

7th “*Open Forum for Osteopathic Education*” Conference

23rd & 24th Sept. 2021 – Antwerp, Belgium



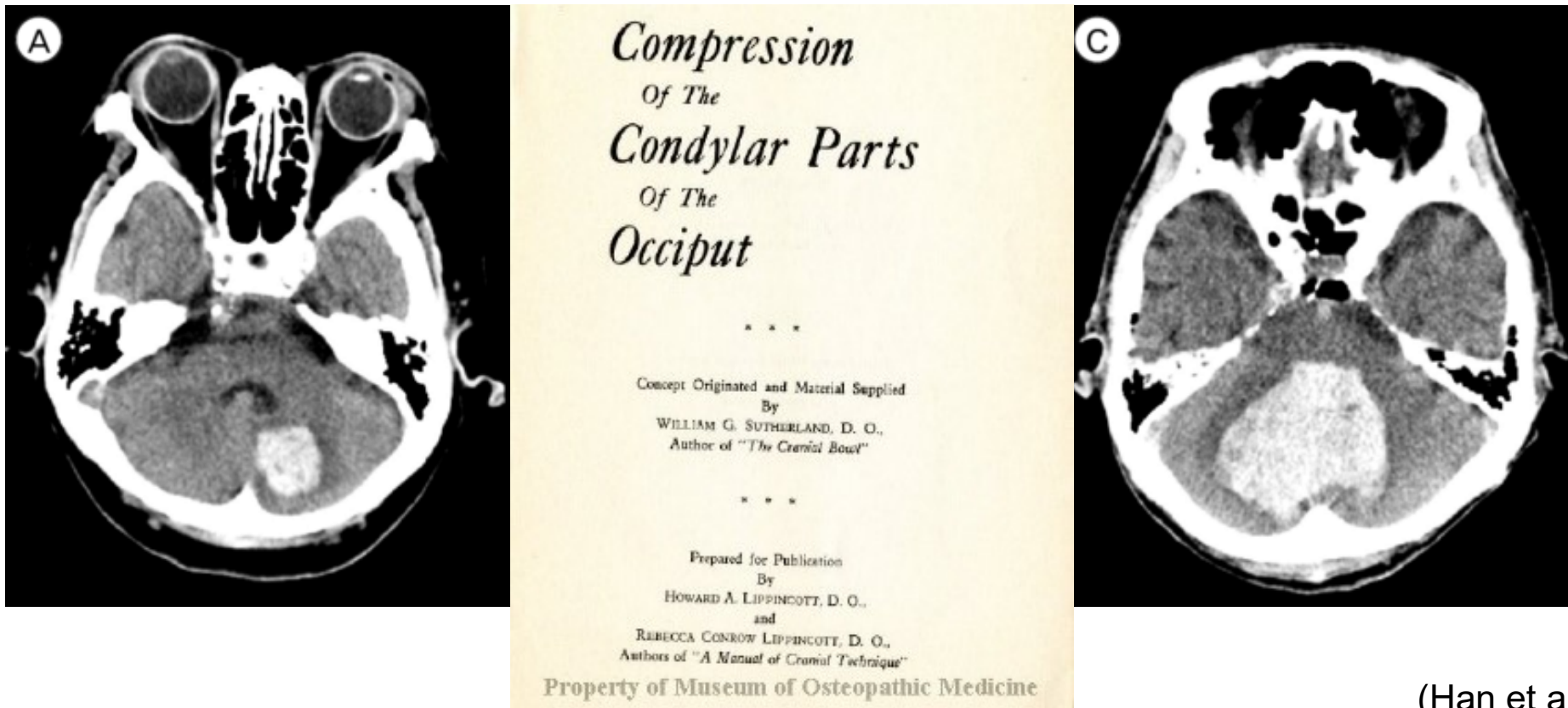
TEACHING THE
WORKING PRINCIPLES
OF OSTEOPATHY

Possible effects of cranial and sacral approach on the brain activity

Cella M, Acella E, Ghelma G, Aquino A, Pisa V



Compression of the 4th ventricle?

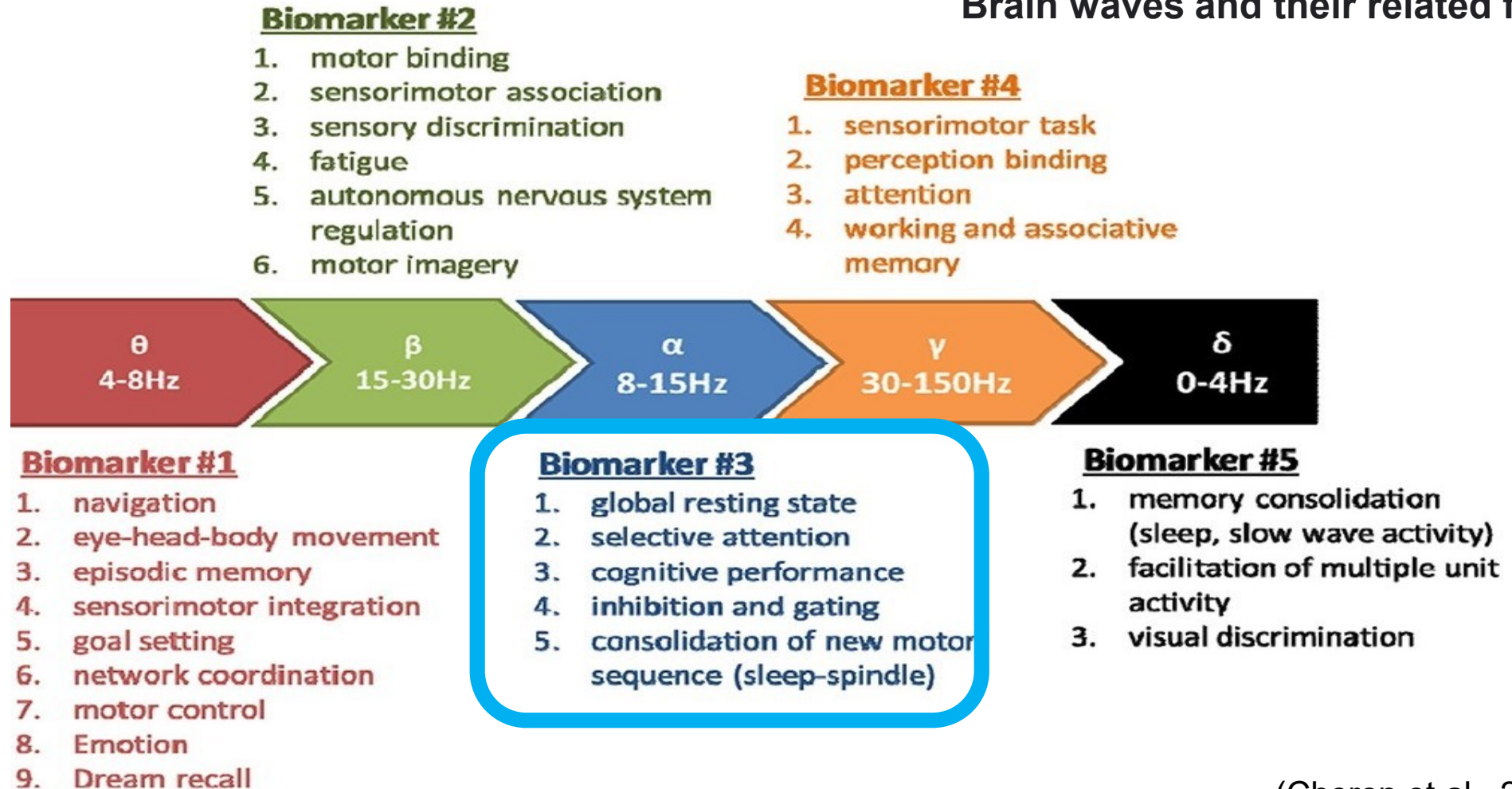


(Han et al., 2015)

- ✓ lower sleep latency (Cutler et al., 2005);
- ✓ changes in blood flow velocity and cerebral tissue oxygenation (Shi et al., 2011);
- ✓ electrical brain activity modulation (Martins et al., 2015);
- ✓ ...

INTRODUCTION

Brain waves and their related functions

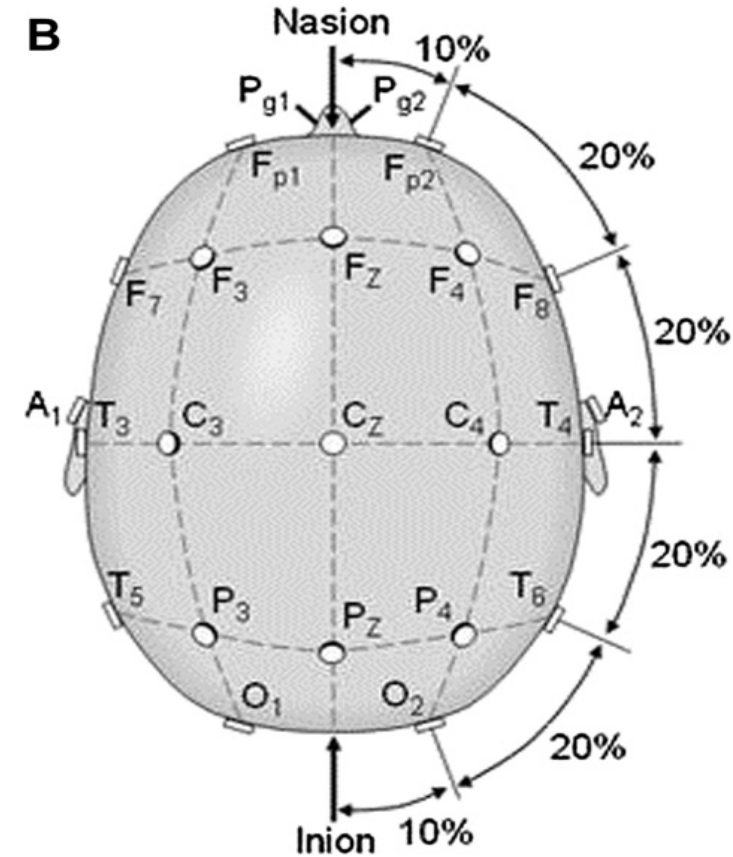
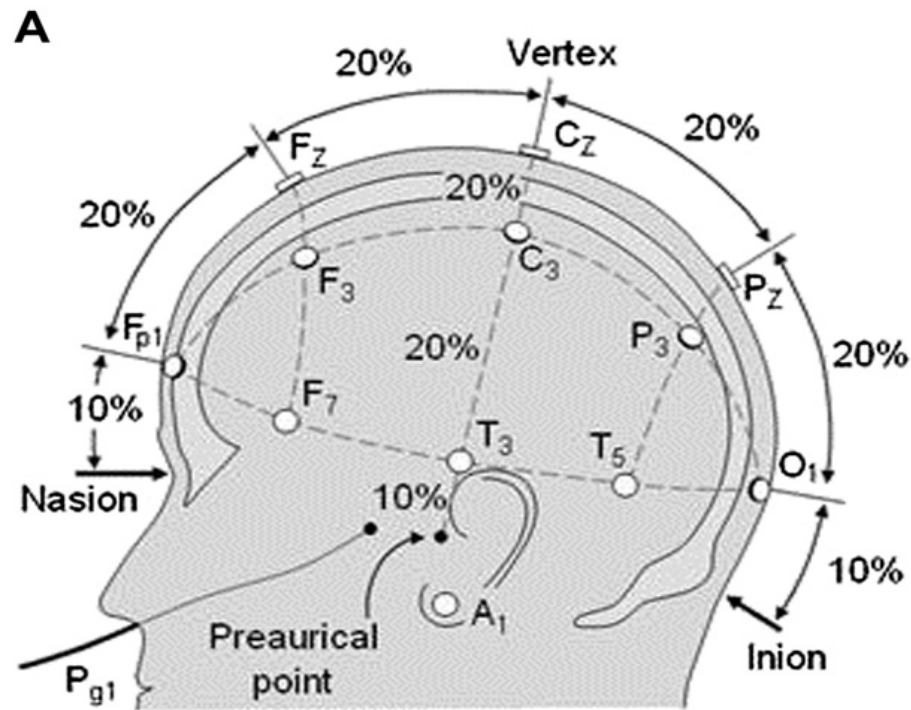


(Cheron et al., 2016)

to explore and compare the effect of CV4 and sacral technique on brain activity by measuring the alpha-band power.

METHODS

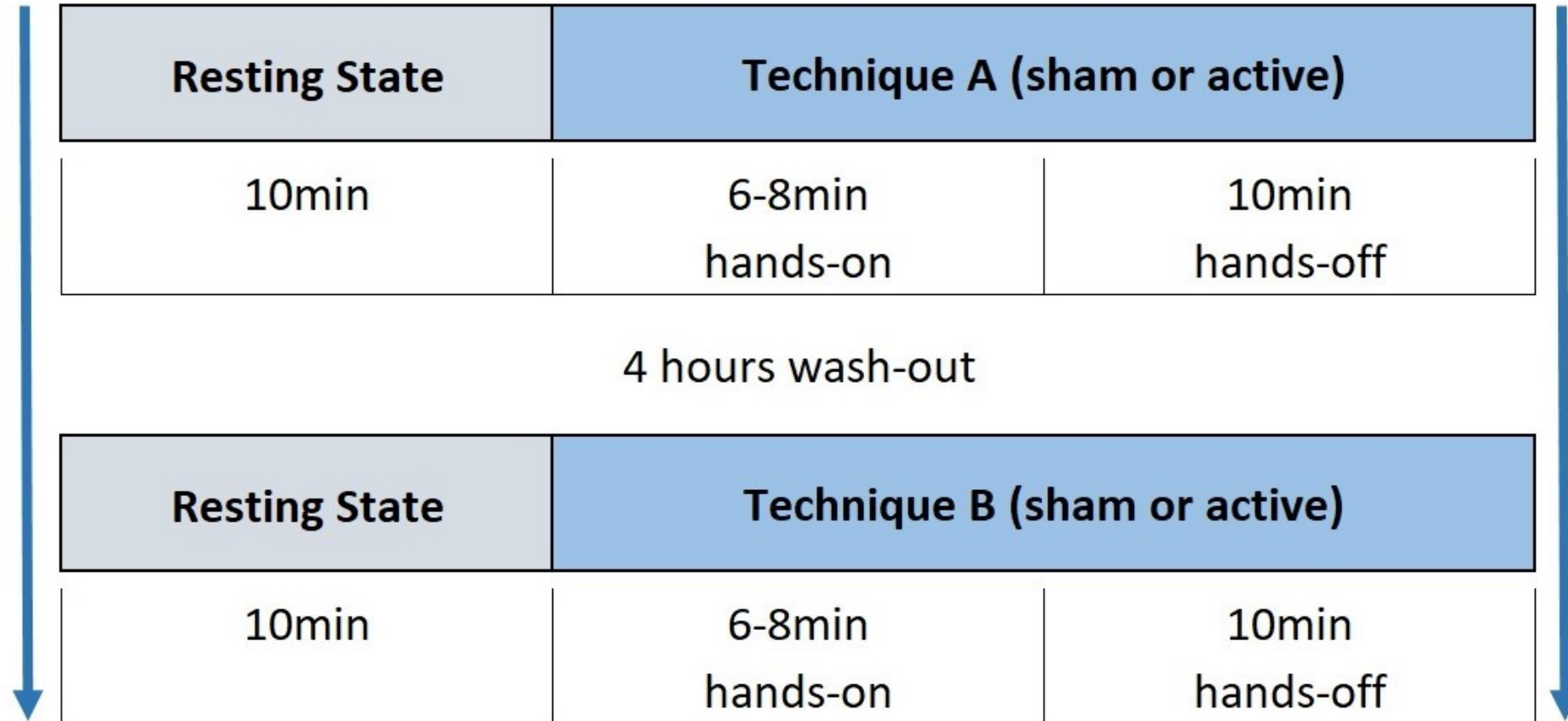
International 10/20 System for Electrodes



(Miana et al., 2013)

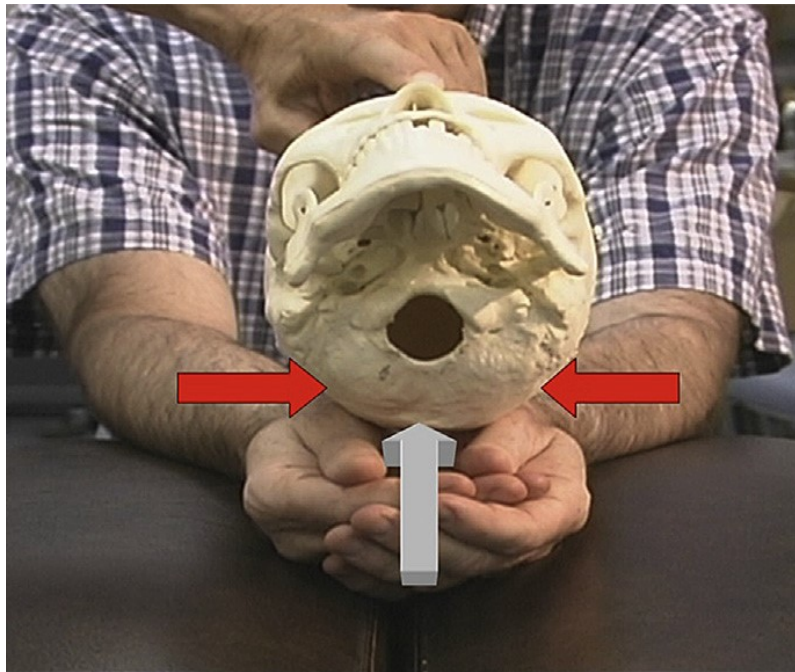
METHODS

Study Design



METHODS

Interventions



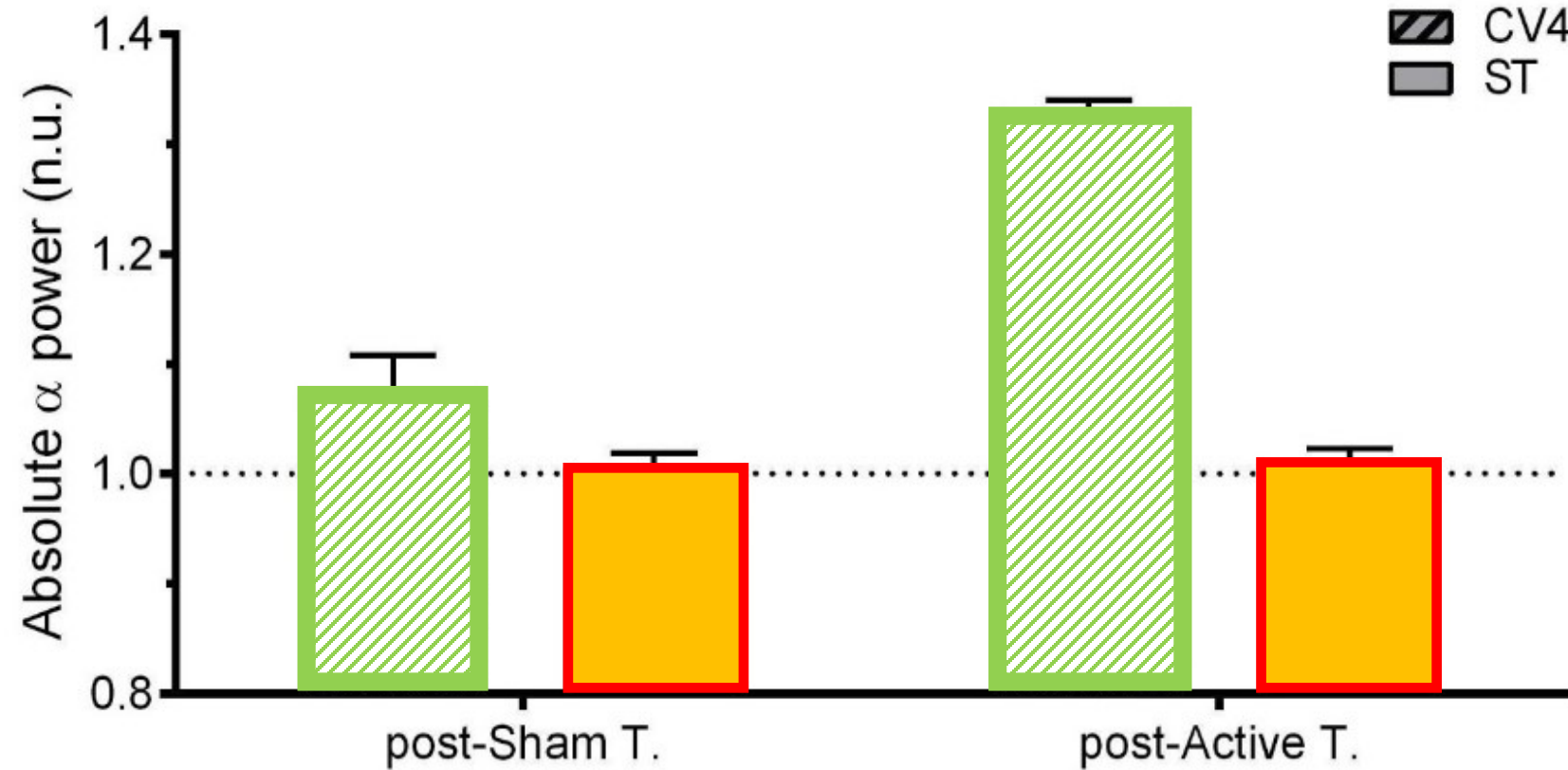
CV4

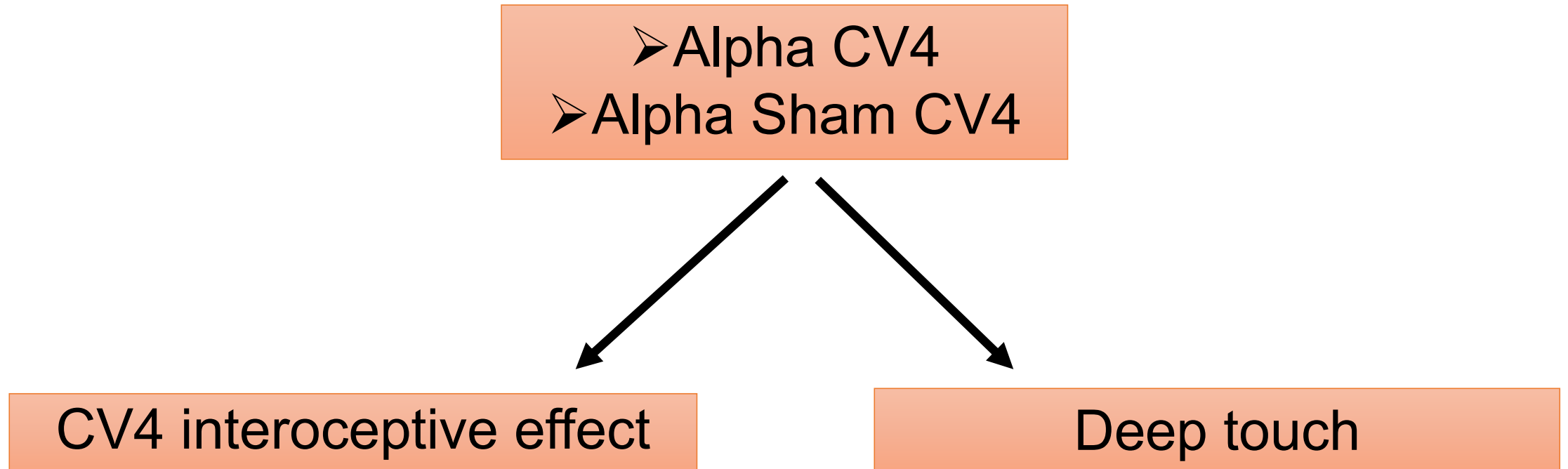


Sham CV4

(Miana et al., 2013)

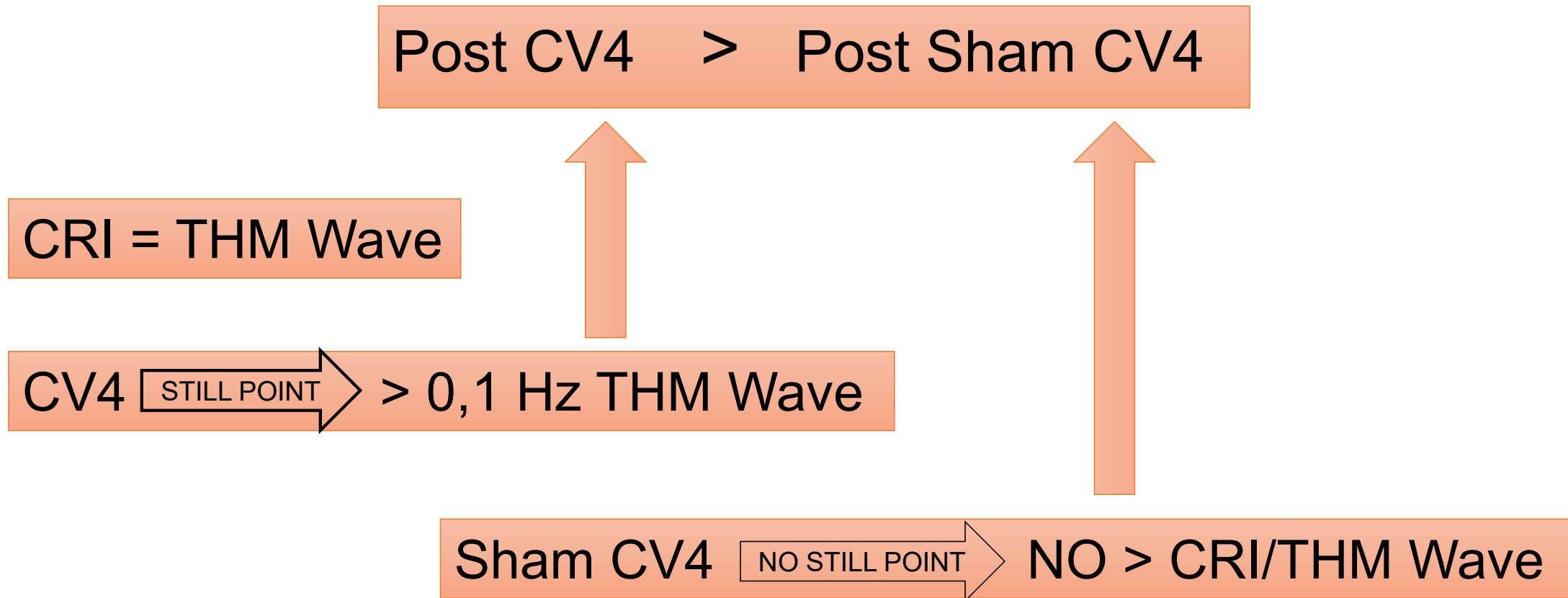
RESULTS





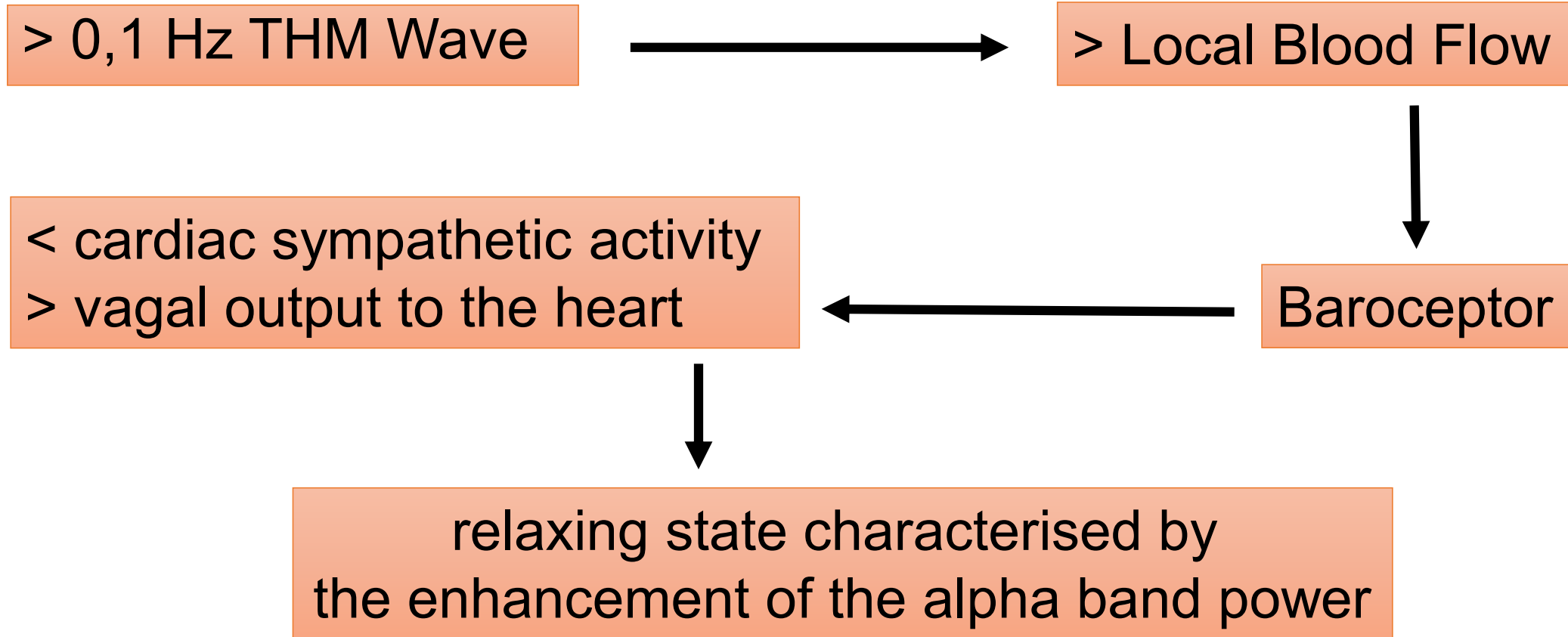
(Cerritelli et al., 2020; Edwards et al., 2018; von Mohr et al., 2018; Benedek et al., 2011; Corbetta et al., 2008)

DISCUSSIONS



(Curi et al., 2018; Shi et al., 2011; Lagopoulos et al., 2009; Benarroch et al., 2008; Nelson et al., 2006; Chaitow, 2005)

DISCUSSIONS



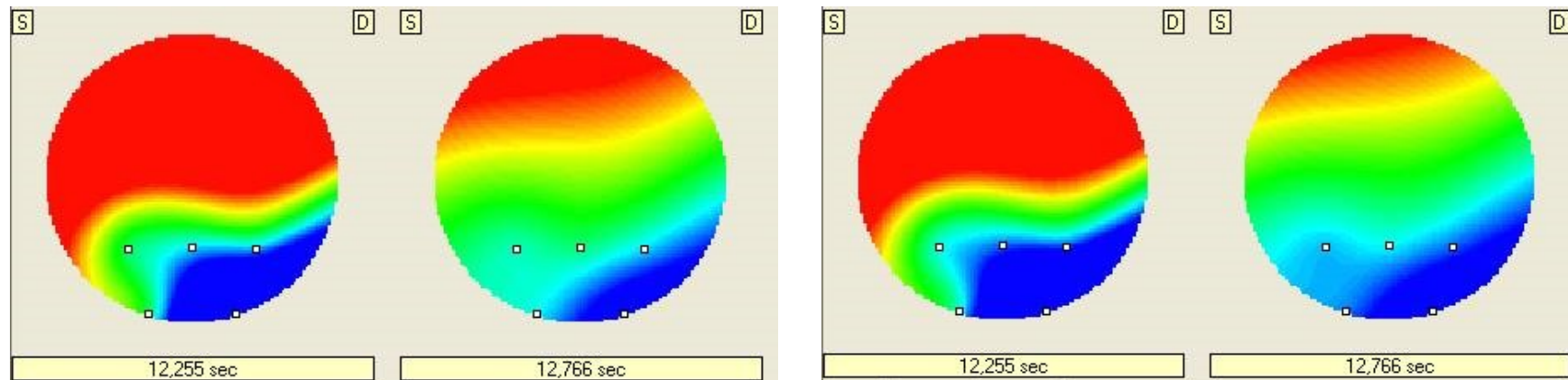
DISCUSSIONS



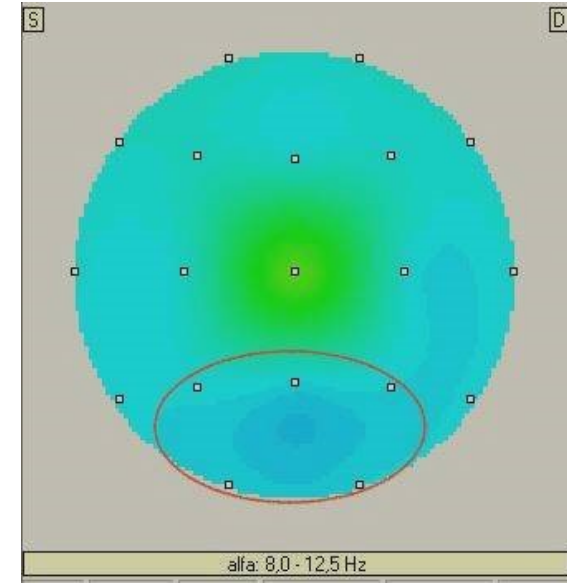
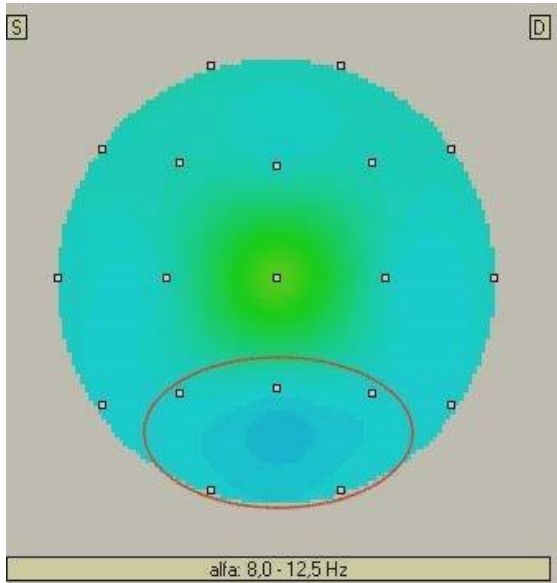
- ✓ None of the above functional hypotheses may apply to sacral treatment.
- ✓ Probably a sacral effect on brain activity is not monitorable through occipital alpha rhythm.
- ✓ A different biological marker for the osteopathic cranial therapy should be explored.

CONCLUSIONS

- CV4 produces immediate effects on brain activity
- Alpha band power increase during CV4 and sham CV4
- Alpha band power largely increase after CV4 technique
- Sacral technique is not able to variate alpha expression



Thank you for your attention



mattia.cella@isoi.it

www.isoi.it

REFERENCES

- Benarroch, E. E. (2008). The arterial baroreflex: Functional organization and involvement in neurologic disease. *Neurology*, 71(21), 1733–1738.
- Benedek, M., Bergner, S., Könen, T., Fink, A., & Neubauer, A. C. (2011). EEG alpha synchronization is related to top-down processing in convergent and divergent thinking. *Neuropsychologia*, 49(12), 3505–3511.
- Berger, H., 1932. Über das Elektrenkephalogramm des Menschen. *Archiv für Psychiatrie und Nervenkrankheiten*, 97(1), pp.6–26.
- Boytsova, Yu. A., & Danko, S. G. (2010). EEG differences between resting states with eyes open and closed in darkness. *Human Physiology*, 36(3), 367–369.
- Cerritelli, F., Chiacchiaretta, P., Gambi, F., Perrucci, M. G., Barassi, G., Visciano, C., Bellomo, R. G., Saggini, R., & Ferretti, A. (2020). Effect of manual approaches with osteopathic modality on brain correlates of interoception: An fMRI study. *Scientific Reports*, 10(1), 3214–3214.

REFERENCES

- Han, J., Lee, H., Cho, T., Moon, J. and Kim, C., 2015. Management and Outcome of Spontaneous Cerebellar Hemorrhage. *Journal of Cerebrovascular and Endovascular Neurosurgery*, 17(3), p.185.
- Cheron, G., Petit, G., Cheron, J., Leroy, A., Cebolla, A., Cevallos, C., Petieau, M., Hoellinger, T., Zarka, D., Clarinval, A.M. and Dan, B., 2016. Brain oscillations in sport: toward EEG biomarkers of performance. *Frontiers in Psychology*, 7.
- Clayton, M.S., Yeung, N. and Cohen Kadosh, R., 2018. The many characters of visual alpha oscillations. *European Journal of Neuroscience*, 48(7), pp.2498–2508.
- Curi, A. C. C., Maier Alves, A. S., & Silva, J. G. (2018). Cardiac autonomic response after cranial technique of the fourth ventricle (cv4) compression in systemic hypertensive subjects. *Journal of Bodywork and Movement Therapies*, 22(3), 666–672
- Cutler, M. J., Holland, B. S., Stupski, B. a, Gamber, R. G., & Smith, M. L. (2005). Cranial manipulation can alter sleep latency and sympathetic nerve activity in humans: A pilot study. *Journal of alternative and complementary medicine (New York, N.Y.)*, 11(1), 103–108.

REFERENCES

- Edwards, D. J., Young, H., & Johnston, R. (2018). The immediate effect of therapeutic touch and deep touch pressure on range of motion, interoceptive accuracy and heart rate variability: A randomized controlled trial with moderation analysis. *Frontiers in Integr. Neuroscience*, 12, 1–13.
- Lachert, P., Zygierewicz, J., Janusek, D., Pulawski, P., Sawosz, P., Kacprzak, M., Liebert, A., & Blinowska, K. J. (2019). Causal Coupling between Electrophysiological Signals, Cerebral Hemodynamics and Systemic Blood Supply Oscillations in Mayer Wave Frequency Range. *International Journal of Neural Systems*, 29(5), 1–13.
- Martins, W. R., Diniz, L. R., Blasczyk, J. C., Lagoa, K. F., Thomaz, S., Rodrigues, M. E., de Oliveira, R. J., & Bonini-Rocha, A. C. (2015). Immediate changes in electroencephalography activity in individuals with nonspecific chronic low back pain after cranial osteopathic manipulative treatment: Study protocol of a randomized, controlled crossover trial. *BMC compl. and alt. medicine*, 15, 223.
- Miana, L., Hugo, V., Machado, S., Arias-Carrión, O., Nardi, A.E., Lai's Almeida Ribeiro, P., Machado, D., King, H. and Silva, J.G., 2013. Changes in alpha band activity associated with application of the compression of fourth ventricular (CV-4) osteopathic procedure: A qEEG pilot study. *Journal of Bodywork & Movement Therapies*, 17, pp.291-296.

REFERENCES

- Nelson, K. E., Sergueef, N., & Glonek, T. (2006). The Effect of an Alternative Medical Procedure Upon Low-Frequency Oscillations in Cutaneous Blood Flow Velocity. *Journal of Manipulative and Physiological Therapeutics*, 29(8), 626–636.
- Nelson, K. E., Sergueef, N., Lipinski, C. M., Chapman, A. R., & Glonek, T. (2001). Cranial rhythmic impulse related to the Traube-Hering-Mayer oscillation: Comparing laser-Doppler flowmetry and palpation. *JAOA*, 101(1–2), 163–173
- Reni, M., Gatta, G., Mazza, E. and Vecht, C., 2007. Ependymoma. *Critical Reviews in Oncology/Hematology*, 63(1), pp.81-89.
- Shi, X., Rehrer, S., Prajapati, P., Stoll, S. T., Gamber, R. G., & Fred Downey, H. (2011). Effect of cranial osteopathic manipulative medicine on cerebral tissue oxygenation. *Journal of the American Osteopathic Association*, 111(12), 660–666.