



The Effect of the StartReact Response on Gross Hand Function after Human Spinal Cord Injury

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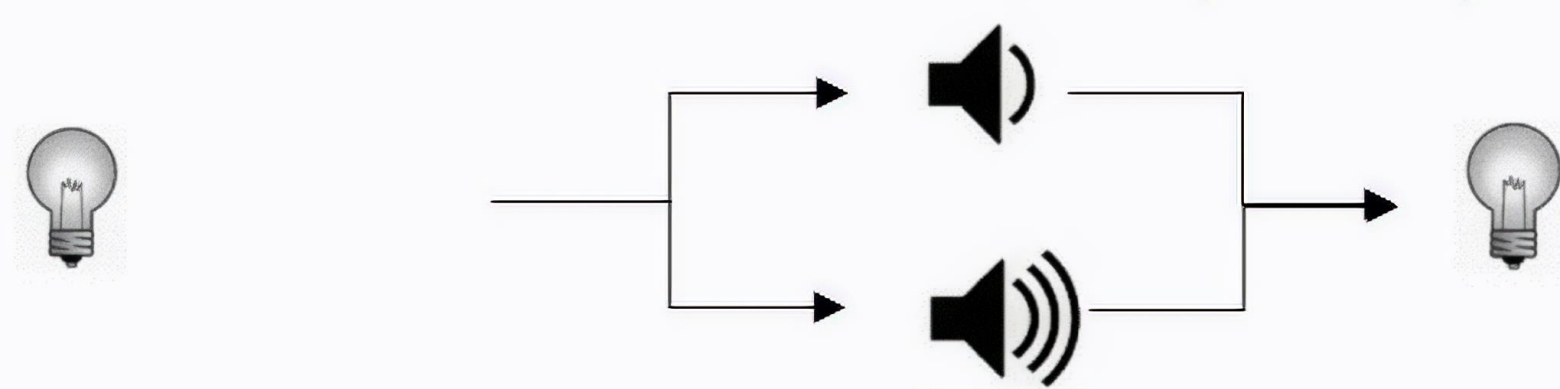


Introduction

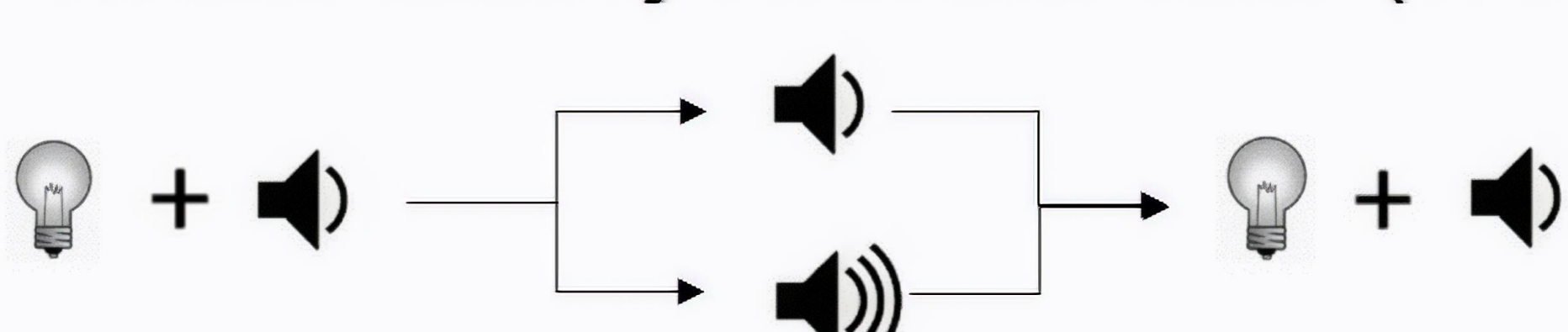
In a reaction time task paradigm, an imperative signal consisting of a startle auditory stimulus (115 dB) shortens reaction times (StartReact Response; Valls-Sole et al. 1995, 1999). Evidence has shown that these changes in reaction time may involve subcortical structures such as the reticular formation (Valls-Sole et al., 1999; Carlsen et al., 2003, 2004). Baker and Perez (2017) used the StartReact paradigm in humans with spinal cord injury (SCI) while performing grasping manipulations. They demonstrated that the reticulospinal tract contributes to a greater extent to the control of gross versus fine finger manipulations after SCI.

Methods

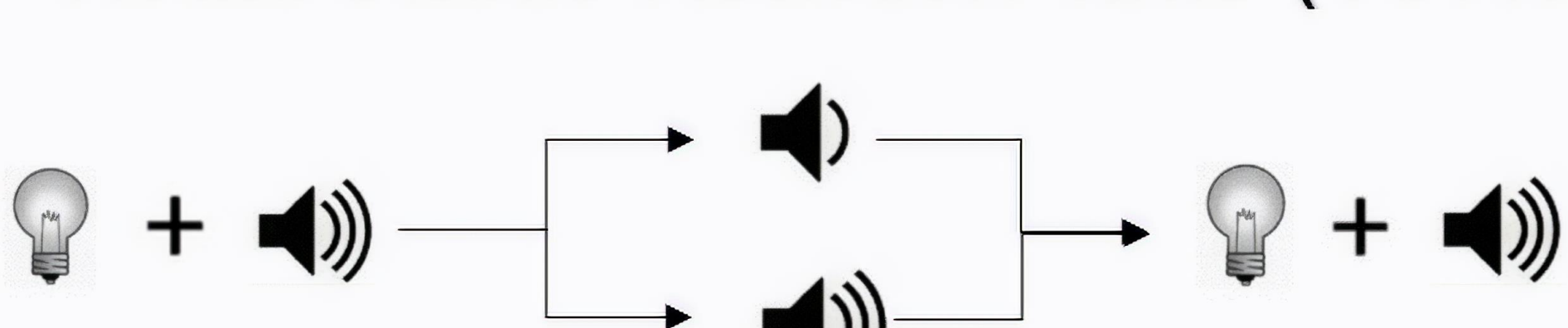
Visual Reaction Time (VRT)



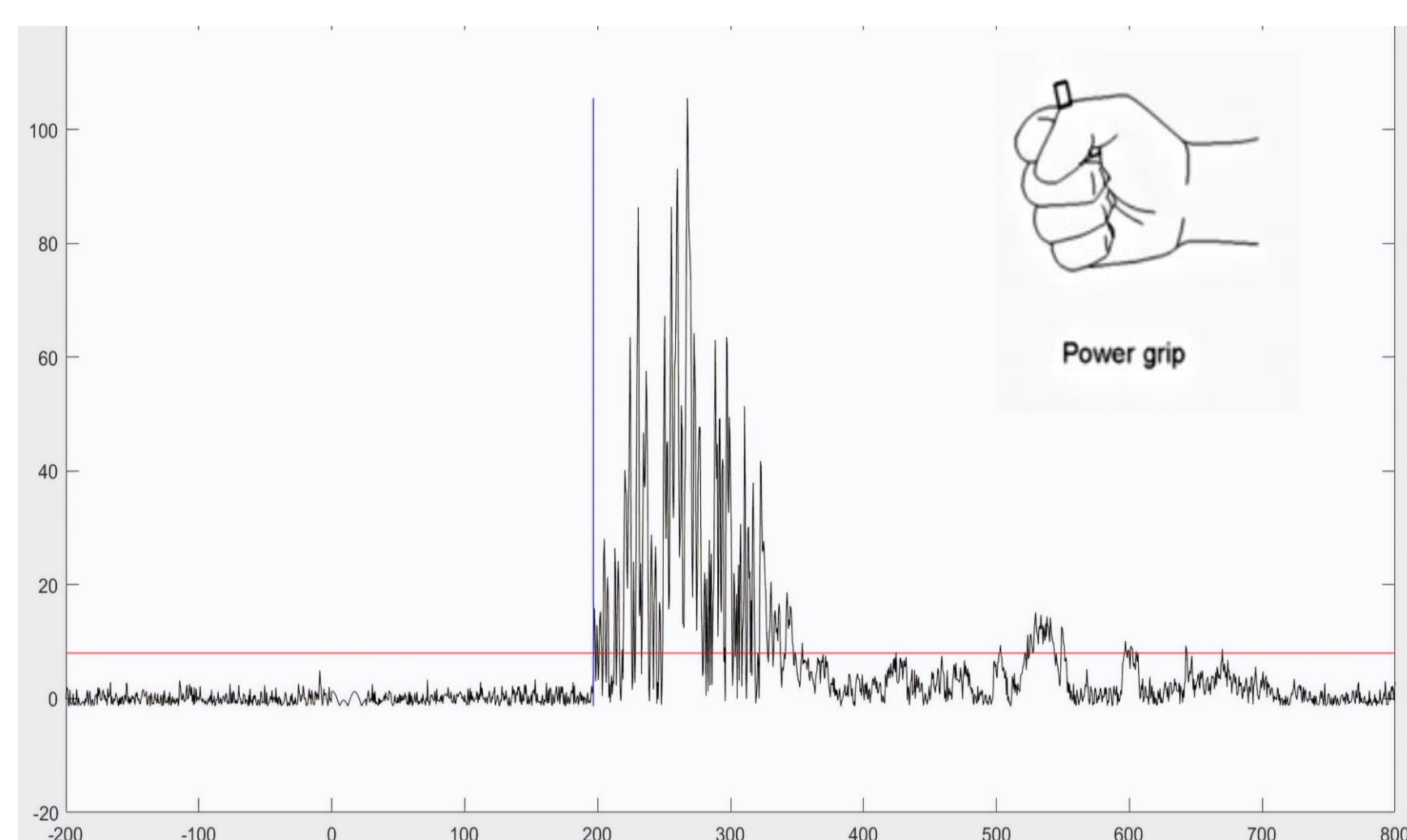
Visual Auditory Reaction Time (VART)



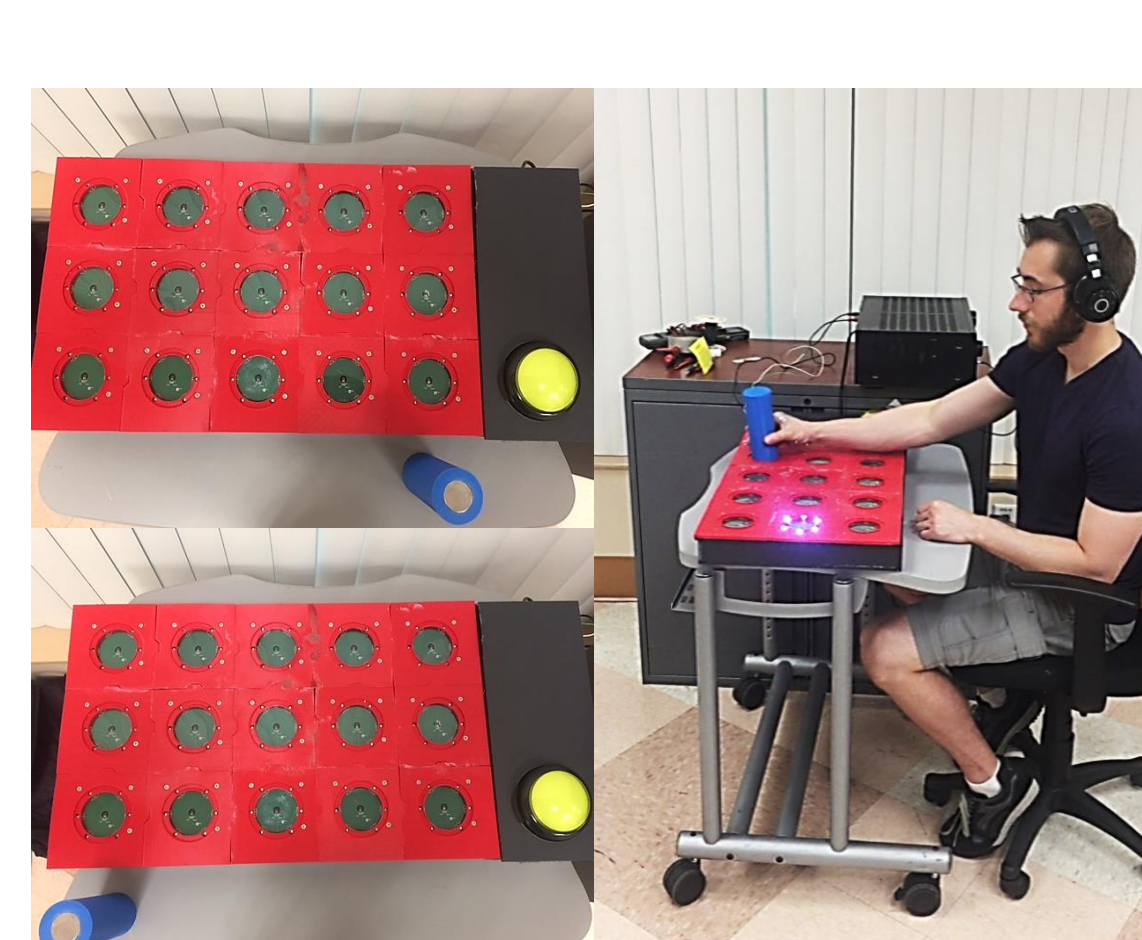
Visual Startle Reaction Time (VSRT)



Baseline and Post Test

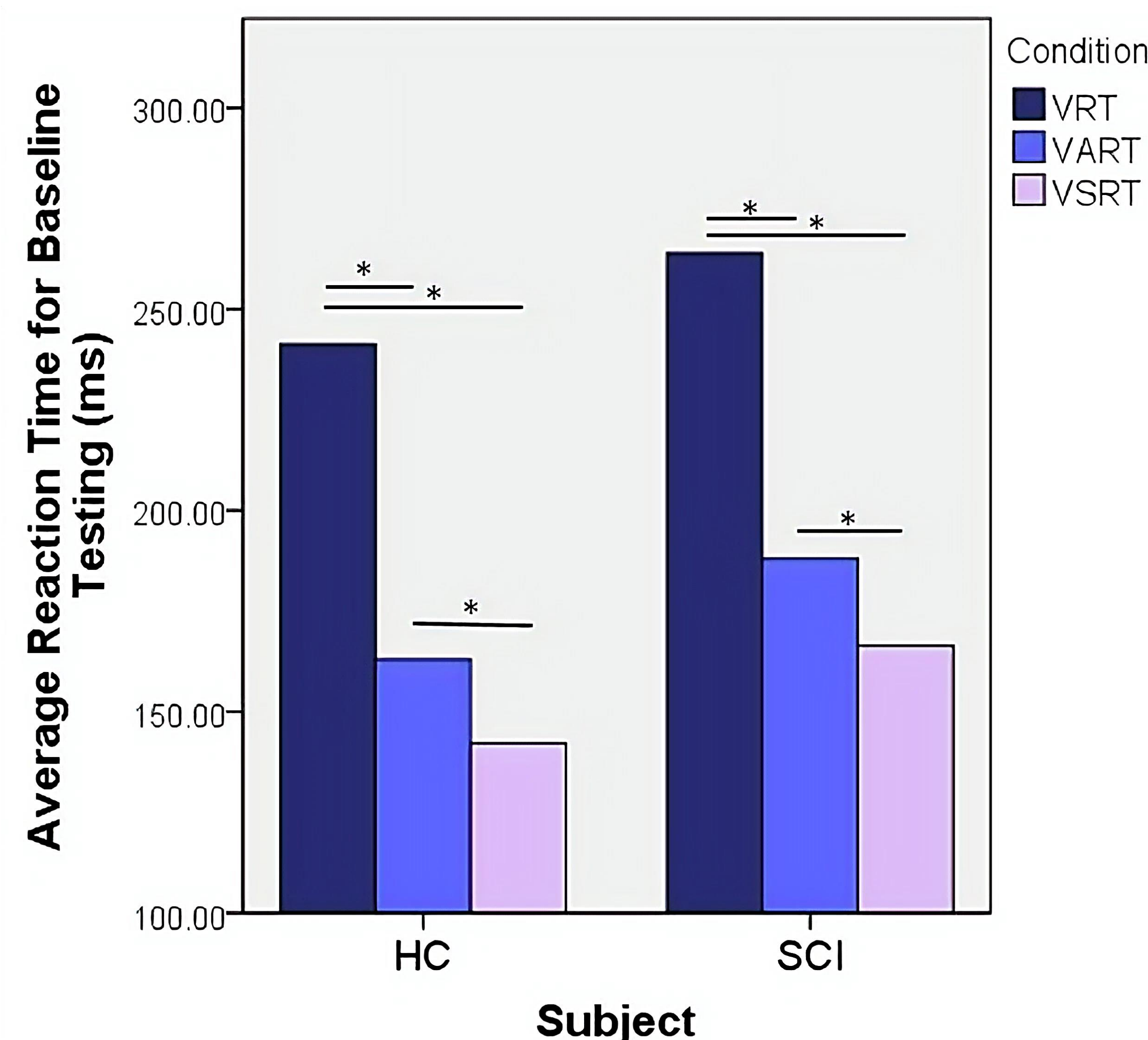


Training Board

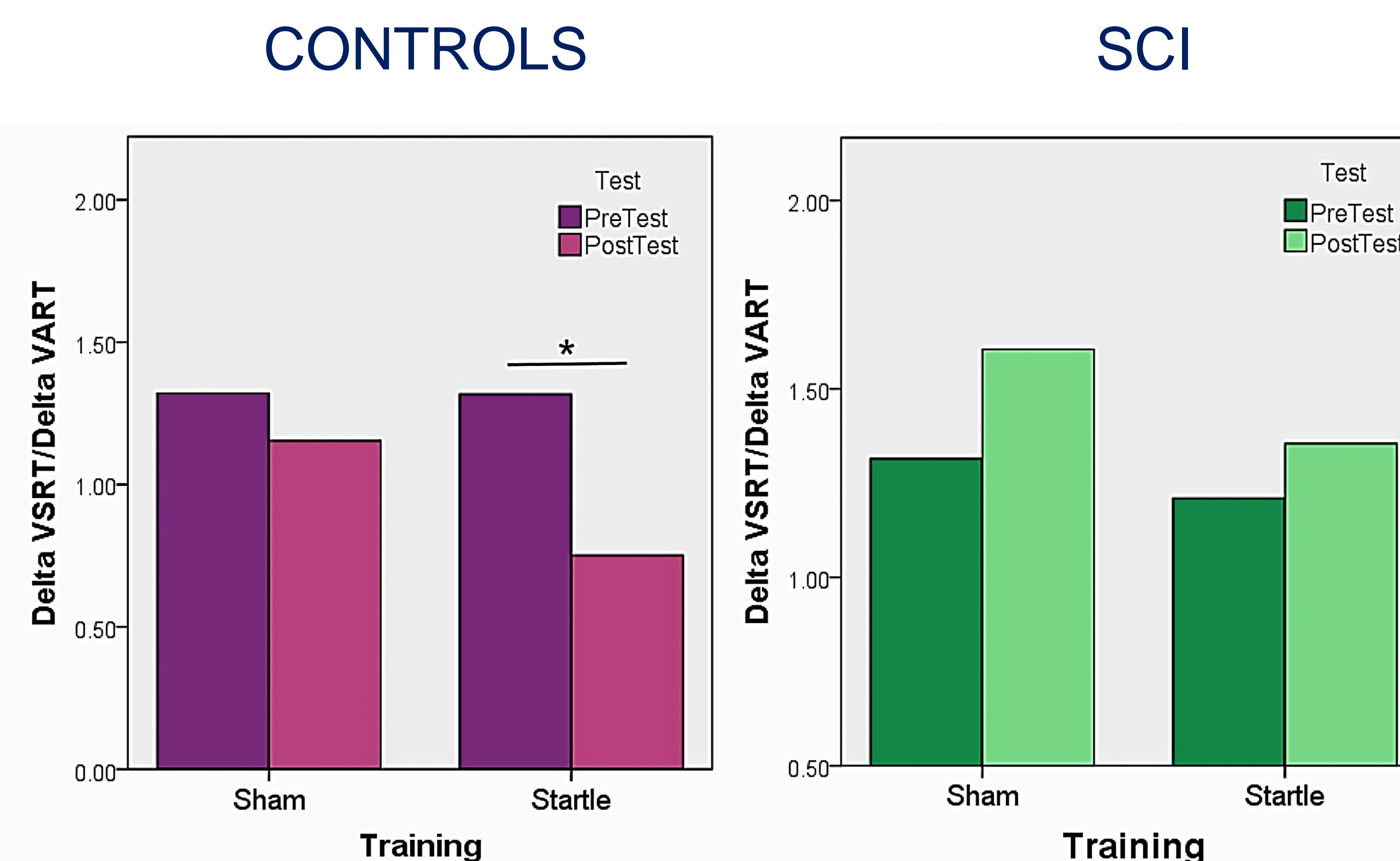


Results

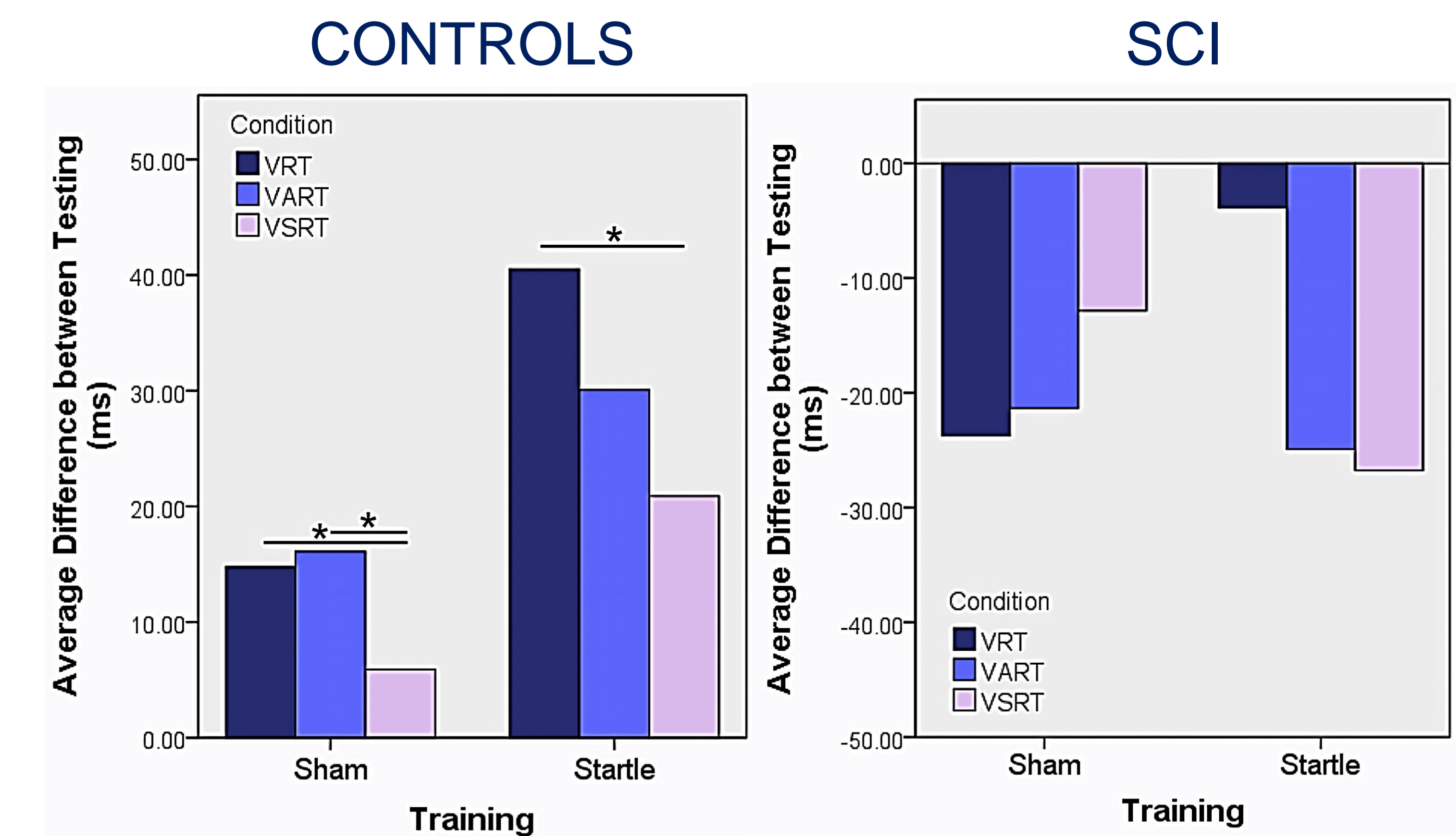
Reaction times are shorter in the VSRT Condition at baseline



$\Delta T_{SR}/\Delta T_{AR}$ is lower in control subjects after Startle Training



Reaction times are shorter in the VRT compared with VART and VSRT



Conclusion

The StartReact Response yielded decreased reaction times following a hand training paradigm that utilized gross hand function, indicating reticulospinal involvement. The most improvement can be seen comparing the testing results of the VRT condition in control subjects. Maximum reticulospinal effects were seen following the Startle Training in control subjects. Future studies will test how to optimize the StartReact Training protocol to maximize reticulospinal effects in humans with SCI.

Acknowledgements

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References

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