# Arm Angle and Jump Force on Basketball Shot Distance

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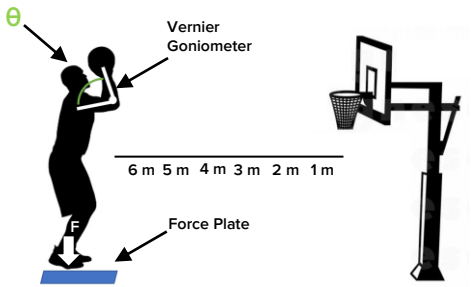
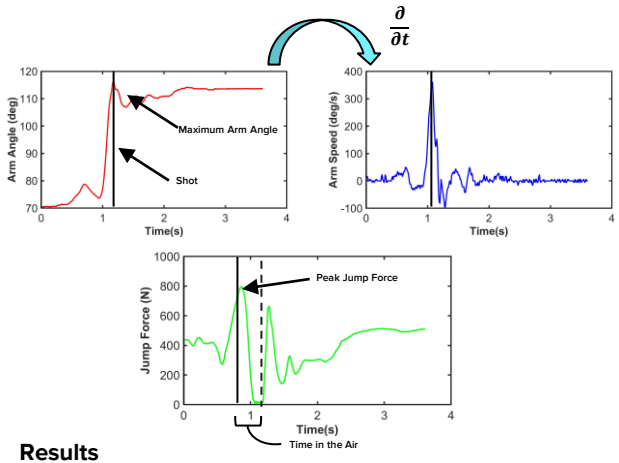
## Abstract

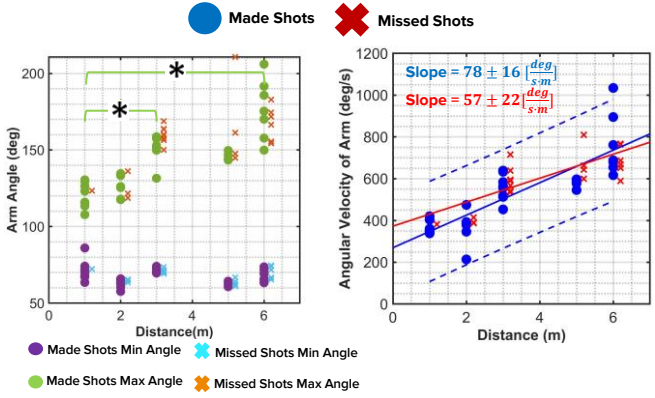
Shooting is the most important aspect of the game of basketball. With each player developing their own unique shot, the optimal release angle and jumping force are individual for each player. To determine these quantities, arm angle and jumping force were measured for ten made shots at increasing distances. Arm angle was measured through the use of a Vernier goniometer strapped to a shooting players arm, while jumping force was calculated by a force plate beneath the players feet. **After comparing shots taken at a variety of distances, there appears to be a positive linear correlation between angular velocity and distance. Furthermore, at a 90% confidence level, it was found that jumping force generally increased as distance from the basket increased. In spite of this, statistically significant differences between made and missed shots could only be identified through arm angular velocity.**

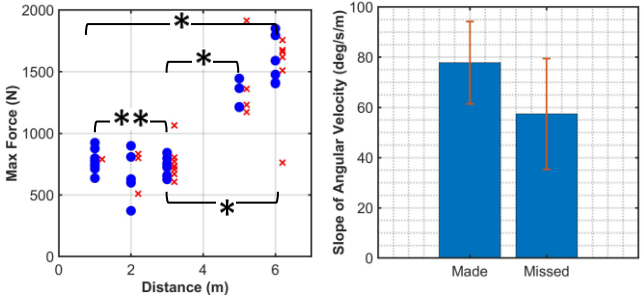
## Experimental Design




## Results




**Missed Shots Offset for Visibility**
**95% Confidence Displayed as *, 90% confidence Displayed as ****

## Conclusion

- Player arm angular velocity increased linearly with distance for both made and missed shots
- The angular velocity for made shots increased by about of $21\frac{deg}{s \cdot m}$ more than missed shots did.
- The peak jump force at 6 meters was about 2 times greater than the peak jump force at 1 meter.

## Acknowledgements

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