Long-term Outcomes Improved With Column-Lengthening Procedures vs Arthroereisis

Written by Toni Rizzo

Posterior tibial tendon dysfunction (PTTD) has a prevalence of 3% to 4% in the Western world. Selecting a management strategy for stage II PTTD is confusing because there are many recommended surgical procedures for this disorder. These surgical techniques can be broadly categorized into column-lengthening procedures and arthroereisis. The principles of surgical correction for PTTD include restoring the longitudinal and transverse arches of the foot, replacing the diseased tibialis posterior tendon with a tendon transfer, and balancing the mechanical forces of the foot.

Amila Silva, MBBS, MRCS, Singapore General Hospital, Singapore, presented the results of a study comparing the clinical and radiologic outcomes of column-lengthening procedures with arthroereisis procedures. According to Prof Silva, this is the only study that has compared the outcomes of the 2 types of surgical procedures for the management of grade IIB PTTD.

A prospective review was conducted from January 2007 to December 2012. Patients in the Singapore General Hospital prospective database with stage II-B PTTD diagnosed by the modified Johnson and Strom criteria were divided into group A and group B according to type of surgical procedure. Patients in group A underwent medializing calcaneal osteotomy, Evans distraction osteotomy, flexor digitorum longus transfer, or tendo-Achilles lengthening. Group B patients underwent subtalar arthroereisis, flexor digitorum longus transfer, or tendo-Achilles lengthening.

The following clinical outcomes were recorded and analyzed preoperatively and at 6 and 24 months after surgery: Short Form 36 (SF36) physical and mental health scores, American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot clinical score, midfoot Visual Analog Scale (VAS) pain score, and hindfoot VAS pain score. Radiologic measurements included hindfoot calcaneal pitch, talo-first metatarsal angle, medial cuneiform height, and talonavicular uncoverage.

Group A included 43 feet and group B included 34 feet. The mean patient age in group A was 46.3 years (18.9 to 73.5 years) and in group B was 46.88 years (18.9 to 68.1 years). There were 10 males in each group, along with 31 females in group A and 23 females in group B. Preoperative anthropometric measurements were as follows: weight, 72.5 kg (56.4 to 94 kg); height, 157 cm (150 to 180 cm); and body mass index (BMI), 29.1 (19.3 to 33.13). In comparison, postoperative anthropometric measurements were as follows: weight, 70.3 kg (51.8 to 91.6 kg); height, 161.6 cm (151 to 181.5 cm); and BMI, 27.2 (18.6 to 33.3; $P = .02$).

Table 1. Clinical Scores in Group A and Group B

Clinical Measures	Group	Preoperative	6 Mo	*P* Value	24 Mo	*P* Value
SFPF	A	59	61.83	.7	76.07	.07
	B	61.47	63.9		72.35	
SFMH	A	76.6	82.73	.06	81.9	.06
	B	73.1	78.59		83.52	
HIND VAS	A	4.6	2.25	.8	1.24	.07
	B	6.11	2.62		1.47	
HIND TOT	A	54	71.36	.06	86.4	.06
	B	50.5	75.6		81.25	
MID VAS	A	3.4	1.45	.08	0.45	.002
	B	5.67	1.61		1.26	
MID TOT	A	59.4	73.1	.04	90.30	.001
	B	61.47	74.68		81.24	

SFPF, Short Form Physical Function; SFMH, Short Form Mental Health; HIND VAS, Hindfoot Visual Analog Scale; HIND TOT, Hindfoot Total Score; MID VAS, Midfoot Visual Analog Scale: MID TOT, Midfoot Total Score.

Reproduced with permission from AN Silva, MD.

Table 2. Radiologic Measurements in Group A and Group B

Radiologic Measurement	Preoperative	24 Mo
Group A		
Calcaneal pitch, degrees	8.38	22.72
Talo-first metatarsal, degrees	13.97	1.34
Talonavicular uncoverage, degrees	35.62	9.23
Medial cuneiform height, mm	10.25	20.44
Group B		
Calcaneal pitch, degrees	10.1	19.43
Talo-first metatarsal, degrees	10.27	2.16
Talonavicular uncoverage, degrees	36.2	9.8
Medial cuneiform height, mm	11.25	20.13

Reproduced with permission from AN Silva, MD.

In group A, significant improvement was seen in the midfoot VAS score at 24 months ($P = .002$), and in the midfoot total score at 6 months ($P = .04$) and 24 months ($P = .001$; Table 1).

The radiologic measurements were improved in both surgical groups (Table 2).

Two patients in group A and 3 patients in group B required reoperation. In group A, 1 patient underwent surgical exploration because of sural nerve entrapment and 1 patient required surgical debridement and implant removal for surgical site infection. Three patients in group B underwent removal of the arthroereisis screw.

Patients with grade II-B PTTD experienced clinical and radiologic improvement in both the column procedures and arthroereisis groups. The long-term outcomes were better with medializing calcaneal osteotomy, Evans distraction osteotomy, flexor digitorum long transfer, and tendo-Achilles lengthening. Patients treated with these procedures had statistically significant improvement in midfoot AOFAS scores and midfoot VAS scores compared with those treated with arthroereisis.

No Difference in Outcomes With Ankle Arthrodesis vs Arthroplasty for Coronal Deformity

Written by Toni Rizzo

Bruce J. Sangeorzan, MD, Harborview Medical Center, Seattle, Washington, USA, described the results of Comparing Ankle Fusion to Ankle Replacement [NCT01620541], a study comparing ankle arthrodesis with ankle arthroplasty in patients with coronal deformity. The investigators performed a single-center chart and data review from a prospective pilot study in which senior surgeons used different implants from 2006 to 2011. Patients with ankle arthritis who underwent surgical treatment at Harborview Medical Center were included in this nonrandomized study. The patients all had varus or valgus > 10°. Patients with inflammatory or infectious arthritis were excluded, as were those with other limb disorders that affected their gait or outcome measures.

Outcome measures included the Musculoskeletal Functional Assessment (MFA), step counts, repeat surgery, and revision rates. The Peak Activity Index assessed the average steps per minute during the most active 30 minutes of the day. Patients were followed for a minimum of 2 years. Linear mixed effects regression was used to test whether changes in step activity or survey responses across follow-up differed by surgery type. The independent variables were time and type of surgery. The time of follow-up was modeled as 5 dummies—3, 6, 12, 24, and 36 months, which were cross-referenced with the type of surgery. The subject was the random effect. The main effect of interest was the interaction between follow-up and surgery type. All analyses were repeated, adjusting for age. A subset analysis of arthrodesis vs arthroplasty was carried out in patients who received a second-generation implant.

Charts and data were reviewed for 269 patients. Of these, 46 patients had coronal deformity > 10° and were > 2 years posttreatment; 19 patients were treated with arthrodesis and 27 with arthroplasty. Thirteen of the arthroplasty patients received an Agility implant and 14 received the Salto Talaris. The coronal deformity averaged 19.2° in the arthrodesis group and 17.6° in the arthroplasty group. There were no statistically significant differences in baseline activity or pain scores between the 2 groups.

No statistically significant difference in pain improvement between the arthrodesis and arthroplasty groups was observed. There were no differences in MFA scores and overall step counts between the 2 groups. At baseline, the MFA score was not significantly different between the 2 groups. Patients in the arthrodesis group slowly improved over time up to about 2 years but then started to decline; the arthroplasty group had more dramatic improvement early on, which then leveled out.

There was no apparent difference in outcomes between the 2 groups in patients with coronal tilt. The patients receiving a second-generation implant had significantly better age-adjusted Peak Activity Index results compared with the arthrodesis group. Five secondary surgical procedures were performed in the arthroplasty group 1 to 4.5 years after surgery, all in the Agility subgroup. The procedures were done for poly wear (n = 2), deformity recurrence (n = 1), nonunion syndesmosis (n = 1), and tibial subsidence (n = 1). In the fusion group, there was a secondary procedure for a nonunion and for a recurrent deformity.

The results of this study demonstrated no significant difference in outcomes between patients treated with arthrodesis and those with arthroplasty for coronal deformity.