

The Effects of Kinesiotape on Scapular Kinematics in Symptomatic Baseball Players

Matt Bouche, SPT, Matt Higgins, SPT, Max IntVeld, SPT, Kyla Schmidt, SPT, Carli Wacker, SPT, Peter J Rundquist, PT, PhD



Concordia
UNIVERSITY-SAIN'T PAUL

Introduction:

Baseball players are at an increased risk for shoulder dysfunction due to repetitive overhead throwing.^{1,2} Patients with symptomatic shoulders present with altered scapular kinematics, with the greatest variations found in upward rotation and posterior tilt which modify subacromial space.^{3,4} Previous investigations of the effects of kinesiotape (KT) on scapular kinematics have been inconclusive.

Objective:

To determine the effects of KT on scapular kinematics in symptomatic collegiate baseball players.

Participants:

Six Division II and III baseball players between 21 and 25 years old (mean 22.7) with a symptomatic throwing shoulder. Four were right hand dominant.

Methods:

- Symptomatic was defined as a report or pain or dysfunction in their throwing shoulder
- Participants were screened by student physical therapists (SPTs) to determine if they fit the inclusion criteria
- Kinesiotape was applied via a mechanical correction stabilization technique by a certified KT practitioner (Figure 1)
- Scapular posterior tilting (PT) and upward rotation (UR) were collected by a designated SPT during three planes of shoulder humerothoracic (HT) elevation with the G4 electromagnetic motion capture system (Innsport, Chicago, IL)
- Scapular kinematics with and without KT were analyzed between 30-90° elevation
- Differences in PT and UR during the three planes of elevation were explored descriptively
- Differences between conditions were compared proportionally to the maximum range of motion available

Results:

- PT was consistently greater in the KT condition
 - The largest difference was in abduction, where PT was 2.92° greater
- UR was consistently less in the KT condition
 - The largest difference was in abduction, where UR was 3.22° less
- These results are outlined in Table 1
- The difference in PT was a larger proportion of available motion in abduction and was an equal proportion of available motion in elevation in the scapular plane as compared to UR
 - The PT proportion in abduction was 16%
 - The UR proportion in scapular plane elevation was 13%
- These results are outlined in Table 2

Conclusion:

Increased posterior tilting widens the subacromial space, which is thought to decrease risk of subacromial impingement in overhead athletes.³ Kinesiotape increased posterior tilting in symptomatic subjects during elevation in all 3 elevation planes. This advantage is somewhat countered by the decrease in upward rotation. Future work with an increased sample size may determine if there are statistical or clinically significant differences. Matched pair t-tests with a Bonferonni correction would be an appropriate analysis.

Clinical Implications:

These results indicate that KT may be an effective non-invasive intervention to improve scapular kinematics and/or decrease injury risk in individuals with symptomatic shoulders.

Acknowledgements:

Shani Johnson, PT, DScPT, CMPT
Kristin Lefebvre, PT, PhD

References:

1. Lin, J. D., et al. Shoulder Injuries in the Overhead-Throwing Athlete: Epidemiology, Mechanisms of Injury, and Imaging Findings. *Radiology* Vol. 286 No. 2. 2018.
2. Kibler, W.B., et al. Clinical implications of scapular dyskinesis in shoulder injury: the 2013 consensus statement from the 'scapular summit'. *Brit J Sport Med*, 2013; 47, 877-885.
3. Lawrence, R.L., et al. Comparison of 3-dimensional shoulder complex kinematics in individuals with and without shoulder pain, part 1: Sternoclavicular, acromioclavicular, and scapulothoracic joints. *J Orthop Sport Phys*, 2014; 44(9), 636-645.
4. Lawrence, R.L., et al. Comparison of 3-dimensional shoulder complex kinematics in individuals with and without shoulder pain, part 2: Glenohumeral joint. *J Orthop Sport Phys*, 2014; 44(9), 646-655.
5. Shih, Y.-F., et al.. Effects of Kinesiology Taping on Scapular Reposition Accuracy, Kinematics, and Muscle Activity in Athletes With Shoulder Impingement Syndrome: A Randomized Controlled Study. *J Sport Rehabil*, 2018; 27(6), 560-569.

Table 1: Dominant Arm Scapular Motions through 30-90 Degrees of Elevation

Scapular Motion	Arm Motion	Average Change – No KT (Range)	Average Change – With KT (Range)
Posterior Tilt	Abduction	11.4 (6.7-17.9)	14.3 (6.1-19.8)
	Flexion	5.4 (-1.5-10.6)	6.4 (-3.5-10.9)
	Elevation in the Scapular Plane	6.9 (1.8-11.7)	8.5 (2.8-12.4)
Upward Rotation	Abduction	24.2 (17.5-28.1)	21.0 (13.9-31.2)
	Flexion	26.2 (21.0-29.7)	24.1 (15.7-30.1)
	Elevation in the Scapular Plane	24.4 (19.1-28.9)	22.5 (15.8-29.2)

Table 2: Proportion Data for Each Scapular Motion

Scapular Motion	Abduction Ratio	Flexion Ratio	Scapular Plane Ratio
Posterior Tilt	0.16	0.10	0.13
Upward Rotation	0.11	0.07	0.13

Figure 1: Kinesiotape application

