Biomechanical Comparison of Transverse Capsulotomy Versus Longitudinal Capsulotomy of the Hip

A Cadaveric Study

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Background: Biomechanical effect on hip joint stability between the transverse interportal capsulotomy and the longitudinal capsulotomy in arthroscopy has not been fully investigated.

Purpose: To evaluate whether rotational stability and distraction resistance differ between the 2 capsulotomy directions using fresh-frozen cadavers.

Study Design: Controlled laboratory study.

Methods: Twelve hips of 6 fresh-frozen cadavers, including intact femur and pelvis, were tested in 3 conditions: intact, capsulotomy, and repaired. Two capsulotomy patterns were made: a 4-cm transverse capsular resection based on a transverse interportal capsulotomy, and longitudinal capsulotomy. Six hips were transverse capsulotomy and 6 hips were longitudinal capsulotomy. The pelvis was fixed to a wooden plate, and the intramedullary nail was inserted into the femur. To evaluate rotational stability, internal and external torques of 5 N·m were applied at 15° of hip extension and 0°, 15°, 30°, 45°, and 60° of hip flexion, respectively. To test for distraction, the specimens were axially loaded from 0- to 150-N distraction forces at different flexion angles (0°, 30°, 45°, 60°).

Results: The external rotation laxity increased significantly after the transverse capsulotomy at all flexion angles and longitudinal capsulotomy only at 0°. The separation distance increased significantly after the transverse and longitudinal capsulotomies. The change in external rotation laxity was significantly greater in transverse capsulotomy at 15° of hip extension and 0° than longitudinal capsulotomies in unrepaired conditions compared with intact conditions. With distraction loads, the transverse capsulotomy resulted in a significantly greater separation distance than the longitudinal capsulotomy at all flexion angles with 100 N, and at 0° and 60° with 50 N. Significant differences were observed after capsular repaired compared with intact for external rotation angle at 15° extension and 0°, and separation distance at 60° flexion with 150 N and 100 N between capsulotomy directions.

Conclusion: This cadaveric study demonstrated that the hips with the longitudinal capsulotomy resulted in less external rotation laxity, especially at 15° extension and 0°, and less distraction laxity compared with those with the transverse capsulotomy; and these differences remained after repair of capsulotomy.

Clinical Relevance: Either capsulotomy direction is effective if the capsular repair is performed properly because the standard capsular repair improves capsular stability. However, surgeons should note that the longitudinal incision tends to be more stable at lower levels of hip flexion.

Keywords: transverse interportal capsulotomy; longitudinal capsulotomy; stability; capsular repair

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Hip arthroscopy is recognized as an effective surgical method to manage a wide range of hip pathologies,[9] and rates are increasing in many countries[10,21,23,27] including

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in Japan with a 1.54-fold frequency of hip arthroscopic procedures in 2019 compared with 2014.[8] Capsulotomy has been an important procedure in hip arthroscopy, and the most commonly performed capsulotomy technique is an interportal capsulotomy, which transversely connects the lateral and anterior portals on the capsule.[19] Capsulotomy could increase the visualization of arthroscopy and the mobility of instruments, which facilitates the management of hip pathologies. Interportal capsulotomy transversely transects the iliofemoral ligament (IFL), which has both static and dynamic stabilizing mechanisms for the hip joint.[11,34,35] As a result, this capsulotomy has a potential risk of postoperative hip instability.[6,29,37] Therefore, capsular closure was recommended to avoid instability, to obtain better patient outcomes, and to have longer-term survival compared with unrepaired after hip arthroscopy.[16,22]

Another capsulotomy has been reported, a capsulotomy technique from pericapsular space, by which the capsulotomy started from pericapsular space and longitudinally split the capsule between 2 branches of the IFL in a traction-free fashion.[32] The visualization and instrumentation are done through the capsulotomy, and no additional portals are necessary. This method reduces the incidence of iatrogenic chondrolabral injury and promises good visualization, sufficient space for practice, and ease of capsular closure.[38] Longitudinal outside-in capsulotomy has been reported to reduce radiation exposure, traction time, and traction complications in arthroscopic cam femoral acetabular impingement treatment.[38] The clinical outcome of longitudinal capsulotomy compared with traditional interportal capsulotomy was evaluated using the International Hip Score Outcome Tool–12, and its results were comparable in short-term follow-up,[38] even though the invasiveness of the IFL was different.

The biomechanical effect on joint stability of the transverse versus longitudinal capsulotomy has not been fully investigated. The purpose of this study was (1) to evaluate whether rotational laxity and distraction distance were different in these 2 types of capsulotomy and (2) to evaluate whether any differences in biomechanical performance after capsulotomy based on capsulotomy technique are resolved after capsular repair using fresh-frozen cadavers.

METHODS

Specimen Preparation

This study was approved by the institutional review board with the ethical standards of the Declaration of Helsinki. In total, 16 hips of 8 fresh-frozen cadavers, including the intact femur and pelvis, were used. Two hips were used for piloting, and another 2 hips were excluded because of a labral tear confirmed by direct intra-articular inspection after testing. Finally, 12 hips of 6 fresh-frozen cadavers (4 male and 2 female; 6 right, 6 left), were used. The mean age at death was 78.6 years (range, 66-85 years). Each cadaveric specimen was dissected at the 5th lumbar spine proximally and at the middle thigh level distally and was dissected free of all soft tissue superficial to the hip capsule. Specimens were stored at −20° C and thawed at room temperature for approximately 24 hours before testing. The pelvis was placed in a prone position on a wooden plate so that the pubic symphysis and the anterior superior iliac spine were in contact and fixed with screws with reference to previous literature.[2] The Phoenix Ankle Arthrodesis Nail (Zimmer Biomet) was inserted in a distal femur and fixed with 2 nonlocking screws. All cadaveric specimens were macroscopically intact without gross deformity or obvious joint contracture. No specimens had advanced degenerative damage or significant labral pathology.

Surgical Procedures

Each specimen underwent biomechanical testing under 3 conditions: intact, capsulotomy, and repaired. We made 2 patterns of capsulotomy: a 4-cm transverse capsular resection perpendicular to the femoral neck axis based on an interportal capsulotomy[7] and a 4-cm capsular resection parallel to the femoral neck axis based on a longitudinal capsulotomy[32] (Figure 1, A and B). Six hips were transverse capsulotomy and 6 hips were longitudinal capsulotomy, and a comparison was conducted. A standard suture repair was performed using 3 evenly spaced simple interrupted sutures passed using a free needle and tied with alternating half-hitch knots using No. 2 Ultra tape (Smith & Nephew).

Rotational Stability Testing

A circular plate (90-mm diameter) with a protractor was fixed to the intramedullary nail 350 mm away from the center of the femoral head (Figure 2A). A reference angle was used at which the linea aspera of the femur was parallel to the floor, pointed in a perpendicular direction to the sagittal axis. The angle was recorded by taking a photograph of a circular plate with a perpendicular hanging string. The circular plate was pulled vertically in the direction of external and internal hip rotation at a constant

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The authors declared that there are no conflicts of interest in the authorship and publication of this contribution. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.
Ethical approval for this study was obtained from Tohoku University Graduate School of Medicine (approval No. 2023-1-241).

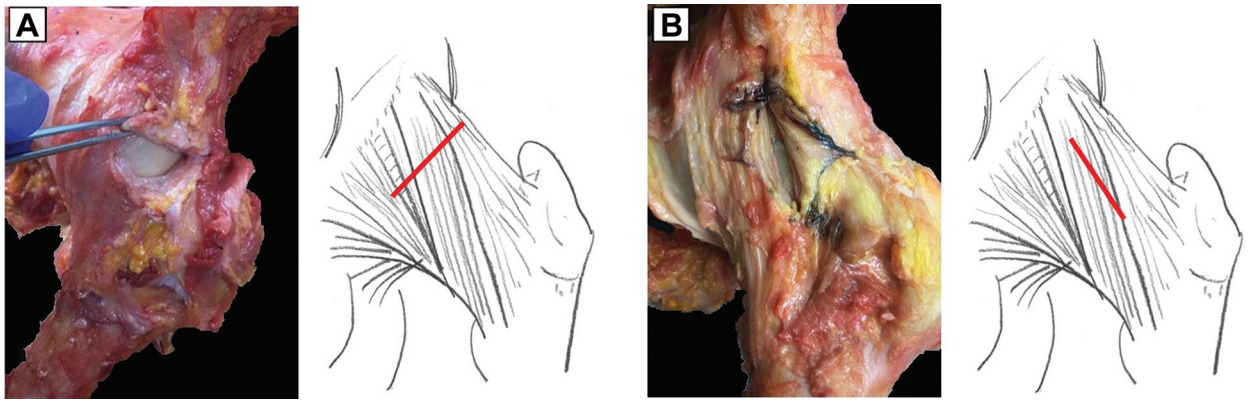


Figure 1. Two patterns of capsulotomy direction: (A) a transverse capsular resection to the femoral neck based on an interportal capsulotomy and (B) a capsular resection parallel to the femoral neck axis based on a longitudinal capsulotomy.

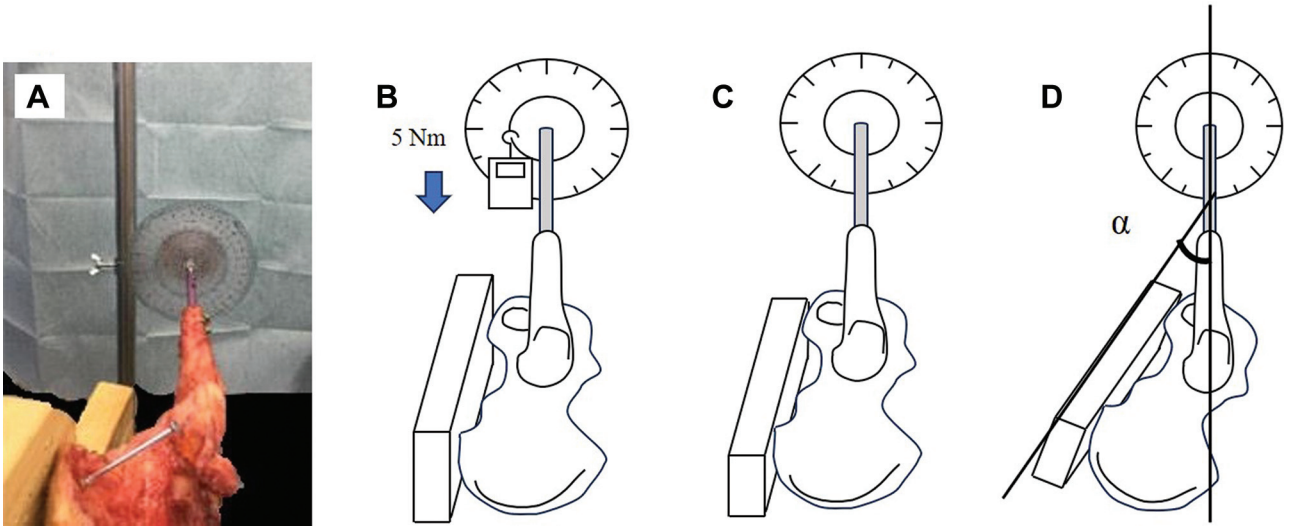


Figure 2. Rotational resistance testing. (A) A circular plate (90-mm diameter) with a protractor was fixed. (B) A digital pull tension gauge applied 5 N·m. (C) A reference angle was used at which the femur's linea aspera was parallel to the floor, pointed perpendicular to the sagittal axis. (D) Each assessment was performed at 15° of hip extension and 0°, and 30°, 45°, and 60° of hip flexion by rotating the wooden plate. α represents the angle.

force of 5 N·m applied by a digital pull tension gauge (DST-500 N; IMADA), then the change in angle was measured on a protractor (Figure 2B). Each evaluation was performed at 15° of hip extension, 0°, and 30°, 45°, and 60° of hip flexion through rotation of a wooden plate (Figure 2, C and D). The test was repeated in 3 conditions because the flexion/extension angle was dependent on the femoral position to the pelvis, the total arc of flexion and extension was measured after the specimen was fixed to the plate, and the neutral position was defined and reset so that 85% of the arc was flexion and 15% was extension. These settings of flexion/extension angle were based on previous reports.[3,25,28] Each test was performed in 3 conditions: intact, capsulotomy, and repaired.

Distraction Laxity Testing

The separation distance in the axial distraction was measured using an Instron material testing machine (Model 5566; Instron Corp). A wire with a hook was attached to the screw hole of the Phoenix Ankle Arthrodesis Nail, and distractive force was applied to the Instron via the wire from the point where the acetabulum and femoral head touched each other (Figure 3, A and B). A distractive force of 0 to 150 N was applied with reference to a previous study.[20] A reference angle was used with the linea aspera being parallel to the floor and perpendicular to the sagittal axis. The Instron continuously recorded the displacement of the femur relative to the pelvis. All assessments were

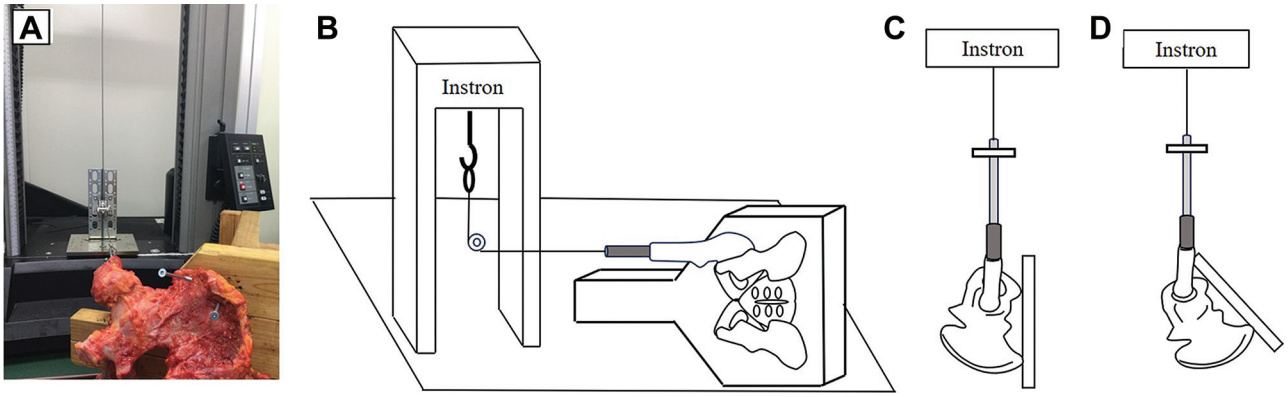


Figure 3. Distraction resistance testing. (A) Photograph of the setting. (B) The scheme of the distraction test. The Instron continuously recorded the displacement of the femur relative to the pelvis. (C) A reference angle was used at which the femur's linea aspera was parallel to the floor, pointed perpendicular to the sagittal axis. (D) Each assessment was performed at 0°, and 30°, 45°, and 60° of hip flexion by rotating the wooden plate.

conducted at 0°, 30°, 45°, and 60° of hip flexion by rotating the wooden plate using a goniometer against the Instron in the 3 conditions (Figure 3, C and D). The distracted femur was allowed to move freely in the direction of rotation. The separation distances at 50 N, 100 N, and 150 N were recorded as the data were continuously recorded. All measurements were performed 3 times, and the results were shown as the mean of 3 measurements.

Statistical Analysis

Statistical analyses were performed using the EZR 1.41 (Saitama Medical Centre; Jichi Medical University), which was a graphical user interface for R (The R Foundation for Statistical Computing).[17] The Shapiro-Wilk test was used to evaluate normally distributed variables. One-way analysis of variance (ANOVA) and Bonferroni post hoc tests were used for statistical analysis of the transverse and longitudinal capsulotomy in each condition, as well as the amount of change in capsulotomy specimens relative to intact and repaired specimens relative to capsulotomy. One-way repeated-measures ANOVA and Bonferroni post hoc tests were performed on the 3 conditions (intact, capsulotomy, and repaired) in each capsulotomy direction for rotation angle and the amount of femoral distraction. When the null hypothesis number was k in the multiple comparisons, the significance level α was adjusted to α/k for each comparison using the Bonferroni correction. A value of $P < .05/k$ was considered statistically significant.

RESULTS

Rotational Stability Testing

External rotation laxity increased significantly after the transverse capsulotomy (11.6° at 15° of hip extension, 15.5° at 0°, 11.5° at 30° of hip flexion, 11.3° at 45° of hip flexion, and 11.8° at 60° of hip flexion, with $P < .05$ at all angles of hip extension and flexion) and increased significantly after the longitudinal capsulotomy only in extension and neutral positions (3.7° at 15° of hip extension, $P = .04$; 3.7° at 0°, $P = .01$, respectively) (Figure 4). After capsular repair, the external rotation laxity remained increased compared with intact conditions. The repaired capsule had less external rotation laxity than the unrepaired conditions (Figure 4). Significant differences were observed in the transverse capsulotomy at 15° of hip extension (8.5°; $P = .00$), 0° (11.7°; $P = .01$), 30° of hip flexion (7.7°; $P = .02$), and 60° of hip flexion (9.0°; $P = .02$). However, in the longitudinal capsulotomy, a significant difference was only found at 0° (3.5°; $P = .00$) (Figure 4). Compared with the unrepaired condition after transverse capsulotomy, the external rotation laxity angle in the capsular repaired hips decreased significantly at 15° of hip extension (–3.2°; $P = .003$) (Figure 4). There were no significant differences in external rotation laxity of the transverse and longitudinal capsulotomy at any extension or flexion angle in each condition (Figure 5). In unrepaired conditions compared with intact conditions, the change in external rotation laxity was significantly greater in transverse capsulotomy at 15° of hip extension and 0° (Table 1). In the repaired conditions compared with capsulotomy, there was no significant external change in rotation laxity between capsulotomy directions (Table 1). No significant difference was observed between the repaired longitudinal capsulotomy and the repaired transverse capsulotomy. In the repaired conditions compared with intact conditions, the change in external rotation laxity was significantly greater in transverse capsulotomy at 15° of hip extension and 0° (Table 1).

Internal rotation laxity did not significantly increase after the transverse and longitudinal capsulotomy and after capsular repair (Figure 4). No significant differences between transverse and longitudinal capsulotomy were observed in the external rotation laxity at each extension or flexion angle at each condition (Figure 5).

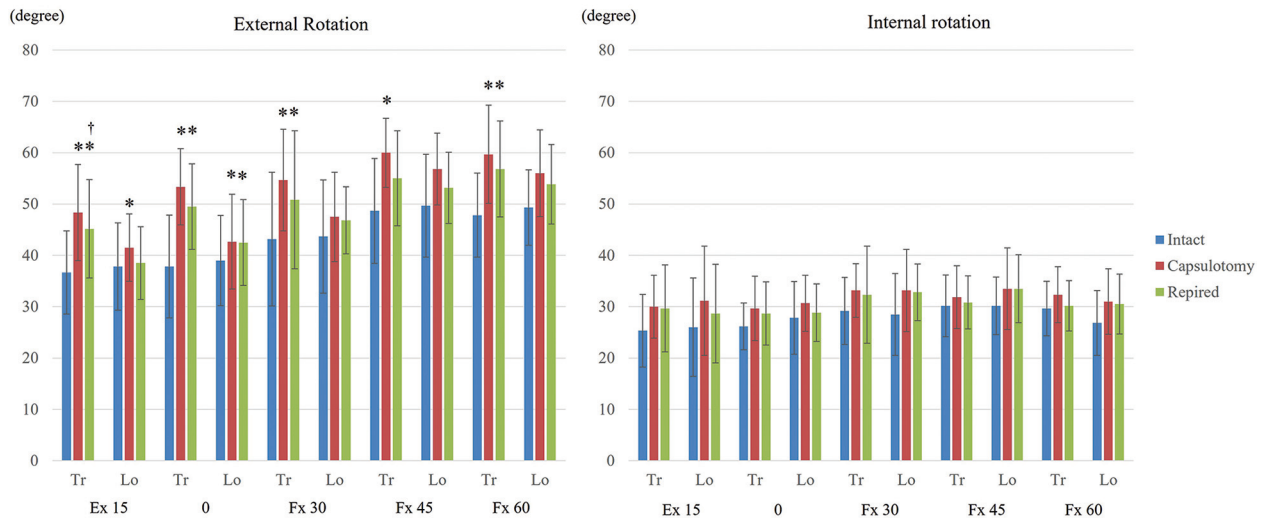


Figure 4. The results of external rotation and internal rotation angles at each hip angle. Ex, extension; Fx, flexion; Lo, longitudinal capsulotomy; Tr, transverse capsulotomy. *Statistically significant vs intact hips. †Significant vs capsulotomy condition. $P < .025$ was considered statistically significant.

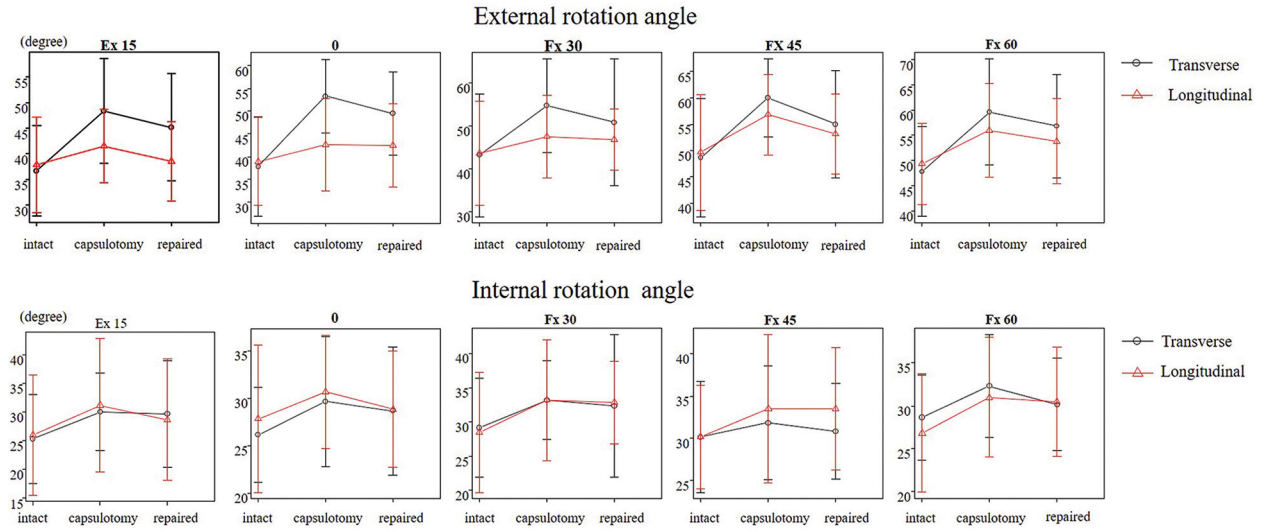


Figure 5. Comparison of the results of the 2 capsulotomy directions. One-way repeated-measures analysis of variance and Bonferroni post hoc tests were performed on the 3 conditions. Ex, extension; Fx, flexion.

Distraction Resistance Testing

The separation distance under the axial distraction force of 150 N was significantly increased after the transverse capsulotomy (mean, 5.0 mm of all angles) and longitudinal capsulotomy (mean, 2.6 mm of all angles) at each angle of flexed position ($P < .025$ at each angle) (Figure 6). The separation distance in the capsule-repaired hips remained significantly increased compared with the intact ($P < .025$ at every angle), except for the distance in the longitudinal capsulotomy at 45° of hip flexion ($P = .19$) (Figure 6). The separation distance in the capsular repair significantly decreased compared with the transverse capsulotomy at 30° and 45° of hip flexion and in the longitudinal capsulotomy at 0° (–2.0 mm, $P < .05$; –2.9 mm, $P < .025$, respectively) (Figure 6). In the unrepaired conditions compared with intact conditions, the amount of change in separation distance was significantly larger in transverse capsulotomy at 45° of hip flexion (Table 1). In the repaired conditions compared with capsulotomy, there were no significant changes between the capsulotomy directions (Table 1). In the repaired conditions compared with intact conditions, the amount of change in separation distance was significantly larger in transverse capsulotomy at 60° of hip flexion (Table 1).

At 100 N of distractive force, the separation distance was significantly increased after the transverse and

TABLE 1
Amount of Change in Range of Motion and Distraction Separation Distance[a]

	Capsulotomy vs Intact Condition			Capsular Repair vs Capsulotomy			Capsular Repair vs Intact Condition		
Rotational Stability, deg	Tra	Lon	*P*	Tra	Lon	*P*	Tra	Lon	*P*
ER at Ex 15	11.7	3.7	.00[b]	–3.2	–3.0	≥.99	8.5	0.7	.00[b]
ER at Neutral	12.5	3.7	.00[b]	–3.8	–1.2	.26	8.6	2.6	.00[b]
ER at Fx 30	11.5	4.0	.06	–3.8	–1.7	≥.99	7.7	2.4	.09
ER at Fx 45	11.3	7.2	≥.99	–5.0	–3.7	≥.99	6.3	3.5	≥.99
ER at Fx 60	11.8	6.7	.18	–2.8	–2.2	≥.99	9.0	4.5	.86
IR at Ex 15	3.7	5.2	≥.99	–3.0	–2.5	≥.99	1.0	2.8	≥.99
IR at neutral	3.7	2.8	≥.99	–0.7	–1.8	≥.99	2.9	1.0	≥.99
IR at Fx 30	3.8	4.7	≥.99	–0.7	–0.3	≥.99	3.2	4.3	≥.99
IR at Fx 45	7.2	3.3	≥.99	–3.7	–0.3	≥.99	3.2	3.8	≥.99
IR at Fx 60	6.7	4.2	≥.99	–2.2	–0.5	≥.99	4.4	3.9	≥.99
Distraction resistance, mm									
Neutral (150 N)	5.3	2.6	.09	–1.3	–1.4	≥.99	3.9	1.2	.06
At Fx 30 (150 N)	5.7	2.6	.03	–2.0	–0.5	.17	3.6	2.2	.78
At Fx 45 (150 N)	5.9	2.0	.00[b]	–2.9	–1.3	.15	2.9	0.7	.07
At Fx 60 (150 N)	6.8	3.2	.15	–1.7	–1.0	≥.99	5.0	2.3	.00[b]
Neutral (100 N)	4.0	1.8	.00[b]	–2.0	–1.1	.06	2.1	0.7	.06
At Fx 30 (100 N)	4.2	2.0	.00[b]	–1.8	–1.0	.29	2.4	1.0	.04
At Fx 45 (100 N)	4.5	1.9	.00[b]	–2.4	–1.2	.10	2.1	0.7	.05
At Fx 60 (100 N)	5.4	1.6	.00[b]	–2.9	–0.9	.00[b]	2.5	0.6	.00[b]
Neutral (50 N)	2.6	0.7	.00[b]	–1.6	–0.3	.00[b]	1.1	0.4	.29
At Fx 30 (50 N)	2.8	1.6	.03	–1.5	–0.6	.28	1.4	1.0	≥.99
At Fx 45 (50 N)	3.2	1.6	.00[b]	–1.6	–0.8	.43	1.6	0.8	≥.99
At Fx 60 (50 N)	4.4	1.1	.00[b]	–1.6	–0.4	.56	2.8	0.7	.10

[a]One-way analysis of variance and Bonferroni multiple comparison tests as post hoc. Ex, extension; Fx, flexion; Lon, longitudinal; Tra, transverse.
[b]$P < .025$ (.05/2).

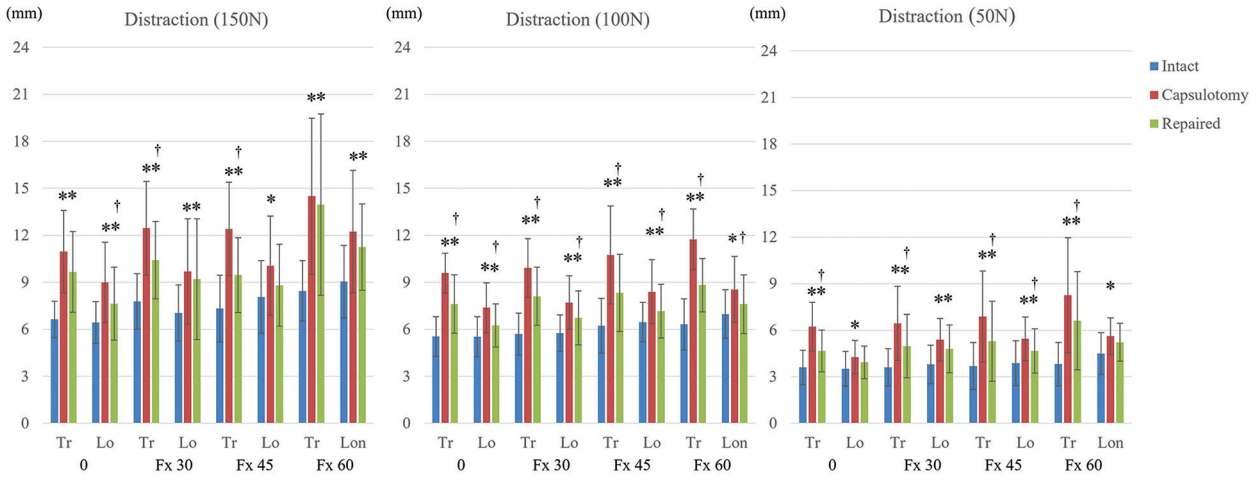


Figure 6. The results of the distraction tests were obtained at each angle of the hip. Fx, flexion Tr, transverse capsulotomy; Lo, longitudinal capsulotomy. *Statistically significant vs intact hips. †Significant vs capsulotomy condition. $P < .025$ was considered statistically significant.

longitudinal capsulotomies and capsular repair ($P < .025$ at every angle), except for the distance in the longitudinal capsulotomy at 60° of hip flexion ($P = .18$) (Figure 6). The separation distance in the capsular repair significantly decreased compared with both capsulotomies ($P < .025$ at every angle) (Figure 6). At 50 N of distractive force, the separation distance was significantly increased after the transverse and longitudinal capsulotomies, and the

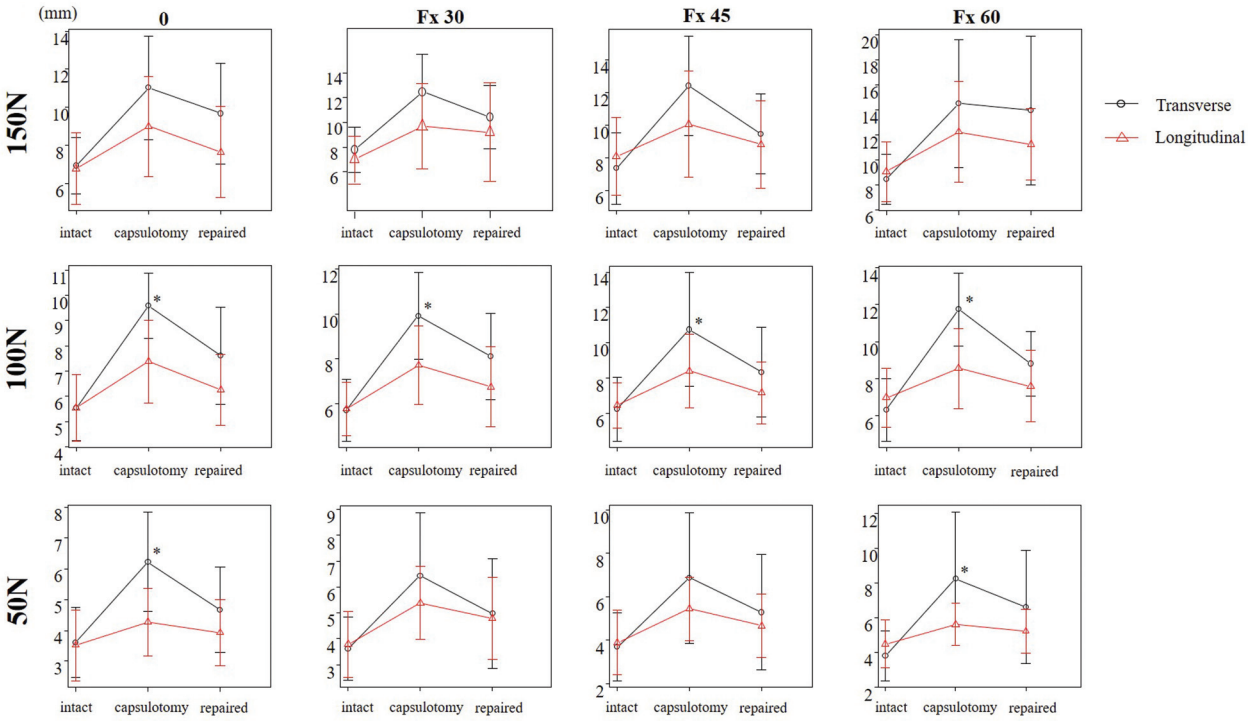


Figure 7. Comparison of the results of the 2 capsulotomy directions. *Statistically significant between the transverse and longitudinal capsulotomy. One-way repeated-measures analysis of variance and Bonferroni post hoc tests were used. $P < .025$ was considered statistically significant. Fx, flexion

capsule was repaired ($P < .025$ at every angle) except for the distance in longitudinal capsulotomy at 0° and at 60° of hip flexion ($P = .06$; $P = .04$, respectively) (Figure 6). The separation distance in the repaired capsules significantly decreased compared with unrepaired conditions in the transverse capsulotomy for all flexion angles ($P < .025$ at every angle) and in the longitudinal capsulotomy at 45° of hip flexion ($P < .025$) (Figure 6). The separation distance in the unrepaired condition was significantly longer in transverse capsulotomy than longitudinal capsulotomy at each angle of flexed position at 100 N and at 0° and 60° of hip flexion at 50 N ($P < .025$) (Figure 7). In the unrepaired conditions compared with intact conditions, the change in separation distance was significantly larger in transverse capsulotomy at every hip flexion angle at 100 N and at 50 N except for the separation distance change at 30° of hip flexion (Table 1). In the repaired conditions compared with capsulotomy, the separation distance was significantly reduced in transverse capsulotomy at 60° of hip flexion at 100 N, and at 0° of hip flexion at 50 N (Table 1). In the repaired conditions compared with intact conditions, the decreased separation distance was significantly larger in transverse capsulotomy compared with the longitudinal capsulotomy at 60° of hip flexion at 100 N (Table 1).

DISCUSSION

This biomechanical study showed that the hips with the longitudinal capsulotomy had less external rotation and distraction laxity compared with the hips with the transverse capsulotomy. There were no significant differences between internal rotational stability in the 2 capsulotomy directions. Although the capsular repair, especially after transverse capsulotomy, significantly improved external rotational and distraction laxity, it remained significantly higher than the intact state. After the capsular repair, there were not any significant differences in external rotation and traction laxity between the 2 capsulotomy techniques. However, comparing the amount of change between the repaired and intact conditions, external rotation laxity at 15° extension and 0° and distraction distance at 60° flexion were significantly lower in the transverse capsulotomy. These results may have come from preserving the medial branch of the IFL. Surgeons should be aware of the longitudinal capsulotomy's greater residual postrepair rotational and distraction laxity compared with the transverse capsulotomy with standard capsular repair.

The IFL has a significant role in limiting external rotation and anterior translation of the femoral head.[26,31,35] The medial arm of the IFL limits the hip external rotation in extension.[11,35] In this study, the external rotation angle increased significantly after the transverse capsulotomy. The difference was smaller at 45° and 60° of hip flexion. This finding was similar to the previous study,[31] with the possible reason that the IFL function was limited due to relaxation of the anterior facet of the capsule in a more flexible hip position.[31] The longitudinal capsulotomy was likely to decrease the risk of external rotation instability because of the preservation of the medial arm of the IFL.

The change in the internal rotation angle was smaller than that in external rotation, and there was no difference between capsulotomy directions. The posterior capsule, including the ischiofemoral ligament, was more likely to be affected by internal rotation than the IFL.[2,31]

This biomechanical study showed that hips with the longitudinal capsulotomy had less distraction laxity than those with the transverse capsulotomy. Several biomechanical studies using cadaveric hips have indicated that the hip capsule was a significant stabilizer when axial traction was applied.[13,18,25,30,31] The capsule is a primary component of distractive stability.[13] A capsulotomy significantly reduces the force to distract the hip joint.[18] After the disruption of the suction seal, the IFL is the primary contributor to the distractive stability of the hip joint.[13,18] Our study focused on the IFL and showed that longitudinal capsulotomy provided more traction stability.

Several techniques have been applied to preserve the IFL in hip arthroscopic surgery. A periportal capsulotomy is known to be the technique that minimizes disruption of the anterior capsule by working through slightly dilated anterolateral and midanterior portals, essentially keeping the majority of the central IFL intact.[4,12,24] The puncture capsulotomy technique was reported to decrease the damage to the IFL and restore the integrity of the capsule.[5] Compared with the traditional interportal capsulotomy, more advanced techniques are required. The longitudinal outside-in capsulotomy also preserves the IFL in hip arthroscopic surgery, as it longitudinally splits the capsule between the 2 branches of the IFL.[32,38] Our study highlighted the importance of IFL preservation during hip arthroscopy. However, the difficulty or inconvenience encountered when making rim resection and anchor implant with longitudinal capsulotomy was pointed out,[38] and the transverse capsulotomy appears to be superior to access the acetabular side. Whether visibility or IFL preservation is a clinical priority was still unclear because there is a trade-off between visibility and tissue preservation.

In our study, the capsular repair effect was inconsistent, but the transverse capsulotomy showed greater improvements in laxity after the repair than the longitudinal capsulotomy. Previous studies have demonstrated that interportal capsulotomy has increased the range of motion.[1,14] A biomechanical study showed that capsular repair significantly decreased rotational laxity.[15] Murata et al[25] reported that as the standard suture technique did not prevent postoperative hip instability after a 5-cm capsulotomy, 3 recently developed suture techniques (Shoelace, Double Shoelace, and Quebec City Slider) were preferable. Only a few studies have reported whether capsular closure should be executed after the longitudinal capsulotomy, and only 1 paper suggested that capsular closure could positively affect the final result.[33] Because capsular repair after longitudinal capsulotomy decreases distraction laxity, capsular repair may be preferable.

LIMITATIONS

There were several limitations in the present study. First, because this study was conducted using cadaveric hips at time zero, the elasticity of the capsule might be different from the actual conditions, as the strain of the capsule may change postoperatively over time. There are no specific techniques for measuring the capsular elasticity in live hips. Healing and fibrosis could significantly alter the properties of the hip capsule. Second, the donor was of advanced age (mean age, 78.6 years; range, 66-85 years). The results may not fully represent the younger population that typically undergoes hip arthroscopy. Additional biomechanical studies or clinical imaging studies are needed to validate our findings. Third, the sample size was limited (12 hips). No power analysis was performed to decide the sample size, as we had a limited number of available cadaveric specimens. The power analysis was desirable, although the statistical results could have been different if the sample size had been larger. However, compared with the previous biomechanical cadaveric studies, our sample size was relatively greater.[20,25] Fourth, only the transverse and longitudinal capsulotomies were evaluated in our study. Although some surgeons clinically used the T-shaped capsulotomy, it could significantly decrease the strength of the IFL.[36] Fifth, it is unclear how these biomechanical findings relate to clinical outcomes. In other words, what constitutes the minimal clinically important difference or the minimal biomechanically important difference in test variables remains uncertain.

CONCLUSION

This cadaveric study demonstrated that the hips with the longitudinal capsulotomy resulted in less external rotation laxity, especially at 15° extension and 0°, and less distraction laxity compared with those with the transverse capsulotomy, and these differences remained after repair of capsulotomy. Either capsulotomy direction is effective if the capsular repair is performed properly. However, the differences in laxity between the 2 approaches compared with an intact capsule were not fully addressed.

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