

# SIMULATION as a new OSTEOPATHIC LEARNING TOOL

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## INTRODUCTION

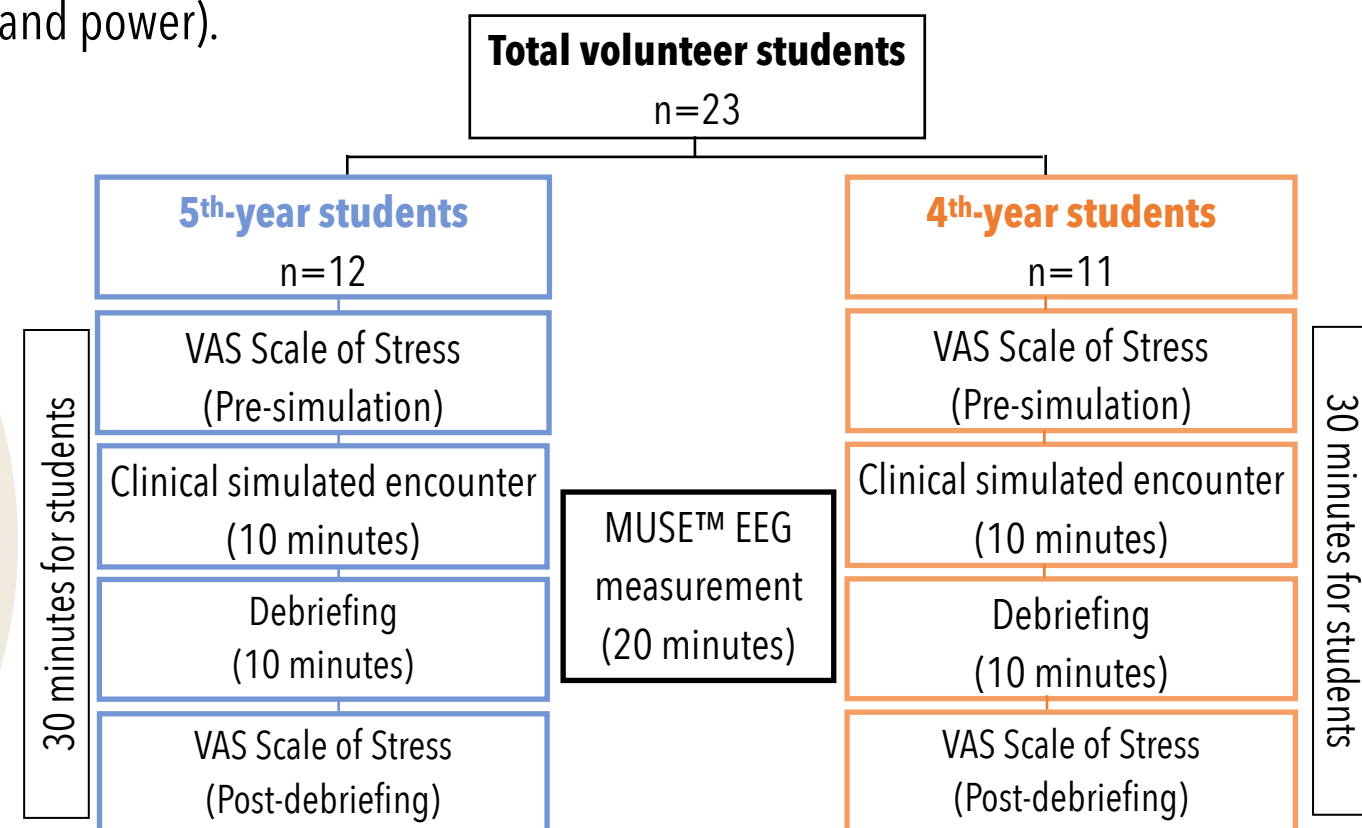
- **Simulation** is commonly used in healthcare education, however, **in the osteopathic field, it's still considered a new approach**<sup>1</sup>.
- According to the WHO, simulation, despite representing a source of stress for the student, can be a tool to overcome training gaps because **it amplifies clinical experiences and leads to an increase in self-efficacy**<sup>2</sup>.

## OBJECTIVES

- Verify the **variation in stress and concentration levels** in the 4<sup>th</sup> and 5<sup>th</sup>-year students of osteopathy **during a clinical simulation** through the VAS stress self-evaluation scales and the measurement of brain alpha and gamma waves with the MUSE™ electroencephalogram.
- Analyze the **correlation between** the intensity of **alpha and gamma waves** in the two evaluation times.
  - a. Alpha waves: indicators of a state of calm. Alpha power decrease indicated less calm and indirectly an increase in stress.
  - b. Gamma waves: indicators of concentration. Gamma power decrease indicated less concentration.

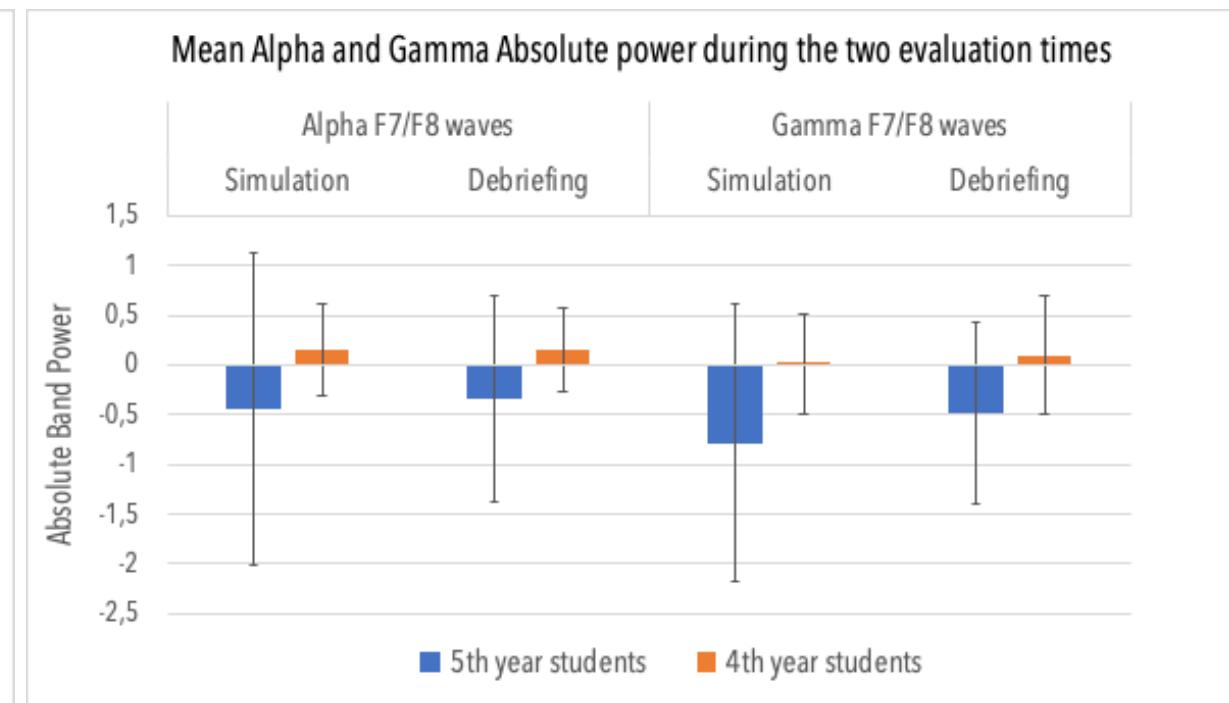
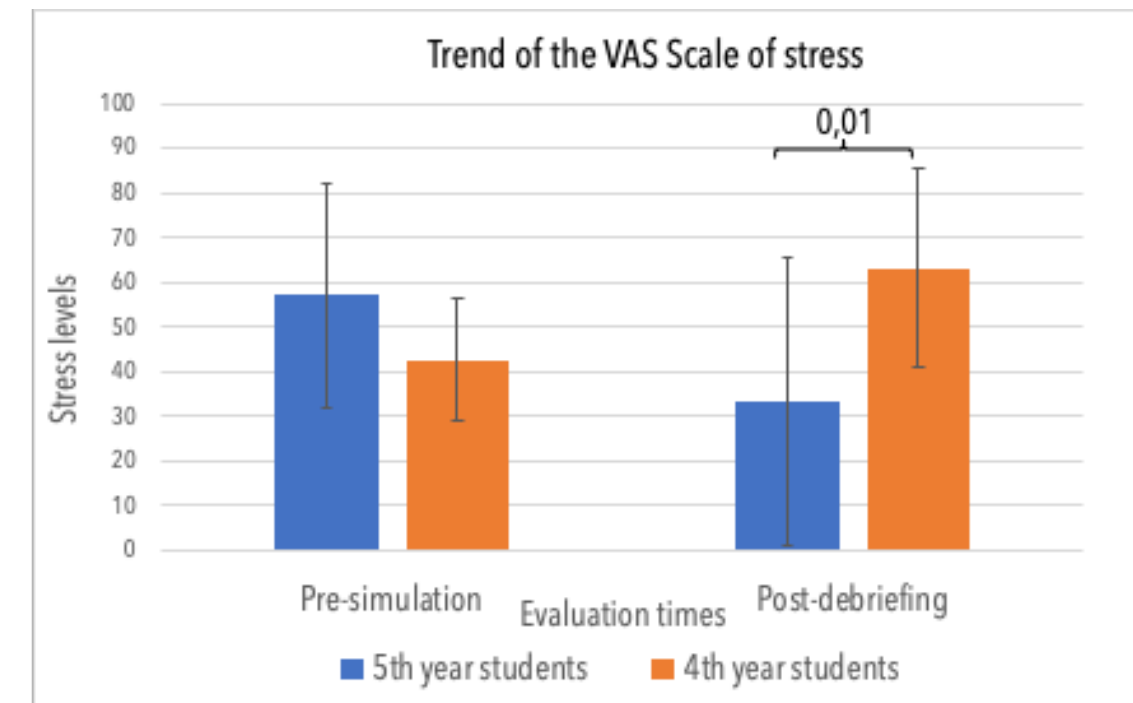
## METHODS

- During the study, each student was required to play the role of osteopathic practitioner during a simulated clinical encounter and to undergo a subsequent debriefing.
- The assessments, during both phases, were performed using EEG MUSE™ and VAS Scale of stress on which the students indicated the perceived stress level from 0 to 100 before simulation and after the debriefing.
- MUSE™ EEG Signals were collected from anterior frontal lobe F7 and F8, then Fast Fourier Transformed to alpha (7.5-13 Hz) and gamma (30-44 Hz) frequency bands. Data were reported averaging F7-F8 electrode signals and expressed as the logarithm of the power spectral density (absolute band power).



## RESULTS

- Both 4<sup>th</sup> and 5<sup>th</sup>-year students showed similar levels of VAS stress self-evaluation in the pre-simulation phase. **Statistically significant differences** between the two groups **emerged from the intergroup analysis during the post-debriefing phase in which the 5<sup>th</sup>-year students were less stressed than 4<sup>th</sup>-year students**.
- **Changes in alpha and gamma absolute power** over the F7 and F8 electrodes **showed a positive correlation during the simulation and the debriefing** (F7  $r=0.971$   $p<0.001$ ; F8  $r=0.883$   $p<0.001$ ) **in 5<sup>th</sup>-year students**. However, differences in the mean alpha and gamma absolute power during the simulation and debriefing phase showed no statistically significant values between the 4<sup>th</sup> and 5<sup>th</sup>-year students.



## CONCLUSION

- Our preliminary data suggested that the experience degree and the process of adaptation that takes place over time through the development of coping strategies may allow students with more experience to cope with stress better than those with less experience<sup>3</sup>.
- The positive correlation between alpha and gamma absolute power we saw supports the notion that a less stressed state may be associated with a more concentrated state. Literature shows that excessive increase in stress tends to reduce concentration<sup>4-5</sup>.

<sup>1</sup>Fitzgerald, K., Denning, T., and Vaughan, B. (2017) Simulated learning activities as part replacement of clinical placements in osteopathy: a case study. *International Journal of Osteopathic Medicine*. 26, pp. 44-48.

<sup>2</sup>Bowling, A.M. and Underwood, P.W. (2016) Effect of simulation on knowledge, self- confidence, and skill performance in the USA: a quasi-experimental study. *Nurs. Health Sci*. 18 (3), pp. 292-298.

<sup>3</sup>Al Gharibi, K.A. and Arulappan, J. (2020) Repeated simulation experience on self- confidence, critical thinking, and competence of nurses and nursing students—an integrative review. *SAGE Open Nurs*.

<sup>4</sup>Bong, C. L., Fraser, K. and Oriot, D. (2016). Cognitive load and stress in simulation. In *Comprehensive healthcare simulation: Pediatrics* (pp. 3-17)

<sup>5</sup>Degroote, C., Schwaninger, A., Heimgartner, N., Hedinger, P., Ehler, U. and Wirtz, P. H. (2020) Acute Stress Improves Concentration Performance. *Experimental Psychology*. 67(2), pp. 88-89.