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## CASE REPORT

# Established scaphoid nonunion progressing to spontaneous union in a child

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## Introduction

Scaphoid fractures in children are uncommon and account for approximately 0.38% of paediatric fractures.<sup>9</sup> Prompt and adequate immobilisation in a scaphoid cast is necessary for successful treatment.<sup>5</sup> Virtually all scaphoid fractures in children will unite with such conservative measures.<sup>1</sup>

We report a case of an established scaphoid nonunion in an 11-year-old child, which spontaneously united 2 years after the initial injury. There appear to be no similar cases in the literature. There is one reported case in an adult,<sup>5</sup> but this represents a separate patient group which behaves differently due to skeletal maturity.

This case highlights the importance of appropriate orthopaedic follow-up and radiological examination in a child with a clinical suspicion of a scaphoid fracture, in order to prevent progressive arthritis<sup>3</sup> and nonunions warranting surgical intervention.

## Case report

A right hand dominant, 11-year-old boy presented to casualty with pain and swelling in his left wrist, consequent to a fall onto his left outstretched hand. AP and lateral X-rays (Fig. 1) of his left wrist were

interpreted as being normal. The boy was treated with a wrist splint and discharged without any further follow-up.

Eighteen months later he presented to an orthopaedic surgeon with persisting pain in his left wrist. Clinical examination revealed he had global wrist tenderness, maximally over the scaphoid poles. The range of movement was reduced when compared with the right wrist.

Scaphoid views of the left wrist demonstrated an established nonunion of the scaphoid waist, with areas of sclerosis and cyst formation (Fig. 2). It was elected to proceed to bone grafting and internal fixation of his scaphoid. Hence, no treatment measures were utilised in the interim.



**Figure 1** AP X-ray at time of injury showing no evidence of a scaphoid fracture. (No scaphoid views obtained at this time.)

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**Figure 2** Scaphoid view 18 months later showing established nonunion.



**Figure 3** Scaphoid view showing union 2 years after initial injury.

Six months later shortly prior to admission for surgery, he was seen again in clinic at his request due to a complete resolution of his symptoms. Repeat examination of his left wrist revealed no generalised or focal tenderness and a normal range of movement when compared with his right side.

Repeat X-rays showed evidence of union (Fig. 3). Therefore, his operation was cancelled and subsequently he was discharged from further follow-up with no evidence of avascular necrosis.

## Discussion

The peak incidence of scaphoid fractures is between the ages of 18–30 years.<sup>2</sup> Most paediatric fractures occur in the age 11–13 year group and involve the distal pole.<sup>9</sup> A third of paediatric scaphoid fractures occur through the waist of the scaphoid<sup>1</sup> and it is in this group of children that carries a subsequent risk of nonunion.<sup>6</sup> The likelihood of a nonunion occurring, as in our case, is very low one study reported it to be 0.77%.<sup>2</sup>

Scaphoid fractures in children are a rarity. This is probably due to its ossification centre being protected by a thick peripheral cartilage.<sup>7</sup> Therefore, there is the potential for mismanagement. Conse-

quently neglected cases may result in delayed union or nonunion, as in our case.

There are reported cases of nonunions, which although not uncommon in adults, are incredibly rare in children.<sup>1,4,9</sup> Given the high potential for mismanagement it is of paramount importance that any child with a clinical suspicion of a scaphoid fracture even with negative radiographs must receive early orthopaedic input and management in a scaphoid type forearm-hand cast.<sup>8</sup>

In one study there was a 1–2-week delay in diagnosis of scaphoid fractures in <12.5% of cases.<sup>1</sup> In our case, initial radiological evaluation involved plain AP and lateral wrist X-rays, which did not show any obvious fracture. However, scaphoid views were not obtained at the initial time of injury. If no fracture is visible then the patient should be reassessed in 1–2 weeks and scaphoid views acquired.<sup>1</sup> If clinical suspicion still persists then further imaging with MRI scan may be helpful in diagnosing such occult fractures.

It is widely accepted that for established scaphoid nonunions in both the adult and paediatric population's surgical intervention is necessary to achieve union. For this reason it was elected to proceed to bone grafting and internal fixation. But fortunately the nonunion spontaneously united, which in itself raises a controversial question.

Contrary to all available literature this nonunion united without any form of management. We do not advocate this form of treatment based on one case, but if there were more cases or a trial conducted would most paediatric scaphoid nonunions spontaneously unite if left?

## References

1. Christodoulou AG, Colton CL. Scaphoid fractures in children. *J Pediatr Orthop* 1986;6:37–9.
2. Henderson B, Letts M. Operative management of pediatric scaphoid fracture nonunion. *J Pediatr Orthop* 2003;23:402–6.
3. Leslie IJ, Dickson RA. The fractured carpal scaphoid: natural history and factors influencing outcome. *J Bone Joint Surg [Br]* 1981;63B:225–30.
4. Macted MJ, Owen R. Two cases of non-union of carpal scaphoid fractures in children. *Injury* 1982;13:441–3.
5. Roolker W, Ritt MJPF, Bos KE. Spontaneous healing of a non-union of the scaphoid. *J Hand Surg* 1998;23B(1):86–7.
6. Southcott R, Rosman MA. Non-union of carpal scaphoid fractures in children. *J Bone Joint Surg [Br]* 1977;59:20–3.
7. Tachdjian MO. *Paediatric orthopaedics*. Philadelphia, London, Toronto: Saunders Co., 1972.
8. Vahvanen V, Westerlund M. Fracture of the carpal scaphoid in children. A clinical and roentgenological study of 108 cases. *Acta Orthop Scand* 1980;51(6):909–13.
9. Wulff RN, Schmidt TL. Carpal fractures in children. *J Pediatr Orthop* 1998;18:462–5.