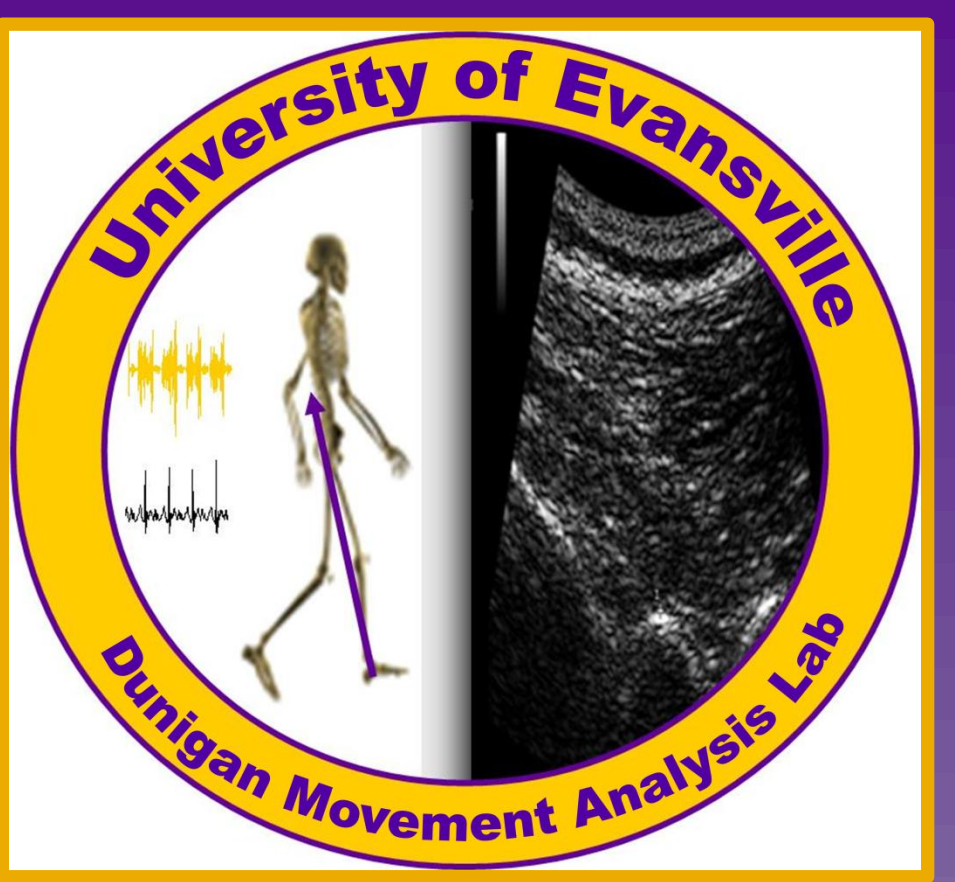


Comparison of single and multiple-sport athletes' performance on the Y Balance Test

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Abstract

Different tools have been developed to screen for injury risk during athletic participation, among them the Y Balance Test (YBT). Scores obtained from the reach directions of the YBT have previously identified individuals at risk for lower extremity injury. However, it is not known whether participating in multiple sports significantly affects performance on the YBT. **PURPOSE:** The primary purpose of this study is to determine whether or not there is an interaction effect between gender and participation in single versus multiple sports on YBT scores. A secondary purpose is to compare YBT scores in high school athletes that compete in a single sport to a matched group of high school athletes who compete in multiple sports. **METHODS:** These data are part of a larger scale study that is examining YBT scores in athletes in various sports and competition levels. Ninety-two high school athletes that participated in only one sport were matched, by gender and sport played, to athletes who participated in multiple sports. All athletes provided informed consent and were free from injury at the time of testing. Each athlete performed the YBT protocol that examines lower extremity reach distance during unilateral stance in the anterior, posteromedial, and posterolateral directions. The greatest reach distance of three trials in each direction was used for analysis. All reach distances were normalized to limb length. A two-way ANOVA was performed to examine the interaction effect between gender and single sport versus multiple sport athletes. **RESULTS:** While no significant differences existed for height and weight between the two groups ($p > 0.05$), single sport athletes were older than multiple sport athletes by 6 months on average ($p < 0.05$). There was no interaction between gender and participation in single versus multiple sports on YBT scores. In addition, there were no significant differences observed for any of the reach distances when normalized to limb length ($p > 0.05$). Further, no significant differences were found when making bilateral comparisons for the specific reach directions ($p > 0.05$). **DISCUSSION:** Our preliminary findings suggest that the number of sports male and female high school athletes participate in may not need to be accounted for when evaluating their functional balance performance using the YBT. Participating in multiple sports does not appear to improve performance on distance reach score for any of the three reach directions on the YBT.

Background

- The YBT is able to reliably predict athletes who are at an increased risk for sustaining a lower extremity injury.¹
- There are known performance differences on the YBT based on competition level, gender, and sport.²
- It is not known whether or not there are performance differences on the YBT based on athletes' participation in single versus multiple sports.
- It is not known whether there is an interaction effect on the YBT between gender and participation in single versus multiple sports.
- It is important to determine whether or not a performance difference on the YBT exists on these bases so that dynamic balance performance and therefore injury risk can be more accurately assessed.

Purpose and Hypotheses

- Purpose: To compare YBT scores in high school athletes that compete in a single sport to those who compete in multiple sports.
- Hypotheses:
 - There will be no interaction effect between gender and participation in single versus multiple sports.
 - The mean YBT score for high school athletes that compete in multiple sports will be greater than the mean YBT score for high school athletes that compete in a single sport.

Methods

- Subjects ($n = 184$)
 - 92 single and 92 multiple sport
 - matched by gender and sport
- Inclusion Criteria
 - Injury-free at data collection
 - Provided informed consent
- Data Collection
 - During administration of pre-participation physicals
 - All examiners trained in the study protocol³
 - Subjects viewed a standard demonstration and performed six practice trials³
 - Reach distance measured:
 - from the most distal aspect of the toes of the stance foot to the most distal aspect of the toes of the reach foot
 - in the anterior, posteromedial, posterolateral directions
 - Reach foot required to:
 - maintain standard elevation off the floor
 - avoid touching the floor
 - Three trials for each direction per lower extremity were attempted
 - Greatest reach distance for each direction per lower extremity were:
 - normalized for limb length
 - subjected to analysis
 - A composite score per lower extremity was:
 - normalized for limb length
 - subjected to analysis
- Data Analysis
 - two-way ANOVA used to examine:
 - the interaction effect between gender and participation in single versus multiple sports
 - the main effects of gender and participation in single versus multiple sports
 - alpha level of $p < 0.05$ assigned

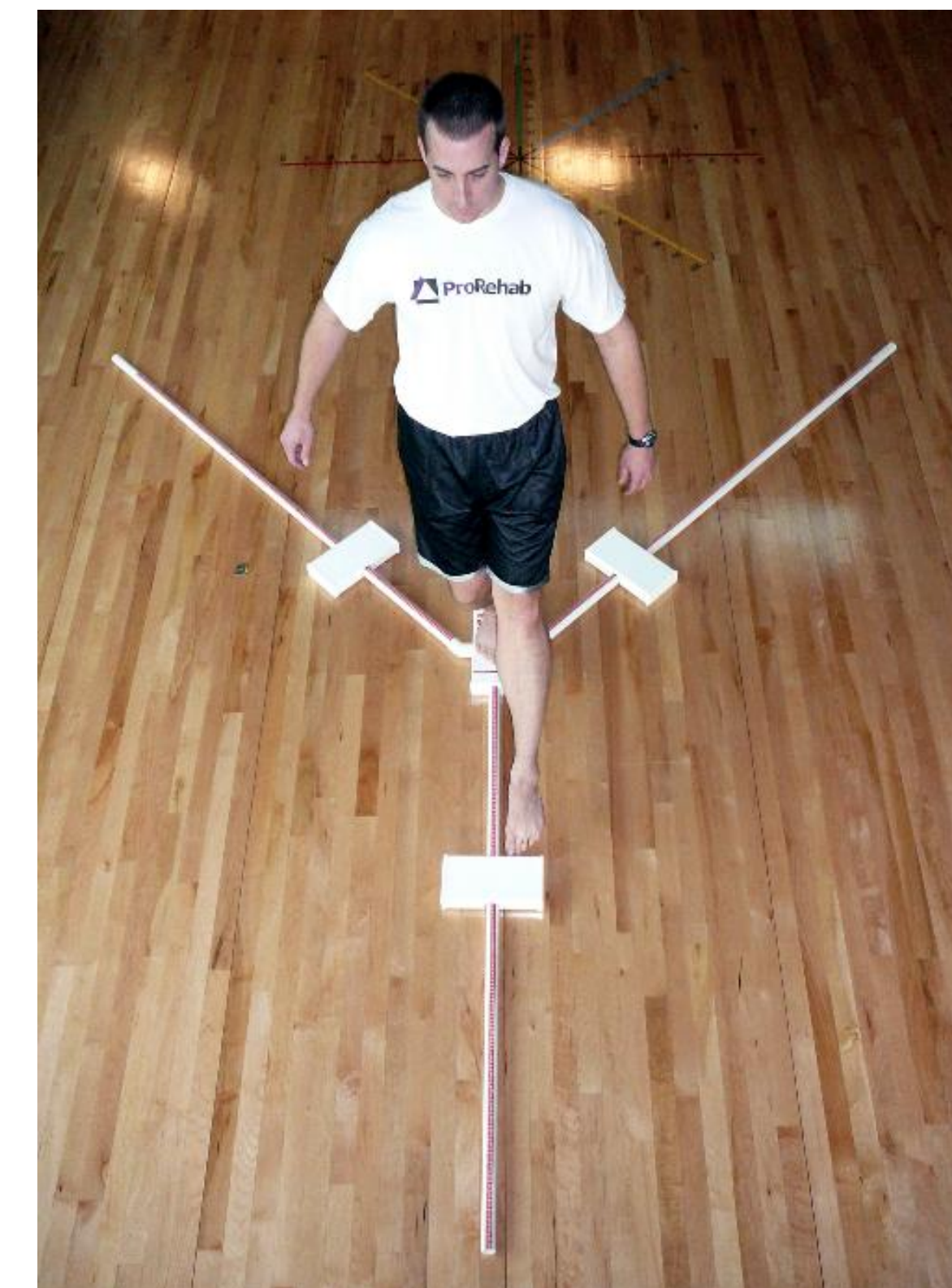


Figure 1. Anterior reach.

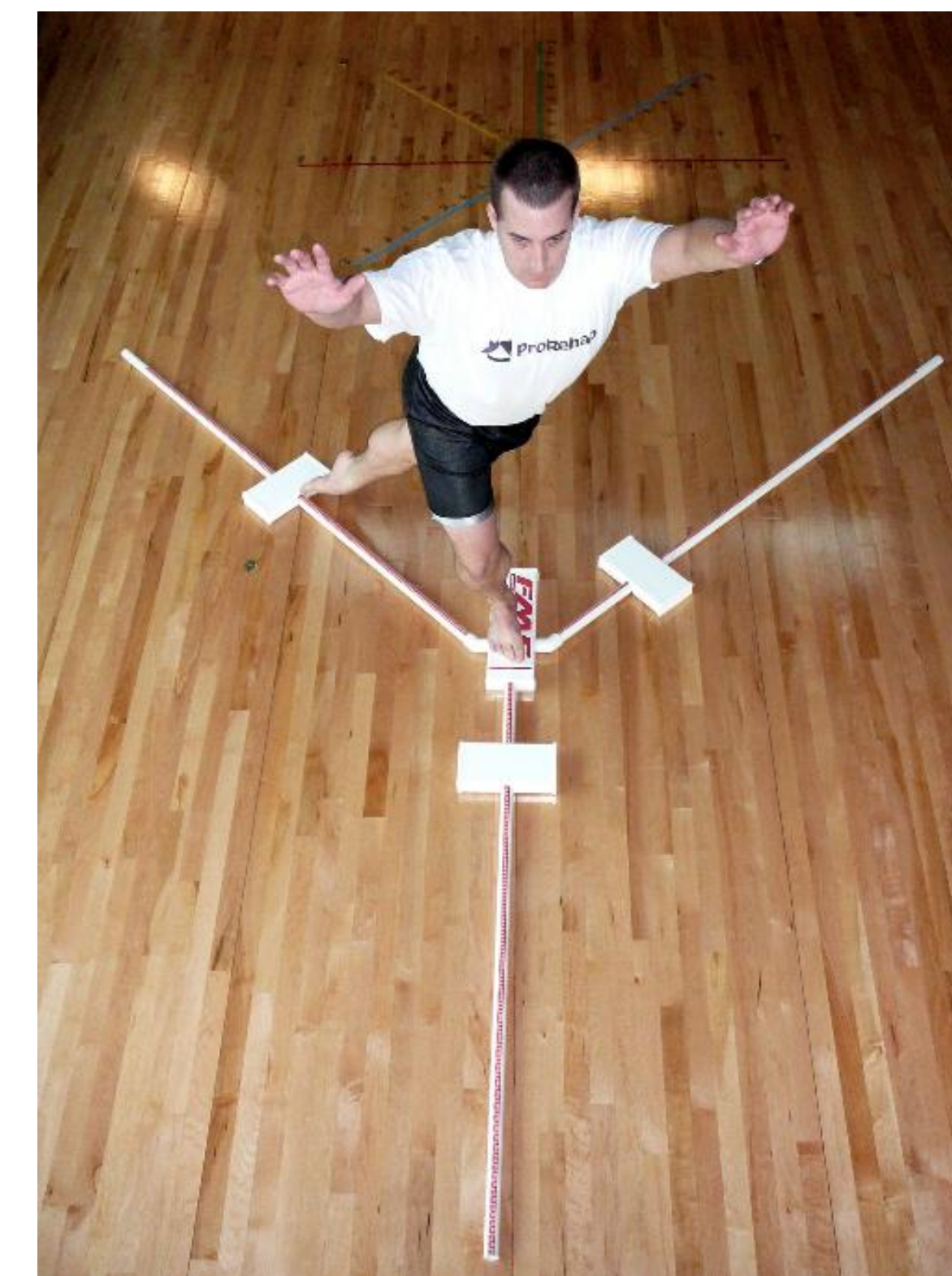


Figure 2. Posteromedial reach.

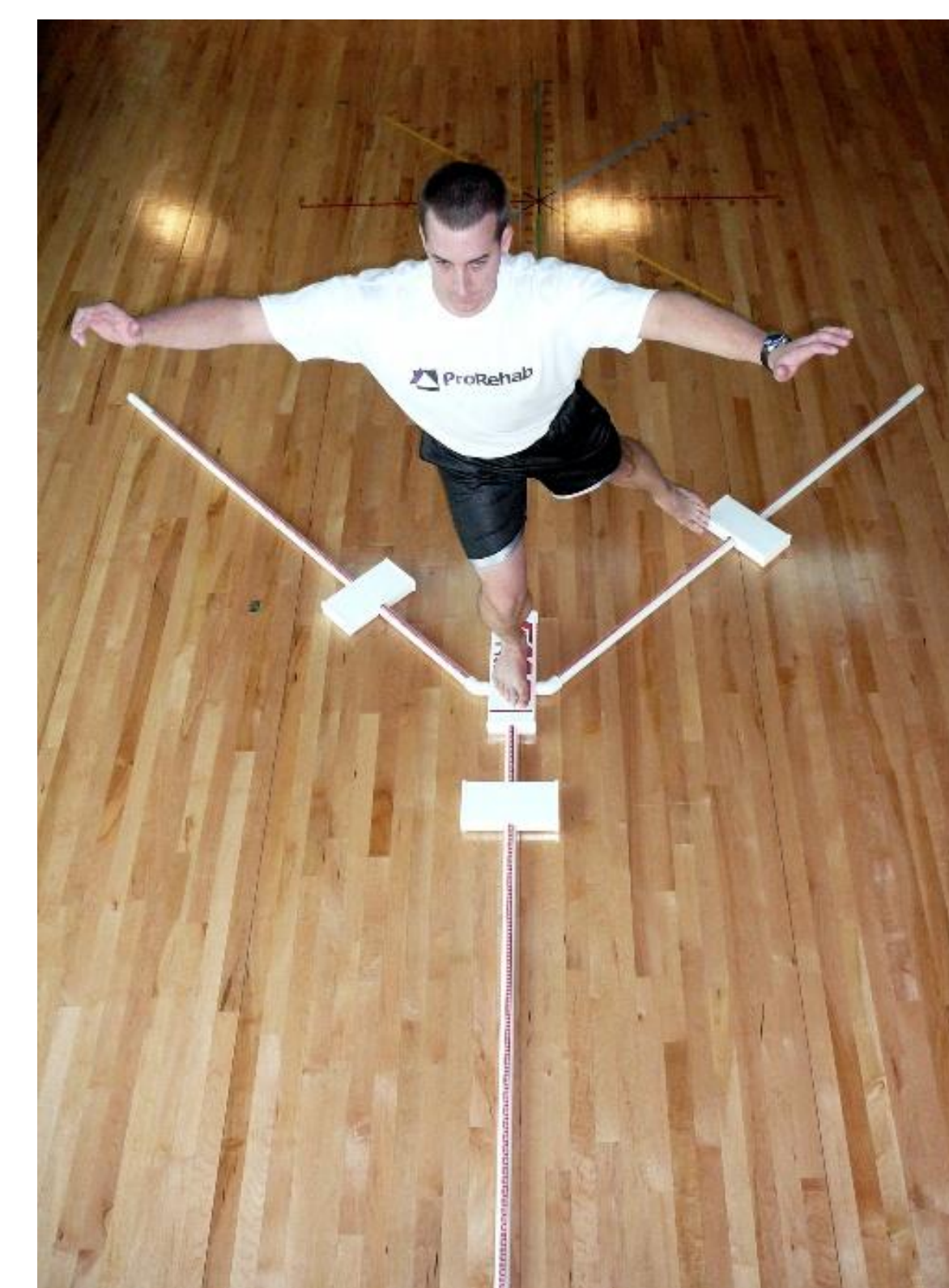


Figure 3. Posterolateral reach.

Results

- Single-sport subjects' mean age six months higher than mean for multiple-sport subjects
- No interaction or main effect for gender and participation in single versus multiple sports

Table 1. Data, Anthropometric and Y-Balance Reach Distances

	Single Sport	Multiple Sports	
Variable	Mean (sd)	Mean (sd)	p-value
Age (years)	15.9 (1.2)	15.4 (1.2)	<0.01
Height (inches)	68.2 (3.6)	68.1 (4.0)	0.90
Weight (pounds)	162.2 (42.0)	155.1 (31.6)	0.19
Composite Right	97.5 (8.2)	97.4 (8.2)	0.98
Composite Left	96.6 (8.2)	96.7 (8.6)	0.89
Anterior Difference	2.8 (2.2)	3.6 (3.8)	0.09
Posteromedial Difference	4.6 (4.4)	4.3 (3.8)	0.63
Posterolateral Difference	4.3 (4.3)	5.0 (4.2)	0.23
Anterior Right Normalized	75.1 (7.0)	76.0 (8.6)	0.43
Anterior Left Normalized	75.8 (7.1)	76.8 (7.2)	0.33
Posteromedial Right Normalized	107.6 (10.6)	108.7 (10.5)	0.47
Posteromedial Left Normalized	108.8 (10.1)	109.5 (9.9)	0.65
Posterolateral Right Normalized	107.0 (11.5)	105.5 (10.7)	0.36
Posterolateral Left Normalized	107.8 (11.3)	106.0 (11.5)	0.29

Discussion

- Participation in multiple sports does not appear to improve performance on distance reach score for any of the three reach directions on the YBT.
- The number of sports male and female high school athletes participate in may not need to be accounted for when evaluating their dynamic balance performance using the YBT.

References

- ¹Plisky PJ et al. (2006) *J Orthop Sports Phys Ther*
- ²Plisky PJ et al. (2009) APTA Combined Sections Meeting, APTA
- ³Plisky PJ et al. (in press) *N Am J Sports Phys Ther*