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## **Fatigue and the Fast-Pitch Softball Pitcher: A Systematic Review**

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Injury risk to the softball athlete is of increasing concern as popularity for the sport in younger athletes rises. Though it has been reported that injury incidence is similar to that of baseball, softball pitchers are not subjected to the same protective measures of pitch counts [1]. As a result, softball pitchers are often required to pitch through injury without required rest between games or practice. The ways in which fatigue influences injury risk in baseball pitchers has been studied extensively. The purpose of this systematic review was to determine what has been studied and the quality of research that has been conducted in the area of fatigue and injury risk in the female softball athlete. It is the goal of the authors that a critical analysis of work accomplished in this area will encourage more research to improve safety of softball for female athletes. A systematic literature search using Pubmed, Google Scholar and Web of Science databases along with hand-searching was conducted to identify original research that reported at least one outcome measure of muscle fatigue in female fast-pitch softball or windmill pitchers. Three journal articles met inclusion criteria. All articles included reported measures of muscle strength fatigue in highschool pitchers before and after one or several games [1–3]. None of the reports measured kinetic or kinematic variations in pitching before and after fatigue. It has been reported that repetitive kinetics and kinematics of the windmill pitch are related to most softball pitching injuries [5]. The repetitive and high intensity motion creates large stresses on ligaments, muscles and joints. This population may be particularly vulnerable to repetitive stress injury due to the lack of pitch counts. Research analyzed in this review demonstrated that changes in muscle strength occur in softball pitchers. While this work is compelling evidence that fatigue may influence the windmill pitch, it has yet to be identified if fatigue is related to injury risk. Kinetic and kinematic evaluation of the windmill pitch before and after fatigue is necessary to answer this question.

### **References:**

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