

INTRODUCTION

Due to physical demands on firefighters while on duty, they are at an increased risk of injury on the job including sprains, strains, and chronic muscular pain. The Functional Movement Screen (FMS) is a tool to examine an individual's mobility quality. Current research has found an inverse relationship between Body Mass Index (BMI) and FMS scores in a variety of populations. The Y-balance test (YBT) measures dynamic balance and functional symmetry. Limited mobility quality, whether bilateral or unilateral has been associated with an increased risk of musculoskeletal injury. Limited research exists on BMI and YBT.

PURPOSE

The purpose was to analyze the relationship between BMI, FMS, and YBT among firefighters to provide insight on potential injury risk due to movement discrepancies or anthropometrics.

METHODS

- Retrospective study. 10 participants (female=6; male=4) between ages of 24 and 49 (average=33.5±7.2) with an average height of 173±10.0 cm and average weight of 81.84±25.24 kg.
- Subjects performed FMS and YBT.
- Subjects were organized into three categories: healthy (BMI 18.5-24.99), overweight (BMI 25.0-29.0), and obese (BMI≥ 30.0), according to ACSM guidelines.
- Pearson correlation coefficient was used to examine the relationship between body mass index, functional movement assessment scores, and YBT.
- An independent t-test was used to assess FMS and YBT outcomes between BMI groups with Bonferroni correction.
- Participants were excluded if they had any incomplete data.
- $\alpha = 0.05$

RESULTS

- The average BMI for females was 25.5 (SD ±3.04) and average BMI for males was 29.2 (SD= 6.53).
- There was a significant correlation between BMI and right shoulder mobility ($r=0.737$, $p<0.05$) and left shoulder mobility ($r=0.816$, $p<0.05$).
- There was a moderate non-significant relationship between BMI and YBT asymmetry ($R=-0.506$), and BMI and FMS composite score ($R=-0.538$).
- There was no significant difference in FMS or YBT between BMI groups.

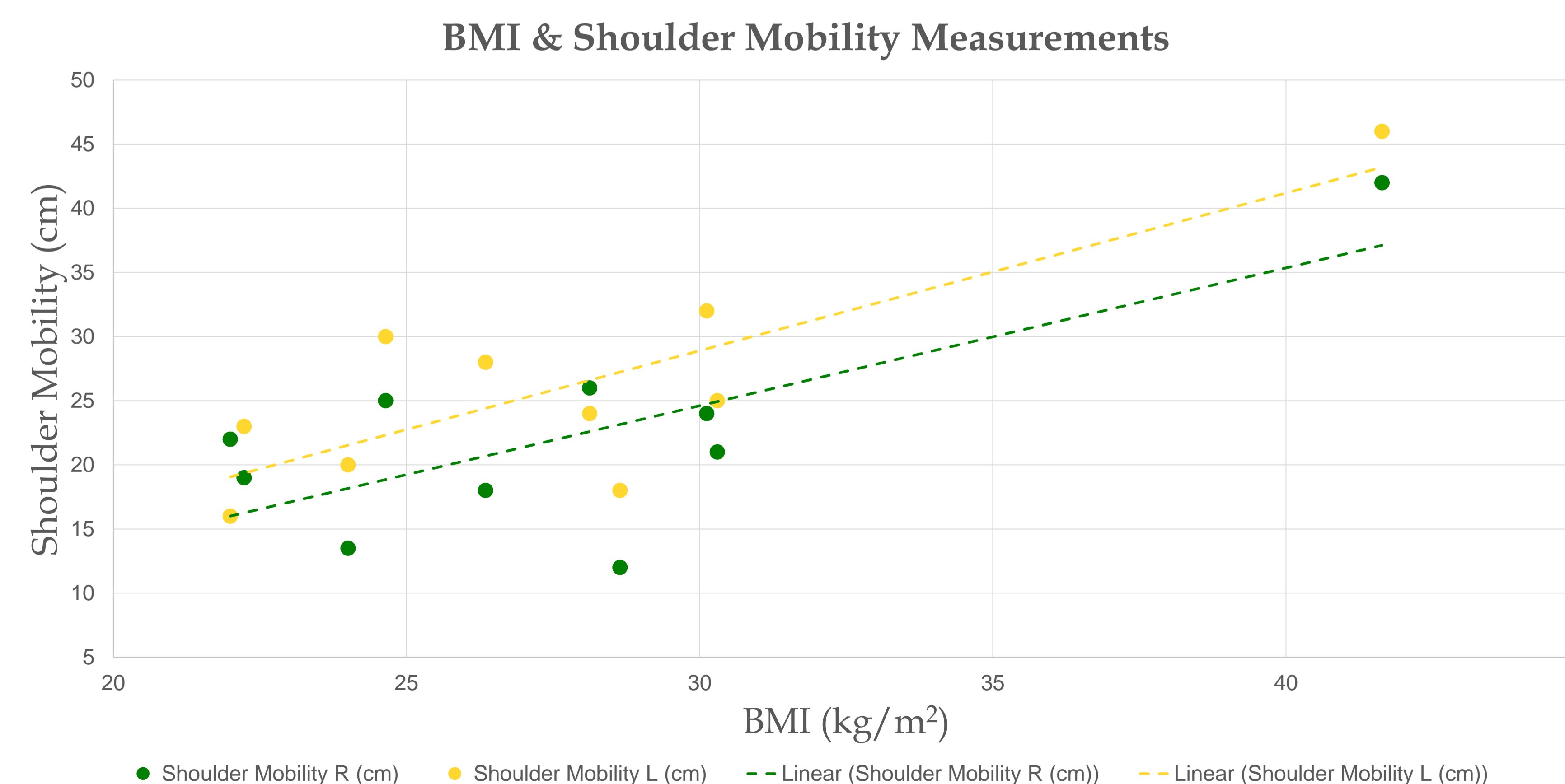
MAIN FINDINGS

Table 1. Correlations Between BMI, Age and Mobility

	BMI	Age	WSR	YBT-A Left	YBT-A Right	YBT-A Asym	SM Right	SM Left	SM Asym.
BMI	-								
Age	0.381	-							
WSR	-0.488	0.417	-						
YBT-A Left	-0.081	-0.261	0.049	-					
YBT-A Right	-0.323	-0.114	0.298	0.856*	-				
YBT-A Asym	-0.506	-0.166	0.067	0.112	0.495	-			
SM Right	0.737*	0.509	-0.299	0.230	0.125	-0.094	-		
SM Left	0.816*	0.512	-0.441	-0.139	-0.286	-0.149	0.847*	-	
SM Asym	-0.192	-0.213	-0.028	-0.264	-0.396	-0.017	-0.384	-0.057	-
FMS Comp	-0.538	-0.153	0.447	0.512	0.776*	0.517	-0.068	-0.459	-0.462

* Denotes statistically significant results
WSR= Wall sit and Reach; YBT-A= Y-balance test anterior; SM= Shoulder mobility; Asym= Asymmetry; Comp= Composite score

Figure 1. Body Mass Index & Shoulder Mobility Measurements



CONCLUSION

- BMI was significantly correlated with shoulder mobility thus, individuals with greater BMI have poor shoulder mobility. This could translate to an increase in risk of injury.
- The moderate non-significant correlation between BMI and YBT asymmetries may indicate limitations in lower extremity range of motion.
- The moderate non-significant correlation between BMI and FMS may indicate that heavier individuals demonstrate poorer functional movement. Because these relationships are non-significant, more data should be collected to further elucidate these findings.
- There was no significant difference between BMI groups for any FMS and YBT test. However, the correlations between BMI are moderate suggesting BMI could still impact mobility.
- FMS and YBT can be used to understand overall movement quality but may not predict a firefighter's ability to perform job related tasks because this was not assessed.
- Utilizing BMI and movement assessments in the firefighting population can provide insightful data when creating fitness programs.
- Body mass index is an indicator of how an individual may perform on a movement assessment, therefore, should be taken into consideration when examining movement quality.
- Limitations of the results of this study includes a small sample size, one researcher examination, and only testing the subjects once.
- Future research should examine multiple body mass index and functional movement assessments of each longitudinally to examine any changes and/or improvements.

PRACTICAL APPLICATION

These findings suggest a reduction in BMI may result in improvement in movement quality which could translate to a reduction in risk of injury and improving overall fitness.

REFERENCES

