Muscle Testing of Knee Extensors

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Tests & Measurements

Muscle Testing of Knee Extensors

Knee Extensors

- **The Primary muscle**
  - Quadriceps Femoris
    - Rectus Femoris
    - Vastus Medialis
    - vastus Lateralis
    - Vastus Intermedius

Rectus Femoris Muscle

Origin

-***Straight head:*** Anterior inferior iliac spine.

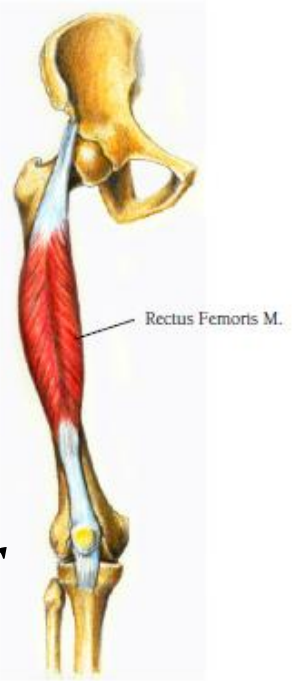
-***Reflected head:*** From groove above rim of acetabulum.

Insertion

-Proximal border of patella and through patellar ligaments to tuberosity of tibia.

Nerve supply

-Femoral nerve L2 L3 L4.



Vastus Medialis Muscle

Origin

-Intertrochanteric line.

-Medial lip of linea aspera.

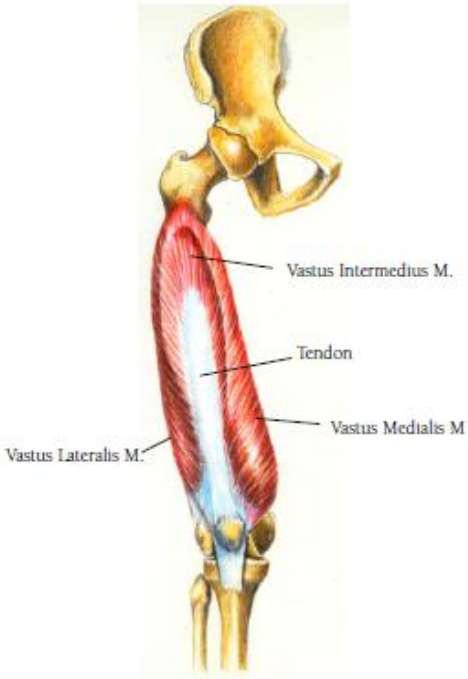
Vastus Lateralis Muscle

Origin

-Intertrochanteric line.

-Anterior and inferior borders of Greater Trochanter.

-Lateral lip of Gluteal Tuberosity



THREE OF THE QUADRACEPS MUSCLES

Vastus Intermedius Muscle

Origin

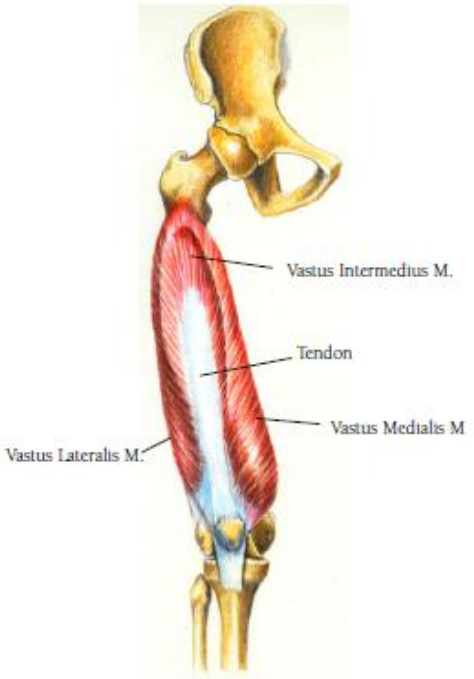
- Anterior and lateral surfaces of proxim
  2/3 of body of femur.
- Distal 1/2 of linea aspera.

Insertion

- Proximal border of patella and through
  Patellar ligaments to tuberosity of tibia.

Nerve supply

- Femoral nerve L2 L3 L4.



THREE OF THE QUADRACEPS MUSCLES

- **Range of Motion:**

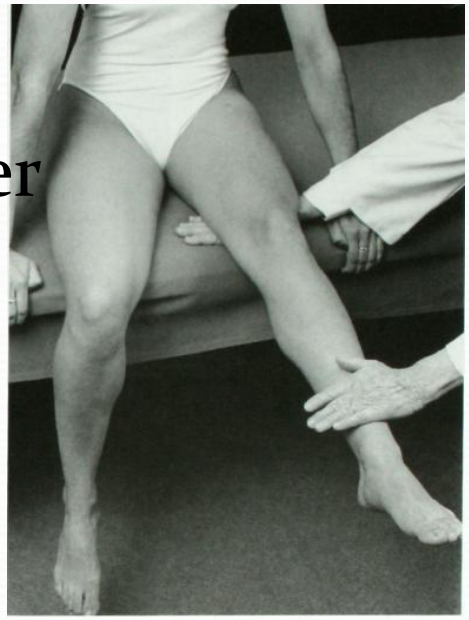
-The range of motion of complete extension of the knee is 0° to 120°-130°.

Testing procedure

- **Grade 3 "fair strength"**

-Patient starting position is Sitting, legs over the edge of the table.

-Hands grasp the edges of table to stabilize pelvis or if possible cross both arms on the chest, with small cushion under the knee.



-Therapist stands beside the table on the side of the sound To stabilize the pelvis, his proximal hand is placed over the rectus femoris origin without applying pressure.

Command

-Raise up your lower leg through full range of motion without medial or lateral rotation of the hip ------- relax.

- **Grades 4-5. "Good and Normal strength"**

-Same as for Grade 3 plus the distal hand is placed on the anterior part of the leg just over the ankle joint to give resistance.

-***Grades 4:*** Moderate leading resistance is given directly opposing the line of motion.

-***Grade 5:*** Maximum leading resistance is given throughout the range plus a "hold" at the end of the range.

- **Grade 2. "poor strength"**

-The patient is Side lying, affected leg down and flexed, the upper leg is supported.

-Therapist stands behind the patient, the distal hand support the upper leg, the proximal hand is placed above the knee joint to stabilize the thigh. Avoid pressure over the quadriceps femoris.

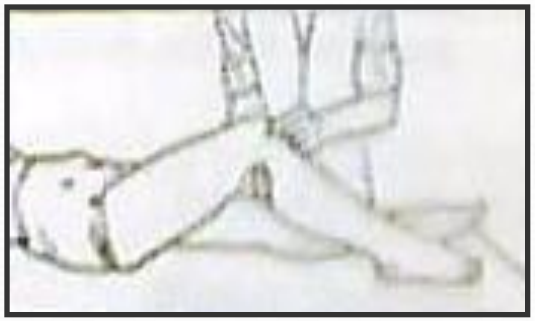
Command

-Extend your knee by moving your lower leg forward throu full range of motion-----Relax.

oGrades 1 and 0. "Trace and Zero strength"

-Patient is back lying, affected knee flexed and supported.

-Therapist stands beside the table, the proximal hand supporting the affected leg under the knee.



-The distal hand palpates contraction of quadriceps femoris on its tendon between patella and tuberosity of tibia.

Command

Try to extend your knee by lifting your foot of the table and pushing on my hand------Relax.

Weakness of Knee Extensors

-Weakness interferes with stair climbing, walking up an incline, and getting up and down from a sitting position.

-The weakness results in knee hyperextension, not in the sense that such weakness permits a posterior knee position but, rather, that walking with a weak quadriceps requires the patient to lock the knee joint by slight hyperextension.

-Continuous thrust in the direction of hyperextension in growing children may result in a very marked deformity.

Effects of shortness or contracture

-Shortness or contracture of knee extensor muscles will produce restriction of the knee flexion.

-In addition, a shortness of the rectus femoris part of the quadriceps results in a restriction of the knee flexion when the hip is extended or a restriction of the hip extension when the knee is flexed.

Muscle Testing of Knee Flexors

Knee Flexors

- **The Primary muscles**
  - ***Medial hamstring muscles***
    - Semitendenosus
    - Semimembranosus
  - ***Lateral hamstring***
    - Biceps femoris
- **The Accessory muscles**
  - Poplitus muscle
  - Sartorius
  - Gastrocnemius muscle
  - Gracilis

Semitendinosus

Origin

- Posterior surface of ischial tuberosity

Insertion

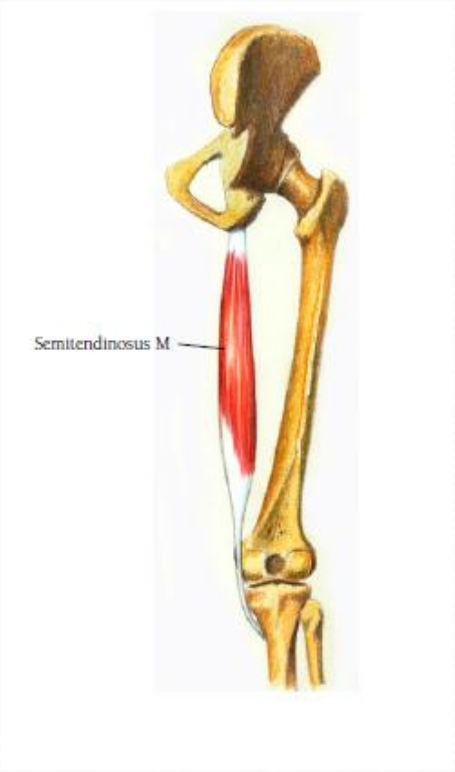
- Upper medial shaft of tibia

Nerve supply

- Sciatic nerve (L5, S1)

Action

- Extends hip
- Flexes and medially rotates knee



Semimembranosus

Origin

- Posterior surface of ischial tuberosity

Insertion

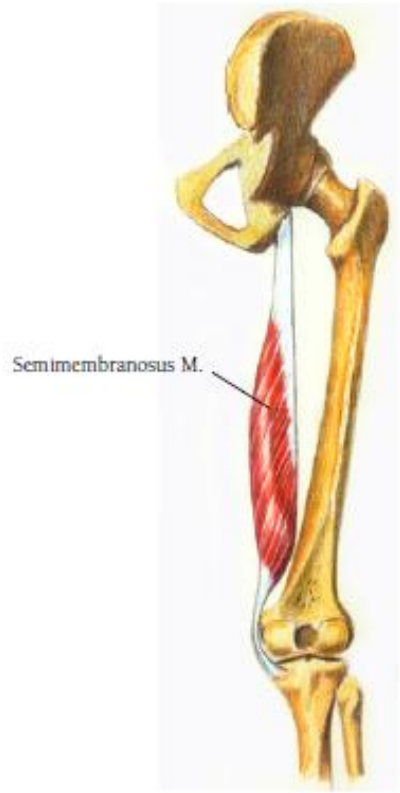
- Medial condyle of tibia below articular margin

Nerve supply

- Sciatic nerve (L5, S1)

Action

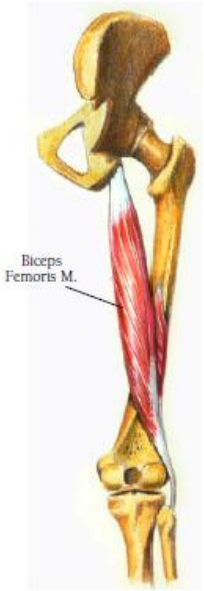
- Extends hip
- Flexes and medially rotates knee



Biceps Femoris

Origin

- ***Long head:*** posterior surface of ischial tuberosity
- ***Short head:*** middle third of linea aspera, lateral supracondylar ridge of femur



Insertion

- Head of fibula
- Lateral collateral ligament
- Lateral tibial condyle

Nerve supply: Sciatic nerve

Action

- Flexes and laterally rotates knee
- Long head extends hip

- **Range of Motion:**

The range of motion of complete flexion of the knee is of 0° to 120°-130°.

Testing procedure

- **Grade 3 "fair strength"**

- Patient starting position is Prone lying with leg straight.

-Therapist stands beside the table on the side of the affected leg. The proximal hand above the thigh proximal to knee to stabilize thigh medially and laterally without pressure over the muscle group being tested.

Command

-Raise your lower leg through full range of motion ------- relax.

Note

-Flexion of knee is actively produced up to 90° only against gravity but after will be with gravity assistance and produce smoothly by eccentric contraction of quadriceps muscle.

-If biceps femoris is stronger, lower leg will laterally rotate during flexion.

-If semitendenosus and semimembranosus are stronger, lower leg will medially rotate during flexion.

oGrades 4-5. "Good and Normal strength"

-Same as for Grade 3, the sound leg is away from the therap

-Therapist position and grasps are the same as for Grade 3, near the affected leg

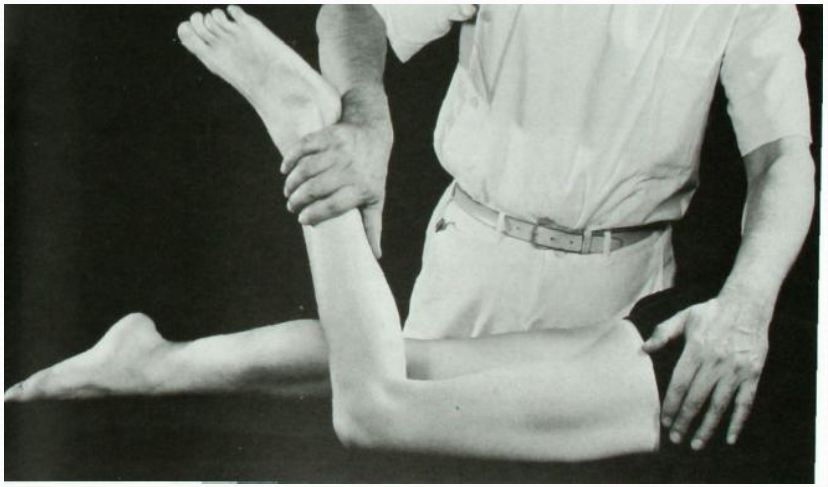
-The proximal hand stabilize pelvis, while The distal hand grasping above ankle to give resistance.

-***Grades 4:*** Moderate leading resistance is given directly opposing the line of motion.

-***Grade 5:*** Maximum leading resistance is given throughout the range plus a "hold" at the end of the

Note

- *To test biceps femoris only the lower leg is laterally rotated to put the muscle in a good alignment.*



- *To test semitendenosus and semimembranosus only the lower leg is medially rotated to put the muscle in a good alignment.*

oGrade 2. "poor strength"

-Side lying, with legs straight, the upper leg is supported, affected leg down.

-Therapist stands beside the table, the proximal hand support the upper leg; the distal hand is placed above the knee joint to stabilize the thigh.

Command

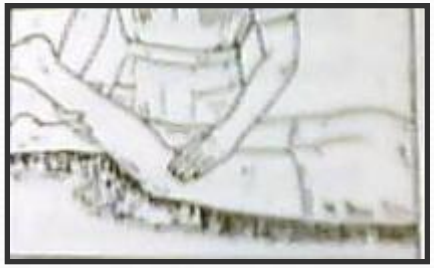
-Move your lower leg backward through full range of motio
-----Relax.

oGrades 1 and 0. "Trace and Zero strength"

-Patient starting position is Prone lying, affected leg is near the therapist with slightly flexed knee, lower leg supported.

-Therapist position and grasps are the same as for Grade 3,the proximal hand supporting the lower affected leg, the proximal hand palpates tendons of knee flexor muscles on the back of the thigh immediately above the medial and lateral tibial condyles.

Command Try to flex your knee by lifting your foot of the table ------Relax.



Weakness of Knee Flexors

-Weakness of both the medial and lateral hamstrings perm hyperextension of the knee.

-When this weakness is bilateral, the pelvis may tilt anteriorly, and the lumbar spine may assume a lordotic position.

-Weakness of the lateral hamstrings causes a tendency toward loss of lateral stability of the knee, allowing a thrust in the direction of a bowleg position in weight bearing.

-Weakness of the medial hamstrings decreases the medial stability of the knee joint and permits a knock-knee position, with a tendency toward lateral rotation of the leg on the femur.

Effects of shortness or contracture

-Shortness of hamstrings causes Restriction of knee extension when the hip is flexed, or restriction of hip flexion when the knee is extended.

-Contracture of both the medial and lateral hamstrings results in a position of knee flexion, and, if the contracture is extreme, it will be accompanied by a posterior tilting of the pelvis and a flattening of the lumbar spine.