

**The Cost of Residents Learning Curve In Hip Fracture Surgery:
Does Inexperience Lead to Mistakes in Implant Choice?**

*Eyal Yaacobi, MD; Altaieb A. Agbaria, MD; Omer Marom, MD; Yaron Shraga Brin, MD;
Ezequiel Palmanovich, MD; Niv Marom, MD; Nissim Ohana, MD
Meir Medical Center, Kfar-Saba, ISRAEL*

Purpose: Hip fracture surgery is a common orthopaedic procedure, being one of the first procedures residents learn and perform autonomously in the operating room. This autonomy for a trainee in the operating room may lead to longer operating time, higher rates of surgical complications, and hardware waste. The purpose of this study was to calculate the financial extra cost of implant choice mistakes made by inexperienced surgeons during residency and early consultancy years.

Methods: We have recorded the use of implants during a 12-month period (2021) in cephalomedullary nailing (predominant Gamma 3, Stryker) operated by 5th and 6th- year residents supervised by an un-scrubbed senior surgeon. All non-reuseable implants that were used and had to be replaced were documented for the reason of replacement. The results were compared to a control group of same surgeries performed by experienced specialists.

Results: Out of 344 hip fractures treated by cephalomedullary nails, 247 (72%) were operated by residents as leading surgeons. Implant waste was recorded in 48 surgeries, 69% of which were operated by a resident as a leading surgeon with a mean cost of \$186.50 of waste per procedure. The main reason for implant waste was incorrect length measurement (79.3%).

Conclusion: Surgical experience is an invaluable element of orthopaedic surgery training. One way to measure this is the correct choice of an implant. In total, implant waste was recorded in only 19.4% of femoral cephalomedullary nailing surgeries performed by residents as leading surgeons with a total cost of \$6,699.88 per the whole year. We believe this is a reasonable cost when considering the benefits of residents' autonomy development in the operating room during training.