Observations on Pain Control and Long Length Acellular Allograft Use in the Early Treatment of Combat Related Injuries of the Sciatic Nerve.

Patrick Jones; Raymond Michael Meyer BS; Walter J. Faillace MD, FACS; Patricia McKay MD; Leon Nesti MD, PhD
Walter Reed National Military Medical Center, Depts of Neurological and Orthopaedic Sugery
Uniformed Services University, F. Edward Hebert School of Medicine Dept of Surgery

Introduction

Our goals were to observe and evaluate the outcome of pain reduction and long length acellular cadaver allograft use in the repair of sciatic nerve injuries of patients injured in recent military conflicts. We also hoped to evaluate long term motor outcomes in this cohort, though this was expected to be limited due to the transisition of these patients to the Veterans Administration Healthcare System from the Department of Defense over the course of such a long follow-up period. Traumatic injury to the sciatic nerve is associated with widespread soft tissue and bone injuries, significant neurological impairment, severe neuritic pain, and a prolonged recovery.

Methods

Retrospective review of 5137 combat related extremity injuries, 2007-2013, with 13 having sciatic nerve injury without amputation of the affected side.

Demographic Data

13 patients, all male, mean age 28.
Mechanism of injury: 9 GSW, 2 RPG blast, 2 IED blast

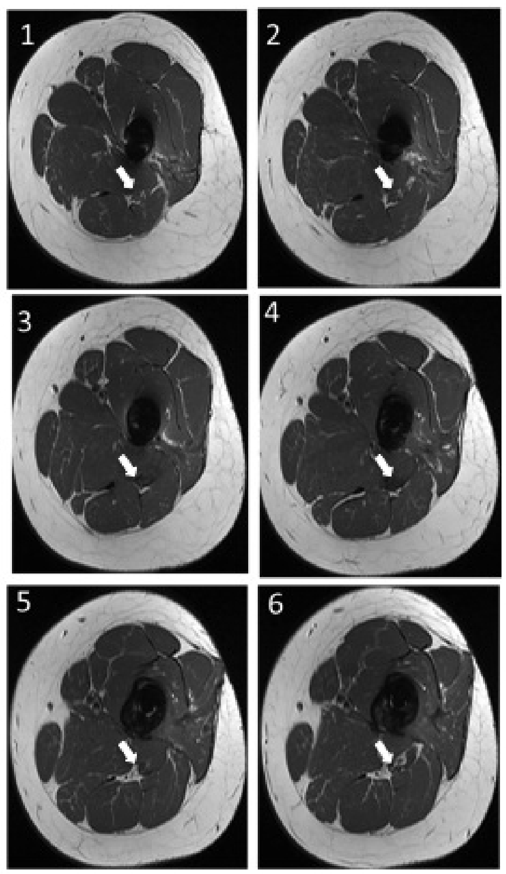
Operative Treatment Data

3 neuroma in continuity, requiring only neurolysis. 8 nerve transections treated with 5-7 cm cadaver allograft, 1 transection treated with sural autograft (5 cm), 1 end to end repair. 5 surgeries 21 to 30 days after the time of injury (early), and 8 greater than 150 days after injury (standard). There was no difference in the amount of nerve resection between the early and late groups.

Outcome Data

The early and late groups had equivalent pain and narcotic use reductions at 6 weeks and 6 months. Long term motor follow-up was limited, only four patients had motor exams at least 6 months post-op documented in the DoD system. A difference between the early and late groups could not be interpreted based on this stength data. There were no allograft or autograft infections or rejections.

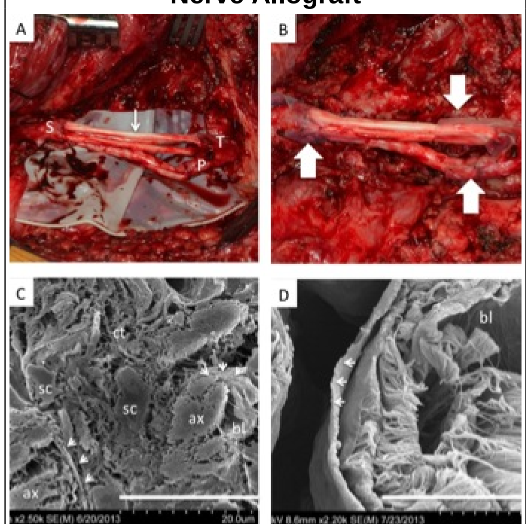
Axial MRI of Sciatic Transection with Associated Femur Fracture



Auto/Allograft Operative Technique

Sciatic nerve exploration with nerve conduction monitoring was undertaken. If no action potentials were present and the nerve was transected, then serial axial cuts of the proximal and distal neuromas were made until normal fascicles were appreciated. The gap was measured with the patient prone and hips/knees flexed to 15 degrees. If direct repair of the ends was not possible without tension, then the nerve was grafted with ipsilateral sural nerve autograft or decellularized cadaver allografts (Avance Nerve Graft) with 8-0 nylon sutures and wrapped with AxoGuard Nerve Protector (Cook Biotech).

Gross Appearance and Electron Microscopy of Decellularized Cadaveric Nerve Allograft



Frames A and B demonstrate cadaveric allograft intraoperatively. Frames C and D demonstrate the microscopic extra-cellurlar matrix that the graft provides to facilitate axonal regeneration.

Conclusions

Traditional teaching is to delay nerve repair for at least six months to provide opportunity for the damage to the injured nerve to fully declare itself. Our experience suggests that combat related sciatic nerve injuries can be operated on 21-30 days post-injury, with benefit toward reduction of neuritic pain, and long-length cadaveric allografts may be placed without infection/rejection.

Selected References

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