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Anterior cruciate ligament reinsertion in an adult patient using a high-strength 6-strand suture technique: Case report and literature review

Clínica Universidad de los Andes
Santiago, Chile

Valenzuela. A, Irarrázaval. JM, Díaz. J, Goldbaum. E, Teuber. J, Marambio. G, Hun. J.

Faculty Disclosure Information

- We have no conflict of interests to disclosure.

Introduction: General Aspects

- Anterior cruciate ligament (ACL) avulsion due to tibial eminence fracture is an uncommon injury, with an approximate incidence of 3 for every 100.000 people a year.

- Represents between 1-5% of all ACL injuries in adults.

- According to the Meyers & McKeever modified classification, surgical management is indicated on type 2 injuries with a displacement greater than 2 mm, as well as on type 3 and 4.

- Management could be more difficult in cases that evolve to nonunion and displacement, even without instability.

Introduction: Case Presentation

- 23 y/o patient suffered a left knee valgus twist injury with a fixed foot playing soccer, which resulted in immediate functional impairment.
- The patient was diagnosed with an ACL avulsion due to a tibial fracture, associated with a bucket-handle lateral meniscus tear.
- The treatment included an arthroscopic reinsertion of the ligament by a three high-strength (6-strand) suture point with transosseous tunnels, alongside the repair of the meniscus.
- The patient continued with a typical ACL rehabilitation protocol, returning to physical activity (including pivoting sports) in 10 months and with a normal Magnetic Resonance Image (MRI) 1 year postoperative.

Introduction: Case Images

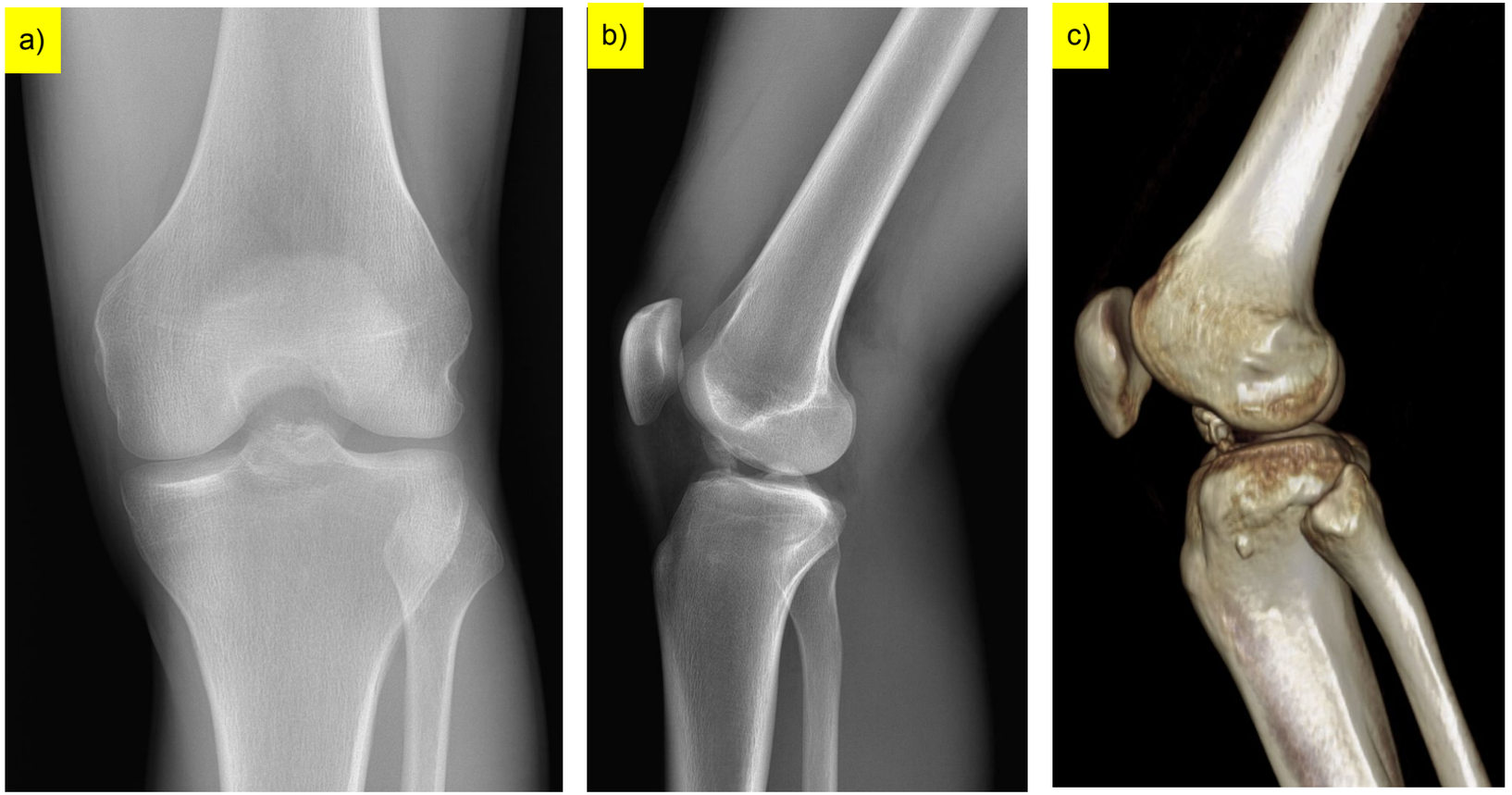

Figure 1.Patient injury images
a, b) X Rays anteroposterior- lateral views with tibial avulsion.
c) 3D CT reconstruction with the displaced tibial avulsion injury.

Introduction: Case Images

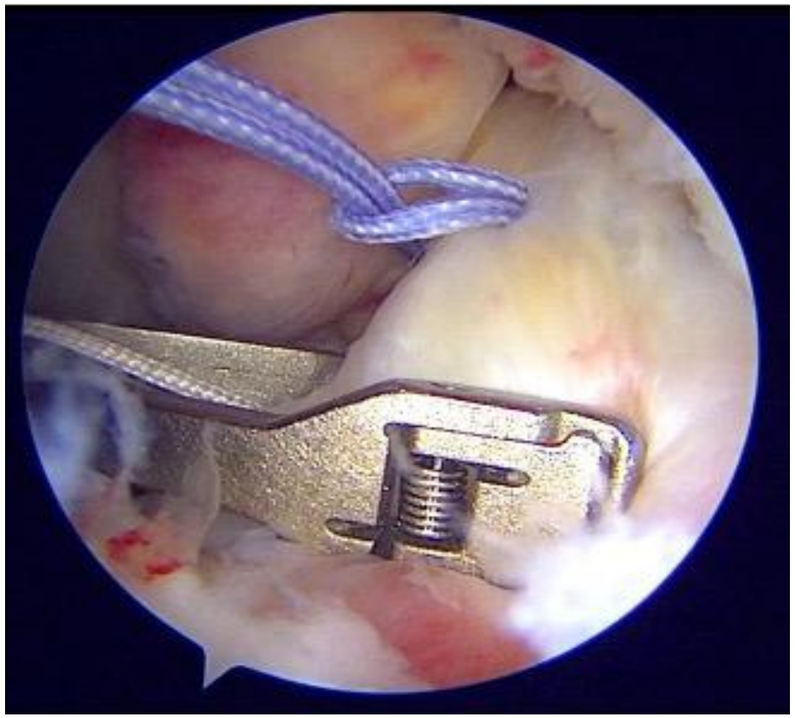

Figure 2: Patient injury images
Sagittal T2 MRI: displaced tibial avulsion injury of the ACL, posterior double cruciate sign (bucket-handle lateral meniscus).
Figure 3: Arthroscopic vision
Anterolateral portal: 2 of the 3 high-strength sutures are observed through the ACL.

Introduction: Case Images

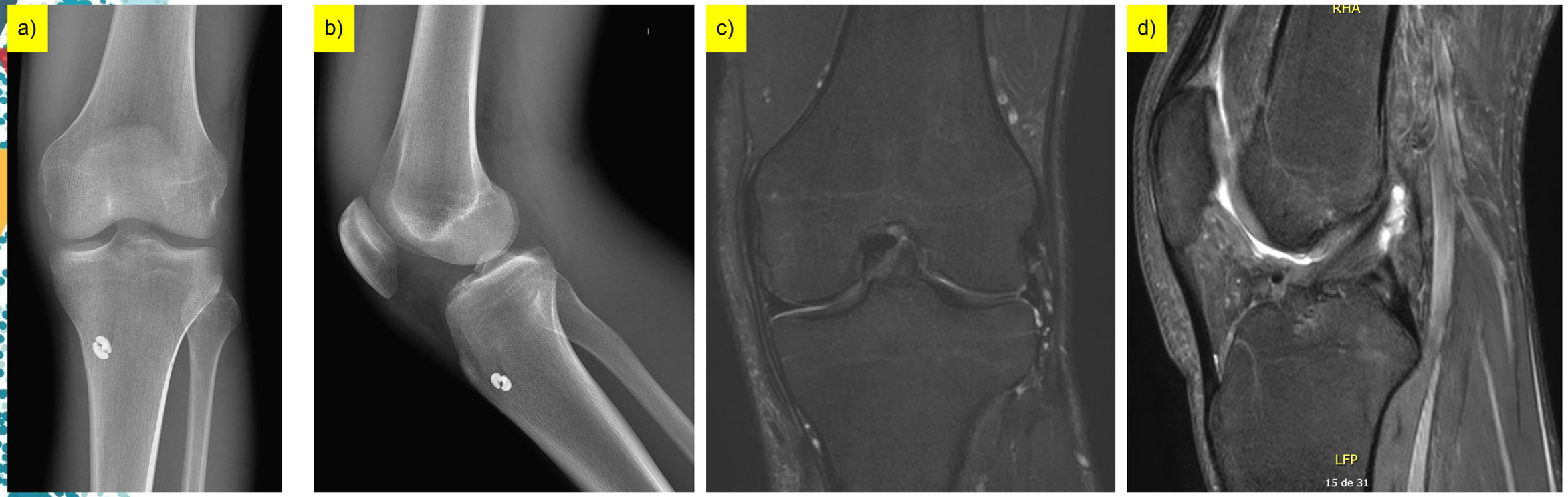

Figure 4. Patient Post op images.
a, b) 6 weeks post surgery X Rays anteroposterior- lateral views that evidence suture point with transosseous tunnels.
c, d) 1 year post surgery Coronal and Sagittal T2 MRI: reduced avulsion injury of the ACL, posterior double cruciate sign (bucket-handle lateral meniscus).

Discussion: General Aspects

- ACL avulsion following tibial eminence fracture is uncommon.
- Frequently affects children and adolescents because the physis is weak compared to the ligament. However, it can occur in adults, causing anterolateral knee instability.
- Its incidence has increased, partly due to the rise of physical activity in infants and high energy trauma in adults.

Discussion: Management

- Based on the severity of the displacement, according to Meyers & McKeever modified classification.

- Green et al. proposed a new classification based on MRI findings, which is equally trustable and gives quantitative guidelines for treatment.

- Surgical techniques have evolved, with arthroscopic methods reducing the open arthrotomy approach.

Discussion: Management

- Many fixation techniques have been described, including Kirschner wires, screws, cables and sutures or suture anchors.

- Comparisons between screws and sutures have not demonstrated significant differences regarding the range of movement (ROM) loss, arthrofibrosis or laxity on pivot shift test, which indicates that there is not a clear preference between methods.

Discussion: Technique

- The ACL reinsertion can be done through arthroscopic techniques using three suture points with hybrid intra articular sutures and external tension bands via transosseous tunnels.

- This technique provides adequate compression, fixation and reduction, supporting multidirectional forces.

- Results have shown to be favorable, with significant improvement on Lysholm and IKDC scores and Tegner activity level.

- Common complications include ROM loss, malunion, impingement and residual laxity, being the physis injuries of greatest concern in growing bones.

Conclusion

- In this case, the ACL repair with three suture point fixation and meniscus tear correction resulted in an excellent joint function and successful return to sport.

- This technique, minimally invasive and with low perioperative complication rates, is reproducible and suggested as a valid option in the management of similar injuries.

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