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Cadaveric study of Electromyographic Needle Approach to the Rhomboid

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Objective
Safe and accurate electromyographic needle access to the rhomboid major (RM) is challenging due to the overlying trapezius muscle and a risk of pneumothorax. This study was performed to investigate the safe and accurate electromyographic needle insertion site of the RM through cadaver dissection.

Methods
Cadaver dissections of the trapezius and RM muscles in 18 scapulae of 9 fresh cadavers were performed. The point (point A) at which the lateral margin of the lower trapezius crosses the medial border of the scapula and the distal insertion point (point DI) of the RM to the scapula were determined. The midpoint (point M) between point A and the point DI was also determined. The distance from the inferior angle of the scapular to the point A, point DI, and point M were measured, respectively.

Results
The average length of the medial scapula was 12.9±1.2 cm from the root of the scapular spine to the inferior angle of the scapula. Point A and Point DI were located at a mean distance of 8.4±0.7 cm and 1.8±0.4 cm proximal to the inferior angle of the scapula, respectively. Point M was sited at a distance of 5.1±0.5 cm from the inferior angle of the scapula.

Conclusion
Needle electromyographic examination of the RM can be accomplished safely and more precisely through the middle to lower part of the RM (about 40 percent distance of the medial scapula from the inferior angle to the root of scapular spine) not covered by the trapezius.

Table 1. Anatomical parameters of the rhomboid major and trapezius muscles. Parameters are distances from the inferior angle of the scapula. Values are mean ± SD (median; range). A, the point where the lateral margin of the trapezius crosses the medial border of the scapula; DI, the distal insertion point of the rhomboid major to the medial margin of the scapula; M = the midpoint between the point A and the point DI; Point_A_ratio, ratio of point A to the distance between the inferior angle and the root of the scapular spine (length of medial scapular margin); Point_M_ratio, ratio of point M to the length of the medial scapula.

Parameters	Values
Point_A (cm)	8.4 ± 0.7 (8.3; 6.9 to 9.4)
Point_A_ratio (%)	65.4 ± 6.0 (65.9; 53.0 to 75.8)
Point_DI (cm)	1.8 ± 0.4 (1.8; 1.0 to 2.4)
Point_M	5.1 ± 0.5 (5.0; 4.3 to 5.8)
Point_M_ratio (%)	39.7 ± 3.7 (39.6; 32.0 to 47.5)

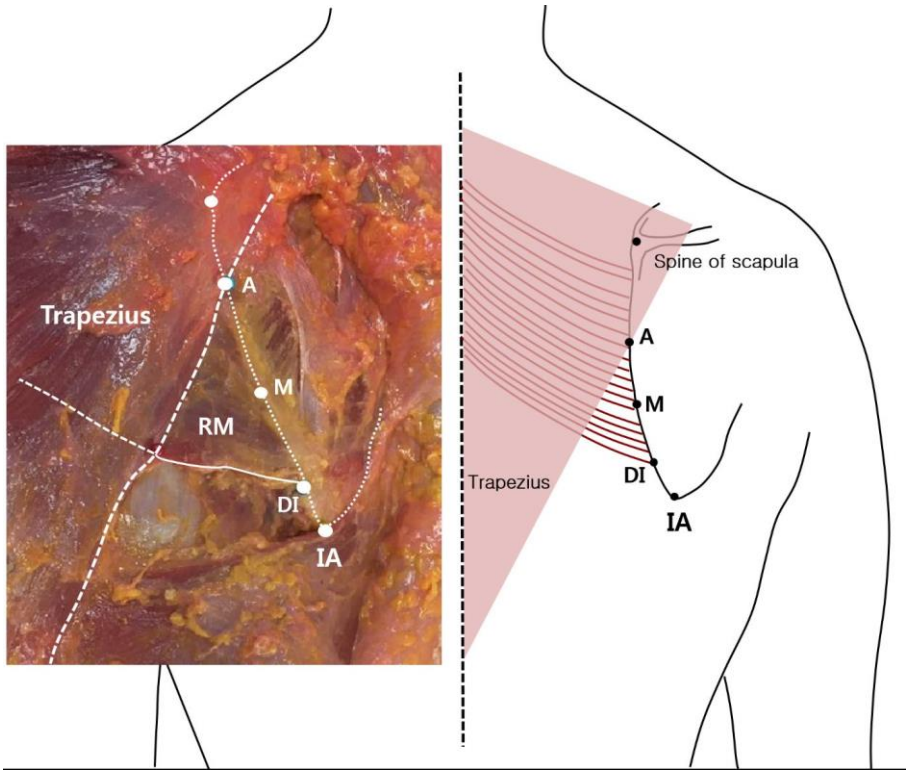

Fig 1. Anatomical relation of the trapezius and the rhomboid major (RM) is investigated after dissection of the subcutaneous tissue of cadaver. A, the point where the lateral margin of the trapezius crosses the medial border of the scapula; DI, the distal insertion point of the rhomboid major to the medial margin of the scapula; M, the midpoint between the point A and the point DI; IA, inferior angle of the scapula.