

## **ORIGINAL ARTICLE**

### **Safety and Efficacy of Achilles Tenotomy under Local Anaesthesia: as Part of the Ponseti Clubfoot Management - Experience at the Sudan clubfoot clinic**

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#### **Abstract:**

**Introduction:** Ponseti method of treatment of clubfoot is a gold standard method. It includes serial casting to be followed by percutaneous tenotomy of the Achilles tendon under local anaesthesia. In the current study the safety and efficacy of tenotomy under local anaesthesia following serial casting will be studied.

**Patients and Methods:** 89 patients who were seen at the Sudan Clubfoot clinic at Soba University Hospital between 2011 and 2012. All underwent serial casting according to Ponseti method and that was followed by Achilles tenotomy under local anaesthesia using a single stab using a size 15 scalpel.

**Results:** there were 89 patients (135 feet), 64 [71.9%] males and 25 (28.1%) females. 46 patients (51.1%) had bilateral involvement. Familial history was there in 11 (11.2%) babies. Tenotomy was performed in all feet after an average of 6.2 casts (range, 3 to 11). All were discharged 2 hours after the tenotomy. No adverse events were related to local anaesthesia and/or the procedure itself, and there was no delay in discharge in any of the operated babies. All patients had an uneventful course. Only one patient (1.12%) had previous conservative treatment before coming to the clinic. Pressure sores were observed as a result of casting in one foot. Residual equinus deformity after the tenotomy was experienced in 5 feet. 86 of the parents were satisfied with the correction. The rest; 3 patients (3.37%) were not satisfied because of the residual equinus.

**Conclusion:** Tenotomy procedure using local anaesthesia is an effective and safe procedure.

## **Introduction:**

Idiopathic clubfoot is a common congenital foot deformity with a worldwide incidence of 1:1000 live births. This incidence is affected by racial differences <sup>(1)</sup>. Ponseti method <sup>(2)</sup> is now the gold standard treatment. It consists of manipulation, serial casting to be followed by percutaneous tenotomy of the Achilles under local anaesthesia to correct residual equinus in over 85% of cases Percutaneous tenotomy was first reported in 1831 by Stromeyer <sup>(2, 3)</sup>. Manipulation and casting starts with cavus correction, a step which is not well addressed in the literature, it is to be followed by correction of the forefoot adduction, hind-foot varus and lastly the equinus is corrected and are best at birth than later <sup>(2, 4, 5)</sup>.

Tenotomy was first carried out by Ponseti under general anaesthesia but later he performed it under local anaesthesia <sup>(2)</sup>.

Achilles Tenotomy prevents the occurrence of rocker bottom deformity <sup>(6)</sup> as it makes the correction of the equinus deformity easy and heals in three weeks leaving minimal scar as it is regarded as minimally invasive surgery <sup>(2, 7)</sup>.

The goal of treatment is to reduce or eliminate clubfoot deformity so that the patient has a functional pain-free, plantigrade foot, with good mobility and without calluses, and does not need to wear modified shoes <sup>(2, 8)</sup>.

However some researchers think that, there is a structural deformities of the tarsal bones and joints in clubfoot that cannot be corrected fully, thus a normal foot should not be expected, even when the foot is clinically sound <sup>(2)</sup>.

The main objectives of this current work are to study the safety and efficacy of Achilles PCT under local anaesthesia as part of treatment of club foot at the Sudan Clubfoot Clinic.

## **Patients and Methods:**

All Club foot patients who were treated in the Sudan clubfoot clinic at Soba University Hospital (SUH) between August 2010 and August 2011 were enrolled in the study.

Records of all patients who underwent Percutaneous Tenotomy during the study period were reviewed retrospectively. Tenotomy was indicated when the forefoot was completely corrected and hind-foot showed rigid equinus according to Pirani Score. <sup>(6)</sup>

Tenotomy was performed in the theatre, after local preparation of the area using Povidone Iodine and Spirit, by injection of 1 ml of 2 % Lidocaine without adrenaline. Then by a single scalpel stab the Achilles tendon is divided <sup>(6)</sup>. The procedure is performed when mid foot Pirani score was zero <sup>(9)</sup>, this was followed by the application of well-moulded long-leg plaster casts. The cast was then applied and kept on for 3 weeks. Surgical reports regarding Achilles tenotomy were reviewed, and data were collected from postoperative notes. We specifically looked for post-operative complications, recovery unit notes, and hospital readmission and Pirani Score <sup>(6)</sup> after removal of cast. Parents' satisfaction was measured using a modified form of Disease Specific Instrument (DSI) <sup>(10)</sup> (see Table 1).

**Table1. Modified Disease Specific Instrument (DSI) <sup>(10)</sup>**

Factor	Question
Satisfaction	1. How satisfied are you with the status of your child's foot?
	2. How satisfied are you with the appearance of your child's foot?
	3. Rate the amount of teasing your child has related to the clubfoot.
	4. Rate problems finding shoes that fit your child
	5. Rate problems finding shoes that your child likes.
Function	6. Does your child complain of pain in the foot that was operated on?
	7. Rate your child's limitations in the following activities:
	A. Walking
	B. Running
	8. How much does your child complain of pain during heavy exercise?
	9. How much does your child complain of pain during moderate exercise?

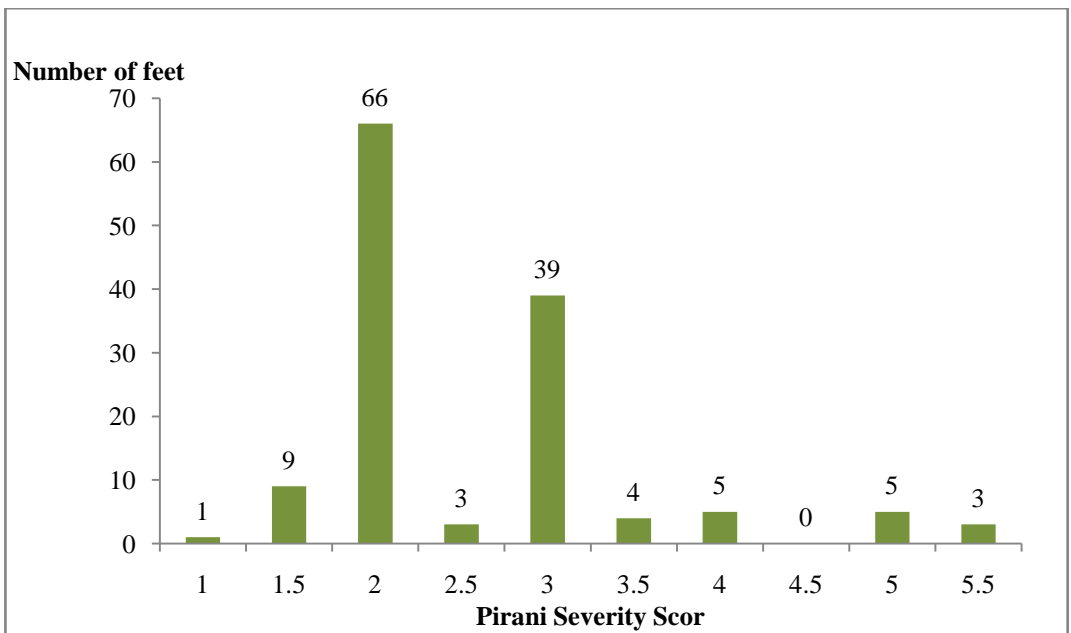
**Results:**

There were 89 patients, 64 males (71.9) 25 females (28.1), of the 89 patients 46 patients had bilateral and 43 had unilateral; a total of 135 feet. 11 (12.3%) of the 89 patients had family history of clubfoot.

Of these 135 feet, 108(80%) had Pirani score between 2 and 3. (Fig.1). Number of serial plaster casting ranged between 3 and 11 mean of 6.2 Tenotomy was

performed in all the 135 feet. All patients were discharged two hours after the surgery. One foot (0.7%) developed pressure ulcer from the plaster, it was less than one cm in diameter and needed no specific treatment. It healed with normal dressing and did not affect the outcome and the management.

The average length of treatment to full correction was 9 weeks with a minimum of 4 weeks and a maximum of 14 weeks. Persistent Equinus deformity after the tenotomy was observed in five feet (3.7%). Of the 89 patients 86(96.6%) were satisfied from function and shape of the foot. Three patients (3.4%) were not satisfied and needed further treatment.



**Figure 1 Pirani Score for 135 feet**

### **Discussion:**

Clubfoot is a complex deformity of foot that requires meticulous and dedicated efforts from the treating physician and parents for the correction of the deformity<sup>(11)</sup>. The Ponseti method for management of clubfoot<sup>(1, 12)</sup> requires serial corrective casts to be followed with percutaneous tenotomy when indicated then

with long-term bracing to maintain the correction.

Males are generally more affected than females, but the male to female ratio varies according to authors. In this series it was 2.6:1. Bitariho<sup>(13)</sup> found it 6:1. Others<sup>(14, 15)</sup> found the ratio comparable to ours; 3:1. There is no explanation for these variations.

Family history is a valid issue to be noted, and in this current study those who had family history were 11.2%, this finding goes with a previous study by Dobbs<sup>(16)</sup> who reported 12% in his series.

The average number of manipulations and Plaster Of Paris casting before the tenotomy in our series was nine; it was higher than what was reported by Ponseti<sup>(2)</sup>, Lebel<sup>(17)</sup>, Bore<sup>(10)</sup>, and Laaveg et al.<sup>(8)</sup> but was lower than what was reported by Morcuende<sup>(18)</sup>.

Pirani score has a reliable and reproducible scoring system to grade severity of clubfoot<sup>(19)</sup>. In grading severity in this current study we observed that feet in which Pirani score was four or more, needed more sessions of casting but at the end of casting sessions and tenotomy all were equally well corrected; a report by Scher et al<sup>(6)</sup>, stated that children with Pirani score five or more are likely to need tenotomy, but at the end of the casting sessions and tenotomy all had the same outcome.

In this current study 86.6% of patients did not need further surgery and parents were satisfied with the outcome, bore in his series reported 89% of parents were satisfied<sup>(10)</sup>, in some other reports satisfaction was 78%<sup>(18, 20)</sup>, Ippolito et al.<sup>(4)</sup> also reported excellent results in 94%(18 of 19 feet). Thus the success rate ranges between 78% and 94%.

Clinical evidence for the regeneration of the Achilles tendon was observed three to five weeks after tenotomy in all feet in our series, we did not do MRI or ultrasound because clinical and ultrasound were found to correlate well by Barker and Levy<sup>(21)</sup>; they had clinical and ultrasonographic evidence of healing in three to six weeks. A similar result was found by Saini<sup>(22)</sup>; who reported in his series all tendons were palpable six weeks after the tenotomy and this clinical finding was proved using MRI.

The adverse effects and complications of tenotomy under local anaesthesia following Ponseti technique is uncommon<sup>(2, 17)</sup> however, Dobbs<sup>(11)</sup> reported that four patients of his series had severe bleeding after tenotomy. In our series we did

not have any complication.

Parents were asked about their satisfaction with the functional outcome; 86 out of 89 (96.6%) were satisfied. In 3 patients (3.4%), the deformity needed further corrective measures. A comparable result was reported by Morcuende <sup>(18)</sup> and Ponseti <sup>(2)</sup>.

### **Conclusion:**

Achilles Tenotomy under local anaesthesia as part of Ponseti Method for treatment of clubfoot is effective with good outcome and safe as well.

### **Recommendation:**

It is recommended that Ponseti method including PCT of the Achilles tendon for treatment of clubfoot is to be practiced in units dealing with clubfoot as an effective and safe method.

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