



Case Report

Long jump – An unusual cause of knee dislocation and multiple ligament injuries

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ABSTRACT

Multiple ligament injuries of the knee joint involve at least 2 of the 4 major ligaments, with an occurrence of 0.001% to 0.013%.

The mechanism of injury for the two most common knee dislocation patterns, anterior and posterior, are reasonably well described. Rotatory dislocations are less common. Various mechanism described by Kennedy et al. are hyperextension, dashboard injury, varus or valgus/rotation, flexion/adduction and rotation around the posterolateral corner.

We report a case of multiple ligament injury following anteromedial dislocation of knee after long jump. In our knowledge, we did not find any literature or case report supporting long jump as mechanism of injury. Patient was taken for single stage arthroscopic ACL and PCL reconstruction and open LCL reconstruction using autologous multiple ipsilateral hamstring grafts. Standard rehabilitation protocol was followed in post operative period. At present, she is walking without assistance and able to perform her daily and routine activities, clinically she is having mild anteroposterior ligaments laxity probably due PCL failure, with full knee range of motion but not involved in sports activities.

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1. Introduction

Multiple ligament injuries of the knee joint involve at least 2 of the 4 major ligaments, with an occurrence of 0.001% to 0.013%.¹⁻³ Knee dislocation is a common cause of multiple ligament injury and gross instability, and may be a surgical emergency as the associated injury of soft tissue and neurovascular structures are high.^{4,5}

Most common mechanism of injury of multiple ligaments is knee dislocation, either anterior or posterior. Kennedy⁶ had described anterior dislocation by a hyperextension force acting on the knee. Other⁷⁻⁹ series demonstrated that both ACL and PCL disruption can occur with complete knee dislocation. Dash board injury can lead to posterior dislocation of knee.⁸

Medial & lateral dislocation is mainly associated with high energy trauma with valgus & varus rotatory

component. Both anterior and posterior dislocation is associated with significant soft tissue & neurovascular injury. Combined dislocation is also possible like posterolateral dislocation when flexed knee is exposed to sudden abduction and internal rotation of tibia.¹⁰

We report a case of multiple ligament injury following anteromedial dislocation of knee after long jump. In our knowledge, we did not find any literature or case report supporting long jump as cause of knee dislocation and multiple ligament injury.

2. Case Report

A 16-year-old girl with tall stature sustained injury to left knee following a fall while playing long jump. Immediately she was taken to nearby hospital where she was diagnosed with traumatic dislocation of knee (Figure 1). Dislocation was reduced and referred to higher centre for further management. She was evaluated and was diagnosed with tear involving the anterior cruciate ligament(ACL),

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posterior cruciate ligament(PCL) and partial tear of lateral collateral ligament(LCL).

No other joint involvement was noted, peripheral pulses (dorsalis pedis and posterior tibial) were felt equally on both sides. In view of suspicion of any intimal tear of popliteal vessels vascular surgeon was consulted & injury was ruled out. Radiographs and MRI were done which showed reduced knee joint dislocation without any bony injury with ACL, PCL & LCL tear on MRI. Ankle-Brachial index was 1.1. The patient was planned for one stage surgery after 6 weeks. During this period limb was elevated and motion limiting brace was given & gradual range of motion exercise and isometric quadriceps & hamstring strengthening exercises were started. After six weeks, she was able to flex the knee up to 100 degree & power of quadriceps & hamstring improved.

Knee injury was classified according to Schenk et al¹¹ in Group KD III L.

Patient was taken for single stage arthroscopic ACL and PCL reconstruction and open LCL reconstruction using hamstring graft and spiked washer.

Immediate post op period (Figure 2) she was put on motion limiting brace locked in full extension for three weeks. For next three weeks, gradual knee passive range of motion was started, followed by quadriceps and hamstring strengthening exercise for another six weeks (Figure 3). After three years screw was removed.

At present, she is walking without assistance, clinically she is having mild anteroposterior ligamentous laxity probably due PCL failure with full knee range of motion (Figure 4). She is able to perform all her daily and routine activities but not participating in previous sports activities, her knee function was in 2000 IKDC grade B (nearly normal).



Fig. 1: Radiographs left knee joint AP/LAT - Showing anteromedial dislocation of knee joint

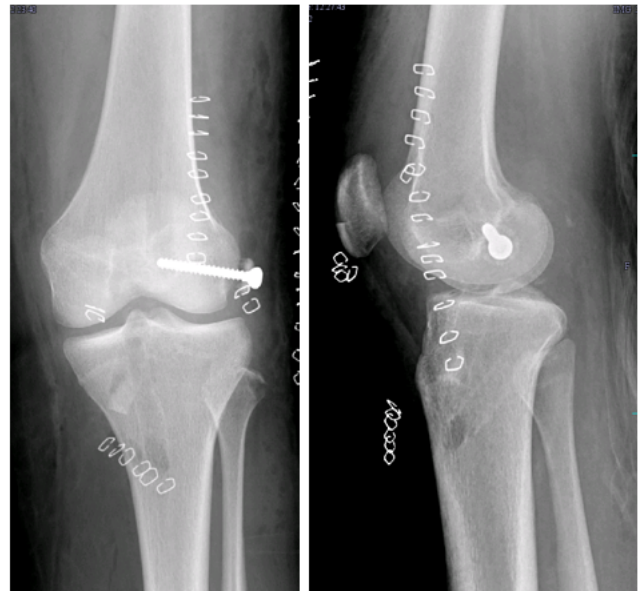


Fig. 2: Radiographs of knee joint AP/LAT - Immediate post operative period



Fig. 3: Radiograph of knee joint - AP/LAT - Six weeks post op period

3. Discussion

The multiple ligament injured knee is a complex problem in orthopedic surgery. These injuries may or may not present as acute knee dislocations, and careful assessment of the extremity vascular status is essential because of the possibility of arterial and/or venous compromise. Popliteal artery may be damaged by two mechanisms; one is by stretching seen in anterior dislocation and other by direct contusion which results in intimal damage seen in Posterior



Fig. 4: Clinical Photographs of outcome of knee function at six month post operative

dislocation.

Long jump may lead to knee dislocation and multiple ligament injuries, by a mechanism which can be understood by following explanation.

Long Jump includes four phases, first being run up followed by take off, flight and the last one is landing. We are more interested in landing phase as knee dislocation depends upon the position of leg during landing. The usual pattern of landing is heel strike, ankle dorsiflexed and knee semi flexed with hip flexed approximately 90 degree. This position can lead to anterior dislocation or anteromedial/anterolateral dislocation depending upon varus/valgus forces applied. Our case had anteromedial dislocation probably in above mentioned position of leg with valgus force. Imaging studies needed for evaluation are plain radiographs and MRI scan, Bone scan may be helpful in subacute and c/c cases. Diagnostic arthroscopy may be helpful in assessing interstitial damage of ACL & PCL. The current consensus indicates that surgical treatment yields better result than conservative treatment of multiple ligaments injured knee.^{12–14} The surgical timing depends upon extremities vascular status, open wounds, reduction stability, skin condition, multiple system injuries and other orthopaedics injuries.^{15–17} Standard post-operative rehabilitation program for multiple ligament injuries results in optimum results.

4. Conclusion

Long jump may cause rotatory dislocation of knee leading to multiple ligament injury by hip and knee flexed ankle dorsiflexed with valgus force mechanism.

5. Source of Funding

None.

6. Conflict of Interest

None.

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