



WATKINS' MANUAL OF
Foot and Ankle
Surgery

FOURTH EDITION

Leon Watkins

Watkins' Manual of Foot and Ankle Medicine and Surgery

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Leon Watkins, DPM, FACFAS, CWS

Podiatric Foot and Ankle Surgeon

Private Practice

Metairie, Louisiana



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Dedicated to my wife Maria

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1

ANATOMY

CRANIAL NERVES

BLOOD SUPPLY TO THE TALUS

NERVES TO THE LOWER EXTREMITY

BLOOD SUPPLY TO THE LOWER EXTREMITY

ANKLE LIGAMENTS

FOOT LIGAMENTS

SESAMOIDAL ATTACHMENTS

TOENAILS

CALCANEUS

TALUS

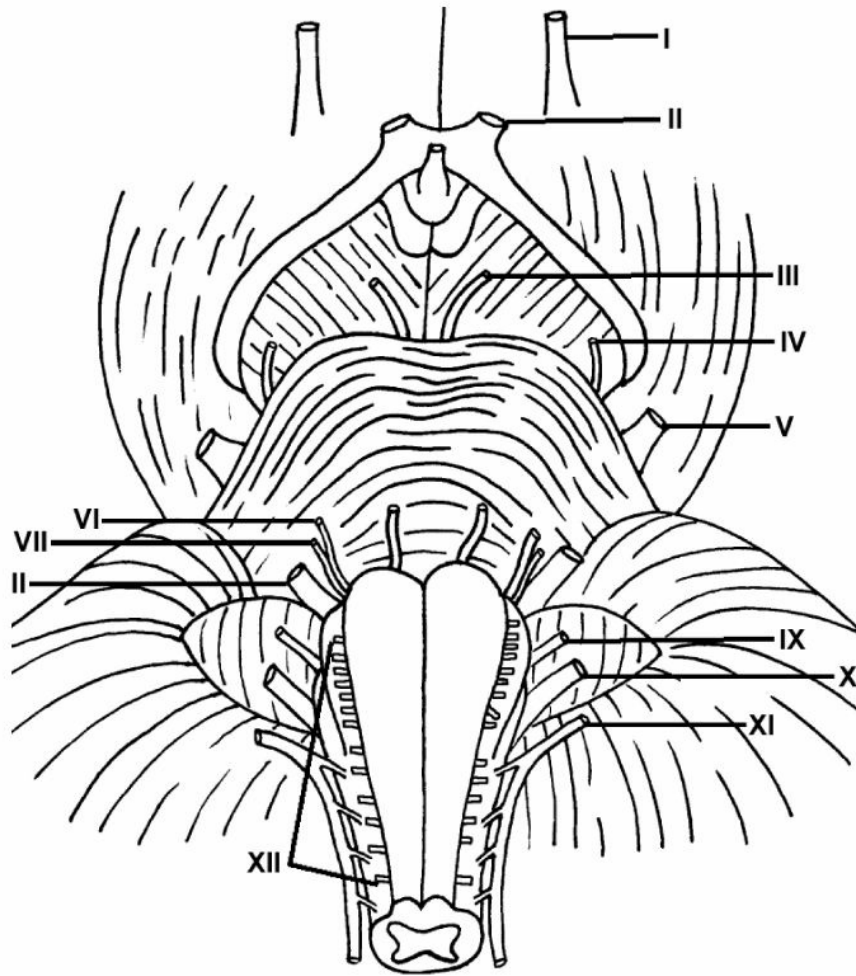
LEG MUSCLES

INTRINSIC MUSCLES OF THE FOOT

PLANTAR LAYERS OF THE FOOT

TYPES OF JOINTS

CRANIAL NERVES



Nerve	Name ^a	Function	Type
I	Olfactory	Smell	Sensory
II	Optic	Vision	Sensory
III	Oculomotor	Eye muscles, accommodation	Motor
IV	Trochlear	One eye muscle	Motor
V	Trigeminal	Sensation to face/oral, muscles of mastication	Both
VI	Abducens	One eye muscle	Motor
VII	Facial	Taste, muscles of facial expression, secretions of lacrimal, mucosal, and some saliva glands	Both
VIII	Vestibulocochlear (or Auditory)	Hearing, sense of equilibrium	Sensory
IX	Glossopharyngeal	Sensation from pharynx, taste, one pharyngeal muscle, secretion of one saliva gland	Both
X	Vagus	Sensation from pharynx and larynx, taste, muscles of palate, pharynx, larynx, and one tongue muscle, parasympathetic to thorax and upper abdomen	Both
XI	Accessory	Two neck muscles	Motor
XII	Hypoglossal	Tongue muscles	Motor

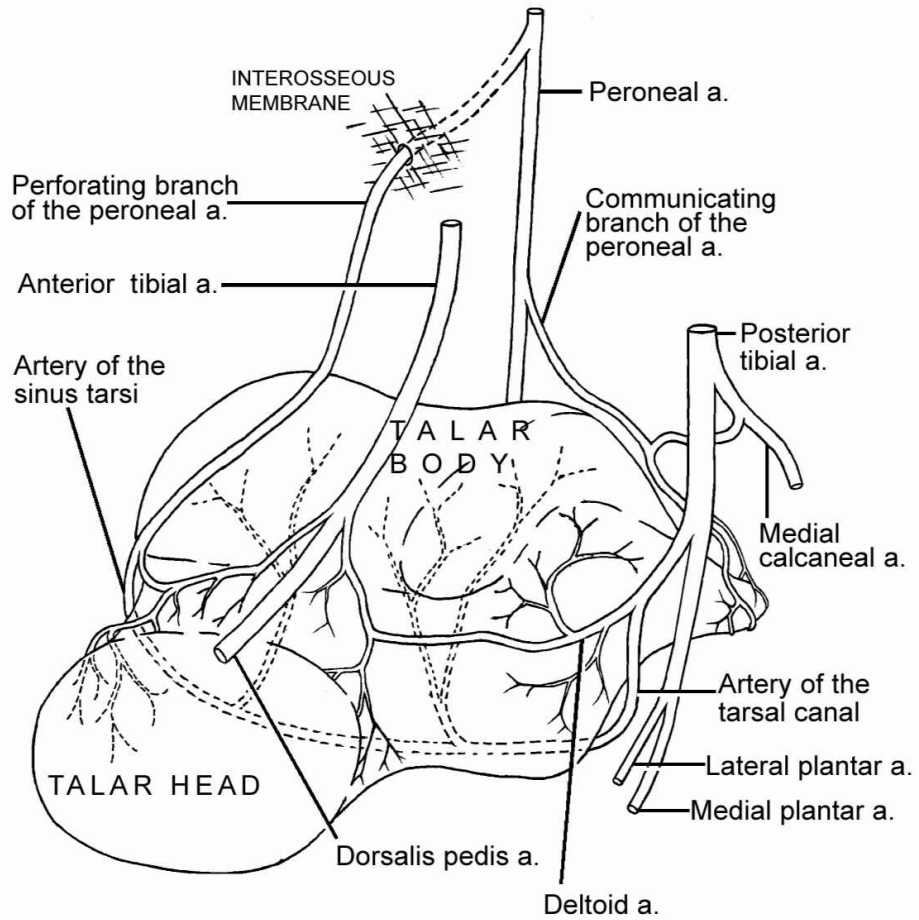
^aMnemonic for names of cranial nerves: *On Old Olympus Towering Top A Fin And German Viewed A Hop.*

BLOOD SUPPLY TO THE TALUS

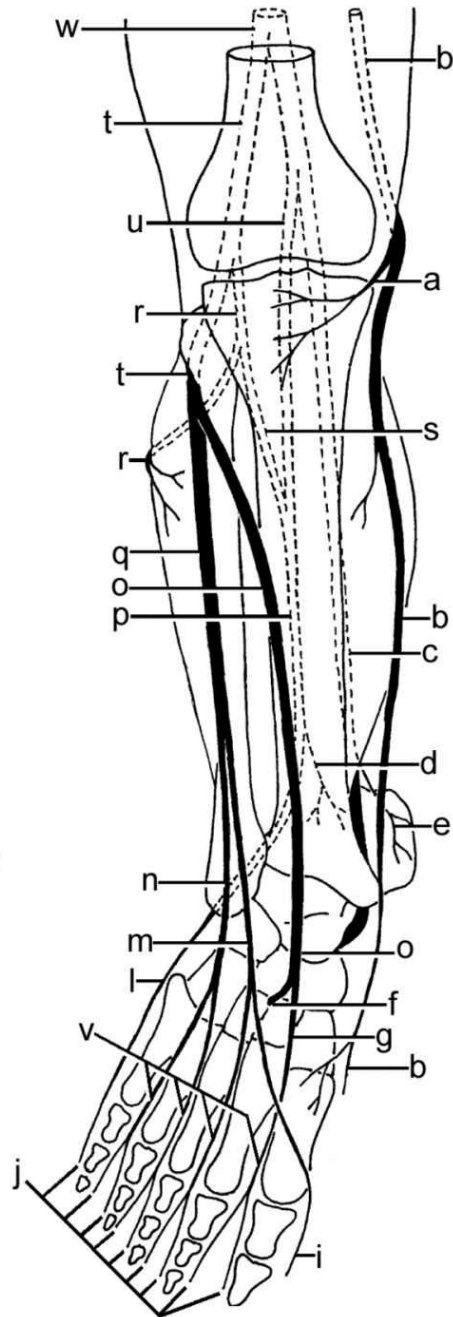
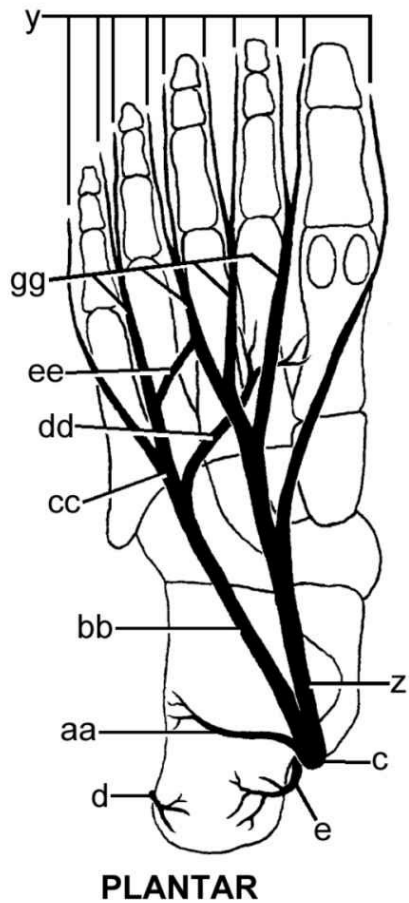
Posterior tubercle: The medial calcaneal artery anastomoses with a branch from the peroneal artery to supply this area.

Body: Supplied by the artery of the sinus tarsi and the artery of the tarsal canal; both anastomose with each other as well as with the deltoid branches

Head/neck: Supplied by direct branches off the dorsalis pedis artery or anterior tibial artery and the anastomoses that the dorsalis pedis makes with the deltoid branches and the artery of the sinus tarsi



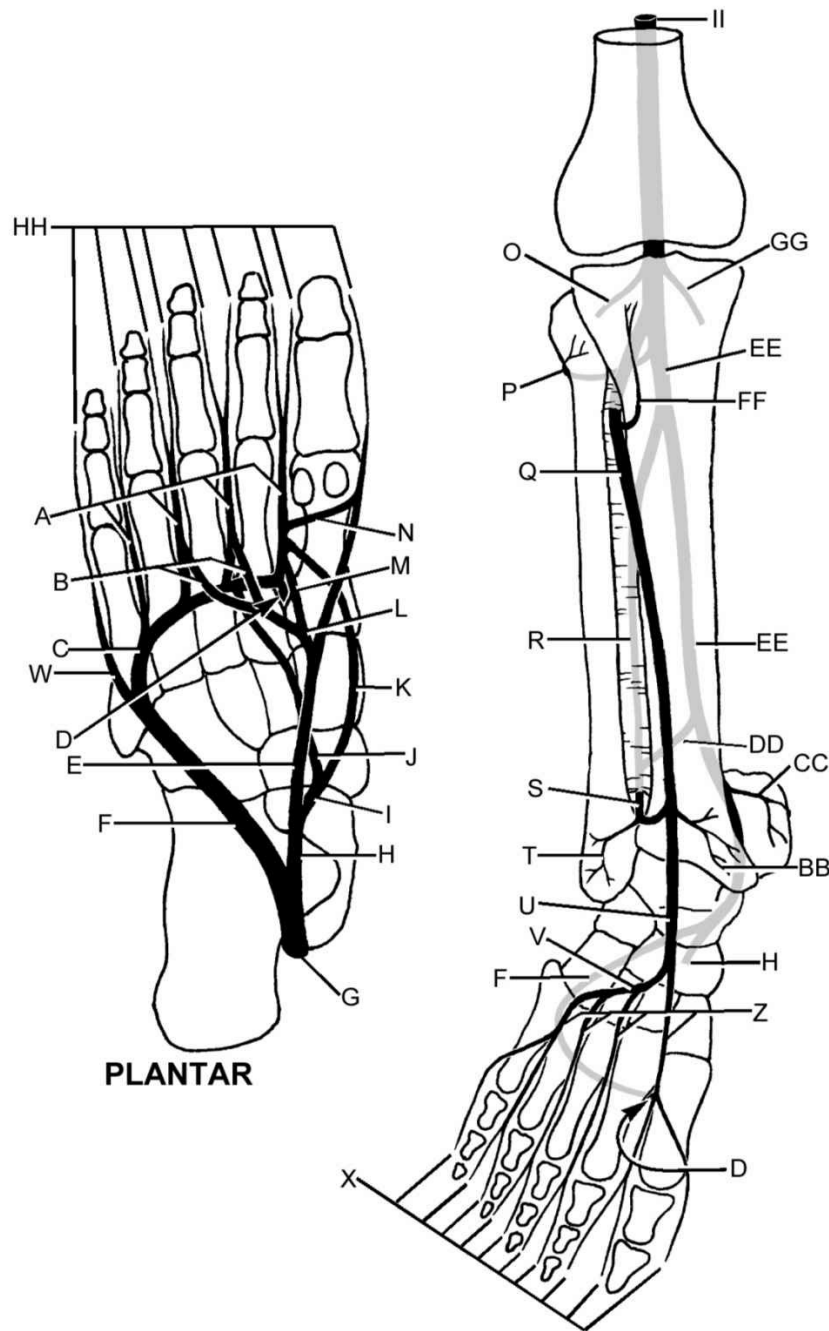
NERVES TO THE LOWER EXTREMITY



- a. Infrapatellar branch of the saphenous nerve
- b. Saphenous nerve (L3, L4)
- c. Tibial nerve
- d. Lateral calcaneal nerve
- e. Medial calcaneal nerve
- f. Lateral branch of deep peroneal nerve
- g. Medial branch of deep peroneal nerve
- i. 1st dorsal digital proper nerve

- j. 2nd to 10th dorsal digital proper nerve
- l. Lateral dorsal cutaneous nerve
- m. Medial dorsal cutaneous nerve
- n. Intermediate dorsal cutaneous nerve
- o. Deep peroneal nerve
- p. Sural nerve
- q. Superficial peroneal nerve
- r. Lateral sural cutaneous nerve
- s. Peroneal communicating branch
- t. Common peroneal nerve
- u. Medial sural cutaneous nerve
- v. 1st to 4th common dorsal digital nerve
- w. Sciatic nerve (L4-S3)
- y. 1st to 10th proper plantar digital nerve
- z. Medial plantar nerve
- aa. Infracalcaneal nerve (nerve to the abductor digiti minimi), a.k.a. Baxter's nerve
- bb. Lateral plantar nerve
- cc. Superficial branch of lateral plantar nerve
- dd. Deep branch of lateral plantar nerve
- ee. Communicating branch
- gg. 1st to 4th common plantar digital nerve

BLOOD SUPPLY TO THE LOWER EXTREMITY



Arteries of The Lower Extremity

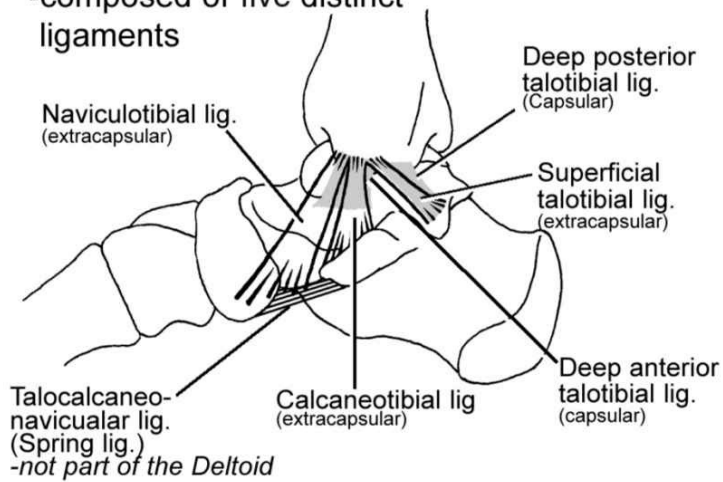
- A. 1st to 4th plantar metatarsal arteries
- B. 2nd and 3rd common superficial plantar digital arteries
- C. Medial or deep branch of the lateral plantar artery (deep plantar arch)
- D. Deep plantar artery
- E. Superficial branch of medial plantar artery
- F. Lateral plantar artery

- G. Posterior tibial artery
- H. Medial plantar artery
- I. Deep branch of the medial plantar artery
- J. Lateral branch of the deep branch of the medial plantar artery
- K. Medial branch of the deep branch of the medial plantar artery
- L. Lateral branch of the superficial branch of the medial plantar artery
- M. 1st common superficial plantar digital artery
- N. Digital branch of the 1st plantar metatarsal artery
- O. Lateral sural artery (an end artery)
- P. Circumflex fibular artery
- Q. Anterior tibial artery
- R. Peroneal artery
- S. Perforating branch of peroneal artery
- T. Anterior lateral malleolar artery
- U. Dorsalis pedis artery
- V. Arcuate artery
- W. Superficial branch of the lateral plantar artery
- X. 1st to 10th dorsal digital proper arteries
- Z. 1st to 4th dorsal metatarsal arteries
- BB. Anterior medial malleolar artery
- CC. Medial calcaneal artery
- DD. Communicating branch of the peroneal artery
- EE. Posterior tibial artery
- FF. Anterior tibial recurrent artery
- GG. Medial sural artery (an end artery)
- HH. 1st to 4th plantar digital proper artery
- II. Femoral artery

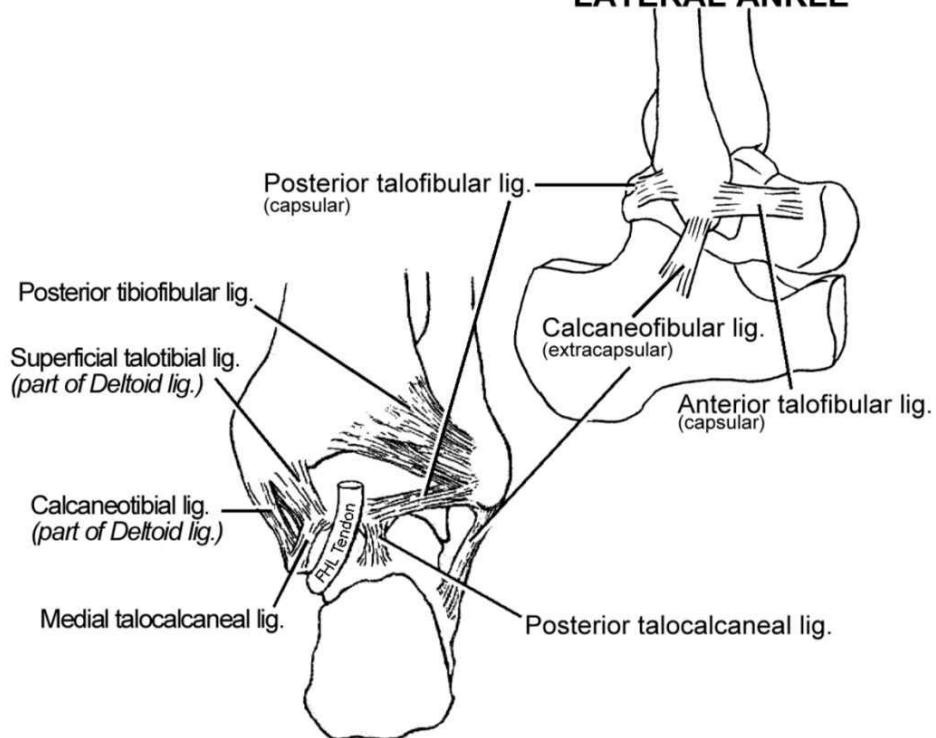
ANKLE LIGAMENTS

DELTOID LIGAMENT

-composed of five distinct ligaments

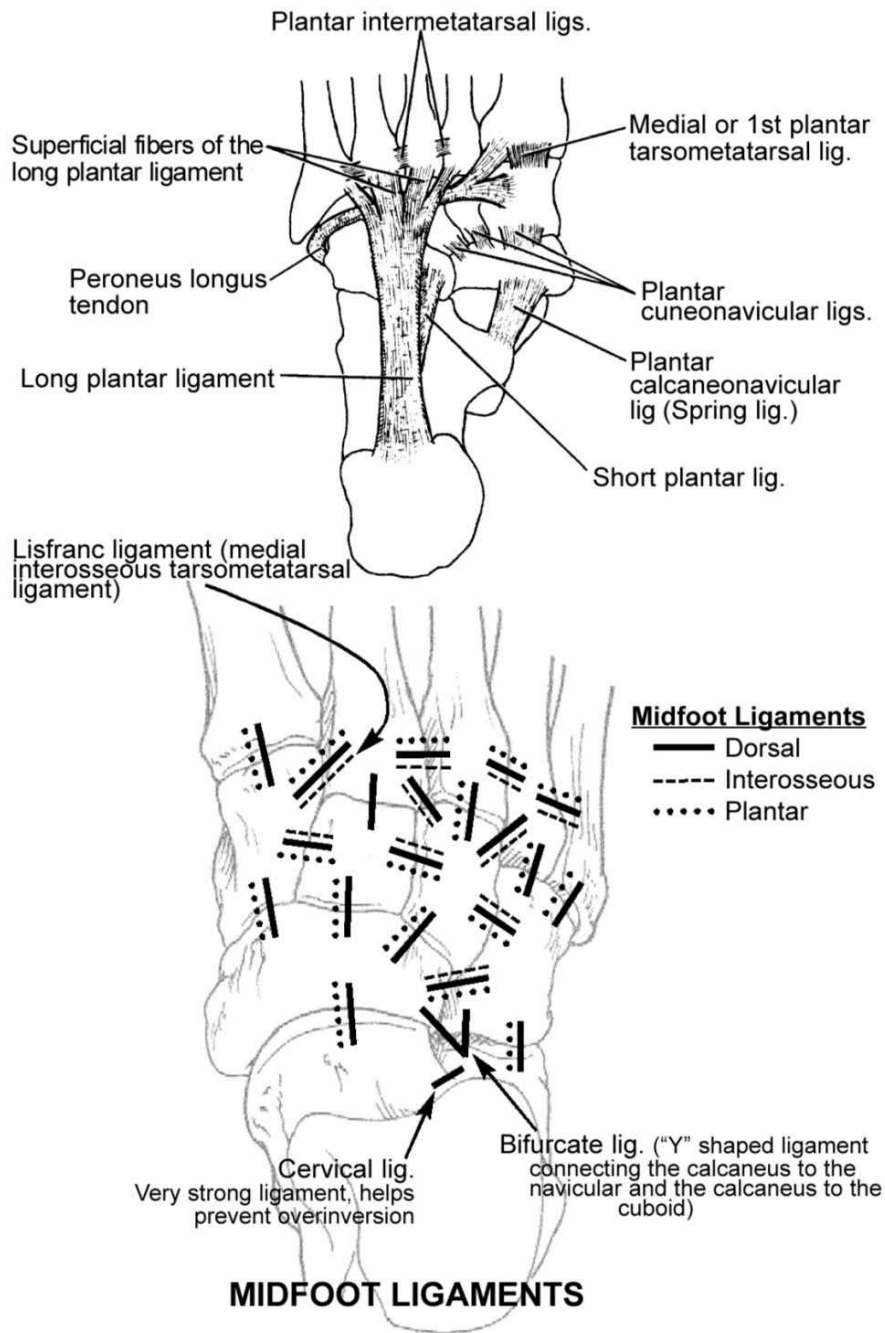


LATERAL ANKLE

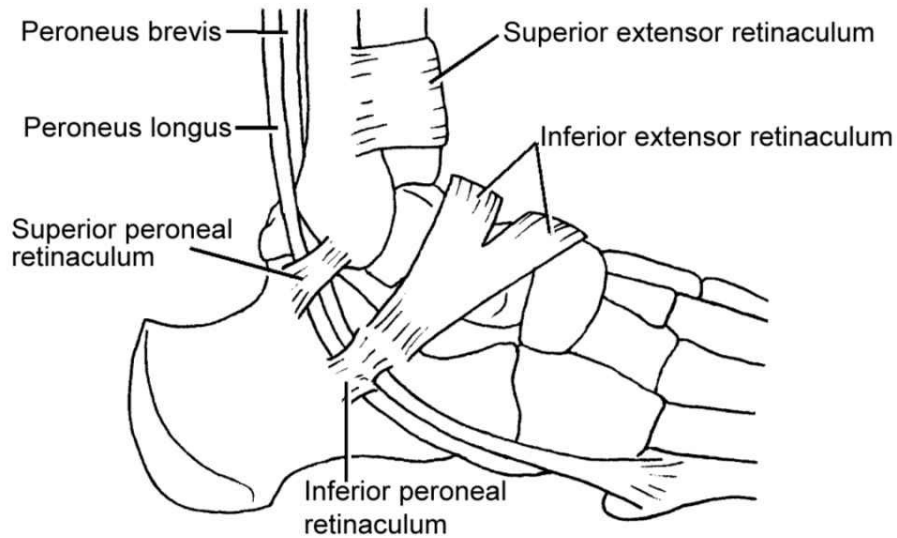


FOOT LIGAMENTS

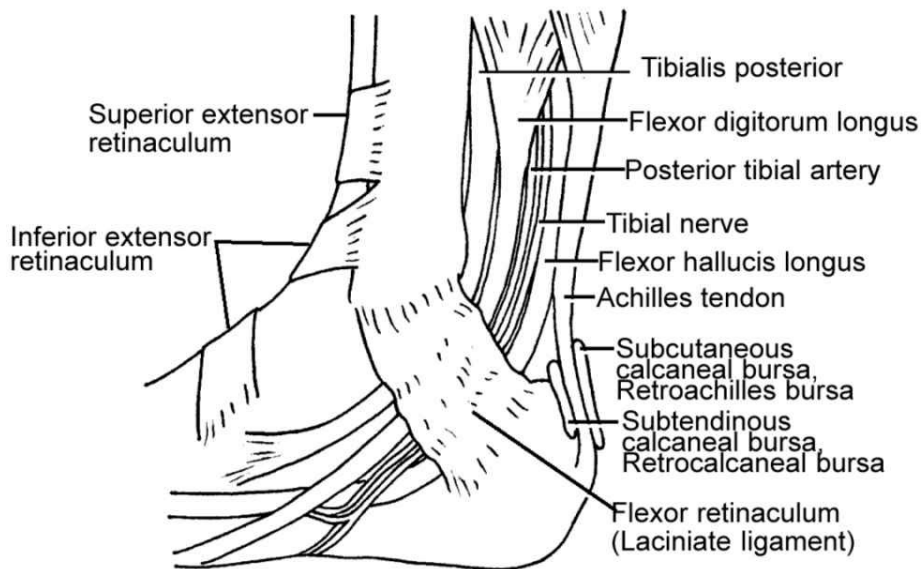
Dorsal and Plantar Ligaments



Retinaculum and Tendon Orientation

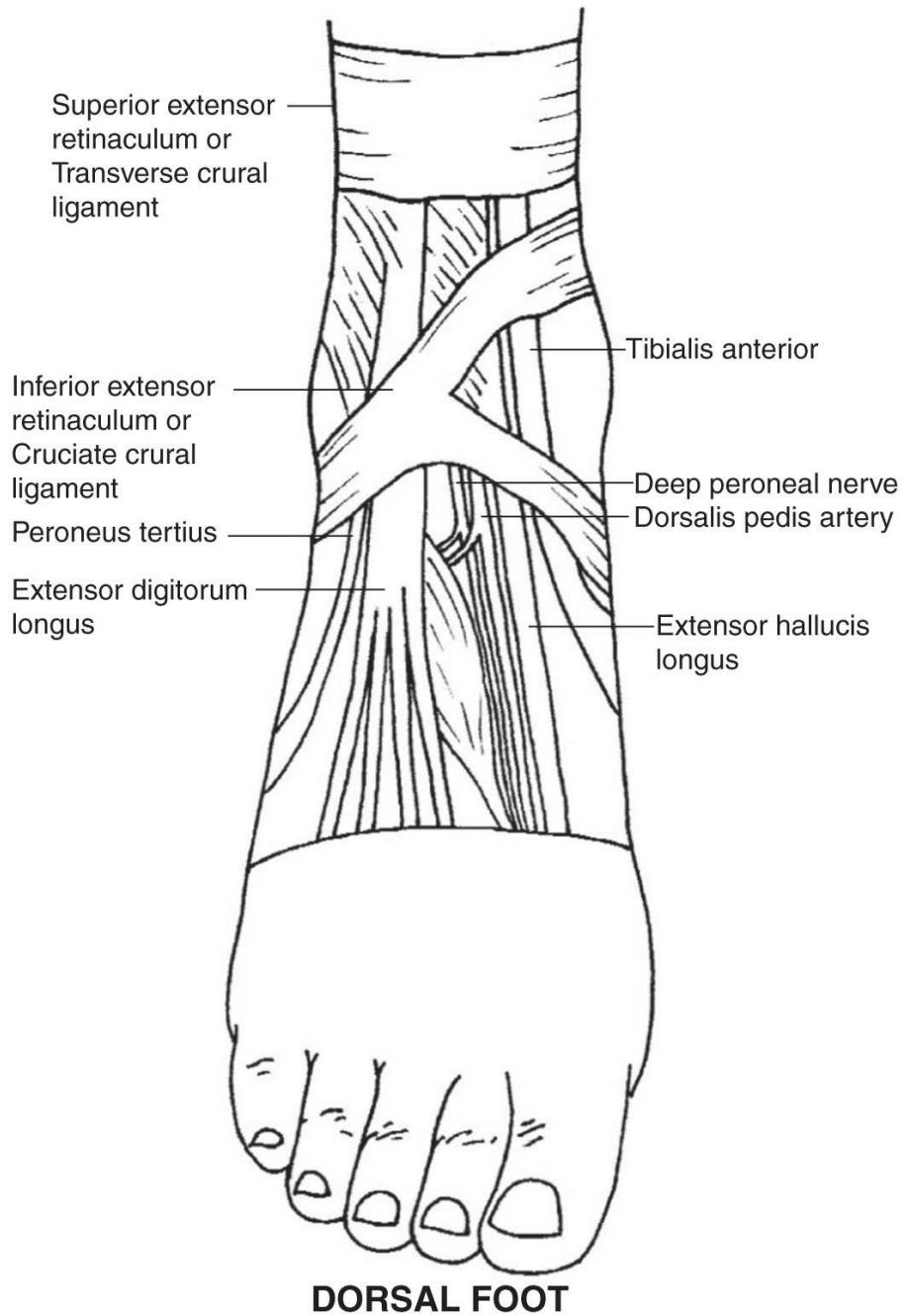


LATERAL ANKLE

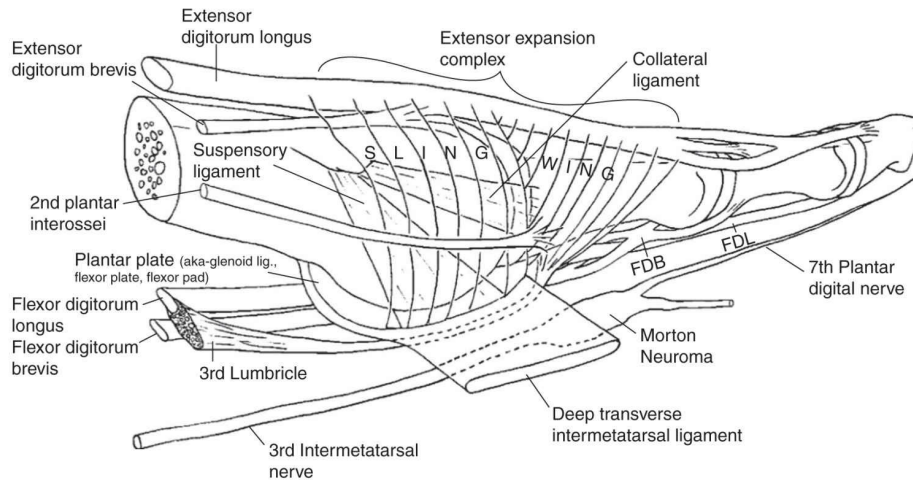


MEDIAL ANKLE

Mnemonic structures from anterior to posterior *Tom, Dick, and Harry*
 (alternative mnemonic: *Timothy Doth Vex (Vein) A Nervous Horse*)
*T*ibialis posterior, flexor *D*igitorum longus, (*V*ein) *A*rtery, *N*erve, flexor
*H*allucis longus



Mnemonic structures from medial to lateral *A HAND P*
Ant tib., ext. *Hallucis longus*, *Artery*, *Nerve*, extensor *Dig. longus*,
Peroneus tertius



MEDIAL VIEW OF THE 4th MPJ

SESAMOIDAL ATTACHMENTS

Ligamentous Attachments

- Intersesamoid ligament (tibial and fibular)
- Medial metatarsosesamoid suspensory ligament (tibial)
- Lateral metatarsosesamoid suspensory ligament (fibular)
- Medial sagittal hood ligament (tibial)
- Lateral sagittal hood ligament (fibular)
- Medial sesamophalangeal ligament (tibial)
- Lateral sesamophalangeal ligament (fibular)

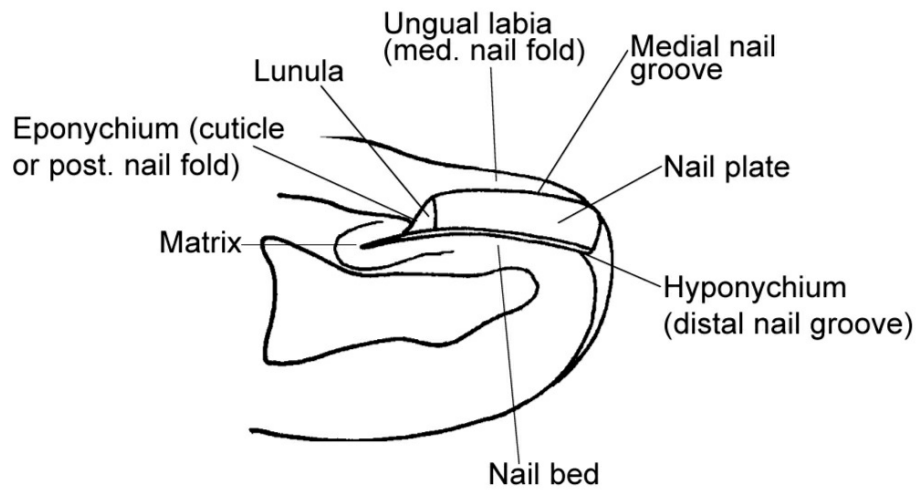
Tendon Attachments

- Adductor hallucis conjoined tendon (fibular)
- Abduct or hallucis tendon (tibial)
- Flexor hallucis brevis tendon (medial head) (tibial)
- Flexor hallucis brevis tendon (lateral head) (fibular)

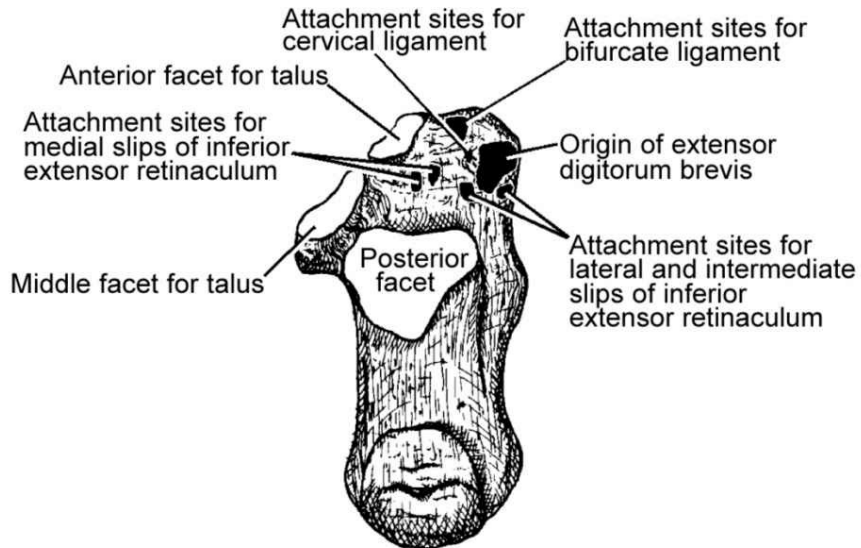
Other Attachments

- Plantar fascia (tibial and fibular)
- Plantar intermetatarsal ligament (fibular)
- Plantar plate (tibial and fibular)

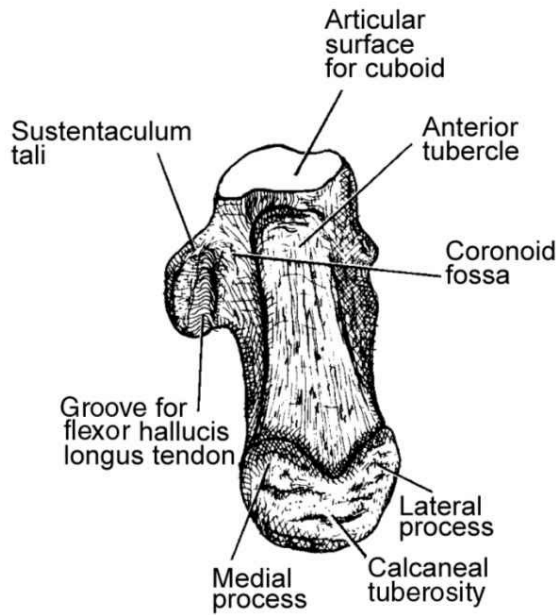
TOENAILS



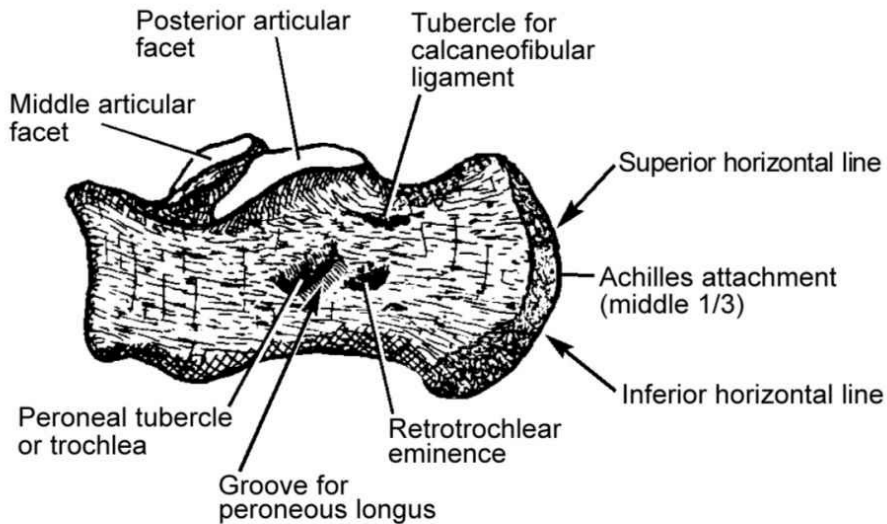
CALCANEUS



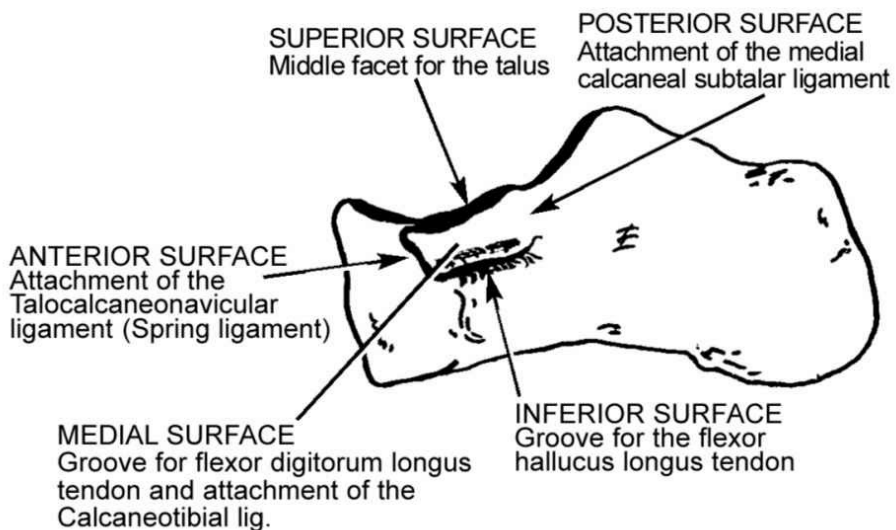
DORSAL VIEW OF CALCANEUS



PLANTAR VIEW OF CALCANEUS



LATERAL VIEW OF CALCANEUS

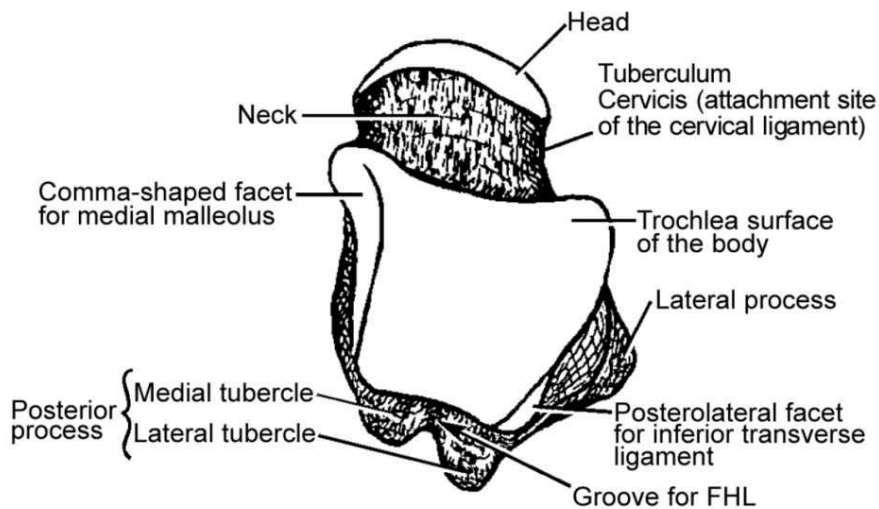


STRUCTURES AROUND THE SUSTENTACULUM TALI

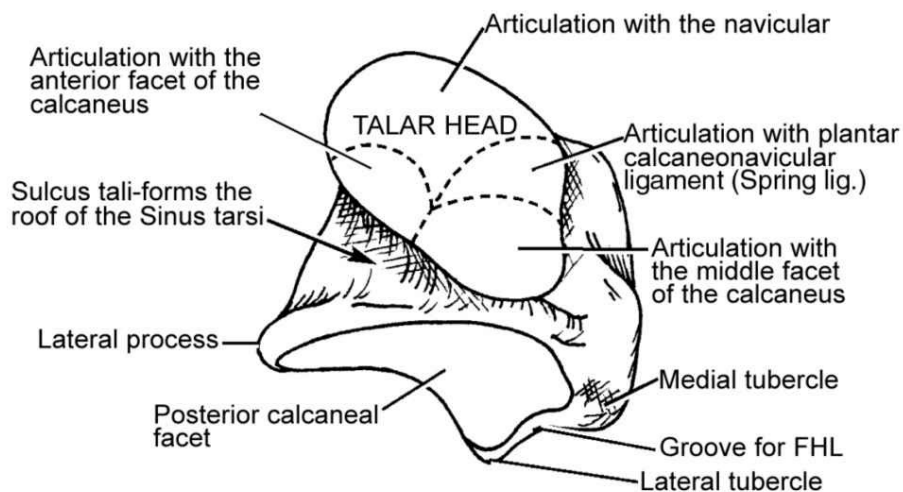
TALUS

3/5 of talus is covered by cartilage.

3/5 of talus is covered by cartilage.



DORSAL VIEW OF THE RIGHT



ANTERIOR VIEW OF THE RIGHT TALUS

LEG MUSCLES

Tibialis Anterior Muscle

Origin: Lateral condyle of the tibia, the proximal lateral 1/2 of the tibial shaft, the interosseous membrane, and the deep surface of the fascia cruris

Insertion: Medial and plantar surface of the medial cuneiform and base of the 1st metatarsal

Action: Dorsiflexes ankle; adducts and inverts foot

Innervation: Deep peroneal nerve (L4, L5, S1)

Arterial supply: Anterior tibial artery

Extensor Hallucis Longus Muscle

Origin: Anterior surface of the interosseous membrane and from the middle two-fourths of the medial surface of the fibula

Insertion: Dorsal base of the distal phalanx

Action: Extension of proximal phalanx of the hallux; dorsiflexion of the ankle

Innervation: Deep peroneal artery (L4, L5, S1)

Arterial supply: Anterior tibial artery

NOTE: *Extensor hallucis capsularis* is an extra slip from the medial side of the EHL tendon. It is present in 80% to 90% of the population and inserts into the dorsomedial capsule of the 1st MPJ. Its function is believed to be to reinforce the joint and take the slack out of the joint upon dorsiflexion.

Extensor Digitorum Longus Muscle

Origin: Lateral condyle of the tibia, the upper two-thirds of the medial surface of the shaft of the fibula, the upper part of the interosseous membrane, the fascia cruris, and the intermuscular septum

Insertion: Dorsal base of the middle and distal phalanx of digits 2 to 5

Action: Extends digits 2 to 5; dorsiflexes the ankle

Innervation: Deep peroneal nerve (L4, L5, S1)

Arterial supply: Anterior tibial artery

Peroneus Tertius Muscle

Origin: Lower one-quarter of the medial surface of the fibula and the adjacent surface of the interosseous membrane

Insertion: Dorsal base and shaft of the 5th metatarsal

Action: Dorsiflexes the ankle; everts the foot

Innervation: Deep peroneal nerve (L5, S1)

Arterial supply: Anterior tibial artery

NOTE: Absent in 8% to 9% of population

Peroneus Longus Muscle

Origin: Head and upper one-half of the lateral fibula

Insertion: Plantar lateral surface of the 1st cuneiform and base of the 1st metatarsal

Action: Everts foot; plantarflexes ankle; supports the longitudinal and transverse arch of the foot

Innervation: Superficial peroneal nerve (L5, S1, S2)

Arterial supply: Anterior tibial and peroneal artery

Peroneus Brevis Muscle

- Most efficient pronator of the subtalar joint

Origin: Inferior two-thirds of the lateral side of the fibula

Insertion: Styloid process of the 5th metatarsal

Action: Everts the foot; plantarflexes the ankle

Innervation: Superficial peroneal nerve (L5, S1)

Arterial supply: Peroneal artery

Gastrocnemius Muscle

Origin: Medial and lateral condyles of the femur

Insertion: Middle one-third of the posterior aspect of the calcaneus

Action: Plantarflexes ankle; flexes knee

Innervation: Tibial nerve (S1, S2)

Arterial supply: Sural artery (an end artery)

Soleus Muscle

Origin: Posterior head and upper one-third of the fibula, and soleus line of the tibia

Insertion: Middle one-third of the posterior aspect of the calcaneus

Action: Plantarflexes ankle

Innervation: Tibial nerve (S1, S2)

Arterial supply: Posterior tibial artery

Plantaris Muscle

Origin: Lateral condyles of the femur

Insertion: Medial one-third of the posterior calcaneus

Action: Plantarflexes ankle; flexes knee

Innervation: Tibial nerve (L5, S1, S2)

Arterial supply: Sural artery

NOTE: Absent in 7% of population

Popliteus Muscle

Origin: Lateral condyle of the femur

Insertion: Superior posterior surface of the tibia

Action: Flexes the knee; medially rotates the knee

Innervation: Tibial nerve (L4, L5, S1)

Arterial supply: Medial inferior genicular artery and the posterior tibial artery

Flexor Digitorum Longus

Origin: The posteromedial aspect of the middle third of the tibial shaft

Insertion: Plantar surface of the base of phalanges 2 to 5

Action: Flexes the DIPJ, PIPJ, and MPJ of digits 2 to 5, and plantarflexes the ankle

Innervation: Tibial nerve (S2, S3)

Arterial supply: Posterior tibia l artery

Tibialis Posterior Muscle

Origin: Posterior two-thirds of the interosseous membrane and the adjacent tibia and fibula

Insertion: Plantar surface of tuberosity of the navicular (major insertion site), medial, and intermediate cuneiform, and base of the 2nd, 3rd, and 4th metatarsal

Action: Inverts and adducts foot; plantarflexes ankle

Innervation: Tibial nerve (L4, L5)

Arterial supply: Sural, peroneal, and posterior tibial arteries

Flexor Hallucis Longus

Origin: Most of the inferior two-thirds of the posterior surface of the fibular and the lower part of the interosseous membrane

Insertion: Plantar surface of the base of the distal phalanx of the hallux

Action: Flexes the IPJ and 1st MPJ; plantarflexes ankle

Innervation: Tibial nerve (S2, S3)

Arterial supply: Peroneal and posterior tibial arteries

INTRINSIC MUSCLES OF THE FOOT

Extensor Digitorum Brevis

Origin: Superolateral aspect of the calcaneus, just anterior to the sinus tarsi

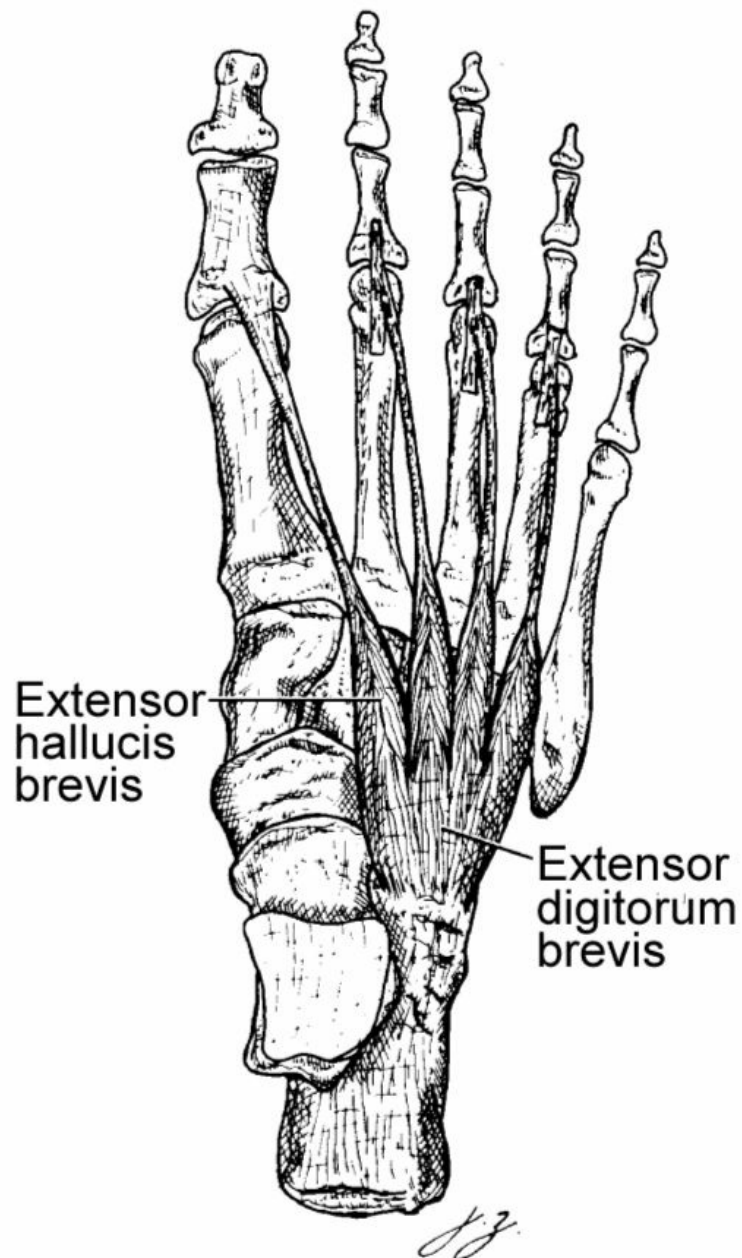
Insertion: Dorsal base of the 1st to 4th proximal phalanx

Action: Extension of the 1st to 4th MPJ and IPJ

Innervation: Lateral terminal branch of the deep peroneal nerve (S1, S2)

Arterial supply: Dorsalis pedis

NOTE: The most medial slip of this muscle is relatively distinct and called the *extensor hallucis brevis*.



Abductor Hallucis

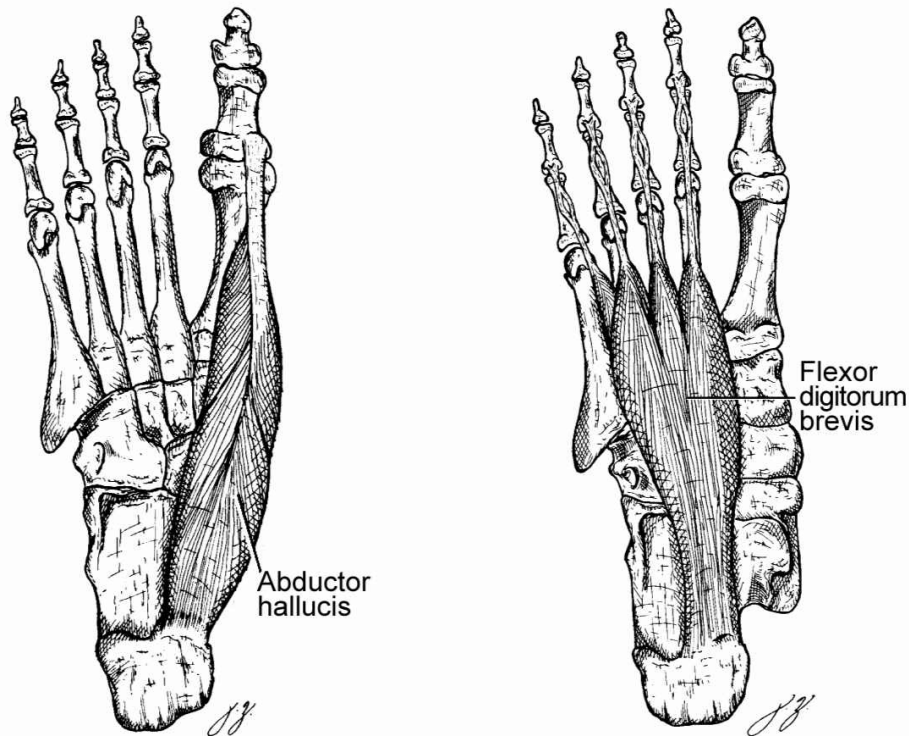
Origin: Medial process of the calcaneal tuberosity

Insertion: The tendons of abductor hallucis and the medial head of the flexor hallucis brevis insert together on the medial side of the plantar aspect of the base of the proximal phalanx. Some fibers also attach to the medial sesamoid.

Action: Abducts the hallux

Innervation: Medial plantar nerve (L5, S1, S2)

Arterial supply: Medial plantar artery



Flexor Digitorum Brevis

Origin: Plantar aponeurosis, medial intermuscular septa, lateral intermuscular septa, and the medial process of the calcaneal tuberosity

Insertion: Inserts by two tendinous slips onto each side of the shaft of the 2nd to 5th middle phalanx

Action: Flexion of the 2nd to 5th PIPJ, with continued contraction flexion of the 2nd to 5th MPJ

Innervation: Medial plantar nerve (L5, S1, S2)

Arterial supply: Medial plantar artery

Abductor Digiti Minimi Quinti

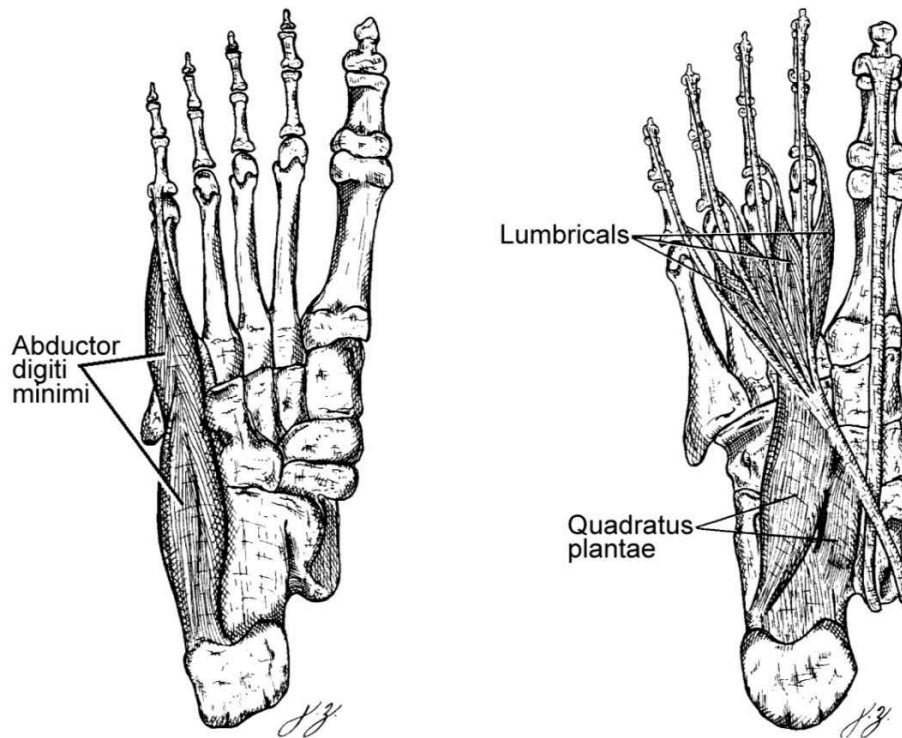
Origin: Lateral process of the calcaneal tuberosity

Insertion: Lateral side of the plantar aspect of the base of the 5th proximal phalanx

Action: Abducts the 5th toe and assists with flexion

Innervation: Lateral plantar nerve S1, S2

Arterial supply: Lateral plantar nerve



Lumbricales

Origin: Tendon of the flexor digitorum longus after its separation into four slips

Insertion: Medial aspect of the extensor expansion, slightly more dorsally than plantarly

Action: Flexes the 2nd to 5th MPJ and extends the IPJs of these same toes

Innervation: The 1st (medial) lumbrical is innervated by the medial plantar nerve L5, S1. The lateral three lumbricales are innervated by the deep branch of the lateral plantar nerve S1, S2.

Arterial supply: Plantar metatarsal arteries

Quadratus Plantae

Origin: Arises from two heads of origin, which are separated from one another by the calcaneal attachment of the long plantar ligament. The medial head originates from the medial plantar surface of the calcaneus. The lateral head originates from the lateral plantar surface of the calcaneus.

Insertion: Tendon of the flexor digitorum longus

Action: Aids the flexor digitorum longus in the flexion of the 2nd to 5th toes by straightening the line of pull to the tendon

Innervation: Lateral plantar nerve S2, S3

Arterial supply: Lateral plantar artery

NOTE: This muscle is also called *flexor digitorum accessorius*.

Flexor Hallucis Brevis

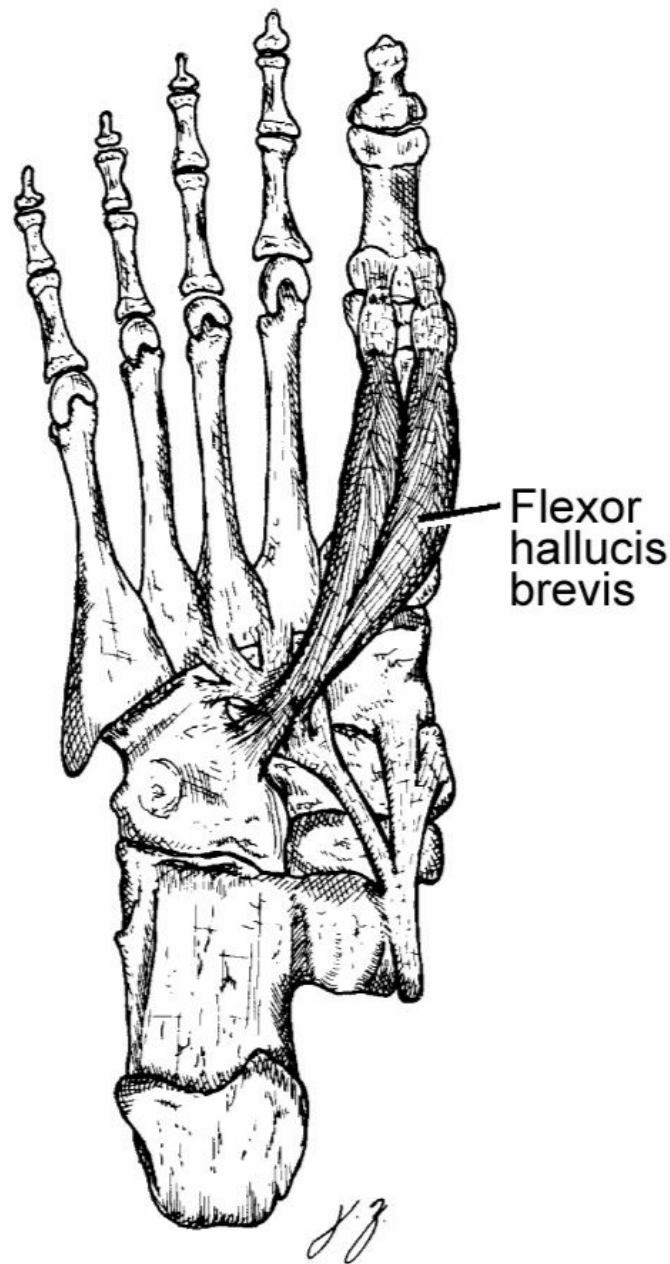
Origin: Plantar surface of the cuboid and lateral cuneiform

Insertion: The medial (larger) head inserts on the medial side of the plantar aspect of the base of the proximal phalanx, the medial sesamoid, and the medial aspect of the plantar pad of the hallux. The lateral (smaller) head inserts on the lateral side of the plantar aspect of the base of the proximal phalanx, the lateral sesamoid, and the lateral aspect of the plantar pad of the hallux.

Action: Flexes the 1st MPJ

Innervation: Medial plantar nerve L5, S1

Arterial supply: The 1st plantar metatarsal artery



Adductor Hallucis

Origin: The oblique head originates from the bases of the plantar-medial aspects of the 2nd, 3rd, and 4th metatarsals and from the mid-portion of the tendinous sheath of the peroneus longus tendon. The transverse head originates from the plantar plates and the plantar metatarsophalangeal ligaments of the 3rd, 4th, and 5th toes and from the deep transverse metatarsal ligament.

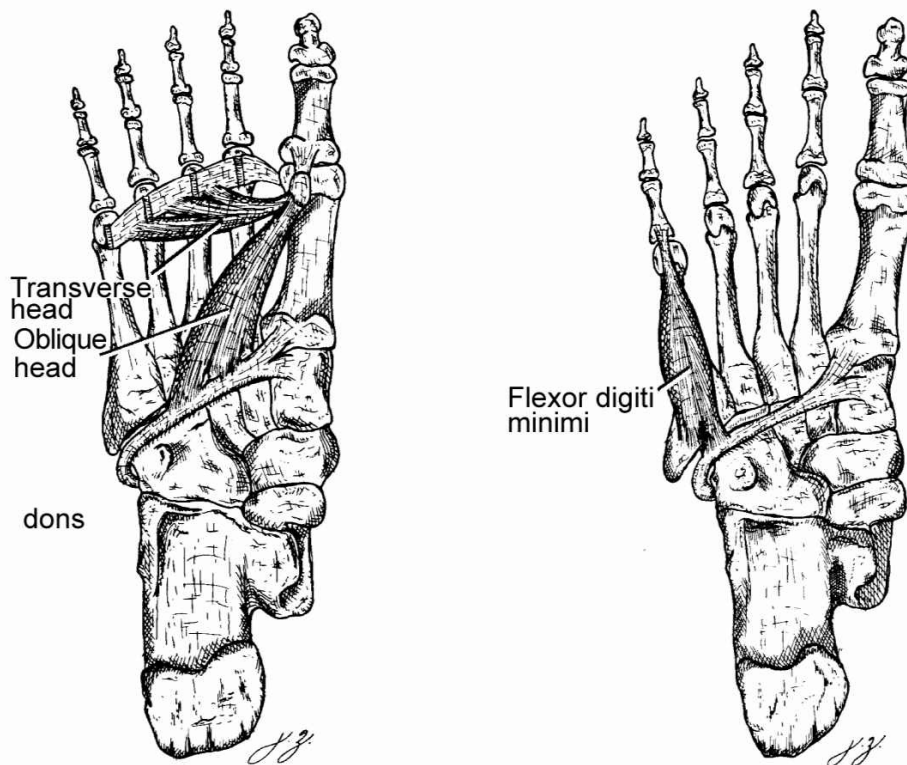
Insertion: The two heads come together and insert proximally along with the lateral head of the flexor hallucis brevis on the lateral, plantar area of

the proximal phalanx. The tendons enclose the lateral sesamoid.

Action: The oblique head functions to adduct and help flex the hallux. The transverse head acts to adduct the hallux and bring the metatarsals closer together and maintain the transverse arch of the foot.

Innervation: Deep branch of the lateral plantar nerve S1, S2, (S3)

Arterial supply: 1st plantar metatarsal artery



Flexor Digiti Minimi

Origin: Base of the 5th metatarsal on its medial plantar surface, the sheath of the tendon of the peroneus longus, and the plantar aponeurosis

Insertion: Lateral side of the plantar aspect of the base of the 5th proximal phalanx

Action: Flexes and helps abduct the 5th digit

Innervation: Superficial branch of the lateral plantar nerve S1, S2, (S3)

Arterial supply: Lateral plantar artery

Plantar Interossei

Origin: Medial side of the bases of the 3rd, 4th, and 5th metatarsal bones

Insertion: Medial side of the bases of the proximal phalanges, the metatarsophalangeal joint capsules, and the extensor expansion of the

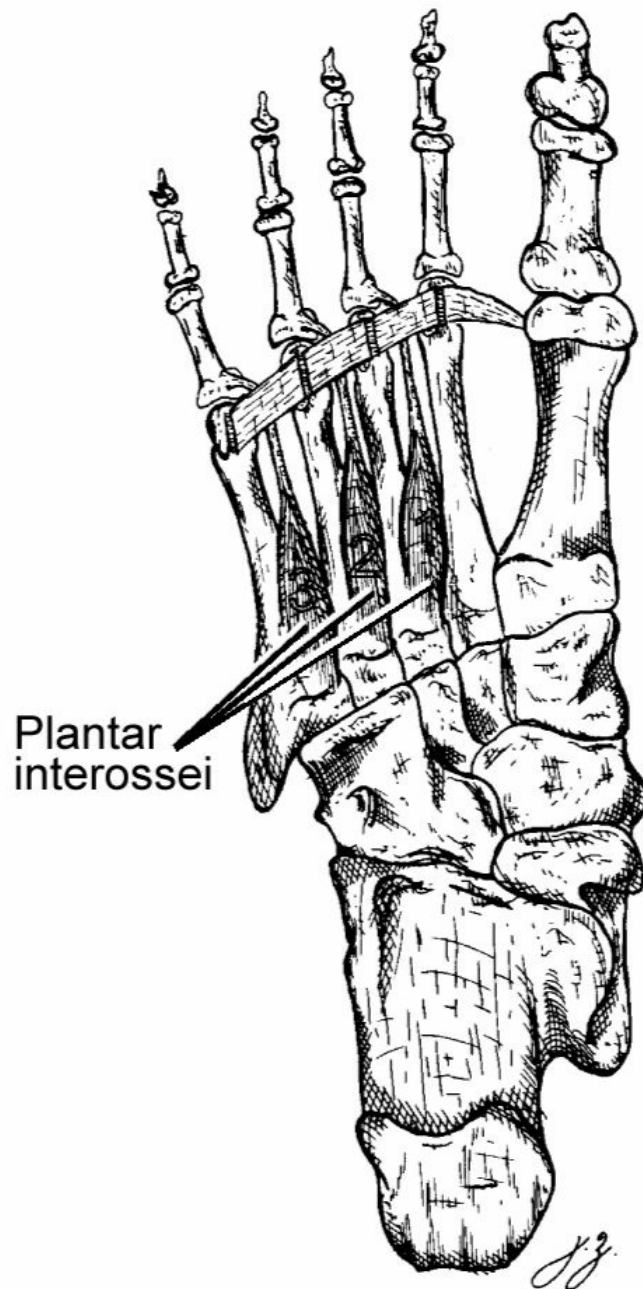
same digit on which they originate

Action: Adducts the 3rd, 4th, and 5th toes toward the midline of the foot

Innervation: The 1st and 2nd are innervated by the deep branch of the lateral plantar nerve. The 3rd is innervated by the superficial branch of the lateral plantar nerve.

Arterial supply: 2nd, 3rd, and 4th plantar metatarsal arteries

NOTE: Mnemonic—PAD, *Plantar- Adduction*



Dorsal Interossei

Origin: Originates from adjacent sides of adjacent metatarsal bones

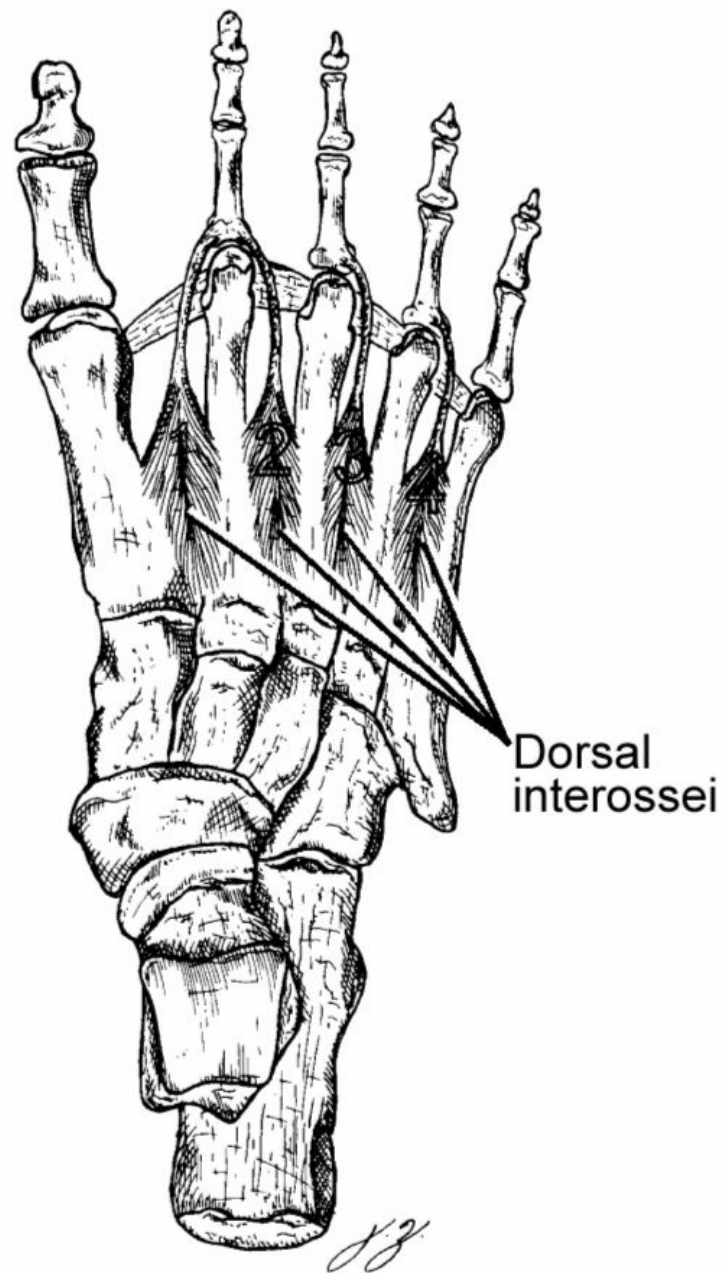
Insertion: The base of the proximal phalanx and the extensor expansion

Action: Abducts the toes away from the midline of the foot (the 2nd toe)

Innervation: 1st deep branch of the lateral plantar nerve and an extra branch, the medial branch of the deep peroneal nerve. 2nd deep branch of the lateral plantar nerve and an extra branch, the lateral branch of the deep peroneal nerve. 3rd deep branch of the lateral plantar nerve. 4th-Superficial branch of the lateral plantar nerve.

Arterial supply: Dorsal metatarsal artery

NOTE: Mnemonic—DAB, *Dorsal- Abduction*



PLANTAR LAYERS OF THE FOOT

First layer (superficial)

Abductor hallucis muscle
Flexor digitorum brevis muscle
Abductor digiti minimi (quinti)

Second layer

Quadratus plantae muscle
Lumbricales

Flexor hallucis longus tendon
Flexor digitorum longus tendon

Third layer

Adductor hallucis brevis muscle
Flexor hallucis brevis muscle
Flexor digiti minimi brevis muscle

Fourth layer (deep)

Plantar interossei
Dorsal interossei
Tibialis posterior tendon
Peroneus longus tendon

TYPES OF JOINTS

Spheroidal (ball and socket)— examples: Hip, shoulder

Ellipsoid (ellipsoid)—examples: Wrist, metatarsophalangeal joints

Sellar (saddle)—example: Calcaneocuboid joint

Ginglymus (hinge)—examples: Interphalangeal joints

Trochoid (ring and pivot)—examples: Atlantoaxial (C1 and C2), there are none in the low extremity

Planar (gliding or plane)—examples: Lisfranc joint, intercarpal joints

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PHARMACOLOGY

ANTIFUNGALS (TOPICAL)
ANTIFUNGALS FOR NAILS (TOPICAL)
ANTIFUNGALS (ORAL/IV)
PEDAL ANTIPERSPIRANTS
TOPICAL KERATOLYTICS
FIBROLYTICS
EMOLLIENTS (SOFTENING AGENTS)
CONTROLLED SUBSTANCE ACT
OPIOID ANALGESICS
NONOPIOID ANALGESICS
NSAIDS
DISEASE-MODIFYING ANTIRHEUMATIC DRUGS (DMARDS)
ANTICOAGULANTS
TOPICAL ANTIMICROBIALS
ANTIBIOTICS
TOPICAL CORTICOSTEROIDS
GLUCOCORTICOSTEROIDS
TOPICAL CORTICOSEROIDS
INJECTABLE STEROIDS
TOPICAL ANESTHETICS
INJECTABLE LOCAL ANESTHETICS
INJECTABLE LOCAL ANESTHETICS
ANESTHESIA MEDICATIONS
PERIPHERAL NEUROPATHY MEDICATIONS
ANTIGOUT MEDICATIONS
ANTIEMETICS
ANTIDOTES
TETANUS/TETANUS PROPHYLAXIS
VARIOUS TREATMENTS FOR WARTS

ANTIFUNGALS (TOPICAL)

Trade Name is a more correct term for the branded drug name.

Group	Generic Name	Trade Name	Formulation	Size	Dosing	Dermatophytes	Candida	OTC	
Imidazole	Clotrimazole	Lotrimin	Cream, 1%	15, 30, 45, 90 g	bid	x	x		
			Lotion, 1%	30 mL	bid	x	x		
			Solution, 1%	10, 30 mL	bid	x	x		
		Lotrimin-AF	Cream, 1%	12, 24 g	bid	x	x	x	
			Lotion, 1%	20 mL	bid	x	x	x	
			Solution, 1%	10 mL	bid	x	x	x	
			Powder, 1%	90 g	bid	x	x	x	
			Spray powder, 1%	3.5 oz	bid	x	x	x	
			Spray liquid, 1%	4.0 oz	bid	x	x	x	
		Mycelex	Cream, 1%	15 g	bid	x	x	x	
			Cruex Prescription Strength	Cream, 1%	0.5%	bid	x	x	x
		Desenex Prescription Strength	Cream, 1%	0.5%	bid	x	x	x	
			Lotrisone (<i>contains 0.05% Betamethasone</i>)	Cream, 1%	15, 45 g	bid	x	x	
		Fungoid	Solution, 1%		1.0 oz	bid	x	x	x
			Tineacide [®]	Cream, 1%	1.25 oz	bid	x	x	x
	Econazole	Spectazole	Cream, 1%	15, 30, 85 g	bid	x	x		
	Ketoconazole	Nizoral	Cream, 1%	15, 30, 60 g	Daily	x	x		
	Luliconazole	Luzu	Cream, 1%	15, 30 g	Daily	x	x		
	Miconazole	Monistat-Derm	Cream, 1%	15 g, 1, 3 oz	bid	x	x		
			Micatin	Spray liquid, 1%	3 oz	bid	x	x	x
			Fungoid Tincture [®]	Solution, 2%	1 oz, 1 pt	bid	x	x	
		Cruex Prescription Strength	Spray powder, 2%	3 oz	bid	x	x	x	
			Desenex Prescription Strength	Spray powder, 2%	3 oz	bid	x	x	x
				Spray liquid, 2%	3.5 oz	bid	x	x	x
		Lotrimin-AF	Powder, 2%	3 oz	bid	x	x	x	
			Spray powder, 2%	3.5 oz	bid	x	x	x	
			Spray deodorant powder, 2%	3.5 oz	bid	x	x	x	
		Micro-Guard	Cream, 2%		2 oz	bid	x	x	x
			Powder, 2%		3 oz	bid	x	x	x
		Zearorb-AF	Powder, 2%		2.5 oz	bid	x	x	x
		Oxiconazole	Oxistat	Cream, 1%	15, 30, 60 g	bid	x	x	x
				Lotion, 1%	30 mL	bid	x	x	
		Sulconazole	Exelderm	Cream, 1%	15, 30, 60 g	bid	x	x	
Haloprogin	Halotex			Cream, 1%	15, 30 g	bid	x	x	
Antibiotics	Amphotericin B	Fungizone	Solution, 1%	10 mL	bid	x	x	x	
			Cream, 1%	20 g	bid		x		
			Lotion, 1%	30 mL	bid	x			
		Ointment, 1%		20 g	bid		x		
	Nystatin	Mycostatin	Cream	30 g	bid		x		
			Powder	15 g	bid	x			
		Nilstat	Ointment	15 g	bid		x	x	
			Cream	15 g	bid		x	x	
		Pedi-Dri	Powder	2 oz	bid		x		
	Nystop	Powder	15 g	bid	x				
		Mycolog	Cream	15, 30, 60 g	bid		x	x	
		Myc-Triacet II (contains Triamcinolone)	Cream	15, 30, 60 g	bid		x		
	Allylamine	Terbinafine	Lamisil-AT	Cream, 1%	15, 30 g	bid	x		
			Naftifine	Naftin	Cream, 1%	15, 30, 60 g	bid	x	
Butenafine		Mentax	Gel, 1%		bid	x			
	Cream, 1%		15, 30 g	qd	x				
Miscellaneous	Undecylenic acid	Cruex	Spray powder	1.8, 3.5, 5.5 oz	bid	x		x	
			Desenex	Spray powder	2.7 oz	bid	x		x
				Shake powder	1.5, 3 oz	bid	x		x
	Gordochochom [®]	FungiCure	Ointment	0.5, 1 oz	bid	x		x	
			Solution	1 oz, 1 pt	bid	x		x	
	Solution	1 oz	bid	x		x			

		Gel	0.6 oz	bid	x	x
	FungiNail ^q	Solution, 25%	30 mL	bid	x	x
Tolnaftate	Tinactin	Cream, 1%	15, 30 g	bid	x	x
		Powder, 1%	45, 90 g	bid	x	x
		Liquid spray, 1%	4 oz	bid	x	x
		Deodorant powder, 1%	3.5 oz	bid	x	x
	Aftate	Spray liquid, 1%	3.5, 4.0 oz	bid	x	x
		Spray powder, 1%	3.5, 4.0 oz	bid	x	x
	Pro Clearz	Solution	1 oz	bid	x	x x
Ciclopirox Olamine	Loprox	Cream, 1%	15, 30, 90 g	bid	x	x
	Penlac ^r	Solution, 8%	3.3 mL	qd	x	x
		Lotion, 1%	30, 60 mL	bid	x	x
Phenol 1.5%	Castellani's Paint ^b	Solution, colored	1oz, 1 pt	bid		
		Solution, colorless	1oz, 1 pt	bid		

^qIndicated for fungal nails.

^bCastellani's Paint is not technically an antifungal but an antiseptic astringent that is often used on macerated interdigital fungal infections. Its active ingredient, phenol, has been shown to have antifungal properties. The color, in the colored solution, is fuchsine and has no medicinal value.

ANTIFUNGALS FOR NAILS (TOPICALS)

Efinaconazole (Jublia) 10% solution

Apply to nails daily.

Tavaborole (Kerydin) 5% solution

Apply to nails daily.

Kills only *T. rubrum* and *T. mentagrophytes*

Ciclopirox (Penlac)

Apply to nails daily.

Every 7 days remove film that develops with alcohol.

Tolnaftate (Formula 3) 1% solution

Apply to nails daily.

Undecylenic Acid (Tineacide)

Apply to nails daily.

ANTIFUNGALS (ORAL/IV)

Itraconazole (Sporanox, Onmel) 100 mg PO bid ×12 weeks for fungal toenails or ×6 weeks for fungal finger nails. "Pulse dosing" 200 mg PO bid ×1 week then 3 weeks off, 3 pulses for toenails and 2 pulses for fingernails. Onmel taken 200 mg qd ×12 weeks. [100mg, 200mg].

Imidazole derivative

Active against dermatophytes and *Candida*

Contraindicated with astemizole, terfenadine, cisapride

Possible hepatotoxicity; monitor hepatic function before treatment and at 1 month

Ketoconazole (Nizoral) 200 to 400 mg PO daily [200mg]

Imidazole derivative

Active against dermatophytes, *Candida*, and some G+, and has also

shown to have some antiviral properties
Can cause hepatotoxicity
Contraindicated with cisapride, terfenadine

Amphotericin B (Abelcet, Amphotec, Fungizone) Test dose of 1 to 5 mg IV over 15 to 30 minutes, then wait 30 minutes. If there are no adverse reactions such as fever, chills, or muscle spasms, begin IV infusion. Dosage varies based on suspension.
Antibiotic antifungal
Used mostly for life-threatening fungal infections after other antifungals have failed
Active against fungus and *Candida*; does not affect bacteria or dermatophytes
Not effective orally
Can cause renal toxicity

Terbinafine HCL (Lamisil) 250 mg PO daily for 6 weeks for fingernails and for 12 weeks for toenails
Allylamine derivative

Fluconazole (Diflucan) Oropharyngeal candidiasis: 200 mg IV/PO first day, then 100 to 200 mg daily for at least 2 weeks. Cryptococcal meningitis: 400 mg IV first day, then 200 to 800 mg daily. Vaginal candidiasis: 150 mg PO single dose [tabs 50, 100, 150, 200 mg, susp 10 and 40 mg per mL].
Imidazole derivative
Active against dermatophytes and some *Candida*, but has no antibacterial properties
Can cause renal toxicity

Griseofulvin (Fulvicin, Grifulvin, Grisactin, Gris-PEG) For tinea corporis, tinea cruris, and tinea capitis 375 mg daily. For tinea pedis and tinea unguium 375 mg bid [tabs 125, 250, 500 mg, susp 125 mg per 5 mL].
Active against dermatophytes; does not kill *Candida*
Renal and hepatic function should be monitored.

Gentian Violet
Topically bid for 3 days
Active against dermatophytes, *Candida*, and G Pos (color is due to crystal violet, hence G Pos activity)
Not commonly used for dermatophyte infections due to low efficacy, and has local irritant and staining properties
Solution 0.5%, 1%, 2%
Drying properties; so use on macerated infections