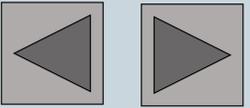


The link between step width and pelvic compensatory mechanisms in hip osteoarthritis

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Results

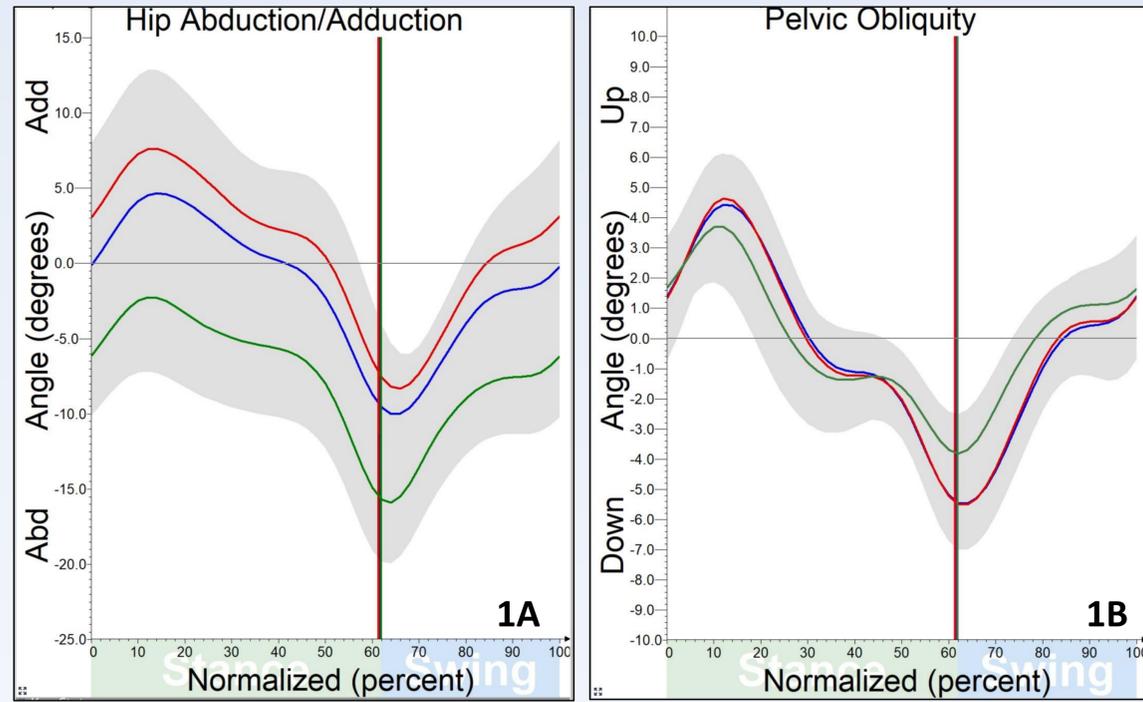


Figure 1: Pelvic and hip motions for varying step widths (normal, narrow, wide). **1A** shows mean hip ab/adduction angles over the stride. **1B** shows average pelvic obliquity angles over the stride. **Fig 1** shows for each condition: **C:** mean relative step widths; **D:** mean hip adduction; and **E:** pelvic list range of motion.

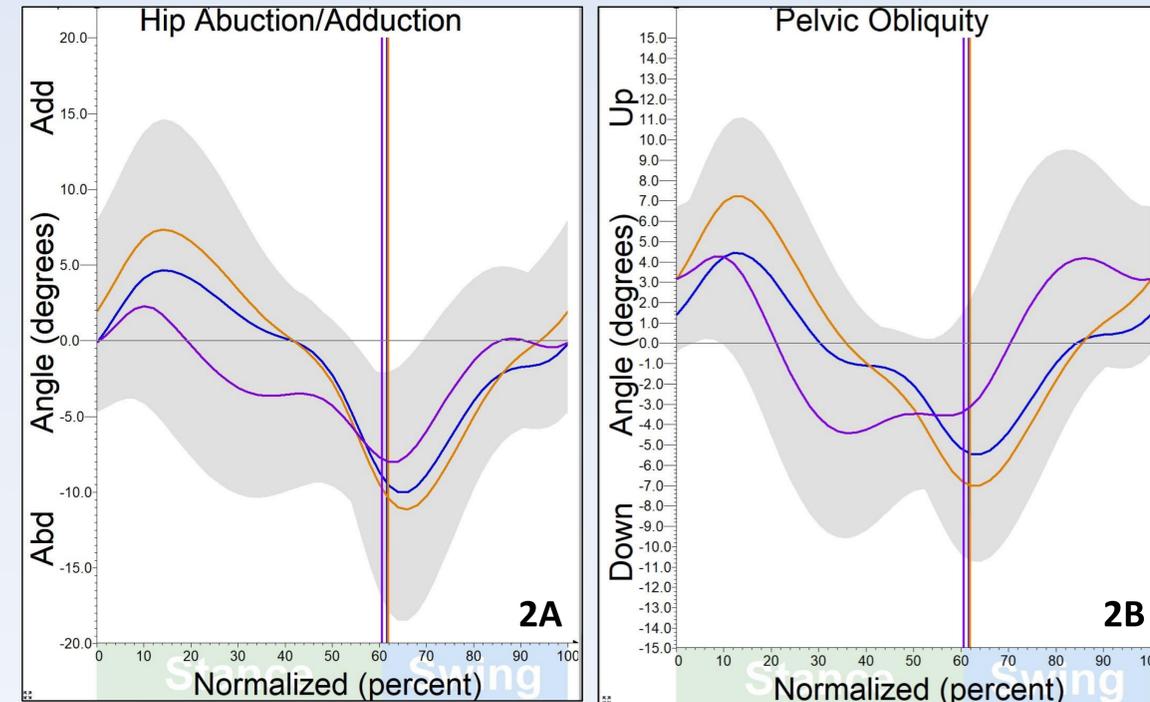
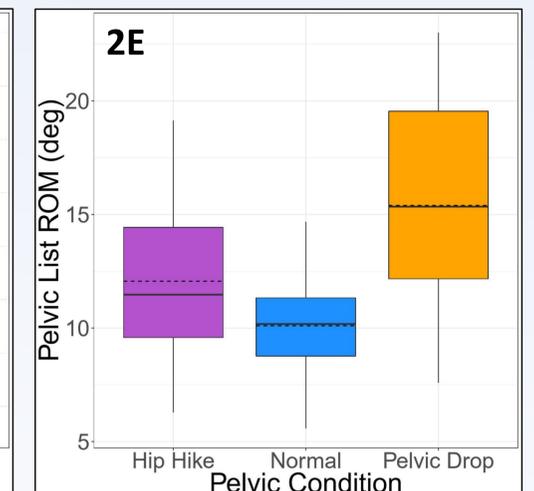
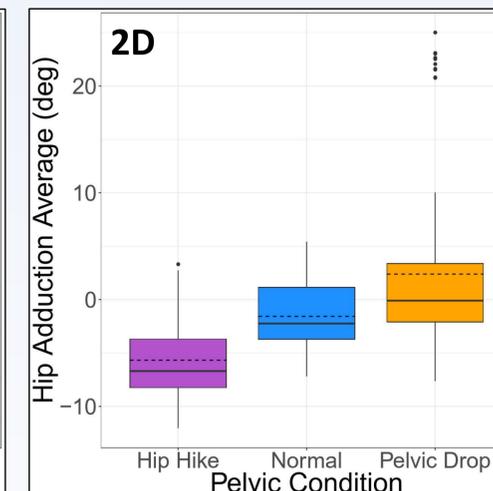
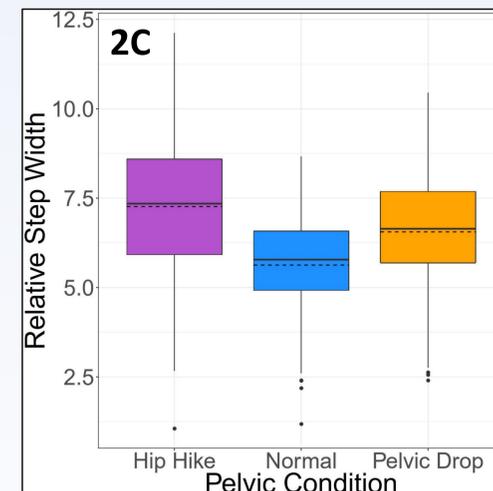
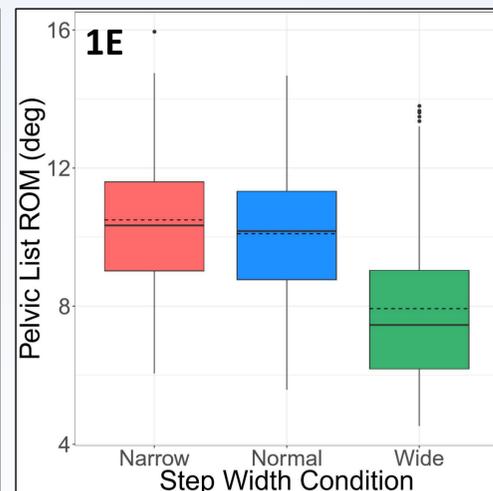
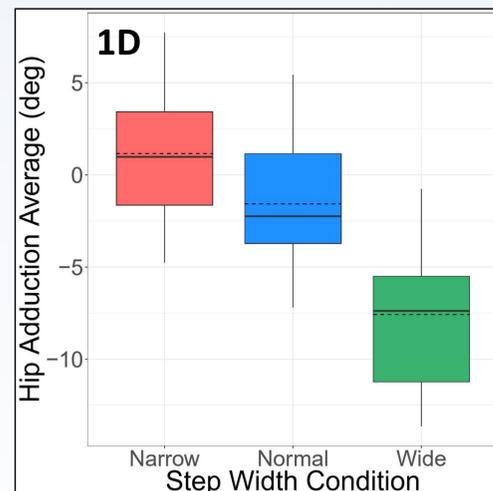
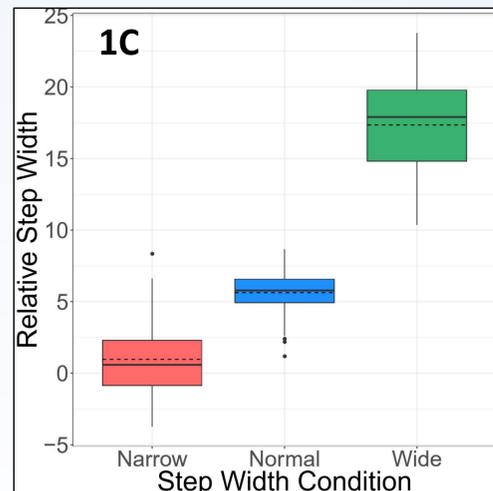


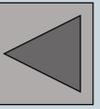
Figure 2: Pelvic and hip motions for varying pelvic conditions (normal, pelvic drop, hip hike). **2A** shows mean hip ab/adduction over the stride. **2B** shows average pelvic obliquity angles over the stride. **Fig 2** shows for each condition: **C:** mean relative step widths; **D:** mean hip adduction; and **E:** pelvic list range of motion.



Key: ■ Narrow Step Width ■ Normal ■ Wide Step Width ■ Hip Hike ■ Pelvic Drop

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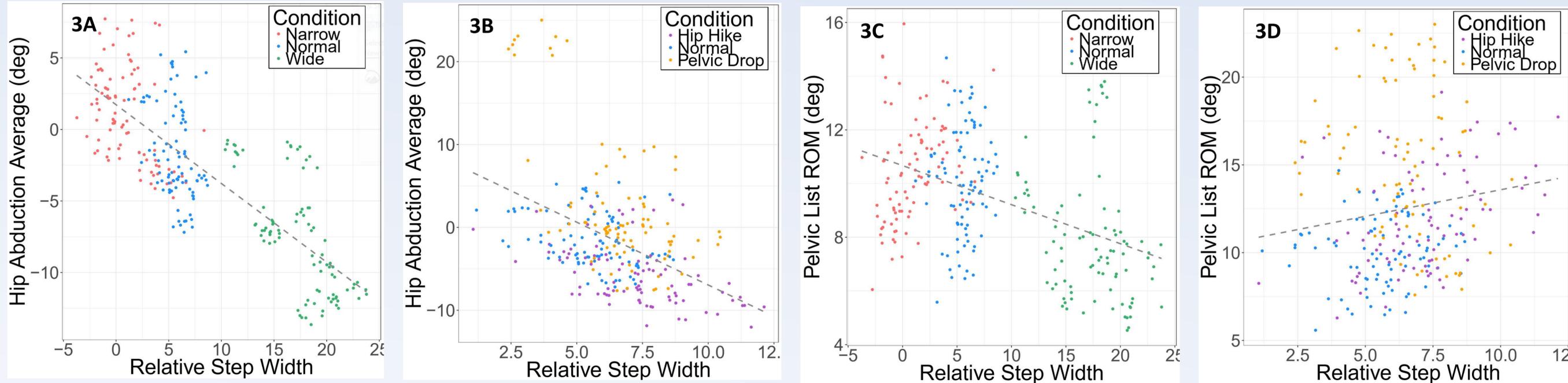


Figure 3: Bivariate plots showing relationship between relative step width and hip abduction average for changing step width conditions (3A) and changing pelvic conditions (3B) or pelvic list range of motion for changing step width conditions (3C) or pelvic list range of motion (3D).

Discussion and Conclusion

- In both the altered step width condition, and the altered pelvic motion condition, pelvic and hip motions were linked to step width.
- Hip adduction was significantly different between step width conditions. Hip adduction decreased as steps widen. When controlling for step widths, walking with wide steps significantly decreased pelvic list range of motion compared to normal and narrow walking.
- When pelvic condition was controlled for, walking with a hip hike or exaggerated pelvic drop resulted in wider steps, though this was only significant for the hip hike condition. Walking with a hip hike also led to significantly decreased hip adduction compared to normal walking or walking with a pelvic drop. The pelvic list range of motion was also significantly different between all pelvic conditions, with both altered conditions having a larger range of motion.
- Our results suggest that compensatory hip OA gaits may be a means to increase the base of support during walking, as both pelvic conditions increased step width. At the same time, our results show that there is a direct link between step width and hip and pelvic motion. Wider steps therefore likely affect the forces and moments experienced by the hip, which are likely to dictate hip pain levels during walking. How each of these factors are prioritized in an individual patient remains the focus of future research.

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