Constant Score Manual

Funder acknowledgement

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Disclaimer

Introduction

The Constant-Murley score is the primary outcome measure in this study. It is widely used in shoulder trials, is well accepted by surgeons, has good reliability and responsiveness, and has been improved by further clarifications from the originating centre and published standardised protocols. (1-8) These protocols are not fully consistent across the literature. A standardised protocol is required to ensure consistency across sites and therapists and to ensure that the primary outcome from the trial is robust and reliable.

We are using the version with the best supporting data in the literature, which is the standardised approach developed by Ban et al (2013) and further improved by Moeller et al (2014) (9, 10) This is a standardised protocol that was developed from the 2008 modification to the Constant score. It is laid out in detail in Ban et al (2013) and as an appendix to Moeller et al (2014) and the text in this manual is taken directly from those papers.(9, 10)

The scoring system consists of four variables that are used to assess the function of the shoulder. The objective variables are range of motion and strength which give a total of 65 points. The subjective variables are pain and activities of daily living (ADL) (sleep, work, recreation / sport) which give a total of 35 points. Each component can be reported separately or can be combined to give a score out of 100.

Assessment of Pain-Free Range of Motion

All measurements are performed using a long arm goniometer (supplied) with the participant standing.

The assessment is of active, pain-free movement. For example, if the arm can be lifted to 140 degrees with pain and 110 degrees without pain, then a range of motion of 110 degrees is recorded.

Before the tests, ask the patient if they have pain at rest, and if so, they perform the movements until the pain worsens.

"Do you have pain in your shoulder when it is resting?"

The tester first shows the desired movement, which the test subject then performs. All exercises are done with the test subject standing with their feet pointing directly forwards and a shoulder width apart.

1. Forward Flexion

In this diagram, the solid red lines are the angles that the goniometer is set at. One arm of the goniometer follows the long axis of the arm, the other is along the mid-axillary line.

"Place yourself comfortably standing with your feet in shoulder-width distance. When I tell you to, elevate your arm in front of yourself with your elbow joint as stretched as possible and your thumb pointing upward. Continue the movement until pain occurs/worsens and remain in this position until I have performed my measurement. Keep your upper body steady and make sure that movement is limited to your shoulder"

Note:

- Use a long goniometer
- The patient should not compensate with excessive movement in other parts of the body. If so, correct the patient's position and allow a new attempt
- Landmarks for goniometer are the axis of the upper arm and the midaxillary line

2. Abduction

"Place yourself comfortably standing with your feet in shoulder-width distance. When I tell you to, elevate your arm laterally with your thumb pointing laterally and your elbow joint as stretched as possible. When your arm reaches a horizontal position, rotate your thumb backward. Continue the lateral elevation until pain occurs/worsens and remain in this position until I have performed my measurement. Keep your upper body steady and make sure that movement is limited to your shoulder"

In this diagram, the solid red lines are the angles that the goniometer is set at. One arm of the goniometer follows the long axis of the arm, the other is parallel to the thoracic spine (the broken line is the thoracic spine).

Note:

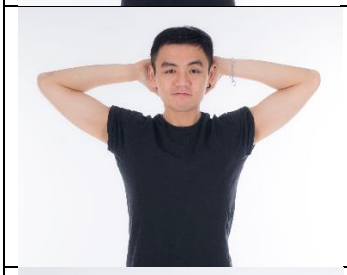
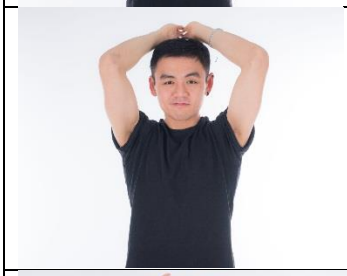
- Use a long goniometer
- The patient should not compensate with excessive movement in other parts of the body. If so, correct the patient's position and allow a new attempt
- Landmarks for goniometer are the axis of the upper arm and parallel to the spinous processes of the thoracic spine

3. External rotation is performed without help and the hands should be placed behind and above the head without touching the head.

Movements are performed by both arms simultaneously but recorded only for the affected side, starting with "hands behind head, elbows forward".

The movement must be performed painlessly.

"Place yourself comfortably standing with your feet in shoulder-width distance. When I tell you to, imitate me in a series of separate movements. After each movement, I will ask you if pain occurred."

	Hand behind head & elbow forward
	Hand behind head & elbow back
	Hand to the top of the head & elbow forward
	Hand to the top of the head & elbow back
	Full elevation of the arms

[adapted from Moeller et al 2014 (9)]

Note:

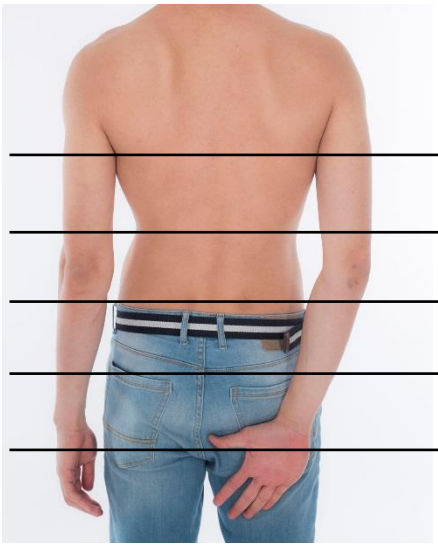
- Movements are performed separately
- The patient should not compensate with excessive movement in other parts of the body. If so, correct the patient's position and allow a new attempt
- The attempt is not accepted if it cannot be performed without the hands touching the neck or head. Let the patient know
- "Elbow pointing lateral" is accepted when the elbow is in line with or behind the ear. Let the patient know and stress the importance of looking straight forward

4. Internal rotation is performed without help and where the subject uses their thumb to point the anatomic landmarks specified.

Movements are performed only by the affected arm, starting with "outer thigh".

The movement must be performed painlessly.

"Place yourself comfortably standing with your feet in shoulder-width distance. When I tell you to, place the back of your hand on the thigh with your thumb pointing upward. Move your hand upward along the spine until pain occurs/worsens and remain in this position until I have performed my measurement. Make sure that movement is limited to your shoulder"



[adapted from Moeller et al 2014 (9)]

Note:

- The patient should not compensate with excessive movement in other parts of the body. If so, correct the patient's position and allow a new attempt
- Movement must be performed active and in constant flow

Assessment of Strength

Strength is measured with the provided dynamometer (IsoForceControl EV02, Switzerland).

The test is done with the test subject standing with their feet pointing directly forwards and a shoulder width apart. The arm should be abducted 90 degrees in the scapular plane. **If the arm cannot be elevated to 90 degrees, place a score of 0 in the first box.**

The wrist is pronated so the palm faces down and the elbow is stretched (extended) as much as possible.

The strap of the dynamometer should be placed around the wrist of the test subject so that it lies over the long head of the ulna. The edge with stitches is placed distally (ie nearer the hand).

[adapted from Moeller et al 2014 (9)]

"Place yourself comfortably standing with your feet in shoulder-width distance and your arm in this position [examiner ensures that the patient is in the correct position]. You now have a trial where you should not perform your maximum"

Position for testing strength. Note that the arm is abducted at 90° to the body, and points forward approximately 20° from the body (that is, the arm is at 90° in the scapular plane)
[adapted from Moeller et al 2014 (9)]

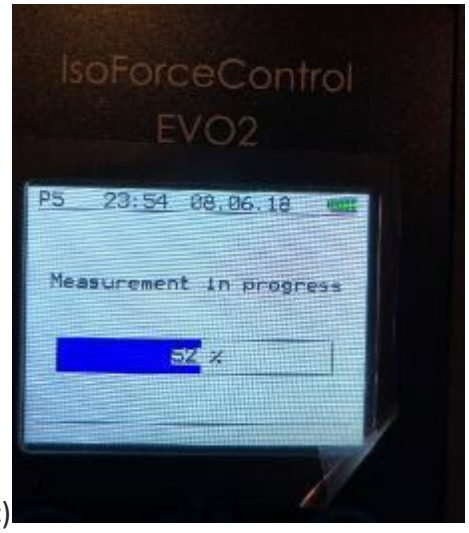
"You now have 3 attempts. When I tell you to, pull the strap upwards with maximum effort until the dynamometer beeps. During the pull, keep your elbow stretched, do not lean toward the opposite side, and limit movement to your shoulder. Ready: 3, 2, 1, pull, pull, pull"

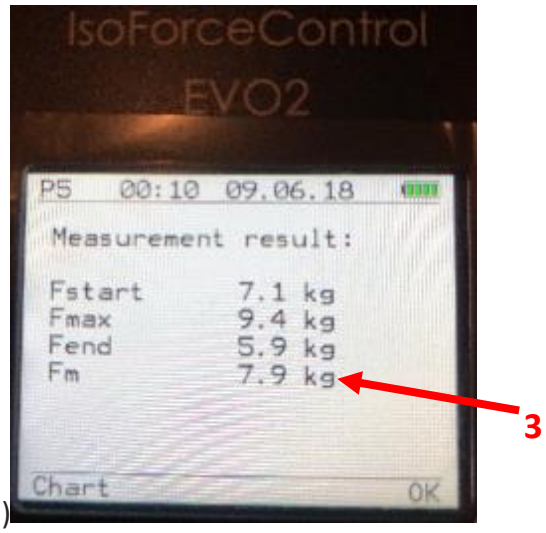
Once in position, turn the power button on (figure a, arrow 1), a screen will show a prompt for a 5 second test (figure b). Press 'OK' (button E; figure a, arrow 2). Wait with the patient in the correct position whilst the screen says calibration is being performed, the test starts when the machine beeps.

a) 

b) 

The test subject is instructed to push maximally upwards for 5 seconds (the time is counted as a %age and on a bar – figure c). Verbal encouragement is given simultaneously.

c) 

d) 

When the test is finished, record the <u>average</u> value over 5 seconds, which is Fm (arrow 3)

Save the measurement each time it is taken in case you need to refer back to it (see manufacturer's instructions for more details on doing this).

Note:

- The patient should not compensate with excessive movement in other parts of the body or lean toward the opposite side. If so, correct the patient's position and allow a new attempt

The score is calculated from the highest score of 3 attempts. Please record all 3 attempts on the CRF. Each attempt is performed with at least a 1 minute interval.

If the arm cannot be elevated to 90 degrees, place a score of 0 in the first box.

Calibration: The IsoForceControl devices used in the START study have been individually calibrated by the manufacturer and come with an individual calibration certificate. It has been decided by the trial management group that re-calibration should be performed for any device that has been used more than 200 times, or if they site team are concerned that it may be defective.

Subjective Variables

These are filled in by the participant, during the same session. Please be available to answer any questions that may come up.

Visual analogue scales such at the ones presented on the second page of the booklet (example below) can sometimes cause confusion for patients, and you may need to explain that they are to make a mark on the line to indicate how severely they are affected.

If the participant does not wish to fill in the full questionnaire at the time, please ask them to complete Section B (the Constant score) at the time, keep this copy, and then give them a new copy of the questionnaire and a stamped addressed envelope so they can complete the remainder of the paper forms and post them back to us, or fill in the forms by using other electronic means (if available, in development).

However, it is more reliable for data collection if they fill in their questionnaires at the time.

Summary

The Constant score can be simple to complete, but it is important that the standard protocol is followed to ensure consistency.

Please contact us if you have any questions or queries and we would be happy to assist you in whatever way we can.

Thank you for taking part in this study and for helping to make it a success.

The START team

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