Can the Functional Movement Screen Identify Risk for Injury in the Recreational Dance Population?

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Background:
- Millions of adolescent dancers in the United States participate at recreational and competitive dance studios.1
- Ballet dancers have a 70-90% chance of sustaining an injury throughout his or her career.2,3
- Most dance injuries are ovosue in nature, developed over time due to poor technique and repetitive movements.2,4
- Lower extremity and back injury rates in recreational dance prevalent. A high prevalence of injuries may be due to developmental instabilities of adolescent bodies.5,6
- Current dance screens are scarred and varied, especially among the recreational population, demonstrating a need for a standardized screening tool, predictive of dance injuries.7
- It is essential to identify body movement impairments prior to the development of acute, overuse or chronic injuries.8
- The Functional Movement Screen (FMS) is a tool designed to quickly detect physical impairments in the athletic population.9
- It is reliable when administered by health care professionals and by coaches or trainers.10
- Seven tests (Figure I), evaluate symmetry, functional mobility, flexibility and stability of the trunk, pelvis and lower extremities.11
- The lower extremity and core focus of the FMS identifies lower extremity and spinal issues in athletes. The screen could apply to the recreational dance population, as most dance injuries involve the lower extremity and spine.12
- A score below 14 may predict an increase in future injury.13-15
- The FMS may be used address the high rates of the adolescent recreational dance population.

Methods:
A systematic review of literature from 1996-2013 was conducted with the aims of identifying components of current screens used for dancers, determining if the FMS has been used with the dancer population, and determining if the impairments identified by the FMS are also common dancer impairments. The process is displayed in a PRISMA flow chart. (Figure II & III)

Dance article search: Key search terms: dance*, ballet*, injury*, assessment, screen*, recreation*, test*, tool, and test*. Exclusion criteria were dance articles consisting of expert opinion papers, screening tools that were only questionnaires, and screenings without follow up injury data. (Figure II)

FMS article search: Key search terms: functional movement screen (FMS) and athletes; FMS and injury*; FMS and performance; FMS and prevention; FMS and sport; FMS and prevent*; FMS and art*; FMS and pain; FMS and dance. (Figure III)

Critical Review of the Literature
Centre of Evidence Based Medicine was used to select the articles for this systematic review. A level of evidence of 2c (outcomes research) was used as a cutoff.

Results:
No articles that explored the relationship between using the FMS and the dance population were identified. In total, 13 studies were included in the systematic review: four dance, and nine FMS.21

Dance Review:
- All four dance articles revealed predictive findings of injury risk, however the methods and screen of each study varied.21-22
- Only one study observed recreational dancers.23
- Predictors for injury identified during dance screens were: median current disability scores, history of low back pain, right foot pronation, less lower extremity strength, positive standing bow and low pressure increase during knee lift abdominal test.2,12
- One study established that a history of previous injury, dance discipline, specifically ballet, scoliosis, young age, and hypomobility in hip external rotation were predictive of back injuries only.12

FMS Review:
The nine FMS articles analyzed: service men and women, firefighters, and athletes of golf, mixed martial arts (MMA), and American football.10,15-18
- The FMS was accurate in predicting injuries in all studied populations, except golfers.21
- Two of out nine studies performed FMS without intervention between pre and post data collection.15,22
- Performance of the deep squat and push up tests were significant predictors of injury.17
- Seven studies utilized an intervention, based on the pre-test FMS results.20,21,22.22 These included core strengthening/ corrective exercise, yoga, standardized off-season intervention program, fitness/movement orientated and functional training programs.

Discussion:
- A need for research on the use of FMS with a dance population was identified, therefore a systematic review was completed.
- The systematic review yielded no sources exploring the use of the FMS with a dance population.
- Of the reviewed dance studies, dynamic movement tests were most effective in identifying potential injury.
- The FMS has been shown to be reliable to evaluate an athlete’s quality of movement. It can identify impaired mobility and/ or stability, especially in the lower extremity and core. It can predict future occurrence of injury in athletes requiring multi-planar movements.
- The FMS could be used in a dance studio setting, administered by dance instructors, and aid in guiding appropriate referrals to prevent future injury. The similar demands of sports and dance suggest appropriateness of the FMS to predict future injury in the recreational dance population. Future studies are needed to confirm this statement.
- Further research is needed regarding the implementation of a dynamic systems screen, like the FMS, with a recreational dance population.

References