

## Technical factors utilised by elite archers: towards setting an agenda for archery

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Archery, in one form or another, has been around for thousands of years yet research into what makes an archer 'good' is still in its infancy. There are several variations over bow type and different competitions which can be competed, previous works have focused on Recurve (Olympic) bow types whilst Compound have generally been ignored. Research in the area has tended to focus on muscle activation patterns using Electromyography (EMG) and aiming based studies, where generally scores are used as a factor to correlate to.

**AIM:** The aim of this research is to offer a development from the use of score incorporating additional marksmanship based statistics. These are used to identify which factors are most critical to elite archers, allowing the identification of the technical performance indicators.

**METHOD:** A Matlab script was produced to represent a target face where arrow locations can be input. The coordinates from these are used to calculate accuracy and precision, and additional tertiary factors. The system was tested utilising known arrow placements, tested by 10 individuals, demonstrating accurate results. The system was then used to analyse arrow placements of the top 4 archers in the finals matches from 2006-2011 Archery World Cup, World Championships and Olympics, both Recurve and Compounds in both genders analysed where possible.

**RESULTS:** Results show that for Recurve there are statistically significant differences in accuracy and precision between 1st and 2nd places, however the compounds are closer matched under these measures. Interestingly, 3rd place archers generally performed better than the 2nd place archer in their final match. The results prompt new thinking towards an agenda for archery based research:

- deeper understandings of the psychological differences between finishing places
- analysis of bow setups using these methods
- rule changes considering a further elimination round between silver and bronze
- deeper analysis for previous works