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SURGICAL MANAGEMENT OF SKIN CANCERS OF THE HEAD AND NECK

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Skin cancer is the most common cancer among Caucasians. The most common histological types are basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and melanoma. Head and Neck Surgery (HNS) has its role in the treatment of advanced cases of the most frequent types and in the treatment of rare tumors.¹

BCC

The incidence of BCC is the highest of all malignant tumors. However, it is difficult to quantify, as notification is not mandatory in most countries. It is estimated to have an incidence between 500 and 1000 cases / 100,000 inhabitants, *i.e.* at least 100 times higher than the incidence of oral cancer in the United States.²

There are several treatment modalities with cure rates of the order of 95%. Eighty percent of BCCs are of the head and neck. Curettage, cryotherapy, electrocoagulation, photodynamic therapy and topical chemotherapy can be performed with high success rates, especially in early cases. The most commonly used treatment is conventional surgical excision.³

The small number of cases referred for surgery are advanced, sometimes due to the patient's neglect of the tumour, difficulty in accessing specialised care, and failure of previous treatments. The most common site is the nose, and there are reports of younger mean age for patients treated by head and neck surgery specialists, when compared to those treated by dermatologists.^{1,4}

There are at least 8 histological subtypes of BCC: nodular, superficial, morpheaform (sclerodermiform), metatypical, micronodular, sclerosing, pigmented, and adenoid.

The occurrence of more than one subtype in a single tumour is common. The nodular and superficial subtypes are the most prevalent and the least aggressive, with a lower probability of relapse. The subtypes micronodular, metatypical and morpheaform present more aggressive characteristics and are more likely to relapse.⁵

Clinically, nodular BCC presents as an elevated, nodular lesion, with well-defined borders, a reddish-brown, pearly, shiny colour and with telangiectasis on the borders, sometimes ulcerated. The superficial BCC has the same characteristics without the appearance of a nodule. Much less characteristic, the morpheaform subtype presents as a reddish, brown or even whitish plaque, resembling scleroderma, with a poorly defined border. This characteristic is due to the presence of collagenase at the extremities of the tumours which may present with finger-like extensions, sometimes called pseudopods.⁴ In these cases, the margins of surgical resection are uncertain and should be confirmed by frozen section examination until complete re-section of the lesion. Most of the time the diagnosis is made only after biopsy and the professional can only then plan the surgery.⁶

In cases of locally advanced tumors, there is a need for histopathological confirmation with incisional biopsy by an experienced pathologist, to determine a diagnosis and permit the correct therapeutic planning. The clinical characteristics described above do not always apply to large lesions, since there is often significant tissue destruction and loss of tissue differentiation.⁷

For surgical planning, computed tomography with contrast should be performed in cases where there is suspicion of invasion of deep planes, especially bony, cartilagi-

nous and parotid. In cases of suspected invasion of the skull base, MRI should be requested.⁸

The location of a BCC is important because of the likelihood of recurrence. High risk areas are nose, eyelids, periorbital, periorally, chin, mandibular, preauricular, postauricular, ear and temporal. Factors such as immunosuppression and previous radiotherapy also increase the chance of relapse, as well as the occurrence of scleroderma, metatypic or micronodular subtypes at any point of the tumour.⁹

Almost all of the tumours treated by head and neck surgeons can be classified into the high-risk group. For these lesions, excision with circumferential and deep free margins confirmed by frozen section is recommended. A 1cm margin is desirable, but is not always possible, especially on the face. Elective neck dissection is not indicated. We observed an incidence of less than 1% of cervical metastases, which is therefore a rare occurrence.¹⁰

Radiotherapy may be indicated in surgical cases with compromised margins where reoperation is not an option, major bone resections and invasion of the skull base. There is a good response of BCC to radiotherapy in the rare cases where surgery is not the treatment of choice.¹¹

Inhibitors of the Hedgehog pathway (HH), such as Vismodegib, are oral chemotherapy options for advanced and irresectable cases. Well-tolerated, the medication presents objective results in selected cases, at a high cost.¹²

SCC

SCC is derived from the spinous layer of the epidermis and accounts for 20% of malignant skin tumours. It has a metastatic potential of around 10%. The precursor le-

sion is actinic keratosis. One of the lesions that presents a difficult differential diagnosis is the keratoacanthoma, a benign lesion with fast growth.²

Clinically, cutaneous squamous cell carcinoma may appear as a plaque or a papule. Bowen's disease and Queyrat's erythroplasia are different forms of SCC in situ. The invasive form is firm and often ulcerated. Although most cases referred to the head and neck surgeon already has been diagnosed by biopsy, it is preferable that the biopsy be reviewed or repeated in doubtful cases.

Risk factors for recurrence in SCC are:

- Location in zone "H"
- Immunosuppression
- Previous radiotherapy
- Recurrence in an operated site
- Poorly defined borders
- Rapid growth
- Neurological symptoms
- Little or moderately differentiated
- Acantholytic, adenosquamous, metaplastic or desmoplastic subtypes
- Invasion level corresponding to Clark IV or V or Breslow > 4mm
- Vascular or perineural invasion

Classically, elective neck dissection is not indicated for cutaneous SCC. The search for sentinel lymph nodes in high-risk SCC is not routine and its benefit is questionable. With cervical metastases, neck dissection should be comprehensive; and with parotid metastasis, at least a supraomohyoid neck dissection should be done, in addition to parotidectomy.¹³

Radiotherapy can be used as primary treatment in nonsurgical cases. As adjuvant treatment, it is beneficial in cases of cervical metastasis revealed by neck dissection or parotidectomy, especially if there is extracapsular extension. Other indications are

involved margins and perineural invasion.¹¹

TNM Staging for Nonmelanoma Skin Cancer (2017)

T1	< 2cm
T2	> 2 cm e <4 cm
T3	≥4 cm, deep invasion (> 6mm or beyond subcutaneous), bone erosion or perineural invasion
T4	T4a: Gross invasion of cortical bone or marrow T4b: Invasion of the base of the skull or foramina of the base of the skull
<hr/>	
N1	ipsilateral lymph node <3cm, without extracapsular extension
N2a	ipsilateral lymph node between 3 and 6 cm, without extracapsular extension
N2b	more than 1 lymph node, ipsilateral, <6cm, without extracapsular extension
N2c	Contralateral or bilateral lymph node(s) <6cm, without extracapsular extension
N3	N3a: lymph node ≥ 6 cm, without extracapsular extension N3b: lymph node (s) with extracapsular extension

Surgical treatment of BCC and SCC

Resection of high-risk head and neck tumours should be planned with 10mm circumferential and deep free margins. Often the planning of this type of resection involves exenteration of the orbit, resection of bone, by a multimultidisciplinary team to permit large surgical approaches (*Figure 1*).

Resulting deformity requires a common-sense approach by the surgeon and a frank discussion with the patient.¹⁴ Curative treatment is not always the best option and palliative alternatives should be considered. With surgical planning, involvement of the surgical teams from other specialties such as plastic surgery, neurosurgery and oto-rhinolaryngology is required to optimise surgical outcome and functional rehabilitation (*Figure 2*).

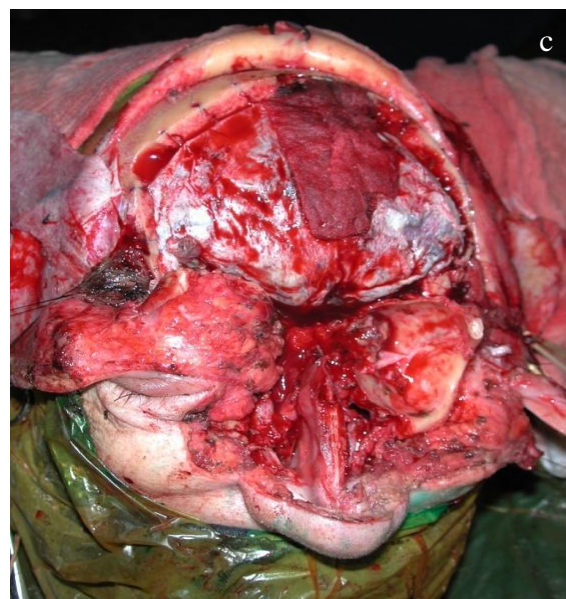
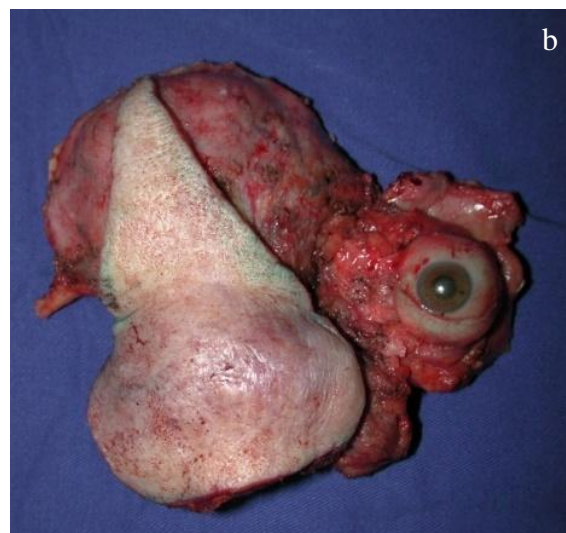




Figure 1 a-e: Recurrent BCC of glabella with invasion of glabella, orbit and skull base



Figure 2 a-c: Patient with SCC of eyelid with orbital and skull base invasion, re-constructed with anterolateral thigh flap

With the patient anaesthetised, the borders of the tumour including the peripheral rim of erythema should be carefully marked. The margin should be drawn with a surgical pen or other marker before infiltration of local anaesthetic. Drawing the specimen and the defect for the pathologist is desirable and assists in describing the margins (*Figure 3*). Infiltration with vasoconstrictor-containing solution can be employed as it reduces the need for electrocoagulation of the margins, contributing to better histopathological analysis. To remove the tumour, a double-bladed scalpel (1mm distance between the blades)¹⁵ may be used, which can be made by attaching a second blade with sterile adhesive tape. This technique allows the removal of margins of skin that can be immediately taken to the pathologist, even prior to removal of the tumour. After removal of the lesion, the deep margin should be assessed, if possible, also with frozen section.



Figure 3 a-c: Retroauricular SCC reconstructed with a [trapezius flap](#)

Melanoma

Melanocytes are cells originating from the neural crest that occupy the epidermis in its basal layer. In part because of their distinct embryological origin, melanomas have very pronounced metastatic potential.

Although it accounts for 4% of skin tumours, melanoma is the most lethal skin tumour. Its prognosis is related to tumour thickness from the granulosa layer to the deepest part of the primary lesion (Breslow index). The higher the Breslow index in millimeters, the greater the chance of lymphatic and distant metastases, especially above 1mm.¹⁶

Clinically, any melanocytic lesion that changes its growth characteristics, changes colour or has pruritus should be suspected. The ABCDE rule exemplifies such characteristics - **A**symmetry, irregular **B**orders, multiple **C**olours, **D**iameter >6mm and **E**volution. The diagnosis of melanoma is made with a biopsy, preferably excisional, or incisional in cases where the resulting defect is unacceptable.

Most of the time the head and neck surgeon receives the diagnosis of melanoma following a prior biopsy. The treatment to be followed depends fundamentally on the Breslow index.¹⁷ It is necessary to resect a margin of macroscopic normal skin around the biopsy scar, according to Breslow index below:

Breslow (mm)	Margin (cm)
In situ	0,5
< 1	1
1-2	1 a 2
2-4	2
>4	2 or greater

Wide excision is the main treatment in patients without metastases. Treatment of the lymphatics depends on sentinel lymph node screening.

Sentinel lymph node biopsy is indicated in all patients with melanoma with a Breslow index above 1 mm without detectable metastases. Cases with Breslow between 0.75mm and 1mm should indicate if there is ulceration or a mitotic index other than zero.

On the day prior to surgery, the patient should have lymphoscintigraphy with technetium. The technetium is injected around the scar and the image obtained locates the first lymph node that drains the region. The nuclear physician then marks the patient's skin overlying the lymph node confirmed by the probe (probe attached to the measuring device). After anesthesia, the patent blue dye is injected (patent blue dye is permeable to lymphatic vessels, unlike methylene blue and other dyes). The recommended volume is 1mL, preferably in insulin syringe, but it is not always possible to inject all the contents, and there is the risk of permanently "tattooing" the skin in regions such as the face. For best results, the injection should be performed intradermally - below this level the drainage is impaired. Leaks from the syringe should be carefully avoided to avoid compromising the procedure.

Close proximity of the lymph node and the primary lesion (rarely with lesions outside the head and neck) may impair the investigation when using the probe. In some cases, margin resection may be necessary prior to sentinel lymph node biopsy. Intraoperative frozen section examination of sentinel lymph nodes is not currently recommended, since it may impair the study of the whole lymph node with hematoxylin-eosin and immunohistochemical study (HMB 45, melan A and protein S100), which is best performed in a block of paraffin.

Classically, the finding of a positive cervical sentinel lymph node is an indication for neck dissection of all 5 levels of the neck. Recently, in a prospective, randomised study, survival proved to be equal between serial ultrasound observation and elective neck dissection in cases with positive sentinel nodes,¹⁸ and continues to be a subject of debate today.¹⁷

With parotid lymph nodes, parotidectomy and supraomohyoid neck dissection should be performed. Much controversy exists about what to do in relation to the facial nerve with intraparotid sentinel lymph nodes - due to the need for reoperation if the node is positive. We perform superficial parotidectomy if nerve dissection is required, which has been shown to be rare - in most cases the lymph nodes are close to the parotid capsule and can be safely biopsied without nerve dissection.

In cases of cervical macrometastases, neck dissection is performed according to the standard procedure for squamous cell carcinoma of mucosa of the head and neck. Preservation of structures not affected by metastases (modified radical cervical dissection) may be performed. Locoregional control is important in melanoma and the presence of distant metastases does not contraindicate neck dissection by itself. Selected cases also benefit from metastasectomy in extra-cervical sites. The behaviour of distant metastases may be aggressive but is not infrequently slow and indolent.¹⁷

After neck dissection for macrometastases, complementary cervical radiotherapy is indicated. This approach is well accepted for extracapsular extension, but some studies have shown better control also for macrometastases.¹⁷

Staging

T	Breslow (mm)	
T1	≤ 1.0	A: 0- 0.8mm without ulceration B: 0.8-1mm or <0.8 with ulceration
T2	1.01-2.0	A – With ulceration B – Without ulceration
T3	2.01-4.0	
T4	> 4.0	

Number of metastatic lymph nodes

	Number of metastatic lymph nodes	Metastatic lymph node mass
N1	1 lymph node	A: micrometastasis * B: macrometastasis† C: metastasis or in transit without metastatic lymph nodes
	0 lymph node	
N2	2-3 lymph nodes	A: micrometastasis* B: macrometastasis† C: metastasis or in transit without metastatic lymph nodes
	1 lymph node	
N3	4 or more	A: positive sentinel lymph nodes B: 4 or more, at least 1 clinically detectable or any number of coalescing lymph nodes C: two or more, with satellite metastasis or associated in transit
	2 or more	

	Local	DHL sérica
M1a	Skin distant, subcutaneous, or lymph node metastasis	
M1b	Pulmonary metastasis	(0) DHL normal
M1c	All other visceral metastases	(1) DHL elevated
M1d	Metastasis to Central Nervous System	

* diagnosed after sentinel lymph node or elective lymphadenectomy

† defined as metastatic lymph node clinically confirmed by therapeutic lymphadenectomy or when lymph node metastasis exhibits gross extracapsular extravasation

Levels of histological invasion (Clark)

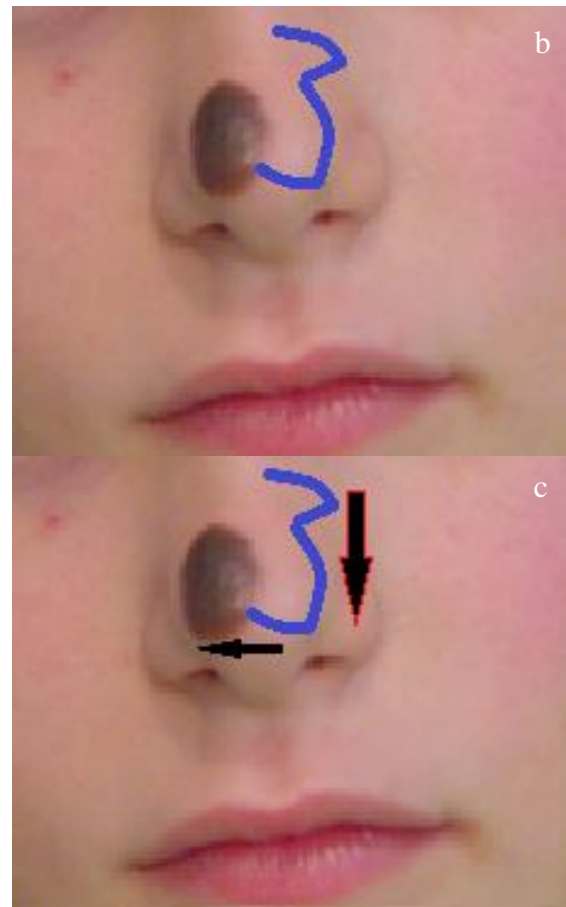
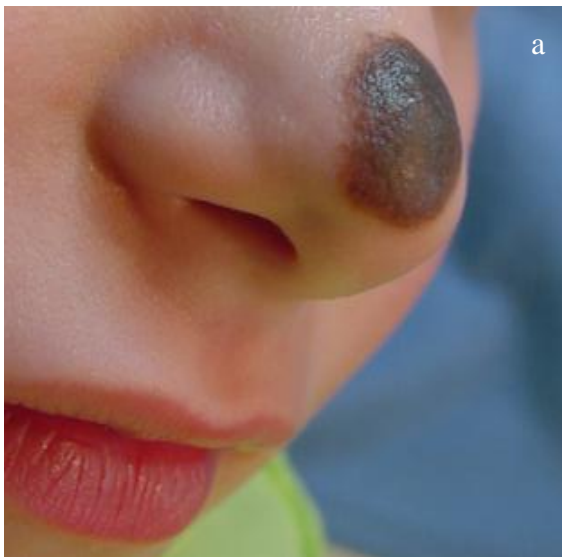
I	<i>in situ</i> . Entire lesion is intraepidermal
II	Beyond basement membrane. Occupies papillary dermis, does not reach the border between papillary and reticular
III	Occupies papillary dermis; reaches border between papillary dermis and reticular, without invading the reticular
IV	Includes reticular dermis
V	invades hypodermis

Clinical stages of melanoma: UICC 2017

Melanomas with Breslow $> 4\text{mm}$ present a $>40\%$ chance of distant metastasis. They are sometimes mistakenly thought to have such a bad outcome that it would not be worthy resecting an additional margin and treating the cervical nodes. Such a practice is unfortunately common and worsens the prognosis. Even in advanced cases, surgical treatment should always be considered, since local control is very important for treatment.

Surgery according to tumor location

The nose is the site of highest incidence of skin tumours on the face. Simple suturing is usually preferred when possible. Nasal tip defects smaller than 1 cm without cartilage invasion can be reconstructed with a bilobed flap from the nose itself (*Figure 4*).



Figures 4 a-d: Patient of 4 years with congenital nevus reconstructed with bilobed flap

One option is the nasal sliding flap, using part of the glabella (*Figure 5*). Small nasal wing defects can be reconstructed with a superior or inferior pedicled nasogenial flap.



Figure 5 a,b: Patient with melanoma of nasal tip, Breslow 1,3mm, reconstructed with nasal flap

Small nasal dorsal defects can be reconstructed with a glabellar flap. With large resections of nasal skin without removal of cartilage, the frontal (or Indian) flap is a good option, requiring two surgical visits, the second time being scheduled three to four weeks later with transection of the pe-

dicle. Removing nasal cartilage implies a greater complexity of reconstruction, that should include the nasal lining and possibly using auricular cartilage to replace a nasal wing.

With total or near total rhinectomy, nasal reconstruction should be an exception, as keeping the defect open may be the best option, being careful not to keep the bone exposed (often it is necessary to remove part of the nasal bone) and posterior reconstruction with a prosthesis.

With the scalp, the thickness of the primary lesion and its extension into the pericranium is important. If the pericranium can be preserved, skin grafting is a good option for most cases. However, when there is invasion and hence resection of pericranium, a scalp flap is needed to cover the exposed bone and a skin graft for the donor area.

In the malar region several reconstruction options may be considered. The Mustardé flap is a good option, especially for defects near the lower eyelid (*Figure 6*). Large bilobed or rhomboid flaps can also be used, always taking care to avoid ectropion due to tension on the lower eyelid.





Figures 6 a-c: Patient with eyelid melanoma, Breslow 1mm, reconstruction with Mustardé flap

Figure 7 is an example of lip reconstruction with V-Y flaps bilaterally. The frontal and temporal regions are regions where skin grafting lends itself well, with aesthetic and functional results superior to grafting on other parts of the face and neck. Still, flap coverage should be preferred whenever possible.

A defect arising from orbital exenteration may be skin grafted directly or onto a [temporalis muscle flap](#) in order to better adapt the prosthesis



Figures 7 a,b: Resection of SCC of the upper lip, reconstructed with bilateral V-Y flaps

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- Readers are also referred to the Open Access Atlas chapters:**
- [Local flaps for facial reconstruction](#)
 - [Sentinel lymph node biopsy \(SLNB\) techniques for cutaneous and mucosal malignancy of the head and neck](#)

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