New Techniques and Emerging Evidence #NT1
Clinical Cases, Solutions, and Novel Techniques

Balanced Cable Bone Transport of the Tibia Using Automated Motorized Struts

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Purpose: The use of automated struts to drive bone transport has gained popularity due to ease of use for the patient and caregiver; however, the ability of automated struts to drive a cable transport has not been described. We set out to demonstrate the utility of automated struts driving bifocal and trifocal cable-assisted bone transport to allow for more efficient bone transport of massive defects.

Methods: A retrospective analysis of tibial bone transports performed via circular external fixation utilizing automated struts driving cable transport at a single institution was performed. Outcome measures included union rate, complications, external fixation index (EFI), bone healing index (BHI), and final mechanical alignment.

Results: Six patients were included with a mean age of 37, 67% male, and an averaged defect of 10.9 cm. Tibial defects were distal third (n = 4) and middle third (n = 2). Constructs included bifocal cable transport (n = 2), trifocal tandem hybrid cable transport (n = 3), and trifocal bidirectional cable transport (n = 1). To date, one patient has completed transport with subsequent docking and conversion to an intramedullary nail with an EFI of 0.24 mo/cm and BHI of 0.32 mo/cm.

Conclusion: Automated struts powering cable-assisted bone transport are possible. This treatment strategy combines the advantages of automation (ease of use, decreased noncompliance, increased segmentation) with the advantages of cable transport (easier conversion to intramedullary nail, less scarring, decreased potential for pin tract infections).