

Exposure of osteosynthesis material for knee arthrodesis and rotation of the gastrocnemius muscle flap. A case report

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Case Report

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Background: Introduction: Coverage of complex defects in the knee and proximal third of the leg is a reconstructive challenge, especially when there is exposed bone or fixation material. The gastrocnemius muscle flap has established itself as a reliable technique due to its robust vascularity and wide rotation range. The anatomy, surgical technique, and clinical application of the gastrocnemius flap are reviewed, with emphasis on coverage of exposed fixation material. Considerations on its use versus other reconstructive alternatives are included.

Results: Rotation of the gastrocnemius muscle flap provides stable coverage, reduces infection rates, and favors the preservation of orthopedic implants. Its technical simplicity, shorter surgical time, and reliability make it superior to free flaps in selected scenarios.

Conclusion: The gastrocnemius flap is an essential tool in reconstructive surgery of the lower extremity. Its application in cases of exposed osteosynthesis material guarantees vascular coverage and satisfactory functional results, with a low complication rate.

Keywords: Gastrocnemius flap, Osteosynthesis exposure, Reconstructive surgery

Reconstruction of defects in the knee and proximal third of the leg is a frequent challenge in plastic and reconstructive surgery. Exposure of bone, joint, or osteosynthesis material increases the risk of infection and failure of the orthopedic procedure if adequate coverage is not provided [1,2]. In this context, the gastrocnemius flap represents one of the most widely used options due to its anatomical proximity, vascular reliability, and ability to provide well-perfused tissue to protect critical structures [3].

The medial gastrocnemius muscle, supplied by branches of the popliteal and sural arteries, is the most commonly used in reconstruction due to its larger volume and range of rotation [4]. The technique consists of a longitudinal incision in the posteromedial aspect of the leg, identification of the muscle belly, careful dissection of its pedicle, and distal release to allow rotation toward the recipient site [5]. Once placed over the defect, coverage is ensured with a skin graft or direct closure, as appropriate [6].

The gastrocnemius flap has demonstrated success rates exceeding 90% in covering complex defects in the knee and proximal leg [7]. In settings with exposed osteosynthesis material, its vascular supply reduces the incidence of infection and allows for implant preservation, avoiding more invasive procedures such as early material removal [8]. Compared to free flaps, the gastrocnemius flap offers

advantages in technical simplicity, shorter surgical time, and a low complication rate, although it is limited in its coverage of distal defects [9,10].

Case report

We present the case of an 80-year-old female patient with a significant history of knee arthrodesis on the left lower extremity with exposed osteosynthesis material for 1 year. (Figure 1) Cultures were negative for soft tissue infection. A protocol for reconstruction with a muscle flap using the gastrocnemius muscle was established. A medial dissection was performed on the left leg, (Figure 2) the subfascial plane was separated, and the flap was constructed, respecting the medial sural artery during its dissection to lift and rotate it toward the knee defect. (Figure 3) It is closed in layers and a partial thickness graft is placed to cover the flap. (Figure 4)

Discussion

Exposure of osteosynthesis material poses a clinical challenge due to the risk of bacterial colonization and reconstructive failure. The use of muscle flaps such as the gastrocnemius provides a vascularized bed that not only covers the implant but also contributes to bacterial eradication and healing of the surgical site [6,8]. Compared with microvascular



Figure 1. Osteosynthesis material defect in left knee arthrodesis with a diameter of 3 cm.

free flaps, the gastrocnemius flap offers similar results in proximal defects, but with less complexity and operative morbidity [7]. However, in larger or distal defects, free flaps are still necessary.

Conclusion

The gastrocnemius muscle flap is the technique of choice for covering proximal knee and leg defects, especially in cases with exposed osteosynthesis material. Its reliability, low complication rate, and ability to preserve implants make it a highly valuable procedure in contemporary reconstructive surgery.



Figure 2. Dissection by planes to locate the medial gastrocnemius muscle and respect its medial sural artery.



Figure 3. Rotation and lifting of a flap to cover a defect at the knee level



Figure 4. Exposed material with adequate rotation is closed in layers and a partial thickness skin graft is placed.

Conflicts of interest

The authors have no conflicts of interests.

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