

The Free Vascularized Fibula Flap for long bone reconstruction in Adults – A Systematic Review and Regional Centre Experience.



N GLYNN, S MARTIN, H LEWIS

DEPARTMENT OF PLASTIC SURGERY, ULSTER HOSPITAL

INTRODUCTION

The free vascularised fibula flap (FVFF) has proven a reliable means of reconstruction since its first description. Its broad spectrum of applications includes that of limb & craniofacial reconstruction following oncological resection and trauma.

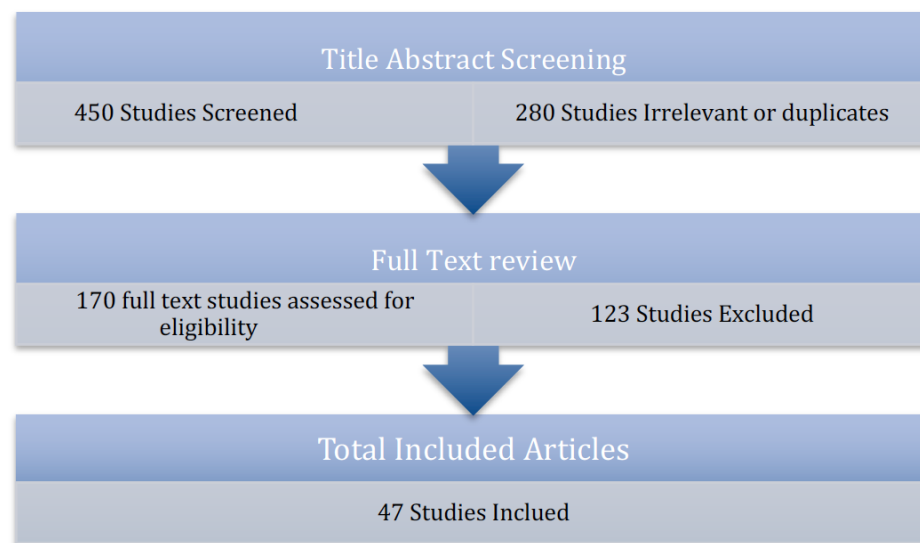
AIMS

Collate current data regarding FVFF and compare this with parameters assessed in our case series and a recently published review on paediatric FVFF (1).

METHODS

A retrospective chart review was performed on patients undergoing FVFF reconstruction in our centre between 1993 and 2021. Surgical indication, intraoperative technique and outcomes were recorded. A systematic review was performed for adult patients undergoing long bone reconstruction (Fig. 1).

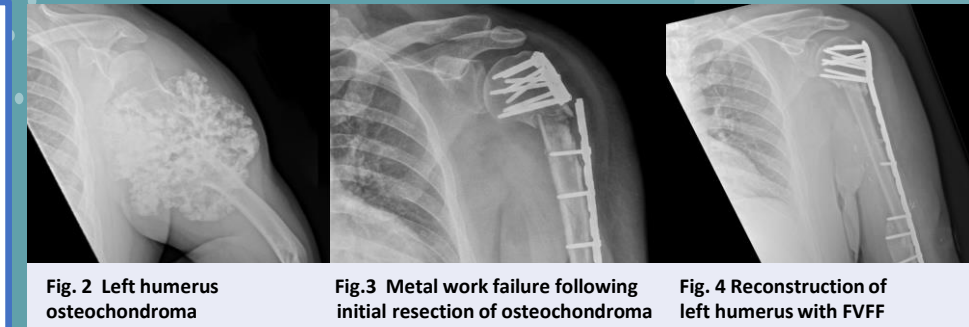
Fig. 1 PRISMA flow diagram



References: (1) McCullough, M. C., Arkader, A., Ariani, R., Lightdale-Miric, N., Tolo, V., Stevanovic, M. Surgical Outcomes, Complications, and Long-Term Functionality for Free Vascularized Fibula Grafts in the Pediatric Population: A 17-Year Experience and Systematic Review of the Literature. *Journal of reconstructive microsurgery* 2020;36:386-396.

RESULTS – REGIONAL CENTRE CASE SERIES

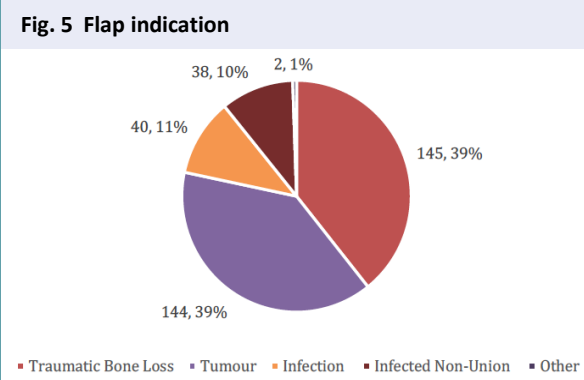
Fifteen patients underwent FVFF reconstruction for indications including tumour resection (Fig 2.) failed metal work (Fig. 3) and osteomyelitis. Mean time to FVFF union was 7 months and we report a low incidence of post-operative complications following FVFF (Fig. 4).



RESULTS – SYSTEMATIC REVIEW

We identified 369 patients across 47 studies (Table 1). The most common indication for FVFF was tumour resection or trauma (Fig. 5). In the paediatric systematic review these were malignancy and osteomyelitis (1). More common complications included non-union and infection (Table 2). Non-union was seen in 21% of the paediatric cohort (1). Donor morbidity was reported in a low number of patients (Table 3). Mean time to bony union was 6 months (Table 4). Evaluation using patient reported scoring systems (Musculoskeletal Tumour Society Score (MSTS) / Disabilities of Arm Shoulder and Hand (DASH) demonstrated excellent functional outcomes (Table 4).

Parameter	Value
Total Patient number	369
Male (number) *	237
Female (number)*	118
Mean Age	37
Mean bony defect (cm) (n=274)	11
Mean fibular graft length (cm) (n=172)	16.6
No. of cases with skin paddle	104



Complication	No.	%
Total No. of patients	369	
Non-union	31	8.4
Infection	23	6.2
Graft fracture	22	6
Delayed Union	9	2.4
Flap loss	7	1.9
Skin paddle sloughing	6	1.6
Revision Anastomosis	4	1
Limb ischaemia	3	0.8
Failure of metal work	3	0.8
DVT	2	0.5
Compartment syndrome	1	0.3
Allograft fracture	1	0.3
Sepsis	1	0.3
Death from Asthma attack	1	0.3
FVFG osteitis	1	0.3
Fistula	1	0.3
Pedicle avulsion	1	0.3

Parameter	No.	%
Total No. of patients	369	
Deformity		
Flexion contracture big toe	6	1
Valgus ankle	2	0.5
Unsightly scar	2	0.5
Equinus midfoot	1	0.3
Functional Loss		
Decreased power FHL	8	2
Feeling of ankle instability	5	1.5
Neuropraxia peroneal nerve	2	0.5

Time to bony union (months)	Time to FWB (months)	Mean MSTS (/30)	Mean DASH score /100
6 ⁺	11.8 [^]	26 [*]	39 [°]

⁺ Average bony union time in 34 papers containing data relating to bony union (n=284)
[^] Data regarding weightbearing status available in 12 papers (n=158)
^{*} MSTS scores available in 10 papers (n=68)
[°] DASH score available in 5 papers (n=21)

DISCUSSION

The use of the FVFF for long bone reconstruction demonstrated excellent functional outcomes with low rates of donor and recipient morbidity.