Impact of Initial Biopsy Technique on T-stage, Time-to-treatment, and Likelihood of Up-staging to Immunotherapy in Melanoma

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1. Background

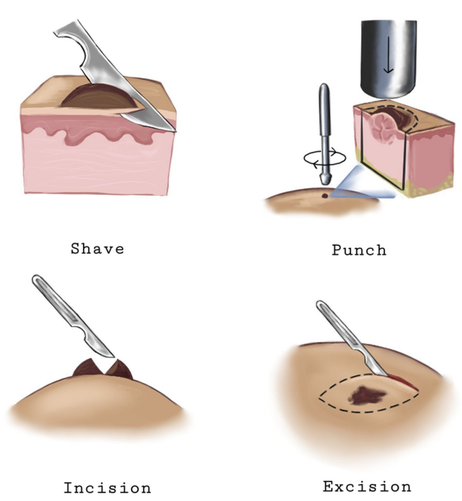
- Melanoma is the deadliest form of skin cancer, with global incidence projected to increase by over 50% by 2040.
- While most early-stage cases are effectively treated surgically, advanced disease carries poor prognosis and high healthcare costs.
- Accurate staging at diagnosis is essential for timely management, particularly given the increasing role of adjuvant and neoadjuvant immunotherapy.
- The recent paradigm shift towards neoadjuvant and adjuvant immunotherapy warrants a closer look at the effect of biopsy technique on the number of cases that are up-staged towards an immunotherapy regimen.
- Study aim: To determine the effect of biopsy technique on T-stage, time-to-treatment, and likelihood of up-staging to immunotherapy.

2. Methods and Materials

- Retrospective review of 834 patients with a diagnosis of a primary head/neck melanoma who received surgical intervention by UVA ENT between 2018 and 2023.
- Patients with known recurrence were excluded.
- Biopsy types:
  - Shave
  - Punch
  - Narrow excisional
- Pathologic grades from both biopsy and surgical specimens were gathered.
- pT3a used as cutoff for need for consideration of adjuvant immunotherapy per NCCN 2025 guidelines.
- Time-to-treatment initiation was calculated from date of initial biopsy to date of definitive surgical resection.

Biopsy Type	Average Age	# Male	# Female	Total #
Punch	43	9	4	13
Shave	68	57	15	72
Narrow excisional	66	7	5	12

Table 1. *Patient Characteristics by Biopsy Type*



3. Results

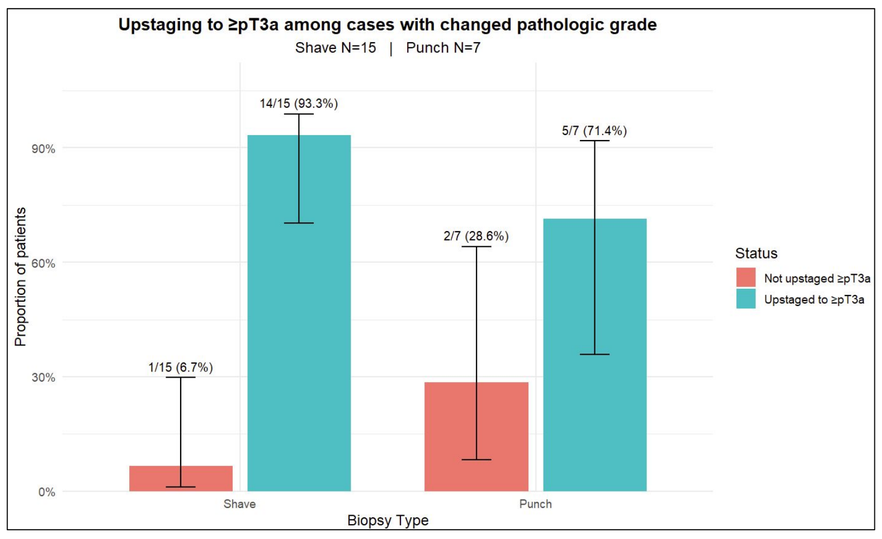


Figure 1. *Number of Patients Up-staged to ≥ pT3a by Biopsy Type.*

Shave biopsies accounted for the majority of up-staging events, though differences were not statistically significant (p=0.29 by Fisher's exact test).

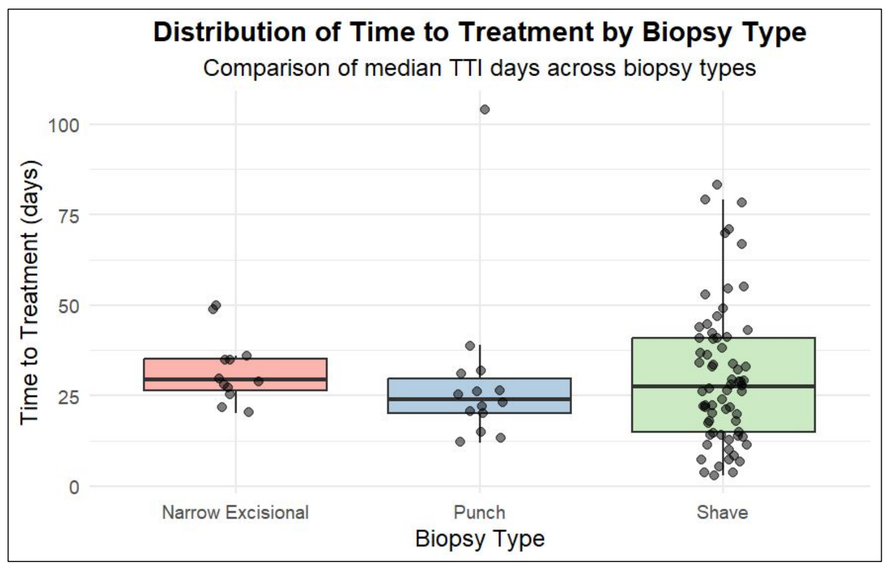


Figure 2. *Distribution of Time-to-Treatment by Biopsy Type*.

Median time from biopsy to surgery did not differ significantly by biopsy type (p=0.41 by Kruskal–Wallis test).

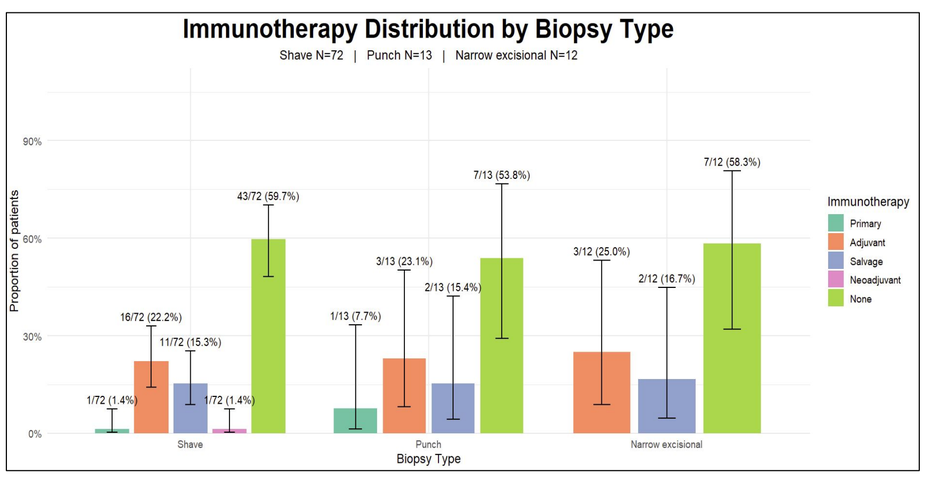


Figure 3. *Distribution of Immunotherapy Use by Biopsy Type.*

Immunotherapy timing did not differ significantly across biopsy techniques (p=0.51 by Fisher's exact test).

4. Discussion

- Among grade-changed cases, up-staging to pT3a+ occurred in 14/16 after shave vs. 5/8 after punch, with shaves comprising 58.3% of all pT3a+ events.
- Median time-to-treatment was similar across techniques, with punch slightly shorter and shave showing greater variability without a clear clinically meaningful difference.
- Immunotherapy utilization proportions were comparable by biopsy type, with most patients receiving none.
- Limitations include retrospective single-center design, small strata (underpowered), and metrics based on the changed-grade subset.
- Potential confounders include lesion characteristics (location, site, ulceration), Breslow depth at biopsy, and clinician preferences, which were not adjusted for.

5. Conclusion

- Shave biopsies were associated with a higher proportion of pT3a+ up-staging among grade-changed cases (14/16 vs 5/8 for punch).
- Time-to-treatment was broadly similar by technique, with only modest differences and greater variance after shave.
- Initial biopsy technique did not meaningfully influence immunotherapy use in this cohort.
- Future work: adjust for key confounders and expand outcomes (e.g., SLN positivity, recurrence, survival) in larger multicenter cohorts.

6. References

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