



"Prospective Comparative Study of Transtibialvs. Anteromedial Portal Technique in Arthroscopic Single Bundle Anterior Cruciate Ligament Reconstruction Using Hamstring Autograft "

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ABSTRACT

Background: Generally, there are two alternatives for drilling the femoral tunnel, the Transtibial (TT) approach and Anteromedial (AM) approach. Recent studies also suggest higher knee stability with the use of the Anteromedial portal (AMP).

Objective:- The aim of this study was to compare functional and clinical outcomes of the TRANSTIBIAL or the ANTEROMEDIAL PORTAL (AMP) technique for drilling the femoral tunnel in arthroscopic single bundle ACL reconstruction using hamstring auto graft at the department of orthopaedics SMIMER hospital, surat.

Materials and methods: The prospective study consists of 20 patients who had undergone Arthroscopic ACL reconstruction by TRANSTIBIAL Femoral Portal (NON ANATOMICAL) and 20 patients using ANTEROMEDIAL (AM)femoral portal (ANATOMICAL) using hamstring autograph at THE ORTHOPAEDIC DEPARTMENT SMIMER HOSPITAL SURAT in period of 2 yrs. Patients are analyzed by Lysholm Knee Scoring Scale.

Results: As Anteromedial portal technique is more Anatomical, clinical results should be better in the Anteromedial portal group compare to Transtibial group.

Conclusion: In our study, looking to the number of patients in each group and follow up period no definitive conclusion can be reached. However, patient treated by AM group had better results compare to TT group.

KEYWORDS

Anterior cruciate ligament reconstruction, femoral tunnel, Transtibial portal, Anteromedial portal.

INTRODUCTION:- The knee joint is the most commonly injured of all joints and the anterior cruciate ligament is the most commonly injured ligament.¹The ACL is the primary stabiliser against the anterior translation of tibia on the femur and is important in counteracting rotation and valgus stress.^{2,3}During the past decade arthroscopically assisted techniques have been an accepted method of reconstructing the ACL.⁴Femoral tunnel position in anterior cruciate ligament reconstruction is critical to a good outcome, while incorrect tunnel placement is considered as the most common cause of clinical failure. Generally, there are two alternatives for drilling the femoral tunnel, the transtibial (TT) approach and anteromedial (AM) approach. The traditional TT approach for femoral tunnel placement is limited by the angulation of the tibial tunnel and places the femoral tunnel higher in the intercondylar notch. Therefore, the anteromedial portal was introduced to overcome these limitations and to increase the rotational stability of the anterior cruciate ligament reconstruction. This technique allows an independent creation of the femoral tunnel from the tibial tunnel and a more anatomic placement.⁵ Recent studies also suggest higher knee stability with the use of the anteromedial portal (AMP). The purpose of this study was to compare functional and clinical outcomes of hamstring ACL reconstruction using the TRANSTIBIAL or the ANTEROMEDIAL PORTAL (AMP) technique for drilling the femoral tunnel in arthroscopic single bundle ACL reconstruction using hamstring auto graft at the department of orthopedics SMIMER hospital surat.

Methods:- The prospective study consists of 20 patients who had undergone Arthroscopic ACL reconstruction by TRANSTIBIAL Femoral Portal (NON-ANATOMICAL) and 20 patients using ANTEROMEDIAL (AM)femoral portal (ANATOMICAL) using hamstring autograph at THE ORTHOPAEDIC DEPARTMENT SMIMER HOSPITAL SURAT in period of 2 yrs. Patients were selected according to inclusion criteria like Willingness to participate and follow up, No prior knee surgery, Normal contralateral knee, Patients aged 15 to 40 years who underwent

elective, primary ACL reconstruction with hamstring autograft, Diagnosed case of ACL tear with instability of 3 weeks or more than 3 weeks old injury. Subjects were identified prospectively, and data were gathered in a cross-sectional manner during the postoperative period. TWENTY patients are enrolled for each technique (Transtibial and anteromedial(AM). Patients were evaluated at 1,3,6,12 and 18 months postoperatively clinically and according to Lysholm & Gillquist Knee Scoring scale.detail refer page no.

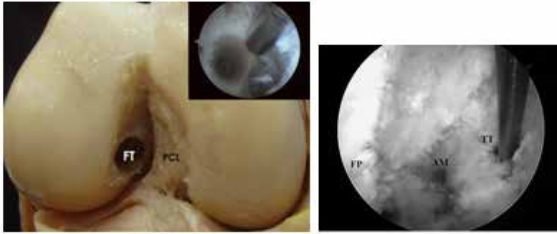
Results:-

In TT group 40% of patients were in 26-30 years age group while in AM group 35% of patients were in 36-40 years age group. In TT group 95% of patients were male and in AM group 90% of patients were male. In TT group 50% of patients had injury due to RTA and in AM group 60% had injury due to fall. In TT group 60% patients were present within 6 weeks of injury in AM group 45% patients were present within 3 weeks to 6 months. When we compare outcome by means of post op locking episodes 15% of patient underwent AM drilling shows occasional locking episodes while 40% of patient in TT group. When we compare outcome by means of post op instability or giving away sensation present in only 10% of patient with AM drilling then 35% in TT group. After surgical reconstruction only 25% of patient in AM group had problem in stair climbing, whereas 50% in TT group. When we compare outcome by means of squatting in AM group 20% of patient shows slight problem while this was observe in 55% of patient in TT group. While evaluating LYSHOLM score 75% of AM group shows excellent and good results while only 35% in TT group and 65% shows fair or poor results in TT group while only 25% in AM group. In TRANS TIBIAL PORTAL GROUP We had 03 (15%)patients with excellent outcome. 04 (20%) patients with Good outcome, 09(45%) patients had a Fair outcome and 04(20%) patient with poor outcome. In ANTEROMEDIAL PORTAL GROUP We had 11(55%) patients with excellent outcome. 04 (20%) patients with Good outcome, 04 (20%)patients had a Fair out-

come and 01(5%) patient with poor outcome. ASSOCIATED INJURIES IN BOTH GROUP: CHONDRAL LESIONS: 25 patients out of our 40 patients had associated Chondral lesions. 14 patients had chondral lesions at more than one site. The commonest site of presentation was the medial femoral condyle, Medial Femoral Condyle - 40%, Lateral Femoral Condyle - 25%, Patellar Surface - 20%, Medial Tibial Plateau - 10%. MENISCAL INJURIES: Meniscal injuries were present in 19 patients, Medial meniscus tear 13, Lateral meniscus tear 06

Discussion:-

In particular, one of the most critical steps is the placement of tunnel in which the ACL graft is secured to the femur. Femoral tunnel placement has a great influence on knee kinematics. The anatomical insertion of native ACL on the femur lies very low in the notch spreading between 11 and 9-8 o'clock very low and the center lies lower than at 11 o'clock position.



Two different approaches for drilling the femoral tunnel are commonly used in single-bundle ACL reconstruction: creating the femoral tunnel through the tibial tunnel or placement of the femoral tunnel through a low anteromedial arthroscopy portal. When using a transtibial drilling technique, the location of the femoral tunnel is restricted by the angulation of the tibial tunnel in the frontal and sagittal plane. There is a tendency for the femoral tunnel to be placed more towards the roof of the notch as well as anterior to the native ACL attachment.^{6,7} When placing the femoral tunnel through the anteromedial portal, drilling is not constrained by the orientation of the tibial tunnel and the surgeon is able to independently choose the correct femoral tunnel position under arthroscopic visualization of the native ACL footprint.^{6,7} The femoral tunnel position consecutively tends to be more towards the medial wall of the lateral femoral condyle, thus imitating more closely the natural course of the ACL and evidently providing additional restraint against externally applied rotatory loads. More recent anatomical and biomechanical studies have led to more and more precise knowledge on optimal tunnel placement. It is very clear that incorrectly positioned grafts still remain one of the most frequent causes for revision ACL reconstruction. The femoral attachment site has greater effect than tibial attachment on graft length changes as the knee flexes and extends.^{6,7} Even minimal displacements on the femoral attachment along the Blumensaat's line are particularly significant. The trans tibial technique for the femoral tunnel with the use of femoral aiming devices is very familiar to many surgeons. The problem is that the guide-wire tends to be more towards the roof of the notch away from the anatomical attachment site. The transtibial technique can produce tunnels centered in the ACL footprints, if the starting point is close to the tibial joint line, resulting in a short tibial tunnel. Consequently, a short tibial tunnel may compromise graft fixation and graft incorporation. The anteromedial technique becomes more and more popular, but it is also a very demanding technique. Ku Kim et al.⁸ evaluated the clinical results in 33 patients with ACL rupture who were treated by anatomic ACL reconstruction using the two AM portal technique. The control group included 33 patients with ACL rupture who were treated with the conventional TT non-anatomic method. An objective instability test was performed, both preoperatively and at the final follow-up. The clinical results of both groups were compared using IKDC and Lysholm scores as subjective tests. At the final follow-up, in the group of patients who underwent anatomic reconstruction by the two AM portal techniques, results in the pivot shift showed statistically significant improvement

compared to the control group. They concluded that anatomic ACL reconstruction by two AM portals is an effective surgical technique that restores rotational stability with excellent clinical results. In our study When we compare outcome by means of post op instability or giving away sensation present in only 10% of patient with AM drilling then 35% in TT group and this difference was statistically significant with odd ratio of 0.14[95% of CI 0.02-0.87]. This means that chances of frequent instability is 80% less in AM group as compare to TT group. When we compare outcome by means of post op locking episodes 15% of patient underwent AM drilling shows occasional locking episodes while 40% of patient in TT group. This difference was statistically significant with odd ratio of 0.18[95% of CI 0.03-0.90]. In a short-term study conducted by Koutras et al.⁹, 51 patients were included and data were collected at 3 and 6 months after surgery. The AM approach group had better Lysholm scores at 3 months and better performance in the time movement function tests at 3 and 6 months. No other comparisons were significant. In our study While evaluating LYSHOLM score 75% of AM group shows excellent and good results while only 35% in TT group and 65% shows fair or poor results in TT group while only 25% in AM group Relevant Historical Analyses of TT Reconstructions Compared With Native ACL and AM Reconstructions Arnold et al studied Cadaveric arthroscopy and dissection Using a correctly placed tibial tunnel and found that the anatomic attachment on the femur could not be achieved through a TT technique.¹⁰ Giron et al done study on Cadaveric dissection and plain radiographs and found that it is impossible to restore anatomic femoral ACL origin with TT drilling technique.¹¹ Advantaged in AM portal technique are A better visualisation of the lateral wall of the intercondylar notch, A more anatomic graft placement bcoz the socket is created independently of the tibial tunnel, A more horizontal graft Placement leading to a greater knee rotational stability in interference screw fixation A parallel socket and screw angle, Any fixation type is compatible, Revision may be easily performed. Risk in AM portal technique are Medial condyle cartilage damage, Tunnel back wall blow out, Inadequet socket length, A more difficult instrument introduction when the knee is hyperflexed, An exit point of the pin from the thigh dangerous for peroneal nerve, Deep flexion of the knee required, that is difficult or impossible to obtain in obese patient, In our study after doing arthroscopic single bundle ACL reconstruction with trans tibial (TT) drilling, patients are complaining of occasional feeling of instability (giving away sensation) especially while climbing the stairs or walking on the slope, this is suggestive of mid flexion rotational knee instability. While none of this complains are present after doing arthroscopic single bundle ACL reconstruction using antero medial (AM) portal technique, Probable justification for this is as already discussed above that drilling femoral tunnel through antero medial (anatomical) technique resembles more closely to the native ACL on lateral femoral condyle as compared to trans tibial(TT) drilling technique.

Conclusion:-

In our study ,looking to the number of patients in each group and follow up period no definitive conclusion can be reached. However, patient treated by AM group had better results compare to TT group.

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