

## Switching Portal Technique in Anterior Cruciate Ligament Reconstruction- Use of an Extra Low and Medial Portal

Abhishek Agarwal<sup>1\*</sup>, Ekansh Debuka<sup>2</sup>, Dharmendra Kumar<sup>1</sup> and Vineet Sharma<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Orthopaedics, King Georges Medical University, Lucknow, India

<sup>2</sup>Senior Resident, Department of Orthopaedics, King Georges Medical University, Lucknow, India

<sup>3</sup>Professor and Head, Department of Orthopaedics, King Georges Medical University, Lucknow, India

**\*Corresponding Author:** Abhishek Agarwal, Assistant Professor, Department of Orthopaedics, King Georges Medical University, Lucknow, India.

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### Abstract

**Background:** Long term success of ACL reconstruction depends on accurate surgical technique of anatomic tunnel placements and proper rehabilitation protocol followed, and for accurate tunnel positioning various arthroscopic landmark should be visible clear with the use of various portals.

**Materials and Methods:** All 112 surgeries were performed by a single surgeon in King Georges Medical University, Lucknow Orthopedic department Operation theatre during July 2016- December 2018. An extra low and medial portal is created and then portal were switched between anteromedial and low medial ones.

**Results and Conclusion:** With the use of this portal the average surgical time was observed to be 43 minutes and no malpositioning of tunnel was encountered. This switching portal technique provides an excellent view of the femoral tunnel plot and gives consistent results with minimum complications

**Keywords:** Switching Portal; Residents Ridge; Arthroscope; Working Portal

### Introduction

With the increasing rate of arthroscopic ACL reconstruction being performed everywhere, the incidence of failure and decreased longevity of the reconstructed graft is being encountered very frequently. Although there can be variety of reasons behind this failure- biological failure, new trauma, faulty surgical technique, the most important reason is due to malposition of tunnel placement more frequently that of femoral tunnel [1,2]. According to a data from Multicentre ACL revision society (MARS) 80% of all ACL failure is because of faulty Femoral tunnel [3]. Anatomic ACL reconstruction is now the method of choice as compared to transtibial technique, the later involves tibial tunnel dependant Femoral tunnel placement [4-6]. Every fraction of millimeters is important as far as accurate positioning tunnel placement is concerned for both entry point as well as the correct trajectory. And to get this we need to see whole plot accurately neat and clear as even minor variation in these principles can lead to bad to worse outcomes.

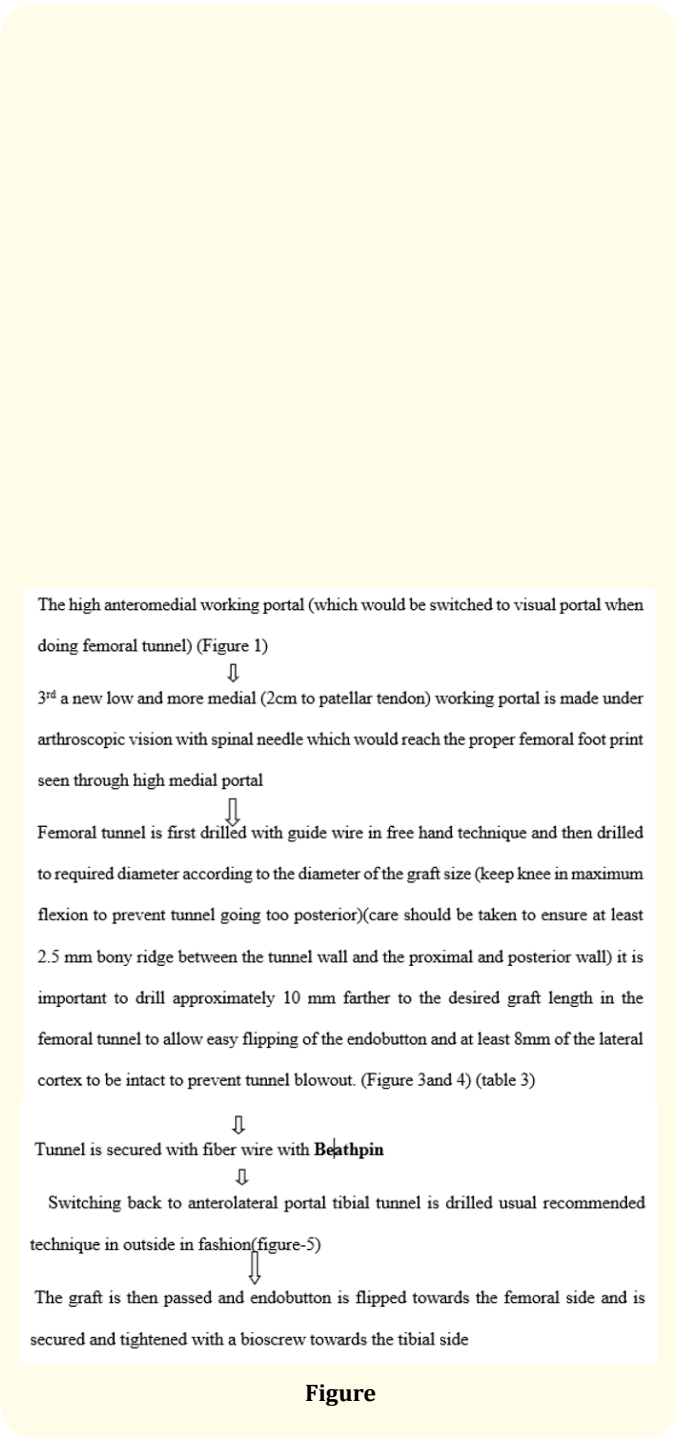
By the use of quadrant method the ACL femoral foot print is located 28-32% of the long axis of the quadrant and 35% of the short axis. There should not be any part of tunnel anterior to the resident's ridge [7,8].

The center of the tibial foot print should be at the level of posterior edge of anterior horn of lateral meniscus antero-posteriorly and in between interspinous area (40-60 ratio) mediolaterally [9,10]. Surgeons are using standard two portal technique for single bundle ACL reconstruction since time. The purpose of the study is to emphasize the role of an extra low and too medial portal to reconstruct ACL reliably with accurate femur and tibial tunnel positioning.

### Materials and Method

The study was conducted over a period of two and a half years during July 2016 to December 2018 in Department of Orthopaedics, King Georges Medical University, Lucknow. All surgeries were performed by single surgeon.

Surgical technique



Result and Discussion

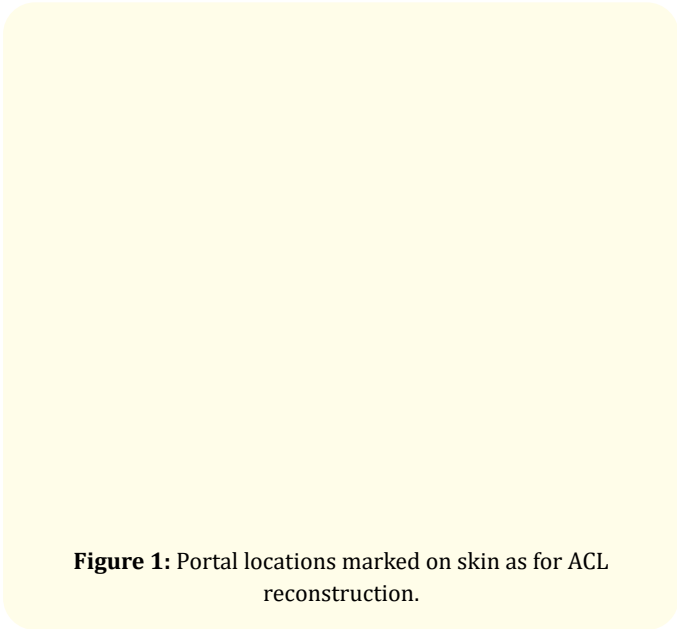
Total 112 ACL reconstruction in 112 patients with at least 3months post injury instability (Table 1).

Male/female – 90/22
Right/left -- 60/52
Average duration from the time of injury to the reconstruction – 168 days
Single/multiligament -- 103/09
Average time of surgery -- 43 minutes (including the graft harvest and preparation)
Average femoral tunnel length -- 38 mm
Average tibial tunnel length -- 47 mm
Average femoral tunnel diameter – 8.4mm
Average tibial tunnel diameter -- 9.1 mm
Malpositioning of femoral tunnel – none
Malpositioning of tibial tunnel –none
Femoral tunnel blowout –02
Tibial tunnel blow out -- none

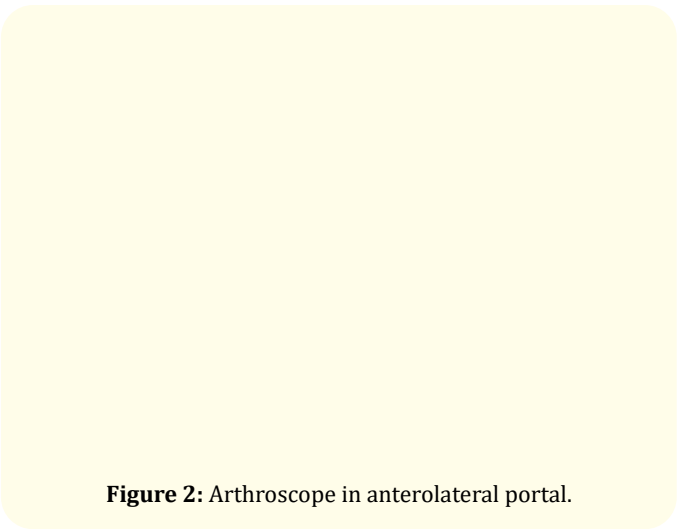
**Table 1:** Showing the mean observed findings.

Anatomic and accurate positioning of tunnel placement is key to success in ACL reconstruction. Although ACL anatomy has been well described by radiographs and cadaveric measurements but arthroscopic landmarks are of importance in reconstruction. Whole plot should be visible neat and clear to pin Arjuna’s fish eye (A reference of accuracy in Indian mythology) and to attain this the use of high anteromedial portal for visualization and extra low medial portal to be used as working portal has been proved to be a very good technique for tunnel placement without necessitating the inadvertent use of notchplasty (figure 2-3). In cases where remnants of ACL hinder the view of footprints, this technique is proven to be superior than two portal technique. In cases where augmentation of ACL is done while preserving the remnant ACL, the use of this extra portal has no match. Snow, *et al.* has mentioned many advantages of anatomical tunnel placement over the ancient transtibial technique which was further reemphasized by lubovitz [11]. Bedi, *et al.* has emphasized the importance of accurate tunnel placement on the basis of footprints and landmarks [12]. Paulo, *et al.* described the three portal technique for double bundle ACL reconstruction. All these statements are in accordance with the technique presented in this study.

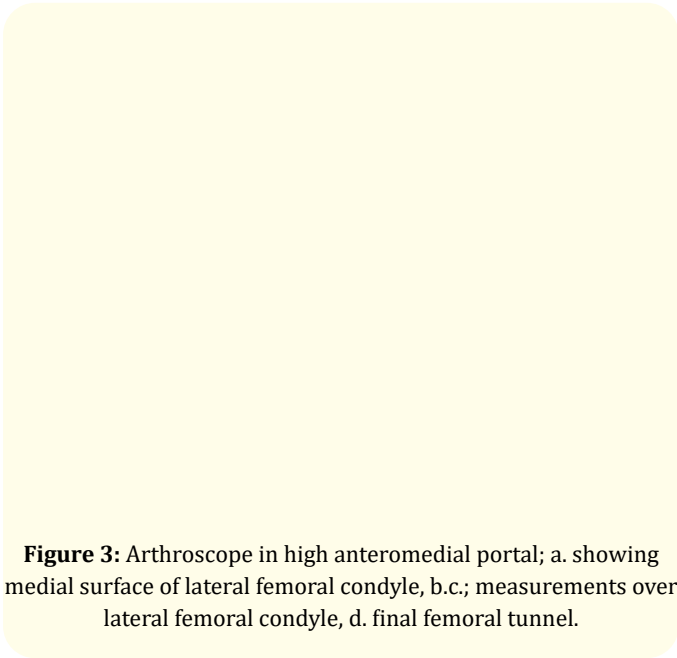
The principle for anatomical ACL reconstruction are to functionally reestablish the ACL to its native dimensions, collagen orientation and insertion sites.



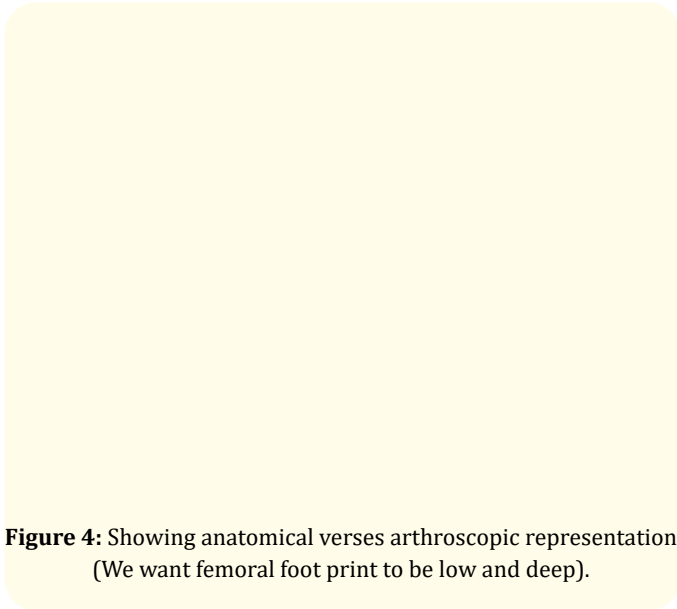
**Figure 1:** Portal locations marked on skin as for ACL reconstruction.



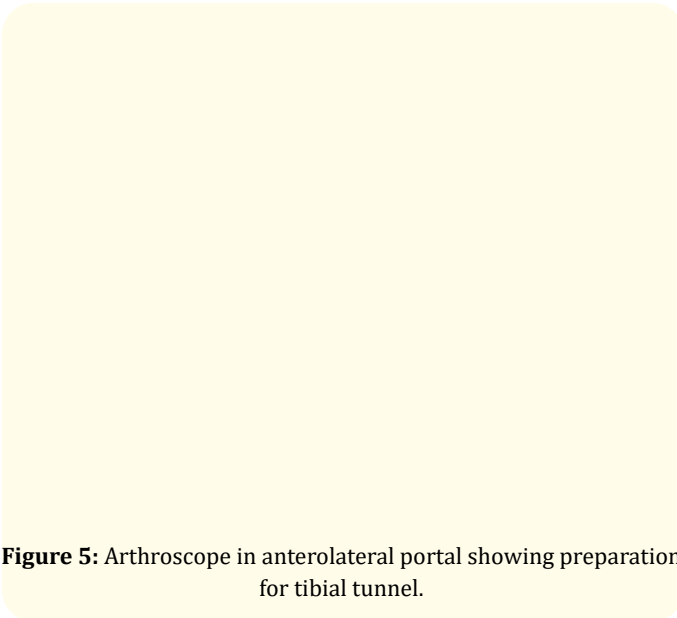
**Figure 2:** Arthroscope in anterolateral portal.



**Figure 3:** Arthroscope in high anteromedial portal; a. showing medial surface of lateral femoral condyle, b.c.; measurements over lateral femoral condyle, d. final femoral tunnel.



**Figure 4:** Showing anatomical verses arthroscopic representation (We want femoral foot print to be low and deep).



**Figure 5:** Arthroscope in anterolateral portal showing preparation for tibial tunnel.

	Visual portal	Working portal
Diagnostic round	High antero lateral portal	
Femoral tunnel placement	High anteromedial portal	Accessory low medial portal
Tibial tunnel placement	High antero lateral portal	High anteromedial portal

**Table 2:** Portal usage according to surgical step in Anatomical ACL reconstruction.

Anatomical	Arthroscopic
posterior	low
anterior	high
superior	deep
inferior	shallow

**Table 3:** Anatomical verses arthroscopic representation.

## Conclusion

Making of one extra medial portal (3<sup>rd</sup> portal) and switching it as working portal and high medial portal as a visual portal for femoral tunnel placement is a very easy, reproducible and technique which provides a meticulous view of remnants and bony arthroscopic landmarks facilitating anatomical graft placement as compared to two portal technique which limits the proper visualization of femoral insertion site (table 2). In knee arthroscopy any numbers of portals can be made according to your comfort until you make the joint a sieve. The author suggests the use of this accessory anteromedial portal technique for ACL reconstruction.

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