

PATIENT CASE EXAMPLE

Highly comminuted patella fracture in a 41-year-old laborer

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OVERVIEW/DISCUSSION

Patella fractures can include a wide spectrum of injuries. Nondisplaced fractures can frequently be treated non-operatively, while severe injuries disrupt the entire extensor mechanism of the knee and necessitate surgery. The fracture repair itself can be simple with tension band or screw fixation but can also require more complex reconstruction. Stiffness is a frequent complication following surgery. This patient had a severely comminuted fracture with significant articular injury. Biologic supplementation with AmnioFix® was used to decrease soft tissue scar formation and improve healing in this injury.

CLINICAL HISTORY

A 41-year-old laborer was brought to the emergency department after falling down a flight of stairs while at work. He landed directly on the anterior knee. At his initial presentation, he had severe knee pain, an inability to perform a straight leg raise and a significantly swollen knee. Plain X-rays and a CT scan were performed which showed a highly comminuted, intra-articular patella fracture (Figure 1).

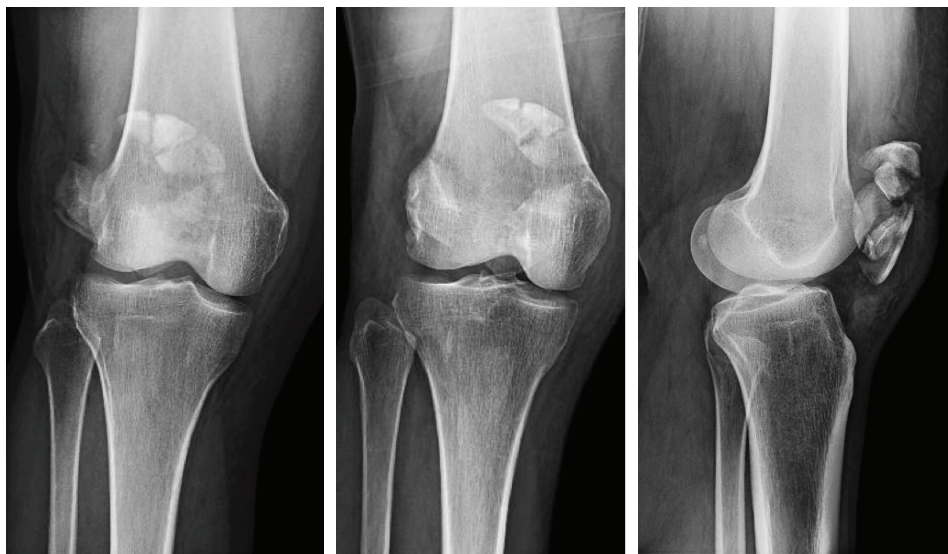


Figure 1
Anteroposterior and lateral X-rays showing a highly comminuted, intra-articular patella fracture.

SURGICAL PROCEDURE

After allowing for adequate soft tissue rest, the patient was scheduled for surgery. He was brought to the operating room for planned open reduction with internal fixation of the patella fracture. A tourniquet was used to improve visualization. A standard midline approach was used to expose the patella. The comminuted fracture was noted as well as significant injury to the surrounding tissues and especially the retinaculum both medially and laterally. Full thickness injury to the retinaculum was noted. The intraoperative photo shows the highly comminuted fracture and surrounding soft tissue injury (Figure 2).

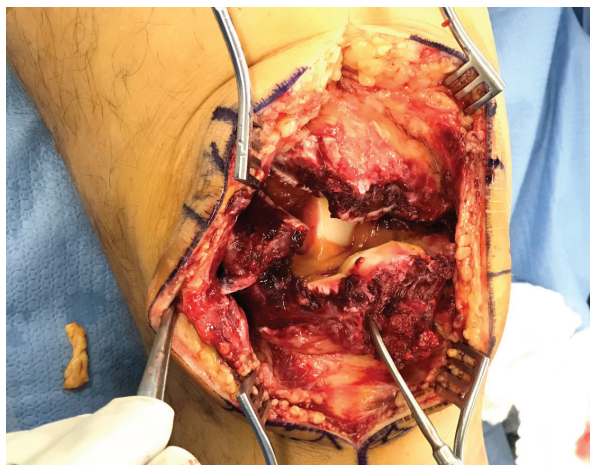


Figure 2

Intraoperative photo shows the highly comminuted fracture and surrounding soft tissue injury.

The fracture had significant anterior cortical impaction and fragmentation with nearly complete disassociation of the articular surface from the anterior bone. The severity of the comminution made traditional tension band or cannulated screw fixation impossible. Initial alignment was provisionally created with multiple k-wires with the primary goal of recreating the articular surface (Figure 3).

Once the alignment had been restored, a locking titanium mesh plate and mini-fragment plate were used to reconstruct the patella. After finishing fixation, a 4 cm x 6 cm AmnioFix sheet was placed over the construct (Figure 4).

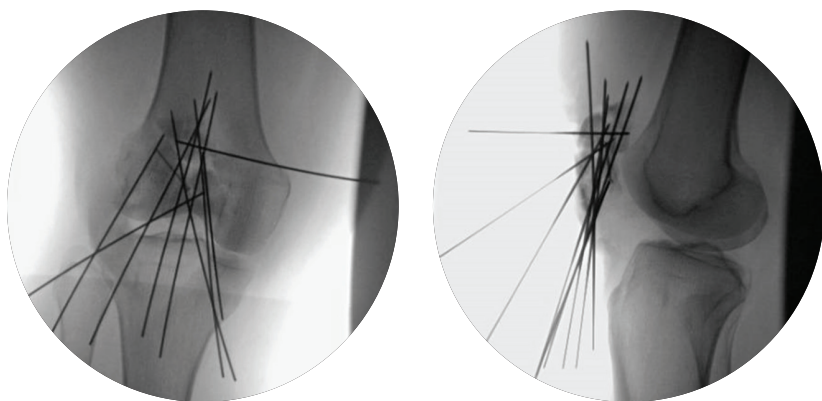


Figure 3

Initial alignment was provisionally created with multiple k-wires with the primary goal of recreating the articular surface.

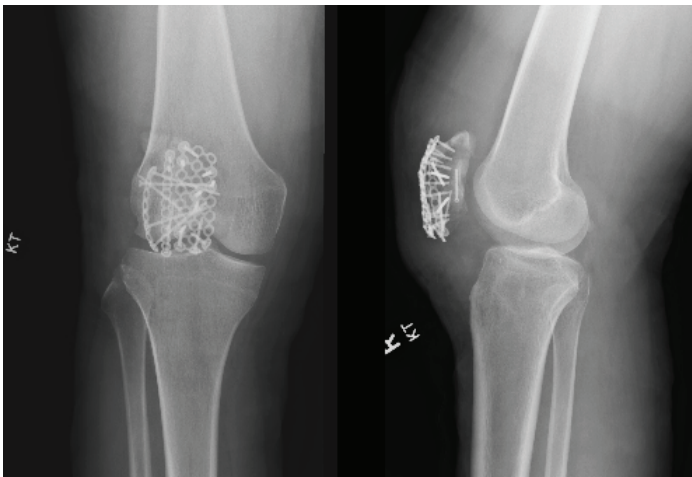


Figure 4

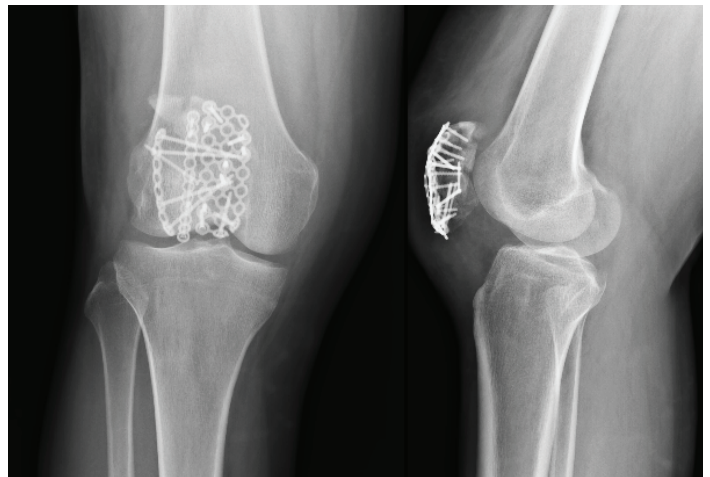
4 cm x 6 cm AmnioFix sheet placed over the construct following fixation.

The goal of applying AmnioFix was to improve vascular ingrowth into the devascularized portions of the fracture and to decrease the scar formation over the anterior surface of the patella. Amniotic membrane, and more specifically AmnioFix, has been shown to possess angiogenic cytokines and promote angiogenesis both *in vivo* and *in vitro*,^{1,2} as well as to reduce scar tissue formation.³⁻⁵ It is postulated that these properties may enhance the healing process and result in an improved functional outcome for the patient.

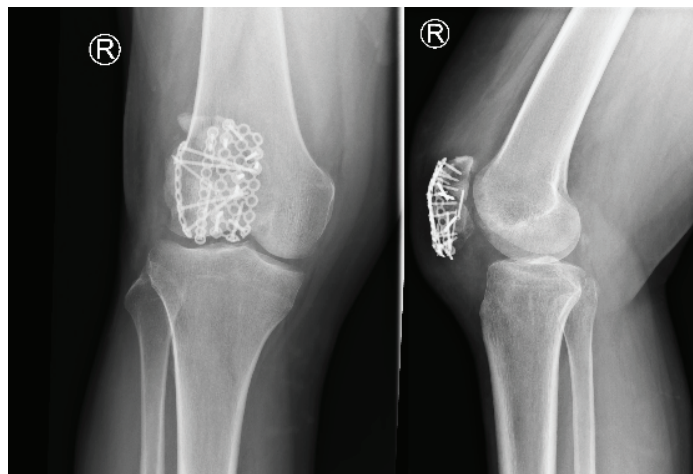
The medial and lateral retinacular tissues were repaired as well. The superficial layers were closed in a typical manner. The patient was discharged home the same day and followed up for scheduled post-operative visits. He was started on a routine patella fracture rehabilitation protocol with immobilization for two weeks followed by progressive flexion with physical therapy and advancement of weight bearing. He was followed for a typical post-operative course and seen on a monthly basis (Figures 5-7).



Figures 5
Post-operative film, 2 weeks post-op.

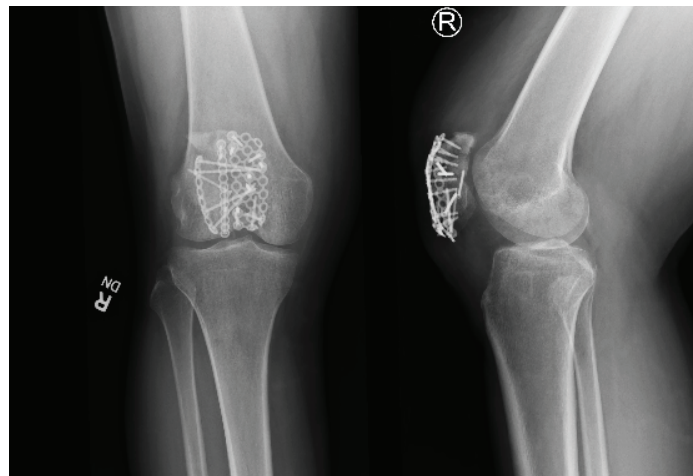


Figures 6
Post-operative film, 6 weeks post-op.



Figures 7
Post-operative film, 10 weeks post-op.

His knee ROM had returned as per the rehab protocol, and the surgical scar healed without complication. By 3 months post-op, he had knee ROM from 0-120 degrees. He does have complaints of quadriceps weakness but has minimal knee pain with activity. Radiographs showed no loss of fixation of the fracture and signs of bony healing (Figure 8). He has been cleared to return to work.



Figures 8
Post-operative film, 3 months post-op. Radiographs show no loss of fixation of the fracture and signs of bony healing.

CONCLUSION

Highly comminuted patella fracture repaired with AmnioFix with excellent functional outcome given the severity of the injury.

REFERENCES

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