## Return to sport and re-injury after anterior cruciate ligament reconstruction with bone-patellar tendon-bone autograft in collision sport athletes

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INTRODUCTION:

The injury rate of anterior cruciate ligament (ACL) injury in collision sports is higher than that in other sports. This is due to contact injuries as well as non-contact injuries such as pivot motion and cutting motion for collision sport athletes, including American football, rugby and handball players.

Recently, the surgical techniques of ACL reconstruction have been developed. On of those surgical techniques, anatomic rectangular tunnel ACL reconstruction with bone-patellar tendon-bone graft can place the tunnel aperture within the ACL footprint and mimic the arrangement of native ACL fibers (Shino K et al, J Orthop Sci 2015), leading to the stabilization of knee and satisfactory clinical results (Tachibana Y et al, Knee Surg Sports Traumatol Arthrosc 2019). However, there was no reports about return to sport and re-injury rate after this anatomic rectangular tunnel ACL reconstruction. Therefore, the aim of this study was to compare the return to sport and re-injury rates between collision sport athletes and the other sport athletes after anterior cruciate reconstruction with bone-patellar tendon-bone autograft. METHODS:

Seventy-six collision sport athletes (group A) (72 males and 4 females, mean age  $22.3 \pm 6.1$  years old) and 79 other sport athletes (group B) (47 males and 32 females, mean age  $22.9 \pm 8.0$  years old) were included in this study, who were underwent anatomic rectangular tunnel anterior cruciate ligament reconstruction with bone-patellar tendon-bone autograft with a minimum two years follow-up. Return to sport rates and the duration from surgery to return to the pre-injury level of sport were investigated and compared between two groups. Moreover, re-tear and contralateral ACL injury rates were also compared. In addition, all postoperative rehabilitation protocols were same in all athletes. RESULTS:

There were no significant differences in demographic data of athletes between two groups except activity level or sport they engaged. Return-to-play rates in group A and B were 85.5 and 88.7%, respectively, with no significant difference (P=0.57), but the mean duration from surgery to return to the pre-injury level in group A was significantly longer than that in group B (11.2 $\pm$ 2.7 vs 9.7 $\pm$ 1.8 months, P<0.05) (Table 1). Re-tear rate in group A was also significantly higher than that in group B (10.5 vs 3.8%, P<0.05) and contralateral injury was 2.6% in both groups (Table 2).

## DISCUSSION AND CONCLUSION:

The longer return period and more frequent re-tear were found in collision sport athletes after anatomical ACL reconstruction with rectangular tunnel than those in other sport athletes, that was similar to the previous report (Salmon L et al, Arthroscopy 2005). In collision sport athletes, not only surgical procedures but also postoperative rehabilitation protocols might need to be devised.

|                 | n   | Return to sport rate | Duration from su<br>to return to sport |                 | n   | Re-tear   | Contralateral |
|-----------------|-----|----------------------|--|-----------------|-----|-----------|---------------|
| Collision       | 76  | 65 (85.5%)           | 11.2 mos.                              | Collision       | 76  | 8 (10.5%) | 2 (2.6%)      |
| Contact         | 63  | 56 (88.9%)           | 9.8 mos.                               | Contact         | 63  | 3 (4.8%)  | 2 (3.2%)      |
| Limited contact | 4   | 4 (100%)             | 8.8 mos.                               | Limited contact | 4   | 0         | 0             |
| Non-contact     | 12  | 10 (83.3%)           | 9.5 mos.                               | Non-contact     | 12  | 0         | 0             |
| Total           | 155 | 129 (87.1%)          | 10.4 mos.                              | Total           | 155 | 11 (7.1%) | 4 (2.6%)      |