Correction of Severe Foot and Ankle Contracture Due to CRPS Using External Fixation and Pain Management: Report of a Pediatric Case

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Complex regional pain syndrome–induced dystonia is a severe deformity that can affect the lower extremities and hinder ambulation. Although a number of conservative treatments have been described for this condition, we are not aware of any publications describing the use of surgical intervention for the treatment of this condition. In this report, we describe the case of a pediatric patient with a severe lower extremity deformity in conjunction with chronic pain syndrome. A concerted, interdisciplinary treatment approach was undertaken for the management of this patient, and this included contributions from a foot and ankle surgeon, a pain specialist, an internist, a physical therapist, and a psychiatrist. The primary goal of the treatment strategy was to recreate a plantigrade, weight-bearing lower extremity, while controlling pain. To this end, gradual correction of deformity was achieved using an external fixator and, by 6 months after the surgery, the patient was for the first time in years ambulating on the realigned lower extremity. After 3 years of follow-up, she maintained an activity level that was equal to that which she enjoyed before the injury. Level of Clinical Evidence: 4 (The Journal of Foot & Ankle Surgery 47(5):434–440, 2008)

Key Words: botulinum, complex regional pain syndrome, CRPS, deformity correction, dystonia, equinovarus, external fixation

Complex regional pain syndrome (CRPS) Type I, previously known as reflex sympathetic dystrophy (RSD), is a chronic pain disorder of the extremities. The clinical signs and symptoms may include (but are not limited to) burning pain, edema, hyperpathia, allodynia, trophic changes, and functional impairment. The diagnostic criteria for CRPS Types I and II are purely clinical, as indicated by Figure 1 (1), and can be missed even by experienced clinicians. The median age for patients diagnosed with CRPS in the United States was reported to be 41.8 (range 18–71) years, whereas the mean age at time of the inciting injury was 37.7 (range

Complex Regional Pain Syndrome Type I

- The presence of an initiating noxious event, or a cause of immobilization
- Continuing pain, allodynia, or hyperalgesia with which the pain is disproportionate to any inciting event.
- Evidence at some time of edema, changes in skin blood flow (skin color changes, skin temperature changes more than 1.1°C difference from the homologous body part), or abnormal sudomotor activity in the region of pain
- This diagnosis is excluded by the existence of conditions that would otherwise account for the degree of pain and dysfunction

Complex Regional Pain Syndrome Type II

- The presence of continuing pain, allodynia, or hyperalgesia after a nerve injury, not necessarily limited to the distribution of the injured nerve
- Evidence at some time of edema, changes in skin blood flow (skin color changes, skin temperature changes more than 1.1°C), or abnormal sudomotor activity in the region of pain
- This diagnosis is excluded by the existence of conditions that would otherwise account for the degree of pain and dysfunction.

FIGURE 1 Differentiation of CRPS Types I and II according to Merskey and Bogduk[1].

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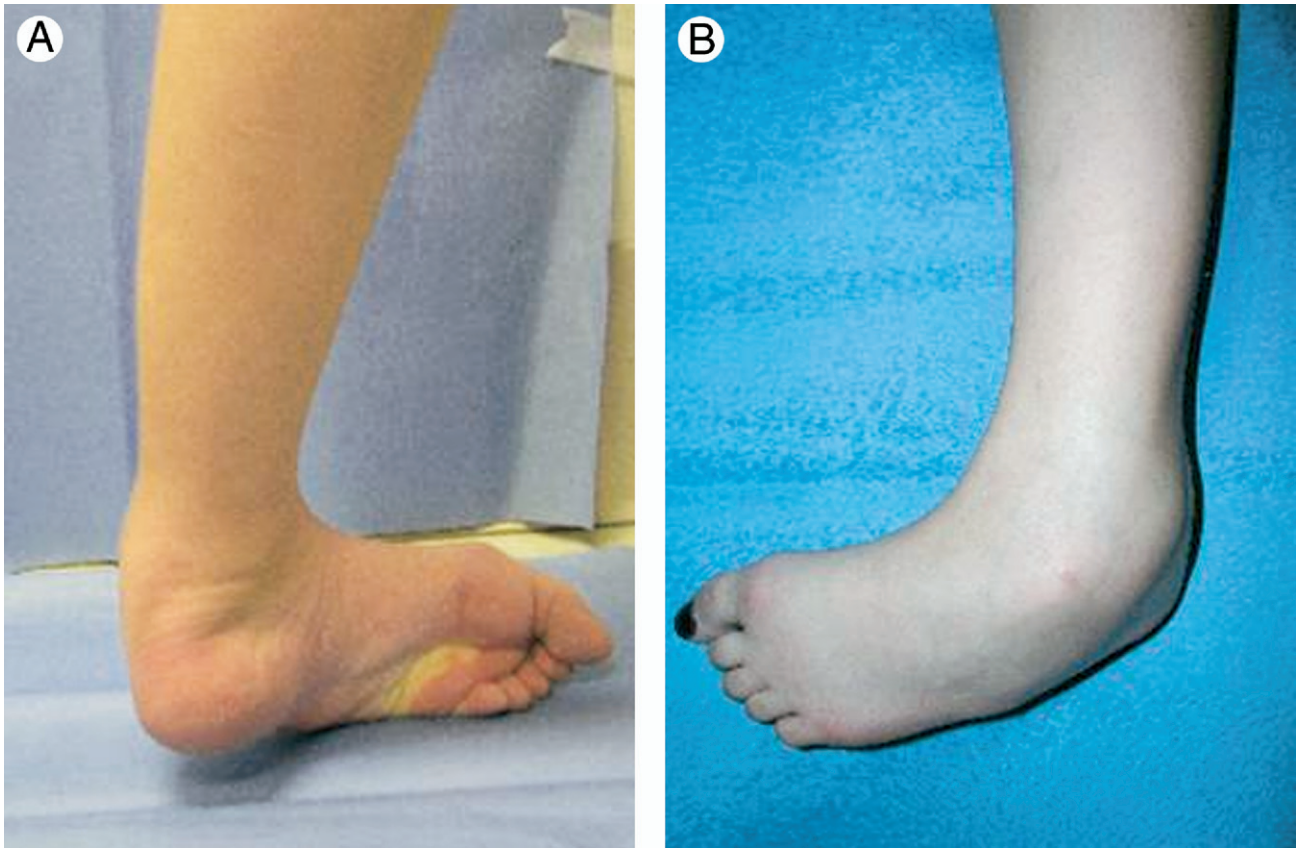

FIGURE 2 Clinical presentation shows the triplanar equinovarus position of the foot and ankle. A. Posteromedial view. B. Anterolateral view.

14–64) years, and the female to male ratio was 2.3:1 (2–4). One of the debilitating symptoms of CRPS is dystonia. In the lower extremities, an equinovarus deformity of the foot and ankle is the most common manifestation of CRPS-induced musculoskeletal contracture (5). Because of the progressive nature of this symptom, immediate treatment is usually necessary to prevent the development of severe deformity. Treatment options for CRPS-induced dystonia include serial casting, aggressive physical therapy, sympathetic ganglion blocks, and adjunctive botulinum toxin injections (6–16). Following a systematic review of the Medline, Excerpta Medica, and the Cumulative Index of Nursing and Allied Health databases, we were unable to identify a reference to the use of gradual correction of the deformity by means of surgical intervention. The patient underwent tendon lengthening, botulinum toxin injections, nerve releases, external fixation application, and spinal cord stimulator implantation. The purpose of this report is to describe the case of a pediatric patient with CRPS-induced dystonia, who was treated surgically with the use of external fixation in order to gradually correct a severe equinovarus contracture. This article also discusses the importance of a multidisciplinary approach to this disease process, including perioperative pain management provided by pain medicine specialists, as well as contributions from a physical therapist, neurosurgeon, and psychiatrist.

Case Report

A 14-year-old girl presented to The Foot and Ankle Institute of Western Pennsylvania on a referral from a pain management specialist at the Western Pennsylvania Hospital. The patient developed a progressive equinovarus deformity of the left lower extremity after she sustained an ankle sprain while diving into third base while playing softball. Within 4 months, she had developed severe equinovarus deformity and was unable to ambulate with weight on her left lower extremity. During an approximately 1.5-year period before presentation to our practice, the patient had undergone serial casting, physical therapy that included contrast baths, and she used an ankle-foot orthosis, under the guidance of the previous treating physician. She had also been manipulated under general anesthesia and casted in an effort to reduce the deformity, however this caused such a severe exacerbation of her pain that she had to be admitted into intensive care and the cast removed. Because of the severe nature of the pain syndrome and the resultant equi-