SMALL WIRE EXTERNAL FIXATION FOR THE TREATMENT OF THE DISTAL TIBIAL FRACTURES-MID TERM RESULTS AND COMPLICATIONS

Andonov Y, Kosev P
Ruse University Teaching Hospital
Bulgaria
CHALLENGE 1
FRACTURE SEVERITY

CHALLENGE 2
SOFTWARE TISSUE DAMAGE

SOLUTION?
OBJECTIVE

TO EVALUATE PROSPECTIVELY THE EFFECTIVENESS OF CIRCULAR WIRE EXTERNAL FIXATION IN THE TREATMENT OF TIBIAL PILON FRACTURES.
1. Pre operative planning
- orthogonal X-rays, CAT
- localization of depression
- reposition sequence
- screw level and direction
- K wire level and direction
- frame construction

2. Articular reposition
- traction table
- K wires for the fibula
- percutaneous, limited open or arthroscopic manipulation of the articular fragments
- cannulated screw fixation

3. Frame application
- 3-4 K wires, 10mm above the joint line
- 5mm bone screws in divergent planes in the cortical bone
- 3 K wires proximally
30 distal tibial fractures
22 men and 6 women
Mean age 48.85 years (range 23-76)
96% high energy fractures
- AO/ASIF type A-6, type C-24

- 17 fractures with soft tissue damage (Tscherne-Gotzen classification)

- 7 open fractures (Gustilo-Anderson classification)
**RESULTS**

**AOFAS** (American Orthopedic Foot and Ankle Society) max 100 points for objective and functional evaluation

<table>
<thead>
<tr>
<th>TOTAL</th>
<th>RESULT</th>
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<tbody>
<tr>
<td>&gt;90%</td>
<td>Excellent- no pain, normal gait, normal ROM, no swelling</td>
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<tr>
<td>80-89%</td>
<td>Good- minimal pain, normal gait, ¾ ROM, moderate swelling</td>
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<td>70-79%</td>
<td>Satisfactory- pain on load bearing, limping gait, ½ ROM, moderate swelling</td>
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<td>&lt;70%</td>
<td>Poor- pain at rest, walking aid needed, ½ ROM, pronounced swelling</td>
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![Bar chart showing results distribution](chart.png)
<table>
<thead>
<tr>
<th>Fracture type</th>
<th>Number of fractures</th>
<th>Rating</th>
<th>Complications</th>
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<tbody>
<tr>
<td>A1</td>
<td>1</td>
<td>Excellent -</td>
<td>0</td>
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<tr>
<td></td>
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<td>Good -</td>
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<td>A2</td>
<td>3</td>
<td>Excellent -</td>
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<td>Delayed union -</td>
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<td>Pin track infection</td>
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<td>A3</td>
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<td>Excellent -</td>
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<td>Excellent -</td>
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<tr>
<td>C2</td>
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<td>4</td>
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<td>Pin track infection</td>
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<tr>
<td>C3</td>
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<td>Arthrodesis</td>
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<td>DVT-</td>
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<td>Pin track infection</td>
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COMPLICATIONS

Pin track infections* - 6
Delayed union (>6 months) - 5
Malunion - 2
Arthrodesis - 1
Deep infections - 0
Skin necrosis - 0
Septic arthritis - 0

Younger patients with simpler fracture patterns and less soft tissue damage tended to have better results and shorter healing times.
CONCLUSIONS

- Soft tissue damage is as important for the final outcome as the bone damage.
- A strategy to reduce iatrogenic soft tissue damage leads to favorable (86% good and excellent) functional results.
- Articular reduction is important for the final outcome.
- There is a marked tendency for delayed healing of fractures with meta-diaphyseal extension (types A and C2).
DISCUSSION

- Low invasive method
- Low complication rate
- Early movement
- Early weight bearing
- Faster functional recovery

- Demanding articular reposition
- Increased risk for neuro-vascular damage
- Pin track infections
- Patient compliance
GREETINGS FROM BULGARIA