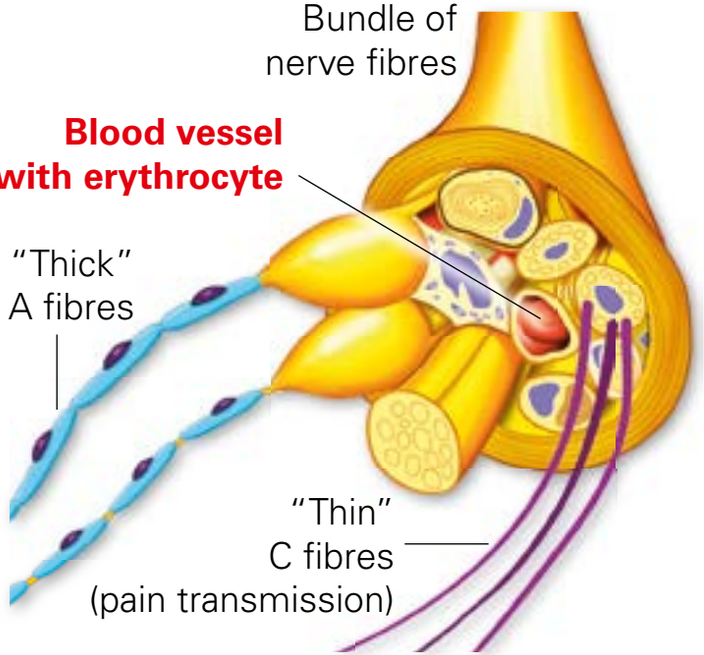
Painful diabetic polyneuropathy

How does diabetic polyneuropathy develop? [1, 2] (1)

A



High blood glucose level

▼

Vascular changes

▼

Insufficient oxygen supply to peripheral nerves

▼

Damage to several nerves (polyneuropathy)

Signs and symptoms [2, 3]

B

- **Abnormal sensations** such as tingling, formication (sensation of crawling insects), feeling of cold or heat in feet and hands (symmetrically), sensation of numbness
- **Stabbing, cutting, shooting or burning pain**
- **Muscle wasting**
- Involvement of the autonomic nervous system
- Faulty regulation of blood circulation
- Physical warning functions may be restricted (e.g. painless heart attack)!

Treatment [2, 3, 4]

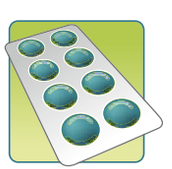
C

Good blood glucose control

Co-analgesics
(antidepressants, which support the body's own inhibition of pain, and antiepileptics, which stabilise the nerve membranes)

In very severe pain:

Opioid painkillers with simultaneous action on the body's own pain-inhibiting system



Long-acting opioid painkillers combined with antidepressants or antiepileptics

(1) modified from: Rohkamm. Taschenatlas Neurologie. 3rd edition. Thieme-Verlag. 65

Painful diabetic polyneuropathy

A How does diabetic polyneuropathy develop? [1, 2]

Nerve fibre bundles contain their own blood vessels (vasa nervorum), which supply individual nerve fibres. If this supply is restricted, the nerve fibres are damaged. The thin C fibres in particular are very sensitive.

High blood glucose levels give rise to damaging **changes in the small vessels (microangiopathy)** with depositions and wall thickening. As a result of these vascular changes the nerve fibres no longer receive sufficient oxygen.

The inadequate supply leads to damage to numerous peripheral nerves, diabetic polyneuropathy.

B Signs and symptoms [2, 3]

The nerves supplying the feet and lower legs are mainly affected (at first), but the nerves of the hands are also often involved.

Abnormal sensations such as tingling, formication (a sensation of crawling insects), numbness, feeling cold or hot and **neuropathic pain** (stabbing, cutting, shooting or burning) are typical.

As a result of damage to the thick nerve fibres which control the muscles, muscle wasting, spasms or twitches may occur.

The autonomic nervous system is very often involved; for example, producing skin colour changes, increased or reduced sweating and heart rhythm disturbances.

In addition, physical warning functions may be affected; for example, a heart attack may take place without pain being felt or hypoglycaemia may be noticed too late because the unpleasant accompanying symptoms are slight.

C Treatment [2,3,4,5]

The priority is to adjust **blood glucose close to the normal level**. Diabetic neuropathy can be reversed in this way at an early stage.

Co-analgesics: antidepressants for support of the body's own inhibition of pain and anticonvulsants [= antiepileptics] to inhibit the excitability of nerve cells and transmission of stimuli in the brain and spinal cord.

In very severe pain an active substance in the proposed **MOR-NRI** class of substances (opioid and noradrenaline reuptake inhibitor in one molecule) can be used or the **co-analgesics can be combined with an opioid.**

[1] Cameron NE et al. Diabetologia (2001) 44: 1973- 1988.

[2] Duby JJ et al. Am J Health-Syst Ph (2004) 61(2).

[3] Hartemann A et al. Diabetes Metab (2011) 37(5): 377- 388.

[4] Morales-Vidal S et al. Postgrad Med (2012) 124(4): doi: 10.3810/pgm.2012.07.2576.

[5] Palomba R et al. Translational Medicine @ UniSa (2012 Special Issue) 1(3):7-9.