

Selective [tibial nerve neurotomy](#) is known as an effective method to reduce focal spasticity when medical treatment including botulinum toxin is not sufficient. The tibial nerve can be targeted to treat spastic equinovarus foot with (or without) claw toes.

Tibial nerve trunk is dissected in the popliteal fossa. Sensitive and motor branches are identified using Electrostimulation to monitor motor responses. The muscular nerves corresponding to the targeted muscles are partially sectioned according to a preoperative chart. A postoperative rehabilitation program is mandatory ¹⁾.

- 2: Kwon SS, Chazen JL, Kishore S, Habibi BA, Chi M, Rand E, Lowder R, Singh JR. Investigation of genicular neurotomy of the knee: MRI characterization of anatomy and implications for intervention. Clin Imaging. 2020 Jan;59(1):78-83. doi: 10.1016/j.clinimag.2019.09.006. Epub 2019 Nov 9. PMID: 31760281.
- 3: Koch G, Cazzato LR, Auloge P, Chiang BJ, Garnon J, Clavert P. Innervation of flexor hallucis longus muscle: an anatomical study for selective neurotomy. Folia Morphol (Warsz). 2019;78(3):617-620. doi: 10.5603/FM.a2019.0007. Epub 2019 Jan 21. PMID: 30664228.
- 4: Deltombe T, Lejeune T, Gustin T. Botulinum toxin type A or selective neurotomy for treating focal spastic muscle overactivity? Ann Phys Rehabil Med. 2019 Jul;62(4):220-224. doi: 10.1016/j.rehab.2018.07.008. Epub 2018 Aug 11. PMID: 30107243.
- 5: Si S, Wang H, Pu Y, Cen Y, Xiao H. [Efficacy evaluation of sural nerve bridging transplantation for restoration of penis disturbance of sensation after selective dorsal nerve neurotomy]. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2017 Jun 15;31(6):709-713. Chinese. doi: 10.7507/1002-1892.201611114. PMID: 29798653; PMCID: PMC8498305.
- 6: Zhong S, Li G, Yang L, Yan Q, Wang Y, Zhao G, Li Y. Anatomic and Ultrasonic Study Based on Selective Tibial Neurotomy. World Neurosurg. 2017 Mar;99:214-225. doi: 10.1016/j.wneu.2016.11.023. Epub 2016 Dec 8. PMID: 27939323.
- 7: Le Bocq C, Rousseaux M, Buisset N, Daveluy W, Blond S, Allart E. Effects of tibial nerve neurotomy on posture and gait in stroke patients: A focus on patient-perceived benefits in daily life. J Neurol Sci. 2016 Jul 15;366:158-163. doi: 10.1016/j.jns.2016.04.055. Epub 2016 May 7. PMID: 27288797.
- 8: Khalil N, Chauvière C, Le Chapelain L, Guesdon H, Speyer E, Bouaziz H, Mainard D, Beis JM, Paysant J. Plantar pressure displacement after anesthetic motor block and tibial nerve neurotomy in spastic equinovarus foot. J Rehabil Res Dev. 2016;53(2):219-28. doi: 10.1682/JRRD.2014.11.0298. PMID: 27149284.
- 9: Deltombe T, Bleyenheuft C, Gustin T. Comparison between tibial nerve block with anaesthetics and neurotomy in hemiplegic adults with spastic equinovarus foot. Ann Phys Rehabil Med. 2015 Apr;58(2):54-9. doi: 10.1016/j.rehab.2014.12.003. Epub 2015 Jan 9. PMID: 25614022.
- 10: Buffenoir K, Decq P, Hamel O, Lambertz D, Perot C. Long-term neuromechanical results of selective tibial neurotomy in patients with spastic equinus foot. Acta Neurochir (Wien). 2013 Sep;155(9):1731-43. doi: 10.1007/s00701-013-1770-5. Epub 2013 May 29. PMID: 23715947.
- 11: Sitthinamsuwan B, Chanvanitkulchai K, Phonwijit L, Ploypitch T, Kumthornthip W, Nunta-Aree S. Utilization of intraoperative electromyography for selecting targeted fascicles and determining the degree of fascicular resection in selective tibial neurotomy for ankle spasticity. Acta Neurochir (Wien).

2013 Jun;155(6):1143-9. doi: 10.1007/s00701-013-1686-0. Epub 2013 Apr 7. PMID: 23563747.

12: Gross R, Leboeuf F, Rémy-Néris O, Perrouin-Verbe B. Unstable gait due to spasticity of the rectus femoris: gait analysis and motor nerve block. Ann Phys Rehabil Med. 2012 Dec;55(9-10):609-22. English, French. doi: 10.1016/j.rehab.2012.08.013. Epub 2012 Sep 25. PMID: 23043733.

13: Deltombe T, Gustin T. Selective tibial neurotomy in the treatment of spastic equinovarus foot in hemiplegic patients: a 2-year longitudinal follow-up of 30 cases. Arch Phys Med Rehabil. 2010 Jul;91(7):1025-30. doi: 10.1016/j.apmr.2010.04.010. PMID: 20599040.

14: Rigoard P, Buffenoir-Billet K, Giot JP, d'Houtaud S, Delmotte A, Lapierre F. Bases anatomiques des voies d'abord chirurgicales des nerfs du membre inférieur: à l'usage des jeunes neurochirurgiens [Anatomic bases of surgical approaches to the nerves of the lower limb: tips for young surgeons]. Neurochirurgie. 2009 Oct;55(4-5):375-83. French. doi: 10.1016/j.neuchi.2009.08.154. Epub 2009 Oct 2. PMID: 19800088.

15: Bleyenheuft C, Detrembleur C, Deltombe T, Fomekong E, Lejeune TM. Quantitative assessment of anaesthetic nerve block and neurotomy in spastic equinus foot: a review of two cases. J Rehabil Med. 2008 Nov;40(10):879-81. doi: 10.2340/16501977-0263. PMID: 19242629.

16: Buffenoir K, Rigoard P, Ferrand-Sorbets S, Lapierre F. Etude rétrospective du résultat à long terme des neurotomies sélectives périphériques dans le traitement du membre supérieur spastique [Retrospective study of the long-term results of selective peripheral neurotomy for the treatment of spastic upper limb]. Neurochirurgie. 2009 Mar;55 Suppl 1:S150-60. French. doi: 10.1016/j.neuchi.2008.04.003. Epub 2009 Feb 14. PMID: 19223045.

17: Mu XH, Xu L, Xu SG, Cao X, Zhang P, Zheng CY, Chen J, Li XP. [Treatment of equinovarus caused by cerebral palsy with neurotomy of muscular branch of tibial nerve]. Zhongguo Gu Shang. 2009 Jan;22(1):31-2. Chinese. PMID: 19203033.

18: Deltombe T, Jamart J, Hanson P, Gustin T. Soleus H reflex and motor unit number estimation after tibial nerve block and neurotomy in patients with spastic equinus foot. Neurophysiol Clin. 2008 Aug;38(4):227-33. doi: 10.1016/j.neucli.2008.03.003. Epub 2008 Apr 22. PMID: 18662619.

19: Buffenoir K, Rigoard P, Lefaucheur JP, Filipetti P, Decq P. Lidocaine hyperselective motor blocks of the triceps surae nerves: role of the soleus versus gastrocnemius on triceps spasticity and predictive value of the soleus motor block on the result of selective tibial neurotomy. Am J Phys Med Rehabil. 2008 Apr;87(4):292-304. doi: 10.1097/PHM.0b013e318168bccb. PMID: 18356621.

20: Sindou MP, Simon F, Mertens P, Decq P. Selective peripheral neurotomy (SPN) for spasticity in childhood. Childs Nerv Syst. 2007 Sep;23(9):957-70. doi: 10.1007/s00381-007-0399-1. Epub 2007 Jun 29. PMID: 17605016.

21: Brenner MJ, Dvali L, Hunter DA, Myckatyn TM, Mackinnon SE. Motor neuron regeneration through end-to-side repairs is a function of donor nerve axotomy. Plast Reconstr Surg. 2007 Jul;120(1):215-223. doi: 10.1097/01.prs.0000264094.06272.67. PMID: 17572566.

22: Xue F, Jiang BG, Fu ZG, Zhang DY. [Changes and the clinical significance of muscle strength after different proportion tibial neurotomy]. Zhonghua Wai Ke Za Zhi. 2005 Aug 15;43(16):1095-7. Chinese. PMID: 16194344.

23: Wang SJ, Chen GQ, Xiu B, Zuo HC. [Neurotomy of the tibial nerve for treatment of the talipes equinovarus]. Zhonghua Wai Ke Za Zhi. 2005 May 1;43(9):605-7. Chinese. PMID: 15938937.

- 24: Buffenoir K, Decq P, Lefaucheur JP. Interest of peripheral anesthetic blocks as a diagnosis and prognosis tool in patients with spastic equinus foot: a clinical and electrophysiological study of the effects of block of nerve branches to the triceps surae muscle. *Clin Neurophysiol.* 2005 Jul;116(7):1596-600. doi: 10.1016/j.clinph.2004.11.024. PMID: 15905125.
- 25: Buffenoir K, Roujeau T, Lapierre F, Menei P, Menegalli-Boggelli D, Mertens P, Decq P. Spastic equinus foot: multicenter study of the long-term results of tibial neurotomy. *Neurosurgery.* 2004 Nov;55(5):1130-7. doi: 10.1227/01.neu.0000140840.59586.cf. PMID: 15509319.
- 26: Taira T, Hori T. The role of neurosurgical interventions for control of spasticity in neurorehabilitation: new findings on functional microanatomy of the tibial nerve. *Acta Neurochir Suppl.* 2003;87:103-5. doi: 10.1007/978-3-7091-6081-7_22. PMID: 14518534.
- 27: Roujeau T, Lefaucheur JP, Slavov V, Gherardi R, Decq P. Long term course of the H reflex after selective tibial neurotomy. *J Neurol Neurosurg Psychiatry.* 2003 Jul;74(7):913-7. doi: 10.1136/jnnp.74.7.913. PMID: 12810779; PMCID: PMC1738540.
- 28: Decq P. Les neurotomies périphériques dans le traitement de la spasticité focalisée des membres [Peripheral neurotomies for the treatment of focal spasticity of the limbs]. *Neurochirurgie.* 2003 May;49(2-3 Pt 2):293-305. French. PMID: 12746705.
- 29: Deltombe T, Gustin T, Laloux P, De Cloedt P, De Wispelaere JF, Hanson P. La neurotomie fasciculaire sélective dans le traitement du pied varus équin spastique de l'enfant infirme moteur d'origine cérébrale [Selective fascicular neurotomy for spastic equinovarus foot deformity in cerebral palsy children]. *Acta Orthop Belg.* 2001 Feb;67(1):1-5. French. PMID: 11284266.
- 30: Decq P, Cuny E, Filipetti P, Fève A, Kéravel Y. Les neurotomies périphériques dans le traitement de la spasticité. Indications, technique et résultats aux membres inférieurs [Peripheral neurotomy in the treatment of spasticity. Indications, techniques and results in the lower limbs]. *Neurochirurgie.* 1998 Sep;44(3):175-82. French. PMID: 9827433.
- 31: Msaddi AK, Mazroue AR, Shahwan S, al Amri N, Dubayan N, Livingston D, Moutaery KR. Microsurgical selective peripheral neurotomy in the treatment of spasticity in cerebral-palsy children. *Stereotact Funct Neurosurg.* 1997;69(1-4 Pt 2):251-8. doi: 10.1159/000099884. PMID: 9711763.
- 32: Firling CE, Evans GL, Wakley GK, Sibonga J, Turner RT. Lack of an effect of sodium zeolite A on rat tibia histomorphometry. *J Bone Miner Res.* 1996 Feb;11(2):254-63. doi: 10.1002/jbmr.5650110215. PMID: 8822350.
- 33: Abdennebi B, Bougatene B. Selective neurotomies for relief of spasticity focalized to the foot and to the knee flexors. Results in a series of 58 patients. *Acta Neurochir (Wien).* 1996;138(8):917-20. doi: 10.1007/BF01411279. PMID: 8890987.
- 34: Povlsen B, Hansson T. Functional evaluation of regenerated and misrouted axons to glabrous and hairy skin of the rat hind foot after sciatic neurotomy and suture. *Exp Neurol.* 1995 Mar;132(1):99-104. doi: 10.1016/0014-4886(95)90063-2. PMID: 7720831.
- 35: Sugimoto T, Ichikawa H, Mitani S, Hitsu A, Nakago T. Changes in c-fos induction in dorsal horn neurons by hindpaw formalin stimulation following tibial neurotomy. *Brain Res.* 1994 Apr 11;642(1-2):348-54. doi: 10.1016/0006-8993(94)90942-3. PMID: 8032900.
- 36: Povlsen B, Hildebrand C. Axon regeneration in an articular branch following rat sciatic nerve lesions. *J Neurol Sci.* 1993 Dec 15;120(2):153-8. doi: 10.1016/0022-510x(93)90267-3. PMID: 8138804.

- 37: Povlsen B, Hildebrand C, Wiesenfeld-Hallin Z, Stankovic N. Functional projection of regenerated rat sural nerve axons to the hindpaw skin after sciatic nerve lesions. *Exp Neurol.* 1993 Jan;119(1):99-106. doi: 10.1006/exnr.1993.1010. PMID: 8432355.
- 38: Asencio G, Pelissier J, Privat JM, Bertin R, Mogy B, Leonardi C. La chirurgie du pied équin chez l'adulte hémiplégique [Surgery of the foot in equinus deformity in hemiplegic adults]. *Rev Chir Orthop Reparatrice Appar Mot.* 1993;79(1):41-8. French. PMID: 8284467.
- 39: Yoshida S, Yamamuro T, Okumura H, Takahashi H. Microstructural changes of osteopenic trabeculae in the rat. *Bone.* 1991;12(3):185-94. doi: 10.1016/8756-3282(91)90041-g. PMID: 1910960.
- 40: Sindou M, Mertens P, Jeanmonod D. Microsurgical ablative procedures in the peripheral nerves and dorsal root entry zone for relief of focal spasticity in the limbs. *Stereotact Funct Neurosurg.* 1990;54-55:140-6. doi: 10.1159/000100204. PMID: 2080329.
- 41: Sindou M, Mertens P. Selective neurotomy of the tibial nerve for treatment of the spastic foot. *Neurosurgery.* 1988 Dec;23(6):738-44. doi: 10.1227/00006123-198812000-00009. PMID: 3216972.
- 42: Sindou M, Keravel Y. Microsurgical procedures in the peripheral nerves and the dorsal root entry zone for the treatment of spasticity. *Scand J Rehabil Med Suppl.* 1988;17:139-43. PMID: 3165206.
- 43: Kanpolat Y, Çağlar C, Akiş E, Ertürk A, Uluğ H. Percutaneous selective RF neurotomy in spasticity. *Acta Neurochir Suppl (Wien).* 1987;39:96-8. doi: 10.1007/978-3-7091-8909-2_25. PMID: 3478990.
- 44: CORDA M, STADERINI G, URBANI F. SULLE MODIFICAZIONI STRUTTURALI DEI FUSI NEURO-MUSCOLARI DEI MUSCOLI SOLEO, GASTROCNEMIO E TIBIALE ANTERIORE DEL RATTO ALBINO INDOTTE DALLA NEUROTOMIA NEONATALE PRECOCE [ON THE STRUCTURAL CHANGES OF THE NEUROMUSCULAR SPINDLES OF THE SOLEUS, GASTROCNEMINUS AND ANTERIOR TIBIAL MUSCLES OF THE ALBINO RAT INDUCED BY EARLY NEONATAL NEUROTOMY]. *Arch Fisiol.* 1963 Dec 30;62:254-61. Italian. PMID: 14166648.
- 45: GALLO G. Il problema del trattamento chirurgico del dolore nelle arteriopatie obliterative croniche periferiche; la neurotoma del nervo tibiale posteriore [The problem of surgery of pain in peripheral chronic obliterative arteriopathy; neurotomy of posterior tibial nerve]. *Minerva Cardioangiolog.* 1958 Jan;6(1):5-11. Italian. PMID: 13516569.
- 46: CASTAGNA R. La neurotoma del tibiale posteriore nelle algie e nelle ulceri plantari di origine trombo-angioitica e arteriosclerotica [Neurotomy of posterior tibial nerve in algias and plantar ulcers of thromboangiitic and arteriosclerotic origin]. *Minerva Chir.* 1956 Aug 31;11(16):780-3. Italian. PMID: 13378118.
- ¹⁾
Dauleac C, Sindou M, Mertens P. How I do it: selective tibial neurotomy. *Acta Neurochir (Wien).* 2020 Aug;162(8):1921-1923. doi: 10.1007/s00701-020-04314-9. Epub 2020 May 7. PMID: 32377951.

From:
<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**



Permanent link:
https://neurosurgerywiki.com/wiki/doku.php?id=tibial_nerve_neurotomy

Last update: **2024/06/07 02:49**

