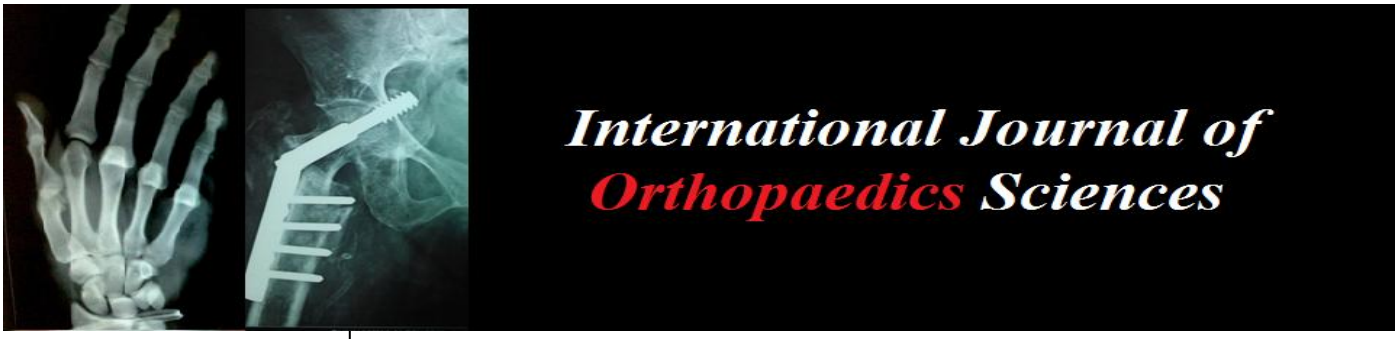

ISSN: 2395-1958
IJOS 2017; 3(1): 632-634

www.orthopaper.com
Received: 01-11-2016
Accepted: 02-12-2016

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Long term results of anterior cruciate ligament reconstruction

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DOI: http://dx.doi.org/10.22271/ortho.2017.v3.i1j.91

Abstract
The anterior cruciate ligament is the weaker of the two cruciate ligaments stabilizing the knee joint, and therefore gets torn easier than the posterior cruciate ligament. Reconstruction of ACL and restoration of musculoskeletal function is a fundamental goal of orthopaedic treatment. This study was conducted to determine pattern of anterior cruciate ligament injury and its management in a tertiary care center and to assess the long term outcome of knee function after anterior cruciate Ligament reconstruction. 28 patients with ACL injury were included. In this study. A detailed history regarding the pattern of injury was noted and ACL reconstruction was done using BT Bone graft with mini-arthrotomy and arthroscopic assisted ACL reconstruction. The clinical follow-up evaluation was done following the surgery and postoperative rehabilitation. International Knee Documentation Committee (IKDC) and Lysholm Score were used to assess the functional outcome. The mean age of the study subjects was 30.6±7.3 years and majority were males. Majority of the ACL injury was sports related and was on the right knee. 64% underwent arthroscopic assisted ACL reconstruction; majority of them had normal range of motion of the knee. According to the IKDC rating scale, 80% of the patients had normal or nearly normal final outcome. The mean Lysholm score was 80. About 10 of the patients had anterior knee pain, as classified by the IKDC. Patients with early reconstruction had less degenerative changes in the tibiofemoral joint, were subjectively more satisfied to the result, and could return to the pre-injury level of activities. Our present study concludes that most common age group involved was 20-30 years and ACL injury was more common among males. Patients with an early ACL reconstruction were more satisfied with the end result. Also, ACL reconstruction techniques using BTB auto graft leads to good ligamentous stability and function of the knee. Mild anterior knee pain and osteoarthritis after reconstruction was a common finding.

Keywords: Long term results, ACL reconstruction

1. Introduction
Ligamentous injury of knee joint is common and potentially serious [1]. The anterior cruciate ligament (ACL) is the weaker of the two cruciate ligaments, and therefore gets torn easier than the posterior cruciate ligament (PCL) [2]. The knee joint becomes very unstable when the ACL is torn, because the ACL is a crucial ligament stabilizing the knee joint [3, 4]. The logical aim of the treatment of a torn ACL is to obtain a stable and painless knee joint with full range of motion and good muscle strength. Conservative treatment of a torn ACL often fails leading to chronic instability, muscle weakness, and post-traumatic osteoarthritis [5]. Therefore, reconstruction of a torn ACL with an intra-articular auto graft has become the most common method in ACL surgery. The most common current graft choices for the ACL reconstruction are the bone-patellar tendon-bone (BTB) and semitendinosus and gracilis (STG) autografts.[6] Although there is a growing body of data on ACL injuries, information available on pattern of injury and its management in our study area is limited. Previously, the methods used for the objective assessment of the success of such reconstructive procedures most often involved evaluation of structural and biochemical parameters such as pain and swelling. However, recently there is more emphasis on the functional outcome following the surgery and many systems have been developed for evaluating the pre and post-operative results from patients who undergo surgical procedures of the knee [7]. Hence, the present study was conducted to assess the long-term 10 years results of the ACL reconstruction using BTB autograft with special emphasis on the pattern of Anterior Cruciate Ligament injury, the timing of the

reconstruction and post-operative problems, such as anterior knee pain and patella-femoral osteoarthritis.

2. Materials and Methods

All the patients presenting with knee injuries with positive clinical findings of anterior cruciate ligament injury were included in the present study. A pre tested and structured questionnaire was used to elicit the detailed history regarding the type of injury and mechanism of injury. ACL reconstruction was done for all the 28 study subjects who were included in the study after obtaining their informed consent. ACL reconstruction was done using BTB autograft with mini-arthrotomy in 10 patients, and arthroscopic assisted ACL reconstruction in 18 patients. Follow up assessment was done to know the stability and functioning of the knee joint. Following the surgery, patients underwent post-operative rehabilitation for 12 weeks, which included partial and complete weight bearing exercises, passive and active stretching of quadriceps and hamstrings. During the follow up visits, range of motion of knee, knee laxity, isokinetic extension and flexion, strength evaluation of the knees and radiographic analysis was done. Also, the evaluation was performed using the standard knee ligament evaluation form of the international Knee Documentation Committee (IKDC) [14]. knee scores. Patients were distributed as groups based on International Knee Documentation Committee (IKDC) scoring. Results were entered in excel spread sheet and data was analyzed. Patients results were studied using Lysholm [12] score as <65 poor, 65-83 Fair, 84-90 good, >90 as excellent.

3. Results

The present study included 28 patients with clinical signs of ACL injury. Among the study subjects, 26 (92.9%) were males and the rest 2(7.1%) were females. The mean age of the study subjects was 30.6±7.3 years. Majority of them belonged to 20-30 years age group. 19 patients (67.86%) had sports injury and 9(32.14%) had RTA,p-value was >0.05.Right side injured were 18(64.29),left side injured were 10(35.71%).Among the study subjects 25% (7) of them had associated medical meniscal injury. patients(32%) were operated in 6 weeks,19 were(68%) operated in 6 weeks to 8 months.10 patients (35.7%) underwent mini arthrotomy and 18 patients(64.3%) underwent Arthroscopic assisted ACL reconstruction. Range of motion of the knee was normal in 24 patients (85.8%), with the extension loss of less than 10 degrees in 2(7%) patients, flexion loss of less than 15 degrees in 2(7%) patients in 2 years follow up. Knee laxity Measurement in 21 (75%) was normal, in 6 patients(21.4%) was around 3-5mm laxity,in one(3.6%) patient it was more than 5mm laxity. isokinetic quadriceps muscle strength more than 10% loss was in 4(14.3%) patients. Radiographic Analysis showed 22 (78.6%) were normal, 3 patients (10.7%) showed mild grade of osteoarthritis, 3 patients (10.7%) showed moderate grade of osteoarthritis**.** Anterior knee pain was seen mild in 7 (25%) patients, moderate in one (3.6%) patient, and no pain in 20 (71.4%) patients. Clinically arthritis was appreciated in 2(7.1%) patients only. According to IKDC stability rating, 21(71.4%) patients were under grade A,6 patients were grade B(25%),one patient was grade C(3.61%).Out of 10 patients who underwent mini arthrotomy 60%(6 patients) were in grade A, 30% were(3 patients) in grade B,one patient(10%) was in grade C. Out of 18 patients who underwent Arthroscopic assisted ACL reconstruction 71.4%(14 patients) were in grade A,25% were (4 patients) in grade B, p-value is of 0.00 is significant. Mean Lysholm score was excellent in 24 patients (85.7%), fair in 4(14.3%), p-value is 0.00 which was significant. All those mentioned above were of two years follow up visit.

During long term follow up of 10 years we can able to assess for 25 patients3 patients lost their follow up. Range of motion of the knee was normal in 21 patients (84%), with the extension loss of less than 10 degrees in 2(8%) patients, flexion loss of less than 15 degrees in 2(8%) patients. This was similar to the patients at 2 year follow up. Knee laxity Measurement in 18 (72%) was normal, in 6 patients(24%) was around 3-5mm,in one(4%) patient it was more than 5mm.isokinetic muscle strength more than 10% loss was in 4(16%) patients. This was also similar to patients at 2 years follow up. Radiographic Analysis showed 19 (76%) were normal, 6 patients (24%) showed moderate grade of osteoarthritis. Anterior knee pain was seen mild in 9 (36%) patients, moderate in one (4%) patient, and no pain in 15 (60%) patients. Clinically arthritis was appreciated in 4(16%) patients. Mean Lysholm score was excellent in 20(80%), fair in 5(20%).

4. Discussion

Our results showed that an ACL reconstruction using mini arthrotomy and arthroscopic assisted ACL reconstruction techniques using BTB autograft leads to good ligamentous stability and function of the knee. It may also prevent the later-life degenerative changes of the tibio femoral joint. In our study, nearly 90% of the patients considered subjectively their knees normal or nearly normal, 2 years after the surgery according to the IKDC standard knee ligament evaluation form. These results are comparable with many previous studies [7-9]. In addition, the range of motion and the stability of the knee of our patients were also good. One of the major problems with the patellar tendon autograft procedures was postoperative anterior knee pain [9-11] In our study, 7 patients had mild and 1 patient had moderate anterior knee pain during the 2 years follow up,and in 9 patient mild and in one moderate knee pain in 10 years follow up. Shelboume and Trumper[10] suggested that the extension deficit of the knee is the main reason for the anterior knee pain and recommended that immediately after the surgery full knee extension should be allowed. In this study, according to the logistic regression analysis of the predicting factors of the anterior knee pain, the extension torque deficit of the ACL-reconstructed knee was the most important factor associated with anterior knee pain. Many previous studies have also shown that an ACL reconstructed knee with a BTB autograft often has extension torque deficit [9, 10]. The Lysholm [12]. Knee score was significantly lower in patients with anterior knee pain than in patients without it. Similar results were found in the final evaluation of the IKDC rating scale in other studies [13]. In our study, the isokinetic testing showed quadriceps strength deficit of 14.3% (mean) at the speed of 60 degrees per second in a patient with moderate patella-femoral osteoarthritis, which was similar to the findings in the study conducted by Rosenberg *et al* [9] where the quadriceps strength deficit was 18% (mean) in patients with ACL reconstruction. Our study showed that 2 years after the ACL reconstruction with BTB autograft, clinical and radiological results were almost same, with other but radiological results showed increase of arthritis in long term results. In long term follow up study due to increase of anterior knee pain there was a comparative change in mean Lysholm scores.

5. Conclusion

Our results showed that an ACL reconstruction using BTB autograft leads to good ligamentous stability and function of the knee. Mild anterior knee pain and minimal number of patients with osteoarthritis was noted.

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