RETROGRADE vs. ANTEGRADE FEMORAL NAILING

ISSUES

ANTEGRADE vs. RETROGRADE
PIRIFORMIS vs. TROCHANTER
FLAT vs. FRACTURE TABLE

SWIONTKOWSKI, 1984

FIRST DESCRIBED RETROGRADE TECHNIQUE USING MEDIAL EPICONDYLE
RETROGRADE NAILING

- SANDERS (TAMPA 1992)
- PATTERSON (SEATTLE 1995)
- MOED & WATSON (MOTOWN 1995)
- HERSCOVICI (TAMPA 1996)

INDICATIONS

- PREGNANCY
- IPSILATERAL NECK & SHAFT
- IPSILATERAL PELVIS OR “TAB”
- FLOATING KNEE
- BILATERAL FEMORAL SHAFTS
- POLYTRAUMA / POLYFXS
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

INDICATIONS

- PREGNANCY
- IPSILATERAL NECK & SHAFT
- IPSILATERAL PELVIS OR “TAB”
- FLOATING KNEE
- BILATERAL FEMORAL SHAFTS
- POLYTRAUMA / POLYFXS
**INDICATIONS**
- Pregnancy
- Ipsilateral neck & shaft
- Ipsilateral pelvis or "Tab"
- Floating knee
- Bilateral femoral shafts
- Polytrauma / POLYFXS

**SET UP**
- Flat table
- Bump under knee
- C-arm
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

If the guide wire is perpendicular to joint surface, the articular segment will be in varus.

DISTAL 1/3 FXS

- Bumps on Triangle
- Fracture Reduction Tool
- F-tool, Mallets
- Skeletal Traction
- Femoral Distractor
- Clamps
- Bone Hook
- Ball Spike
- Schanz pins
- Provisional Plate
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

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RETROGRADE vs. ANTEGRADE FEMORAL NAILING

DISTAL 1/3 FXS

• Blocking Screws

SIX (6) OPERATIONS POST TKA TO FIX STRESS FRACTURE. HAS NOT WALKED IN 5 YEARS
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

LIMITATIONS - IM NAILING

REQUIRES 12 mm. INTERCONDYLAR REGION

CONTRA-INDICATED IF CLOSED BOX

Retrograde femoral nailing of periprosthetic fractures around total knee replacements

Mark D. Jones, 1,2, Charlotte Carpenter, 3, Stephen R. Mitchell, 4, Michael Whitehouse, 5, Sanchit Mehande 6

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Department of Trauma and Orthopaedics, Southend University Hospital, Southend, UK

Injury

2016, Vol 47
pp. 460 - 464

RETRORGRADE FEMORAL INTRAMEDULLARY NAILS USED.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomet</td>
<td>Phoenix retrograde nail</td>
<td>10.5</td>
</tr>
<tr>
<td>DePuy</td>
<td>ACE retrograde femoral nail</td>
<td>10</td>
</tr>
<tr>
<td>Smith &amp; Nephew</td>
<td>Trigen retrograde femoral nail</td>
<td>10</td>
</tr>
<tr>
<td>Stryker</td>
<td>T2 supracondylar femoral nail</td>
<td>10</td>
</tr>
</tbody>
</table>
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

ANTEGRADE FEMORAL NAIL INSERTION

G. KÜNTSCHER – 1940’s
- OPEN SECTION NAIL
- LATERAL POSITION
- TROCHANTERIC PORTAL

CLOSED IM NAILING OF FEMORAL FRACTURES
- 520 FXS – 99.1% UNION
  - Winquist et al.
  - JBJS 66A, 1984
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

- OPEN SECTION
- STRAIGHT - 316L S.S.
- NON LOCKED
- LATERAL - FX TABLE
- LATERAL START

PROBLEM WITH LARGER NAILS

PROXIMAL FEMUR
WOULD EXPLODE

RESULT?

PIRIFORMIS FOSSA
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

PROBLEMS WITH ENTRY

- DIFFICULT ENTRY
- VARUS NAILING

OBESE PATIENTS

FORGET ABOUT IT!
PIRIFORMIS PORTAL IN OBESE PTS

- McKEE & WADELL
  J. Trauma 1994

- OSTRUM
  Orthopedics 1996

TROCHANTERIC PORTAL REVISITED

- TIP OF TROCH AS ENTRY PORTAL

- 4º VALGUS BEND IN PROXIMAL NAIL

- 13 mm PROXIMAL DIAMETER

TROCHANTERIC ANTIGRADE NAIL (T.A.N.)
MATERIALS

- 32 FEMUR SHAFT FXS
- AVE. AGE 45 (14 – 97)
- 14 OBESE (3 > 400 LBS)

MATERIALS

- SUPINE (WELL LEG UP)
- OSI FX TABLE
- T.A.N. NAIL (ALL CASES)
- TIP OF TROCH (ALL CASES)

OPERATIVE TECHNIQUE
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

TRULY PERCUTANEOUS TECHNIQUE
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

RESULTS

- 24/32 FXS (> 1 YR F/U)
- 100% UNION
- NO INFECTIONS
- 4 PTS – MILD PAIN
- HARRIS SCORE 77.6

RETROGRADE vs. ANTEGRADE FEMORAL NAILING

RESULTS

- NO COMPLICATIONS (PROX FEMUR)
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

RESULTS

- NO COMPLICATIONS
- EASE OF INSERTION WAS REMARKABLE (EVEN IN THE OBESE PT)
- SURGEON SATISFACTION WAS EXCELLENT

TECHNICAL ADVANCES

- SMALL PROXIMAL DIAMETER NAIL (13 mm)
- 4° VALGUS
Retrograde vs. Antegrade Femoral Nailing

Tip of the Troch Supine on FX Table

No Complications Seen: Even in Morbidly Obese Pts

Ease & Speed of Insertion A Distinct Surgical Advantage

Clamp-Assisted Reduction of High Subtrochanteric Fractures of the Femur

By: Alan Mintz, MD, Frank Copray, MD, T.C. Distin, MD, Anthony M. Zuber Jr., MD

- 44 Patients
  - Antegrade IMN with Clamp through Lateral Incision
    - 9 with Cerclage Wire
    - No Stripping!
    - 43/44 United
  - 86% Reductions Anatomic
    - All within 5 degrees
There were more complications related to the knee after retrograde nailing.
Angular Malalignment After Intramedullary Nailing of Femoral Shaft Fractures

William M. Ricci, Carl Bellerba, Robert Lewis, Bradley Evanoff, Dolfi Henzovici, Thomas DiPasquale, and Roy Sanders

Department of Orthopaedic Surgery, Washington University School of Medicine, St. Louis, Missouri, U.S.A. *Department of Orthopaedics, University of Washington, Seattle, Washington, U.S.A. †Department of Orthopaedics, University of South Florida School of Medicine, Tampa, Florida, U.S.A. ‡Division of General Medical Sciences, Washington University School of Medicine, St. Louis, Missouri, U.S.A. and Florida Orthopaedic Institute, Tampa, Florida, U.S.A.

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RETROGRADE vs. ANTEGRADE FEMORAL NAILING
JAN 1, 1991 - MARCH 31, 1998

FEMORAL NAILS
319

ANTEGRADE
163

RETROGRADE
156

STARTING POINT
WAS
SURGEON'S
CHOICE

FEMUR DIVIDED
• PROXIMAL
• MIDDLE
• DISTAL
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

RETROGRADE NAILING
JAN 1, 1991 - MARCH 31, 1998

ANTEGRADE
40
95
28

RETROGRADE
15
87
54

MALREDUCTIONS

ANTEGRADE
30%
3%
18%

RETROGRADE
47%
3%
6%
RETOGRADE vs. ANTEGRADE FEMORAL NAILING

MALREDUCTIONS

<table>
<thead>
<tr>
<th>ANTEGRADE</th>
<th>RETROGRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>47%</td>
</tr>
<tr>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>18%</td>
<td>6%</td>
</tr>
</tbody>
</table>

ANTEGRADE NAILING OF PROXIMAL FEMUR FRACTURES IS SUPERIOR

RETOGRADE NAILING OF DISTAL FEMUR FRACTURES IS SUPERIOR
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

**TRANSVERSE, ISOLATED MIDSHAFT FRACTURE**

**DEALER’S CHOICE**
( I PREFER TROCH START)

**COMMINUTED, ISOLATED MIDSHAFT - WINQUIST III / IV**

**ANTEGRADE NAIL**
(TROCHANTERIC)
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

COMMINUTED, POLYTRAUMA MIDSHAFT - WINQUIST III / IV

RETROGRADE NAIL

RETROGRADE vs. ANTEGRADE FEMORAL NAILING

COMMINUTED, ISOLATED PROXIMAL – SUBTROCH FX

ANTEGRADE NAIL (TROCHANTERIC)

RETROGRADE vs. ANTEGRADE FEMORAL NAILING

COMMINUTED, ISOLATED MIDSHAFT - WINQUIST III / IV

ANTEGRADE NAIL (TROCHANTERIC)
RETROGRADE vs. ANTEGRADE FEMORAL NAILING

COMMINUTED, DISTAL SHAFT FRACTURE

RETROGRADE NAIL (BUT PROBABLY LOCKED PLATE NOW)