 to 6 months, this treatment should be reserved for failure of a high-quality programme of conservative management.[72] If surgery is required, rehabilitation should start pre-surgery in order to improve post-surgery recovery. This includes physiotherapy, occupational therapy and exercise therapy.

8.3 Algorithms

Algorithms A, B and C[73] (p. 38 – 40) offer OHNs and OMPs guidelines on how to manage a possible case of WRULD.

The rationale behind these algorithms in managing WRULDs is:

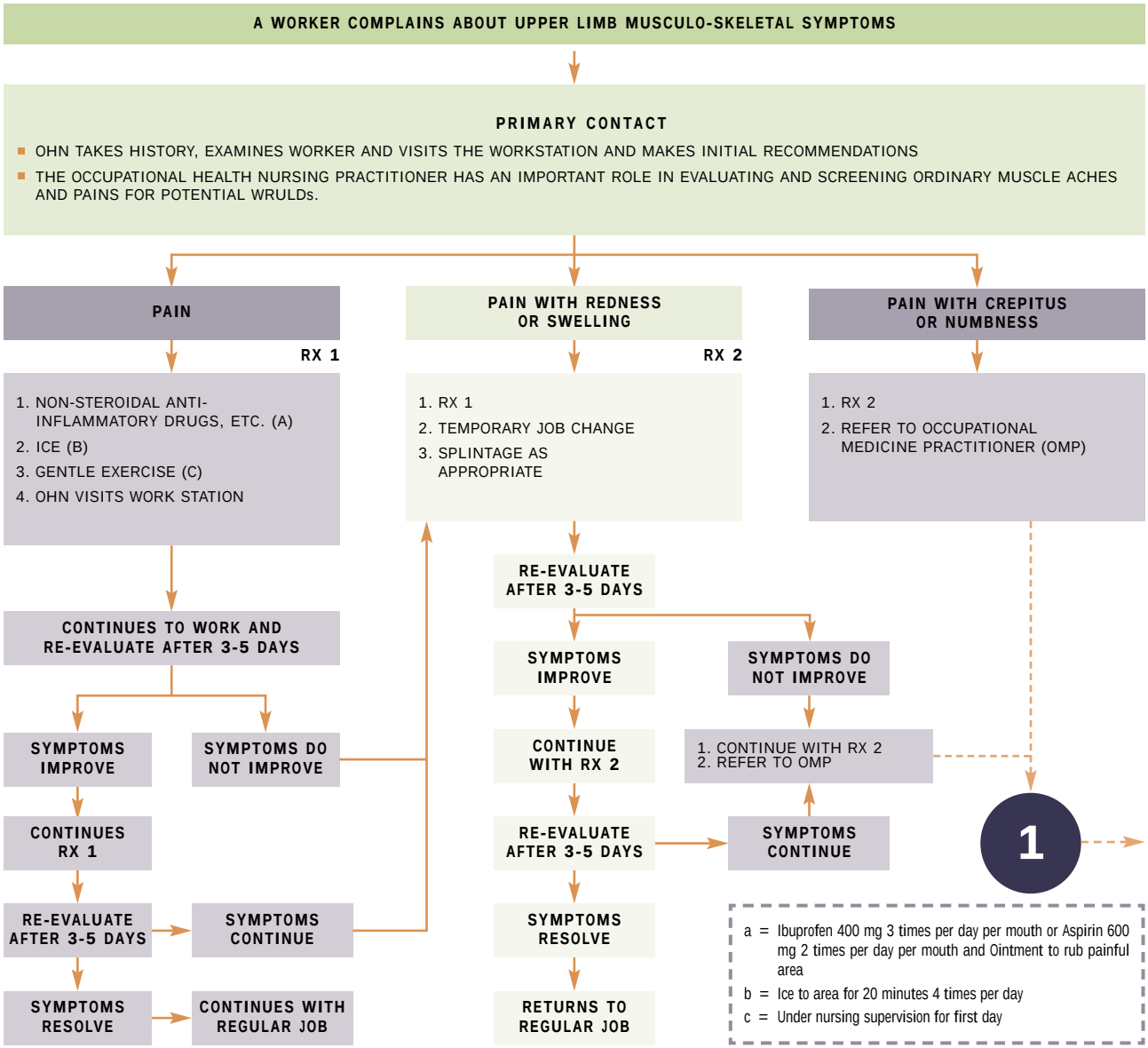
- That of a typical occupational health clinic in an industrial setting
- With an occupational nursing practitioner as the primary contact
- And the visiting occupational medicine practitioner or general practitioner as secondary contact

Where this is not the case, these algorithms will still give a health practitioner a good idea of the process to be followed in managing and reporting a WRULD to the Compensation Commissioner. See 'Reporting' (p. 43) for forms which should be used.

ALGORITHM A	PRIMARY CONTACT: GUIDELINES FOR THE OCCUPATIONAL NURSING PRACTITIONER WHEN A WRULD IS SUSPECTED. THE OCCUPATIONAL HEALTH NURSING PRACTITIONER HAS AN IMPORTANT ROLE IN EVALUATING AND SCREENING ORDINARY MUSCLE ACHES AND PAINS FOR POTENTIAL WRULDs.
ALGORITHM B	SECONDARY CONTACT: GUIDELINES FOR THE OCCUPATIONAL HEALTH MEDICINE PRACTITIONER BEFORE A WRULD IS REPORTED TO THE COMPENSATION COMMISSIONER THE DOCTOR USUALLY EVALUATES THOSE EMPLOYEES NOT RESPONDING TO THE OHN'S CONSERVATIVE MANAGEMENT. THE DOCTOR NOW HAS THE TASK TO EVALUATE THE WORK-RELATEDNESS OF THE SYMPTOMS, AND THEN HAS TO DECIDE IF AN OCCUPATIONAL INJURY OR AN OCCUPATIONAL DISEASE (WRULDs) SHOULD BE REPORTED TO THE COMPENSATION COMMISSIONER.
ALGORITHM C	GUIDELINES TO THE OCCUPATIONAL HEALTH MEDICINE PRACTITIONER WHEN REPORTING A CASE OF WRULD TO THE COMPENSATION COMMISSIONER
ALGORITHM D	GUIDELINES TO THE EMPLOYER IN REPORTING WRULDs TO THE DEPT OF LABOUR

70 Coleman BD; Khan KM; Maffulli, et al. (2000)
71 Coleman BD; Khan KM; Kiss ZS, et al. (2000)
72 Khan(2000)
73 Adapted for South African circumstances from a NIOSH Health Hazard Evaluation Report (HETA 89-307-2009) by Afrox Occupational Healthcare

A Guidelines for the occupational nursing practitioner (OHN) when a work-related upper limb musculo-skeletal disorder (WRULD) is suspected

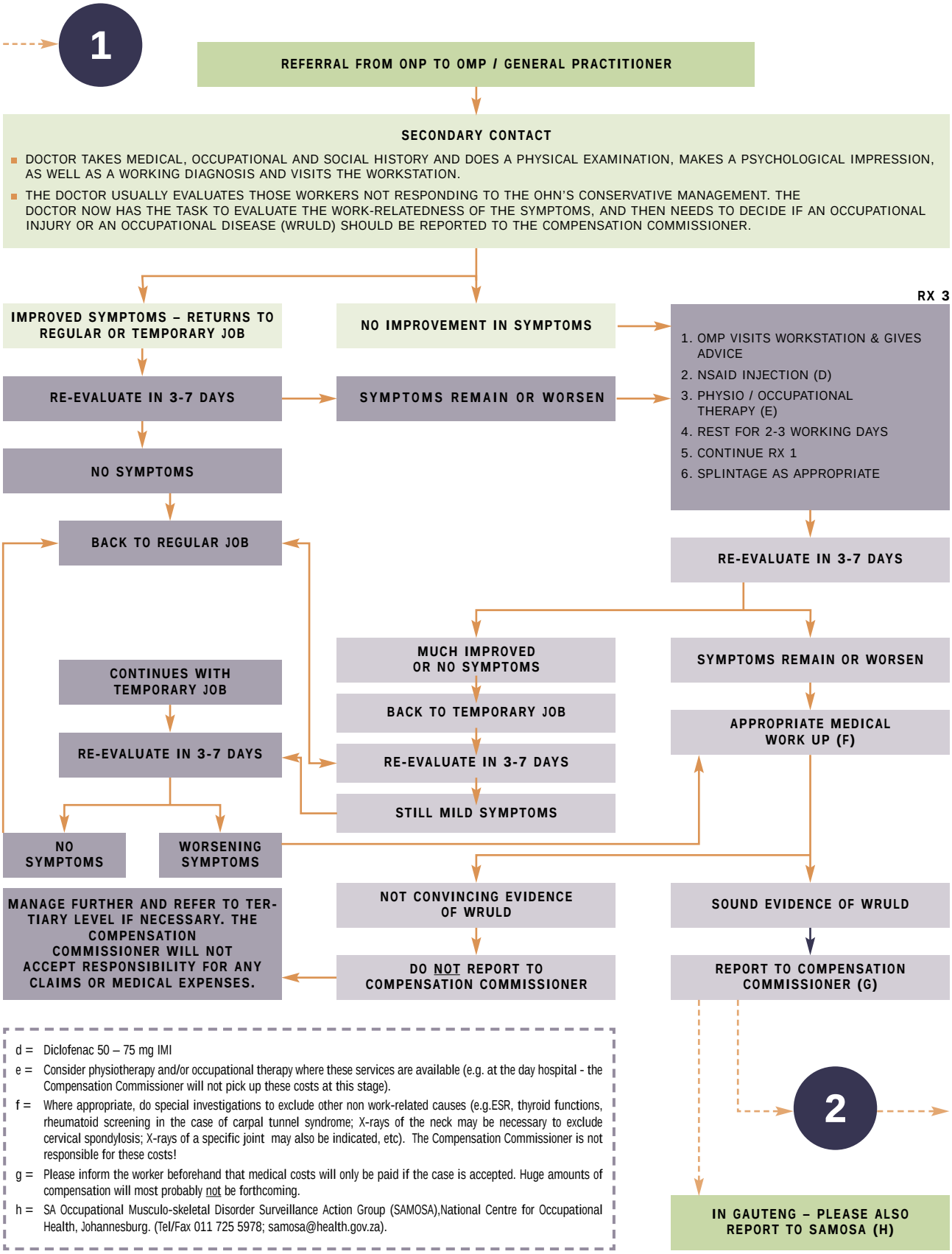


ABOUT THESE ALGORITHMS

The rationale behind these algorithms is a typical occupational health clinic in an industrial setting with an occupational health nurse, as well as an occupational medicine practitioner (doctor) or general practitioner visiting a few hours per week. Where this is not the case, these algorithms will still give a health practitioner a good idea of the process to be followed in reporting a WRULD to the Compensation Commissioner, as well as the investigation of other potential causes.

- **Algorithm [A]** is meant for the occupational health nursing practitioner to screen workers, to initiate treatment and to make appropriate recommendations after an initial visit to the work station (i.e. simple adjustments, recommend full ergonomic assessment by competent person, etc.).
- **Algorithm [B]** is meant for the visiting in-house medical practitioner and gives guidance on how to work up a case before reporting the WRULD to the Compensation Commissioner. No 'external' medical costs should be encountered during this phase (i.e. the on-site occupational health clinic should be able to handle it satisfactorally and referrals to the public health sector can help with initial tests, etc.).
- **Algorithm [C]** refers to the reporting of a worker with WRULD by an occupational medicine practitioner. 'External' medical costs may be encountered (i.e. outside the scope of a typical occupational health industrial clinic) in the treatment and rehabilitation of a worker. If the case is accepted, the Compensation Commissioner may pay for reasonable medical costs, as well as the sick leave.
- **Algorithm [D]** gives guidance to the employer on how to respond if a case of WRULD has been reported.

B Guidelines for the occupational medicine practitioner (OMP) before a work-related upper limb disorder (WRULD) is reported to the Compensation Commissioner



d = Diclofenac 50 – 75 mg IMI

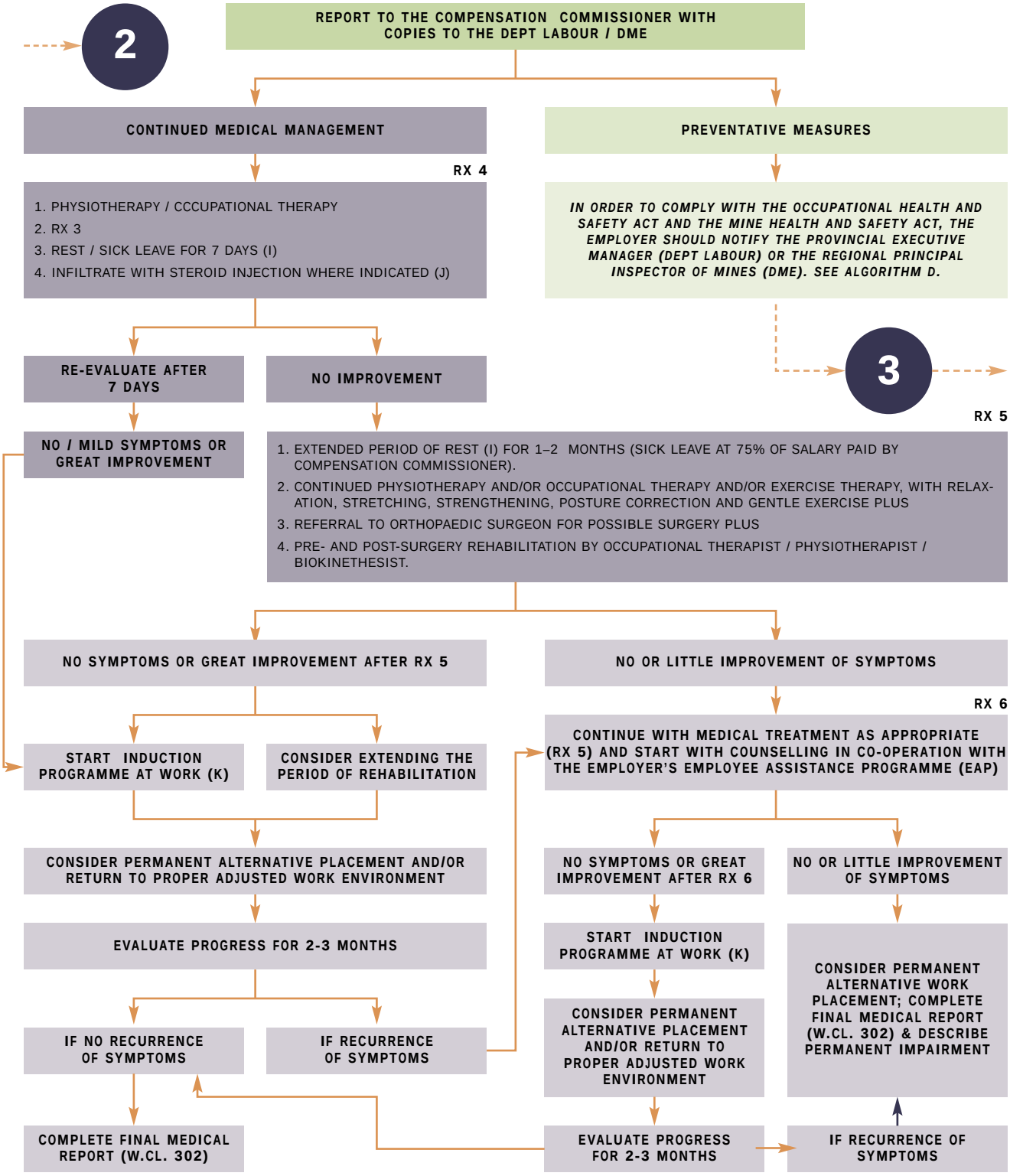
e = Consider physiotherapy and/or occupational therapy where these services are available (e.g. at the day hospital - the Compensation Commissioner will not pick up these costs at this stage).

f = Where appropriate, do special investigations to exclude other non work-related causes (e.g.ESR, thyroid functions, rheumatoid screening in the case of carpal tunnel syndrome; X-rays of the neck may be necessary to exclude cervical spondylosis; X-rays of a specific joint may also be indicated, etc). The Compensation Commissioner is not responsible for these costs!

g = Please inform the worker beforehand that medical costs will only be paid if the case is accepted. Huge amounts of compensation will most probably not be forthcoming.

h = SA Occupational Musculo-skeletal Disorder Surveillance Action Group (SAMOSA),National Centre for Occupational Health, Johannesburg. (Tel/Fax 011 725 5978; samosa@health.gov.za).

C Guidelines for the occupational medicine practitioner (OMP) when a WRULD is reported to the Compensation Commissioner



i = Rest (i.e. sick leave) should be part of a well-planned rehabilitation programme under the supervision of physiotherapist / occupational therapist / biokinethesist.
j = Example: 1 ml Depot Medrol with 2 ml of Lignocaine injected into tendon sheath.
k = Return to temporary job for 1-6 months and start with supervised work hardening programme (e.g. with help of ergonomist, physiotherapist, occupational therapist or OHP)

9. Evaluation of impairment

Should an employee be unable to perform the required work at the level achieved prior to the development of this condition, he/she could be deemed 'unfit' to continue in that position, but permanent disability might not necessarily be awarded, as the Compensation Commissioner assesses impairment and permanent disability in comparison with the open labour market and not for a specific job or position.

When the Final Medical Report (W. Cl. 302) is received from the treating doctor, after maximum medical improvement has been reached, impairment will be determined by the medical officers of the Compensation Commissioner, in accordance with Internal Instruction 157 for residual impairment of the function of the muscles, tendons, joints or nerves involved.

Maximum medical improvement should preferably be reached after a reasonable recovery period not exceeding 12 months, and failure to perform work effectively after the following process has been followed:

a. Thorough investigations, which include:

i. Medical assessment

ii. Functional capacity evaluation

iii. Job analysis/ergonomic assessment

b. An integrated treatment plan, which includes:

i. Medical treatment [medication, surgical intervention (where indicated) and / or acute rehabilitation (e.g. physiotherapy, occupational therapy, etc.)]

ii. Vocational rehabilitation, which includes

– *Optimising the person's functional ability (i.e. ability to perform tasks) through rehabilitation that includes work hardening, work conditioning, etc.*

– *Addressing problem areas identified in the job analysis / ergonomic assessment by allowing alterations in the way in which work is performed through reasonable accommodation. Reasonable accommodation would include workplace environment adaptation, tool and equipment adaptation, workstation redesign, job task modification, retraining and reassignment, and work schedule modifications.*

Permanent disablement will thus be awarded only if objective and verifiable clinical signs and symptoms are present after optimum treatment had been administered, and no further recovery can reasonably be expected.

- In case of nerve conditions, documented abnormal sensory and/ or motor latencies are important. Therefore a full sensory evaluation should be performed. (It is important to note that neural dysfunction can occur in the absence of abnormal nerve conduction tests.[74])
- Grip strength is one of the few objective measurable signs of muscular dysfunction, provided the measuring instrument is properly calibrated.
- Observable muscle wasting is also an objective sign.
- Causalgia and other sensory abnormalities, if accurately and reliably described, will be considered in the assessment of impairment and disablement.

However, it is expected that most employees will recover and return to work and that only a very small percentage will suffer any permanent residual impairment if the worker was properly managed as suggested in these guidelines.

74 Greening and Lynn (1998)

SECTION C-2:

For the employer

Compensation Commissioner

10. Reporting WRULDs to the Compensation Commissioner

Table 21. The following documentation should be submitted to the Compensation Commissioner by the employer individually liable or the mutual association concerned

W. CL. 1	EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE **OR**
W. CL. 305	EMPLOYEE AFFIDAVIT FOR AN OCCUPATIONAL DISEASE (WHEN THE EMPLOYER DOES NOT TIMEOUSLY SUBMIT THE EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE (W. CL.1))
W. CL. 14	NOTICE OF AN OCCUPATIONAL DISEASE AND CLAIM FOR COMPENSATION (SIGNED BY THE EMPLOYEE)
W. CL. 110	EXPOSURE HISTORY OR AN APPROPRIATE EMPLOYMENT HISTORY (PLEASE NOTE THAT THE NEW W. CL. 110 FORM SHOULD BE USED)
W. CL. 301	FIRST MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD) WHEN WRULDs ARE REPORTED, W. CL. 301 MUST BE USED INSTEAD OF THE USUAL W. CL. 22 (FIRST MEDICAL REPORT IN RESPECT OF AN OCCUPATIONAL DISEASE)
ALL OTHER REPORTS	THAT MAY BE RELEVANT TO THE DIAGNOSIS AND TREATMENT OF THE CONDITION (E.G. AN ERGONOMIC ASSESSMENT SUPPORTED BY PHOTOGRAPHS, VIDEO CLIPS, ETC.)

As long as the case is open, the employer must **submit the following reports on a monthly basis** to the Compensation Commissioner or Mutual Association or employer individually liable, as the case may be, until the employee's condition has become stabilised, when a **Final Medical Report (W.Cl. 302)** should be submitted.

W. CL. 6	RESUMPTION REPORT (EVEN IF THE EMPLOYEE IS AT WORK)
W. CL. 302	PROGRESS/FINAL MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD) WHEN WRULDs ARE REPORTED, W. CL. 302 MUST BE USED INSTEAD OF THE USUAL W. CL. 26 (PROGRESS/FINAL MEDICAL REPORT IN RESPECT OF AN OCCUPATIONAL DISEASE)

11. Benefits

Benefits will be payable according to the Compensation for Occupational Injuries and Diseases Act, 1993, as amended.

11.1 Temporary total disablement

Payment for reasonable temporary total or partial disablement will be made on the basis of medical reports for as long as such disablement continues, for a period not exceeding 24 months.

11.2 Permanent disablement

Permanent disablement will be assessed when a Final Medical Report is received, after a reasonable recovery period not exceeding 24 months, and failure to perform work effectively after the appropriate course of treatment and rehabilitation.

11.3 Medical aid

Medical expenses shall be provided for a period of not more than 24 months from the date of diagnosis. This period may be extended if, in the opinion of the Director General, further medical aid will reduce the extent of the disablement. The medical aid covers the costs of diagnosing a WRULD and any necessary treatment provided by any healthcare provider. The Compensation Commissioner will decide on the need for, the nature and the sufficiency of the medical aid supplied.

12. Claim Processing

The Office of the Compensation Commissioner will consider and adjudicate upon the liability of all claims. The medical officers in the Compensation Commissioner's office are responsible for the medical assessment of a claim and for the confirmation of the acceptance or rejection of a claim.

D

SECTION D:

For the employer

Inspectorate of Labour

13. Reporting to the Inspectorate of Labour

The employer should not only report a case of WRULD to the Compensation Commissioner, but also to the nearest Inspectorate of the Department of Labour. The employer must be able to demonstrate to the Inspectorate what is being done to reduce the risk of WRULDs.

- The General Administrative Regulations of the Occupational Health and Safety Act (No 85 of 1993), provides for investigation and recording of incidents and occupational disease.[75]
- Section 8(1) provides that employers must provide and maintain a workplace that is safe and without risk to the health of their employees.
- Section 8(2) (d) also provides for a risk assessment of the working environment.
- The same is true of section 8(2)(e) dealing with training of and information to employees.

In discussions with the Chief Inspectorate of Labour during the drafting of these guidelines, the following practical steps were tabled by the Inspectorate to guide employers in adhering to the above-mentioned requirements (see Algorithm D).

Recommended action steps to prevent, reduce and eliminate WRULDs in the workplace)

STEP 1:	NOTIFY THE NEAREST INSPECTORATE OF LABOUR WITHIN 14 DAYS OF DEFINITIVE DIAGNOSIS BEING MADE
STEP 2:	OBTAIN AN ERGONOMIC ASSESSMENT
STEP 3:	COMPILE A SUBSEQUENT PLAN OF ACTION
STEP 4:	IMPLEMENT THE PLAN OF ACTION AND REVIEW IT AT APPROPRIATE INTERVALS

The improvement of the employee's working conditions by reducing the ergonomic risks is not only a legal requirement as stated above, but is also part and parcel of the employee's integrated treatment plan (see p. 41). Determination of impairment is also not feasible if task and equipment adaptations were not considered as part of the final report.

STEP 1: Notify the Inspectorate of Labour

The Inspectorate of Labour must be notified within 14 days of definitive diagnosis being made. Copies of the following forms which was sent to the Compensation Commissioner, should be sent to the nearest Provincial Executive Manager of Labour.

W. CL. 1	EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE OR
W. CL. 305	EMPLOYEE AFFIDAVIT FOR AN OCCUPATIONAL DISEASE (WHEN THE EMPLOYER DOES NOT TIMEOUSLY SUBMIT THE EMPLOYER'S REPORT OF AN OCCUPATIONAL DISEASE (W. CL.1))
W. CL. 301	FIRST MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD)
W. CL. 302	PROGRESS/FINAL MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD) (MONTHLY)

STEP 2: Obtain an ergonomic assessment

It is recommended that the employer obtain an ergonomic assessment of the workplace if WRULD is diagnosed.

An ergonomics report can only be compiled by an ergonomist or one with knowledge of ergonomics and who is competent to do so – this may be a "safety officer", an occupational health practitioner, a physiotherapist, an occupational therapist or an occupational hygienist.

NOTE:

The Compensation Commissioner will not be liable to pay for any ergonomic reports.

The costs of ergonomic reports should be carried by the employer. It is the employer's responsibility to assess the health hazards in the workplace according

75 Regulations 6 and 8.

to the Occupational Health and Safety Act and the Mine Health and Safety Act.

Therefore employers are required to examine their own organisation to assess whether other employees are likely to be at risk of developing WRULDs as a result of the jobs they do, the environment they work in and any other organisational factors.

A practical approach to identify and assess risks in the workplace which may cause WRULDs is discussed in detail in the next chapter. (See 14, p. 50)

STEP 3: Compile a plan of action

If an ergonomic assessment (see Step 2 above) was done, the employer should compile a plan of action to eliminate / reduce the ergonomic risks which may lead to the development of WRULDs. Such a plan should have the following elements:

- A plan to implement the ergonomic recommendations (see Step 2 above)
- A plan to manage the health surveillance of employees (see 15, p. 64)
- A plan to negotiate a health and safety policy on the prevention of WRULDs (see 16, p. 67)

The Chief Inspectorate of Labour advises employers to have such a plan of action ready within 3 months of the definitive diagnosis being made.

STEP 4: Implement the plan of action and review it at appropriate intervals

Having adopted a step-by-step approach in identifying locations in their organisation which have the potential for WRULDs, as well as identifying those at risk, employers must now implement appropriate measures for purposes of prevention and control.

The Chief Inspectorate of Labour advises employers to implement such a plan of action (see Step 3 above) and to have the following available within 6 months of the definitive diagnosis being made:

- A review of progress made regarding the implementation of the ergonomic plan of action, especially the progress made to adjust/modify the job to the person and not attempts to fit the person to the job.
- A summary of progress made in the implementation of an occupational health programme (including a health risk assessment and a medical surveillance programme).
- The negotiated policy on the prevention of WRULDs signed by the management, labour union representatives and an occupational health practitioner.

Table 22. Various components of an ergonomic survey

ORGANISATIONAL FACTORS	• ORGANISATION OF WORK • JOB ROTATION • MANAGEMENT STYLE • WORK RATE	• MONITORING • CONSULTATION • BONUS SYSTEMS • STRESS, ETC.
ENVIRONMENTAL FACTORS	• COLD TEMPERATURES	• VIBRATION, ETC.
TASK ANALYSIS	• INDICATE A BRIEF DESCRIPTION OF THE TASK	
INDIVIDUAL FACTORS	• PHYSICAL CONDITION • TRAINING	• PERSONAL PROTECTIVE EQUIPMENT, ETC.
HUMAN – TASK INTERACTION	• USE OF FORCE • REPETITIVE MOVEMENTS • RAPID MOVEMENTS • TWISTING MOVEMENTS • AWKWARD POSTURES	• OVERSTRETCHING • LACK OF REST BREAKS • STATIC LOADING • DESIGN OF TOOLS AND EQUIPMENT, ETC.

D The employer reporting WRULDs to the Department of Labour

3

REPORT THE FOLLOWING TO THE
PROVINCIAL EXECUTIVE MANAGER OF THE DEPARTMENT OF LABOUR
(OCCUPATIONAL HEALTH AND SAFETY ACT)

STEP 1: WITHIN 14 DAYS OF DEFINITIVE DIAGNOSIS BEING MADE

A COPY OF THE NOTIFICATION OF A WRULD TO THE COMPENSATION COMMISSIONER SHOULD BE SENT TO THE PROVINCIAL EXECUTIVE MANAGER OF LABOUR (OHS ACT) WITHIN 14 DAYS OF THE DIAGNOSIS BEING MADE.

STEP 2: OBTAIN AN ERGONOMIC ASSESSMENT

ERGONOMIC REPORT

• ORGANISATIONAL FACTORS • TASK ANALYSIS • INDIVIDUAL FACTORS
• HUMAN – TASK INTERACTION • ENVIRONMENTAL FACTORS

STEP 3: COMPILE A PLAN OF ACTION

PLAN OF ACTION

- DETAILED ERGONOMIC PLAN OF ACTION WITH TIME-SCALE
- OCCUPATIONAL HEALTH PLAN SHOULD MAKE PROVISION FOR EDUCATION, HEALTH RISK ASSESSMENT AND MEDICAL SURVEILLANCE
- NEGOTIATE A POLICY ON PREVENTION OF WRULDs WITH EMPLOYEES

STEP 4: IMPLEMENT THE PLAN OF ACTION AND REVIEW IT AT APPROPRIATE INTERVALS

THE EMPLOYER WILL SUBMIT A REPORT CONTAINING:

- A REVIEW ON PROGRESS MADE REGARDING THE IMPLEMENTATION OF THE ERGONOMIC PLAN OF ACTION
- PROGRESS MADE WITH HEALTH RISK ASSESSMENT AND MEDICAL SURVEILLANCE
- THE NEGOTIATED POLICY ON PREVENTION OF WRULDs

SECTION E-1

For the employer

Ergonomic plan of action

14 A practical approach to identify and assess risks in the workplace which may cause WRULDs

14.1 Ergonomics and its practice

"Ergonomics is the scientific discipline concerned with the fundamental understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance". International Ergonomics Association (IEA) 2000.

Ergonomics is a rigorous, applied science and at an international level all registered ergonomists must have at least an MSc in Ergonomics. Often "safety officers", occupational health professionals, physio-therapists, occupational therapists and occupational hygienists are able to conduct basic ergonomic surveys or analyses, but not just anyone can offer ergonomically sound intervention strategies in more complicated cases. There is a growing number of guidelines being written for occupational health professionals on the basic principles of basic ergonomics, but we urge occupational health profes-sionals and employers to recognise their limitations and call in a qualified ergonomist on a regular basis.

Ergonomic enhancements can, and should, play a major role in furthering the health and safety of workers and improving the quality and quantity of productivity. This improved productivity is essential for the economy of the country and will be achieved not by the workers being pushed to work harder, but by running companies on sound ergonomics principles resulting in improved worker efficiency and less physical and mental stress being placed on workers.

Physical ergonomics is concerned with human anatomical, anthropometric, physio-logical and biomechanical characteristics as they relate to physical activity. Relevant topics include working postures, materials handling, repetitive movements, heavy work, work-related musculo-skeletal disorders, workplace layout, safety and health.

Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system. Relevant topics include mental workload, decision-making, skilled performance, human-computer interaction, work stress and training as these may relate to the way humans work in systems.

Organisational ergonomics is concerned with the optimisation of socio-technical systems, including their organisational structures, policies, and processes. Relevant topics include human system considerations in communication, human resource management, work design, design of working times, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, virtual organisations, tele-work, and quality management. While the emphasis in any ergonomic investigation may be more in one domain than the other, it is important to realise that no thorough evaluation of a work site should ever be exclusively in one area: a holistic approach is the very essence of any ergonomic assessment.

With the growing awareness of ergonomics in industrial developing countries it is important that the limited number of ergonomists establish a "functional partnership" with other professionals involved in addressing the challenging problem of improving the often horrendous working conditions, as well as the health and safety of people working under these conditions.

Ergonomic principles applied systematically will ensure improved working conditions, thereby reducing the risks of injuries and illness arising from working under poor conditions. A prime objective of ergonomics is to increase worker efficiency and reduce the like-lihood of excessive physical and/or mental strain being placed on the worker, thereby improving productivity, with obvious benefits for workers and the organisation.

14.2 Ergonomic analysis – practical steps

Changing social attitudes have made most jobs/tasks non-gender specific. If the person performing a job has the physical and mental capability to successful-

ly and safely complete the task, by law he/she has the right to perform that job. Concurrent with these trends, is the need to develop safe, efficient environments which allow for adjustability to accommodate persons of varying physical dimensions and skill capabilities. When taking into account subject specific factors like gender, age and cultural background, the problem of fitting the task to the user becomes difficult.

The complexity of an ergonomic assessment is limited only by the physical resources available to the investigator. Many thorough ergonomic assessments have been completed with a ruler, weigh scale and (sometimes) photographic equipment. Although some of the data reduction is computation intensive, insight may be gained from easily obtainable information.

An existing job design will as a rule determine:

- the types of tasks performed
- how tasks are performed
- the order in which tasks are completed
- the type of equipment needed to complete the task

One must always keep these factors in mind when assessing a task. Generally, the types of tasks performed are the only factors which remain fixed. However, how tasks are performed and the order in which these tasks are completed, may be factors which can be adjusted to improve overall task performance and decrease risk for injury or error. Although the type of equipment required for the task is often a fixed variable, suggestions for alterations to equipment may be necessary, especially if equipment design is deemed responsible for causing acute or chronic injury to the worker.

The following criteria have been identified as necessary for a well-designed job (Stones, 1989[76]):

- Allows worker to vary body position to avoid physical strain
- Allows worker to frequently change mental tasks to avoid mental fatigue
- Gives worker a sense of accomplishment
- Provides adequate work/rest ratios which allows the person adequate time to complete the task and recover in order to continue to the next task
- Allows an adjustment period (warm-up) for physically demanding tasks (habitualise to the working conditions)
- Prompts worker as to what tasks to do and how to complete them

In order to successfully make recommendations for improved manners in which a task/skill is to be performed, these criteria should be satisfied. Depending upon the specific job being considered, some of the listed criteria will rank higher in importance than others. However, the following should be considered: *The ultimate goal of an ergonomic analysis is to ensure that a person is satisfied physically, psychologically, and socially with their work situation.*

14.3 Principles of task/workplace assessment

14.3.1 Heed concerns of workers and supervisors

The most efficient form of ergonomic assessment is to ask all individuals (involved in completing a task) about their specific concerns and suggestions for correcting the situation. Workers involved directly with a task will as a rule delineate specific problems for the safe and successful completion of the task. Management and supervisors will detail specific performance standards expected of the worker. Performance expectations may be a fixed variable or one that is presently unacceptable from a human performance point of view.

14.3.2 Gain better understanding of jobs and tasks

For optimal understanding of a job or task, one should perform it oneself. This may not however always be feasible, especially where complicated or dangerous tasks are being assessed. First-hand experience could, however, be invaluable when assessing a task. In attempting a skill or job, one must always be aware of the physical and mental demands involved. For example, is the task physically reasonable; can the task be performed for an extended period of time; is there evidence of physical or mental stress? Cognisance of these questions allows for better decision-making on task components to be considered in greater detail.

76 Stones (1989)

14.3.3 Identify existing and potential hazards

There are several checklist-type surveys which can be used to organise the assessment of a task. These checklists are discussed in more detail later in this chapter. The scope of an ergonomic assessment is generally limited to specific or potential hazards.

14.3.4 Determine underlying causes of hazards

Use the Ergomax's (Pty) Ltd. checklist (see 14.7 – 14.10) to determine factors contributing to a claimed WRULD. The total score will enable one to determine potential risk and the area/s which are deemed high risk.

14.4 Recommend changes and monitor hazard controls (personal protective equipment, engineering controls, policies, procedures)

Once causal factors have been identified, they should be monitored on at least a weekly basis. If changes have been done, it is important that these changes be monitored and assessed.

14.5 Workplace observation considerations

The first inspection of a worksite or task will provide one with basic information for initiating a more comprehensive ergonomic assessment. It should be kept in mind that a worker may alter work habits or execution of skills if there is any suspicion of being observed. Observations should be as discreet as possible and if management and employees agree, a video or still photography record could be obtained (this process could be sensitive, particularly when workers' union or management policies are considered).

The following has been adapted from Stewart (1989)[77] and is based on the U.S.A. National Safety Council's report on poor common working practices. These include items to be noted on initial inspection, more specifically for an industrial setting.

- Using equipment without authority or previous instruction/certification
- Operating at unsafe speeds, rates or repetitions
- Removing guards or other safety devices, or rendering them ineffective
- Using hands or body instead of tools or push sticks
- Overloading, crowding or failing to balance materials, or handling materials in other unsafe ways, including improper lifting techniques
- Repairing or adjusting equipment which are in motion, under pressure, or electrically charged
- Failing to use or maintain, or improperly using personal protective equipment or safety devices
- Creating unsafe, unsanitary or unhealthy conditions by improper personal hygiene, by using compressed air for cleaning clothes, by poor housekeeping, or by smoking in unauthorised areas
- Standing or working under suspended loads, scaffolds, shafts or open hatches

14.6 Assessing working environment for WRULDs

Many employers find a checklist useful in deciding:

- If other employees are at risk of developing WRULDs
- Whether they need to take more precautions; and
- What to do.

Following a step-by-step approach in assessing potential WRULDs in their organisation and identifying those at possible risk, employers must implement the appropriate measures needed to prevent or control the risk of WRULDs:

Useful checklists are supplied with kind permission of the Health and Safety Executive (HSE) in the United Kingdom. One does not need any specialist knowledge to complete these. "Yes" entries in the checklist imply that action is required. The more "Yes" entries, the more urgently one should act. Risks may be much higher than average where several things are present in the same job which may cause WRULDs.

14.6.1 Ergomax risk calculator

Ergomax (Pty) Ltd developed a WRULDs **risk calculator** which could be used to assess and score (as percentage) the critical ergonomics risk factors an employee is exposed to (Kennedy 2004)[78]

77 Stewart (1989)

78 Kennedy (2004)

(see 14.7 – 14.10). The calculator may also be used as a preventative tool in assessing various workstation tasks.

In situations where only one risk factor can be identified, a more in-depth ergonomic assessment of that particular risk factor is required. The calculator may score the one risk as low and not give a true reflection of the severity of the risk. Although one isolated factor is rarely evident, the likelihood should nevertheless be considered.

Ergomax's risk calculator is available on their website: http:\\www.ergomax.co.za. It can also be done manually on the following page.

14.6.2 Using the risk calculator

The **Total WRULDs Risk Score (TWRS)** is obtained by adding the score for each **Task Risk Score (TRS)** and each **Human Risk Score (HRS)** and multiplying this by 50 to get a percentage score. The following formula can thus be used:

TWRS = 50 X [(TRS / 36) + (HRS / 18)]

TWRS =	TOTAL WRULDs RISK SCORE AS PERCENTAGE
TRS =	TOTAL TASK RISK SCORE (ADD TOGETHER ALL 9 TASK RISKS)
HRS =	TOTAL HUMAN RISK SCORE (ADD TOGETHER ALL HUMAN RISKS)

Any score above 30% is deemed to predispose the employee to WRULDs.

One can then review the risk data sheet and determine where the greater risks are. Obviously factors such as age and gender cannot be adjusted for. The variables relevant to these human factors need therefore to be modified (Kennedy 2004)[79].

14.7 TASK RISKS

In Circular Instruction 180 various risk factors are mentioned that could contribute to the development of WRULDs. In this section these task risk factors are defined and practical tools are suggested on how these task risks could be assessed and scored.

The task risks discussed below score as either:

1 = LOW RISK

2 = MEDIUM RISK

4 = HIGH RISK

Note: if a risk is not present, the score is 0

If there is immediate danger, shut down and "lock out" any hazardous items which cannot be brought to a safe operating standard until repaired.

14.7.1 Highly repetitive movements

Repetition is a matter of definition ("more than once per time unit") and what is low or high depends on the specific activities or body part involved.

A concern is that in numerically describing the frequency of an activity one presumes that the actions occur at regular intervals during the recording time. Yet, in reality, this is commonly not the case for an average working day: certain activities may run concurrently during some periods and may seldomly occur during others.

Ergomax's risk calculator is based on data published by Kilbom (1994)[80]. Both the number of hand manipulations per 8-hour work shift and the task cycle time have been used to rate this factor. Task cycle times of 30 sec or less were defined as high repetition; cycle times greater than 30 sec as low repetition. For hand manipulations, high repetitiveness was described as more than 20,000 manipulations per 8-hour work shift; medium repetitiveness as between 10,000 and 20,000 manipulations per 8-hour work shift, and low repetitiveness as less than 10,000 manipulations per 8-hour work shift.

These guidelines also consider other areas of the upper extremity. Each area may have a different ability to tolerate repetitious activity. At the same rate of repetitions some specific acts such as pinching may be less well tolerated than others. This is an example of complexities that current guidelines may not address adequately.

79 Kennedy (2004)

80 Kilbom (1994)

Repetition calculator: highly repetitive movements

How often does the repetition occur during an 8-hour shift or per minute? (Count the number of upper limb movements the employee makes in one minute)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
REPETITIONS PER 8-HOUR SHIFT	<10,000	10,001 – 20,000	>20,001
OR	OR	OR	OR
REPETITIONS PER MINUTE	20 – 30	31 – 41	>41

Ergonomic solutions for repetitiveness

Repetitive motions can have cumulative effects. To reduce the risk of injury, perform tasks so as to minimise stress on the body:

- Implement frequent short rest breaks
- Minimise the number of motions between operations
- Use conveyors, chutes, slides and turntables to change direction of material flow
- Prevent movements occurring at the extreme range of motions

14.7.2 Movements requiring force

Force is defined as any muscular contraction that requires extended effort over a given time period.

Forcefulness is also a matter of definition and what is low or high depends on the specific activities or body part involved. Not everyone has the ability to measure force as this is often expensive. For the purpose of these guidelines any force exerted over an extended time period places the employee at risk.

Force risk calculator: movements requiring force

How long does the forceful movement last during an 8-hour shift?

(Time the duration of the movement, for example if one has to turn a screwdriver for half and hour every hour, then the total risk for this category would be 4 hours or 240 minutes)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
EXERTION OF FORCE PER MINUTE PER 8-HOUR SHIFT	1-120	121- 240	>240

Ergonomic solutions for force

To reduce the risk of injury, design tasks that minimise stress on the body:

- Use rollers to move objects
- Use mechanical lifting aids
- Use two or more people to help lift or move heavy loads
- Use hand carts or dollies with large diameter wheels for moving objects
- If possible use larger muscle groups to complete the task

14.7.3 Movements at the extremes of reach

Extreme reach is defined as the working area that occurs outside of your wrist, elbow or shoulder circumference zone.

For example, if you were to sit at a desk with your upper arms relaxed and your elbows bent at 90 degrees and you move your forearms in a semi-circle (like windscreen wipers of a car) that would be your zone of convenient reach. Obviously this applies in both the horizontal and vertical directions.

Movements at the extremes of reach predispose the employee to arm injury due to the static nature the shoulder muscles have to endure to hold the arm in an extended position. Furthermore, the further one reaches, the more the facet joints of the vertebral bodies are loaded. This increases the shearing forces within the spine and in turn stresses the surrounding soft tissue which may result in neck and lower back pain.

Reach risk calculator: extremes of reach

How far from the centre of the hip to the centre of the object does the movement occur?

(Measure the distance from the middle of the hip joint

to the middle of the object being manipulated)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MEASUREMENT IS TAKEN FROM THE PERPENDICULAR DISTANCE BETWEEN THE CENTRES OF THE HIP TO CENTRE OF THE OBJECT BEING LIFTED (MILLIMETRES)	150 – -599 MM	600 – 750 MM	>750 MM

Ergonomic solutions for reach

- Keep working zones within "safe working parameter" (see diagrams in section 14.9, p. 55)
- Avoid obstacles which necessitate employees leaning over in order to reach controls
- Place objects used most frequently within safe working zones

14.7.4 Static muscle loading

Static postures may be defined as postures that are held for longer than 30 seconds, without the limb moving.

Fixed postures also result in static (isometric) muscle contractions. A muscle that is actively involved in concentric and eccentric contractions converts glucose and oxygen into carbon dioxide and water, liberating energy in the process. Muscles therefore require a regular blood supply in order to replenish fuel and remove waste products. The rhythmic pumping action of an active muscle facilitates this flow of blood. However, during sustained isometric contractions a muscle occludes the blood vessels within it, resulting in diminished blood supply. The muscle is thus starved of oxygen and waste products accumulate as oxygen-independent metabolic processes take place. Discomfort and fatigue occur rapidly for this reason, as well as the increased risk of WRULDs.

For example, if one has to fit a light bulb above your head, you would have to hold your arms above your head continually in order to position and screw in the bulb. This results in a static muscle posture of the shoulder muscles and fatigue sets in quickly.

Static muscle risk calculator

How long is the static posture held?

(Time the duration the employee has to hold his arms above his head, for example if one has to turn a screwdriver for half and hour above one's head, every hour, then the total risk for this category would be 4 hours or 240 minutes)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MINUTES PER 8-HOUR SHIFT	1-120	121-240	>240

Ergonomic solutions for static muscle loading

- Try avoiding the static posture where possible
- Allow lifting devices, jigs or turntables to hold and move the load whilst handling it
- Increase the number of rest breaks

14.7.5 Awkward sustained postures

Postures that are not within the normal reach zones of the employee are considered to be awkward.

This variable needs to be measured individually for each employee assessed, as we all have various working postures. The time spent working in this posture will need to be considered to calculate the risk exposure.

For example, if one has to fully bend one's wrist in order to thread material through a sewing machine, this wrist posture will be deemed awkward.

Risk calculator: awkward postures

How long is the awkward posture maintained?

(Time the duration the employee has to hold his hands in an awkward position, for example if one has to turn a screwdriver for half and hour, with hand bent every hour, then the total risk for this category would be 4 hours or 240 minutes)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MINUTES PER 8-HOUR SHIFT	1-120	121-240	>240

Ergonomic solution for awkward postures

- Keep working zones within "safe working parameter" (see diagrams in section 14.9, p. 55)
- Avoid obstacles which necessitate employees leaning over in order to stretch and reach controls
- Design hand-held tools to accommodate the angle of use, instead of the employee having to bend his wrist, for example

14.7.6 Contact stress

Contact stress is defined as the time spent leaning/ pressing the upper limb against an uncomfortable surface (e.g. uncomfortable gripping and twisting, sharp edges to hand tools, desk edges, etc.)

The risk calculator considers the time spent in contact with the object. For example, if one leans one's elbows on the desk all day to type, the contact stress for the elbows will be considered a high risk

Contact stress calculator

How long is contact made with an object?

(For example: Time how long the employee has to lean his hand against his desk in order to type)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MINUTES PER 8-HOUR SHIFT	1-120	121-240	>240

Ergonomic solutions for contact stress

- Avoid employees having to lean against objects or machinery
- Design appropriate surface edges for employee to work against. (Round square edges)
- Proven adequate Personal Protective Equipment (PPE) for employees who have to hold tools for extended periods

14.7.7 Vibration

Vibration is defined as any hand-held tool or working surface that shakes, pulsates whilst in use.

The calculation of vibration exposure is often costly and difficult to administer. For ease of use, Ergomax uses length of time exposure to vibrations. Obviously exposure limits will vary according to the area of the body affected and the frequency of vibrating cycles per second exposure. Vibration exposure can affect your upper limbs when using hand-held power tools, hand-guided tools or holding material being processed by machinery.

Vibration risk exposure

How long is the employee exposed to vibrations?

(Time how long the employee has to stand or use vibrating equipment.)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MINUTES PER 8-HOUR SHIFT	1-120	121-240	>240

Ergonomic solution for vibration

- Minimise exposure to vibrations from hand-held tools.
- Consider using anti-vibration gloves when using vibrating tools
- Maintain tools regularly

Vibration exposure

Note: the best way to quantify vibration exposure is to calculate the daily vibration exposure. This, however, is often difficult, as suppliers often do not indicate the vibration magnitude. The vibration exposure is dependant on the duration of exposure to a reference period of 8 hours, thereby allowing different exposures to be compared. It is currently recommended that preventative measures and health surveillance be provided when workers' daily vibration exposure regularly **exceeds** 2.8m/s^2 A(*8).

It is possible to calculate the vibration exposure when the vibration magnitude of the tool is known. For example, information from a supplier of a chainsaw states that vibration magnitude is 9.7 m/s^2. The equipment is used for 2 hours daily.

Using A(8) = $a_{hw}\sqrt{t/8}$

where: t is the daily exposure time; a_{hw} is the vibration magnitude

A(8) = $9.7\sqrt{2/8}$

Average for 8 hours = 4. 8m/s²

14.7.8 Load exposure

Load is defined as the weight of the object being lifted.

Obviously, the heavier the load, the more strenuous and dangerous the task. The introduction of mechanical devices for handling heavy materials, the division of heavy items into smaller objects or two workers involved in handling one heavy item reduces the fatigue caused by handling heavy weights, and worker productivity is improved. The risk of back injuries is also greatly reduced.

Load risk calculator

What is the weight of the load lifted or handled?

(Weigh the tool or load that the employee has to operate or lift)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
KILOGRAM	< 5KG	5,1 – 7 KG	>7KG

Ergonomic solutions for load

- Minimise the load as far as reasonably possible
- Lift loads within safe range of motion zones
- Lift directly in front of the body
- Eliminate or reduce lifts occurring in confined spaces
- Decrease frequency of lift

14.7.9 Cold exposure

Cold is defined as the environment temperature being below 18 degrees Celsius where discomfort is felt.

In general, when it is too cold, or when we touch cold materials, our hands can become numb. Due to the physiological changes that occur due to cold exposure, one is more likely to misjudge the amount of force required to complete work and normally exert too much force. A cold environment also makes our bodies less flexible. Every movement made and every position held takes more effort.

Cold risk calculator

How long does the employee spend working in a cold environment?

(Time the length of shift the employee is working in a cold environment)

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
MINUTES PER 8-HOUR SHIFT	1-120	121-240	>240

Ergonomic solutions for cold environments

- Minimise the exposure to cold environments as far as reasonably possible
- Allow adequate personal protective equipment against the cold.

14.8 Additional guidelines to WRULDs assessment

a.) Do not operate equipment unless authorised to do so. Ask the operator for a demonstration. If the operator of any piece of equipment does not know what dangers may be present, this is cause for concern. Never ignore any item because you do not have the necessary knowledge to make an accurate judgement of safety.

b.) Look up, down, around and inside. Be methodical and thorough. Do not spoil your limited inspection opportunities with a “once-over-lightly” approach.

c.) Clearly describe each hazard and its exact location in your rough notes. Allow recording of all findings before they are forgotten or inspection is interrupted.

d.) Ask questions, but do not unnecessarily disrupt work activities. This may interfere with efficient assessment of the job function and may also create a potentially hazardous situation.

e.) Consider the static and dynamic conditions of the item you are inspecting. If a machine is shut down, consider postponing the inspection until it is functioning again.

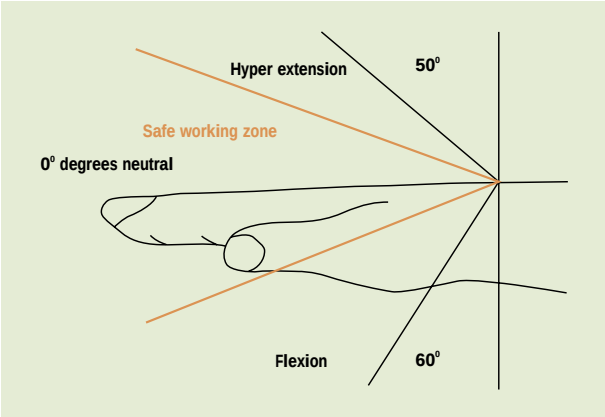
f.) Discuss as a group: 'Can any problem, hazard or accident generate from this situation when looking at the equipment, the process or the environment?' Determine appropriate corrections or controls.

14.9 Ergonomic range of motion with safe working zones

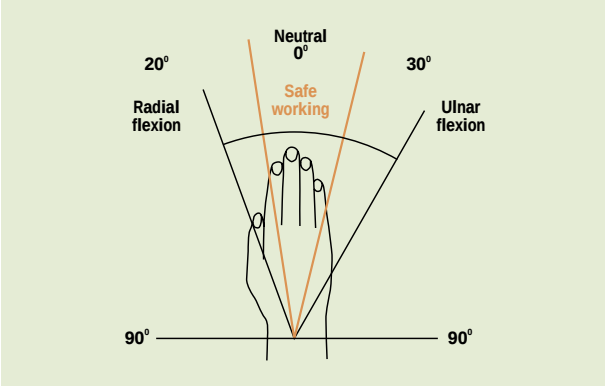
The following sketches may be used as a quick reference to describe safe working zones for various movements of the upper limb. Any movements occurring outside the "safe working zone" is deemed awkward and should be avoided where possible.

14.9.1 Wrist range of motion:[81]

Flexion/ Extension

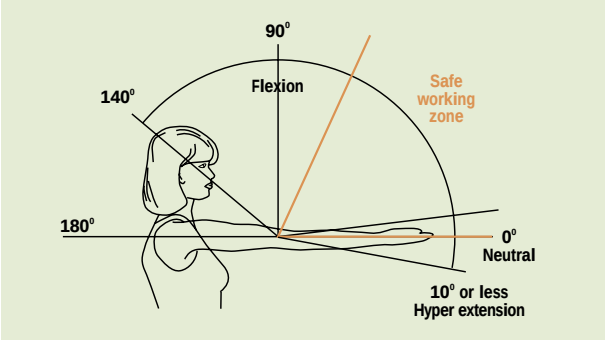


Radial and ulnar flexion



14.9.2 Elbow range of motion

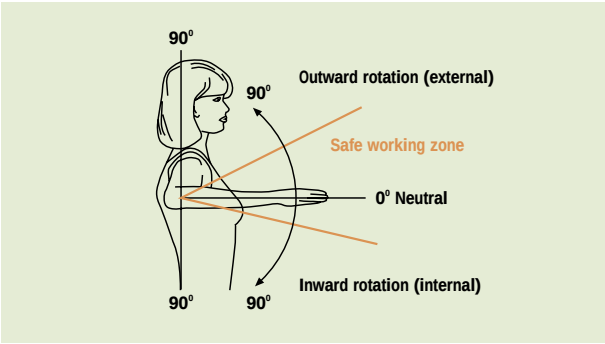
Elbow flexion extension



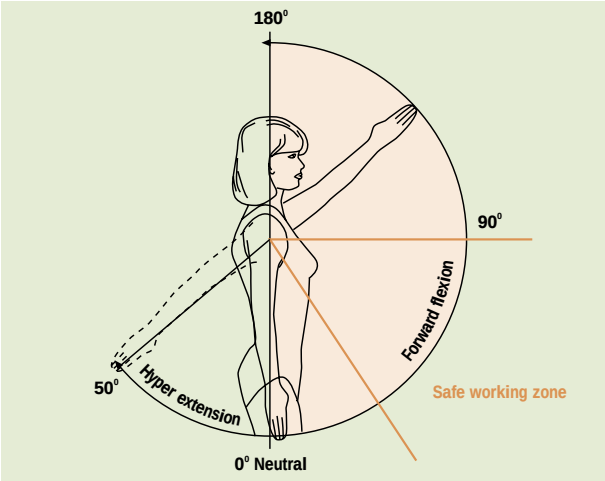
14.9. Shoulder range of motion

Internal and external rotation

Note: any work occurring above shoulder height is deemed awkward for the purpose of these guidelines.



Shoulder flexion extension



81 *Drawings and diagrams taken from Luttgens, K. & Hamilton, N. (1997). Kinesiology: Scientific Basis of Human Motion, 9th Ed., Madison, WI: Brown & Benchmark.*

14.10 Human risks – Human variables affecting WRULDs risk exposure

The human risks discussed below score slightly differently than the task risks as each human risk has independent associated risks:

14.10.1 Gender

Depending on one's gender, the exposure or likelihood of the development of WRULDs varies. Due to physiological differences, females appear to be more predisposed to certain WRULDs relative to their male counterparts. Use the table below to score the relevant risk.

- For female employees add a score of 2 to the total human variable score.

14.10.2 Age

As one ages certain physiological and biomechanical changes occur. For example one looses 1 percent of one's total strength capability each year from the age of 25 onwards. These physiological changes, associated with ageing, may increase the likelihood of developing WRULDs in certain individuals.

SCORE	LOW (1 POINT)	MEDIUM (2 POINTS)	HIGH (4 POINTS)
AGE (YEARS)	20-39	40-50	>51

14.10.3 Body mass index (BMI)

Body mass index (BMI) is derived from the calculation of body mass divided by height squared.

- BMI = kg/m^2

Body mass index can be used to indicate whether one is overweight, obese, underweight or normal. It will, however, overestimate fatness in people who are muscular or athletic. One generally makes use of the BMI index as a quick reference to the body composition of an individual, instead of the lengthy process of measuring ones fat content versus lean body mass. Women will tend to score higher due to the physiological constitution of their bodies.

SCORE	LOW (0 POINT)	MEDIUM (3 POINTS)	HIGH (5 POINTS)
AGE (YEARS)	19-27	28-32	>32

14.10.4 Exposure history

Exposure history considers the environment in which the employee has worked that have exposed him/her to the risk factors of WRULDs. If the employee has worked in an environment which has previously exposed him/her to any of the seven task risk factors, indicate the length of time he/she has been exposed.

SCORE	LOW (3 POINTS)	MEDIUM (5 POINTS)	HIGH (7 POINTS)
PERIOD (YEARS)	<2	2-5	>5

14.11 Worked examples:

14.11.1 Industrial setting

An employee in a warehouse has to lift and place more than 480 boxes on a conveyor belt above shoulder height each hour. The duration of the shift is eight hours and the employee is required to complete this task for the entire shift. The conveyor system is 1.8 m above the ground. Each box is held briefly (3 sec) whilst the conveyor partitioning moves into place in order for the employee to load the box.

Task criteria:

- Lifts occur 8 times per minute
- Movements requiring force is throughout the shift
- Static posture is held for 24 sec per minute
- Awkward postures occur throughout the shift
- Contact stress occurs for 36 sec per minute
- The weight of the load is 8 kg
- The distance that the box has to be moved is 1.8 m
- There is no vibration exposure

Human criteria

- The employee's age is 42 yrs, is a female and has been exposed to one or more of the seven risk factors for approximately 5 years. Her height is 1.61 and weight is 74 kg.

  BMI = 74/1.61m^2

  = 74/2.592

Total WRULDs Risk Score:

- TWRS = 50 X [(TRS / 32) + (HRS / 18)]

  = 50 X [(18/32) + (12/18)]

  = 50 X [0.5625 +0.6666]

  = 50 X 1.2291

  = 61.45 %

14.11.2 Office setting

An employee is involved in editing magazine articles and spends about 5 hours a day typing. She is 53 years old; height 168 m and weight is 63kg. Her keyboard is placed 45 cm from the centre of her hip. She has to hold her arms up in order to type on her keyboard, due to the height of the desk. As a consequence she has to rest her elbows on the edge of her desk. She makes over 100 repetitions with her fingers each minute. She has been at this job her whole working career.

Task criteria:

- Repetitive movements occur more than 100 times per minute
- She types for 5 hours a day (force)
- Her keyboard is placed 450 mm from the centre of her hip (reach)
- Her shoulder muscles have to hold her arms up whilst typing (static)
- She rests her elbows on the desk whilst typing (contact)

Human criteria

- The employee's age is 53 yrs, is a female. Her height is 1.68 m and weight is 63 kg.

  BMI = 63/1.68m^2

  = 63/2.8224

  = 22.3

Total WRULDs Risk Score:

- TWRS = 50 X [(TRS / 32) + (HRS / 18)]

  = 50 X [(22/32) + (13/18)]

  = 50 X [0.6875 +0.7222]

  = 50 X 1.409

  = 70.46 %

14.12 Ergonomic intervention strategies

14.12.1 Deciding how to reduce risks

Approaches to problems can include people-based solutions (e.g. training, adding variety to the job, appropriate treatment of the individual and rescheduling rest breaks) as well as alterations to workstations, tools or the work environment. However, no single approach is successful all the time and as such, several solutions need to be investigated.

Often straightforward and inexpensive changes are all that is required. Again, remember to consult the workers who are actually doing the job. They should know what the difficulties are and may have good ideas on how to modify the task.

Unusual WRULDs problems may require more complex solutions, for example where risks are high, or where several interacting risk factors exist. Here, approaches such as redesigning workstations, providing better tools, or supplying sub-components already assembled may help. If not, one may have to consider fundamental changes of approach such as automation, or changing from assembly-line to other production methods. One could also consider introducing job rotation – which implies workers in a team exchanging jobs at intervals to provide greater variety.

Remember, if one introduces new tools, equipment or working methods, workers will have to be trained in order to get the best results (both for health and safety, as well as productivity).

An employer should make sure that staff knows who is

responsible for taking action to reduce the risks for WRULDs.

14.12.2 Ergonomic principles

The following main ergonomic principles must be taken into consideration when implementing an ergonomic plan of action

a) Avoid the risk altogether (e.g. by not using a particular tool or process)

b) Combat risks at source rather than applying palliative measures

c) Adapt work to the individual, especially as regards the design of workplaces, the choice of work equipment and the choice of working and production methods, with a view to eliminating monotonous work and work at a predetermined rate

d) Take advantage of technological and technical progress to improve working methods and make them safer

e) Ensure that the measures form part of a coherent policy of reducing risks, which takes account of the way work is organised, working conditions, the working environment and any relevant social factors

f) Give priority to measures which protect the whole workforce

g) Ensure that workers understand what they need to do by providing information and training

h) Ensure an active health and safety culture throughout the entire workplace

i) Conduct regular evaluations of the situation in order to be pro-active to potential problems

Table 23. Some of the main measures that employers can take to prevent WRULDs

A qualified ergonomist can be of great value in providing expertise and advice so that WRULDs can be eliminated from the workplace:

Improving the work environment

THE PHYSICAL WORK ENVIRONMENT CAN BE A SOURCE OF STRESS AND STRAIN TO WORKERS. EMPLOYERS CAN HELP TO REDUCE THESE STRESSES BY:

a) Ensuring noise levels are kept as low as possible.

b) Improving lighting levels and removing irritating flickers or glares.

c) Improving temperature and ventilation.

d) Providing well designed protective clothing and regular breaks in a warmer environment for workers who have to work in cold conditions or with frozen foods.

e) Providing suitable rest areas away from the workstation for workers to have recuperative breaks.

f) Encouraging fluid intake at all times but particularly in hot environments.

g) Reducing the need to use vibrating tools.

h) Providing vibration absorbing grips on tools and by maintaining them in a good state of repair.

Improving task and equipment design

THIS CAN BE DONE BY APPLYING GOOD ERGONOMIC PRINCIPLES IN THE DESIGN OF TOOLS, EQUIPMENT, WORKSTATIONS, TASKS AND WORK METHODS. IMPROVEMENTS CAN BE ACHIEVED BY:

a) Selecting tools and equipment appropriate for the job and suitable for the individual who has to use them.

b) Maintaining tools in a condition which makes them easy to use, e.g. keeping them sharpened or lubricated.

c) Providing powered versions of tools.

d) Selecting tools with handles which allow the worker to work with the limbs in a 'natural' alignment.

e) Redesigning workstation so that everything is within reach, or so that controls are easier to use.

f) Providing seats, equipment, etc., that can be adjusted to meet individual needs and by providing training in how to adjust them.

g) Giving the worker an appropriate space in which to work.

h) Redesigning the task to minimise repetitive movements and static handling and/or sustained postures.

i) Automating the task.

j) Redesigning the work method to avoid overreaching and other awkward postures.

Improving work organisation

WORK SHOULD BE ORGANISED IN SUCH A WAY THAT EMPLOYEES' HEALTH AND SAFETY IS NOT PUT AT RISK. WORK ORGANISATION CAN BE IMPROVED IN A NUMBER OF WAYS, FOR EXAMPLE BY:

a) Improving communication between management and staff.

b) Consulting employees and their representatives about their jobs and any changes they may suggest (participatory ergonomics).

c) Ensuring that jobs which pose a risk and which cannot be completely eliminated are rotated so that no individual spends long periods on that task.

d) Ensuring that all employees have sufficient variety in the demands of their task, thus ensuring different muscles and postures being utilised and making their jobs more satisfying.

e) Providing adequate rest breaks with pause exercises to prevent the build-up of fatigue, and by ensuring that the breaks are in fact taken, i.e. improving the work-to-rest ratio.

f) Identifying and limiting stress factors in the workplace.

g) Discussing the control of work pace and the overall plan for the day with the workers.

h) Removing task rate and payment by results systems that make earnings dependent on excessive work rates.

i) Removing bonus, performance or monitoring schemes which make workers push themselves beyond their capacities.

j) Having proper monitoring and reporting procedures for symptoms of WRULDs as well as appropriate work hardening programmes.

Taking account of the individual

EMPLOYERS NEED TO ENSURE THAT WORKERS ARE NOT AT RISK THROUGH LACK OF TRAINING OR BECAUSE OF INDIVIDUAL FACTORS. THEY CAN HELP PROTECT THEIR EMPLOYEES FROM DEVELOPING WRULDs BY:

a) Providing information and training about WRULDs and how to recognise the symptoms.

b) Providing information and training about how to avoid WRULDs through safe working techniques and safe working postures.

c) Advising employees on the importance of taking breaks before the onset of fatigue and of varying their work routines.

d) Informing employees of the importance of reporting symptoms of WRULDs as soon as possible.

e) Providing information on how to report symptoms of WRULDs.

f) Ensuring that workstations and equipment can be fully adjusted to accommodate people of very different sizes, heights or with particular needs.

g) Ensuring that workstations and equipment can be adjusted to the needs of people with disabilities.

h) Ensuring that males or females, left or right-handed workers, do not have to use equipment and tools designed for other groups.

i) Ensuring that new employees or those returning from a long break are allowed to build up their work rate gradually.

j) Ensuring that the wearing of personal protective equipment or clothing (e.g. gloves) does not increase the risk of WRULDs.

Care should be taken that this does not result in an over-eagerness to report WRULDs in the hope of receiving compensation.

SECTION E-2

FOR THE EMPLOYER

Occupational health programme

15 Occupational health programme

Health risk assessment, adequate medical surveillance and relevant health education and training should form an integral part of an institution's occupational health programme.

15.1 Health risk assessment

As part of risk assessment, employers should check whether any of their employees are already displaying symptoms of WRULDs. However, it is important to note that:

- Many employees may not recognise their own symptoms as WRULDs.
- Many employees will be unaware of the serious nature of WRULDs even if they do suspect the symptoms.
- Many employees will continue to work, regardless of their symptoms.
- Many employees will be unaware of the importance of reporting their symptoms early.
- Many employees will be afraid to report their symptoms.

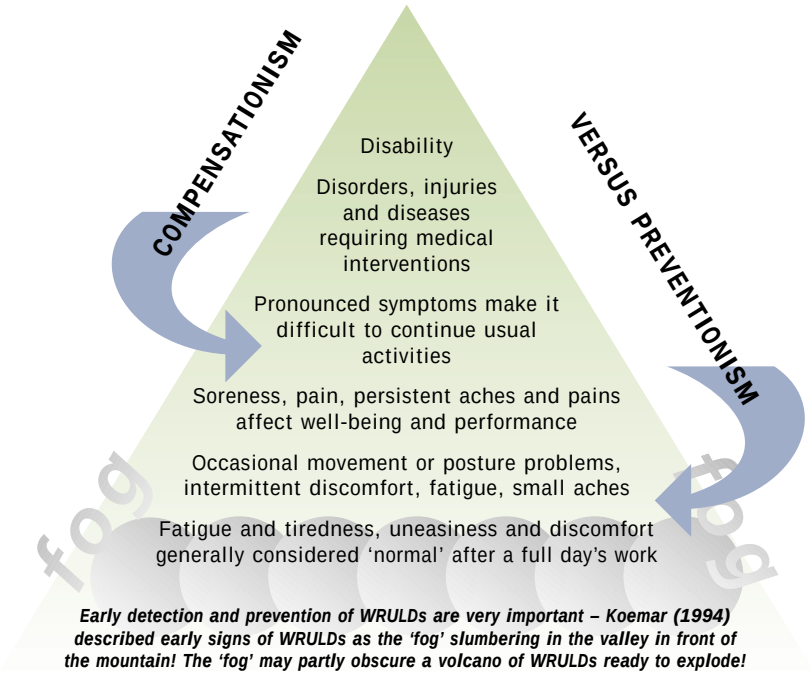
Early detection and prevention of WRULDs (Figure 9) are very important. It is important to be on the look-out for the 'fog' – the level of which indicates perception and awareness of symptoms. The fog may partly obscure a volcano of WRULDs ready to explode![82]

Employers should take account of these problems when trying to assess the extent of any existing problem in their organisation.

One way to find out whether employees have WRULD symptoms is for employers to look at their accident book and at sickness absence records and to consult their occupational health service if one is available.

However, since many employees will not recognise or report symptoms, as already indicated, employers will probably need to carry out a health survey of their employees. This should be done in an open and transparent way and employers will need to explain the purpose of the survey and demonstrate a commitment to resolving any problems, whilst guaranteeing employment security to anyone found to have symptoms. If employees suspect that the real motive behind the survey is to weed out people with problems, they will

Figure 9. Early detection and prevention of WRULDs



Early detection and prevention of WRULDs are very important – Koemar (1994) described early signs of WRULDs as the 'fog' slumbering in the valley in front of the mountain! The 'fog' may partly obscure a volcano of WRULDs ready to explode!

82 Koemer (1994)

not have any confidence in the survey and are unlikely to take part.

The survey itself will have to be appropriate to the purpose and set out in a way that is easy to understand. The language used should be simple, with translations available in any other languages in common use amongst the workforce. (See 15.1.1, p. 65) An example of a simple form which incorporates questions about symptoms with reference to different parts of the body as well as questions about the job can be viewed on the next page.

The role of trade unions is vital in ensuring that surveys are done properly and are not used to weaken job security and discriminate against employees. The employer should consult the union at every step along the way and obtain agreement for the method to be employed.

15.1.1 Medical surveillance

Health surveillance can play an important role in the prevention of WRULDs, by detecting symptoms early, so that remedial action can be taken. It should be seen as an essential backup to the preventive measures taken to design WRULDs out of the workplace.

Employers should at the very least set up an internal reporting system so that symptoms of WRULDs can be monitored, recognised early, and treated before the condition progresses to a more serious state. In order for such a system to be effective, it must be explained properly to employees so that they understand the purpose of the system, how to recognise symptoms of WRULDs, how to report them and what would happen if they do report them. Employees are unlikely to report symptoms if they think their future employment will be at risk, so the system must be seen as a positive element of the employer's approach to WRULDs prevention.

Some employers have tried to introduce pre-employment screening in an attempt to weed out people who may be susceptible to WRULDs. Not only could this amount to discrimination under the law, but the evidence shows that there is no reliable test available. There is no scientific evidence to show that pre-employment and preplacement screening can predict the risk of developing a work-related musculo-skeletal disorder. The principle must be to make the workplace safe for everyone and not to try and select a workforce of super-resilient men and women.

The Musculo-skeletal Wellness Questionnaire (currently only available in English and Afrikaans) can help you assess / screen potential WRULDs in the workplace.

More detailed scientific musculo-skeletal questionnaires are available for occupational health practitioners and ergonomists, e.g. the Nordic Questionnaire which has been adapted by the CSIR for the South African mining industry.

SECTION E-3

For the employer

A policy on the prevention and management of WRULDs

16 Negotiate a policy on the prevention and management of WRULDs

It is recommended that an employer negotiate a policy on the prevention and management of WRULDs.

This negotiated policy could be signed by the management, health and safety committee representatives, labour union representatives and an occupational health practitioner.

The Trade Union Congress in the United Kingdom (TUC) has published a model policy on the prevention of WRULDs, which has been adapted with their kind permission. As with all model policies, it is not something merely to be accepted and filed away, but should be discussed, fully understood and adapted as a living policy. This means that if such a policy is introduced, the health and safety committee should monitor its implementation and effectiveness.

The following model policy for the prevention and management of WRULDs could be used as an example by employers when developing their own custom-made policy, which should be relevant for their own unique circumstances:[83]

16.1 Aim

The aim of this agreement is to provide a healthy and safe working environment and prevent the development of WRULDs. The employer and the union recognise that there must be a programme of preventive action which should include the following commitments:

a.) Management commitment to reduce the risk of WRULDs.

b.) To consult the union on the development of the programme.

c.) To provide resources for the information, instruction and training to be given to management, those involved in design of work areas, supervisors and employees on WRULD, its symptoms and its prevention.

d.) To conduct risk assessments for tasks identified as potentially hazardous by agreement with management and the union, or subsequently through a regular programme covering every aspect of work, or in the event of significant changes to work systems, work methods, equipment, environment or training.

e.) To set up a competent Health and Safety working group on WRULDs to oversee the implementation of the WRULD prevention policy.

f.) To implement changes identified as necessary by such risk assessments and review the implementation of these changes (e.g. an agreement on suitable rest breaks and pause exercises when necessary during continuous repetitive work (dependent on the intensity of the work).

g.) Clear procedures for early reporting of symptoms and no victimisation or harassing of employees who develop WRULDs or report symptoms.

h.) Clear procedures for dealing with diagnosed cases.

i.) An agreement that employees with WRULD symptoms will be offered temporary or permanent redeployment and/or time off for recovery, as stated in the Compensation for Occupational Injuries and Diseases Act.

j.) An agreement that the employer will pay for any reasonable treatment or investigations that are required until the case is accepted by the Compensation Commissioner, when these expenses can be claimed from the Commissioner.

k.) To use an agreed occupational health practitioner experienced in WRULDs to monitor staff on a regular basis.

l.) A commitment to monitor and review the policy.

16.2 Risk assessments

The following factors which are known to cause or contribute to WRULDs will be taken into account, in terms of work equipment, workplaces and methods:

a) Frequency and duration of repetitive movements.

b) Force used in performing the movements.

83 Used and adapted with the kind permission of the London Hazard Centre.

c) Absence of adequate recuperative breaks.

d) Awkward postures, particularly degree of fixed muscle loading in the trunk, shoulders and arms.

e) Static work load.

f) Degree of stress involved in the job contributed to by its boring and monotonous nature or lack of opportunity for initiative, responsibility or individuality.

g) Sudden changes in work rate or fast pace of work.

h) Individual monitoring of work, leading to stress and work pressure.

i) Vibration, temperature, lighting and glare.

The risk assessment will involve union and management assessors and reports by competent persons, who should also assist in implementing the preventive programme. The employees concerned will be involved in the risk assessment and be provided with a copy of it.

16.3 Information, education and training

The employer will consult with the union regarding an education programme for employees, which will include:

a) Ergonomic principles associated with work equipment, workstations, work patterns, etc.

b) Ways of making necessary adjustments to furniture, equipment, lighting, etc.

c) Regular monitoring of the workplace to ensure it remains ergonomically sound

d) Exercises for eyes, shoulders, hands, arms, etc., to prevent excessive strain on the muscles

e) Information on potential hazards associated with methods of work and the importance of safe work rates and adequate rest breaks

f) Information on management's health and safety policy

g) Information on health and safety reporting and monitoring systems as well as the signs, symptoms and management of WRULDs

h) Training of managers and supervisors in the sympathetic handling of known or potential cases

16.4 Work routine

Management and the union agree that a reasonable work rate varies with the capabilities of individual employees, the demands of the task and environmental factors. The availability of rest breaks and pause exercises (e.g. quick stretching exercises done at the workstation for 60 seconds every 30 minutes) in work involving WRULDs risk factors is necessary to avoid the accumulation of fatigue and strain which contribute to WRULDs. Breaks in work involving WRULDs risk factors will therefore be provided on the basis of an assessment of the overall situation and adjusted accordingly. These breaks and pause exercises should be in addition to personal health and meal breaks.

16.5 Notification

A notification system will be set up as follows:

a) Employees will be encouraged to report signs and symptoms of WRULDs.

b) Incidences of such signs and symptoms will be logged in the accident book.

c) Line managers will have responsibility for monitoring the incidence of signs and symptoms and proposing remedial action, including reviewing the risk assessment, for employees for whom they are responsible.

d) Safety representatives will be informed periodically of the incidence of signs and symptoms in their area of responsibility and whenever the incidence rises appreciably.

e) Annual statistics will be supplied to the health and safety committee.

16.6 Responding to diagnosed conditions

When a case of WRULDs is medically diagnosed, management will assess necessary action on the basis of medical advice, including:

a) The extent and nature of the condition

b) The possible causes of the condition

c) The course of treatment recommended

d) The length of time needed for rehabilitation, and

e) The limitations placed on employment in terms of both tasks and recommended duration of work

The following steps will be taken:

a) A review of the risk assessment of the job involved by a competent person to be agreed on by both management and union.

b) Provision of the assessment and reports to the employee concerned.

c) Implementation, as appropriate, of changes, training and treatment necessary to enable the employee to return to his/her position, or of suitable retraining and redeployment.

d) The granting of access to the workplace to health professionals who are treating the employee.

e) Training of the employee in the application of ergonomic and preventive principles.

f) The employer will report a case of WRULD 14 days after the definitive diagnosis by a doctor to the Compensation Commissioner and the Dept of Labour / Minerals and Energy Affairs, as is required by the COID Act..

g) The employer will submit the subsequently required reports to the Dept of Labour / Minerals and Energy Affairs, 3 and 6 months respectively, after the date the definitive diagnosis was made.

16.7 Redeployment

Where the employee is redeployed, the following will apply:

a) Job security will be a primary objective and employees who have to take sick leave will receive time off with pay until the Compensation Commissioner reimburses the company for the temporary total disablement. (The COID Act determines that an employer will pay 75% of the employee's salary for three months)

b) There will be full consultation with the employee on career options and procedures prior to any decisions being taken

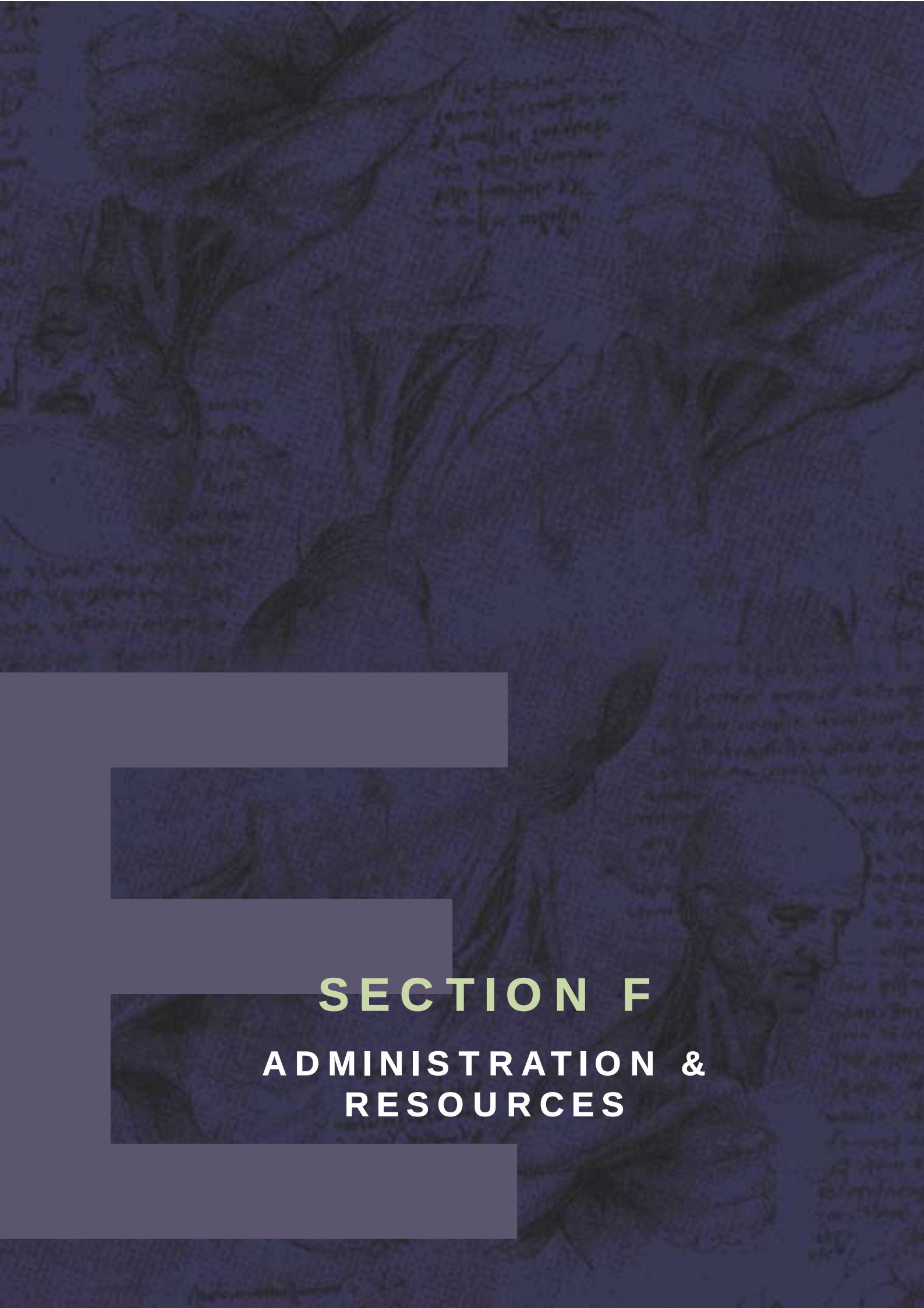
c) Detailed job descriptions of prospective positions will be provided to the employee, their treating medical practitioner and their union

d) Modifications to prospective positions to make them suitable in the light of the nature of the condition and treatment will be undertaken where necessary

e) A gradual return to work will be allowed with no pressure to return to work until fully 'fit'

16.8 Monitoring and review

Regular monitoring and annual review of this policy will be carried out by the health and safety committee and any difficulties reported to the person responsible for the implementation of the policy.



SECTION F

ADMINISTRATION & RESOURCES

17

Circular Instruction 180

Circular Instruction 180 regarding the Compensation of Work-related Upper Limb Disorders (WRULDs), Compensation for Occupational Injuries and Diseases Act, 1993 (Act no 130 of 1993), as amended.

Published in the Government Gazette (23 April 2004) No. 26270; General notices: Notice 498 of 2004

CIRCULAR INSTRUCTION NO. 180

Circular Instruction 180 regarding the compensation of work-related upper limb disorders (WRULDs)

Compensation for Occupational Injuries and Diseases Act, 1993 (Act no 130 of 1993), as amended

The following circular instruction is issued to clarify the compensation of claims for work-related upper limb disorders (WRULDs) and supersedes all previous instructions in this regard. The Compensation Commissioner's "Guidelines for medical practitioners and employers on how to manage Work-Related Upper Limb Disorders (WRULDs)" can also be used for further reference. These guidelines are available on the Department of Labour web-site – www.labour.gov.za – through the CC web page under Occupational Diseases.

1. Definition

WRULDs is a collective term for a group of *occupational diseases* that consist of musculo-skeletal disorders caused by exposure in the workplace affecting the muscles, tendons, nerves, blood vessels, joints and bursae of the hand, wrist, arm and shoulder. These are syndromes associated with characteristic symptoms and physical signs (e.g. rotator cuff syndrome, epicondylitis at the elbow, tenosynovitis and nerve entrapments such as carpal tunnel syndrome).

Previously other terms had been used, such as *repetitive strain injury* (RSI), *cumulative trauma disorder* (CTD), *occupational overuse syndrome* (OOS), *occupational cervico-brachial disorder* (OCD), etc. For the purpose of this instruction the umbrella term, *work-related upper limb disorders* (WRULDs), will be used.

WRULDs are caused, aggravated or precipitated by one or more of the following risk factors, singly or in combination:

- Highly repetitive movements
- Movements requiring force
- Movements at the extremes of reach
- Static muscle loading
- Awkward sustained postures
- Contact stress (e.g. uncomfortable gripping and twisting, sharp edges to hand tools, desk edges, etc.)
- Vibration

In terms of this instruction, upper limb musculo-skeletal disorders will be presumed to be work-related if the nature of the work performed includes exposure to the relevant risk factors.

2. Diagnosis

The following criteria should be used to confirm the diagnosis:

- A diagnosis of WRULD by the medical practitioner.
- Medical history and clinical signs indicating - site and distribution, quality (type, character), severity (intensity, frequency, duration) and progression of the symptoms according to the type of disorder
- Functional ability report by an occupational therapist and / or physiotherapist, where necessary
- Occupational exposure to known risk factors and a chronological relationship between the WRULD and the work environment.
- The confirmatory tests/investigations (e.g. x-rays, strength testing, range of motion testing, nerve conduction tests), where appropriate.

The medical officers in the Compensation Office will determine whether the diagnosis of WRULD was made according to acceptable medical standards.

3. Impairment

Impairment will be determined, in accordance with the internal instructions 157 for residual impairment of the function of the muscles, tendons, joints or nerves involved, after maximum medical improvement has been reached.

4. Benefits

Benefits will be payable according to the Compensation for Occupational Injuries and Diseases Act, 1993 (Act number 130 of 1993), as amended.

- **Temporary total disablement**

  Payment for reasonable temporary total or partial disablement will be made on the basis of medical reports for as long as such disablement continues, for a period not exceeding 24 months.

- **Permanent disablement**

  Permanent disablement will be assessed when a Final Medical Report is received, after a reasonable recovery period not exceeding 24 months, and failure to perform work effectively after the appropriate course of treatment and rehabilitation.

- **Medical aid**

  Medical expenses shall be provided for a period of not more than 24 months from the date of the diagnosis. This period may be extended if, in the opinion of the Director General, further medical aid will reduce the extent of the disablement. The medical aid covers the costs of diagnosing a WRULD and any necessary treatment provided by any healthcare provider. The Compensation Commissioner will decide on the need for, the nature and the sufficiency of the medical aid supplied.

5. Reporting

The following documentation should be submitted to the Compensation Commissioner, or the employer individually liable, or the mutual association concerned:

W.Cl.1 *Employer's Report of an Occupational Disease*

W.Cl.14 *Notice of an Occupational Disease and Claim for Compensation*

W.Cl.301 *First Medical Report in respect of a Work-Related Upper Limb Disorder (WRULD)*

All other reports that may be relevant to the diagnosis and treatment of the condition (e.g. an ergonomic assessment supported by photographs, video clips, etc.)

W.Cl.302 *Progress / Final Medical Report in respect of a Work-Related Upper Limb Disorder (WRULD)*

Progress medical reports must be submitted monthly to the Compensation Commissioner.

W.Cl. 110 *Exposure History or an appropriate employment history*

W.Cl.6 *Resumption Report* (monthly as long as the case is open, even if the employee is at work)

6. Claim Processing

The Office of the Compensation Commissioner will consider and adjudicate upon the liability of all claims. The medical officers in the Compensation Commissioner's office are responsible for the medical assessment of a claim and for the confirmation of the acceptance or rejection of a claim.



DIRECTOR GENERAL: LABOUR
Date: 9 March 2004

Published in the Government Gazette (23 April 2004) No. 26270, General notices: Notice 498 of 2004

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W.CL 301: First Medical Report

First medical report in respect of a work-related upper limb disorder (WRULD), published in the Government Gazette (21 May 2004) No. 26384

FIRST MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD)

Claim number:

Compensation for Occupational Injuries and Diseases Act, 1993 (Act number 130 of 1993)

[Section 6A(b) – Commissioner's rules, forms and particulars – Annexure 25]

This form must be completed by a medical practitioner and sent to the Compensation Commissioner, PO Box 955, Pretoria, 0001

Employee: Surname: Identity number:

First names:

Address: Code:

Employer:

Address: Code:

---

1. Date symptoms first started: 2. Date of first consultation: 3. Date of specific diagnosis:

4. Specific diagnosis of this upper limb disorder:

5. The symptoms the employee experiences (tick the appropriate box/es):

- ☐ Burning sensation
- ☐ Fatiguability
- ☐ Loss of grip strength
- ☐ Loss of normal sensation
- ☐ Muscle weakness
- ☐ Pain
- ☐ Paraesthesia (tingling)
- ☐ Sensation of cold
- ☐ Swelling
- ☐ Stiffness and cramps

Describe:

6. The clinical signs found on examination (tick the appropriate box/es):

- ☐ Crepitus (crackling sound in subcutaneous tissue)
- ☐ Muscle spasm
- ☐ Muscle weakness
- ☐ Reduction of range movement
- ☐ Swelling
- ☐ Tender trigger points in muscles
- ☐ Tenderness

Describe:

7. Is the employee left or right handed?* Right / Left Sex:* Male / Female Age: years

8. Height of employee: cm Weight of employee: kg Body mass index:

9. Which special medical investigation/s and/or job analysis / ergonomic assessments were done to prove the diagnosis and/or what other potential causes of the above-mentioned upper limb disorder have been investigated / eliminated? (Where applicable, please attach these reports.

10. Does the employee suffer from any other diseases? (If so, please specify)

11. Describe the nature of any previous injuries sustained and/or abnormalities to the employee's upper limb/s?

**Encircle correct answer*

Please turn over and complete reverse side.

12. Appraise the job or summarise the job analysis / ergonomic assessment of the job which has allegedly caused the disorder, in terms of these risk factors (Where applicable, attach photos, diagrams and/or job analysis / ergonomic assessment):

Risk factor	**Percentage of working day**	**Briefly describe the job task where this risk factor occurs and quantify in terms of repetitions / duration / strength required / range of movement, etc.**
Repetitive movements		
Movements requiring force		
Movements at the extremes of reach		
Static muscle loading		
Awkward sustained postures		
Contact stress		
Vibration		
Low temperatures		

13. How long has the employee been doing this job? _____ years _____ months

14. Explain how this alleged occupational disease progressed over a period of time in terms of function (i.e. signs and symptoms with relation to job tasks) [E.g. wrist pain started after 8 hours of sewing 6 months ago (no clinical signs). Currently increased pain after 30 minutes of sewing with pain keeping her out of sleep. Positive Phalen and Tinel tests and reduction in grip strength.]

15. Have any of the employee's colleagues, performing a similar job, complained of similar symptoms? If yes, explain. Yes / No

16. Explain how this condition was managed before this specific diagnosis was made in terms of:

a) The Person Medically (e.g. medication, surgery, etc.):

Functionally (e.g. rehabilitation, etc.):

b) The Job Task adaptation (e.g. job rotation, shorter hours, etc.):

Equipment adaptation (e.g. extended handle on tool used, etc.):

17. Is the employee currently fit to work?* Yes / No If yes, is he/she performing his/her* Usual work or Alternate/Adapted work ?

If the employee is performing alternate/adapted work, is this position* Temporary or Permanent ?

I certify that I have by examination of the employee, satisfied myself of the above-mentioned facts.

Signature (Medical Practitioner):

Registered address with HPCSA:

Name (printed):

Qualifications:

Code:

Practice number:

Date (Important):

IMPORTANT:

- All questions must be answered in full (use extra paper if necessary).
- Full motivation of diagnosis will prevent unnecessary correspondence and delays in adjudication of claim.
- The form must be forwarded to the employer within 14 days after the specific diagnosis was made. The employer must forward this report to the Compensation Commissioner.
- Please submit medical accounts separately. Attach a copy of this report to your account.
- It is advisable to consult the Compensation Commissioner's "Guidelines for Managing Work-Related Upper Limb Disorders" before reporting this condition.
- The employer must submit a copy of this report to the Provincial Executive Manager of the Department of Labour (Occupational Health and Safety Act) or the Regional Principal Inspector of Mines (Mine Health and Safety Act)
- The employer must submit a Progress Medical Report (W.CI. 302) and a Resumption Report (W.CI. 6) on a monthly basis to the Compensation Commissioner or Mutual Association or employer individually liable, as the case may be, until the employee's condition has become stabilised, when a Final Medical Report (W.CI. 302) should be submitted.

**Encircle correct answer*

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W.CL 302: Progress/ Final medical report

Progress/Final medical report in respect of a work-related upper limb disorder (WRULD), published in the Government Gazette (21 May 2004) No. 26384

PROGRESS / FINAL* MEDICAL REPORT IN RESPECT OF A WORK-RELATED UPPER LIMB DISORDER (WRULD)

Claim number:

Compensation for Occupational Injuries and Diseases Act, 1993 (Act number 130 of 1993)

[Section 6A(b) – Commissioner's rules, forms and particulars – Annexure 26]

This form must be completed by a medical practitioner and sent to the Compensation Commissioner, PO Box 955, Pretoria, 0001

Employee: Surname: Identity number:

First names:

Address: Code:

Employer:

Address: Code:

Specific diagnosis: Date of specific diagnosis:

A. CURRENT CLINICAL CONDITION OF EMPLOYEE (Complete this section)

1. Since the previous Medical Report, is there an improvement in the severity of the symptoms the employee is experiencing and clinical signs found on examination?** Explain. YES NO

2. Describe how the employee's condition has been managed since the previous report (mention dates of procedures, tests, etc.) in terms of the following:

   a. Medically (e.g. medication, surgery, etc.)

   b. Functionally (e.g. rehabilitation, etc.)

B. COMPLETE THE FOLLOWING SECTION ONLY IF THE EMPLOYEE IS CURRENTLY NOT WORKING DUE TO THIS CONDITION

3. Is the employee still in the employment of the above-mentioned employee? If yes, answer the following questions: YES NO

   a. Since when is the employee not working because of this occupational disease? (Date)

   b. When do you expect the employee to return to work? (Date)

   c. Will the employee be returning to his/her usual job?** YES NO

      i. If yes, are there any task adaptations?* YES NO If yes, please explain (e.g. job rotation, shorter hours)

      ii. If yes, are there any equipment adaptations? ** YES NO If yes, please explain (e.g. extended handle on tool used)

   d. Is the employee returning to an alternate position?** YES NO If yes, is this position TEMPORARY or PERMANENT ?**

   e. What arrangements have been made with the employer regarding the employee's re-introduction to work (e.g. work hardening, shorter hours, etc.)?

*Delete which is not applicable **Encircle the correct answer*

Please turn over and complete reverse side.

C. COMPLETE THE FOLLOWING SECTION ONLY IF THE EMPLOYEE IS CURRENTLY AT WORK:

4. Was the employee off work for more than 2 days due to this condition?** YES NO

   If yes, the period the employee was not at work, was from (inclusive) _____ to _____ (Dates)

5. Has the employee returned to his/her usual job?** YES NO

   a. If yes, are there any task adaptations?* YES NO If yes, please explain (e.g. job rotation, shorter hours)

   _____

   _____

   b. If yes, are there any equipment adaptations? ** YES NO If yes, please explain (e.g. extended handle on tool used)

   _____

   _____

6. Has the employee returned to an alternate position?** YES NO If yes, is this position** TEMPORARY or PERMANENT ?

   If yes, then analyse the job that the employee has returned to in terms of the risk factors below:

Risk factor	Percentage of working day	Briefly describe the job task where this risk factor occurs and quantify in terms of repetitions / duration / strength required / range of movement, etc.
Repetitive movements		
Movements requiring force		
Movements at the extremes of reach		
Static muscle loading		
Awkward sustained postures		
Contact stress		
Vibration		
Low temperatures		

7. Did the employee receive a planned re-introduction when returning to work?** YES NO

8. Are you aware of any adaptation to the workplace that are planned / implemented by the employer to prevent other employees from developing WRULDs?** YES NO

9. Are you aware of an occupational health programme that is in place to assess the health risks causing WRULDs and to do adequate medical surveillance and health education?** YES NO

10. Are you aware of a company policy to address WRULDs?** YES NO

D. PROGNOSIS (Complete this section)

11. Has the employee's condition been optimally managed since the previous Medical Report in terms of medical treatment and actions taken in response to the functional capacity and job analysis / ergonomics assessments? If no, please explain. YES NO

    _____

12. a. Has the employee's condition become stabilised (i.e. reasonable medical intervention will not improve the employee's condition)? YES NO

    b. If yes, has there been any permanent anatomical defect and/or impairment of functions as a result of this occupational disease? If yes, describe this in detail and substantiate by special reports where necessary. YES NO

    _____

    _____

I certify that I have by examination of the employee satisfied myself of the above-mentioned facts.

Signature (Medical Practitioner): _____

Name (printed): _____

Qualifications: _____

Practice number: _____

Registered address with HPCSA: _____

_____

_____

Code: _____

Date (Important): _____

IMPORTANT:

- All questions must be answered in full (use extra paper if necessary).
- The form must be forwarded to the employer who will send it to the Compensation Commissioner.
- Please submit medical accounts separately. Attach a copy of this report to your account.
- It is advisable to consult the Compensation Commissioner's "Guidelines for Managing Work-Related Upper Limb Disorders" before completing this report.
- The employer must submit a copy of this report to the Provincial Executive Manager of the Department of Labour (Occupational Health and Safety Act) or the Regional Principal Inspector of Mines (Mine Health and Safety Act).
- A Progress Medical Report (W.CI. 302) and a Resumption Report (W.CI. 6) must be submitted by the employer on a monthly basis to the Compensation Commissioner or Mutual Association or employer individually liable, as the case may be, until the employee's condition has become stabilised, when a Final Medical Report (W.CI. 302) should be submitted.

***Encircle correct answer*

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Reporting – the contact details

The contact details of the Compensation Commissioner and the Provincial Executive Managers of the Department of Labour

REPORTING – The contact details[1]

- The employer must submit the necessary forms to the Compensation Commissioner.
- The employer must also notify the Provincial Executive Manager of the Department of Labour (Occupational Health and Safety Act) of a case of WRULD.
- The employer must submit a Progress Medical Report (W.Cl. 302) and a Resumption Report (W.Cl. 6) on a monthly basis to the Compensation Commissioner or Mutual Association or employer individually liable, as the case may be, until the employee's condition has become stabilised, when a Final Medical Report (W.Cl. 302) should be submitted.

COMPENSATION COMMISSIONER	PO BOX 955 PRETORIA 0001	TEL: 012 321 0245 FAX: 012 324 4451 E-MAIL: INFO@WCOMP.GOV.ZA WEB: WWW.LABOUR.GOV.ZA
DEPARTMENT OF LABOUR: CHIEF INSPECTOR OCCUPATIONAL HEALTH AND SAFETY	PRIVATE BAG X117 PRETORIA 0001	TEL: 012 309 4377 FAX: 012 320 0923 WEB: WWW.LABOUR.GOV.ZA

PROVINCIAL EXECUTIVE MANAGERS OF THE DEPARTMENT OF LABOUR

REGION	POSTAL ADDRESS	PHONE	FAX
EASTERN CAPE	PRIVATE BAG X9005 EAST LONDON 5200	043 701 3128	043 722 1012
FREE STATE	P.O. BOX 522 BLOEMFONTEIN 9300	051 505 6203	051 448 5329
GAUTENG NORTH	PRIVATE BAG 393 PRETORIA 0001	012 309 5065	012 320 2367
GAUTENG SOUTH	P O BOX 4560 JOHANNESBURG 2000	011 497 3047	011 497 3225
KWAZULU-NATAL	PO BOX 940 DURBAN 4000	031 366 2022	031 305 9540
LIMPOPO	PRIVATE BAG X9368 POLOKWANE 0700	015 290 1607	015 290 1608
MPUMALANGA	PRIVATE BAG X7263 WITBANK 1035	013 655 8701	013 655 8838
NORTHERN CAPE	PRIVATE BAG X5012 KIMBERLEY 8301	053 838 1502	053 832 9386
NORTHWEST	PRIVATE BAG X2040 MMABATHO 2745	018 387 8100 (EXT. 101)	018 384 2597
WESTERN CAPE	PRIVATE BAG X872 CAPE TOWN 8000	021 421 0802	021 425 2392

1 As on 1 April 2004

21 Getting further advice

In many cases employer, line managers or supervisors will be quite capable of assessing WRULD risks and taking appropriate action. However, an employer should get further advice if:

- There is uncertainty whether a significant risk exists;
- Simple and cheap corrective measures are not available;
- The right action to handle a risk is not obvious; or
- If numerous employees are developing WRULDs.

Where help is needed, and no one else in the organisation has the answer, an employer should seek expert advice. The following organisations (in alphabetical order) may be able to point an employer in the right direction:

Getting futher advice

In many cases employers, line managers or supervisors will be quite capable of assessing WRULD risks and taking appropriate action. However, an employer should get further advice if:

- There is uncertainty whether a significant risk exists
- Simple and cheap corrective measures are not available
- The right action to handle a risk is not obvious or
- If numerous employees are developing WRULDs.

Where help is needed, and no one else in the organisation has the answer, an employer should seek expert advice. The following organisations (in alphabetical order) may be able to point an employer in the right direction:

AFROX OCCUPATIONAL HEALTHCARE ***Attention: Dr Stefanus Snyman***	PO BOX 474 GOODWOOD CAPE TOWN 7459	TEL: 082 557 1056 FAX: 086 670 1842 E-MAIL: SNYMANS@NEW.CO.ZA WEB: WWW.OCCHEALTH.GIVENGAIN.NET
CSIR MINING TECHNOLOGY ***Attention: Mr Schu Schutte*** ***Dr Belinda Dias***	P O BOX 91230 AUCKLAND PARK 2006	TEL: 011 358 0202 / 011 358 0291 FAX: 011 482 3267 E-MAIL: PSCHUTTE@CSIR.CO.ZA WEB: WWW.CSIR.CO.ZA/MININGTEK
ERGOMAX (PTY) LTD (ERGONOMIC CONSULTANTS) ***Attention: Dale Kennedy***	UNIT B6 WESTLAKE SQUARE WESTLAKE 7945	TEL: 021 702 2001 OR 011 791 1616 FAX: 021 701 1117 MOBILE: 082 462 54 86 OR 072 321 9227 E-MAIL: DALE@ERGOMAX.CO.ZA OR ESMERALDA@ERGOMAX.CO.ZA WEB: WWW.ERGOMAX.CO.ZA
ERGONOMIC SOCIETY OF SOUTH AFRICA (ESSA) *can advise on finding a consultant ergonomist (a specialist in ensuring a good 'fit' between employees and their 'job' requirements).* ***Attention: Jon James***	C/O DEPARTMENT OF HUMAN KINETICS AND ERGONOMICS RHODES UNIVERSITY GRAHAMSTOWN 6140	TEL: 046 6038468 E-MAIL: J.JAMES@RU.AC.ZA WEB: WWW.ERGONOMICS-SA.ORG.ZA
OCCUPATIONAL THERAPY ASSOCIATION OF SOUTH AFRICA (OTASA) ***Attention: Mrs B. Badenhorst***	PO BOX 11695 HATFIELD 0028	TEL: 012 342 6731 FAX: 012 342 5400 E-MAIL: OTASA@MWEB.CO.ZA WEB: WWW.OTASA.ORG.ZA
SOUTH AFRICAN SOCIETY OF OCCUPATIONAL HEALTH NURSES (SASOHN) ***Attention: Linda Stokes***	P.O.BOX 18793 SUNWARD PARK 1470	TEL: 011-8923174 E-MAIL:: SASOHNOFFICE@MWEB.CO.ZA WEB: WWW.SASOHN.ORG.ZA

SOUTH AFRICAN SOCIETY OF OCCUPATIONAL MEDICINE (SASOM) ***Attention: Dr Fiona Robinson*** ***(Tel: 011 315 1926)*** ***Prof Mary Ross*** ***(Tel: 011 358 9183)***	PO BOX 16179 LYTTLETON 0140 WEB:	TEL: 012 667 5160/1 FAX: 012 667 5160 E-MAIL: SASOMDM@IAFRICA.COM WWW.SASOM.ORG.ZA
SOUTH AFRICAN SOCIETY OF PHYSIOTHERAPY ***Attention: Saira Khan***	P O BOX 92125 NORWOOD 2117	TEL: 011 4851467 FAX:: 011 4851613 E-MAIL: CEO@SAPHYSIO.CO.ZA WEB: WWW.PHYSIOSA.ORG.ZA
WORKABILITY – PREVENTION, ASSESSMENT & WORK REHABILITATION SERVICES ***Attention: Lindsay Scott*** ***Lize Slabbert***	PO BOX 51784 WEST BEACH 7449	TEL 021 551 9108 FAX: 021 5519108 E-MAIL: LSCOTT@WORKABILITY.CO.ZA

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Checklist: WRULDs in the workplace

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CHECKLIST: WRULDs IN THE WORKPLACE[1]

Company / Department:			
Workstation:		Completed by:	
Task:			
Worker:		Date:	

RISK FACTOR		TICK YOUR ANSWER		ACTION REQUIRED
INITIAL ASSESSMENT		**YES**	**NO**	
DOES THE JOB INVOLVE MUCH FREQUENT or FORCEFUL or AWKWARD**	Gripping (a tool or work piece)?			If you have no ticks in the "YES" column on this page, you are unlikely to have any WRULDs. You need not go on to the following pages. However, if you have any ticks in the "YES" column on this page, there may be a risk of WRULDs in your workplace. You should go on and complete the full risk assessment on the following pages. ** *'Awkward' includes 'staying in one position for a long time' and 'holding things for a long time'*
	Squeezing (e.g. tool handles)?			
	Twisting?			
	Reaching?			
	Moving things (pushing, pulling, lifting)?			
	Finger/hand movements (e.g. keyboard work)?			
ARE THERE ANY WARNING SIGNS OF UPPER LIMB DISORDERS? For example:				
	Actual cases of possible WRULDs in this or similar work?			
	Complaints by employees, e.g. aches and pains in hands, wrists, arms, shoulder, etc.? Ask your employees if they have any of these symptoms.			
	Home-made, improvised changes to workstations or tools? (e.g. handles cushioned or made longer)			

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FULL RISK ASSESSMENT

RISK FACTOR	YES	NO	POSSIBLE SOLUTIONS	
Are there any factors in the job that make WRULDs likely, such as NEED FOR MUCH FORCE?				
Does the job involve:				**RECOMMENDATIONS FOR ACTION** ✓
1. Strong force at the same time as awkward movements or posture (e.g. static loading, bent wrists, work with arms raised or fully extended)?			Redesign workstation or tool, e.g. • Reposition supply of components to reduce reaching required • Move controls to more convenient position	
2. Forceful use of hand/forearm muscles?			• Redesign job, workstation, and/or tools to avoid over-use of the hand or forearm • Maintain tools for ease of use.(e.g. keep them sharp and lubricated • Assess improved job rotation / sharing	
3. Trying to make do with ill-fitting components by forcing them into place?			• Improve quality of components, or provide suitable tools for fitting them	
4. Tools not ideal for repetitive or frequent use – particularly if squeezing, twisting or hammering actions are required?			• Replace domestic or DIY hand tools with tools designed for repetitive industrial use • Redesign tool handles to achieve even distribution of force across the hand (adequate size of the handle and power grip preferable to pinch grip) and straight rather than bent wrists. Consider replacing hand tools with power tools. Reduce squeezing forces by using weaker springs in triggers, etc.	
5. Using equipment designed for a larger or stronger person (e.g. women using tools designed for men)?			• Redesign equipment or tool (e.g. counter-balancing to reduce force required) • Provide powered version	

RISK FACTOR	YES	NO	POSSIBLE SOLUTIONS	
Are there any factors in the job that make WRULDs likely, such as RAPID, AWKWARD OR FREQUENT MOVEMENTS?				
Does the job involve:				**RECOMMENDATIONS FOR ACTION** ✓
1. Machine pacing (e.g. to keep up with conveyor)?			• Self-pacing is preferable	
2. Frequent repetitions of the same small number of movements?			• Re-plan work, e.g. break up pause/repetition cycles or spread movement across both hands. Consider adding extra activities to job, to give variety. Consider scope for automation or use of power tools.	
3. Awkward movements such as twisting or rotation of wrist, movements of wrist from side to side,very bent fingers and wrist, or hand or arm movements beyond a comfortable range?			• Redesign workstation, controls or shape of tool handles	
4. Pressure on employees to work fast, e.g. perform piecework or bonus system?			• Consider need for such systems (but employees may resist change). Better training in WRULD risks may help.	

RISK FACTOR	YES	NO	POSSIBLE SOLUTIONS		
Are there any factors in the job that make WRULDs likely, such as AWKWARD OR STATIC POSTURE?					
Does the job involve:				**RECOMMENDATIONS FOR ACTION**	✓
1. Cramped body position, and/or not enough space to change posture?			• Improve space available to worker. Provide adjustable workstation (especially chair) for employees who are above or below average height or shape.		
2. Arms stretching out or at shoulder height or above for long periods?			• Move materials or controls to more convenient position.		
3. Work at awkwardly high or low height (crouching, stooping, or reaching up)?			• Move materials or controls to more convenient position.		
4. Poor posture for any other reason?			• Has worker been trained in good working techniques and posture? • Is there a need for better seating (adjustable to correct height for individual) footrests, etc.? • Sitting versus standing position?		

RISK FACTOR	YES	NO	POSSIBLE SOLUTIONS	
Are there any factors in the job that make WRULDs likely, such as AWKWARD OR STATIC POSTURE?				
Does the job involve:				**RECOMMENDATIONS FOR ACTION** ✓
1. No changes to work routine or variation of tasks?			• If possible, vary tasks to provide changes in activity. If not, check that there is adequate rest breaks	
2. No breaks or infrequent breaks?			• Check that breaks are taken, especially if work involves continuous effort such as holding tools, or rapidly repeated movements (e.g. typing) • Pause exercises, e.g. quick stretches / movements at workstation for 60 seconds every 30 minutes	
3. Worker not able to have short pauses when desired?			• Redesign work to make short breaks possible	

Are there any factors in the job that make WRULDs likely, such as NO SPECIAL ARRANGEMENT FOR NEW EMPLOYEES?				
Does the job involve:				**RECOMMENDATIONS FOR ACTION** ✓
1. People having to work at full pace immediately on starting (or resuming) the job?			• Allow recruits to build up their work rate sensibly as they gain experience	
2. No training in risks of WRULDs and ways employees can reduce risks?			• Provide training in skills, posture and warning symptoms for all those at risk	

RISK FACTOR	YES	NO	POSSIBLE SOLUTIONS		
Are there any factors in the job that make WRULDs likely, such as POOR ENVIRONMENTAL CONDITIONS					
Is the job performed:				**RECOMMENDATIONS FOR ACTION**	✓
1. In dim light, shadow or flickering light?			• Provide better lighting so that employees do not have to adopt awkward postures to see properly		
2. In cold or otherwise adverse conditions?			• Cold (e.g. handling frozen foods) may increase the risk of WRULDs. If it is not possible to warm the working environment, check that protective clothing is well designed and does not affect posture or grip		
3. With tools that vibrate?			• Consider whether job can be done another way to avoid need for high-vibration tools. Or provide vibration-absorbing grip and minimise vibration by proper maintenance.		

23 Bibliography

This bibliography contains more references than referred to in the text. Various individuals and professional interest groups commented on the draft documents in developing these guidelines and most of them mentioned additional sources and references. We considered it valuable to include everything in this bibliography.

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