

## NEUROMUSCULAR SYSTEMS OF THE LOWER MEMBER

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### INTERNAL PLANTAR NERVE

#### GLOBAL FUNCTION:

- Statics: Maintain the external arch.
- Dynamics: Movement of the 1st finger and impulsor effect.

| MUSCLE                                 | ORIGIN   | INSERTION   | FUNCTION   |
|--|--|---|--|
| SHORT FLEXOR OF THE 1ST FINGER         | 1st wedge  | 1 <sup>a</sup> phalanx of the 1 <sup>o</sup> finger.  | Flexor of the 1 <sup>o</sup> finger.   |
| SEPARATOR OF THE 1 <sup>o</sup> FINGER | Internal condyle of the calcaneous                       | 1 <sup>a</sup> phalanx of the 1 <sup>o</sup> finger   | Separates the 1 <sup>o</sup> finger  |
| LUMBRICAL 1 <sup>o</sup>               | Tendon of the 2 <sup>o</sup> finger of the large flexor. | Dorsum of the proximal Proximal phalanx of the 2 <sup>o</sup> finger and tendon of this finger of the large flexor. | To bend the 1st phalanx and to extend the 2nd and the 3rd of the 1st finger. |
| SHORT FLEXOR DIGITORUM.                | Calcaneous   | Medial phalanxes of the last four fingers.  | To bend the medial phalanxes of the last four fingers.                       |

### EXTERNAL PLANTAR NERVE

#### GLOBAL FUNCTION:

- Statics: They maintain the osseous arches of the 3 support points
- Dynamics: They maintain the force from the external part of the foot to the internal part.

| MUSCLE  | ORIGIN   | INSERTION  | FUNCTION  |
|---|--|--|---|
| DORSAL INTEROSSEOUS: There are 4 of them.                       | In the two metatarsals of the corresponding interosseous space. The 2nd toe has 1 internal and 2 external. The 3rd and the 4th external. | External side of the proximal phalanxes of the 2nd toe, 3rd and 4th toe. | To bend the primer phalanx and to extend the other two. To separate the toes.             |
| PLANTAR INTEROSSEOUS: there are 3: in the 3rd, 4th and 5th toe. | In the internal surface of the corresponding metatarsal.   | Internal side of the proximal phalanxes of the corresponding toe         | To bend the first phalanx and to extend the other two. To approximate the toes.           |
| SHORT FLEXOR OF THE 5TH TOE                                     | Large and basic plantar ligament of the 5th metatarsal.  | External side of the proximal phalanx of the 5th toe.                    | Separador anf flexor of the 5thtoe.   |
| OPONENT OF THE 5TH FINGER                                       | Large and basic ligament of the 5th metatarsal.  | External rim of the 5th metatarsal.                                      | Oponent of the 5 <sup>o</sup> toe   |
| SEPARATOR OF THE 5TH TOE  | External tuberosity of the calcaneous.   | Proximal phalanx of the 5th toe.   | Separador and flexor of the 5th toe.  |
| APROXIMATOR OF THE DEL 1 <sup>o</sup> TOE. (Transvers fascicle) | Head of the 2 <sup>o</sup> ,3 <sup>o</sup> ,4 <sup>o</sup> and 5 <sup>o</sup> metatarsal   | Proximal phalanx of the 1 <sup>o</sup> toe.                              | Aproximates the 1 <sup>o</sup> toe.   |
| APROXIMATOR OF THE 1 <sup>o</sup> TOE. (Oblique fasciculus)     | Cuboides   | Proximal phalanx of the 1 <sup>o</sup> toe.                              | Aproximates the 1 <sup>o</sup> toe.   |
| CUADRATUS PLANTAE   | Tuberosity of the calcaneous   | Tendon of the large flexor of the toes.                                  | Corrects the direction of the tendon of the large flexor of the toes and helps it to bend |
| 2 <sup>o</sup> , 3 <sup>o</sup> and 4 <sup>o</sup> LUMBRICAL    | Tendons of the 3 <sup>o</sup> , 4 <sup>o</sup> and 5 <sup>o</sup> toe of the profound common flexor.                                     | Back of the phalanxes and the proximal tendons of the common extensor    | To bend the 1st phalanx and to extend the 2nd and the 3rd                                 |

|  |  |                                  |
|--|--|----------------------------------|
|  |  | muscle of the 3°, 4° and 5° toe. |
|--|--|----------------------------------|

**Sciatic of the internal popliteal**

**GLOBAL FUNCTION:**

- Statics: To maintain the osseous arches.
- Dynamics: Transmission of charges

| MUSCLE                          | ORIGIN  | INSERTION   | FUNCTION  |
|---------------------------------|---|---|---|
| LARGE FLEXOR OF THE 1ST FINGER  | Posterior surface and rim of the fibula                         | Distal Phalanx of the 1st finger  | Flexor of the 1st finger, plantar flexor and supinator. Strenghtens the articulation of the ankle.      |
| TIBIALIS POSTERIOR              | Interosseous membrabe, tibial and fibula                        | Scaphoid bone and 1st wedge   | Plantar flexor and supinator. Sustains the plantar arch.  |
| LARGE COMMON FLEXOR OF THE TOES | Posterior surface of the tibial                                 | Distal phalanxes of the 2nd and 5th toe                                     | To bend the toes and the sole. Sustains the plantar arch.   |
| POPLITEAL                       | Posterior external surfaxe of the external condyle of the femur | Posterior surface of the tibial above the oblique line                      | Directs the external condyle backwards  |
| SOLEUS (TRÍCEPS SURAL)          | Posterior surface, external border and head of the fibula.      | Through the Achilles tendon and the posterior tuberosity of the calcaneous. | Plantar flexion and supination.   |
| GEMELO INTERNO (TRÍCEPS SURAL)  | Surface postero-externa del cóndilo interno del fémur           | Achilles tendon   | To bend the knee  |
| SURAL TRICEPS                   | Posterior-external surfaxe of the external condyle of the femur | Achilles tendon   | To bend the knee  |
| PLANTARIS                       | Interior surface of the external condyle of the femur           | Achilles tendon or directly in the calcaneous.                              | To bend the knee. Contributes to the emptying of the popliteal vein by positioning itself on top of it. |

**EXTERNAL SCIATIC POPLITEAL NERVE**

**GLOBAL FUNCTION:**

- Dynamics: Dorsiflexion of the ankle when supporting the foot. Direct the point of the foot outwards. The global function of the anterior tibial nerve is to extend the toes and to twist the ankle

| MUSCLE   | ORIGIN   | INSERTION                         | FUNCTION  |
|--|--|-----------------------------------|---|
| <b>MUSCULAR CUTANEOUS NERVE OR FIBULAR NERVE</b> |  |                                   |   |
| SHORT LATERAL FIBULAR                            | External surface of the fibula                               | Styloid process of the metatarsal | Extensión y pronación del pie                   |
| LARGE LATERAL FIBULAR                            | Anterior external surface of the fibula                      | Base of the 1° metarsal           | Extensión y pronación del pie                   |
| <b>ANTERIOR TIBIAL NERVE</b>                     |  |                                   |   |
| ANTERIOR TIBIAL                                  | External surface of the tibial and the interosseous membrane | First metatarsal and 1st wedge    | Flexión dorsal del pie.                         |
| LARGE EXTENSOR OF THE 1ST TOE                    | Interosseous membrana and tibial                             | Distal phalanx of the 1st toe     | Extensión del dedo 1° y flexión dorsal del pie. |

|                           |   |   |   |
|---------------------------|---|---|---|
| EXTENSOR DIGITORUM LONGUS | Internal surface of the fibula                      | Distal phalanx of the 2nd and 5th finger                    | Flexión dorsal del pie y extiende del 2º al 5º dedo |
| ANTERIOR FIBULAR          | Lower third of the fibula and interosseous membrane | External surface of the 5º metatarsal                       | Extensión del pie y pronación                       |
| SHORT COMMON EXTENSOR     | Dorsal and external surface of the calcaneus        | Tendons of the common extensor of the 1st until the 4th toe | Extensión from the 1st until the 4th toe            |

**INTERNAL SCIATIC POPLITEAL NERVE OF THE THIGH OR GREAT SCIATIC  
GLOBAL FUNCTION:**

Righting of the pelvis and flexion of the knee. Drivers when walking.

| MUSCLE                                   | ORIGIN                    | INSERTION   | FUNCTION  |
|--|---------------------------|---|---|
| STRAIGHT PIECE OF THE MAJOR APPROXIMATOR | Sciatic tuberosity        | Tubérculo del gran APPROXIMATOR.  | Aproxima el muslo y extiende la articulación coxo femoral. Transmite las fuerzas        |
| SEMIMEMBRANOSUS                          | Sciatic tuberosity        | 2 tendones a la tuberosidad interna de la tibia y otro a la capsula articular of the knee | Flexor y APPROXIMATOR de la cadera y flexor of the knee y rotación externa de la pierna |
| SEMITENDINOSUS                           | Sciatic tuberosity        | Tuberosidad superior de la tibia  | Flexor y APPROXIMATOR de la cadera y flexor of the knee y rotación externa de la pierna |
| FEMORAL BICEPS SHORT PORTION             | Linea aspera of the femur | Head of the fibula  | To bend the knee and external rotation of the leg                                       |
| FEMORAL BICEPS LARGE PORTION             | Sciatic tuberosity        | Head of the fibula  | To bend the knee and external rotation of the leg                                       |

**LUMBO SACRAL PLEXUS NERVE  
GLOBAL FUNCTION:**

- Deep muscles: Active ligaments of the hip joint.
- Superficial muscles: each muscle has a specific action.

| MUSCLE               | ORIGIN   | INSERTION                         | FUNCTION  |
|----------------------|--|-----------------------------------|---|
| <b>DEEP MUSCLES</b>  |  |                                   |   |
| VASTUS INTERMEDIUS   | Sciatic tuberosity                                   | Posterior intertrochanterial line | Approximation and internal rotation of the hip. Compacts the fémur against the cotyloid |
| INTERNAL OBTURATOR   | Internal surface of the obturator hole               | Digital recess                    | Adductor and external rotator of the hip  |
| SUPERIOR GEMELLUS    | External surface of the sciatic spinal               | Tendon of the internal obturator  | Adductor and external rotator of the hip  |
| INFERIOR GEMELLUS    | Sciatic tuberosity                                   | Tendon of the internal obturator  | Adductor and external rotator of the hip  |
| PYRAMIDAL            | Anterior surface of the sacral                       | Vértice del trocanter mayor       | Adductor y rotador externo e interno de la cadera                                       |
| <b>SUPERFICIALES</b> |  |                                   |   |
| MINOR GLUTEAL        | External iliac fossa until the anterior gluteal line | Vertex of the major trochanter    | Adductor, flexor y internal rotator of the hip  |
|                      |  |                                   |   |

|                       |   |   |  |
|-----------------------|---|---|--|
| MEDIAN GLUTEAL        | External iliac fossa between the anterior and posterior gluteal line                          | External surface of the major trochanter  | Adductor, flexor y internal rotator of the hip   |
| TENSOR OF FASCIA LATA | Anterior-superior spinal iliac  | Through the lower part of the tensor of the fascia lata until the external tuberosity of the tibial | Flexion, extensión and rotation of the knee. Flexion, adduction and rotation of the hip. |
| MAJOR GLUTEAL         | Posterior base of the sacral, coccyx, posterior-superior and posterior-inferior iliac spinals | Fascia lata and linea aspera  | Righting of the rachis. Adduction, extensión and external rotation of the thigh          |

**OBTURATOR NERVE  
GLOBAL FUNCTION:**

Intermedian action between the 1st and 2nd phase of walking. External rotation and approximation of the hip.

| MUSCLE                              | ORIGIN                                  | INSERTION                                  | FUNCTION  |
|-------------------------------------|---|--|---|
| BENT PART OF THE MAJOR APPROXIMATOR | Sciatic tuberosity y rama isquiopubiana | Linea aspera of the femur                  | Adductor and flexor of the femur                    |
| MINOR APPROXIMATOR                  | Pubis                                   | Linea aspera of the femur (superior third) | Adductor and flexor of the femur                    |
| MEDIAN APPROXIMATOR                 | Pubic spinal                            | Linea aspera of the femur (middle third)   | Adductor and flexor of the femur                    |
| INTERNAL RECTUS OF THE THIGH        | Pubic spinal nearby the pubic symphysis | Internal tibial plateau                    | Abductor and flexor of the thigh y flexor del muslo |
| EXTERNAL OBTURATOR                  | External surface of the obturator hole  | Digital recess of the femur                | Adductor and external rotator of the femur          |
| PECTINEUS                           | Pectineus crest of the pubis            | Linea pectinea of the linea aspera         | Abductor and external rotator of the femur          |

**CRURAL NERVE  
GLOBAL FUNCTION:**

Final phase of the intermedian movements between the 1st and 2nd phase of walking

| MUSCLE                               | ORIGIN  | INSERTION                               | FUNCTION   |
|--------------------------------------|---|---|--|
| ILIAC PSOAS (MAJOR)                  | Intervertebral bodies and intervertebral disks of ribs D11 and L4. Costal process of lumbar vertebrae | Trochanter minor                        | Flexor and external rotator of the hip   |
| ILIAC PSOAS (ILIAC)                  | Internal iliac fossa  | Trochanter minor                        | Flexor and external rotator of the hip   |
| CRURAL (CUADRICEPS FEMORIS)          | Anterior surface of the femur   | Tendon of the patella                   | Extensor of the knee   |
| VASTUS INTERNUS (CUADRICEPS FEMORIS) | Internal lip of the linea aspera  | Tendon of the patella                   | Extensor of the knee   |
| VASTUS EXTERNUS (CUADRICEPS FEMORIS) | External lip of the linea aspera  | Tendon of the patella                   | Extensor of the knee   |
| RECTUS ANTERIOR (CUADRICEPS FEMORIS) | Anterior-inferior iliac spinal  | Tendon of the patella                   | Extensor of the knee and flexor of the hip   |
| SUBCRURAL                            | Anterior surface of the femur   | Articular capsule of the knee           | Traction of the knee capsule   |
| SARTORIUS                            | Iliac anterior-superior spinal  | Superior-internal surface of the tibial | Adduction, flexion and external rotation of the hip. Flexion and internal rotation of the knee |

