



Aalborg Universitet

AALBORG UNIVERSITY  
DENMARK

## Crossed responses in human trapezius are not H-reflexes

Vangsgaard, Steffen; Nørgaard, Lars Tønners; Madeleine, Pascal; Taylor, Janet L.

*Published in:*

Proceedings, 4th Annual Meeting of the Danish Society of Biomechanics, 26 October 2012, Aarhus, Denmark

*Publication date:*  
2012

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Vangsgaard, S., Nørgaard, L. T., Madeleine, P., & Taylor, J. L. (2012). Crossed responses in human trapezius are not H-reflexes. In *Proceedings, 4th Annual Meeting of the Danish Society of Biomechanics, 26 October 2012, Aarhus, Denmark* (pp. 19). Aarhus University.

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

### Take down policy

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

## Crossed responses in human trapezius are not H-reflexes

Steffen Vangsgaard<sup>1</sup> • Lars T. Nørgaard<sup>1</sup> • Pascal Madeleine<sup>1</sup> • Janet L. Taylor<sup>2</sup>

<sup>1</sup>Center for Sensory-Motor Interaction (SMI), Dept. of Health Science and Technology, Aalborg University; <sup>2</sup>Neuroscience Research Australia and the University of New South Wales, Sydney, Australia

**Introduction:** In trapezius, previous findings have described both ipsilateral and unusual crossed H-reflexes. Our study aimed to confirm these findings by investigating the responses evoked in trapezius by stimulation of the C3/4 cervical nerves.

**Methods:**  $M_{\max}$  and  $H_{\max}$  were measured in the ipsilateral trapezius in subjects (n=10) by percutaneous electrical stimulation of the accessory nerve and the cervical nerves of C3/4 respectively. Repeated stimulation of the C3/4 cervical nerves was performed during 3 different tasks (relaxation, contraction of ipsilateral side, contraction of contralateral side).

**Results:** Stimulation of the accessory nerve evoked M waves at an average latency of  $2.9 \pm 0.2$  ms for the upper part,  $3.9 \pm 0.5$  ms for the middle part, and  $5.0 \pm 0.7$  ms for the lower part of the ipsilateral trapezius. Stimulation of the C3/4 cervical nerves evoked ipsilateral reflexes in the upper (n=8) middle (n=9) and in the lower (n=7) trapezius with an ipsilateral contraction. The latencies were  $8.9 \pm 0.2$  ms,  $10.0 \pm 0.4$  ms, and  $10.9 \pm 0.4$  ms respectively in the upper, middle, and lower parts of trapezius. These responses increased significantly with an increase in pre-stimulus EMG and decreased significantly with a decrease in pre-stimulus EMG in all ipsilateral parts of trapezius. Thus, they were considered H-reflexes. Contralaterally, responses with latencies corresponding to those observed ipsilaterally occurred in the upper (n=1), middle (n=9), and lower (n=6) part of trapezius. These potentials which were recorded from the left trapezius increased significantly more with contraction of the right trapezius compared with contraction on the left side. Thus, they were considered not to be H-reflexes, but to be far field EMG.

**Conclusion:** This study found ipsilateral and contralateral responses consistent with previous findings. However, we conclude that the contralateral response is not a crossed reflex. Further investigations are required to be able to fully dismiss that crossed reflexes between the two trapezii are present.