

Lunges & Knee Pain

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The Lunge

A good alternative to the traditional squat is the lunge (and its variations).

This exercise is beneficial for several reasons:

1. You don't need to hold as much weight to get the appropriate loading as it is a single leg exercise.
 1. Therefore your lower back/core will not be the limiting factor as it usually is in squatting (particularly when trying to increase strength/muscle size).
2. Flexibility is less of a problem with lunging (hamstring/calf ROM is less inhibitive in lunging than in squats largely due to the fact that there isn't as large a hip flexion component to lunging as there is for squatting).
3. You can expose your hip extensor muscle groups (Hamstrings & adductors) to a larger ROM which can lead to better functional strength development.
4. The exercise requires an increased proprioceptive component (due typically to a narrower base of support).

One downside to lunges are that clients may highlight knee pain during the exercise.

In most cases, knee pain is due to placing the knee joint in a less than optimal position to generate the required force to complete the movement – The two typical errors that you will see are:



1. Excessive anterior translocation of the knee beyond the vertical position of the foot (increasing knee joint angle and resultant load on the patella & underlying knee structures).

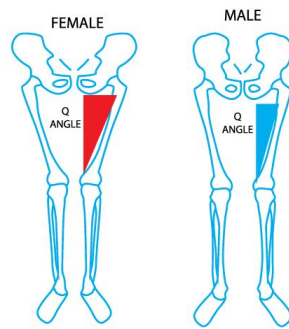
This position typically occurs when the lunge step taken is short – the client continues the forward motion resulting in this excessive knee flexion and the weight of the body excessively loading this single knee joint.

The load on the knee is typically at its highest b/w 70°-90° (at the bottom of the movement).



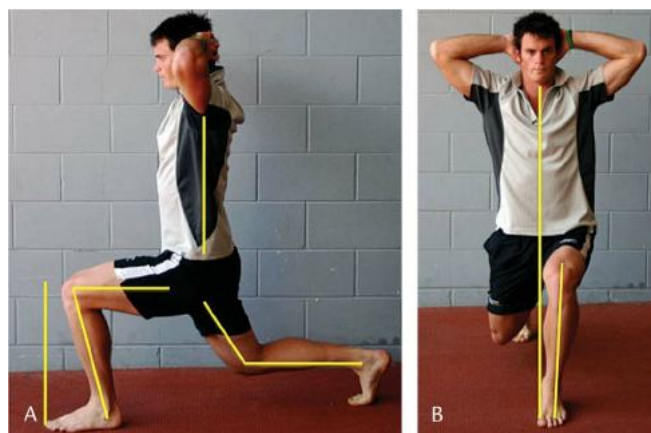
2. Knee valgus (bending in towards the midline of the body).

Everyone has some knee valgus, but allowing this valgus to increase during lunging can lead to knee tracking and patellofemoral pain during the exercise.



Women are more prone to excessive knee valgus than males (Due to the increased Q-angle of the femur in relation to the tibia) but both males and females can show this technical fault during lunging if they are not aware of their technique and/or they have a weakness in their external rotators/hip abductors (to offset the internal rotation and adduction that occurs during any hip extension activity).

Research has shown that knee pain is reduced by following these technical cues:



1. Keep the vertical knee position behind the toes at the bottom of the movement. (I suggest the client tries to keep their tibia almost vertical at the bottom of the movement). See image A.
2. Stop the forward movement of the lunge step once the front foot touches the ground, from here the movement should be totally vertical to remove any further transfer of weight or knee position forwards.
3. A technique cue can be taking a "Long Lunge" as opposed to a "Short Lunge". This will limit the forward movement of the knee over the toe.
4. Long lunging also decreases the total load on the Quadriceps and places more of the load on the hamstring/Adductor muscle groups (which is a more balanced strength approach).
5. Ensure that you do not allow your knee to "buckle in" as you move into your lunge position. Equally important is to maintain this knee alignment when you push back to your start position. See image B.

This is a great animation looking at hip stability and knee inward rotation. ([Knee Valgus](#))



If you are struggling to be able to maintain the correct technique when lunging forward, a viable alternative is to keep both feet stationary on the floor (in the lunge position) and just complete repeated lunges (vertically moving up and down) whilst maintaining the correct technique.

SUMMARY:

Lunging is a great alternative to squatting and arguably will provide you with more functional strength than squatting alone.

As long as you learn the correct technique early in your training and don't hurry to add too much weight to the movement, lunging will develop great pelvic and knee strength through a wide range of motion that will be highly beneficial for leg conditioning and functional real world movements (such as walking up stairs or uphill).

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