



National Federation of State
High School Associations



Pitcher's Arm Care Suggestions



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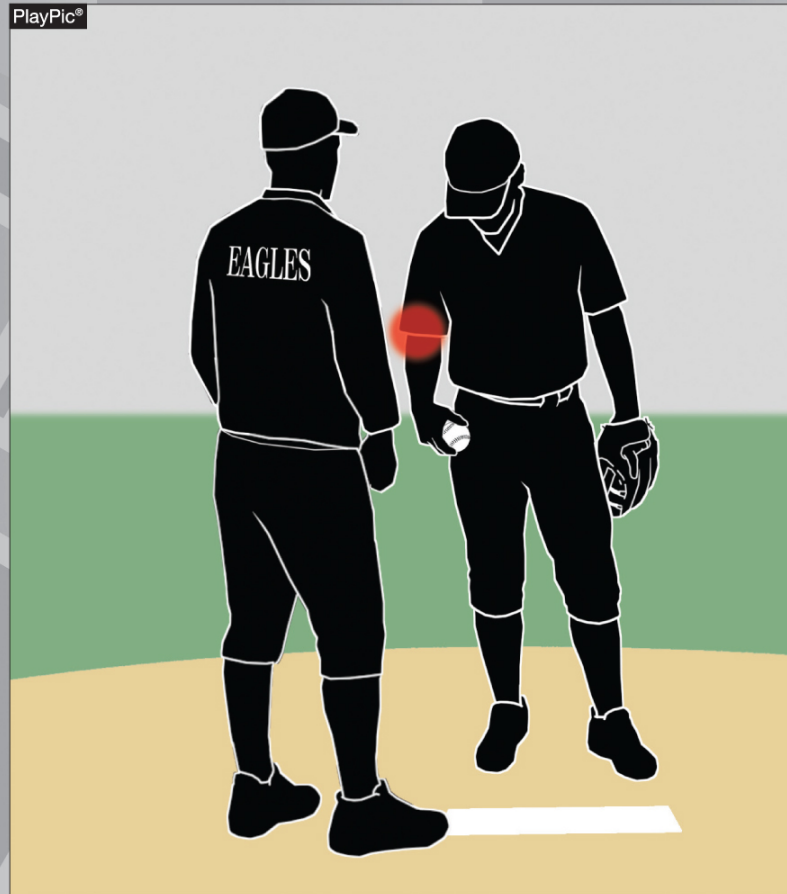
Arm Care



Coaches have an obligation to take care of their pitchers. Arm injuries continue to rise and proper care must be taken. No single win is worth unnecessary risk or injury to a player.



Arm Care



When a pitcher indicates he is injured, the coach should remove him from the game immediately. His replacement gets as many throws as reasonable to warm up.



Arm Care



Taking care of a pitcher's arm following a game is one thing that can be done to help prevent injuries. However, no training or treatment program will prevent all injuries.



Arm Care Suggestions

- Arm injuries are on the rise in high school age players.
- Most of the arm injuries are at the pitcher position.
- 45% of pitchers under the age of 12 experience chronic elbow pain.
- Ulnar collateral ligament reconstruction (Tommy John) surgeries have increased over 700% in the last decade for adolescent pitchers.



Arm Care Suggestions

4 Main Areas of Concern

- Anterior Shoulder
- Posterior Shoulder
- Medial Elbow
- Lateral Elbow



Arm Care Suggestions

Reasons

- Overuse, undertrained, inadequate rest, insufficient recovery and repair time
- Poor throwing/pitching delivery
- Incomplete warm-up and cool down activity
- Anatomical limitations or restrictions
- Too many games and not enough practices
- Poor physical conditioning
- Parental and coaching ignorance or worse... indifference



Arm Care Suggestions

Red Flags

- Decrease in velocity
- Lack of command, breaking ball loses snap
- Reluctant to throw off-speed pitches
- Pitching delivery changes
- Facial grimaces, frustration, rubbing or shaking arm
- Normal routine altered, less or more time spent to get ready to pitch
- Pain, sensitivity, burning sensation or swelling
- Loss of range of motion and/or grip strength



Arm Care Suggestions

Corrective Actions

- Proper technical, mental, nutritional and physical training before, during and after pitching with appropriate rest, recovery and repair time
- Proper practices, workload management for pitches, pitchers and entire staff
- Develop other pitchers to share the pitching load
- Observe and understand pitchers' tendencies, make pain assessments, review past performances, preparation and routine



Arm Care Suggestions

Corrective Actions

- No overhead throwing of any kind for at least 2-3 months per year (4 months preferable).
- No competitive baseball pitching for at least 4 months per year.
- Do not pitch more than 100 innings in games in any calendar year.
- Avoid pitching on multiple teams with overlapping seasons.
- A pitcher should not also be team's catcher due to overuse concerns.



Arm Care Suggestions PDF References

Risk Factors for Shoulder and Elbow Injuries in Adolescent Baseball Pitchers

Samuel J. Olsen II, MD, Glenn S. Fleisig,* PhD, Shouchen Dun, MS, Jeremy Loftice, and James R. Andrews, MD
From the American Sports Medicine Institute, Birmingham, Alabama

Background: There is little evidence supporting current safety recommendations for adolescent pitchers.

Hypothesis: Pitching practices of adolescent pitchers without history of arm injury will be significantly different from those of adolescent pitchers who required shoulder or elbow surgery.

Study Design: Case control study; Level of evidence, 3.

Methods: Ninety-five adolescent pitchers who had shoulder or elbow surgery and 45 adolescent pitchers who never had a significant pitching-related injury completed a survey. Responses were compared between the 2 groups using χ^2 tests and Z' analyses. Multivariable logistic regression models were developed to identify the risk factors.

Results: The injured group pitched significantly more months per year, games per year, innings per game, pitches per game, pitches per year, and warm-up pitches before a game. These pitchers were more frequently starting pitchers, pitched in more showcases, pitched with higher velocity, and pitched more often with arm pain and fatigue. They also used anti-inflammatory drugs and ice more frequently to prevent an injury. Although the groups were age matched, the injured group was taller and heavier. There were no significant differences regarding private pitching instruction, coach's chief concern, pitcher's self-rating, exercise programs, stretching practices, relieving frequency, pitch type frequency, or age at which pitch types were first thrown.

Conclusion: Pitching practices were significantly different between the groups. The factors with the strongest associations with injury were overuse and fatigue. High pitch velocity and participation in showcases were also associated with increased risk for injury.

Clinical Relevance: New recommendations were made based on these results. Adherence to the recommendations may reduce the incidence of significant injury to adolescent pitchers.

Keywords: pitch count; curvball; velocity; showcase; surgery; prevention

Baseball pitchers are at increased risk for shoulder and elbow injuries. Over the past several years at our institution, we have noted a sharp increase in the number of high school and collegiate pitchers requiring surgery for a pitching-related injury. When comparing the time period of 1994-1999 to 2000-2004, there was a 4-fold increase in the number of elbow surgeries performed on collegiate baseball pitchers by our senior surgeon (J.R.A.) and a 6-fold increase for high school pitchers.¹ Because of this observation, attempts have been made to identify risk factors for these injuries.

Lynn et al² followed 286 youth baseball pitchers (9-12 years old) during 2 consecutive spring seasons. They found that the incidence of elbow pain increased with increased

age, increased weight, decreased height, lifting weights, playing outside the league, decreased satisfaction with one's pitching, pitching with arm fatigue, and number of pitches thrown per season.³ They also identified risk factors for shoulder pain, which included decreased satisfaction with one's pitching, pitching with arm fatigue, number of pitches thrown per game, and number of pitches thrown per season.⁴ The subsequent study by the same authors made several similar conclusions. In addition, they recommended that pitchers between ages 9 and 14 years should not throw breaking pitches because of an increased incidence of shoulder and elbow pain.⁵ However, long-term follow-up of these subjects has not yet been reported. Therefore, it is unknown whether their pain was an early indicator for significant injury.

On the basis of these studies, the USA Baseball Medical and Safety Advisory Committee made several recommendations to help young pitchers avoid injury.⁶ Included was a statement that adults should pay attention and react appropriately to arm pain in these athletes. Pitch counts should be monitored closely. Pitchers should avoid throwing

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[Athletic Training]



Baseball Pitching Biomechanics in Relation to Injury Risk and Performance

Dave Fortinbaugh, MS, Glenn S. Fleisig, PhD,* and James R. Andrews, MD

Context: Baseball pitching kinematics, kinetics, ball velocity, and injuries at the shoulder and elbow are related.

Evidence Acquisition: PubMed and Sport Discus were searched for original studies published between 1991 and 2008. Relevant references in these studies were reviewed. Independent studies that tested relationships between kinematics and kinetics were included, as were studies that tested relationships between kinematics and ball velocity. Descriptive studies that simply quantified kinematics and/or kinetics were excluded.

Results: Several kinematic parameters at the instant of foot contact were associated with increased upper extremity kinetic (ie, knee flexion, knee flexion moment, shoulder abduction, and shoulder horizontal adduction). The timing of medial-rotational rotation, pelvic rotation, and upper trunk rotation was associated with increased kinetics and decreased ball velocity. Low loading force of the lead leg and a short stride were associated with decreased ball velocity. Decreased maximum shoulder external rotation, shoulder abduction, knee extension, and trunk tilt were also associated with decreased ball velocity. As pitchers develop, kinematic values remain similar, their variability reduces, and kinetic values gradually increase. Right kinematic variables were more among pitch types, although the kinetics of fastballs and curveballs were relatively the same; changing kinetics were the lowest. As pitchers progressed, kinetic values remained constant, but increases in arm pain were reported.

Conclusions: Several kinematic parameters were related to joint kinetics and ball velocity. To enhance performance and reduce injury risk, pitchers need to learn proper baseball mechanics as an early age. A changing is recommended as a safe secondary pitch to complement the fastball; the curvball can be added after fastball and changing mechanics are mastered. Decoding increase and pitching while fatigued is necessary to minimize the risk of arm injury.

Keywords: shoulder; elbow; ball velocity; kinetics; mechanics

A s with most other athletic movements, the biomechanics of baseball pitching is studied to improve performance and prevent and/or rehabilitate injury. As technology in the sports science field has developed over the past 20 years, the science has approached its using these observations to the benefit of athletes. The initial studies provided accurate descriptions of the pitching kinematics and kinetics,¹⁻¹⁰ which helped athletes, coaches, medical professionals, and scientists understand the demands of pitching. Subsequent research has introduced factors that comprise performance enhancement and/or injury. The purpose of this review is to summarize all the available scientific research on baseball pitching biomechanics related to performance and injury. The information is grouped into 3 areas: kinematics and its relationship to velocity; the association among kinematics, kinetics, and injury; the effects of

fatigue; the development of a pitcher from youth to adult; and the effect of pitch type on mechanics. Over the years, research has been collected from different institutions with assorted methodologies, thereby making it difficult to compare numbers directly. Despite variance in numbers, the commonalities among professional patterns are most interesting.

KINEMATICS AND VELOCITY

If you ask baseball coaches what elements make a pitcher effective, their responses will be "velocity" and "accuracy." Pitching coaches and biomechanists have studied the motion of elite pitchers to determine how they consistently throw fast pitches at the elite level. Limited scientific research exists on the biomechanical factors that affect accuracy, but it is a known good

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Risk of Serious Injury for Young Baseball Pitchers - A 10 Year Prospective Study
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Arm Care Suggestions

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- The references for these suggestions are from:
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 - (<http://www.asmi.org/research.php?page=research§ion=positionStatement>)



KSHSAA Pitching Rule

- This information is in your Baseball/Softball Manual on page 10.
 - 9 innings in an one day.
 - Maximum accumulation of 12 innings during any 48 hour period.
 - One pitch to a batter = one inning.
 - 48 hour period starts with the beginning of the game.
 - Regular season and postseason.

