



Short Communication

Analysis of Student Performance Patterns in Practical Anatomy Spotter Examinations

Uma Pandalai

Department of Biological Sciences, Oakland University, Rochester, MI, USA
umapandalai07@gmail.com

Available online at: www.isca.in

Received 23rd February 2026, revised 12th March 2026, accepted 30th April 2026

Abstract

Practical spotter examinations are widely used in undergraduate anatomy education to evaluate rapid identification of anatomical structures and applied spatial knowledge. This study analyzed performance patterns among 150 undergraduate students across six anatomical regions. Region-wise mean accuracy percentages were calculated and compared using one-way ANOVA. Highest accuracy was observed in the upper limb (78.2%) and lowest in neuroanatomy (64.3%). Significant variation in performance was identified ($p < 0.05$), with frequent errors in complex neurovascular regions. Region-specific performance analytics may support targeted curricular refinement in anatomy education.

Keywords: Anatomy education; spotter examination; undergraduate learning; neuroanatomy; performance analysis.

Introduction

Anatomy remains a foundational discipline in medical and health sciences education¹. Practical spotter examinations are commonly employed to assess students' ability to recognize anatomical structures under time constraints². Performance may vary across anatomical regions due to structural complexity and cognitive load differences^{3,4}.

The present study aimed to analyze student performance patterns across major anatomical regions and identify commonly misunderstood structures.

Materials and Methods

A retrospective cross-sectional study was conducted using anonymized academic performance data from 150 undergraduate students enrolled in a gross anatomy course. The examination consisted of labeled cadaveric specimens and models categorized into six anatomical regions.

One-way ANOVA was used for comparison, with statistical significance set at $p < 0.05$ ³. Institutional permission was obtained in accordance with ethical research principles².

Results and Discussion

The overall mean performance was 72.4±8.6%. Students performed significantly better in musculoskeletal regions compared to neuroanatomy and head and neck ($p < 0.05$). Lower performance in neuroanatomy likely reflects higher spatial complexity and cognitive demand⁴.

Table-1: Region-wise Performance in Practical Spotter Examination.

Anatomical Region	Total Questions	Mean Accuracy (%)	Standard Deviation	% Incorrect
Upper Limb	10	78.2	7.4	21.8
Lower Limb	10	75.6	8.1	24.4
Thorax	8	73.5	7.9	26.5
Abdomen	8	71.2	8.3	28.8
Head and Neck	7	67.1	9.2	32.9
Neuroanatomy	7	64.3	9.8	35.7

Table-2: Most Frequently Missed Structures.

Structure Identified	Anatomical Region	% Incorrect
Cranial nerve branches	Head & Neck	42%
Skull base foramina	Head & Neck	39%
Brainstem nuclei	Neuroanatomy	45%
Internal capsule components	Neuroanatomy	38%
Autonomic plexuses	Abdomen	34%
Deep cervical vessels	Head & Neck	31%

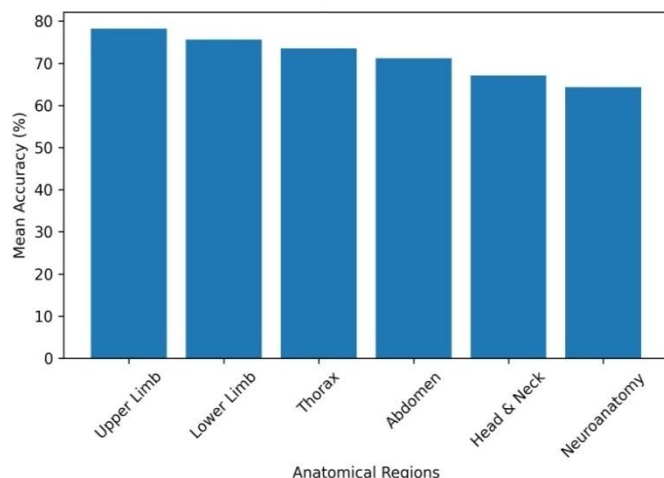


Figure-1: Mean Accuracy (%) Across Anatomical Regions.

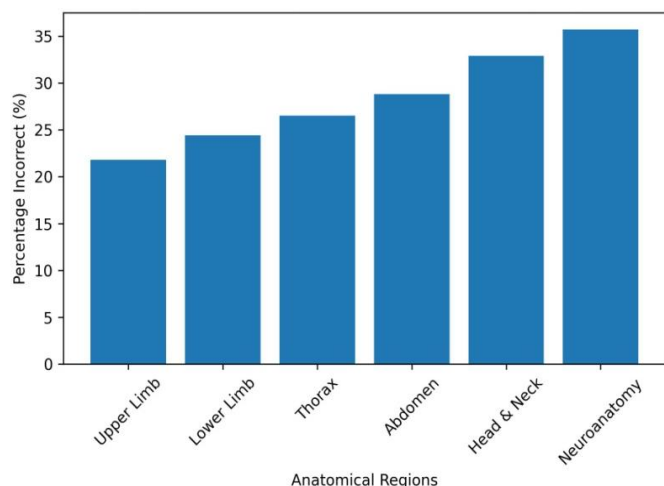


Figure-2: Percentage of Incorrect Responses by Anatomical Region.

Discussion: Students performed significantly better in musculoskeletal regions compared to neuroanatomy and head and neck ($p < 0.05$).

Error Patterns: Frequently missed structures included cranial nerve branches, foramina of the skull base, and deep cervical neurovascular bundles. Lower accuracy in neuroanatomy may reflect the intricate spatial organization and higher cognitive demands associated with this region⁴.

Educational Implications: Previous literature emphasizes that spatially complex anatomical regions increase cognitive load and require enhanced visual reinforcement strategies^{3,4}. The present findings support incorporating structured neuroanatomy revision sessions, three-dimensional visualization tools, and clinically integrated learning to improve performance.

Systematic performance analytics in anatomy assessments may assist educators in identifying curricular gaps and implementing targeted instructional interventions¹.

Conclusion

Distinct regional variability was observed in practical anatomy spotter examinations. Lower accuracy in neuroanatomy and head and neck highlights areas requiring enhanced instructional reinforcement.

References

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