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### Bilateral Anterior Cruciate Ligament (ACL) Tears treated by double bundle grafting

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#### ABSTRACT

Anterior Cruciate Ligament (ACL) tears are orthopaedic injury, particularly in athlete and youth populations. ACL is composed of longitudinally oriented bundles of collagen tissue arranged in fascicular subunits within larger functional bands. Ligament is surrounded by synovium, thus making it extra-synovial. Unilateral ACL tear is common & seen by sports medicine orthopaedic surgeons. But bilateral ACL injury is extremely rare and reported only three times in the previous literature. In this case of bilateral ACL tear, which was surgically treated and managed by performing arthroscopic double bundle ACL reconstruction in left knee using quadruplet hamstring graft. This particular surgery is a rare practice adopted by orthopaedic surgeons. We would like to highlight that, performing double bundle grafting not only helped the patient back into his sports field in shorter duration, but also shows that orthopaedic surgeons are espousing newer techniques and accomplishment of such procedure opening new dimension in ACL tear management.

**Key words:** Bilateral anterior cruciate ligament (ACL) tears, sports medicine, arthroscopic double bundle, hamstring graft.

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## Introduction:

The Anterior Cruciate Ligament (ACL) is composed of longitudinally adapted to bundles of collagen tissue set in fascicular subunits inside larger functional bands. Ligament is enclosed by synovium, therefore building it extra-synovial. Ligament is 31 to 35mm in dimension also 31.3mm in cross section.<sup>[1]</sup> ACL plays an vital role in the equilibrium of the knee.<sup>[2,3]</sup> The chief blood supply to ligament is from the middle geniculate artery, which penetrates the posterior capsule and come in the inter-condylar notch nearby the femoral attachment.<sup>[1]</sup> Unilateral ACL tear remains a common injury seen in sports medication orthopaedic surgeons. Though, a bilateral concurrent ACL injury is very rare and has remained reported merely three times in the earlier literature. This specific injury lacks definite guidelines for optimum management. However both staged and simultaneous ACL reconstructions are measured suitable strategies for the management of bilateral ACL Injuries.<sup>[4]</sup> ACL is one of the most usually disrupted ligaments in the knee. Even with the explosion of information on the ACL over earlier 25 years, slight attention has been absorbed on the causes and avoidance of injury.<sup>[5]</sup> New epidemiologic studies have documented a suggestively higher ACL injury amount in female athletes as related with male colleagues, mainly in basketball and soccer. Women tolerate two to eight times additional ACL injuries for the similar sport than men.<sup>[6]</sup> Though, numerous concepts have been planned to explain what influences patients to noncontact ACL injury. These concepts consist of hormonal difference, anatomic ACL size, inter-condylar notch, lower-leg alignment, knee joint slackness, muscle springiness, environmental playing style, shoe-surface interface and uneven playing surface are distributed into four classes: These contains; Hormonal, Anatomic, Ecological and Neuromuscular.<sup>[5]</sup>

## Case Report:

A 19 yr old male was admitted in Orthopaedic department on 13/01/2016 with chief complaints of pain in right knee joint since 1year and pain in left knee since 5months.

On examination (O/E) - patient was conscious, coherent, pulse rate 80beats/min. Blood pressure

110/70mmHg. Local examination of both knee revealed- no swelling, no scars & palpation and no local rise in temperature. No medical and lateral joint line tenderness. Patient had a history of fall from bike 1 year back, and fall while playing tennis one month back.

His **laboratory investigation** shows: RBS: 94gm/dl (80-120), Blood Urea: 22mg% (7-20). Serum Creatinine: 0.8mg% (0.6-1.2). Serum electrolytes: Sodium-138mEq/L (135-145) Potassium-3.5mEq/L (3.5-5.5), Chloride-104mEq/L (95-105). RBC: 4.8 Cells/mm<sup>3</sup> (4.2-5.4) WBC: 8,700 Cells/mm<sup>3</sup> (5,000-10,000).

**Differential Diagnosis:** X-ray, shows no bone injury, NMRI of left knee shows post horn of medial meniscus tear. Partial tear of ACL on femoral attachment. Based on examination and various diagnostic tests the case was provisionally diagnosed as **left ACL tear**, and was further confirmed as **left ACL tear with posterior horn of medial meniscus tear**. From 13/1/2016 to 25/1/2016 he was admitted for various test and were prescribed with

1. Tab Calcium OD
2. Tab Paracetamol BD
3. Tab B-Complex OD

He was permitted to go home on 25/01/2016 evening and was instructed to come back on 28/01/2016 morning to perform arthroscopic double bundle ACL reconstruction left using quadruplet hamstring graft.

On 29/01/2016, arthroscopic double bundle ACL reconstruction on left knee was done using quadruplet hamstring graft and was prescribed with the following medications:

1. IVF. 2 Pint RL, 2 pint DNS (1 pint= 500 ml)
2. Inj. Ceftriaxone 1g IV BD
3. Inj. Diclofenac 50 mg IM BD
4. Inj. Ranitidine 50mg IV BD
5. Inj. Amikacin 0.5g IV BD
6. Inj. Paracetamol IV slow infusion

On 30/1/16, patient general condition was fair



Figure: 1.

Figure: 2.

Fig 1 & 2. Showing postoperative double bundle in left knee.



Figure: 3. X-Ray of postoperative double bundle in left knee

without any local or systemic abnormalities and was prescribed with:

1. Inj. Ceftriaxone 1g IV BD
2. Inj. Amikacin BD
3. Tab. Diclofenac 100mg PO OD
4. Tab. Ranitidine 50mg PO BD
5. Tab. B-complex OD

Same treatment was continued till 2/2/2016 as patient condition remains same.

On 3/2/16 patient general condition was fair without any further post-operative complications and was prescribed with

1. Tab. Diclofenac 100mg PO OD
2. Tab. Ranitidine 150mg PO BD
3. Tab. B-complex OD

On 6/2/2016 patient general condition was good and vitals were stable. Patient was found fit to discharge and discharged with following prescription:

1. Tab. Diclofenac 100mg PO OD
2. Tab. Ranitidine 150mg PO BD
3. Tab. B-complex OD for a period of 15 days and was advised to revisit in Orthopaedic OPD.

### Discussion:

Reconstructions of ACL are amongst the most often performed techniques in knee surgery in recent years. Historically, ACL is a structure that was never touched by a scalpel by orthopaedic surgeon. However, meanwhile the early 20th century, there has been growing awareness and attention in ligament and its lesions & repair.<sup>[7]</sup> Communication among the surgeon and the therapist is a serious component of successful rehabilitation later surgery. The discussion of information benefits both professionals to exploit successful and effective patient result.<sup>[8]</sup> Currently, orthopaedic surgeons frequently prescribe a progressive protocol next ACL reconstruction and advise their patients returning to sporting events 6 months after surgery.<sup>[9]</sup>

In this case of bilateral ACL tear, which was surgically treated and managed by arthroscopic double bundle ACL reconstruction in left knee by quadruplet hamstring graft which is a rare practice adopted by orthopaedic surgeons. In this case surgeons have performed the procedure of double bundle graft as because the patient is an athlete and wants to back in the track in shorter duration after surgery<sup>[10]</sup>. Using single bundle graft may take longer time<sup>[10]</sup> thus this rare surgery has adopted and got success.

As a clinical pharmacist we must be aware about such rare clinical condition which are presenting in various departments of the hospital. A close monitoring of such cases and reporting them in an appropriate manner not only improve the activity of clinical pharmacist, it will also create awareness among other health care professional regarding rare clinical entity and management of such condition by adopting newer technique which ultimately leading to better patient care.

### Conclusion:

In conclusion we would like to highlight that, performing double bundle grafting not only helped the patient back into his sports field in shorter duration, but also shows that orthopaedic surgeons are espousing newer techniques and accomplishment of such procedure opening new dimension in ACL tear management.

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### List of Abbreviation:

**ACL:** Anterior Cruciate Ligament

**RBS:** Random blood sugar

**RBC:** Red blood cells

**WBC:** White blood cells

**NMRI:** Nuclear magnetic resonance imaging

**Inj.:** Injection

**Tab:** Tablet

**OD:** Once a day

**BD:** Twice a day

**PO:** Per oral

**IVF:** Intravenous fluids

**DNS:** Dextrose normal saline

**RL:** Ringer lactate

**OPD:** Out-patient department

**Source of funding:** Nil

**Ethical approval:** Not required

**Conflict of interest:** None declared

**Informed consent form:**

Informed consent was obtained from the patient for publishing the case. A copy of the consent form is available with author for future proceeding.

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