Chronic pain and sleep impairments are often closely associated. Sleep deprivation results in increased pain perception and lower pain thresholds. We recently developed a new method to study nociceptive processing by simultaneous tracking of nociceptive detection thresholds (NDTs) and evoked potentials (EPs) in response to intra-epidermal electric stimuli. In this work, we study whether we can use this method to assess impaired nociceptive processing after sleep deprivation in a cross-over study on 24 subjects.

**OBJECTIVE**

“Assess the sensitivity of tracked nociceptive intra-epidermal detection thresholds and evoked potentials to altered nociceptive processing following sleep deprivation.”

**RESULTS**

**Nocteptive Detection Threshold (NDT)**
- Significantly lower NDT for single- and double-pulse deprivation.
- No significant difference in NDT between both control measurements.

**Evoked Potential (EP)**
- Significantly lower EP for single-pulse and intra-epidermal stimuli after sleep deprivation.
- No significant difference in EP between both control measurements.

**CONCLUSIONS**

Earlier studies showed that sleep deprivation results in lower thermal sensory and pain thresholds and a lower evoked potential (Ødegård, Omland et al. 2015, Schuh-Hofer, Wodarski et al. 2013). This study demonstrated lower detection thresholds of intra-epidermal nerve fibers as well as decreased evoked potentials after sleep deprivation. As no significant differences were observed between both control measurements, these alterations were likely induced by the sleep deprivation.

These results suggest that simultaneous tracking of nociceptive detection thresholds and evoked potentials is useful to observe altered nociceptive processing after sleep deprivation. Further studies should assess whether we can also use this method to monitor pain sensitivity in chronic pain patients.

**REFERENCES**

1. van den Berg, B. et al. (2020). "Simultaneous tracking of psychophysical detection thresholds and evoked potentials to study nociceptive processing." Behavior Research Methods.