

Is It Safe to Elevate Flaps for Secondary Bone Grafting After Open Tibia Fractures?

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Purpose: Severe open tibia fractures that require flaps often require subsequent bone grafting for bone gaps or to treat nonunion. Surgeons are typically faced with a choice of elevating the flap or using a fresh surgical approach to access the tibia. Little is known regarding the complications associated with these two surgical tactics. We hypothesized that bone grafting with a flap elevation approach would have significantly more surgical wound complications than a control group of bone grafting with flap-sparing alternate approaches.

Methods: This retrospective cohort study was performed at a Level I trauma center. We included all adult patients with open tibia fractures treated with rotational or free tissue transfers followed by tibia bone grafting between 2006 and 2020. Our primary outcome was postoperative wound dehiscence requiring additional surgery. Secondary outcomes included deep wound infection and amputation after bone grafting. We compared complications proportion with a mixed-effects regression model to account for repeat operations among some patients.

Results: There were 124 study patients (mean age, 40 years; 82% male) who underwent 150 bone grafts. There were no differences between the 2 groups in fracture types or demographics. 58% of the flaps were rotational, and 40% were free flaps. 71 bone grafts (47.7%) were performed with flap elevation, and 78 bone grafts in the control group (52.3%) underwent a flap-sparing alternate approach for the procedure. In only 1 case (1 of 71, 1.4%) did a patient who underwent flap elevation for bone grafting have a postoperative wound dehiscence requiring reoperation. Similarly, there were no cases of surgical dehiscence (0 of 78, 0.0%) in the control group (adjusted risk difference [RD], 0.7%, 95% confidence interval [CI]: -0.3% to 1.8%, $P = 0.14$). Overall, there were also no clinically or statistically significant differences in deep wound infection (flap elevation: 24%, control: 15%, adjusted RD, 3.3%, 95% CI: -2.1 % to 8.7%, $P = 0.23$) or amputation (flap elevation: 6%, control: 3%, adjusted RD, 2.0%, 95% CI: -1.6% to 5.6%, $P = 0.26$) after adjusting for confounders.

Conclusion: We found no evidence that flap elevation during a subsequent bone graft treatment in open tibia fracture patients was associated with elevated risk of a surgical wound dehiscence or other type of complication compared to a control group that did not have flap elevation for the bone graft. As limb salvage efforts for severe open tibia often involve secondary procedures after soft-tissue coverage, surgeons should be aware that tibial flaps can typically be elevated for such procedures when indicated without fear of adverse consequences to the flap.