MEDICAL UNIVERSITY OF VIENNA

Representing melanoma depth with limited sampling

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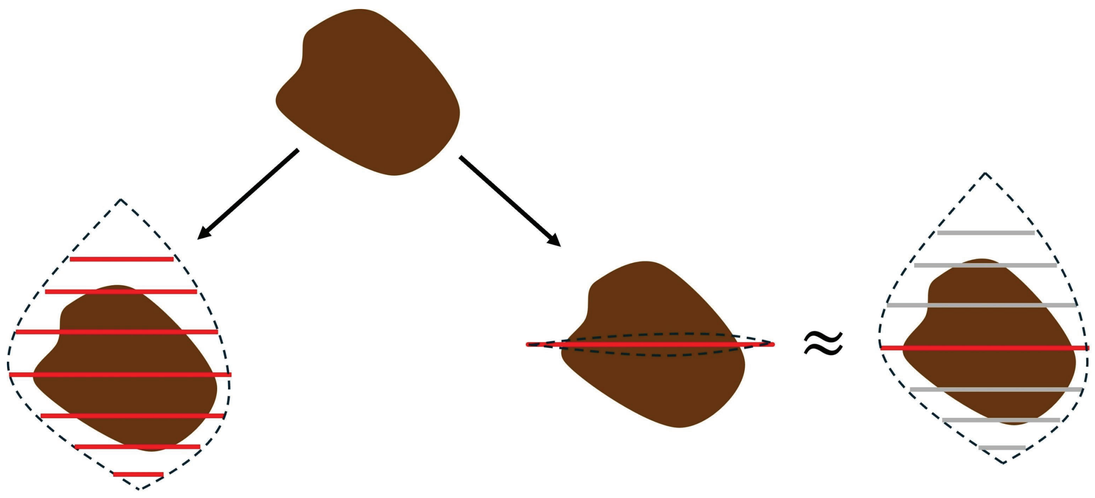
Objective

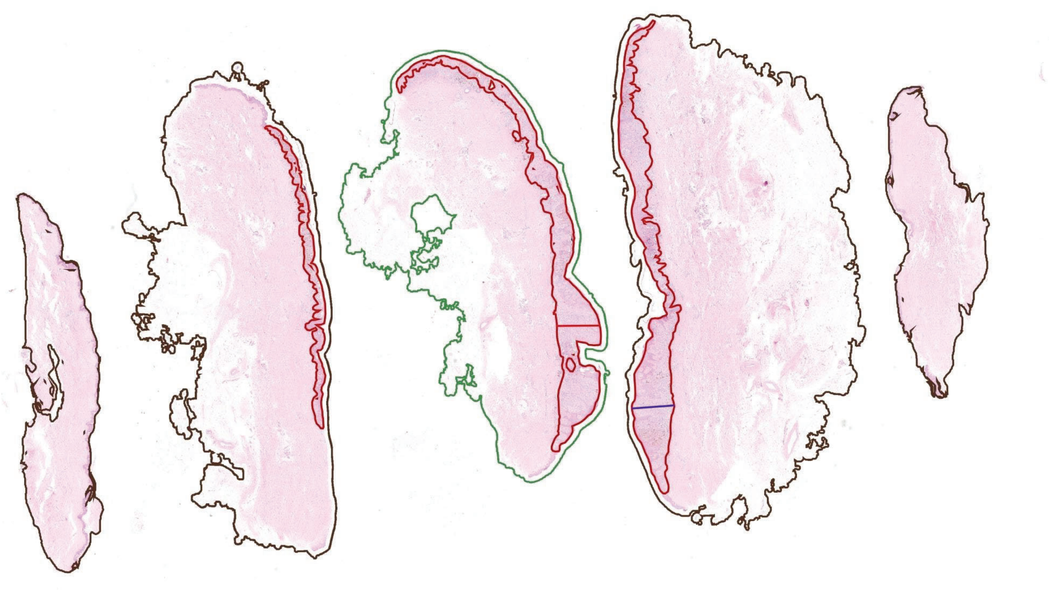
For thick melanomas, retaining the primary lesion during neoadjuvant therapy may enhance immune response through increased antigen load[1]. This study assessed whether a central section from serially processed melanoma specimen, representing a transectional incisional biopsy, accurately reflects Breslow thickness and ulceration compared to full serial sectioning.



Schematic Illustration of Serial Cuts versus a Central Cut.
Thickness-measurement in a single thin, central transectional biopsy is simulated by evaluating the central sections of full workup of an excisional biopsy with serial cuts.

Patients and Methods

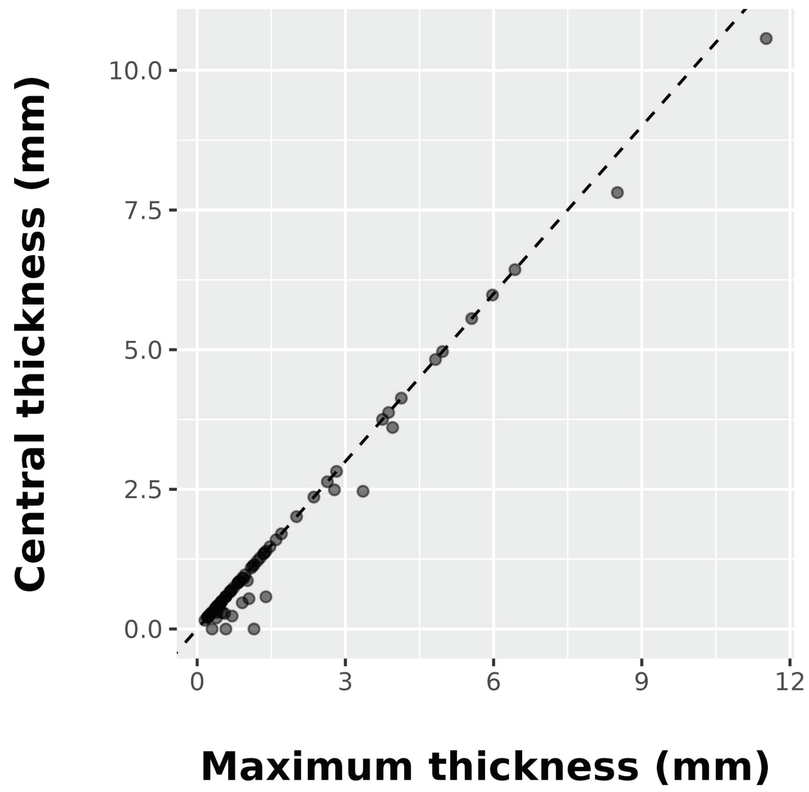
From a single center, histological slides of 78 invasive melanomas from 76 patients were retrospectively collected. Specimen were digitized, tumor-thickness and ulceration were measured across all tissue sections. The most central section was compared to the overall specimen.



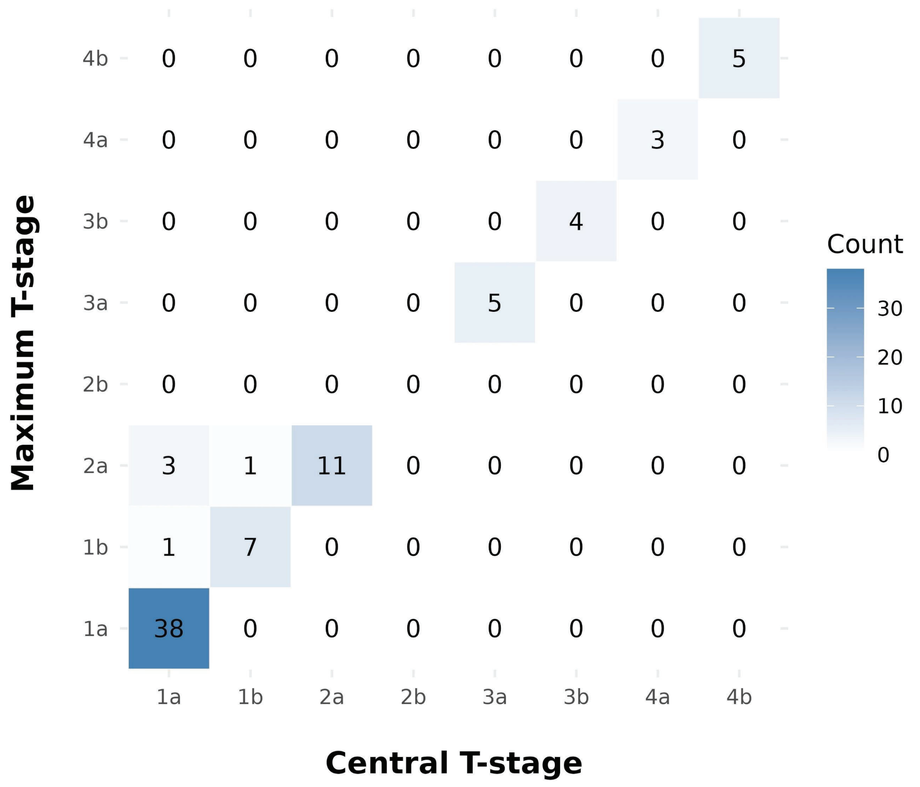
Digital Slide Annotation.
Example of one digital histological slide of a serially processed melanoma showing tissue, tumor, and depth annotations.

Results

Across 78 paired comparisons, the median difference between central and maximum depth measurement was below 0.2mm (0mm, IQR 0.02, p = <0.001), with 64 (82.1%) cases ≤0.2mm. Ulceration was present in 9 cases (11.5%), consistently detectable in the central section. T-stage remained unchanged in 73/78 cases (93.6%), the remaining 5 cases showed higher stages with full workup within T-stages ≤ 2.



Central-section versus maximum-section tumor-thickness.
Each dot represents one tumor, the dashed line indicates the line of identity (y = x) where the central thickness is identical to the maximum tumor-thickness, with points below the line representing cases where the central section underestimated the maximum depth.



T-stage comparison.
Cross-tabulation of AJCC 8th Edition T-categories comparing maximum (rows) and central-section (columns) based T-classifications.

Discussion

Despite a significant reduction in the amount of tissue examined, a central section resulted in a T-stage that matched that of complete processing in 93.6% of cases.
Underestimations occurred exclusively in thin melanomas.
The risk of missing the site of greatest tumor depth in an incisional biopsy[2] can be reduced by using imaging techniques[3];
a prognostically disadvantageous effect of incisional biopsy in melanoma has already been ruled out[4].

Conclusion

In this retrospective cohort, a central section provided Breslow thickness and T-stage equivalent to full serial sectioning in most cases, underestimation occurred only in thin melanomas. These findings provide a pre-clinical foundation for trials testing whether retaining the primary melanoma during neoadjuvant therapy may enhance treatment efficacy.

References

1) Goodman AM et al. Mol Cancer Ther. 2017;16:2598-2608.
2) Ng JC et al. Arch Dermatol. 2010;146:234-239.
3) Chaput L et al. Eur J Dermatol. 2018;28:202-208.
4) Pflugfelder A et al. Clin Dermatol. 2010;28:316-318.