The Incidence and Structure of the Fabella in Japanese Population. -Anatomical Study, Radiographic Study, and Clinical Cases-

Introduction:
The fabella is a small sesamoid bone embedded in the tendinous portion of the lateral head of the gastrocnemius muscle, often articulating directory with the lateral femoral condyle. It is well-known normal variant of the para-articular structures of the knee. The fabella syndrome is most common in early adolescence and most likely is the result of repetitive friction of the fabella over the posterolateral femoral condyle. However, reports have described symptoms arising from the fabella both as a result of not only chondromalacia in the young patients but also osteoarthritis in the old patients. Pritchett associated osteoarthritis with the occurrence of fabella, but the fabella itself may become primarily osteoarthritic.

The purposes of this study were 1) to define the incidence of the fabella and the prevalence of fabello-femoral osteoarthritis in a cadaver sample of the Japanese, 2) to investigate the incidence of the fabella radiographically, and 3) to compare the incidence and size between the young and the elderly. In addition, we reported 3 cases which required surgical treatment to educate clinicians about fabella-femoral arthritis as a possible cause for posterolateral knee pain and dysfunction.

Materials and methods:
Anatomical examination
From 2006 to 2009, the authors observed anatomical specimens used in medical student examinations at Nihon University. One hundred fifty cadaveric knees (average age 81.0 yr at death) were dissected. We performed a macroscopic examination to determine the presence of the fabella. Fabellae were classified into “bony”, “cartilage”, and “potential ossified” groups by manual touch and observation. From 2006 to 2009, the radiographs of 347 knees from 279 out-patients were divided into two groups, a young-group under 50 yr (154 knees, average age 33.2 yr) and an old-group aged 50 yr and over (193 knees, average age 70.3 yr). The X-ray pictures were obtained from computed radiography. The size of fabella (length and thickness) was measured in a lateral view of radiograph using Picture Archiving and Communication System (PACS).

Statistical analysis: Differences in length and thickness between the young and old groups were analyzed using an independent T-test. It was assumed that there was statistical significance when P<0.05. The statistical analysis was done using the software package SPSS ver. 17.0.

Results:
Anatomical examination:
The incidence of fabella was 81 % (122 knees) in 150 cadaveric knees. In 122 knees, there were 34 knees with bony fabella (28 %), 26 knees with cartilage fabella (21 %), and 62 knees with potential ossified fabella (51 %).

The incidence of fabello-femoral osteoarthritis was 13 % (19 knees) in 150 knees. In 14 of the 19 knees, a huge spur formation on the fabella and a mirror chondral lesion on the lateral femoral condyle were found.

Radiographic examination:
The incidence in the young-group was 31 % (48 knees). The incidence in the old-group was 47 % (91 knees). The sizes of fabella were average 6.2 * 3.7 mm in the young-group and average 7.5 * 4.4 mm in the old-group. There was a significant difference in length and thickness between the young and the old groups (p = 0.004 and 0.026, respectively).

Case presentation:
Case 1; A 86 year-old-man presented with a 4-year history of intermittent pain localized to the posterolateral aspect of the left knee. CT scan showed an enlarged fabella located laterally. He underwent excision of the enlarged fabella (17 * 12 mm). Arthroscopic view showed the fabella articulating the lateral femoral condyle in the knee joint. Postoperatively his symptoms subsided. (Fig. 2)

Case 2; A 69 year-old-man presented with a 4-year history of pain and catching localized to the posterolateral aspect of the right knee. He underwent excision of the enlarged fabella without spur formation. Postoperatively his symptoms subsided. (Fig. 3)

Case 3; A 69 year-old-woman presented with a 1-year history of pain and catching localized to the posterolateral aspect of the right knee. The limited range of motion made walking difficult. CT scan showed an enlarged fabella. She underwent excision of the enlarged fabella (25 *20 mm). Postoperatively her symptoms subsided. (Fig. 4)

Discussion:
In this study, the incidence of fabella was higher in both radiographic and anatomical examinations when compared to previous studies which described that fabella was a normal variant in 10-30% of patients. In the present study, the high incidence of fabella was reported in especially anatomical examinations. The reason for this may be that it is possible to identify not only bony fabella but also non-bony fabella (cartilage or potential ossified) in cadaver dissection. The high incidence in the old-patients was found in the present radiographic study. Also, the fabella size in the old group is bigger than that in the young. These results suggested that bony metaplastic change could occur to non-bony fabellae and that fabellae could be enlarging with age-related osteoarthritic change. The fabello-femoral osteoarthritis should be considered during an examination of symptomatic knee in older patients.

References: