



Functional Movement Screen Integration

Let's start with some questions.

Do you assess your athletes risk of injury?

Do you have a system to check whether all necessary elements for movements are present before training.

By Mrinal Roy

How much can you improve someone's performance in 6 to 8 weeks time 10% 20%?

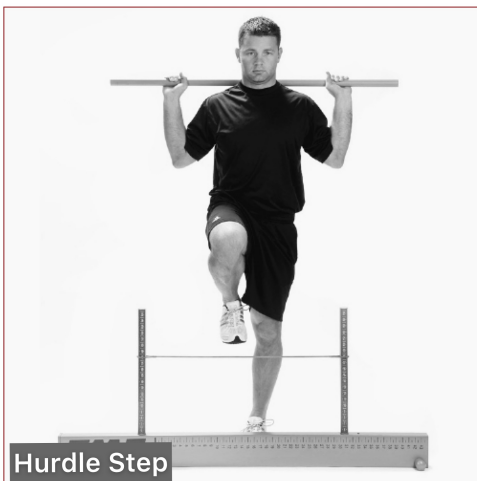
Let us consider improving 30" VJ by 10% is a 3" increment, if you're talking about 20% it will be 6". This is an excellent improvement in 6 to 8 weeks time.

Same way improving a 40m. time from 5sec 4.5sec it will be 10%, but we all know those gains are tough to come by and difficult to achieve.

But how much percentage performance will decrease if an athlete sustained an injury - 10% 20% 50% even 100%. It depends on different type of injuries and their impact on an athletes performance. An athlete's performance dropped rapidly after an injury than his performance enhancement by 10 to 20% at his best time. That's why it is important to quantify injury risk and to do that we can quantify movement efficiency which ultimately help to improve performance.

Thats Why We Need To -

- Understand the importance of injury potential and fundamental movement
- Understanding principles of the Functional Movement Screen (FMS)
- Understand principles of the FMS Solutions
- Know where to inject FMS corrective solutions into your program design
- Improve the ability to implement FMS corrective solutions into your training system



SKILL

PERFORMANCE

PILLAR STRENGTH / MOBILITY

Understanding Injury:

- PREDICTION
- PREVENTION

If you look at the above Graphic - Pillar is the key component and locate at the base. It covers the most of the area above which you build the Performance. Then comes your Skill which is your implementation of your all physical quality towards your sports or game. If you loose the Pillar base component then the whole structure will loose its balance and collapse. Result of which you will loose your performance. So its critical to identify is the Pillar functioning well that's where FMS (Functional Movement Screen) comes in picture.

Type of Injury:

Acute -

- Contact & non-contact
- Mechanism of Injury

Chronic (Overuse)

- Insidious onset
- No mechanism of injury
- Repetitive microtrauma

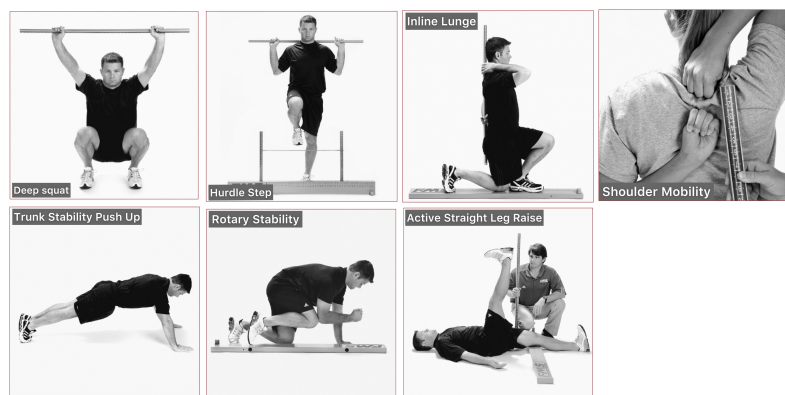
In **Acute** injuries Contact injury hardly you can predict. But non-contact injuries like while running and sudden decelerate and you tear ACL or twist ankle can be avoided if we can screen the movement errors in advance and work on them. These are the specific mechanisms.

In **Chronic** injuries are overuse injuries, these may come of doing the same biomechanical flaws or inefficiency time and time again.

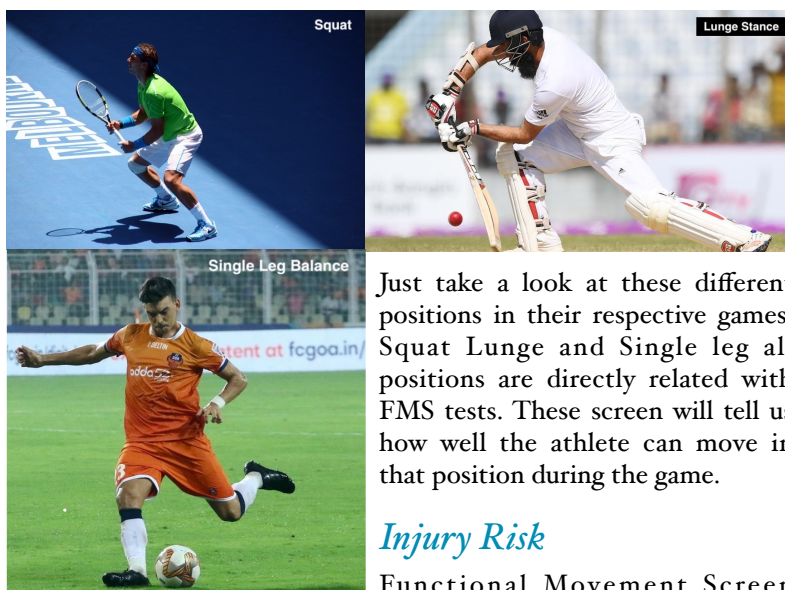
Thats why key to prevent injury is to identify these dysfunction before they start building up their performances.

Don't Place Performance On Dysfunction

Thats why we need to develop a system to identify dysfunction so that we can improve it. The movement screen made up of seven tests.



First 3 tests from top left corner Squat Hurdle Step and Lunge are specifically are standing dynamic functional positions. Other tests like Shoulder Mobility and the Active Straight Leg Raise are both mobility focused tests. They still have stability component but more on mobility focused.



Just take a look at these different positions in their respective games. Squat Lunge and Single leg all positions are directly related with FMS tests. These screen will tell us how well the athlete can move in that position during the game.

Injury Risk

Functional Movement Screen (FMS)TM looks at fundamental

movement patterns to identify compensations and inefficient movement

The screen is scored out of **21**, Each movement scored **0-3**

- Lower scores = Higher risk for injury
- Higher scores = Lower risk for injury

Research has shown improvements in FMS score to be correlated to a **significantly** reduced injury risk

FMS allows us to identify “Red Flags” or movement patterns that put athletes at risk.

Allow us to target their weak links

- Create training programs
- Movement efficiency
- Help them reach performance potential

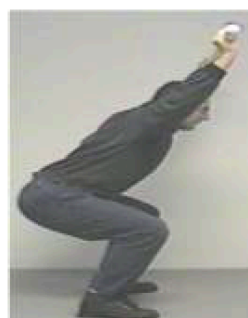
The FMS

is a simple, standardised screen that allows anyone to rate & rank the quality of individual's movement patterns in a systematic approach.

The FMS is simply a screen designed to catch fundamental movement pattern compensations. It is not an assessment tool to determine the root cause of the compensation.

The FMS cannot separate the two systems musculoskeletal and neurological, all we can tell if the athlete can perform the pattern or not.

Advantages of doing this screen is inter-rater reliability is very high.



If you look at these two images, two people are performing deep squat. The person to the left fails in the ability to drop to the proper depth. But the individual to the right shows good

depth. If we are scoring them with an FM assistant the individual to the right will score for full three points where is the person to the left will score one point. But we don't know the causes of why the person to the left is not able to achieve adequate depth by this deep squat test.



Let us look at the same pattern in a different plane so now we have the same client lying on their back in overhead squat position, now the ground is assisting them. Looks like from the mobility standpoint both of them are in a pretty good position and they should be able to do did squat better than that one individual and the left was able to do. So the point is doing deep squat alone doesn't tell us what the deficit is. It just tells us there is a deficit.

Key Consideration

Complete the entire FMS™ before making decisions or trying to interpret the weak link on a person

The screener may find that 2-3 movements uncover a weakness, but without looking at all 7 movements, a more important weakness may be overlooked.

Once you have finished the entire screening process it is time to filter out the individual's functional movement problems and make recommendations on improving them. Or refer them to someone else who can provide specialised care.

FMS SCORING AND HIERARCHY

- SOP
- Corrective Solutions

We should screen every athlete via FMS as they enter our facility and before they begin training. So we can understand the deficit in an athlete before we begin. With this we can prioritise how we can improve their deficits and design a specific program to make them better. We can then re-asses them in 4 to 6 weeks whether they have improved or not and change the program based on that.

Let us understand the FMS scoring hierarchy by the following chart.

PAIN ON ANY OF THE SCREENS	0s	UPPER/LOWER QUARTER SCREEN WORK CORRECTIVE STRATEGIES & RE-TEST IN 2 WEEKS
ASYMMETRICAL 1s	(L1, R3) OR (R1, L3) (L1, R2) OR (R1, L2)	WORK CORRECTIVE STRATEGIES & RE-TEST IN 2 WEEKS
SYMMETRICAL 1s	(L1, R1)	
ASYMMETRICAL 2s	(L2, R3) OR (R2, L3)	WORK CORRECTIVE STRATEGIES & RE-TEST IN 2 WEEKS
SYMMETRICAL 2s	(L2, R2)	
SYMMETRICAL 3s	ALL 3'S	CONTINUE MAINTENANCE PROGRAM

The above table shows us the SMS scoring system. It shows us how we can identify what are the most important points to address. So if an athlete gets zero on any movement immediately then it gets sent to the sports medicine area. That means the athlete had pain with the movement. Sports medicine department can do the further evaluation. Next important thing on the hierarchy is asymmetrical scores of one. If you see one to the left side and three or two to the right side of the table that would be something we want to address. This can be a big target area of corrective exercises. Next time will be symmetrical two's. Two's are better than asymmetrical two's, but it still shows there is a deficit which can be addressed by corrective exercises. Last in the chart is three, if anyone is scoring three better not to interfere in their movement cause their movement falls in maintenance of the movement.

FMS MOVEMENT HIERARCHY

01	ACTIVE STRAIGHT LEG RAISE
02	SHOULDER MOBILITY
03	ROTARY STABILITY
04	TRUNK STABILITY PUSH UP
05	IN-LINE LUNGE
06	HURDLE STEP
07	DEEP SQUAT

The next step is looking at the movement hierarchy and choosing the corrective solutions. So most importantly if an athlete scores poorly on an active straight leg raise then that should be addressed first. If somebody is having a problem in active straight leg raise and deep squat we need to first address the active straight leg raises because once you are sorting out the active straight leg raise maybe you can get the solution for deep squat also. The order is as per the picture on the top. Recognise that pattern moves in the simple activities to more complex.

TARGETING THE PRIORITIES

FMS SOLUTIONS TARGET EACH “WEAK LINK” WITH DIFFERENT strategies and corrective methods.

Soft Tissue

- Tension and adhesion by means of different SMR (self myofascial release)

Mobility

- Restore symmetry
- Increase range of motion

Stability

- Motor Control
- Proper sequencing patterns

This corrective exercises can be part of the warm up or pre-warmup with focus on maximum one to two priorities. Couple of exercise we can put it in strength exercise sessions and maybe 2 to 3 priority can be part of the cooling down session. Or we can have a separate standalone sessions with their off days or later in the afternoon after training.

SCORING ANALYSIS

- A ZERO must be evaluated and treated first
- Mobility first - Active Straight Leg Raise and Shoulder Mobility
- Primitive patterns next - Rotary Stability and TSPU
- Asymmetries must take priority
- Finally, functional re-patterning

So mobility should be the first approach after treating the pain. Building on that we should look for the asymmetrical movement patterns first. If we find a score of 1-3 or 2-3 we have to address that fast as there are high on hierarchy. Once we develop the mobility we can look for the primitive pattern movements - rotary stability or trunk stability. Both ability to move we learn first with crawling or engaging the ground on all four position. Normally we develop from all 4 to the kneeling positions and from there to standing positions. So we want to do the same progression as you move forward with our corrective exercises. Next is functionally re-patterning. In this phase body has to integrate with the mobility and stability that gained in other corrective exercises and start a new movement pattern so it will get rid of its old movement pattern and replace with more desirable and efficient movement pattern.

SUMMARY

INJURY RISK/MOVEMENT

Movement screening can help predict injury and identify energy leaks that may limit performance.

MOVEMENT SCREEN

The FMS is composed of 7 movements

It can identify movement dysfunction, but It cannot determine the cause of the dysfunction

The FMS can act as a filter to help identify focus points and specificity and categorise athletes

FMS SCORING

Each movement is scored 0-3. Total score of 21

- Scores of 0 or 1 are sent to sports medicine
- Lower scores are associated with increased risk of non contact injury

Apply Corrective solutions based on scoring and movement hierarchy.

- Asymmetrical followed by symmetrical.
- 1's, followed by 2's, followed by 3's

CORRECTIVE SOLUTIONS

Based on Scoring and Movement Hierarchy

Sequence of correctives:

- Soft Tissue
- Mobility
- Activation and Motor Control

References -

Cook, Gray. Athletic body in balance. Human Kinetics, 2003.

Cook, Gray. Movement: Functional movement systems: screening, assessment, corrective strategies. On Target

Publications, 2010.

Kiesel, K., Plisky, P. J., & Voight, M. L. (2007). Can serious injury in professional football be predicted by a preseason

functional movement screen?. North American journal of sports physical therapy: NAJSPT, 2(3), 147.

Minick, Kate I., et al. "Interrater reliability of the functional movement screen." The Journal of Strength & Conditioning

Research 24.2 (2010): 479-486.

Lisman, Peter, et al. "Functional movement screen and aerobic fitness predict injuries in military training." Medicine and

science in sports and exercise 45.4 (2013): 636-643.

Brown, Matthew. The ability of the functional movement screen in predicting injury rates in Division I female athletes. Diss.

University of Toledo, 2011.

Knapik, Joseph, et al. "Strength, flexibility and athletic injuries." Sports Medicine 14.5 (1992): 277-288.

Peate, W. F., et al. "Core strength: A new model for injury prediction and prevention." J Occup Med Toxicol 2.3 (2007): 1-9.

Cook, Gray, Lee Burton, and Barb Hoogenboom. "Pre-participation screening: The use of fundamental movements as an

assessment of function-part 1." North American journal of sports physical therapy: NAJSPT 1.2 (2006): 62.

Cook, Gray, Lee Burton, and Barb Hoogenboom. "Pre-participation screening: The use of fundamental movements as an

assessment of function-Part 2." North American journal of sports physical therapy: NAJSPT 1.3 (2006): 132.

Kiesel, K., P. Plisky, and R. Butler. "Functional movement test scores improve following a standardized off-season

intervention program in professional football players." Scandinavian journal of medicine & science in sports 21.2

(2011): 287-292.

EXOS Performance Specialist Course material