ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

12th Biennial ISAKOS Congress • May 12-16, 2019 • Cancun, Mexico

Paper #38

Alternative Method to Detect Dynamic Medial Meniscus Extrusion: Weight-Bearing Magnetic Resonance Imaging, Comparison to Ultrasonography Measurement

Makoto Kobayashi, MD, PhD, JAPAN
Masahiro Nozaki, MD, PhD, JAPAN
Sanshiro Yasuma, MD, JAPAN
Yusuke Kawanishi, JAPAN
Masahito Yoshida, MD, PhD, JAPAN
Hiroto Mitsui, MD, PhD, JAPAN
Takanobu Otsuka, MD, PhD, Prof., JAPAN

Nagoya City University
Nagoya, Aichi, JAPAN

Summary:
Weight-bearing magnetic resonance imaging can detect the medial meniscal extrusion in weight baring status that may close link to the patient's symptom in weight-bearing.

Abstract:

Introduction

In the recent years, preservation of medial meniscus(MM) function is widely recognized as a key to prevent osteoarthritis (OA) or osteonecrosis (ON) of the knee. The MM extrusion has been reported to the prognosis factor of the knee OA. Magnetic resonance imaging (MRI) is usually used to measure the MM extrusion, but this method can only measure the no weight-bearing (NWB) static state and may underestimate the extrusion that is actually occurs in weight-bearing (WB) dynamic state. Hence, "ultrasonography (US)" measurement to measure the dynamic extrusion of the MM has been drawing attention. But this measurement highly depends on the technique and difficult to make it consistent. In this study, we tried the new method to measure the MM extrusion "WB MRI" which can detect dynamic WB state of meniscal extrusion without any special skill and compared the results to those of US measurement.

Material And Methods

Twelve patients (age: 42-72, mean59.8) who had both MM posterior root tear and MM extrusion in the MRI were enrolled in this study. After US measurement of MM extrusion in two different state (NWB and WB), MRI measurement was performed also in two different state (NWB and mimic WB). The measurement method of the US and the MRI were as follows. US: A Patient was in standing position with WB fully to the affected leg, US prove was applied along with the medial collateral ligament and the distance from the tibial cortex to the edge of the MM was recorded (WB state). Then the patient moved the WB completely on unaffected leg and MM extrusion was recorded again (NWB state). MRI: Patients were lied on the MRI table in supine position with the equipment DynaWell L-Spine Compression Device applied. First, ordinal MRI image was taken (NWB status). Then to apply simulated WB stress, one fourth of body weight was applied on each leg according to the instruction of this equipment and MRI image was taken again (WB status). Meniscal extrusion was measured in coronal slice where the anterior- posterior center of the medial femoral condyle according to previously described method1. The results of US and MRI measurement were compared. Statistical analysis ware done with paired t-test. Significance was set at <.05.

Paper #38

Results

The result of the medial meniscus extrusion in NWB and WB status were as follows (mean ± SE, range (mm)); US: NWB (4.82 ± 0.62, 2.7-9.3), WB (6.43 ± 0.51, 4.00-9.50) and MRI: NWB (5.93 ± 0.44, 3.30-8.50), WB (6.52 ± 0.39, 4.20-8.40). In each method, meniscal extrusions were significantly increased with the WB (US: p=0.005, MRI: p=0.01). Although there was no difference in meniscal extrusions between the US and the MRI when compared within the NWB and WB state, the delta extrusion in the US measurement was significantly larger than that of in MRI measurement.

Discussion

In this study we measured the MM extrusion in two different state; NWB and WB using the US and the MRI. The most important findings in this study was that in either measurement method, MM extrusion was significantly increased when the WB road was applied. These result indicated that the US as well as WB MRI may useful to detect the dynamic movement of MM in WB status which is more close link to the patient symptom.