Alignment Evaluation of Total Knee Arthroplasty Using Three-Dimension Lower Extremity Alignment Assessment System
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PURPOSE:
Recently, total knee arthroplasty (TKA) has been generalized as an operation that achieves excellent clinical results. However, younger and more demanding patients require even greater implant longevity and functional performance, and there are many variations in the prosthesis design. It is necessary to acquire an accurate lower extremity alignment for excellent clinical result in TKA. The installing position of the femur component becomes the factor to control postoperative function. Especially, it is reported that changing posterior condyle offset of the femur influences a knee range of motion after TKA.\(^{1,2}\)

However, the general evaluation to align is taken in a concept of two-dimension using X-ray photogram. Therefore, lower extremity alignment after TKA is evaluated by three-dimension (3D) lower extremity alignment assessment system using biplanar CR images and CT images.

METHODS:
CT scans with 2.0 mm pitch of femur and tibia are performed before TKA. 3D digital models of femur and tibia are reconstructed using 3D visualization software, via Zed View made by LEXI, Inc. in JAPAN.

Biplanar anteroposterior and 60-degree oblique long-leg CR projections are performed before and after TKA. Biplanar CR images of the lower extremities and 3D digital models of femur and tibia and 3D TKA prostheses models are matched by 3D lower extremity alignment assessment system, via Knee-CAS by LEXI, Inc. in JAPAN. (Fig.1)

3D lower extremity alignment assessment is performed in 5 patients. TKA is performed with the FINE total knee system CR type (FINE TKA) made by NAKASHIMA MEDICAL Co., Ltd. in JAPAN. (Fig.2)

CONCLUSIONS:
We are able to elucidate a correct component position after TKA by 3D lower extremity alignment assessment system. It is shown that anatomical posterior condylar offset is acquired by TKA design. It is suggested that it is possible for the maximum flexion angle of the knee joint after TKA to be increased using FINE TKA.

REFERENCES: