

Tibial Defect Reconstruction with Fibula Composite Flap: New Surgical Technique – Dorsal Osteosynthesis Approach

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Introduction. Lower leg posttraumatic complications such as osteomyelitis and soft tissue defect cause significant disability and impact the quality of life. Tibial reconstruction with fibula flap using classical anteromedial osteosynthesis approach has some limitations and high risk of complications such as partial or total skin paddle necrosis, plate and bone exposure. Dorsal osteosynthesis approach through dorsal and lateral muscle compartments could be used to avoid losing a plate for tibial defect reconstruction.

Material and Methods. Nine patients underwent dorsal osteosynthesis approach for tibial defect reconstruction with free or pedicled fibula flaps in the Microsurgery centre of Latvia between 2010 and 2015. In all cases etiology was soft tissue infection and osteomyelitis with bone defect after high energy trauma. Eight patients were males and one patient was a female with mean age of 41.3 (24–57). Four patients had free contralateral osteocutaneous fibula flaps, including 3 double-barrel fibula flaps. Three patients had ipsilateral pedicled osteocutaneous fibula flaps. Two patients had ipsilateral pedicled osteomuscular fibula flap. Seven patients responded to the study. Mean follow up time for 5 patients was 2 years and 8 months, for 2 patients it was less than 1 year. Patient's functionality was observed by *Lower Extremity Functional Scale* score. X-rays, sensation, range of motion, leg length and MRC scale were evaluated.

Results. All flaps survived. Five out of 7 soft tissue defects were healed by secondary intention. No one has had recurrence of the infection so far. X-ray showed acceptable fibula hypertrophy. Only 1 patient had broken plate without bone fracture. Mean LEFS score was 51.75 points (43–65) or 65.7% (53–82%) from maximal function. Six patients had normal ankles ROM (mean 20–0–50), but 1 had decreased (10–0–35). Six patients had normal knee ROM (mean 7–0–125), but 1 decreased (0–0–75). No one had abnormal sensation. MRC scale was M5 for all the patients. Mean limb length difference for 6 patients was 1 cm, for 1 patient – 3 cm.

Conclusion. Dorsal osteosynthesis approach is more prior in cases when there is expected a large soft tissue defect which increases the risk of skin paddle necrosis. Advantages of this method are incision throughout healthy not compromised tissue, free access for anastomosis, contralateral fibula flap can either be harvested from dorsal side, pedicled fibula flap can be harvested through the same incision, operation time does not increase and in cases of partial tissue necrosis it can be left for secondary healing. It is a safe and effective method to achieve good coverage of bone graft and plate for the patients with lower leg soft tissue and tibial defect.