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THE ABILITY OF MOVEMENT SCREENING TOOLS TO PREDICT INJURY IN THE ATHLETIC AND TACTICAL POPULATIONS

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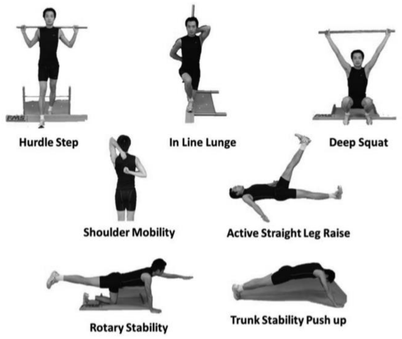
Introduction

Injury prediction using movement screens could save the economy billions of dollars each year in both athletic and tactical populations in terms of rehabilitation costs and productivity loss.[1] Movement screens assist in identifying compensations, which can create poor movement patterns, alter biomechanics, and can have the potential to create micro- or macro traumatic injury.[2]

Movement screens such as: Star Excursion Balance Test, Landing Error Scoring System, Y Balance Test and Functional Movement Screen (FMS) have attempted to predict injury. Created in 2005, the FMS™ is a popular screening tool that has been applied to multiple sporting populations in attempt to predict injury[3]

The purpose of the critical review was to
(1) critically review research examining the relationship between movement screens and injury, (2) to synthesize their findings, and (3) to explore any emerging differences in the use of movement screens between tactical and athletic populations on movement screens and their ability to predict injury.



Seven Movement Patterns of the Functional Movement Screen

METHODS

A search of key databases (CINAHL, OVID, PubMed and SportsDiscus) using dedicated search terms was used to inform this literature review.

The databases used included CINAHL, OVID, PubMEd and SportsDiscus with variation on search terms including movement screen(ing), FMS, SFMA and injur*
The inclusion criteria were: a) human subjects, b) adults, c) injury sustained, and d) movement screen completed. The exclusion criteria were: comparing injured vs uninjured population, b) study population included participants under 18 years of age, c) injury obtained prior to initial assessment, d) not a research article, e) not injury specific, f) unable to be translated into English, g) provided specific training to decrease likelihood of injury.

Included studies were evaluated using the modified Downs and Blacks[4] tool. The Kennelly's[5] grading system was used to rate the quality of each paper.

Following appraisal, key data were extracted from the articles and tabulated, including the design, demographics, movement screen and examiner, injury collection, criteria for injury, findings, injury risk factors, reported weaknesses/limitations and CAS.

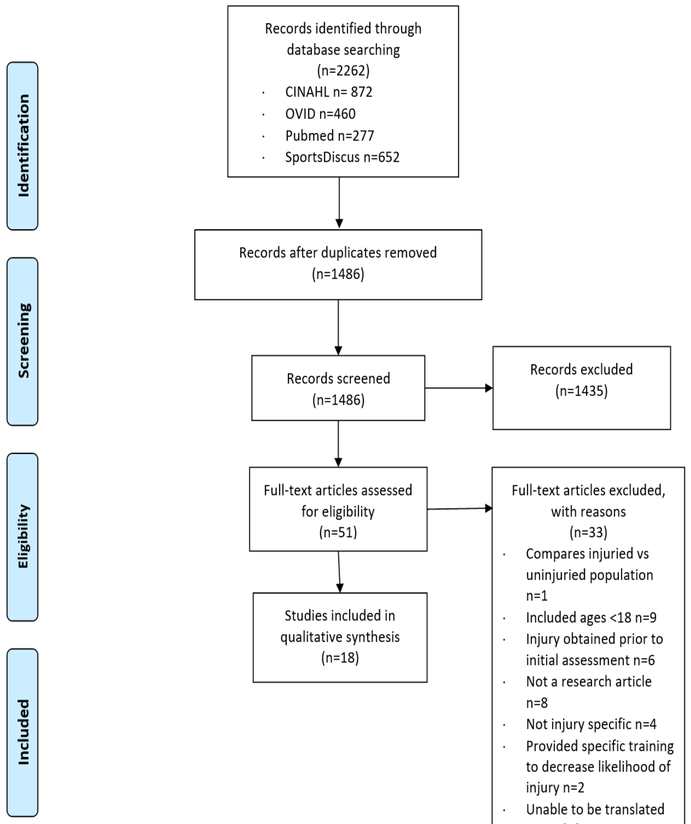


Figure 1. PRISMA flow diagram identifying literature search, screening and eligibility results.

Results

Study Characteristics

8 Tactical and 10 Athletic studies

- Tactical: firefighters, soldiers, Maritime Security, US Coast Guards, US Naval Midshipmen, Marine Corps
  Findings: 18 to 30 years (mean=22.4± 2.7), with one study including 18 to 57 years
- Athletic: basketball, football, Soccer, track and field, and collegiate athletes
  Findings: 18 to 25 years (mean= 21.4±2.3) with one population >32 years

Research Quality

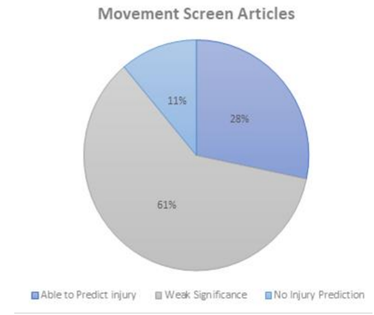
The studies ranged from 14.29% to 58.93% for methodological quality using the Downs and Blacks appraisal tool

Movement Screens

- FMS (used in 12 of 18 articles)
- Basketball Mobility Test (BMT), upper and lower Y balance test, Marine Corps Physical Fitness Test (PFT), Movement Competency Screen (MCS) and Physical Readiness Test (PRT)

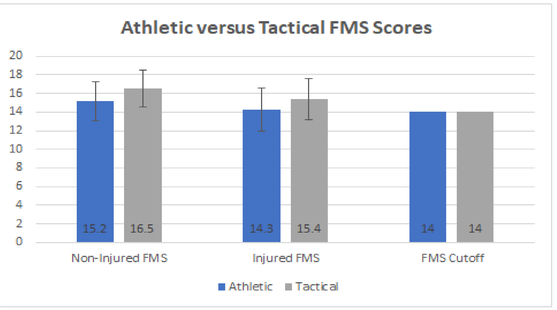
Movement Screens Ability to Predict Injury

- Combined result from all studies: mean FMS score of 13.2-16.6 has been reported to predict injury.
- Uninjured population mean FMS score: 12.6-16.3
- 6 of 18 studies reported the FMS did not have enough discriminative power to or significance to predict injury
- Components of the PFT, MCS, PRT found significant relationships to predict injury



Summary

The quality of the studies reviewed were evaluated as fair or poor utilizing the Downs and Black critical review tool. Upon comparison of athletic versus tactical populations, the percentage of male versus females, the quality of studies, and the FMS cut-off scores were relatively similar. Differences were present in sample sizes and the mean FMS scores. The average sample size was 9x larger for tactical populations. In addition, the FMS scores for athletic populations were also one point lower than the tactical population for both injured and non-injured FMS scores.



Discussion

In a quarter of the studies reviewed, movement screens were able to predict injury, however; the majority of studies were not able to draw a strong statistical conclusion. The quality of these studies were also evaluated as fair to poor. The main weaknesses and limitations of the studies reviewed included small sample sizes, no consensus of injury definition, short surveillance period and low sensitivities for FMS scores. Confounding variables that may have affected the ability to predict injury included: previous injuries, age, gender and exercise history. However these variables were poorly reported.

Conclusion

The clinical use of movement screens to predict injury should be used with caution in both tactical and athletic populations. The majority of studies evaluated were either of poor quality or unable to provide a strong significant finding. Movement screens provide insight into quality of movement and future directions for conditioning programs.

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