

Reliability of a Novel iPhone App on Testing Proprioception of the Lower Extremities

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- A pilot study to test reliability of a student designed app at measuring proprioception of lower extremities
 - Results suggest a successful pilot program
 - More statistical power is needed
 - Proprioception = balance/stability

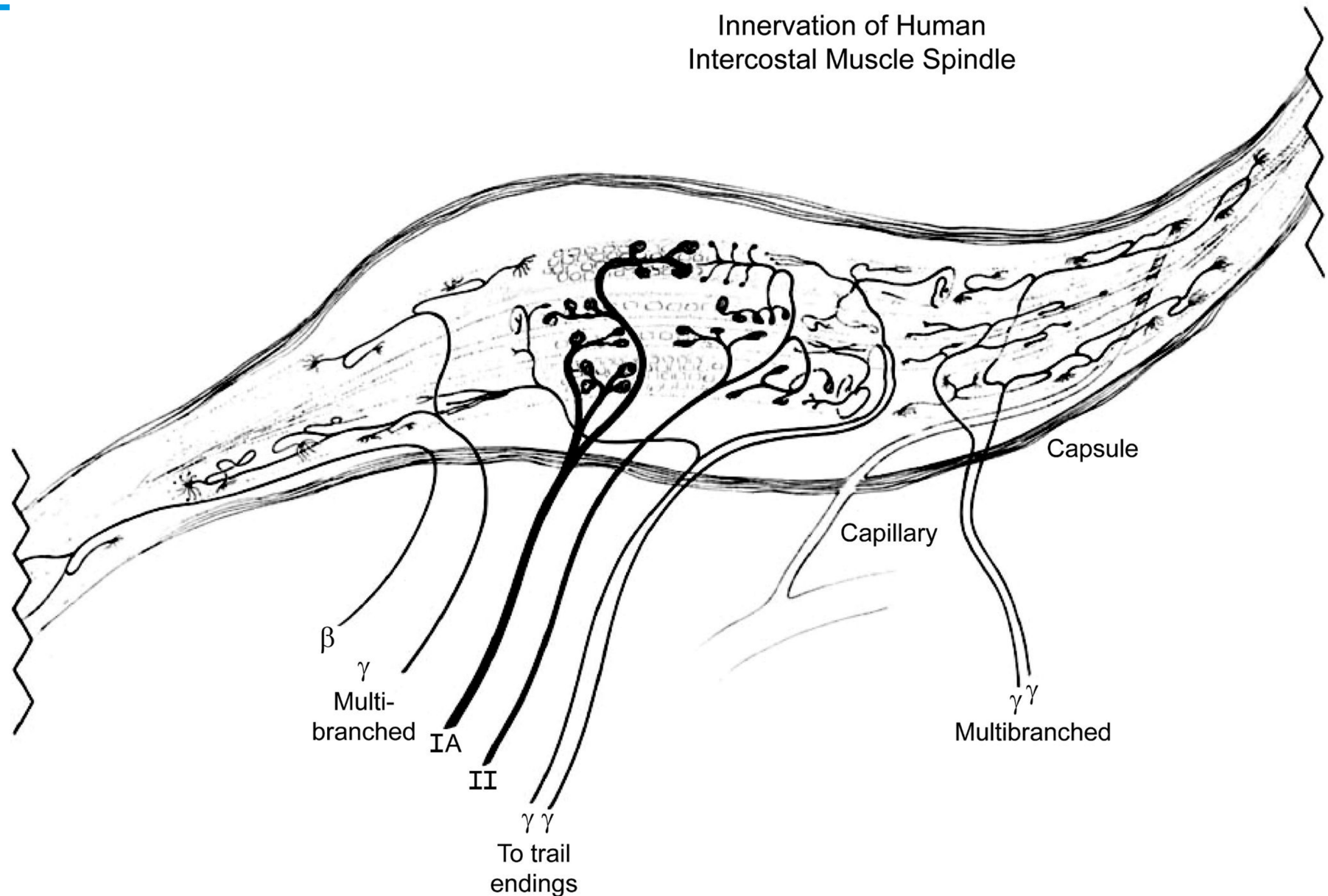
Background

- Proprioception consists of various sensory receptors that help humans understand their position in space

Proprioceptors

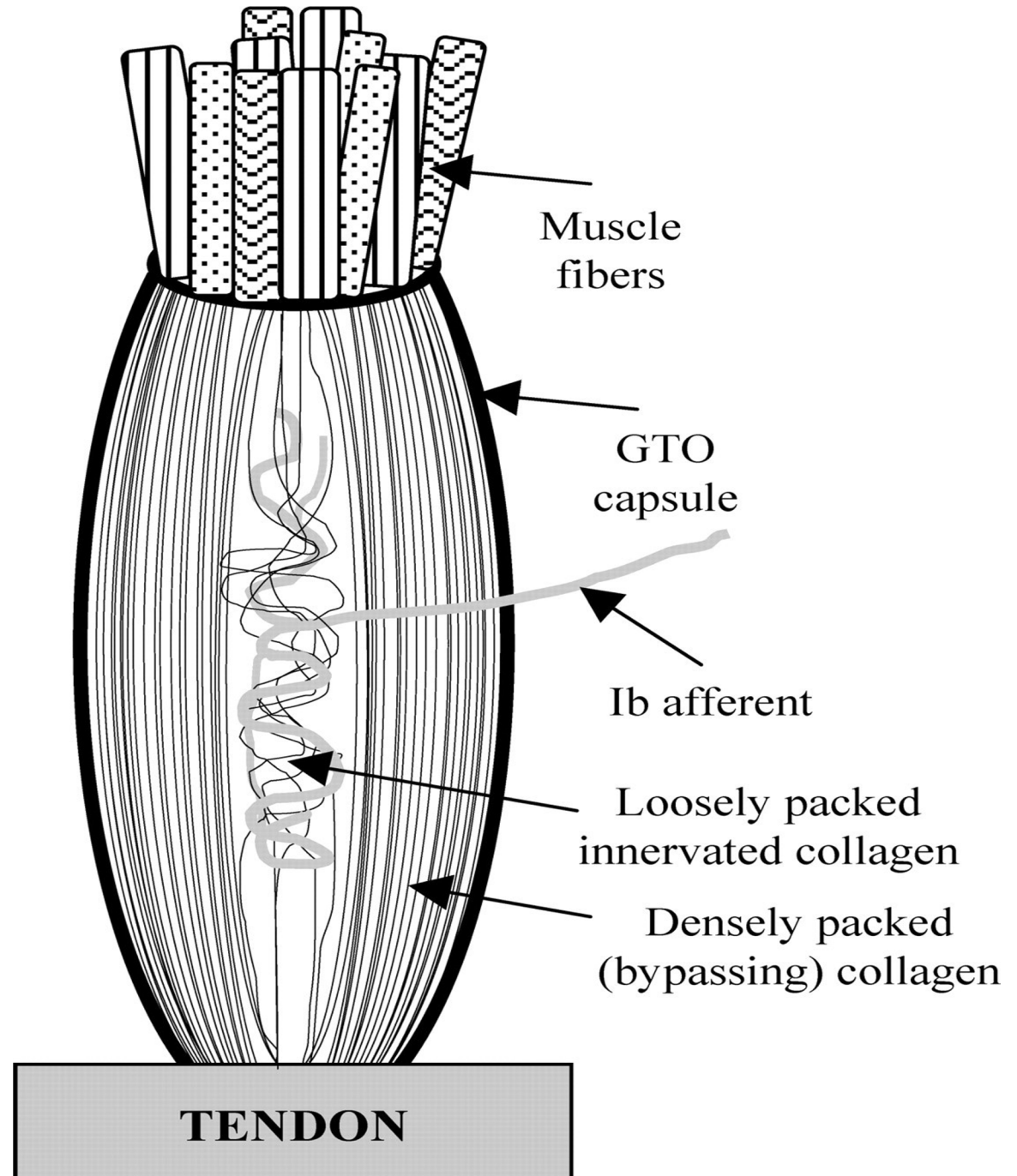
- Muscle spindles

Innervation of Human
Intercostal Muscle Spindle



Proprioceptors (cont.)

- Golgi Tendon Organ



Background (cont.)

- Previous studies investigated proprioception using the Balance Error Scoring System (BESS)

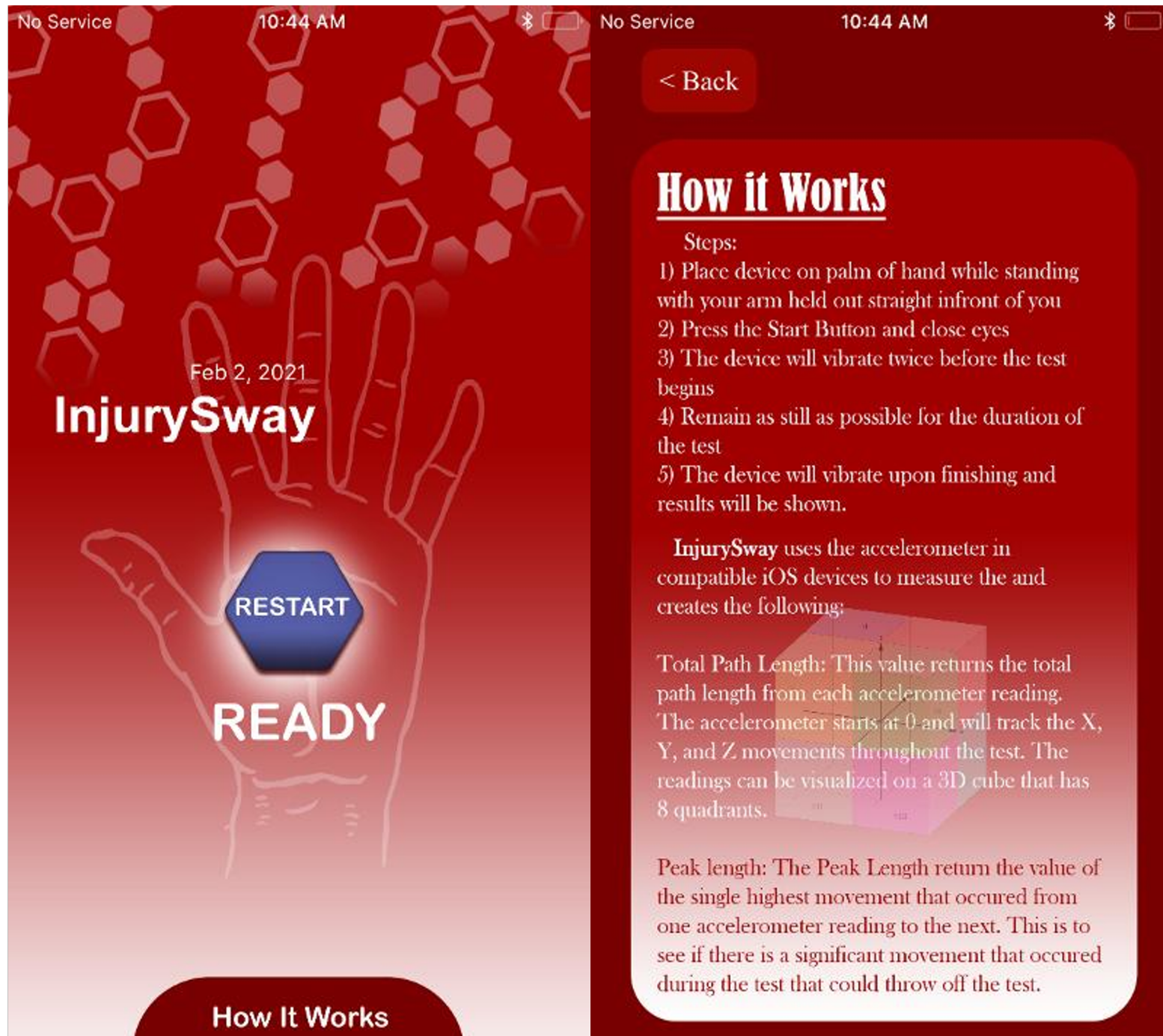


- Reliability is critical for healthcare providers
- Important consequences for athletes and sports medicine

Background (cont.)

- No prior studies investigating an iPhone app with the iPhone's accelerometer
- Concussions affect proprioception

Injury Sway App



Methods

- Subjects from Florida Southern
- Four subjects
- Three trials over one week period
- Three stances on the Shuttle Balance
 - Two feet, one foot, tandem

Methods (cont.)

- Two feet stance



Methods (cont.)

- One foot stance
 - Non-dominant foot



Methods (cont.)

- Tandem stance
 - Dominant foot in front
 - Cardinal position



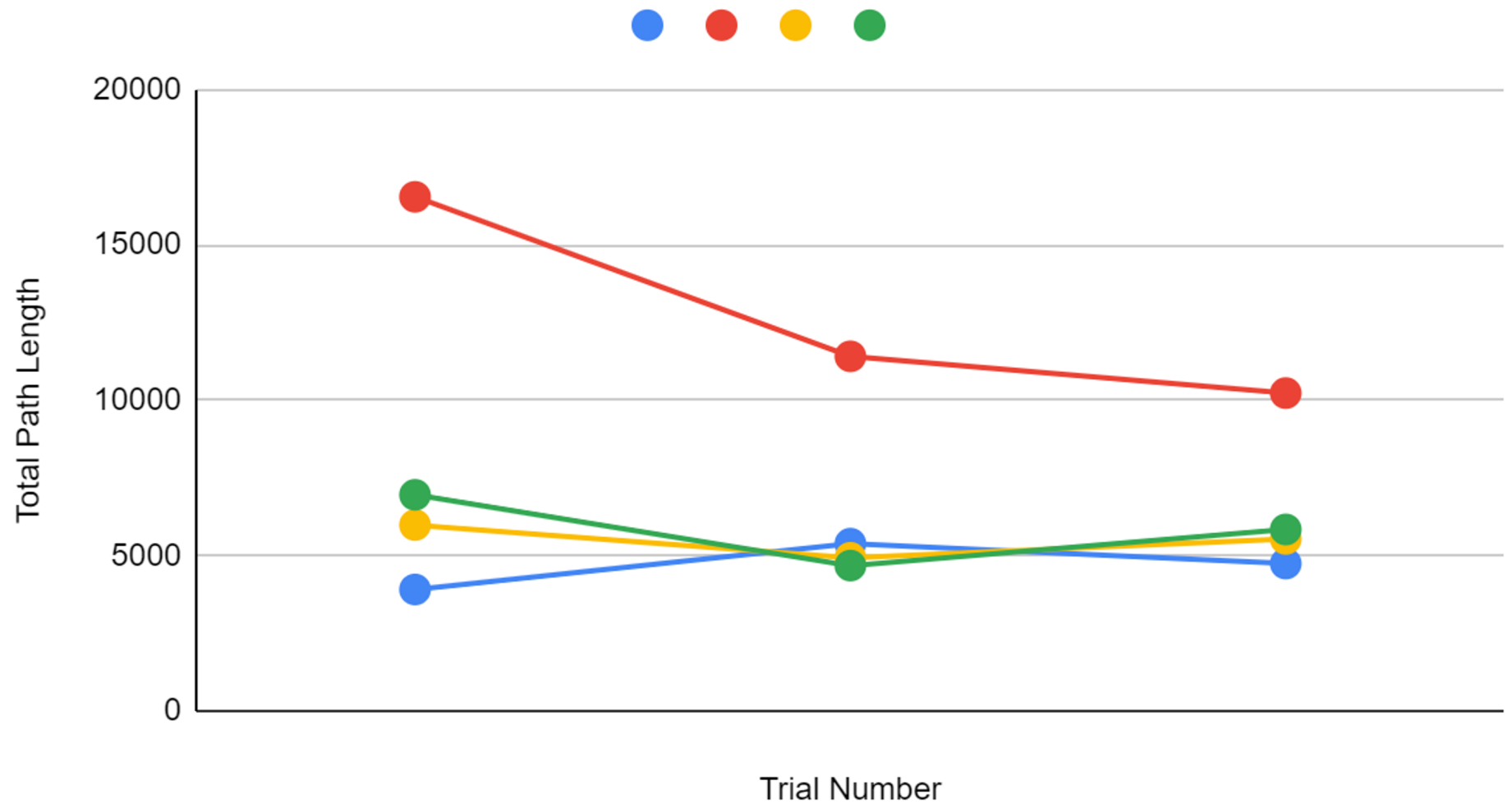
Results

- Cronbach's alpha measure for internal reliability

| Stance | Cronbach's Alpha Values | Internal Consistency |
|----------|-------------------------|----------------------|
| Two Feet | 0.9258083357 | Excellent |
| One Foot | 0.6597352388 | Questionable |
| Tandem | 0.7317763978 | Acceptable |

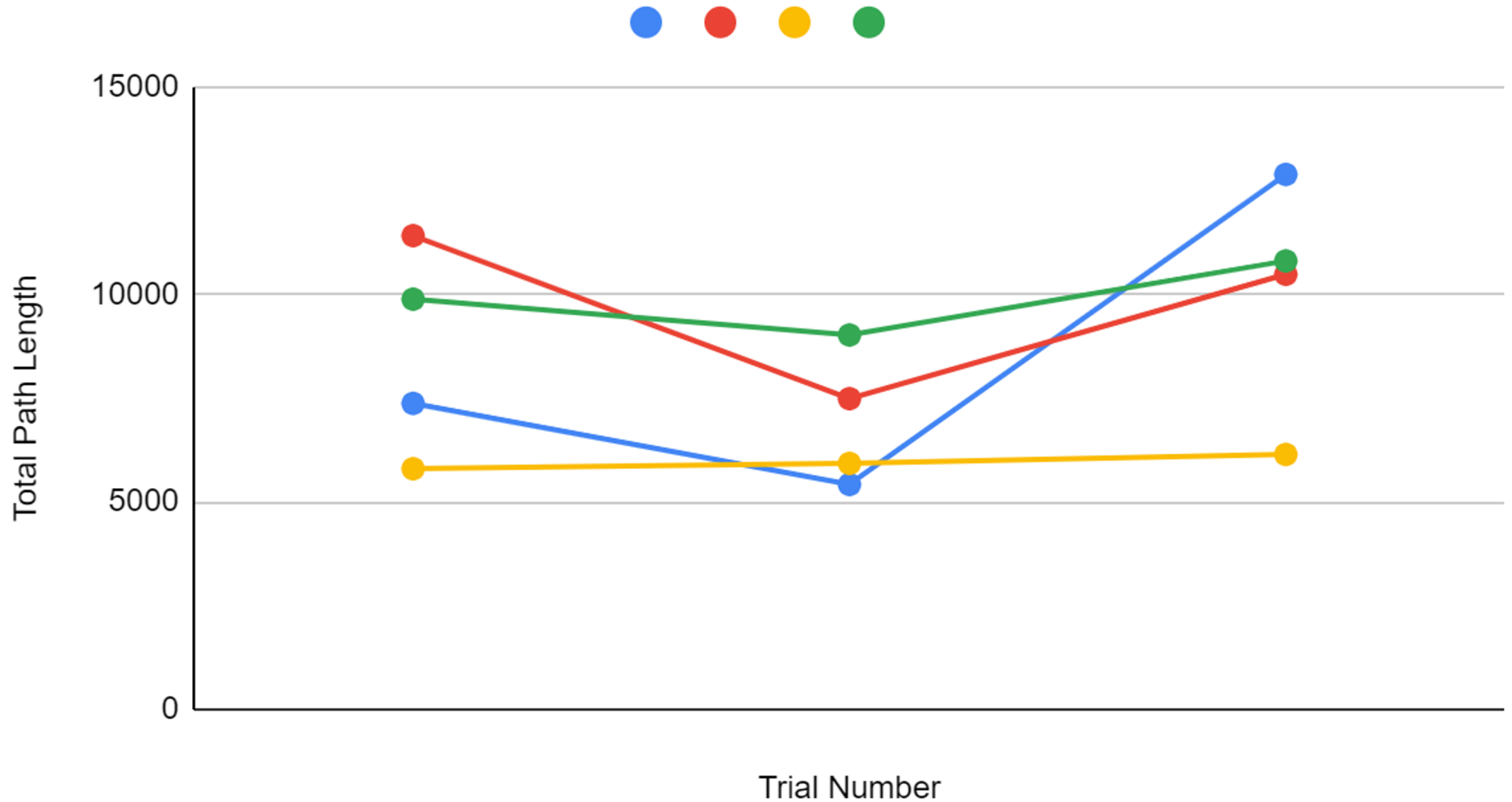
Results (cont.)

Spaghetti Plot for Two Leg



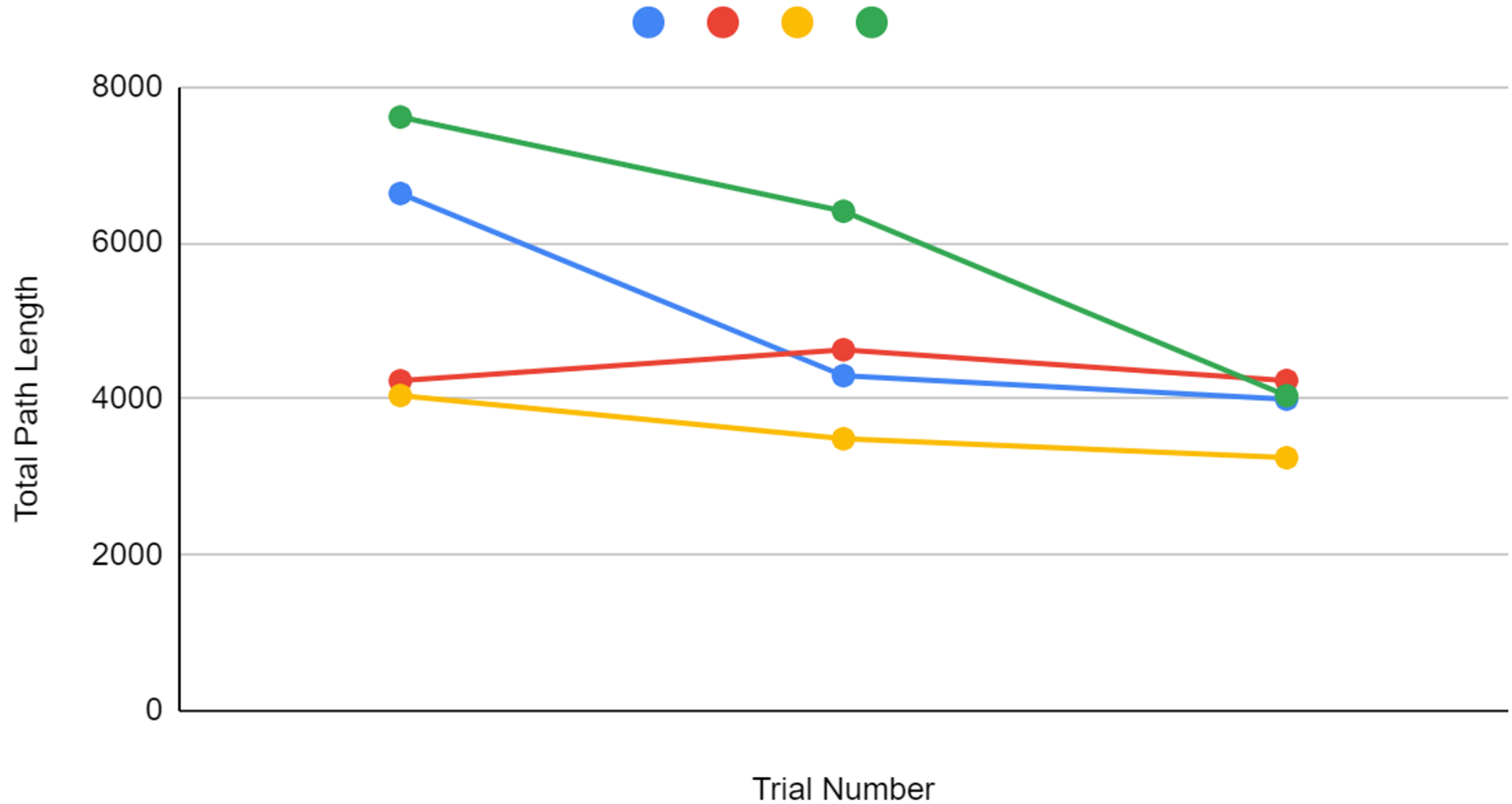
Results (cont.)

Spaghetti Plot for One Leg



Results (cont.)

Spaghetti Plot for Tandem



Improvements?

- Larger sample size
- More statistical analysis
- More diverse population
- Familiarization Session?

Future Directions

- Include concussed population
- Include musculoskeletal injuries
- Validity
 - Does this measure what it claims to measure?

Acknowledgments

- Thank you Dr. Lynch !!!

References

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Questions?

