

# Motion sensors to select exercises in people with neck pain

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# Neck pain

- Common condition
- Contribute to 16% of all sick leave in Denmark
- Ranked fourth as contributor to years living with disability

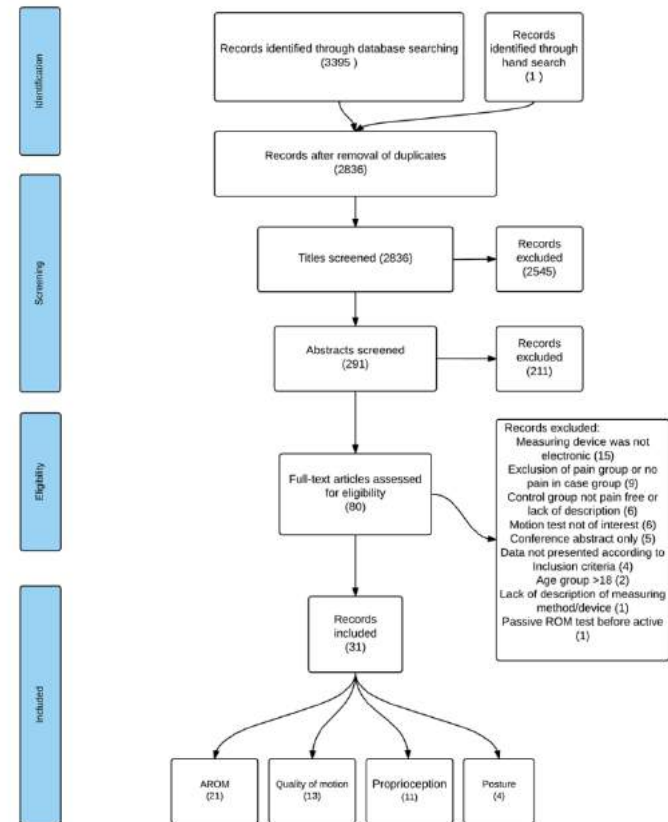


# Why measure neck movements and posture?

- Exercises recommended treatment for neck pain
- Which type of exercises?
- Need for a toolbox

# Do movement patterns and posture differ in people with and without neck pain?

- Systematic literature review
- Electronic measures
- Movement impairments
- Proprioception
- Posture



# Do movement patterns and posture differ in people with and without neck pain? YES

- People with neck pain have:
  - Less movement in all direction
  - Reduced movement speed
  - Reduced ability to re-find a position
  - Inconclusive for posture

# The weaknesses

- Previous methods not clinically applicable
- Need for clear definitions of patients and controls
- Clearly defined tests
- Reliable and valid
  - Measurement instruments
  - Measurement methods

# Searching for a new tool

- Identification of potential technology
- **DorsaVi's sensors and software: ViMove**
- Developing the neck movement tests
- Development of ViMove for the neck
- Validate ViMove for the neck against Vicon



# Development of ViMove device and methods for comparison

## Workshops

- Create a set of clinical tests for the neck
- Select measures to perform
- Record measures from ViMove and Vicon

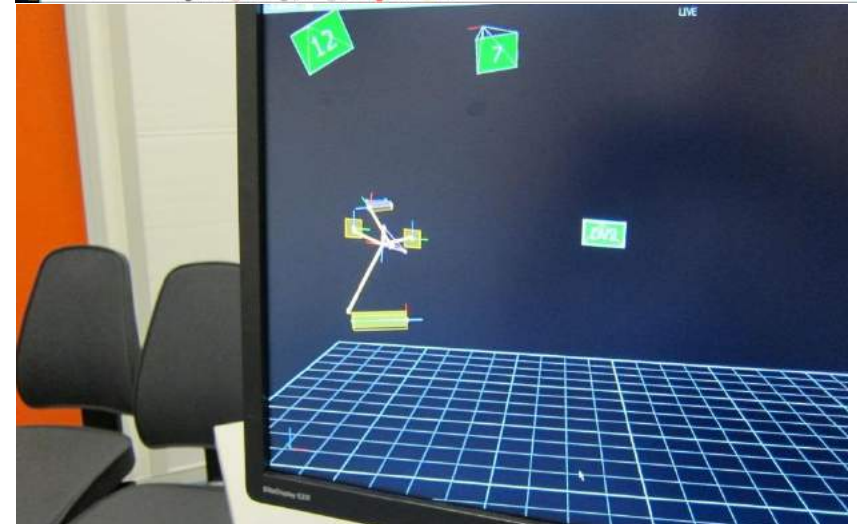
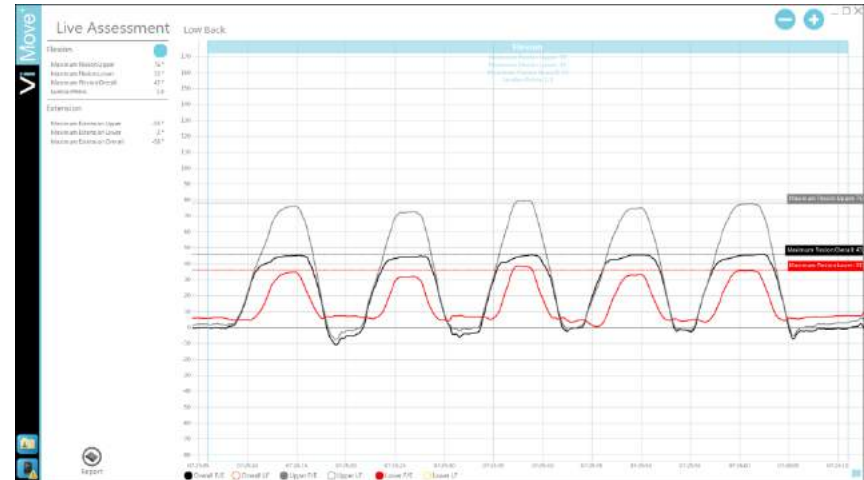


# New software for the neck

- ViMove:
  - Two sensors
- Vicon system
  - Infrared cameras
- Math models build and software developed by the DorsaVi company

# Validation of the ViMove system

- ViMove
  - Sensor output
- Vicon
  - Infrared video



# Concurrent validity of ViMove and Vicon

- 10 subjects without neck pain
- ViMove and Vicon simultaneously
  - Good reliability between the devices for most directions of movement and for posture
- Measures repeated after one week
  - Large variations in measurements over time

# Next step: Study on people with and without neck pain

- The toolbox ability to detect difference
- Concurrent validity when people have neck pain
- Still use of both Vicon and ViMove

# Perspective

- First step in establishing measures of neck movements and posture as a potential tool for managing neck exercises

# Funding and acknowledgments

## *Funding*

- The Danish Chiropractic Research Foundation
- Aleris-Hamlet Ringsted
- Patient@home
- DorsaVi

## *Acknowledgments*

Supervisors:

Per Kjær, Professor

Jan Hartvigsen, Professor

Gisela Sjøgaard, Professor Emeritus

Eleanor Boyle, Associate Professor

Collaborators:

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Jacob Nielsen, Associate Professor