Decompressive Surgery in Diabetes

Ryan D. Jacobson MD
Assistant Professor of Neurology
Rush University
Chicago, IL
surgery for diabetic neuropathy
vascular surgery for diabetic neuropathy
surgery for diabetic peripheral neuropathy
surgery treatment for diabetic neuropathy
surgical treatment for diabetic neuropathy
nerve decompression surgery for diabetic neuropathy
is there surgery for diabetic neuropathy
Nerve Decompression Surgery Can Reverse Neuropathy of the Foot

Similar to carpal tunnel syndrome surgery, nerve decompression surgery helps improve symptoms of diabetic peripheral neuropathy of the foot and prevents amputation.

By Stephen L. Barrett, DPM, FACFAS and D. Scott Nickerson, MD, FAAOS

Like water flowing through a dam, nerve decompression surgery can reverse the symptoms of numbness and tingling (nerve compression and entrapment) associated with diabetic neuropathy.
Decompressive Nerve Surgery: What is it?

• Meant to address patients with symptoms of distal symmetric polyneuropathy, with presumed component of compressive nerve injury

• Most often, surgical compression of
  – peroneal nerve at the fibular head
  – Deep peroneal nerve in the foot
  – and tibial nerve branches at the ankle/tarsal tunnel
Why think about this?

• Diabetic neuropathy is extremely common and expensive
• Diabetics are known to be more susceptible to compressive nerve injuries
• limited treatments exist for this common, costly problem
• Noted that there was not enough distinction between patients with DSP vs. entrapment neuropathies
• Existing studies did not clearly define peripheral neuropathy or use validated or standardized outcome measures
• Recommended more monitoring of glycemic control, complications in future studies
Decompressive surgery of lower limbs for symmetrical diabetic peripheral neuropathy

Vinay Chaudhry¹, James Russell², Allan Belzberg³

¹Neurology, Johns Hopkins Outpatient Center, Baltimore, Maryland, USA. ²School of Medicine, University of Maryland, Baltimore, USA. ³Department of Neurosurgery, The Johns Hopkins Hospital, Baltimore, USA

• No randomized, controlled trials were available for inclusion
Decompression nerve surgery for diabetic neuropathy: a structured review of published clinical trials

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James W Albers¹
Ryan Jacobson²

¹Department of Neurology, University of Michigan Medical School, Ann Arbor, MI, USA; ²Department of Neurology, Rush University Medical Center, Chicago, IL, USA
Decompression nerve surgery for diabetic neuropathy: a structured review of published clinical trials

- Key endpoints:
  - Pain relief
  - Sensory testing
  - Nerve conduction velocities
Secondary Outcomes

**Sensation**
- 9 studies assessed 2-point discrimination
- 6 papers addressed touch-pressure sensation
- 1 paper addressed quantitative sensory testing
- All sensory measurements tended to improve with surgery
- Pooled data from 5 studies assessing 2PD at great toe: mean improvement in 5.8 mm

**Nerve Conduction Studies**
- 3 studies included NCS data
- Only 1 study included information about amplitude and distal latency of lower extremity nerves
- 2 other studies only included data regarding conduction velocity
- No improvement in amplitude or latency of peroneal or tibial nerves pre- vs. post-surgery, or vs. control leg
- Some improvement in CV – combined effect size of 1.4
<table>
<thead>
<tr>
<th>Authors</th>
<th>Study type</th>
<th>Pain scale</th>
<th>Limb group</th>
<th>n</th>
<th>Pre-DNS score</th>
<th>Post-DNS pain score at nearest month (effect size)</th>
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<td></td>
<td></td>
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<td>DNS</td>
<td>161</td>
<td>8.3±1.8*</td>
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<td>DNS limb</td>
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<td>1.9 (1.6-2.2)</td>
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<td>-8.0*</td>
<td>-5.7±2.7</td>
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<td>Average pain score (average effect size)</td>
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<td></td>
<td>459</td>
<td>8.0±1.8</td>
<td>1.5±1.8</td>
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<td>Sham limb</td>
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</tbody>
</table>

Notes: *VAS pain scores based on a visual analog scale (0-10); **Liao et al mean ± SD measured from Figure 1 of their paper; Likert pain scores based on eleven items (0-10) with distance between each item being equal; Results convoluted by SD of all studies having bilateral DNS; *No significant mean difference from baseline at 12 months (DNS log. -5.76±0.17; sham log. -5.76±0.17) and at 54 months (actual values not reported and unavailable on request); (mean difference ± SD) from pre-DNS mean post-DNS; **Normal double, right, and post pain scores, expressed on eleven-item rating scale (0-10). Estimated SD from 12-month data.

Abbreviations: DNS, decompression nerve surgery; RCT, randomized controlled trial; VAS, visual analog scale.
Value of Surgical Decompression of Compressed Nerves in the Lower Extremity in Patients with Painful Diabetic Neuropathy: A Randomized Controlled Trial

Joanne F.M. Macaré van Maurik, M.D.
Mireille van Hal, M.D.
Ruben P. A. van Eijk, B.Sc.
Moshe Kon, M.D., Ph.D.
Edgar J. G. Peters, M.D., Ph.D.
Rozen et al, “DNND study: a controlled, randomized, double-blinded prospective study on the role of surgical decompression of low extremity nerves for the treatments of patients with symptomatic diabetic neuropathy with chronic nerve compression”

- Patients randomized to surgical or non-surgical group in 2:1 ratio
- Surgical group underwent DNS on one side, and sham surgery on the contralateral side. Patients and examiners blinded to which side received true nerve decompression
- 92 patients randomized to surgery, 48 to the control group
- 40 patients also re-evaluated at 1 year, 36 at 4 years
- Pain measured on Likert scale
• At 1 year, mean pain reduction:
  – 5.7 (±/-2.1) in the **surgical leg**
  – 5.3 (±/-2.8) in the **sham leg**
  – Not statistically changed in the control group

Pain scores were significantly reduced from baseline and from the control group, but not in the surgical compared to sham legs.

Effect size in sham surgery leg: 1.9
Effect size in surgical leg: 3.0
Effect size in control leg in previous study 0.3
Decompressive Surgery: Take Home Points

• Diabetic neuropathy is a painful, expensive, disabling condition and patients are looking for more answers

• Recommending decompressive nerve surgery is problematic for a number of reasons
Decompressive Surgery: Take Home Points and Concerns

• The existing literature does not clearly differentiate patients with distal symmetric polyneuropathy from those with true compressive injury. (Overreliance on Tinel sign?) Who is the target population?
• Sensation is often measured in unclear ways, or with methods inconsistent with what is often employed in clinic.
• Complications and complication rates of these surgeries are not very well-described
• No quality, randomized, controlled trials exist.
• In existing trials, marked improvement in the sham leg is difficult to explain. Suggests a strong surgical placebo component.

• The evidence currently does not support recommending decompressive nerve surgeries, though some surgical candidates are likely to exist.