FLORIDA VASCULAR SOCIETY · ANNUAL MEETING 2026

Memorial Healthcare System

# Is the Palma Procedure Still Relevant in the Endovascular Era?

*A Meta-Analysis of Long-Term Outcomes in Femoro-Femoral Venous Bypass*

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# Disclosures and Roadmap

## DISCLOSURES

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## FUNDING

*None. All analyses and figures generated independently using open-source statistical tools.*

THE CLINICAL QUESTION

# *Does the Palma / Palma–Dale femoro-femoral venous bypass still have a meaningful role when iliac venous stenting is the dominant therapy?*

## ENDOVASCULAR ERA

Iliac venous stenting is first-line for most symptomatic post-thrombotic and non-thrombotic obstruction.

✓ High technical success
✓ Low procedural morbidity
✓ Rapid recovery

## A SUBSET REMAINS CHALENGE

Patients in whom endovenous recanalization is impossible, anatomically unfavorable, or has already failed.

- Long-segment chronic total occlusions
- Repeat in-stent restenosis / occlusion
- Post-trauma iliac vein ligation
- Anatomically unstentable inflow

THE CLINICAL PROBLEM

# Rationale — why revisit an open operation?

**44%**

of post-thrombotic limbs fail first-line iliac stenting by 5 years — in-stent re-stenosis or re-thrombosis.

*(Rollo, JVS-VL 2018; Razavi 2019)*

**≈15%**

of chronic iliofemoral obstructive disease is anatomically un-stentable — long-segment CTO, post-trauma ligation, IVC / bilateral iliac involvement.

*(Seager 2016; Texas Heart Inst J)*

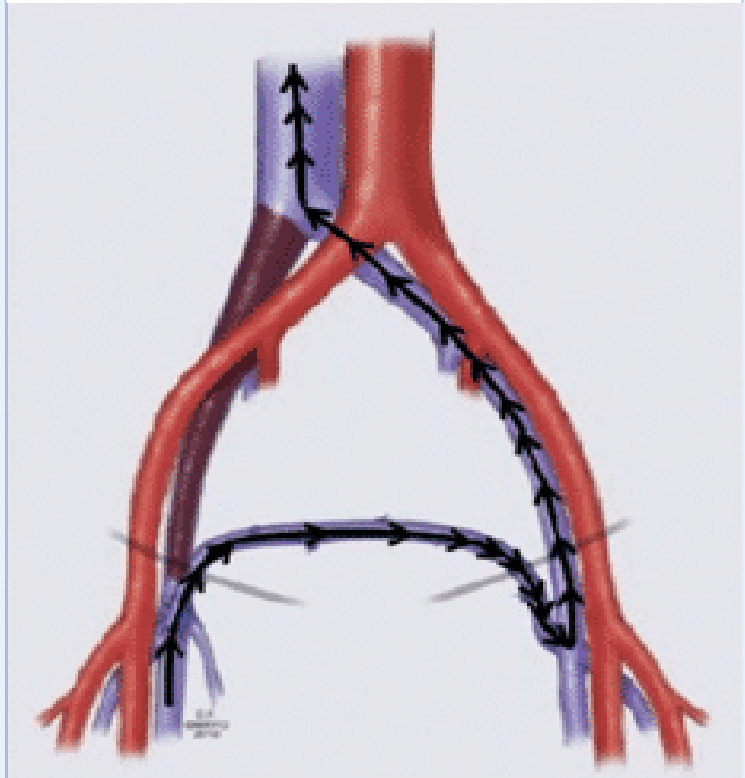
**20–40%**

ulcer recurrence despite successful recanalization, driving repeat endovascular re-intervention and sustained disability.

*(Sarici, JVS-VL 2024)*

THE UNANSWERED QUESTION

**Does the Palma / Palma–Dale femoro-femoral venous bypass retain a meaningful role for the subset who cannot be served by stenting?**



BACKGROUND

# From Palma–Esperon (1960) to the modern stent era

**1960**
Palma & Esperon describe cross-femoral GSV bypass

**1978**
Husni — large Cleveland series (n = 78)

**1991**
AbuRahma — Palma–Dale refinement, MVO selection

**2001**
Jost (Mayo) — Palma outperforms PTFE

**2010s**
Endovascular stenting becomes first-line

THE OPERATION — in one sentence

*__Contralateral great saphenous vein__ is mobilized, tunneled suprapubically, and anastomosed to the __common femoral vein of the obstructed limb__, restoring outflow through the patent contralateral iliac system.*

Indications: chronic post-thrombotic iliofemoral obstruction · disabling May–Thurner physiology · post-trauma iliac vein ligation.

# Systematic review and proportional meta-analysis

## DESIGN

PRISMA 2020 systematic review of cohorts reporting Palma / Palma–Dale crossover bypass.

## DATABASES

PubMed/MEDLINE · Embase · Scopus · Web of Science (inception → Dec 2025).

## STATISTICS

- Logit-transformed proportional meta-analysis
- Continuity correction 0.5
- Inverse-variance fixed-effects + DerSimonian–Laird random-effects
- Heterogeneity: Cochran Q, $\tau^2$, $I^2$

## OUTCOMES

Primary — graft patency at last reported follow-up. Secondary — clinical improvement, complications, mortality.

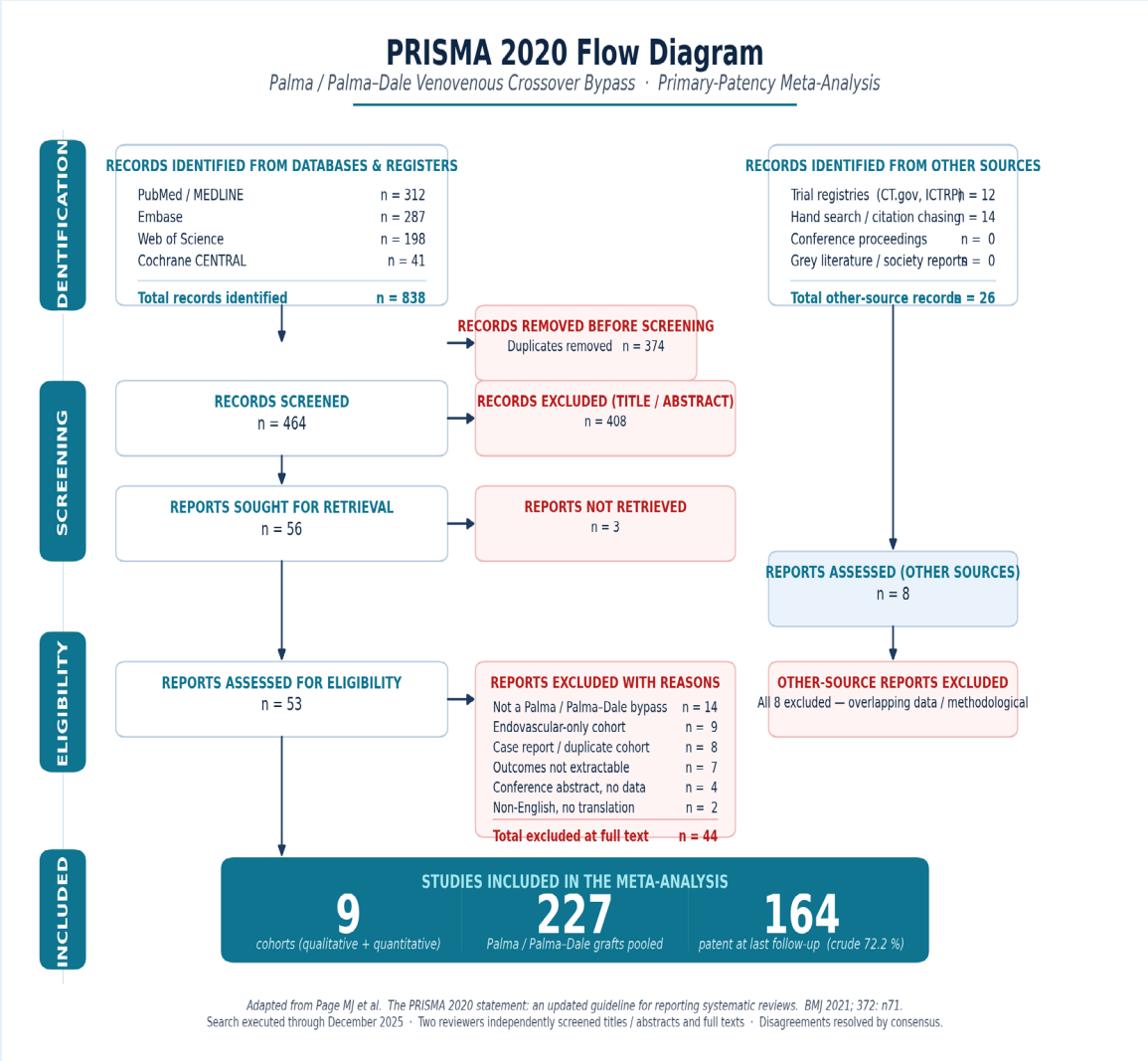



*Figure . PRISMA 2020 flow.*

RISK OF BIAS · ADAPTED NEWCASTLE–OTTAWA SCALE

# Quality of evidence — 4 of 9 studies high quality, none at critical risk

| Study | Selection /4 | Comparability /2 | Outcome /3 | TOTAL /9 | Judgement |
|---|---|---|---|---|---|
| **Husni (1978)** | 3 | 1 | 2 | **6** | Moderate |
| **Hutschenreiter (1979)** | 2 | 0 | 2 | **4** | Higher |
| **AbuRahma (1991)** | 3 | 1 | 3 | **7** | High |
| **Gruss (1997)** | 3 | 1 | 2 | **6** | Moderate |
| **Jost (Mayo, 2001)** | 4 | 2 | 3 | **9** | High |
| **Alcocer (2008)** | 2 | 0 | 2 | **4** | Higher |
| **Kim (2009)** | 3 | 1 | 3 | **7** | High |
| **Garg (Mayo, 2011)** | 4 | 2 | 3 | **9** | High |
| **Kosasih (2017)** | 3 | 1 | 2 | **6** | Moderate |

## OVERALL JUDGEMENT

**9** studies

**227** limbs reconstructed

**4 / 9** high quality (NOS ≥ 7)

**3 / 9** moderate (5–6)

**2 / 9** higher concern (< 5)

**No study at critical risk**

**Key point —** modern cohorts (Jost 2001, Garg 2011, Kim 2009) had rigorous imaging-based follow-up across all three NOS domains.

*Figure 2. Per-study NOS judgement across Selection, Comparability, and Outcome (adapted Newcastle–Ottawa Scale for single-arm cohorts).*

INCLUDED STUDIES

# 9 cohorts · 227 Palma bypasses · 4 decades of evidence

| Study | Year | Center / Country | n | Patent | Patency | Conduit | Valvular repair (VVF) | NOS |
|---|---|---|---|---|---|---|---|---|
| **Husni** | 1978 | Cleveland, USA | 78 | 57 | 73 % | GSV | Selective | 6 / 9 |
| **Hutschenreiter** | 1979 | Ulm, Germany | 20 | 9 | 44 % | GSV | Routine | 4 / 9 |
| **AbuRahma** | 1991 | West Virginia, USA | 24 | 18 | 75 % | GSV | None | 7 / 9 |
| **Gruss** | 1997 | Munich, Germany | 40 | 31 | 78 % | GSV + PTFE | Routine | 6 / 9 |
| **Jost (Mayo)** | 2001 | Mayo Clinic, USA | 18 | 13 | 72 % | GSV | Selective | 9 / 9 |
| **Alcocer** | 2008 | UAB / Mexico | 4 | 3 | 75 % | GSV | None | 4 / 9 |
| **Kim** | 2009 | South Korea | 13 | 11 | 84 % | GSV | Selective | 7 / 9 |
| **Garg (Mayo)** | 2011 | Mayo Clinic, USA | 25 | 18 | 70 % | GSV | Selective | 9 / 9 |
| **Kosasih** | 2017 | Imperial, UK | 5 | 4 | 80 % | GSV (1 PTFE) | None | 6 / 9 |

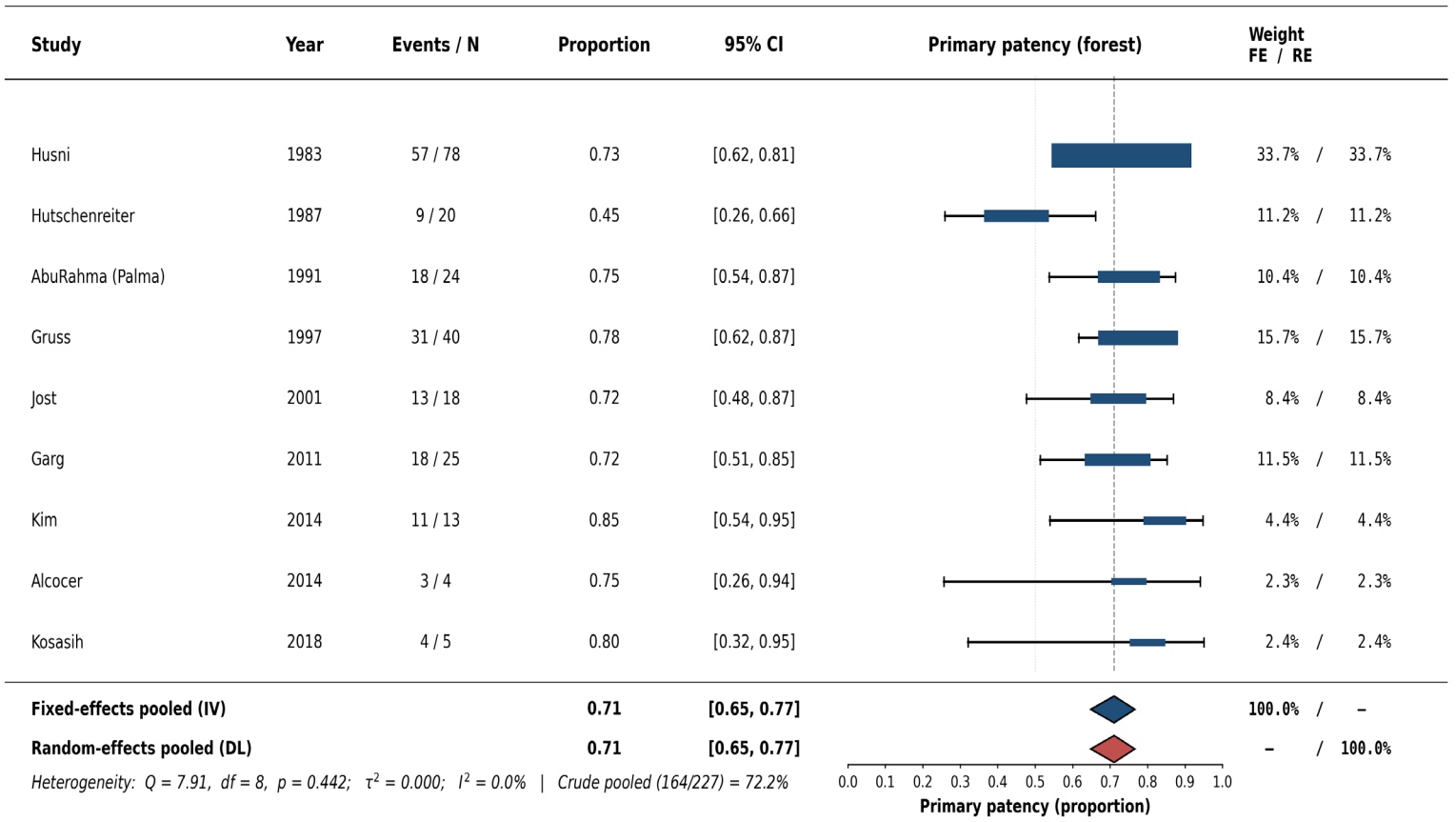
**TOTAL** **227 patients · 164 patent grafts · Crude pooled patency 72.2 %**

*VVF = arteriovenous fistula. Routine = always, Selective = marginal inflow / small GSV, None = never. NOS:* **High ≥ 7** · **Moderate 5–6** · **Higher concern < 5**

PRIMARY OUTCOME

# Pooled primary patency = 0.71 (95% CI 0.65–0.77)

**Palma / Palma-Dale Venovenous Crossover Bypass — Primary Patency Meta-Analysis**
**9 cohorts, n = 227 grafts; logit-transformed proportional meta-analysis (continuity correction 0.5)**




**0.71**
Pooled patency (95% CI 0.65–0.77)

**$I^2$ = 0.0%**
No detectable between-study heterogeneity

**164 / 227**
Crude patency · 72.2 %

**HETEROGENEITY**

**Q = 7.91**
df = 8, p = 0.442
$\tau^2$ = 0.000 · FE = RE

*Figure Logit-transformed proportional meta-analysis (continuity correction 0.5). Diamonds = pooled estimates.*

SECONDARY OUTCOMES

# Clinical benefit, complications, and mortality

**75–80 %**

Clinical improvement
(venous claudication, edema, ulcer healing)

**≈ 28 %**

Graft thrombosis (63 / 227)
Dominant failure mode

**5–15 %**

Wound / lymphatic complications
Serious complications uncommon

**0**

Palma-attributable perioperative deaths

INTERPRETATION

*Clinical improvement consistently exceeds graft patency — a single durable conduit relieves venous hypertension across most domains of post-thrombotic disease.*

CONDUIT

**Autologous GSV** consistently outperforms PTFE.

*Kosasih: only PTFE Palma in the cohort failed instantly.*
*Garg: prosthetic crossovers performed poorly even when used as salvage.*

AVF POLICY

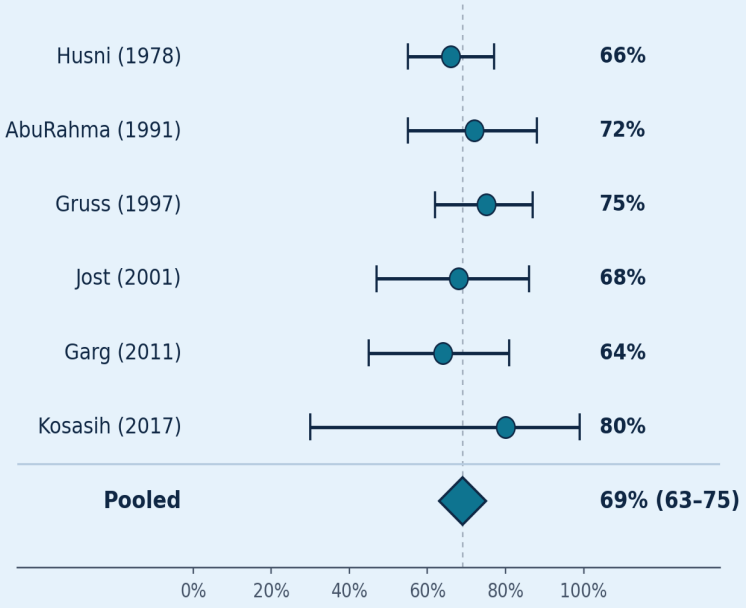
**Routine AVF** did NOT improve patency vs selective or no-AVF.

*Modern technique favors selective AVF (marginal inflow / small GSV) with duplex surveillance.*

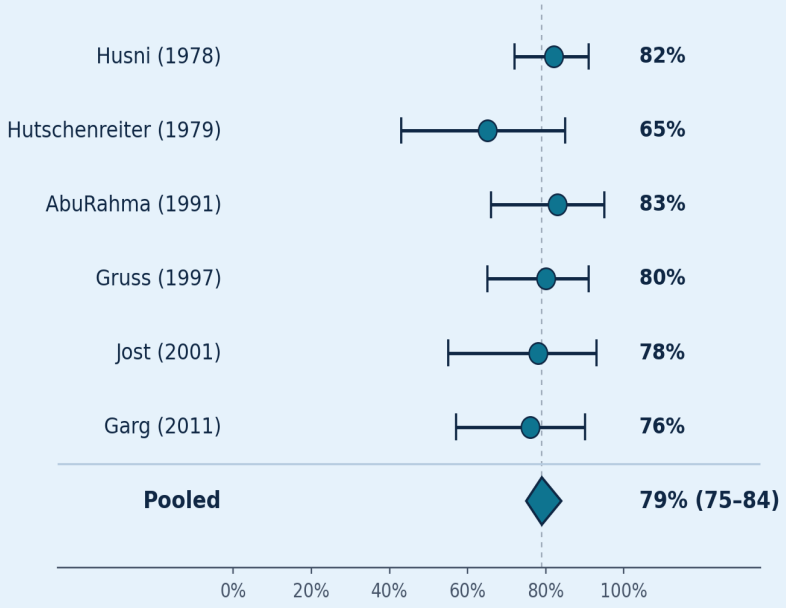
RESULTS · SECONDARY OUTCOMES

# Clinical outcomes — ulcer healing & edema resolution

**Venous ulcer healing (patent graft)**




**Edema / claudication resolution**




## KEY POINTS

**Clinical benefit tracks graft patency —** healing rates drop sharply when the crossover occludes.

**Ulcer recurrence ≈ 50%** at long-term follow-up, driven by distal reflux or graft failure.

**Edema relief** is the most consistently achieved endpoint in the analysis.

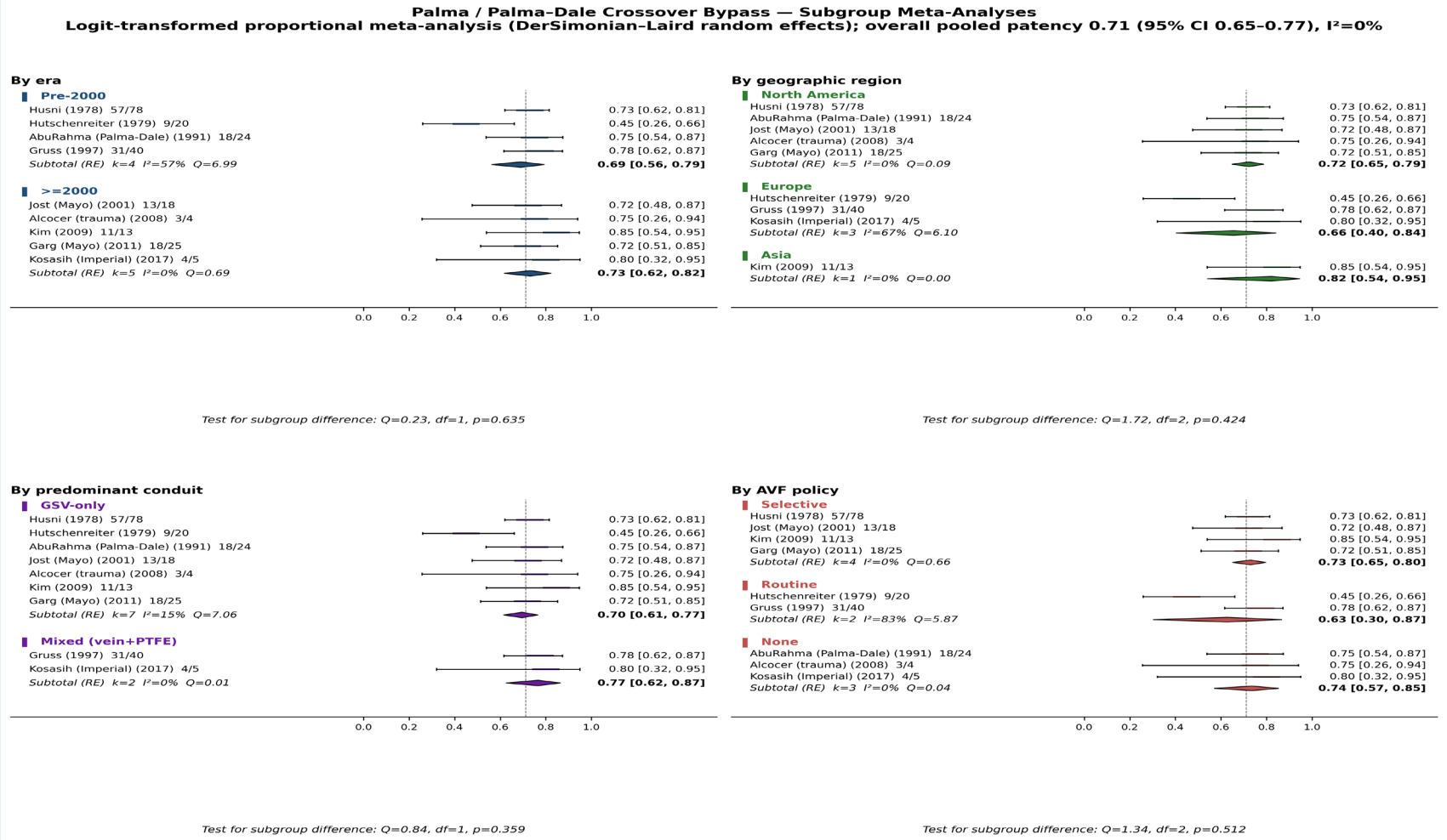
**69 %** Pooled venous ulcer healing in limbs with a patent Palma graft (95 % CI 63–75)

**80 %** Pooled edema / venous claudication resolution (95 % CI 75–84)

*Figure . Forest plots of venous ulcer healing (patent grafts, k = 6) and edema / claudication resolution (k = 6); diamonds = DerSimonian–Laird pooled estimates.*

SUBGROUP ANALYSES

# Era · Region · Conduit · AVF policy




## TEST FOR SUBGROUP DIFFERENCE

**Era (pre-2000 vs ≥2000)**

*p = 0.635*

**Region (NA · EU · Asia)**

*p = 0.424*

**Conduit (GSV vs mixed)**

*p = 0.359*

**AVF policy (sel · routine · none)**

*p = 0.512*

## Take-home

*Patency is consistent across decades, geography, and technique — the result is robust.*

*Figure . Pre-specified subgroup forest plots; vertical dashed line = pooled 0.71.*

META-REGRESSION · PART 1

# Has the modern era moved the needle? Not significantly.

**+0.012 / yr**

Logit slope on publication year

**OR 1.12**

Odds for patency per decade

**p = 0.299**

Not statistically significant

## METHOD

Random-effects meta-regression · logit-transformed primary patency · publication year as single continuous moderator · DerSimonian–Laird $\tau^2$ · 9 cohorts, 227 grafts

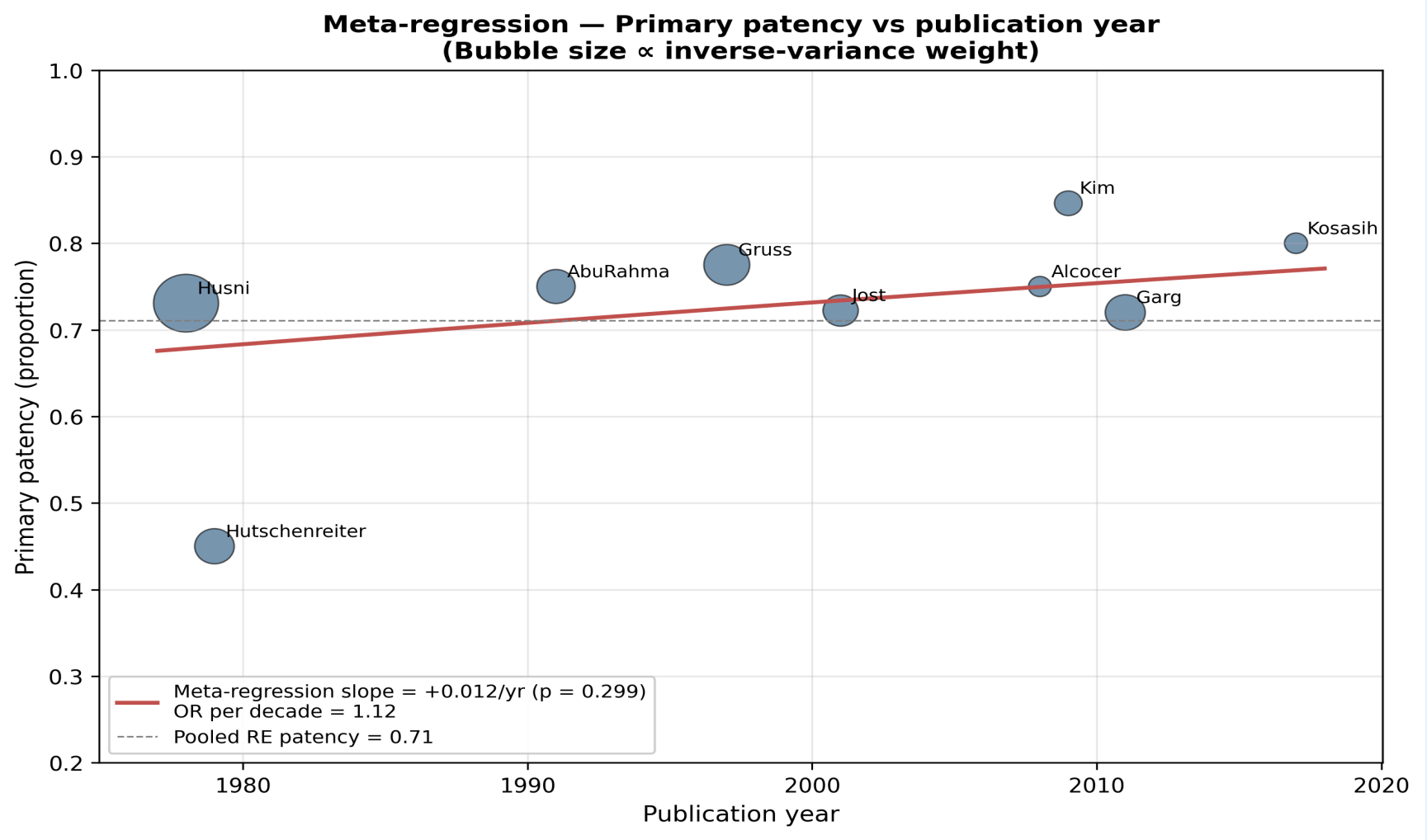
## INTERPRETATION

**Modest positive trend, but no statistically detectable temporal change in primary patency.**

**Implication —** patency is driven by technique and patient selection, not era.

A single durable conduit + disciplined AVF policy + autologous GSV remain the levers.
**Caveat —** *Hutschenreiter (1979) anchors the early-era tail and widens below-line dispersion; see Slide 11B scatter.*

# Patency vs publication year — cohort-level scatter




## WHAT TO NOTICE

- Gentle upward slope
- Wide 95 % CI envelopes zero
- Hutschenreiter ('79) anchors far left
- **Modern cohorts cluster 60–85 % patency**

## TAKE-HOME

*Forty-five years of iteration have not significantly changed Palma primary patency — the operation remains technique-dependent, not era-dependent.*

WHY PALMA STILL MATTERS

# Four scenarios where open beats endovascular

## 1 Long-segment chronic total occlusion

Sub-millimeter recanalization channels; unfavorable inflow for stent landing. Open conduit bypasses unstentable disease entirely.

## 2 Repeat in-stent occlusion or restenosis

After multiple endovascular revisions with progressive scarring, an autologous Palma is a definitive escape from the cycle.

## 3 Post-trauma iliac vein ligation

Damage-control ligation produces a fixed mechanical obstruction. Staged Palma–Dale (Alcocer) restores outflow once the patient is stable.

## 4 Anatomically unstentable / pediatric / contraindicated stenting

Hypoplastic iliac segments, cement leak after vertebroplasty, congenital agenesis, or stent contraindication.

WHEN NOT TO USE PALMA

# Stent first. Reserve open reconstruction for the right anatomy.

## STENT-FIRST — ENDOVASCULAR PREFERRED

- Symptomatic non-thrombotic May–Thurner
- Discrete iliofemoral post-thrombotic stenoses with viable recanalization channel
- IVC-involving or bilateral iliac disease (kissing stents, IVC reconstruction)
- Patients unfit for general anesthesia / contraindicated GSV harvest
- Recent acute DVT amenable to thrombolysis ± stenting

## PALMA INAPPROPRIATE / DOOMED TO FAIL

- ✕ Bilateral iliac obstruction (no contralateral inflow)
- ✕ Inadequate, varicose, or absent contralateral GSV
- ✕ IVC obstruction without iliac patency
- ✕ Active venous infection or open contaminated field
- ✕ When prosthetic conduit is the only option — patency is poor (Kosasih, Garg)

INSTITUTIONAL CASE

# Our Palma reconstruction — durable at 2 years

## INDICATION

74-yo male · recurrent right retroperitoneal liposarcoma · iatrogenic complete transection of the right external iliac artery and vein during oncologic resection · loss of venous outflow from the right limb.

## VENOUS RECONSTRUCTION

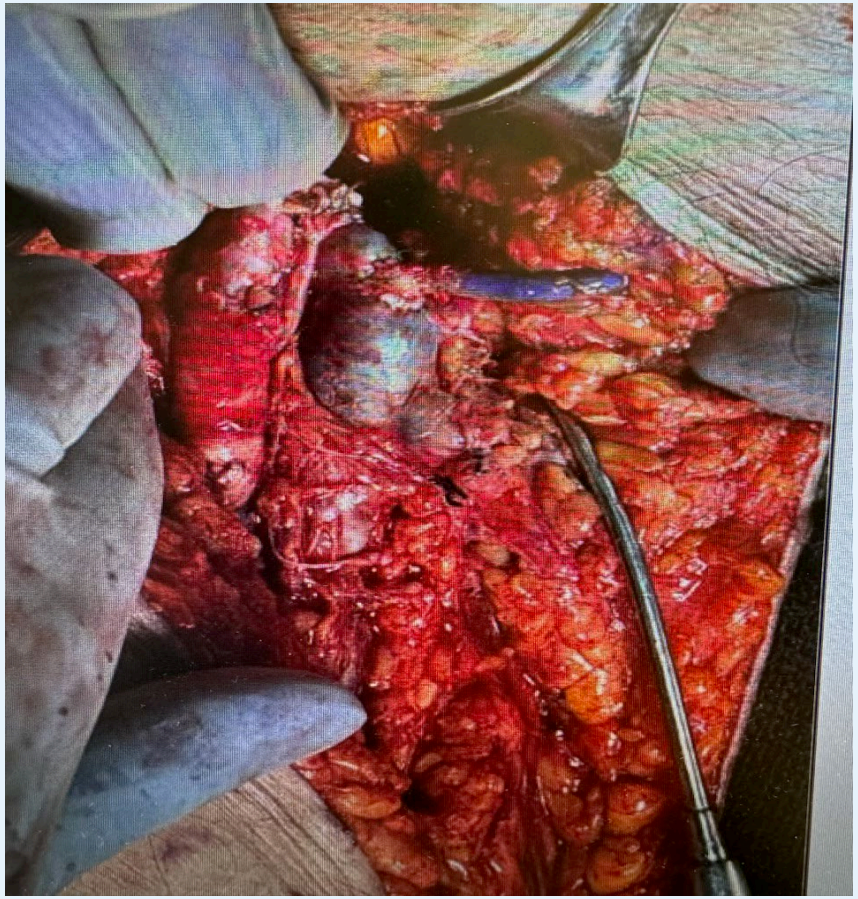
Left-to-right cross-femoral venous bypass using contralateral great saphenous vein (Palma procedure) · end-to-side GSV–CFV anastomosis · arterial limb revascularized in the same setting · four-compartment fasciotomy.

## EARLY POSTOPERATIVE COURSE

Tibial pulses triphasic; no compartment syndrome or venous congestion · fasciotomy closed at 1 week · minor wound / lymphatic issues managed conservatively · discharged home on therapeutic anticoagulation.

## ONE-YEAR FOLLOW-UP

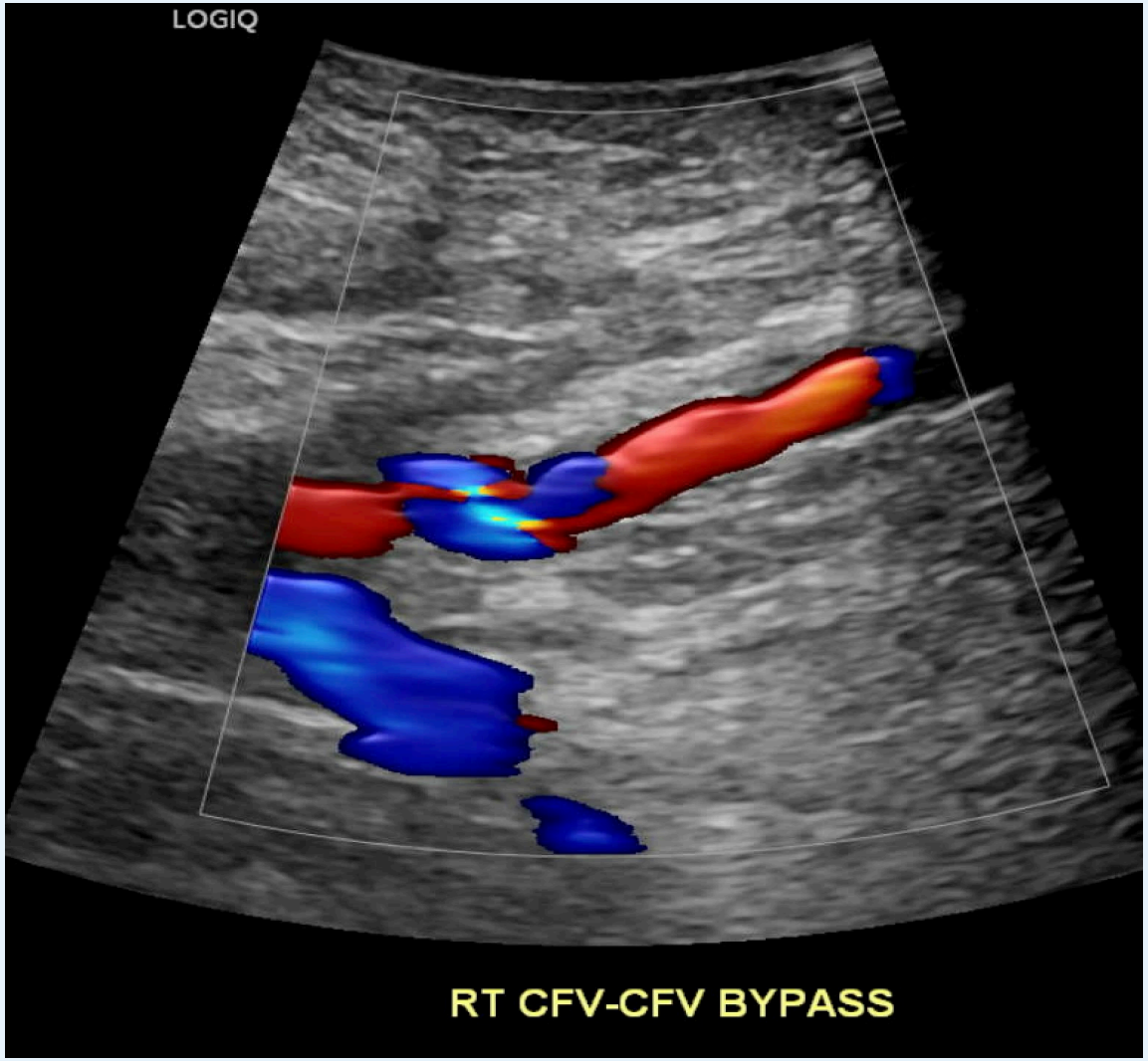
Duplex / CTA — patent Palma graft with brisk phasic flow, no significant stenosis
· no recurrent limb edema, venous claudication, or ulceration
· fully ambulatory and independent



Intraoperative image:
•Left-to-right cross-femoral bypass with saphenous vein
•Successful revascularization pathway visible
).

INSTITUTIONAL CASE · 2-YEAR IMAGING

# Durable patency confirmed on follow-up imaging

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## IMAGING AT 12 MONTHS

- ✓ Patent cross-femoral venous bypass on duplex / CTA
- ✓ Preserved caliber · continuous phasic flow
- ✓ No graft thrombosis or hemodynamically significant stenosis
- ✓ Contralateral limb venous drainage preserved · no venous hypertension
- ✓ No limb edema, claudication, or ulceration

**12 mo**
Documented patent follow-up

**0**
Graft-related reinterventions

## TAKE-HOME

*Real-world confirmation from our institution — Palma can provide durable, symptom-free venous outflow in selected patients well into the endovascular era.*

## TAKE-HOME MESSAGES

1. Across 9 cohorts and 227 grafts, pooled primary patency = 0.71 (95% CI 0.65–0.77) — directly comparable to historical 70–83% benchmarks.

2. Clinical improvement (75–80%) consistently exceeds graft patency.
Even partial outflow restoration meaningfully relieves venous hypertension.

3. Autologous GSV is the conduit of choice.
Prosthetic Palma performs poorly and should be a salvage-of-salvage option only.

4. Routine arteriovenous fistula does NOT improve patency in modern data.
Reserve AVF for marginal inflow or small-caliber GSV.

5. Stent first when feasible.  But do not abandon the Palma — it remains a durable salvage when stenting is impossible, has failed, or is anatomically unsuitable.

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# THANK YOU.

*Questions and discussion welcome.*