Predictive Value of the Functional Movement Screen as it Relates to Anterior Cruciate Ligament Injury

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Anterior cruciate ligament injuries occur over 200,000 times annually in the United States alone (Brophy, et al. 2009). This injury strains the healthcare system and affects the players, teams, parents, and the organization they are a part of. There have been, however, clinically researched risk factors that predispose athletes to ACL injury (Gignac, et al. 2015; Laible, et al. 2014). As a result, there is a clinical need for an effective screening tool to identify those athletes at risk for ACL injury. The Functional Movement Screen has been shown to be an effective screening tool for detecting athletes who are at a greater risk for generalized injury, but its predictive value has never been tested for specific injury rates (Kiesel, et al. 2007; Chorba, et al. 2010; Kiesel, et al. 2014; Letalafkar, et al. 2014). We performed a prospective study on 20 freshman participants who were athletes on a NCAA Division II soccer, basketball, or volleyball team. The results of the study to this point include one men’s soccer athlete with a torn ACL, and an FMS score of 19, leading us to believe that no correlation exists between FMS score and incidence of ACL injury at this time. The purpose of this study was to determine if FMS can be an effective tool for predicting risk of ACL injury in athletes.

**RESULTS**

Distribution of 12, 17, 17, 17, 17, 16, 16, 16, 19, 16, 18, 18, 18, 18, 16, 17, 18, 17, 17, 17

Due to the lack of data points, we were unable to perform any clinically significant statistical analysis. The hope is that over the remaining three years of this study more data will be gathered so that this can be performed with significance.

**DISCUSSION**

There have been studies conducted on the predictive value of FMS, but all have been for generalized injury, including upper and lower extremities (Kiesel, et al. 2007; Chorba, et al. 2010; Kiesel, et al. 2014; Letalafkar, et al. 2014). In addition, all the previous studies defined an injury based on time lost from practice or competition (Kiesel, et al. 2007; Chorba, et al. 2010; Kiesel, et al. 2014; Letalafkar, et al. 2014). This study was designed to assess the predictive value of FMS for a specific injury, that being injury of the ACL. Our definition of an ACL injury was that it had to be diagnosed by a certified athletic trainer or sports medicine doctor along with a confirming MRI. The purpose of identifying the predictive value of FMS is regards to incidence of ACL injury was to potentially identify an effective screening tool to identify athletes who are at a greater risk for ACL injury. Once identified, these athletes could be placed into an ACL prevention program to attempt to control the modifiable risk factors for ACL injury, and thus reduce overall incidence of ACL injury (Laible, et al. 2014). Through this point in the study, there is no correlation between FMS score and ACL injury. The single athlete who suffered an ACL tear had an impressive FMS score of 19, meaning that he performed over half of the movement tests without any compensation.

**LIMITATIONS**

There were several limitations to this study. Both of the researchers were trained in FMS prior to this study, but neither had any patient experience with FMS outside of supervision and instruction. The researchers were also not trained in an official FMS course, but rather were instructed by a healthcare professional who was certified in FMS. The researchers were also unable to screen 2 men’s soccer athletes, 2 volleyball athletes, and 6 men’s basketball athletes due to unforeseen issues to e-mail, so the sample size was also too small to be statistically significant, having only 20 participants.

The aim of this study is to decrease the number of ACL injuries in athletics through early identification and preventative care. ACL injuries have a debilitating effect on an athlete psychologically, physiologically, socially, and financially (Gignac, et al. 2015; Laible, et al. 2014). The secondary goal of this study is to decrease the number of ACL injuries in athletics through early identification and preventative care. Preventing ACL injuries is the best way to avoid these complications. There are several risk factors that have been identified to increase the risk of ACL injury (Laible, et al. 2014; Alentorn-Geli, et al. 2009; Evans, et al. 2012; Anderson, et al. 1987; Ruan, et al. 2009; Fauché, et al. 2013). There are modifiable risk factors, however, which when addressed in a prevention program have been shown to decrease incidence of non-contact ACL injury (Alentorn-Geli, et al. 2009; Evans, et al. 2012; Blackburn, et al. 2013; Hewett, et al. 2005).

The functional movement screen is a seven test system used to quantify the quality of an athlete’s functional movement. It consists of the deep squat, hurdle step, single leg lunge, active straight-leg raise, trunk stability push-up, shoulder mobility test, and rotary stability test (Burton, et al. 2010). Each of the aforementioned tests are scored on a scale of 0-3. A zero is awarded if the athlete experiences pain at any point during the test, a 1 is awarded if the athlete is unable to perform the test, a 2 is awarded if the athlete is able to perform the test with a compensation, and a 3 is awarded if the athlete is able to perform the test perfectly without any compensations. The individual scores are then added up to create the athlete’s composite score (Burton, et al. 2010). This composite score is used to determine an athlete’s level of risk for sustaining a non-contact injury. It is generally accepted that a composite score of less than 14 places an athlete at a greatly increased risk for injury (Kiesel, et al. 2007). Therefore, the purpose of this study was to determine the efficacy of using FMS as a screening tool to identify athletes who are at an increased risk for ACL injury.