# Retrograde Nail/Plate Combination for Vancouver C Periprosthetic Femur Fractures Provides Reliable Healing Rates

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INTRODUCTION:

Vancouver C periprosthetic femoral fractures distal to the stem of a total hip arthroplasty pose a unique challenge to orthopedic surgeons. There is continued debate over the ideal fixation strategy for this injury pattern. The goal of this study was to compare lateral locking plate (LLP) fixation to a combined approach utilizing rIMN alongside minimally invasive locked lateral plating using a periprosthetic plating system (PPS) (Smith & Nephew; Memphis, TN) in the management of Vancouver C periprosthetic femoral fractures.

METHODS: A retrospective review at a single level 1 trauma center was conducted of adult patients (age >18 years) who underwent fixation of Vancouver C periprosthetic femoral fractures from 2019-2025. The PPS, which became available in July 2023, was incorporated into the management of Vancouver C fractures and their variants by the authors of this study. Prior to July 2023, surgeons utilized LLP to treat Vancouver C fractures. Patients were grouped based on the fixation utilized (LLP or nail/plate (NP)). Post-operatively for patients in the NP group, immediate, full weight-bearing was recommended for all patients. For patients in the LLP group, patients were advised to remain non-weight-bearing for approximately 8 weeks. Early clinical outcomes were assessed based on complications, reoperations, and treatment failure. For study inclusion, follow-up of at least 3 months was required.

RESULTS:

A total of 26 patients were included in the NP group compared to 20 patients in the LLP group. In the NP group, 19 patients were female compared to 14 in LLP group. The average age of patients in the NP group was 79 years (range, 67–99 years) compared to 69 years (range 53-85 years) in the LLP group. The average BMI in was 29 kg/m² in both groups.

In the NP group, the median nail diameter was 12 mm (range, 10–13 mm), and the median nail length was 240 mm (range, 130–260 mm). On average, 5 screws (range, 3–8) were placed in the femoral condyles, and 4 screws (range, 2–6) were placed in the femoral shaft proximal to the fracture. No cables were used in this group. At final follow-up, all patients had healed without implant failure. Two patients required reoperation to remove a distal interlocking bolt that had loosened. No infections or revisions for non-union occurred.

In the LLP group, on average, 6 screws (range, 3–7) were placed in the femoral condyles, and 4 screws (range, 3-8) were placed in the femoral shaft proximal to the fracture. Cables were utilized in 6 patients in the LLP group. The average post-op anatomic lateral distal femoral angle (aLDFA) was 80.28 degrees in the LLP group compared to 82.3 degrees in the NP group (p=0.1432). There were no significant changes in aLDFA in either group at final follow-up. Two patients (10%) in the LLP group went onto non-union and were revised to a NP construct. Both patients went onto healing following revision to the NP construct. No additional complications occurred in this group.

DISCUSSION AND CONCLUSION:

Vancouver C periprosthetic femur fractures are expected to increase in frequency with the aging population. This study presents a reproducible fixation strategy combining rIMN with a new-generation plating system compared to traditional LLP constructs, resulting in excellent union rates and reliable outcomes. This approach enables immediate weight bearing and promotes early mobilization, while maintaining high union rates and implant integrity.

**Figure 1.** 67-year-old female with Vancouver C periprosthetic femur fracture

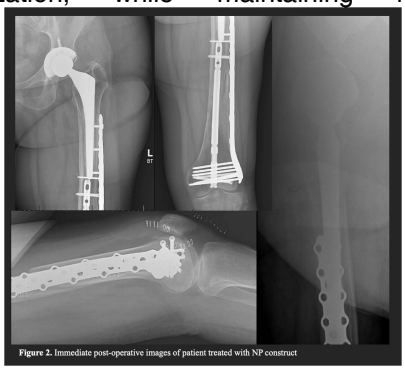

**Figure 2.** Immediate post-operative images of patient treated with NP construct

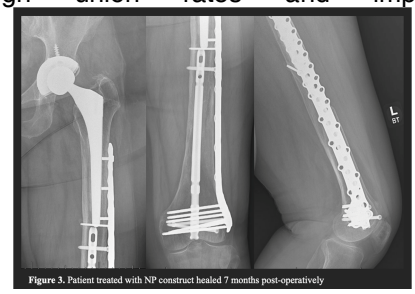

**Figure 3.** Patient treated with NP construct healed 7 months post-operatively