

Stature Lengthening Using the PRECICE Intramedullary Lengthening Nail

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Metrics

Abstract

Stature lengthening for short stature, often referred to as cosmetic stature lengthening, is controversial. Previous methods and devices have been fraught with high complications rates. The PRECICE intramedullary lengthening nail offers a superior alternative for these patients due to its minimal incision technique, remote controlled gradual distraction, the rate of which can be accurately modulated and the direction reversed, if necessary. The purpose of this study is to report the results of the PRECICE for short stature lengthening and to compare them to previously reported results with other methods. Another objective of this paper is to discuss the indications for treatment by exploring the motivation, selection, and outcome of such treatment. Fifty-one patients were lengthened for short stature with the PRECICE; 25 with the PRECICE 1 (P1) and 26 with the PRECICE 2 (P2). There were 7 bilateral tibial and 22 bilateral femoral lengthenings in the P1 and 4 bilateral tibial and 25 bilateral femoral lengthenings in the P2 groups. In total there were 58 P1 and 58 P2 bone segments lengthened. Lengthening was up to 6.5 cm for P1 and 8 cm for P2 with an average increase of 5.2 cm for P1 and 6.0 cm for P2. There were 7/58 (12.1%) implant failures for P1 and 1/58 (1.7%) for P2. The P1 failures were due to breakage of the nail through a weld in the nail in 4 cases and the breakage of the mechanism in 3 cases. The P2 failure may be related to too little overlap of the wider nail tube into the distal bone segment combined with potential stress fracture propagation due to small slots at the end of the larger tube of the nail. All nail breakages occurred in patients who did not comply with the weight-bearing restrictions. The new clutched mechanism and 1-piece outer tube construction in the P2, prevented fracture through the nail and mechanism failure in the P2 compared with the P1. Stress propagation by the small slots at the end of the P2 led to redesign with elimination of slots and release of the P2.1. There were 2 cases of suspected fat embolism despite venting and 1 deep vein thrombosis upon stopping anticoagulation, from which the patient recovered without further complication. There was 1 femur fracture through an anteroposterior femoral locking screw and 1 bilateral peroneal nerve stretch injury that fully recovered. All patients consolidated the distraction gap of the femurs and/or tibias without additional surgery. All returned to previous activities including sports. In comparison to previously published methods, the P2 had the lowest complication rate with the best overall reported results.