CUMULATIVE TRAUMA DISORDERS
ME 502

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E/04/344
DEPARTMENT OF MECHANICAL ENGINEERING

PRESENTATION FLOW

General Introduction
Background
Definition
Stages of disorders
Disorders seen in workers
Symptoms of CTD
How CTDs are treated
Ergonomic measures to avoid CTD

GENERAL INTRODUCTION

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GENERAL INTRODUCTION

Cumulative Trauma Disorders, CTD, are the summary results of many micro trauma.
Though known since the early 1800s, they have become a matter of urgent ergonomics concern in the 1980s.
Usually caused by repeated and/or forceful exertions, often in the hand-arm-shoulder region.

GENERAL INTRODUCTION

Preceding Introduction

Cumulative Trauma Disorders, CTD, are the summary results of many micro trauma.
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GENERAL INTRODUCTION

Predominantly occur to soft tissues, such as tendons and ligaments, and to nerves and blood vessels.
Associated with certain occupational and leisure activities.
CTD can be avoided by a set of fairly simple and straightforward ergonomics procedures.

BACKGROUND

Single-event injuries, called acute or traumatic injuries
Injuries that are sustained through often repeated actions whose cumulative effects finally result in an injury-CTDs
Cumulative injuries occur often in connective soft tissues, particularly to tendons and their sheaths.
They are frequent in the hand-wrist, forearm area, shoulder and neck.

BACKGROUND

Bernardino Ramazzini reported in 1813 that this condition occurred among clerks and scribes
In 1960, the International Labour Office recognised repetition strain injury as an occupational disease.
**DEFINITION**

- CTD-collective term for syndromes characterised by,
  - discomfort
  - impairment
  - disability
  - persistent pain in joints, muscles, tendons and other soft tissues
  with or without physical manifestations.
- It is caused or aggravated by repetitive motions,
  - Vibrations
  - Sustained or constrained postures
  - Forceful movements at work or leisure

**DEFINITION**

This is also known as,
- over-use injury
- cervicobrachial disorder
- cumulative trauma injury
- repetition strain injury
- repetitive motion injury
- rheumatic disease

**DEFINITION**

- Repetitive strains clearly occur from many occupational activities,
  assembly, manufacturing, sewing, packing cashiers in supermarkets and among keyboard operators.
  Also associated with leisure and sports activities; the “tennis elbow”

**STAGES OF DISORDERS**

**Stage 1**
- Shows aches and “tiredness” during the working hours, but which usually settle overnight and over days off work.
- There is usually no reduction in work performance.
- This condition may persist for weeks or months, and is reversible.

**STAGES OF DISORDERS**

**Stage 2**
- Has symptoms that start early in the work shift, and which do not settle overnight.
- Sleep may be disturbed and the capacity to perform the repetitive work reduced.
- This condition usually persists over months.
STAGES OF DISORDERS

Stage 3
- Is characterised by symptoms that persist at rest, pain that occurs with non-repetitive movements, and disturbed sleep.
- The person is unable to perform even light duties, and experiences difficulties in other tasks.
- This condition may last for months or years.

DISORDERS SEEN IN WORKERS

- Hand and wrist problems
- Arm and elbow problems
- Shoulder and neck disorders
- Leg and foot problems

- DeQuervain's Disease - a type of synovitis that involves the base of the thumb

- Carpal Tunnel Syndrome - a compression of the median nerve in the wrist that may be caused by swelling and irritation of tendons and tendon sheaths.

- Epicondylitis - elbow pain associated with extreme rotation of the forearm and bending of the wrist. The condition is also called tennis elbow or golfer's elbow

- Associated with repetitive use
  - Occupational
  - Sports
  - Musicians
- Pain on resisted wrist extension
DISORDERS SEEN IN WORKERS

- Tendinitis - an inflammation (swelling) or irritation of a tendon. It develops when the tendon is repeatedly tensed from overuse or unaccustomed use of the hand, wrist, arm, or shoulder.
- Tenosynovitis - an inflammation (swelling) or irritation of a tendon sheath associated with extreme flexion and extension of the wrist.
- Low Back Disorders - these include pulled or strained muscles, ligaments, tendons, or ruptured disks. They may be caused by cumulative effects of faulty body mechanics, poor posture, and/or improper lifting techniques.

THORACIC OUTLET SYNDROME - a compression of nerves and blood vessels between the first rib, clavicle (collar bone), and accompanying muscles as they leave the thorax (chest) and enter the shoulder.

CERVICAL RADICULOPATHY - a compression of the nerve roots in the neck.

ULNAR NERVE ENTRAPMENT - a compression of the ulnar nerve in the wrist.

WHAT ARE THE SYMPTOMS OF CUMULATIVE TRAUMA DISORDERS?

- Numbness
- Decreased Joint Motion
- Swelling
- Burning
- Pain
- Aching
- Redness
- Weakness
- Tingling
- Swelling
- Cracking or popping of joints

HOW ARE CUMULATIVE TRAUMA DISORDERS TREATED?

- Wrist splint to keep the wrist from bending
- Anti-inflammatory medications
- Steroid injections
- Physical and/or occupational therapy
- Cold and hot baths
- Surgery in advanced cases

DEEP BREATHING FOR OVERALL RELAXATION

RELIEF OF HAND AND FINGER TENSION

RELIEF OF HAND AND WRIST TENSION

RELIEF OF SHOULDER TIGHTNESS

RELIEF OF A STIFF NECK

RELIEF OF ARM TENSION

RELIEF OF SHOULDER AND BACK TENSION

RELIEF OF LOW BACK TENSION

RELIEF OF CRAMPING AND TIGHTNESS IN LEGS

RELIEF OF EYE FATIGUE

“THE OVERALL PRINCIPLE IS TO FIT THE JOB TO THE PERSON, AND NOT TO ATTEMPT TO FIT PERSON TO THE JOB”
There are seven conditions that specifically need to be avoided:

1. Job activities with many repetitions, (work in which each cycle lasts less than 30 s, or as work in which one basic activity element is present during more than 50% of the total cycle time)

2. Work that requires prolonged or repetitive exertion of more than 30% of the operator’s muscle strength available for that activity.

3. Putting body segments in an extreme position, such as severely bending at the wrist.

4. Work that makes a person maintain the same body posture for long periods of time.

5. Work in which a tool vibrates the body or part of the body.

6. Exposure of working body segments to cold, including air flow from pneumatic tools.

7. Combinations of the conditions mentioned above.