

## Correlation between Archer's Hands Movement While Shooting and its Score

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### ABSTRACT

In archery, the most critical time is a few seconds before the release of the arrows because the trajectory of the released arrows is dependent on the movement of the archers arm in the release phase. Archers uses two hands while drawing a bow, one hand to push on the bow riser and the other to pull the string. The archer's performance can be quantified through the analysis of the movement of both the archer's both arm while they release the arrow. In this paper, a study of archers' arm movement while shooting using recurved bow is presented. In the experiments, university level archers shot six arrows per frame and each archers shot three frames each whilst wearing a dedicated small sized accelerometer in both arms. The generated data, in terms of linear acceleration, were streamed in real time to a computer wirelessly via Bluetooth. The sampling rate of the accelerometer was about 15 Hz. The forward-reverse, up-down, left-right motion of both arms as well as the score and the position of the arrow of each shot were recorded. A high score category is when an archer shot ten, nine, and eight points while three, two, and one points score is a low score category. The analysis of the data showed a correlation between the archers' arm movement and their score. The linear acceleration pattern for a higher score is very similar to the lower score; however, the average time taken before release for lower scores is about one second longer than the average time taken for higher scores.

**KEYWORDS:** archery; recurved bow; accelerometer; vibration

**DOI: [10.1016/j.proeng.2016.06.204](https://doi.org/10.1016/j.proeng.2016.06.204)**