

A literature review of the benefits and limits of affordable measure devices in biomechanical and biophysics courses

Perspectives for osteopathic education and research

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Context

- Osteopathic education evolves, becomes evidence informed and tends to university standards.
- Bringing more objectivity in clinical exam and clinical decision.
- Lack of validity and reliability of osteopathic tests (*Basile et al, 2017*)
- New models appear, trying to bring us beyond the somatic dysfunction model (*Menard et al, 2020*).
- Promising results merge using biomechanics methods to evaluate osteopathic manual care (*Bagory et al, 2021, Chenaud et al, 2019*).
- Student are now introduced early in their curriculum to scientific research.
- New clinical measure devices needs to compromise between quality of measure, ergonomic, price and clinical validity.
- ❖ What clinical measure device from biomechanics could be used in a clinical context and what is their validity?

Methods

- Screening articles about devices used for biomechanic purposes.
- From 2010 to 2020.
- Prioritizing systematic review, and studies about device's reliability and validity.

Results

- Several devices and software have been identified in the literature (*Michellini et al, 2020, Keogh et al, 2019, Romero-Franco et al, 2019, Clark et al, 2018, Romero-Franco et al, 2017, Springer and Seligmann, 2016, Burke et al, 2013*).
- Type, reliability, using information proposed in the Figure 1.

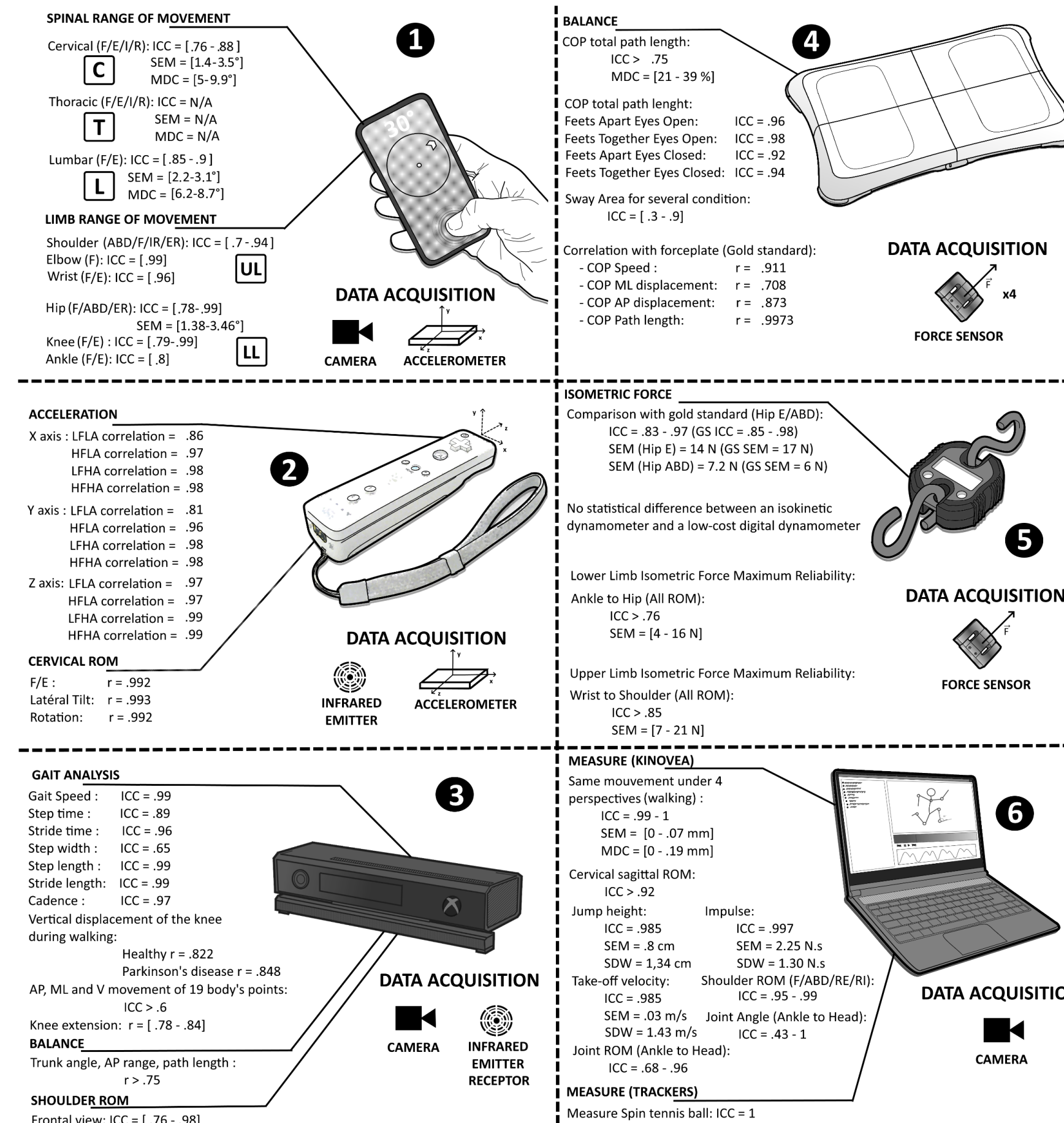


Figure 1 : Device's reliability and software's reliability based on literature (ICC: Interclasse Correlation Coefficient, SEM: Standard error mean, SDW: Small Difference W, AP: Antero-posterior, ML: Medio-Lateral, V: Vertical, COP: Center Of Pressure, ROM: Range of Movement, LF: Low Frequency, LA: Low Amplitude, HF: High Frequency, HA: High Amplitude).

Discussion & Perspectives

- All devices **could help** biophysics and biomechanics courses **to be more “touchable”** for osteopathic students.
- The diversity of uses in a clinical context (balance, gait, force, mobility, functional tests) → an opportunity to link with clinical cases.
- Objective data inform students about several risk factors in an holistic approach of patient.

Take-home messages

- There are reliable and affordable device for pedagogical, research and clinical purposes.
- Osteopaths have a opportunity to make their clinical exam with objective data (ROM, Balance, muscular isometric force).
- Softwares and Hardwares are simple to use and open new perspectives in order to improve student's understanding of the human movement in clinical and physics/biomechanics courses.

Main References

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