



## Editorial comment

# Evoked potentials through small-fiber pathways – For both clinical and research purposes?



Dagfinn Matre<sup>a,\*</sup>, Kristian Bernhard Nilsen<sup>a,b,c</sup>

<sup>a</sup> Department of Work Psychology and Physiology, National Institute of Occupational Health, Oslo, Norway

<sup>b</sup> Section for Clinical Neurophysiology, Oslo University Hospital, Norway

<sup>c</sup> Department of Neuroscience, Norwegian University of Science and Technology, Norway

Sensory loss, hyposensitivity and hypersensitivity are common manifestations of neuropathic pain. Lesions or disease of the nerve fibers or along the fiber pathways may be responsible for these sensory dysfunctions. A neurophysiological tool to investigate these pathways is to apply brief stimulation of the sensory fibers and record the nerve conduction and/or the evoked potential from the electroencephalographic (EEG) signal.

Small-fiber evoked potentials may be useful in the diagnosis of neuropathic pain [1,2]. In the present issue of the *Scandinavian Journal of Pain* Caspar Skau Madsen, Nanna Brix Finnerup, and Ulf Baumgärtner [3] address how objective testing of the nociceptive (small-fiber) pathways may be performed in a standardized manner in order to investigate the function of these pathways and to detect abnormalities.

The review starts with a brief physiological description of the nociceptive A-delta and C fibers, and continues by a thorough and systematic presentation of different stimulus modalities used to study small-fiber function, including contact and radiant heat stimulation, electrical stimulation, mechanical stimulation, and cold stimulation. Both well validated, as well as more experimental, stimulus modalities are covered. The authors continue by describing modulating effects, analyzing techniques and clinical implications [3].

As a research tool the methods is undoubtedly of great value, and the clinical value is promising, although some obstacles still exist

due to problems with habituation, practical difficulties requiring highly skilled technicians, lack of specificity with problems obtaining reliable responses in healthy controls, especially in the lower extremities which are of greatest clinical interest [2,4]. If evoked potentials are to be implemented in clinical medicine it is probably of uttermost importance to involve clinicians when refining the methodology.

The review may be informative for both basic scientists and clinicians interested in methods for studying small-fiber function. The review provides basic knowledge on the methodology of evoked potentials from small-fibers and neurophysiological mechanisms involved in pain sensation and pain modulation [3].

## References

- [1] Cruccu G, Sommer C, Anand P, Attal N, Baron R, Garcia-Larrea L, Haanpaa M, Jensen TS, Serra J, Treede RD. EFNS guidelines on neuropathic pain assessment: revised 2009. *Eur J Neurol* 2010;17:1010–8.
- [2] Haanpaa M, Attal N, Backonja M, Baron R, Bennett M, Bouhassira D, Cruccu G, Hansson P, Haythornthwaite JA, Iannetti GD, Jensen TS, Kauppila T, Nurmikko TJ, Rice AS, Rowbotham M, Serra J, Sommer C, Smith BH, Treede RD. NeuPSIG guidelines on neuropathic pain assessment. *Pain* 2011;152:14–27.
- [3] Madsen CS, Finnerup NB, Baumgärtner U. Assessment of small fibers using evoked potentials. *Scand J Pain* 2014;5:111–8.
- [4] Warbrick T, Derbyshire SW, Bagshaw AP. Optimizing the measurement of contact heat evoked potentials. *J Clin Neurophysiol* 2009;26:117–22.

DOI of refers to article: <http://dx.doi.org/10.1016/j.sjpain.2013.11.007>.

\* Corresponding author. Tel.: +47 23 19 52 15.

E-mail addresses: [Dagfinn.Matre@stami.no](mailto:Dagfinn.Matre@stami.no), [dagfinn.matre@gmail.com](mailto:dagfinn.matre@gmail.com), [dagfinn@stami.no](mailto:dagfinn@stami.no) (D. Matre).