

Classification and types of acute and chronic pain



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Pain

An unplesent sensory and emotional experience associated with actual or potential tissue damage

or described in terms of such damage

International Association for the Study of Pain, 1979

(Merskey & Bogduk, 1994).



Jan Matejko
"Stańczyk udający ból zębów",
1856, Muzeum Narodowe, Kraków

Acute pain is defined as 'pain of recent onset and probable limited duration. It usually has an identifiable temporal and causal relationship to injury or disease

(Ready & Edward)

(Ready & Edwards, 1992).

Acute pain warning defence role

management







Pain is the body's normal response to injury.

It serves an evolutionary role, warning an individual of potential injury or illness and preventing the worsening of an existing pathology.

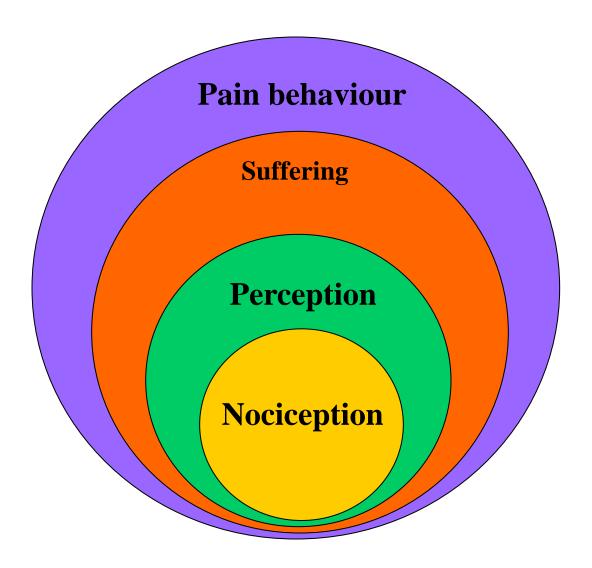


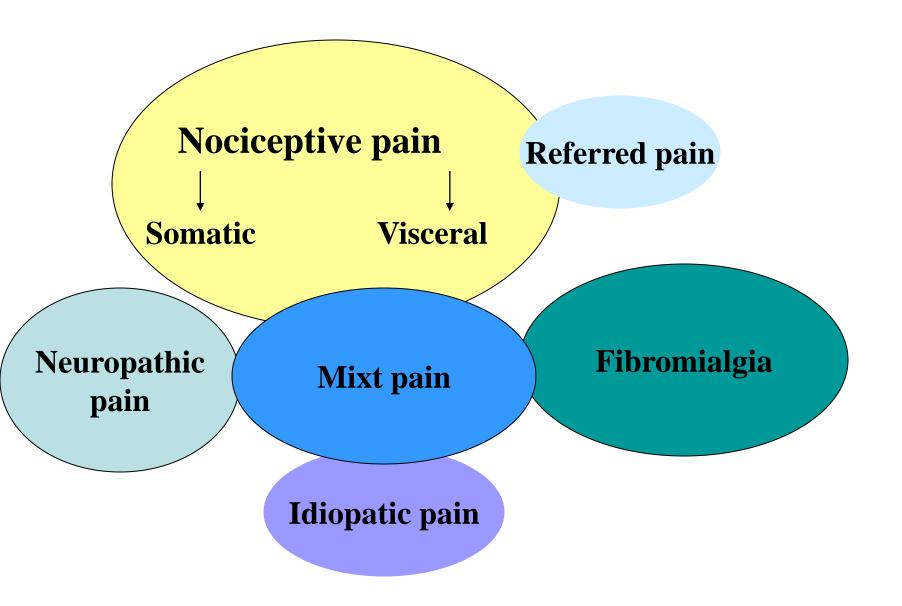
Rene Descartes 1664

The neural processes underlying the encoding and processing of noxious stimuli are defined as 'nociception'

(Loeser & Treede, 2008)

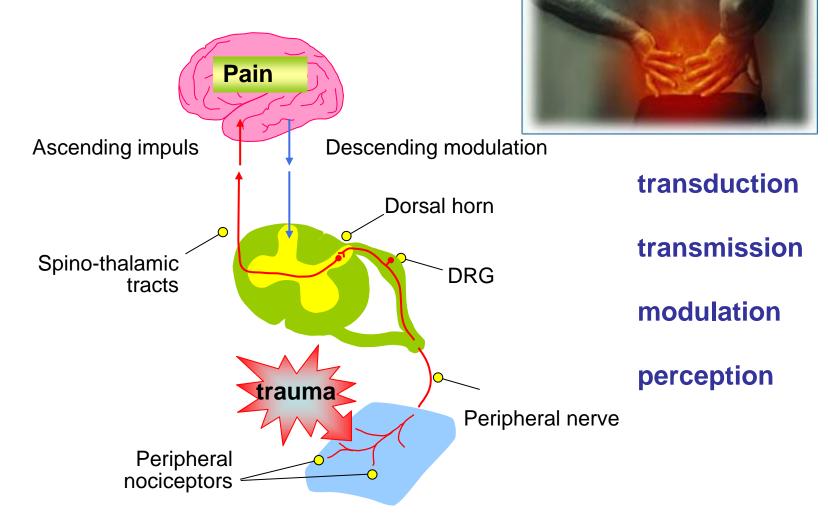
Multidimensional character of pain





Pain mechanisms

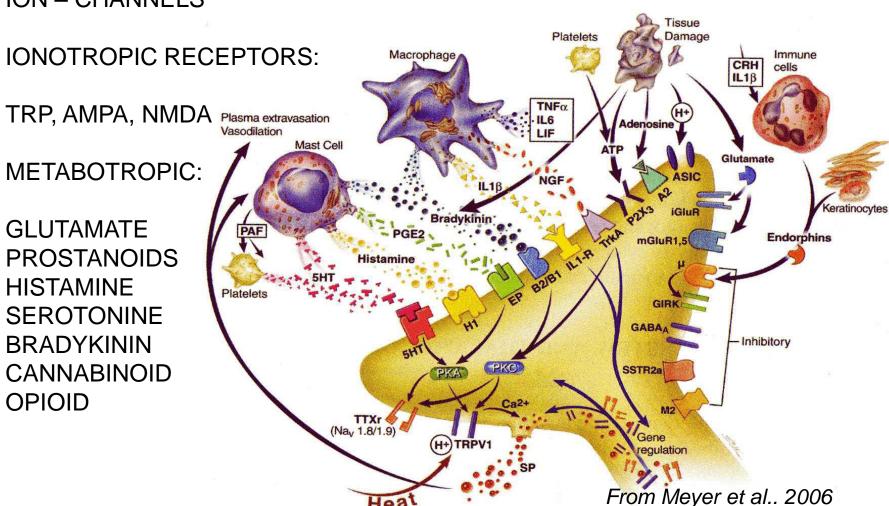
Nociceptive pain



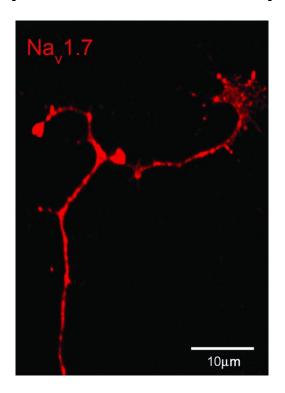
Tortora G, Grabowski SR. Principles of Anatomy and Physiology. 10th ed.2003.

Receptors and peripheral sensitisation

ION - CHANNELS



Receptors - Na channels - pain sensitivity

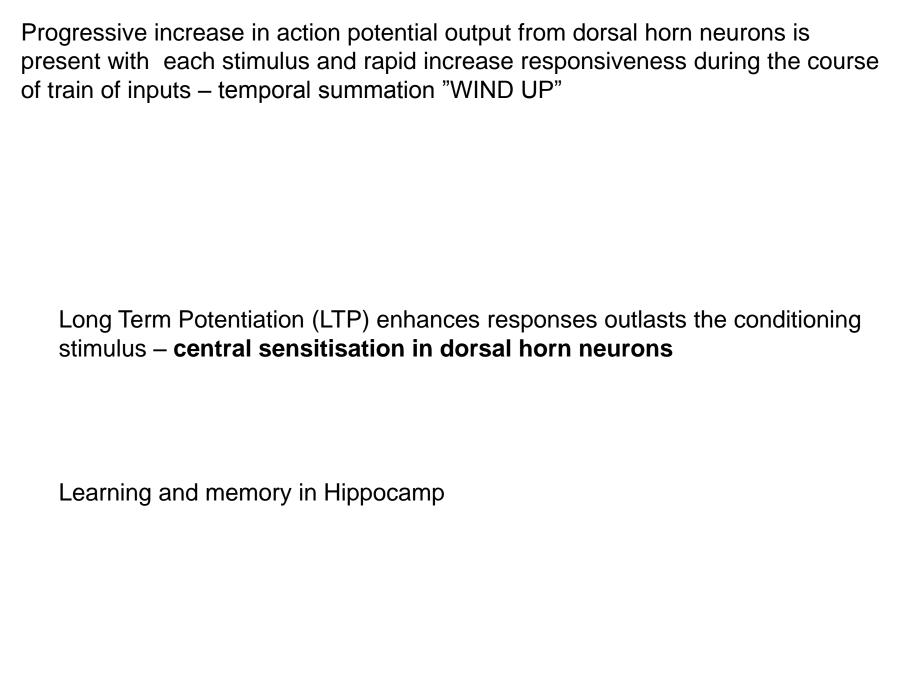


The voltage-gated sodium-channel type IX α subunit, known as Nav1.7 and encoded by the gene *SCN9A*, is located in peripheral neurons and plays an important role in action potential production in these cells.

Joost P.H. Drenth and Stephen G. **Mutations in sodium-channel gene** *SCN9A* **cause a spectrum of human genetic pain disorders.** *J Clin Invest.*2007;117(12):3603–3609.

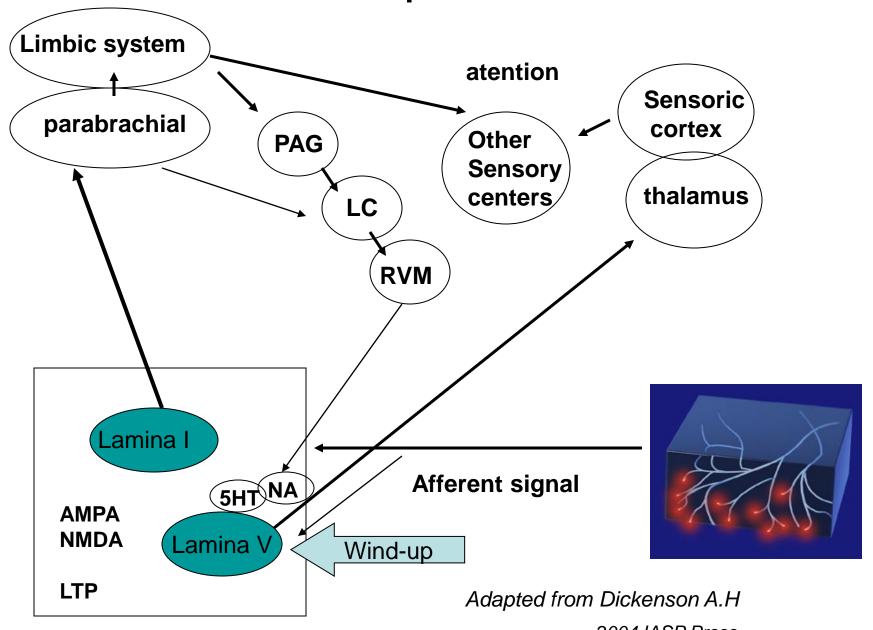
Gain-of-function missense mutations in Nav1.7 have been shown to cause primary erythermalgia and paroxysmal extreme pain disorder nonsense mutations in Nav1.7 result in loss of Nav1.7 function and a condition known as channelopathy-associated insensitivity to pain

Cregg R, Momin A, Rugiero F, Wood JN, Zhao J. **Pain Channelopathies.** J Physiol. 2010 Feb 22.

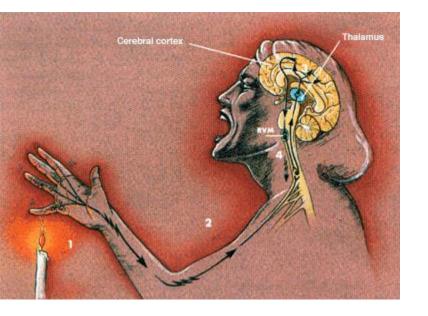


Afective and autonomic responses

Sensoric responses



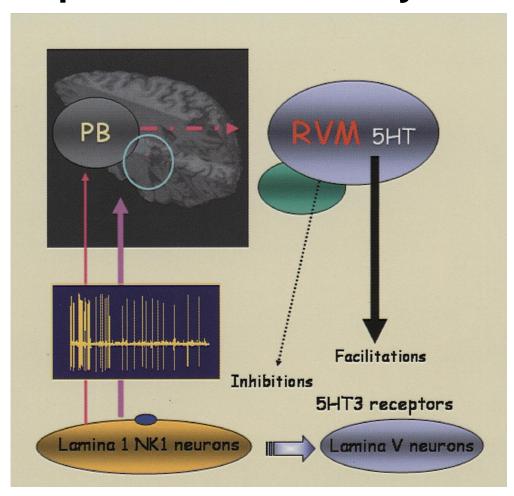
2004 IASP Press



Perception

The limbic system and cerebral cortex plays cognitive role and are responsible for recognition of pain stimulation. Here arouse fear, anxiety and anger, and pain behavior and memory are created

Descending modulatory circuity Deep Noxious Inhibitory Control



Attention, expectation and the role of the limbic cortex in top-down modulation of pain

Chronic pain

There is no evolutionary role for chronic pain

It does not play warning defence role



It is almost invariably accompanied by a significant behavioural response and varying degrees of disability

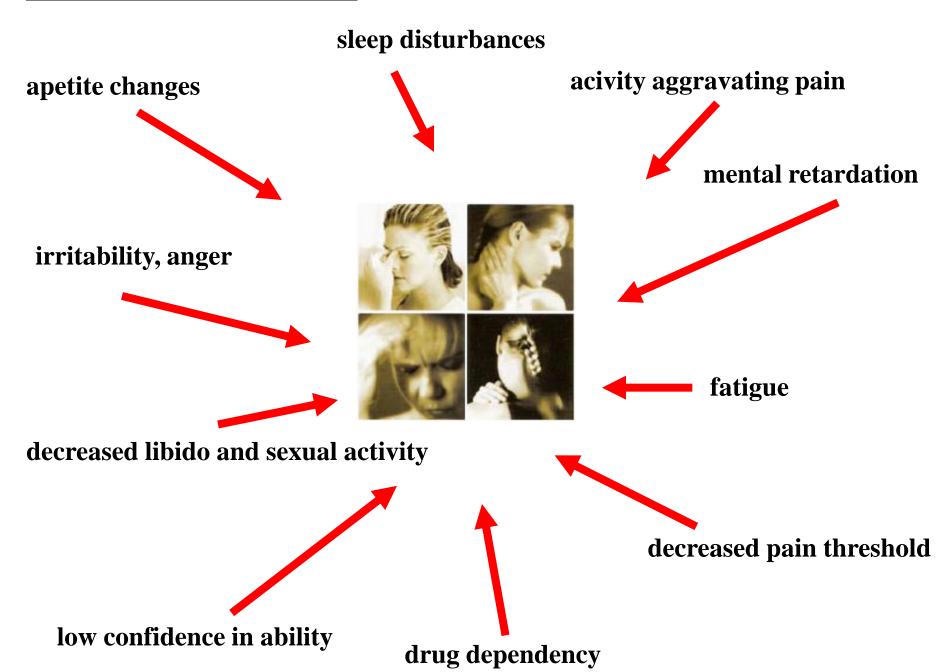


Multidirectional management

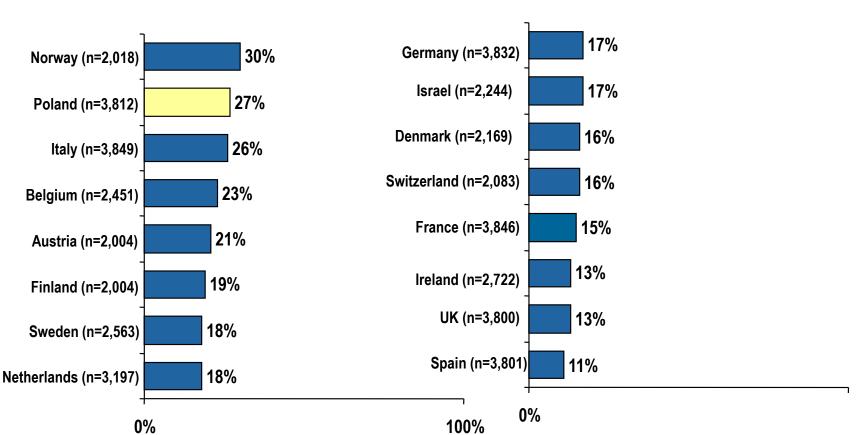
Pain therapy



Chronic pain patient



Prevalence of Chronic Pain by Country - European Summary Based on Complete Screener Data -(Unweighted)



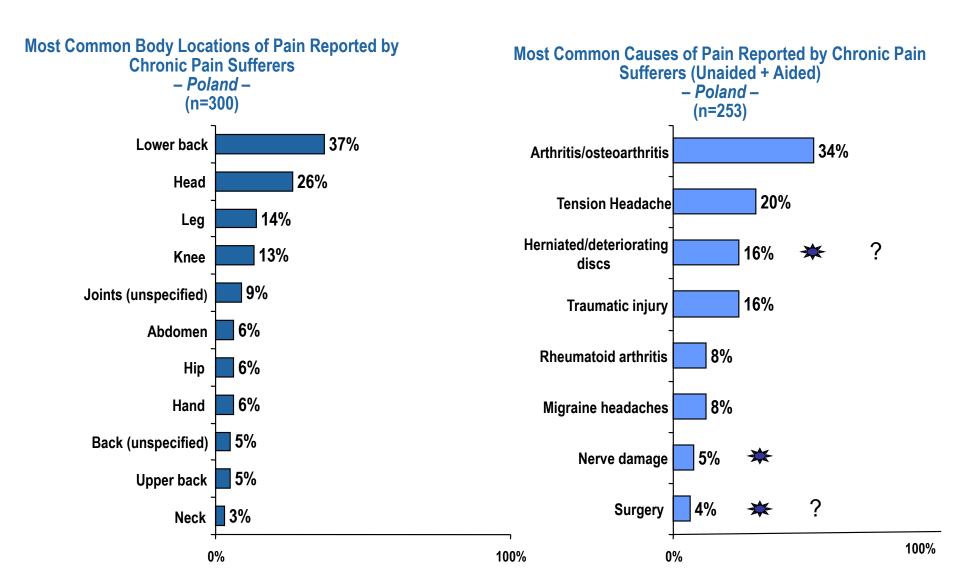
Stat testing at the 95% confidence level where: U = greater than United Kingdom, F = greater than France, G = greater than Germany, T = greater than Italy, S = greater than Spain, P = greater than Poland, W = greater than Sweden, Y = greater than Norway, D = greater than Denmark, L = greater than Finland, I = greater than Ireland, N = greater than Norway, B = greater than Belgium, A = greater than Ireland, N = greater than Ireland greater than Austria, Z = greater than Switzerland, and E = greater than Israel

100%

Source: All screening criteria.

III. Profile of Pain

Locations and Causes of Chronic Pain



Neuropathic pain – pain iniciated or caused by a primary lesion, dysfunction, or transitory perturbation in the peripheral or central nervous system

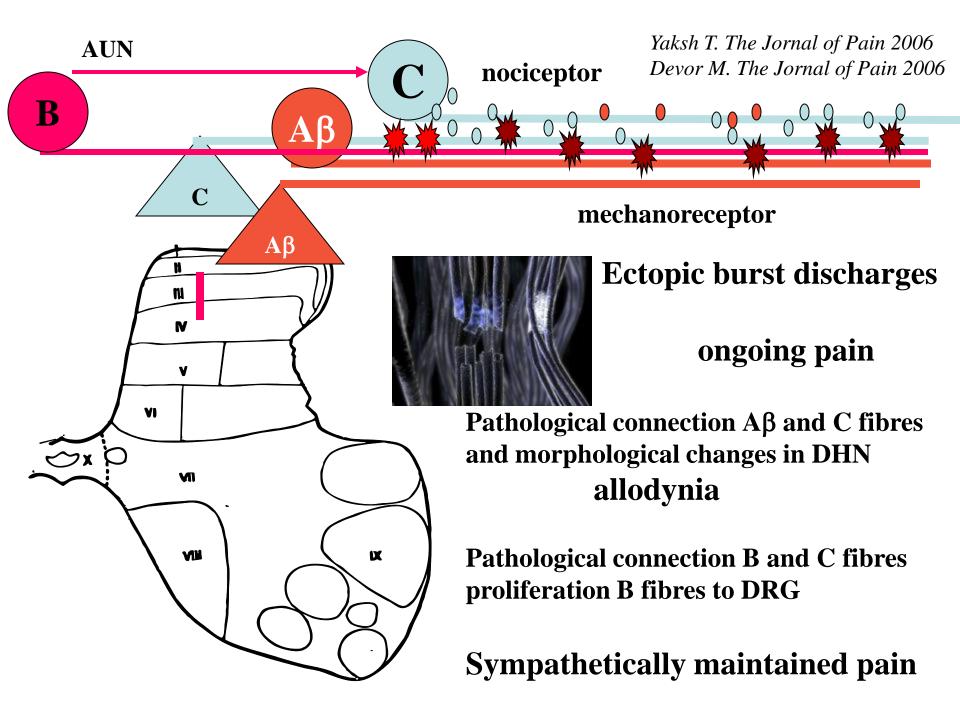
Neuropathic pain – pain arising as a direct consequence of a lesion or disease affecting the somatosensory system (IASP definition 2008)

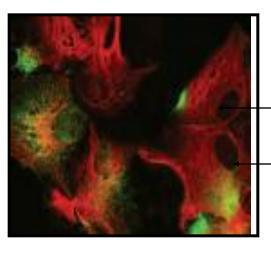
Non-nociceptive, pathological pain

- it is often experienced in parts of the body that otherwise appear normal
- it is generally chronic, severe and resistant to analgesic
- it is rarely if ever an indication of progressive damage

There is often cited that 1.5% of the general population is affected by neuropathic pain, however a UK study found that the prevalence was about 8,2% (17% of patient with chronic pain). That difference indicates the difficulty of diagnosing and estimating precisely the prevalence and incidence of neuropathic pain

Post-amputation pain PDPN MS PHN Myelopaty Post-stroke pain Spinal cord injury pain Trigeminal neuralgia CRPS

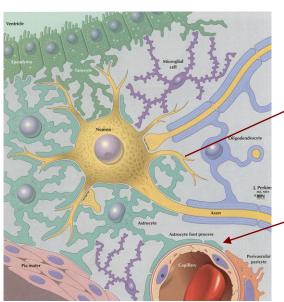




Glial cell activation – EAA, fractalkins

TNF a

astrocytes



Production of IL-1 β , IL-6, TNF α

Activation of p38MAPK

Chronic neuroimmune activation

Audette JF et al.: Neuropathic low back pain. Curr Pain Headache Rep. 2005 White FA et al.: Chemokines: Integrators pain and inflammation. Nature Rev Drug Discov. 2005

Vallejo R et al.:The Role of Glia and the Immune System in the Development and Maintenance of Neuropathic Pain. Pain Pract. 2010 Apr 5

Lack of agreed definitions and specific diagnostic tool for neuropathic pain

- hamper epidemiological studies and grading system for neuropathic pain

was proposed:

- definite
- probable
- possible neuropathic pain











Neuropathic pain scales:

- NPS
- Leeds Assesment of Neuropathic Symptoms and Signs (LANSS) Scale
- Self-report LANSS (S-LANSS)
- DN4
- Pain DETECT

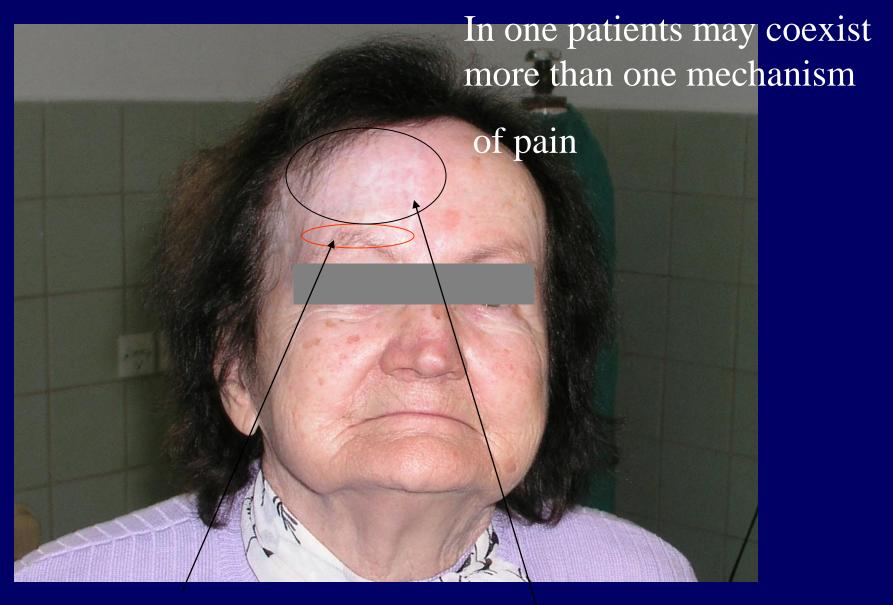
Definite neuropathic pain

Postherpetic neuralgia



71 y.o. patient with postherpetic neuralgia, C6-C7 dermatomes

Edema, changes in skin blood flow, abnormal sudomotor activity in the region of pain(PHN + CRPS)



Margin of area of allodynia

Margin of area of hypoesthesia

Definite peripheral neuropathic pain

- Diabethic neuropathy
- Trigeminal neuralgia
- Postamputation pain

Phantom limb pain

Stump pain

- Postsurgical/posttraumatic neuropathic pain
- Nerve compression neuropathies, e.g. CTS, meralgia paresthetica
- CRPS II
- CRPS I (?)
- Radiculopathy
- Radicular pain

Probable neuropathic pain

Hereditary neuropathies

Guillain-Barre syndrome

Toxic neuropathies

Hypothyroid neuropathy

Temporomandibular disorder pain

Possible neuropathic pain

Mixed pain

Cancer pain

Failed back surgery syndrome

Transient radicular pain

• Posterior ramus and medial branch neuropathy (??)

Central neuropathic pain

Central post-stroke pain

Multiple sclerosis pain

Spinal cord injury pain

Causes and patomechanisms of pain in spinal diseases Neuropathic: Definite? Probable? Possible?

Discogenic pain

Radicular pain/ Radiculopathy

FBSS

Referred pain

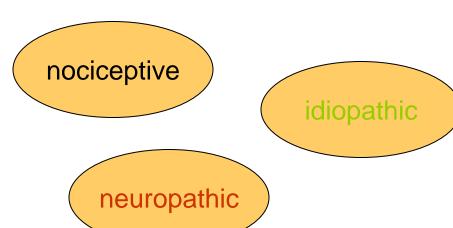
Spinal stenosis

Musculosceletal pain

Nonspecific LBP



Fractures
Infections
Neoplasms



The aim of the study was to determine occurrence of selected kinds of neuropathic pain in the general population in Poland, in which pathophysiology of the somatosensory nervous system lesion was obvious.

Polish Pain Society asked Polish National Health Fund to provide data concerning diagnosis of neuropathic pain syndromes among out-patients on the basis of ICD-10 between 1 June 2008- 31 May 2009.

Data provided by NHF revealed, that in 2008-2009 different neuropathic pain syndromes were diagnosed and treated in 111 041 patients (0,3% of general Polish population and 1,46% of chronic pain patients).

The most common neuropathic pain syndromes diagnosed by primary care physicians and other specialists were:

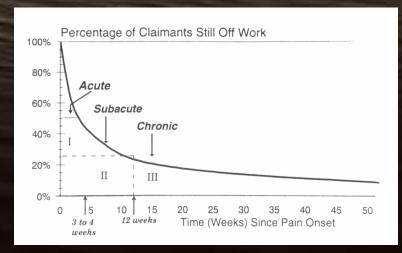
- mononeuropathy of upper extremity (G56) 63 433 patients (57% of all neuropathic pain patients),
- mononeuropathy of lower extremity (G57) 22 225 patients (20%)
- trigeminal neuralgia (G50) 18 092 patients (16,3%)
- painful polineuropathy (G63) 7 291 patients (6,6%)

Acute pain states that may progress to chronic pain:

- postoperative
- post-traumatic pain
- acute back pain
- herpes zoster

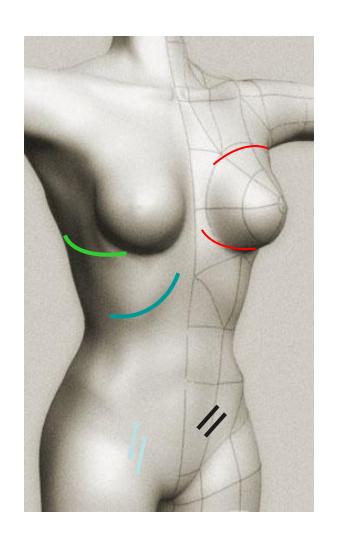
Transition from acute to chronic pain

Progression of acute to chronic pain



Persistent post operative pain

Herniotomy



Risk of nerves damage after surgery

Amputation	5 - 10 %
■ Thoracotomy	10%
Mastectomy	5 – 10%
Cholecystectomy	2%

■ (Coronary Aortic Bypass Graft) 5 – 10%

2 - 4%

Risk factors for chronic postsurgical pain

Preoperative factors

- Pain, moderate to severe, lasting more than 1 month
- Repeat surgery
- Psychologic vulnerability (eg catastrophising)
- Preoperative anxiety
- Female gender
- Younger age (adults)
- Workers' compensation
- Genetic predisposition
- Inefficient diffuse noxious inhibitory control (DNIC)

(Kehlet et al, 2006) (Macrae, 2008) (Schua 2010)

Risk factors for chronic postsurgical pain

Intraoperative factors - Surgical approach with risk of nerve damage

Postoperative factors

- Pain (acute, moderate to severe)
- Radiation therapy to area
- Neurotoxic chemotherapy
- Depression
- Psychological vulnerability
- Neuroticism
- Anxiety

(Kehlet et al, 2006) (Macrae, 2008) (Schug 2010)

Transition from acute to chronic pain

Chronic pain:

Radicular pain

Discogenic pain

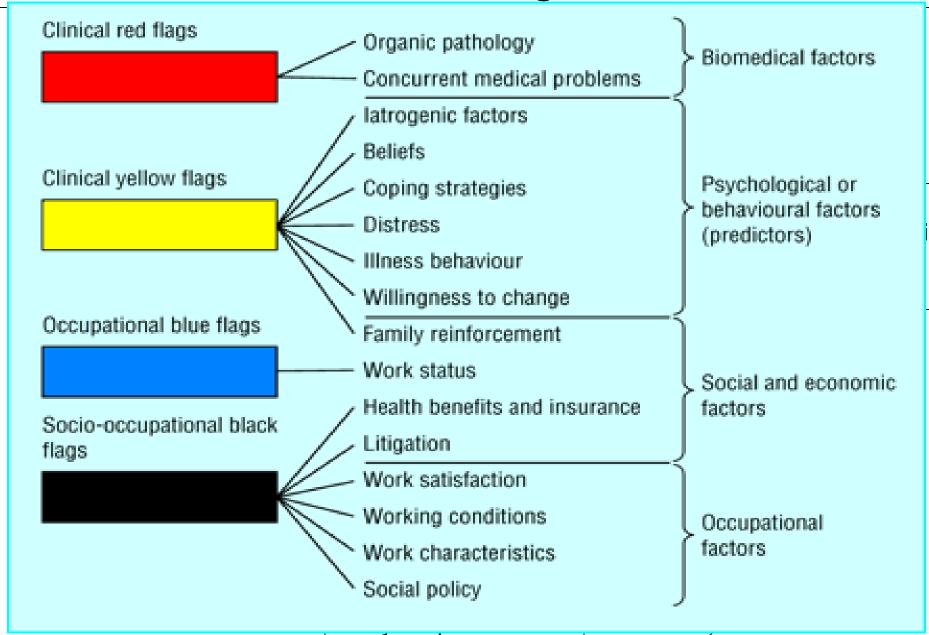
Nonspecific LBP

Failed back surgery syndrome

Karpinen J. New Perspectives in sciatica In: Immune and Glial Regulation of Pain IASPPress 2007



Clinical flags



Main Ch, Williams A: ABC of psychological medicine. Musculoskeletal pain. BMJ 2002 Vol 325



Thank you for your attention