

Allgöwer-Donati Versus Vertical Mattress Suture Technique Impact on Perfusion in Ankle Fracture Surgery: A Randomized Clinical Trial Using Intraoperative Angiography

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Purpose: The purpose of this study was to evaluate which primary wound closure technique for ankle fractures affords the most robust perfusion as measured by laser-assisted indocyanine green angiography (LA-ICGA): Allgöwer-Donati or vertical mattress.

Methods: This prospective, randomized study was conducted at a Level I academic trauma center. 30 patients undergoing open reduction and internal fixation (ORIF) for ankle fractures were prospectively randomized to Allgöwer-Donati (n = 15) or vertical mattress (n = 15) closure. Demographics were similar for both cohorts with respect to age, sex, body mass index, surgical timing and AO/OTA fracture classification. The main outcome measurement was skin perfusion, quantified in fluorescence units with LA-ICGA along the lateral incision as well as anterior and posterior to the incision at 30 separate locations. Minimum follow-up was 3 months (mean 4.7 months).

Results: Allgöwer-Donati enabled superior perfusion compared to the vertical mattress suture technique. Mean incision perfusion for Allgöwer-Donati was 51 (SD = 13) and for vertical mattress was 28 (SD = 10; $P < 0.0001$). Mean perfusion impairment was less in the Allgöwer-Donati cohort (12.8, SD = 9) compared to the vertical mattress cohort (23.4, SD = 14; $P = 0.03$). One patient in each cohort experienced a wound complication.

Conclusion: The Allgöwer-Donati suture technique offers improved incision perfusion compared to vertical mattress closure following ORIF of ankle fractures. Theoretically this may enhance soft-tissue healing and decrease the risk of wound complications. Surgeons may take this into consideration when deciding closure techniques for ankle fractures.