

The role of the intramedullary implant in limb lengthening

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Abstract

Limb lengthening is now an accepted practice in orthopaedic surgery. The principles of distraction osteogenesis have become well established with the use of external fixators, utilizing both monolateral and ring fixators. Corticotomy technique, frame stability, lengthening rate and rhythm all contribute to the formation of bone regenerate and tissues. Complications are however common including pin-site infection, soft tissue tethering from the pins and wires resulting in pain, regenerate deformity from soft tissue forces or fracture following frame removal and patient intolerance of the frames during treatment. Surgical techniques have changed to try and minimise these complications. The use of intramedullary nails have been used in conjunction with an external fixator or inserted after lengthening has been achieved, to reduce fixator time and prevent regenerate deformity. Implant innovation has led to the production of intramedullary lengthening nails. The initial devices used ratchet mechanisms with rotation of the bone fragments to achieve lengthening (Bliskunov, Albizzia and ISKD). More accurate control of lengthening and a reduction in pain, resulting from the manual rotation of the leg required to achieve the ratchet progression, was achieved by the use of a transcutaneous electrical conduit powered by external high frequency electrical energy (Fitbone). The most recent implant uses an external remote controller which contains two neodymium magnets. These are placed over the nail on the skin and rotate which in turn rotates a third magnet within the intramedullary nail (Precice). This magnet rotation is converted by a motor to extend or retract the extendible rod. There are multiple nail sizes and lengths available, and early results have shown accurate control with few complications. With such promising outcomes the use of this lengthening intramedullary nail is now recommended as the implant of choice in femoral

lengthening. This article is an historical account of the intramedullary device and the impact on limb lengthening.

Keywords: Bone transport; Corticotomy; Distraction osteogenesis; IM nailing; Intramedullary nail; Limb lengthening; Magnet; Precice lengthening nail.

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