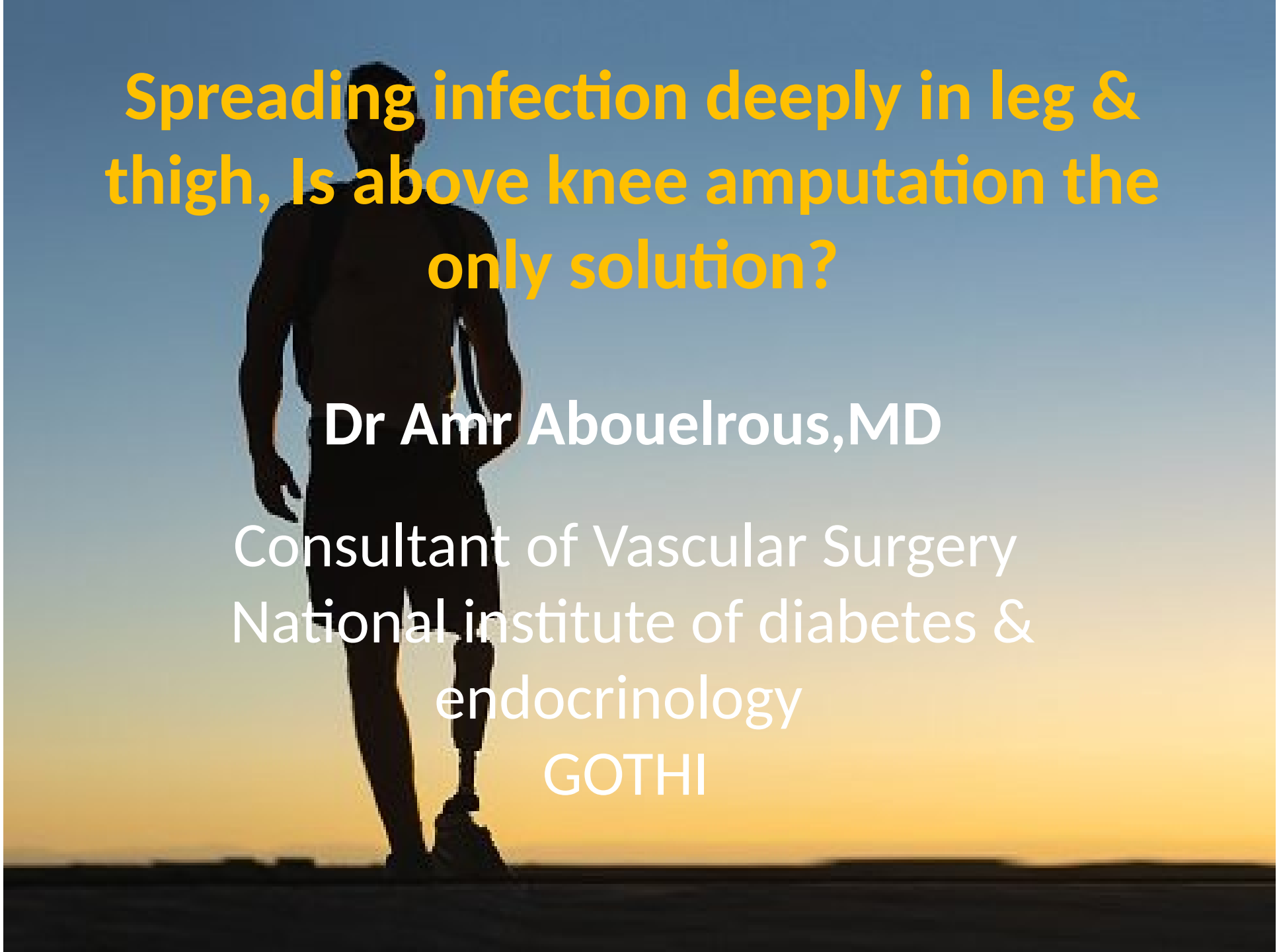

Spreading infection deeply in leg & thigh, Is above knee amputation the only solution?

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Case 1

- Male Patient aged 65 y old accidently discovered with D.M.
- General manifestations: fever & vomiting
- Local manifestations: Right lower limb edema, pain & tenderness with multiple bullae oozing offensive odor from the foot, leg & thigh.

Case 1

- At examination intact distal pulse with multiple bullae & collection felt in the dorsum of foot, medial side of leg & medial side of thigh up to groin.
- Tlcs 34000 creatinene 1.8

Case 1

Case 2

- Male pt aged 49 y old known to be diabetic.
- General manifestations: Malaise & low grade fever.
- Local manifestations: Left lower limb edema, pain & tenderness with multiple bullae oozing with tender leg & thigh.

Case 2

- At examination absent distal pulse with multiple bullae & collection felt deep in the medial side of leg & medial side of knee & thigh.
- Tlcs 18000
- X ray show collection at medial side of knee

Case 2

Case 3

- Male patient aged 64 y old known to be diabetic.
- General manifestations: fever & malaise.
- Local manifestations: right lower limb edema, pain & tenderness mainly at right leg with oozing sores.

Case 3

- At examination intact distal pulse with collection felt at back of leg.

Case 4

- Male Patient aged 73 y known to be diabetic. Patient presented with local & general manifestations
- General manifestations: fever, vomiting & malaise.
- Local manifestations: Right lower limb edema, pain & tenderness with multiple bullae oozing offensive odor from the foot, leg & thigh.

Case 4

The 4 cases are severely infected with extension from foot to leg & to thigh in some of them

The 4 cases suffer from septicemia & D.M.

For AKA vs. massive debridement??

- Lower extremity amputation is performed to remove ischemic, infected, necrotic tissue or locally unresectable tumor and at times, is a life-saving procedure.

The Management of Peripheral Arterial Disease (TASC II). AUNorgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FG, TASC II Working Group, J Vasc Surg. 2007;45 Suppl S:S5.


European Journal of Vascular and Endovascular Surgery
Volume 60, Issue 1, July 2020, Pages 88-96

National registry

Trends in Surgical Indications for Major Lower Limb Amputation in the USA from 2000 to 2016

Corey A. Kalbaugh [a], Paulo D. Strassle [b], Nicole J. Paul [b], Katharine L. McGinigle [b], Melina R. Kibbe [b, c], William A. Marston [b]

the most common primary indications for amputation were **chronic ischaemia (72%)** and **infection (15%).**

All other indications represented <5% of the primary code listed, including ALI (4%), other (4%), **trauma (3.6%)**, and oncological (1.2%).

GMJ - Ghana Medical Journal

Ghana Med J. 2013 Dec; 47(4): 165–169.

PMCID: PMC3961849

PMID: 24659024

Indications and Complications of Major Limb Amputations in Kano, Nigeria

A Ajibade,[1] OT Akinniyi,[2] and CS Okoye[2]

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- The commonest indication for major amputations was **trauma (42.4%)** followed by TBS gangrene (31.8%) and malignant tumours (12.9%).
- Diabetic foot gangrene accounted for only 4.5% of the amputations.

- Indications included **ischaemia (55.2%)**, **infection (30.6%)**, malignancy (6.9%), **trauma (4.4%)**, and chronic pain or instability (2.5%).

- Factors that predict the need for lower extremity amputation in patients with extremity ischemia include:

tissue loss, end-stage kidney disease, poor functional status, and **diabetes mellitus**.

Reamputation, mortality, and health care costs among persons with dysvascular lower-limb amputations. AUDillingham TR, Pezzin LE, Shore AD SOArch Phys Med Rehabil. 2005;86(3):480.

- Patients with diabetes have a 10-fold increased risk for lower extremity amputation compared with those who do not have diabetes.
- Amputees with diabetes are more likely to be **severely disabled, experience their initial amputation at a younger age, progress to higher-level amputations, and die at a younger age compared with patients without diabetes** .

Reamputation, mortality, and health care costs among persons with dysvascular lower-limb amputations. AUDillingham TR, Pezzin LE, Shore AD SOArch Phys Med Rehabil. 2005;86(3):480.

Lower limb infections

- Cellulitis
- Abscess and phlegmon
- Necrotizing fasciitis
- Pyomyositis
- Infectious tenosynovitis
- Septic arthritis
- Osteomyelitis

- Necrotizing fasciitis is a rapidly progressive, limb and life-threatening infection.

Alaia EF, Chhabra A, Simpfendorfer CS, et al. MRI nomenclature for musculoskeletal infection. Skelet Radiol. 2021;50(12):2319–47.

- Necrotizing soft tissue infection is associated with necrosis involving the skin and superficial soft tissues, fascia (superficial and deep), and muscles

Alaia EF, Chhabra A, Simpfendorfer CS, et al. MRI nomenclature for musculoskeletal infection. Skelet Radiol. 2021;50(12):2319–47.

- There is nearly four times the incidence of amputation in the lower extremities compared to the upper extremities.

Hua C, Urbina T, Bosc R, et al. Necrotising soft-tissue infections. Lancet Infect Dis. 2023;23(3):e81–94

- The prevalence of diabetes in patients with necrotizing fasciitis is between 40 and 60% with a high incidence of necrotizing fasciitis coinciding with diabetic foot infection.

Iacopi E, Coppelli A, Goretti C, Piaggesi A. Necrotizing fasciitis and the diabetic foot. Int J Low Extrem Wounds. 2015;14(4):316–27.

- Other risk factors associated with necrotizing fasciitis, including vascular disease and renal failure, are also more common in patients with diabetes.

Iacopi E, Coppelli A, Goretti C, Piaggesi A. Necrotizing fasciitis and the diabetic foot. Int J Low Extrem Wounds. 2015;14(4):316–27.

- Irrespective of the source of infection and causative organism, certain components of the pathophysiology are consistent.
- The infection starts in the hypodermis and the superficial fascia.

Spread of infection

- There is thrombosis of the vessels and lymphatic in the subcutaneous tissues, which, along with compression of the vessels by edema, result in widespread necrosis.
- Rapid progression and systemic toxicity are the norm.

Spread of infection

- Although lymphatic in the lower limb play a major role for resistance of infection but also extension of lymphangitis be away of spread of infection & ascend up through it.

Relevant anatomy

- Also anatomical compartments of foot, leg & thigh play a role to spread of infection from foot up to thigh.
- Although The septum & fascia between the compartments prevent spread of infection in a transverse manner but facilitate infection spread in the longitudinal plane.

Relevant anatomy

Localizing soft tissue infections to the anatomic compartment(s) of involvement can help predict the extent of spread and guide surgical intervention and management

Fisher TK, Scimeca CL, Bharara M, Mills JL Sr, Armstrong DG. A step-wise approach for surgical management of diabetic foot infections. J Vasc Surg. 2010;52(3 Suppl):72S-75S.

- An understanding of anatomy may also help to explain potential routes of spread of infection between structures that may be contiguous.

Tsang KW, Morrison WB. Update: Imaging of lower extremity infection. Semin Musculoskelet Radiol. 2016;20(2):175–91.

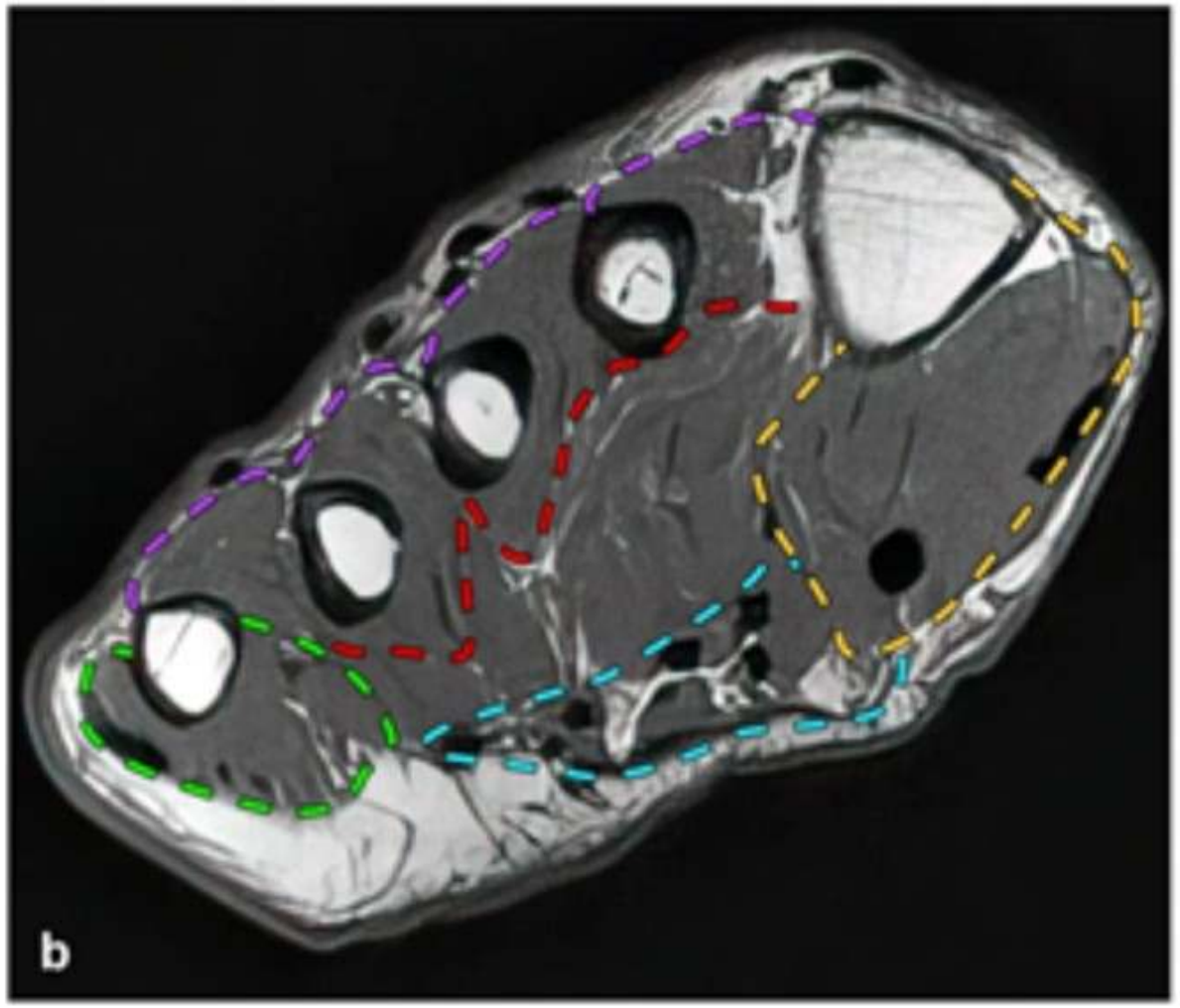
- Foot infections can spread into the deep compartment of the leg along the tendon sheaths of the long flexors, as well as into the tibiotalar and posterior subtalar joints (and vice versa), as these commonly communicate

Tsang KW, Morrison WB. Update: Imaging of lower extremity infection. Semin Musculoskelet Radiol. 2016;20(2):175–91.

Foot compartments

- The foot contains several compartments.
- Most surgically accessible **are the four interossei compartments**, which contain the dorsal and plantar interosseous muscles.

Foot compartments



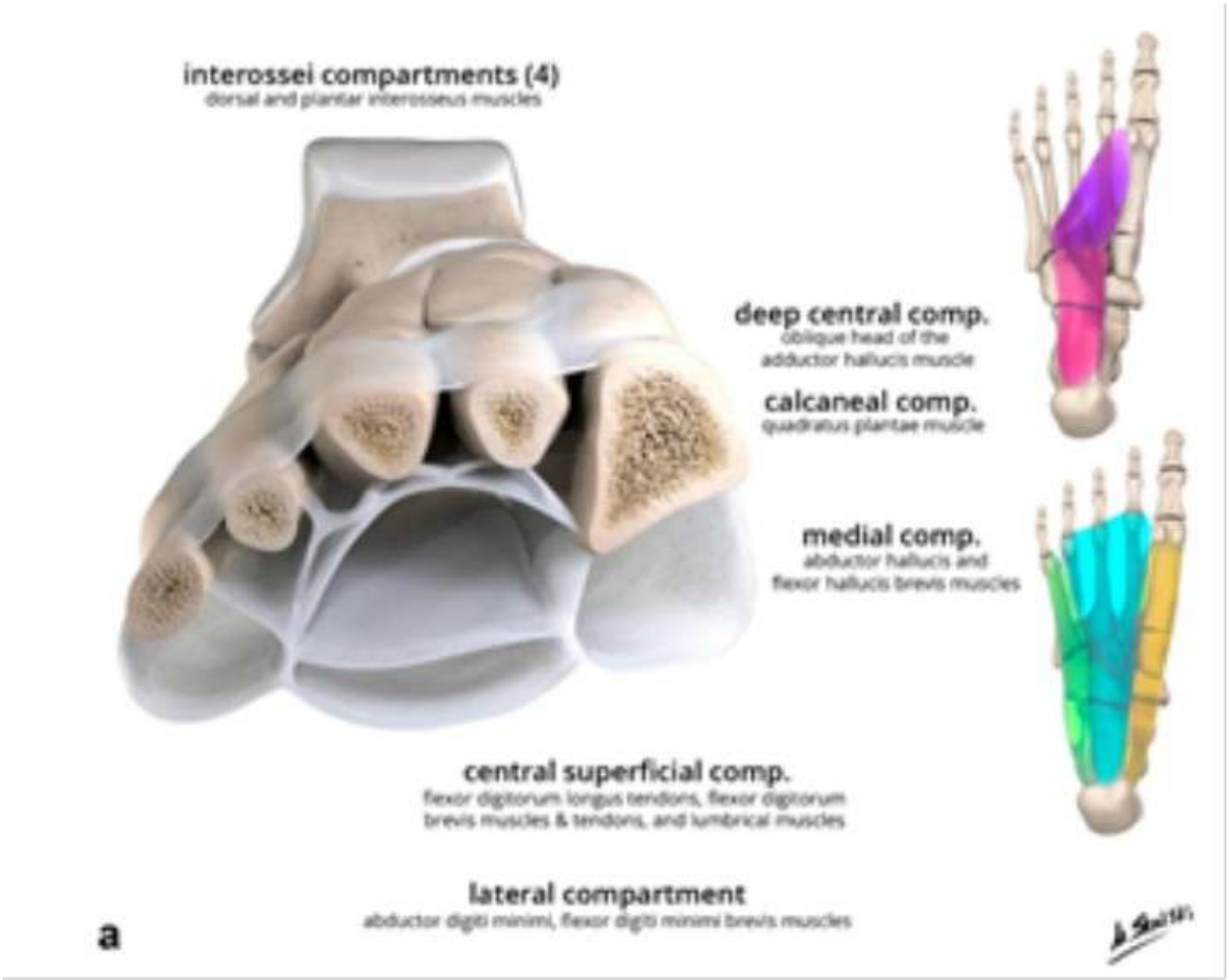
Foot compartments

- There are **two deep compartments** consisting of the calcaneal compartment proximally, which contains the quadratus plantae muscle, and the deep central compartment more distally, which contains the adductor hallucis muscle.

Foot compartment

- Overlying the deep compartments is the **central superficial compartment**, which contains the flexor digitorum longus tendons, flexor digitorum brevis muscle and tendons, and the lumbricals.

Foot compartment



Foot compartment

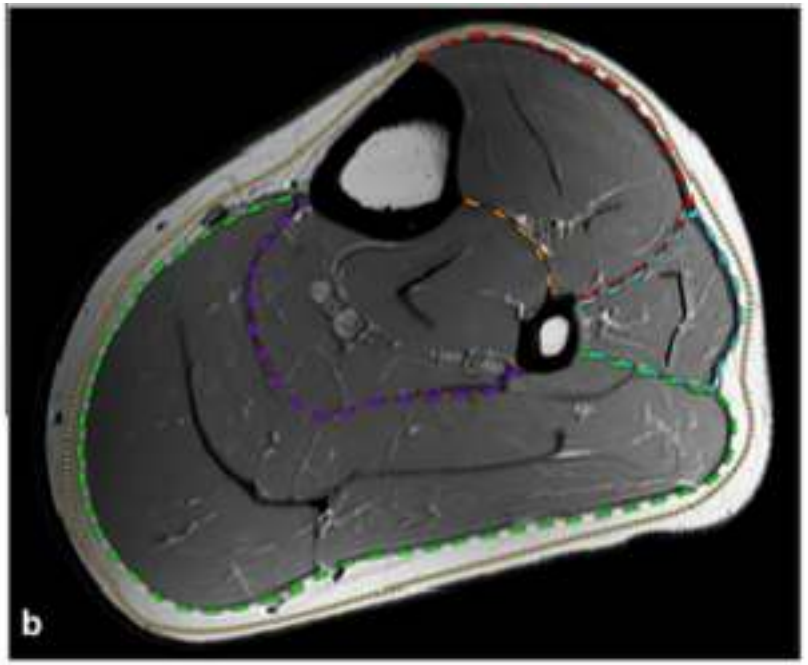
- On either side of this are **the lateral and medial compartments**.
- The lateral compartment contains the abductor and flexor digiti minimi brevis muscles, while the medial compartment contains the abductor hallucis and flexor hallucis brevis muscles.

Foot compartment

- Some authors include **a dorsal compartment** containing the extensor digitorum brevis and extensor hallucis brevis muscle

Leg compartment

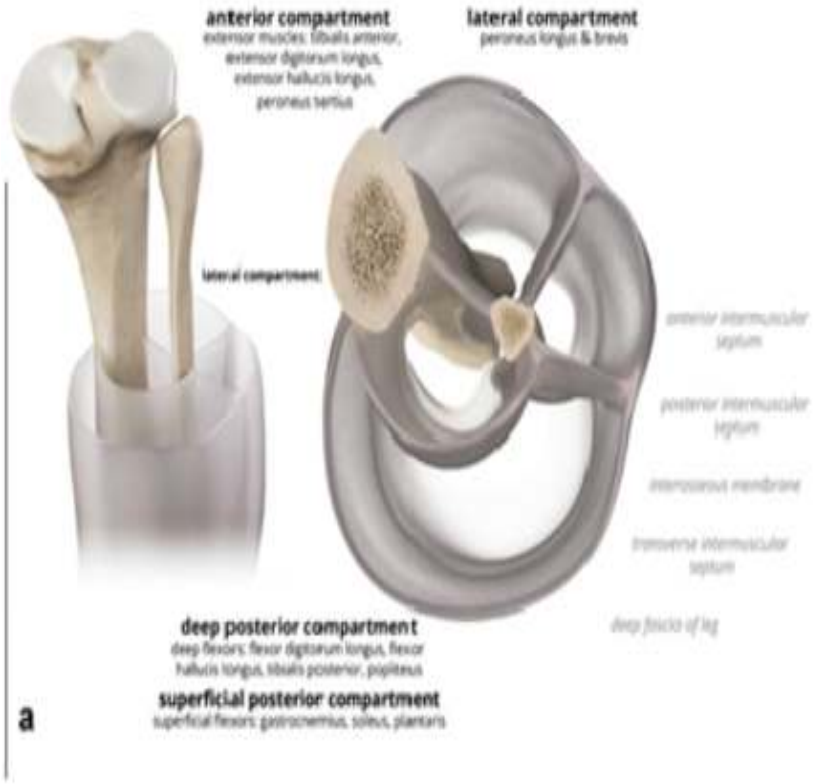
The leg contains **four compartments** and is contained by the deep/crural fascia, which encircles the leg and affixes it to the anteromedial tibia.



Leg compartment

- Anterior compartment.
- Lateral compartment.
- Superficial & deep

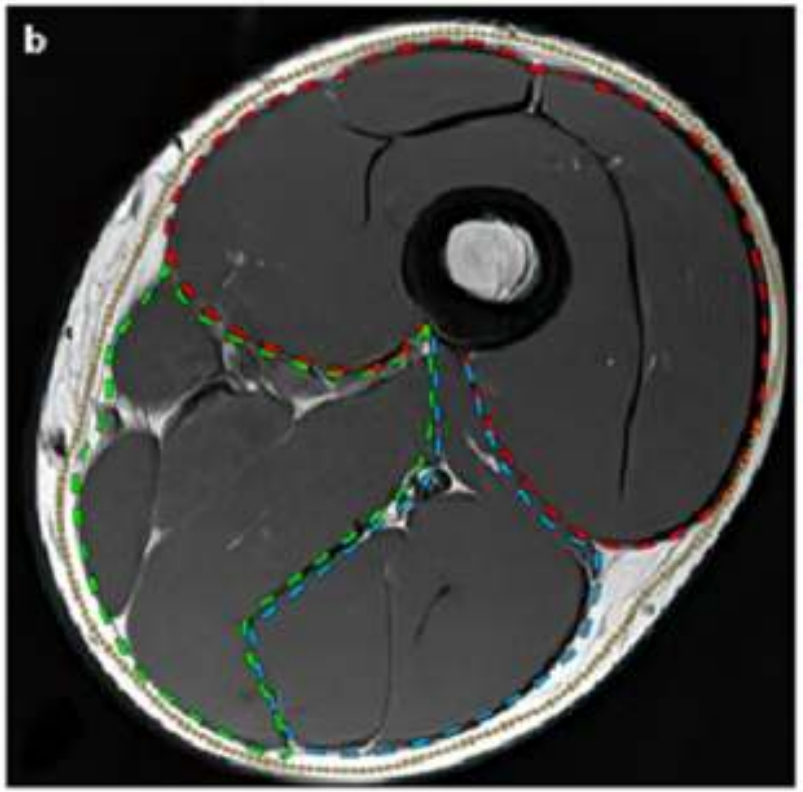
posterior compartments.



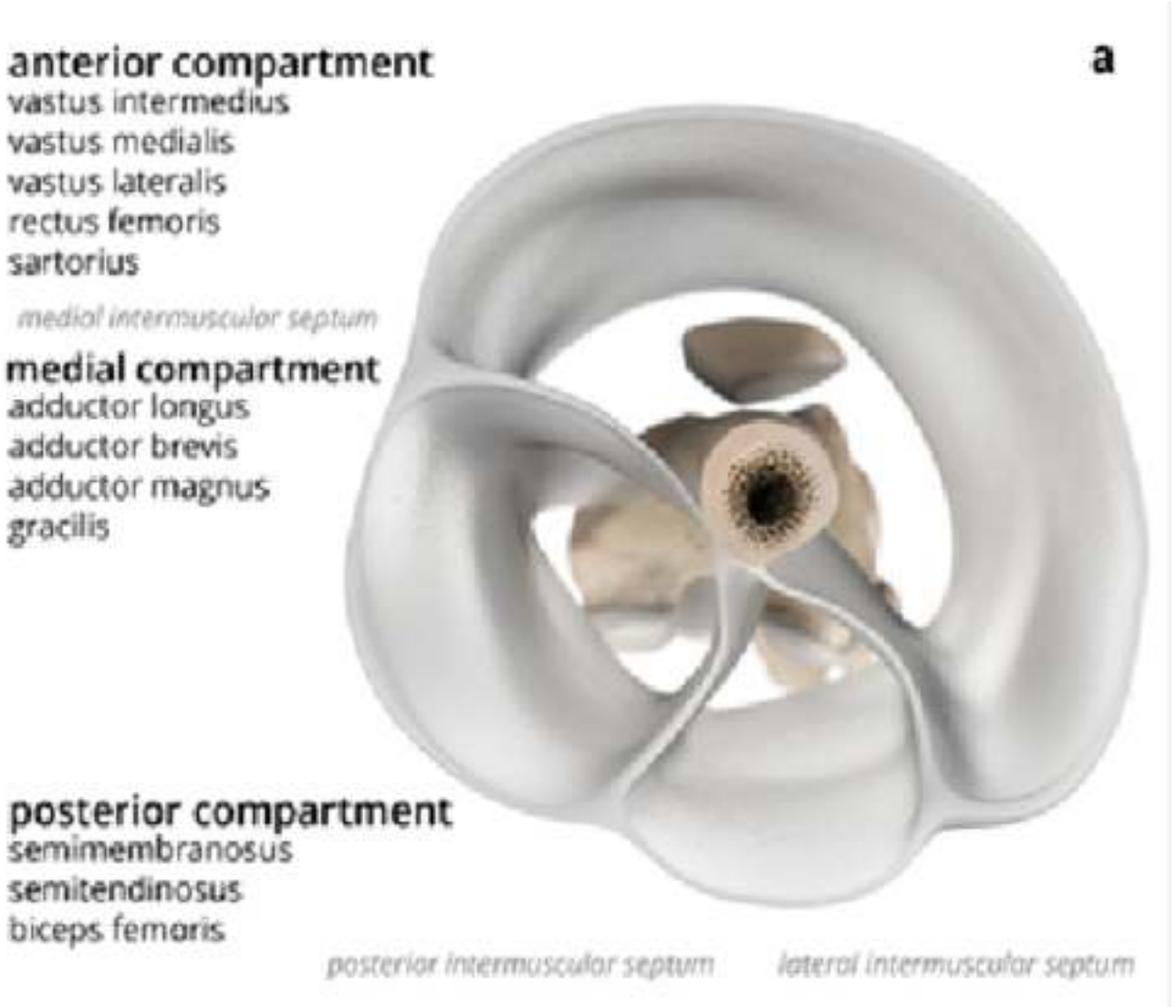
Thigh compartment

The thigh is composed of three compartments:

anterior, medial, and posterior compartments



Thigh compartment



Case 1

Case 1

Case 1

Case 1

Case 1



Case 1



Case 2

Case 2

Case 2

- One week post debridement
- SFA balloon angioplasty done for distal SFA tight stenotic lesion in the ipsilateral limb.

Case 2

Case 2

Case 2

Case 2

Case 2

Case 3

Case 3

Case 3

Case 3

Case 3

Case 4

Case 4

Case 4

Case 4

Case 4

Case 4

Case 4

Case 4

Case 4

- In all cases I present today the infection extend to leg & thigh through some compartments & limited to it & not extend or involve the other compartments & not involve the vascular bundle.
- Although the extensive, repeated debridement & the long time of trip of dressing but the final result is limb saving.

Take home message

1. Rapid intervention & massive debridement is a must in severe extended infection in limbs.
2. Respect the anatomical plane & follow it during the surgery.
3. Major amputation is life saving procedure but if you can save the limb also **DON'T HESITATE**.


Thank you