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学位論文の題名	<p>Is the canal flare index a reliable means of estimation of canal shape? Measurement of proximal femoral geometry by use of 3D models of the femur (Canal Flare Index は近位大腿骨髓腔形態の評価に適切か? 3D 大腿骨モデルを用いた近位大腿骨形態の計測)</p> <p>J Orthop Sci. 2015 May;20(3):498-506</p>
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1 **ABSTRACT**

2 Background: Canal Flare Index (CFI) is often used for canal characteristics. However clinically, CFI
3 measurements were sometimes untrustworthy due to femoral rotation and especially higher anteversion in
4 Japanese patients. Our objectives were to analyze the femoral geometries using 3D CAD models and evaluate
5 rotational error effects, and to seek for an index less affected by rotation.

6 Methods: CAT scan data of 60 femurs were used. Using CAD software, 3D femoral models were created.
7 Outside of femur and inside canal width at 20 mm (P20) and 10 mm proximal (P10), 10 mm (D10), 20 mm
8 (D20), 30mm (D30) and 40mm (D40) distal from the center of the lesser trochanter, and at the isthmus were
9 measured with various femoral rotational angles. Then CFI, FFI (Femoral Flare Index; the ratio of the
10 extra-cortical diameter at the same level with CFI) and other canal ratio (P20/D10, P20/D20, P20/D30,
11 P20/D40) were calculated and effect of the rotational errors was investigated.

12 Results: Mean CFI, FFI, P20/D10, P20/D20, P20/D30 and P20/D40 were 4.29, 2.08, 2.05, 2.49, 2.85 and 3.09
13 in the position without rotational error. CFI had no relation with anteversion, but it exhibited a negative
14 correlation with only isthmus canal width. On the contrary FFI was almost constant around 2.1 over different
15 anteversion and age. As for the effect of rotational error, CFI was changing by 1.31, FFI by 0.40, P20/D10 by
16 0.41, P20/D20 by 0.40, P20/D30 by 0.59 and P20/D40 by 0.80 among various rotational angles.

17 Conclusions: Outside femoral shape has small difference among any person due to that FFI was almost
18 constant. On the contrary CFI was revealed to be affected only by canal width at isthmus. Regarding the

- 19 rotational effect, P20/D20 was much less affected by rotation than CFI, it could be an appropriate index for
- 20 expressing the proximal canal shape.