

Aims of this lecture:

- To review basic issues related to pain
- To discuss the use of physical agents in rehabilitation
- To develop an understanding of the terminology of:
 - impairments
 - disability
 - handicap
- To discuss issues related to treatment planning
- This will 'set the scene' for the rest of the subject.

PAIN - WHAT IS IT?

- Derived from the Latin poena which means punishment
- Very Individual experience
 - includes sensory, emotional and cultural components
- Subjective in nature
 - difficult to communicate it verbally
- IASP Definition:
- "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".

Definition of pain

- Highlights the 'duality' of pain being both a physiological and psychological experience
- It is a physical event in the body that is dependent on subjective recognition
- Thus without consciousness pain cannot exist
- Aspects:
 - emotional, psychological and physical can all profoundly affect the human experience of pain

Functions of acute pain

- Protective function
 - alerts individual to make response
 - remove painful stimulus
 - withdrawal of limb etc (reflex)
 - prepare to escape (primitive reflex)
 - immobilisation (allow healing)
 - learning experience
- Pain can also aid in the diagnostic process
 - location
 - intensity
 - nature i.e. burning, dull ache, sharp stabbing type pain
 - duration

When does acute pain become chronic?

- Acute pain has an inherent biological function
- It may stop before healing is complete
- Chronic pain is not thought to have useful biological function
- May persist long after healing has occurred
- Used to think that 'chronic' pain was pain that lasted more than 3-6 months, however.....

IASP Definition of Chronic Pain:

- "A persistent pain that is not amenable, as a rule, to treatments based upon specific remedies, or to the routine methods of pain control such as non-narcotic analgesics"
- Loeser and Melzack (1999) added:
- "It is not the duration of pain that distinguishes acute from chronic pain but, more importantly, the inability of the body to restore its physiological functions to normal homeostatic levels"

Type of pain

- Transient
 - short duration - no real damage
 - e.g. stubbed toe
 - pain subsides after short while
- Acute
 - tissue damage has occurred
 - e.g. broken toe
 - inflammation occurs
 - resolves with removal of cause and healing
- Chronic
 - pain persists long after healing has occurred
 - no longer serves useful function
 - associated with physiological and behavioural changes

Type and location of pain

- Superficial or deep
 - superficial = sharp
 - deep = duller more persistent (large joint or visceral pain)
- Localized or referred pain
 - localized = directly from injury site
 - referred = felt in remote site
- Projected
 - occurs along pathway beyond receptors e.g. phantom limb pain
- Intractable pain
 - refers to persistent pain not able to be controlled by normal medication
- Psychogenic pain
 - no detectable cause
 - thought to be a physical manifestation of a psychological disturbance

Theories on pain

- Many throughout history
 - demons, punishment from the gods, imbalance in yin and yang, spirits of the dead, pain originated in the heart
- Specificity theory
 - specific pain system carries messages from pain receptors to pain centre in brain - independent of other senses
- Pattern theory
 - intensity of stimulation determines amount of pain produced thus excessive stimulation of touch receptors results in pain

Theories on pain

- Endorphin theory
 - *Polypeptide neurotransmitters & neurohormones (endorphins) produced by body - body's homemade painkillers*
 - *Stimulation of nociceptors or deep pressure receptors stimulates release*
 - *Endorphins travel through blood to brain and block nociceptive pathways...therefore, suppressing pain response*

Pain gate theory

- Proposed by Melzack & Wall 1960's
- Impulses transmitted to:
 - substantia gelatinosa
 - dorsal column fibers
 - spinal column T cells
 - T cells mediate transmission to brain
- T cells controlled by gating mechanism
- Affected by amount of activity in small diameter (A-delta, C) fibers and large diameter (A-beta) fibers
- More activity in A-beta - gate closed
- More activity in C, A-delta - gate open
- Gating mechanism influenced by neural impulses from the brain.
- PAIN MANAGEMENT LIKELY TO BE COMBINATION OF ENDORPHINS AND PAIN GATE CONTROL

Pain Assessment

- Essential for the diagnosis and planning of treatment
- Types of information:
 - duration, location, nature
 - activity levels and social life
 - when is it bad - when is it good
 - medication and medical history
 - previous or current treatments
- Remember pain is subjective - only the person experiencing the pain knows how it feels
- Any intervention for pain relief should be regularly assessed

Pain Assessment

- Types of pain measures may include
 - Self report measures, eg scales (numeric pain scale), drawings (pain charts), questionnaires etc
 - Observational measures, eg measure of behaviour, function, range of motion etc
 - Physiological measures, eg. Heart rate, breathing etc

Visual Analogue Scale

- Is a type of self reporting scale
- Used to measure pain, treatment satisfaction, mood etc.
- 10cm line with ends of scale marked
- Advantages:
 - sensitive
 - easy to use
 - can be used frequently
- Disadvantages:
 - pain only rated on single dimension
 - elderly or visually impaired may find difficulty
 - requires patient to accurately remember pain intensity

VISUAL ANALOGUE SCALE



1 2 3 4 5 6 7 8 9 10

Assessment of pain

- Is important to identify patient needs and areas of difficulty
- Can help with diagnosis of the problem
- Can help with defining goals for clinical intervention and management
- Can help with evaluating effectiveness of any management or rehabilitation program

Physical therapy in rehabilitation

- Historically:
 - Physical agents used for centuries
 - eg. Bath houses and hot/cold water pools in ancient Rome
 - 19th C Europe – evidence of hot water therapy and health spas
 - Use of 'torpedo fish' in 400 B.C. to apply electric shocks to head and feet to treat headaches and arthritis
 - Use of sunlight to treat tuberculosis before discovery of antibiotics

Physical therapy

- Over time new agents are developed
- TENS, ULTRASOUND
- Other agents are discontinued or fall out of favor:
 - INFRARED LAMPS FOR WOUND HEALING
- Popularity of particular physical agents often based on their historical use and often clinical research,
- HOWEVER.....some agents have continued to be used in spite of the lack of supporting evidence....

- EVIDENCE BASED PRACTICE??

Purpose of use of physical therapies

- Physical agents are tools to be used, when appropriate, as components of rehabilitation
- REHABILITATION:
 - Goal-oriented treatment process
 - 'Designed to maximize independence in individuals who have compromised function due to underlying pathological process and secondary impairments'
 - Tends to address the OUTCOMES of pathology rather than the pathology itself
 - WHAT ARE THE OUTCOMES?

Outcomes of pathology

- International Classification of Impairments, Disabilities and Handicaps (ICIDH) – published by WHO 1980.
- Sequelae of pathology classified as:
 - IMPAIRMENTS
 - DISABILITIES
 - HANDICAPS
- There are varieties on this model but we will concentrate on the ICIDH definitions.

Impairment

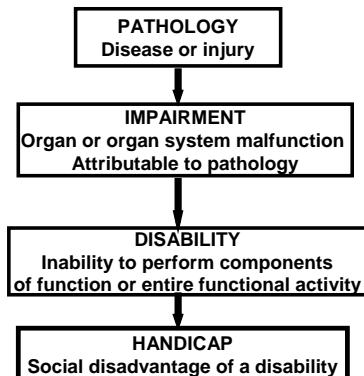
- Alterations in anatomical, physiological, or psychological structures or functions as the result of some underlying pathology.
- It is at the 'organ' or 'system' level if you like. Examples:
 - Reduced range of motion and pain in small joints of foot and ankle (pathology may be rheumatoid arthritis)

Disability

- Includes both limitations in components of normal functional activities and entire functional activities. A reduced ability to perform.
- It is at the task level of activities of daily life. EXAMPLES:
 - Unable to walk far without use of a walking aid (rheumatoid arthritis)

Handicap

- Defined as the social disadvantage of a disability.
- Measured at the level of the disadvantage to the individual in society. EXAMPLE:
 - Unable to continue working as a post-man.
 - Cannot use buildings without a lift



Physical agents FACTS.....

- DO NOT CONSTITUTE 'PHYSICAL THERAPY'
- What does this mean?
- Agents should be applied in conjunction with other interventions/education etc.
- Agents are used to facilitate progress towards functional goals of treatment
- Have direct effects primarily at the impairment level
- May then cause improvements at disability and handicap levels

Physical agents FACTS.....

- Used primarily to:
 - reduce or eliminate soft tissue inflammation
 - improve circulatory function
 - increase healing rate of soft tissue
 - modulate pain
 - modify tone
 - increase connective tissue extensibility
 - remodel scar tissue
- Can be used prior to other interventions...
- heat prior to stretching – increases extensibility

Categories of physical agents

- Physical agents are various forms of energy and materials that are applied to patients.....
- THREE MAIN CATEGORIES:
 - THERMAL
 - MECHANICAL
 - ELECTROMAGNETIC

THERMAL

- | ● TYPES | ● CLINICAL EXAMPLES |
|------------------------------|------------------------|
| ● Deep heating agents | ● Diathermy/Ultrasound |
| ● Superficial heating agents | ● Hot packs |
| ● Cooling agents | ● Ice packs |

MECHANICAL

- | ● TYPES | ● CLINICAL EXAMPLES |
|---------------|-----------------------|
| ● Traction | ● Mechanical traction |
| ● Compression | ● Elastic bandage |
| ● Water | ● Whirlpool baths |
| ● Sound | ● Ultrasound |

ELECTROMAGNETIC

- | ● TYPES | ● CLINICAL EXAMPLES |
|-------------------------|---|
| ● Electromagnetic field | ● Ultraviolet light |
| ● Electric currents | ● TENS
(Transcutaneous Electrical Nerve Stimulation) |

REVIEW

- Physical agents are energy or materials applied to patients
- May include heat/cold/water/pressure/sound/electrical currents etc
- Categorised as THERMAL, MECHANICAL, ELECTROMAGNETIC
- Physical agents have been used for centuries throughout history
- Continue today as essential components of rehabilitation
- Rehabilitation focuses on the treatment of the sequelae of pathology, including impairments, disabilities and handicaps
- Physical agents primarily affect the impairments directly
- Physical agents generally integrated into a program of treatment
- May promote the resolution of inflammation, accelerate tissue healing, relieve pain change muscle tone etc

PAIN MANAGEMENT

- Various techniques used in treatment of chronic and acute pain:
- PHYSICAL TECHNIQUES:
 - massage
 - heat and cold
 - ultrasound
 - transcutaneous nerve stimulation
 - other electrical modalities
- MEDICATION:
 - may alter pain sensation, depress the pain perception or alter pt. response
 - analgesics - mild - strong
 - NSAIDS - analgesic, anti-inflamm. and antipyretic
 - opiates - act on CNS

PAIN MANAGEMENT:

- NERVE BLOCKS AND INJECTIONS
 - may contain LA and corticosteroids
- NEUROSURGERY
 - neural pathways destroyed electrically, chemically or by cutting
- OTHER METHODS
 - relaxation
 - meditation
 - acupuncture
 - aromatherapy
 - homoeopathy
 - hypnotherapy
 - Reflexology