

PONSETI BRASIL: A NATIONAL PROGRAM TO ERADICATE NEGLECTED CLUBFOOT – PRELIMINARY RESULTS

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ABSTRACT

Background

After hearing about the reproducible and excellent results of the Ponseti method for clubfoot treatment, a group of Brazilian orthopaedic surgeons organized and participated in a standardized national program to teach the Ponseti technique in 21 different cities across Brazil.

Methods

A total of 21 Ponseti symposiums were organized in a standard fashion from January, 2007 to December, 2008. They consisted of a two-day program with lectures, hands-on cast application, and discussion of local clinical cases presented by orthopaedic surgeons. Thirteen Brazilian orthopaedic surgeons, who had been trained by the University of Iowa or centers recognized by them, taught the method. Financial support for travel was provided by an English charity: La Vida (Vital Investment for Developing Aid in Latin America). The physicians who attended the symposiums answered questionnaires before and after the training.

Results

About 7% of the 8000 orthopaedic surgeons in Brazil (556 orthopaedic surgeons) were trained. These orthopaedic surgeons stated that they had treated about 4905 babies in the previous year via other methods, including extensive surgery. Seventeen percent of the surgeons did not know about the Ponseti technique at the start of the symposium. Eighty-eight percent reported they felt able to treat children with the Ponseti technique after the symposium. Ninety-four percent of respondents reported that the symposium changed their way of treating clubfoot.

Conclusions

These Ponseti symposiums brought about an exchange of medical information and empowered the participants. This program is a good educational tool which can be used in eradicating neglected clubfoot in Brazil.

INTRODUCTION

Congenital clubfoot is an orthopaedic deformity affecting the foot and leg that consists of a combination of equinus of the ankle, hindfoot varus, and cavus and adduction of the forefoot. Worldwide, it occurs in 0.39 of 1000 newborns, with differences related to race and ethnic group. It is the seventh most common congenital and the first most common congenital anomaly involving the musculoskeletal system.¹ In Brazil, clubfoot occurs in approximately two of 1000 newborns; it is estimated that about 7000 children are born in Brazil with one or two clubfeet every year (www.ibge.gov.br).

The severity of clubfoot deformity varies. About 130,000 children worldwide are born every year with clubfoot, many in developing countries where they do not get proper treatment, resulting in a neglected deformity.²⁻⁷ The neglected clubfoot is a social, psychological, and physical burden for the patient, his/her family, and society. It is the most important cause of physical disability among all congenital musculoskeletal defects.⁵ In the next ten years, there will be about 2 million adults living with this deformity who could easily have been treated in their first months of life.¹

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Children with neglected clubfoot can become locked in a cycle of deformity, incapacity, dependence, demoralization, depression and segregation. These children are intellectually able to participate in school activities, but many do not have the opportunity. Less than 2% of children with deformities are in school in developing countries. The more difficulty these children have walking, the less likely they are attend school.⁶ In rural societies, physical incapacity is the most important cause of disease and poverty. People with deformities have economic and social disadvantages with few opportunities for education or a professional life.^{6,7}

Ten years ago, standard treatment for congenital clubfoot in Brazil consisted of the Kite technique, as first published in 1939⁸. This technique consists of corrective manipulations followed by applications of short-leg casts for three to 12 months, followed by posteromedial releases in 60 to 80% of cases. The results of this technique have proven unsuccessful. Aronson et al. described deformity, disability and complications from this technique.⁹ Dobbs et al.¹⁰ described long-term results after posteromedial release which confirmed the clinical impression that feet treated with this technique were more rigid and painful, and often required multiple surgeries. Additionally, extensive surgery is expensive and requires the expertise of tertiary medical centers with well-trained specialists and general anesthesia.

The Ponseti method is a well-described treatment consisting of five to seven serial casts applied after manipulations followed by a tenotomy. To prevent recurrence, continuous use of an abduction brace is recommended for three months and then during night time (14 hours) until the child is four years of age.^{1,11}

Feet treated with this technique are flexible, mobile, functional, and are clinically very close to normal.^{1,11} This is corroborated by published long-term follow-up studies.^{12,13} These results have been reproduced in clinics all around the world.^{2-5,7,14-23} The correction rate with the Ponseti technique (over 90%) can be accomplished in about two to three months. Extensive surgery is rarely indicated.

Furthermore, the Ponseti technique has been used in Brazil to treat neglected clubfeet, even after a child achieves walking age, with good results⁵. It has also been demonstrated that the Ponseti method can be successful in clubfoot that recurs after extensive surgery.²⁴ This makes the Ponseti method a very powerful tool in public health, a much more “democratic” treatment that is cost effective and can be made accessible. This method is very useful for developing countries. The technique is easy to teach, but requires great attention to detail. It is very important for health care practitioners to counsel parents regarding the bracing protocol after correction,

to avoid recurrences.^{6,7,23} Treatment is not expensive, and is painless for babies. When the Ponseti method proves successful in Brazil, it should reduce the number of disabled people with clubfeet.

Medical education projects employing the Ponseti method are the most effective way to reduce neglected clubfoot deformities. As reported by the World Health Organization in 2002²⁵, the best approach to pediatric problems in developing countries includes strengthening educational projects. Good examples are the Uganda Clubfoot Project⁶, the project developed in Nepal²³, and most recently, clubfoot projects in Mali (Radler, C), Kenya (Mayo, Cure International), Malawi²⁶ and Haiti (Kay Wilkins and Patrick De Heer). Similar projects have been developed since 2007 in Ethiopia and Cambodia and are expanding into the Dominican Republic, Honduras and Nigeria. Those programs are producing good results under adverse conditions including political instability and a shortage of practitioners. Happily, these conditions do not exist in Brazil.

A group of Brazilian orthopaedic surgeons heard of the reproducible and excellent results of the Ponseti method of clubfoot treatment around the world and organized a standardized national program to teach the Ponseti method in 21 different cities in Brazil. This study describes the Ponseti method training program titled “Ponseti Brasil”, and evaluates the preliminary results of the training program.

METHODS

Program characteristics

“Ponseti Brasil” consisted of training groups of 15 to 30 Brazilian orthopaedic surgeons in 21 different cities in Brazil. The cities included in the program were: Manaus, Belém, Goiânia, Campo Grande, Brasília, São Luis, Teresina, Fortaleza, Natal, Recife, Maceió, Aracaju, Salvador, Belo Horizonte, Rio de Janeiro, Vitória, Londrina, Uberlândia, Florianópolis, Campina Grande and Porto Alegre. The orthopaedic surgeons were contacted by letter or electronic message and were asked to participate in two days of training, free of cost. Regional centers were chosen to maximize the number orthopaedic surgeons who could be trained. Some cities were not included because it was known that they already had a number of surgeons trained in the Ponseti method.

Symposiums were held in 2007 and 2008 and were given by three instructors in each city, chosen from a group of 13 orthopaedic surgeons who were trained in the technique (all professionals with Ponseti training recognized by the University of Iowa – Ponseti International Association). Planning of the symposiums was based on regions of the Brazilian Orthopaedic Society in each state. Invitations were sent to the orthopaedic

surgeons listed in the state and in some cases, states nearby. Local leaders arranged for facilities and casting materials. Local doctors were encouraged to bring patients who agreed to participate (treated and untreated) for discussion. Thus, symposiums had characteristics specific to their own regions. Discussions included the treatment itself, but also the related issues of healthcare access, difficulty in obtaining the abduction brace, and specific issues unique to each region.

The “Ponseti Brasil” program consisted of a two-day course; Friday consisted of theoretical lectures in the morning followed by casting workshops with clubfoot models, and Saturday morning included clinical case discussions and abduction brace manufacturing. A manual printed in Portuguese was distributed with content adapted to Brazilian realities. The lectures were standard with specific content given to each of the faculty participants. The financial support for all faculty members for traveling and hotel stays was donated by La Vida, an English charity. (www.lavida.org.uk).

EVALUATIONS

Participants filled out a questionnaire before lectures on the first day of each symposium requesting identification data and contact information. The questions were:

- Do you treat clubfoot?
- Do you perform posteromedial releases?
- How many children did you treat last year?
- Have you ever heard of the Ponseti technique?
- What are your expectations from this symposium?

At the end of the symposiums, participants again filled out questionnaires. After completion of all the symposiums, results were compiled which are reproduced below with Likert scales (Table 1). After one year, another questionnaire was sent electronically to every participant asking them to provide additional information about how the Ponseti Method had been integrated into their practice.

Questions at one year were:

- How many patients have you treated with clubfoot?
- For how many of them did you apply the Ponseti technique?
- In how many patients was a successful correction obtained after casting and tenotomy?
- How many casts were used in each treatment?
- What were the main problems in using the Ponseti method?

RESULTS

Five-hundred and fifty-six orthopaedic surgeons (about 7% of the 8000 orthopaedic surgeons in Brazil) were trained in the Ponseti method by “Ponseti Brasil”.

TABLE 1.
Evaluation of Ponseti Symposium

Did the symposium correspond to your expectations?				
1	2	3	4	5
no	a little	reasonably	yes	was beyond
Was the Ponseti technique well presented?				
1	2	3	4	5
no	a little	reasonably	yes	was beyond
partially	totally			
With information from this course, do you consider yourself able to treat patients with Ponseti technique?				
1	2	3	4	5
no	could be	reasonably	yes,	yes
for sure	able	probably		
After your participation in the symposium are you convinced that Ponseti Technique is the most indicated way of treating clubfoot?				
1	2	3	4	5
no	not sure	could be	possibly	yes
Do you believe this symposium could have changed the way you treat clubfoot?				
1	2	3	4	5
no	a little	reasonably	possibly	yes
Suggestions and comments:				

The trainees answered a questionnaire before and after their symposium. All participants completed the initial form prior to the symposiums, but not all of them filled out the forms after the 2nd day, since some did not stay to the end of the second day. Fifty-two percent answered the final evaluation forms.

Orthopaedic surgeons who had participated in the Ponseti training answered the initial questionnaire, and stated they had treated about 4905 babies altogether in the year prior to the training using the Kite technique and posteromedial release. Seventeen percent did not know of the Ponseti method before their training. Eighty-eight percent reported that after training they felt able to treat children with the Ponseti method. Ninety-four percent of those reported the symposium changed their way of treating clubfoot.

After one year, an inquiry was sent electronically to symposium participants asking them to provide more

information about how the Ponseti technique was integrating into their practice. Only 4% of the 556 participants responded to this survey, a very small sample size. They were from 10 of the 21 cities where the symposiums took place. They had treated 160 patients altogether since their training. Sixty percent of them reported they treated all clubfoot patients with the Ponseti method. Seventy-eight percent reported successfully treating clubfeet in more than 90% of the patients they treated. On average, respondents reported applying a total of eight casts for correction of clubfoot.

When asked to cite problems or complications, these surgeons reported problems related to application of the casts (six), issues with the brace protocol such as getting the correct braces and fitting them (three), and issues related to cast removal (two). One surgeon commented on difficulties related to the evaluation of recurrence.

DISCUSSION

This program was very important in increasing awareness of the Ponseti method among orthopaedic surgeons in Brazil, but it is not yet known how many orthopaedic surgeons effectively mastered the technique. A hypothesis for this could be that the course was open and free of charge and some of the participants were curious and interested in knowing about the technique, but some of them may not have ever treated children with clubfeet.

Brazil has a population of 183 million people and about 8000 orthopaedic surgeons (SBOT, Brazilian Orthopaedic and Traumatology Society), one for every 22,800 inhabitants. The distribution of orthopaedic surgeons in Brazil is described in Table 2. With more than 8000 orthopaedic surgeons in Brazil, training in different states could potentially increase the number of orthopaedic surgeons treating children with clubfoot, reduce the occurrence of neglected clubfoot, reduce cost of treatment, and result in patients with better clinical results.

Unfortunately, only 52% of the evaluation forms were filled in by participants at the end of the symposiums: one reason for this was that many orthopaedic surgeons could not come for both days of the symposium and the forms were only presented at the end of the practical session on the second day. Other possible reasons were that the evaluation forms were printed and handed out by instructors, who may have been more concerned about course content. On the second day, the instructors would have been occupied with discussion and treatment of children brought by the local doctors. There were no clerical workers to distribute the forms, and many orthopaedic surgeons left before completing them.

Some consequences of the training could not be measured by the forms, but were noted by the instructors. One important consequence was the empowerment the

TABLE 2.
Distribution of orthopaedic surgeons
in Brazil in 2007.

States	Number of orthopaedic surgeons
Minas Gerais	809
Paraíba	74
Bahia	292
Rio de Janeiro	978
Ceará	160
Pernambuco	168
Amazonas	71
Pará	81
Mato Grosso do Sul	107
Sergipe	43
Rio Grande do Norte	70
Acre	11
Alagoas	48
DF	150
Espirito Santo	157
Goiás	238
Maranhão	40
Mato Grosso	74
Paraná	548
Piauí	41
Rio Grande do Sul	530
Rondônia	37
Roraima	6
Santa Catarina	268
São Paulo	2897
Tocantins	32
Total	7930

Source: www.sbot.org.br, December, 2007

symposiums gave each participant. Participants were provided with a treatment “tool” they could use, essentially the same treatment performed in well-equipped medical centers around the world, with expectations of getting the same excellent results. In a heterogeneous nation such as Brazil, this was very important. The symposiums also fostered cooperation among the orthopaedic surgeons from each center, as well as between trainees and instructors. Many experiences were shared in a very academic but informal way, which contributed to a very positive result at the end of the training as reported by both participants and instructors.

The sample size was small for the one-year follow-up questionnaires, but the data may be very important. The majority of those who responded reported good

TABLE 3.
Percentage of clubfoot correction with Ponseti technique in different countries.

Country	Author	Correction
USA ¹⁸	Herzenberg et al, 2002	94 %
France ¹⁶	Chotel et al, 2002	95 %
Turkey ⁴	Göksan, 2003	95 %
USA ¹⁴	Abdelgawad al, 2007	92 %
USA ²	Colburn et al, 2004	95 %
USA ¹⁷	Dobbs et al, 2004	100 %
Israel ²¹	Segev et al, 2004	94 %
Malawi ²³	Tindall et al, 2005	98 %
Austria ²⁰	Radler et al, 2006	93 %
England ²²	ShackeEastwood, 2006	98 %
India ³	Gupta et al, 2007	100 %

Source: Pubmed

results with a good average number of casts. However, even with this small sample, it was realized that many of those trained were still having problems with the basics. One of the most crucial aspects of the technique is how to apply a good cast. It may be necessary for “Ponseti Brasil” to offer “advanced” or “refresher” courses.

It is very important that Ponseti-trained orthopaedic surgeons follow the guidelines for treatment, without modification, so optimum results are obtained. Incorrect use of the Ponseti method could result in the technique being viewed as less effective.

Clinics around the world are experiencing excellent results from the Ponseti method, and Brazil can also achieve that. The Ponseti method is very reproducible, as evidenced in many publications (Table 3).

The Brazilian Ponseti Study Group will try to measure continued results from this program, inviting trained surgeons to present both their treated patients and data from their treatment. This will also be an opportunity for “advanced training” for surgeons who are actively treating children with clubfoot.

In conclusion, Brazilian orthopaedic surgeons are working to get the best results with the Ponseti method. This is important for empowering Brazilian surgeons, improving the practice of orthopaedics in Brazil, and for providing better treatment for our children. Further efforts toward achieving these goals are under way.

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Conflict of interest: None declared

This study discusses a Brazilian Project of Medical Education in the Treatment of Congenital Clubfoot in 21 cities in Brazil. This pioneering public health approach in orthopaedics is following the same steps as used for the eradication of poliomyelitis.

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