

# Stable passive dynamics during obstacle crossing may indicate a safety-energy efficiency tradeoff in older adults

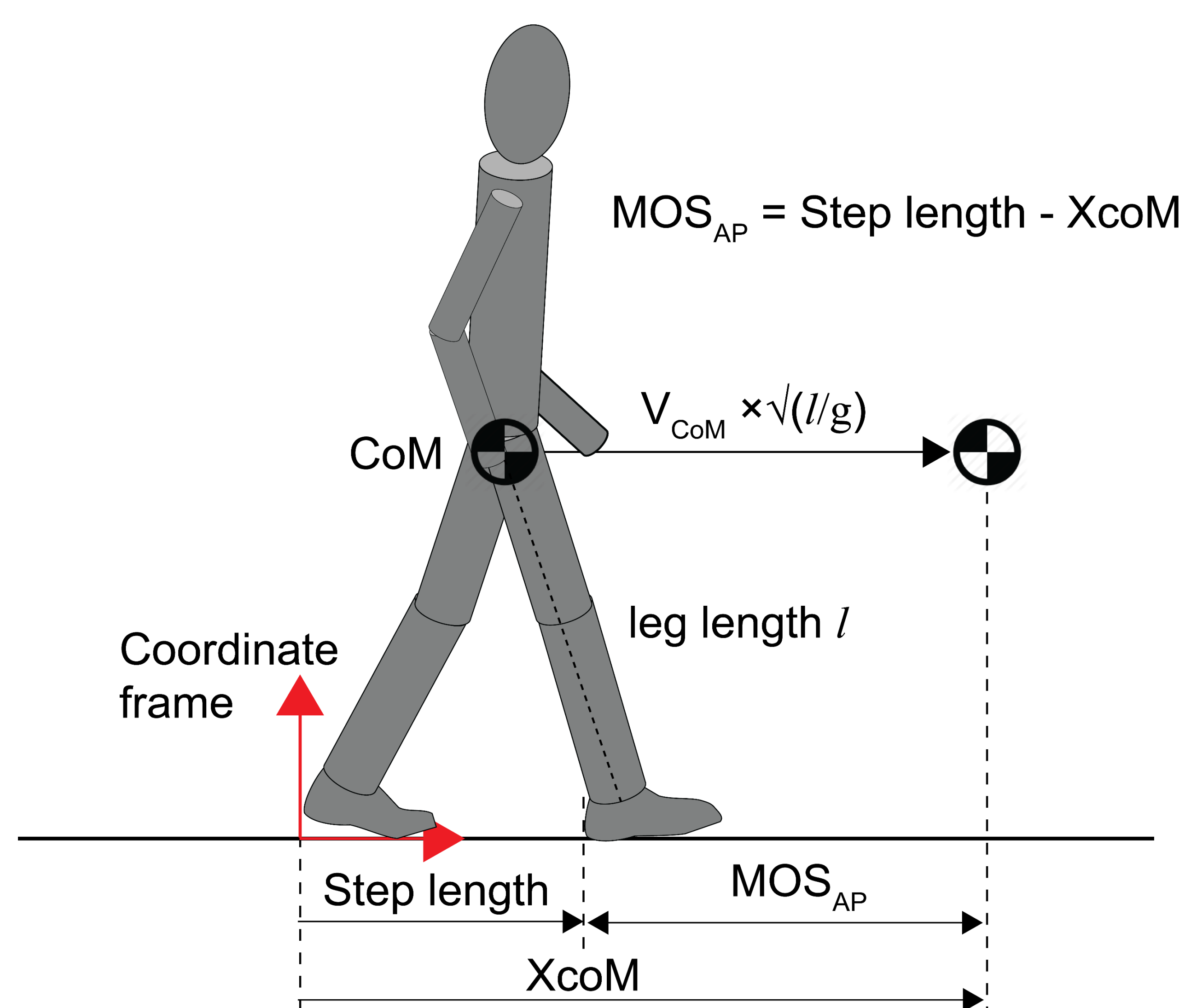


**Ashwini Kulkarni**, Chuyi Cui, Shirley Rietdyk, Satyajit Ambike

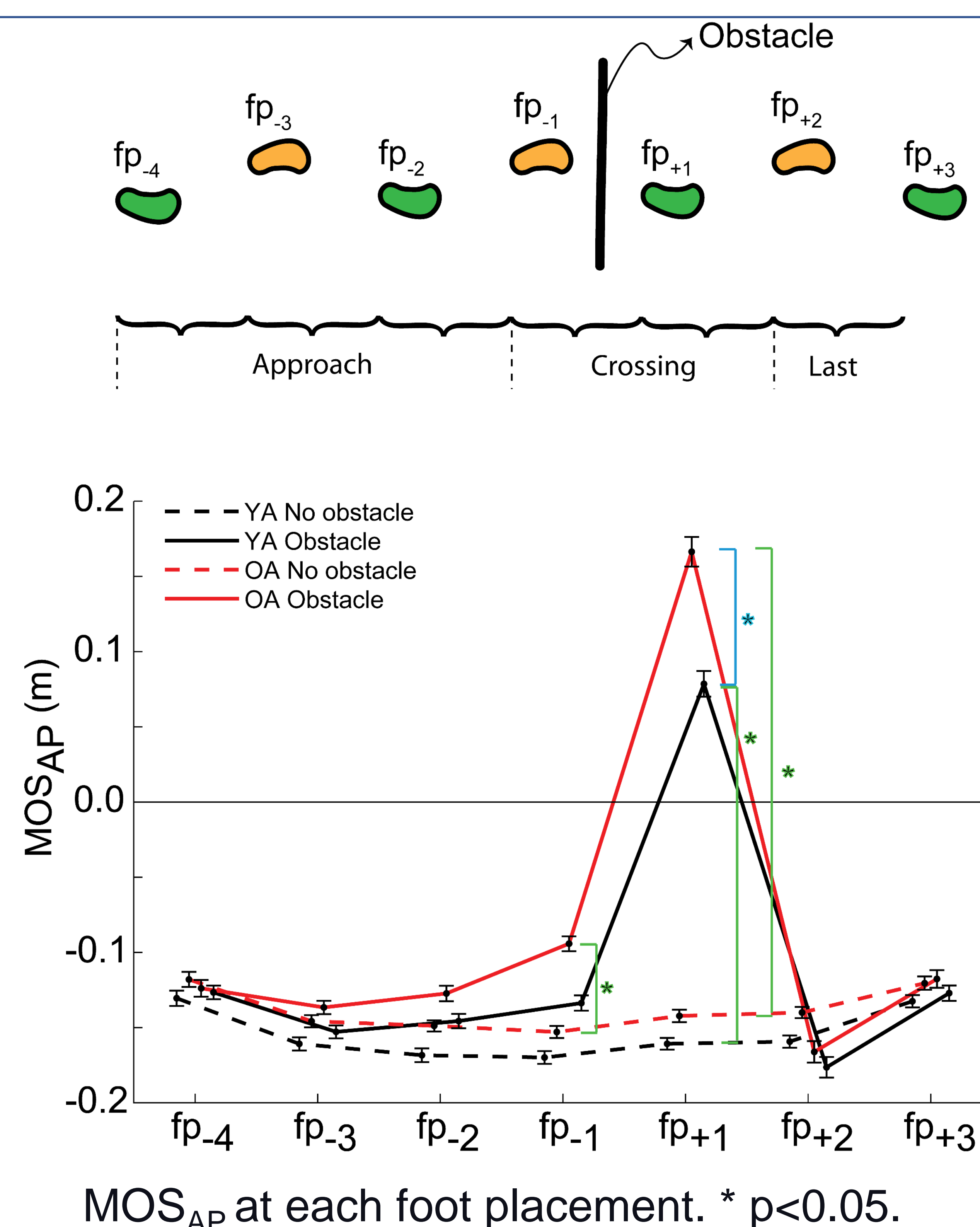
Department of Health & Kinesiology, Purdue University, West Lafayette, IN, USA. E-mail: kulkar50@purdue.edu

## RESEARCH QUESTION

Do individuals modulate passive stability as a function of task, age, and during transition between unobstructed and obstructed gait?



Extrapolated center of mass (XcoM) and margin of stability in antero-posterior direction ( $MOS_{AP}$ ). Twenty-six young and twenty-four older adults walked with and without an obstacle on a 6 m walkway. Passive dynamics were quantified using  $MOS_{AP}$  at seven foot placements.



## SUMMARY

- Older adults proactively modulated passive stability one step before crossing the obstacle.
- Positive  $MOS_{AP}$  at fp<sub>+1</sub> (lead crossing foot placement) indicates a preference for safety over energy efficiency; older adults prioritized safety more than young adults.

For more info, check: Kulkarni et al (2022), Humans exploit passive anterior-posterior motion to improve either walking efficiency or walking balance based on environmental risk. BioRxiv. doi: <https://doi.org/10.1101/2022.03.13.482180>

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