Relationship between functional movement screening and physical fitness characteristics in Indonesian youth combat sport athletes

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Introduction: The functional movement screen (FMS) is a subjective assessment of movement quality to identify muscular limitations and/or asymmetries consisting of seven movements that utilise a variety of body positions which are suggested to provide movement integration. The objective of this study was to examine relationships between FMS scores and physical fitness characteristics as this has not been previously reported.

Methods: Seventeen pre-elite youth (16.2yrs ± 0.9) combat sport (pencak silat) athletes from the Indonesian Sport Education and Training Centre for Students (PPLP) undertook FMS (deep squat; hurdle step; in-line lunge; shoulder mobility; active straight-leg raise; rotary stability and trunk-stability push-up) and physical fitness testing (muscular endurance; muscular power; speed and speed endurance; agility; anaerobic capacity and power) at orientation camp 2009. Testing was conducted by the head trainer, who had extensive sport experience (15yrs). Regression analysis determined associations between selected variables (r). Analysis was performed using SPSS v17.0 (Chicago, IL). Significance was accepted when P < 0.05.

Results: The mean (SD) FMS score (highest possible score = 21; athlete displays complete movement competence), for all subjects was 15.6 (1.6). Of the seven movement screens, rotary stability displayed significant correlation with selected physical fitness characteristics (squat jumps: r = 0.74, P=0.001; upper body medicine ball throw: r = –0.59, P=0.01; standing long jump: r = –0.63, P=0.006; 300m sprint: r = 0.52, P=0.03; and power: r = –0.65, P=0.005).

Conclusions: Combat sport athletes require significant core strength and torso stability to optimise power projection and this emphasises the anterior oblique slings. These results suggest that the FMS rotary stability pattern is a suitable measure that is associated with specific physical fitness characteristics.

Introduction

- **Functional movement**: defined as the ability to produce coordinated movement patterns with efficiency, and this requires an optimal balance between segmental mobility and core stability throughout the kinetic chain.
- **Movement efficiency**: represents the way in which an athlete moves their body that maximises a successful performance outcome. Therefore, functional movements through enhanced core stability may provide the foundation for athletic performance.
- **Combat sport athletes require**: significant core stability and explosive torso rotational slings (anterior oblique sling) to optimise power projection. From a neuromuscular standpoint, muscle imbalances would compromise movement efficiency, thereby reducing force production capabilities and this may be related to core stability.
- **Primary purpose**: determine the relationships between functional movement screens, and physical fitness characteristics in pre-elite Indonesian combat sport athletes.

Methods

- **Design**: Multivariate correlational.
- **Participants**: Seventeen pre-elite youth (16.2yrs ± 0.9) combat sport (pencak silat) athletes from the Indonesian Sport Education and Training Centre for Students (PPLP) reported for 1 test session that lasted approximately 2 hours at an orientation camp in 2009.
- **Functional movement screen (FMS)**: Subjective assessment of movement quality proposed to identify muscular limitations/asymmetries. Seven movement screens (deep squat; hurdle step; in-line lunge; shoulder mobility; active straight-leg raise; rotary stability and trunk-stability push-up) that utilise a variety of body positions which are suggested to provide movement integration. All screens except the deep squat and trunk-stability push-up were tested bilaterally. FMS is scored on a 0–3 ordinal scale.
- **Physical fitness characteristics**: Qualitative assessment of movement quantity based on five areas including (1) muscular endurance (push up and squat jumps in 1-min); (2) muscular power (backward overhead medicine ball throw and standing long jump); (3) speed and speed endurance (30m and 300m sprint); (4) agility (4 x 5m shuttle); and (5) anaerobic capacity and power (running-based anaerobic sprint test - RAST).
- **Statistical analyses**: Descriptive and inferential statistics performed. Regression analysis determined associations between selected variables (r). Analysis was performed using SPSS v17.0 (Chicago, IL). Significance was accepted when p<0.05.

Results

- **Mean (SD) FMS score**: for all subjects was 15.6 (1.6) (highest possible score = 21; athlete displays complete movement competence).
- **Rotary stability**: only FMS that displayed significant correlation with selected physical fitness characteristics
  - Squat jumps: r = 0.74, p<0.01 (Figure A)
  - 300m sprint: r = 0.52, p<0.05 (Figure B)
  - Backward overhead medicine ball throw: r = -0.59, p<0.01
  - Standing long jump: r = -0.63, p<0.01
  - Power: r = -0.65, p<0.01

Conclusion

- The FMS rotary stability pattern is associated with specific physical fitness characteristics in pre-elite youth combat sport athletes.
- In agreement with previous research, only moderate to weak correlations suggest that FMS are not strong predictors of performance.
- Practical relevance of the FMS may be in the assessment of injury risk as previous research has shown that athletes scoring <14 are more likely to be injured.

References