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Algorithm of Surgical Treatment of Critical Bone Defects in Combat Trauma of Limbs

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Purpose: The aim of the work is to improve the results of treatment of patients with critical bone defects by substantiating and implementing a patient-oriented technology of surgical treatment.

Methods: The results of treatment of 131 patients with bone defects were analyzed: from 5 to 10 cm in 89 victims, 10.1 cm and more in 42 patients, mean age 35 years (range, 23-56). According to the localization, the defect of the humerus was in 24 cases, the forearm 21, the femur 36, and the tibia 50. All wounded were treated in 3 stages. Stage 1 included debridement, fixation of bone fragments by external fixation. At the second stage, the soft-tissue defect is closed and the spacer is installed (n = 56). The third stage is the final bone reconstruction, namely: the Masquelet technique (n = 65), bone transport (n = 52), free fibular vascularized autograft (n = 2), and the use of scaffolds based on additive technologies (n = 12). The criterion for the Masquelet technique was a bone defect of 5 to 10 cm. Individual scaffolds, bone transport, and free vascularized autograft were used for defects of 5 cm or more.

Results: The median follow-up period was 15.8 months (range, 12-18). The mean length of the bone defect was 8.7 cm (range, 5-18 cm). Joint contractures were detected in 67% of cases and predominantly after bone transport. The development of infectious complications was observed in patients who used scaffolds 8%, the Masquelet technique 9.5%, and bone transport in 4.8%, which in 4.5% of patients required amputation above the level of bone defect.

Conclusion: Treatment of critical bone defects in combat trauma is difficult and requires timely differentiated and staged treatment.