

Post-traumatic nonunion of the ulna in a child

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Cases of pseudarthrosis of the forearm in children reported in the literature are almost always of congenital origin or associated with neurofibromatosis.¹ The largest series reported was that by Bell² (6 cases) from the Hospital for Sick Children in Toronto in 1989. From a review of the literature she concluded that more than 50% of cases were associated with Von Recklinghausen's disease. In her series, only 1 patient had a nonunion, resulting from a greenstick fracture of a normal ulna after trauma and there were no stigmata of neurofibromatosis. Wood³ found 46 patients with congenital pseudarthrosis of the forearm. LeWallen and Peterson⁴ reported on 6 forearm nonunions in their review of 30 cases of fracture nonunion in children. Five of these were in adolescents (13–15 years of age) and the last child was 8.5 years old but had open reduction initially with Kirschner wire fixation. We report a case of nonunion of the ulna after forearm fracture in a boy with no evidence of Von Recklinghausen's disease.

Case report

A 7-year-old boy was seen in the emergency room, complaining of right wrist pain after a fall. Clinical examination revealed an obvious deformity of his right forearm. There was no wound. Findings on neurologic and vascular ex-



FIG. 1. Displaced distal forearm fracture.



FIG. 2. Initial reduction has been obtained.

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FIG. 3. Healed fractures at 6 weeks.

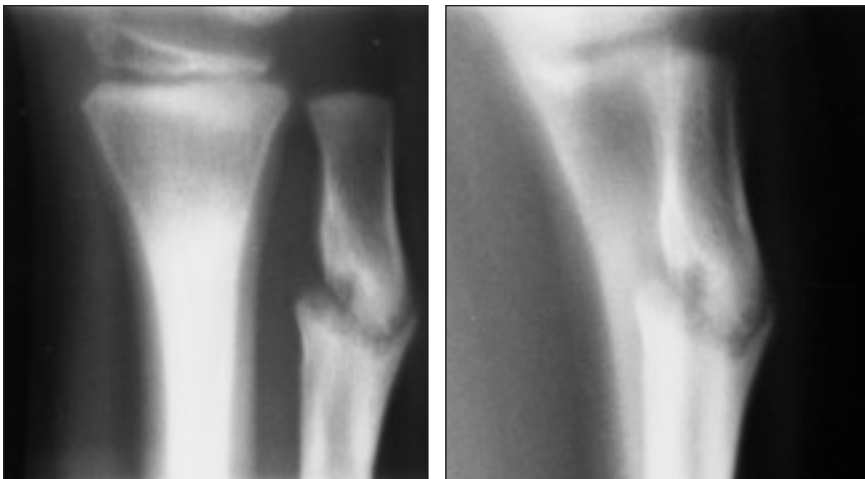


FIG. 4. Tomograms demonstrating nonunion of the ulna at 6 months.

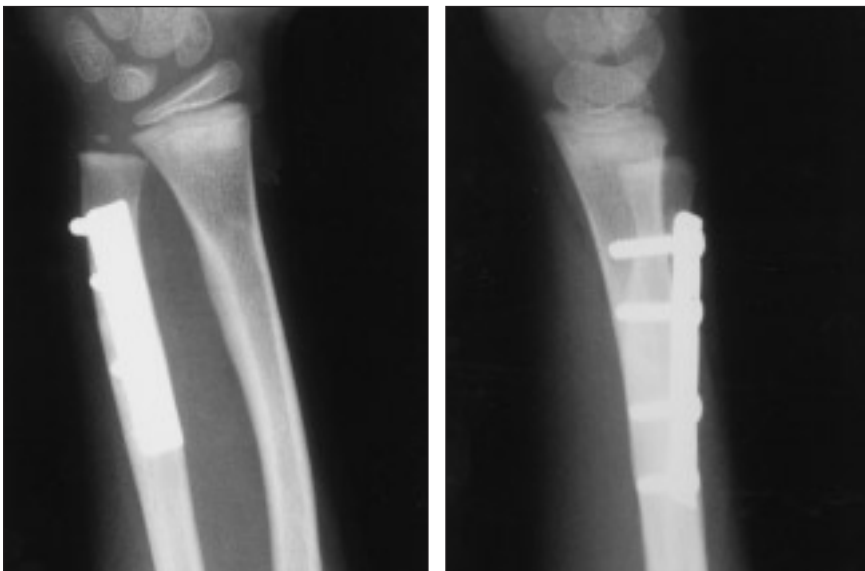


FIG. 5. Healed nonunion 1 year after resection and stabilization.

amination of the distal forearm were normal. Radiographs (Fig. 1) demonstrated a fracture of the distal third of the radius and ulna with complete dorsal translation without any underlying bony lesion. The patient was treated by closed reduction and immobilization in a long-arm cast (Fig. 2). Follow-up was by serial radiography, and after 6 weeks, the cast was removed. Clinically, the patient was pain free and the x-ray film showed bone healing (Fig. 3).

Six months later, the patient returned to our clinic, complaining of pain for 2 months around the distal ulna. He had tenderness on palpation but no motion was found at the ulnar fracture site. He had 80° of pronation and 10° of supination. Otherwise he was in good health and had no skin pigmentation. There was no family history of neurofibromatosis. Radiography and conventional tomography demonstrated that the radius was completely healed, but the ulna showed signs of nonunion with sclerosis at each end of the fracture (Fig. 4).

One year after the initial injury, the patient continued to suffer pain at the site of nonunion, with 50° of supination and 80° of pronation in his dominant hand. Resection was done at the site of the nonunion. We stabilized both ends of the ulna with an AO plate without adding any bone graft. Three months postoperatively, solid union was achieved (Fig. 5) and the patient had no more pain. The pathology report demonstrated only fibrous and osteocartilagenous fragments compatible with nonunion. The plate was removed 15 months postoperatively. At the last follow-up, 1 year later, he had 90° of pronation and 90° of supination (like his contralateral wrist) and was pain free. He still had no "café-au-lait" spots.

Discussion

Traumatic nonunion in children usually results from high energy trauma, treatment by open reduction with inadequate fixation or soft-tissue injury and infection.⁴

Many surgical procedures have been proposed to treat pseudarthrosis of the forearm. In the literature, poor results (35% success rate) have been achieved with conventional corticocancellous grafting, with or without rigid fixation, for congenital pseudarthrosis.⁵⁻⁷ On the other hand, encouraging results have

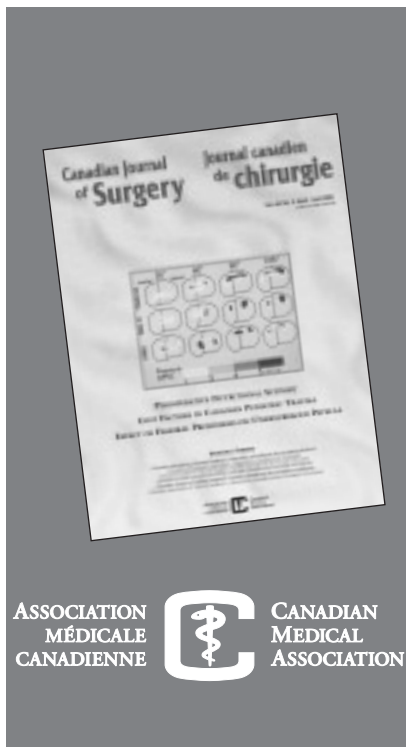
been obtained by Allieu and associates⁸ and Bell² in a small number of patients with a free vascularized fibular graft. LeWallen and Peterson⁴ were able to achieve union in 29 of 30 children with nonunion of a long bone, but multiple surgical procedures were required and they stated that treatment should be individualized.

In our case, the patient had no signs of neurofibromatosis or congenital pseudarthrosis. The patient had a closed fracture and was treated with a closed reduction without any open treatment. He therefore had no risk factors for nonunion. Conventional treatment was used and solid union was obtained quickly in 3 months. We can therefore state that if forearm nonunion is not congenital or associated with neurofibromatosis, conventional corticocancellous

grafting and stabilization should be tried and can lead to solid union. We can also conclude that traumatic nonunion of the ulna can exist in children without being associated with neurofibromatosis.

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