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Randomised comparison of pretensioning using cyclical loading and on tendon board for arthroscopic anterior cruciate ligament reconstruction using hamstring autograft

Rahul Khare[a,*], Hitesh Lal[b], Kandarp Vidyarthi[a], Vivek Jangira[c], Deepak Mittal[a]

[a] Department of Orthopaedics, Dr Ram Manohar Lohia Hospital, New Delhi, Pin–110001, India
[b] Department of Orthopaedics, VMMC, Safdarjang Hospital, New Delhi, Pin–110001, India
[c] Department of Orthopaedics, Lady Hardinge Medical College, New Delhi, Pin–110001, India

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ABSTRACT

Objective: Pretensioning is usually done using two methods - manual cyclical loading and using tensioner with a tendon board. Both the methods are being used with little knowledge about the superiority of either method. This study was done with the objective of trying to find out the better method.
Methods: A total of 50 patients were selected for the above mentioned study who were randomised into each of the two groups using chit system – In group A patients, cyclical loading was done by twenty times full flexion -extension movements but in group B patients, the graft was placed on a tensioner with 15 pounds tension for 10 minutes. All patients were operated by the same surgeon. The patients were put on a strict rehabilitation protocol. Patients were allowed to bear weight as tolerated. Patients returned for follow up at 6 weeks, 3 months, 6 months and 12 months. At each visit patients were followed with Lysholm's Score and ROLIMETER reading.
Results: The ROLIMETER reading and Lysholm's score were seen to improve from preoperative to postoperative period and improved further over time with the progress of the rehabilitation protocol in both the groups. When compared to each other Group A i.e. patients pretensioned with cyclical loading had better Lysholm scores and ROLIMETER readings with the difference being statistically significant at all time periods except at 1 year when the difference between the ROLIMETER readings in the two groups were no more significant, though the difference of the Lysholms score was still found to be statistically significant.
Conclusion: It was concluded in this study that cyclical loading is a better method of pretensioning in ACL reconstruction than tensioner on tendon board with 15 pounds of tension for 10 minutes.

1. Introduction

Anterior cruciate ligament (ACL) is frequently injured during sports participation.1,2 Arthroscopic evaluation of knees with heamarthrosis following injury has demonstrated ACL injury in 60%–70% of cases.3 Natural history of the athlete with ACL deficient knees is likely to be dependent on associated meniscal and ligament injuries, age, activity level, and degree of initial ACL injury.4–6 There are a lot of controversies related to the management of this injury and more than 2000 papers have been published on the various aspects of the topic.

In ACL reconstruction procedure an anatomically placed, high strength graft with rigid fixation yields the best clinical results. Although many authors have mentioned that the amount and direction of initial graft tension may be of critical importance for the clinical outcome, there remains no clear consensus for the magnitude of force or position of knee during tensioning.

Pretensioning is usually done using 2 methods–manual cyclical loading and using tensioner with a tendon board. Both the methods are being used with little knowledge about the superiority of either method. This study aims to compare the two methods of pretensioning and document the better one for future reference of surgeons.

* Corresponding author.
E-mail addresses: drrahulkhare@gmail.com (R. Khare), drhiteshlall@gmail.com (H. Lal), v.kandarp@gmail.com (K. Vidyarthi), vivek.jangira@gmail.com (V. Jangira).

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2. Materials and methods

The study has been conducted in Department Of Orthopaedics, PGIMER, Dr. Ram Manohar Lohia Hospital, New Delhi from October 2007 to March 2012.

A total of 50 patients were selected for the above mentioned study. All patients with isolated Anterior Cruciate Ligament tear (more than six weeks old injury) with or without meniscal injuries were included in the study. The patients having the following were excluded from the study.

1. Patients with bilateral Anterior Cruciate Ligament injury and bony avulsions of Anterior Cruciate Ligament.
2. Patients with associated injuries other than stable meniscal injuries (multiligamentous injuries, cartilage lesions, post traumatic osteoarthritis).
3. Intraoperative graft excursion more than 2 mm in 0° to 100° flexion which was measured at the tibial tunnel end.

Patients were evaluated preoperatively with pre-anaesthetic checkups and measuring of the joint laxity clinically with Lachman Test and Anterior Drawer Test. Radiographs of the knee, Antero posterior and lateral views was done. MRI was done if required in patients of doubtful diagnosis. These were the patients who had a complaint of instability but clinically were not positive for ACL tear, as in partial tears. Patients were also evaluated with ROLIMETER (See) and Lysholm's score.

All the patients were randomly divided into 2 groups with chits-group A in which pretensioning was done using cyclical loading (20 times full excursion of flexion and extension) and group B in which pretensioning was done using tensioner with a tendon board (15 pounds for 10 min).

The basic steps of arthroscopic Anterior Cruciate Ligament reconstruction were as under:

1. Diagnostic arthroscopy
2. Graft harvesting and preparation
3. Notch debridement and notchplasty ·
4. Tibial tunnel
5. Femoral tunnel

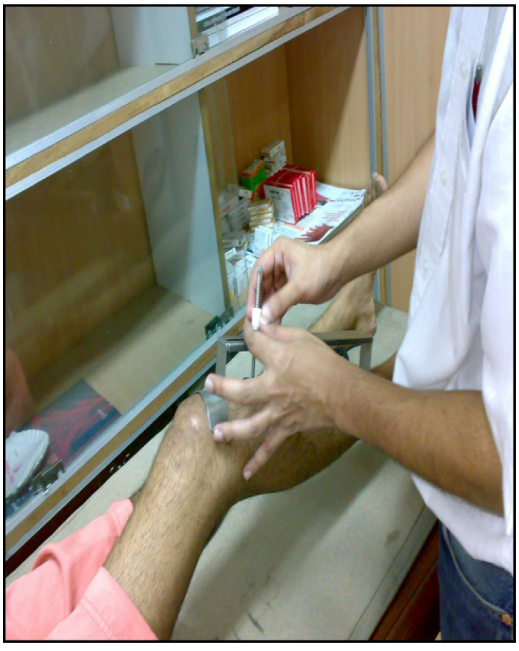

Photo 1. Application of Rolimeter.

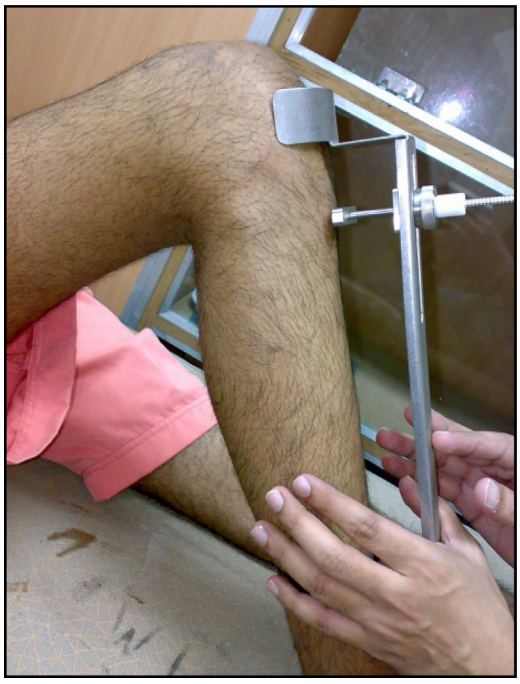

Photo 2. Application of Rolimeter.

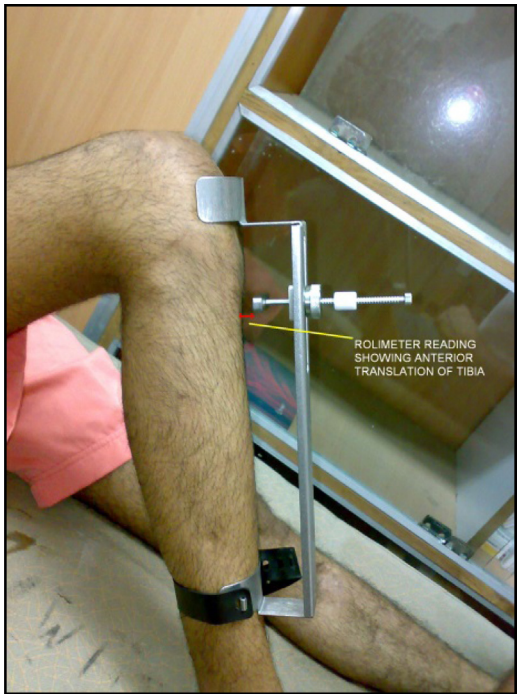

Photo 3. After Anterior Drawer test with Rolimeter.

6. Graft insertion and fixation
7. Closure

The patients were taken up for surgery after pre-anaesthesia fitness of the patient under spinal, epidural or general anaesthesia. Tourniquet was applied high up on the thigh in a supine position and the limb prepared.

Surface marking of the knee was done i.e. the patella, tibial tuberosity, patellar tendon, medial and lateral joint lines were marked.

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