

Experiments in Fending Atlatl Darts with Basketmaker S-Shaped Sticks

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Background

The S-shaped stick is a diagnostic artifact of the Basketmaker II period. In the early 20th century these artifacts were assumed to be throwing sticks, similar to ethnographically known rabbit-sticks used in the American Southwest. In 1921, it was first suggested by Kidder and Guernsey that these sticks might serve a different function, due in large part to differing use wear patterns observed on S-shaped sticks and modern rabbit-sticks¹. A footnote in their paper suggests the possibility that these sticks may have served as tools for fending atlatl darts. By 1942, Robert Heizer had assumed the position that these sticks were unlikely to be rabbit-sticks based on use wear, although he concedes that not all researchers were in agreement on the matter².

By the time of Heizer's writing, the idea of these S-shaped sticks and some C-shaped sticks as "fending sticks" for the deflection of atlatl darts had become established in the literature. In 1939, Earl Morris noted the lack of shields in Basketmaker II contexts, and established the idea that these sticks are essentially early forms of shields, and part of a warrior's battle kit. Morris goes on to assert "The curved fending stick adroitly handled would have been most efficacious in striking aside the relatively slow moving darts."³. Morris cites no experimentation to back up this claim. In 1990, in an article in *Kiva*, Phil R. Geib quoted Morris, and added that he can verify Morris' claim "from personal experience"⁴. The nature of this experience is unfortunately left to the reader's imagination. The views of Morris and Geib have since been reiterated by Steven LeBlanc⁵. LeBlanc's statements have since gone on to be cited by others as well.

The present work is an attempt to evaluate Basketmaker S-shaped sticks in the role of fending sticks. A reproduction S-shaped stick and a "control" C-shaped stick were tested in this capacity. Results follow.



Figure 1 A: A successful fend by Devin Pettigrew. Left to right, the dart approaches, and the stick is swung to intercept. As the dart point passes beyond the stick the two make contact. The continued sweeping motion of the stick pushes the dart away from the body of the fender, altering its trajectory and sending it harmlessly past. This outcome, that of a successful fend, was the least frequent outcome of the experiment.



Figure 1 B: An unsuccessful fend The author. Left to right, the dart approaches, and the stick is swung to intercept. The stick was not swung soon enough, and dart point impacts the fender's abdomen. The stick then makes contact with the dart shaft. Had this dart been tipped with a stone point or even a hardwood point, this would have resulted in serious injury and likely immediate death. This outcome, that of an unsuccessful fend, was the most frequent outcome of the experiment.

Experimental equipment and design

Preliminary experiments were performed sporadically over the course of a about a year before the experiment commenced. Two fenders (The author and Devin Pettigrew) were outfitted with paintball helmets and baseball chest protectors. Reproduction Basketmaker II atlatl darts were prepared with blunt rubber heads made from golf club grips packed with closed cell foam rubber. The fender was outfitted with either a replica S-shaped stick or a control stick, a Sinagua style C-shaped rabbit-stick (fig 1 B).

Darts were thrown at the fender from a distance of 10 yards. Darts of the weight tested have been clocked with a radar gun to travel between about 45 and 60 miles per hour, thrown from the atlatls used. The fender attempted to sweep the darts away from their body. Two experiments were recorded, with each fender utilizing both the S-shaped stick and the C-shaped control. Each experiment consisted of an irregular number of repetitions, due to complications and circumstance. Experiments varied between n=22 and n=30. Data generated are therefore presented as averages, to avoid complications due to uneven sample sizes.

Results of experiment

For both fenders, and both fending sticks, the least frequent outcome was a successful fend. Darts, while traveling slower than arrows, are still fast enough that from the test range (10 yards) reaction time was insufficient to both judge where the dart was likely to impact the body and move the stick to intercept it. The results of both the S-shaped stick and the C-shaped stick were not significantly different. In all cases, wounding was the most likely outcome of attempting to fend a dart with either stick (figs 2 A, 2B). As such, one can consider the two stick shapes roughly equivalent as fending tools.

Fending attempts, considered across all reps with both sticks, resulted in a 3.9% success rate. In contrast, **66.23% of attempts resulted in "injuries" of varying severity.** Interestingly, the "flinch" response (an unconscious flexing of the body out of the way of incoming projectiles) was significant. **Flinching resulted in a "success" rate of 12%.** This is significant, because both fenders consciously attempted to stand their ground against incoming darts, and as a result of an unwanted reflexive action were able to more successfully defend themselves against injury than through the use of fending sticks.

Outcomes of fending attempts, C-Shaped stick

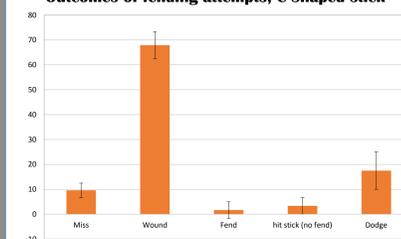


Figure 2 A: The outcomes of fending attempts with the C-shaped stick. Histogram shows outcomes, expressed percentages, with standard errors calculated between experiments. Pie chart shows breakdown of locations of "injuries", or dart impacts.

Outcomes of fending attempts, S-Shaped stick

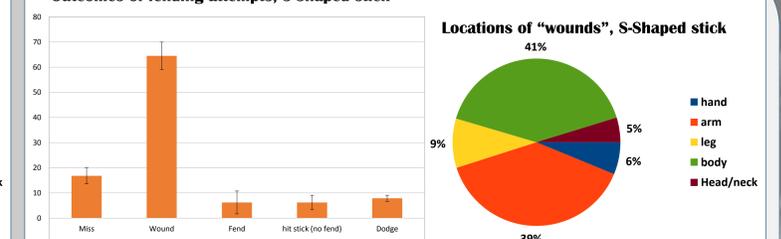


Figure 2 B: The outcomes of fending attempts with the S-shaped stick. Histogram shows outcomes, expressed percentages, with standard errors calculated between experiments. Pie chart shows breakdown of locations of "injuries", or dart impacts.

Conclusions

The present study is only preliminary, and only represent the fending attempts of two test subjects. As such, no conclusive statements can be made regarding the universal efficacy of S-shaped or C-shaped sticks as dart fending devices. That said, the 3.9% success rate for fending with both sticks is extremely low. Flinching provided a significantly higher degree of protection from darts (12%) even when test subjects attempted not to flinch. While this flinching response could be overcome through practice, and dart fending success rates could likely increase due to practice, would this be of practical use, and is it likely that S-shaped sticks were designed as dart fending devices?

The author has also performed preliminary experiments using a small 14" diameter shield mounted on the left arm. Even with an atlatl in the right hand and a handful of darts in the left, a 90% success rate in protecting the body from darts was readily possible in the first shield-fending session. Additionally, simply stepping aside as an incoming atlatl dart approaches is almost 100% effective-so effective in fact that the subconscious flinch response provides a significant degree of protection from atlatl darts, even at the relatively close range of 10 yards.

Preliminary data of this study suggest that Basketmaker S-shaped sticks are unlikely to be "fending sticks". Far better tools (shields) could be designed for the task, and behavior (Side stepping) provides an extremely significant degree of protection as well. The idea of these tools as fending sticks is both unnecessary and in the author's opinion unlikely. Preliminary experiments in throwing Basketmaker S-shaped sticks show them to be very stable in flight, exhibiting straight flight paths of many tens of yards. S-shaped sticks are poor defensive tools and are likely to be throwing sticks. This is perhaps unsurprising, as there exist in New Mexico pictographs of S-shaped being employed in rabbit hunting⁶.

References Cited

- Guernsey, S. J., and Kidder, A. V. 1921. "Basket-maker Caves of Northeastern Arizona". Papers of the Peabody Museum of American Archaeology. Cambridge.
- Heizer, R. F. 1942. "Ancient Grooved Clubs and Modern Rabbit-Sticks". American Antiquity, Vol 8, No. 1.
- Morris, E. H. 1939. "Archaeological Studies in the LaPlata District, Southwestern Colorado and Northwestern New Mexico." Washington D.C.
- Geib, P. R. 1990. "A Basketmaker II Wooden Tool Cache from Lower Glen Canyon." Kiva, Vol. 55, No. 3.
- LeBlanc, S. A. 1999. "Prehistoric Warfare in the American Southwest". University of Utah Press.
- Mark, R., and Bill, E. 2009. "Pictographs at Hunters Shelter: Possible Extension of the Red Linear Style into the Guadalupe Mountains of Southern New Mexico." Plains Anthropologist, Vol. 54, No. 211.



Figure 3: Some of the equipment used in the experiment. Clockwise from top: Two S-Shaped sticks (The one at bottom is the one which was used). Ventral and dorsal views of the two atlatls used in the experiment (Top is a replica of a specimen from Broken roof Cave, AZ, bottom a reproduction of one from White Dog Cave, AZ). Three darts, based on specimens recovered from White Dog Cave, AZ, fitted with rubber blunts fashioned from golf club grips.

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