

How to Remove a Bent Intramedullary Nail from Long Bones



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Abstract

The gold standard treatment for femoral, tibial and humeral shaft fractures in most circumstances is intramedullary nailing. Sometimes the nail continuity fails before a complete union, rarely the nail construct becomes bend due to high energy trauma. These circumstances are big challenges for orthopaedic surgeons. We are going to have a mini review for this condition and available technique in the literature.

Keywords: Long bone fractures; Bent intramedullary; Trauma

Introduction

The gold standard of treatment in long bone shaft fractures, except forearm bones, is intramedullary nailing [1-3]. Sometimes the intramedullary nail becomes bent, usually due to non-union. The other cause for bent intramedullary nail is severe trauma. Extraction of the bent intramedullary nail is a challenging circumstance for orthopedic surgeons. In the literature, most articles are about femoral shaft fractures [4-6]. We are going to review available methods to extract a bent intramedullary nail.

Discussion

Usually, intramedullary failure occurs due to nail construct fatigue, this condition is the result of microtraumas in especial conditions such as severe comminution. Sometimes the intramedullary construct continuity fails due to severe trauma [7], in this circumstances the nail usually becomes bend. Bent intramedullary extraction is easier than broken intramedullary extraction [8].

One method to extract the nail is to extract it as a similar method like a straight nail. This method can be used when the angulation in the tibia or femur is less than 20 degrees. Anterolateral bowing in the femoral medullary canal and large proximal canal in the tibia makes it possible to extract the nail in this condition [9]. The most ideal case to use the standard extraction technique is a fine titanium nail in a femur with anterolateral banding or tibia with a posterior apex, both less than 20-degree angulation. The second method is done by two-step at first by the use of perineal

post straight the nail to the normal angulation and thereafter extract the nail by the standard method [10]. For distal and proximal fractures this method can cause a soft tissue injury due to a short lever arm, therefore, it needs excessive force. Extra fractures can occur in this condition especially in an undiagnosed longitudinal crack and osteoporotic bones [11]. This technique is not recommended in anteroposterior angulation because of the high risk of vessel injury [12].

The third technique is to open the site of the fracture to weaken the nail with drilling. The Text step is to extract the nail as a straight nail. This technique has some disadvantages. One disadvantage is debris Formation; therefore, the site of fracture should be lavaged completely. The second disadvantage is the possibility to cause heat injury due to high temperature the nail and drill, the solution for this condition is to down the temperature by a normal serum solution lavage [12-15].

The next technique is to extract the nail by cutting the nail by a saw dental drill high-speed burr [16,17]. This technique with saw and drill has some disadvantages include: heat burn, debris formation In this technique, continuous irrigation is mandatory to prevent heat damage and debris formation [18]. After cutting the nail the proximal part of the nail extracted as a straight nail with a similar technique. The distal part should be extracted through the fracture site. An alternative technique, which in my opinion is to extract the nail after cutting the nail in the fracture site. In this technique, we can cut the nail without debris and excessive heat

formation. The last technique discussed in the literature is to use a femoral plate to straighten the nail and extract it by the standard method. This technique is reported only in femoral nails and can be used in a minimally invasive manner [17,19].

Conclusion

There are different methods in the literature to extract a bent nail, but the most important factor to choose a technique is surgeon familiarity and preference for each technique.

Conflict of Interest

There was no conflict of interest.

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