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## Respiratory Muscle Assessments to Predict Weaning Outcomes



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Various factors influence failure to wean from mechanical ventilation, including respiratory muscle dysfunction, which is strongly associated with weaning failure and mortality. However, respiratory muscle function assessment is not routinely performed in most ICUs.

Various bedside tools are available for assessing respiratory muscle function, including non-volitional and less invasive methods such as maximal inspiratory and expiratory pressures, ultrasound imaging, airway occlusion pressure, and electromyography. Previous studies have examined the associations between these assessments and weaning outcomes, but none have compared their predictive accuracy.

This review aimed to estimate and compare the accuracy of bedside respiratory muscle assessments in predicting weaning outcomes. The study focused on methods evaluated in previous meta-analyses or recommended in recent international statements for ICU settings. The goal of the comparative analysis is to guide clinicians in selecting the most appropriate respiratory muscle assessment method during the weaning process.

The assessments included maximal inspiratory and expiratory pressures, diaphragm thickening fraction (DTF) and excursion (DE), end-expiratory and end-inspiratory diaphragm thickness, airway occlusion pressure, electrical activity of respiratory muscles, and assessments of transdiaphragmatic and airway opening pressures, both volitional and non-volitional.

The researchers searched several databases, including Medline (via Pubmed), EMBASE, Web of Science, Cochrane Library, and CINAHL, from inception to April 5, 2023. They included studies involving adult patients on mechanical ventilation that reported data on predictive accuracy. Out of 94 identified studies, 88 studies comprising 6296 patients were included in the meta-analyses.

When comparing the accuracy of these assessments, it was found that DE and DTF had significantly higher accuracy in predicting weaning success than maximal inspiratory pressure (P<sub>I</sub>max). Additionally, sensitivity and direct comparison analyses revealed that DTF's accuracy in predicting weaning success was significantly higher than DE.

The findings suggest that DTF and DE outperform P<sub>I</sub>max in predicting weaning success. Specifically, DTF appears to have the highest accuracy among all respiratory muscle assessments. However, further research is needed to determine the optimal threshold of DTF for accurately predicting weaning success.

Source: [Critical Care](#)  
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Published on : Tue, 12 Mar 2024