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내측 반월상 연골판 손상에 대한 신바로 약침을 포함한 한의학적 치료효과 증례보고 5례

The Effect of Korean Medical Treatments including Shinbaro Pharmacopuncture for Medial Meniscus Tear Patients: Five Cases Report

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연구 목적 이 연구는 내측 반월상 연골판 손상으로 인한 무릎 통증을 호소하는 5명의 환자에서 한의학적 치료, 특히 신바로 약침으로 인한 통증 개선이 있었기에 보고함이다.
연구 방법 무릎 통증으로 본원 입원치료를 받은 환자 중, MRI 영상 검사상 내측 반월상 연골 파열 진단을 받은 환자들의 차트를 분석하였다. 슬관절 통증 호전 및 기능 개선은 Numeric Rating Scale (NRS), Western Ontario and McMaster Universities Arthritis Index (WOMAC Index), 슬관절 Range Of Motion(ROM) 및 special tests 측정으로 판단하였다.
연구 결과 5증례에서 NRS는 평균 3.4의 호전, WOMAC Index는 평균 64.4%의 호전을 보였다. 슬관절 ROM 측정에서 환자 모두 입원시보다 증가되었으나, 무릎에 손상에 사용되는 보편적 검사인 Stress valgus, Stress varus, Drawer test, Apley compression test, Mcmurray's test 상 전후비교에서 4명의 환자는 호전되었고, 1명 환자에서는 변화가 없었다.
결과 이 연구는 내측 반월상 연골판 손상에 대한 신바로 약침을 포함한 한의학적 치료 후 단기간 내 통증 및 기능 향상을 보여주었다.

주제어 Medial meniscus tear, Korean medicine, Shinbaro pharmacopuncture

Ⅰ. Introduction

A torn medial meniscus can be caused by acute injury from trauma or chronic degenerative condition. In the elderly, degenerative tear accounts for almost 60%[1]. A torn medial meniscus prior to confirmation through close examination can be classified as an internal derangement of knee. According to the 2019 medical expense statistics provided by the Health Insurance Review & Assessment Service, there are 70,000 inpatients per year due to the internal derangement of knee, and each case costs over KRW 1.2 million[2].

The meniscus is a piece of cartilage located between the femur and the tibial plateau, which is a structure involved in the absorption of shocks against vertical load, reduction of joint pressure, weight distribution, and joint lubrication. However, acute tear may occur if rotational pressure, that is, torsional damage, is applied while the knee joint is flexed. This can lead to decreased elasticity of cartilage and degenerative tear[3].

Unlike in the past, when total meniscectomy was performed for a torn meniscus, the latest trend is to preserve the meniscus since there have been numerous reports that osteoarthritis occurs due to the progression of degenerative changes in the knee joint after resection[4]. Diversification of treatment methods is required as the age, range of activity, and severity of damage may vary for each patient, and current practice focuses on the treatment that preserves the meniscus as much as possi-

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ble as the mechanical and biological functions of the meniscus are revealed[5].

In the previous study by Kim et al.[6], the possibility of treating inflammation and joint disease with Shinbaro pharmacopuncture was proven by an experiment using a rat model of osteoarthritis. It has been shown to inhibit the production of prostaglandin E2 (PGE2), a substance that induces inflammation in joints, which is associated with overexpression of cyclooxygenase-2 (COX-2) as a mediator of the inflammatory response. Since the group treated with Shinbaro pharmacopuncture showed recovery in the damaged part of the joint cartilage surface in the same experiment, the same pharmacopuncture was administered to the pain caused by the meniscal injury[6].

Recently, there were reports that the difference between surgical and conservative treatment for patients with meniscal injury is not significant in terms of their progress and outcome[7,8], and studies on the effects of Korean Medicine treatment of a torn meniscus are being actively conducted in South Korea. There was a study on the combined Korean Medicine treatment in patients with meniscal injury and partial medial collateral ligament tear[9], and there was also a study on motion style treatment in the knee joint for meniscal injury[10]. Studies on pharmacopuncture treatment included a case report of intra-articular bee venom pharmacopuncture for acute traumatic partial tear of meniscus[11] and a case report of Shinbaro pharmacopuncture and combined Korean Medicine treatment[12]. However, studies focusing the torn medial meniscus are hard to find, and there are still not enough cases reported for treatment with Shinbaro pharmacopuncture. Since we obtained significant results treating patients diagnosed as medial meniscus tear on MRI image with Shinbaro pharmacopuncture treatment combined with Korean Medicine treatment, we are reporting this case.

II. Method

Among the patients admitted to Jaseng hospital of Korean medicine, 5 patients were diagnosed with meniscus damage by MRI. Analyze a patient's record retrospectively. The study was approved by the Jaseng hospital of Korean medicine Institutional Review Board with approval number 2020-10-005. Informed consents were received from patients who agreed to the use of their personal data academically.

A. Treatment methods

1. Pharmacopuncture therapy

The Shinbaro pharmacopuncture used in the case was prepared by Jaseng Wonoe Tangjunwom, Namyangju, Korea. For each patient during the hospitalization period, choosing 內膝眼(EX-LE4), 外膝眼(EX-LE5), 陽陵泉(GB34), 陰陵泉(SP9), and 足三里(ST36). Once per day, 1.0 cc was divided by 0.2 cc per acupuncture point using a 29G×13mm needle 1.0 cc syringe (Sungsim Medical, Korea)

2. Acupuncture treatment

0.25×30㎜ disposable sterilization needle (Stainless steel needle, Dong-bang Medical, Korea) was used to perform acupuncture by a Doctor of Korean medicine with more than 3 years of experience for 10 minutes, once a day during the hospitalization period. The needles were inserted at 內膝眼(EX-LE4), 外膝眼(EX-LE5), 陽陵泉(GB34), 陰陵泉(SP9), and 足三里(ST36).

3. Herbal medicine treatment

Mabalgwanjeol-tang (馬勃關節湯) was prescribed for all cases. The patients took the medicine 3 times a day. It was consist of Lasiosphaera Seu Calvatia 12g, Achyranthis Radix 8g, Ginseng Radix 8g, Glycyrrhizae

Radix 4g, Osterici Radix 4g, Testudinis Plastrum 4g, Angelicae Pubescentis Radix 4g, Hordei Fructus Germinatus 4g, Saposhnikoviae Radix 4g, Amomi Fructus 4g, Astragali Radix 4g, Aconiti Tuber 2.8g.

B. Method of evaluation

1. Numeric Rating Scale(NRS)

NRS was used for evaluating objective pain. The patient subjectively assesses their degree of pain from 0 to 10[13]. This assessment was performed twice; once on the admission day and again on the discharge day.

2. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC Index)

WOMAC Index is an instrument for measuring health status for patients with osteoarthritis. It is composed of 24 questions about pain, stiffness, and physical function[11]. This assessment was performed twice, once on the admission day and again on the discharge day.

3. Range of motion(ROM) and special tests

Active ROM for flexion, extension, and five knee-related special tests were measured at 7am every day.

Ⅲ. Report of the cases

A. Case 1

a. Patient: Park OO; Female, 65 years old

b. Chief complaint and Date of onset: Right knee pain, April 2019

c. Past medical history: Diabetes, Osteoporosis and Diplopia

d. Present illness: Right knee pain developed at April 2019 for no specific reason. In May 2019 The patient had a radiograph taken and was diagnosed Degenerative arthritis at a local clinic. The patient was prescribed 15 days of medicine and received physical therapy.

e. Duration of treatment: November 26, 2019 to January 3, 2020 (39 days of hospitalization)

f. Radiology(Fig. 1)

Results of the knee MRI, Rt(2019.11.28.)

Medial meniscus: Suspect horizontal tear, posterior horn

Lateral meniscus, ACL, PCL, MCL, LCL: Unremarkable.

Bone and cartilage lesion: Small focal chondromalacic change, patella with small bone marrow lesion

g. Progress after treatments

- Change in the NRS (Table I), WOMAC (Table II), ROM and results from special tests(Table III)

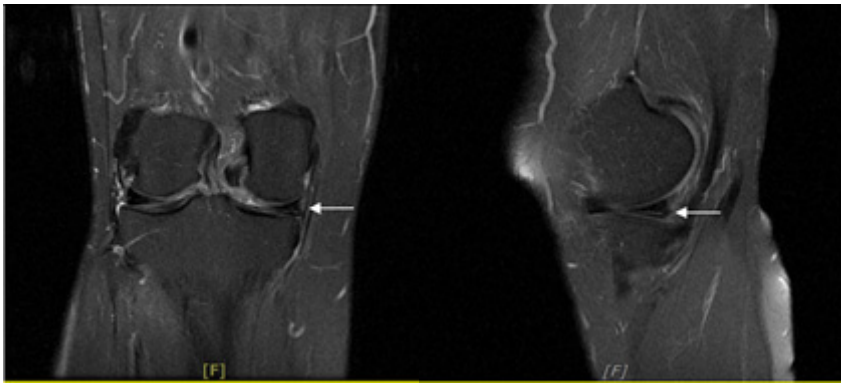

Fig. 1. Right knee MRI from case 1(11/28/2019).

B. Case 2

a. Patient: Jeon OO; Female, 43 years old

b. Chief complaint and Date of onset: Left knee pain, End of December 2019

c. Past medical history: Cholecystectomy

d. Present illness: Left knee pain developed at the end of December 2019 while falling bumped into the Knee. The patient did an ultrasound and was diagnosed with no specific disease at a local clinic. The patient received Injection treatment.

e. Duration of treatment: February 4, 2020 to February 14, 2020 (11 days of hospitalization)

f. Radiology(Fig. 2)

Results of the knee MRI, Lt(2020.02.04.)

Medial meniscus: Horizontal tear, body. Posterior root tear

Lateral meniscus, ACL, PCL, MCL, LCL: Unremarkable.

Bone and cartilage lesion: Focal thinning of cartilage, medial compartment.

g. Progress after treatments

- Change in the NRS (Table I), WOMAC (Table II), ROM and results from special tests(Table III)

C. Case 3

a. Patient: Park OO; Male, 65 years old

b. Chief complaint and Date of onset: Right knee pain, May 2019

c. Past medical history: None

d. Present illness: Right knee pain developed at May 2019 for no specific reason. The patient had not any test and didn't receive treatment.

e. Duration of treatment: January 18, 2020 to March 3, 2020 (46 days of hospitalization)

f. Radiology(Fig. 3)

Results of the knee MRI, Rt(2020.02.10.)

Medial meniscus: Oblique tear, body and posterior horn

Lateral meniscus: Bucket-handle tear or flipped meniscus

ACL, PCL, MCL, LCL: Unremarkable.

Bone and cartilage lesion: Osteophyte formation, tibia and femur, Thinning of catilage, lateral tibia

g. Progress after treatments

- Change in the NRS (Table I), WOMAC (Table II),

Table I. Change in the Numerical Rating Scale

NRS	Admission Day	Discharge Day
Case 1	8	4
Case 2	5	2
Case 3	7	5
Case 4	8	4
Case 5	8	4

Table II. Change in the Western Ontario and McMaster Universities Osteoarthritis Index

WOMAC	Admission Day	Discharge Day	Improvement Rate
Case 1	80	27	66%
Case 2	69	26	62%
Case 3	77	29	62%
Case 4	72	33	54%
Case 5	79	17	78%

Table III. Change in the ROM and Special Tests

	Case 1	Case 2	Case 3	Case 4	Case 5
	Admission Day to Discharge day	Admission Day to Discharge day	Admission Day to Discharge day	Admission Day to Discharge day	Admission Day to Discharge day
Active Flexion	100 ->135	100 ->135	90 ->100	120 ->135	100 ->135
Active Extension	0 -> 0	0 -> 0	0 -> 0	0 -> 0	0 -> 0
Stress Valgus	+ ->-	+ ->-	+ ->+	+ ->-	+ ->-
Stress Varus	- ->-	- ->-	+ ->+	+ ->-	+ ->-
Drawer Test	- ->-	- ->-	- ->-	- ->-	- ->-
Apley Compression Test	+ ->-	+ ->-	+ ->-	+ ->-	+ ->-
Mcmurray's Test	+ ->-	+ ->-	+ ->+	+ ->-	+ ->-

ROM and results from special tests(Table III)

D. Case 4

a. Patient: Lee OO; Male, 59 years old

b. Chief complaint and Date of onset: Left knee pain, July. 2019

c. Past medical history: Both Knee Cartilage Operation

d. Present illness: Left knee pain developed at July 2019 for no specific reason. The patient had not any test and didn't receive treatment.

e. Duration of treatment: June 15, 2019 to July 22, 2019 (38 days of hospitalization)

f. Radiology(Fig. 4)

Results of the knee MRI, Lt(2019.06.17.)

Medial meniscus: Horizontal tear, body and posteri-

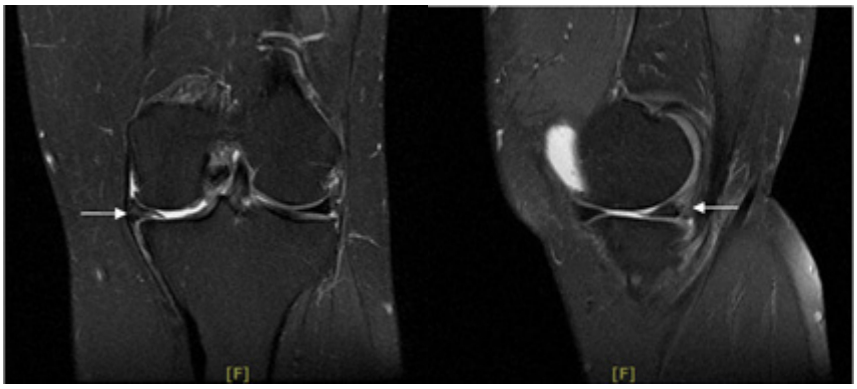

Fig. 2. Left knee MRI from case 2(02/04/2020).

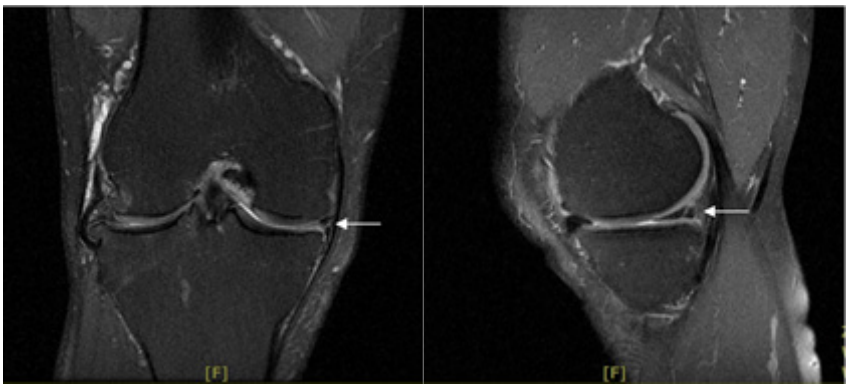

Fig. 3. Right knee MRI from case 3(02/10/2020).

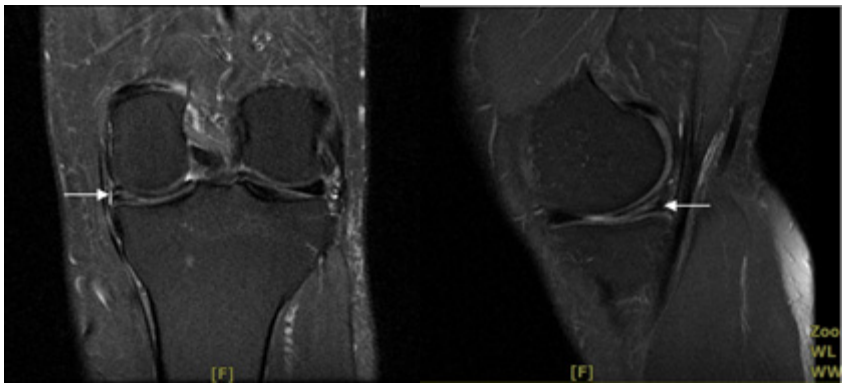

Fig. 4. Left knee MRI of case 4 (06/15/2019).

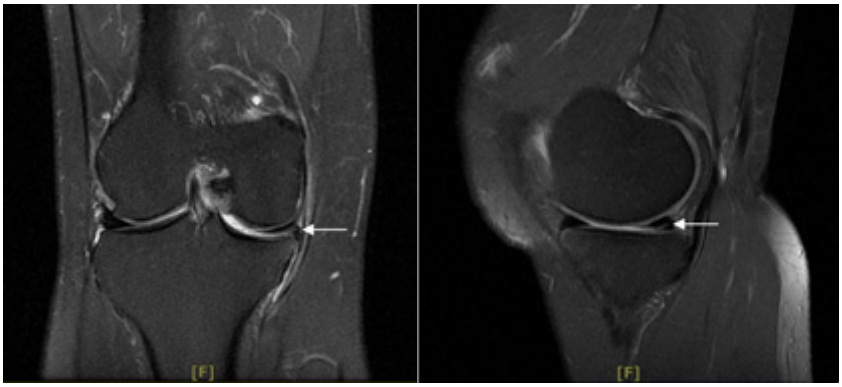

Fig. 5. Right knee MRI of case 5 (12/12/2019).

or horn

Lateral meniscus, ACL, PCL, MCL, LCL: Unremarkable.

Bone and cartilage lesion: Small bone marrow lesion, intercondylar area, tibia.

g. Progress after treatments

- Change in the NRS (Table I), WOMAC (Table II), ROM and results from special tests(Table III)

E. Case 5

a. Patient: Jung OO; Female, 59 years old

b. Chief complaint and Date of onset: Right knee pain, July. 2019

c. Past medical history: Lumbar Herniated Intervertebral Disc

d. Present illness: Right knee pain developed at July 2019 for no specific reason. The patient had not any test and didn't receive treatment.

e. Duration of treatment: December 10, 2019 to January 12, 2020 (34 days of hospitalization)

f. Radiology(Fig. 5)

Results of the knee MRI, Rt(2019.12.12.)

Medial meniscus: Oblique tear, posterior horn

Lateral meniscus, ACL, PCL, MCL, LCL: Unremarkable.

Bone and cartilage lesion: Unremarkable.

Muscle and soft tissue lesion: Scanty amount of fluid collection between biceps femoris muscle and lateral head of gastrocnemius muscle.

g. Progress after treatments

- Change in the NRS (Table I), WOMAC (Table II), ROM and results from special tests(Table III)

Ⅳ. Discussion and Conclusion

The function of the medial meniscus is clinically important as a secondary stabilizing structure that absorbs the impact applied to the articular cartilage by distributing the load evenly and assists the ligaments[14]. The tear in the medial meniscus is classified according to the shape of the tear; there are vertical longitudinal tear, bucket handle tear, radial tear, flap tear, horizontal tear, and complex tear. Horizontal tear and complex tear are commonly found in the elderly patients[15].

In ≪黃帝內經・靈樞・經脈≫, knee joint disease is referred to as'膝臢腫痛, and '膝痛' is considered as a common symptom in knee joint disease, and subdivided 鶴膝風, 歷節風, 痛風, 痺症[16]. Because Stomach meridian(足陽明胃經) and Gallbladder meridian(足少陽膽經) go through the knee joint, acupuncture points are selected in these meridians. Based on the treatment method like祛風勝濕, 溫經通絡, 消腫止痛, you will use acupuncture treatment, moxibustion treatment, cupping therapy, herbal medicine treatment, bee venom treatment, pharmacopuncture therapy[10].

Shinbaro is a purified extract from a mixture of 6 oriental herbs (Ledebouriellae Radix;방풍, Achyranthis Radix;우슬, Acanthopanacis Cortex;오가피, Cibotii Rhizoma;구척, Glycine Semen;두시, and Eucommiae Cortex;두충) that have been used as a traditional medicine for treatment of several inflammatory diseases and bone disorders[17]. Shinbaro treatment on monosodium iodoacetate-induced osteoarthritis caused the trabecular bone to increase by approximately 40% and reduced the inflammation-inducing element, such as prostaglandin and anti-collagen antibody, by about 60% when compared to that of the control group. Also Inflammatory cytokines including tissue necrosis factor-α(TNF-α) and interleukin-1 beta(IL-1β) levels were effectively reduced. These cytokines promote the catabolic processes in OA, causing cartilage degradation[6].

The NRS score was improved from 8 to 4 in cases 1, 4 and 5; improved from 5 to 2 in case 2; and improved slightly from 7 to 5 in case 3. The WOMAC index was improved from the initial state by about 66% in case 1; improved by about 62% in case 2; improved by about 62% in case 3; improved by about 54% in case 4; and improved by about 78% in case 5. The ROM was improved from 100 to 135 in cases 1, 2 and 5; improved from 90 to 100 in case 3; and improved from 120 to 135 in case 4. In special tests such as Stress Valgus, McMurray and Apley compression tests, only case 3 showed no change, and the average treatment period was 33.4 days, demonstrating no change in the improvement pattern proportional to the treatment period.

In terms of the type of medial meniscus tear, a horizontal tear was found in cases 1, 2 and 4, and an oblique tear was found in cases 3 and 5. Overall, there were many cases of horizontal tear frequently found in the elderly. Case 3 showed slower improvement in NRS, ROM and special tests compared to other cases, which is likely to have been caused by the medial meniscus tear accompanied by the bucket-handle tear in the lateral meniscus. However, with reduced inflammatory factors and swelling and activation of body functions, the daily life and quality of life were improved in the patients, and this resulted in the greater improvement in the WOMAC index than in the NRS score.

Although this case report has limitations in that it only includes five cases, it will be able to suggest the possibility of developing medical guidelines for Korean Medicine treatment for a torn medial meniscus in combination with more case studies and a randomized clinical trial study on Shinbaro pharmacopuncture treatment in the future.

References

1. Waldman SD. Atlas of common pain syndromes. 3rd rev. ed. Seoul: Elsevier Korea LLC. 2012:334-5.
2. Kim SM, Kim YI. Major statistics of medical expenses. Seoul:Health Insurance Review and Assessment Service. 2019:36-7.
3. Korean Acupuncture & Moxibustion Society Textbook Compilation Committee. The acupunture and moxibustion medicine. 1st ed. Seoul:Jipmoondang. 2012:193:549-64.
4. Choi NH, Oh JS. Management of meniscal Injury: repair, meniscectomy, and transplantation. J Korean Orthop Assoc. 2012;47(3):165-70.
5. Jun DJ, Jee WH, Lee YJ, Choi KH. Diagnostic value of MR Imaging in differentiation of meniscal tear patterns. J Korean Radiol Soc. 1999;41:159-64.
6. Kim WK, Chung HJ, Pyee Y, Choi TJ, Park HJ, Hong JY, Shin JS, Lee JH, Ha IH, Lee SK. Effects of intra articular SHINBARO treatment on monosodium iodoacetate induced osteoarthritis in rats. Chin Med. 2016;11(1): 17-26.
7. Sihvonen R, Paavola M, Malmivaara A, Itälä A, Joukainen A, Nurmi H, Kalske J, Järvinen TL. Arthroscopic partial meniscectomy versus sham surgery for a degenerative meniscal tear. N Engl J Med. 2013; 369(26):2515-24.
8. Katz JN, Brophy RH, Chaisson CE, Leigh de Chaves, Cole BJ, Dahm DL, Donnell-Fink LA, Guermazi A, Haas AK, Jones MH, Levy BA, Mandl LA, Martin SD, Marx RG, Miniaci A, Matava MJ, Palmisano J, Reinke EK, Richardson BE, Rome BN, Safran-Norton CE, Skoniecki DJ, Solomon DH, Smith MV, Spindler KP, Sruart MJ,

Wright J, Wright RW, Losina E. Surgery versus physical therapy for a meniscal tear and osteoarthritis. N Engl J Med. 2013;368(18):1675-84.
9. Jeon YH, Kim DR, Moon HY, Park JW, Lee YH, Chai JW, Choi DJ, Choi HJ. Effects of Korean Medicine Treatment on Medial Collateral Ligament Tear with Meniscal Tears: Report of 3 Cases. JKCMM. 2019;14(2): 89-100.
10. Choi YI, Kim MY, Choi HS, Shin DJ, Choo WJ. The Clinical Report on 2 cases of Meniscal Injury patients with Knee Pain improved by Motion Style Treatment. JKCMM. 2011;6(2):97-107.
11. Lee JH, Kim JS, Jeong YH, Jeong B, Lee CR. Case report of intra-articular bee venom pharmacopuncture combining with oriental medical treatment for Acute traumatic partial tear of meniscus. J Pharmacopuncture. 2010;13(4):129-36.
12. Lee SJ, Yoon TK, Shin SJ, Ahn SM, Lee SJ, Won JY, Jang YJ. Three cases meniscus injury treated with Shinbaro pharmacopuncture therapy. The Acupuncture. 2017;34(3):109-19.
13. Ha IH, Park WS, Woo I, Kim HN, Kho DH, Yoon YS. Correlation between horizontal visual analogue scale, vertical visual analogue scale and numerical rating scale for pain measurement. Journal of Korean Medicine Rehabilitation. 2006;16(4):125-33.
14. Lee BS, Bin SI, Kim TH. Evolving indication of meniscal allograft transplantation. J Korean Orthop Assoc. 2020;55:200-9.
15. Sarwark JF. Essential of musculoskeletal care. 4th rev. ed. Seoul:Beommun Education. 2013:411-2.
16. Lee GE, Lee GY, Han SH, Kim GB, Kim HJ, Jang JW, Jang YW, Cho JH. The Correlation between korean medical treatment on degenerative meniscus tear and kellgren-lawrence-grade, body mass index. J Oriental Rehab Med. 2018;28(4):71-9.
17. Lee SY, Kwon HK, Lee SM. SHINBARO, a new herbal medicine with multifunctional mechanism for joint disease: first therapeutic application for the treatment of osteoarthritis. Arch Pharm Res. 2011;34(11):1773-7.

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