



## Case Report ●●●●

# Versatility of the anterolateral thigh flap in oncology reconstructions: Case reports of the reconstructive plastic surgery and microsurgery procedures in Erasto Gaertner Hospital

*A versatilidade do retalho anterolateral da coxa em reconstruções oncológicas: série de casos do serviço de cirurgia plástica reconstrutora e microcirurgia do hospital Erasto Gaertner*

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### ■ ABSTRACT

**Introduction:** The anterolateral thigh (ALT) flap first described in 1984 is based on perforator vessels of the lateral femoral circumflex artery. It is a cutaneous flap located in the middle third of the anterior thigh and lateral to the rectus femoris and vastus lateralis. The low morbidity related to the donor site and its usefulness for different dimensions make it a versatile flap. **Method:** This study aimed to present the versatility of the ALT flap in plastic and reconstructive surgeries at the Erasto Gaertner Hospital through a report of three cases. **Cases:** We describe three cases in which the ALT flap was used for the head and neck, and right hemithorax reconstructions.

**Keywords:** Anterolateral Thigh Flap; Microsurgery; Versatility of the Flap.

### ■ RESUMO

**Introdução:** Retalho anterolateral da coxa (ALT) foi descrito em 1984, baseado nos vasos perfurantes da artéria circunflexa femoral lateral. Trata-se de um retalho cutâneo, localizado no terço médio da coxa anterior, e lateral aos músculos reto femoral e vasto lateral. A baixa morbidade, relacionada à área doadora, e a possibilidade de utilizá-lo com diversas dimensões o tornam um retalho muito versátil. **Método:** Apresentar sua versatilidade no serviço de Cirurgia Plástica Reconstrutora e Microcirurgia, do Hospital Erasto Gaertner, através do relato de três casos. **Casos:** Foram descritos dois casos com utilização do retalho ALT para reconstrução de cabeça e pescoço, e um caso com reconstrução do hemitórax direito.

**Descritores:** Retalho anterolateral da coxa; Microcirurgia; Versatilidade do retalho.

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## INTRODUCTION

Plastic surgery has greatly advanced in terms of the use of the microsurgical flap, often in cases of defects and complex deformities for the covering of articular surfaces, vessels, tendons, and bones with the periosteum removed, with the objective of restoring function and shape<sup>1</sup>.

For this purpose, these flaps must be adapted in their dimension and composition. They can be simple or compound flaps, transferred at one time from one part of the body to another, and modified for a specific defect. It is important to highlight that the anterolateral thigh (ALT) flap became popular in the recent years for its advantages that include long and large pedicles, reduced thickness, cutaneous sensitivity, possibility of flow through or chimerical construction, three-dimensional covering and filling of the cavities (due to its malleability), and minimum morbidity of the donor area<sup>1</sup>.

The ALT flap, initially described by Song et al in 1984, was based on the perforations of the lateral femoral circumflex artery. It consists of a fasciocutaneous flap located in the middle third of the anterior thigh and lateral to the rectus femoris and vastus lateralis. Its measures may reach 20 x 40cm; however, traditionally, flaps with smaller dimensions, which are safer, are used<sup>2</sup>.

Considering the great importance of the use of ALT flaps, this study aimed to show their versatility by reporting three cases selected at the plastic and reconstructive surgery, and microsurgery departments of Erasto Gaertner Hospital (Curitiba, Paraná), which is the national reference center for the treatment of cancer.

## CASES

### Case 1

A 58-year-old female patient underwent mastectomy for adenocarcinoma. She presented with a recurrent tumor invading the thoracic wall. Metastatic tumor resection resulted in deformity of the thoracic wall. Reconstruction of the left hemithorax was performed using an ALT microsurgical flap. The flap showed good postoperative viability (Figure 1A and B; Figure 2A and B).



**Figure 1**(A) – Right thigh anterolateral flap lifted. (B) – Panoramic view of the donor area.



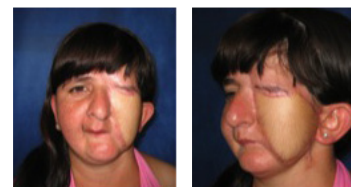
**Figure 2**(A) – Receptor area after tumor removal. (B) – Immediate postoperative thoracic reconstruction.

### Case 2

A 34-year-old female patient underwent maxillectomy and orbital exenteration of invasive contralateral breast cancer (CBC). The left hemiface was reconstructed with an ALT flap (Figure 3A–C; Figure 4A and B).



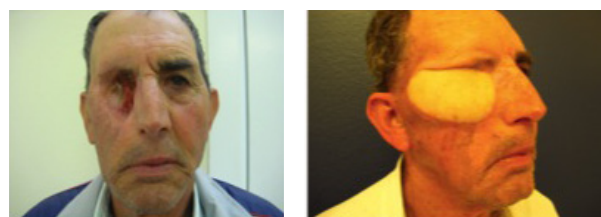
**Figure 3**(A) – Coronal computed tomographic scan demonstrating the absence of the orbital floor and side wall of the orbit and jaw. (B) – Frontal view of the patient after exenteration of the left orbit. (C) – Profile picture.



**Figure 4**(A) – Oblique view of the patient after reconstruction with the anterolateral thigh flap. (B) – Front view.

### Case 3

A 52-year-old male patient underwent orbital exenteration of invasive CBC with reconstruction using an ALT flap (Figure 5A and B).



**Figure 5**(A) – Frontal view of the patient after exenteration of the right orbit. (B) – Oblique image after reconstruction with an anterolateral thigh flap.

## DISCUSSION

The ALT flap is versatile, as it can be modified to suit the receptor area. It is considered an ideal flap owing to the following factors: long pedicle, vessels with good diameter, availability of several types of cutaneous tissue or muscles with the same pedicle, great extension of the skin, and low morbidity of the donor area<sup>3</sup>.

These characteristics of the flap allow successful thoracic reconstructions because it is a larger flap and has the advantage of being fasciocutaneous without causing functional damage to the donor area.

The location of the donor area and possibility of lifting the flap in the supine position allow two teams to work simultaneously in the reconstruction of the head, neck, and upper limbs, reducing the total surgery time, and physical and mental fatigue of the team. In reconstruction of the legs, it allows surgical manipulations to be restricted to only one lower limb with regional anesthesia<sup>4</sup>.

The cases described demonstrate satisfactory functional and esthetic results with the use of the ALT flap for head and neck reconstruction surgeries, besides the high resolution in the treatment of oral and nasal fistulas after maxillary removal. It also results in lower morbidity of the donor area compared to the radial anterobrachial flap. ("Chinese").

The descending branch of the femoral circumflex artery is primarily responsible for the arterial irrigation of the ALT area. The system of this vessel is formed by the femoral circumflex artery itself, its ascending, transverse, and descending branches, and perforating cutaneous, muscular, facial, and bone tissue branches<sup>5</sup>.

This rich vascular system allows creation of flaps with the following tissues: skin from the anterolateral and anteromedial thigh region, and lateral vastus, femoral rectus, sartorius, fascia lata tensor, and iliac crest muscles, totaling 120 different combinations<sup>6</sup>.

The flap under discussion can also be transferred in the form of a fascial or adipofascial flap, and a cutaneous flap with the graft of the vascularized femoral nerve for the simultaneous reconstruction of skin and peripheral nerve<sup>7</sup>.

In an experience with 8,500 microsurgical flaps, Chen and Tang (2003), from the Chang Gung Memorial Hospital in Taiwan, affirmed that the ALT flap replaces other flaps. Among 1,500 ALT flaps, in only 12% of the patients the path of the perforating vessels was septocutaneous, while in the other 88%, the path of the vessels was musculocutaneous. The peduncle, in turn, varied from 8 to 20 cm. The anatomy was relatively constant, allowing easy and safe dissection. Only 2–3% of the dissections were considered difficult due to the absence of perforating vessels or a perforator artery that did not accompany the vein<sup>8</sup>.

More recently, in his doctorate thesis, Ishida (2006) studied 100 thighs of 50 fresh cadavers. He found 0–4 perforator arteries per thigh, all in an area of 6 cm from the midpoint between the anterosuperior iliac spine and the upper lateral edge of the patella. The perforating vessels had a musculocutaneous path in 75.76% and septocutaneous in 24.24%. The pedicle presented a mean length of  $11.31 \pm 3.12$  cm. The arterial diameter was  $2.21 \pm 0.85$  mm, and the diameters of the veins from the same area were  $2.66 \pm 1.33$  mm and  $2.1 \pm 1.11$  mm. Finally, he highlighted that the mean subcutaneous thicknesses of the skin were  $8.98 \pm 6.25$  mm and  $1.6 \pm 0.76$  mm.<sup>1</sup>

## CONCLUSION

The ALT flap can be lifted safely, independent of whether the path of the perforating vessels is septocutaneous or musculocutaneous. It has an ideal donor area due to the characteristics of its vascular anatomy mentioned earlier, such as easy lifting and great versatility. Thus, the ALT flap represents one of the most useful free flaps available<sup>9</sup>.

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