

Return to play criteria of the lower extremity



- Adopted from:
 - Kentucky Sports Medicine Clinic
 - Scott Crook, PA, CSCS

- Adapted by:
 - Center of Orthopaedics and Sports Medicine
 - Indiana, PA

Functional Testing

- Evaluates athletes ability to control forces
- Provides objective data regarding functional ability
- Assists in determining return play status

Interpreting Results

- Quantity
 - Distance, Height, Time, Etc.
- Quality
 - Controlled Landings
 - Directional Changes
 - Stopping

Interpreting Results

- Combine quantity of movement findings with quality of movement scores
- Percentage difference through bilateral comparison

Basic Tests

- Used to determine rehab progression
- Testing for ability to begin running

Single Leg Squats, 45 degrees

- Maximum number of repetitions before loss of balance
- Evaluate loss of balance
- Quality of movement score
 - - 1 point for:
 - Every 2 losses of balance during test
 - Frequent swaying of trunk during test

Controlled Landing

- Double leg take off/Single leg landing
 - - 1 point for:
 - Extra small hop when landing
 - Loss of balance < 1 second
 - Excessive trunk sway
 - - 2 points for:
 - Loss of balance > 1 second
 - - 3 points for:
 - Substitute landing on uninvolved leg

Controlled Landing

- Single leg take off/Single leg landing
 - - 1 point for:
 - Extra small hop when landing
 - Loss of balance < 1 second
 - Excessive trunk sway
 - - 2 points for:
 - Loss of balance > 1 second
 - - 3 points for:
 - Substitute landing on uninvolved leg

Leg Press

- Performed last due to fatigue
- 10 repetition maximum
 - Total weight – bilateral comparison
 - 70% - bilateral comparison

Criteria for Return to Run

- Strength of 70% - bilateral comparison
- Quality of movement score of 80% - bilateral comparison

Advanced Tests

- Used to determine advanced rehab progression
- Testing for ability to return to play

Vertical Jump

- Single leg take off/Single leg landing
 - - 1 point for:
 - Extra small hop when landing
 - Loss of balance < 1 second
 - Excessive trunk sway
 - - 2 points for:
 - Loss of balance > 1 second
 - - 3 points for:
 - Substitute landing on uninvolved leg
- Compare Height Uninvolved to Involved

Single Leg Long Jump

Quality of Movement

- - 1 point for:
 - Extra hop when landing
 - Loss of balance < 1 second
 - Excessive trunk sway
- - 2 points for:
 - Loss of balance > 1 second
- - 3 points for:
 - Substitute landing on uninvolved leg

Compare Horizontal Distance Uninvolved to Involved

Triple Jump

- Single leg take off/Single leg landing

Quality of Movement

- - 1 point for:
 - Unable to stay on line
 - Pauses during jumps
- - 2 points for:
 - Opposite foot touch
 - Each failed attempt

Compare Horizontal Distance Uninvolved to Involved

Timed Agility Test

- Single leg take off/Single leg landing
 - Tests for speed, accuracy (proprioception), and ability to change direction
 - Score based on total time to complete
 - (to .01 seconds)
 - 0.1 second penalty for each landing point missed

Timed Agility Test

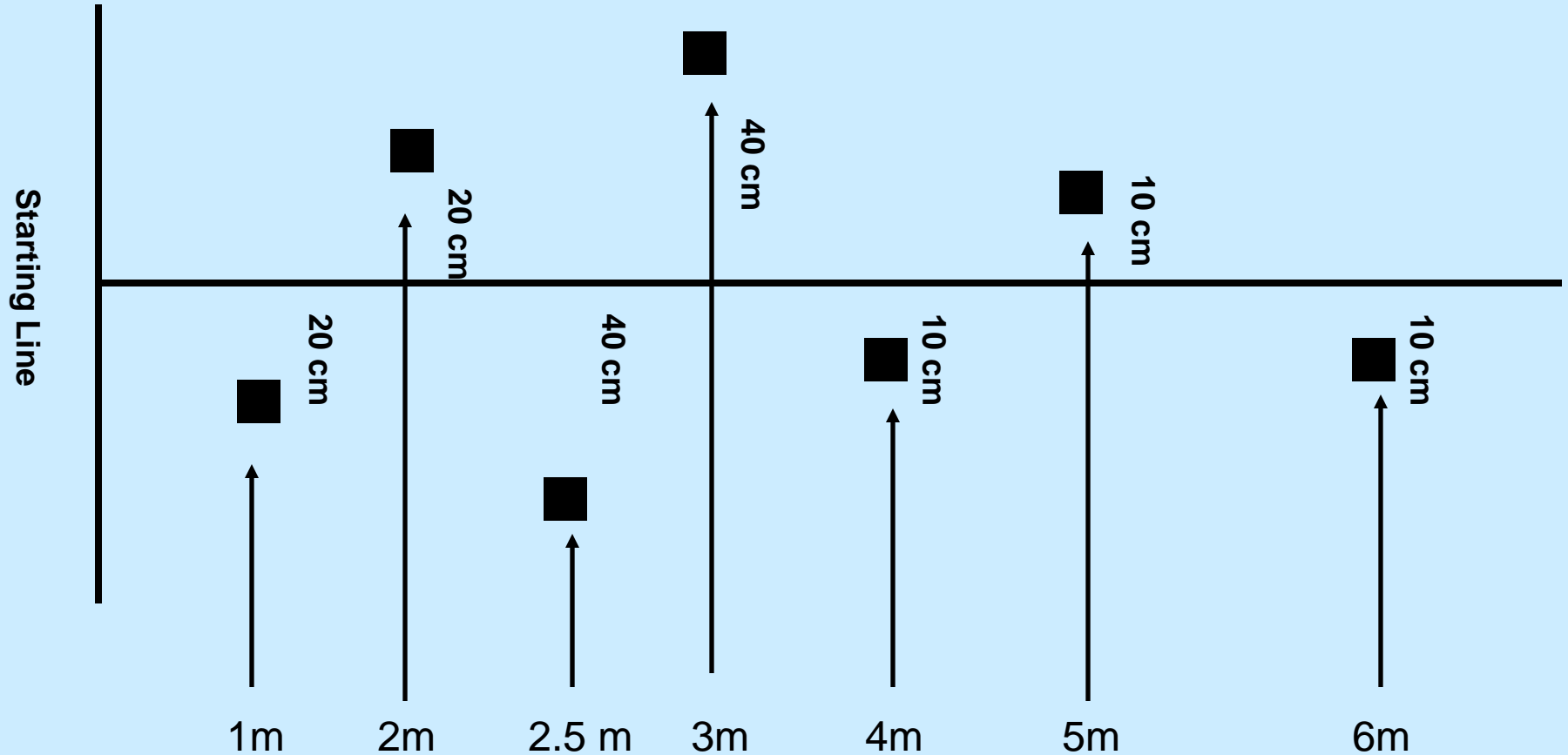
- Single leg take off/Single leg landing

Quality of Movement

- - 1 point for:
 - Three or more missed landing points
 - Each failed attempt
- - 2 points for:
 - Four or more missed landing points in two attempts
 - Three or more episodes of assisting with uninvolved foot during 3 trials

Compare Involved and Uninvolved Speeds

Single Leg Timed Agility Test



■ Landing Spot = 5 x 5 cm

Leg Press

- Performed last due to fatigue
- 10 repetition maximum
 - Total weight – bilateral comparison
 - 90% - bilateral comparison
- Consider Endurance Test
 - 70% Max Weight
 - Reps to Fatigue

Criteria for Return to Play

- Strength of 90% - bilateral comparison
- Quality of movement score within 10% difference (example: uninvolved 17/20, 85%, involved 19/20, 95% -- 10% difference)
- Objective data score within 10% difference (example: uninvolved 2.2 m, involved 2.0m -- 10% difference)

Sport Specific Tests

Observe Quality of Movement

- Mild differences in ability
- Moderate difficulty with tasks
- Inability to perform specific tasks
- Unable to complete sport specific task
- Significant difference in direction change
- Reaches to “splint” involved leg
- Decreases weight bearing on affected leg

Ankle Testing



Functional Return

0363-5465/94/2204-0462\$02.00/0

THE AMERICAN JOURNAL OF SPORTS MEDICINE, Vol. 22, No. 4
© 1994 American Orthopaedic Society for Sports Medicine

A Performance Test Protocol and Scoring Scale for the Evaluation of Ankle Injuries

Auvo Kaikkonen,* MD, Pekka Kannus,† MD, PhD, and Markku Järvinen,*‡ MD, PhD

*From the *Department of Clinical Medicine, University of Tampere, and Section of Orthopaedics, Department of Surgery, Tampere University Hospital, and the †Accident and Trauma Research Center and Tampere Research Center of Sports Medicine, the Urho Kaleva Kekkonen Institute, Tampere, Finland*

ABSTRACT

The aim of the study was to introduce and evaluate a standardized test protocol and scoring scale for evaluation of ankle injuries. After evaluation of 11 different functional ankle tests, questionnaire answers, and results of clinical ankle examination, the final test protocol consisted of 3 simple questions describing the subjective assessment of the injured ankle, 2 clinical measurements (range of motion in dorsiflexion, laxity of the ankle joint), 1 ankle test measuring functional stability (walking down a staircase), 2 tests measuring muscle strength (rising on heels and toes), and 1 test measuring balance (balancing on a square beam). Each selected test showed excellent reproducibility when tested with a reference group of 100 uninjured persons. According to the test results of a population of 148 patients with an operatively treated grade III lateral ligament injury of the ankle, each test could significantly differentiate healthy controls and patients with excellent overall healing from those with poor or fair recovery. The final total test score correlated significantly with the isokinetic strength results of the ankle, subjective opinion about the recovery, and subjective-functional assessment. The scale presented is recommended for studies evaluating functional recovery after ankle injury.

Injuries of the lateral ligaments of the ankle are the most common injuries in sports.^{1,2,14,15,24} Ankle sprains are classified into three groups according to the severity of the sprain. Mild or grade I injury is defined as stretch of the ligaments without macroscopic tearing, little swelling or

tenderness, slight or no functional loss, and no mechanical instability of the joint. Moderate or grade II injury is a partial macroscopic tear of the ligaments with moderate pain, swelling, and tenderness over the involved structures with some loss of motion and mild or moderate instability of the joint. A grade III injury includes complete rupture of the ligaments with severe swelling, hemorrhage, and tenderness with loss of function and with considerably abnormal motion and instability of the joint.^{1,2,5,8,19}

Treatment for grades I and II sprains is usually non-operative. The management of grade III injuries is controversial, and the debate about whether the treatment should be operative or nonoperative is still going on.^{2,9,17} However, the final goal for the treatment, whether operative or nonoperative, is to restore ankle function to the preinjury level.

Previous studies have indicated that peripheral sensation is important in the maintenance of static postural stability of the body.^{4,6,7,21} Poor performance is associated with reduced sensation in the lower limbs as measured by joint position sense, tactile sensitivity and vibration sense, with reduced gastrocnemius and ankle dorsiflexion strength, and with slow reaction time. Stabliometry is a sophisticated method to measure postural equilibrium quantitatively.¹¹ While most authors consider the stability of upright stance in the anteroposterior direction of prime importance, it would seem that stability in the frontal plane also merits investigation when considering the mechanism of injury to the lateral ankle complex.¹³

The ankle joint has a central role for postural corrections. The position of the center of pressure is highly correlated to the position of the ankle and peroneal muscle activity.²¹ Postural control in single-limbed stance has previously been shown to be impaired among soccer players with functional instability of the ankle joint.²¹ Nashner²⁵ has proposed that under normal conditions one of the primary contributors to sway stabilization is proprioception from the ankle. If this contribution is diminished (for example, after an ankle injury), postural sway increases. Freeman et al.¹⁰ have suggested that postural sway increase is caused by decreased reflex activity in the muscles responsible for

- 3 questions describing symptom assessment
- 2 clinical measurements (dorsi-flexion ROM, joint laxity)
- 1 functional stability test (walking down stairs)
- 2 muscle strength/endurance tests (toe raise, heel raise)
- 1 balance test (beam balancing)

* Address correspondence and reprint requests to: Markku Järvinen, MD, PhD, Section of Orthopaedics, Department of Surgery, Tampere University Hospital, Box 2000, 33521 Tampere, Finland.

No author or related institution has received any financial benefit from research in this study.

- Test Population (reference) 100 healthy Indv.
53 M 47F

32yoa

-
- Test Population (patient) 148 Post-op Lateral
lig. Surgery

91 M 57 F

36yoa

Validity

- Compared results (post test scores) to Cybex II strength test at 60 degrees per second
- Plantar / Dorsi Flexion
- Compared results (post test scores) to subjective evaluation

Reproducibility

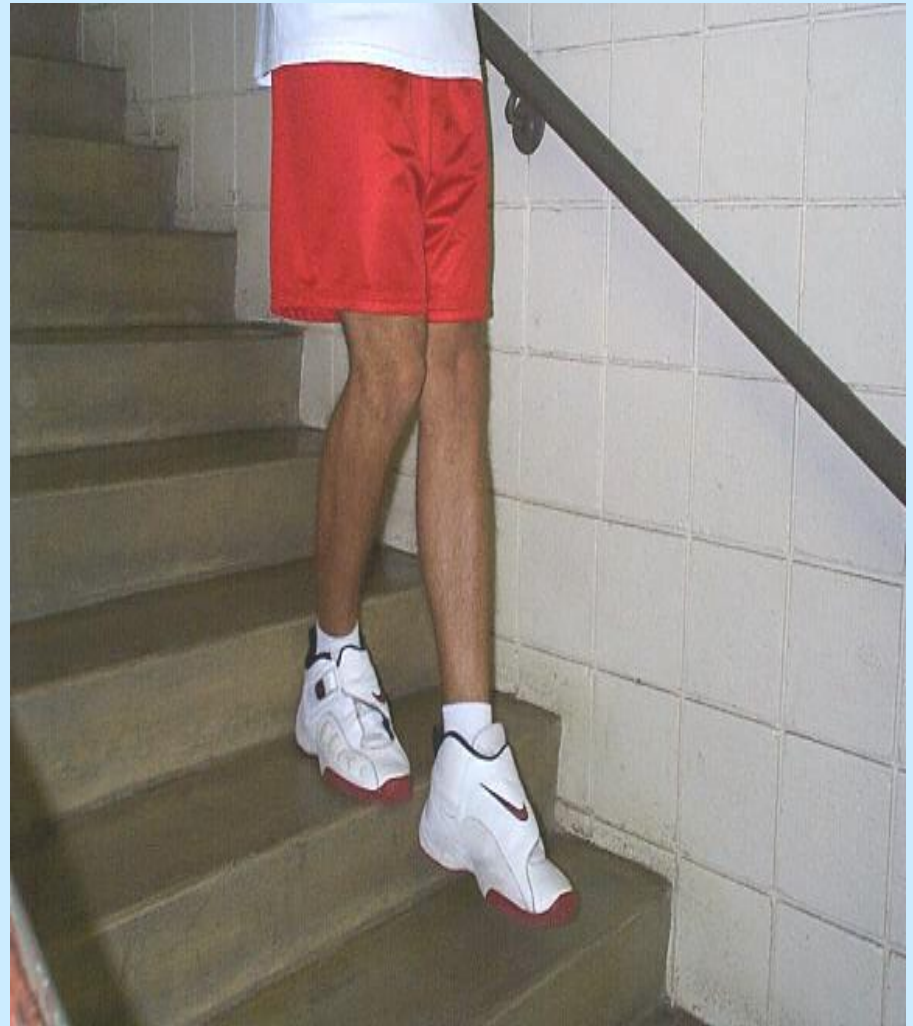
- Pearson Coefficients ranged between .84-.99
- test and re-test of reference group

Subjective Assessment

- Note symptoms throughout testing
- Ability to walk normally?
- Ability to run normally?

Descending Stairs

- 44 steps, 18cm height
- Descending one step at a time
- Full contact with sole of foot
- Total time to descend



Heel and Toe Raise

- Single leg
- 60 repetitions per minute pace
- Performed until fatigue
- Athlete could touch wall to maintain balance
- Number of repetitions was counted



Balance Test

- Single leg stance
- 10 cm height and width
- Time in seconds was recorded



Ankle Laxity

- Anterior Drawer Test
- Ankle in neutral position
- Anterior displacement of talus from the talocrural joint



Dorsi - Flexion Range of Motion

- Athlete in Supine
- Passive test performed
- Goniometric measurement used



Scoring Scale, Symptoms

- I Symptom Assessment

- No symptoms 15
- Mild symptoms 10
- Moderate symptoms 5
- Severe symptoms 0

- II Ability to walk normally?

- Yes 15
- No 0

- III Ability to Run Normally?

- Yes 15
- No 0

Scoring Scale, Functional Stability

- IV Descending Stairs

| | |
|-----------------------|----|
| – Under 18 seconds | 10 |
| – 18 - 20 seconds | 5 |
| – 20 seconds or above | 0 |

Scoring Scale, Muscle Strength/Endurance

- V Heel Raising

- 40 repetitions or above 10
- 30 - 39 repetitions 5
- Less than 30 repetitions 0

- VI Toe Raising

- 40 repetitions or above 10
- 30 - 39 repetitions 5
- Less than 30 repetitions 0

Scoring Scale, Balance

- VII Balance Test

| | |
|------------------------|----|
| – More than 55 seconds | 10 |
| – 50 - 55 seconds | 5 |
| – Less than 50 seconds | 0 |

Scoring Scale, Clinical Signs

- VIII Ankle Laxity

- Stable (≤ 5 mm) 10
- Moderate instability 5
(6-10 mm)
- Severe instability 0
(> 10 mm)

- IX Range of Motion

- ≥ 10 degrees 10
- 5 - 9 degrees 5
- < 5 degrees 0

Rating

- Excellent 85 - 100 points
- Good 70 - 80 points
- Fair 55 - 65 points
- Poor \leq 50 points

- **Reliability and Sensitivity of the Foot and Ankle Disability Index in Subjects With Chronic Ankle Instability**

- **Sheri A. Hale & Jay Hertel**

- *Journal of Athletic Training* 2005;40(1):35–40
- www.journalofathletictraining.org

- **KOOS KNEE SURVEY**

- Knee and Osteoarthritis Outcome Score (KOOS)

<http://www.biomedcentral.com/content/supplementary/1471-2474-7-38-s1.pdf>

Thank You

