Transtibial vs Anatomical tunneling techniques for arthroscopic ACL Reconstruction in non-athletic population

Ali Electricwala¹, Chintamani Latkar¹, Sanjay Patil¹, Vilas Jog¹, Amit Mahajan¹, Shantanu Deshpande¹

¹Department of Orthopaedics, Bharati Vidyapeeth University, Pune, India

Abstract: Background: Transtibial tunneling technique has been the gold standard for arthroscopic ACL reconstruction for many years. Despite this high level of success, a growing body of literature has questioned whether this technique sufficiently re-creates the anatomy and function of the native ACL. This created a vogue amongst the arthoscopists for anatomical ACL reconstruction using the anteromedial portal. The purpose of this study was to compare the stability and functional outcome using both the techniques.

Materials and methods: 50 patients (39 males and 11 females), all non-athletes with ACL deficient knees underwent ACL reconstruction, 25 by transtibial and 25 by anatomical technique. On the basis on stability using Lachman’s and Slocum’s tests and functional outcome using Lysholm knee score at 3, 6 and 12 months.

Result: There was no significant difference in the Functional outcome (Lysholm Knee score), anteroposterior stability (Lachman’s test) and rotational stability (Slocum’s test) [p values > 0.05].

Conclusion: Both groups have equally good stability in both the anteroposterior and rotational plane.

Keywords: Transtibial tunnel, anatomical tunnel, non athlete, ACL injury

THESIS SUMMARY

Introduction:

Anterior Cruciate ligament (ACL) injuries of the knee are very common today due increasing incidence of road traffic accidents and sports injuries. ACL autograft can be prepare d using Bone-Tendon-Bone (BTB) or Hamstring graft harvest. For ACL reconstruction, tibial tunnel is prepared using a standard jig. The femoral tunnel can be prepared either through the tibial tunnel (Transtibial) or through the anteromedial portal (Anatomical). Transtibial tunneling technique has been the gold standard for arthroscopic ACL reconstruction for many years. Despite this high level of success, a growing body of literature has questioned whether this technique sufficiently re-creates the anatomy and function of the native ACL. The advantage of anteromedial portal are femoral and tibial tunnels are drilled independently of each other, allows preservation of any remaining intact ACL fibers, allowing isolated reconstruction of the anteromedial or posteriolateral bundle. Revision can be done using a new anatomical femoral tunnel and femoral end can be positioned at ideal 10 or 2 o clock positions ensuring better rotational stability. The advantages of transtibial technique are straight guide wire tunnel, technically easy, Longer and less oblique tunnel giving better AP stability and endobutton is resting on good cortical bone. The disadvantages of anteromedial portal are shorter tunnel hence less AP stability. Risk of peroneal nerve injury. Femoral tunnel must be drilled with the knee in hyperflexion (130 to 140 degrees). Visualization in the notch is obscured when the knee is placed in hyperflexion, due to poor
circulation of the arthroscopic inflow fluid and debris from drilling the femoral tunnel and dragging of the fat pad into the femoral notch, technically more demanding, endobutton is resting on the cortex of cancellous bone and working with the knee in hyperflexion causes a loss of the normal anatomical relationships in the notch, leading to spatial disorientation. Advantages of the transtibial tunnel technique are that it is familiar to most surgeons, it is simple and quick and it does not require the knee to be flexed beyond 90° of flexion when the femoral tunnel is drilled. The major disadvantage of the transtibial tunnel technique is that it is not possible to independently drill the ACL femoral tunnel. Anatomical and clinical studies have demonstrated that the transtibial tunnel technique tends to place the tibial tunnel too posterior and the femoral tunnel too high and deep in the intercondylar notch. The purpose of our study was to compare the stability and functional outcome achieved with each technique in non-athletic population.

Materials and methods:

50 patients (39 males and 11 females), all non-athletes with ACL deficient knees underwent ACL reconstruction, 25 by transtibial and 25 by anatomical technique. This was a randomized control trial. All patients were operated by a single surgeon. Patients from both the groups were evaluated on the basis of stability using Lachman’s and Slocum’s tests and functional outcome using Lysholm knee score at 3, 6 and 12 months. The duration of study was 5 years. All surgeries were performed under spinal anesthesia under tourniquet control. Quadrupled hamstring graft (Semitendinosus and Gracilis) was used. The tibial tunnel was prepared using a standard tibial angle guide. The femoral tunnel was drilled either through the tibial tunnel (transtibial technique) or the anteromedial portal (anatomical technique). The tibial side of the graft was fixed using an interference screw and the femoral tunnel with either interference screw or endobutton. The graft was cycled 15 to 20 times before closure of portals. All patients underwent a same physiotherapy protocol.

Results:

Demographic data was comparable in both groups. The rate of injury and injury to surgery interval was similar in both groups. The length of femoral tunnel was similar in both groups. There was no statistical difference in range of motion at 3, 6, and 12 months. There was no significant difference in the Functional outcome (Lysholm Knee score), anteroposterior stability (Lachman’s test) and rotational stability (Slocum’s test) [p values > 0.05].

Conclusion:

From our study we conclude that-
1) Both groups have equally good stability in both the anteroposterior and rotational plane.
2) Both groups have a good functional outcome in non-athletic group of individuals.

Key Words:

transtibial tunnel, anatomical tunnel, non athlete, ACL injury

Bibliography

4. Gonzalo Samitier, Pedro Alvarez; Anteromedial portal versus transtibial drilling techniques in ACL reconstruction: a blinded cross-sectional study at two- to five-year follow-up; INTERNATIONAL ORTHOPAEDICS; Volume 34, Number 5 (2010), 747-754.