

Immediate Full Weight Bearing in Extension Brace Following Arthroscopic Primary Repair or Reconstruction of ACL

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관절경하 전방십자인대 일차수복술 및 재건술후 신전보조기를 착용한 조기 완전체중부하

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전방십자인대의 일차수복술이나 재건술후에 장기간의 비체중부하가 필요한지를 결정하기 위해서 일차수복술을 시행한 96례와 재건술을 시행한 82례 등 총 178례를 대상으로 술후 체중부하시기에 따라 두군으로 나누어 비교분석 하였다. 모든 레에서 술후 보조기를 착용하였고 120례에서는 술후 첫 6주간 점차적으로 관절운동범위를 증가를 시키고 다음 6주간은 완전운동범위 회복상태에서 유지후 술후 12주에 체중부하를 허용하였으며 나머지 58례에서 술후 완전신전상태에서 즉시 체중부하를 시켜서 정기적으로 Lachman검사, KT 2000을 이용하여 불안정성이부족 관찰하였다. 평균 추시기간은 4.2년(2년~6년)이었고 불안정성에 대한 평가는 AMA 분류에 따랐다.

최중추시상 모든환자에서 1+이상의 불안정성은 발견되지 않았으며 술후 12주에 체중부하를 한군에서는 1a+가 104례(86.7%), 1b+군이 16례(13.3%)로 관찰되고 즉시 체중부하를 한 군에서는 1a+가 51례(87.9%), 1b+가 7례(12.1%)에서 보였으나 통계적으로 의미있는 차이는 없었다($P>0.05$). 본연구의 결과로 전방십자인대 일차수복술이나 재건술후 신전보조기를 착용시키고 즉시 보행을시키는 것이 술후 슬관절의 불안정성에 영향을 주지 않으며 안전한 재활방법으로 생각된다.

Key Words : Knee, Anterior cruciate ligament, Repair, Reconstruction, Rehabilitation

INTRODUCTION

There are many accepted operative methods for the ACL-deficient knee. These include primary repair, repair with augmentation and reconstruction using autogenous tissue. The results of primary repair of the ACL has been

reported unpredictably¹⁰. Primary repair is best performed when the ACL is avulsed proximally from its femoral attachment. In the comparison study Grontvedt et al. reported that non-augmented primary repair of the ACL should not be performed because of its poor results, a repair with a ligament-augmentation device had an unacceptably high rate of failure (more than one-third of the patients), and a repair that was augmented with the patellar ligament had the best outcome⁵. However, our results of arthroscopic primary repair of the fresh tear of proxi-

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mal and mid-third of the ACL has been equally good¹¹. Currently the most common method of ACL reconstruction is autogenous graft reconstruction using central one third of the patellar tendon⁷. Our results of arthroscopic reconstruction of ACL using bone-patellar tendon-bone has been good as well¹⁰. Although good results of arthroscopic primary repair of the ACL or arthroscopic reconstruction of ACL using bone-patellar tendon-bone could be achieved with 12 weeks of non-weight bearing and staged following of range of motion in limited motion brace, limited activity of patient's daily life for such a long time is not desirable. To eliminate the crutches after repair or reconstruction of the ACL and to allow the patients immediate returning to their society we tried to allow full weight bearing in extension brace or non-weight bearing ROM exercise after primary repair or reconstruction of ACL. The purpose of this study was to evaluate whether this full weight bearing in extension brace immediate after surgery was acceptable as was in non-weight bearing for 12 weeks following surgery even in primary repair of ACL in which weak holding power is anticipated.

MATERIALS AND METHODS

Eighty-two knees of arthroscopic reconstruction with bone-patellar tendon-bone and 96 knees of arthroscopic primary repair of the ACL with or without primary repair of MCL, LCL or PCL were involved in this study. All cases were unilateral involvement. The reconstruction cases had old isolated ACL tear and the primary repair cases had 37 isolated ACL tears and 59 combined ACL and MCL or LCL or PCL tears. Sexes were 136 males and 42 females. The follow up period was between 2 and 6 years, averaging 4.2 years. The materials were divided into 2 groups; 1) non-weight bearing for 12 weeks with staged ROM exercise in brace for 6 weeks

and full ROM in brace afterwards for further 6 weeks(non-weight bearing group): 120 knees 2) immediate full weight bearing in extension brace for 6 weeks(full weight bearing group): 58 knees. We compared the end results of instability of both groups using Lachman test and KT 2000. The instability were graded 1+, 2+, and 3+ according to the AMA classification. The grade 1+ was subdivided into 1a+(-2 mm) and 1b+(3-5 mm). The results were analyzed statistically with chisquare test.

RESULTS

No case showed instability more than 1+. In non-weight bearing group 1a+ were 40 knees(78.4 %) and 1b+ was 11 knees(21.6 %) out of 51 knees of reconstructed ACL and 64 knees of 1a+(92.8 %) and 5 knees of 1b+(7.2 %) out of 69 knees of arthroscopic primary repair of ACL. In full weight bearing group 1a+ were 26 knees(83.9 %) and 1b+ were 5 knees(16.1%) out of 31 knees of reconstructed ACL, 25 knees(92.6 %) of 1a+ and 2 knee(7.4 %) of 1b+ out of 27 knees of primary repair group. In other words, in non-weight bearing group 1a+ were 104 knees(86.7 %) and 1b+ were 16 knees(13.3 %) out of 120 knees. In full weight bearing group 1a+ were 51 knees(87.9 %) and 1b+ were 7 knees(12.1 %) out of 58 knees. There was no statistically significant difference between the two groups($P>0.05$). The valgus instability in primary repair were less than 1+.

DISCUSSION

After primary repair or intra-articular reconstruction of the torn ACL rehabilitation unquestionably is a critical factor in the success of the surgical procedure, and immediate motion and appropriate biomechanical stresses on the ligament have proved compatible with good functional and objective results¹⁰. Early motion after repair or reconstruction of the ACL limits disuse

atrophy, adhesion formation, capsular contraction, and promotes articular cartilage nutrition. However, the usual protocol of rehabilitation has been non-weight bearing in limited motion brace³ or immobilization⁴ for 6 weeks postoperatively. The University of Pittsburgh Sports Medicine and Rehabilitation Center protocol for ACL reconstruction allows immediate full passive extension and flexion. Immediate after operation the patient is allowed to bear weight as tolerated with the aid of crutches and the use of a brace locked in full extension. At 1 week postoperatively, the brace is unlocked; at 4 weeks, it is discontinued. Athletes may begin sports-specific rehabilitation as early as 4 months postsurgery, with the aim of a return to participation between 6 and 9 months postoperatively⁴. However they did not mention the rationale of their program in their textbook. They did not explain why they lock the brace in extension only for 1 week. If locking in extension is good for protection of the bone plug fixations it must be continued for at least 6 weeks, which is minimum requirement for healing of the cancellous bone fracture.

While performing the examination under anesthesia we found that anterior displacement of the tibia never happen in extension although Lachman test was positive performed in 150-200 flexion. The posterior capsule and posteromedial and posterolateral structures were tight in extension and automatic splinting effect prevented the anterior displacement of the tibial condyle. That was why we thought that full weight bearing in extension after repair or reconstruction of the ACL did not do any harm to fixation or integrity of the repaired or reconstructed ligament. Without weight bearing the stress imposed to the repaired or reconstructed ligament is bearable. So we allowed range of motion(0-90) on the bed or while sitting. Bone-patellar tendon-bone for the reconstruction of

the ACL is preferable not only because of its enough strength^{2,6} but also its availability and its immediate strong fixation to bone with interference screws as well as the bone plugs' rapid healing into the femoral and tibial bone tunnels in which they are fixed. These allow a more aggressive early rehabilitation program.

CONCLUSION

The results of immediate full weight bearing in extension in limited motion brace were comparable to non-weight bearing for 12 weeks following repair or reconstruction of ACL.

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