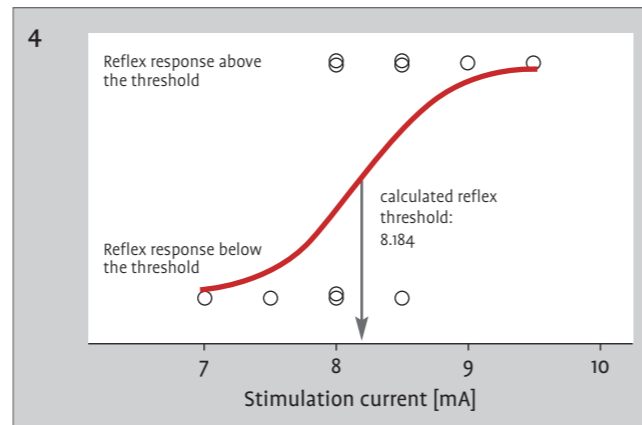
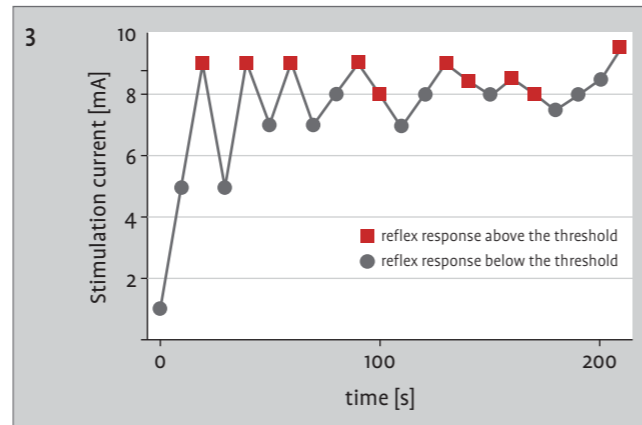
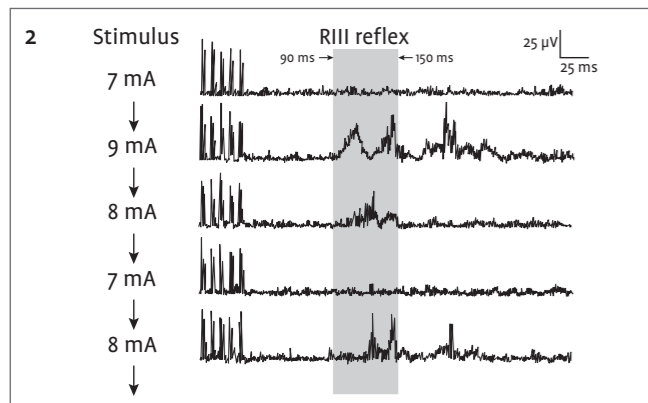
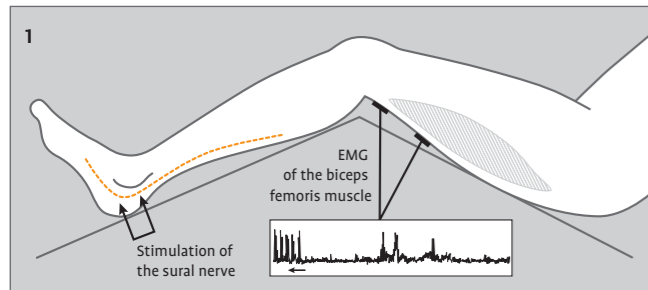


Description of the technique to determine the reflex threshold

The technique is based on the lower limb nociceptive flexion reflex (flexor reflex).³ Transcutaneous electrical stimulation near the lateral malleolus is used to stimulate pain afferent nerve fibres (predominantly A-delta fibres) in the sural nerve (Fig. 1). The stimulation is transmitted via the nerve fibres to the spinal cord by activating the motor neurons of the biceps femoris muscle after oligosynaptic switching. The resultant involuntary minimal muscle contraction is quantified via adhesive electrodes on the muscle as an EMG response.



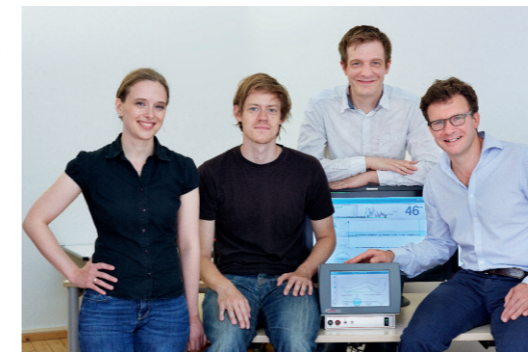
By varying the intensity of the stimulation current (Fig. 2 and 3) the reflex threshold is determined after a few stimuli (Fig. 4) that corresponds to the subjective pain threshold in awake patients and is a measure of the currently prevailing pain attenuation.

1. Von Dincklage et al, Br J Anaesth. 2010;104(2):201-8
2. Barr et al. Crit Care Med. 2013;41(1):263-306.
3. Von Dincklage et al. Brain Res. 2009 1260:24-9

Dolosys GmbH: We're here for you

As a spin-off from the Charité, our company has close ties to current research and everyday clinical practice. Between 2002 to 2012 PD Dr med. Jan Baars, Managing Director of Dolosys GmbH, researched the behaviour of spinal reflexes and their possible use in pain and analgesia measurement at the Charité. As an anaesthetist with many years of experience, Dr Jan Baars (*first on the right*) is very familiar with everyday clinical practice and its challenges and can cater to your individual questions and needs.

'We make pain therapy measurable'



If you would like more information, please write to us or call us:



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PAINTRACKER

- *Make pain therapy measurable*
- *Control analgesia better*
- *Increase patient safety*



'We make pain therapy measurable'

Technology

The Dolosys Paintracker enables measurement of the effect of analgesics, particularly of opioids, even under sedation.¹ To do this, the novel technique uses automatic measurement of the analgesia-dependent reflex threshold. The effects of pain therapy can therefore be measured using an objective parameter and concrete treatment recommendations can be derived from these measurements. Unlike other techniques that are based on surrogate parameters such as changes in the variability of the heart rate or skin conduction, with this technique the fundamental targets of pain therapy within the pain reflex arc can be monitored. This ensures a high degree of pain sensitivity.

Properties

- Measurements are highly specific and reproducible
- Minimal stimulus currents to elicit nociceptive responses

Handling

- Handy compact device (about 28x22x18 cm) that can be attached to the patient's bed using the mounting clamp
- Easy to operate via a touch screen
- Simple, safe and non-invasive application using adhesive electrodes
- Save measured data on a USB flash drive

Possible applications of the Paintracker

Inpatient (ICU)	Analgesia monitoring for intensive care patients
Outpatient (pain patients)	Determination of the individual effect and course of action of analgesics for chronic pain patients
Research	Clinical testing of analgesics

Analgesia monitoring for intensive care patients

Regular monitoring of analgesic therapy for intensive care patients is very important in routine clinical practice. Both overdosing and underdosing of analgesics as well as the associated negative consequences must be avoided.²

Benefits of controlled, optimised pain therapy

- Shorten the time patients spend in the intensive care unit
- Reduce ventilation time with a subsequent reduction in complications (infections, pneumonia, etc.) and therapy costs
- Reduce nursing tasks due to complications
- Reduce the incidence of delirium
- Improve patient safety and satisfaction

Many of observational techniques used to date such as the Behavioural Pain Scale (BPS) reach their limits when monitoring analgesia for deeply sedated patients.

With Paintracker you can use an instrument-based technique to supplement existing methods that enables you to regularly quantify the level of spinal analgesia. This allows the benefits of controlled, optimised pain therapy to be fully utilised.

Contributions to optimising analgesia monitoring

- Objective and observer-independent monitoring of spinal analgesia for intensive care patients
- Wide range of analgesic effects measured, also detection of significant overdosing (very difficult with the BPS)
- Precise and individual control of analgesia prior to painful therapeutic measures
- Direct translation of the information obtained from the reflexes to treatment recommendations for adjusting the analgesic dose
- Easily delegate monitoring of the analgesia by defining clear limits

Use in pain clinics

The Dolosys Paintracker can be used as part of outpatient pain therapy monitoring for chronic pain patients. It can help to significantly reduce the time needed to adjust the individual pain therapy.

Possible applications to optimise outpatient analgesia

- Objectively verify antinociceptive effect immediately after starting therapy
- Objectively monitor the antinociceptive effect over the course
- Provides opportunity to explain therapy effects to the patient in the form of positive feedback
- Objectively test individual opiate sensitivity prior to starting therapy
- Enables a comparison between objective reflex behaviour and subjective pain perception
- Provides biofeedback for cognitive or emotional activation of pain inhibitory neuronal systems
- Where applicable, use as a tool for diagnostic differentiation of chronic pain diseases

