

## Return to Duty in Military Members Following Surgical Treatment of Incomplete Femoral Neck Fractures

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**Background/Purpose:** Femoral neck stress fractures (FNSFs) are a devastating injury in young adults. The incidence is highest among military members. Completion of an FNSF is a catastrophic event with complications of osteonecrosis and osteoarthritis. Surgical management is controversial but can hasten recovery and prevent progression to a completed FNSF. Prognosis after surgical fixation of incomplete FNSF is unclear due to the rarity of operative management. Long-term functional outcomes following surgical fixation of this injury are not known. Previous studies have suggested a correlation with FNSF and radiographic signs of femoroacetabular impingement (FAI). The purpose of this study was primarily to retrospectively review return to active duty in patients undergoing surgical fixation for incomplete FNSFs. Secondary purpose was to identify and define the presence of radiographic indicators of FAI.

**Methods:** Following IRB approval, we conducted a retrospective review of the electronic medical record at our military institution. A cohort of 53 patients met inclusion criteria of active-duty men and women, ages 18-40 years, with incomplete FNSF from a nontraumatic mechanism. Descriptive statistical methods were used to determine the rate of return to duty (RTD) compared to sex, branch of service, side of fracture, and signs of FAI. Femoral neck shaft angle (FSA), center-edge angle (CEA), and femoral neck offset were measured on standard radiographs on fractured and unfractured sides by all authors and compared to RTD using two-sample t test. Inter-rater variance was calculated between authors to determine accuracy of measurements using Scheffé pair-wise comparison of means. The presence of crossover signs (COS), prominence of ischial spines (PRIS), cam lesions, and synovial herniation pits were assessed in relationship to functional outcomes.

**Results:** 67% of our sample population did not return to duty. Based on branch of service, 83% of Marine Corps members did not return to duty, whereas 82% of Navy active duty did return to duty, which was statistically significant ( $P < 0.001$ ). Follow-up ranged from 2-111 months with an average of 25 months. There were 50 male patients and 3 female patients. 34 patients had right-sided fractures and 19 had left-sided fractures. The mean age at date of surgery was 21 years. RTD rates compared to sex was statistically significant ( $P = 0.031$ ) with 3/3 (100%) female active duty members returning to duty. COS was present in 56% of patients. PRIS was present in 48%. Herniation pits were present in 15/53 (28%), while 32/53 patients (60%) had cam lesions. Prevalence of COS, PRIS, herniation pits, and cam lesions compared to RTD rates were not statistically significant but were present in the majority of those who did not return to duty. Measurements of FSA, CEA, and offset compared to RTD were not significant; however, higher offset on fractured versus unfractured sides was significant ( $P = 0.014$ ). Analysis of variance regarding radiographic measurements revealed agreement increased with level of training.

**Conclusion:** Surgical fixation of FNSF does not improve a service member's ability to return to unrestricted active duty but did prevent progression to completion and displacement.

Despite robust postoperative rehabilitation, the demands on the active-duty member in training may exceed the nature of the injury. The majority not returning to active duty were Marines in recruit basic training, whereas, the majority of those returning to duty were in Naval Special Warfare training. Self-efficacy likely plays a strong role in determining which service members will return to full duty with higher RTD rates seen in those enlisted in Special Warfare training. Counseling of service members with FNSF should reflect the severe nature of this injury and guarded prognosis for return to previous activity level. Signs of FAI were present in the majority of patients and correlated with decreased RTD but were not statistically significant. It is unclear if a causal relationship exists between FAI and FNSF. The presence of radiologic signs of FAI in this select population is higher than that reported in the literature for a normal population.