Research Article

The effect of oblique femoral tunnel placement on the knee using quadrupled hamstring graft

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Abstract

Introduction: A common cause for failure after ACL reconstruction has been the incorrect placement of bone tunnels, especially on the femoral side resulting in a non anatomical graft. The most commonly employed technique of femoral tunnel placement, the trans-tibial technique, has been reported not to provide anatomical placement of femoral tunnel and result in rotational instability. Cadaveric and radiographic studies have confirmed that drilling the femoral tunnel through anteromedial portal allows a more oblique placement of the tunnel and higher rotational stability than does the trans-tibial technique. However clinical results of trans-tibial and anteromedial portal techniques are still controversial. A recent literature review showed improved rotational stability with oblique femoral tunnel technique but no difference in terms of clinical functions between the two techniques at mid and long term follow up. Very few other studies are available providing direct comparison between these two techniques.

Keywords: Anterior cruciate ligamanet, Anteromedial portal, Rotational.

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INTRODUCTION

An ideal surgical technique should restore sagittal, frontal and transverse plane stability and normal knee kinematics in an ACL deficient knee[1,2]. However the traditionally employed Trans-tibial technique has been shown to provide only anterior stability and no rotational stability due to the relative vertical orientation of the graft obtained by this technique [3,4,5]. To address this problem focus was shifted to the anteromedial portal technique which is believed to result in a more anatomic orientation of the ACL graft[6,7,8]. However a recent literature review, a meta-analysis based on indirect comparison of non-homogenous studies, has failed to show any difference between the two techniques in terms of actual clinical outcome The study is to determine the effect of oblique femoral tunnel placement on the knee using quadrupled hamstring graft. The contribution of the present study to the literature would be to confirm or refute an actual clinical advantage of the technically difficult anteromedial portal technique over the easier, more popular and well established trans-tibial technique.

MATERIAL AND METHODS

All patients with knee pain and instability, who attended the Department of Orthopaedics, FMMCH, during the period September 2012-February 2014, were evaluated clinically and with MRI. 20 patients were selected for the study, with the inclusion criteria being Isolated ACL complete tear, Age group 18-45 and a more than 3 week old injury, exclusion criteria were associated collateral ligament injuries, patients who have already developed arthritic changes, associated fractures. All the patients were evaluated pre and post operatively with respect to IKDC and Lysholm scores. These patients underwent arthroscopic ACL reconstruction using quadrupled hamstring tendon graft via the anteromedial portal technique in order to achieve a more oblique femoral tunnel. All the surgeries were performed by the same surgeon and by the same technique. The patients followed a standard rehab protocol with slight modifications depending on the presence of pain and individual patient response. The patients were followed up at regular intervals with the minimum follow up interval being 6months

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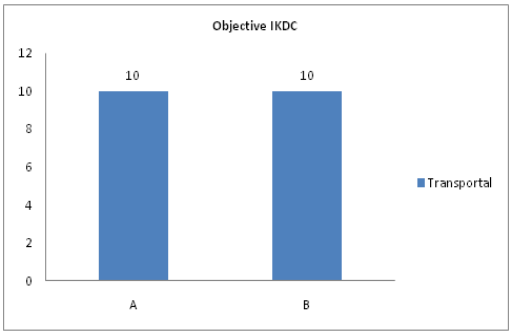
OBSERVATIONS AND RESULTS

Table 1: Objective IKDC

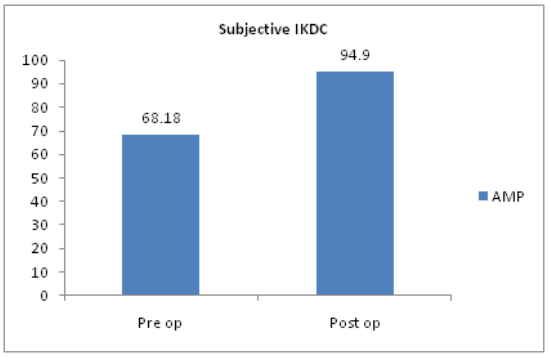
	Objective IKDC A	Objective IKDC B
Transportal	10	10



All 20 cases fell into 2 categories of the Objective IKDC score the A and B group which was suggestive of normal or nearly normal knee function post operatively

Table 2: Subjective IKDC

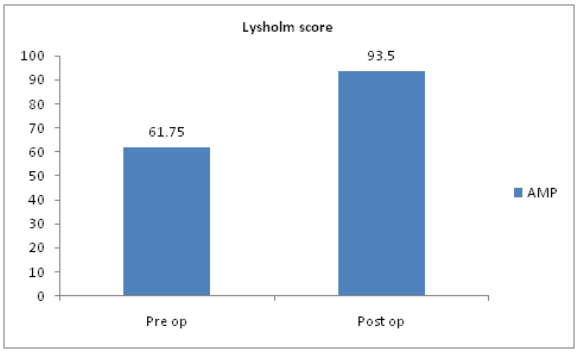
	Pre op	Post Op
AMP	68.18	94.90



The pre and post operative Subjective IKDC scores showed significant difference, which was similar to other studies conducted

Table 3: Lysholm score

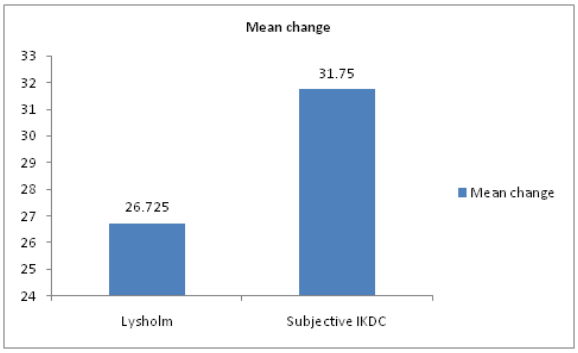
	Pre op	Post Op
AMP	61.75	93.5



The Pre and post operative Lysholm scores showed significant difference

Table 4: Comparison within the groups

	Mean change
Lysholm score	26.725
Subjective IKDC	31.75



There was no statistical significant difference between the mean change of the 2 scores when compared

DISCUSSION

Femoral attachment of ACL has been a subject of extensive research since it is close to the centre of axis of knee motion and may significantly influence the behaviour of the reconstructed ACL and consequently the clinical results. The femoral attachment is well posterior to the long axis of femur and lower down on the lateral wall of the notch with none of the fibres attaching at 12 o'clock position. For anatomic reconstruction it is essential to drill the femoral tunnel at the centre of this attachment. Biomechanical studies confirmed that the more anatomic low femoral tunnel placement provided better restoration of stability and normal knee kinematics[9,10]. Implications of proper femoral tunnel placement could be Anatomic, Biomechanical and Clinical Anteromedial portal technique, wherein the femoral tunnel is drilled through the antero-medial portal independent of the tibial tunnel. Most of the cadaveric studies have confirmed a more anatomic femoral tunnel placement with this new technique[11]. Biomechanical studies comparing these two techniques have overwhelmingly found favour with anteromedial portal technique with respect to rotational stability[8] However similar results have not been replicated consistently in clinical trials. Although there is agreement on better rotational stability with Trans-portal technique, its clinical significance has not been established[12,13]

CONCLUSION

In conclusion, although results of biomechanical studies are heavily in favour of oblique femoral placement

technique, there isn't enough clinical evidence to warrant giving up on a technique (Trans tibial) which is time tested, simpler and safe. In the present study the patients showed a marginally better functional outcome with respect to the Lysholm and IKDC scores; however the statistical significance was lacking. Further long term studies are required to establish the efficacy of oblique femoral placement technique in ACL reconstruction.

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