

FIELD SCREENING TOOL TO IDENTIFY MODIFIABLE RISK FACTORS IN ACL INJURY FOR YOUNG WOMEN

ASSESSORS GUIDE



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ASSESSOR GUIDELINES

FIELD SCREENING TOOL

The Field Screening Tool (FST) is a test procedure and assessment guide for screening young female athletes at risk of knee injury due to faulty movement patterns in jumping and landing. The FST uses a tuck jump test and assessment adapted from Myer et al. (2011) and Stroube et al. (2013).

AIM

The purpose of the test and assessment is to identify female athletes with specific neuromuscular deficits which are high risk factors for non-contact Anterior Cruciate Ligament (ACL) injury. The neuromuscular deficits detected by the FST can be modified and improved through a targeted intervention of therapeutic exercises.

POPULATION AND SETTING

The FST is intended for screening female athletes aged 12 to 25 years in a community or school sports setting. Sports with a high risk for knee injury involve pivoting, side stepping and jumping such as soccer, basketball, gymnastics and volleyball. The tuck jump test is suitable for rapid assessment of whole teams or groups in a clinic or field environment due to minimal set-up and equipment.

TEST ADMINISTRATION

The test and assessment should be carried out by a physiotherapist. Testing involves video recording of individuals doing 10 rapid tuck jumps. Assessment involves reviewing the video and identifying specific flaws in technique. An individual with an injury, heavy fatigue or under the influence of drugs or alcohol should be excluded from testing.

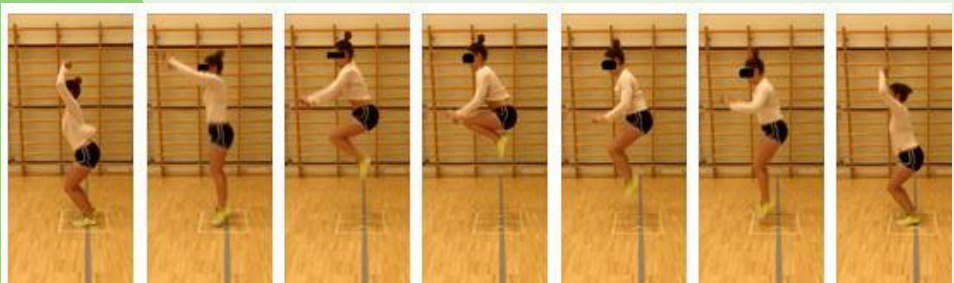
TUCK JUMP TEST

PREPARATION

Mark with tape a 40x40 cm square target on the floor. Set up two digital cameras (e.g. mobile phones) to video record the jump sequence from frontal and sagittal planes. Test subjects should wear sports shoes, shorts and tee shirt.

TEST PROCEDURE

- Briefly interview the subject to record background information, health status and contraindications for testing.
- Instruct the test subject in basic tuck jump technique.
- The subject stands in the target square then does 10 rapid tuck jumps (no pause between) while being video recorded.



Start of
jump

Peak

Initial
Contact







Landing

INSTRUCTIONS FOR TEST SUBJECT

1. Slightly crouch downward with arms extended behind;
2. Swing arms forward and jump straight up;
3. Jump as high as possible, bringing knees up so that thighs are parallel to ground;
4. Try to land softly using toe-to-midfoot rocker and try landing in the same footprint each time.
5. Jump 10 times rapidly. On each landing immediately begin the next tuck jump (no pauses).

ASSESSMENT

1. Review all ten jumps from the video, examine body position for technique flaws at peak, initial contact and full landing phases of each jump.
2. Record each instance of the 12 technique flaws using the Assessment Tool (page 7). Technique flaws are potential indications of one of four movement dysfunctions. Examples of technique flaws are on page 5.
3. A movement dysfunction is positively indicated when a specific flaw appears three times or more or has one extreme occurrence.
4. Note the type and severity of the dysfunctions in the assessment and their priority for treatment. Photos can be attached showing the most common and serious flaws.

Tuck Jump Test - Field Screening Tool					
					
A dysfunction is positively indicated when a Specific Flaw occurs 3 times or more OR has 1 Extreme Occurrence within the 10 jump sequence.					
Ligament Dominance Dysfunction			Quadriceps Dominance Dysfunction		
Knee valgus of one leg at landing	3 right side only		Knee flexion <40° at initial contact		1
Knee valgus both legs at landing			Little change in knee flexion at landing		
Foot placement too narrow/wide at landing			Flat footed / excess noise on landing		2
Leg Dominance Dysfunction			Trunk Dominance Dysfunction		
Foot contact not simultaneous at initial contact	4 left first		Excess lateral trunk movement at peak or landing		2
Feet not parallel (front to back) at landing			Pause between jumps		
Thighs not equal height / not parallel with ground at peak	4		Not landing in same footprint		1
Assessment Notes					
At risk of non-contact ACL injury					
Ligament dominance and leg dominance dysfunctions indicated					
Recommend NMT program targeting these movement dysfunctions.					

An example of Assessment Tool in use

RESULTS

The result of the assessment is a positive indication in one or more of the four neuromuscular dysfunctions. These represent deficits in neuromuscular control, proprioception and strength which contribute to risk of ACL injury. Each dysfunction identified by the FST can be treated with a targeted therapeutic exercise program.

FOUR DYSFUNCTIONS

LIGAMENT DOMINANCE

A dysfunction due to lack of control of lower limbs in the frontal plane during dynamic loading, typically characterized by knee valgus at landing.

TRUNK DOMINANCE

A dysfunction due to a deficit in coordination and control of the core and hip stabilizers during dynamic movement, typically characterized by excessive lateral displacement of the trunk.

QUADRICEPS DOMINANCE

A dysfunction due to excessive muscle activation and strength of knee extensors compared to knee flexors, typically characterized by minimal knee flexion at initial contact or limited change in knee flexion during landing.

LEG DOMINANCE

A dysfunction due to an asymmetry of strength and control between legs, typically characterized by landing first with the preferred leg.

EXAMPLES OF SPECIFIC FLAWS

- (A) Knee extension on landing; (B) foot contact not simultaneous
(C) Knee valgus, one leg; (D) knee valgus, two legs;
(E) Lateral trunk movement; (F) knees not high enough;
(G) Too narrow foot placement; (H) Not landing in target square;
(I) limited change in flexion; (J) Too wide foot placement;
(K) Flat footed landing; (L) Feet not parallel front-to-back.



EXERCISE INTERVENTION

- Our [Intervention Guide](#) details four programs of progressive neuromuscular exercises to target the four movement dysfunctions identified in the assessment.
- These programs involve training to improve balance, strength and proprioceptive control and so reduce the risk of ACL injury.
- The exercises are intended to be incorporated into a warm-up session and can be modified to include sport-specific tasks.
- For optimal effect in injury prevention the exercises should be at least 30min per session, 3 times a week for 6-12 weeks starting in the pre-season.

REFERENCES

- Myer, G.D., Brent, J.L., Ford, K.R. and Hewett, T.E., 2011. Real-time assessment and neuromuscular training feedback techniques to prevent ACL injury in female athletes. *Strength and conditioning journal*, 33, 21-35.
- Stroube, B.W., Myer, G.D., Brent, J.L., Ford, K.R., Heidt Jr, R.S. and Hewett, T.E., 2013. Effects of task-specific augmented feedback on deficit modification during performance of the tuck-jump exercise. *Journal of sport rehabilitation*. 22, 7-18.
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Tuck Jump Test - Field Screening Tool

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Knee valgus both legs at landing		Little change in knee flexion at landing	
Foot placement too narrow/wide at landing		Flat footed / excess noise on landing	
Leg Dominance Dysfunction		Trunk Dominance Dysfunction	
Foot contact not simultaneous at initial contact		Excess lateral trunk movement at peak or landing	
Feet not parallel (front to back) at landing		Pause between jumps	
Thighs not equal height / not parallel with ground at peak		Not landing in same footprint	

Assessment Notes

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NOTES

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