The Effect of the previous arthroscopic proximal realignment performed in the skeletally immature on the Result of the Anteromedial Tibial Tuberosity Transfer

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The Effect of the previous arthroscopic proximal realignment performed in the skeletally immature on the Result of the Anteromedial Tibial Tuberosity Transfer

Directed by Professor Sung-Jae Kim

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This certifies that the Master's Thesisof
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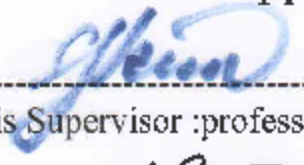

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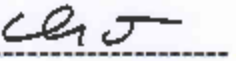

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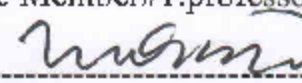

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<TABLE OF CONTENTS>

LIST OF Figure

LIST OF TABLES

ABSTRACT

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Purpose: This study aims to evaluate the effect of the previous arthroscopic proximal realignment performed in the skeletally immature on the result of the anteromedial tibial tuberosity transfer(AMTT) by comparison the result of the staged operation which performed the AMTT at skeletally mature after arthroscopic proximal realignment at skeletally immature with the result of the delayed operation which performed the AMTT after the conservative treatment in the patients with recurrent patella dislocation had developed at skeletally immature.

Method: We retrospectively reviewed the recorded of 412 patients (436 knees) who had diagnosed with recurrent patella dislocation from March 2001 to April 2009. Patients were categorized into two groups which had the AMTT at the skeletally mature after the previous arthroscopic medial plication and lateral release in the skeletally immature (Group S: 26 knees) and after the conservative management (Group D: 18 knees) to recurrent patella dislocation in the skeletally immature. Functional scores were assessed using the Lysholm

score, the Kujala score and Tenger score. Clinical outcomes were determined from the data obtained before surgery and at the last follow-up visit.

Result: There were no significant difference between the groups with regard to the demographic evaluation except the average number of dislocations before the AMTT ($P<0.01$) and the average span from dislocation after the primary management to the AMTT ($P<0.01$). There was improvement to radiologic indicator (average congruence angle, average of lateral patellofemoral angle, Insall-Salvati ratio, Tibial tuberosity-trochlear groove distance) between the preoperative and the last follow-up in both the groups. There was no significant difference between two groups regarding to radiologic indicator. Substantial improvement in Lysholm, Kujala scores, and Tenger score between the preoperative and the last follow-up were observed in both the groups. There were significant differences in Lysholm score (Group D 80.3 ± 6.0, Group S 85.5 ± 6.5), Kujala score(Group D 86.6 ± 3.9, Group S 86.6 ± 3.9), and Tenger score (Group D 5.7 ± 1.5, Group S 6.7 ± 1.4) between the groups at last follow-up (Lysholm score: $P=0.012$, Kujala score: $P< 0.01$, Tenger score: $P=0.032$).

Conclusion: The AMTT after the previous arthroscopic proximal realignment performed in the skeletally immature had better satisfactory clinical results than the AMTT after the conservative management to the recurrent patella dislocation developed at skeletally immature. Sequence of arthroscopic proximal realignment in skeletally immature and the AMTT after closing the

physis of the knee might be good option to manage to recurrent patella dislocation in skeletally immature.

Key words: Skeletally immature, Patella dislocation, Anteromedial tibial tuberosity transfer

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I. INTRODUCTION

Acute patellar dislocations account for 9% to 16% of acute knee trauma incidents in young active patients with hemarthrosis[1]. Risk is highest among females between 10 and 17years of age[2]. Osseous abnormalities and malalignment, such as patella alta, excessive femoral anteversion, internal tibial torsion, genu valgum, and hypoplasia of the lateral trochlea, have all been associated with patella dislocation[3].

Treatment of acute patellar dislocations is typically nonsurgical. However, redislocation rates range from 15% to 71% in such patients and the rate of recurrent dislocation is higher in younger patients than in patients over 20 years of age[1]. Failure of nonsurgical management of patellofemoral instability to control patellofemoral pain and prevent patellar subluxation/dislocations is the main surgical indication. The most surgical procedures can be grouped into proximal soft realignment, distal bony realignment or a combination of these. Arthroscopic proximal realignment including medial plicaiton or lateral release

showed the good clinical results[4-6]. This procedure could be performed without damage the growth plate in the skeletally immature. Distal bony realignment also showed the good clinical result and could get the correction of osseous abnormality and malalginment[7-9]. However, in skeletally immature patients, the presence of open physes prohibits the use of surgery on bony elements, such as tibial tuberosity transfer because disruption of this apophysis by distal bony realignment may lead to genu recurvatum.

The purpose of this study was to investigate the effect of the previous arthroscopic proximal realignment performed in the skeletally immature on the result of the anteromedial tibial tuberosity transfer (AMTT) by comparison the result of the staged operation which performed the AMTT at skeletally mature after arthroscopic proximal realignment at skeletally immature with the result of the delayed operation which performed the AMTT after the conservative treatment in the patients with recurrent patella dislocation had developed at skeletally immature.

II. MATERIALS AND METHODS

1. Patients selection

We retrospectively reviewed the records of 412 patients (436 knees) who had diagnosed with recurrent patella dislocation from March 2001 to April 2009. Subjected were selected according to the criteria: (1) the patients with open physis of the proximal tibia on the MRI when they got the diagnosis; (2) more

than 3 patellar dislocations or subluxations[10]; (3) TT (tibial tubercle)—TG (trochlear groove) distance more than 20 mm; (3) a Q-angle more than 15 degree at male and 20 degree at female.

57 patients (74 knees) with recurrent patellar dislocation under the skeletally immature were eligible for the study. 4 of these patients (6 knees) were subsequently excluded because of follow-up loss. 9 (11knees) patients were excluded because they didn't need other procedure after the arthroscopic patella medial plication with lateral patella release at the skeletally immature. 25 patients (34knees) were managed with the staged operation: the AMTT to recurrent patella dislocation at the skeletally mature of the proximal tibia, after the arthroscopic patella medial plication with lateral patella release at the skeletally immature. 19 patients (23 knees) were managed with the delayed operation: the conservative management at the skeletally immature and the AMTT to recurrent patella dislocation at the skeletally mature of the proximal tibia

Exclusion criteria were as follow; (1) a congenital patellar dislocation ; (2) ipsilateral knee surgery earlier except the arthroscopic patella medial plication with lateral patella release; (3) cartilage lesions of greater than grade II according to the Outerbridge classification on the femurotibial joint at arthroscopy[11];(4) a severe meniscal tear requiring subtotal or total meniscal injury;(5) ligament injury; (6) severe dysplastic trochlear (the Dejour's

classification D)[12];(7) severe dysplastic patella (the Wiberg classification III, IV)[13];(8) Minimum follow-up after surgery was 2 years post operation.

A total of 33 patients were assessed at a 2 years follow-up. Patients were categorized into two groups which had the staged operation (Group S: 17 patients (26 knees)) and the delayed operation (Group D: 16 patients (18 knees))(Figure 1).

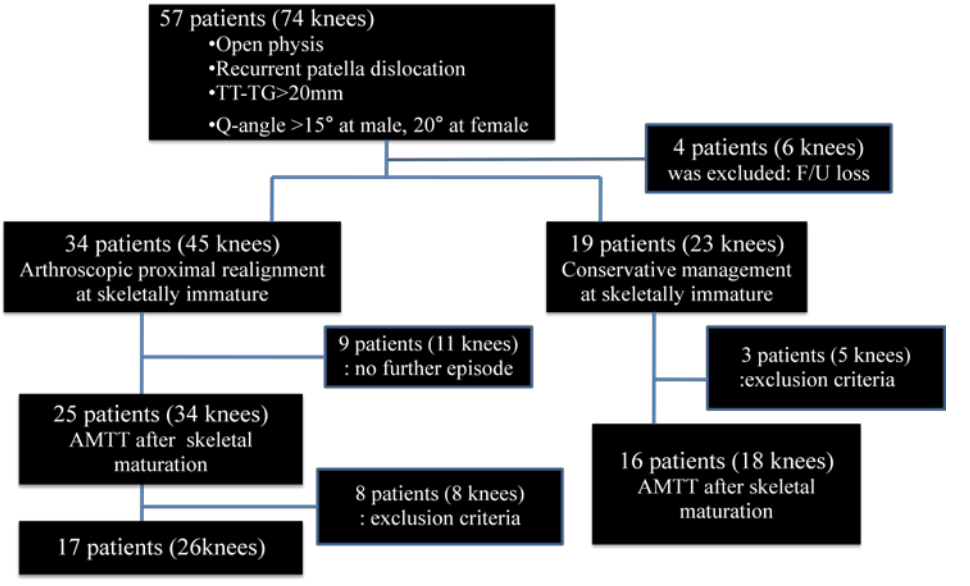

Figure 1.Flowchart illustrating the process for inclusion and exclusion of the patients

All the patients had a positive apprehension test. Q- angle was measured with a knee flexed in 20 degrees for accuracy and reproducibility.

We analyzed the radiologic examination consisted of the anterior–posterior

view, the lateral view, and the Merchant axial view. Congruence angle, sulcus angle, and lateral patellofemoral angle were measured in the Merchant axial view and Insall-Salvati ratio was checked on the lateral view. The shape of the patella was decided according to the Wiberg classification on the Merchant axial view[13] and trochlear dysplasia was defined according to the Dejour's classification on a true lateral radiograph[12]. A CT scan was taken in all of the patients preoperatively and postoperatively and TT-TG distance was measured. TT–TG distance is the distance between tibial tubercle and trochlear groove in horizontal plane. The medialization distance to normalize TT-TG distance to 10-15mm was measured on the CT scan using a computerized radiographic system (Centricity1 Enterprise Web v 2.0; GE Medical Systems, Waukesha, WI) as described by other author[14].

Functional outcomes were assessed using the Lysholm knee score and Kujala knee score. Activity was rated using the Tegner score. All patients gave informed consent to participate in the study and institutional review board approval was obtained.

2. Surgical technique

Generally the patients were examinzed arthroscopically through the high anterolateral portal[15] and a standard anteromedial portal. Arthroscopic lateral release was performed in all the patients due to some degree of lateral surgery is needed to allow for movement of the tuberosity without increasing tension in

those structures. Lateral release was done until the patella should be able to translate 2 to 3 quadrants if lateral retinacular tightness was noted. Arthroscopic loose body removal and shaving of cartilage lesion was performed according to the condition of the patients. The cartilage lesion was classified according to the Outerbridge classification at arthroscopy. Medial plication was performed in carefully selected knees which had lossening of medial structure after anteromedial tibial transfer osteotomy avoiding overcontraining of the medial retinaulum. Medial retinacular repair was performed until it remained intact at 90^{o} of knee flexion without undue tension in order that the patellafemoral joint is deemed not to be overstrained[16].

For the AMTT, an anterior incision was made on the medial aspect of the tibial tubercle, beginning approximately at the level of the tubercle and extending distally approximately 6 to 8 cm to the inferior aspect of the tibial tubercle. Subcutaneous tissue was sharply dissected and complete exposure of the tibial tubercle was achieved. Capsulotomies were made along the medial and lateral borders of the patella tendon to allow mobilization of the subsequent osteotomy. The tibialis anterior muscle was elevated from the tibia by the peristeal elevator. To get oblique anteromedialization cut, 2 Kirschner wires were inserted parallel to each other from the posterolateral plane to the anteromedial plane as the osteotomy guide avoiding to injury of the anterior tibial vessels and the peroneal nerve. The angle of the osteotomy performed was depended on the desired amount of anteromedial transfer was obtained. The angle of the

osteotomy performed was usually 30 degrees from the horizontal plane, but adapted the angle for more horizontal plane to be more medialization. The pilot hole for the screw was made before the ostetomy to allow lag technique. The tibial tubercle was osteomized 6-7 cm distally with a motorized saw. The osteotomy was tapered anteriorly at the inferior aspect of the tibial tubercle to minimize cortical notching of the anterior tibial cortex. The K-wires were removed.The fragment was elevated en bloc and mobilized to achieve the desired correction. The fragement was trimmed and the bone bed to receive the fragement was prepared not to be sit proud of tibia. The desired amount of anteromedial transfer was obtained under the estimation from the preoperative CT images to normalize the TT-TG distance to less than 15mm. Distal transfer of the tubercle was likewise performed depending on the degree of patella alta. Once in the desired position, the fragement was temporarily fixed with 2 Kirschner's wires. A 3.5 or 4.5-mm cortical screw was then placed through the predrilled pilot hole. The second screw was inserted after checking the amount of anteromedial transfer is corret. The bone was grafted beside the medial osteotomy site, then covered with periosteum peeled off the medial osteotomy site of the proximal tibia.

3. Rehabilitation

The patients were protected by immobilization with a hinged knee brace in extension.

The patients were allowed to the range of motion exercise with a continuous passive motion and isometric quadriceps exercise on the first postoperative day. Range of motion is increased based on patient tolerance.

Partial weight bearing with crutches was allowed as the patient tolerated for the first 6 weeks to reduce the risk of tibial fracture. After 6 weeks, the brace was removed and weightbearing restrictions are discontinued. Return to sports activities was permitted at 6 months.

4. Statistical analysis

Stastical analysis was performed using SPSS software (Statistical Package for the Social Science, v.22.0, Chicago, IL, USA).A 2-sample t-test was used to compare the Age, Body Mass Index(BMI), the Insall-Salvati ratio, the congruence angle, the lateral patellofemoral angle, the tibial tuberosity trochlear groove distance, and Tenger score between the two groups. To compare the clinical result between Group P and Group C, we used the Mann-Whitney test to the Lysholm knee score and Kujala knee score (ranked continuous data). The level of significance was at $P<0.05$.

5. Source of Funding

There was no external funding source for this study.

III. RESULTS

There were 3 male and 13 female in Group D and 4 male and 13 female in Group S. The mean age at the time of surgery was 18.2 years (range: 15 to 21years old) in Group D and 17.5 years (range: 15 to 19 years old) in Group S. All patients had management to previous recurrent patella dislocation. The first episode had happed at the average age which was 13.0 years (range: 10 to 14 years) in Group D and 12.7 years (range: 10 to 14 years) in Group S. The mean span from dislocation after the primary management to the AMTT was 5.3 ± 2.2 years in Group D and 2.6 ± 1.0 years in Group S. The mean time of follow-up period was 4.1 ± 1.3 years in Group D and 4.0 ± 1.3 years in Group S. The average number of dislocations before the operation was 9.0 ± 2.2 times in Group D and 3.9 ± 2.3 times in Group S. There was no significant difference between the groups with regard to the mean age at the time of surgery, sex, BMI, the mean age at the first dislocation, follow-up period. However, there were significant differences between the groups with regard to the average number of dislocations before the operation ($P<0.01$), and the average span from dislocation after the primary management to the AMTT ($P<0.01$). The average of Q- angle was 21.6°± 4.2° in Group D and 20.7° ± 4.0° in Group S preoperatively. There was no significant difference between two groups (Table1).

Table1. Patient desmographics

Demographic	Group D	Group S	P value
Number of patients	16(18 knees)	17(26 knees)	
Age (years)	18.2± 3.5	17.5 ± 1.1	0.092
Gender (male/female)	3/13	4/13	0.552
Body Mass Index	22.7 ±3.2	22.9±3.0	0.892
Mean Follow-up(years)	4.1 ± 1.3	4.0± 1.3	0.954
Time to Surgery(years)	5.3 ± 2.2	2.6 ± 1.0	<0.01
Dislocation times	9.0 ± 2.2	3.9 ± 2.3	<0.01
Preoperative Q-angle	21.6°± 4.2°	20.7° ± 4.0	0.499

Substantial improvement in the evaluation of radiologic indicator between the preoperative and the last follow-up were observed in both the groups. The average congruence angle improved from17.4°± 5.7° preoperatively to -1.4°± 2.9°postoperatively in Group D and from18.9°± 4.9° preoperatively to -0.2°± 3.0°postoperatively in Group S. The average of lateral patellofemoral angle improved from -10.6 ± 4.2 preoperatively to 4.7 ± 3.4 postoperatively in Group D and from -10.1 ± 4.1 to 4.5 ± 3.1 postoperatively in Group S. The average of Insall-Salvati ratio improved from 1.3 ± 0.2 preoperatively to 1.1 ± 0.1 postoperatively in Group D and from 1.4 ± 0.2 to 1.1 ± 0.1 postoperatively in Group S. The average of TT-TG distance improved from 24.2 mm ±3.1 mm preoperatively to 14.8 mm ± 1.5 mm postoperatively in Group D and from 25.2

mm ± 1.9 mm to 14 .6 mm ± 1.5 mm postoperatively in Group S. There was no significant difference between two groups preoperatively and at the last follow-up with regarding to the average congruence angle, the average of lateral patellofemoral angle, the average of Insall-Salvati ratio and the average of TT-TG distance (Table 2).

Table 2. Radiologic Indicators

		Preoperative	Postoperative
The average congruence angle	Group D(N=18)	17.4°± 5.7°	-1.4°± 2.9°
	Group S (N=26)	18.9°± 4.9	-0.2°± 3.0°
	P value	0.306	0.191
The average of lateral patellofemoral angle	Group D (N=18)	-10.6°± 4.2°	4.7° ± 3.4°
	Group S (N=26)	-10.1° ± 4.1°	4.5° ± 3.1°
	P value	0.641	0.957
The average of Insall-Salvati ratio	Group D (N=18)	1.3 ± 0.2	1.1 ± 0.1
	Group S (N=26)	1.4 ± 0.2	1.1 ± 0.1
	P value	0.621	0.736
The average of TT-TG distance	Group D (N=18)	24.2 ±3.1 mm	14.8 ± 1.5 mm
	Group S (N=26)	25.2 ± 1.9 mm	14 .6± 1.5 mm
	P value	0.159	0.574

(TT-TG is the abbreviation of Tibial Tuberosity-Trochlea Groove)

Under arthroscopic evaluation, cartilage lesions were observed in 37 knees of 44 knees (84.1%) which were composed of 16 knees in Group D (88.9%) and 21 knees in Group S (80.7%). Severe cartilage damage (Outerbridge grade III-IV) was exhibited in 9 knees of Group D (50%) and in 4 knees of Group S (15.3%). Moderate (grade I-II) was noted in 7 knees of Group D (38.9%) and 17 knees of Group S (65.4%). There was significant difference between two groups ($P<0.024$).

There was no case where progression of patellofemoral arthritis comparative to progression of tibiofemoral joint arthritis.

Substantial improvement in both Lysholm and Kujala scores between the preoperative and the last follow-up were observed in both the groups. The average Lysholm score improved from 58.9 ± 5.8 preoperatively to 80.3±6.0 at the last follow-up in Group D and from 57.9 ± 5.9 to 85.5 ± 6.5 in Group S. The average Kujala score improved from 58.3 ± 5.0 preoperatively to 86.6±3.9 at the last follow-up in Group D and from 59.3 ± 5.3 to 91.2 ± 3.6 in Group S. There was no significant difference between the groups preoperatively ($p=0.871$). However, there was no significant difference between the groups at last follow-up (Lysholm score: $P<0.02$, Kujala score: $P< 0.01$). There was improvement in the Tegner score between the preoperative and the last follow-op in both the groups. The median Tegner score improved from 2.7 ± 0.8 to 5.7 ± 1.5 in Group D and from 3.1 ± 0.8 to 6.7 ± 1.4 in Group S. There was no significant difference between the groups preoperatively. However, there

were significant differences between the groups at last follow-up (Lysholm score: P=0.012, Kujala score: P< 0.01, Tenger score:P=0.032) (Table 3). Only cartilage lesion of Outerbridge grade IV had negative correlation with the Kujala score (B= -6.34, SE 0.14, P=0.13).

Table3. Preoperative and postoperative Lysholm score and Kajala score and Tenger score

		Preoperative	Postoperative
Lysholm score	Group D (N=18)	58.9 ± 5.8	80.3±6.0
	Group S (N=26)	57.9 ± 5.9	85.5 ± 6.5
	P value	0.602	0.012
Kujala score	Group D (N=18)	58.3 ± 5.0	86.6±3.9
	Group S (N=26)	59.3 ± 5.3	91.2 ± 3.6
	P value	0.532	<0.01
Tegner score	Group D (N=18)	2.7 ± 0.8	5.7 ± 1.5
	Group S (N=26)	3.1 ± 0.8	6.7 ± 1.4
	P value	0.287	0.032

There was one patient with patella subluxation in Group D postoperatively, but not to the degree to get revision surgery. There was 3 cases (6.8 %) with positive apprehension test composed of 2 cases in Group D and of 1 case in Group S. No patients had other surgical complications of superficial or deep infection, neurovascular injury, nonunion of the osteotomy site or joint contracture.

IV. DISCUSSION

The principal findings of this investigation were the AMTT after the previous arthroscopic proximal realignment performed in the skeletally immature had better satisfactory clinical results than the AMTT after the conservative management to recurrent patella dislocation developed at skeletally immature.

In this study, cartilage lesions were observed in 37 knees (84.1%). According to the case series by Nomura et al[17], thirty-seven knees (95%) of 39 knees with lateral patella dislocation had articaular cartilage injuries. The main site of osteochondral fracture was the medial facet, and the main site of cracks was the central dome. Tsuda et al[7] revealed cartilage lesion was observed in 44 knees (71%) of 62 knees with Fulkerson procedure for recurrent patella dislocation. In this study, the ratio of the patients with cartilage lesion seems not to be different with the result of the others studies.

Vollnberg et al.[18]showed cartilage lesions and early OA are common after patellar dislocation and appear to increase with the frequency of dislocation. Chronic dislocators over 10 times had severe defects of the lateral patella facet and of trochlear cartilage. Luhman et al.[16] revealed that the group had good Lysholm scores was younger, was all patellar dislocators, and with shorter length of symptoms. Akgun et al.[9] insisted that severe retropatellar cartilage damage seen of the patella instability has an adverse effect on the quality of life. In this study, the osteoarthritic development in patellofemoral joint after the AMTT was not detected on the X-ray in such patients, but the activity score of

clinical assessment was significantly better in the patients with the AMTT after the previous arthroscopic proximal realignment performed in the skeletally immature. The reasons to this result are almost of the patients had previous arthroscopic proximal realignment in the skeletally immature had got regular follow-up and prone to get the early management to the symptom of the patella instability. However, many of the patients had been performed continuously the conservative treatment after first patella dislocation episode were lost at follow-up and prone to get the conservative management in other clinic although the continuous dislocation had been.

Distal alignment procedures have an established success rate and provide an appropriate alternative for patients with closed growth plates who have an abnormal lateral position of the tibial tuberosity, have failed a previous soft tissue procedure, have documented patellofemoral arthritis, or show generalized hyperlaxity[19]. In this study, the average Lysholm score and Kujala score were improved from preoperative (Lysholm: 58.9 in Group D and 57.9 in Group S; Kujal: 58.3 and 59.3) to postoperative (Lysholm: 80.3 and 85.5; Kujala 86.6 and 91.2 respectively). There was one of 41 cases had recurrent dislocation in the conservative management group. Other authors also reported the similar result after AMTT. Tsuda et al[7] revealed 62 cases performed modified Fulkerson procedure and the Fulkerson score and the Kujala score were significantly improved from the median of 65 (35-80) points and 68 (36-82) points preoperatively to 95 (60-100) points and 92 (57-100) points at the final

follow-up, respectively. Three knees (4.8%) experienced postoperative patellar re-dislocation. Tjoumakaris et al.[8]showed the average Lysholm score was 91.8 (range, 67-100) at follow-up in 47 cases had been modified Fulkerson osteotomy and lateral release and there was no dislocation case.

There are good advantages to perform the AMTT to recurrent patella dislocation. Correction of malalignment as well as correction of patella alta could be performed in the same procedure. Patella alta is the contributing factor to recurrent patella dislocation because the patella glides a longer distance on the flat or convex surface of the supracondyle and upper trochlea, so the patella is prone to subluxate or dislocate in a larger range of knee motion. The nteromedial tuberosity transfer can correct the patella alta by distal placement of the tubercle fragement. While it is possible to increase the risk of avascular necrosis (AVN) by placing significant tension on the blood supply to the patella, this has not been reported in our study or in any other in the literature. The AMTT could get good result in the patients with trochlear dysplasia unlike a MPFL reconstruction showed the poor result in the setting of trochlear dysplasia[8].

Unlike in adults, however, distal realignment of the tibial tubercle in the skeletally immature gives damage to the tibial tubercle growth plate, which can lead to premature closure of the physis and significant recurvatum deformity of the tibia[20]. Several authors have advocated reconstruction of the medial patellofemoral ligament(MPFL) because of the importance of the MPFL as a

medial constrain for appropriate patellar tracking[20]. However, MPFL reconstruction has some limitation, including the lack of consensus over the insertion isometric point, graft choice, type of graft fixation type, or angle of knee flexion to fix the graft[1,21]. It is also complicated by technically demanding procedure, femoral tunnel preformed close to the physis and transverse avulsion of patellae following MPFL reconstruction in open physis of the knee[1,22]. Moreover, there is limitation in number to previous studies addressing the outcomes of an MPFL reconstruction in skeletally immature, with only short follow-up periods [23]. Investigators have preformed arthroscopic proximal realignment, including medial plication and lateral release and showed the good clinical results[4−6]. Roth et al.[24] insisted that arthroscopic lateral release could be chosen as a primary treatment for recurrent patellar instability in the skeletally immature because it is minimally invasive, for cosmetic reasons and because of possibilities of damaging the growth plate area with other procedures. In this study, 24.4% (11 cases) of the patients who performed only arthroscopic proximal realignment to the skeletally immature with recurrent patella dislocation had no redislocation. Therefore, sequence of arthroscopic proximal realignment in skeletally immature and the AMTT after closing the physis might be good option to manage to recurrent patella dislocation in skeletally immature, given surgical risk and cosmetic reason on the skeletally immature .

We note several limitations to our study. First, this series is a retrospective review. Second, the clinical evaluation at the final follow-up was performed by

only 1 author. This potentially introduces a degree of bias. Third, a lack of Q-angle evaluation postoperatively made it difficult to evaluate the degree of the correction of proximal alignment. However, the effect of medialization distance was analyzed by TT-TG distance difference between preoperatively and postoperatively with CT images.

V. CONCLUSION

The AMTT after the previous arthroscopic proximal realignment performed in the skeletally immature had better satisfactory clinical results than the AMTT after the conservative management to the recurrent patella dislocation developed at skeletally immature. Sequence of arthroscopic proximal realignment in skeletally immature and the AMTT after closing the physes of the knee might be good option to manage for recurrent patella dislocation in skeletally immature.

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ABSTRACT (IN KOREAN)

골 미성숙시에 시행한 관절경하 근위 재정렬술이 전내측 경골 조면 전위술에 미치는 영향

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목적: 본 연구의 목적은 골 미성숙시에 발생된 슬개골 재발성 탈구 환자에 있어서 골 미성숙 시에 보존적 치료한 환자와 관절경하 근위 재정렬술을 시행 받은 환자가 골 성숙시에 전내측 경골 조면 전위술 시행 받은 뒤의 결과를 비교하여 골 미성숙 시에 시행한 관절경하 근위 재정렬술이 전내측 경골 조면 전위술에 미치는 영향에 대하여 알아 보고자 하였다.

방법: 2001년 3월부터 2009년 4월까지 슬개골 재발성 탈구로 진단받았던 환자 412명(436례)를 후향적으로 조사하였다. 환자는 골 미성숙시에 발생한 슬개골 재발성 탈구에 관절경하 근위 재정렬술을 시행받고 골 성숙시에 전내측 경골 조면 전위술 시행 받은 환자(Group S :26례)와 골 미성숙 시에 보존적 치료를 시행 받고 골 성숙시에 전내측 경골 조면 전위술을 시행 받은 환자(Group D:18례)로 분류되었

다. 전내측 경골 조면 전위술 전과 마지막 외래 추시 시의 방사선학적 조사를 시행하였고 임상적 결과로 Lysholm score, the Kujala score and Tenger score를 조사하였다.

결과: 전내측 경골 조면 전위술 시행 전 슬개골의 평균 탈구 회수와 초기치료((P<0.01)에서 수술 시행 시까지의 평균 기간 (P<0.01)에 두 군간에 유의한 차이를 보였다. 방사선학적 검사에서는 두 군에서 모두 수술 전 후에 유의한 호전을 보였으나 두 군에서는 유의한 차이를 보이지 않았다. 임상학적 조사에서는 수술 후 마지막 추시 결과에서 Lysholm score (Group D 80.3±6.0, Group S 85.5 ± 6.5) 및 Kujala score(Group D 86.6 ± 3.9, Group S 86.6 ± 3.9), Tenger score (Group D 5.7 ± 1.5, Group S 6.7 ± 1.4)로 두 군간의 유의한 차이가 있었다(Lysholm score: P=0.012, Kujala score: P< 0.01, Tenger score: P=0.032).

결론: 골 미성숙 시에 발생한 재발성 탈구에 대하여 골 미성숙시에 관절경하 근위 재정렬술을 시행하고 성장판 유합 후 전내측 경골 조면 전위술을 시행한 임상적 결과가 골 미성숙 시에 보존적 치료 후 근위 재정렬술을 시행한 결과보다 좀 더 만족스러운 결과를 보였다. 관절경하 근위 재정렬술을 시행 한 뒤 성장판이 유합된 뒤 전내측 경골 조면 전위술을 하는 시행 법이 골 미성숙 시에 발생한 재발성 탈

구에 대하여 좋은 치료 방법이 될 것으로 사료된다.

핵심되는말: 골 미성숙, 슬개골 탈구, 전내측 경골 조면 전위술