Clinical and Radiographic Outcomes Following SIGN Fin Nailing for Femoral Shaft Fractures

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Objective:

To evaluate clinical and radiographic outcomes in femoral shaft fractures treated with the SIGN Fin nail

Background

- The Surgical Implant Generation Network (SIGN) provides low cost implants to treat long bone fractures (tibia, femur, and humerus) in resource-limited settings
- Unique design eliminates need for, fracture tables, power reaming, or fluoroscopy
- SIGN FIN nail eliminates need for proximal interlocking screws in retrograde treatment of femoral shaft fractures

Methods

- Retrospective review of femoral shaft fractures treated with FIN nail
- All cases with > 6 months follow-up in SIGN Online Surgical Database
- Patient and fracture data tabulated
- Deviation from anatomic alignment (DFAA) recorded
- Union status, Weight bearing (WB) and knee motion (ROM) recorded
- Univariate T-test and chi square analyses performed as appropriate

SIGN Fin Nail

92% Union rate

**90%
Full weight-
bearing**

**91%
Knee ROM
>90°**

6% Malalignment rate (>10° in any plane)

**2.2°
Average DFAA
Coronal plane**

**2.6°
Average DFAA
Sagittal plane**

Results

- 242 fractures analyzed with mean follow-up of 48 weeks
- 92% of fractures united
- 90% of united fractures able to WB fully
- 91% of united fractures with knee ROM >90 degrees
- Mean coronal and sagittal plane alignment 2.2 and 2.6 degrees, respectively
- 6% of fractures malaligned (DFAA>10° in any plane)
- Patients with non-union less likely to WB (p<0.001) and have knee ROM > 90 degrees (p<0.001)

Conclusions

- FIN nail achieves satisfactory radiographic alignment at minimum 6 month follow-up
- Rate of malalignment (6%) similar to North American centers
- Union rate (92%) comparable to that achieved with standard SIGN nail
- FIN nail further simplifies fracture care in resource-limited settings
- Further research needed to determine non-union risk factors