Intramedullary nailing is one of the preferred operative fixation methods for pediatric diaphyseal forearm fractures. Currently, there are no clinical studies supporting a specific nail fit for optimal outcomes in these fractures.

**Aim:** To assess the impact of nail diameter to medullary canal diameter (ND/MCD) ratio on postoperative outcomes in pediatric patients treated with intramedullary nailing for forearm fractures.

**Background**
- Intramedullary nailing is one of the preferred operative fixation methods for pediatric diaphyseal forearm fractures.
- Currently, there are no clinical studies supporting a specific nail fit for optimal outcomes in these fractures.

**Methods**

**Inclusion criteria:**
- Age <18 years
- Diaphyseal forearm fractures (OTA 22A and 22B) treated with intramedullary fixation 2004-2014

**Exclusion criteria:**
- Pathologic and radial neck fractures
- Follow-up <6 months

**Gender, age at injury, BMI, mechanism of injury**

**Fracture and injury type**

**Reduction type, surgery time, implant data, ND/MCD ratio**

**Chart review**

**Time to union and hardware removal, complications**

**Results**
- Average age: 9.6 years (range: 2.0-18 years)
- Average ND/MCD ratio: 52.2% (range: 27.3-77.6%)
- Majority:
  - Male (49/73, 67%)
  - Healthy weight, BMI percentile 5th to <85th (69%)
  - ND/MCD ratio >40% (89%)

**Patients >10 years of age were more likely to develop delayed fracture union** [p=0.0490].

**Rates of complications were comparable between fractures with ND/MCD ratios of <40%, 40-49%, 50-59%, and ≥60%** [p=0.7135].

**ND/MCD ratio was not associated with time to union** [p=0.1488], complications [p=0.9922], or time to hardware removal [p=0.1737].

**Figure 1. One of the study patients with an ND/MCD ratio of <40% at 4 weeks post-op. The patient had uneventful recovery.**

**Figure 2. Average time to radiographic union in the ND/MCD ratio groups of <40%, 40-49%, 50-59%, and ≥60%.**

**Trend towards shorter times to union with an increased ND/MCD ratio but no statistical significance** [p=0.6073].

**Figure 2. Average time to radiographic union in the ND/MCD ratio groups of <40%, 40-49%, 50-59%, and ≥60%.**

**Significance**
- Intramedullary nail to canal diameter (ND/MCD) ratio is not associated with fracture healing outcomes including complications, time to union, or time to hardware removal in pediatric diaphyseal forearm fractures.
- There may be a trend towards shorter times to union with an increased ND/MCD ratio but its significance could not be established.

**Disclosures**
- None of the authors have any relevant disclosures or conflicts of interest in regards to this research.