

# Surgical Repair of Open Femur Fracture with Bone Loss Using Vivigen® Cellular Bone Matrix

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CASE STUDY

The infrequent occurrence of open femur fractures with bone loss has made standardizing treatment difficult.<sup>1</sup> The uncertain outcomes, technically difficult procedures and extensive patient burdens add to the challenge of this surgical repair.<sup>2</sup> One bone-grafting option for managing fractures is autograft bone. Autograft bone can provide the osteoconductive, osteoinductive, and osteogenic properties needed for successful bone fusion; however, the retrieval of the autograft can cause pain and site morbidity to patients.<sup>3</sup> The use of allografts can avoid these downsides and one particular allograft, Vivigen, provides all three properties using viable lineage-committed bone cells. Vivigen contains viable cortico-cancellous bone matrix, cortico-cancellous chips, and demineralized bone. Preclinical studies involving seeding of porous ceramic scaffolds have suggested that bone cells may provide a higher degree of bone deposition than mesenchymal stem cells (MSCs).<sup>4,5</sup> Such findings may have relevance in cases where bone fusion has presented a unique challenge.

The following describes the use of Vivigen to treat a challenging open femur fracture case:

## Patient

- A 19 year-old patient
- Involved in a motorcycle accident
- Presented with an open, midshaft, left femur fracture with bone loss (Fig 1)
- Previously underwent irrigation debridement and primary wound closure and stabilization with an intramedullary nail for initial fracture management (Fig 2)

## Procedure

- At six months following the accident (Fig 3), bone graft from the ipsilateral femur taken using the Reamer/Irrigator/Aspirator (RIA) technique, (DePuy Synthes, West Chester, PA) and 10 cc of Vivigen (LifeNet Health, Virginia Beach, VA) (Fig 4)

## Results

- Fusion was achieved within 14 months post-operative (Figs 5-7)

## Conclusion

- Patient was satisfied and no complications were observed
- Repair of an open femur fracture using Vivigen was successful at inducing fusion within 14 months



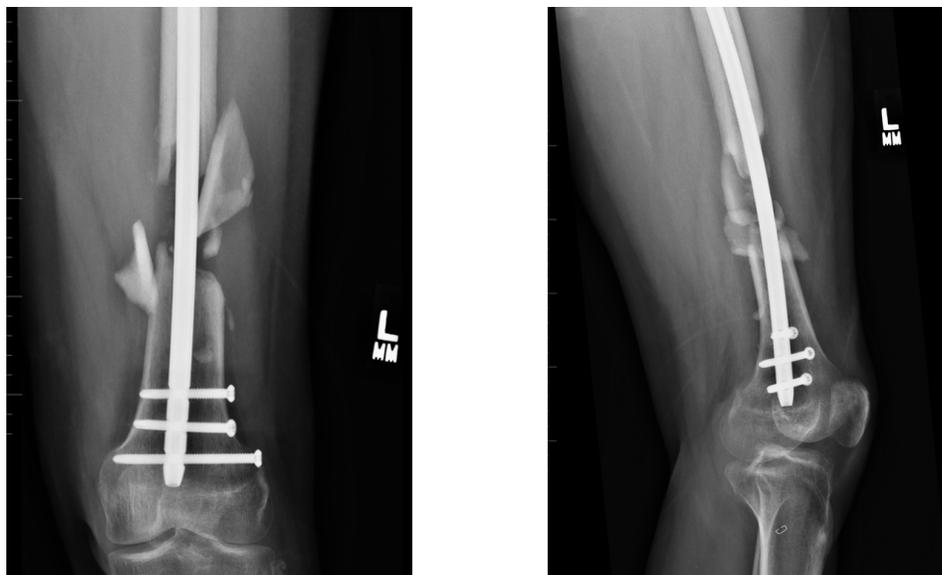
**Figure 1.**

Presenting films showing an open comminuted midshaft femur fracture



**Figure 2.**

Post-operative irrigation and debridement, intramedullary nail and primary closure of open wounds was undertaken



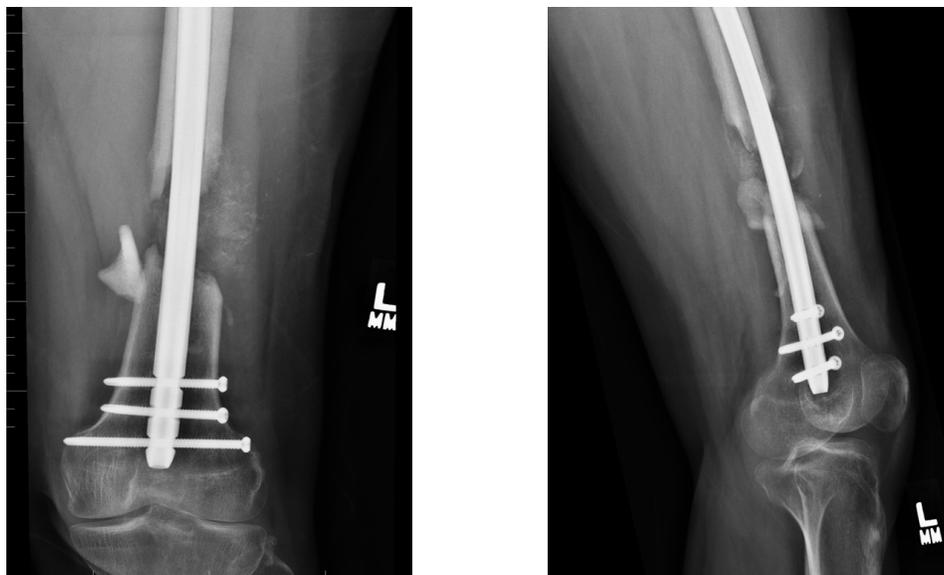
**Figure 3.**

No visible callous formation and ongoing pain at fracture site six months after initial surgery



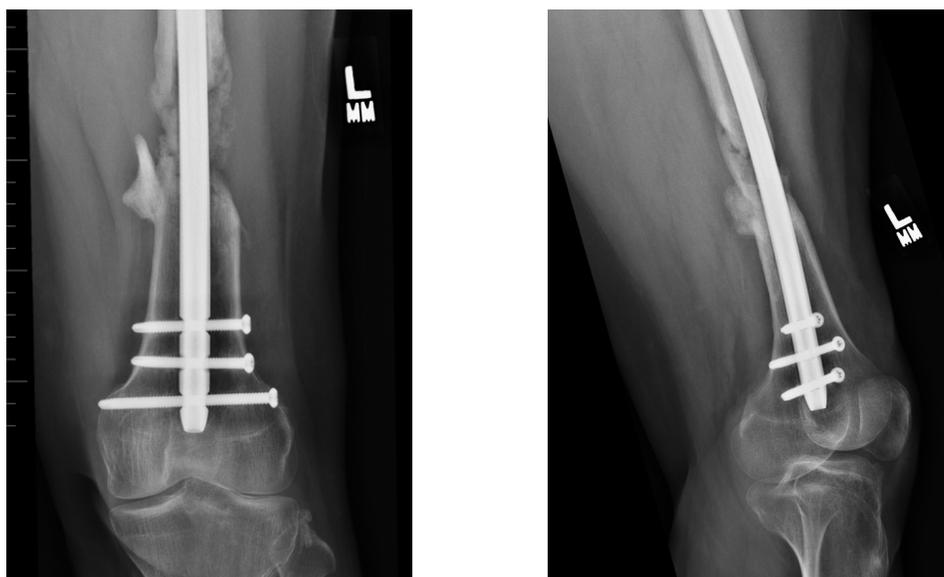
**Figure 4.**

Images one day following revision surgery using femoral nail, RIA bone graft femur, 10 cc ViviGen



**Figure 5.**

Images taken six weeks post-operative



**Figure 6.**

Images taken six months post-operative



**Figure 7.**

Fusion observed in radiographs taken 14 months post-operative

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

## References

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