

## The Overhead Squat Assessment

Perry Nickelston, DC, FMS, SFMA

The [overhead squat](#) is one of the most valuable assessments you can do with your patients. This single movement divulges crucial information about your client's mobility and stability in the kinetic chain. The assessment tests for bilateral symmetrical mobility and stability of the hips, knees and ankles. When combined with the hands held overhead, this test also assesses bilateral symmetrical mobility of the shoulders, as well as extension of the thoracic spine.<sup>1</sup>

Of course, there are situations in which the client may be in too much pain to complete the task; this will be determined on a case-by-case basis. However, you can always use this as a final clearance evaluation at the end of your prescribed treatment plan. Pain will alter movement patterns and show you many things, as long as you are observant enough to see the signs. The objective of the exercise is to test total kinetic-chain neuromuscular efficiency, integrated functional strength and dynamic flexibility.

### The Exercise

- Have the patient place their feet shoulder-width apart with their arms straight up over head, elbows extended. They can hold something over their head such as a dowel rod, [tubing](#) or even a towel.
- Instruct the patient to slowly squat down to a position that is comfortable for them, cueing them to go slow and controlled, squatting as deep as they can without letting the heels leave the ground. If they are unfamiliar with the squatting motion, use the analogy of sitting down in a chair.
- Instruct them to squat under control for 2-3 repetitions. If the patient experiences too much pain, discontinue the evaluation and document location and intensity.
- Do not let the patient know what you are specifically looking for, as they will tend to try and "correct" themselves as they perform the desired repetitions. Do not coach the movement; simply repeat the instructions if needed.
- View the motion from all different angles: anterior, lateral and posterior.
- Ideally the patient should wear shorts and a T-shirt and be in bare feet so you can get unobstructed views of the movement.
- Note any deviations from the checklist below, as they will allow you to see your patient's muscular imbalances and movement dysfunctions.

### Observation Checklist

- *Feet pronate and externally rotate*: This may indicate tightness in the soleus, gastrocnemius, peroneals, hamstring and piriformis and/or weakness in the gluteus medius. There may also be a restriction in ankle joint dorsiflexion, since the body will pronate the foot to gain more motion in the ankle mortise. If dorsiflexion is limited, there is a posterior chain extensibility dysfunction or ankle joint extensibility problem, or both.
- *Knees buckle / hip internal rotation*: May indicate weak/inhibited gluteus maximus/medius, tight adductor complex and iliotibial band. May be an inability to control hip movements, pointing to an underlying motor control stability problem.
- *Low back arches*: May indicate tight iliopsoas and/or other hip flexors and latissimus dorsi,

compensating for a weak outer and inner core.

- *Low back rounds*: May indicate overactive external obliques, compensating for a [weak core](#). Observe if there is a rotational component to the movement when the low back rounds due to the fascial attachment of the spiral line of myofascial from the external oblique to the opposite shoulder.
- *Arms fall forward*: May indicate tight latissimus dorsi and /or pectoralis major/minor and weak lower trapezius, rhomboids, teres minor and infraspinatus.
- *Lateral shift*: A shift to either the right or left side during any part of the movement may indicate a motor control stability problem or an underlying self-protective mechanism to deviate away from pain. Take note if the deviation occurs on the downward or upward motion.
- *Cervical spine hyperextension*: If the cervical spine hyperextends, this may indicate overactive sternocleidomastoids and weak stabilizers.<sup>2</sup>

### Normal Assessment Criteria

- Heels remain on the ground
- Feet do not externally rotate
- No lateral shifting
- Knees track over the toes
- Dowel rod remains behind knees
- Hips break parallel
- Head remains level
- No pain

### Gathering More Information

Was the patient able to complete the movement? Was there any pain? To investigate a little deeper into the dysfunction, you can do various "breakout" squat assessments to gather more information about the possible dysfunction. These breakouts allow you to change dynamics of the movements to see if the pain or dysfunction increases or decreases.

To determine if there may be a thoracic extension and shoulder flexion problem, simply have them interlock their fingers behind the neck and repeat the squat. If the squat improves, then you know there is something dysfunctional in the thoracic spine and shoulder complex. Why do we know this? Because you took the shoulder and trunk out of the movement dynamics and it improved.

To determine if there is a [stability motor control](#) issue, have the patient perform an assisted squat. This allows you to look for true symmetrical mobility of the lower body joints without the requirement of dynamic stability. Instruct the patient to grab your hands for support. Have them repeat the full deep squat; if they go all the way down into the squat pattern, elevate the hands above the patient's head and try to let go. If the finding is normal, there is a core stability dysfunction or both.<sup>1</sup>

To determine if there is a hip and knee issue, have the patient lie supine on a table and bring the knees toward the chest in a non-weight-bearing position. If the patient can show full hip flexion and knee flexion while holding the shins, and ankle dorsiflexion is normal, consider this a weight-bearing motor control issue.

The overhead squat is a universal assessment and gives you so much information about how body mechanics change during movement. During your patient evaluation it is important to isolate the painful and symptomatic area by doing the standard requisite tests, but to get a true measure of function you should include movement patterns. The overhead squat is the foundational movement

pattern to evaluate. It is important that you do not try to micro-assess each particular joint during the evaluation. Try to take in the entire picture when watching your patient's movement; if you do not see any dysfunction, then move on to the next evaluation. By assessing your patient's static and dynamic posture, flexibility profiles and movement patterns, you can create a more individualized treatment program.

### *References*

1. Cook G, Burton L, Kiesel K, Rose G, Bryant M. *Movement: Functional Movement Systems. Screening Assessment Corrective Strategies*. On Target Publications, 2010.
2. Clark M. *Integrated Training for the New Millennium*. National Academy of Sports Medicine, 2000.

JANUARY 2011