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CASE REPORT

Four years follow-up after clavicle reconstruction in a child: A case report



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External fixator

Summary Clavicle reconstruction is a rare operation. In most cases a mid-shaft defect of the clavicle is bridged by using different grafting techniques or musculo-osteous flaps. In some clinical situations where reconstruction is not a suitable option claviclectomy as a salvation procedure has proven to be an acceptable solution. In the paediatric population the challenge of both the cosmetic and the functional result attempting reconstruction of large bone defects is of higher demand. To our knowledge, this is the first case of a successful clavicle reconstruction with a sufficient follow-up using a free vascularised fibula graft in a child. This case provides a technique description, considerations in the paediatric population, an overview of other techniques used, and a long-term follow-up.

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Introduction

The destruction of the clavicle in a child is a rare clinical situation. In adults cases of irreversible damage are mostly reported after multiple failed surgeries.¹ Free vascularised fibular grafting (FVFG) is widely used to support healing in unfavourable environments and has been described in

different clinical situations. In children FVFG is uncommon but has been described even at the age of 12 months.² However, in the setting of a malignant tumour, a chronic infection, or in older immunocompromised patients claviclectomy can be a considerable alternative.³ Clavicle reconstruction has to take in consideration: the exposed location of the clavicle, the required stability, functional

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demands,^{1,4} the risk of donor site associated morbidity, and additionally in the case of a child the remaining growth potential.^{2,5} The aim of this case report is to provide a link between adult and paediatric population, present specific considerations, a technique description, and long-term follow-up.

Case report

A ten year old girl (147 cm (39th centile), 47 kg (74th centile)) presented with a large aneurysmal bone cyst (ABC) of her left lateral clavicle with nearly total AC-joint destruction (Figures 1 and 2a). Wide en-block resection resulted in a defect of 11 cm. The graft (13 cm) was harvested using a standard approach, with a 13 × 3 cm skin paddle incorporating two perforators. External jugular vein and dorsal scapula arteria were used for anastomosis. Initially fixation with a 2.4 mm titanium elastic nail seemed favourable but two posterior dislocations appeared within the first ten days. An external fixation was therefore applied (Figure 2b). Two pins were placed in the remaining medial clavicle, two in the graft and one in the coracoid to stabilise the lateral aspect of the graft. The skin flap was removed on day four. Further follow-up was unremarkable with no loss of positioning, any pin-track-infection, and consolidation at six weeks post-op with subsequent removal of the fixation. At follow-up after four years the patient presented with a Constant Shoulder Score of 92 points, pain-free symmetric range of motion with five degree deficit in elevation on the operated side (i.e. elevation to 175°, extension to 40°, adduction to 55°, and abduction to 110°). The AC-joint was stable, the shoulders of equal height and positioning, and with a symmetric silhouette (Figure 3a and b). The patient has returned to sports with limitations to maximum shoulder demanding sports (e.g. ring gymnastics), otherwise she is very satisfied with the result. Slight discomfort remains over the scar when carrying a back-pack, with a maximum VAS (visual analogue scale pain score) of three out of ten. As she reported no problems at the donor site (Figure 3c), no X-ray was taken at the time of follow-up. On the obtained panoramic clavicle view, the graft showed remodeling leading to a slight bow which led to an almost anatomical alignment of the neo-clavicle (Figure 2c).

Discussion

In the current literature reports on clavicle reconstruction are mostly case reports and small series, and mainly carried

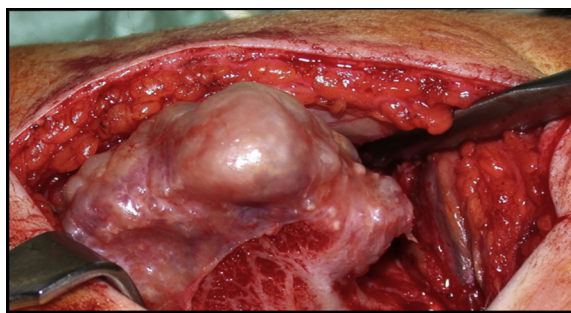


Figure 1 Intra-operative view of the cysts.

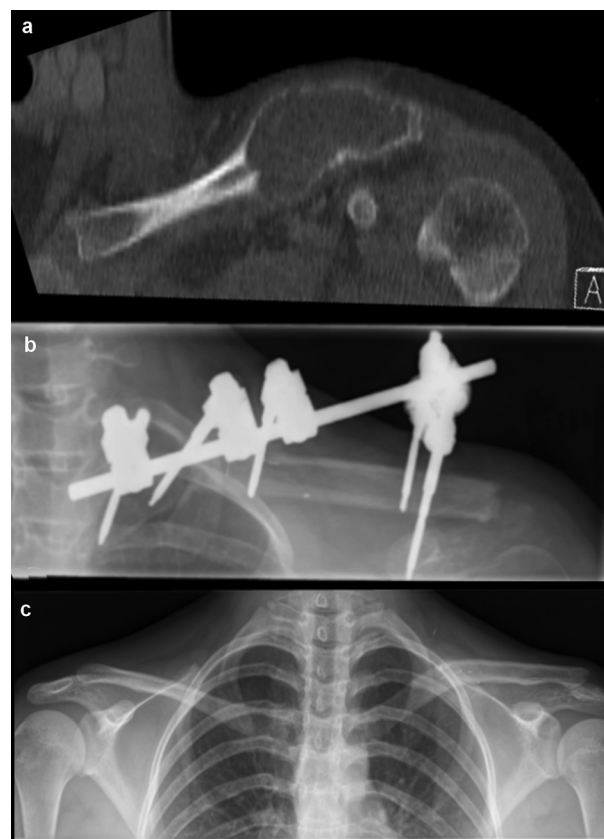


Figure 2 X-ray series: pre-operative CT (a), post-operative fixation (b), and long term follow-up panoramic shoulder view (c).

out on adults (Table 1). This underlines the rarity of this condition and the agreement that reconstruction may only be used in specific situations. A recently published algorithm provides a guide as to whether reconstruction is a suitable option.¹

Complicated non-unions after multiple surgeries and failed treatment as well as tumours are the main cause for



Figure 3 Post-operative result at four years follow-up: Shoulders neutral (a) and in maximum elevation (b), and the donor site (c).

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