

# Cutaneous triangular excision with primary closure

## Excisão triangular cutânea com fechamento primário

### RESUMO

**Introdução:** Tumores cutâneos são frequentes e podem apresentar crescimento irregular, cujas ressecções resultam em figuras geométricas variadas.

**Objetivo:** Descrição de técnica de excisão em triângulo seguida de fechamento primário para tratamento de neoplasias cutâneas.

**Métodos:** Foram estudados 11 pacientes com tumores de pele medindo entre 1,8 e 5,7cm em regiões anatômicas que favoreceram a utilização de incisões no formato de triângulo equilátero seguidas de fechamento primário.

**Resultados:** Todos os casos tiveram seus defeitos cirúrgicos fechados com a formação de cicatriz em formato de Y. No pós-operatório foram observados dois casos de deiscência parcial da sutura.

**Conclusões:** A técnica cirúrgica de fechamento primário de excisão triangular de pele apresenta bom resultado estético e bom controle de margens cirúrgicas conservando tecido adjacente.

**Palavras-chave:** oncologia; procedimentos cirúrgicos ambulatoriais; neoplasias cutâneas.

### ABSTRACT

**Introdução:** Skin tumors are common and may present irregular growth, requiring resections with diverse geometric shapes. Many descriptions have been reported.

**Objective:** To describe a triangle-shaped excision technique followed by primary closure in the treatment of skin cancer.

**Methods:** Patients (n = 11) with tumors of between 1.8 and 5.7 cm located in areas that favored the use of equilateral triangle-shaped incision and primary closure were studied.

**Results:** All patients had their surgical closure in the shape of a "Y." Two cases of partial dehiscence of the suture were observed in the post-operative period.

**Conclusions:** The surgical technique of primary closure of triangular excisions of skin allows effective control of the surgical margins and leads to good cosmetic results, preserving the surrounding tissue.

**Keywords:** medical oncology; ambulatory surgical procedures; skin neoplasms.

### INTRODUCTION AND OBJECTIVES

Cutaneous tumors can occur in different shapes and on different areas of the body. Particularly in photoexposed areas, depending on the proximity of important structures, the traditional circular and elliptical shapes used in excisions can compromise the closure of the surgical wound or cause unattractive scars. The removing of the tumor using different geometric shapes can treat these neoplasias with acceptable aesthetic results.<sup>1</sup> The closure of the resulting defects can be carried out in several ways: with flaps, grafts, partial closure combined with healing by second intention, primary closure, or a combination of these techniques.

This study describes the technique of triangular resection of cutaneous tumors with primary closure of the resulting defect, discussing its clinical and surgical applicability, and methods for histological evaluation.

## Original Article

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## METHODS

A prospective study evaluating the applicability of the triangular excision technique, with primary closure of malignant cutaneous lesions, was carried out in 11 patients (Table 1). The patients were treated and followed up in the Dermatology and Cutaneous Oncology Department of the Hospital de Clínicas of the Universidade Federal do Paraná and at the Centro de Estudos em Dermatologia e Infectologia Souza Araújo (CEDISA) in Curitiba, in the Brazilian State of Paraná. The study complied with the ethical recommendations of the Declaration of Helsinki 2000.

### Description of the surgical technique

After the pre-operative delimitation of the lesion to be treated, the appropriate margins should be defined and marked around the tumor. At this point it is important to observe the best locations for the vertex and the basis of the triangle, taking into account the sites of highest and lowest tensions, the amount of adjacent tissue, and the anatomical structures in the treated area. Three straight lines should be drawn to link these points, forming the vertices of the triangle (Figure 1). Although the defect's final shape will depend on the lesion and the configuration of local structures, it should ideally resemble an equilateral triangle.

The incisions must be carried out with a scalpel along the three marked lines. After the tumor exeresis with the appropriate spreads (Figure 2), the closure can involve grafts or flap rota-

tions, when clearly indicated. The closure must begin in the central portion of one side of the triangle. After transfixing the skin, the needle will exit in the subcutaneous cellular tissue (SCT) of the perforated wall. The needle must then enter the SCT and exit through the skin of the second border of the triangle. In the third border, the needle first perforates the epidermis, advancing in the direction of the subcutaneous. The needle can transfix the first border for a second time in order to facilitate the closure. Next, the lateral walls are approximated, forming a central point (Figure 3). When suturing opposite borders, it is important to ensure that the needle always penetrates the wound at the same level it exited in the previous movement. When approximating the borders, the tension must be kept constant to avoid the loosening of the central knot, which provides the support for the wound (Figure 4). This stitch is the main factor responsible for keeping the operative wound closed and should thus be carefully carried out. The remaining part of the wound is sutured using simple or vertical mattress stitches. The correct surgical technique will allow adequate coaptation of the lateral walls, with the incision's final format in the shape of a "Y" (Figure 5).

Triangular skin specimens must receive a differentiated treatment when analyzed from a macroscopic point of view in order to ensure the appropriate microscopic evaluation of the surgical margins of resection. Due to their shape, the handling of the surgical margins is slightly different from that usually used in the elliptical exeresis. It is not possible to prepare the "tips"

Table 1: Patient data

Patient	Gender	Age	Lesion site	Anatomopathological diagnosis	Surgical margins	Intercurrences
1	F	76	Right malar	Solid, expansive basocellular carcinoma with invasion of the middle dermis	Free margins	None
2	M	56	Left malar	Solid, expansive basocellular carcinoma, with invasion up to the dermis	Free margins	None
3	M	36	Left infraclavicular	Solid-cordon, infiltrative basocellular carcinoma, extending up to the deep dermis' inferior portion	Free margins	Local infection and suture dehiscence
4	M	50	Right hand	Solid-cystic, expansive basocellular carcinoma, extending up to the deep dermis	Free margins	None
5	F	56	Anterior and right thoracic	Ulcerated epidermoid carcinoma <i>in situ</i> (Bowen's disease)	Free margins	None
6	M	85	Left malar	Solid, expansive basocellular carcinoma, extending up to the hypodermis' superior portion	Free margins	None
7	M	63	Right malar	Invasive, well differentiated epidermoid carcinoma	Free margins	None
8	M	83	Pre-sternal	Keratoacanthoma	Free margins	None
9	M	77	Right forearm	Keratoacanthoma	Free margins	None
10	M	67	Posterior cervical	Metatypic, expansive basocellular carcinoma, up to the middle dermis	Free margins	
11	M	71	Right temporal	basocellular carcinoma	Free margins with one narrow margin	None

(distal borders of the specimen's longest axis), with the analysis having been carried out in "modified cross," as can be seen in Figure 6. The pathologist must position the sample in order to favor the surgical margin that is visibly closer to the tumor.

## RESULTS

Triangular excisions were carried out in 11 patients (nine men and two women, aged 36–85, mean 66 years) with cutaneous neoplasias. The neoplasias treated were: 7 basocellular carcinomas, one invasive squamous cell carcinoma, one in situ Bowen's Disease type squamous cell carcinoma, and 2 keratoacanthomas. The areas treated were: face (temporal and malar), upper limbs (forearm and hand), anterior thorax (infra-clavicular and pre-sternal), and neck (Table 1).

The areas removed surgically presented different sizes (from 1.8 x 1.5 x 0.5 cm to 5.7 x 4.5 x 2.0 cm). The resection margins used ranged from 4 to 6 mm. All pieces sent for histological analysis at the Pathological Anatomy Department of the Hospital de Clínicas of the UFPR presented margins that were free from neoplasias.

## THERE WERE NO INTRA-OPERATIVE INTERCURRENCES.

None of the patients developed hematomas or seromas, however two presented dehiscence in the post-operative period (one for precociously removing the sutures and the other one due to infection of the operative wound) (Table 1). In the cases observed, the dehiscence occurred in the central portion – in the location of the main initial suture.

The removal of the sutures varied according to the location of the lesion, taking place in 7 to 21 days, happening earlier in facial lesions and later in places of great mobility. In some patients crusts formed in the location of the central knot, especially in areas subjected to a higher tension. In general, healing happened satisfactorily in the treated patients, even in cases with dehiscence (Figure 7), with only a hypochromic central healing area becoming visible in those two cases.

## DISCUSSION

The pattern of growth of most tumors is centrifugal and relatively spherical from a three-dimensional perspective. Consequently, a circular excision presents minimum reduced loss of healthy tissue. In some situations, nevertheless, tumors –



Figure 1: Marking of the margins and positioning of the vertices



Figure 3: Central knot being performed



Figure 2: Defect resulting from lesion exeresis



Figure 4: Perfect coaptation of lateral regions and defect after central knot has been completed

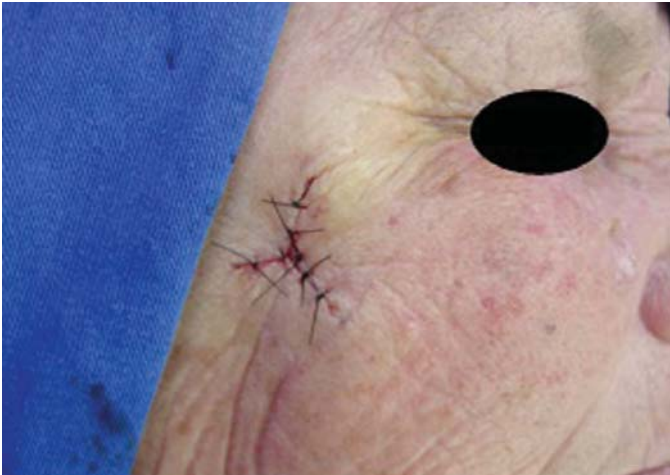


Figure 5: Final shape after sutures



Figure 7: Third post-operative month

especially those with larger dimensions – can have irregular growth, requiring the use of unusual excision techniques. When those neoplasias occur in areas where circular excision is not indicated for primary closure since it would compromise important anatomical structures, other geometric approaches (triangle, star or rectangle shaped) can be used.

Cronin and Cronin Jr.<sup>1,2</sup> described a series of techniques for the excision and closure of irregular wounds, including triangular, star-shaped, trapezoid and irregular defects. The authors suggested that the approximation of angles to considerably decrease the primary defect's size, completing the closure with cutaneous grafts and flaps, and healing by second intention could lead to favourable results.

Triangular excisions are frequently used in several surgical medical specialties: in nipple reduction,<sup>3</sup> corrections of valvar defects,<sup>4,5</sup> ectropion, and pilonidal cysts among others,<sup>6</sup> with or without the closure of the resulting defect. In dermatologic surgery, triangular incisions can be used in the preparation of flaps, correction of “dog ears” and other secondary defects.

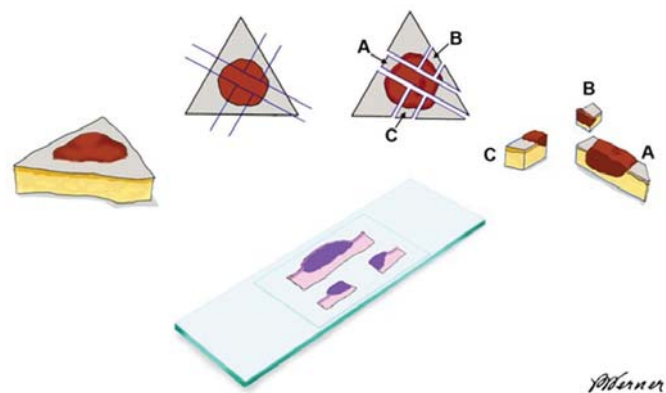


Figure 6: Macroscopic analysis, sampling suggestion, and triangular surgical specimen inclusion for histologic evaluation

Nevertheless, the triangular incision with primary closure of the surgical wound is not frequently used and there is a lack of studies analyzing its applicability in the treatment of cutaneous tumors.

When correctly implemented, this technique allows the complete exeresis of the lesion with free margins and a good aesthetic result. It is particularly useful in some anatomical regions. For instance, in lesions located on the back of the hand, the apex of the triangle can be oriented towards the interdigital spaces and the base aligned with the wrist. The suture must be carried out above the tendons, allowing full mobility of the hand and fingers, and reducing the risk of sequels due to contracture.<sup>7</sup> The neck, pre-sternal and malar regions are appropriate locations for this technique, and achieve satisfactory cosmetic results. On the other hand, areas subject to great tension or with thick and little distensible dermis, such as the dorsum and some periarticular regions, are not appropriate for triangular excisions due to the risk of enlargement of the operative wound. In the authors' opinion, additional studies are necessary to identify the most appropriate areas.

Complications observed were infection and enlargement of the operative wound, probably due to the early removal of sutures. The authors recommend the removal of sutures at between 15 and 21 days after the procedure, given that removal in 7 days was associated with partial dehiscence of the operative wound. Another patient developed infection in the surgical site. In the medical literature, that rate is 1.3%.<sup>8</sup>

## CONCLUSION

Triangular excision is an alternative to circular, elliptical and purse string excisions, and flaps and grafts, for it allows the effective treatment of cutaneous tumors with appropriate margins, preserving the adjacent skin and allowing the adaptation of suture lines according to the areas with greater tension. ●

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