

Balanced Cable Transport with Circular External Fixation and Then Nailing for Segmental Tibia Bone Defects

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What was the question?

Is cable bone transport and then immediate intramedullary nailing (CB-TATN) effective in the treatment of tibia bone defects?

How did you answer the question?

After institutional review board approval, a retrospective review was performed at a single university level 1 trauma center. We identified 37 adult patients that underwent CB-TATN. Of these, 20 have completed 1-year follow up. We defined healing as radiographic healing with 3 bridging healed cortices together with independent ambulation without assistive devices.

What are the results?

Seventeen (85%) patients had defects from severe open tibia fractures (AO/OTA 42), 2 (10%) from tibial septic nonunion, and 1 (5%) from osteomyelitis. 10% of our patients were smokers. Average follow up time was 16 months (12-43 months). The average bone loss was 11.6 cm (6-24). 13 (65%) patients had a single level osteotomy and 7 (35%) had multifocal transport. Average frame time was 115 days (74-314). Average healing time was 281 days (197-477), with an average healing index of 0.9 months (28 days) per cm bone loss. Fracture union rate and healing of regenerate bone was 100%. One patient developed a deep infection 6 months after healing and required debridement, nail removal, and intravenous antibiotics with no further sequelae or limitations at final follow-up. Alignment data at healing revealed an average medial proximal tibia angle of 86.7 (84-90), medial distal tibia angle of 89.8 (87-92), proximal posterior tibia angle of 79.2 (77-81) and anterior distal tibia angle of 80.4 (77-84). The incidence of malalignment greater than 5 degrees was 0%.

What are your conclusions?

Balanced cable transport with circular fixation followed by intramedullary nailing provides a reliable and safe option to treat tibial bone loss associated with severe open fractures, infected nonunions, and osteomyelitis. The results of the CB-TATN method reported here show an outstanding success rate with a dramatic decrease in external fixator and bone healing index over more traditional methods of distraction osteogenesis. These differences indicate that the CB-TATN method may represent a new gold standard in tibial bone defect reconstruction with distraction osteogenesis.