

**EDITORIAL**

## ACL Deficient Knee, an Approach to Patient Selection and Reconstruction

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**R**upture of the anterior cruciate ligament (ACL) is one of the most common injuries of the knee in the athletes and other group of patients who present to the knee clinics each year.

Near to 250000 ACL ruptures occur in the United States each year. Almost 100000 ACL reconstructions are performed in the USA annually (1).

This means that not all the patients with an ACL injury need operation. So, patient selection is an important step towards surgical treatment of ACL injury.

Reconstruction of the anterior cruciate ligament is one of the most commonly performed orthopedic procedures in developed countries of the world. The goal of anatomic reconstruction is to restore normal motion and stability to the knee and thereby, presumably, to restore its function and allow the patient to return to normal activities, including sports. Another goal is to prevent early degenerative changes. In order to achieve these goals, the immediate objective of the operation is to reduce abnormal laxity by substituting the injured anterior cruciate ligament with a graft (2).

We know about the natural history of a knee with an ACL rupture and the consequences of such an injury to the knee. This might include meniscal injury, stretching of other ligaments and degenerative changes in the knee joint.

On the other hand not all patients with ACL injury are suitable or good candidates for reconstruction. We know that having an operation needs considerations such as social and work status of the patient, availability of skillful surgeon and well equipped operating room. One should balance the risks and benefits of a major reconstruction surgery with potential risks and complications. The patient usually needs general or regional anesthesia for his/her operation. They need to be off work for a couple of

months and need extensive rehabilitation.

Looking at all these points and problems encountered in surgical and non-surgical treatment of an ACL deficient knee we need to have a method of classification and criteria to choose the best means of treatment which suits each patient.

Most of the patients with an ACL injury of the knee are in the young and active age group who might be keen to pursue their sport activities. They usually present with the chief complaint of giving way.

The main indication for reconstruction surgery is instability presenting as giving way. Some patients present to the knee clinic with a locked knee. They usually give a history of knee injury a couple of years ago and subsequent instability which was left untreated. A recent injury and giving way has damaged the meniscus, usually a bucket handle tear of medial meniscus with a typical pattern of image on the MRI scan. They need to be operated on as soon as possible for a meniscal repair or meniscectomy and ACL reconstruction at the same time.

An important issue in the treatment of an ACL deficient knee is patient selection. The technical issues such as graft selection, graft harvest and preparation, proximal fixation, tensioning and distal fixation with the knee in extension are also important.

A period of rehabilitation before surgery and early range of motion and extensive physiotherapy and rehabilitation after surgery will complete the procedure.

At our referral Knee and Shoulder center, Ghaem Hospital Medical Center, Mashhad, Iran, preferred method of reconstruction of ACL is BPB tendon autograft as the gold standard technique. Over 2000 patients have been operated on by the same technique in our center in the last 15 years. Overall results are satisfactory. Anterior knee pain and pain on kneeling is not as common as been previously

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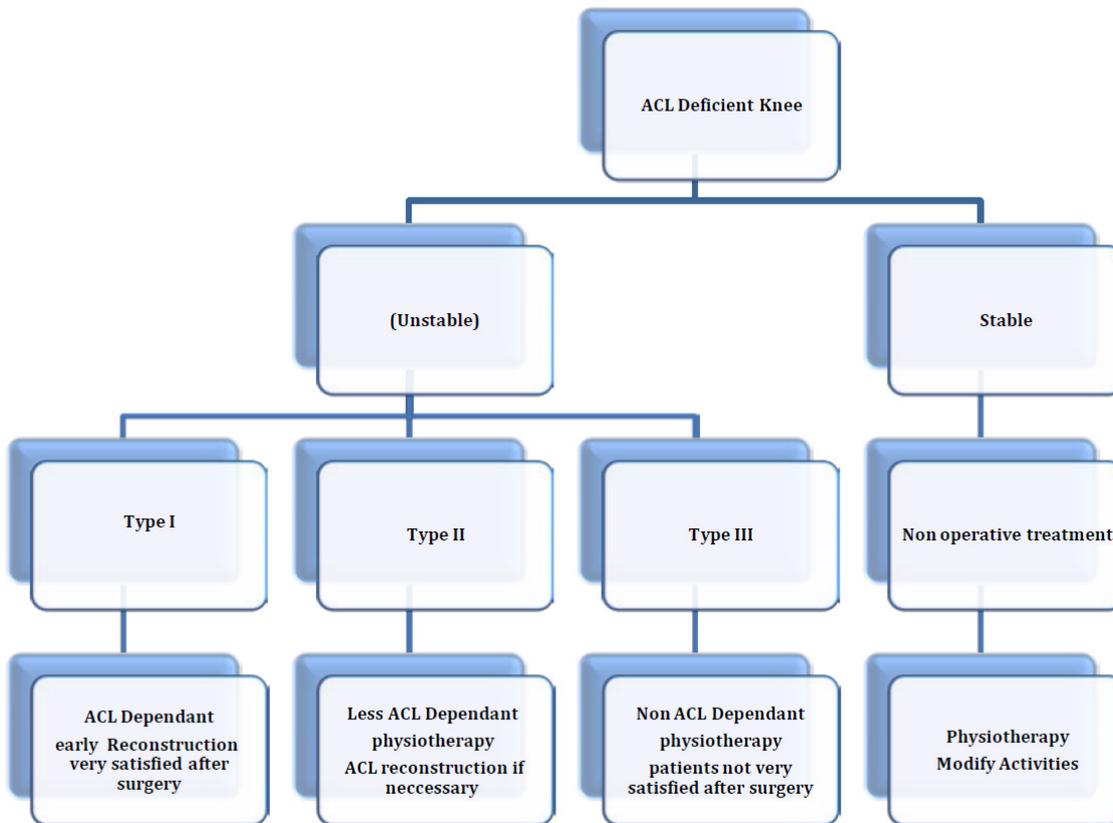


Figure 1. The algorithm for ACL deficient knee and patient's management.

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Best results are achieved in the younger age group and male patients. Older age groups and female patients do not respond to surgery as expected.

While considering a patient for ACL reconstruction one should look at patient's demand and expectation. The patient's phenotype and his BMI are important as well.

The timing of surgery is important. Of course is not urgent. Apart from instability other factors should be considered. This should include, the presence of OA, varus deformity and meniscal injury. In the presence of varus deformity which needs corrective osteotomy, we prefer to do it on a separate occasion. Because it makes the procedure more complicated and if one operation goes wrong it jeopardizes the other one.

The relative contraindications for ACL reconstruction are a painful knee with limitation of ROM, obese and non-cooperative patient (3, 4).

As Dye SF has mentioned in his article, knee is a biologic transmission with an envelope of function, the envelope of function of the knee shrinks after injury and it will never reach the pre-injury status even in the hands of the best surgeons (5). The patient should keep this in mind.

We have classified the ACL deficient knee to three subtypes. Type I is a patient with an ACL dependent knee whose knee gives way in ordinary daily activities. The anterior drawer and Lachman tests are positive. Type II patients complain of giving way during sport activities. The anterior drawer and Lachman tests are positive only when the patients are anesthetized. Type III patients are

Table 1. The Classification (typing) of patients regarding clinical, EUA & MRI findings

Type	Chief complain	On Examination	*EUA	Arthroscopy Finding	MRI Finding
Type I	Giving way/ daily activity	+ ADT + Lachman	+ ve	+	+
Type II	Giving way/ sport	- ADT - Lachman	+ ve	+	+
Type III	Giving way/ heavy sport champion	- ADT - Lachman	- ve	+	+

\*) Examination Under Anesthesia

+ve: Positive

-ve: Negative

those who are involved in heavy sport activities and are champions. These knees are non ACL dependent. The anterior drawer and Lachman tests are negative even under anesthesia.

Our classification allows us to choose the best patients for reconstructive ACL surgery which might get the best satisfactory and predictive results.

As it is shown in the table (Table 1), type I ACL deficient patients need surgery most often, they get better results and more satisfied. While type II ACL deficient patients in our classification might need ACL reconstruction less often. Some of them might get away with physiotherapy, modification of sport activities and having no surgery (Figure 1).

In type III patients who are usually involved in heavy sport activities and championship, these knees are not ACL dependent, they may not require ACL reconstruction. As it is very difficult to satisfy these patients and there is no positive Lachman test preoperatively to become negative postoperatively to show the graft stability. The knee might be captured if the ACL graft is tightened too much.

We believe that the best method of treatment and reconstruction of an ACL deficient knee is the one which suits best both the patient and surgeon. The selection of the graft and technique of reconstruction highly depends on the surgeon's skill and availability of the grafts and instrumentation.

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