



Figure 24-1. Scapular muscle exercise continuum. Abbreviations: EMG, electromyography; MVIC, maximum voluntary isometric contraction.

observed, make the exercises simpler by, for example, changing the lever arm or reducing the resistance. The push-up plus exercise is identified in this program but can be simplified by using a knee push-up plus or incline push-up plus. Lower loads reduce muscular demands. A wall push-up plus is often prescribed because it creates a lower load on the shoulder muscles, but it has been found to improperly increase upper trapezius activation over the serratus anterior, the targeted muscle during this type of exercise.⁴

The final 4 exercises are high to very high in muscular activation levels. The horizontal abduction exercises target the lower trapezius muscles, whereas the upper cut and scaption above 120 degrees exercises primarily challenge the serratus anterior. Prescriptions of these exercises are used to strengthen but should not be at the cost of creating substitution patterns with other muscles or aggravating a sore shoulder. When a patient has demonstrated a good foundation of scapular control with the lower-demand exercises, these higher-demand exercises can be introduced. In a healthy population, these exercises would be good candidates for use to prevent scapular dyskinesia. Increased loads and longer lever arms increase muscular demands during these exercises and can be modified to minimize substitution patterns.