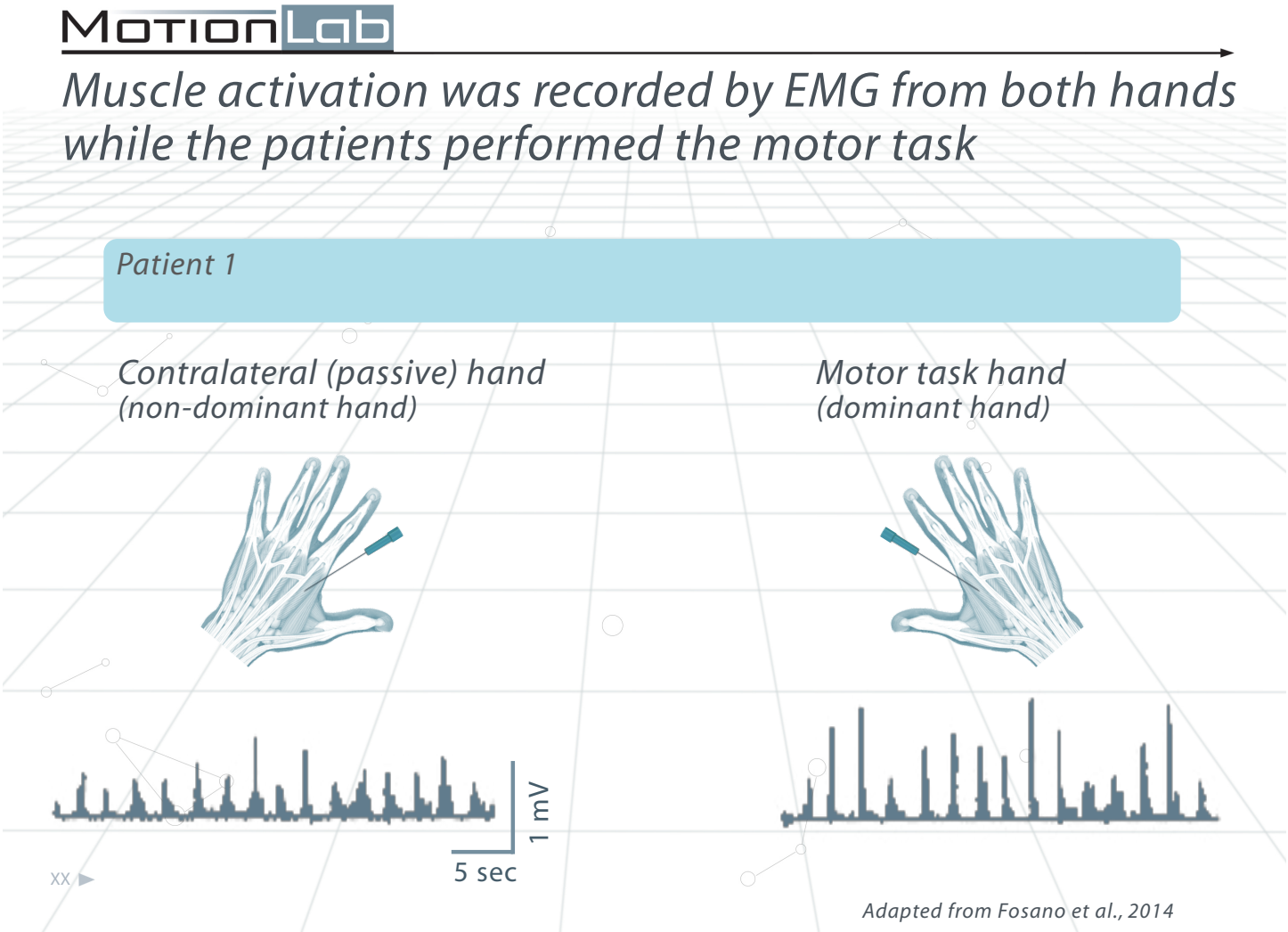
NeuroLab 2.0: Co-Designing a STEM+M Storyline – Santschi, et al.

Appendix A. Visual and Text Prompts - EMG Data

Slide series showing embedded visual and text prompts to help guide student data analysis and interpretation of EMG data and foster student recognition of key findings and their relation to visual observations of patients.

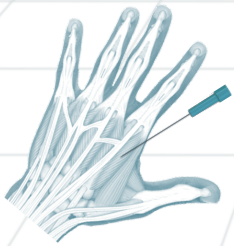


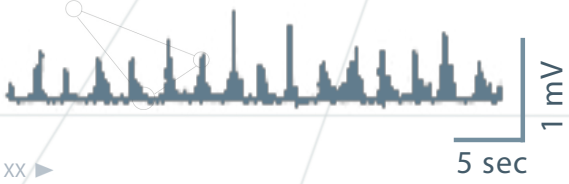
MotionLab

About how long did Patient 1 perform the clinical motor task?

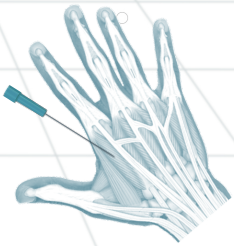
Patient 1

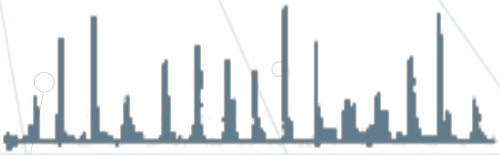
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





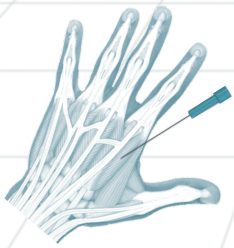
Adapted from Fosano et al., 2014

MotionLab

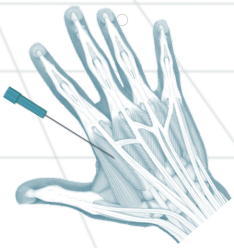
Patient 1 performed the clinical motor task for about 30 seconds

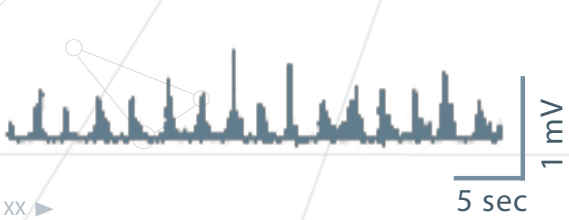
Patient 1

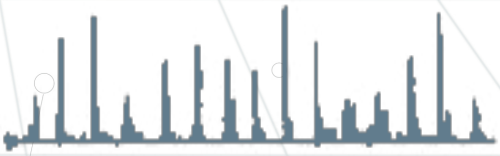
Contralateral (passive) hand
(non-dominant hand)



Motor task hand
(dominant hand)







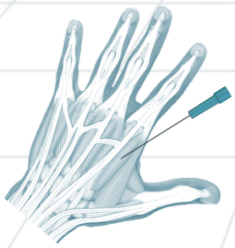
Adapted from Fosano et al., 2014

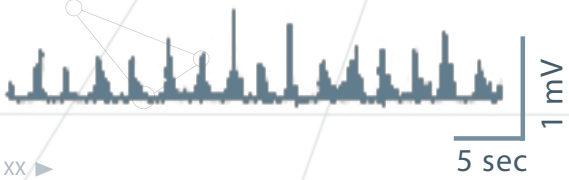
MotionLab

What do the peaks or spikes represent in the two graphs below?

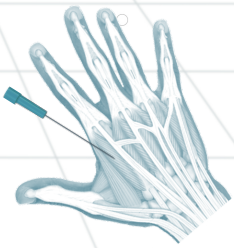
Patient 1

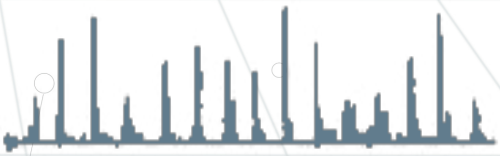
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





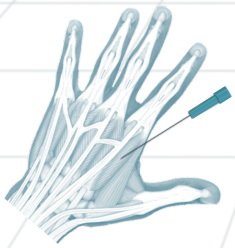
Adapted from Fosano et al., 2014

MotionLab

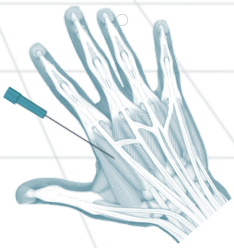
The spikes represent the level of FDI muscle activation

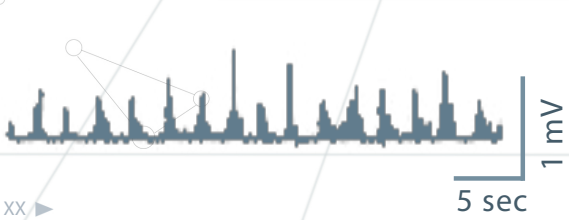
Patient 1

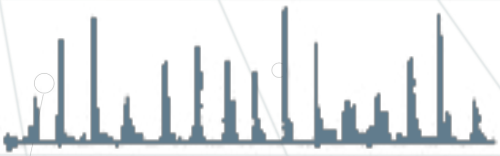
Contralateral (passive) hand
(non-dominant hand)



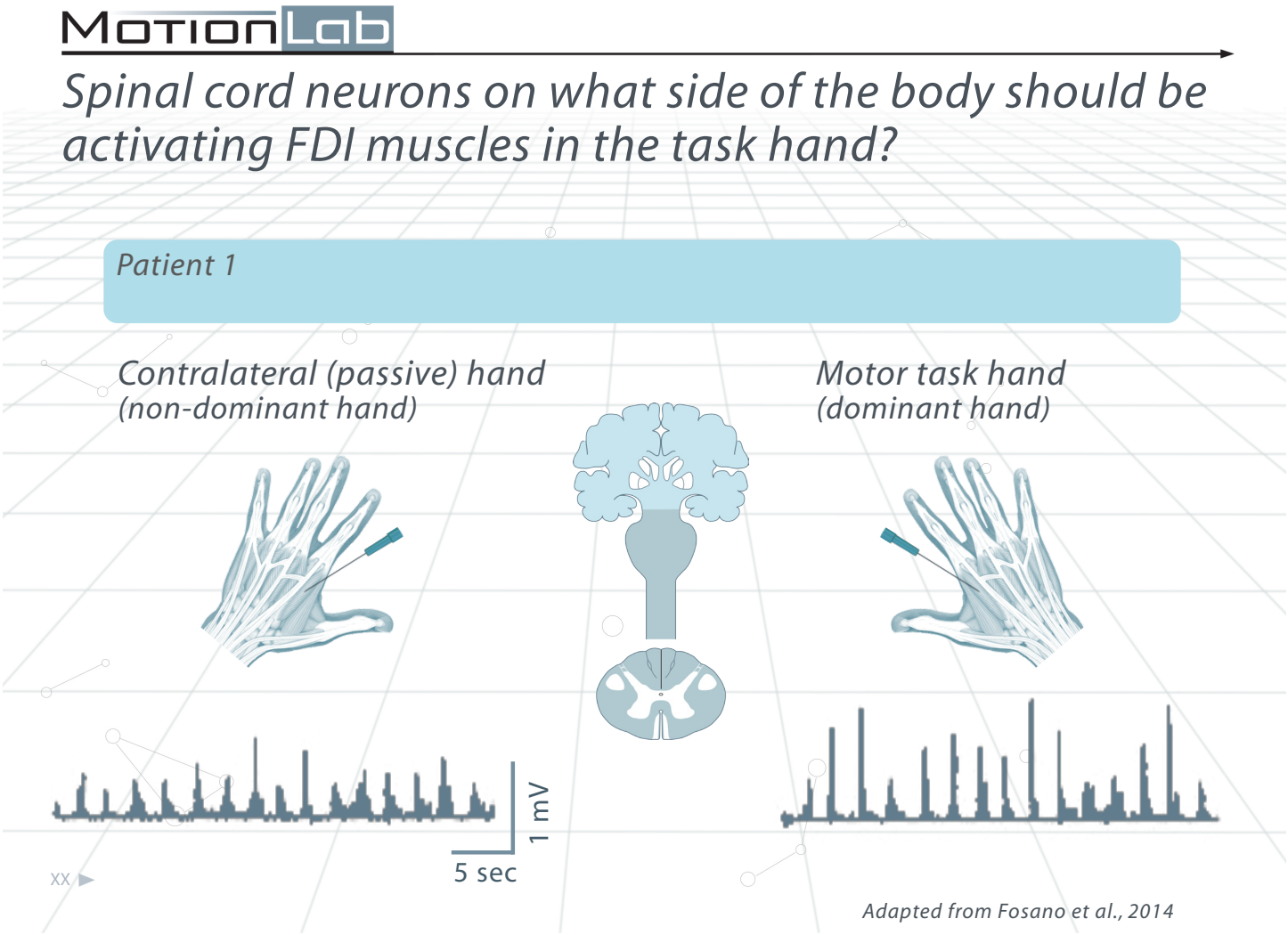
Motor task hand
(dominant hand)







Adapted from Fosano et al., 2014


MotionLab
Spinal cord neurons on what side of the body should be activating FDI muscles in the task hand?
Patient 1
Contralateral (passive) hand
(non-dominant hand)
Motor task hand
(dominant hand)
1 mV
5 sec
xx
Adapted from Fosano et al., 2014

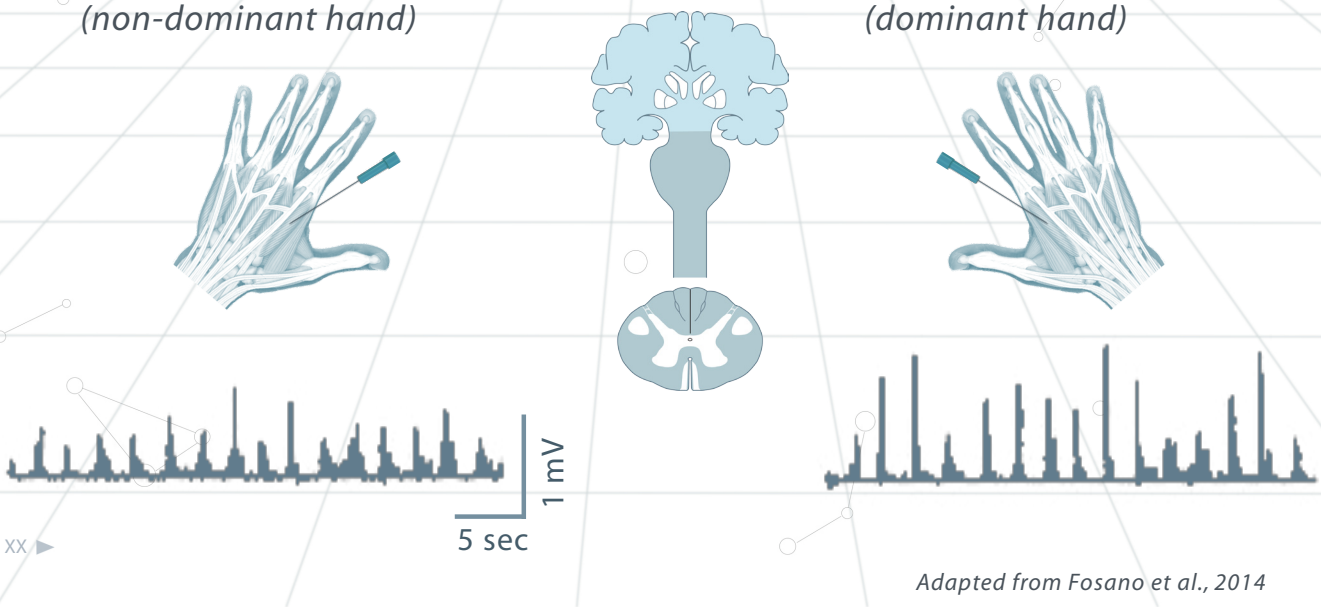
MotionLab

Cortical motor neurons on what side of the body should be activating FDI muscles in the task hand?

Patient 1

Contralateral (passive) hand
(non-dominant hand)

Motor task hand
(dominant hand)



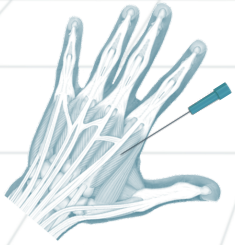
Adapted from Fosano et al., 2014

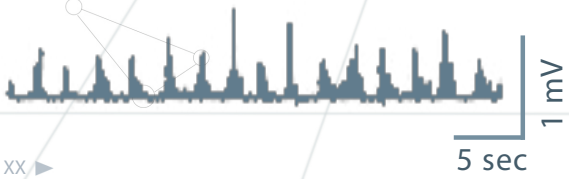
MotionLab

What does the gap or interval between peaks represent?

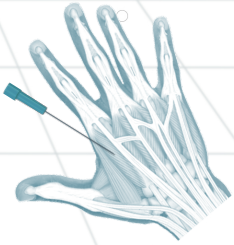
Patient 1

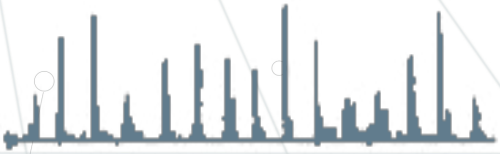
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





Adapted from Fosano et al., 2014

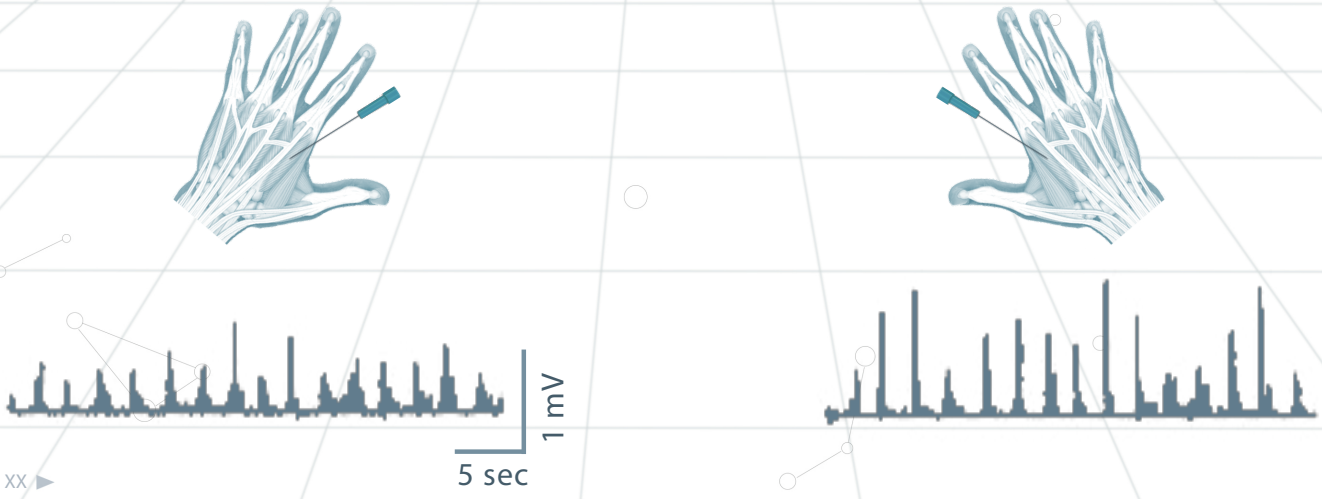
MotionLab

The interval between peaks represents the time between finger tapping commands

Patient 1

Contralateral (passive) hand
(non-dominant hand)

Motor task hand
(dominant hand)



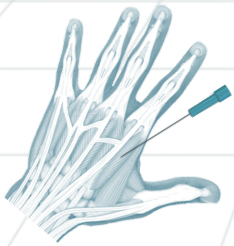
Adapted from Fosano et al., 2014

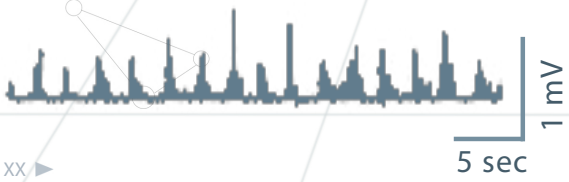
MotionLab

What does the height or amplitude of the peaks indicate in the graphs?

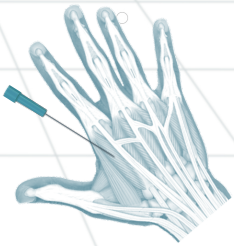
Patient 1

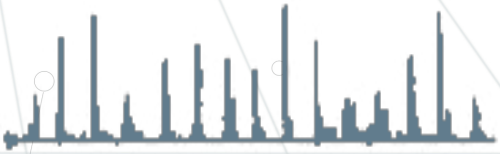
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





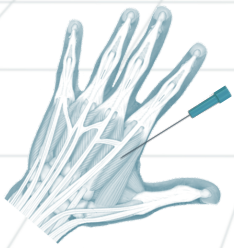
Adapted from Fosano et al., 2014

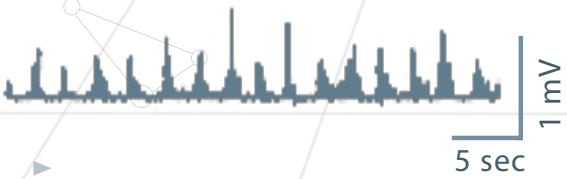
MotionLab

Is there a difference in the height or amplitude of the peaks generated by the task hand and the contralateral passive hand?

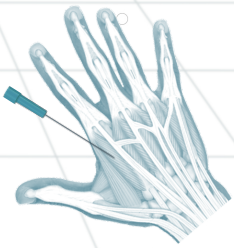
Patient 1

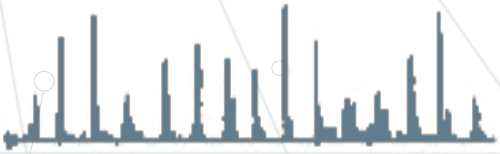
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





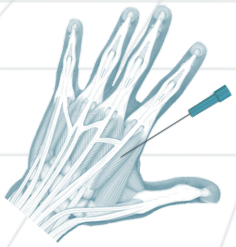
Adapted from Fosano et al., 2014

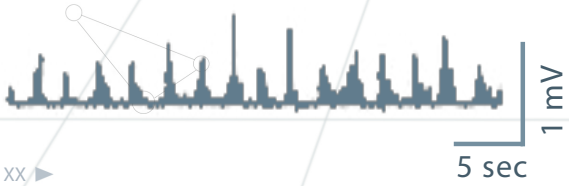
MotionLab

How does this difference compare (correlate) with what you observed in the videos of affected patients?

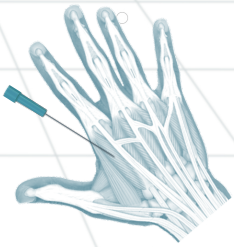
Patient 1

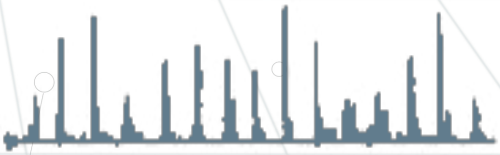
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





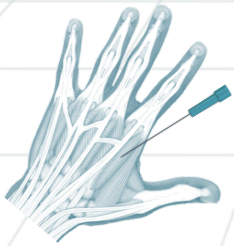
Adapted from Fosano et al., 2014

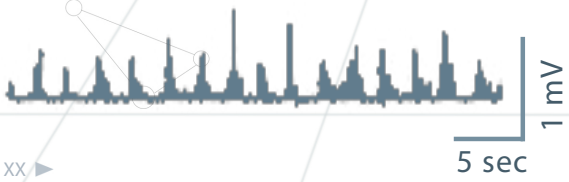
MotionLab

Based on this data, would this patient show a higher or lower degree of hand mirroring by visual observation?

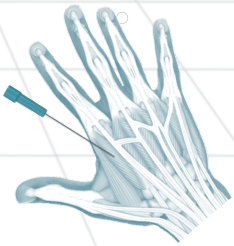
Patient 1

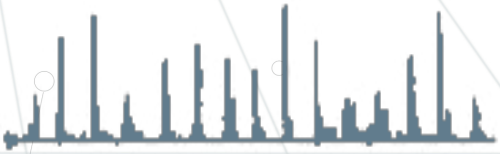
Contralateral (passive) hand
(non-dominant hand)





Motor task hand
(dominant hand)





Adapted from Fosano et al., 2014