
Upper Extremity: An Introduction

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Ilizarov's method has revolutionized the orthopedic approach to complex limb deformities, limb length discrepancy, joint contractures, bone defects, and osteomyelitis. However, in practice, it would seem that the vast majority of "Ilizarov procedures" are done in the lower extremities.

This section of the case atlas demonstrates that there are a myriad of useful applications of the Ilizarov limb reconstruction methodology for upper extremity problems. The most obvious use is for humeral lengthening in cases of shortening due to achondroplasia, septic growth arrest, or Ollier disease. Our contributors also demonstrate remarkable cases of combined humeral angular deformity correction with lengthening. Off-label application of the lower extremity internal magnetic lengthening nail is also shown, as a glimpse into the future of humeral lengthening, avoiding the external fixator altogether.

For the forearm, our surgeons have devised clever techniques to address the complex deformities associated with multiple hereditary exostosis and radial clubhand. Even the hand is not immune, with brachymetacarpia being treated with mini-fixators, similar to the more ubiquitous applications in the foot for brachymetatarsia.

Ilizarov surgeons need to be aware that the healing of regenerate bone in the humerus is faster than the radius/ulna.

This situation is analogous to the faster healing seen in the femur as compared to the tibia/fibula. For this reason, it is recommended to start lengthening at a slower rate of distraction (0.25 mm BID in adults and 0.25 mm TID in children) in the forearm. The humerus can typically sustain a rate of 0.25 mm QID in children and 0.25 mm TID in adults. Great care must be taken to avoid injury to the radial nerve in humeral applications, and the surgeon must be prepared to do a surgical decompression of the radial nerve if symptoms develop during lengthening. A thorough knowledge of the complex neurologic anatomy of the forearm is essential when applying external fixation of the radius and ulna.

The other category of challenging problems is complex trauma reconstruction for osteomyelitis and the mangled arm. The ingenuity and inventiveness displayed in the submitted cases will be an inspiration to the Ilizarov limb reconstructive surgeon to be open to new applications in the upper extremity. The cases shown in this section are by no means exhaustive or representative of all the potential upper extremity applications. The online nature of this Springer Atlas lends itself to incremental growth in the number of cases, and we are certain that even more upper extremity applications will be added to this already interesting and inspiring group of cases.

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