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Case Series

En bloc resection of proximal fibular giant cell tumour in skeletally immature patients with common peroneal nerve neuropraxia: a retrospective case series of 20 patients with one-year follow-up

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ABSTRACT

Giant cell tumour (GCT) of bone is rare in skeletally immature patients, and its occurrence in the proximal fibula presents unique challenges due to the risk of common peroneal nerve (CPN) injury and knee instability. This retrospective case series included 20 skeletally immature patients (≤18 years; mean age 16.35 years) with histologically confirmed proximal fibula GCT and preoperative CPN neuropraxia treated between September 2023 and August 2024 using en bloc (Malawer type I) resection with reattachment of the lateral collateral ligament (LCL) and biceps femoris. At a minimum 12-month follow-up, outcomes assessed included CPN recovery, recurrence, knee stability, MSTS score, complications, and return to school/sports. There were eight males and twelve females (right: left=9:11); 16 (80%) had Campanacci grade II and 4 (20%) grade III lesions, with a median symptom duration of seven months. All underwent resection with negative margins, and the mean operative time was 72 minutes. At 12 months, 17 patients (85%) achieved complete CPN recovery (mean 9 months), and 3 (15%) had partial recovery, with no persistent palsy or recurrence. The mean MSTS score was 28.6±1.87, and 17 knees (85%) were stable while 3 (15%) showed grade I varus laxity. Median return to school and sports were 28 and 32 weeks, respectively. Complications included two superficial infections and one wound debridement, with no permanent deficits. These findings indicate that en bloc resection with nerve preservation and lateral stabiliser reattachment provides excellent oncological control and functional outcomes in skeletally immature patients with proximal fibula GCT and preoperative CPN neuropraxia.

Keywords: Giant cell tumour, Proximal fibula, Skeletally immature, Common peroneal nerve, En bloc resection, Malawer

INTRODUCTION

Giant cell tumour of bone (GCTB) typically affects skeletally mature adults, but up to 10% may occur in skeletally immature patients.[1] The proximal fibula is an uncommon site, accounting for 2.5–5% of GCTB.[1,2] Surgery in this region is challenging due to proximity of the common peroneal nerve (CPN) and stabilising structures (LCL, biceps femoris).[3]

While en bloc resection reduces recurrence risk compared to curettage, it carries potential complications of peroneal palsy and lateral knee instability.[1,2] These issues are particularly relevant in skeletally immature patients presenting with preoperative CPN neuropraxia.[4] This study evaluates outcomes of 20 skeletally immature patients with proximal fibular GCT and preoperative CPN neuropraxia treated by en bloc resection, with a minimum one-year follow-up.

CASE SERIES

A case series of consecutive 20 patients who were skeletally immature (≤18 years or open physes), presented

with weakness in ankle dorsiflexion (CPN neuropraxia) with palpable swelling over lateral aspect of proximal leg treated between September 2023 and August 2024 at New Medical College and Hospital, Kota, Rajasthan.

Inclusion criteria

Inclusion criteria included skeletally immature (≤18 years or open physes), histologically confirmed proximal fibular GCT, presence of preoperative CPN neuropraxia, and treatment by en bloc resection.

Exclusion criteria

Exclusion criteria included individuals with prior surgery, metastatic disease, inadequate follow-up (<12 months).

Preoperative assessment

All patients had documented CPN involvement. Preoperative ankle dorsiflexion (ADF) power was graded using the medical research council (MRC) scale.

Management

All patients underwent Malawer type I extra-periosteal proximal fibulectomy.[6,7] The CPN was identified and preserved. LCL and biceps femoris were reattached to the lateral tibia using transosseous tunnels or suture anchors.[3] Margins were negative in all cases.

Outcomes assessed

Primary

CPN recovery (complete, partial, persistent; time to recovery), local recurrence.

Secondary

MSTS score, knee stability (clinical varus stress test), final ADF power, return to school/sport, complications.

Statistical analysis

Descriptive statistics were used.

Baseline characteristics

At presentation, mean age was 16.35 years (range 14–18); 8 were male and 12 females. Laterality was 9 right and 11 left. Campanacci grade II was most common (16/20, 80%), grade III in 4 (20%).

Median symptom duration was 7 months (range 5–8). Preoperative ADF power was grade 1 in 4 (20%), grade 2 in 12 (60%), and grade 3 in 4 (20%) (Table 1).

Table 1: Baseline characteristics of 20 skeletally immature patients with proximal fibular giant cell tumour and preoperative common peroneal nerve neuropraxia.

Variables	Value
Mean age (range), years	16.35 (14-18)
Sex (M:F)	8:12
Laterality (R:L)	9:11
Campanacci grade I	0
Campanacci grade II	16 (80%)
Campanacci grade III	4 (20%)
Symptom duration	5–8 months (median 7 months)
Preop ankle dorsiflexion (MRC)	Grade 1: 4 (20%); grade 2: 12 (60%); grade 3: 4 (20%)

Operative details

All 20 patients underwent Malawer type I resection. LCL and biceps femoris were reattached in all. Margins were negative. Mean operative time was 72 minutes (range 60–88); blood loss was not significant (Table 2).

Table 2: Operative details of en bloc (Malawer type I) resections performed for proximal fibular giant cell tumour in skeletally immature patients.

Variables	Value
Malawer type I resection	20 (100%)
Malawer type II resection	0
LCL and biceps femoris reattachment	20 (100%)
Margin status	All negative (20/20, 100%)
Mean operative time (range), minutes	72 (60–88)
Estimated blood loss	Not significant

Outcomes at 12 months

At one year, 17 patients (85%) regained complete CPN recovery at a mean of 9 months (range 6–10); 3 (15%) had partial recovery; none had persistent palsy. All patients achieved functional ADF: 17 (85%) improved to grade 5, 3 (15%) to grade 4.

No recurrences were recorded.[13] Mean MSTS score was 28.6±1.87. Knee stability was preserved in 17 (85%) patients, with grade I varus laxity in 3 (15%).[3] Median return to school was 28 weeks; return to sports 32 weeks (Table 3).

Complications

Superficial infection occurred in 2 cases, and 1 required wound debridement with closure. No permanent palsy or major complications occurred (Table 4). Comparison of preoperative and 12-month postoperative ankle

dorsiflexion power (Medical Research Council grading) in 20 skeletally immature patients undergoing en bloc resection of proximal fibular giant cell tumour with preoperative common peroneal nerve neuropraxia. Preoperatively, most patients presented with grade 2 weakness, whereas at 12 months all improved to grade 4 or 5, with 85% regaining full strength (grade 5) (Figure 1). Figure 2 shows pre-op and post-op X-ray, respectively. Intra-op photos showing en-bloc resection of fibular head (Figure 3).

Table 3: Functional and oncological outcomes at 12-month follow-up following en bloc resection of proximal fibular giant cell tumour in skeletally immature patients.

CPN recovery	**Complete**	**17 (85%) mean time 9 months (6-10 months)**
	Partial	3 (15%)
	No recovery	0
Local recurrence		0
MSTS score (mean±SD)		28.6±1.87 (out of 30)
Knee stability		Stable (85%)
		Grade 1 laxity (15%)
Return to school (weeks)		Median value 28
Return to sports (weeks)		Median value 32

Table 4: Postoperative complications in 20 skeletally immature patients undergoing en bloc resection of proximal fibular giant cell tumour of the proximal fibula.

Complication	N (%)	Management
Superficial infection	2 (10)	Local care + antibiotics
Wound debridement + closure	1 (5)	Surgical debridement, secondary closure
Permanent peroneal palsy	0	—
Other major complications	0	—

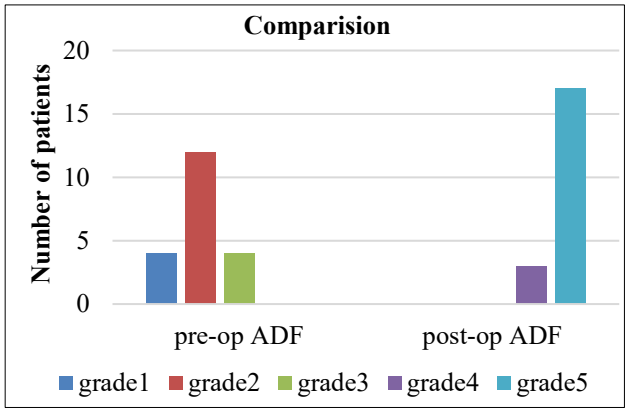

Figure 1: Comparison between pre-op and post-op ankle dorsiflexion power.

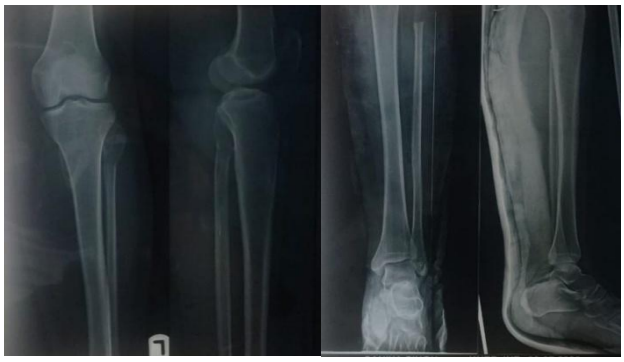

Figure 2: Pre-op and post-op x-ray, respectively.

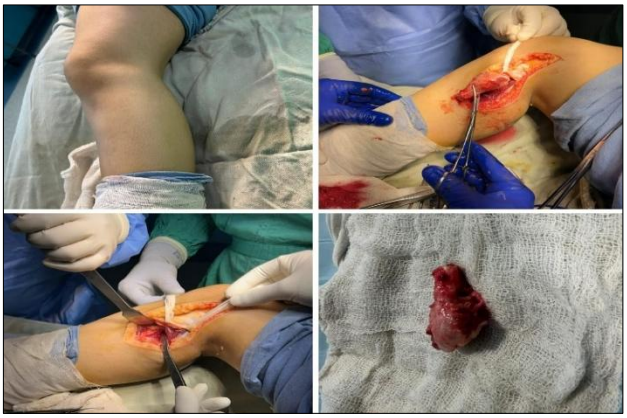

Figure 3: Intra-op photos showing en-bloc resection of fibular head.

DISCUSSION

This series demonstrates that en bloc (Malawer type I) resection of proximal fibular GCT in skeletally immature patients with preoperative CPN neuropraxia is oncologically safe and functionally effective. Complete or partial CPN recovery occurred in all patients, with no persistent palsy. Previous studies report peroneal palsy rates from 3–57% after proximal fibula resection, highlighting the value of nerve-preserving techniques.[1,2,11]

Importantly, all patients regained at least grade 4 ADF power, with 85% recovering fully to grade 5. This

reinforces that preoperative neuropraxia is reversible when the CPN is preserved.[2,4] The absence of recurrence aligns with published evidence favouring en bloc resection at this site.[13] Knee stability was maintained in 85% with only mild laxity in 15%, consistent with the protective effect of LCL and biceps femoris reattachment.[3,12]

Strengths include uniform surgical technique and systematic follow-up; limitations are retrospective design, single-centre data, and relatively short follow-up.

CONCLUSION

En bloc resection of proximal fibular GCT in skeletally immature patients with preoperative CPN neuropraxia provides excellent local control, high rates of nerve recovery, functional restoration of dorsiflexion, and stable knees at one year.

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