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| 学位論文の題名 | Efficacy of all-inside devices in reducing gap and step-off in knee extension for ramp lesion repair: A cadaveric study<br>(All-inside デバイスを用いたランプ病変の修復は膝伸展位でギャップとステップオフが減少するため有用である：屍体研究)<br><br>Knee Surgery, Sports Traumatology, Arthroscopy 32: 257-264, 2024 |
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Abstract

*Background:* Ramp lesions are injuries of the posterior horn of the medial meniscus (MMPH) associated with anterior cruciate ligament (ACL)-injured knees. Various suture methods have been reported for ramp lesions; however, the all-inside method is the most common, using either an all-inside device or a suture hook. The former method does not require suture manipulation from the posteromedial portal and is relatively easy to perform; however, the ramp lesion cannot be sutured under direct vision, and the repositioning of the tear cannot be confirmed during the tightening of the anchor. The latter is considered to suture the ruptured area under direct vision from the posteromedial portal, and suturing is performed securely. In addition to surgical visualisation, the other difference between the two methods is the knee flexion angle at the time of suturing, extended for the all-inside device method and flexed for the suture hook method. No available literature has examined the optimal knee flexion angle for ramp lesion suturing.

*Purpose:* This study aimed to assess the dynamics of the tear site of meniscal ramp lesions, particularly considering knee flexion angles, and validate anchor fixation using an all-inside device.

*Methods*: Eight Thiel-embalmed paired cadaveric knees with their whole bodies were used in this study. The ramp lesions were created arthroscopically, and ramp lesion dynamics were evaluated by gradually extending the knee from 90° of knee flexion. Changes in the gap and step-off (0: no step-off, 1: cross-sectional overlap exists, and 2: tibial articular surface exposed) were evaluated at 90°, 60°, 30°, and 10° of knee flexion. After dynamic evaluation, all-inside repairs of the ramp lesions using all-inside devices were conducted. Dissection was performed to confirm the position of anchor fixation.

*Results*: As the knee was extended, the gap significantly decreased at all knee flexion angles. Similarly, the step-off grade decreased as the knee was extended, and the step-off completely disappeared in all cases when the knee was extended from 30° to 10°. The average knee flexion angle at which the gap and step-off completely disappeared was 22.5°. After suturing the ramp lesion, arthroscopic evaluation showed that the gap had disappeared and the step-off had been repaired in all cases. Anchor fixation locations were not found within the joint but were fixed to the semimembranosus tendon or its surrounding articular capsule. Overall, 31% (5/16) anchors were fixed to the attachment site of the semimembranosus tendon, whereas the remaining were fixed to the articular capsule, located peripherally to the semimembranosus tendon.

*Conclusion*: Suturing with an all-inside device for ramp lesions is a good option, and the repair in knee extension was found to be reasonable, considering the dynamics of ramp lesions in this study.