

INTRODUCTION

Understanding the effect of emotional states on gait initiation and sit-to-walk (STW) transition is essential for fall prevention in patients with neuromuscular complications and mood disorders.

This study focuses on the following parameters:

- Heel strike (HS): the foot's contact with the ground at the first step
- Toe-off (TO): When the first stepping foot leaves the ground for the subsequent step.
- Seat-off(SO): The center of mass (COM) at peak upward velocity.

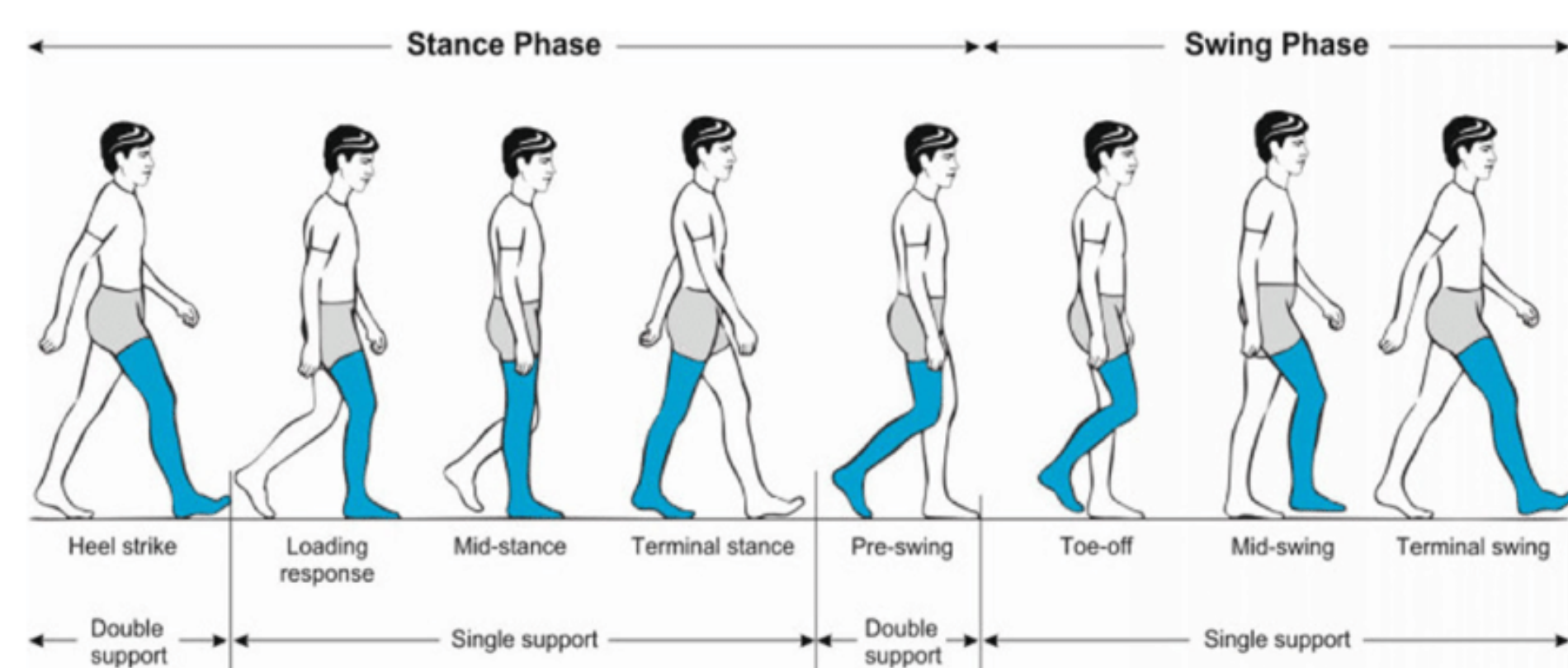


Figure A: Representation of a Walking Trial.

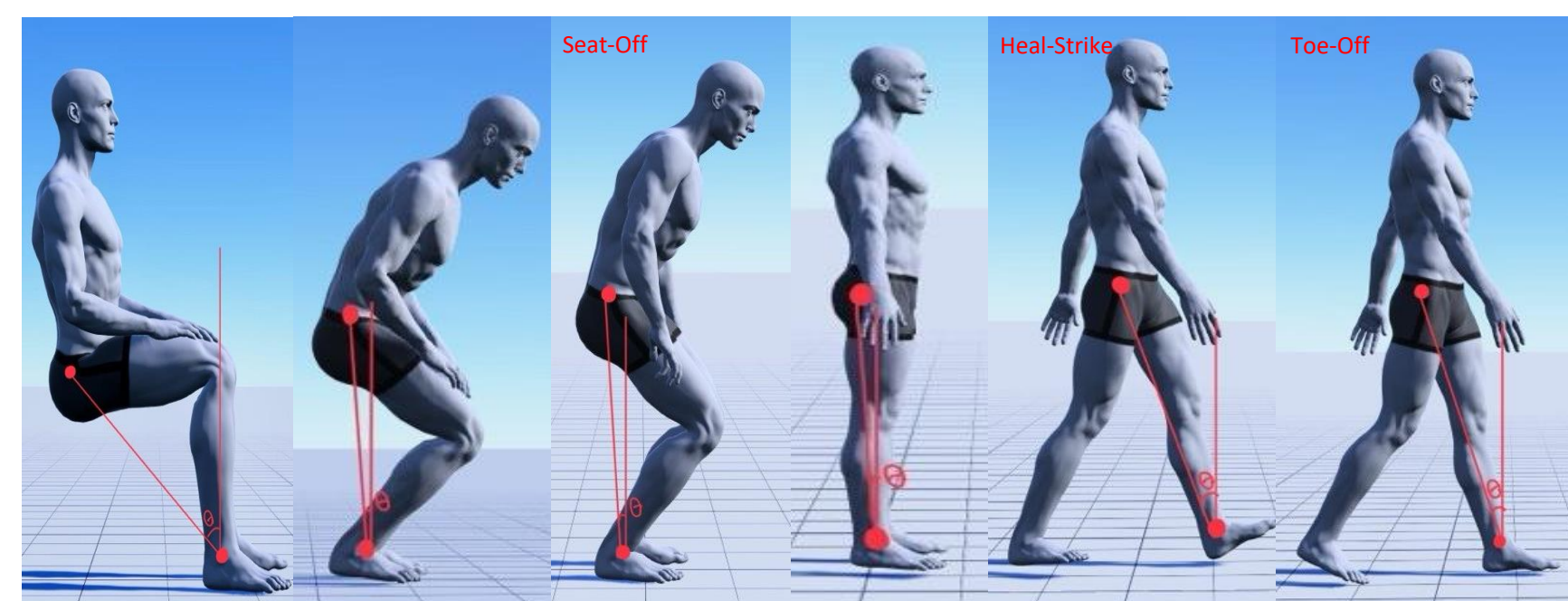


Figure B: Representation of a Sit-to-Walk Trial.

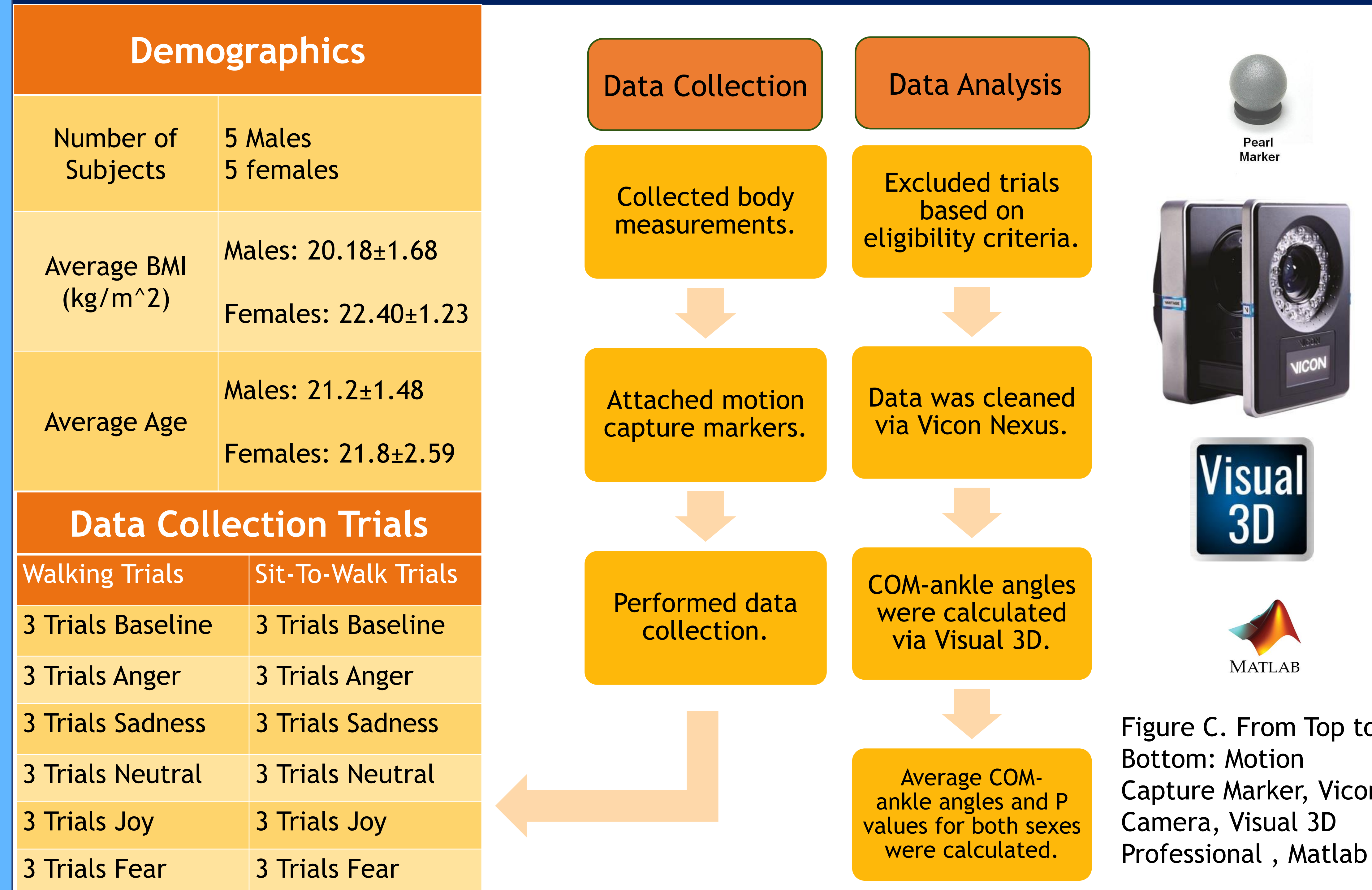
OBJECTIVES AND HYPOTHESIS

- **Objective:** Explore the sex-based difference in how emotions affect the COM-to-ankle angle during gait initiation and sit-to-walk transitions in adults with healthy BMI.
- **Hypothesis:** Emotional states (anger, sadness, neutral, joy, fear) will affect the COM-to-ankle angle differently in male vs. female participants.

Acknowledgements

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METHODOLOGY



RESULTS

Results for Walking Trials

Emotion	Males Average HS	Females Average HS	P Value for HS	Males Average TO	Females Average TO	P Value for TO
Baseline	19.16	19.47	0.76	26.56	21.56	0.03
Anger	20.05	19.21	0.42	26.29	21.58	0.08
Sadness	19.38	18.86	0.54	26.09	23.18	0.23
Neutral	18.53	18.82	0.80	26.34	25.44	0.67
Joy	19.94	19.88	0.94	25.28	20.41	0.09
Fear	19.62	19.37	0.80	26.03	24.12	0.46

Results for Sit-To-Walk Trials

Emotion	Males Average SO	Females Average SO	P Value for SO	Males Average TO	Females Average TO	P Value for TO
Baseline	23.07	17.60	1.58E-05	20.37	16.88	0.07
Anger	22.35	16.61	1.86E-05	20.86	17.09	0.02
Sadness	21.92	16.87	3.76E-04	19.84	16.42	0.04
Neutral	21.24	16.59	8.21E-06	19.93	16.73	0.07
Joy	21.69	16.33	4.01E-05	20.62	17.09	0.04
Fear	21.48	16.21	3.29E-06	19.13	16.84	0.14

CONCLUSIONS

- **Sit-to Walk:**
 - Male participants had significantly higher STW COM-ankle angles during baseline, anger, sadness, neutral, joy, and fear at the SO position.
 - Male participants had significantly higher STW COM-ankle angles during anger, sadness, and joy at the TO position.
- **Walking:** Male participants had significantly higher W COM-ankle angles during baseline at the TO position.

Implications

- Potential applications in telemedicine could make healthcare more accessible to patients in underserved areas.
- Development of personalized rehabilitation strategies for patients with fall risk.

Future Research

- Larger sample size
- Wider range of BMI
- Patients diagnosed with mood disorders or neuromuscular diseases

REFERENCES

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- [2] Caron, R. R., Wagenaar, R. C., Lewis, C. L., Saltzman, E., & Holt, K. G. (2013). Center of mass trajectory and orientation to the ankle and knee in the sagittal plane is maintained with forward lean when the backpacking load changes during treadmill walking. *Journal of Biomechanics*, 46(1), 70-76