Ponseti's Treatment for Congenital Clubfoot (1963) [1]

By: Gandee, Katherine

In 1963, Ignacio Ponseti and Eugene Smoley experimentally determined an effective and minimally invasive method of treating congenital clubfoot. Congenital clubfoot is a disorder in which a newborn’s foot is rigidly turned inwards and upwards. During the early 1960s, orthopedists often relied on invasive surgical procedures to treat clubfoot. In Ponseti and Smoley's experiment, Ponseti and Smoley had a team of physicians treat patients with clubfoot using the Ponseti method, which consisted of manually manipulating each patient's foot into a more desirable position and subsequently casting each foot to heal in place. After following up with the patients for several years, Ponseti and Smoley concluded that the Ponseti method is an effective alternative to the more invasive surgical procedures that orthopedists had often relied on. Ponseti and Smoley provided physicians with a novel and minimally invasive method of correcting foot deformities to ensure that developing infants maintain healthy feet.

In 1963, Ponseti and Smoley both worked as orthopedic physicians at the State University of Iowa, later renamed Iowa State University, in Iowa City, Iowa. During the early 1940s, Ponseti had studied the effectiveness of specific surgeries that many US physicians used to treat patients with congenital clubfoot. Ponseti had found that those surgeries, which require bone to be removed from patient’s feet, often caused patients lifelong discomfort and failed to prevent many patients from developing with malformed feet. To address the limitations of existing methods of treating clubfoot, in 1948 Ponseti devised a minimally invasive strategy for treating the deformity that was later called the Ponseti method. That year, Ponseti began a study to determine the effectiveness of the Ponseti method. He, along with Smoley, published results of the study in the 1963 edition of Journal of Bone and Joint Surgery.

In Ponseti and Smoley's study, the medical researchers observed the foot formation outcomes of infants that had clubfoot and that had been treated using the Ponseti method. Their study specifically included infants that were treated at the State University of Iowa [2], which had started uniformly applying the Ponseti method to all cases of congenital clubfoot in 1948. The patients ranged from one week to six months old at the time of initial treatment, and the average age of the patient was one month. Ponseti and Smoley claimed that they were interested in severe cases of deformity. From their observations, they excluded patients that had already received some form of prior treatment for clubfoot, as well as patients that had other disorders, so that they could attribute any effects resulting from the method to the method itself and not other causes.

Between 1948 and 1956, the State University of Iowa [2] treated 322 patients, sixty-seven of which Ponseti and Smoley included into their study. Physicians at the university manually manipulated each patient's foot and then cast each foot to gradually reposition the bones, muscles, and connective tissues of the foot into a more normal and functional position. The physicians left each cast on their patients for around a week, and to ensure complete correction of any deformities, the physicians repeated the process multiple times throughout each patient’s course of treatment. On average, the treatments lasted a total of 9.5 weeks. Additionally, patients were given splints, which on average they wore for 21.5 months. Ponseti and Smoley followed up with patients for five to twelve years. During that follow-up period, Ponseti and Smoley examined changes in the feet of the affected patients as they matured. The researchers also addressed any recurrences in which a previously affected foot had returned to its deformed position.

Ponseti and Smoley observed that over half of the patients with club feet that were treated in their study had experienced at least one recurrence. On average, those recurrences occurred when patients were two and a half years old. The researchers reported that most of those occurrences were able to be treated through conservative treatments, such as casting and splinting. However, a small portion of the recurrences required tendon surgery.

To address why some patients had recurrences, Ponseti and Smoley observed which patients had recurrences of the deformity. The researchers found that such recurrences were not due to insufficient or ineffective treatment, which the researchers argued was a common misconception that doctors attributed to the Ponseti method. Ponseti and Smoley reported that recurrences occurred for two main reasons. Either the initial case was extremely severe, or the parents of the affected children were not cooperative and stopped using splints too early.

Ponseti and Smoley also observed that eighteen percent of patients had a secondary recurrence, ten percent had a third recurrence, and one percent had a fourth recurrence. Ponseti and Smoley reported that half of the feet with a third recurrence of deformity were able to be treated by casting the foot into place two to three more times. Half of the feet had more severe recurrences, and, except in one case, were able to be corrected by tendon surgeries. The one patient that had a fourth recurrence did not achieve remission from congenital clubfoot.

To assess the overall effectiveness of the Ponseti method, Ponseti and Smoley observed how well patients could move their feet and used X-ray imaging to view how their patients' feet had formed. The researchers categorized the treatment results as “good,” “acceptable,” or “poor” based on three main criteria. The criteria were how far up the patient could flex his or her toes,
In the early 1960s, orthopedists often relied on invasive surgical procedures to treat clubfoot. In Ponseti and Smoley's experiment, Ignacio Ponseti and Eugene Smoley experimentally determined an effective and minimally invasive method of treating clubfoot. Physicians and researchers continue to emphasize the importance of adhering to the methods Ponseti devised over fifty years ago for the best treatment outcomes for affected infants. As of 2017, the Ponseti method remains the most widely-used treatment method for infants with congenital clubfoot. According to scholar Frances Luttikhuizen, a majority of physicians disregarded the effectiveness of the Ponseti method. At the time of Ponseti and Smoley's publication of the study, their article received little attention from the medical community. Ponseti and Smoley's study helped reinforce the efficacy of what later became known as the Ponseti method for treating congenital clubfoot. As of 2017, the Ponseti method remains the most widely-used treatment method for infants with congenital clubfoot. Physicians and researchers continue to emphasize the importance of adhering to the methods Ponseti devised over fifty years ago for the best treatment outcomes for affected infants.

**Sources**


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- Smoley, Eugene R.
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- Foot--Abnormalities
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- Congenital Talipes Equinovarus
- Clubfoot, Congenital
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