## *Introduction* :

A major effort has recently been made to analyze the normal function of the anterior cruciate ligament, as well as the sequel of its injury, because the anterior cruciate ligament is the most commonly injured ligament in the knee joint *(Johanson et., 1991)* .

Rupture of the anterior cruciate ligament and certain capsular restrains such as the posteromedial and lateral parts of the capsule can result in anterior subluxation of the tibia .

Operative procedures used to stabilize the knee that has anterior subluxation can be grouped in two major categories : Intra-articular and Extra-articular *(Noyes et., 1984)* .

Intra-articular reconstruction of the anterior cruciate ligament is done by the use of either biological graft or artificial material .

The use of artificial materials for ligament replacement has gained popularity in recent years . Interest in the use of artificial ligament for treatment of symptomatic anterior cruciate ligament deficient knees has been marked .

## *Aim of the essay* :

To discuss the different types of artificial materials used in reconstruction of the anterior cruciate ligament and their results .

# ANATOMY OF THE ANTERIOR CRUCIATE LIGAMENT & THE SUPPORTING STRUCTURES OF THE KNEE.

*** Embryology :**

The development of the knee joint can first be detected at approximately 4 weeks , or 5 cm - stage of the embryo . It begins as a condensation of the mesenchyme , the so called "pre -cartilage state".

The future femur and tibia become recognizable only when an are of mesenchyme between these two pre - cartilage representation rarefies.

The progress is very rapid , and by 6 weeks an obvious knee joint can be detected .

The anterior cruciate ligament, itself, appears as a condensation in the blastoma at about 6.5 weeks. It begins as a vertical ligament , and gradually invaginates with the formation of the intercondylar space . It appears well before joint cavitation and remains extrasynovial at all times .

Thus , the cruciate ligaments are formed in the human embryo before the development of a joint space with freedom of motion .

*(Insall,1984)*

So , the subsequent motion of the articular surfaces apparently is predetermined to a large degree by the earliest presence of the

cruciate ligaments . So the functional importance of the cruciate ligaments has a very early origin.

***Gross Anatomy:**

Anterior cruciate ligament (ACL), in its adult form , has a mean length of 31+/-3 mm and 10 mm in width , And is entirely intracapsular but it is extrasynovial . Proximally , it is attached to the posterior part of the intercondylar surface of the lateral femoral condyle in the form of an arc of a circle , it is relatively straight anteriorly and obliquely convex posteriorly ; it occupies a surface area of 2 square cm on this femoral attachment . *(fig. 1)*

*(Arthur and Eugene 1985)*

Distally ,the Anterior cruciate ligament is attached to the tibia over a broader area , filling into a depression slightly anterior and lateral to the anterior tibial spine about 3 square cm in surface area . *(fig. 2)*

At this attachment the anterior cruciate ligament passes beneath the transverse meniscal ligament , there is fibrous attachment to the base of the anterior tibial spine , frequently, there is an insertion that blends into the anterior horn of the lateral meniscus .

*(Girgis et al., 1975)* and *(Arthur and Eugene, 1985)*