Percutaneous versus Open Reduction and Fixation for Tillaux and Triplane Fractures: A Multicenter Study

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Purpose: For Tillaux and triplane ankle fractures, treatment via both open and percutaneous techniques has been described. The literature contains supportive evidence for both techniques, leaving no general consensus on which is superior when it comes to minimizing residual gap or preventing growth disturbance. In this study, we present a multicenter initiative comparing the two techniques in a large, cohort comparison.

Methods: Four academic pediatric orthopaedic centers participated in this retrospective cohort comparison study. Two cohorts were formulated dependent on operative technique: percutaneous (PERC) or open reduction (OPEN). Inclusion criteria included all healthy, adolescent children undergoing operative fixation for either Tillaux or triplane ankle fractures with minimum 1-year follow-up. Data collected included age, gender, body mass index (BMI), diagnosis, time to surgery, operative technique, initial displacement, residual gap, and/or any radiographics signs of growth disturbance.

Results: A total of 68 patients met inclusion criteria and were included for analysis. The OPEN group consisted of 52 patients, while the PERC group consisted of 16 patients. There were no significant differences in age, gender, BMI, or diagnosis between the two cohorts. While results exhibited a significantly higher initial displacement in the OPEN group (4.4 ± 2.2mm vs 2.7 ± 1.9mm, $P = 0.01$), there was no significant difference in residual gap at final follow-up. Furthermore, at final radiographic follow-up, there were no significant differences in the presence of growth arrest.

Conclusion: Despite a significantly higher initial displacement in the OPEN group, a seemingly higher-energy injury did not yield any significant differences in residual gap or growth disturbances at final follow-up. In this multicenter study, both techniques yielded desired results; however, prospective, controlled comparisons are required to truly delineate a difference.