Infrapopliteal Intervention
Technical Tips and Tricks

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	主	副
Koh	Coronary Intervention	
Cho	Echocardiography	Coronary Intervention
Cho	Coronary Intervention	
Hwang	Electrophysiology	Coronary Intervention
Won	Coronary Intervention	
Choi	Echocardiography	

Feel Something Lacking


Coronary
Wire to
The Foot

Critical Limb Ischemia (CLI)

Critical Limb Ischemia(CLI)

- Advanced PAD resulting in breakdown of the skin (ulcers or gangrene) or pain in the foot even at rest
  - Stage III or IV of Fontaine classification
  - Rutherford Categories 4, 5, and 6

Prognosis of CLI

- Only 50% of patients with CLI will be alive with 2 limbs at 6-months after diagnosis:
  - 2 to18% will die
  - 30 to 35% will have amputation
- Of those who have amputation:
  - Only 22% will walk again
  - 30% will be bed bound

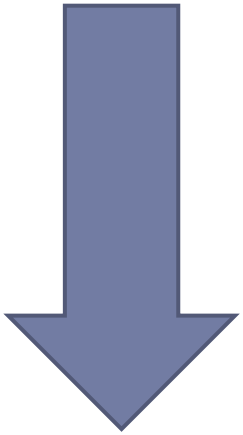
The Goal of Endovascular Therapy in Critical Limb Ischemia

- Restoration of straight-line, pulsatile arterial blood flow to the foot

- Primary patency is less important ?

Why you're doing the procedure?

Critical Limb Ischemia



Limb Salvage

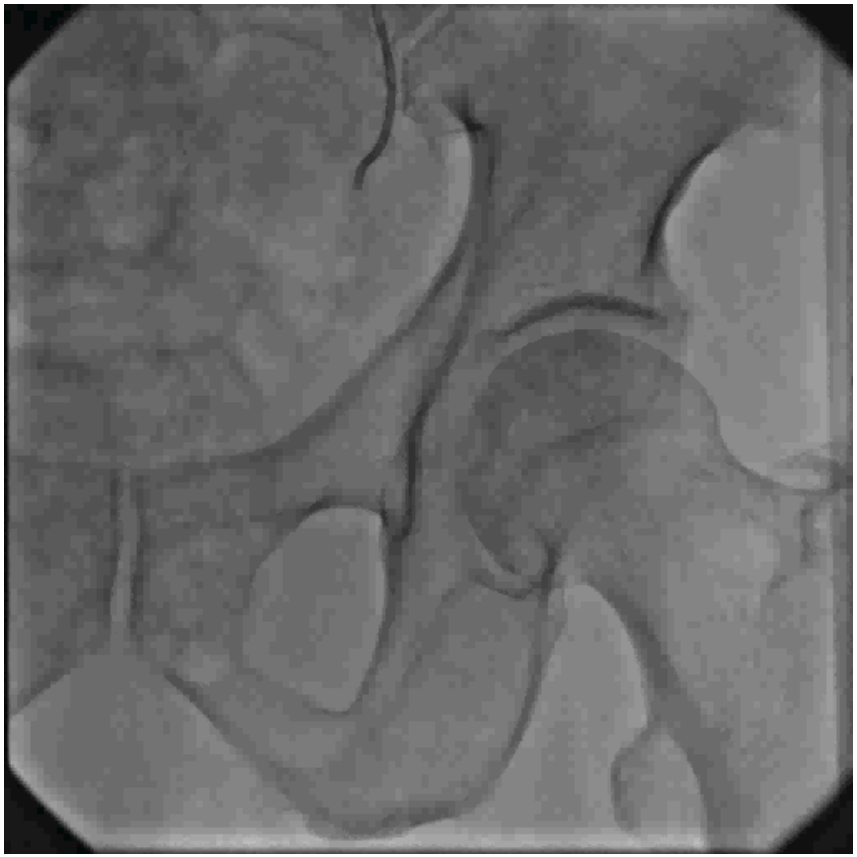
What's Required for Limb Salvage?

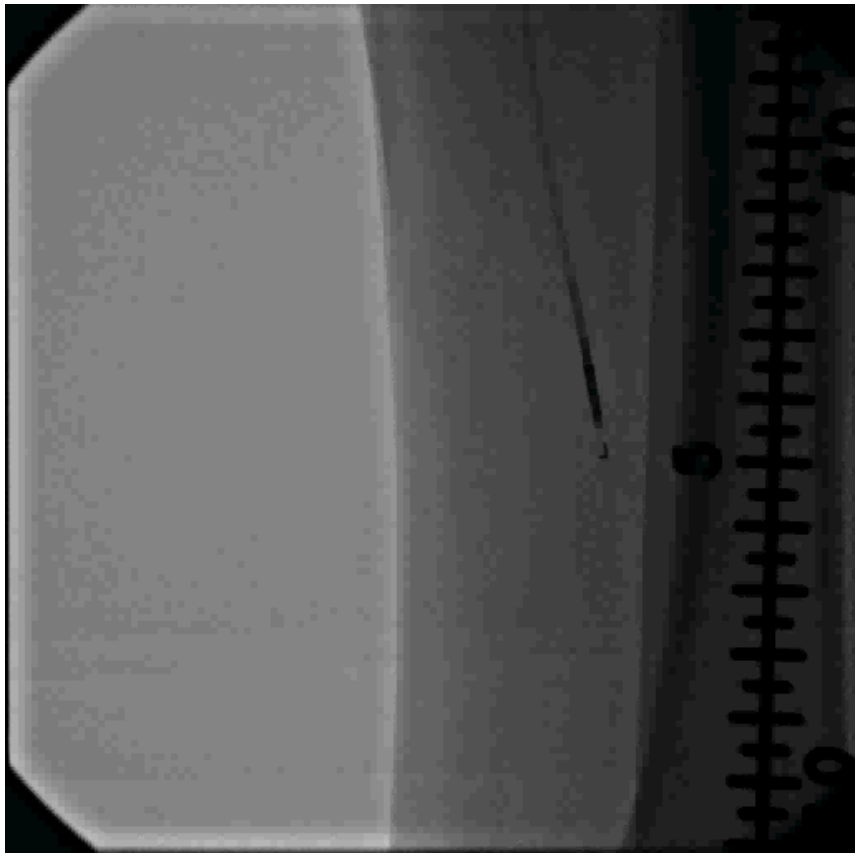
- Increase ABI to >0.4 long enough for wound to heal
- Excellent wound care (CRITICAL)
- Re intervention if ABI decreases
- Re intervention if wound healing plateaus

Arterial Occlusive Patterns in CLI

- Multi level obstructions
  - Collaterals to collaterals……ABI<0.3
- Non diabetic
  - Multilevel (iliac + SFA + trifurcation)
  - Advanced age (>75 yrs) & / or smoker
- Diabetics
  - All trifurcation stenosed or occluded
  - Or multilevel if smoker

Multilevel Obstruction





Pre-Procedural Evaluation

- Ankle-Brachial Index (ABI)
- CT Angiography (CTA)
- Color Duplex Ultrasound (CDUS)
- Invasive Peripheral Angiography

- Socks Off !

Ankle-Brachial Index (ABI)

ABI	Interpretation
1.00 – .129	Normal
0.91 – 0.99	Borderline
0.71 – 0.90	Mild disease
0.41 – 0.70	Moderate disease
≤ 0.40	Severe disease
≥ 1.30	Noncompressible

Do Not Believe ABI

- Incompressible arteries result in normal ABI
  - Elderly patients, diabetes, renal failure
  - Toe-brachial index (TBI)

CT Angiography

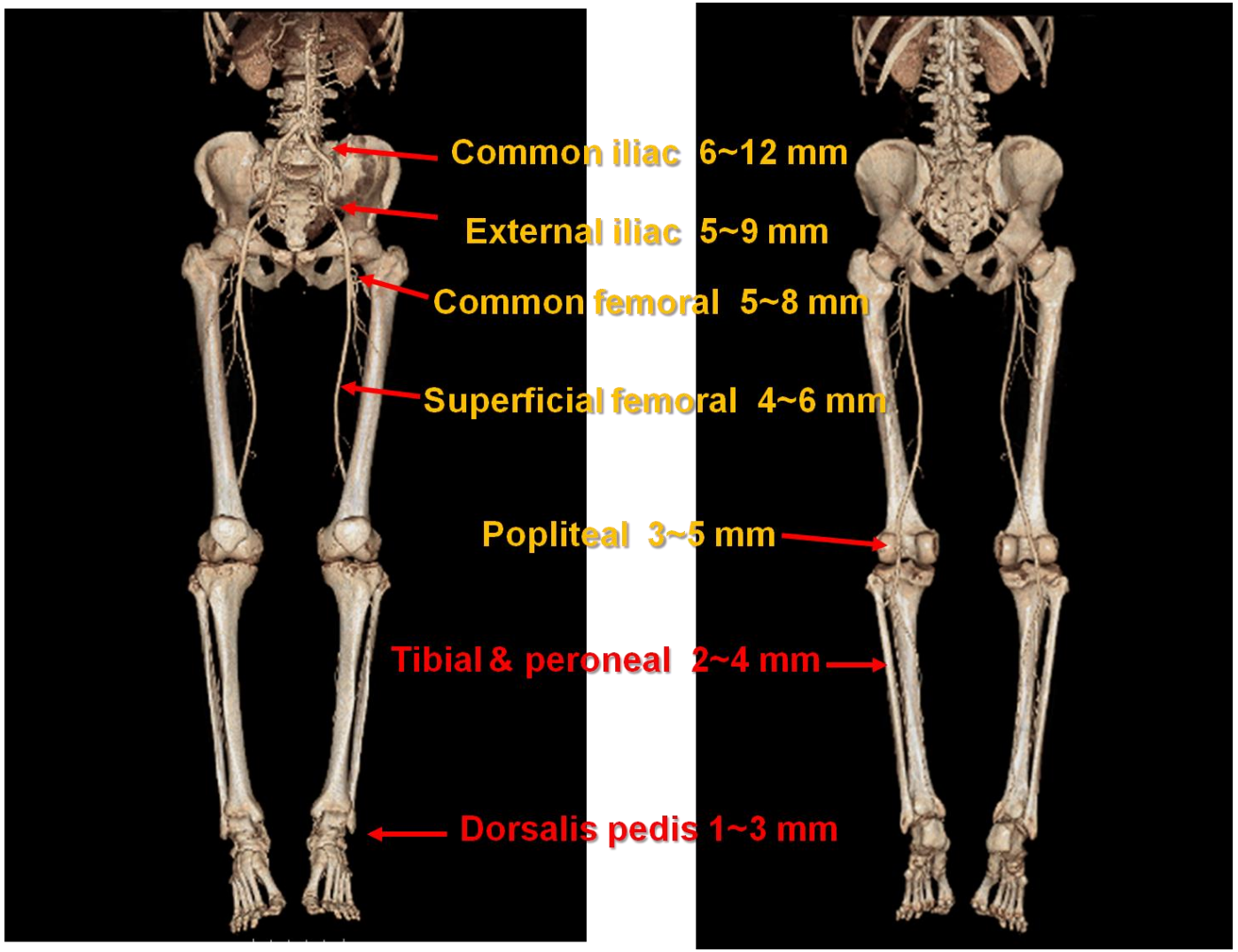
- Benefit
  - Knowing the anatomy of vessel
  - Localization of femoral bifurcation
  - Localization of iliac bifurcation

Do Not Believe CTA

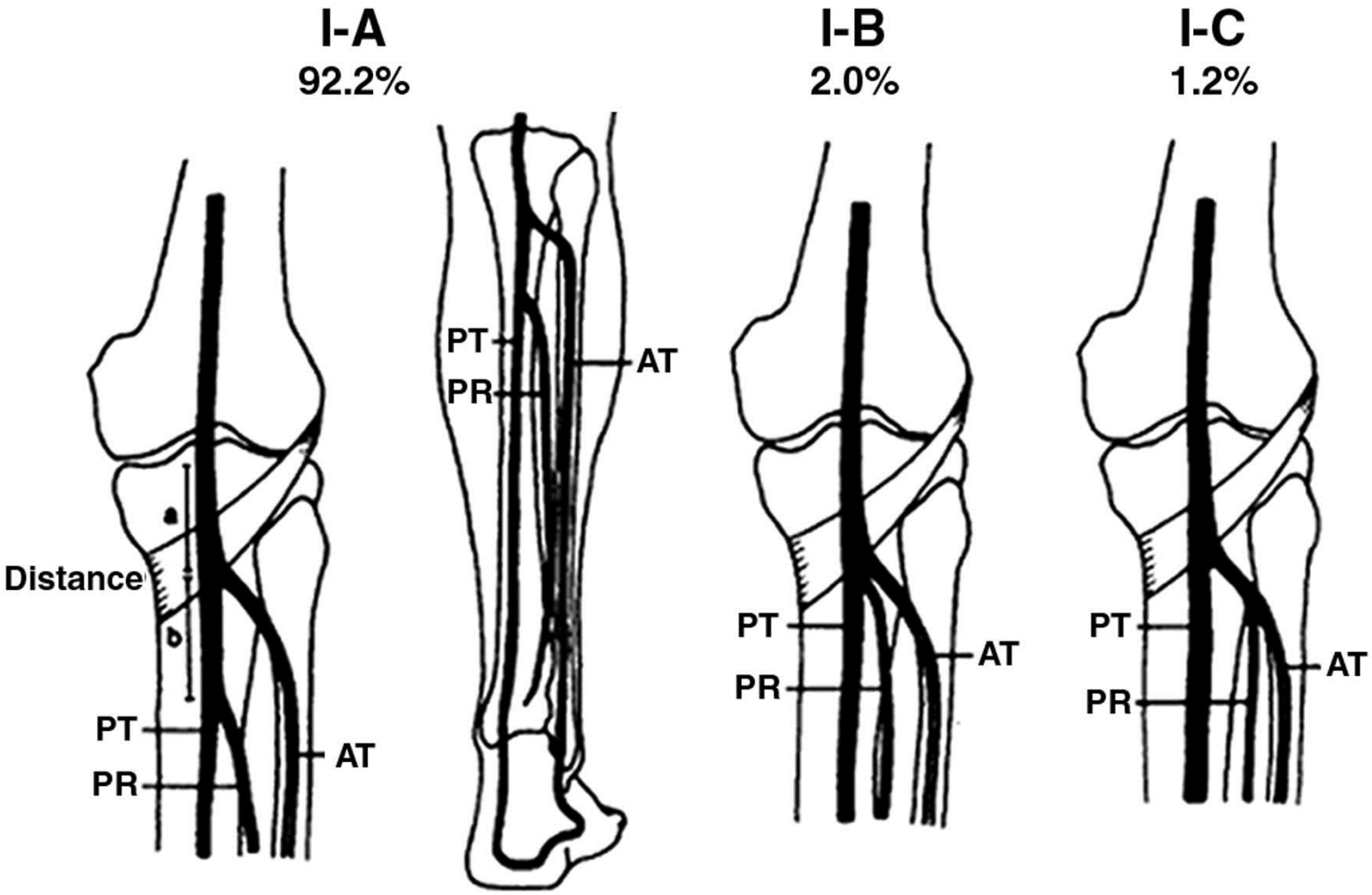
- Weak point
  - Severe calcified lesion
  - Below knee lesion

ANATOMY

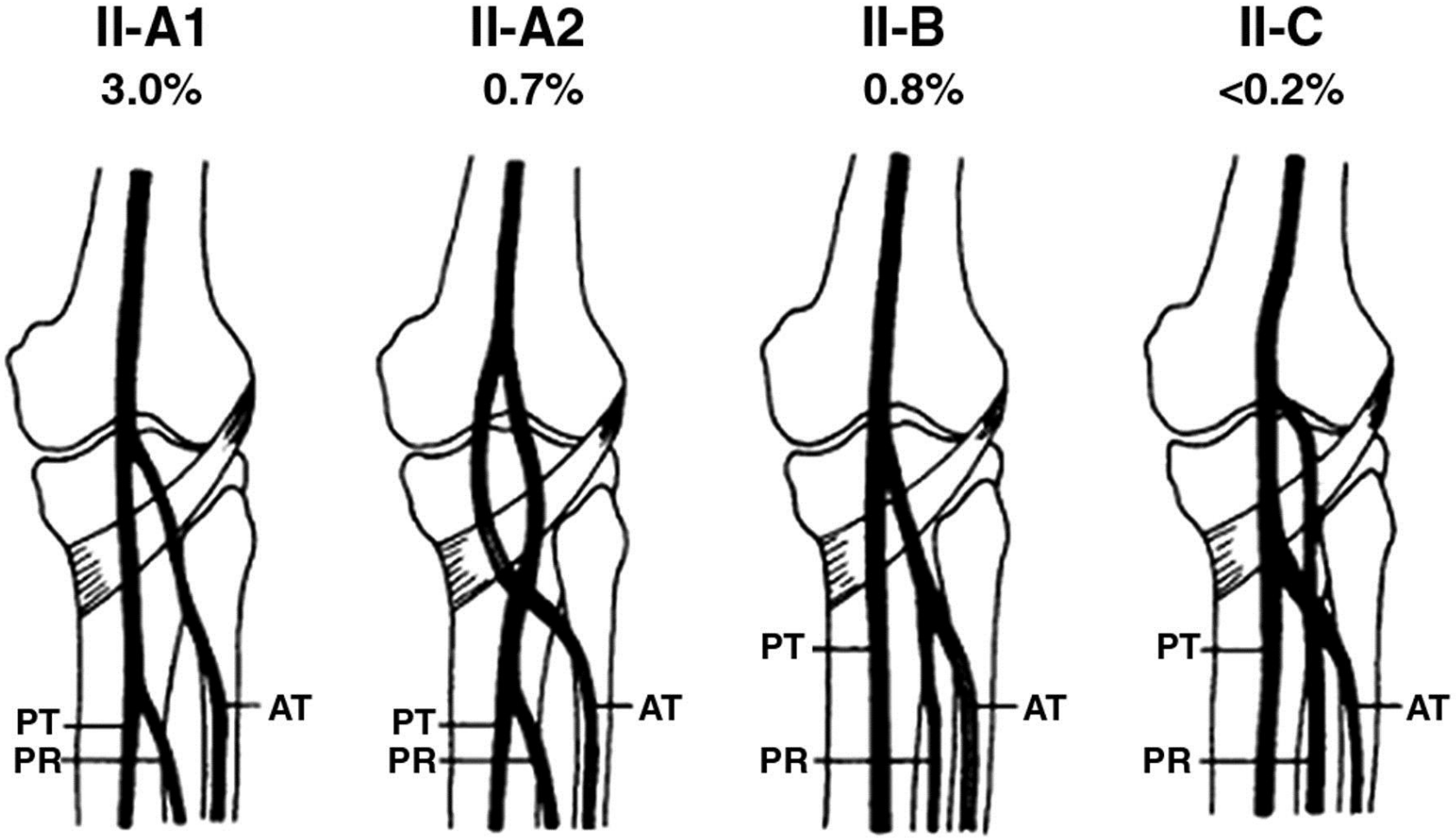
Anatomy


Common iliac 6~12 mm
External iliac 5~9 mm
Common femoral 5~8 mm
Superficial femoral 4~6 mm
Popliteal 3~5 mm
Tibial & peroneal 2~4 mm
Dorsalis pedis 1~3 mm

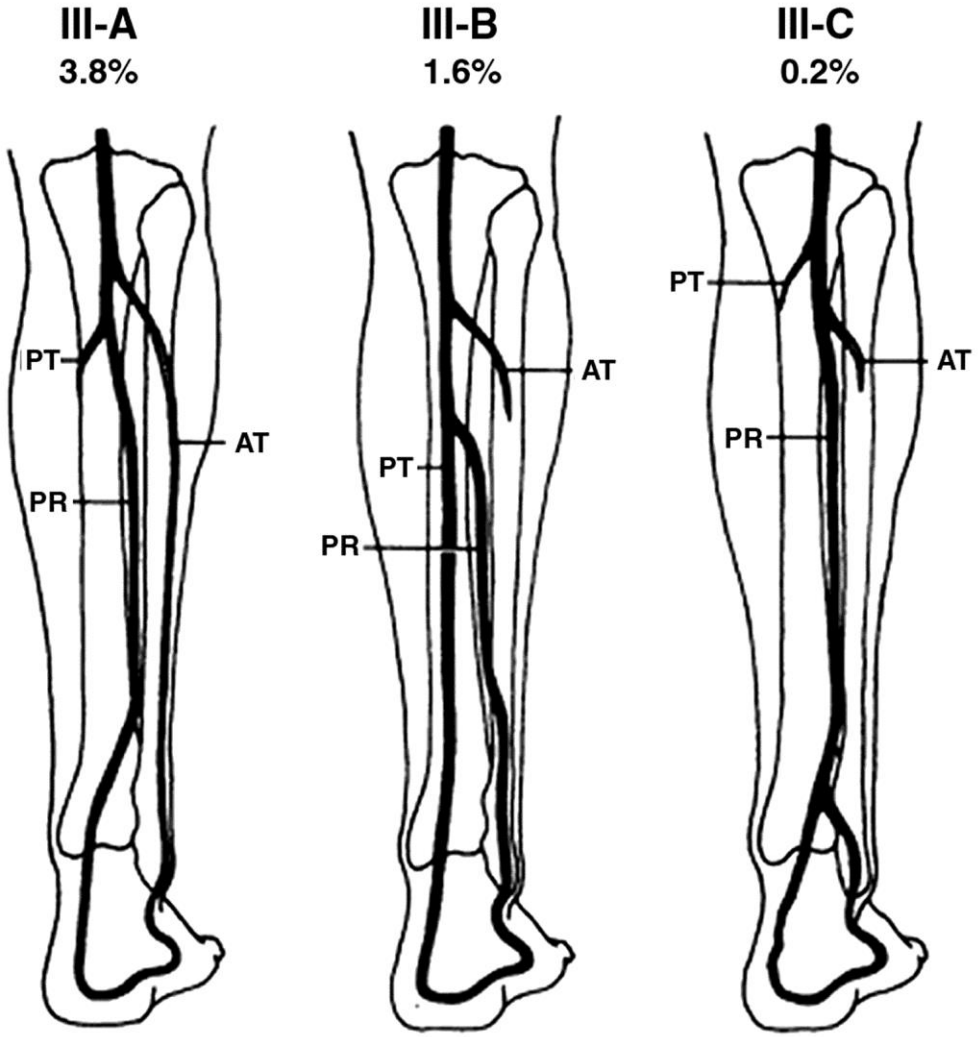
Anatomy of Tibioperoneal Arteries



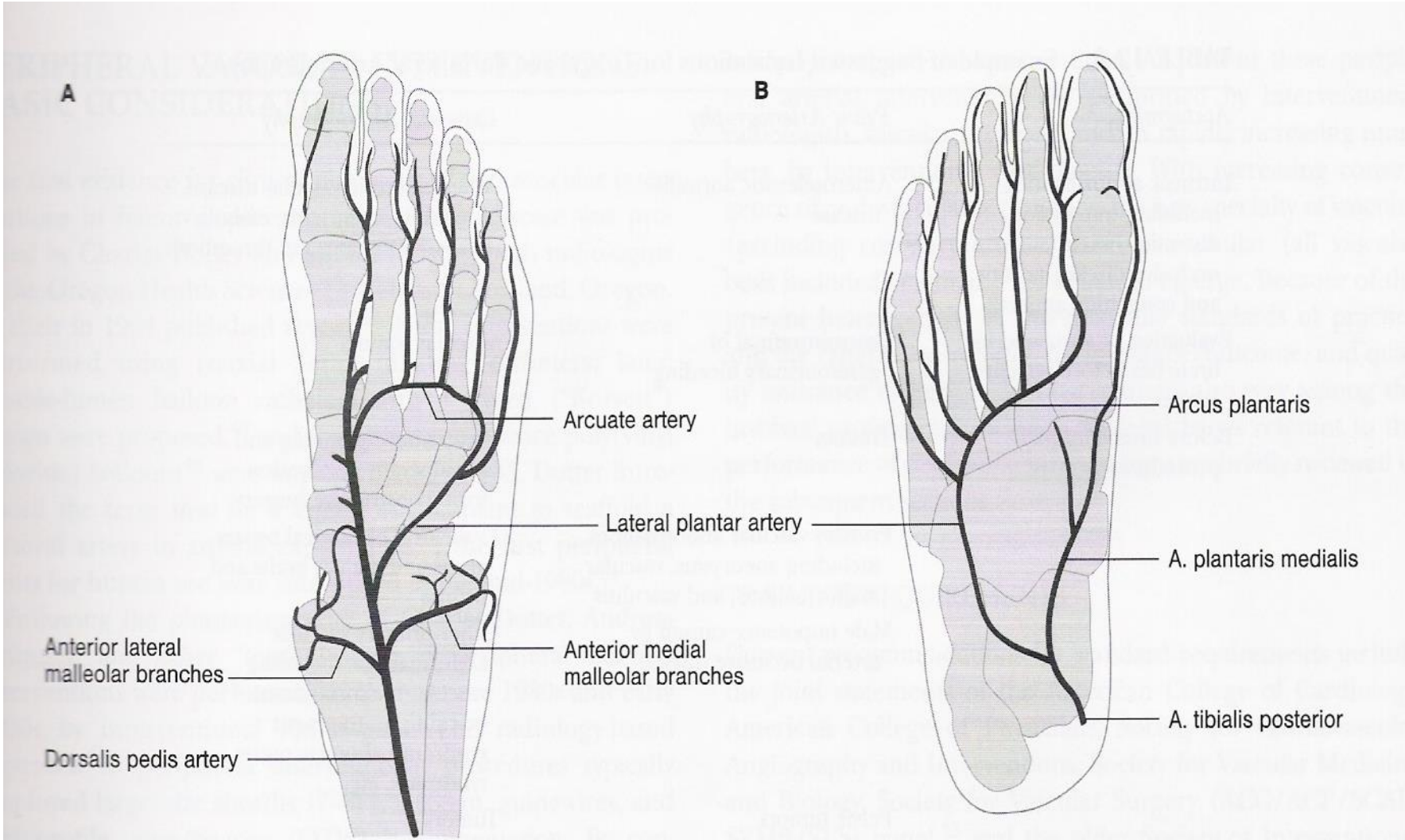
Anatomy of Tibioperoneal Arteries



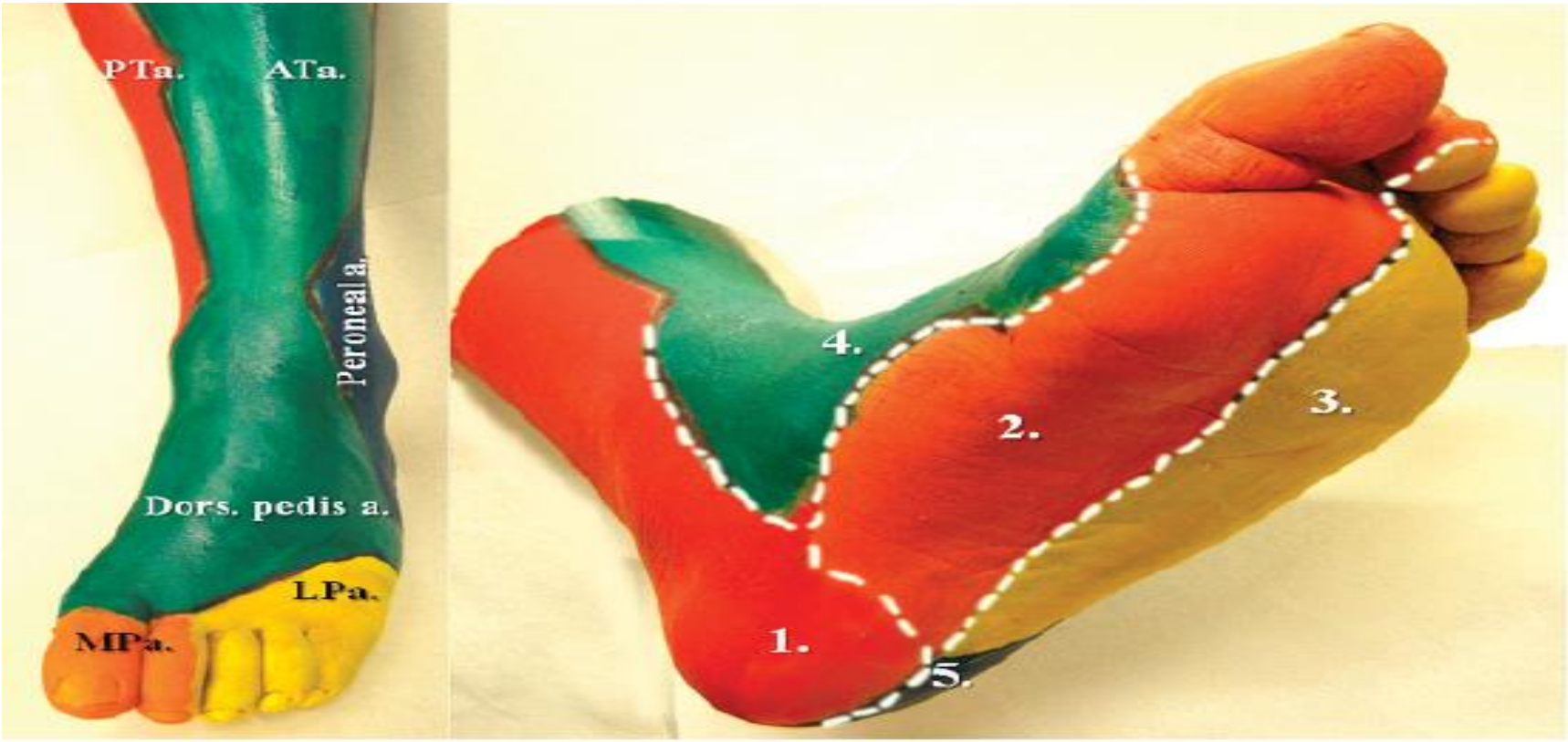
Anatomy of Tibioperoneal Arteries



Dorsal & Plantar Artery Anatomy



Angiosome Concept



1. Posterior tibial a,
2. Main crural and pedal a,
3. Left crural and pedal a ,
4. Anterior tibial a
5. Peronial a.

Terms

- Ipsilateral
  - Puncture site is same side as vessel imaged
- Contralateral
  - Puncture site is different side as vessel imaged
  - Catheter must pass thru aorta
- Retrograde
  - Against blood flow
  - Femoral artery access with cath movement toward aorta
- Antegrade
  - With blood flow
  - Cath placement in femoral artery with movement toward foot

Vascular Access

Contralateral Femoral Access

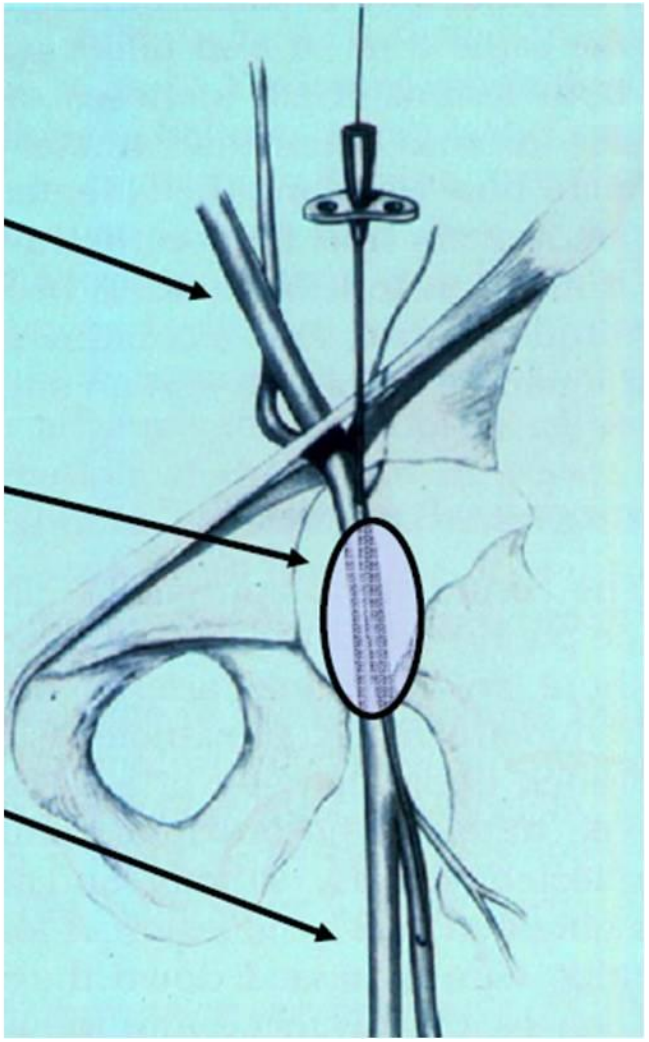
Retrograde Puncture

- Allows complete diagnostic study (CAG, Aortogram..)
- Allows treatment of CFA, ostial and proximal SFA
- Manual pressure does not impair inflow
- Allows standard application of closure devices

Ipsilateral Femoral Access

Antegrade Puncture

- Maximum control of guidewire
  - Preferable for complex anatomy
- Easy to work around image intensifier
- Puncture site is above the artery entrance area.
  - Higher risk for complication.
  - Too high of a puncture makes hemostasis a problem and a retroperitoneal bleed is possible

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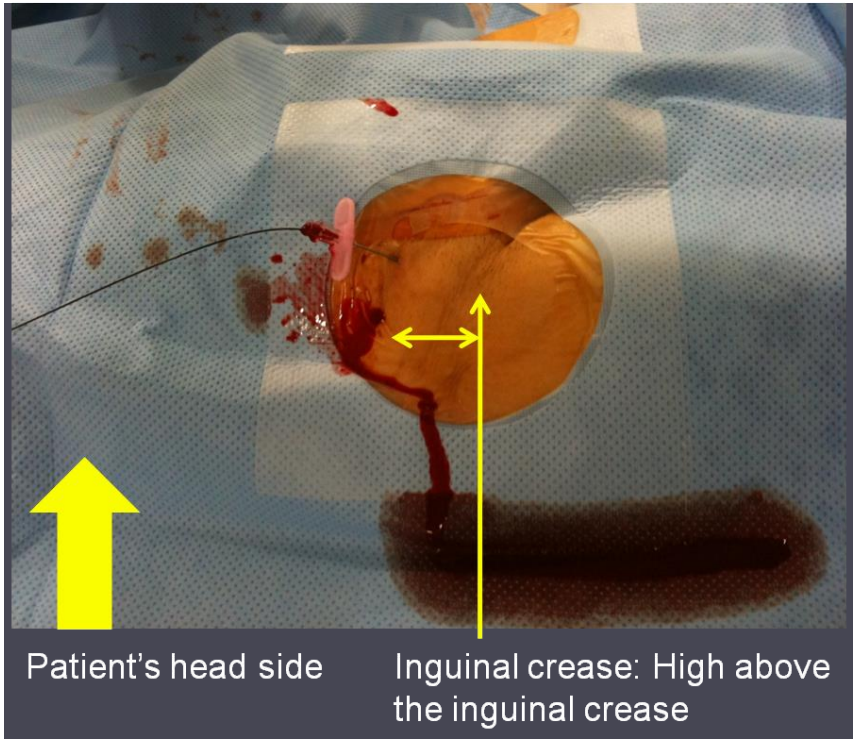
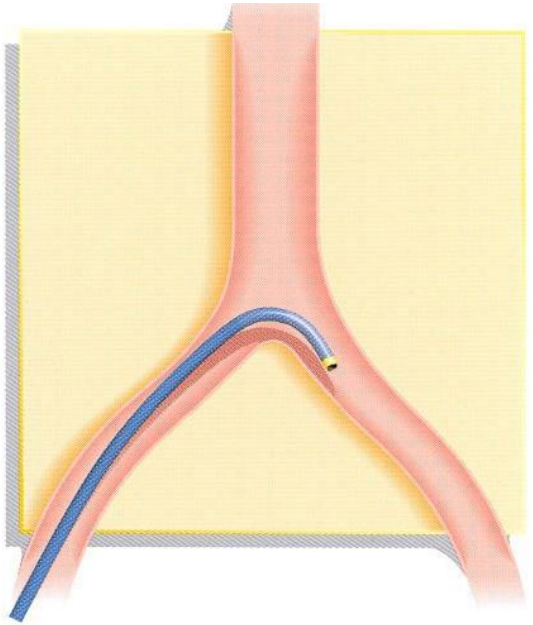

Patient's head side
Inguinal crease: High above the inguinal crease

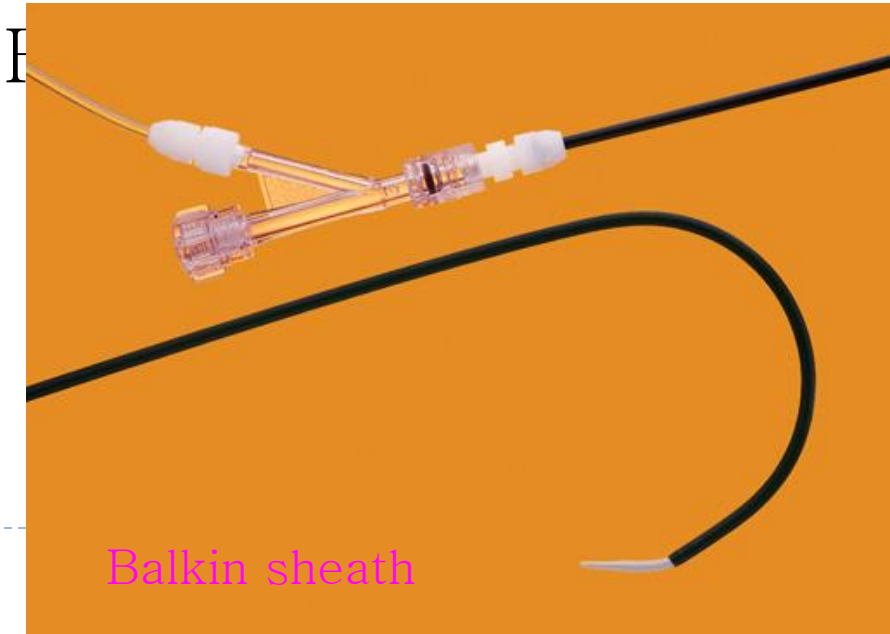
Guiding Sheath

- Ipsilateral sheath
  - 4-5Fr. & 35, 45cm sheath
  - 6Fr. 25-45cm sheath (for specific techniques e.g. double-wire)



Contralateral I

- Crossover sheath (6,7,8F
  - Contralateral I, II sheath
  - Balkin sheath
  - Arrow sheath, 25cm
  - Ansel sheath



Balkin sheath

Cross-Over Method

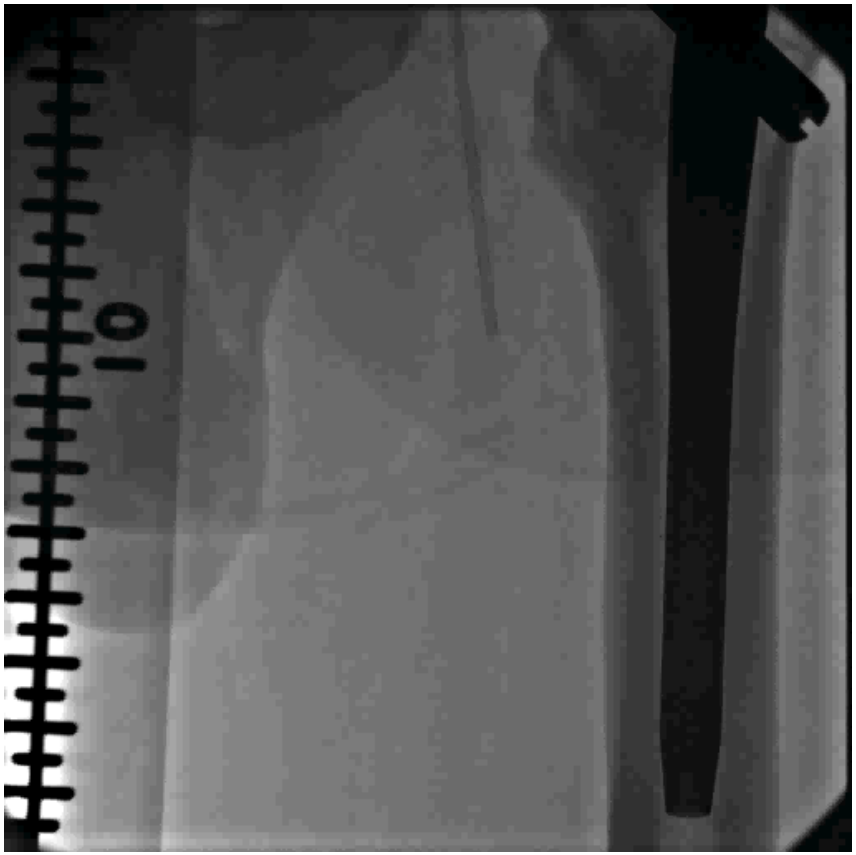
1. Diagnostic JR catheter
2. Internal mammary catheter
3. Omni catheter (5F)
4. JL or Pigtail catheter ··

Patient Preparation
Ipsilateral, Antegrade

Default Access in Myongji Hospital

Peripheral Angiography

Through Sheath



Through MP cath.

GUIDEWIRE & CATHETER

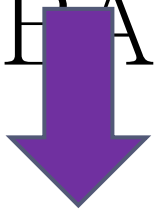
Guidewires for BTK CTO Intervention

- Standard guidewires
  - Hydrophilic tipped guidewires
  - 0.014 PT2, PT Graphics (Boston Scientific)
  - 0.014 Shinobi, 300cm (Cordis)
  - 0.018 V18-control (Boston Scientific)
  - **0.035 angled, 1.5mm J, straight Terumo (Terumo)**

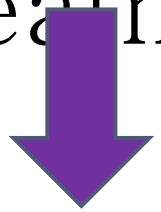
- Coronary 0.014 CTO guidewire
  - Miracle guidewire (Asahi, Abbott)
  - Confienza guidewire (Asahi, Abbott)

ENDOLUMINAL vs. SUBINTIMAL

1° approach = Endoluminal POBA

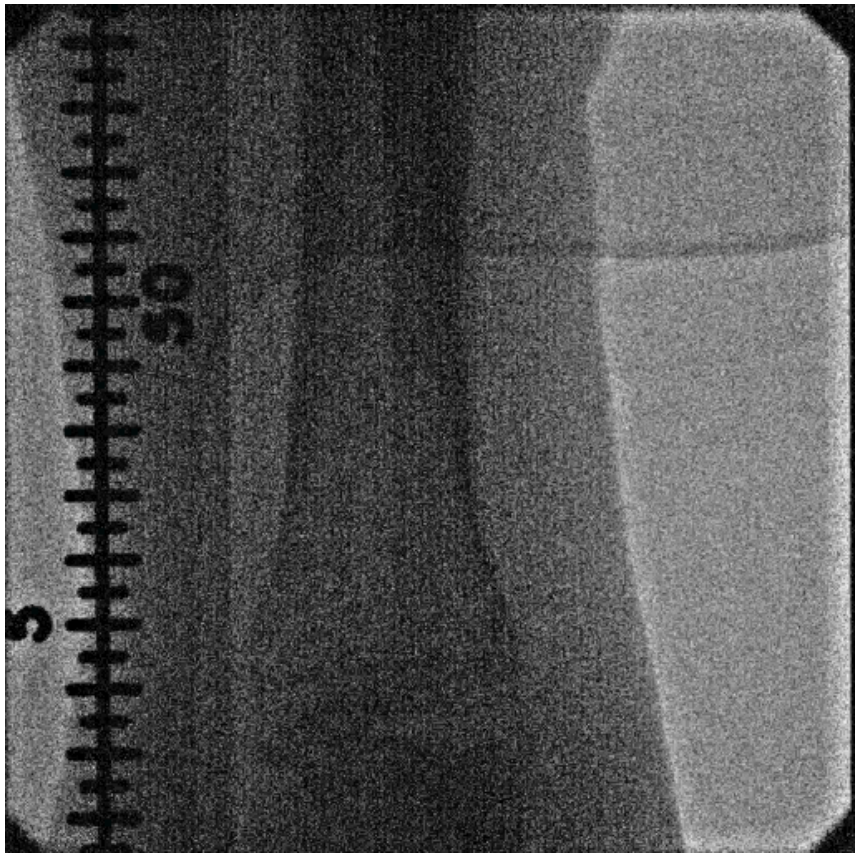


Endoluminal treatment failure



Subintimal treatment

Endoluminal



Subintimal Angioplasty

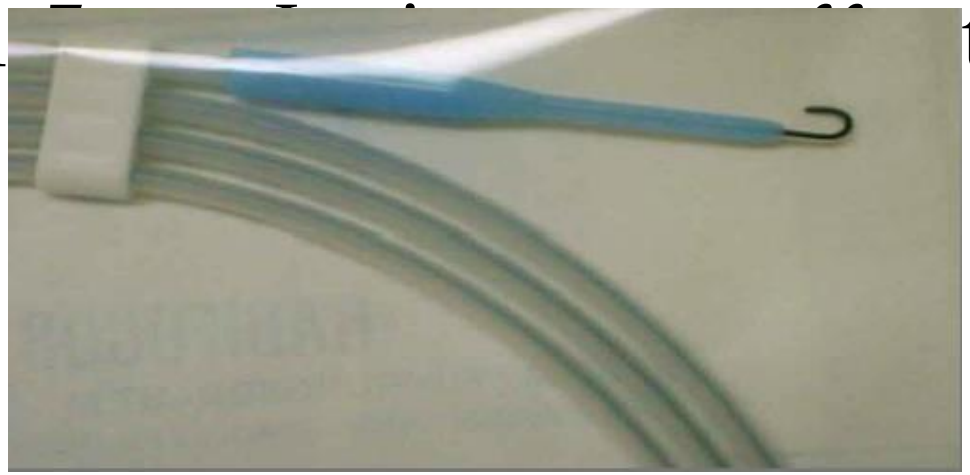
Indications:

- Long occlusions
- Good distal target vessels
- Predominantly atheromatous disease
- Not much Ca++

Subintimal Angioplasty

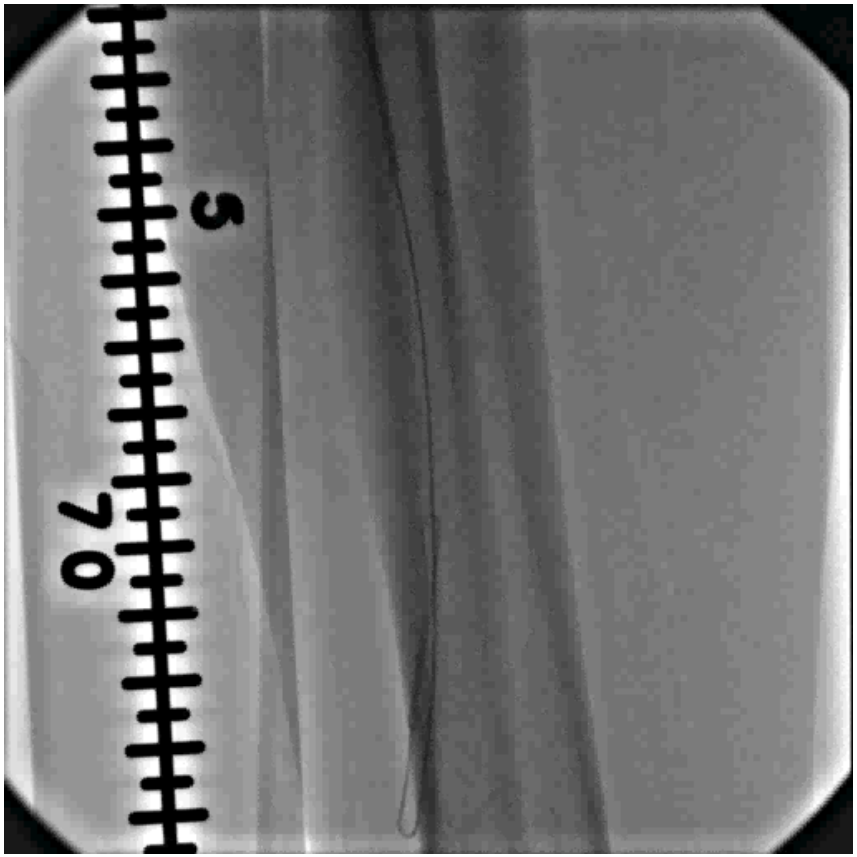
THE FINER POINTS

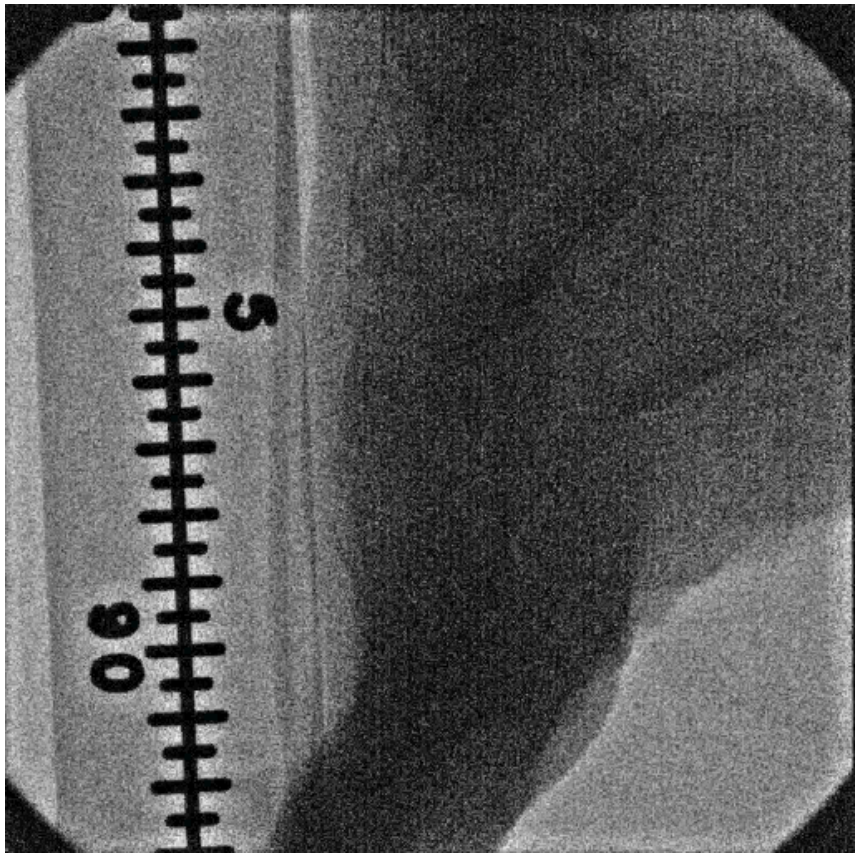
- Keep the loop short to avoid perforation
- 0.035” wire / 4-5F system for strength
  - 4/5F Multipurpose / Glide catheter
- New 1[illegible]tive



Subintimal angioplasty

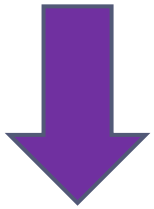
0.035” 1.5mm J wire with 5F MP Catheter



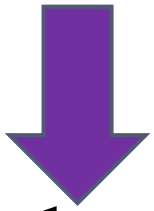


Intraluminal vs. Subintimal

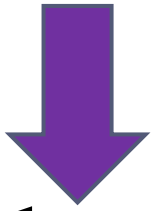
1° approach = POBA



Endoluminal treatment failure



Subintimal treatment



Retrograde approach

Retrograde approach

- Proximal access in SFA (CFA)

- Distal access:
  - pedal artery → ATA
  - retromalleolar artery → PT
- 20/22 gauge needle puncture (the radial needle)
- No sheath wire + low profile OTW balloon + 0.014" wire
- Snare kit to capture wire in SFA

BALLOON

BTK New Balloons

- Low profile balloon with high pushability and trackability to easy cross the lesion
- Long balloons (80-210 mm) to reduce procedure times and dissection
- High pressure (13-20 atm)
- Long inflation time (3-5 min.)

Commercially Available BTK Balloons

- Tracking over 0.018 guidewire
  - Pacific (Invatec), Savvy (Cordis), Fox SV (Abbott), Sterling (BS), Passeo 18 (Biotronik)
- Tracking over 0.014 guidewire
  - Amphirion Deep, OTW + RX (Invatec)
  - Sleek RX (Cordis)

Tips to Optimize the POBA Results

- Prolonged balloon inflation
  - 120-180 sec, if needed, repeat
- Longer balloons
- Adequate balloon size
  - correct balloon size, not oversize..
  - Subintimal space is larger than truelumen: oversize balloon (0.5 mm)
- Gradual high-pressure balloon dilation
  - observing 'waist' (the culprit lesion)
- Supporting catheter
  - to prevent recoil, optional

STENT

Stent

Balloon Angioplasty: first approach

↓

Bailout stenting with dedicated BTK-stents in case of failure or suboptimal outcome

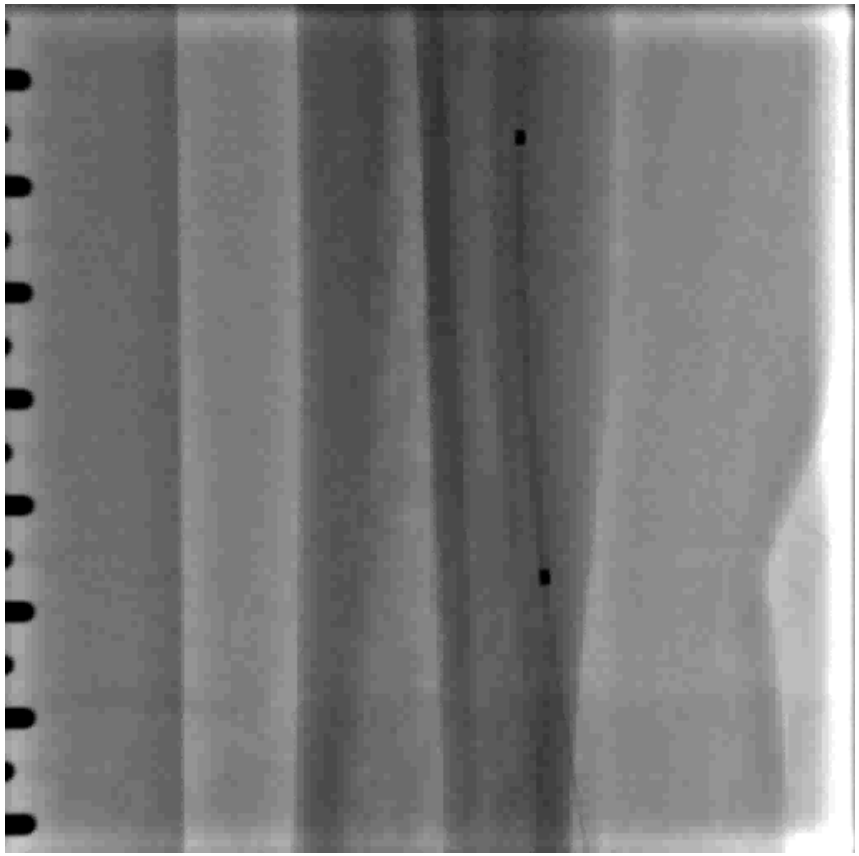
↓ Calcified / Ostial

↓ Balloon-expandable stents

↓ Others

↓ Self-expandable stents

Suboptimal POBA result

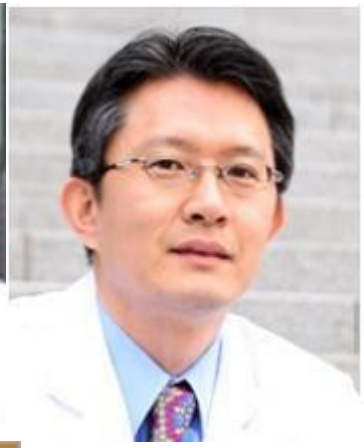


Commercially Available BTK Stents

- Max Length: 80mm
- Self-Expanding Nitinol Stents (Diameter 3~4mm)
  - Xpert (Abbott)
  - Maris deep (Medtronic/Invatec)
- Balloon-Expandable Stents (Diameter 2~4mm)
  - Chromis deep (Medtronic/Invatec)
- Any Coronary Stent (No reimbursement)
  - Cypher, Endeavor R/I, Xience Prime, Promus Element, Biomatrix, Nobori, Genous …

혈관중재술 연구회
(Vascular Intervention Society)



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Thank you for your attention

경청해주셔서 감사합니다