Shave procedures in the management of skin lesions where melanoma is a differential diagnosis

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Background
Australia has the world's highest melanoma incidence. Diagnostic aids improve melanoma diagnosis, but most lesions excised on suspicion of being melanoma are benign. Reliance on formal ellipse is common.

Objective
We explore the utility of shave procedures in melanoma management.

Discussion
The topic of shave procedures in the management of melanoma is controversial and attracts strongly held views both for and against. The available data shows that shaves can be employed safely and produce an acceptable cosmetic outcome with low financial costs while also being a time-efficient procedure both for the patient and the clinician alike.

IN MANAGING CUTANEOUS NEOPLASIA, shave procedures are used for sampling or definitive removal of suspect lesions. They are same-day, quick-to-perform procedures performed in basic surgical facilities, producing good cosmetic and functional outcomes without sutures.[1] Compliance is excellent and costs (direct and indirect) are minimised.

In melanoma management, shaves can be used for:

- initial removal of small, pigmented lesions where in situ or superficially invasive melanoma is a differential
- sampling of lesions where complete excision is untenable due to size or site
- mapping the extent of large lentigo maligna.[2]

Literature on shave procedures is contradictory. Many studies conflate shave excision (removal) with shave biopsy (sampling). Published data on shave procedures is often retrospective with unknown clinician intent and training.[3] de Menezes et al referenced studies showing levels of shave base transection from 7% to 68%.[1] Transection precludes measuring Breslow thickness and compromises staging.[4] However, base transection has no adverse effect on metastasis or survival.[5]

Australian guidelines recommend elliptical excision as the preferred diagnostic procedure.[6] This is a Grade C recommendation only (ie the body of evidence provides some support for recommendation(s), but care should be taken in its application).[6] These guidelines then state that 'deep shave excision (saucerisation/scoop) and punch excision methods might also be used for complete excision but are more often associated with positive margins than elliptical excision with primary closure'.[6] The supporting references for this statement do not take into account practitioner intent or training.[7–11]

Where melanoma is a significant differential, shave excision is only appropriate if the clinician is confident the lesion can be removed in width and depth. Despite shave excision being widely, effectively and safely used by Australian and international dermatologists, utilisation by other clinicians is less common.[12] Appropriately performed shave excisions remove thin, small-diameter melanocytic lesions in their entirety with no greater incidence of margin involvement than an ellipse.[13] Most diagnosed melanomas are in situ or <1-mm thick and readily cleared by a competent shave.[14] Total reliance on formal excision needlessly increases the physical, financial and time burdens of melanoma management.

Shave procedures in melanoma diagnosis

Shave biopsies are deemed appropriate for diagnosing lesions with a low index of suspicion for melanoma and melanoma in situ.[6] Base transection is rare if lesion selection and operative technique are optimal.[13,15,16] Shao et al had no base transections in 50 consecutive shave excised melanomas.[13] Pitney and Muir reported one base transection in 190 melanomas diagnosed by shave excision.[15] In both studies, all melanomas were in situ or thin (<0.8 mm). Brown et al showed a deep margin transection rate of 4.3% (27 of 615 melanomas) but included both excisions and biopsies.[16] Staging was revised upwards for just two of 297 shaved melanomas (0.67%). One desmoplastic melanoma was upstaged from Stage I to Stage II disease, and one amelanotic melanoma from Stage 0 to I. Neither of these was clinically suspected to be a melanoma.

High rates of base transection reflect failings in technique and/or lesion selection. In de Menezes et al, shaved melanomas <1-mm or even 0.5-mm thick were commonly transected.[1] Such extremely superficial shave procedures could not consistently clear invasive lesions. In Shao et al,[13] lateral margin involvement was seen in 13 of 50 shave excisions (27%), a similar rate to that seen in Mills et al,[11] where ellipses were performed. Importantly, none of these shaved lesions were upgraded on final excision.[13]

In the studies of Pitney and Muir (0.5% base transection)[15] and Shao et al (0% base transection),[13] no shave excised melanoma was over 0.8-mm thick. Hay et al had base transection in 8.9% of 637 melanomas (n=19).[17] Three of these base transections were with deliberate shaves into the subcutis of what must have been very thick and, thus, clinically unsuitable lesions. Similarly, in de Menezes et al, 50% of the melanomas studied were >1-mm thick, with 25% more than 4 mm.[1] These melanomas would have been palpably raised and, thus, unsuitable for shave excision and, as expected, high rates of base transection were seen.

Approximately 4% of all histopathologically confirmed melanomas are unsuspected clinically.[15,18] Reliance on formal elliptical excision might delay their diagnosis. de Menezes et al showed that where provisional diagnoses were available and melanoma was not suspected, 'seborrhoeic keratosis' was the preferred diagnosis for 32% of shaved melanomas but only 3% of those formally excised.[5] Perhaps the relative difficulty of a formal excision discourages biopsy, with resultant delayed or missed diagnosis of melanoma.

Benign-to-malignant ratios for melanoma diagnosis range from 1:1 to 287:1.[19,20] Most excised suspect lesions are benign and typically require no further treatment. The majority of melanomas are in situ or <1-mm thick and readily cleared by a competent shave.[14]

The convenience and cost of shave procedures might result in a lower threshold for use and higher benign-to-malignant ratios. Shao et al reported a benign-to-malignant ratio of just under seven in 349 consecutive lesions removed by shave excision.[13] All 50 melanomas were in situ or thin (<1 mm), with no base transections noted.[13] Their rate of lateral margin involvement was higher in the superficial spreading melanoma or lentigo maligna subtype, which are known to have greater subclinical extension.[2,21] Improved specificity, reflected in reduced benign-to-malignant ratios, might risk decreasing sensitivity, with melanomas missed or their diagnosis delayed.[22]

Greater use of shaves might lead to diagnosis of melanoma earlier in its evolution. Four studies where shaves were used produced higher in situ-to-invasive ratios with greater use of the procedure.[13,15,16,23] Hay et al reported on 637 melanomas diagnosed in one year by 27 general practitioners (GPs).[17] Shaves were used in just one-third of cases with an in situ-to-invasive ratio of 1.85. By contrast, in Green et al, a single GP diagnosed 298 of 497 melanomas by shave (60%), with an in situ-to-invasive ratio of 2.88 (Table 1).[23]

Three dermatologists in Brown et al used shaves to diagnose approximately half of 615 cases.[16] In Pitney and Muir, 84% of 224 melanomas were diagnosed by a single dermatologist using shaves (Table 1).[15] The resultant in situ-to-invasive ratios were 4.59:1 and 4:1, respectively. Although not directly comparable, these figures suggest that increased use of shaves favours diagnosis while lesions are still in situ before any significant metastatic risk.

In a study published in 2023, Pandeya et al explored the diagnosis and management of melanoma in Queensland.[24] The study demonstrated that most melanomas were initially managed within general practice. The authors noted that although dermatologists make up only 0.7% of the medical workforce in this state, they accounted for almost 15% of all melanomas found.[24] Dermatologists used shave procedures to diagnose melanomas in over half of these instances. By contrast, GPs, who make up 44% of the medical workforce, accounted for 77% of all melanoma diagnoses but only employed shaves in 30% of cases.[24]

These results suggest that training and confidence in lesion selection and shave technique lead to more frequent utilisation of the procedure, more favourable in situ-to-invasive melanoma ratios, fewer thicker melanomas and insignificant rates of base transection or upstaging.

Pitney and Muir surveyed 123 Australian dermatologists and 269 GPs.[12] They showed that 54% of the dermatologists would always or often shave excise if presented with a <1-cm diameter lesion on the trunk or limbs where their differential diagnosis included dysplastic/atypical naevus, in situ or, at worst, early invasive melanoma.[12] Only 21% of the surveyed GPs would always or often shave excise in the same situation. Reluctance to use shaves might reflect lack of training and confidence in lesion selection and technique. As GPs diagnose most melanomas in Australia[25] but report inferior outcomes in terms of benign-to-malignant[26–28] and in situ-to-invasive ratios,[17,23] training in the indications for and technique of shave excision might reduce surgical costs and morbidity and increase early diagnosis.

Short-term monitoring aided by total body photography (TBP) and digital dermoscopic imaging (SDDI) is an alternative to excision. Studies claim improved benign-to-malignant ratios and diagnosis of melanoma.[29–31] These are uncontrolled and have not shown any survival benefit.[16] They report in situ-to-invasive ratios between 0.59 and 2.88 from a combined total of 1755 melanomas,[16] with up to 8.2% of melanomas being >1-mm thick. In two published studies, no digital imaging was used and suspect lesions were removed by shave or ellipse rather than monitored.[15,16] Brown et al[16] and Pitney and Muir[15] achieved a far higher ratio of in situ to invasive melanomas (4.59 and 4, respectively) from a total of 841 melanomas.

When it has been decided that a lesion should be monitored rather than removed, diagnosis of melanoma might be delayed. In a study where short-term digital dermoscopic imaging was widely employed,[32] more melanomas were diagnosed in years 2 to 4 of monitoring compared to years 0 to 2. The authors noted that because the protocol relied heavily on photographic change, they were 'shifting the diagnosis to later time points'. At the same time, they achieved inferior in situ-to-invasive ratios and a greater percentage of thicker melanomas than in Brown et al[16] and Pitney and Muir.[15]

The characteristics of clinicians and patients in these studies is not uniform. However, the marked difference in outcomes must call into question the utility of TBP and SDDI. As monitoring risks delaying diagnosis and, hence, definitive treatment of an imaged melanoma, the risk of an adverse outcome for the patient might actually be increased. Xiong et al showed that a three-month delay in definitive treatment of Stage I melanoma increases the risk of melanoma-specific death.[33] For perspective, in Argenziano et al, the median monitoring period before excision was 20 months.[34] Of the 103 monitored melanomas eventually diagnosed, over half were already invasive and three were >1-mm thick.[34]

Any surgery carries a cosmetic effect. In Pitney and Muir, 80% of surveyed practitioners felt that the cosmetic results from shave excision were always or often acceptable in their hands.[12]

Rosendahl et al claimed that wide excisions following an initial shave are larger than those following an ellipse.[35] No clinical data was supplied to support the claim. Shave excisions produce a scar approximately the same size as the initial lesion. Most excisions will not need further surgery. If, as the evidence suggests, shaves increase diagnoses of melanoma while still in situ, this will result in smaller excision margins. In Pitney and Muir,[15] all shaves were performed at the same visit that the lesion was found and billed as biopsies. If formally excised, costs to Medicare would have increased by 440%.[15]

Conclusion

Shave procedures can be employed safely and can assist with early diagnosis of melanoma. The available evidence indicates that in melanoma management, shave excisions performed by practitioners confident in lesion selection and technique rarely result in base transection or upstaging.

The evidence suggests that utilising competently executed shave procedures where appropriate results in superior outcomes in terms of identification of melanomas compared to always using ellipse. Shaves are more likely to capture diagnostically difficult melanomas.[13,15,16]

Shaves reduce costs to the patient, the practice and the healthcare system and can enhance compliance because they are a same-day procedure.

Table 1. Comparison of melanomas diagnosed by shave excision, elliptical excision and punch procedure in four studies with differing rates of shave procedures

	Pitney and Muir[15]	Brown et al[16]	Hay et al[17]	Green et al[23]
Clinician	**Dermatologist**	**Dermatologist**	**General practitioner**	**General practitioner**
Total number of melanomas	n=226	n=615	n=637	n=497
In situ melanoma (%)	80 (n=181)	82.1 (n=505)	65 (n=414)	74.2 (n=369)
Invasive melanoma (%)	20 (n=45)	17.9 (n=110)	35 (n=213)	25.5 (n=127)
In situ: Invasive	4.00	4.59	1.85	2.88
Shave procedure (%)	88.9 (n=201)	48.2 (n=297)	33.5 (n=213)	60 (n=298)
Ellipse excision (%)	10.6 (n=24)	51.2 (n=315)	55.9 (n=356)	34.2 (n=170)
Punch procedure (%)	0.4 (n=1)	0.32 (n=2)	8.5 (n=54)	0.6 (n=3)
Base transection in shave procedure (%)	5.9 (n=12)[A]	4.3 (n=27)	8.9 (n=19)	–
In situ melanoma diagnosed by shave (%)	88.9 (n=161)	47.3 (n=239)	–	67 (n=247)
Invasive melanoma diagnosed by shave (%)	64.4 (n=29)	52.7 (n=58)	–	40.1 (n=51)
In situ melanoma diagnosed by ellipse excision (%)	58.3 (n=14)	52.3 (n=264)	–	28 (n=102)
Invasive melanoma diagnosed by ellipse excision (%)	41.6 (n=10)	46.4 (n=51)	–	53.5 (n=68)
BT <1 mm from all samples (%)	–	94.5 (n=104)	72.3 (n=154)	84 (n=107)
BT >1 mm from all samples (%)	–	5.5 (n=6)	27.7 (n=59)	16 (n=20)

[A]0.5% (n=1) where excision was intended.

BT, Breslow thickness; –, no data available.

Key points

- Shave procedures can be safely employed in melanoma diagnosis.
- Shave procedures are cost effective and time efficient.
- When appropriately performed, shave excisions rarely result in base transection.
- Training in lesion selection and technique is paramount.

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References

1. de Menezes SL, Kelly JW, Wolfe R, Farrugia H, Mar VJ. The increasing use of shave biopsy for diagnosing invasive melanoma in Australia. Med J Aust 2019;211(5):213–18. doi: 10.5694/mja2.50289.
2. Guitera P, Collgros H, Madronio CM, et al. The steadily growing problem of lentigo maligna and lentigo maligna melanoma in Australia: Population-based data on diagnosis and management. Australas J Dermatol 2019;60(2):118–25. doi: 10.1111/ajd.12928.
3. Pitney T, Shao E, Muir J. A Reply to 'Think before you shave: factors influencing choice of biopsy technique for invasive melanoma and effect on definitive management'. Australas J Dermatol. 2020;62(1):96–97. doi: 10.1111/ajd.13389.
4. Mazzoni D, Shao E, Brown H, Muir J. A reply to 'The impact of incomplete clinical information and initial biopsy technique on the histopathologic diagnosis of cutaneous melanoma'. Australas J Dermatol 2022;63(1):e106–07. doi: 10.1111/ajd.13732.
5. de Menezes SL, Wolfe R, Kelly JW, Farrugia H, Mar VJ. Think before you shave: Factors influencing choice of biopsy technique for invasive melanoma and effect on definitive management. Australas J Dermatol 2020;61(2):134–39. doi: 10.1111/ajd.13227.
6. Kelly JBT, Damian D, Ng J, Fishburn P, Scolyer R, Soyer P; Cancer Council Australia Melanoma Guidelines Working Party. Clinical question: What type of biopsy should be performed for a suspicious pigmented skin lesion? In: Clinical practice guidelines for the diagnosis and management of melanoma. Sydney: Melanoma Institute Australia. Available at www.cancer.org.au/assets/pdf/archived-diagnosis-and-management-of-melanoma-guidelines-11-june-2018 [Accessed 24 September 2023]
7. Mir M, Chan CS, Khan F, Krishnan B, Orengo I, Rosen T. The rate of melanoma transection with various biopsy techniques and the influence of tumor transection on patient survival. J Am Acad Dermatol 2013;68(3):452–58. doi: 10.1016/j.jaad.2012.08.005.
8. Egnatios GL, Dueck AC, Macdonald JB, et al. The impact of biopsy technique on upstaging, residual disease, and outcome in cutaneous melanoma. Am J Surg 2011;202(6):771–77. doi: 10.1016/j.amjsurg.2011.06.037.
9. Hieken TJ, Hernández-Irizarry R, Boll JM, Jones Coleman JE. Accuracy of diagnostic biopsy for cutaneous melanoma: Implications for surgical oncologists. Int J Surg Oncol 2013;2013:196493. doi: 10.1155/2013/196493.
10. Lowe M, Hill N, Page A, Chen S, Delman KA. The impact of shave biopsy on the management of patients with thin melanomas. Am Surg 2011;77(8):1050–53. doi: 10.1177/000313481107700826.
11. Mills JK, White I, Diggs B, Fortino J, Vetto JT. Effect of biopsy type on outcomes in the treatment of primary cutaneous melanoma. Am J Surg 2013;205(5):585–90. doi: 10.1016/j.amjsurg.2013.01.023.
12. Pitney T, Muir J. The use of shave excision by dermatologists in Australia: A consensus survey. Australas J Dermatol 2021;62(4):514–17. doi: 10.1111/ajd.13664.
13. Shao E, Blake T, Po-Chao F, et al. Prospective study of pigmented lesions managed by shave excision with no deep margin transection of melanomas. Australas J Dermatol 2020;61(3):269–72. doi: 10.1111/ajd.13312.
14. Olsen CM, Pandeya N, Rosenberg PS, Whiteman DC. Incidence of in situ vs invasive melanoma: Testing the 'obligate precursor' hypothesis. J Natl Cancer Inst 2022;114(10):1364–70. doi: 10.1093/jnci/djac138.
15. Pitney T, Muir DJ. Single-center, single-operator, retrospective analysis of base transection rates in shave procedures for melanoma diagnosis. J Am Acad Dermatol 2021;84(3):861–62. doi: 10.1016/j.jaad.2020.10.049.
16. Brown H, De'Ambrosis B, Yong-Gee S, Griffin A, Muir J. Melanoma diagnosis at a specialist dermatology practice without the use of photographic surveillance. Australas J Dermatol 2023;64(2):234–41. doi: 10.1111/ajd.14008.
17. Hay J, Keir J, Jimenez Balcells C, et al. Characteristics, treatment and outcomes of 589 melanoma patients documented by 27 general practitioners on the Skin Cancer Audit Research Database. Australas J Dermatol 2022;63(2):204–12. doi: 10.1111/ajd.13843.
18. Chia AL, Simonova G, Dutta B, Lim A, Shumack S. Melanoma diagnosis: Australian dermatologists' number needed to treat. Australas J Dermatol 2008;49(1):12–15. doi: 10.1111/j.1440-0960.2007.00410.x.
19. Nguyen J, Doolan BJ, Pan Y, et al. Evaluation of dynamic dermoscopic features of melanoma and benign naevi by sequential digital dermoscopic imaging and total body photography in a high-risk Australian cohort. Australas J Dermatol 2023;64(1):67–79. doi: 10.1111/ajd.13975.
20. Nelson KC, Swetter SM, Saboda K, Chen SC, Curiel-Lewandrowski C. Evaluation of the number-needed-to-biopsy metric for the diagnosis of cutaneous melanoma: A systematic review and meta-analysis. JAMA Dermatol 2019;155(10):1167–74. doi: 10.1001/jamadermatol.2019.1514.
21. McKenna JK, Florell SR, Goldman GD, Bowen GM. Lentigo maligna/lentigo maligna melanoma: Current state of diagnosis and treatment. Dermatol Surg 2006;32(4):493–504. doi: 10.1097/00042728-200604000-00003.
22. Marchetti MA, Yu A, Nanda J, et al. Number needed to biopsy ratio and diagnostic accuracy for melanoma detection. J Am Acad Dermatol 2020;83(3):780–87. doi: 10.1016/j.jaad.2020.04.109.
23. Green AC, Pandeya N, Morton S, Simonidis J, Whiteman DC. Early detection of melanoma in specialised primary care practice in Australia. Cancer Epidemiol 2021;70:101872. doi: 10.1016/j.canep.2020.101872.
24. Pandeya N, Olsen CM, Shalit MM, Dusingize JC, Neale RE, Whiteman DC. The diagnosis and initial management of melanoma in Australia: Findings from the prospective, population-based QSkin study. Med J Aust 2023;218(9):402–07. doi: 10.5694/mja2.51919.
25. Smith AL, Watts CG, Robinson S, et al; Australian Melanoma Centre of Research Excellence Study Group. GPs' involvement in diagnosing, treating, and referring patients with suspected or confirmed primary cutaneous melanoma: A qualitative study. BJGP Open 2020;4(2):bjgpopen20X101028. doi: 10.3399/bjgpopen20X101028.
26. Byrnes P, Ackermann E, Williams ID, Mitchell GK, Askew D. Management of skin cancer in Australia—A comparison of general practice and skin cancer clinics. Aust Fam Physician 2007;36(12):1073–75.
27. Youl PH, Baade PD, Janda M, Del Mar CB, Whiteman DC, Aitken JF. Diagnosing skin cancer in primary care: How do mainstream general practitioners compare with primary care skin cancer clinic doctors? Med J Aust 2007;187(4):215–20. doi: 10.5694/j.1326-5377.2007.tb01202.x.
28. Skaggs R, Coldiron B. Skin biopsy and skin cancer treatment use in the Medicare population, 1993 to 2016. J Am Acad Dermatol 2021;84(1):53–59. doi: 10.1016/j.jaad.2020.06.030.
29. Hornung A, Steeb T, Wessely A, et al. The value of total body photography for the early detection of melanoma: A systematic review. Int J Environ Res Public Health 2021;18(4):1726. doi: 10.3390/ijerph18041726.
30. Salerni G, Carrera C, Lovatto L, et al. Benefits of total body photography and digital dermatoscopy ('two-step method of digital follow-up') in the early diagnosis of melanoma in patients at high risk for melanoma. J Am Acad Dermatol 2012 Jul;67(1):e17–27. doi: 10.1016/j.jaad.2011.04.008.
31. Ji-Xu A, Dinnes J, Matin RN. Total body photography for the diagnosis of cutaneous melanoma in adults: A systematic review and meta-analysis. Br J Dermatol 2021;185(2):302–12. doi: 10.1111/bjd.19759.
32. Guitera P, Menzies SW, Coates E, et al. Efficiency of detecting new primary melanoma among individuals treated in a high-risk clinic for skin surveillance. JAMA Dermatol 2021;157(5):521–30. doi: 10.1001/jamadermatol.2020.5651.
33. Xiong DD, Barriera-Silvestrini P, Knackstedt TJ. Delays in the surgical treatment of melanoma are associated with worsened overall and melanoma-specific mortality: A population-based analysis. J Am Acad Dermatol 2022;87(4):807–14. doi: 10.1016/j.jaad.2022.06.1190.
34. Argenziano G, Kittler H, Ferrara G, et al. Slow-growing melanoma: A dermoscopy follow-up study. Br J Dermatol 2010;162(2):267–73. doi: 10.1111/j.1365-2133.2009.09416.x.
35. Rosendahl C, Hishon M, Akay BN. Shave versus elliptical biopsy for melanoma substantially increases re-excision area and length. Dermatol Surg 2018;44(5):731–33. doi: 10.1097/DSS.0000000000001292.

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