

HIP INTERNAL ROTATION

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1. Background and rationale

In MOST, we will assess hip internal rotation to better understand how it relates to osteoarthritis. Pain on internal rotation of the hip or reduced range of motion on internal rotation will be used in conjunction with self-report of hip pain to fulfill ACR clinical criteria for hip OA.

We will assess hip internal rotation using a long-arm goniometer.

2. Equipment and supplies

- Hand-held, long-armed goniometer
- Examination table; situating the examination table in the room to allow convenient access to the right and left limbs of the participant

3. Safety and exclusions

There are no general safety issues for this exam.

We will not assess internal rotation on a hip that has been replaced.

Some participants may feel discomfort or joint pain during the hip examination. Even if some pain is felt, there is no risk of injury to the participant. If the participant exhibits or complains of pain, ask if it is OK to continue with the exam.

4. Participant preparation

Acceptable participant attire during testing includes:

- Loose shorts (participants should be encouraged to bring loose shorts, e.g., gym shorts)
- Hospital gown
- Skirt (pulled out of the way)

The following should not be worn during testing:

- Pants
- Spandex or bicycle shorts
- Stockings or pantyhose
- Long-underwear
- Shoes

5. Measurement procedures

Do NOT perform the internal rotation exam if a hip has had a total hip replacement.

Internal rotation of the hip is the movement made by the femoral head in the acetabulum when the hip and the knee are both flexed to 90 degrees and the lower leg is moved laterally away from the midline of the body (See Figure 2).

Range of hip internal rotation measured by goniometer. Range of hip internal rotation will be measured in degrees using a goniometer. Goniometry is the measurement of angles; in our study the measurement in degrees of the internal rotation of the hip. The measurement is taken while the pivot, or axis, of the goniometer is over the axis of motion of the joint; in this case, the patella which is perpendicular to the axis of motion of the hip (see Figure 1). Since the axis of motion may shift somewhat when the joint is moved, care should be taken to be sure the pivot of the goniometer is as closely as possible over the axis of motion when the measurement is taken.

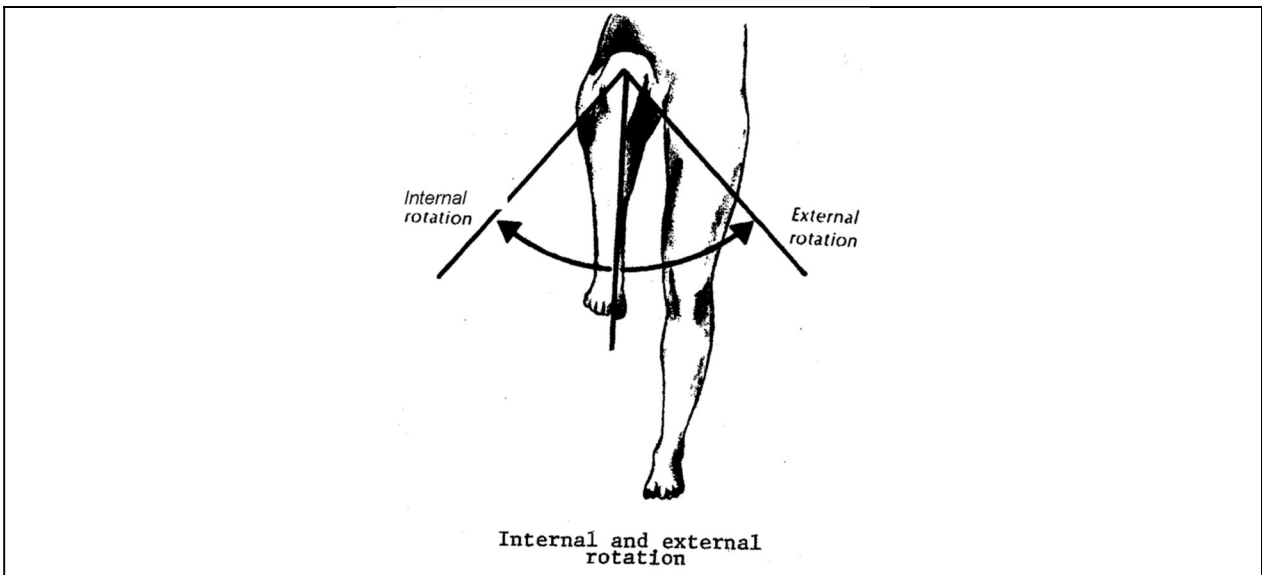


Figure 1

We will measure free and easy range of passive motion, which is defined as movement of the joint by the examiner up to the point of firm resistance to movement, or to the point where joint pain prevents further movement. For some participants this will mean moving the joint beyond the onset of discomfort in the joint. Generally, less than 30 degrees of internal rotation is considered limited and 15 degrees is highly limited.

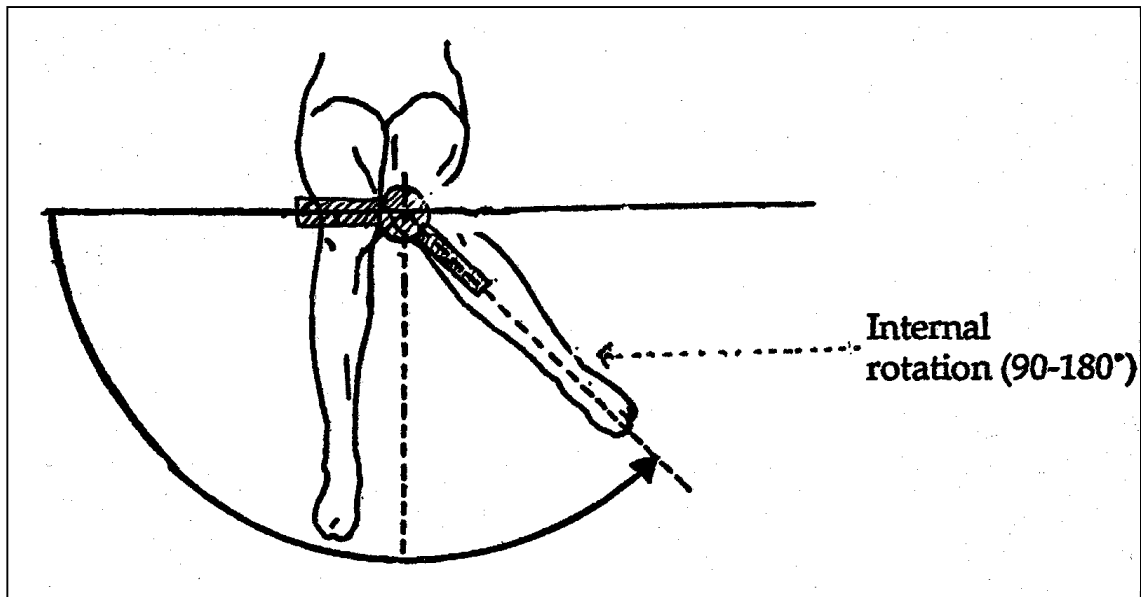


Figure 2

IMPORTANT: For purposes of recording, the goniometer measurement will always be an angle between 90 degrees and 180 degrees, as recorded from the black numbered scale at the bottom of the goniometer dial. The 'stationary' arm of the goniometer is the arm attached to the circular dial calibrated in degrees. The moveable arm pivots around the circular dial.

1. Participant is seated on the edge of the examination table with legs over the side and knees flexed to about 90 degrees; knees about 8 inches apart. The participant's hands are resting on knees to help hold the goniometer in place. You may need to place a wedge under the thighs to get knees and hips to 90 degrees.

Test the right leg, then the left leg.

Have the participant hold the goniometer with the pivot centered over the middle of the patella of the knee on the side being rotated, and the stationary arm on a line between the patellae of the right and left knees. (See Figure 2.) Ask the participant to keep the pivot point centered over the knee while you are moving their leg.

Script: "I'm going to rotate your hip by pulling your lower leg outward and measuring its movement. To help me measure this, I need you to hold this device in place over your knees. *(Explain to participant how to hold the goniometer.)*

Script: "While I'm moving your leg, try to keep both of your buttocks on the table.

2. The examiner may either squat or sit on exam stool in front of the participant and push their leg laterally, or (this is preferred) stand to the side of the participant and pull the lower leg

laterally. In either case, use the flat part of your hand or the 'V' between thumb and first finger to apply pressure. If pressure is applied with the fingertips, this may hurt the participant's lower leg. PLEASE NOTE: For some very large participants, it may be necessary to have one examiner hold the knee to stabilize it and the other to rotate the hip.

Hold the leg at the shin near the ankle with one hand and put your other hand on the top of the knee to stabilize the joint. Move the lower leg (and the arm of the goniometer) laterally to the limit of motion or until the participant complains of pain. Buttocks should remain on the table and the stationary arm of the goniometer parallel to the table top. Apply firm pressure to the top of the knee to keep it from moving.

The resistance encountered at the limit of normal motion is typically "firm" - a firm or springy sensation that has a little give as muscle is stretched. The typical limit of motion, as measured by the goniometer, is about 135 degrees to 155 degrees.

3. When you have reached the point of firm resistance or the participant complains of pain, read the angle from the black numbered scale at the bottom of the goniometer dial (between 90 degrees and 180; full ROM usually not more than about 135 to 155 degrees).
4. Relax the lower limb and record degrees of motion.

NOTE: Repeat the examination as needed to obtain an accurate measurement.

5. Ask the participant:

Script: "Did that hurt?"

If "Yes," ask:

Script: "Where did it hurt?"

NOTE: If the participant does not respond "Yes," but made an indication of discomfort or withdrew or winced or in some other way indicated discomfort, continue applying pressure and ask again:

Script: "You seemed to be in discomfort when I moved your leg. Did it hurt?"

If, "Yes," ask:

Script: "Where did it hurt?"

If the participant says that it hurt, show them the hip diagram card and mark all that apply.

- 1 Groin/inside leg near hip
- 2 Outside of leg near hip
- 3 Front of leg near hip
- 4 Buttocks
- 5 Lower back
- 6 Other, please specify: _____

6. Record the participant's response on the data collection form.
7. After completing the test on the right leg, reverse examiner hand and goniometer positions and perform the examination on the left leg.

6. Quality assurance

6.1 Training

Experience in musculoskeletal examinations is preferred but not required. Training includes:

- Read and study operations manual chapter
- Attend training session
- Practice on volunteers between the ages of 50 and 79 and compare findings with other examiners.
- Discuss problems with study rheumatologist

6.2 Certification requirements

- Fulfill training requirements
- Conduct exam on two participants with more experienced examiner and reach consensus on findings
 - According to protocol, as demonstrated by completed QC checklist

6.3 Quality assurance checklist

Right hip internal rotation ROM exam

- Participant sitting on edge of exam table, lower leg able to move freely
- Goniometer positioned properly, participant instructed to hold in place
 - Pivot remains over patella during the exam
- Examiner moves lower leg clockwise
 - One hand on right knee, other hand grasping shin and arm of goniometer
- Examiner pushes limb to limit of motion or until participant complains of discomfort
- Participant's buttocks do not rise up off table
- Records range of motion in degrees and pain for right
- Reverses goniometer and hand position and repeats for the left leg

Left hip internal rotation ROM exam

- Participant sitting on edge of exam table, lower leg able to move freely
- Goniometer positioned properly, participant instructed to hold in place
 - Pivot remains over patella during the exam
- Examiner moves lower leg counterclockwise
 - One hand on left knee, other hand grasping shin and arm of goniometer
- Examiner pushes limb to limit of motion or until participant complains of discomfort
- Participant's buttocks do not rise up off table
- Records range of motion in degrees and pain for left
- Reviews form for completeness
- Correctly completes form

7. Data collection form

Please see the Overview of the 144-month Follow-up Visit Operations Manual for an overview of the data collection forms, information on whether each form is in REDCap or TELEForm, and where the forms can be accessed on the study website.