Value Of Redo Tibial Bypasses: Technical Tips For Facilitating - Some Old And Some New Tricks

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VEITH SYMPOSIUM Connecting The Vascular Community 51st

Montefiore Inspired Medicine

EINSTEIN Albert Einstein College of Medicine

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No related disclosures

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Challenges in Redo tibial bypass

- Difficult redo dissections
- Medical comorbidities (older/sicker patient)
- Limited (poor quality) autogenous conduit
- Length of bypass required (more proximal inflow)
- Smaller, more distal and diseased outflow
- Long procedures & technically challenging
- Requires meticulous wound, & post-op care (tissue loss/rest pain)
- Infection risk
- Need for surveillance
- Commitment in the event of graft failure

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Use of more distal *inflow*

> Surgery. 1981 Dec;90(6):980-90.

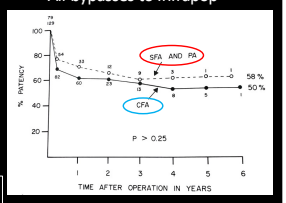
Superficial femoral and popliteal arteries as inflow sites for distal bypasses

F J Veith, S K Gupta, R H Samson, S W Flores, G Janko, L A Scher

- SVS 1981
- Others beginning to adopt with some success
- FJV surprised new concept not more controversial

- Eventually Hybrid procedures
  - ✓ Improve inflow
  - ✓ Obviate the need for more proximal exposure

All bypasses to Infrapop



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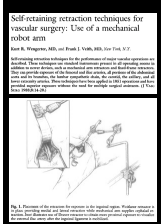
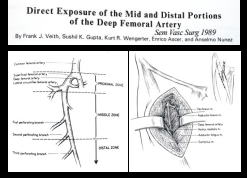
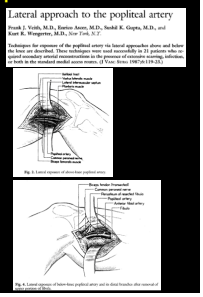
Alternative Exposures / Approaches


Self-retaining retraction techniques for vascular surgery: Use of a mechanical robot arm


Direct Exposure of the Mid and Distal Portions of the Deep Femoral Artery
Semin Vasc Surg 1989


Lateral approach to the popliteal artery

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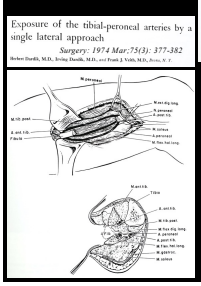
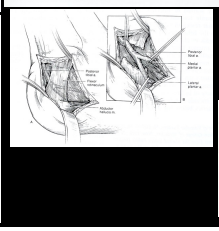
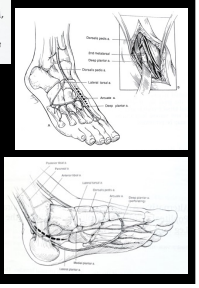
Alternative Exposures / Approaches


Exposure of the tibial-peroneal arteries by a single lateral approach
Surgery: 1974 Mar;75(3): 377-382


Alternative Approaches to the Deep Femoral, Popliteal, and Infrapopliteal Arteries in the Leg and Foot: Part II
Ann Vasc Surg: 1994 Nov;8(6):599-603



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Alternative Conduits

Expanded Polytetrafluoroethylene Grafts in Reconstructive Arterial Surgery

Preliminary Report of the First 110 Consecutive Cases for Limb Salvage

Frank J. Veith, MD; Charles M. Moss, MD; Stanley C. Fell, MD; Barbara A. Rhodes; Eric Somberg, MD; Paul Weiss, MD; Scott J. Bolley, MD; Henry Heimovici, MD

• One hundred ten arterial reconstructions, including several new and extended bypasses, were performed with polytetrafluoroethylene (PTFE) grafts and were observed for three to 16 months. Patency rates were 100% with 15 bypasses to the femoral artery, 95% with 66 bypasses to the popliteal artery, and 76% with 29 bypasses to the arteries of the leg and foot. These encouraging preliminary results justify continued use and evaluation of PTFE as an arterial prosthesis.

(*JAMA* 240:1867-1869, 1978)

- Patients with failed bypasses
- Observed 3-16 months
- Patency rates
  - ✓ To Fem (15) 100%
  - ✓ To Pop (66) 95%
  - ✓ To leg/foot (29) 76%
- *Supports continued use and evaluation of PTFE*

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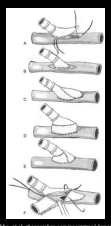
Adjunctive Techniques - Patches, Cuffs

- Theoretical Advantages
  - ✓Mechanical advantage (geometry)
  - ✓Presence of biologic material
  - ✓More forgiving anastomosis
- Disadvantages
  - ✓Increased complexity & operative time
  - ✓Additional incisions, wound infection
  - ✓"…the floor shear stress distribution is less adverse in the conventional [non-cuffed] model. …aspects of the anastomotic haemodynamics are worsened when the cuff is employed."*
- *May facilitate technical aspects of distal anastomosis & increase willingness to pursue limb salvage*



Kibbe, et al. *thoracickey.com/neointimal-hyperplasia*

*Cole JS, et al. *J Biomech* 2002;35:1337-46

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Adjunctive Techniques - Fistulas, Arterialization

Arterialization of the Distal Venous System Alone or Combined With Bypasses to Limited Outflow Tracts: A Last Resort for the "Unsalvageable Leg"?

IZHAR YANIV, M.D., and FRANK J. VEITH, M.D.

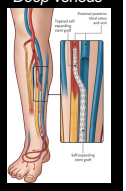
- "Nonstandard" option
- Arterialization - *Limited role*
- Fistulas - common ostium, remote, saphenous turndown
  - Anecdotal success - *Unknown and limited value and role*

"Everything old is new again" - Jonathan Swift

Arterialization

Superficial venous — *Deep* venous

Surgical incision and mobilization



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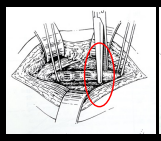
Meticulous Anastomotic Technique

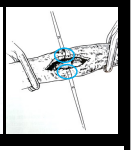
- Techniques to manage calcified arteries
  - ✓"fracture" calcified plaque
  - ✓Sew around subintimal sessile calcifications

Infrapopliteal Bypasses to Heavily Calcified Rock-Like Arteries: Management and Results

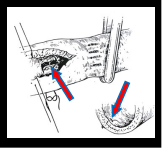
Enrico Ascer, MD; New York, New York; Frank J. Veith, MD; New York, New York; Sheila A. White-Flores, RN, BA; New York, New York

Am J Surg. 1986;152(2):220-223





- Other concepts
  - ✓Intima to intima (or graft)
  - ✓Equal bites of all layers, avoid flaps "foil"
  - ✓Tack flaps (can tie inside)
  - ✓Use stay sutures
  - ✓Handle arteries and all tissues gently
  - ✓Avoid overuse of cautery



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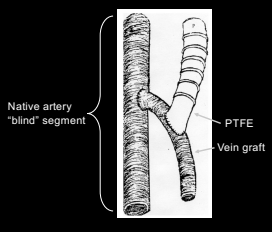
Experience With a Modified Composite Sequential Bypass Technique for Limb-Threatening Ischemia

Ann Vasc Surg 2010; 24: 1000-1004

Nicholas J. Gargiulo III,[1] Frank J. Veith,[2,3] David J. O'Connor,[1] Evan C. Lipsitz,[1] William D. Suggs,[1] and Larry A. Scher,[1] Bronx, New York; Cleveland, Ohio

- Use of composite sequential technique
- When inadequate length of vein
- Revascularize "blind" segments
- In line flow to collateral network
- PTFE (or other) onto vein configuration
- Promotes maintenance of vein patency, thrombectomy/redo of prosthetic component



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No Age Alone Restrictions

Limb salvage in octogenarians and nonagenarians

Surgery. 1986 Feb;99(2):160-5.

Larry A. Scher, M.D., F.A.C.S., Frank J. Veith, M.D., F.A.C.S., Enrico Ascer, M.D., Ronald A. White, M.D., Russell H. Samson, M.D., F.A.C.S., Seymour Sprayregen, M.D., and Sushil K. Gupta, M.D., F.A.C.S., *New York, N.Y.*

- Rx of older, sicker patients
  - ✓6% mortality, 71% 3-year limb salvage
- Advances in
  - ✓Anesthetic management
  - ✓Cardiovascular medications
  - ✓Post-operative care
  - ✓Antibiotics
  - ✓Wound care

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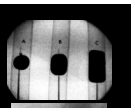
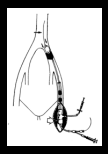
Fluoroscopically Assisted Thromboembolectomy: An Improved Method for Treating Acute Arterial Occlusions

Ann Vasc Surg 1996

Richard E. Parsons, MD, Michael L. Marin, MD, Frank J. Veith, MD, Luis A. Sanchez, MD, Ross T. Lyon, MD, William D. Suggs, MD, Peter L. Faries, MD, and Michael L. Schwartz, MD. New York, New York



- Prevents overdistention and vessel injury
- Identifies errant balloon tracking into branches (collaterals)
- Identifies and may help characterize the underlying lesion
- Facilitates completion angiography
- Can be performed through a sheath to minimize blood loss



Resident surgeon postgraduate level	Iliac artery balloon diameter (mm) (% overdistention)	Femoral artery balloon diameter (mm) (% overdistention)
PGY-1	6 (20%)	>5.5 (25%)
PGY-1	6.5 (30%)	5 (50%)
PGY-1	6 (20%)	2.5 (25%)
PGY-3	6 (20%)	5 (50%)
PGY-3	6 (20%)	5 (50%)
PGY-3	6.5 (30%)	2.5 (25%)
PGY-5	6.5 (30%	5 (50%)
PGY-7	6 (20%)	5 (50%)
PGY-8	6 (20%)	2.5 (25%)
PGY-9	6 (20%)	5 (50%)
PGY-14	6 (20%)	2.5 (25%)
PGY-40	6.5 (30%)	5 (50%)
Average	6.2 (23%)	2.8 (60%)

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Aggressive Re-operation & Re-intervention

	2/3 patients with ≥3 bypasses			all pts >3; ½ >4 bypasses
Study	1	2	3	4
Reconstructions:	389	23	85	105
Patients:	202	16	81	54
Prosthetic:	87%	36%	21%	66%
Peri-op mortality:	1%	0%	4%	2%
Patency (yr):	37%(5)	50%(3)	79%(4)	70%(3)
Limb Salvage (yr):	59%(5)	50%(3)	69%(4)	59%(3)
Survival (yr):	80%(5)	62%(3)		67%(3)

- No incremental failure rate
- Less than expected M&M
- (selected, patients with extensive PVD)
- *Lent support to an aggressive approach*

1. Bartlett, et al. *J Vasc Surg* 1987;5(1):170-9
2. George, et al. *Ann Vasc Surg* 1994;8(4):332-6
3. De Frang, et al. *J Vasc Surg* 1994;19(2):268-76
4. Lipsitz, et al. *Vascular*; 21(2):63-8, 2013

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Challenges in Redo tibial bypass

- Difficult redo dissections → *alternative exposures/approaches*
- Medical comorbidities → *improved management*
- Limited autogenous conduit → *alternative conduits*
- Length of bypass required → *distal inflow and PTA*
- Small, diseased outflow → *techniques to manage*
- Long procedures & post-op care → *commitment & dedication*
- Need for surveillance → *enhanced protocols, Rx failing grafts*
- Graft failure → *thrombectomy and re-op (x multiple)*

Requires a dedicated surgeon with robust open experience & skill!

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Thank you

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