

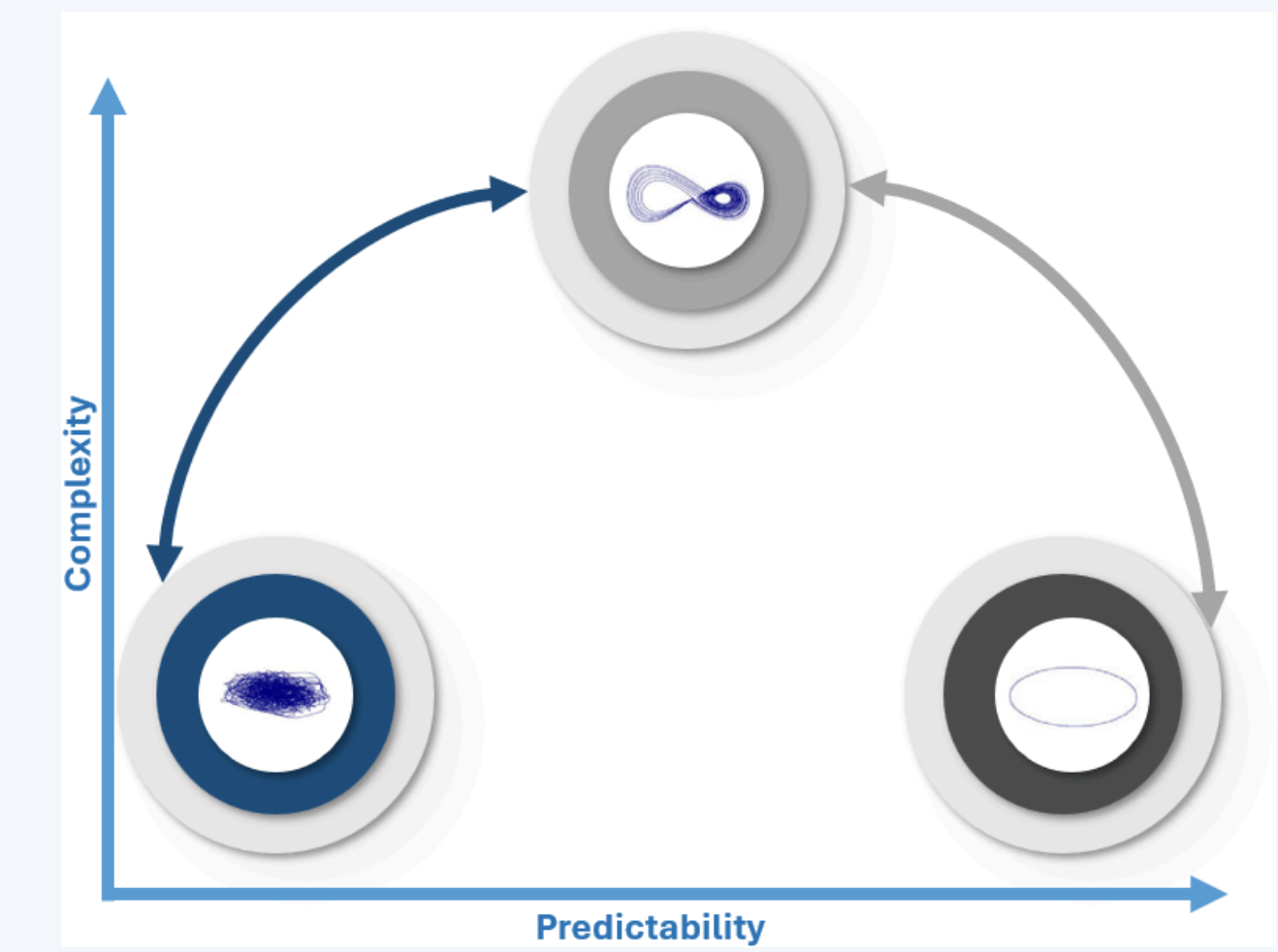
Comparing postural control variability in 4th year dental students with and without neck pain in their first year of clinical practice: A cross-sectional study

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Introduction

- Neck pain (NP) is a highly prevalent **occupational health problem** among dental professionals, with over 58.5% experiencing it, often starting early in clinical practice. This condition significantly impairs cervical proprioception and sensorimotor control, thereby affecting posture and balance.
- Previous studies used **traditional linear methods** to analyse the Center of Pressure (CoP), reflecting only the quantity of movement without considering its variation over time.
- Sample Entropy (SampEn) is a **nonlinear method** that quantifies the complexity of CoP oscillations.
- Low entropy indicates a variability too rigid when high entropy is too irregular. A healthy system is one that is not too repetitive but not completely random either.



Stergiou et al. (2006)

Aim

- To compare postural control variability in 4th year dental students with and without NP.

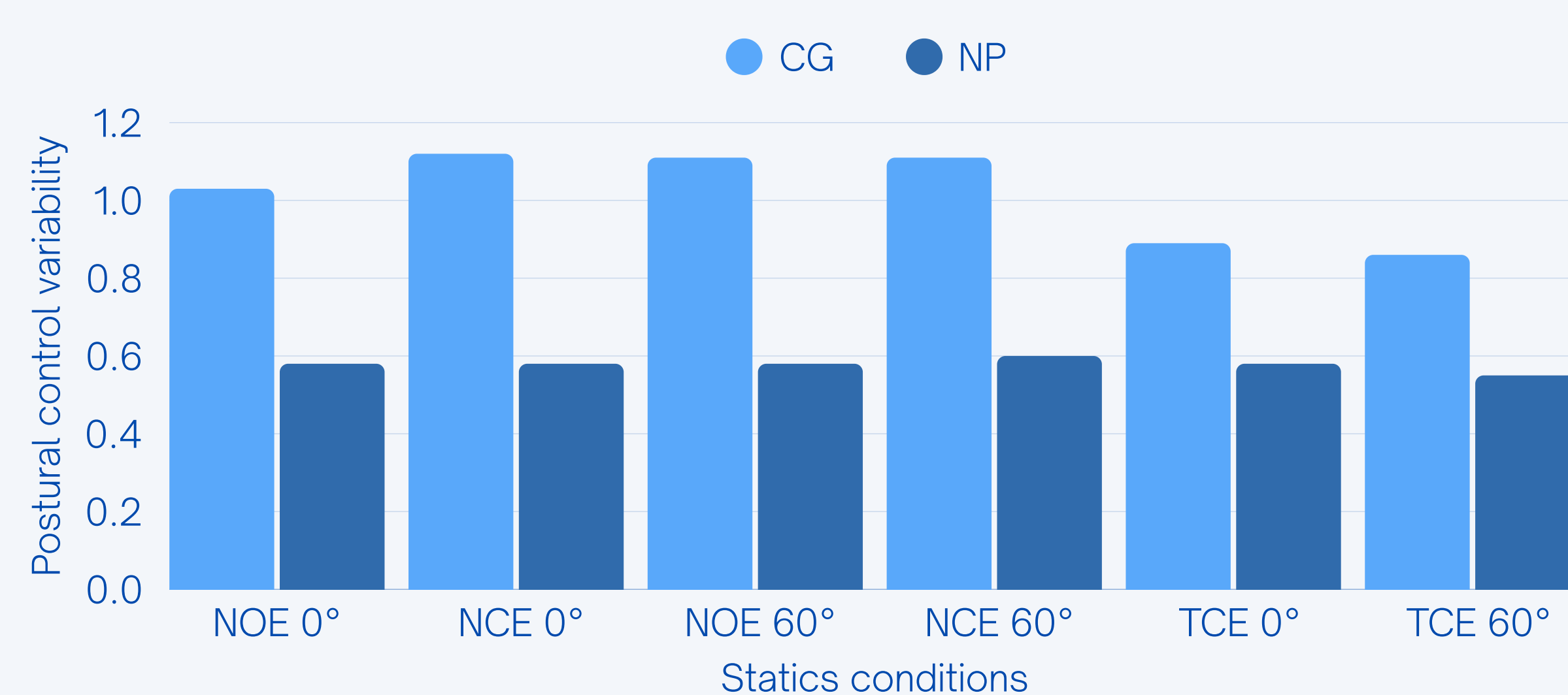
Materials & Methods

- Participants were divided into a control group (CG, n=17) with Neck Disability Index (NDI) < 6, and a neck pain group (NP, n=12) with NDI ≥ 6.
- They stood on a force platform under **8 static conditions**: 4 stances (neutral narrow/tandem with 0°/60° left cervical rotation) and 2 visual conditions (eyes open and closed), each held for **45 sec**.
- CoP oscillations were assessed in **2 axis**: antero-posterior (AP) and medio-lateral (ML).



Results & Discussion

Students with neck pain showed reduced postural control variability.



Gratic 1. Postural control variability comparison in ML in eight different positions between CG and NP

Legend: 0° = cervical neutral position; 60° = 60 degrees of cervical left rotation; CG control group; NP neck pain; *N* narrow stance, *T* tandem stance; *CE* Closed eyes; *OE* Open eyes.

- ML variability was significantly lower in NP group compared to CG in the positions illustrated in the graphic.
- No significant difference was observed in the AP direction.

- This reduced variability suggests a **more rigid motor strategy** in the NP group.
- The greater sensitivity in the ML plane aligns with the body's inherent lateral instability and reliance on proprioception. The base of support being wider in the AP plane than the ML plane, makes ML postural control more susceptible to disruption.
- Pain can inhibit or reduce the effectiveness of crucial ML stabilizing muscles (neck, hip abductors, lateral trunk muscles), increasing CoP variability in this plane. Reduced proprioceptive input, intensified with eyes closed, also impacts lateral control. This rigid motor strategy may be counter-productive in the long term, potentially favoring chronic musculoskeletal disorders.

Conclusion

- These findings underline the importance of **early preventive strategies**, including postural education and neuromuscular training, to protect students' long-term health.
- It also highlights the importance of **assessing motor control and cervical proprioception** in neck pain management.
- Further research with **larger samples** is needed to confirm these findings and guide effective prevention strategies in university settings.

References

Stergiou, N., Harbourne, R., & Cavanaugh, J. (2006). Optimal movement variability: a new theoretical perspective for neurologic physical therapy. *Journal of neurologic physical therapy* : JNPT, 30(3), 120–129. <https://doi.org/10.1097/01.npt.0000281949.48193.d9>