other approaches is that it can be accomplished with 1 procedure (vs ACI or matrix-induced ACI, which requires 2 procedures). Whether MAST is superior to other available procedures—such as debridement, microfracturing, or abrasion; use of a matrix without cells; or other available cells—is not known. How the result with MAST might compare to the use of "real" stem cells is also not known. Prof Richter concluded that MAST is "just one single step forward." Prospective randomized studies are needed to compare these methodologies.

Similar Functional Outcomes With Open and Minimally Invasive Gastrosoleus-Lengthening Techniques

Written by Phil Vinall

Results of a study comparing open and minimally invasive approaches to gastrosoleus lengthening showed similar functional outcomes for all techniques. Complications were generally lower in patients treated noninvasively except for weakness of plantar flexion, which was significantly higher in patients treated using the Hoke technique. The study results were presented by Chamnanni Rungprai, MD, University of Iowa Hospitals and Clinics, Iowa City, Iowa, USA.

When conservative management fails in the treatment of gastrocnemius or gastrosoleus contracture, surgical treatment is indicated. Standard techniques are open lengthening and percutaneous triple hemisections (Hoke); however, 2 newer approaches, Baumann and endoscopic, are gaining popularity. Dr Rungprai reported the results of a retrospective chart review, Endoscopic Gastrocnemius Recession for the Treatment of Isolated Gastrocnemius Contracture: A Prospective Study on 320 Consecutive Patients [Phisitkul P et al. *Foot Ankle Int.* 2014], of 610 consecutive patients (640 legs) who received surgery at a single institution between 2006 and 2013 using 1 of 4 techniques: an open Vulpius or Strayer approach (VSO; 200 patients; 206 legs), a Baumann approach (38 patients; 38 legs), a Hoke procedure (52 patients; 52 legs), or endoscopic gastrocnemius recession (EGR; 320 patients; 344 legs). Outcome measures were the Foot Function Index (FFI), the Short Form-36 (SF-36), the visual analog scale (VAS), ankle dorsiflexion, operative time, and complications.

There were no significant differences in age, body mass index, and average time to follow-up, although Hoke patients tended to be older (around 60 years) and those receiving EGR were younger (approximately 47 years) than VSO or Baumann patients (close to 51 years). The majority of Hoke patients were men; women were in the majority in all other groups. Preoperatively, patients treated with the Baumann technique had significant equinus compared with other groups.

Functional outcomes improved for all groups postsurgery. VAS scores and scores on the SF-36 were similar for all 4 approaches, as were scores on the FFI for pain, disability, activity limitation, and total score. Operative time was considerably shorter for the Hoke procedure (3.1 ± 1.1 minutes; range, 2 to 5 minutes) compared with the 3 other procedures, which ranged from 18.2 ± 5 minutes for the endoscopic approach to 28.1 ± 5.1 minutes and 29 ± 6.5 minutes for the VSO and Baumann approaches, respectively.

Hoke patients had significantly less correction immediately postsurgery and at final follow-up, and less ankle dorsiflexion at final follow-up, compared with the other groups. Ankle range of motion preoperatively, immediately postoperatively, and at final follow-up for all groups is shown in Table 1.

A significantly higher rate of superficial infection was seen with the invasive procedures compared with the less invasive approaches. Weakness of plantar flexion was significantly higher in Hoke patients. The approaches

Table 1. Ankle Range of Motion

Dorsiflexion	Open Strayer or Vulpius, n = 206	Baumann, n = 38	Hoke, n = 52	Endoscopic, n = 344
Preoperative (range, degrees) up (number of available patients/total number)	−2.8 ± 8.9 ([−50]–10) (n = 164)	−5.1 ± 6.6 ([−30]–10) (n = 34)	−0.5 ± 8.1 ([−20]–10) (n = 40)	−0.8 ± 5.4 ([−50]–10) (n = 294)
Immediate postoperative/(improvement) (range, degrees) (number of available patients/total number)*	12.4 ± 4.8/(15.0) ([−5]–30) (n = 164)	9.8 ± 4.7/(14.9) (0–20) (n = 34)	10.1 ± 5.5/(10.6) (0–20) (n = 40)	14.7 ± 6.7/(15.6) (0–30) (n = 294)
At final follow-up/(improvement) (range, degrees) up (number of available patients/total number)*	7.8 ± 5.7/(10.6) ([−10]–30) (n = 164)	7.8 ± 4.6/(12.8) (0–20) (n = 34)	6.6 ± 5.8/(7.1) ([−5]–20) (n = 40)	11.0 ± 6.6/(11.8) ([−10]–30) (n = 294)

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*On May 1, 2015, the punctuation in these cells was edited.

Table 2. Complications, No. (%)

Complication	Open Strayer or Vulpius, n = 206	Baumann, n = 38	Hoke, n = 52	Endoscopic, n = 344
Superficial infection	13 (6.3)	3 (7.9)	0 (0.0)	0 (0.0)
Sural nerve dysesthesia	7 (3.4)	1 (2.6)	1 (1.9)	10 (2.9)
Weakness of plantar flexion	9 (4.4)	1 (2.6)	5 (9.6)	11 (3.2)
Painful scar	5 (2.4)	1 (1.9)	0 (0.0)	0 (0.0)
Calf muscle atrophy	5 (2.4)	0 (0.0)	0 (0.0)	8 (2.6)

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did not differ in the rate of sural nerve dysesthesia, painful scar, and calf muscle atrophy (Table 2).

This study is limited by the fact that it was retrospective, by the inherent difficulty in comparing outcomes from different sources of contracture, and because the surgical techniques were selected by surgeon preference.

In this study, all techniques led to significant improvement of functional outcomes. The Hoke technique was associated with significantly shorter operative time but less equinus correction and a higher incidence of plantar flexion weakness. Patients treated with EGR had lower rates of wound complications and painful scar. There was a low incidence of sural nerve symptoms and weakness of plantar flexion with all 4 approaches.

Incobotulinum Toxin A Effective in Treating Plantar Fasciitis

Written by Emma Hitt Nichols, PhD

Treatment of plantar fasciitis with incobotulinum toxin A resulted in improved functional and pain outcomes and increased patient satisfaction as compared with placebo. Jamal Ahmad, MD, Rothman Institute, Philadelphia, Pennsylvania, USA, presented data from the Treatment of Plantar Fasciitis With Xeomin study [NCT01678001].

Up to 2 million patients per year require treatment for plantar fasciitis, with risk factors including prolonged weight-bearing activity, inappropriate shoe wear, greater body weight, and medical comorbidities. Botulinum toxin has been studied for the treatment of plantar fasciitis in several short-term prospective studies, demonstrating symptom improvement in up to 90% of patients at 3- and 6-month follow-up [Diaz-Llopis IV et al. *Clin Rehabil.* 2013; Placzek R et al. *Clin J Pain.* 2006]. The purpose of this study was to evaluate long-term outcomes of patients with plantar fasciitis treated with incobotulinum toxin A.

In this prospective double-blind study, 28 patients with plantar fasciitis who had unsuccessful nonsurgical treatment were randomly assigned to receive a 1-cc injection of 100 U of botulinum toxin or placebo. A board certified neurologist placed the injection at the flexor digitorum brevis muscle, which is continuous with the plantar fascia. Postinjection, patients completed physical therapy, including plantar fascial and Achilles stretching. Clinical end points included Foot and Ankle Ability Measure, visual analog scale, and patient satisfaction.

At 1-year follow-up, patients who received botulinum toxin had a significantly higher mean Foot and Ankle Ability Measure score of 73.8, compared with 40.9 in placebo-treated patients ($P = .01$). In addition, the mean visual analog scale score, a measure of pain, was significantly lower in the botulinum toxin arm, with a score of 3.6 out of 10, compared with 7.9 in the placebo arm ($P = .01$). Approximately 86% of patients in the botulinum toxin arm and 36% of patients in the placebo arm reported symptom improvement, with about 29% in the botulinum toxin arm indicating that they had achieved complete relief. In the botulinum toxin group, about 14% of patients experienced no change in symptoms, although none received surgery. In the placebo arm, about 64% of patients experienced no change in symptoms, with 2 patients undergoing surgery at 6 months.

Table1. Effect of Botulinum Toxin on Patient Satisfaction, No. (%)

	Incobotulinum Toxin A	Placebo
Excellent	4 (28.6)	0 (0)
Good	7 (50)	1 (7.1)
Fair	1 (7.1)	4 (28.6)
Poor	2 (14.3)	9 (64.3)

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