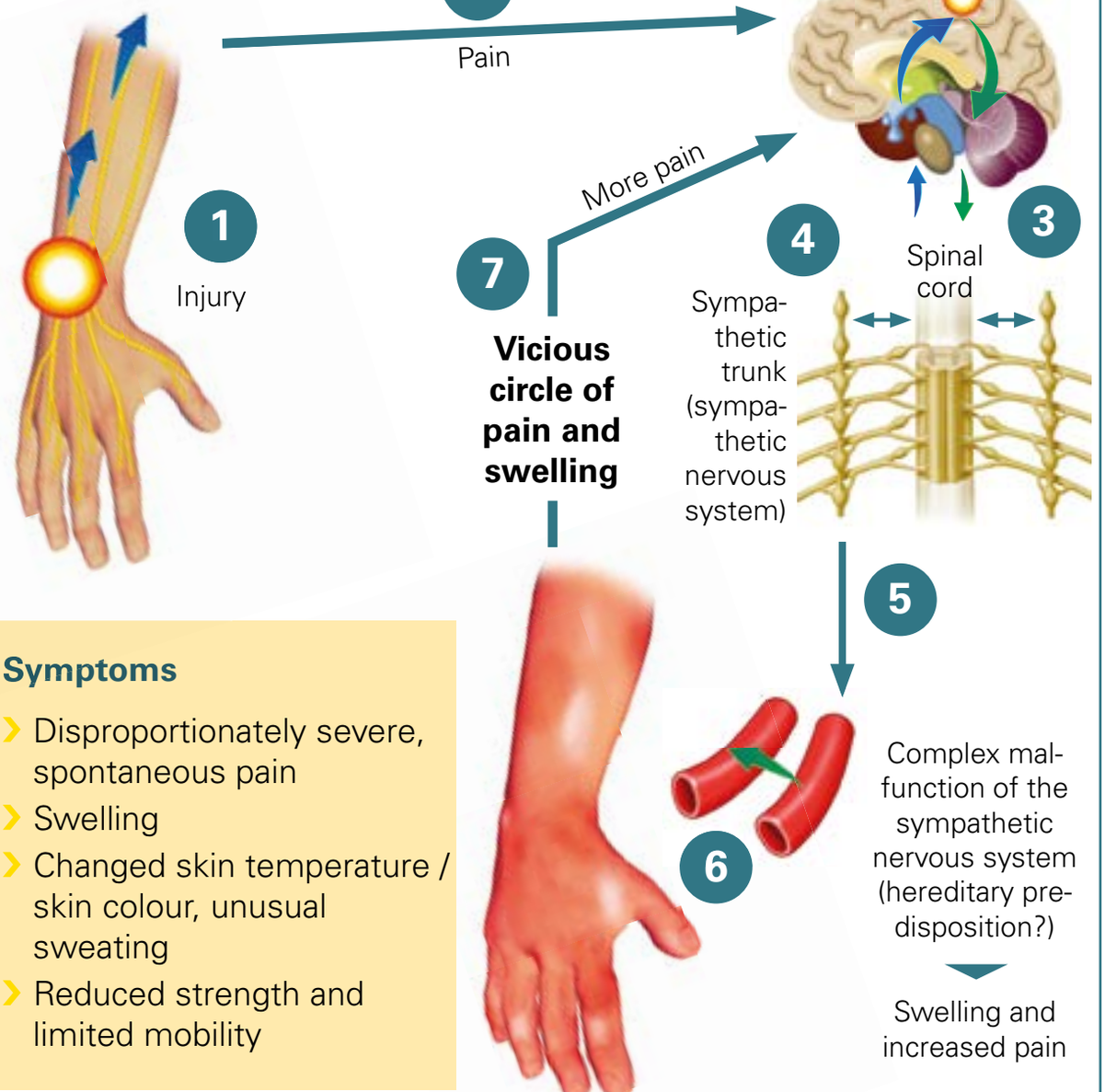
Complex regional pain syndrome (CRPS I [Sudeck's disease], CRPS II [causalgia])

Possible development, signs and symptoms of CRPS [1, 2] (1)

A



Symptoms

- Disproportionately severe, spontaneous pain
- Swelling
- Changed skin temperature / skin colour, unusual sweating
- Reduced strength and limited mobility

Treatment [3]

B

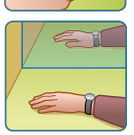
Aims of treatment:

- Pain reduction
- Reduction of inflammation / swelling
- Improvement of muscle function and mobility
- Reduce malfunction of autonomic nervous system
- Prevent changes in brain and spinal cord

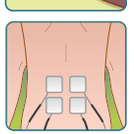
Glucocorticoids, painkillers, bisphosphonates, co-analgesics (antidepressants to support body's own inhibition of pain and antiepileptics to stabilise the nerve membranes)

Sympathetic blocks (to reduce malfunction of the sympathetic nervous system in the early phase)

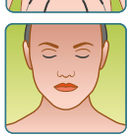
Physiotherapy, occupational therapy



Mirror therapy



TENS



Pain management training in chronic cases

(1) modified from: http://www.rsdfoundation.org/zh/ct_clinical_practice_guidelines.html. Accessed February 2013

Complex regional pain syndrome (CRPS I [Sudeck's disease], CRPS II [causalgia])

A Possible development, signs and symptoms of CRPS [1, 2]

CRPS typically develops after injuries or surgical procedures. CRPS is most often preceded by a distal radius fracture (fracture of the radius close to the wrist). The definition of CRPS I (Sudeck's disease) is that there is no nerve damage, whereas in CRPS II (causalgia) nerve injury has been demonstrated.

It is characteristic of CRPS that the severity of symptoms is disproportionate to the severity of the initial injury. Alongside other factors, reduced inhibition of pain by the body itself is suspected.

Possible development:

The starting point is an injury (1) that generates a pain signal (2), which is transmitted to the brain. The brain transmits controlling impulses via the spinal cord (3), to the sympathetic nervous system, as well as other tissues (4). The normal reactions of the sympathetic nervous system, such as constriction of blood vessels and sweat secretion, follow initially (5). **However, a complex malfunction appears to exist in CRPS which may be genetic in origin.**

This malfunction leads to severe swelling and particularly strong and persistent narrowing of the vessels, leading to the tissue becoming under-supplied with oxygen. Increasing amounts of acidic breakdown products arise (acidosis), which contribute to **intensification of the pain signal (6).**

The strengthened pain signal is transmitted to the brain, and a **vicious circle of pain and swelling** arises (7).

Symptoms in the acute stage: after a comparatively harmless injury, severe neuropathic spontaneous pain, hyperalgesia (hypersensitivity to pain) and hyperaesthesia (hypersensitivity to touch) develop. In addition, extensive swelling occurs with deposition of fluid (oedema) and severe autonomic accompanying symptoms, such as unusually profuse sweating.

Movement is commonly restricted. As a result of the change in skin blood flow, the temperature and colour of the skin are altered. In many cases of advanced disease, trophic disturbances are found in the nails and hair (increased growth), subcutaneous tissue and bones, the volume of bone being reduced by increased bone turnover (high-turnover osteoporosis).

The weakness and low mobility of the affected limbs are initially due to pain and swelling, and later in the chronic stage to severe damage to muscle, tendons, ligaments and bones.

B Treatment [3]

Aims of treatment: early interdisciplinary treatment to restore correct neural functioning.

Drug treatment with glucocorticoids, analgesics (painkillers), bisphosphonates and anticonvulsants (= antiepileptics, to inhibit the excitability of nerve cells and conduction of stimuli in the brain and spinal cord) and antidepressants to support the body's own inhibition of pain.

In addition, **sympathetic blocks** are used in the early phase to reduce malfunction of the sympathetic nervous system. If no improvement occurs despite appropriate treatment, spinal cord stimulation may be considered.

Further treatment options are physiotherapy to improve function, **TENS** (transcutaneous electrical nerve stimulation) to raise the pain threshold, and **pain management training** for better control of pain. **Mirror therapy** has a pain-reducing effect, using a mirror to produce the optical illusion of two healthy parts of the body.

Quality of life can be lastingly improved by **occupational therapy** (practising everyday actions with the aim of self-determined participation in socio-cultural life) and **social counselling.**

[1] Janig W, Baron R. Lancet Neurol (2003) 2(11): 687- 697.

[2] Marinus J et al. Lancet Neurol (2011) 10: 637- 648.

[3] Perez RS et al. BMC Neurol (2010) 10: 20.