



# CPOP DAG 2023

## SMERTER OG FØLEFORSTYRRELSER HOS BØRN OG UNGE MED CEREBRAL PARESE

# GRUPPE



**Nanna Brix Finnerup**  
Professor



**Gija Rackauskaite**  
MD, PhD, associate  
professor



**Michael Vinkel**  
MD, PhD



**Astrid Juhl Terkelsen**  
MD, PhD, associate  
professor



**John Rosendahl Østergaard**  
Professor

# STØTTE



# AGENDA

## Neuropathic pain and sensory disturbances

- Introduction
- Methods
- Results
- Take home

# NEUROPATHIC PAIN AND SENSORY DISTURBANCES



AARHUS  
UNIVERSITY  
DEPARTMENT OF CLINICAL MEDICINE

DANSK SMERTEFORSKNINGSCENTER  
27 SEP 2023

MICHAEL NØRREGAARD VINKEL  
MD, PHD



# UP TO 77%

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OF CHILDREN AND ADOLESCENTS  
WITH CEREBRAL PALSY HAVE  
**CHRONIC PAIN**



# BACKGROUND

# PAIN

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## Chronology

- Acute
- Chronic

## Etiology

- Primary
- Secondary



## Pathophysiology

- Nociceptive
- Neuropathic
- Nociplastic

## Locality

- Musculoskeletal
- Visceral
- Headache

# BACKGROUND

# PAIN

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## Nociceptive pain

“Pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors.”

## Neuropathic pain

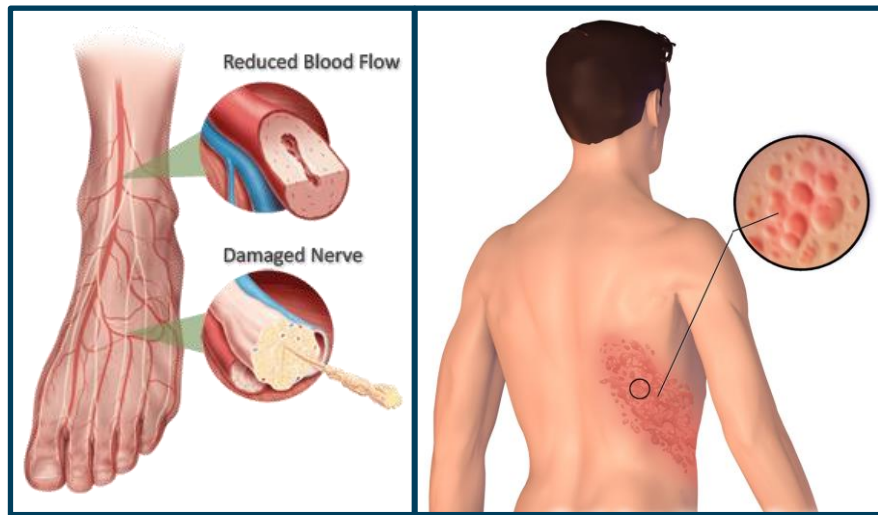
“Pain caused by a lesion or disease of the somatosensory nervous system.”

# BACKGROUND

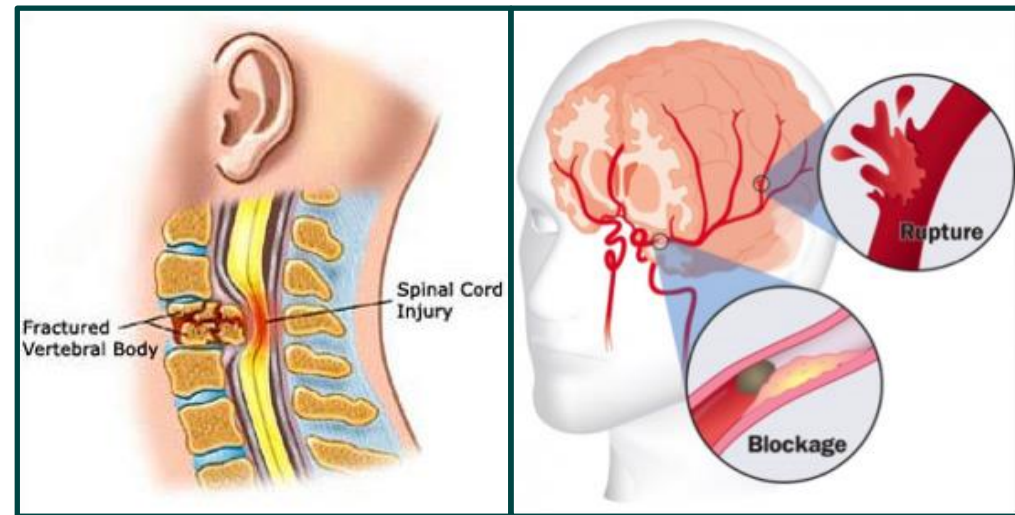
# NEUROPATHIC PAIN

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## Peripheral



## Central





# BACKGROUND

# NEUROPATHIC PAIN

## Pain descriptors



Burning

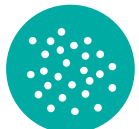


Shocks or shooting



Pins and needles

## Non-painful sensations



Numbness



Tingling

## Negative sensory signs



Partial sensory loss



Complete sensory loss

## Positive sensory signs



Hyperalgesia

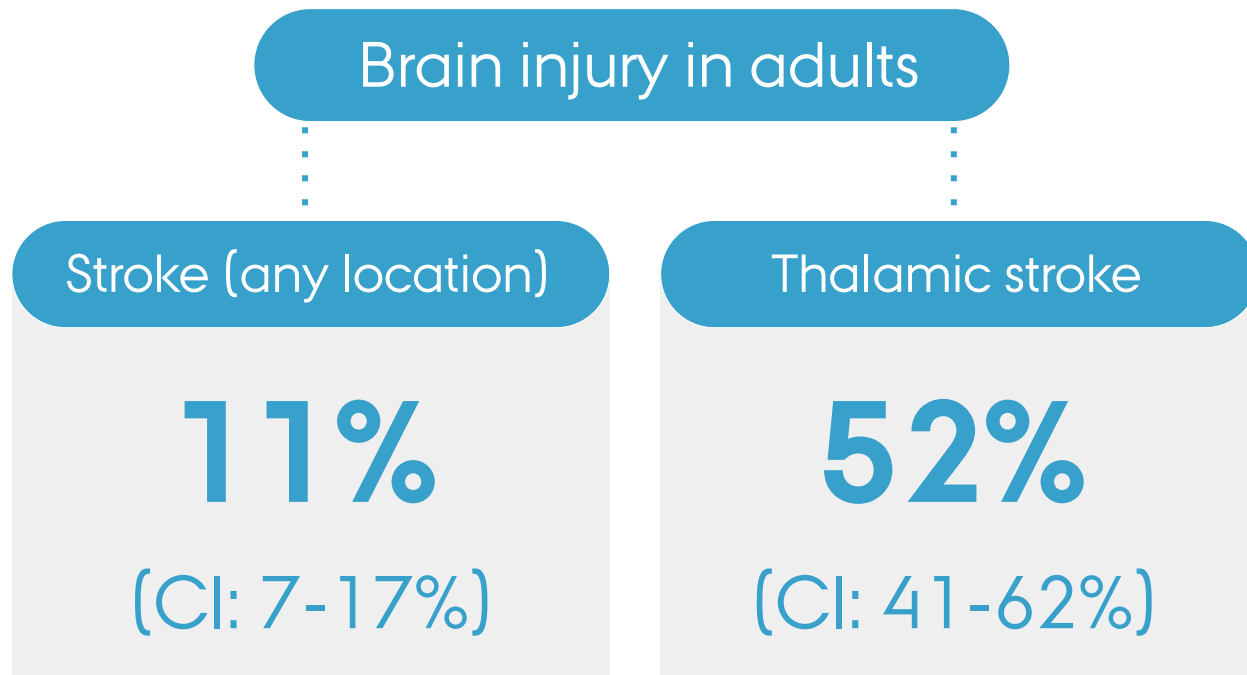


Allodynia

# BACKGROUND

## NEUROPATHIC PAIN

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Liampas et al. 2022

# BACKGROUND

# NEUROPATHIC PAIN

**Table 1:** Primary themes in the studies about pain in children with cerebral palsy identified in this review

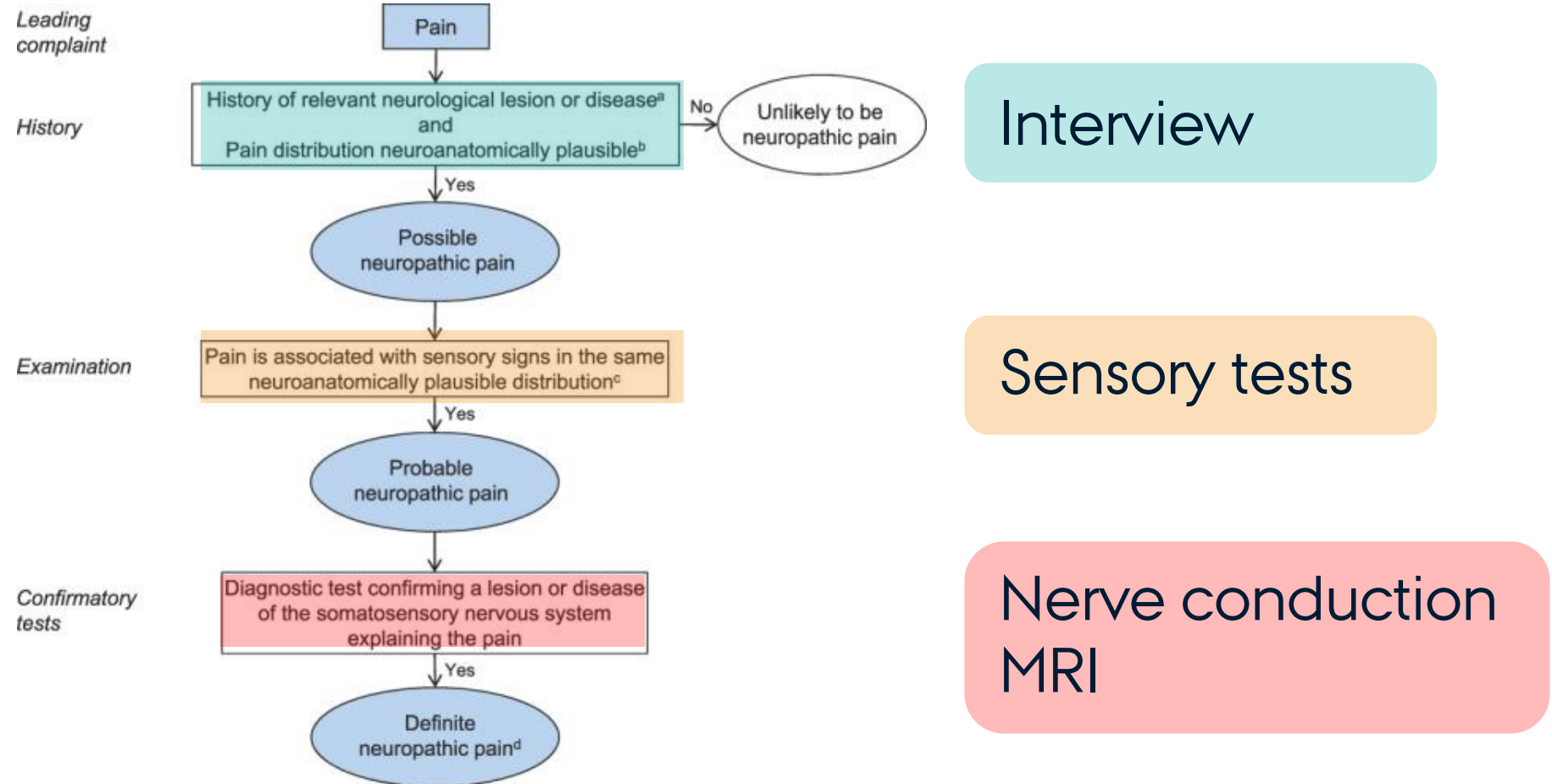
|                                             | <i>n</i> (%) |
|---------------------------------------------|--------------|
| <b>Acute pain</b>                           | 39 (20.0)    |
| Procedural pain                             |              |
| Pain from botulinum neurotoxin A injections | 11 (5.6)     |
| Pain during surgery                         | 3 (1.5)      |
| Other                                       | 1 (0.5)      |
| Postsurgical pain                           | 16 (8.2)     |
| Rehabilitative pain                         |              |
| Pain from physiotherapy                     | 5 (2.6)      |
| Pain from using standing frames             | 3 (1.5)      |
| <b>Chronic primary pain</b>                 | 1 (0.5)      |
| Complex regional pain syndrome              | 1 (0.5)      |
| <b>Chronic secondary pain</b>               | 81 (41.5)    |
| Musculoskeletal pain                        |              |
| Pain from deformities and misalignment      | 40 (20.5)    |
| Spasticity and dystonia-related pain        | 27 (13.8)    |
| Bone pain                                   | 2 (1.0)      |
| Other                                       | 6 (3.1)      |
| Visceral pain                               |              |
| Gastrointestinal pain                       | 3 (1.5)      |
| Headache                                    | 0 (0)        |
| Neuropathic pain                            |              |
| Peripheral neuropathic pain                 | 2 (1.0)      |
| Central neuropathic pain                    | 0 (0)        |
| Postsurgical pain                           | 1 (0.5)      |
| Chronic cancer-related pain                 | 0 (0)        |
| <b>Non-specified pain</b>                   | 74 (37.9)    |
| Pain prevalence                             | 15 (8.0)     |
| Quality of life, mental health, and coping  | 40 (20.5)    |
| Other                                       | 19 (9.7)     |

Overview of 195 studies on pain in children with cerebral palsy categorized based on the primary theme and cause of pain.

From: Vinkel et al. 2022

# MATERIALS AND METHODS

## PAIN AND SENSORY FUNCTION



From: Finnerup et al. 2016

# MATERIALS AND METHODS

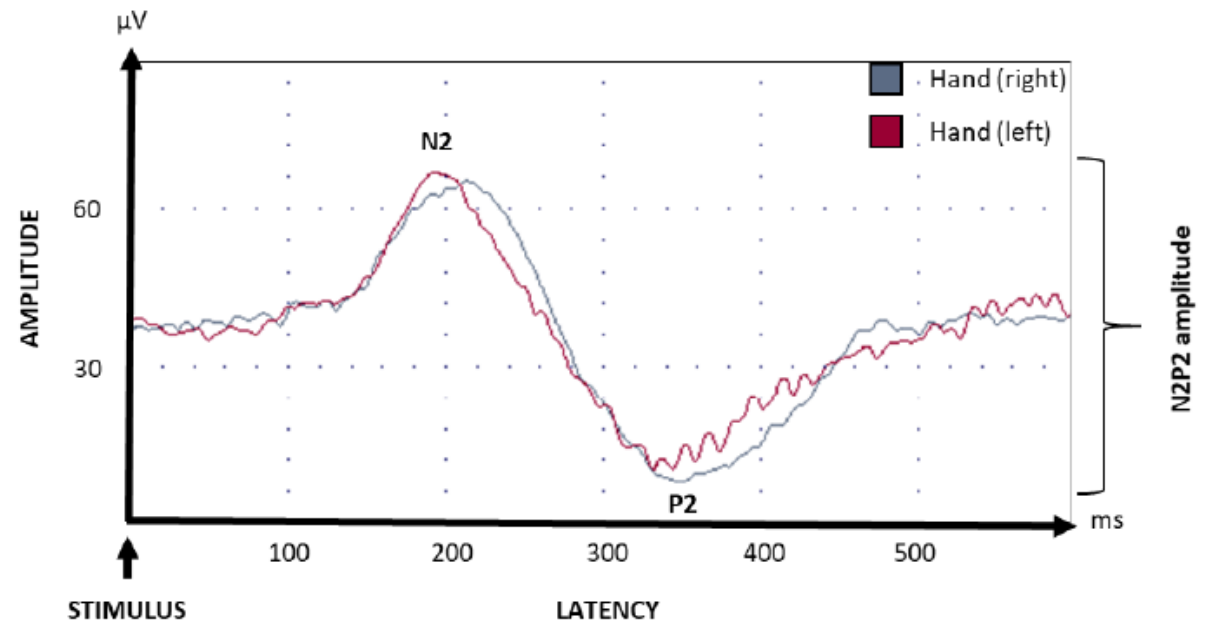
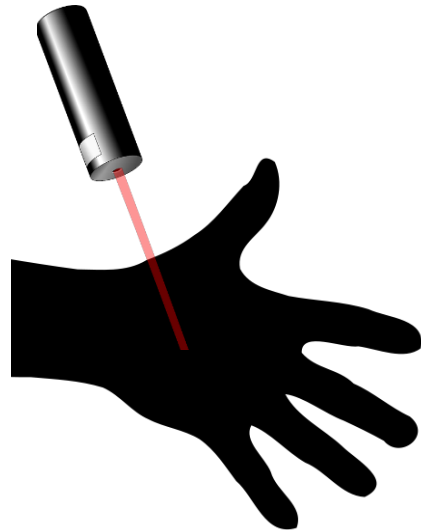
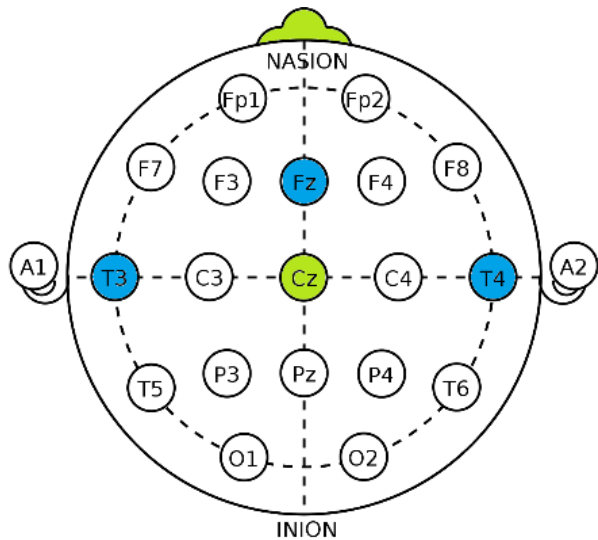
## PAIN AND SENSORY FUNCTION

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# MATERIALS AND METHODS

## PAIN AND SENSORY FUNCTION



**Figure 5.** Example of laser evoked potentials with main components N2 and P2 recorded from vertex (Cz) referencing the nose.

# MATERIALS AND METHODS

## **PAIN AND SENSORY FUNCTION**

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# RESULTS

## PAIN AND SENSORY FUNCTION

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Figure 1: Comparison of sensory function in patients with chronic pain and healthy controls. The chart displays the mean and standard deviation for various sensory function tests. The y-axis represents the score, and the x-axis represents the different tests. The bars are color-coded: yellow for the first test, cyan for the second, red for the third, and dark red for the fourth. The scores for the first two tests are significantly higher than the control group, while the scores for the last two tests are significantly lower.



# RESULTS

## PAIN AND SENSORY FUNCTION

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### Participant 1

“Always emptied dishwasher using the non-motor-affected hand ...”

Objective: Heat pain hyperalgesia

### Participant 2

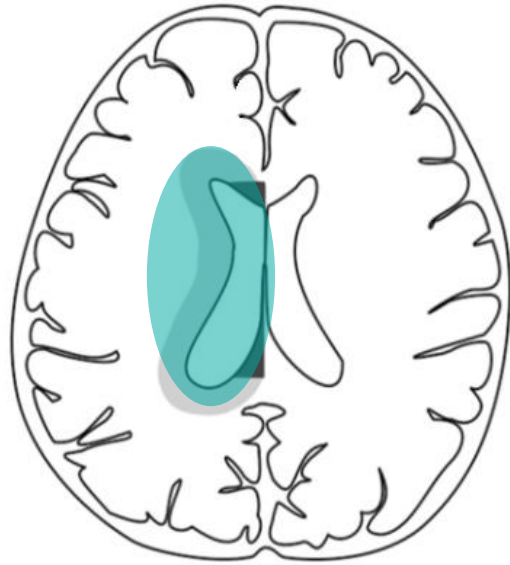
“Uncomfortable pocketing the motor affected hand (...) and holding a cup with hot beverages ...”

Objective: Mechanical allodynia

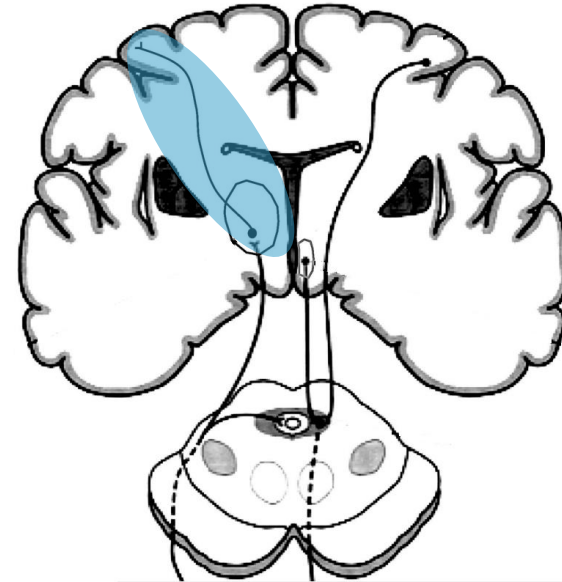
# RESULTS

# PAIN AND SENSORY FUNCTION

Sensory gain



Sensory loss



# CONCLUSIONS AND FUTURE PERSPECTIVES

# CONCLUSIONS AND PERSPECTIVES

## PAIN AND SENSORY FUNCTION

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Central neuropathic pain is not prevalent in ambulant youth with cerebral palsy.



Presence of central neuropathic pain in patients with severe motor-impairment (GMFCS IV-V).

Sensory abnormalities are common but underreported in youth with cerebral palsy.



Address sensory abnormalities (including dysesthesia) in CP follow-up programs.

Some brain injury patterns are associated with sensory gain or sensory loss.



Examine the association between specific brain injuries and sensory abnormalities in a large group of patients.

