MOHS SURGERY FOR NON-MELANOMA FACIAL SKIN CANCERS

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INTRODUCTION

Skin cancers are the most common malignancies occurring in the Caucasian population. Basal cell carcinoma (BCC) represents 75% and squamous cell carcinoma (SCC) 20% of cutaneous malignancies[5,29]. The other 5%, including melanomas, are beyond the scope of this article. Over the last decade, a significant rise in incidence of non melanoma skin cancer (NMSC) has been noted[16,20,29]. However, the mortality rates have decreased over the last few decades, attesting to the effectiveness of increased public awareness including sun protection as well as improved physician knowledge and enhanced, more accessible therapy[29].

There are several methods of therapy for NMSC's including radiotherapy, cryotherapy, curettage/electrodessication, conventional excision and Mohs micrographic surgery. Radiotherapy, cryotherapy, curettage/electrodessication are modes of field therapy heavily reliant on visual assessment of margins and without pathological control of complete removal. Conventional excision is often followed by limited pathological checking of margins[54]. This contrasts with Mohs micrographic surgery described in detail below, which aims to assess 100% of the peripheral and deep margins of the specimen.

It is well established that conventional treatment modalities generally result in high cure rates for small circumscript primary tumours with well-defined borders. However, a comprehensive review of relevant studies over 4 decades demonstrates that the highest overall cure rate for primary as well as recurrent NMSC is achieved by Mohs cutaneous micrographic surgery (Table 1)[63,64].

These favourable cure rates using the modality of Mohs surgery are supported by the author's 9 year experience and are the reasons for highlighting this technique in the current review.

TABLE 1: Five year recurrence rate of primary and recurrent basal cell carcinoma a compilation of representative studies by Rowe (1989)

	Basal Cell Carcinoma	
Treatment modalities	**Primary**	**Recurrent**
Surgical excision	10%	17%
Curettage-electrodessication	8%	40%
Radiotherapy	9%	10%
Cryotherapy	8%	> 13%
Mohs micrographic surgery	1%	6%

To clarify the concept of Mohs surgery a general overview on the determination of tumour margins will be presented. Next, the current methods of histopathological control of resection margins will be reviewed. Finally, the history of Mohs surgery along with the technique, indications, limitations and cost benefit ratio will be described.

Determination of tumour margins

Before any type of treatment for skin cancer is considered, the margins of tumour are visually assessed. Often the visual assessment may be straightforward in small-defined circumscript tumours such as nodular type basal cell carcinomas. However, infiltrating and morpheaform BCC may present as flat, atrophic teleangiectatic plaques or scar-like patches with notably indistinct margins, which may grow unnoticed for years in some patients. Severe actinic skin damage may further obscure concomitant BCC or SCC margins.
As a result, excision of tissue in cases with indistinct margins or the width and depth of the field to be treated with curative RT or cryotherapy is extremely unreliable[33,53,60].

Studies on treatment safety margins of NMSC provide clinical, albeit vague, recommendations[68], ranging from 2-10 mm[26,30,37,79]. These recommendations are based on the assumption that tumour outgrowth occurs symmetrically in all directions and for all types of NMSC.
Despite its importance, only a few studies provide research data on NMSC (mainly concerning BCC) growth pattern and the margins of "normal" tissue, that should be included in the treatment[8,9,10,12,82]. Data from these studies were collected by examining subclinical extension using microscopic control of complete lateral and deep margins with (modified) Mohs techniques[8,9,10,12,79,82]. These studies have substantiated that, in contrast to previous assumptions, an asymmetrical subclinical growth pattern with one or multiple extensions seems to characterise the majority of BCC, including small primary BCC[9]. Thus, in order to perform radical excisions, conventional safety margins at the time of surgery are dictated by these specific extensions, while sacrificing a certain amount of non-involved tissue[11].
The magnitude of subclinical outgrowth in BCC is largely related to histologic type and size of tumour. Suggestions on treatment margins can be made based on these specific characteristics. For example, a case of small primary nodular BCC with a diameter of 10 mm or less require a 3 mm margin to include all tumour extensions in 80% of cases[9,82]. Morpheaform or infiltrating type BCC are, however, notoriously deceptive, sending out subclinical extensions of 7 mm or more beyond clinically estimated borders[9,66]. Recurrent tumours need notably larger margins than primary tumours[9].
Curettage to a degree may help to delineate tumour margins further[75], especially in nodular BCC which are more friable and present a soft feel on curettage compared to normal healthy tissue. However, in deep invasive tumours, morpheaform sclerotic BCC or recurrent tumours, curettage is of limited benefit in determining margins. For the same reason, curettage combined with electrodessication has only been therapeutically successful in experienced hands for small, well-defined lesions[69].

Pathological examination.

In order to establish a quality of care, the methods available to the pathologist to examine margins should be understood by the clinician[56]. Logically, the more complete the examination of the margin, the higher the correlation between presence and absence of tumour and, predictably, subsequent recurrence[1]. To evaluate surgical margins, two major types of sectioning are distinguished:
1) transection through the tumour; 2) peripheral sections of the tumour used alone or in combination with transection through tumour.
For practical purposes vertical transections (transverse or longitudinal sections, quadrant sections or a combination) through representative areas of the specimen are most commonly used[28,55]. However, vertical sampling of sections at 2-3 mm interval through the specimen evaluate less than 5 % of the true surgical margin[1,21]. Failure to identify residual fingerlike extensions in between the sampled areas is one of the most important factors in local recurrence, despite the pathology report indicating clear margins[72].
Peripheral vertical sectioning techniques are often used to evaluate the epidermal margins. Ideally 100% of the specimen including the deep margins is examined[7,46,64]. Routine peripheral sectioning in case of rectangular or triangular shaped excisions of eyelids, ears or lips does indeed control 100% of the margins, but in other tumour locations, Mohs surgery has been developed using oblique peripheral sections, encompassing the peripheral and deep margins, combined with tissue coding and mapping.

The key to Mohs surgery is the excision and control of complete peripheral and deep resection margins in one plane, allowing orientation, identification, mapping and re-excision of microscopic tumour extension. These extensions can be followed without sacrificing inappropriate amounts of normal tissue, while yielding high cure rates and maximum preservation of tissue[11,44,46,49,65,75].
The value of an alternative method of staged excision with mapped-out peripheral sections of margins that complete encompass the neoplasm has been confirmed. This was done using peripheral sectioning control with peripheral vertical sectioning of the epidermal edges of the specimen combined with horizontal sections of the deep margins[7].

History

As a medical student in the mid 1930's, Frederick Mohs developed a technique for treating cutaneous tumours. The tumour was chemically fixed in situ, using 20% zinc chloride paste. This method of in vivo fixation was combined with serial excision of tumour and complete microscopic control of the section margins. Mohs[46] obtained extremely high cure rates of over 95% for the treatment of both primary and recurrent tumours. Frequently, however, the often multiple chemo-surgical excisions were painful and time consuming, while additional normal tissue was lost because of obligatory postchemical slough.
Tromowitch and Stegman[78] took Mohs' concept of microscopic controlled surgery further by omitting the zinc chloride paste while examining slices of fresh tissue specimens, which were cut in a cryostat and subsequently stained. This modification proved less painful (no zinc chloride paste), the multiple stages took less time (often

no more than 1 day) and a fresh tumour-free defect remained, enabling the option of immediate surgical repair[75]. A large number of publications subsequently documented the versality and excellent success rates which were comparable to Mohs fixed-tissue technique[44].

MOHS TECHNIQUE

The visible tumour margins are outlined with ink before injecting local anaesthesia. For local anaesthesia, a combination of lidocaine 1% and adrenaline 1 : 100.000 is used for short term induction, while marcaine 0.5 % and adrenaline 1 : 200.000 is used for a longer period of local anaesthesia.
With curettage soft, fragile cancerous tissue may be removed helping further to identify the extent and depth of the tumour. Subsequently, the lesion is excised with approximately a 3 mm margin of macroscopically normal tissue. This additional surgical margin may be varied according to a number of variables, such as tumour type, previous treatments and the aesthetic importance of the area treated(Fig. 1) .
For Mohs micrographic surgery it is essential to obtain a flat, thin layered tissue specimen.

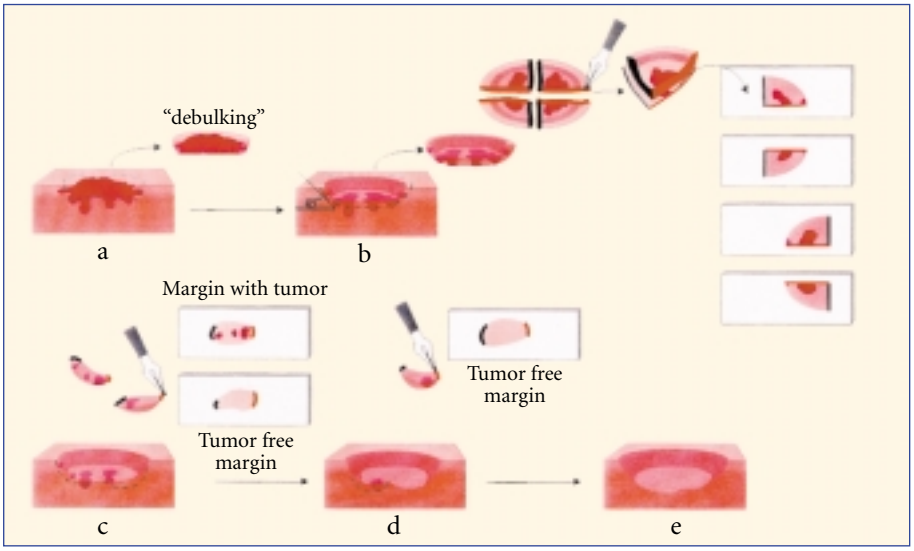

Fig. 1. Schematic representation of the micrographic surgery according to Mohs. After the tumour bulk has been corrected (a) additional excision is performed with a beveled knife. The peripheral and deep margins will be colour coded and repaired for horizontal frozen sections (b). Using horizontal frozen sections 100% of the margins may histologically be reviewed. Mapping and colour coding help locate residual tumour mass. Only where tumour persists, additional slices of tissues are excised, mapped, colour coded and prepared and subsequently histologically examined(c). This procedure will be repeated until no tumour is found in the specimen (d) which leads to tumour-free wound edges (e). (Illustration: R.P. Slagter). Reprinted with permission from: Micrographic Surgery According to Mohs for recurrent basal cell carcinoma (Dutch Medical Journal 141: 524-9, 1997).

Thus the knife and incisions are bevelled at a 45 angle to the skin surface. Next, the inferior surface is incised parallel to the skin surface. The specimen is oriented to the defect using ink, sutures, staples or hatchmarks and placed on a piece of gauze with the fold of the gauze always indicating 12 o'clock.

In the frozen section laboratory the thin specimen is divided into sizes appropriate for frozen section processing[52] and colour coded. On a map delineating tumour site, shape of excised specimen and markings, the manner of division and colour coding is outlined prior to histologic processing.

In order to produce high quality sections encompassing the inferior surface and circumference of the divided specimens, it is essential to obtain a horizontal surface of the tissue block that is subsequently mounted and cut in the cryostat. The inferior portion of the specimen is transferred on to a glass slide, with full contact between the tissue and the glass interface is assured by gradual localised finger pressure whilst inspecting the slide from below. Subsequently the compressed tissue is "glued" to the glass side using NO_2 cryospray[73].

These manoeuvres, including bevelled excision, produce a flat undersurface with the epidermal margin exposed in a single plane for cutting with a microtome and subsequent preparation for histologic examination. A small amount of optimal cutting temperature (OCT) embedding compound is applied to the specimen and the glass slide with tissue is flipped so that the cut surface is facing upward. This is then placed on a cryostat chunk. To optimise precise planar orientation of the undersurface of the specimen parallel to the cryostat chuck, a heat extractor is placed onto the glass slide containing the tissue until freezing of the specimen is complete. The slide is finally separated from the specimen by warming it with a finger and the undersurface of the specimen on the chunk is carefully oriented, parallel to the cryostat knife blades. This is essential, otherwise incomplete sections or deep complete sections cutting towards (and even into) the tumour may result[54].

A trained laboratory assistant then proceeds to cut horizontal slides of 15 micron thickness. The first complete section and then a number of deeper sections are placed on a microscopic slide and coloured using toluidine blue. Now, an experienced pathologist examines each slide under the microscope with the quality of the slides evaluated for the completeness of the sections, which should include an inferior surface and an epithelial border. Suspicious sites or evidence of tumour is marked on the reference map and communicated to the surgeon. One Mohs cycle, exclusing the excision itself, takes about 45 minutes.

The patient is taken to the operating room and further local anaesthetic is injected if necessary. If further excisions are needed, the localization of any residual tumour or suspicious sites is facilitated with relative accuracy using the reference map placed beside the patient. The tissue is removed only where indicated with the rest of the defect left intact. The process is repeated until a tumourfree plane is obtained and adequate

margins have been established. This surgical procedure, which includes a number of steps (Table 2), is meant to result in a defect reflecting the tumour's true extent with maximal preservation of normal tissue[27].

TABLE 2: Mohs surgery essentials

a	Outline of macroscopic margins	**f**	Flattening of specimen
b	Optional curettage	**g**	Horizontal sectioning
c	Bevelled incision	**h**	Staining
d	Specimen orientation	**i**	Interpretation
e	Mapping and colour coding	**j**	Communication

Indications Mohs surgery

Mohs surgery may be specifically indicated for a subset of BCC and for SCC. The subset of BCC include BCC with *unfavourable histology, unfavourable location, incompletely removed BCC, recurrent BCC* and *large BCC*. These indications follow guidelines developed by the American Academy of Dermatology. Other indications have been described but are beyond the scope of this essay.

Unfavourable histology

For reasons mentioned above aggressive basal cell carcinoma with poorly defined clinical margins and deep tissue invasion (morpheaform, infiltrative type, sclerosing and basosquamous basal cell carcinoma) have higher recurrent rates than well defined nodular type basal cell carcinoma[66]. These specific tumours represent a special therapeutic problem for which Mohs surgery may be the most appropriate form of treatment[74,75] (Fig. 2).

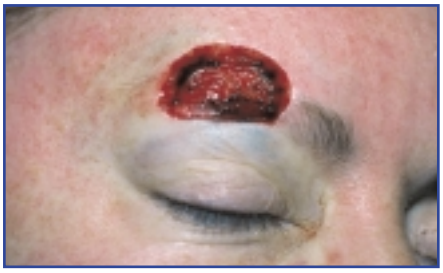

Fig. 2a. Defect after first excision including a 3 mm margin of apparently healthy normal tissue visible beyond tumour margin (infiltrating BCC). Note apparent non-involved forehead skin around defect.

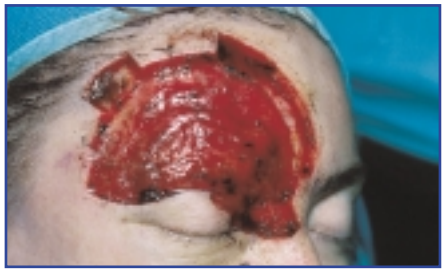

Fig. 2b. Final defect after 7 stages of Mohs micrographic surgery.

Unfavourable location

Certain anatomic sites warrant the need for special consideration, with Mohs' surgery offering the best treatment solution[75]. The following areas are considered to be particularly difficult to treat: ears, periauricular region, temporal region, peri-ocular region

and nasal tip ala, as well as melolabial sulcus and upper lip[11,48]. These areas together constitute the socalled "H"zone of the face[75]. The exact significance of anatomic location is not clear, but it is likely that tumour histology and behaviour influences the prognosis more than tumour site[77]. Indeed, aggressive BCC occurs more often in the H-zone of the face[8]. Embryological planes have been described lying within the H-zone including the junction of the nasal ala and nasal alar fold, nasal tip, columella and medial canthal area[50,74]. Whether, histology aside, the spread of skin cancer is facilitated by these embryological fusion planes, remains to be investigated[81]. So far, multiple histologic sections have not been able to identify fusion planes as identifiable structures that influence tumour spread[81] (Fig. 3).

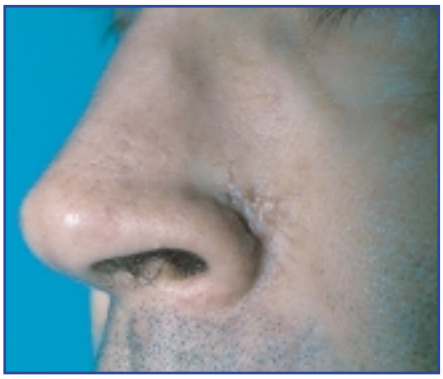

Fig. 3a. Primary nodular type basal cell carcinoma in left supra-alar/melolabial groove.

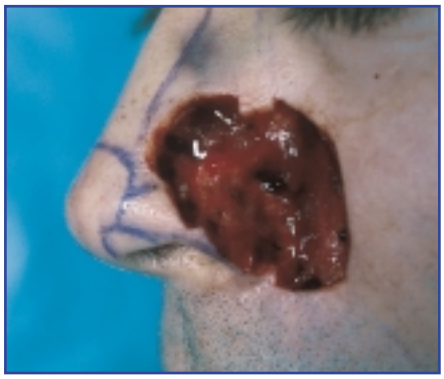

Fig. 3b. Complete tumour-free margins afters 3 Mohs sessions. Tumour extended well beyond visible clinical margins.

Certain cosmetic and functionally important areas such as nasal tip, ala, lip, ear, eyelid, etc. have limited amounts of tissue for simple, functional and cosmetically elegant reconstructions. Obviously, maximum preservation of normal tissue is important because of difficulties in reconstruction and consequently there may be a strong tendency to develop narrow margins of excision in an effort to simplify reconstruction. This cosmetic conservatism with smaller margins makes inadequate excision an ever present danger[47, 61]. These considerations suggest Mohs micrographic surgery as treatment even for "simple" tumours, especially in aesthetically important areas, such as nasal tip, ala, columella, eye and possibly ear and lip. Mohs surgery provides a tumour free plane with maximal preservation of normal tissue, considerably facilitating reconstruction, while improving chances of optimal function and cosmesis.

Incomplete tumour removal

Previously, the need to reexcise BCC with positive margins has been debated[63]. There is no doubt that the presence of tumour at the specimen margin markedly increases the chances of BCC recurrence independent of other variables, such as tumour histology, location and host response[60]. Approximately 40% of these basal cell carcinomas with positive histological margins and no further therapy, will recur at 5 year follow-up[22,63].

An additional 5% may reoccur even after the 5 year follow-up period[51]. The explanation for some of these residual tumours remaining quiesent is possibly explained by inflammatory or immune responses directed to the residual tumour[23]. Alternatively, residual tumour may be trapped in scar tissue remaining silent for years[80]. The most rational approach to marginal involvement is reexcision[13,37,79] and in these situations Mohs surgery may be used, permitting high cure rates and optimal tissue preservation.

Recurrent tumour

There are various reasons why recurrent tumours are more difficult to treat than primary NMSC. These tumours may have an aggressive biology[40,54,71]. Indistinct margins associated with significant subclinical growth compound the therapeutic problem (Fig. 4). Generally speaking, the cure rate of a given standard modality is normally around 90% but it drops to 50% if the same treatment modality of the primary tumour is applied to the recurrence[43,74] . Even if other treatment regimens are chosen the overall cure rates are generally unsatisfactory (Table 1). Mohs surgery does not rely on difficult estimates of 3-dimensional histology (lateral extensions and depth) of recurrent tumours, but provides optimal marginal control with 5 year cure rates in excess of 90%[3]. It should be noted that even with Mohs surgery the entire scar including flap or graft, as well as a deep margin of original resection should be reexcised, because tumour tends to move in previously dissected planes and possible nests of discontinuous tumour may present after previous treatment[80].

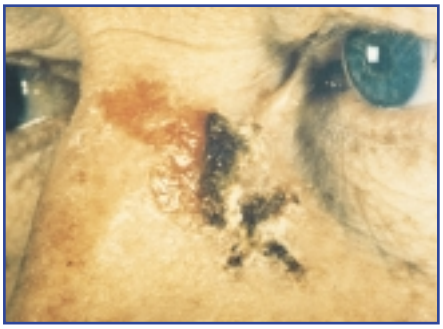

Fig. 4a. Recurrent BCC after photodynamic therapy (other institution).

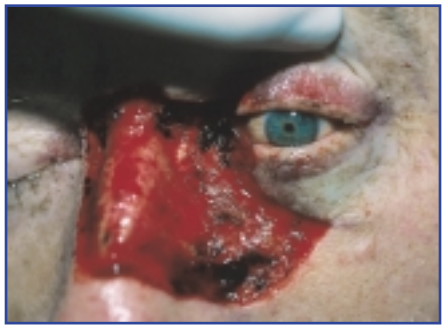

Fig. 4b. Defect after radical exision after 5 Mohs sessions.

Large tumour size

The greater the diameter of a lesion, the greater the likelyhood of recurrence[58,70]. For example, BCC smaller than 6 mm on the head have higher cure rates with conventional excision than larger lesions[70]. What is considered large depends somewhat on the anatomic location. A 1 cm lesion on the forehead may be considered small, while the same size lesion in the medial canthus may be considered large. Even Mohs surgery, although more effective than other treatment modalities, has a high recurrence rate when the lesions are over 2-3 cm[33,47]. For SCC larger than 2 cm the recurrence rate

doubles and the metastatic rate triples as compared to lesions less than 2 cm[5]. Given the possibility of human error, patients at high risk for recurrence can be managed with wider clear tissue margins taken at the time of surgery to increase the chance of complete tumour removal. For Mohs surgery this involves an extra tumour-free stage of tissue which might be performed after the usual completion of surgery in these patients[58]
Because of the relatively high recurrence rates for large and deeply invasive tumours, it is sometimes prudent to delay permanent reconstruction for 1-2 years, using skin grafts and prostheses in the interim[33].
In BCC, the size of the primary lesion may play a role in the metastatic potential which is very low. Generally, in tumours larger than 1 cm or present for more than 2 years, behaviour may become unpredictable[14].

Squamous cell carcinoma
Compared with BCC, SCC is a more aggressive tumour with potential for distant metastases and death[10]. The clinical factors that correlate with a high risk of local recurrence and with metastases include size, depth, histologic differentiation, site, scar carcinoma, histologic evidence of perineural involvement, previous treatment and immunosuppression[14,65]. Most SCC in high risk locations, such as scalp, ears, eyelid, nose and lips need at least a 6 mm margin for excision[10]. It is recommended that excision of all SCC should include subcutaneous fat, because at least 30% invade to this level[10].

Complete SSC removal is essential, as recurrent tumours are more difficult to eradicate and are associated with 25-45% rate of metastasis[76]. Cutaneous micrographic surgery remains the surgical method with the highest cure rate for localised SCC (97%)[65]. Mohs surgery offers high cure rates, even for squamous cell carcinoma with perineural invasion[39 ,68]. However, more aggressive therapy, e.g. the employment of larger surgical margins or additional stages of Mohs surgery beyond the tumour/free planes may be necessary to decrease the risk of local recurrence[2, 24, 62,68]. It should be emphasized that in cases of perineural invasion where an additional inflammatory response is observed around a nerve branch, the nerve should be traced microscopically until the perineural reaction is no longer observed[2, 42]. Any patient with SCC that has a higher potential for regional metastasis should be managed by a multidisciplinary team[17]. For example patients with squamous cell carcinoma and perineural invasion may possibly benefit from postoperative radiotherapy[4]. Delay of ultimate reconstructive surgery after Mohs surgery in certain patients may also be prudent to prevent recurrence under flaps or grafts[24].

RESULTS

In a 9 year study period, 502 NMSC of the head and neck were treated in our department. Four hundred twenty-four of these NMSC's were treated with Mohs surgery (Table 3).

TABLE 3: Type of non-melanoma facial skin cancer treated by Mohs surgery

		Primary	Recurrence	Total
BCC	-solid/superficial	215	20	235
	-aggressive growth pattern*	107	9	116
SCC**		58	1	59
Others		14	0	14
Total		394	30	424

**BCC with aggressive growth pattern has morpheaform, sclerosing, mixed infiltrative, or micronodular features in any portion of the tumour.*

*** Squamous cell carcinoma ranges from well to poorly differentiated.*

The majority (351), were BCC, reflecting the overall incidence of this type of tumour. Primary lesions were 322 (92%) and recurrent lesions were 29 (8%).
The most common site of NMSC treated with Mohs surgery was the nose: 228 (54%) and ear: 78 (18%) (see Table 4).

TABLE 4: Localisation of non-melanoma facial skin cancers treated by Mohs surgery

	n	%
Nose	228	(54)
Ear	78	(18)
Lip/chin	35	(8)
Forhead/temple/scalp	32	(8)
Eye	27	(6)
Cheek	13	(3)
Neck	11	(3)
Total	424	(100)

Nearly all SCC treated with Mohs surgery were primary lesions: 58 (98%).
With a mean follow-up of 24 months, ranging from 3 months to 9 years only one of the Mohs treated NMSC has demonstrated neurological signs of recurrence. Of this SCC of the tragus of the ear, which demonstrated perineural invasion, no local recurrence has been noted.

DISCUSSION

Limitations of Mohs surgery

A number of factors may limit the albeit high cure rate of Mohs surgery, the most important being discontinuous tumour growth and technical flaws[34,35]. The major premise of Mohs surgery is based on contiguous tumour growth[14, 35]. Tumours presenting in a discontinuous fashion (for example Paget's extra mammary disease) are less treatable as breaks in tumour continuity may occur. Breaks in tumour continuity may also be due to the production of intervening scar tissue by multiple treatments (iatrogenically induced multifocality)[25,80]. If satellite islands of tumour exist that are separate from the main tumour mass, histopathologic examination of margins by any method will be inadequate in demonstrating residual neoplasm[24,67].
For these reasons Mohs surgery (as well as conventional surgery) should include the entire region of previous treatment and not only treat the clinical recurrence to improve cure rates[11, 13,14,48].

Scrupulous attention to technical detail (Table 2) helps to prevent technical flaws in the Mohs surgical procedure aiming to reduce the potential for false negative margins[14]. Indeed, suboptimal pathological slices have shown to be a major factor in most failures. Technically the most difficult part of Mohs procedure is the production of a horizontal frozen section that includes all of the epidermal edges through to the true depth of the specimen providing a complete sample of margins. As discussed earlier, tumour excision at 45 degrees is the first step to facilitate forcing the epidermis into the same plane as the deep tissue[78]. Thicker tissue specimens are more difficult to compress and partial scoring incisions may help to compress all margins flat onto the glass slide, using finger pressure on the specimen with visual control through the glass slide. Large tissue surfaces are more difficult to orientate parallel to the cryostat knife risking squewed incomplete sections. Despite numerous techniques, devices and meticulous effort, it is probably impossible to view indeed 100% of the epidermal and deep margins[25, 32].
The quality of frozen sections may also be suboptimal for various other reasons[55]. Adipose tissue is notoriously difficult to cut with the cryostat[47]. Paraffin-embedded sections may thus be useful in this scenario[44, 56,57].

Thin specimens may fragment producing holes or folds in the cutting process, deeper sections reduce this problem, but risk moving away from the true margin and cutting into the tumour producing false positive margins. Slide interpretation may be difficult as pathologists are not usually accustomed to viewing horizontal skin sections. For example, longitudinal sections of hair follicles, sweat glands or blood samples may resemble basal cell carcinoma[15,25].
Human errors may occur in the many steps for orientation, mapping, incising, freezing and interpreting frozen sections[31,84]. If the surgeon himself does not interpret the frozen sections, communication with the pathologist and laboratory technician becomes extremely important[19]. In our setting the surgeon performs the whole surgical procedure including excision and supervision of mounting of sections by the technician, leaving

the interpretation to the pathologist. Disorientation of positive margins may result in further excision of healthy tissue (in stead of remaining tumour) yielding false negative margin reports.
While aiming to produce optimal cure with maximal tissue conservation, Mohs surgery may at times produce excessively wide margins. If the technician fails to provide a complete section at the earliest possible moment, he may cut too deeply into the tissue block and even into the tumour. A false positive margin will consequently lead to further tissue sacrifice[56].

Although unusual, total tumour eradication may be impossible with Mohs surgery in the case of large neglected tumours which involve vital structures. These rare situations may not be amenable to any curative treatment.

The cost/benefit ratio of Mohs surgery

For small primary tumours with minimal chance of recurrence, routine procedures are efficient and very cost effective. Mohs surgery involves more expenses related to longer operating time and additional laboratory assistance. When performed in collaboration with a pathology department, specific equipment such as cryostat and microscopes are already available. As Mohs surgery greatly reduces the likelihood of recurrence in the future, and allows closure in the same session, it is cost effective especially in the treatment of recurrent tumours or primary tumours with a high incidence of recurrence following standard treatment[6,18,45,68,83]. About 5% of Mohs surgeons believe that all BCC's require Mohs surgery[41], but most will agree that this is excessive use of resources, despite the extremely high cure rates[55].

CONCLUSION

Of all the modalities for treating skin cancer, Mohs surgery has the highest cure rate, made possible by its accurate histologic margin evaluation. Theoretically the method evaluates nearly 100% of tumour margins, in contrast to random margin evaluations performed routinely in most laboratories.
For the difficult NMSC scenarios such as recurrent tumours, large tumours, tumours with aggressive histology, incompletely excised tumours and tumours in high risk, aesthetically important, anatomic areas, the value of Mohs surgery is well established. As a result of the success of Mohs surgery, most defects will be reconstructed primarily, although reconstruction method and timing should still be individualised to patients with high risk tumours.

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