

*Research Article***Peroneous brevis muscle flap for reconstruction of defects around the ankle: Clinical evaluation****Ahmed M. Mohamed, Khaled M. Hassan, and Mostafa S. Mohamed Bakr**

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Abstracts

Introduction: Soft tissue defects of the distal lower extremity are notoriously difficult wounds to treat. This area of the leg has a thin integument, relatively superficial tendons and a Soft tissue defects of the distal lower extremity are notoriously difficult wounds to paucity of soft tissue. **Aim of the Work: The aim of this study was to;** Clinically evaluate the role of peroneous brevis muscle flap for coverage of defects (post traumatic, post burn) around the ankle. **Patients and Methods: Study Design:** This is a prospective non randomized clinical study. The study was conducted in the plastic surgery department Minia university hospital in the period from January to October 2018. It included 20 patients presented with defect around the ankle. We had approval of the ethics committee of faculty of medicine Minia university. **Results:** This clinical study includes reconstruction of defects around the ankle by peroneous brevis muscle flap in 20 patients admitted at Minia university hospital from January to October 2018. **Conclusion:** We conclude that, the peroneus brevis muscle flap is an option in this situation because of its adjacent location, reliability, and the relative simplicity of technique.

Keywords: Peroneous brevis, defects around the ankle**Introduction**

Soft tissue defects of the distal lower extremity are notoriously difficult wounds to treat. This area of the leg has a thin integument, relatively superficial tendons and a Soft tissue defects of the distal lower extremity are notoriously difficult wounds to paucity of soft tissue. For these reasons, injuries often expose vital structures and leave the plastic surgeon with a difficult decision regarding appropriate wound management. Over the last several decades, microsurgical free-flap techniques looked to supplant pedicled muscle flaps for coverage of foot and ankle defects. However, other studies indicate that local flap options have seen resurgence in popularity, concurrent with a better understanding of lower leg vascular anatomy and improved wound care technology. Pedicled flaps afford the surgeon a reliable and relatively straight forward reconstructive option for patients with osteomyelitis or those who may not tolerate a larger operation. The usefulness of a muscle flap to cover exposed tendon and bone is not only from its ability to physically cover the defect, but also from its ability to introduce a new vascular bed to potentiate wound healing. Once the surgeon becomes comfortable in performing the

anatomic dissection, harvesting and in setting, the pedicled muscle flap can be performed rapidly and with a high success rate.⁽¹⁾

The goals of reconstructive surgery include safety as well as restoration of form and function.⁽²⁾

The donor site must also be considered when planning a reconstruction. Repair of a defect in one region by creating an equally problematic defect in the donor site is not a satisfactory trade-off. Anatomic knowledge of the vascular territory of the donor muscle based on either dominant or segmental supply help to define which portion of the muscle can successfully be transferred or survive regional mobilization. Limitations of fascial harvest and muscle dissection can offer a functional benefit to certain donor regions and should be taken into account when designing the reconstruction.⁽³⁾

Aim of the Work**The aim of this study was to;**

Clinically evaluate the role of peroneous brevis muscle flap for coverage of defects (post traumatic, post burn) around the ankle.

Patients and Methods

Study Design:

This is a prospective non randomized clinical study .

The study was conducted in the plastic surgery department Minia university hospital in the period from January to October 2018. It included 20 patients presented with defect around the ankle. We had approval of the ethics committee of faculty of medicine Minia university.

Patients in our study comprised (16) males and (4) females aged between (10) and (55) years. All the patients presented with defects (pos traumatic, post burn) around the ankle, (4) cases with defect in the lateral ankle, (8) cases with defect in the medial aspect, (4) cases with defect on anterior aspect, (4) cases with defect over Achilles tendon.

All patients were counselled and signed an informed consent to share in the study.

Inclusion criteria:

- All ages were included.
- Both sex.
- Defects (2-7cm).
- Acute and chronic defects.

Exclusion criteria:

- Patients with history of hematological disorders.
- Chronic use of corticosteroid.
- Larger defects around the ankle.
- Scarred tissue at the pedicle.
- Distant defects.
- Chronic heavy smoker.

Results

This clinical study includes reconstruction of defects around the ankle by peroneous brevis muscle flap in 20 patients admitted at Minia university hospital from January to October 2018. (16) Cases of them were males (80%), while (4) cases were females (20%).

Demographic and clinical Data of the study are shown in table 1.:

Table 1: Show age, sex, co morbidities, smoking and type of Etiology of raw area.

Patient Number	Age /year	sex	Co morbidities	smoking	Etiology of raw area
1	20	Male	-	Yes	trauma
2	25	Male	-	Yes	Trauma
3	55	Male	Diabetic	Yes	Exposed metals
4	10	Male	-	No	Trauma
5	17	Male	-	No	Post burn raw area
6	50	Female	Diabetic	No	Post burn raw area
7	23	Male	-	No	Trauma
8	30	Male	-	No	Trauma
9	45	Male	diabetic	Yes	Exposed metals
10	40	Male	-	Yes	Trauma
11	42	Male	Diabetic	Yes	Trauma
12	50	Female	-	No	Trauma
13	45	female	-	No	Post burn raw area
14	40	female	-	No	Post burn raw area
15	12	Male	-	No	Trauma
16	13	Male	-	No	Trauma
17	11	Male	-	No	Trauma
18	19	Male	-	No	Post burn raw area
19	16	Male	-	No	Trauma
20	17	Male	-	No	Trauma

Discussion

Because of the delicate soft tissue coverage of the ankle and lower third of the leg, tissue defects in this area usually require coverage by flaps.⁽⁴⁾

Complex soft tissue defects of the lower extremity, especially around the ankle and foot, represent difficult reconstructive problems due to exposure of bone, joint, or tendons. Clinically, several reconstructive procedures have been selected to repair soft tissue defects in these regions, including local cutaneous flaps pedicled fascial or fasciocutaneous flaps, pedicled muscle flaps, and microsurgical flaps. However, the applicability of local and pedicled flaps is limited due to their limited reach and reduced amount of soft tissue that can be transported.⁽⁵⁾

Common local proximally based muscle Transpositional flaps have difficulty reaching the heel and the ankle region.⁽⁶⁾

Use of the proximally based peroneus brevis as a pedicled muscle flap was first described by Pers and Medgyesi in 1973. In 2001, Eren et al., described the use of the distally based peroneus brevis flap for reconstruction around the ankle. This muscle flap is easily raised, whether pedicled proximally or distally.⁽⁷⁾

The distally based peroneus brevis muscle flap represents a local and simple method of covering soft tissue defects in the region of the distal leg.⁽⁸⁾

Yang et al., (2005) reported the peroneus brevis muscle flap has been employed for many years as a type II muscle flap according to the classification of Mathes and Nahai for converge of defects in distal third of the leg. This flap allowed for free rotation of the distal portion without transaction of the major pedicle. In 1998, Taylor reclassified the peroneus brevis flap as a type IV muscle flap because of the numerous vascular pedicles. Eren successfully used the peroneus brevis muscle flap with a distally pedicled base and suggested that key to success was preservation of the distal pedicle in the region 3-finger breadths proximal to the tip of the fibula. Eren et al concluded that the blood supply of the distally pedicled peroneus brevis muscle flap received retrograde perfusion from the posterior tibial artery .In addition, the

distally pedicled peroneus brevis muscle flap receives ante grade perfusion from the peroneal artery, whether the posterior tibial artery contribution is present or absent.

Conclusion

We conclude that, the peroneus brevis muscle flap is an option in this situation because of its adjacent location, reliability, and the relative simplicity of technique.

This surgical technique is relatively easy, safe, and suitable for reconstruction of soft-tissue defects in a single stage.

The overall success of the flap was reasonable. The cosmetic result was accepted and no functional impairment of the affected extremity occurs due to flap harvest. Function of foot eversion and plantar flexion as well as ankle functionality are maintained due to preservation of the peroneus longus muscle.

Another strong point favoring the peroneus brevis flap is the low donor site morbidity.

The possibly poorly vascularized tip of the flap should be revised.

The presence of diabetes was not a limiting factor for using the flap.

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