



NZSCD
NEW ZEALAND SKIN CANCER DOCTORS

Clinical and Histological Margins in Melanoma

Discussion Document

Goals:

- Improve basic understanding of melanoma margins
- Clarify areas of the guidelines that are ambiguous or not consistent with current practice
- Explain what is meant by "clear histological margins" (which isn't defined anywhere), by reverse engineering from clinical margins.

What Are Margins?

Margins define the tissue excised around a melanoma to ensure complete tumour removal and minimise recurrence.

1. **Clinical Radial Margin:** Distance from the surgical scar or edge of residual tumour (assessed clinically or dermatoscopically). May overestimate (e.g., due to surrounding photo-damage) or underestimate (e.g., due to subclinical tumour extension). The reason that international recommendations for wide clinical margins do not explicitly account for the primary histological margin already achieved in the diagnostic biopsy is because the supporting studies were conducted based on this approach. However, in practical surgical settings, the histological margin already achieved is often considered, especially in anatomical locations where it has significant clinical relevance.
2. **Clinical Deep Margin:** To fascia or subcutaneous depth equal to the radial margin (for both MIS and invasive melanoma). The reasons for the same deep margin for MIS (noting the disease by definition is restricted to the epidermis) is due to the potential for the malignant cells to spread down hair follicles whilst remaining in the epidermis.
3. **Histological Margins:** Distance from the tumour edge to the excision margin, measured microscopically on sampled sections. Typically, 30-40% smaller than clinical margins due to tissue shrinkage post-excision and processing. Histological margins may be imprecise due to tumour irregularity and sampling limitations.

Why Excise Beyond Visible Tumour?

Excision beyond the visible tumour removes subclinical disease, increasing the likelihood of clear histological margins and reducing local recurrence (LR).

Why do we want a Histological Margin?

Routine histology (bread-loafing) examines circa 1-3% of margins. Irregular tumour borders may be missed, necessitating a safety margin to improve the chances of statistically clear margins.

Current Australasian Guidelines for Melanoma Excision

Initial Biopsy: Clinical radial margin

Radial Margin: 2 mm

Wide Local Excision (WLE): Clinical radial margins

- Melanoma in situ (MIS): 5–10 mm
- Breslow \leq 1 mm: 10 mm
- Breslow 1.1–2.0 mm: 10–20 mm
- Breslow $>$ 2.0 mm: 20 mm

Clinical considerations in radial margin selection for Lentigo Maligna on the head or neck

Lentigo maligna frequently has varying degrees of subclinical disease and frequently requires $>$ 10 mm clinical margins to achieve adequate histological margins. Associated photodamaged skin complicates clinical and histological margin assessment. For this reason, lesions in anatomically challenging areas, preliminary border mapping, and serial excisions are useful techniques when Mohs micrographic surgery isn't available. When available Mohs or slow Mohs will maximise the chance of clear margins and minimise tissue loss. Histologic clearance should be confirmed prior to undertaking complex reconstruction. Consideration should be given to field treatment with imiquimod for 3 months post excision when the lesion is very large and lentiginous with poorly demarcated histological features.

Nonsurgical treatment methods are sometimes resorted to including Imiquimod, radiotherapy (e.g., Grenz rays), or active surveillance in elderly/fragile patients (note: nonsurgical options lack robust evidence).

5 mm clinical margins may be sufficient if all of the following criteria are met:

- Well-circumscribed lesions;
- Small lesions, < 1 cm in diameter;
- Non-chronically sun-exposed skin (trunk, proximal extremities);
- Absence of histological evidence of chronic sun damage/solar elastosis on biopsy (i.e., not LM)

10 mm clinical margins should be considered for:

- Areas of sufficient skin laxity where larger margins can be achieved without untoward consequence;
- Ill-defined lesions;
- Lesions >1 cm in diameter;
- Chronically sun-exposed skin, such as the head and neck and distal extremities;
- Diagnosis of LM on dermatopathology review of biopsy;
- Acral lesions

10-15 mm clinical margins should be considered in:

- Very large lesions >3 cm in diameter;
- On chronically sun-exposed skin;
- Head and neck location

Clinical considerations in radial margin selection for invasive melanoma

There is a paucity of evidence supporting margins above 1cm for thicker Melanomas (>2mm). Although Melmart II (Reference 1) aims to quantify this, we await the report. Meanwhile, it has been suggested that a 10mm margin for Melanoma 1-2mm Breslow thickness and 10-20mm for Melanoma >2mm Breslow thickness is probably adequate (Reference 2).

Clinical considerations in rare subtypes of melanoma

Desmoplastic melanoma (DM) is a histologic subtype of melanoma that tends to be locally aggressive with a higher propensity for local recurrence, especially when perineural invasion is present. Wider margins are recommended. DM has a lower risk of distant metastasis compared to other melanoma subtypes. Mucosal, Spitzoid and Acral melanomas are often more aggressive subtypes that require careful consideration of management strategies, including clinical margins, sentinel lymph node biopsy considerations, and adjuvant therapies.

Survival Predictors

Melanoma subtype, Breslow depth, ulceration, and mitotic rate strongly predict survival. Wide clinical and/or histological margins have not been shown to improve survival rates, but research suggests it reduces LR.

What is a “clear histological margin?”

Guidelines consider treatment adequate when “clear histological margins” are achieved, but “clear histological margins” lack a universal definition. By reverse engineering from the recommended clinical margins and assuming up to 40% shrinkage, this would typically yield histological margins of >3 mm and >6 mm, in MIS and invasive melanomas respectively. This provides some insight as to what may be considered “a clear histological margin”. Margins less than this are accepted by some experts, and research is in progress to assess the adequacy of 1.5 mm histological margins for primary invasive cutaneous melanoma of Breslow thickness ≤ 1.0 mm (pT1) (Reference 3).

References:

- a. **Rossi AJ, Verbus EA, Faries MB, Moncrieff M, Henderson M, Hernandez JM, Lowe MC.** A Phase III, Multicenter, Randomized Controlled Trial Investigating 1-cm Versus 2-cm Surgical Excision Margins for Stage II Primary Cutaneous Melanoma (MelMarT-II). *Ann Surg Oncol.* 2022;29:4050-4051. doi:10.1245/s10434-022-11766-z

- b. **Zijlker, LP, Eggermont, AMM, & van Akkooi, ACJ. (2023).** The end of wide local excision (WLE) margins for melanoma? *European Journal of Cancer*, 178, 82–87.

- c. **Wennberg E, Claeson M, Olofsson Bagge R, Polesie S, Paoli J.** Wise or wide (WoW) study protocol: a national, multicentre, prospective, randomised and controlled, parallel group, non-inferiority study to compare single-staged versus two-staged excisions of thin invasive (≤ 1.0 mm) melanoma. *BMJ Open.* 2025 Apr 2;15(4):e094544.