Lengthening of the Humerus Using a Motorized Lengthening Nail: A Retrospective Comparative Series

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Abstract

Background: Lengthening of the humerus has traditionally been accomplished by the use of external fixation. Intramedullary motorized lengthening nails are now frequently used for lower limb lengthening, and this technology is slowly being adopted for use in the humerus.

Methods: A retrospective, single-surgeon experience of pediatric humeral lengthenings was performed. The time period surveyed included use of external fixation (EF) for lengthening, and the use of a motorized nail (MN) for lengthening. The primary outcome measures were lengthening magnitude achieved, duration of lengthening, frequency and type of complications encountered, or further procedures required, during each lengthening.

Results: From 1999 to 2018, 13 humeral lengthenings were performed in 9 patients. Six lengthenings were performed using the MN technique and 7 using the EF technique. The average absolute lengthening achieved was 8.5±1.3 cm in the EF group and 6.6±2.3 cm in the MN group. The duration of lengthening averaged 114 days in the MN group and 103 days in the EF group. The average duration of EF time was 215 days. Two patients underwent an initial EF lengthening of a humerus and then underwent a second lengthening using the MN technique. Two of 6 (33%) MN lengthenings and 3 of 7 (43%) EF lengthenings experienced complications during treatment. Two patients in the MN group underwent planned reversal and redeployment of their motorized nails to attain the planned lengthening magnitude.

Conclusions: Humeral lengthening using motorized intramedullary nails is a safe technique that mitigates some of the complications of EF including pin site infection. It is well tolerated by patients. For lengthenings of a large magnitude, reversal and reuse of MN can be considered.