

## KEY PROCEDURES

## PROXIMAL MEDIAL GASTROCNEMIUS RELEASE

## Surgical Technique

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Published outcomes of this procedure can be found at: *Foot Ankle Int.* 2020 Mar;41(3):267-74, *Foot Ankle Int.* 2012;33(1):14-9, and *Int Orthop.* 2013 Sep;37(9):1845-50.

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**Abstract**

**Background:** Proximal medial gastrocnemius release (PMGR) is a technique that is performed to relieve tension in the Achilles–calcaneus–plantar system when a biomechanical overload is present<sup>1-3</sup>. One of the main indications for this technique is recalcitrant plantar fasciitis. This procedure may also be useful in second-rocker metatarsalgia or midportion Achilles tendinitis<sup>4</sup>. It is considered to be an easy and safe method for achieving good results<sup>5-7</sup>.

**Description:** PMGR is performed with the patient in the prone position. A thigh tourniquet is not utilized. We prefer to use spinal anesthesia, but local anesthesia could be applied along with sedation. A posteromedial incision is made on or just below the posterior knee crease. The crural fascia is divided, and the proximal insertion of the medial gastrocnemius is identified. Performing the “hook maneuver” with a curved dissector is helpful at this step. Only the white fibers are sectioned in order to allow for a lengthening of the muscular fibers that is completed with forceful ankle dorsiflexion. After proper hemostasis has been achieved, the subcutaneous layer and skin are closed, leaving the fascia open.

**Alternatives:** Nonoperative treatment should be the first option, including analgesics, insoles, heel cups, calf-stretching, injections, and extracorporeal shock wave therapy<sup>8</sup>. Some authors have also suggested that application of a walking cast for 3 to 6 weeks should be attempted<sup>9,10</sup>. Once all of these treatment options have failed, operative treatment is appropriate. Historically, open plantar fasciotomy was offered to patients with recalcitrant plantar fasciitis, and this treatment continues to be a surgical option. Other procedure, like the Strayer, Vulpius, or Baumann techniques, involve the calf system and are called “gastrocnemius recession.” However, these techniques act in the more distal aspect of the calf system compared with PMGR.

**Rationale:** PMGR offers patients with recalcitrant plantar fasciitis rapid recovery and good results. This procedure obviates the complications associated with plantar fasciotomy, in which the medial aspect of the proximal plantar fascia is divided to relieve the overload. A plantar fasciotomy (either open or endoscopic<sup>11</sup>) risks lateral column overload<sup>12</sup> or a painful flatfoot if >50% of the fascia is divided. A long recovery period following plantar

**Disclosure:** The Disclosure of Potential Conflicts of Interest forms are provided with the online version of the article (<http://links.lww.com/JBJSST/A363>).

fasciotomy has also been described<sup>7</sup>. On the other hand, other procedures have been utilized to lengthen the Achilles-calcaneus-plantar system to an even greater extent. Techniques like the Silfverskiöld (i.e., medial and lateral proximal gastrocnemius release) or Strayer (i.e., division of the distal aspect of the gastrocnemius fascia) technique present a higher rate of complications (up to 38%), specifically nerve injuries<sup>13,14</sup>. We consider these procedures (classified as gastrocnemius recession procedures) more properly indicated for patients with neurological diseases or with an equinus contracture. The medial gastrocnemius is the more powerful of the 2 bellies. Releasing the medial head alone offers a robust decrease in tension and is safer than approaching the lateral head of the gastrocnemius<sup>15</sup>. At the same time, this technique provides a quick recovery for the patient. PMGR can also help those patients with other clinical signs related to gastrocnemius tightness, such as calf cramps and pain or repeated muscle injuries. Moreover, it can be effective in patients with second-rocker metatarsalgia or midportion Achilles tendinitis<sup>1,16</sup>.

**Expected Outcomes:** PMGR has a reported rate of satisfaction of >80%. Most patients undergoing this procedure experience substantial pain relief within the first 2 to 3 months<sup>6,17</sup>. PMGR is an outpatient procedure with a short operative time and a rapid return to recreational and labor activities. The complication rate is low, and the most common complications are calf hematomas and delayed wound healing. The present article demonstrates a reduction in pain and good functional results. An improvement in the perception of health-related quality of life, especially in the physical and pain domains of the Short Form-36 questionnaire, was also observed.

#### Important Tips:

- The prone position allows for direct access to the proximal medial head of the gastrocnemius.
- Preferably, perform PMGR without a tourniquet in order to assure proper hemostasis.
- Keep the ankle joint free at the end of operating table because ankle dorsiflexion is a helpful maneuver at some stages in this procedure.
- Digital (index finger) dissection should be performed among the medial head of the gastrocnemius, the hamstrings, and the posterior aspect of the proximal tibia.
- The hook maneuver, performed with use of a blunt dissector, is helpful to identify all of the white fibers.
- Only white fibers should be divided. The surgeon must also make sure to cut the more anterior part of the aponeurosis that is hidden by red fibers.
- After cutting the white fibers, forceful ankle dorsiflexion is required to obtain full lengthening of the muscle.
- Proper hemostasis should be achieved to prevent formation of a calf hematoma.
- Advise the patient to do calf-stretches as soon as pain permits in order to prevent a contracting muscle scar.

#### Acronyms & Abbreviations:

- PMGR = proximal medial gastrocnemius release
- ESWT = extracorporeal shock wave therapy
- SD = standard deviation

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## References

1. Barouk P. Technique, indications, and results of proximal medial gastrocnemius lengthening. *Foot Ankle Clin.* 2014 Dec;19(4):795-806.
2. Jastifer JR, Marston J. Gastrocnemius Contracture in Patients With and Without Foot Pathology. *Foot Ankle Int.* 2016 Nov;37(11):1165-70.
3. Patel A, DiGiovanni B. Association between plantar fasciitis and isolated contracture of the gastrocnemius. *Foot Ankle Int.* 2011 Jan;32(1):5-8.
4. Cychosz CC, Phisitkul P, Belatti DA, Glazebrook MA, DiGiovanni CW. Gastrocnemius recession for foot and ankle conditions in adults: Evidence-based recommendations. *Foot Ankle Surg.* 2015 Jun;21(2):77-85.
5. Gamba C, Serrano-Chinchilla P, Ares-Vidal J, Solano-Lopez A, Gonzalez-Lucena G, Ginés-Cespedosa A. Proximal Medial Gastrocnemius Release Versus Open Plantar Fasciotomy for the Surgical Treatment in Recalcitrant Plantar Fasciitis. *Foot Ankle Int.* 2020 Mar;41(3):267-74.
6. Abbassian A, Kohls-Gatzoulis J, Solan MC. Proximal medial gastrocnemius release in the treatment of recalcitrant plantar fasciitis. *Foot Ankle Int.* 2012 Jan;33(1):14-9.
7. Monteagudo M, Maceira E, Garcia-Virto V, Canosa R. Chronic plantar fasciitis: plantar fasciotomy versus gastrocnemius recession. *Int Orthop.* 2013 Sep;37(9):1845-50.
8. Buchbinder R. Clinical practice. Plantar fasciitis. *N Engl J Med.* 2004 May 20;350(21):2159-66.
9. Gill LH. Plantar Fasciitis: Diagnosis and Conservative Management. *J Am Acad Orthop Surg.* 1997 Mar;5(2):109-17.
10. Tisdell CL, Harper MC. Chronic plantar heel pain: treatment with a short leg walking cast. *Foot Ankle Int.* 1996 Jan;17(1):41-2.
11. Mao DW, Chandrakumara D, Zheng Q, Kam C, Kon Kam King C. Endoscopic plantar fasciotomy for plantar fasciitis: A systematic review and network meta-analysis of the English literature. *Foot (Edinb).* 2019 Dec;41:63-73.
12. Brugh AM, Fallat LM, Savoy-Moore RT. Lateral column symptomatology following plantar fascial release: a prospective study. *J Foot Ankle Surg.* 2002 Nov-Dec;41(6):365-71.
13. Rush SM, Ford LA, Hamilton GA. Morbidity associated with high gastrocnemius recession: retrospective review of 126 cases. *J Foot Ankle Surg.* 2006 May-Jun;45(3):156-60.
14. Molund M, Paulsrud Ø, Ellingsen Husebye E, Nilsen F, Hvaal K. Results after gastrocnemius recession in 73 patients. *Foot Ankle Surg.* 2014 Dec;20(4):272-5.
15. Hamilton PD, Brown M, Ferguson N, Adebibe M, Maggs J, Solan M. Surgical anatomy of the proximal release of the gastrocnemius: a cadaveric study. *Foot Ankle Int.* 2009 Dec;30(12):1202-6.
16. Gurdezi S, Kohls-Gatzoulis J, Solan MC. Results of proximal medial gastrocnemius release for Achilles tendinopathy. *Foot Ankle Int.* 2013 Oct;34(10):1364-9.
17. Monteagudo M, de Albornoz PM, Gutierrez B, Tabuenca J, Álvarez I. Plantar fasciopathy: A current concepts review. *EFORT Open Rev.* 2018 Aug 29;3(8):485-93.