

Development of the New Short Femoral Nail for Trochanteric Fractures*Masahiro Shirahama, MD, PhD; Shingo Okazaki**Kurume University School of Medicine, Kurume, Japan*

Purpose: The role of a short femoral nail for trochanteric fractures is to get the stability of proximal segment and the nail itself. Although there are various implants used for trochanteric fractures, the serious problem of cutout still occurs. Therefore, we developed a new short femoral nail for trochanteric fractures.

Methods: A new short femoral nail for trochanteric fractures can insert 1 lag screw, 1 anti-rotation screw, and 2 anti-rotation pins into the femoral head. According to the biomechanical test that measures the rotation torque and load resistance by increasing the number of screws and pins, the rotation torque and load resistance increased as the number of screws and pins increase. Inserting 4 screws and pins compared with 1 lag screw, the rotation torque increased up to 468.8%-616.1% and load resistance increased up to 425%. In literature, the femoral neck's most narrow part is 23.8 mm in Japanese, a part becoming largest is set to 23 mm in a new short femoral nail for trochanteric fractures. Therefore, we can use this nail even in Japanese small-sized elderly persons. A new short femoral nail for trochanteric fractures also can insert distal locking screws in cross to stabilize the nail itself. We used this new nail for 24 fractures of 23 cases from 2017 January to 2018 December. Patients included 6 male and 16 female, with the mean age of 81.9 years (range, 27-99). According to the AO classification, 4 patients had a stable type, and 19 had an unstable type.

Results: The average of surgical time was 80 minutes and intraoperative blood loss was 50 mL. All patients can be permitted full weight-bearing walking immediately after operation. The duration of hospitalization was mean of 20.1 days. During the follow-up period of 3 months, there were no complications or cutout. All patients recovered pre-injury function and achieved bone union.

Conclusion: A new short femoral nail for trochanteric fractures can insert 4 screws and pins into the femoral head in the 3 dimensions, have rotational resistance, and non-sliding system. This new short femoral nail can achieve rigid fixation, and it will prevent cutout after fixation of trochanteric fractures.