

Simultaneous Bilateral Anterior Cruciate Ligament Injuries: A Case Report

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ABSTRACT

Simultaneous bilateral anterior cruciate ligament (ACL) injuries are not common¹. The mechanism of injury is difficult to explain, and the therapeutic strategies are yet to be established. Without proper management, the injuries would lead to progressive deterioration of knee function with rotatory instability, meniscal tear and degeneration of the joint cartilage^{2,3,4}. There have been a few reports of simultaneous bilateral injuries of ACL in the literature. Recently Maywood⁵ reported a case and Sanchis-Alfonso⁶ described the above injury for a novice skier. We report a case of simultaneous bilateral ACL injury occurring in a military recruit who jumped off an elevated obstacle.

Case report

A 20-year-old Chinese man injured both knees after jumping off an obstacle of about 1.5 meters high. There was sharp pain and swelling of both knees and he was unable to walk following the injury. About 40 ml of blood was aspirated from each knee. He was managed conservatively with analgesics and splintage.

He was seen in our orthopaedic clinic six months later complaining of giving way during walking, activity-related pain at both knees and locking and mild effusion in the right knee. He had been attending physiotherapy in the preceding four months but still experienced pain occasionally, for which he required analgesics. He was unable to walk on uneven ground due to the sensation of instability.

Examination revealed positive Lachman and anterior Drawer test for both knees, mild effusion and positive McMurray's test for lateral meniscus on his right knee signifying bilateral ACL injuries with concomitant lateral meniscal injury of his right knee. There was no significant rotatory or side to side instability. He had almost similar range of motion (ROM) in both knees ranging from -15° extension to 110° flexion. Radiologically, a Second

fracture was present in the right knee. X-rays of the left knee were normal. His systemic examination was normal and he had no drug allergies.

Arthroscopic ACL reconstruction with partial menisectomy of lateral meniscus was performed only after several weeks of quadriceps strengthening / passive non-weight bearing range of motion exercises on the right knee as this was more symptomatic than the left. The graft used was a quadrupled semitendinosus and gracilis tendon anchored at the femoral end with an endobutton (STG-endobutton) and screw plus washer at the tibial end. At the end of operative procedure the ACL graft was checked for positioning and the graft position was found to be satisfactory, being isometric in the full range of motion of the knee.

For the left knee, ACL reconstruction was performed 12 weeks later with the aforementioned procedure as the patient was doing well with his right knee.

DISCUSSION

Knee injuries may result from direct contact or, more frequently, from indirect contact to the knee during activity⁷. For the anterior cruciate ligament to tear there must be excess anterior tibial translation or rotation of the femur on the tibia.

Most non-contact injuries occur with the knee typically close to extension during a sharp deceleration or landing followed by a fall. Mechanically, the angle of the patellar tendon and tibial shaft increases as the knee approaches full extension. This gives a mechanical advantage to the quadriceps. The tibia can move anteriorly during quadriceps activation that is not counterbalanced by hamstring activation. This acceleration produces a massive compensatory quadriceps contraction to prevent a backward fall, followed by an "anteroposterior shift" of the femur on the tibia in the sense of an anterior drawer, which in association with other factors leads to an ACL rupture⁸. Non-contact mechanisms were classified as sudden deceleration prior to a change of direction or landing motion, while contact injuries occurred as a result of valgus collapse of the knee⁹.

The patient could not explain the exact attitude of his lower limbs at the time of the injury, but he remembered that it was the jump-landing-backward fall¹⁰ sequence. At the end phase of landing with increasing knee flexion possibly the quadriceps dominated over the hamstring muscles at its relaxation phase and the anterior drawer force

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may rupture the ACL in both knees. Lateral meniscal injury could be secondary to ACL tear and associated Segond fracture¹¹ and the bucket handle type of meniscus tear at right knee indicated that this bony avulsion of the menisco-capsular ligament occurred due to some internal rotation at the end stage of jumping.

To manage the case, operation on both the knees were performed at an interval of 12 weeks. We used the quadrupled semitendinosus tendon for the right knee with femoral endobutton fixation as the doubled semitendinosus tendon is known to elongate over time¹². Operation on the left knee was performed 12 weeks later, as it was then pain free, ADL independent and had good range of motion (10°-110°). The other reason for this 3-month interval between surgeries was to avoid graft pull-out from the

femoral tunnel implying incomplete tendon incorporation during the first three months post-operatively¹³. In the post-operative period the overload and stretching of the grafted ligaments was eliminated with the aid of a suitable knee brace, but early range of motion exercises of the knee were allowed immediately. At final follow up, he was symptomfree with a stable and functional knee.

CONCLUSION

Bilateral ACL rupture can occur simultaneously particularly in a fall from height with the jump-landing-backward-fall sequence. The patient did well with ACL reconstruction that was done at an interval of three months using quadrupled semitendinous grafts.

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