VASCULARIZATION OF SKIN OF THE LIMBS/CLASSIFICATION OF SKIN FLAPS

Skin Vascularization (by Salmon)

- Direct arteries: 1. Arteries with a long course
  2. Interstitial arteries
- Indirect arteries

VASCULARIZATION OF SKIN OF THE LIMBS/CLASSIFICATION OF SKIN FLAPS

DIRECT ARTERIES

1.Long course arteries (limited number, significant size 1-2mm, axial pattern flap)

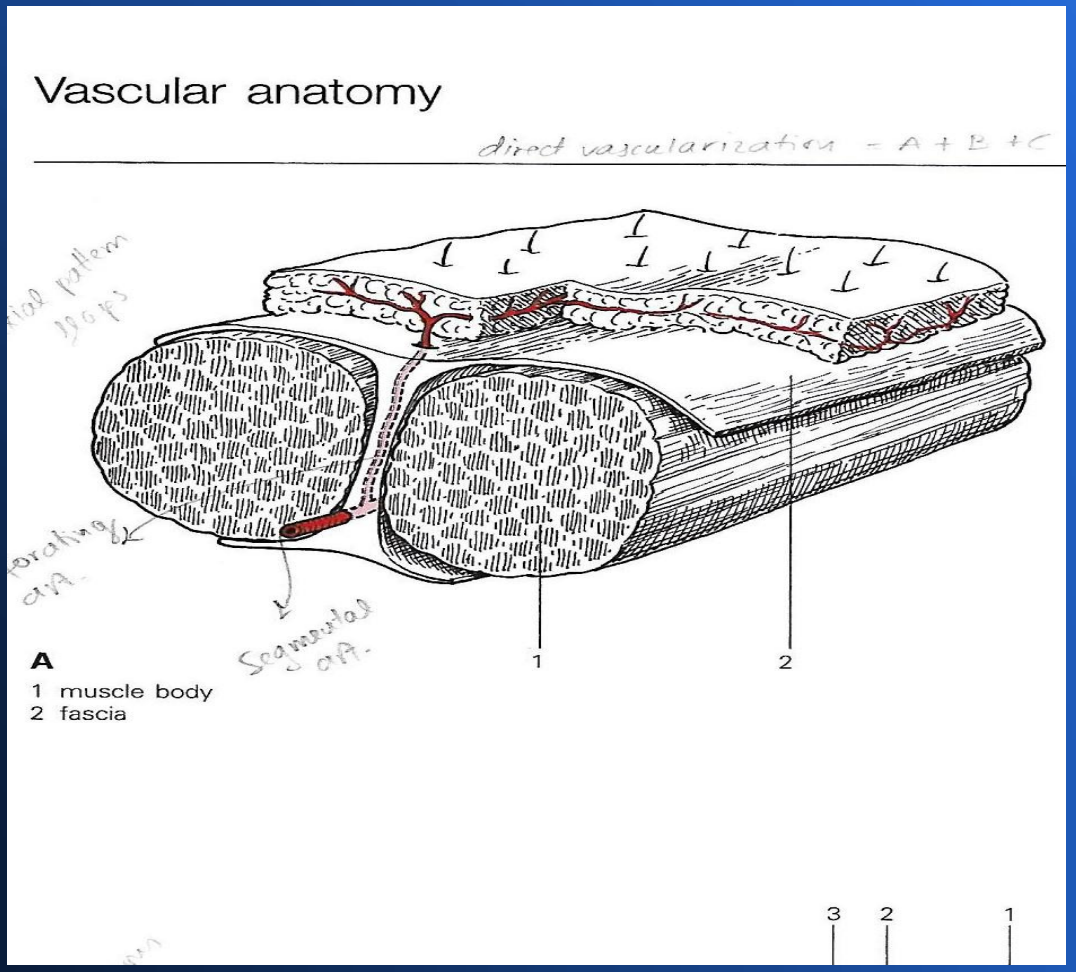
1a.Type of the long course arteries is the neurocutaneous arteries that accompany a superficial cutaneous nerve (neurocutaneous flap)

2.Interstitial arteries (branches of the main axial artery which gives a septocutaneous perforator, usually located between two muscles,form two plexuses - immediate suprafascial plane (reason why we take the fascia in the flap (Ponten 1981)
- subcutaneous tissue

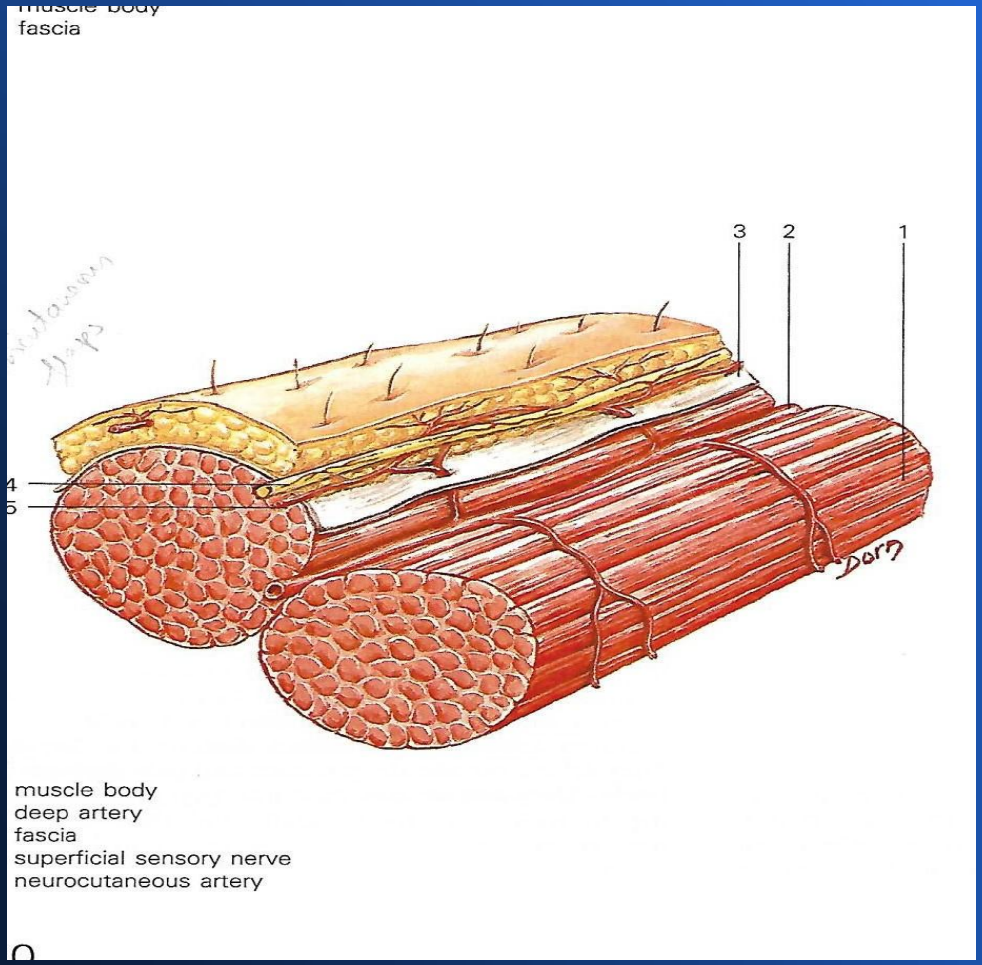
INDIRECT ARTERIES

Arteries of muscular origin (musculocutaneous flaps)

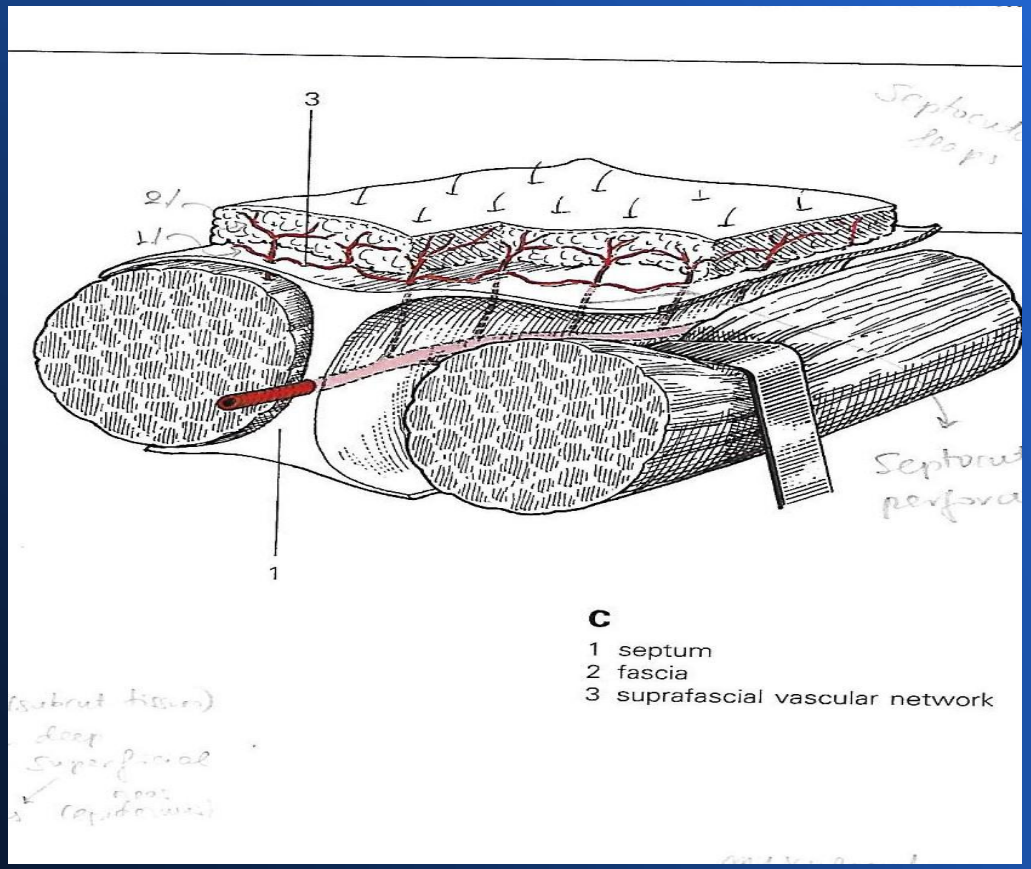
LONG COURSE ARTERY



NEUROCUTANEOUS ARTERY



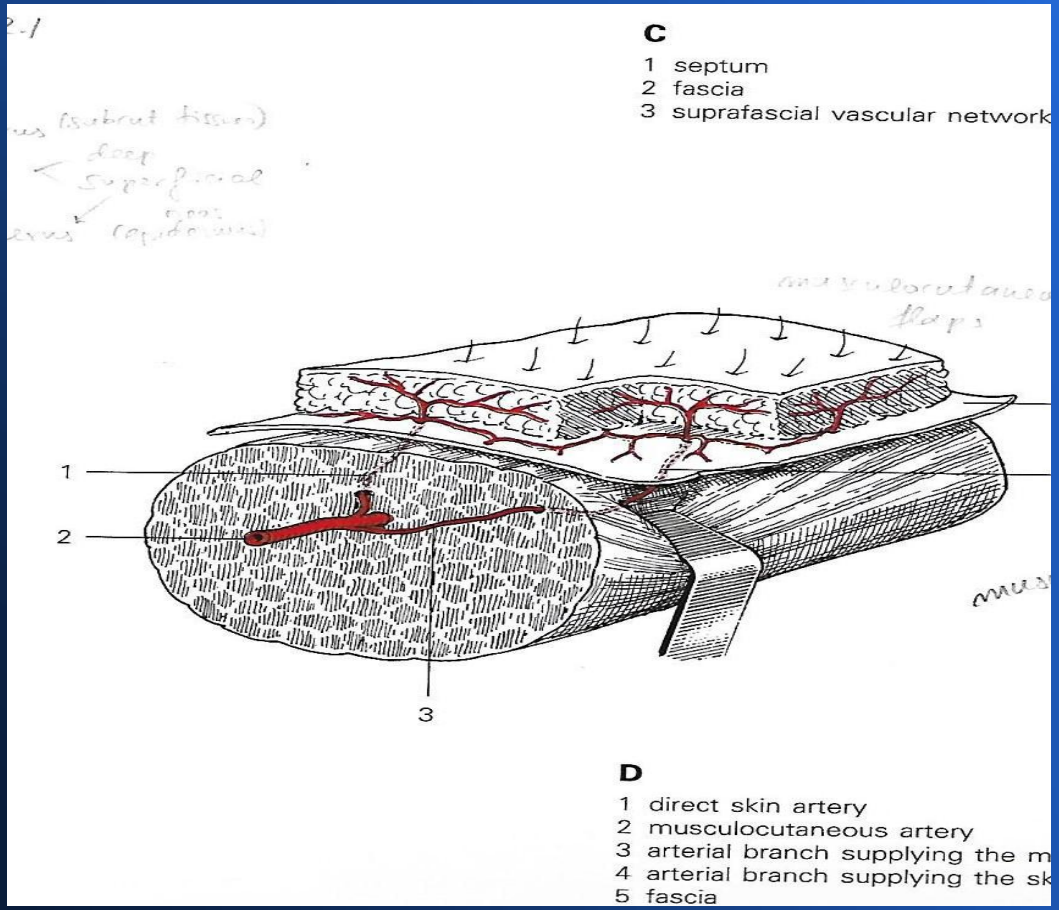
INTERSTITIAL ARTERIES



C

1 septum
2 fascia
3 suprafascial vascular network

ARTERIES OF MUSCULAR ORIGIN



VASCULARIZATION OF SKIN OF THE LIMBS/CLASSIFICATION OF SKIN FLAPS

Examples:

- Long course artery → GROIN flap (1st axial pattern flap discribed by McGregor),superficial circumflex iliac art ← common femoral)
- Neurocutaneous artery → sural flap (sural nerve)
- Interstitial artery → chinese forearm flap(based on radial pedicle)
- Musculocutaneous flaps → gastrocnemius flap

VASCULARIZATION OF SKIN OF THE LIMBS/CLASSIFICATION OF SKIN FLAPS

Classification of skin flaps (according to 3 critiria)

- Vascular anatomy - axial pattern flap/neurocutaneous flap
  - musculocutaneous flap
  - septocutaneous flap
- Method of utilization - free flap (microsurgery technique)
  - rotation flap (maintenance of cutaneous hinge proximmally or distally
  - island flap (vascularized pedicle with length to confer to the flap an arc of rotation)
- Component tissue - cutaneous/subcutaneous flap (skin+subcutis)
  - fascial flap (subcutis+ fascia)
  - fasciocutaneous (skin+subcutis+fascia)

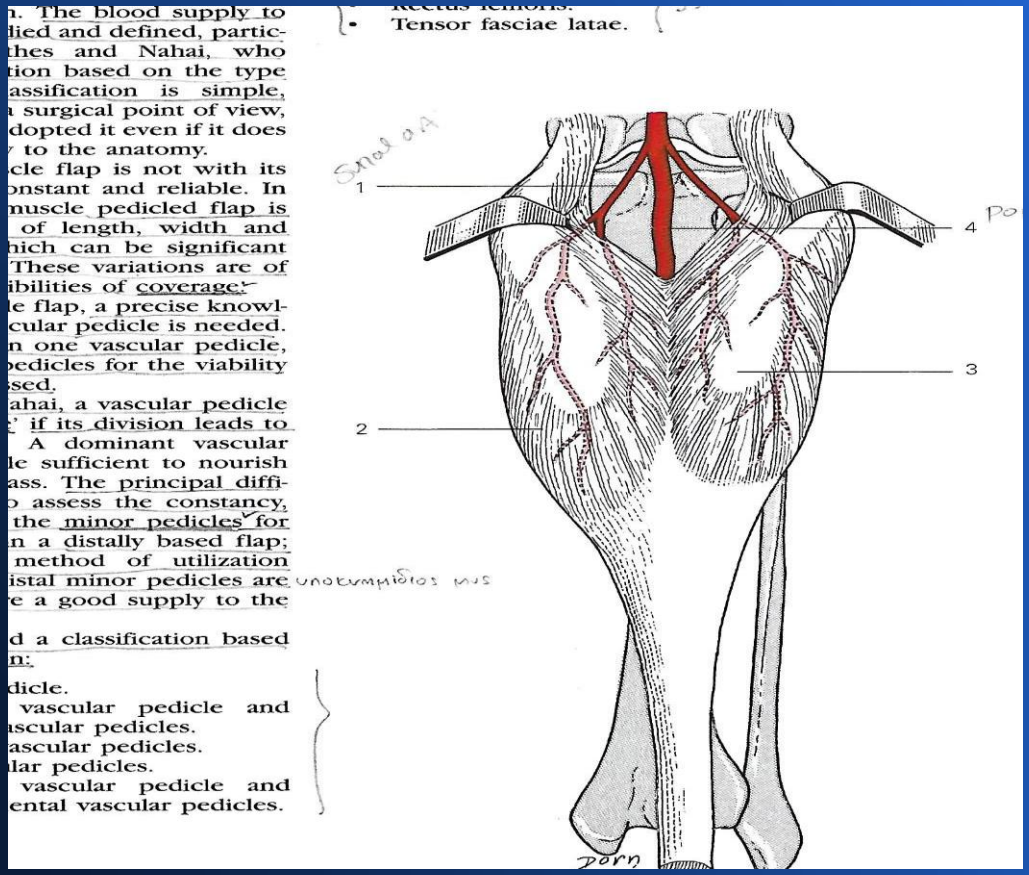
VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

Vascularization Types:

- Type I : one vascular pedicle
- Type II : one dominant + several minor v.p.
- Type III : two dominant v.p.
- Type IV : segmental v.p.
- Type V : one dominant + secondary segmental v.p.

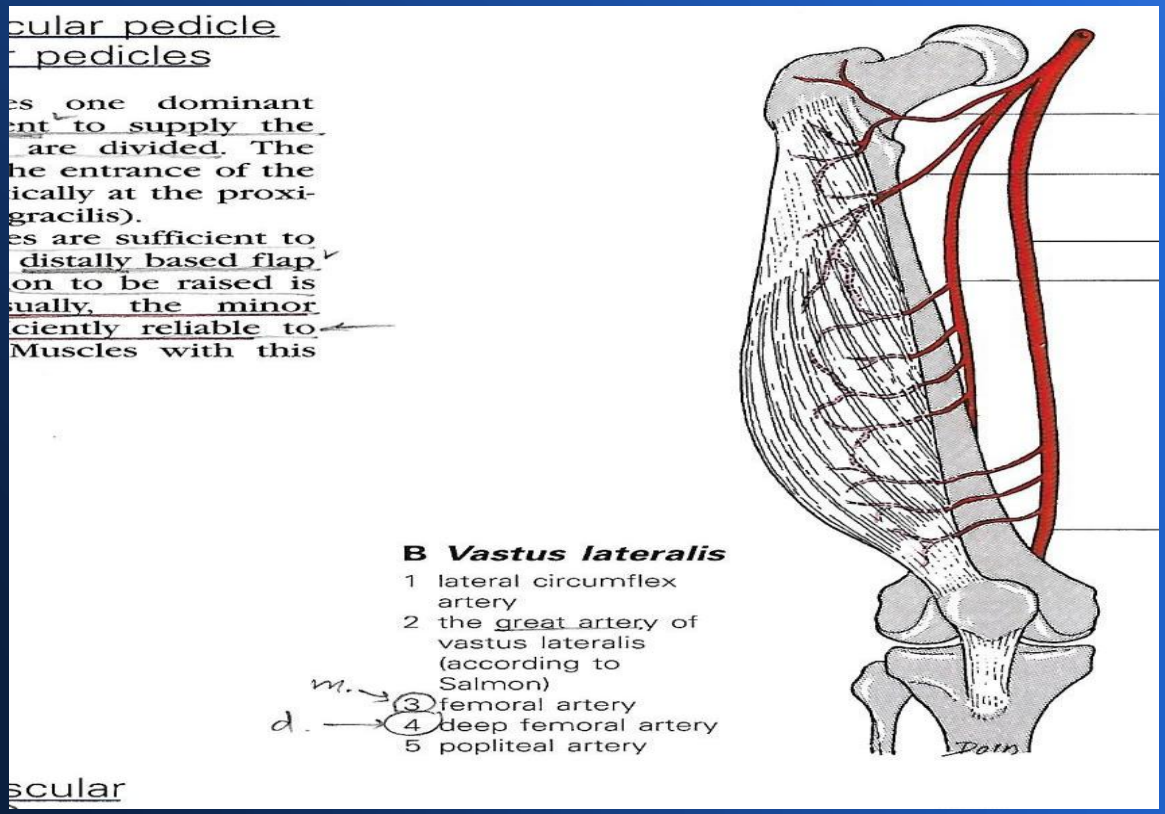
VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

- Type I : one v.p. / each head of gastrocnemius



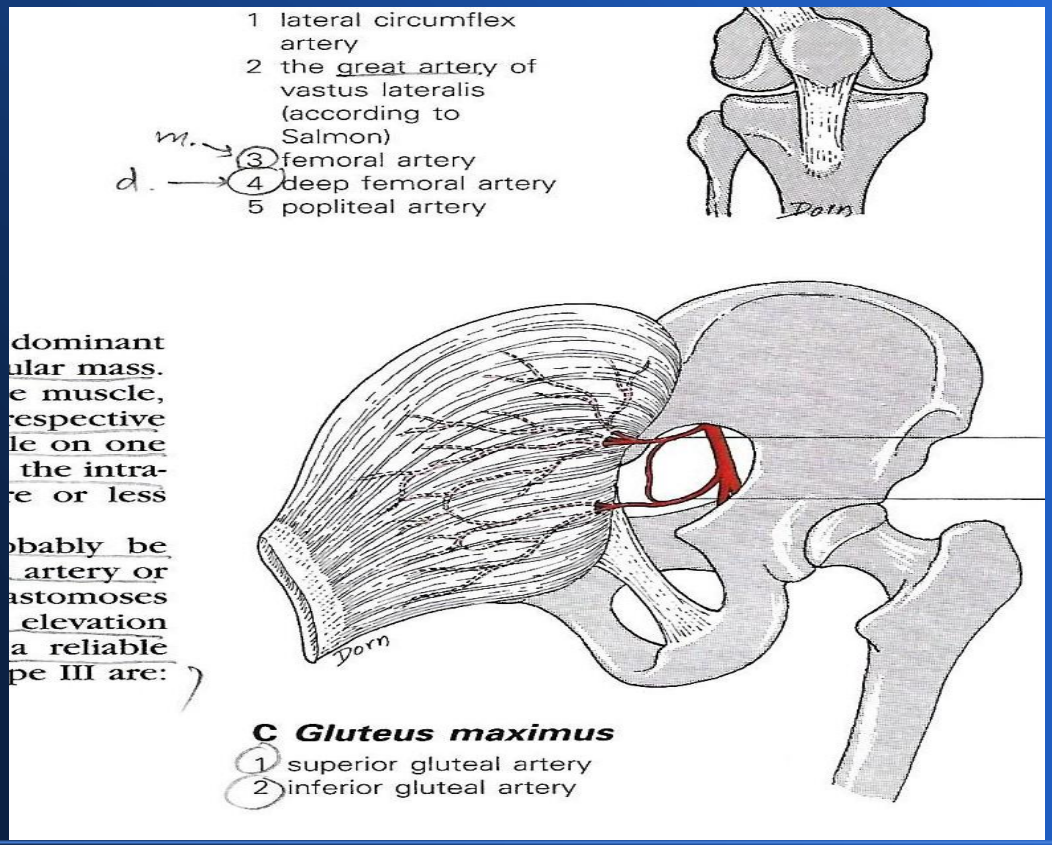
VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

- Type II:one dominant,several minor vp./vastus lateralis : d=deep femoral art, m= femoral art., usually the minor v.p. is not reliable



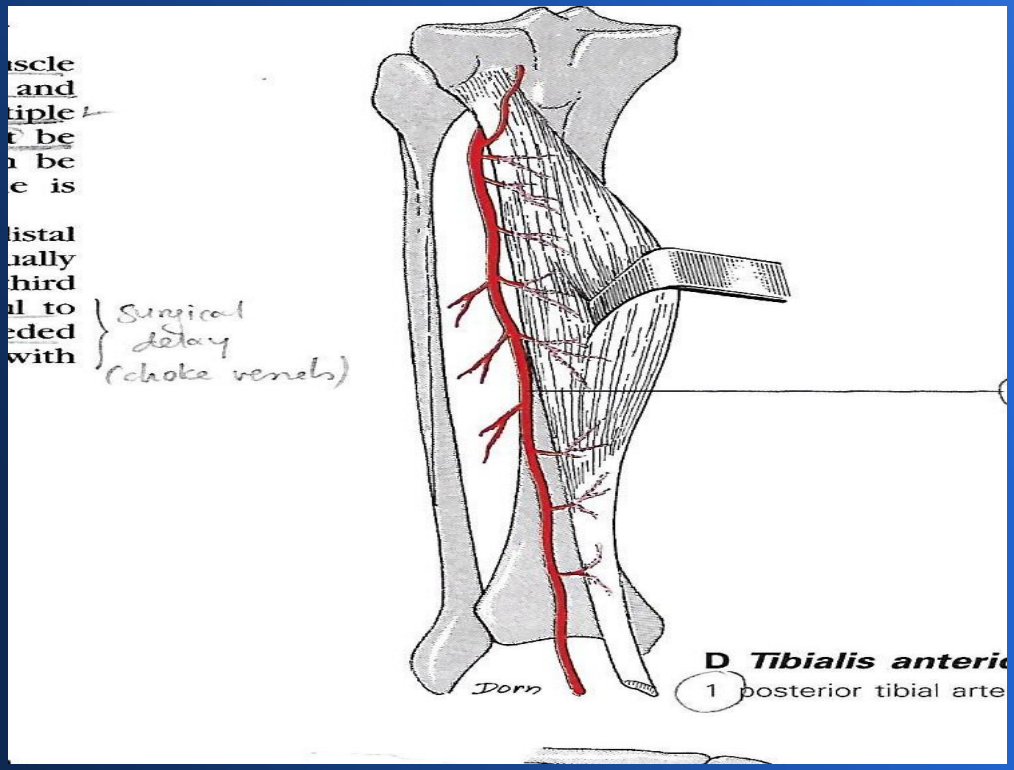
VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

- Type III: two dominant v.p./gluteus maximus (sup. and inf.gluteal art.),rectus abd.=not reliable on one pedicle(sup. and inf.epigastric art.)



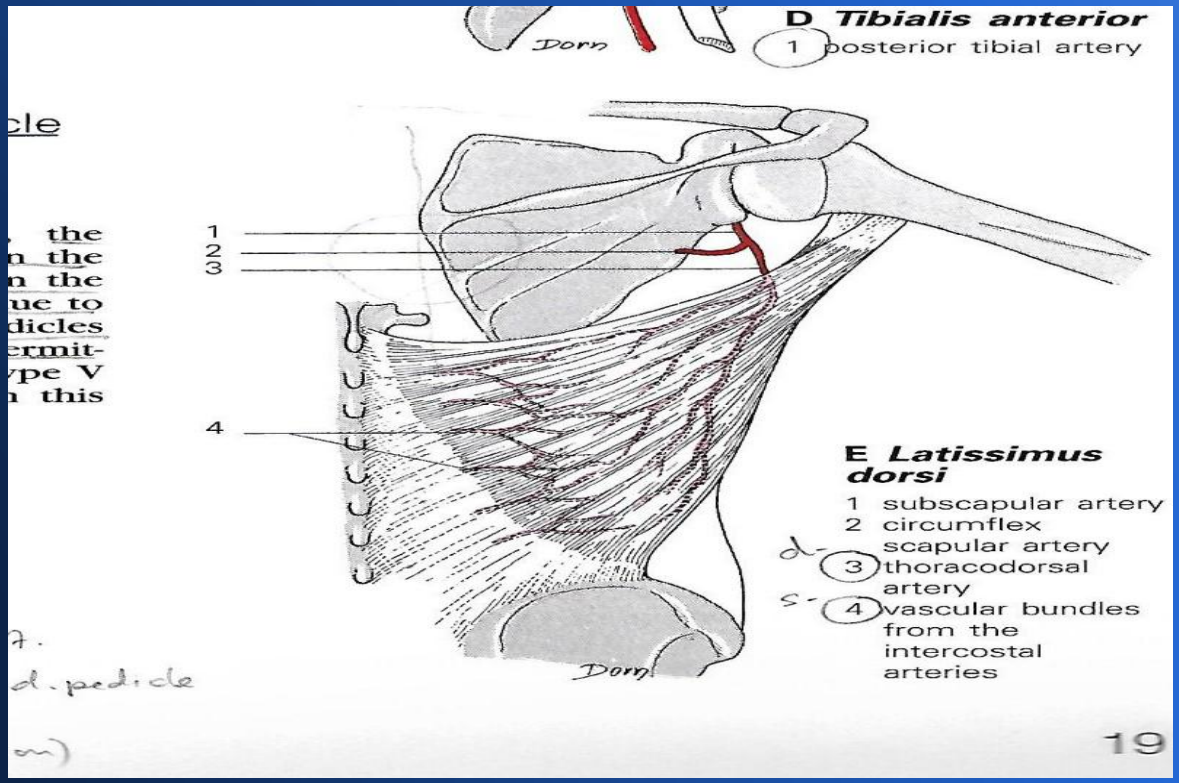
VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

- Type IV: segmental vp./tibialis anterior(post.tibial art.).Muscle cannot be mobilized on one pedicle->useful to perform a delayed flap(surgical delay,choke vessels)



VASCULAR ANATOMY OF MUSCLES/MATHES-NAHAY CLASSIFICATION

- Type V:one dominant,secondary segmental vp./Latt.dorsi(d=thoracodorsal art.,minor=intercostal art).It can survive on segmental vp.



LOWER LIMB RECONSTRUCTION

- Calcaneus,sole and foot : - Imre flap(medial vp)/rotation cutaneous flap

  - Instep flap(medial or lateral plantar art)/fasciocutaneous flap

NEAR BY FLAPS - Flexor digitorum brevis+skin graft/muscular flap

- Lateral calcaneal art(<-peroneal art) +sural nerve(<-tibial)+lesser saph.vein to reconstruct Achilles tendon+calcaneous (3cm)

LOWER LIMB RECONSTRUCTION

- Calcaneus,sole and foot : - Dorsalis Pedis skin flap (neurovascular flap,deep peroneal nerve+superf.peroneal nerve)

REGIONAL FLAPS - Distally based neurocutaneous sural flap for reconstruction of heel and lateral malleolus(sural nerve+vein+art/anastomoses with peroneal art)

- Dorsal foot : -skin graft - free flaps (latt.dorsi, superf.temporal fascia)
- Knee and upper 1/3 of leg : - skin graft - gastrocnemius muscle flap + skin gaft – free flaps (latt.dorsi) – lateral thigh skin flap (cutaneous branch of popliteal art)

LOWER LIMB RECONSTRUCTION

- Middle 1/3 of leg : - skin graft – soleus + skin graft (type II flap, post.tibial and peroneal art) – free flaps (latt.dorsi)
- Lower 1/3 of leg : - skin graft – soleus (distally based/hemisoleus flap) – free flaps

KNEE RECONSTRUCTION

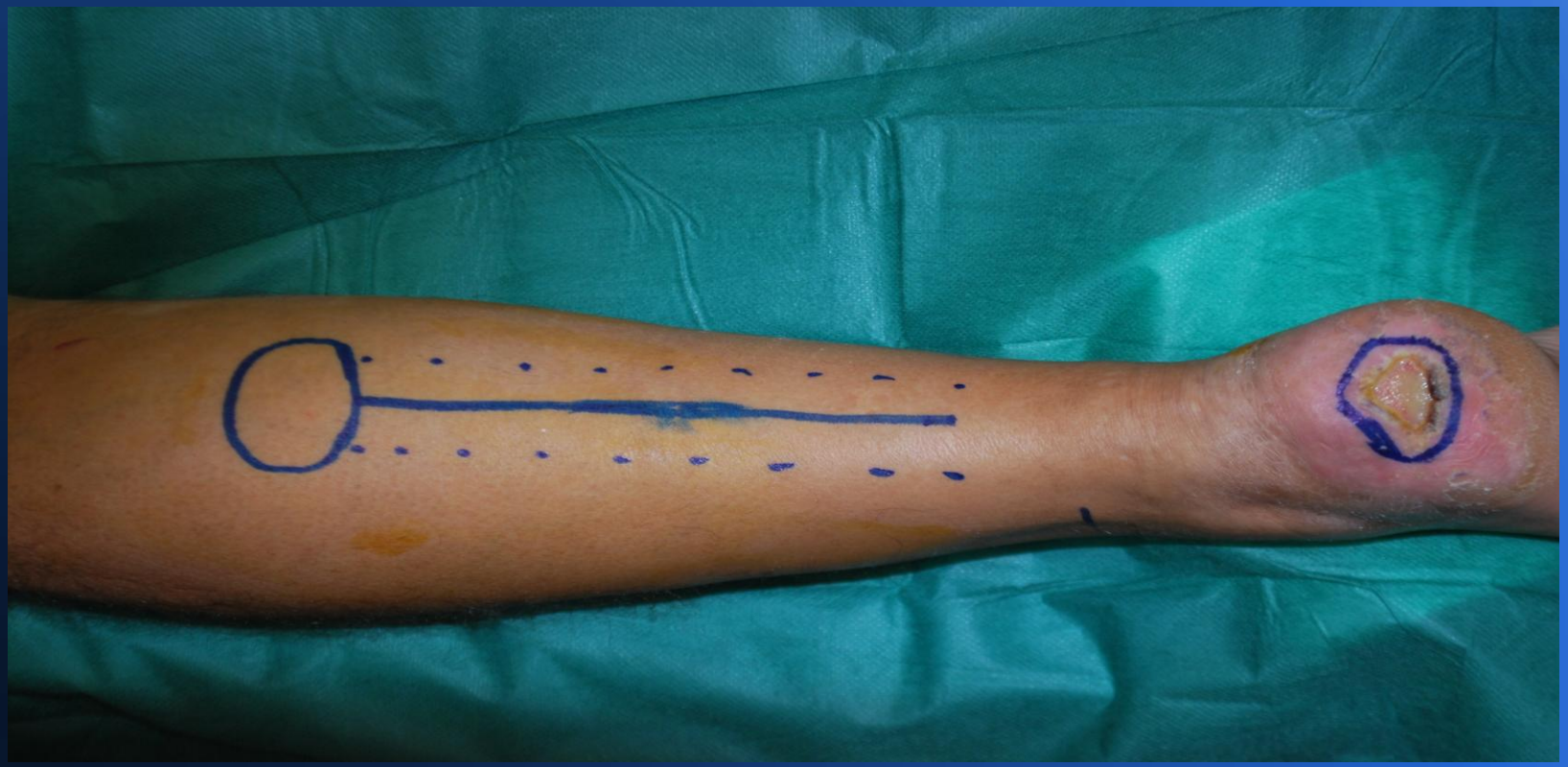
- Knee reconstruction with gastrocnemius flap

KNEE RECONSTRUCTION

- Gastrocnemius flap

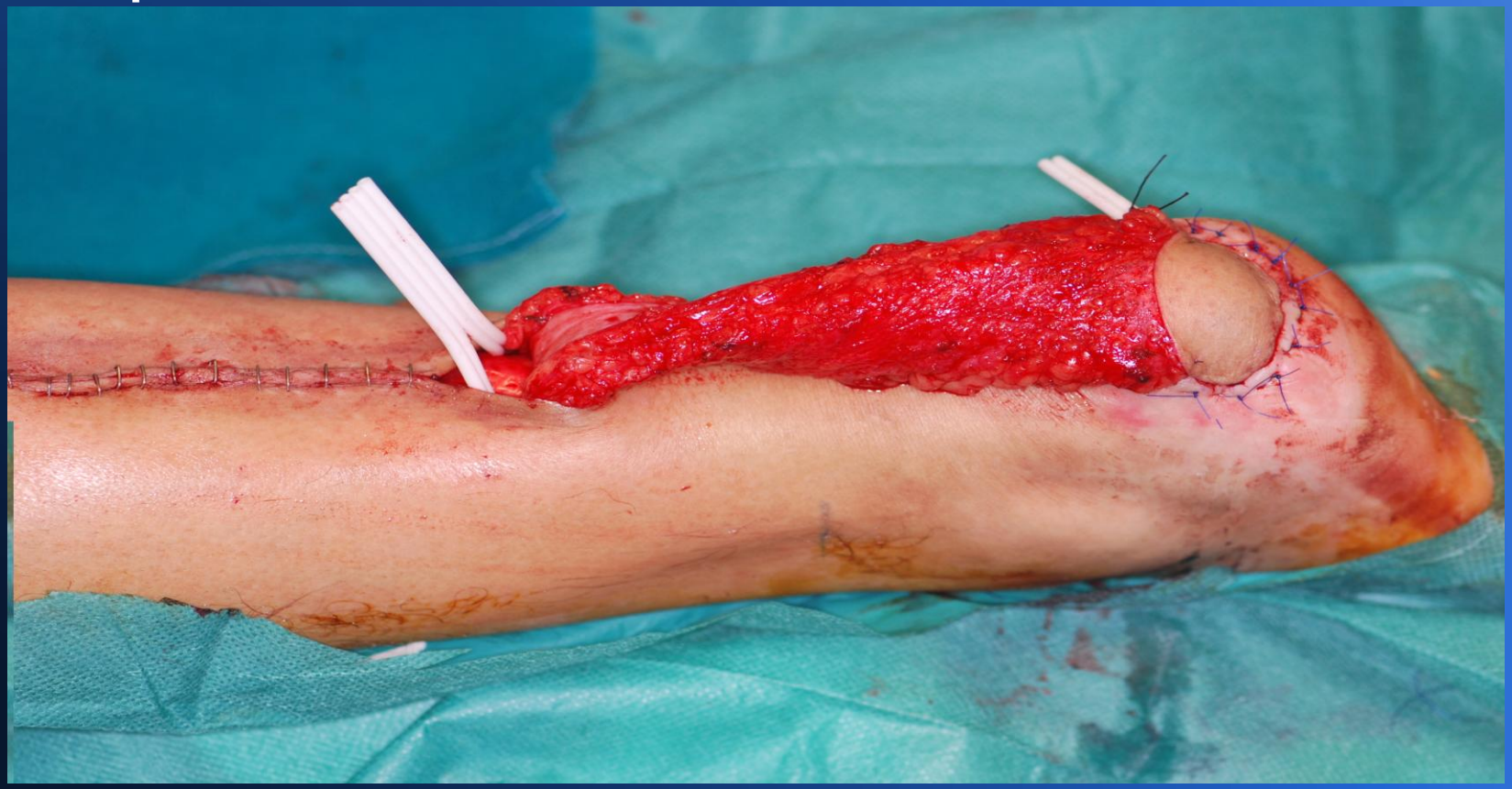
HEEL RECONSTRUCTION

- Heel reconstruction by sural flap



HEEL RECONSTRUCTION

- Sural flap



LEG RECONSTRUCTION

- Granular tissue+skin graft

LEG RECONSTRUCTION

- Granular tissue+skin graft

TISSUE EXPANDERS

- Tissue expanders and rotation flaps

TISSUE EXPANDERS

- Tissue expanders

TISSUE EXPANDERS

- Tissue expanders