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Lecture 15

FRONTAL AND LATERAL COMPARTMENT OF THE LEG AND DORSUM OF FOOT

OBJECTIVES

- Identify the deep fascia of leg.
- Identify the fascial compartments of the leg.
- Describe the anatomy of the anterior & lateral compartments of the leg (muscles, vessels & nerves).
- Describe the anatomy of the dorsum of the foot (retinacula, muscles, vessels & nerves).

Color Index:

- Main text
- Boys' Slides
- Girls' Slides
- Important
- Dr's Notes
- Extra

Editing File

Please make sure that you're familiar with these terms

Terms	meaning	Example
Hallucis	it is used to describe structures or conditions related to **big toe**	Extensor Hallucis longus
Peroneus	is a term that is derived from latin and refers to **fibula** bone	Peroneus Tertius
Longus	is often used as part of the name of specific muscles to indicate their **elongated** shape or position	extensor digitorum longus
Brevis	refer to a structure or muscle that is relatively **short** in comparison to others	Extensor digitorum brevis
Digitorum	is a term derived from latin and is commonly used in anatomy refer to the digits or **fingers/toes**	extensor digitorum longus
Retinacula	thickening of deep fascia	EXTENSOR RETINACULA
Dorsiflexion	Extensor In leg	
Plantarflexion	Flexor in the leg	

Helpful Video

Fascia of the Leg

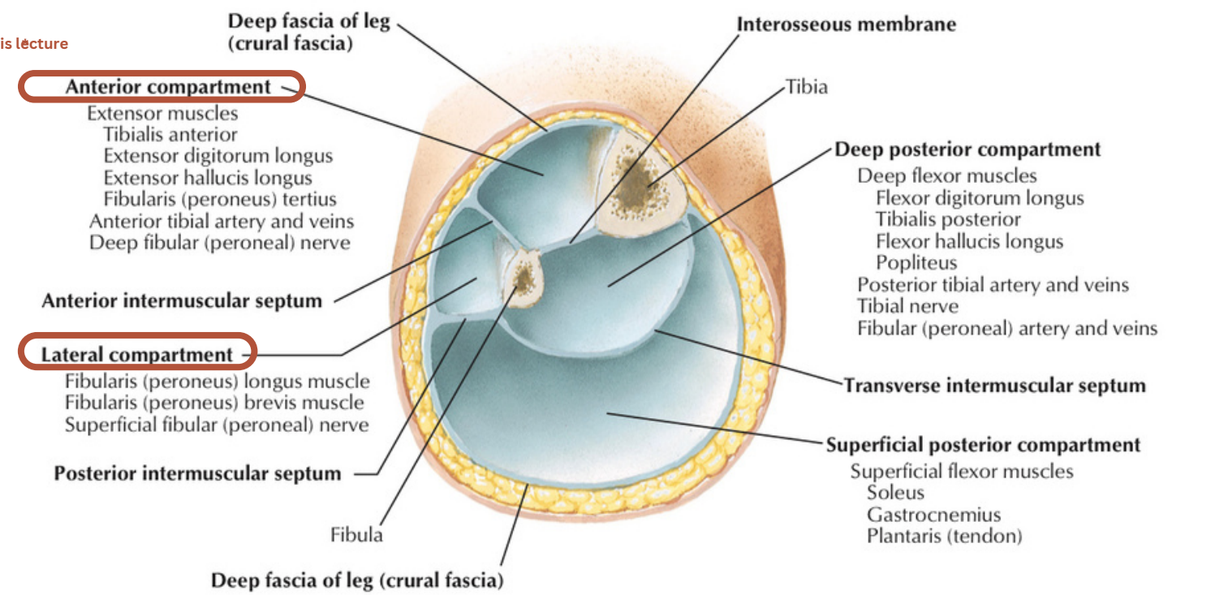
There is a deep fascia that surrounds the leg, attaching itself to the anterior and medial borders of the tibia.

We can see that there are two intermuscular septa that go from the deep fascia to the fibula:

- Anterior intermuscular (fascial) septa (at anterior border of fibula)
- Posterior intermuscular (fascial) septa (at posterior border of fibula)

Boys' Slides

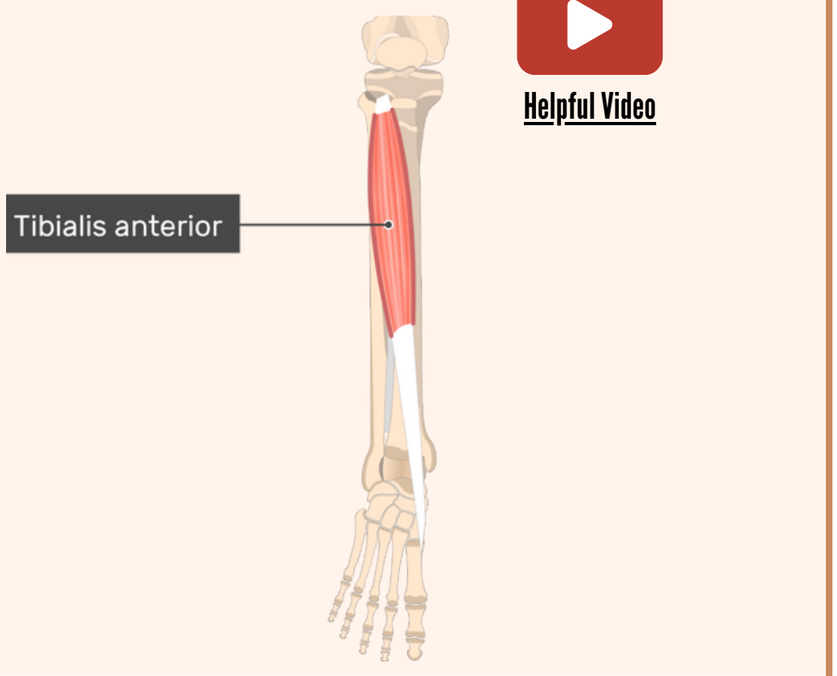
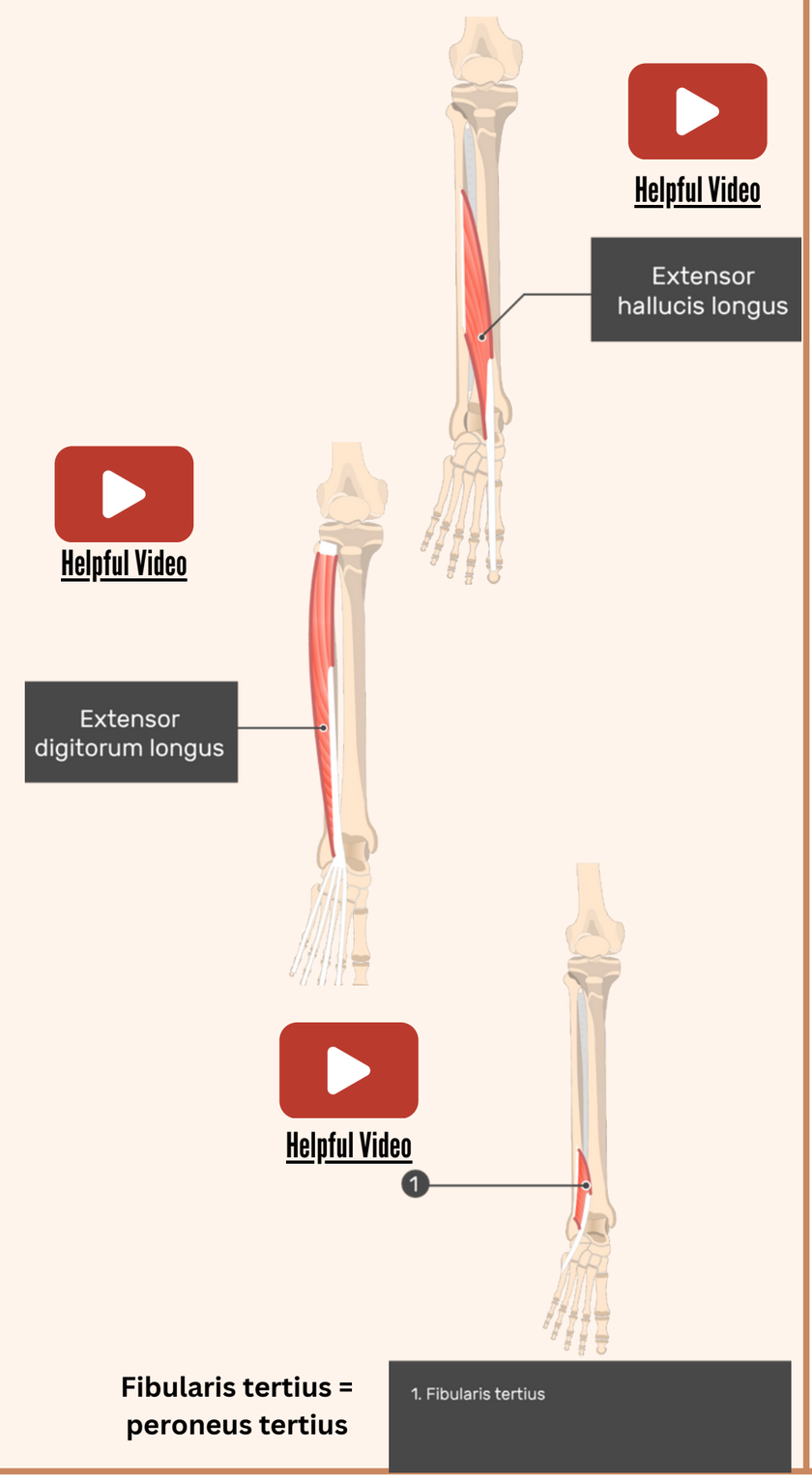
in this lecture



interosseous membrane

A thin & strong membrane, that binds the interosseous borders of the tibia & fibula.
It provides attachment for muscles.

Anterior compartment of the Leg

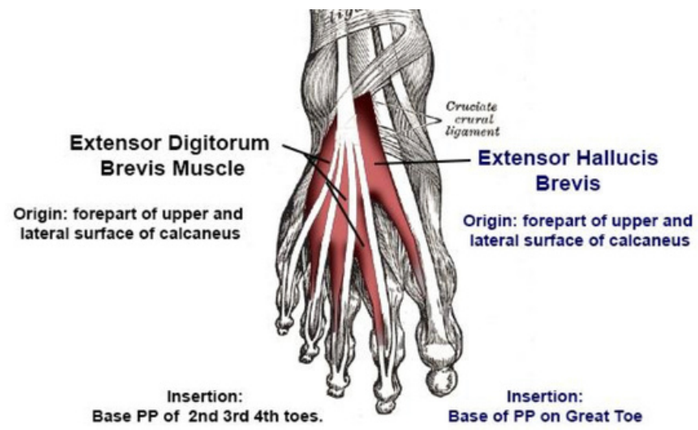
	Origin	Insertion	Action
	Lateral surface of Tibia	medial cuneiform & base of 1st metatarsal	- Extension (dorsiflexion) of big toe - Inversion of foot (subtalar joint)
	Medial surface of fibula	dorsum of distal phalanx of big toe	- Extension of all joint of big toe - Dorsiflexion
		Into extensor expansion to dorsum of middle & distal phalanges of lateral 4 toes	- Dorsiflexion Extension of all joints of lateral 4 toes
		Dorsum of 5th metatarsal	-Dorsiflexion - Eversion of foot

- supplied by anterior tibial artery
- All muscles dorsiflex the ankle joint
- innervated by the anterior tibial (deep peroneal) nerve
- Peroneus tertius (maybe absent)

Dorsal extensor expansion of toes (Insertion of Long Extensor Tendons)

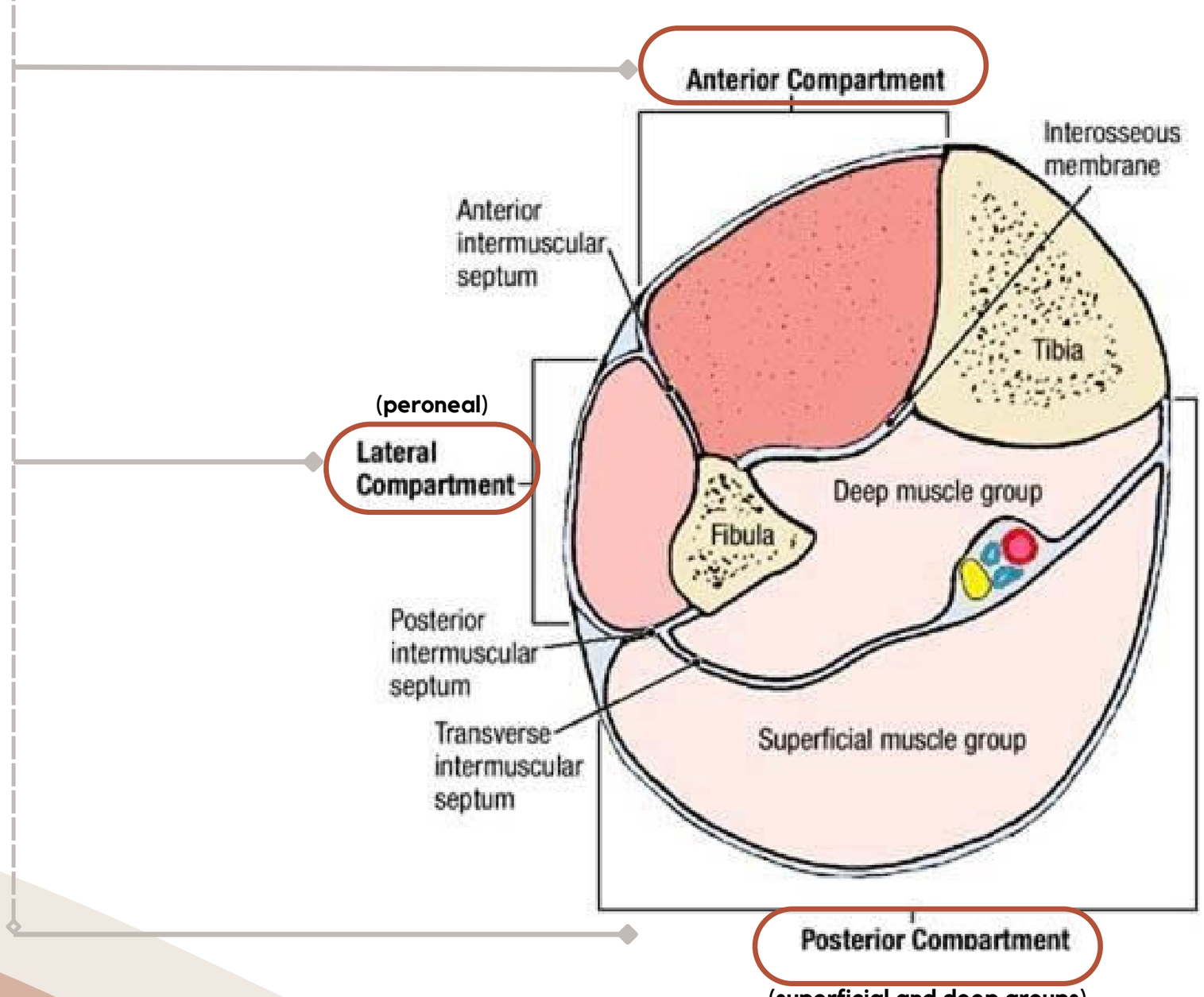
Girls' Slides

- The tendons of Extensor digitorum longus pass to the lateral four toes
- Each tendon to the 2nd, 3rd & 4th toes is joined on its lateral side by a tendon of **Extensor digitorum brevis**

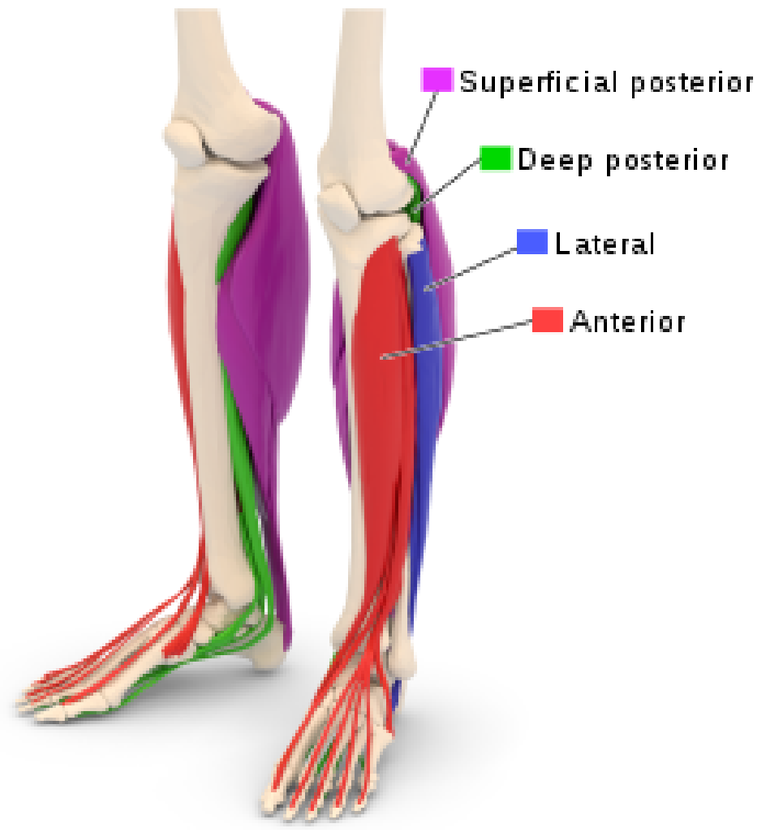


- The extensor tendons form: a **Fascial Expansion** (Extensor Expansion) on the dorsum of each toe
- The expansion divides into (3) parts:
  - **Central part**: inserted into the Base of Middle phalanges.
  - **Two Lateral parts**: inserted into the Base of Distal phalanges.
  - **The (Extensor Expansion) receives insertion of** : Interossei & Lumbrical muscles.

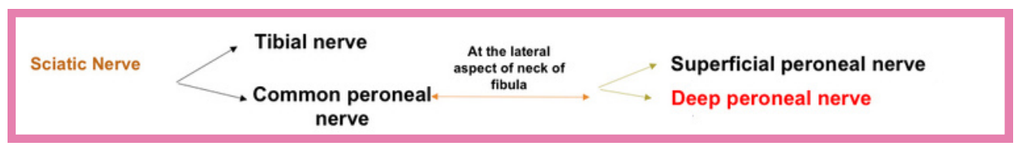
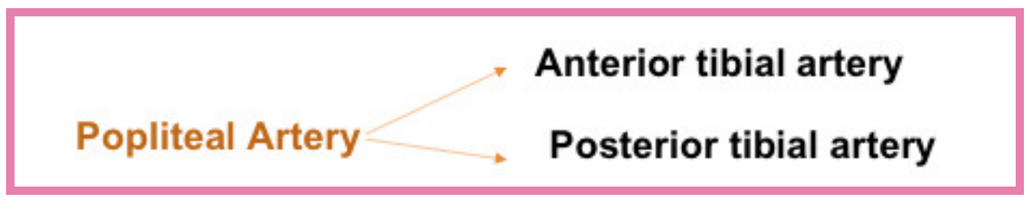
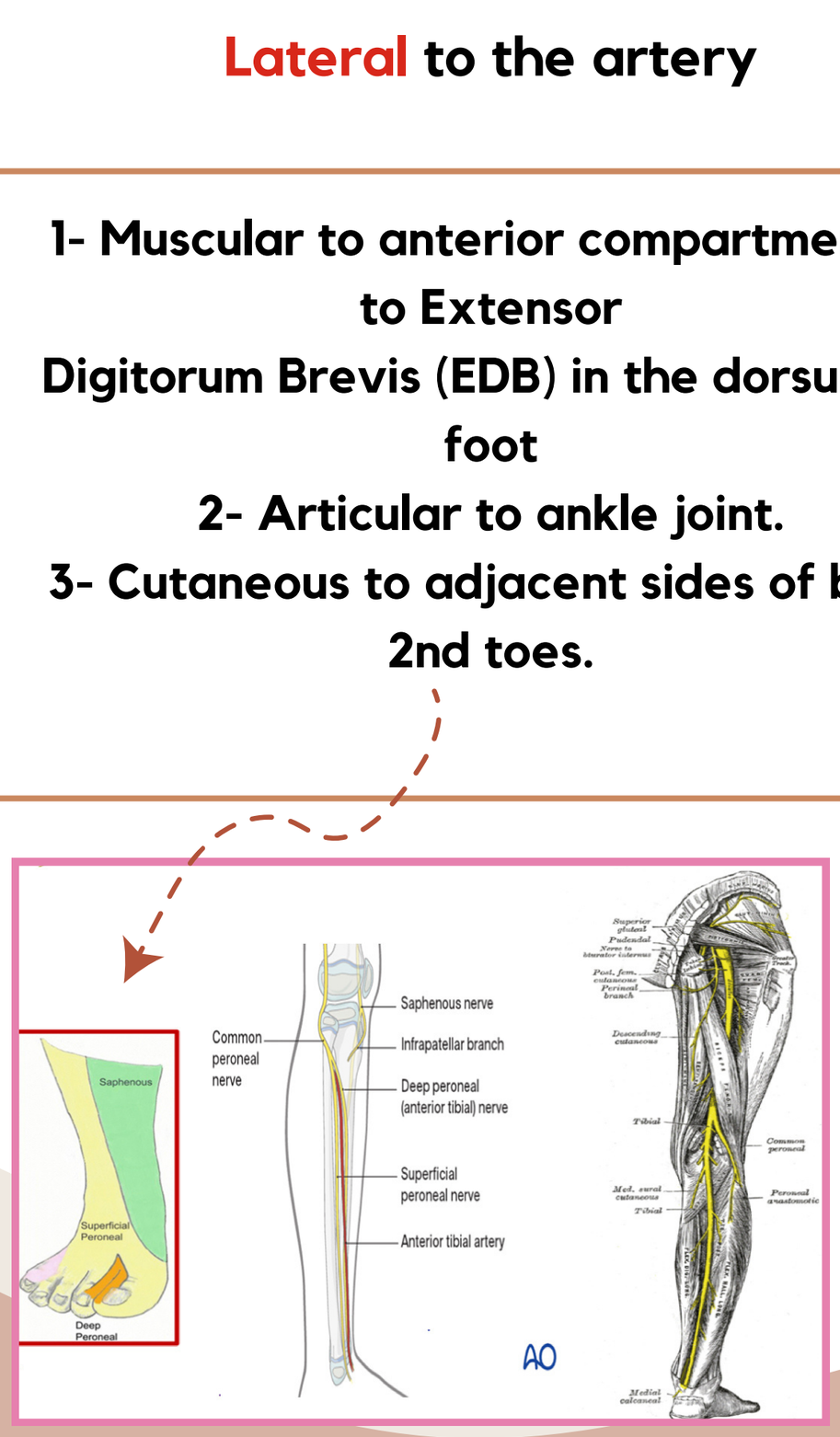
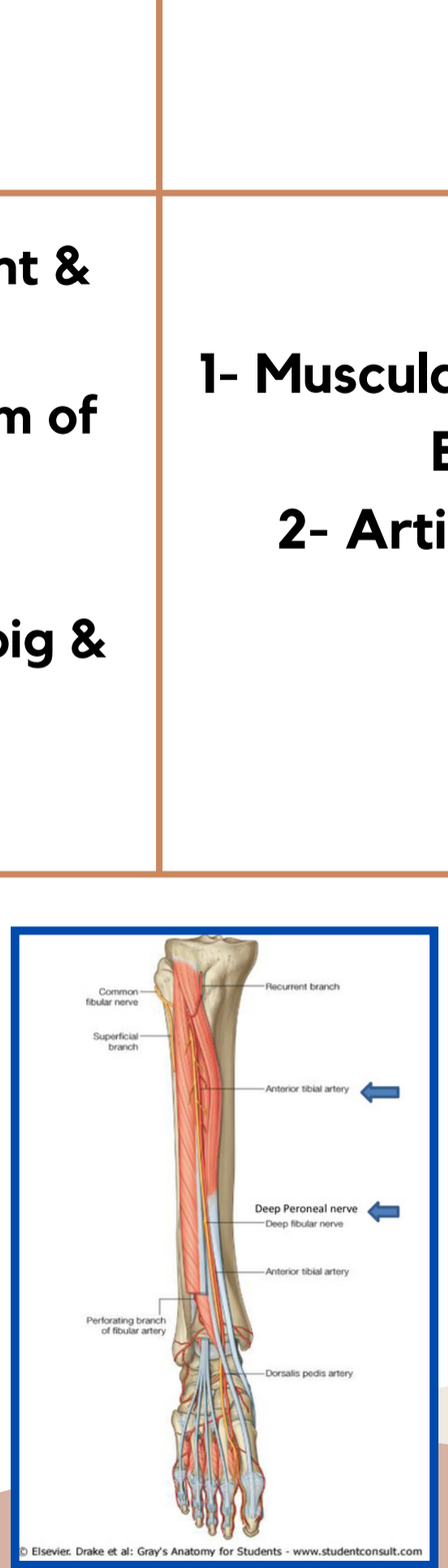
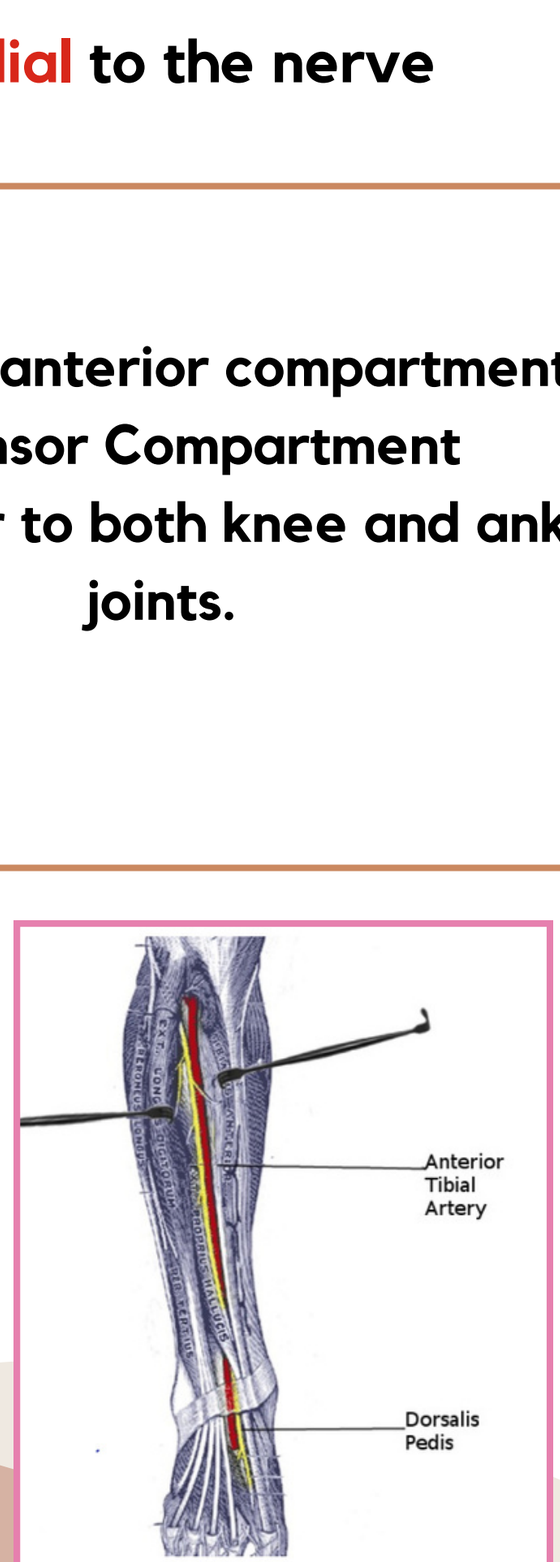
There are two Intermuscular Septa arising from the deep fascia together with the Interosseous membrane, divide the leg into 3 Compartments:



Each compartment has its own Muscles (with specific action), Blood vessels and Nerves.



Nerve and blood supply

	Deep peroneal nerve (anterior tibial nerve)	Anterior tibial artery
	Helpful Video	Helpful Video
Origin	One of 2 terminal branches of common peroneal nerve at lateral aspect of neck of fibula. 	One of 2 terminal branches of of popliteal artery at distal Origin border of popliteus 
Termination	Continues in dorsum of foot	Continues as dorsalis pedis in front of ankle joint
Course	It runs in the anterior compartment of the leg, together with the anterior tibial artery. At first, 1- the nerve runs lateral to the artery, 2-then crosses anterior to the artery. 3-Just proximal to the ankle joint, the nerve again lateral to the artery. Then both enter the dorsum of the foot deep to the extensor retinaculum. between tendons of EHL &EDL	Between tendons of EHL & EDL And Continues in the dorsum of foot as dorsalis pedis artery.
Relations	Lateral to the artery	Medial to the nerve
Branches	1- Muscular to anterior compartment & to Extensor Digitorum Brevis (EDB) in the dorsum of foot 2- Articular to ankle joint. 3- Cutaneous to adjacent sides of big & 2nd toes.	1- Muscular to anterior compartment & to Extensor Compartment 2- Articular to both knee and ankle joints.
pictures		
		

Dorsum of the foot

Extensor Retinaculum

Thickening of the deep fascia in the ankle region to keep the extensor tendons in position during action of ankle joint.

Superior (superior to ankle): attached to anterior borders of tibia and fibula

Inferior (inferior to ankle): Y-shaped, it has a stem attached to the upper surface of calcaneus, upper arm attached to the medial malleolus and lower arm which is continuous with plantar aponeurosis.

Contents Of The Dorsum Of Foot

- Extensor retinacula
  - Superior
  - inferior
- Dorsalis pedis artery
- Extensor digitorum brevis muscle
- Superficial and deep peroneal nerves

"It's a *superior extensor retinacula*, and don't say 'superior retinacula' without extensor because there is a superior retinacula in the upper limb."

Structures passing deep to the superior extensor retinacula

- It's important to memorise it in this order.

from medial to lateral:

Tom Has Very Nice Dogs & Pigeon

1.Tom (Tibialis Anterior)

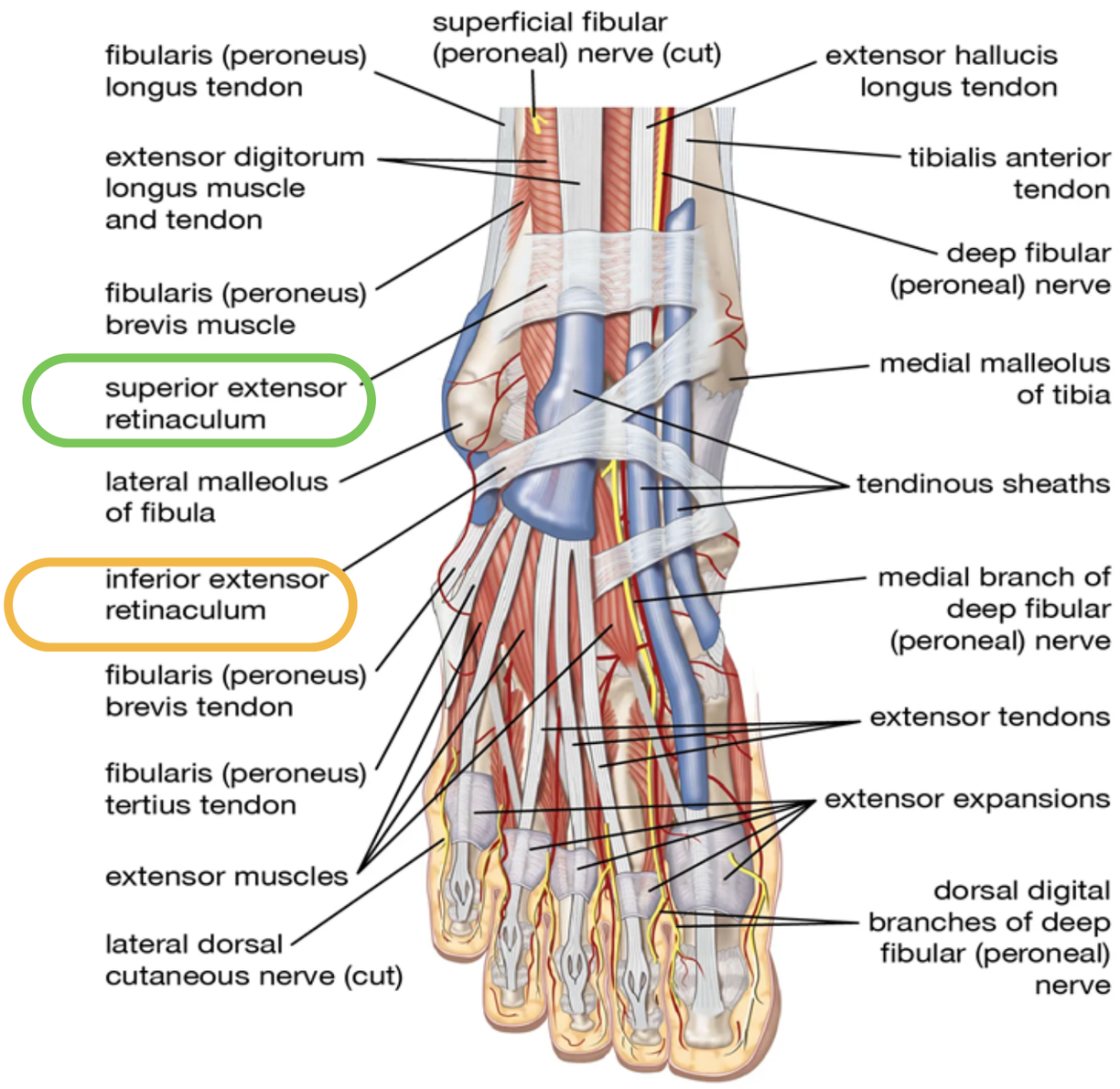
2.Has (Extensor Hallucis long.)

3.Very (Anterior Tibial Vessels)

4.Nice (Anterior Tibial Nerve)

5.Dog (Extensor Digitorum long)

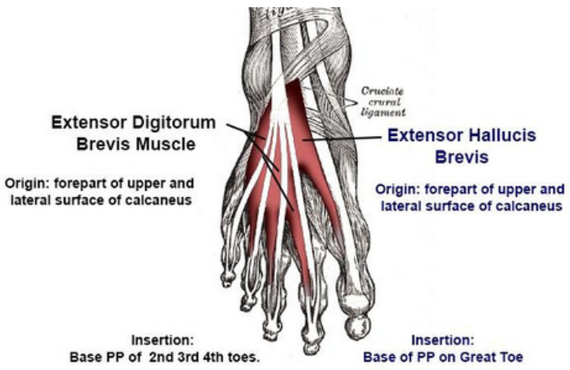
6.Pigs (Peroneus Tertius)

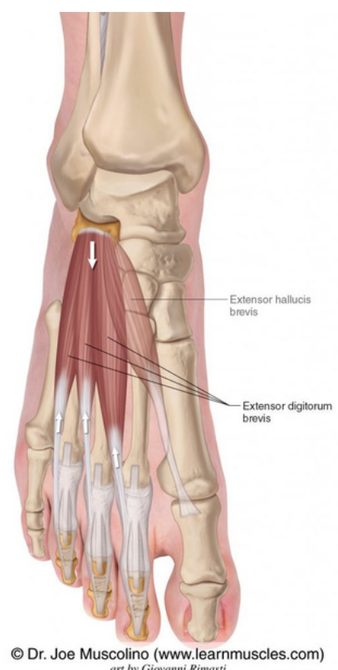


Dorsum of the foot muscle and artery

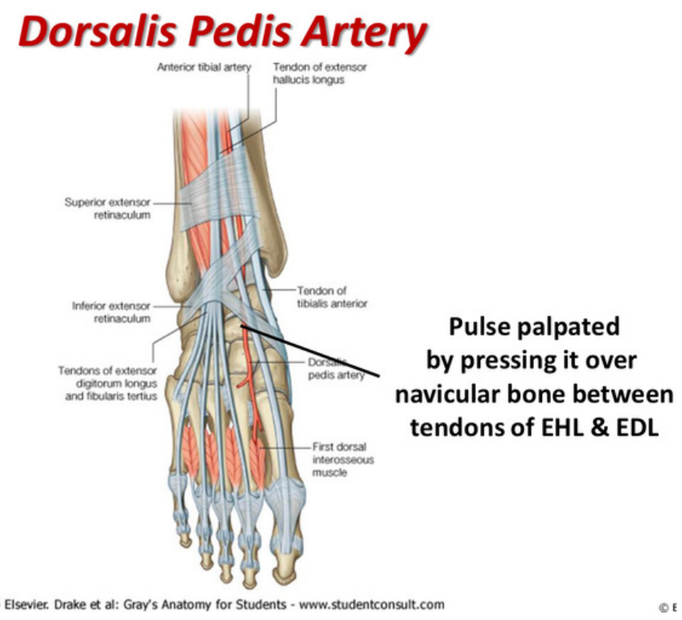
- Nerve supply is given by the deep & superficial peroneal nerves.
- Blood supply is given by the dorsalis pedis artery.

	Origin	Insertion	Nerve supply	Action
Helpful Video **Extensor digitorum brevis muscle**	upper surface of calcaneus.	Into the medial 4 toes. The first tendon is (Extensor hallucis brevis muscle) into proximal phalanx of big toe, The other 3 join extensor expansions of 2nd, 3rd & 4th toes.	deep peroneal nerve.	Extension of medial 4 toes.





	Origin	Termination	Branches
Helpful Video **Dorsalis pedis artery**	Continuation of anterior tibial artery, in front of ankle joint (between superior & inferior extensor retinacula). between the two malleoli.	It ends by pierces the 1st dorsal interosseous muscle & reaches the sole to join the plantar arch.	- Muscular: to EDB. - Articular: to ankle joint.



Lateral Compartment of Leg

Girls' Slides

Muscles
1- peroneus longus
2- peroneus Brevis

Nerve
superficial peroneal nerve

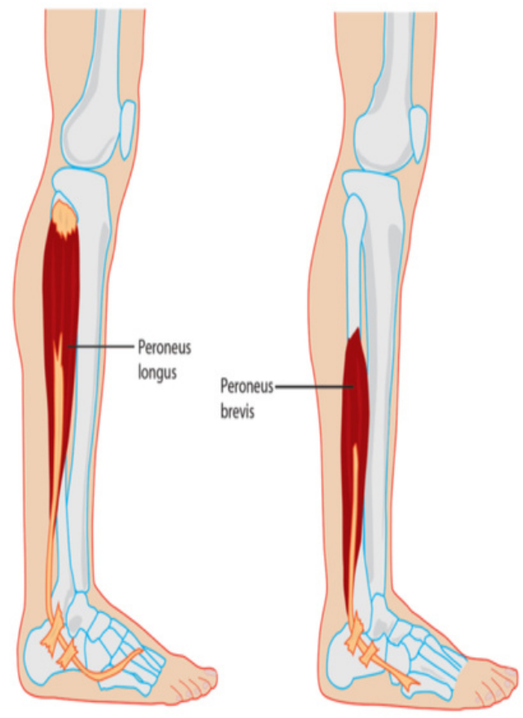
Contents Of The Lateral Compartment Of Leg

Vessel
perneal branch of posterior tibial artery

Preneal Retinacula
1- superior
2- inferior

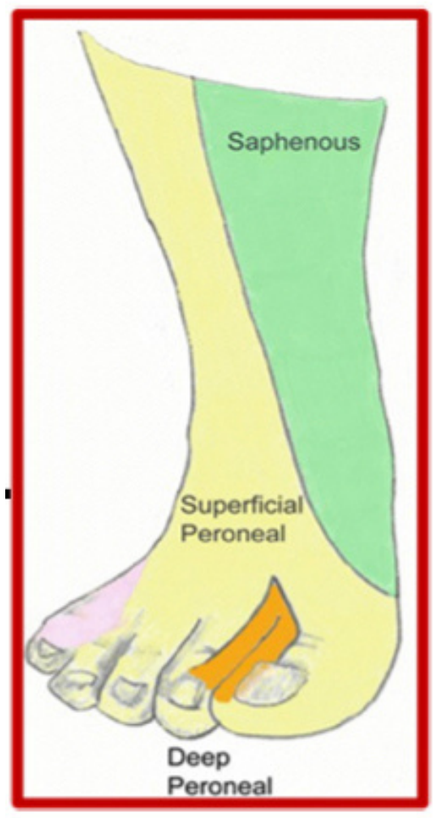
- Both muscles pass behind then below lateral malleolus, deep to peroneal reticula, then on lateral surface of calcaneus.

	Origin	Insertion	Action	nerve supply
Helpful Video **peroneus longus**	Lateral surface of fibula	1st metatarsal & medial cuneiform bones (same bones as tibialis anterior)	**Eversion (main) + plantar flexion (weak)**	**superficial peroneal nerve**
Helpful Video **peroneus brevis**		Tubercle of 5th metatarsal bone (same bone as peroneus tertius)		



- Both receive blood supply from the peroneal branch of posterior tibial artery, and nerve supply from the superficial peroneal nerve.

	Origin	Course	Branches
Helpful Video **Superficial peroneal nerve**	One of 2 terminal branches of common peroneal nerve at lateral aspect of neck of fibula	Between Peroneus Longus and Peroneus Brevis then pierces deep fascia to become cutaneous	- Muscular: to peroneus longus and brevis - cutaneous: 1- to lower ⅓ of anterolateral aspect of leg 2- to all dorsum **except**: medial border of foot (saphenous), lateral side of little toe (sural), adjacent sides of big & 2nd toes (deep peroneal)

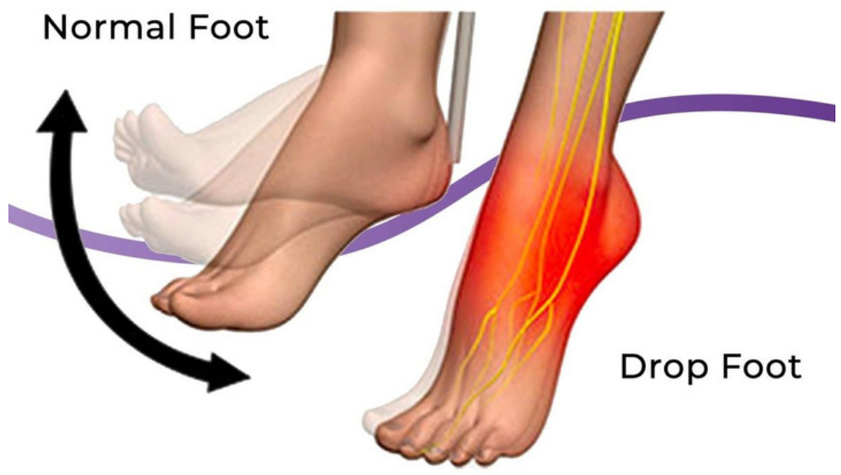


Clinical Anatomy:

Girls' Slides

Foot drop

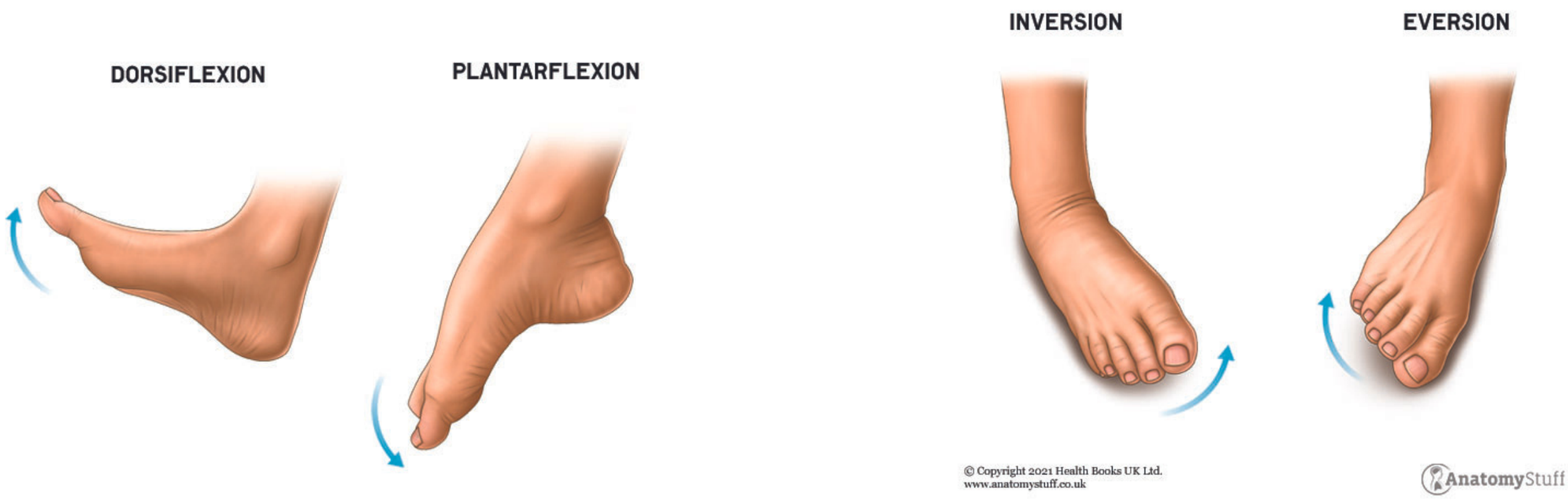
- It is a paralysis of the muscles in the anterior compartment (dorsiflexors) of the leg due to damage of the common fibular (peroneal) nerve or sciatic nerve.



Movements Of The Foot

Girls' Slides

	Action	muscles
Ankle joint: tibia , fibula, talus	Dorsiflexion	Tibialis anterior,extensor hallucis longus, extensor digitorum longus and peroneus tertius
	plantarflexion	Gastrocnemius, soleus,plantaris and posterior tibialis, flexor hallucis longus, flexor digitorum longus,Peroneus longus, peroneus brevis
Subtalar joint (talocalcaneal joint) between the talus and cacaneus	Inversion	Tibialis anterior, Tibialis posterior
	Eversion	Peroneus longus, peroneus brevis, Peroneus tertius



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MCQs

1 which of the following muscles doesn't do a dorsi flextion?

A-Peroneus Tertius	B-Tibialis Anterior	C-Peroneus longus	Extensor Hallucis Longus

2 what is the third structure passing deep to the retinacula?

anterior tibial vessels	Tibialis Anterior	Extensor Digitorum long	Extensor Hallucis long

3 dorsum of the foot Nerve supply?

superficial peroneal nerve	dorsalis pedis	deep peroneal nerve	both A&C

4 what causes foot drop?

damage of the common fibular	damage of peroneal branch of posterior tibial artery	damage of the Deep peroneal nerve	damage of peroneus longus

5 which vessel supplies the lateral compartment?

peroneal branch of anterior tibial artery	peroneal branch of posterior tibial artery	dorsalis pedis	Anterior tibial artery

1-C 2-A 3-D 4-A 5-B

MCQs

6 Extensor digitorum brevis action is:

A- Flex the toes	B- Rotate the toes	C- Adduct the toes	D- Extend the toes

7 The nerve of the lateral side of the small toe and the lateral side of foot is:

A- Superficial nerve	B- Sural nerve	C- Deep nerve	D- Median nerve

8 Which one of the following is attached to lower part of anterior borders of tibia & fibula above ankle?

A- Superior Extensor retinaculum	B- Extensor Digitorum brevis	C- Extensor Digitorum longus	D- Inferior Extensor retinaculum

9 The anterior compartment is innervated by:

A- Deep peroneal nerve	B- Common peroneal nerve	C- Saphenous nerve	D- Sural nerve

10 Which of the following is a muscle in the lateral compartment of the leg?

A-Adductor magnus	B- Peroneus longus	C- Peroneus profundus	D- Semitendinosus

6-D, 7- B , 8- A , 9- A , 10- B

SAQs

1

Branches of the superficial peroneal nerve

- Muscular: to peroneus longus and brevis

- cutaneous:
1- to lower ⅓ of anterolateral aspect of leg
2- to all dorsum except: medial border of foot (saphenous), lateral side of little toe (sural), adjacent sides of big & 2nd toes (deep peroneal)

2

what are the Structures passing deep to the superior extensor retinacula?

1.Tibialis Anterior 2.Extensor Hallucis long. 3.Anterior Tibial Vessels 4.Anterior Tibial Nerve 5.Extensor Digitorum long 6.Peroneus Tertius

3

lateral compartment muscles action

Eversion (main) + plantar flexion (weak)

4

attachment of fascia of the Leg

anterior and medial borders of the tibia

SAQs

A young man was admitted to the emergency department of the hospital after an accident.
On examination he was found to have fracture of the right neck of fibula.

5 Which nerve is injured?

Common peroneal nerve.

6 What are the motor effects of this nerve injury ?

Paralysis of anterior muscles of leg leading to dorsiflexion of foot.
Paralysis of peronei muscles leading to loss of eversion.

7 So, the characteristic deformity is

'Foot Drop' because the foot is plantar flexed and inverted.

ANATOMY
TEAM 444

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