

What is the podiatrist's role in the modern day treatment of Talipes Equinovrus?

The third in a series of three articles by Janet McGroggan, joint winner of the Cosyfeet Podiatry Award 2009

Abstract

In two previous articles I introduced the work of Dr Ponseti in the non-surgical correction of talipes equinovarus and described the methodology of the treatment.

This article will summarize the second day of the Ponseti Workshop I attended in Manchester on the 11th October 2010. I will then go on to discuss recent literature pertaining to gait analysis of corrected feet and what we may expect to see in podiatry gait labs in the future as a result of these findings. Further to this I will describe the structure of a Ponseti clinic and the implications for podiatrists in such clinics. Finally I will refer to current literature in all aspects of the Ponseti method and bring us up to date on the topic.

The second day of the Ponseti Method Workshop in Manchester's Chancellor's Hotel and Conference Centre was an 'Advanced Course' and was attended by many experienced practitioners eager to revise their skills and catch up with current research. Following a history of the Life and Work of Dr Ponseti,¹ a recap on the technique² and a plastering master class, Naomi Davis reviewed a number of case studies in which the patients had kindly come, or been brought, along. These varied from a mother who described her experience of antenatal advice, to a baby currently undergoing treatment. Also present was a young boy who had mismanaged complex clubfoot plus a knee pathology, and a young girl who had been through several failed surgical corrections.

Miss Davis³ then presented a talk on treating the complex foot, also known as the atypical clubfoot. The atypical clubfoot is tight posteriorly and on the plantar aspect rather than medially as expected. It is not necessarily obvious at the initiation of treatment that the foot is atypical, but if during manipulation the anterior process of the calcaneus comes out from underneath the talus early, and correcting the equinus and plantaris is difficult, then this is an indication that something is unusual. The result will be an over abducted foot with a lateral crease. Continuing on with treatment can result in the foot swelling, causing constant cast slippage. As the child gets older and stronger the foot can get stuck in cavus and equinus. Failure to stop treatment at this point can result in a break of the mid foot. When recognized, the foot can be treated using a modified Ponseti technique.

By removing the casts and allowing swelling to reduce, the deformity can revert to its original form and the modified technique can begin. Abducting gently to no more than 30° the cavus and equinus is addressed early by extending all the metatarsals simultaneously with both thumbs and casting. Good moulding around the heel will help prevent slippage, as will keeping the knee at 90° and taking the plaster high on the thigh. In this treatment technique the practitioner will feel the anterior process of the calcaneus moving out from beneath the talus around the third cast. When this happens and the foot is in marked equinus and cavus then the practitioner must

actively manipulate the foot into dorsiflexion. The tenotomy may need to be repeated in such cases and further dorsiflexion can take place in the boots. Walking will improve the rear foot but the feet must be carefully monitored for recurrence so this can be treated immediately.

Following this talk, Stephanie Bohm⁴, an orthopaedic surgeon from Basel, Switzerland, with a particular interest in research associated with the Ponseti method, presented case studies where talipes was associated with other conditions such as Spina Bifida and Arthrogyrosis. The Ponseti method was successfully used in these cases. Guy Atherton⁵ then discussed Congenital Vertical Talus, a condition which he has successfully treated with a combination of surgical and modified Ponseti method. Other conditions which have also been treated via the Ponseti method but using fewer casts are metatarsus adductus and positional clubfoot. Details of these were presented by Denise Watson,⁶ a physiotherapist from Chelsea and Westminster Hospital.

Jennifer McCahill,⁷ from the Oxford Gait Laboratory, presented her research on the correlation between plantar pressure (using a prototype piezoresistive pressure plate) and Oxford Foot Model (OFM) kinematics in clubfoot. The kinematic data was collected with a 12 camera Vicon 612 system. Using visual markers in conjunction with pressure plates the researchers superimposed anatomical landmarks onto pressure footprints. This allowed them to divide the foot into five sub-sections based on the anatomical landmarks and correlate the peak force from each sub-section with clinically relevant variables from the OFM.

McCahill reported that by dividing the pressure footprint into medial and lateral forefoot, medial and lateral rear foot and midfoot they found an inverse correlation between forefoot supination in relation to the rear foot and medial/lateral heel force. This indicates forefoot pronation compensating for rear foot varus. Midfoot force was significantly higher in affected limbs when compared to a normal control group. The research concluded that rear foot loading influenced forefoot positioning.

I managed to chat with Jennifer McCahill over coffee, explaining that I was trying not only to involve podiatrists in the Ponseti treatment but in the long term aftercare. She was very encouraging and recognized that podiatrists are well trained and well placed to undertake such work. She also pointed out that research into midfoot pressures was needed and saw this area as one in which podiatrists could perhaps assist. She later emailed me two articles pertaining specifically to midfoot pressures.

Research that Stephanie Bohm was involved in^{8,9} showed significantly higher maximum force, contact area and impulse moment in the midfoot region compared to normal values and stated that the increased contact area was not easily understood. Conversely, the midfoot plantar pressures showed no significant differences to normal values. However, the rear foot plantar pressures were reduced in affected feet. This was attributed to the delayed development of muscular activity. (The average age of subjects was three years). They also observed significantly higher plantar pressure values in the whole foot in the non-affected limbs in unilateral cases.

For me, this was the area of the course that I had been waiting for. What residual anomalies pertaining to gait and deformity will we be presented within our clinics as the children treated using the Ponseti method mature? Podiatrists will need to be prepared for patients who have been treated using the Ponseti method presenting once skeletal maturity has been reached or as the aging process causes pathological gait changes. Research has shown excessive internal tibial torsion can be problematic in such patients^{10, 11} and the significance of the subtalar joint as an interface between the leg and foot should not be underestimated when treating associated pathologies.

There is also evidence that vascular and neurological conditions^{12,13} exist as a result of the original deformity that cannot be corrected by manipulation or a single surgical procedure. This research is still in its infancy and in the future it may become evident that the podiatrist is not only required to monitor the gait of patients born with talipes on a regular basis but carry out vascular and neurological assessments also.

The Ponseti method is currently provided in the NHS in a 'hub and spoke' form¹⁴. The 'hub' clinic is in a hospital and the 'spoke' clinics are a number of secondary care clinics in the community. These physiotherapist-led clinics free up orthopaedic consultants' time and are convenient for families, preventing long weekly journeys to specialist hospitals and reducing in-clinic waiting times. The families attend the 'hub' for the tenotomy and brace fitting, and the 'spoke' for serial manipulation and casting (see chart 1)¹⁵.

Trials showed that providing treatment in secondary care clinics results in fewer tenotomys, most likely as a result of earlier intervention. This clinic design also reported that the use of a number of trained clinical specialists reduced the effect of absenteeism through holidays and sickness.

It is interesting that podiatrists are not currently involved in the provision of treatment for talipes as it is a lower limb complaint and we are lower limb specialists. Our knowledge of functional anatomy and biomechanics makes podiatrists the ideal health profession to provide the Ponseti method of treatment.

In a recent article, Donald Lorimer¹⁶ considered the future of podiatry, whose evolution into a science has often been hindered by financial constraints within the NHS. He pointed out that we do not want to shift away from general podiatry, but that as a profession we must embrace new skills that allow us to be regarded as foot and lower-limb specialists. Lorimer predicts a sea change within podiatry where assistant practitioners are managed by podiatrists as dental hygienists are managed by dentists. This allows the practitioner to develop specialist interests without ostracising our core skills. We are trained to work both independently and as part of a team and we demonstrate professional autonomy. Autonomy allows us to have influence and freedom within our specialism. This is a privilege not afforded to all health professions and we should value this and use it to enhance our professional status¹⁷.

Due to the long term studies which demonstrate the effectiveness of the Ponseti method, the incidence of surgical correction of talipes is declining¹⁸. Research is now turning to gait analysis,^{8,9,10,11,19} classification systems²⁰ and using the method

to treat more complex cases such as untreated adults and children with associated pathologies^{4,5,6}.

Epidemiologists in Denmark²¹ and Sweden²² have reported an increase in the incidence of talipes. As the cause of talipes is still unknown the researchers could only speculate on the reasons for this. If, as some evidence suggests, there is a genetic aetiology, immigration has been proposed as a link as there is a higher incidence of talipes in the Far East and South Africa. The Danish study concluded that the rise is associated with an increase in population density and cited exogenous factors such as environmental stress, substance abuse and potential exposure to infection. These factors are more common in a dense population. The Danish study also pointed out that fewer foetuses with talipes are being aborted and therefore the statistics show an increase in live births with talipes. Whatever the aetiology, this fact indicates that the UK could have a significant increase in talipes patients in the future as the condition is de-stigmatised.

I was the only podiatrist on this course and chatting to physiotherapists I felt that our involvement would be welcomed. One lady actually said that she wished they had a podiatrist on their team as our biomechanical knowledge is superior to that of the orthotists they use.

It is important that we are trained in the Ponseti technique even if we use this information only to enhance our understanding of the condition and the corrected limb. The majority of treated patients in the UK at the moment are children. One study actually recommended that it would be best if these patients were advised to adopt sedentary careers to maintain long term correction²³. I feel that podiatrists are critical to allowing treated talipes patients to lead a full life, choosing whatever career and hobbies they wish through the use of gait analysis, orthotics, vascular and neurological assessments. Long term correction may be maintained through a long term relationship with a podiatrist.

For a FREE DVD called 'How to do "The Ponseti Method" Including Atypical Club Foot' please email Stella Morris at stella@c-prodirect.co.uk or go to www.c-prodirect.co.uk

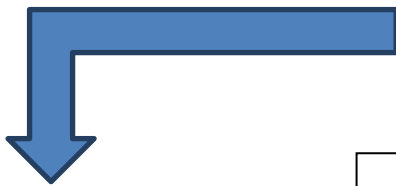
For a FREE DVD called 'Parents Guide to Clubfoot. The Ponseti Method' please contact www.steps-charity.org.uk You can also stream this film from http://www.steps-charity.org.uk/links/4-14-clubfoot_or_talipes.php

Ante-/Postnatal diagnosis
Meet parents – discussion of
treatment, information sources,
contact details

Chart 1: Physiotherapist delivered pathway for Ponseti clinic.



Commence treatment 1-2 weeks post (ideal) birth
Weekly assessments, manipulations and casting
Additional telephonic contact in between cast changes if required
Once desired abduction achieved discussion/review with
consultant regarding need for tenotomy



No tenotomy



Tenotomy
Cast for 3 weeks, except if improved range of
movement can be achieved with cast change (done at
week 2 for one further week)
Telephone contact first week post-operatively



Removal of plaster and application of foot abduction splint
Further discussion, practice sessions and regular telephone contact
Full time 3 months
At night and nap time 4 years (consideration of less if foot is very
mild)



Regular Follow-up
Next day phone call (after brace applied)
Clinical review – week 1,2,6,9,12. Every 2-3 months
thereafter or sooner if new brace required
Consultant review 6 monthly

Related images:



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References

1. Hulme, A. 2010. The Ponseti Method Workshop. *The Life and Work of Dr Ponseti*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
2. DeKiewiet, G. 2010. The Ponseti Method Workshop. *Recap – The Ponseti Technique*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
3. Davis, N. 2010. The Ponseti Method Workshop. *Treating the Complex foot*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
4. Bohm, S. 2010. The Ponseti Method Workshop. *Spina Bifida and Arthrogyrosis*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
5. Atherton, G. 2010. The Ponseti Method Workshop. *Congenital Vertical Talus*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.

6. Watson, D. 2010. The Ponseti Method Workshop. *Protocols for Metatarsus Adductus and Positional Clubfoot*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
7. McCahill, J. 2010. The Ponseti Method Workshop. *Outcome Tools and Gait Analysis*. [lecture] October 11. Manchester: The Chancellor's Hotel and Conference Centre.
8. Bosch, K., Bohm, S., Sinclair, M.F. & Rosenbaum, D. 2008. Foot loading patterns in children after Ponseti clubfoot treatment. *Clinical Biomechanics*. 23 pp665-666.
9. Sinclair, M.F., Bosch, K., Rosenbaum, D. & Bohm, S. 2009. Pedobarographic analysis following Ponseti treatment for congenital clubfoot. *Clin Orthop Relat Res*. 467 pp1223-1230.
10. El-Hawary, R., Karol, L.A., Jeans, K.A. & Richards, B.S. 2008. Gait analysis of children treated with physical therapy or the Ponseti cast technique. *J Bone Joint Surg Am*. 90pp1508-1516.
11. Gottschalk, H.P., Karol, L.A. & Jeans, K.A. 2010. Gait analysis of children treated for moderate clubfoot with physical therapy versus the Ponseti cast technique. *J Pediatr Orthop*. 30(3)pp235-9.
12. Dobbs, M.B., Gordon, J.E. & Schoenecker, P.L. 2004. Absent posterior tibial artery associated with idiopathic clubfoot. *J Bone Joint Surg Am*. 86pp599-602.
13. Klychkova IJ. 2008. Clinical and physiological examination of congenital clubfoot (principles and results). In: Bensahel H, Kuo KN, Lehman. *Fifth Annual Clubfoot Congress IFPOS & ICFSG*, August 27-28, Hong Kong. *Journal of Childrens Orthopaedics* 3:67-83, 2009.
14. Waite, J. 2010. The Ponseti Method Workshop. *Setting up a Clinic in the UK*. [lecture] October 10. Manchester: The Chancellor's Hotel and Conference Centre.
15. Kampa, R., Binks, K., Dunkley, M. & Coates, C. 2008. Multidisciplinary management of clubfeet using the Ponseti method in a district general hospital setting. *J Child Orthop*. 2 pp463-467.
16. Lorimer, D. 2009. The scope of podiatry – use it or lose it. Podiatry as a science. *Podiatry Now*. January. pp22-23.
17. Mandy, P. 2008. Demons and slaves: autonomy and status in professional practice. *Podiatry Now*. May. pp 23-25.
18. Bridgens, J. & Kiely, N. 2010. Clinical review. *BMJ*. 340:c355.
19. Nabeshima, Y., Mori, H., Fujii, H., Ozaki, A., Mitani, M. & Fujioka, H. 2009. Ankle valgus and subtalar varus in treated clubfoot. *J Foot Ankle Surg*. 48(6)pp615-9.

20. Chu, A., Labar, A.S., Sala, D.A., van Bosse, H.J. & Lehman, W.B. 2010. Clubfoot classification: correlation with Ponseti cast treatment. *J Pediatr Orthop.* 30.
21. Krogsgaard, M.R., Jensen, P.K., Kjaer, I., Husted, H., Lorentzen, J., Hvass-Christensen, B., Christensen, S.B., Larsen, K. & Sonne-Holm, S. 2006. Increasing incidence of club foot with higher population density. *Acta Orthopaedica.* 77(6)pp839-846.
22. Engesaeter, L.B. 2006. Increasing incidence of clubfoot. Changes in the genes or the environment? *Acta Orthopaedica.* 77(6)pp837-838.
23. Cooper, D.M., & Dietz, F.R. Treatment of idiopathic clubfoot. A thirty-year follow-up note. *J Bone Joint Surg Am.* 1995. 77pp1477-1489.