

Idiopathic clubfoot management by Ponsetti technique hyperkyphosis

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Abstract

Background: Clubfoot is a birth defect where one or both feet are rotated inwards and downwards. The affected foot, calf and leg may be smaller than the other. In about half of those affected, both feet are involved. **Aims and Objective:** To study Idiopathic clubfoot management by ponsetti technique. **Methodology:** This was cross-sectional study carried out in the pediatric with idiopathic club foot less than one year age presented to the orthopedic department during the two year period were included into the study. In the two year period there were 52 patients after written explained consent were enrolled to study. All of them undergone ponsetti technique for the management of idiopathic club foot. At the end all of them evaluated by Pirani score. The statistical analysis was done by paired t-test and calculated by SPSS 19 version software. **Result:** the majority of the patients were in the age group of 0-3 (months) were 48.08%, followed by 3-6 were 25.00%, 6-9 were 17.31%, 9-12 were 9.62%. The Majority of the patients were Female i.e. 67.31% and Male were 32.69%. In all the age groups the Post treatment Pirani score significantly differed as compared to pre treatment score i.e. 0-3 Years. (n=25)- 6.12 \pm 1.94 and 1.23 \pm 0.98 (t=11.24,df=49,p<0.0001); 3-6 Years. (n=13) were 5.89 \pm 2.12 and 0.95 \pm 0.23 (t=12.34,df=49,p<0.0001); 6-9 Years. (n=9) were 6.32 \pm 3.12 and 0.78 \pm 0.13 (t=13.45,df=49,p<0.0001); 9-12 Years. (n=5)- 5.63 \pm 3.54 and 1.17 \pm 0.56 (t=10.27,df=49,p<0.001) overall in all age groups score was 5.99 \pm 0.30 and 1.03 \pm 0.21 (t=12.92,df=103,p<0.001) respectively in Pre-treatment score and Post treatment score. **Conclusion:** It can be concluded from our study the ponsetti technique was very effective in the management of Idiopathic club foot with respect to Pirani score for the assessment of club foot.

Key words: Ponsetti technique, Pirani score, Idiopathic clubfoot.

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INTRODUCTION

Clubfoot is a birth defect where one or both feet are rotated inwards and downwards.¹⁴ The affected foot, calf and leg may be smaller than the other.¹ In about half of those affected, both feet are involved.¹ Most cases are not associated with other problems.¹ Without treatment, people walk on the sides of their feet, which causes problems with walking.² The exact cause is usually

unclear.¹ A few cases are associated with distal arthrogryposis or myelomeningocele.² If one identical twin is affected, there is a 33% chance the other one will be as well.¹ Diagnosis may occur at birth or before birth during an ultrasound exam.¹² Initial treatment is most often with the Ponseti method.¹ This involves moving the foot into an improved position followed by casting, which is repeated at weekly intervals.¹ Once the inward bending is improved, the Achilles tendon is often cut, and braces are worn until the age of four.¹ Initially, the brace is worn nearly continuously and then just at night.¹ In about 20% of cases, further surgery is required.¹ So in our study we have seen effectiveness of ponsetti technique for the management of idiopathic club foot in children at tertiary health care.

METHODOLOGY

This was cross-sectional study carried out in the pediatric with idiopathic club foot less than one year age presented

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to the orthopedic department during the two year period were included into the study. In the two year period there were 52 patients after written explained consent were enrolled to study. All necessary details of the patients were noted like age, sex, pre interventions Pirani score noted. All of them undergone all routine investigations including

radiological like USG etc. All of them undergone ponsetti technique for the management of idiopathic club foot. At the end all of them evaluated by Pirani score. The statistical analysis was done by paired t-test and calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of the patients as per the age (months)

Age (months)	No.	Percentage (%)
0-3	25	48.08
3-6	13	25.00
6-9	9	17.31
9-12	5	9.62
Total	52	100.00

The majority of the patients were in the age group of 0-3 (months) were 48.08%, followed by 3-6 were 25.00%, 6-9 were 17.31%, 9-12 were 9.62%.

Table 2: Distribution of the patients as per the sex

Sex	No.	Percentage (%)
Female	35	67.31
Male	17	32.69
Total	52	100.00

The majority of the patients were Female i.e. 67.31% and Male were 32.69%

Table 3: Distribution of the patients as per the Pirani score

Age group	Pre-treatment score	Post treatment score	p-value (paired t-test)
0-3 (n=25)	6.12 ± 1.94	1.23 ± 0.98	t=11.24,df=49,p<0.0001
3-6 (n=13)	5.89 ± 2.12	0.95 ± 0.23	t=12.34,df=25,p<0.0001
6-9 (n=9)	6.32 ± 3.12	0.78 ± 0.13	t=13.45,df=17,p<0.0001
9-12 (n=5)	5.63 ± 3.54	1.17 ± 0.56	t=10.27,df=9,p<0.001
Overall in All age groups (n=52)	5.99 ± 0.30	1.03 ± 0.21	12.92,df=103,p<0.001

In all the age groups the Post treatment Pirani score significantly differed as compared to pre treatment score i.e. 0-3 Years. (n=25)- 6.12 ± 1.94 and 1.23 ± 0.98 (t=11.24,df=49,p<0.0001); 3-6 Years. (n=13) were 5.89 ± 2.12 and 0.95 ± 0.23 (t=12.34,df=25,p<0.0001); 6-9 Years. (n=9) were 6.32 ± 3.12 and 0.78 ± 0.13 (t=13.45,df=17,p<0.0001); 9-12 Years. (n=5)- 5.63 ± 3.54 and 1.17 ± 0.56 (t=10.27,df=9,p<0.001), overall in all age groups 5.99 ± 0.30 and 1.03 ± 0.21 (t=12.92,df=103,p<0.001) respectively in Pre-treatment score and Post treatment score

DISCUSSION

Ponsetti treatment was introduced in UK in the late 1990s and widely popularized around the country by NHS physiotherapist Steve Wildon. The manipulative treatment of clubfoot deformity is based on the inherent properties of the connective tissue, cartilage, and bone, which respond to the proper mechanical stimuli created by the gradual reduction of the deformity. The ligaments, joint capsules, and tendons are stretched under gentle manipulations. A plaster cast is applied after each manipulation to retain the degree of correction and soften the ligaments. The displaced bones are thus gradually brought into the correct alignment with their joint surfaces progressively remodeled yet maintaining congruency. After two months of manipulation and casting the foot appears slightly over-

corrected. After a few weeks in splints however, the foot looks normal. Proper foot manipulations require a thorough understanding of the anatomy and kinematics of the normal foot and of the deviations of the tarsal bones in the clubfoot. Poorly conducted manipulations will further complicate the clubfoot deformity. The non-operative treatment will succeed better if it is started a few days or weeks after birth and if the podiatrist understands the nature of the deformity and possesses manipulative skill and expertise in plaster-cast applications.³ The Ponsetti's technique is painless, fast, cost-effective and successful in almost 100% of all congenital clubfoot cases. The Ponsetti method is endorsed and supported by World Health Organization⁴⁵ National Institutes of Health,⁶ American Academy of Orthopedic Surgeons,⁷ Pediatric Orthopedic

Society of North America,⁸ European Pediatric Orthopedic Society,⁹ CURE International, STEPS Charity UK,¹⁰ STEPS Charity South Africa,¹¹ and A Leg to Stand On (India).¹² In Ponseti method of management the first element of correction is the cavus deformity by positioning the forefoot in proper alignment with the hindfoot.^{13,14} Cavus, which is due to the pronation of the forefoot in relation to the hindfoot requires only elevating the first ray of the forefoot to achieve a normal longitudinal arch of the foot. The forefoot is supinated not too high or too flat so that the plantar surface of the foot reveals a normal appearing arch. For subsequent correction of adducts and varus, alignment of the forefoot with the hindfoot is necessary to give an effective abduction movement of the foot. Using the stabilized talar head as fulcrum the foot is abducted. Pronation or eversion of the foot and external rotation of the foot to correct adduction while calcaneus remains in varus are to be avoided. Eversion of the calcaneus to correct heel varus (Kites error) is not possible unless the calcaneus is abducted (i.e., laterally rotated) under the talus. Kite explained in his method of correction to abduct the forefoot against pressure at the calcaneocuboid joint which Ponseti described as Kites error.¹⁵ It blocked the correction of hindfoot varus and internal rotation. Ponseti technique has been reported with 92 to 98 % successful results for the treatment of idiopathic clubfoot.^{16,17-19} In our study we have seen that the majority of the patients were in the age group of 0-3 (months) were 48.08%, followed by 3-6 were 25.00%, 6-9 were 17.31%, 9-12 were 9.62%. The Majority of the patients were Female i.e. 67.31% and Male were 32.69% . In all the age groups the Post treatment Pirani score significantly differed as compared to pre treatment score i.e. 0-3 Years. (n=25)- 6.12 \pm 1.94 and 1.23 \pm 0.98 (t=11.24,df=49,p<0.0001); 3-6 Years. (n=13) were 5.89 \pm 2.12 and 0.95 \pm 0.23 (t=12.34,df=49,p<0.0001); 6-9 Years. (n=9) were 6.32 \pm 3.12 and 0.78 \pm 0.13 (t=13.45,df=49,p<0.0001); 9-12 Years. (n=5)- 5.63 \pm 3.54 and 1.17 \pm 0.56(t=10.27,df=49,p<0.001), overall in all age groups 5.99 \pm 0.30 and 1.03 \pm 0.21 (t=12.92,df=103,p<0.001) respectively in Pre-treatment score and Post treatment score. These findings are similar to Harshal Suhas Sakale²⁰ they found The mean initial Pirani on presentation was 0-4 months was 5.4, 4-8 months was 5.61, and more than 8 months was 5.8 was improved to 0.13, 0.27, and 0.7, respectively. Sharma Pulak²¹ *et al* found that was a significant difference in the pre-treatment and the post-treatment Pirani score and goniometry values.

CONCLUSION

It can be concluded from our study the ponsetti technique was very effective in the management of Idiopathic club foot with respect to Pirani score for the assessment of club foot.

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