

Treatment Outcomes Following Retrograde Femoral Extramedullary Lengthening Using an Internal Lengthening Nail

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INTRODUCTION:

Whenever possible, internal lengthening nails have replaced external fixators as the primary device for lengthening long bones. However, there are situations, such as small patients or very young patients, where placing the internal lengthening nail in an intramedullary location is either not safe or not possible due to the limited implant sizes. In these situations, it may be possible to use the internal lengthening nail in an extramedullary location. We have been using a retrograde extramedullary femoral technique without supplemental internal fixation in our patients since 2018. The purpose of this study was to review the outcomes in patients undergoing retrograde femoral extramedullary lengthening.

METHODS: We conducted a retrospective chart review of patients who underwent limb-lengthening procedures using an extramedullary retrograde femoral lengthening nail technique. We recorded the magnitude of the initial length discrepancy, the amount of length gained, range of motion, narcotic pain medication requirements, and the bone healing index. We also reviewed the incidence of complications following this procedure. Descriptive statistics were carried out for the group.

RESULTS:

The cohort consisted of 17 patients, including 9 males and 8 females. All patients underwent femur lengthening using a magnetic lengthening nail, applied in an extramedullary, retrograde fashion, at a rate of 0.5 to 0.8 mm per day. The mean age of the patients was 7 years with an average starting discrepancy of 7 cm. The average length gained was 3.7 cm which represented 15% of the total femoral length. The average bone healing index was 32 days/cm. Patients averaged a total of 0.75 doses of oxycodone for the entire treatment. The mean preop knee range of motion was 128 degrees while the mean post-treatment knee range of motion was 118 degrees. Three patients developed aseptic bursal fluid collections within the soft tissue around the distal end of the nail and one patient broke one of the proximal interlocking screws with no effect on the final outcome. No patient developed complications related to the regenerate bone formation, deformation or fracture. No supplemental hardware was required. No patients required a return trip to the operating room and no patients developed contractures of the hip or knee requiring intervention other than conventional therapy or bracing. Patients were followed up for an average of 23 months.

DISCUSSION AND CONCLUSION:

Retrograde extramedullary lengthening of the femur using an internal lengthening nail has been demonstrated to be a safe, comfortable and effective method of lengthening the femur in young patients as an alternative to using an external fixator. By using the implant in a retrograde fashion, no supplemental internal fixation was required, and no deformities of the regenerate bone were noted. Therefore, retrograde extramedullary femoral lengthening using an internal lengthening nail is a viable alternative to external fixator lengthening in young, skeletally immature patients when intramedullary placement of the nail is not possible.