

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, BharatiVidyapeeth University, Pune, India

Institute at which research was conducted: Bharati Vidyapeeth University,
Pune, India.

University Affiliation of Thesis: BharatiVidyapeeth University, Pune, India.

Year of Acceptance: 2013

Address of Correspondence

Dr Ali Electricwala.

Department of Orthopaedics, BharatiVidyapeeth University, Pune, India

E mail: ali.electricwala@gmail.com



Dr Ali Electricwala



Dr Chintamani L



Dr Sanjay Patil



Dr Vilas Jog



Dr Amit Mahajan



Dr Shantanu D

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 arthroscopists 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 (39males 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 to increasing incidence of road traffic accidents and sports injuries. ACL autograft can be prepared 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 Slocom's tests and functional outcome using Lysholm knee score at 3, 6 and 12 months. The duration of study was 3 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 mode 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

1. Aglietti P, Buzzi R, Menchetti PM, Giron F. Arthroscopically assisted semitendinosus and gracilis tendon graft in reconstruction for acute anterior cruciate ligament injuries in athletes. *Am J Sports Med* 1996; 24: 726-31.
2. Arnold MP, Kooloos J, van Kampen A (2001) Single-incision technique misses the anatomical femoral anterior cruciate ligament insertion: a cadaver study. *Knee Surg Sports Traumatol Arthrosc* 9:194-199
3. Bedi A, Altchek DW; The "footprint" anterior cruciate ligament technique: an anatomic approach to anterior cruciate ligament reconstruction. *Arthroscopy*. 2009 Oct;25(10):1128-38.
4. Gonzalo Samitier, Pedro Álvarez; 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.
5. Behrendt S, Richter J. Anterior cruciate ligament reconstruction: drilling a femoral posterolateral tunnel cannot be accomplished using an over-the-top step-off drill guide. *Knee Surg Sports Traumatol Arthrosc*. 2010; 18(9):1252-1256.
6. Brophy RH, Pearle AD. Single-bundle anterior cruciate ligament reconstruction: a comparison of conventional, central, and horizontal single-bundle virtual graft positions. *Am J Sports Med*. 2009; 37(7):1317-1323.
7. Jepsen CF, Lundberg-Jensen AK, Faunoe P; Does the position of the femoral tunnel affect the laxity or clinical outcome of the anterior cruciate ligament reconstructed knee? A clinical, prospective, randomized, double-blind study. *Arthroscopy*. 2007 Dec;23(12):1326-33.
8. Pearle AD, Shannon FJ, Granchi C, Wickiewicz TL, Warren RF; Comparison of 3-dimensional obliquity and anisometric characteristics of anterior cruciate ligament graft positions using surgical navigation; *Am J Sports Med*. 2008 Aug;36(8):1534-41.
9. Omer A. Ilahi, N. Janet Ventura, Amad A. Qadeer; Femoral Tunnel Length: Accessory Anteromedial Portal Drilling Versus Transtibial Drilling; *Arthroscopy*. 2012 Apr; 28(4):486-91.
10. Arnold MP, Kooloos J, van Kampen A (2001) Single-incision technique misses the anatomical femoral anterior cruciate ligament insertion: a cadaver study. *Knee Surg Sports Traumatol Arthrosc* 9:194-199.
11. Pearle AD, Shannon FJ, Granchi C, Wickiewicz TL, Warren RF; Comparison of 3-dimensional obliquity and anisometric characteristics of anterior cruciate ligament graft positions using surgical navigation; *Am J Sports Med*. 2008 Aug;36(8):1534-41.
12. Behrendt S, Richter J. Anterior cruciate ligament reconstruction : drilling a femoral posterolateral tunnel cannot be accomplished using an over-the-top step-off drill guide. *Knee Surg Sports Traumatol Arthrosc*. 2010; 18(9):1252-1256.

Conflict of Interest: Nil
Source of Support: None

Full Thesis and Master Chart available
on www.journalmedicalthesis.com

How to Cite this Article:

Electricwala A, Latkar C, Patil S, Jog V, Mahajan A, Deshpande S. Transtibial vs Anatomical tunneling techniques for arthroscopic ACL Reconstruction in non-athletic population. *Journal Medical Thesis* 2013 July-Sep; 1(1):35-36