

**Midterm Outcomes After the Surgical Treatment of Atypical Femoral Fractures: Minimum 3-Year Follow-up**

*Kyu-Tae Hwang, PhD; Soo-Young Jeong, MD; Chang-Wug Oh, MD; Joon-Woo Kim, MD; Oog Jin Shon, MD; Ji Wan Kim, MD; Youngho Cho, MD; Ki Chul Park, MD*  
*Department of Orthopedic Surgery, College of Medicine, Hanyang University, Seoul, Korea, Republic of*

**Purpose:** The incidence of atypical femoral fractures (AFFs) continues to increase. However, there are currently limited long-term studies on the complications of AFFs and factors affecting them. Therefore, we attempted to investigate the outcomes, complications, and affecting risk factors for complication through mid-term follow-up of more than 3 years.

**Methods:** From January 2003 to January 2016, 305 patients who underwent surgery for AFFs at 6 hospitals were enrolled. After exclusion, a total of 147 patients were included. We retrospectively evaluated medical records, and reviewed radiographic images to investigate the fracture site, femur bowing angle, presence of delayed / nonunion, contralateral AFFs, and peri-implant fracture. Statistical analysis was performed on the affecting factors.

**Results:** The mean follow-up period was 70.2 months (range, 36-191). There were 146 cases (99.3%) in women and the average age was 71.6 years (range, 48-89). The subtrochanter and shaft fractures were in 52 cases (35.4%) and 95 cases (64.6%), respectively. The preoperative mean anterior / lateral femoral bowing angle were  $10.5^\circ \pm 5.7^\circ / 6.1^\circ \pm 6.2^\circ$ . The postoperative mean anterior / lateral bowing value were changed by  $8.7^\circ \pm 5.4^\circ / 4.6^\circ \pm 5.9^\circ$ , respectively. Bisphosphonates were used in 115 cases (78.2%) for an average of 52.4 months preoperatively. Nailing was performed in 133 cases (90.5%), and bony union was obtained at an average of 23.6 weeks (range, 7-85). Delayed union occurred in 41 cases (27.9%), and nonunion occurred in 13 cases (8.8%). Contralateral AFF occurred in 79 cases (53.7%), and the use of a bisphosphonate significantly influenced the occurrence of contralateral AFFs ( $P = 0.019$ ). Peri-implant fractures occurred in a total of 13 cases (8.8%), and a significant increase was observed in cases with plating ( $P = 0.021$ ) and high-grade postoperative anterolateral bowing ( $P = 0.044$ ).

**Conclusion:** The use of a bisphosphonate was found to be a risk factor for contralateral AFF, and high-grade postoperative anterolateral bowing and plate fixation significantly increased the occurrence of peri-implant fractures. Therefore, long-term follow-up studies on the bilaterality of AFFs and peri-implant fractures are necessary.