

Liposclerosing myxofibrous tumor of the proximal femur: a case report

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ABSTRACT

Liposclerosing myxofibrous tumor (LSMFT) is a rare fibro-osseous lesion with a strong predilection for the proximal femur, rarely seen in clinical practice and often diagnostically challenging. A 29-year-old woman who presented with left hip pain after a fall is reported. Multimodal imaging — plain radiographs, computed tomography, and magnetic resonance imaging (MRI) — was performed, followed by intraoperative frozen section analysis and curettage. The residual cavity was filled with a synthetic bioactive-glass bone substitute, and the proximal femur was stabilised with a dynamic hip screw (DHS). Plain radiographs showed a geographic lytic lesion in the subtrochanteric femur with a thick sclerotic rim. Computed tomography confirmed well-defined medullary expansion with heterogeneous mineralisation. MRI demonstrated marked T2 hyperintensity consistent with myxoid stroma. Intraoperative frozen section showed a benign-appearing spindle-cell lesion; permanent histopathology on a 10×8×2 cm curettage specimen confirmed LSMFT, demonstrating the characteristic polymorphic combination of xanthomatous foci, mature adipocytes, fibrous stroma, and myxoid areas without malignant features. At the latest follow-up, 4 months postoperatively, the patient was pain-free (visual analogue scale 0) with a full, unrestricted hip range of motion and a Harris Hip Score of 99.8; full weight-bearing had been resumed by the second postoperative month. Follow-up radiographs demonstrated incorporation of the graft without evidence of local recurrence, and no complications were recorded. This case highlights the diagnostic challenges of LSMFT, the limitations of intraoperative frozen section in polymorphic fibro-osseous lesions, and the importance of structural fixation at the subtrochanteric level. Although the short-term outcome was excellent, lifelong surveillance is warranted given the reported risk of malignant transformation.

Keywords: bioactive glass, case report, dynamic hip screw, femur, fibro-osseous lesion, liposclerosing myxofibrous tumor.

INTRODUCTION

Liposclerosing myxofibrous tumor (LSMFT) is one of the polymorphic fibro-osseous lesions of the proximal femur characterised by Ragsdale¹. It almost always arises in the intertrochanteric or subtrochanteric femur — roughly 80–90% of reported cases — and is defined histologically by a striking mixture of myxoid degeneration, fibroxanthomatous stroma, lipomatous elements, fat necrosis, ischemic ossification, and fibrous dysplasia-like trabeculae, often coexisting in the same specimen^{2,3}.

Most patients present in the fourth decade with longstanding dull proximal thigh pain; a minority are identified incidentally. Pathological fracture occurs in approximately 10% of cases at presentation^{2,4}. The

2020 WHO Classification has incorporated LSMFT into fibrous dysplasia on molecular grounds⁵, but many orthopaedic oncologists retain the designation because its histological polymorphism and its historically reported malignant transformation risk⁶ warrant specific clinical management distinct from typical fibrous dysplasia.

A 29-year-old woman with a large subtrochanteric LSMFT, managed with curettage, synthetic bioactive-glass grafting, and DHS fixation, is presented. Although surgically treated proximal femoral LSMFTs and closely related myxoid fibro-osseous lesions have previously been reported^{7,8}, the present case is offered for its specific illustrative value in three respects: the role of intraoperative frozen section as a decision gate in a polymorphic fibro-osseous lesion, the mechanical

vulnerability of the subtrochanteric femur after curettage, and the rationale underlying the choice of an extramedullary sliding-hip-screw construct.

PATIENTS AND METHODS

This case report was prepared in accordance with the CARE (CAse REport) guidelines.

A 29-year-old female patient presented at our clinic with a subtrochanteric femoral lesion identified on plain radiographs and MRI following a fall. On examination she was ambulant with a full, pain-free left hip range of motion. Routine biochemistry, including alkaline phosphatase, calcium, and phosphate, was normal. There was no personal or family history of metabolic bone disease or malignancy.

The chronology of the clinical episode is summarised in Table I.

RESULTS

Plain radiography (Fig. 1a) revealed a well-defined geographic lytic lesion centred in the subtrochanteric and proximal diaphyseal femur, with a thick peripheral sclerotic rim without cortical breach. Computed tomography (Fig. 1b, Fig. 2a) confirmed intramedullary expansion of the proximal femoral

shaft, demonstrating the dense peripheral sclerosis and the heterogeneous internal matrix with foci of mineralisation more clearly than plain films. On MRI, coronal T1-weighted sequences (Fig. 2b) showed the lesion as iso- to hypointense relative to skeletal muscle; coronal T2-weighted sequences (Fig. 2c) demonstrated marked, heterogeneous hyperintensity consistent with a myxoid component. There was no cortical disruption and no adjacent soft-tissue extension on any sequence. The differential diagnosis included fibrous dysplasia, non-ossifying fibroma, and low-grade intramedullary osteosarcoma.

Under general anaesthesia, the proximal femur was exposed through a standard lateral approach. Frozen section analysis was requested intraoperatively for the curettage specimen (approximately 10×8×2 cm of firm, yellow-cream tissue). Frozen sections revealed a spindle-cell lesion with a myxoid background without pleomorphism, atypical mitoses, or necrosis. Definitive diagnosis was deferred to permanent sections owing to the well-recognised diagnostic challenges of polymorphic fibro-osseous lesions on frozen tissue. As the frozen section was consistent with a benign process, thorough curettage of the intramedullary lesion was completed and the residual cavity was filled with 30 cc of a synthetic bioactive-glass bone substitute. The proximal femur was subsequently

Table I. — The chronology of the clinical episode.

Time point	Event
At presentation	Low-energy fall; left hip pain. Ambulant, full pain-free hip range of motion. Plain radiographs and MRI obtained; subtrochanteric femoral lesion identified.
10 March 2026 (surgery)	Lateral approach; intraoperative frozen section (benign spindle-cell lesion); thorough curettage; residual cavity filled with 30 cc synthetic bioactive-glass bone substitute; DHS with lateral side plate. Permanent sections confirmed LSMFT.
Postoperative month 2	Progression to full weight-bearing; return to usual daily activities.
10 July 2026 (month 4)	Pain-free (VAS 0); full, symmetrical hip range of motion; Harris Hip Score 99.8; radiographic graft incorporation; no local recurrence; no complications.

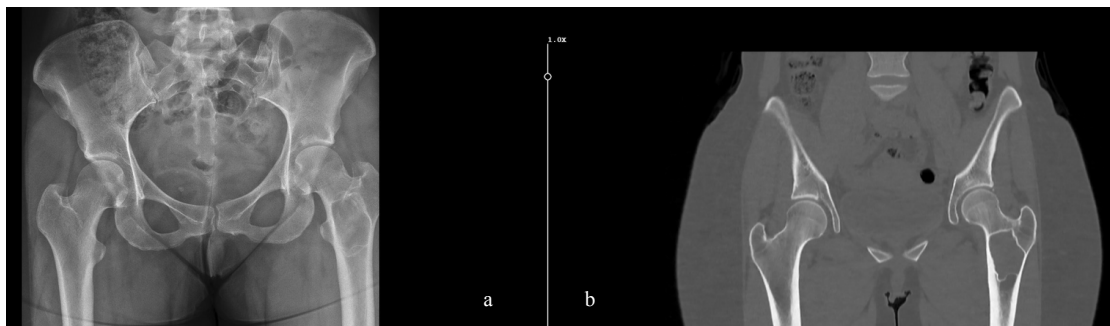


Fig. 1 — Preoperative imaging. (a) Pelvis AP radiograph: well-defined geographic lytic lesion in the left subtrochanteric femur with a thick sclerotic rim and internal calcification; no cortical breach is evident. (b) Coronal CT (bone window): intramedullary expansion with dense peripheral sclerosis.



Fig. 2 — Preoperative cross-sectional imaging. (a) Axial CT (bone window): well-defined intramedullary lesion with a peripheral sclerotic rim; no cortical penetration. (b) Coronal MRI T1-weighted sequence: the lesion is iso- to hypointense relative to skeletal muscle. (c) Coronal MRI T2-weighted sequence: marked heterogeneous hyperintensity consistent with a myxoid stromal component; no soft-tissue extension.



Fig. 3 — Postoperative radiographs. (a) AP pelvis. (b) Lateral view of the left proximal femur. (c) Frog-leg view. A DHS lag screw is seated centrally in the femoral head with adequate tip-apex distance. The lateral plate is secured with three distal cortical screws.

stabilised with a DHS and a lateral side plate secured with three distal cortical screws. Structural fixation was considered mandatory given the subtrochanteric location — one of the skeleton's highest-stress regions — where an unsupported, grafted intramedullary defect posed a substantial fracture risk. Postoperative radiographs (Fig. 3) confirmed satisfactory implant position and graft filling of the cavity.

Permanent sections (Fig. 4) confirmed LSMFT's characteristic histological polymorphism. Panel (a): mature adipocytes with xanthomatous foci (asterisks). Panels (b, c): fibrous stroma — bland spindle cells in dense collagen (red arrows) — adjacent to lipomatous areas. Panel (d): myxoid stroma with stellate cells in pale matrix (blue circles). No pleomorphism, mitoses, or necrosis were identified. Final diagnosis: left subtrochanteric femur curettage — liposclerosing myxofibrous tumor.

The postoperative course was uneventful. Full weight-bearing was permitted from the second postoperative month, at which point the patient had returned to her usual daily activities. At the most recent review, 4 months after surgery, she remained free of pain (visual analogue scale 0) with a full and symmetrical hip range of motion and a Harris Hip Score of 99.8. Serial radiographs demonstrated progressive incorporation and integration of the bioactive-glass

graft with no evidence of local recurrence, cortical erosion, or implant loosening (Fig. 5). No intra- or postoperative complications were recorded. The limited duration of follow-up is acknowledged, and continued surveillance is planned.

DISCUSSION

This case highlights three practically important aspects of managing proximal femoral LSMFT: the multimodal imaging approach needed to narrow the differential diagnosis, the role of intraoperative frozen section as a decision gate, and the structural-fixation rationale specific to the subtrochanteric femur. Although surgically managed proximal femoral LSMFTs and closely related myxoid fibro-osseous lesions have been reported previously, including within this journal⁸, the interplay of these three factors in a single young patient is instructive for the practising orthopaedic surgeon.

Each imaging modality provided complementary information. Plain radiography delineated the geographic lytic lesion with sclerotic margins, excluding aggressive periosteal reaction or cortical destruction. CT characterised heterogeneous mineralisation on bone windows, distinguishing LSMFT from simple bone cysts or non-ossifying

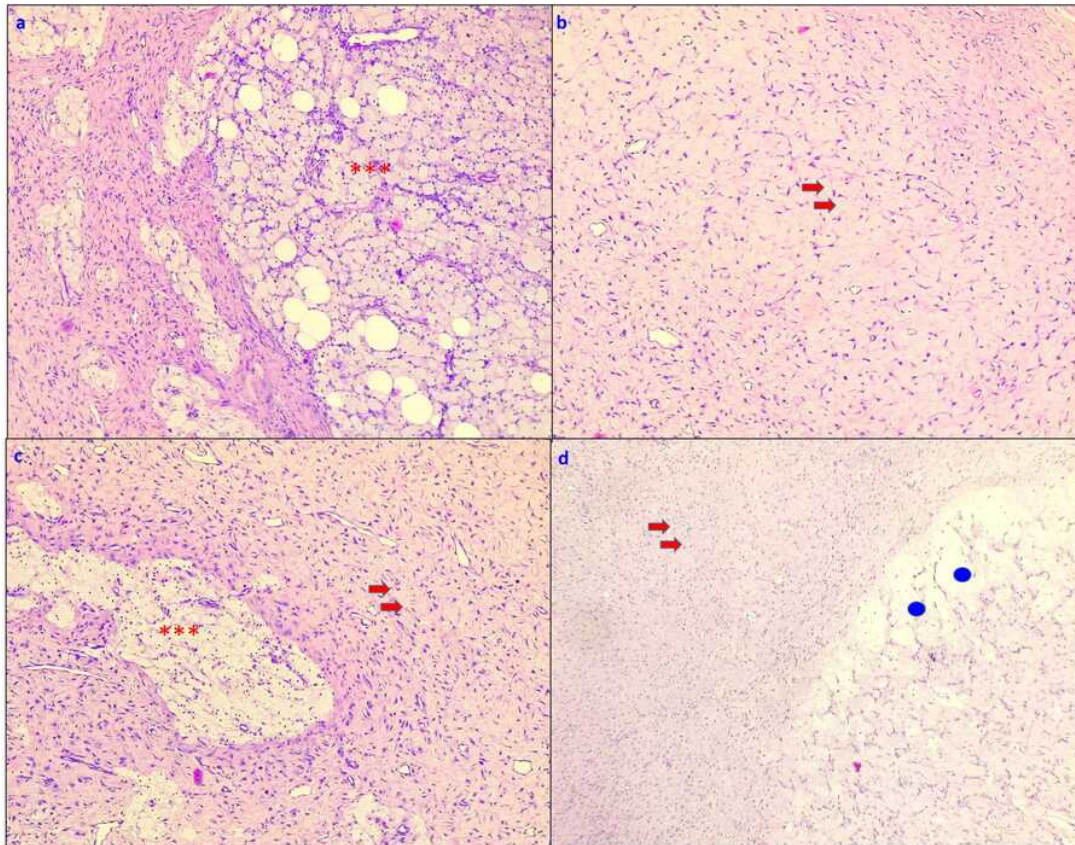


Fig. 4 — Histopathological findings (haematoxylin and eosin). (a) Xanthomatous component: accumulation of foamy histiocytes (asterisks) admixed with mature adipocytes and spindle cells ($\times 200$). (b, c) Fibrous component: bland spindle cells embedded in dense collagenous stroma (red arrows) ($\times 400$ and $\times 200$, respectively). (d) Myxoid stromal component: loosely arranged stellate cells in a pale myxoid background (blue circles), with the fibrous component (red arrows) at the periphery ($\times 200$). No pleomorphism, atypical mitoses, or necrosis were identified in any panel.

fibromas. MRI T2 hyperintensity reflected the myxoid stroma — a recognised feature of LSMFT² — but this finding also overlaps with low-grade intramedullary osteosarcoma, making histological confirmation prior to definitive fixation non-negotiable in a young patient. Intraoperative frozen section served as the decision gate: a benign result authorised proceeding to curettage and fixation; a suspicious result would have ended the operation and triggered formal staging.

Permanent sections provided definitive diagnosis. LSMFT's hallmark is the coexistence of xanthomatous foci, lipomatous elements, fibrous stroma, and myxoid background within the same specimen^{2,3}. Fibrous dysplasia lacks lipomatous and xanthomatous components; low-grade osteosarcoma shows nuclear atypia or a permeative growth pattern. The absence of mitoses and necrosis confirmed the benign nature of the lesion. A closely related myxoid fibro-osseous lesion of the proximal femur — fibromyxoma — has been described in this journal and, like LSMFT, has been regarded by some authors as a degenerative

variant of fibrous dysplasia⁸; other rare fibro-osseous lesions of the long bones, such as ossifying fibroma, have likewise been managed by curettage and grafting⁹. This overlap underscores the interpretive difficulty at both the radiological and histological level.

Regarding fixation, the subtrochanteric femur is subject to some of the highest bending moments in the skeleton, and a large, grafted post-curettage cavity at this level presents a genuine fracture risk in an active young patient. Several constructs are available. Prophylactic intramedullary nailing has been reported for symptomatic monostotic fibrous dysplasia¹⁰, and dynamic condylar screw (DCS) constructs have been reported for LSMFT at this location⁷. In the present case a DHS with a lateral side plate was selected for several reasons. First, this is a long-established implant with well-documented reliability, and the operating surgeon's familiarity with it favoured its use. Second, the lateral approach required for plate fixation coincided with the exposure used for curettage, allowing the lesion to be addressed and

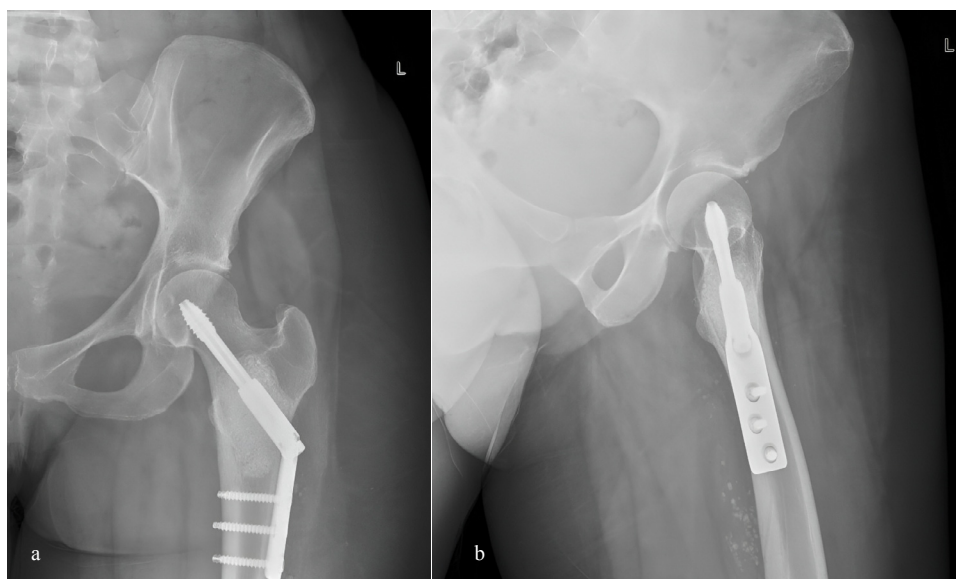


Fig. 5 — Follow-up radiographs at 4 months. (a) Anteroposterior and (b) lateral views of the left proximal femur demonstrating a stable DHS construct with maintained implant position and progressive incorporation of the bioactive-glass graft within the subtrochanteric cavity, without evidence of local recurrence or implant loosening.

the construct to be applied through a single window. Third, because the medullary cavity had been curetted and packed with bioactive glass, an extramedullary load-sharing device preserved the graft bed, whereas an intramedullary implant would have disturbed it. Finally, the DHS provides controlled compression and mechanical support across the subtrochanteric region without the trochanteric-entry irritation occasionally associated with cephalomedullary nails, and its surface characteristics are compatible with bony integration. Either an extramedullary or an intramedullary construct is acceptable when bone stock permits, and the choice should be individualised to lesion geometry and surgeon experience.

The malignant potential of LSMFT remains debated. Early reports described transformation in up to 10–16% of cases^{4,6}, but these figures derive from small, selected series and are likely to overestimate the true risk; malignant change is now regarded as uncommon. Nonetheless, because sarcomatous transformation has been documented and cannot be predicted from imaging or limited sampling, prudent long-term surveillance is justified, particularly as fibrous dysplasia itself has been shown to behave more dynamically over the long term than is often assumed¹¹. The patient will undergo six-monthly radiographic review; interval growth, cortical erosion, or soft-tissue extension would prompt MRI and rebiopsy.

The relationship between LSMFT and fibrous dysplasia has been clarified but not fully settled by the 2020 WHO classification, which no longer recognises

LSMFT as a distinct entity and places it within the spectrum of fibrous dysplasia, largely on the basis of shared GNAS-activating mutations⁵. This is consistent with the long-held view that LSMFT represents a degenerated or traumatised variant of fibrous dysplasia³. In routine practice, however, the designation remains useful: the marked histological polymorphism of these lesions and their historically reported transformation risk continue to justify a management approach — thorough sampling, structural fixation where indicated, and long-term follow-up — that differs from that of uncomplicated fibrous dysplasia.

The limitations of intraoperative frozen section in this setting merit emphasis. In a lesion as heterogeneous as LSMFT, a single frozen sample is subject to considerable sampling error, and freezing artefact further compromises the assessment of cytological detail; the distinction between a benign polymorphic fibro-osseous lesion and a low-grade malignancy is therefore unreliable on frozen tissue. Accordingly, frozen section in this context should be regarded not as a means of definitive diagnosis but as a decision gate — its purpose is to exclude overt malignancy and thereby authorise curettage and immediate fixation, while definitive classification is reserved for comprehensively sampled permanent sections.

CONCLUSION

In summary, LSMFT is a rare but diagnostically important entity. The radiological triad — geographic

subtrochanteric lytic lesion with sclerotic margins, internal mineralisation, and MRI T2 hyperintensity — should prompt its inclusion in the differential diagnosis. Frozen section analysis alone is inadequate; comprehensive permanent-section sampling is mandatory. Structural fixation is essential in the subtrochanteric femur, with lifelong surveillance warranted due to sarcomatous transformation risk. The principal limitation of this report is the short duration of follow-up, which precludes conclusions regarding long-term graft behaviour, functional durability, and recurrence; the favourable early result should therefore be interpreted with caution.

Patient perspective: The patient reported that she was satisfied with the outcome of treatment and had returned to her normal daily activities without pain.

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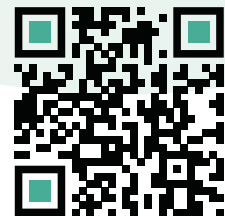
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