

## Clubfoot: Etiology and Treatment

Ignacio V. Ponseti, MD, 1914–

Richard A. Brand MD

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**Abstract** This biographical sketch of Ignacio V. Ponseti, MD, corresponds to the historic text, *The Classic: Congenital Club Foot: The Results of Treatment*, available at DOI [10.1007/s11999-009-0720-2](https://doi.org/10.1007/s11999-009-0720-2) and *The Classic: Observations on Pathogenesis and Treatment of Congenital Clubfoot*, available at DOI [10.1007/s11999-009-0721-1](https://doi.org/10.1007/s11999-009-0721-1).

Dr. Ignacio Vives Ponseti was born in Ciutadella de Menorca, Spain, June 3, 1914 [4]. His father was a prominent watchmaker (and president of the Watchmaker Society). Ponseti was a bright student and was able to enter the University of Barcelona without tuition; the following year he received a scholarship from the City of Barcelona. During his first year in medical school (1931) the monarchy fell and Spain became a republic. His final examinations in 1936 took place only one day before the Spanish Civil War began. Being a Republican, he joined the war effort in Catalonia. During that time he obtained valuable experience in the treatment of fractures and war wounds. When Barcelona fell to the Nationalists January 26, 1939, he managed to escape to France while transporting wounded soldiers by mule. After he had spent a half year in refugee camps, the government of Mexico offered passports to some of the stateless refugees and in July of 1939 he traveled by ship from Bordeaux to Veracruz, Mexico. He could not, however, find work in Mexico City, and moved to Juchitepec, a small town of about 5,000 inhabitants south of the capital near the volcano, Popocatepetl. He spent two years in

general practice, greatly enhancing the health of the community, before leaving for Iowa City in May, 1941 to train with Dr. Arthur Steindler.

Steindler (1878–1959) had trained in Vienna with Albert and Lorenz, two of the great European orthopaedists [2]. He worked at the University of Vienna until 1907, when he emigrated to the United States, initially working with Ridlon in Chicago until accepting the position of Professor of Orthopaedic Surgery at the Drake Medical School in Des Moines, Iowa. In 1913 he moved to the State University of Iowa (now The University of Iowa) to found the Department of Orthopaedic Surgery. He became an American citizen in 1914. Steindler had wide interests in the field of orthopaedics, and read and wrote extensively (he spoke, read, and wrote in five languages). By the 1930s he had established an internationally known orthopaedic department with trainees from around the world. He became President of the American Orthopaedic Association in 1933.

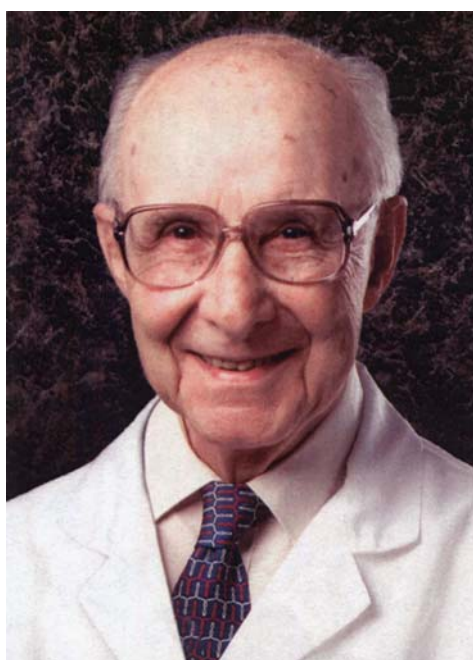
Thus, by the time Dr. Ponseti arrived in 1941, the Department was well-established as a premiere location for orthopaedic training. One of Dr. Steindler's legacies was inculcating the importance of long-term followup (a point emphasized in the title of one of his many textbooks: "Orthopaedic Operations: Indications, Technique and End Results" [20]). As a result of his recognition of the importance of "End Results," he established a tradition of regular long-term followup and appropriate record keeping. He was able to do this in part owing to the relatively stable population in Iowa, which was a working population that also understood the importance of returning for followup even when not symptomatic.

In the summer of 1943, Ponseti visited Drs. Dallas Phemister and C. Howard Hatcher at the University of Chicago, both of whom had published extensively on the

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R. A. Brand (✉)  
Clinical Orthopaedics and Related Research, 1600 Spruce Street,  
Philadelphia, PA 19103, USA  
e-mail: dick.brand@clinorthop.org

**Fig. 1** Dr. Ignacio Ponseti (center, in white) is shown as a resident with Prof. Arthur Steindler (on the right, speaking). Reprinted with kind permission of Dr. Joseph A. Buckwalter, IV.



**Fig. 2** Dr. Ignacio Ponseti is shown. Reprinted with kind permission of the Department of Orthopaedic Surgery, The University of Iowa.

pathology of musculoskeletal tissues [4]. When he returned to Iowa City, he assumed the responsibility of teaching pathology to orthopaedic residents and maintained a life-long interest in normal and pathologic tissue development. Dr. Ponseti's intellectual curiosity also immediately led him to begin exploring the causes and treatment of a range of ailments, including various childhood disorders, tumors,



**Fig. 3** Dr. Ignacio Ponseti on his 90th birthday is shown with his wife, Dr. Helena Percas-Ponseti. Reprinted with kind permission of the Department of Orthopaedic Surgery, The University of Iowa.

and infections [5–8, 10, 11, 13, 15–17], topics on which he published in the 1940s and early 1950s.

According to Percas-Ponseti [4], Ponseti's second research project at The University of Iowa was to study the effect of surgery on clubfoot. Although Sayre [19] and others [1, 21] had described the nonoperative treatment of clubfoot, the techniques were not based on a clear understanding of the anatomy and motions of the hindfoot, and recurrences were common. Therefore, operative treatments became popular [3, 22] (and remained so throughout much of the 20th century). When he recalled patients over

20 years of age, Ponseti found many of the patients treated operatively by Steindler and his colleagues had rigid, weak, and painful feet in followup. Based upon his understanding of the hindfoot anatomy from dissections of stillborn babies, in 1948 he devised a way to correct the feet non-operatively [18]. Many of his basic observations were later reported in one of the Classics we reproduce here [14]. These findings were the foundation of his new approach, for which he published the long-term results in 1963 [18]. These findings reflected a 5–12 year followup of patients treated from 1948–1956. The report outlines the results in 67 patients (94 feet) they had primarily treated during those years. Ponseti and Smoley commented,

“In fifty-three feet the deformity recurred and required further treatment. The recurrences of the equinus deformity were usually mild and responded to conservative treatment. Only seven tendo achillis lengthening operations were performed. A transfer of the anterior tibial tendon to the dorsolateral aspect of the foot was performed in thirty-nine feet to prevent further recurrences of the heel varus deformity. Medial release operations were necessary in only three feet. In no case was bone surgery performed. The results in 71 per cent of the feet were good; in 28 per cent a slight residual deformity persisted; and in one foot a poor result was obtained” [17].

In a later article of 10 to 27 year followup of patients treated from 1950–1967, the authors found “satisfactory” mean ratings of 88.5% on a new rating scale and a patient satisfaction of 90%. Fifty-three percent had no relapse and 47% had one relapse, most treated without extensive surgery: of 104 feet, seven eventually underwent posteromedial or posterior releases. Importantly, the majority of their patients had maintained reasonably flexible feet and the authors expressed concern about extensive releases leading to stiffness.

Despite Dr. Ponseti’s writings and presentations, extensive releases continued to be a major approach to clubfoot treatment worldwide. His book, “Congenital Clubfoot: Fundamentals of Treatment,” published in 1996 [9] certainly generated much interest and helped spread the notion that major surgery of the joints could be avoided. While surgeons began to realize in the 1990s the deleterious long-term effects of major surgery (a fact that obviously took many decades), Dr. Ponseti attributed the primary factor in the change of surgeon’s attitude to parents recognizing and requesting more conservative treatment (personal communication). Sometime after his book was published, he established a website for parents [12]. This website came to the attention of thousands of parents worldwide, and they began seeking surgeons who

would treat their babies without major surgery. In many cases surgeons unfamiliar with the technique visited either Dr. Ponseti at The University of Iowa or other surgeons who had learned the technique. Today, only a decade later, the “Ponseti Method,” as it is widely called, is the standard of treatment worldwide. In this Symposium on Clubfoot, readers can read of the uniformly good outcomes in the large majority of patients treated worldwide under many conditions with this approach and its minor variants. The story of this change is attributable to the persistence and insight of one remarkable human, Dr. Ignacio Ponseti.

## References

1. Bradford EH. Treatment of club-foot. *J Bone Joint Surg Am.* 1889;s1-1:89–115.
2. Buckwalter JA. The Vienna heritage of Iowa orthopaedics. *Iowa Orthop J.* 2003;23:108–122.
3. Milliken FH. Treatment of infantile club-foot preliminary to operation. *J Bone Joint Surg Am.* 1890;s1-3:50–62.
4. Percas-Ponseti H. *Homage to Iowa: The inside story of Ignacio V. Ponseti.* Iowa City, IA: The University of Iowa Press; 2007.
5. Ponseti I. Causes of failure in the treatment of congenital dislocation of the hip. *J Bone Joint Surg Am.* 1944;26:775–792.
6. Ponseti I. Pathomechanics of the hip after the shelf operation. *J Bone Joint Surg Am.* 1946;28:229–240.
7. Ponseti I. Bone lesions in eosinophilic granuloma, Hand-Schuller-Christian disease, and Letterer-Siwe disease. *J Bone Joint Surg Am.* 1948;30:811–833.
8. Ponseti I. Evolution and treatment of tuberculosis of the hip. *Surg Gynecol Obstet.* 1948;87:257–276.
9. Ponseti I. *Congenital Clubfoot: Fundamentals of Treatment.* Oxford, UK: Oxford University Press; 1996.
10. Ponseti I, Barta CK. Evaluation of treatment of slipping of the capital femoral epiphysis. *Surg Gynecol Obstet.* 1948;86:87–97.
11. Ponseti I, Gillies CL, et al. Tabes dorsalis with a Charcot fracture. *J Iowa State Med Soc.* 1947;37:539–544.
12. Ponseti IV. To Parents of Children Born with Clubfeet. Available at: <http://www.uihealthcare.com/topics/medicaldepartments/orthopaedics/clubfeet/>. Accessed January 7, 2009.
13. Ponseti IV. Early diagnosis of congenital dislocation of the hip. *J Iowa State Med Soc.* 1950;50:520–522.
14. Ponseti IV, Campos J. Observations on pathogenesis and treatment of congenital clubfoot. *Clin Orthop Relat Res.* 1972;84:50–60.
15. Ponseti IV, Friedman B. Evolution of metaphyseal fibrous defects. *J Bone Joint Surg Am.* 1949;31:582–585.
16. Ponseti IV, Friedman B. Changes in the scoliotic spine after fusion. *J Bone Joint Surg Am.* 1950;32:751–766.
17. Ponseti IV, Friedman B. Prognosis in idiopathic scoliosis. *J Bone Joint Surg Am.* 1950;32:381–395.
18. Ponseti IV, Smoley EN. Congenital club foot: The results of treatment. *J Bone Joint Surg Am.* 1963;45:261–275.
19. Sayre L. *A Practical Manual of the Treatment of Clubfoot.* New York, NY: D. Appleton and Company; 1869.
20. Steindler A. *Orthopaedic Operations: Indications, Technique and End Results.* Springfield IL: Charles C. Thomas; 1940.
21. Taylor HL. The treatment of club-foot by continuous leverage. *J Bone Joint Surg Am.* 1893;s1-5:178–182.
22. Willard DF. Comparison of operative methods in the treatment of club-foot. *J Bone Joint Surg Am.* 1893;s1-5:225–231.