

# Guidelines for the Trunk test for Para-Canoe Athletes



# Equipment

- Treatment bench with adjustable height
- Wobble cushion
- Protocol

# Manual Muscle Test

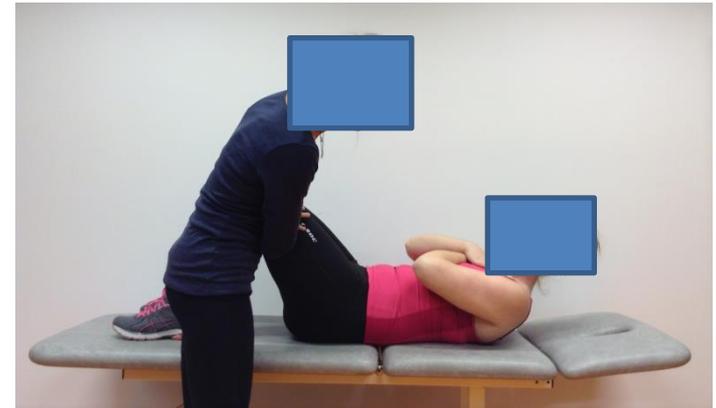
- Athlete will perform **seven** trunk muscle tasks
  - trunk flexion
  - trunk rotation to the right (R) and to the left (L)
  - trunk side bending to the R and L
  - trunk lumbar extension
  - trunk lumbar extension and hip extension
- The tests will be performed on a **0-2** scale.
- Total number of points available for this section = **14**

# Performance of each test

- The following instruction will be given during all Manual Muscle Test
  - breathe out (2s) (athlete is still in the initial position) (instruction: out, out).
  - perform the trunk muscle task (2s) (athlete is moving to the final position) (instruction: up, up).
  - hold a maximal contraction (2s) (athlete is in the final position) (instruction: hold, hold).
- All tests will be performed during normal exhalation.

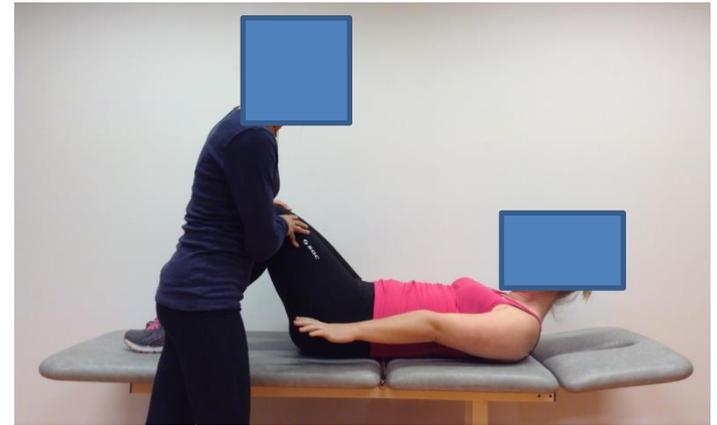
# Trunk flexion Score 2

- **Position of Athlete:** Supine with arms crossed over chest.
- **Position of Classifier:** Standing at level of patient's chest to be able to ascertain whether scapulae clear table during test. If athlete has weak hip flexors, the examiner should stabilize the pelvis by leaning across the athlete on the forearms.
- **Test:** Athlete flexes trunk through range of motion. A curl-up is emphasized, and trunk is curled until scapulae clear table.
- **Instruction:** "Tuck your chin and lift your head, shoulders off the table in a sit-up."
- **Score 2:** Athlete completes range of motion and raises trunk until scapulae are off the table.



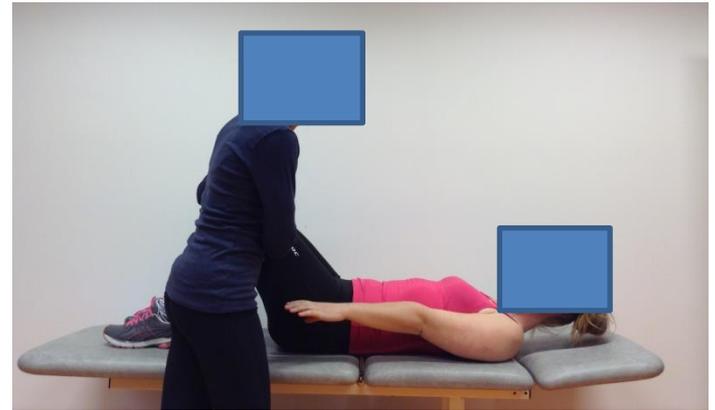
# Trunk flexion Score 1

- **Position of Athlete:** Supine with arms stretched towards toes.
- **Position of Classifier:** Standing at level of patient's belly. The hand used for palpation is placed at the midline of the thorax over the linea alba, and the four fingers of both hands are used to palpate the Rectus abdominus.
- **Test:** Athlete attempts to flex trunk.
- **Instructions:** "Tuck your chin and lift your head, shoulders off the table in a sit-up."
- **Score 1:** Athlete completes partial range of motion and the examiner must be able to detect contractile activity.



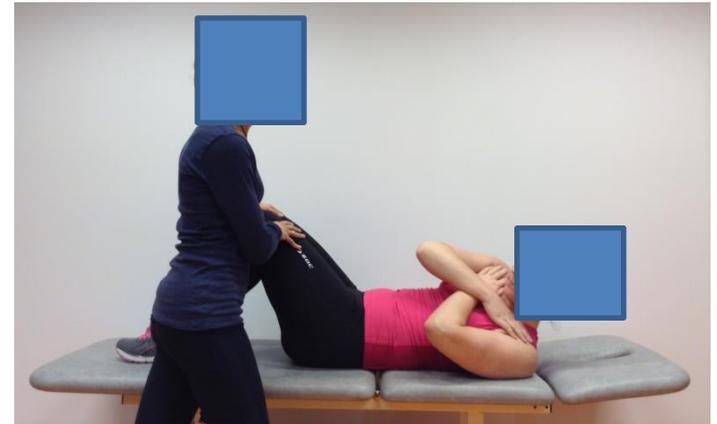
# Trunk flexion Score 0

- **Position of Athlete.** Supine with arms stretched towards toes.
- **Position of Classifier:** Standing at level of patient's belly. The hand used for palpation is placed at the midline of the thorax over the linea alba, and the four fingers of both hands are used to palpate the Rectus abdominus.
- **Test:** Athlete attempts to flex trunk.
- **Instructions:** "Tuck your chin and lift your head, shoulders off the table in a sit-up."
- **Score 0:** The athlete is unable to lift the shoulders from the table, and no or very limited activity is visible or palpable during attempted contraction.



# Trunk rotation Score 2

- **Position of Athlete:** Supine with arms crossed over chest.
- **Position of Classifier:** Standing at level of patient's waist.
- **Test:** Athlete flexes trunk and rotates to one side. And then the other.
- **Instruction:** "Lift your head and shoulders from the table, taking your right elbow toward your left knee." Repeat on opposite side.
- **Score 2:** The inferior angle of the scapula on the opposite side to the rotation clears the table.



# Trunk rotation Score 1

- **Position of Athlete:** Supine with arms at sides.
- **Position of Classifier:** Classifier palpates the external oblique first on one side and then on the other, with one hand placed on the lateral part of the anterior abdominal wall distal to the rib cage. Continue to palpate the muscle distally in the direction of its fibers until reaching the anterior superior iliac spine.
- **Test:** Athlete attempts to raise body and rotate to one side. And then the other.
- **Instruction:** “Lift your head and shoulders from the table, taking your right elbow toward your left knee.” Repeat on opposite side.
- **Score 1.** Athlete completes partial range of motion and the classifier must be able to detect contractile activity.



# Trunk rotation Score 0

- **Position of Athlete:** Supine with arms at sides.
- **Position of Classifier:** Standing at level of athlete's waist
- **Test:** Athlete attempts to flex trunk and turn to either side.
- **Instruction:** "Try to lift your head and shoulders from the table, taking your right hand towards your left knee." Repeat on opposite side.
- **Score 0:** The athlete is unable to lift the shoulder from the table, and no or very limited activity is visible or palpable during attempted contraction.



# Trunk side flexion Score 2

- **Position of Athlete:** On their side with arms crossed over chest.
- **Position of Classifier:** Standing at level of athlete's shanks to provide support.
- **Test:** Athlete laterally bends the trunk.
- **Instruction:** "Lift your trunk off the table as high as you can." Repeat on opposite side.
- **Score 2:** The inferior angle of the deltoid clears the table.



# Trunk side flexion Score 1

- **Position of Athlete:** Supine with arms at sides.
- **Position of Classifier:** Standing at level of athlete's waist. If athlete has weak hip flexors, the examiner should stabilize the pelvis by leaning across the athlete on the forearms. Classifier palpates the external oblique first on one side and then on the other, with one hand placed on the lateral part of the anterior abdominal wall distal to the rib cage.
- **Test:** Athlete laterally bends the trunk.
- **Instruction:** "Lift your head off the table and bend your trunk sideways, hand towards toes." Repeat on opposite side.
- **Score 1:** Athlete completes partial range of motion and the classifier must be able to detect contractile activity.



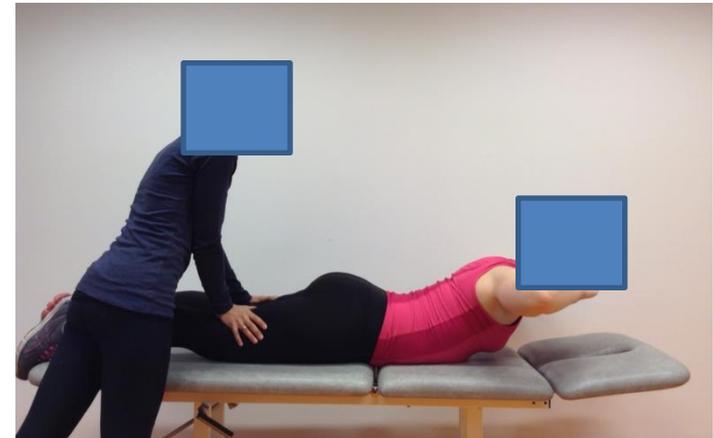
# Trunk side flexion Score 0

- **Position of Athlete:** Supine with arms at sides.
- **Position of Classifier:** Standing at level of athlete's waist. If athlete has weak hip flexors, the examiner should stabilize the pelvis by leaning across the athlete on the forearms. Classifier palpates the external oblique first on one side and then on the other, with one hand placed on the lateral part of the anterior abdominal wall distal to the rib cage.
- **Test:** Athlete attempts to laterally bend the trunk.
- **Instruction:** "Lift your head off the table and bend your trunk sideways, hand towards toes." Repeat on opposite side.
- **Score 0:** The athlete is unable to bend sideways and no or very limited activity is visible or palpable during attempted contraction.



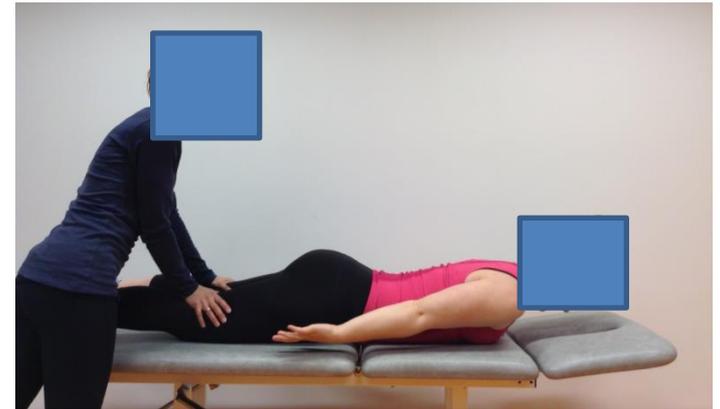
# Trunk Lumbar Extension Score 2

- **Position of Athlete:** Prone with hands close to head.
- **Position of Classifier:** With hands holding the ankles.
- **Test:** Athlete extends the **lumbar** spine until the entire sternum is raised from the table .
- **Instruction:** “Raise your head, shoulders, and chest from the table as high as you can”
- **Score 2:** The athlete can achieve the end position.



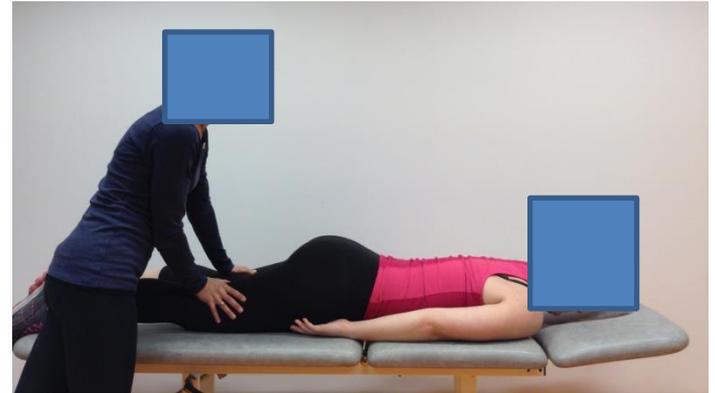
# Trunk Lumbar Extension Score 1

- **Position of Athlete:** Prone with their arms placed by their sides.
- **Position of Classifier:** With hands holding the ankles.
- **Test:** Athlete extend the trunk.
- **Instruction:** “Lift your head and chest as high as possible”
- **Score 1:** Athlete completes partial range of motion and the classifier must be able to detect contractile activity.



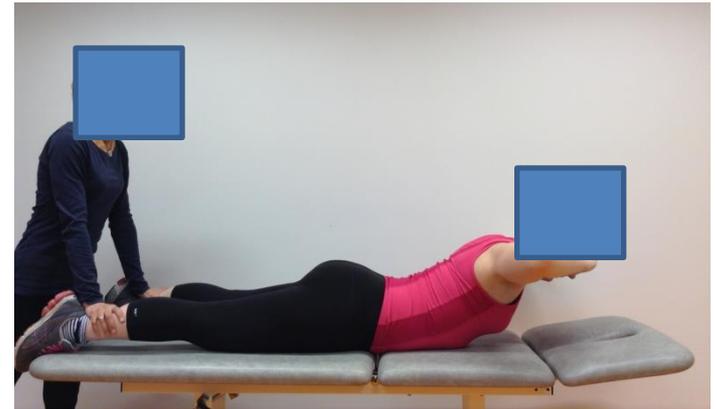
# Trunk Lumbar Extension Score 0

- **Position of Athlete :** Prone with their arms placed by their sides.
- **Position of Classifier:** Standing at level of athlete's waist. Classifier palpates the lumbar extensor muscles .
- **Test:** Athlete extend the trunk.
- **Instruction:** "Lift your head and chest as high as possible"
- **Score 0:** The athlete is unable to lift the trunk of the table and no or very limited activity is visible or palpable during attempted contraction.



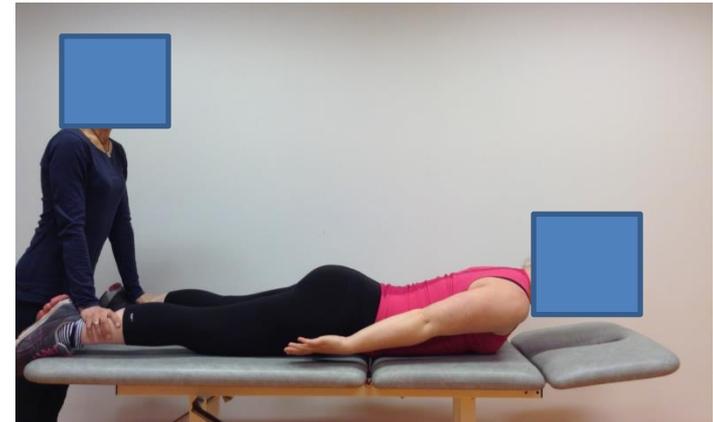
# Trunk and hip extension Score 2

- **Position of Athlete:** Prone with their hands placed by the head
- **Position of Classifier:** With hands holding the ankles.
- **Test:** Athlete extend the trunk.
- **Instruction:** “Lift your head and chest as high as possible”
- **Score 2:** The sternum clears the table.



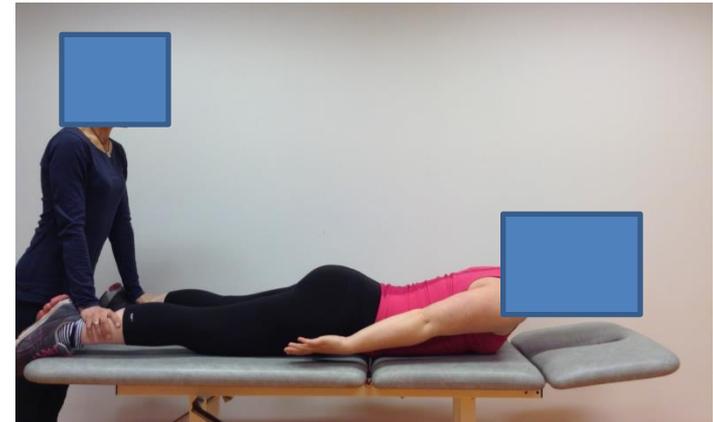
# Trunk and hip extension Score 1

- **Position of athlete:** Prone with their arms placed by their sides.
- **Position of classifier:** With hands holding the ankles
- **Test:** Athlete extend the trunk.
- **Instruction:** “Lift your head and chest as high as possible”
- **Score 1:** Athlete completes partial range of motion and the classifier must be able to detect contractile activity.



# Trunk and hip extension Score 0

- **Position of athlete :** Prone with their arms placed by their sides.
- **Position of classifier:** Standing at level of athlete's waist. Classifier palpates the lumbar extensor muscles and hip extensor muscles .
- **Test:** Athlete extend the trunk.
- **Instruction:** “Lift your head and chest as high as possible”
- **Score 0:** The athlete is unable to lift the trunk of the table and no or very limited activity is visible or palpable during attempted contraction.



# Functional Assessment Score

Athlete will be asked to complete functional tasks while sitting unsupported.

The examination includes:

- static tasks (sitting upright with arms outstretched in 4 directions), scores a maximum of **10** points
- dynamic tasks (moving trunk through a range of motion), scores a maximum of **12** points
- perturbation tasks (push and recovery from 6 directions), scores a maximum of **24** points
- perturbation tasks while athlete is sitting on a wobble cushion (push and recovery from 6 directions), scores a maximum of **24** points

There are a maximum of **70** points for the Functional assessment. These are added to the Manual Muscle Test score for a maximum of **84** points

# Static test

## Upright Sitting

- **Description:** Athlete sits with legs hanging over the edge with feet unsupported. Athlete crosses arms to prevent support. Classifier brings athlete into upright position, one hand on sternal bone and one hand on back, then slowly lets go of support.
- **Instruction:** “Sit up tall.”
- **Evaluation:** Observe sitting position after removing the support:
  - straight/upright
  - flat belly
  - kyphotic/quad/para belly
- **Score 2:** Sits straight upright, without marked kyphosis, and with flat belly for at least 10 seconds
- **Score 1:** Can only manage upright sitting for less than 3 seconds
- **Score 0:** Sits with marked kyphosis or with quad belly

Score 2



Score 0



# Static test

## Upright Sitting with shoulder flexion/extension

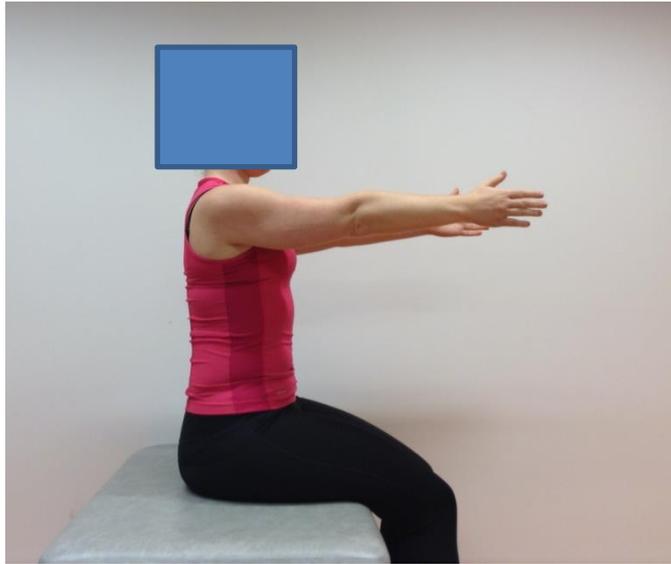
- **Description:** Athlete sitting on the plinth with legs hanging over edge of plinth with the feet unsupported. The classifier may need to place his/her hands close to the hips, to fix both legs to the plinth.

*Flexion:* Athlete is instructed to lift both arms to 90° shoulder flexion, hold for 2 seconds and slowly go back to the initial position.

*Extension:* Athlete is instructed to lift both arms to about 30° shoulder extension, hold for 2 seconds and slowly go back to the initial position.

- **Evaluation:** Observe movement quality and range standing lateral to the Athlete.
- **Score 2:** Athlete performs shoulder **flexion** to at least 90° with a straight upright position.
- **Score 2:** Athlete performs shoulder **extension** to at least 30° with a straight upright trunk position.
- **Score 1:** Athlete attempts to **flex/extend** shoulders to **90°/30°** but can only maintain a straight upright trunk momentarily before compensating by kyphosis or lordosis
- **Score 0:** Athlete is unable to maintain an upright posture to lift the arms, either into flexion or extension.

Score 2



Shoulder flexion

Score 0



Shoulder extension



# Static test

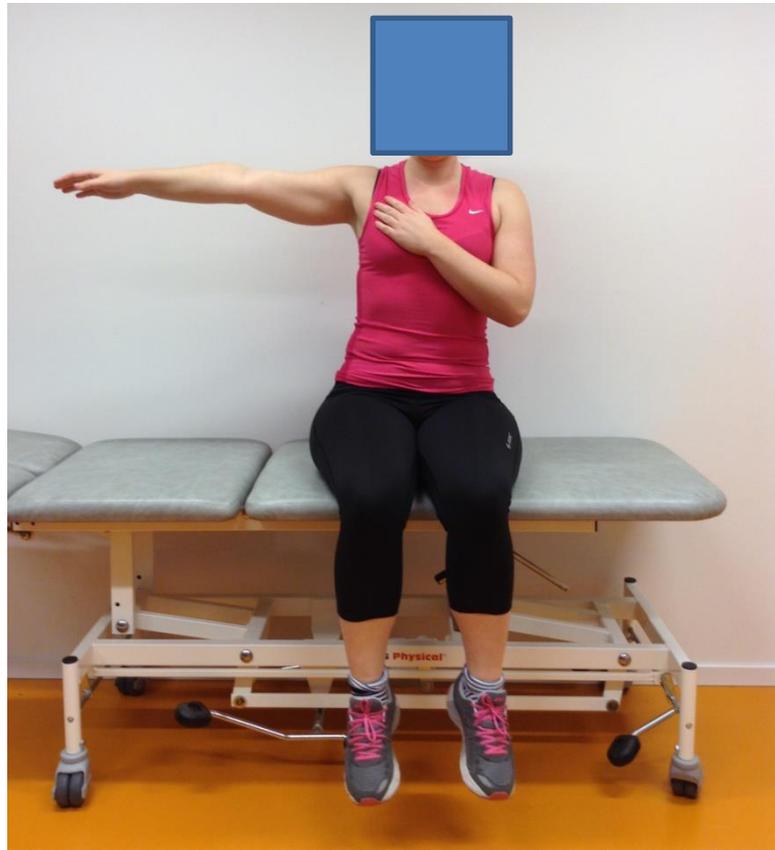
## Upright Sitting with abduction

- **Description:** Athlete sitting on the plinth with legs hanging over edge of plinth with the feet unsupported. The classifier may need to place his/her hands close to the hips, to fix both legs to the plinth. .

*Abduction:* Athlete is instructed to lift one arm to 90° shoulder abduction, hold the position for 2 seconds and slowly go back to the initial position. The other arm is crossed over the chest.

- **Evaluation:** Observe movement quality and range standing lateral to the Athlete.
- **Score 2:** Athlete performs shoulder abduction to at least 90° with a straight upright position.
- **Score 1:** Athlete lifts shoulder to 90°, but is unable to maintain upright posture throughout the test without compensation.
- **Score 0:** Athlete is unable to lift the shoulder to 90° and compensates with kyphosis/lordosis. May need support to resume straight position

Score 2

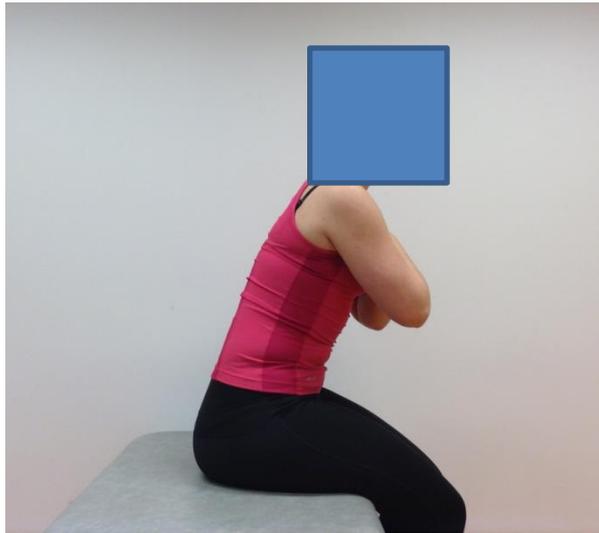


# Dynamic test

## Active Trunk Flexion/Extension

- **Description:** Athlete sits on the plinth with legs hanging over the edge, with the feet unsupported. Athlete crosses the arms in front of his/her chest, to prevent support for sitting balance from the arms. The classifier may need to place his/her hands close to the hips, to fix both legs to the plinth.
- **Evaluation:** Observe movement quality and range standing lateral to the Athlete.
- **Score 2:** Athlete performs trunk flexion to at least 20° line between pelvis and C7 and vertical, and maintains position for 2 seconds before returning to upright position, **and** performs at least 15° trunk extension and maintains position for 2 seconds before returning to upright position.
- **Score 1:** Athlete flexes to less than 20° and extends to less than 15°, and is unable to maintain the position for 2 seconds. May compensate to resume straight position.
- **Score 0:** Athlete cannot flex or extend without compensation by kyphosis/lordosis or cannot resume straight position without support.

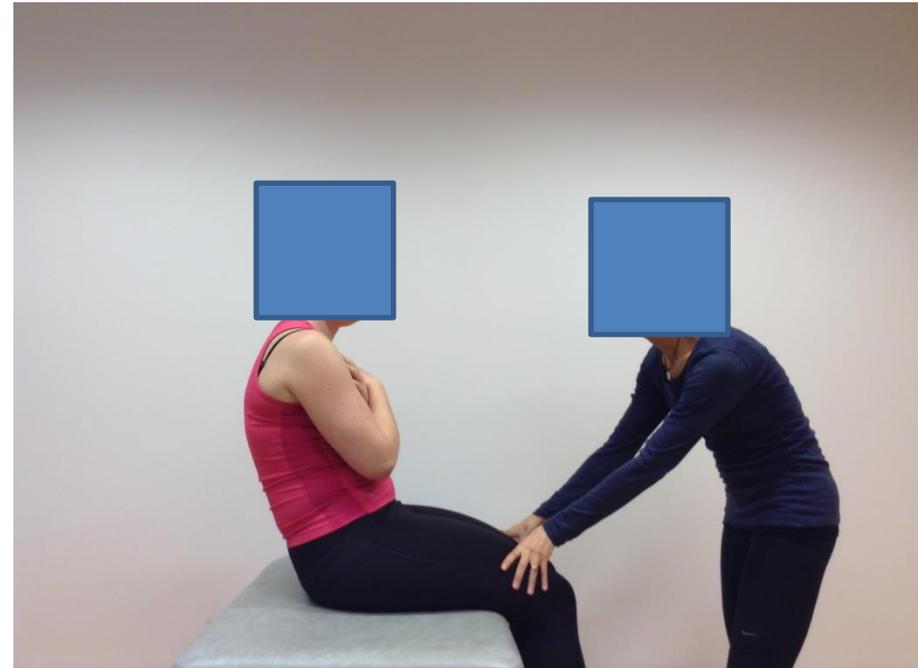
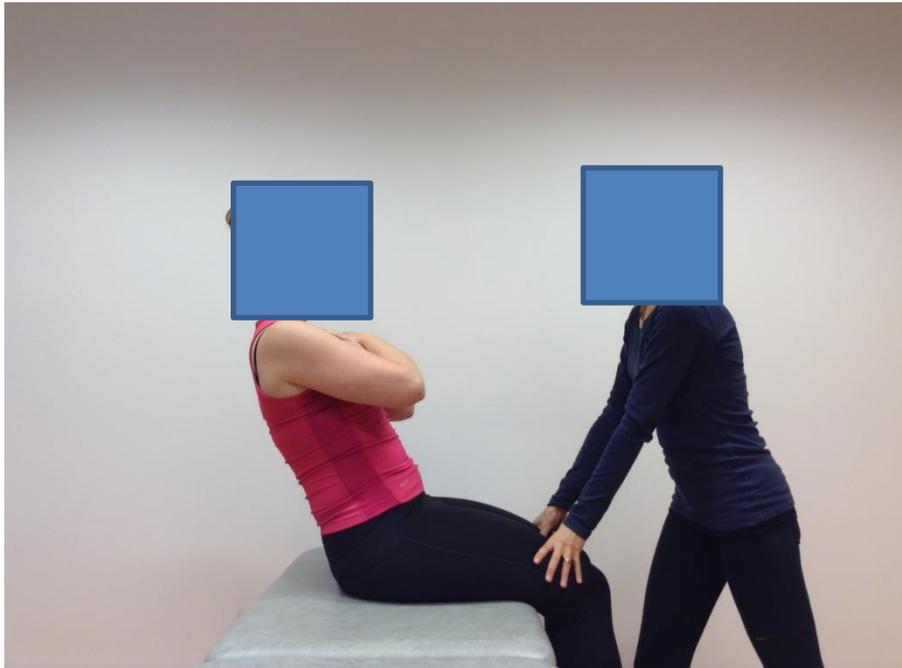
Grade 2      **Trunk flexion**      Grade 0



Grade 2

## Trunk extension

Grade 0



# Dynamic test

## Active Trunk Rotation

Grade 2

- **Description:** Athlete sits on the plinth with legs hanging over edge, with the feet unsupported. Athlete crosses the arms in front of his/her chest, to prevent support for sitting balance from the arms. The classifier may need to place his/her hands close to the hips, to fix both legs to the plinth.
- **Evaluation:** Observe movement quality and range standing lateral to the Athlete.
- **Score2:** Athlete stays in upright position and rotates 20° or more to both sides, measured in straight line between both shoulders and line between ASIS on both sides.
- **Score 1:** Athlete rotates less than 20°, or cannot remain upright whilst rotating
- **Score 0:** Athlete does not rotate, or cannot maintain upright position in sagittal plane while rotating (e.g. assumes kyphotic posture).

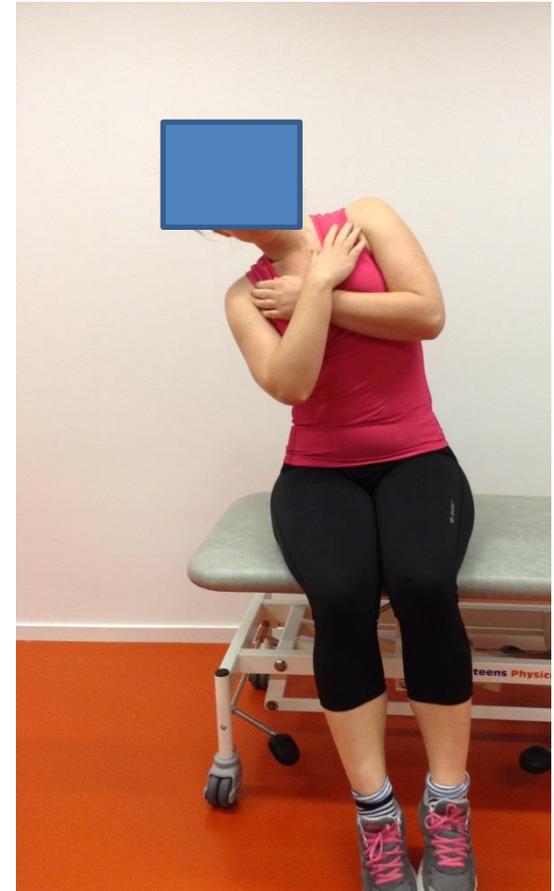


# Dynamic test

## Active Trunk Side Flexion

Score 2

- **Description:** Athlete sits on the plinth with legs hanging over edge, with the feet unsupported. Athlete crosses the arms in front of his/her chest, to prevent support for sitting balance from the arms. The classifier may need to place his/her hands close to the hips, to fix both legs to the plinth.
- **Evaluation:** Observe movement quality and range standing lateral to the A.
- **Score 2:** Athlete stays in upright position in the sagittal plane and performs side flexion at least with suprasternal notch in vertical line above the ASIS to both sides and can maintain this position for 2 seconds before resuming the upright position.
- **Score 1:** Athlete cannot side flex to the level of the suprasternal notch, or can only maintain position momentarily.
- **Score 0:** Athlete cannot side flex, or cannot maintain an upright position in the sagittal plane while performing side flexion (e.g. kyphotic posture).



# Trunk Resistance (Perturbation)

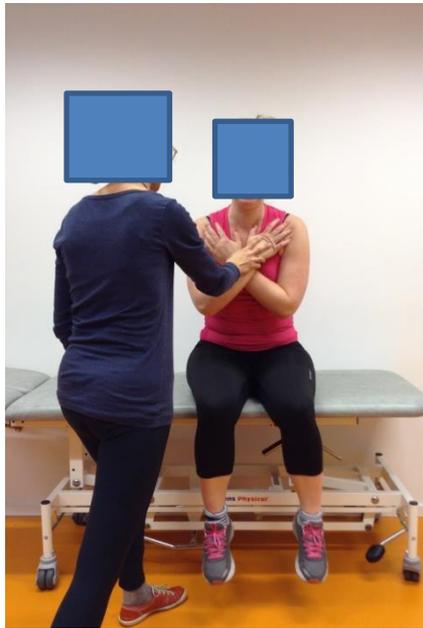
- Trunk Flexion, Trunk Extension, Trunk Rotation, Trunk Side Flexion

- **Description:** Athlete sits on the plinth with legs hanging over the edge, with the feet unsupported. Athlete crosses the arms in front of his/her chest, to prevent support for sitting balance from the arms.

Classifier applies prolonged force to the trunk in six directions by placing the hand in six different locations; anterior, over the mid sternum, posterior, over the thoracic spine midway between the superior and inferior angles of the scapula, and right and left rotation, over the frontal aspect of the acromial process, and right and left side flex, over the lateral aspect of the acromial process.

- **Instruction:** “Hold, do not let me push you over!”
- **Evaluation:** Trunk flexion: RA, both sides of umbilicus, Trunk extension: ES, both sides spine, Trunk rotation to the L: OE R and OI L, Trunk rotation to the R: OE L and OI R, Trunk lat. bending to the L: QL R, Trunk lat. bending to the R: QL L.
- **Score 2:** Athlete is able to adequately resist the constant force to the trunk .
- **Score1:** Athlete resists the initial push but is unable to maintain upright posture, or can only resist a very gentle force
- **Score 0:** Athlete is not able to recover from the constant force.

# Trunk Resistance



Trunk Flexion



Trunk Extension



Trunk Rotation



Trunk Lateral Bending

# Trunk Push (Perturbation)

- Trunk Flexion, Trunk Extension, Trunk Rotation, Trunk Side Flexion

- **Description:** Athlete sitting on the plinth with legs hanging over edge of plinth with the feet unsupported. Athlete crosses the arms in front of his/her chest, to prevent support for sitting balance from the arms.

Classifier applies an unexpected/sharp force to the trunk in six directions by placing the hand in six different locations; anterior, over the mid sternum, posterior, over the thoracic spine midway between the superior and inferior angles of the scapula, and right and left rotation, over the frontal aspect of the acromial process, and right and left lateral, over the lateral aspect of the acromial process.

- **Instruction:** “Hold, do not let me push you over!”
- **Evaluation:** Trunk flexion: RA, both sides of umbilicus, Trunk extension: ES, both sides spine, Trunk rotation to the L: OE R and OI L, Trunk rotation to the R: OE L and OI R, Trunk lat. bending to the L: QL R, Trunk lat. bending to the R: QL L.
- **Score 2:** Athlete is able to adequately resist the trunk push.
- **Score 1:** Athlete attempts to resist the push, or can only resist a very gentle push.
- **Score 0:** Athlete is not able to apply any resistance to the push.

# Trunk Push



Trunk Flexion



Trunk Extension



Trunk Rotation



Trunk Lateral Bending

All Dynamic and Perturbation tasks will be performed on the wobble cushion on a 3 graded scale.

Succeed = 2, In doubt = 1, Clearly fails = 0

Upright sitting



Trunk Resistance



Trunk Push

