

Anatomical Findings and Co-Operative Function of m. Deltoid and m. Brachialis

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BACKGROUND: In the anatomical literature muscles deltoid and brachialis are two individual muscles with own origins, insertions and functions. Deltoid acts with glenohumeral joint whereas brachialis acts with humeroulnar joint. On the other hand old anatomists e.g. Da Vinci described insertion of deltoid much more complex. The deltoid muscle works together with the brachialis muscle from the functional point of view. The aim of this study is to analyse the anatomical/fascial continuity between the brachialis and deltoid.

MATERIAL AND METHODS: Six embalmed cadavers and two fresh cadavers were dissected. Ultrasonography and EMG analysis of the 19 healthy adults.

RESULTS: In cadavers the origin of the m. deltoid was similar with literature. Insertion and muscular fascicles orientation differs. There was clearly visible anterior part, but lateral and posterior parts formed only one division, which fascicular orientation was horizontally inclining. Anterior part inserted via tendon to the deltoid tuberosity. The lateral and posterior parts inserted with deep fibres in to the broad area above deltoid tuberosity and superficial fibres formed a clear continuity to the m. brachialis. Those fibres were not attached to the anterior part of tendon at all. Ultrasonography visualized mechanical changes in both muscles while doing active glenohumeral abduction and also in humeroulnar flexion. There were individual muscular and fascial layouts. EMG activations showed clear co-activation in G/H abduction in all 19 cases. In 14/19 deltoid activated with brachialis in the humeroulnar flexion.

CONCLUSION: Cadaver findings points clearly that muscles are tightly forming united network rather than exist in single forms. Therefore it is obvious muscles can't work alone. This co-activation was seen also by ultrasonography and supported by EMG. Clinically this study highlights importance of functional movement patterns and supports idea of myofascial anatomy and its complexity.

