Technical Tricks and Innovative Tools for Minimally Invasive Removal of Broken or Jammed Intramedullary Nails

Christian Krettek MD*; Mohamed Omar MD*

Medizinische Hochschule HannoverMHH, Hannover, Germany

Purpose: Implant removal is one of the most common, but also one of the most underrated orthopaedic procedures. When implants break (and all implants can and sometimes do break) or connecting threads get damaged, things can get very difficult, complex, dangerous, and expensive. We describe technical tricks and innovative tools for various scenarios with the following objectives: describe the importance of analysis and planning; explain where and how slotted and solid nails can break; recognize how standard instruments can be utilized; describe how to minimize soft tissue and bone damage; and discuss several strategies, techniques, and new tools for removing broken or jammed nails.

Methods: Techniques are described in detail with analysis, preoperative plan, and intraoperative photos/videos for all the problems shown in Figure 1: (1) broken connector screw (suspender technique), (2) broken connector thread (jammed bone hook technique), (3) broken solid femoral nail (push-out technique), (4) broken solid tibial nail (innovative tool tube-to-cerclage jammed wire technique), and (5) broken cannulated nail (jamming ball-tip wire technique). Additionally, a technique is shown how to remove a jammed intramedullary humerus nail with 2 attempted but failed implant removals in other institutions.

Results: In all cases, the broken intramedullary implants could be removed without osteotomy and without soft-tissue dissection at the fracture site in minimally invasive techniques.

Conclusion: Detailed analysis, proper preoperative plan, and sometimes special tools are prerequisites for the removal of broken or jammed intramedullary nails.