A Review of Knee Movement After Retrograde & Antegrade Intramedullary Nailing for Femoral Fractures.

Kibira G.M, Makanza N.P.N, Lyamuya I.P
Arusha Lutheran Medical Center & Selian Lutheran Hospital
Introduction

• Femoral shaft fractures cause considerable morbidity & mortality.
• In Tanzania fractures commonly occur in young socio-economically active group
• Majority caused by motor vehicle accidents.

• Antegrade approach is the standard approach for these femoral shaft fractures although
• Retrograde approach is acceptable in various centers
Cont...

• Introducing the nail through the knee has potential of forming dense Intra-articular adhesions &/or fibrotic transformation of periarticular structures.

• Extra articular (retraction of quadriceps due to scar tissue, quadriceps adhesions to a femoral callus, intermuscular septum and aponeurosis)
Cont...

• These may cause reduction of knee movements.

• Postoperative rehabilitation is crucial in maintaining the range of motion obtained during surgery.

• Inadequate postsurgery rehabilitation is mentioned as the cause of knee function impairment but is not adequately documented in the literature.
• Different studies have shown acceptable knee functional outcome for retrograde intramedullary nail

• The long term knee functional outcomes are controversial
Methods

- It was a retrospective-descriptive study.
- **Included**: patients with femoral shaft fractures not associated with other injuries to the lower limbs.
- A total of 167 patients met the inclusion criteria between March 2009 & Feb. 2014.
- 62 patients (44 males, 18 females) underwent Retrograde nailing.
- 102 patients (78 males, 24 females) underwent Antegrade nailing.
- **Patients’ Data collection**: included demographics, interval from injury to operation, treatment details, range of motion, & charts of physical examination of the affected knee.
Cont...

• From patients’ physiotherapy charts the following were reviewed:
  – duration of attendance from time of surgery,
  – knee movements achieved after six weeks from time of surgery,
  – Six weeks from time of surgery was used for each group as a minimum duration

A comparison of clinical knee function outcomes between Retrograde & Antegrade nailing was performed
Ngorongoro - Arusha
Results

• A total of 167 patients were included in this study.

• In the antegrade group 76.5 % aged between 20 and 40 years and 74.5% were operated within 2 weeks from the time of injury.

• In the retrograde group 59.7 % aged between 20 and 40 years and 88.7% were operated within 2 weeks from the time of injury.

• In the antegrade group knee movement results were rated as 125 or more degree in 56.8%, 110-124 degree in 34.3%, and 100-109 degree in 7.8% and less than 100 degree in 0.9%.

• In the retrograde group knee movement results were rated as 125 or more degree in 38.8%, 110-124 degree in 35.5%, 100-109 degree in 19.3% and less than 100 degree in 11.3%.
Cont...

• Rate of knee stiffness was higher in Retrograde (11.3%) compared to the Antegrade group (0.9%).

• In Antegrade group, 60% attended physiotherapy after 4 weeks & 8.8% had knee movement <109°.

• In Retrograde group, 74% attended physiotherapy after 4 weeks & 46.7% had knee movement <109°.
Percentage Distribution of Age of patients vs. Retrograde approach

59.7% (n=37) of patients lie between the age of 20 and 40 years
Percentage Distribution of Age of patients vs. Antegrade approach

- 42.20% (n=43)
- 34.30% (n=35)
- 9.80% (n=10)
- 6.90% (n=7)
- 2.9% (n=3)
- 3.90% (n=4)

76.5% (n=78) of patients lie between the age of 20 and 40 years.
### Interval before surgery Vs Knee movement in “Antegrade approach”

<table>
<thead>
<tr>
<th>Weeks</th>
<th>≥125° (n=45)</th>
<th>110-124° (n=28)</th>
<th>100-109° (n=3)</th>
<th>&lt;100°</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&lt;</td>
<td>44.1%</td>
<td>27.5</td>
<td>2.9%</td>
<td>0</td>
</tr>
<tr>
<td>3-4</td>
<td>9.8% (n=10)</td>
<td>5.9% (n=6)</td>
<td>0.98% (n=1)</td>
<td>0</td>
</tr>
<tr>
<td>5-6</td>
<td>0</td>
<td>0.98% (n=1)</td>
<td>0.98% (n=1)</td>
<td>0</td>
</tr>
<tr>
<td>&gt;6</td>
<td>0</td>
<td>2.9% (n=3)</td>
<td>2.9% (n=3)</td>
<td>0.98% (n=1)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>53.9% (n=55)</td>
<td>37.3% (n=38)</td>
<td>7.8% (n=8)</td>
<td>0.98% (n=1)</td>
</tr>
</tbody>
</table>

*n = number of patients
## Interval before surgery Vs Knee movement in “Retrograde approach”

<table>
<thead>
<tr>
<th>Knee movement flexion</th>
<th>&lt;2</th>
<th>&gt;125°</th>
<th>110-124°</th>
<th>100-109°</th>
<th>&lt;100</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>16% (n=10)</td>
<td>35.5% (n=22)</td>
<td>29% (n=18)</td>
<td>8% (n=5)</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>0</td>
<td>1.6% (n=1)</td>
<td>3.2% (n=2)</td>
<td>3.2% (n=2)</td>
<td></td>
</tr>
<tr>
<td>&gt;6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>16% (n=10)</td>
<td>37.1% (n=23)</td>
<td>32.2 (n=20)</td>
<td>14.5% (n=9)</td>
<td></td>
</tr>
</tbody>
</table>
# Antegrade vs. Knee movement “flexion” Post Physiotherapy

<table>
<thead>
<tr>
<th>No. of Weeks</th>
<th>Knee Movement &quot;flexion&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;125</td>
</tr>
<tr>
<td>2-4</td>
<td>34.3% (n=35)</td>
</tr>
<tr>
<td>4-6</td>
<td>9.8% (n=10)</td>
</tr>
<tr>
<td>&gt; 6</td>
<td>9.8% (n=10)</td>
</tr>
<tr>
<td>Total</td>
<td>53.9% (n=55)</td>
</tr>
</tbody>
</table>

60% (n=61) attended physio after 4 Weeks; 8.8% (n=) had <109%
### Retrograde Vs Knee movement “flexion” -Post Physiotherapy

<table>
<thead>
<tr>
<th>No. of Weeks</th>
<th>Knee movement “flexion”</th>
<th>≥125°</th>
<th>110-124</th>
<th>100-109</th>
<th>&lt;100</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4</td>
<td>16% (n=10)</td>
<td>9.7%  (n=6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td>2.4% (n=15)</td>
<td>12.9% (n=8)</td>
<td>3.3% (n=2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;6</td>
<td>3.3% (n=2)</td>
<td>19.1% (n=12)</td>
<td>11.2% (n=7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16% (n=10)</td>
<td>37%   (n=23)</td>
<td>32% (n=20)</td>
<td>14.5% (n=9)</td>
<td></td>
</tr>
</tbody>
</table>

74% (n=46) attended Physio after 4 Weeks; 46.7% (n=) had <109°
Physiotherapy attendance Vs degree of knee movement - Antegrade approach

- >125°: 35 patients
- 110-124°: 10 patients
- 100-109°: 20 patients
- <100°: 13 patients

- >6 Weeks: 1 patient
- 4-6 Weeks: 3 patients
- 2-4 Weeks: 35 patients
Total Patients Vs different degree of knee movement - Antegrade approach

- >125° (53.9%, n=55)
- 110-124° (37.3%, n=38)
- 100-109° (7.8%, n=8)
- <100° (9.8%, n=1)
Physiotherapy attendance Vs degree of knee movement “Retrograde approach”
Total Patients Vs different degree of knee movement “Antegrade approach”

- 16.1% (n=10) ≤125°
- 37.1% (n=23) 110-124°
- 32.3% (n=20) 100-109°
- 14.5% (n=9) <100°
Patients age Vs degree of knee movement
“Antegrade approach”

98% (n=93) had knee flexion between 100 and 124°
Patients age Vs degree of knee movement
“Retrograde approach”

98% (n=93) had knee flexion between 100 and 124°
Discussion.

• Common age group; 20 - 40 years. Over 75% were operated within 2 weeks from time of injury.
• Increasing patient age was associated with poor knee flexion outcome in Retrograde compared to Antegrade approach.
• Kenya study; knee stiffness was higher in Retrograde group (40.6%) than in Antegrade (3%) (Lekei L.K, et.al).
• Patients who started supervised physiotherapy 4 weeks after surgery had poor outcome in Retrograde group compared to Antegrade group.
Study Limitations

- This is retrospective in nature
- Inadequate documentation in patients files
- Irregular patients attendance for physiotherapy
- Loss to follow up
Conclusion

• In our population group knee stiffness was higher in retrograde approach than in antegrade.

• Increasing patients age was associated with decreased knee flexion in retrograde group.

• Delayed postsurgery physiotherapy after 4 weeks was associated with impaired knee function in retrograde group
References:

3. Mark VP, Michael TA, Kevin RF, Early Rehabilitation following Surgical fixation of a femoral shaft fracture. Journal of the American physical therapy Association 2006 Vol 86 No 4:558-572
Thank you!