

EXAMINATION OF THE KINETIC ARM THROWING SLEEVE AND ITS EFFECTS ON THROWING MECHANICS

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INTRODUCTION

In the overhead throwing athlete, elbow injuries commonly occur, especially in baseball players. Various methods have attempted to manage throwing volume and load via manipulation of training or performance factors, such as pitch counts, inning limits, or pitch type restrictions. However, even with these methods in place elbow injuries continue to rise. In high school, collegiate, and professional baseball pitchers there has been no link to pitch and inning counts and reduced injury risk [1,2]. Recently, a throwing device, The Kinetic Arm worn on the throwing arm has been developed in attempts to alleviate the stress seen at the elbow. The purpose of this study is to investigate the effects of The Kinetic Arm device on the athlete's throwing biomechanics, specifically elbow varus torque, arm rotational velocity, arm rotation, and arm slot.

METHODS

A total of 8 high school and collegiate baseball players (age 18.8 ± 2.9 yrs; height 71.8 ± 1.9 in; weight 183.9 ± 32.2 lbs) were used in this study. Players reported to Elite Edge (Chamblee, GA) facility and were fitted with a motusBASEBALL biomechanics sensor and sleeve (Motus Global, Rockville Centre, NY, USA). Each player was given unlimited time to warm-up for maximum effort throwing. When ready, players were asked to throw 5-8 throws without wearing the KA device and then 5-8 throws while wearing the KA device. Throws were made into a target on a net at a distance of 20 ft away with maximum effort. Players were allowed to crow-hop and were instructed to take their time between throws. Ball velocity was recorded with a radar gun (Pocket Radar, Santa Rosa, CA) for each throw. The sensor recorded four metrics - elbow varus torque, arm rotational velocity, arm rotation, and arm

slot - for each throw. Previous research has shown the biomechanics sleeve to be a valid tool for these measurements [3]. For each player, measurements were averaged for both conditions. Paired t-tests were used to compare without KA throws and with KA throws. The level of significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Means and standard deviations were calculated for both conditions (Table 1). Elbow varus torque was lower in the KA condition ($p=0.01$). There were no differences in arm rotation, arm speed, or arm slot between conditions. The Kinetic Arm sleeve is a unique intervention that directly manages biomechanics on the throwing upper extremity for the throwing athlete. The Kinetic Arm sleeve could be applied to the broad spectrum of the care of the throwing athlete. Specifically, the KA could be utilized for all aspects of the athlete's preseason, in-season, and post-season management. For rehabilitation of the throwing athlete, the KA could serve as a rehabilitative assistive device for the return-to-sport phase for throwing, similar to how post-operative ACL patients may utilize aquatic therapy to facilitate return to running.

CONCLUSIONS

Wearing The Kinetic Arm device allows for the same throwing mechanics in baseball players while decreasing elbow varus torque. This device can be used in the rehabilitation of players as they progress in their return to throw programs preseason, in season, or post injury as a workload management tool to reduce stress at the elbow.

REFERENCES

- [1] Zaremski et al. (2018). *Orthop J Sports Med.*
- [2] Saltzman et al. (2018). *J Shoulder Elbow Surg*
- [3] Boddy et al. (2019) *PeerJ*,

Table 1: Arm biomechanics when throwing with and without the Kinetic Arm.

	Without KA	With KA	P-value
Torque (Nm)*	42 ±13	35±11	0.01
Arm rotation (°)	154±10	152±9	0.21
Arm speed (RPM)	930±97	884±75	0.08
Arm slot (°)	55±7	55±8	0.75
Ball velocity (MPH)	78±5	79±5	0.11

* Significant difference ($p < 0.05$).