“Divinum est sedare dolorem” (Ippocrate)

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Definition

“Pain is an unpleasant sensory and emotional experience associated with tissue damage (real or perceived) or described in terms of such damage”

IASP (International Association for the Study of Pain - 1986)
The 4 components of pain

Neuropathic

Somatic

Visceral

Mixed
Pain is interpreted by the individual:

– there is no biological measure or marker for pain

– the most reliable indicator of the existence and intensity of pain is the patient’s description
La douleur n'est ni plus ni moins qu'un système d'alarme, dont la seule fonction est de signaler une lésion corporelle. " Descartes 1664.

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Self-assessment scale

**Verbal scale**
- absent
- slight
- moderate
- strong
- very strong

**Numerical scale NRS**
no pain 1 2 3 4 5 6 7 8 9 10 extreme pain

Downie, 1978; Grossi, 1983

**Visual analogue scale (VAS)**
No pain 10 cm Maximum pain

Scott Huskisson, 1976

**Colour (chromatic) scale**
No pain Maximum pain
The measurement of subjective pain: its usefulness

- As far as chronic pain is concerned, the measurement of pain does not allow a correct evaluation of the progress of the clinical picture.

- It is advisable to use measurement to evaluate episodes of acute conditions or to analyse, in the short term, the efficacy of a therapeutic choice.

- In acute episodes the intensity of pain may indicate the drug to be used and its dosage (OMS scale).
Evaluation of pain to reach a diagnosis:

- where illness includes pain (requiring investigation into how the illness arose), it involves a specific therapeutic plan for the illness (*illness related*)

- in the case of a pathogenetic mechanism (a true algological diagnosis), it involves a therapeutic plan targeted at the mechanism (*mechanism related*)
Classification of pain

**ACUTE PAIN:**
- Serves to alert the body to the presence of dangerous stimuli

**CHRONIC PAIN:**
- Not just extended in time but with different qualitative characteristics

**NOCICEPTIVE PAIN (SOMATIC AND VISCERAL):**

**NEUROPATHIC PAIN (CENTRAL, PERIPHERAL):**

**IDEOPATHIC OR FUNCTIONAL PAIN**
Key points and guidelines for the treatment of pain
- Joint Commission on Accreditation of Health Care Organizations -

1. **The patient’s right to be treated for pain**

2. Evaluate and document the presence, nature and intensity of pain in all patients (**5th vital indication** in conjunction with blood pressure, pulse, temperature and respiratory rate)

3. Ensure **staff competence** in the evaluation and treatment of pain

4. Establish **protocols for adequate treatment** of pain

5. **Educate patients and their families** for effective control of pain

6. **Satisfy the patient’s needs for effective treatment of symptoms after discharge**

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Legge 15 marzo 2010, n. 38 concernente “Disposizioni per garantire l’accesso alle cure palliative e alla terapia del dolore” (Gazzetta Ufficiale n. 65 del 19 marzo 2010)
Who takes responsibility for each type of pain - the Physiatrist, the Rheumatologist, or the Orthopedist?

- Muscolotendinous (including tendon sheaths and synovial bursa)
- Articulate and capsuloligamentous
- Bone
- Neurological: peripheral and central
- Oncological: supporting the Oncologist
Overview of therapy: the vicious circle of untreated pain

Pain -> Limiting behaviour

Social limitations -> Pain

Reduced mobility -> Altered functional status

Decreased autonomy -> Social limitations
Some painful forms of musculoskeletal origin

Post-traumatic pain
Fracture, Dislocation, Distortion

Inflammatory joint pain (acute or chronic)
Arthritis, Rheumatoid arthritis, Gout

Periarticular inflammatory pain (acute or chronic)
Pathology from functional overload in muscles, tendons or ligaments

Neuropathic or mixed pain
Compressive nerve syndromes, Rachialgia, Radiculopathy

Osteoporosis pain
Oncological pain
NEURAL PATHS FOR THE TRANSMISSION OF PAIN

1st neuron: from peripheral nociceptors to the spinal cord

2nd neuron: from the spinal chord to the thalamus

3rd neuron: from the thalamus to the cerebral cortex

Opioids

Alpha 2 agonists

Local anesthetics

Anti-inflammatory drugs
Routes of management

- Intra-articular
- intrathecal
- intranasal
- sublingual
- extradural
- iontophoresis
- Inhalation
- transdermal
- transmucosal
- Oral
- Intravenous
- Intramuscular
- Periarticular
But also in Orthopedic Medicine
Infiltration therapy
Acupuncture
(ancient Chinese approach outlined by Huangdi Neijing between 305 and 204 B.C.)

This subject is only briefly mentioned here, as it deserves its own separate conference. There are however very few evidence based medical (EBM) studies of this ancient approach.
Mesotherapy and Prolotherapy

Mesotherapy (M. Pistor) is an excellent analgesic therapy, which uses a single needle or multi-injector, as detailed by colleagues in the SFM (Société Française de Mésothérapie).

Neuroprolotherapy (NPT) is a method of treatment which is distinct and separate from Prolotherapy, from which it was evolved. Developed since 2002 by New Zealander Dr John Lyftogt, it targets the superficial sensory nerves of the body with micro-injections of low concentration glucose (5%).
Dry needling

Annals of the Rheumatic Diseases 74(Suppl 2):624 · June 2015, R.V. Bubnov

- Very similar to acupuncture, but treats the trigger points and myalgic intramuscular cords
- It provides pinpoint mechanical stimulation
- It provides both intramuscular and superficial stimulation
- Precise «Pain points» can be treated

TREATMENT OF PAIN
in Orthopaedic Medicine
ELECTROANALGESIA

Based on Melzack and Wall’s theory of "gate control", which describes two types of intervention for pain control:

- the first consists of reinforcing the inhibitory power of large fibers;
- the second aims selectively to interrupt the communication of small calibre fibers, near the posterior horns (where the peripheral terminations are connected to the main neural pathways of communication to the brain).
“Transcutaneous Electrical Nerve Stimulation” is characterised by the fact that the electrodes are applied directly to the skin above the path of the nerve trunk, causing paresthesia in the area of the stimulated nerve distribution.

Low frequency currents are used, rectangular in shape, which have an analgesic effect, with modalities that are not perfectly defined.

Non surgical laser therapy

In analgesic therapy the ideal laser emission instrument is one which uses a semiconductor diode as its "active medium", emitting invisible bursts of radiation, delivered in extremely short pulses, typically within the infrared (I.R.) band, with a wavelength of approximately 904 nanometres, i.e. the IR laser. Other options include He-Ne, CO2, Neodimio Yag, and HILT.


Biological Effects of LASER THERAPY

- an increase in the speed of mitosis;
- temporary and reversible tissue dehydration;
- denaturation of proteins;
- thermolysis;
- carbonization; for focal CO$_2$
- tissue evaporation.

Physiotherapeutic lasers essentially produce two effects: analgesic /anti edema and biostimulant.
Heat Therapy (Thermotherapy)

• **Heat**: action on the gate-control of M&W
  There is limited overall evidence to support the general *use of localized heat*; however, randomised clinical trials (RCTs) have shown that heat therapy provides short-term reductions in pain and disability in patients with acute lower back pain and provides significantly greater pain relief from DOMS than cold therapy. (Mechanisms and efficacy of heat and cold therapies for musculoskeletal injury. Gerard A. Malanga, Ning Yan & Jill Stark, Oct. 2014) PubMed.gov

• **Cold**: reduction of tissue temperature, which subsequently exerts local effects on blood flow, on cell swelling and on metabolism and speed of neural conduction (Cold-water immersion and other forms of cryotherapy: physiological changes potentially affecting recovery from high-intensity exercise: Gillian E White and Greg D Wells Email author; Extreme Physiology & Medicine 2013)
Mechanotherapy: vibration

- CONTROL OF MUSCULAR STIFFNESS (tonic reflex from vibration)
- STIMULATION OF BLOOD LYMPHATIC CIRCULATION
- PAIN RELIEF (gate control)
- INCREASED SENSITIVITY

Impact Waves

- 1. direct effect of the impulse on the tissue in the target area, and, in conjunction with the reflection phenomena, more accentuated in the points of transition between soft tissue (tendons, muscles) and more compact tissues (bones and calcification formations);
- 2. indirect effect of “cavitation” caused by the subsequent depression of the impulse, which exceeds the elastic characteristics of the tissue.

NO DIRECT EFFECT ON PAIN.

MODULATORS OF BIOLOGICAL FUNCTIONS IN HUMAN MUSCLE CELLS

Mattyasovszky SG1, Langendorf EK2, Ritz U2, Schmitz C3, Schmidtmann I4, Nowak TE2, Wagner D2, Hofmann A2, Rommens PM2, Drees P2.)
Ion Cyclotron Resonance

- Stimulates the biological functions of cells
- Rebalances the correct membrane potential
- Activates enzymatic processes
- Restores the correct ion exchange for cell metabolism
- Promotes intra-extra cellular ion balance.

Quantum Molecular Resonance

Operating principle, based on Quantum Molecular Resonance with the application of high-frequency and low-power micro-currents. Induces the regeneration of damaged tissues, especially muscular tissues, without thermal effects.

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KINESIOTHERAPY IS NECESSARY

• WITH REGARD TO ARTICULAR LINKS
  – JOINT PLAY
  – STRUCTURAL INTEGRITY OF THE CARTILAGE, CAPSULE AND LIGAMENTS
  – CORRECT MUSCLE SYNERGY
  – ELIMINATION OF FUNCTIONAL COMPENSATIONS

• PAIN CONTROL

• NO CONTRAINDICATION
• POSTURAL: Aims to correct any negative issues of posture (often secondary to analgesic compensatory attitudes), to detect alterations in the knee and calcaneal axis and of the plantar support, visual disturbance, dental malocclusion, dysmetria of the pelvis, etc.
KINESIOTHERAPY

- **HYDRO-KINESIOTHERAPY**: Very useful in cases of rheumatic diseases. Therapeutic exercise in water is facilitated by the option to regulate water temperature and by the reduction in gravitational force which this medium allows.
VERTEBRAL MANIPULATION
Robert Maigne’s “Manu Medica”

• SEMIOTICS
  ➢ NATURE OF ILLNESS OR PATHOLOGY (clinical examination, imaging, laboratory, etc.)
  ➢ ANALYSIS OF MINOR INTERVERTEBRAL DISTURBANCE (R.O.M., DDIM, SCTM, according to R. Maigne’s research into signs of functional limitations)

• THERAPY: Principles
  ➢ RULE OF NO PAIN AND OF CONTRARY MOVEMENT
  ➢ VERIFICATION OF EVERY MANIPULATION BEFORE PERFORMING THE NEXT
TECHNIQUES

• TREATMENT OF SOFT PARTS
• MUSCULAR STRETCHING
• REPEATED INTERVENTIONS
• MANIPULATION (3 STAGES):
  ▪ Place in position
  ▪ Apply tension
  ▪ Manipulative thrust (low amplitude, high velocity).

“IT IS A NON-SYMPOTOMATIC CAUSAL THERAPY”
Mechanism of action of Vertebral Manipulation

• Stretching and distension of the posterior joint capsule has a powerful inhibitory effect on muscle contraction (analgesic contraction). The hypotonic Gamma is determined by the stimulation of the periarticular receptors activated by the manipulative manoeuvre, and results in a rapid and powerful “INHIBITORY REFLEX” through the contraction of the intervertebral musculature (D.D.I.M.)

• With Vertebral Manipulation, abruptly stretching structures such as ligaments, discs, joint capsules or muscles activates the descending system of nociceptive inhibition of pain, in cases where this originates at the level of the grey matter.
ORTHESES AND AUXILIARIES

• **ORTHESIS**: Apparatus applied to the body or a part of it to allow an improvement to functionality or adaptation to particular pathologies (e.g. orthotics, adapted shoes, splints, braces, etc.).

• **AUXILIARY**: Instrument to enable greater autonomy, where this would not otherwise be possible (e.g. walking stick, zimmer frame, wheelchair, etc.).
Functional bandages (preventative or post-trauma)
KINESIO TAPING

- Muscular: to relax or heal the muscle
- Corrective: for joints
Pain is subjective
merci pour votre attention