A NEW METHOD FOR A PRECISE PATELLA RESECTION IN TOTAL KNEE ARTHROPLASTY.

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Introduction
Preparing the patella in total knee arthroplasty (TKA) continues to have many problems. We developed a new guide to cut the patella correctly. This study was performed to evaluate the accuracy of the angle of the resected surface, the thickness of the resected patella, and the simplicity of the operation.

Methods
A new cutting guide consists of a central shaft, two frames, a ring and four small tubes attached to the lower surface of the ring (Fig. 1). The central shaft is located in the center of the ring in the coronal plane. The inside and the outside diameter of the ring are 50 mm and 60 mm, respectively. The ring consists of upper and lower discs and a slot for the bone saw between the two discs. The distance from the distal end of the shaft to the lowest level of the slot along the long axis of the shaft is 8 mm, which is the same thickness as that of the patellar component. The patella is placed in the ring and the distal end of the shaft is then attached to the highest point of the articular surface. A stylus is inserted through the slot in order to feel the circumference of the articular surface. This procedure can set the slot in a proper angle to cut the patella. Two K-wires are then inserted through small tubes to fix the guide to the patella firmly. A K-wire can also be inserted through a hole of the central shaft. As a result, a bone resection at the same thickness as that of the patellar component can be performed. If the thickness of the patella were less than 22 mm, then an 8-mm resection would be too large. In such a case, a cap from 2 to 4 mm thick is put on the distal end of the central shaft. The slot moves toward the articular surface, and the patella can then be resected so that the resected patella has sufficient thickness. A preliminary study using cadaver specimens showed that such fixation was both strong enough and accurate enough for clinical use. This cutting guide has been clinically used in twelve cases since January 1999. Five cases had osteoarthritis while seven cases had rheumatoid arthritis (RA). The thickness of the patella was measured with a calliper during TKA. The average thickness of the patella before resection was 22.8 ± 2.1 mm. In two cases, the thickness of the patella was 20 mm and a bone resection was performed with a 2-mm cap on the central shaft. In all other cases, a bone resection was performed without a cap. After the thickness of the resected patella was measured with the calliper, the angle between the circumference of the articular surface and the resected surface was measured with a specially designed goniometer.

Results
In two cases with a thin patella, the thickness of the resected patella was 14 mm. In all other cases, an 8-mm resection was established. The angle between the circumference of the articular surface and the resected surface was less than one degree in all cases. Even in the RA patients, the fixation of the guide to the patella was strong enough to resect the patella.

Discussion
The method using this guide is totally different from any other conventional cutting guide of the patella. The inserting point of the bone saw into the patella and the angle of the bone saw are the critical points to cut the patella correctly. With this guide, the inserting point and the angle of the bone saw are automatically decided because the slot between the two discs induces only one way for the bone saw. Overresection is the other critical point for the patella. However, it is impossible to cut more than 8 mm with this device because the distal end of the shaft is attached to the most highest point of the articular surface and the distance between the distal end of the shaft and the lowest level of the slot is 8 mm. The whole articular surface can be seen during the preparation. Therefore, it is very comfortable to cut the patella with this device. If other guides for the recessed patellar component were used, no vision of the articular surface can be obtained and it is doubtful for the surgeon to cut the patella correctly during the preparation. Furthermore, the resection was completed with one insertion of the bone saw through the slot in all cases. It is easy to set the angle of the guide using the stylus through the slot and it is easy to fix the guide with K-wires. This guide is thus considered to be reliable and easy to use in TKA.

Figure 1. Schematic of the new patella cutting guide