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A tongue retaining device and sleep-state genioglossus muscle activity in patients with obstructive sleep apnea

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ABSTRACT

To define the effect of a tongue retaining device (TRD) on genioglossus (GG) muscle activity in seven obstructive sleep apnea subjects, two overnight sleep studies were carried out with two TRDs. TRD-A had no anterior bulb and incorporated two electrodes to record GG electromyographic (EMG) activity. TRD-B had a bulb and it had electrodes similar to those in TRD-A. Episodes of apnea/hypopnea (AH) were analyzed during both rapid eye movement (REM) and non-REM (NREM) sleep. The peak GG muscle activity was measured for the breath immediately before the AH (pre-AH), for the first (first-E) and last (last-E) inspiratory efforts during the AH, and for the first breath after the AH (post-AH). The time lag between the peak GG EMG activity and the maximum inspiratory effort was calculated. The AH index decreased with both TRDs. The peak GG EMG activity preceded the maximum inspiratory effort throughout the periods, however the time lag changed considerably with TRD-A. The time lags with TRD-A and TRD-B differed significantly for the first-E and the last-E during NREM sleep and for the first-E during REM sleep. The TRD reduces AH severity, normalizes the time lag, and counteracts fluctuating GG EMG activity observed when no bulb is present.

KEY WORDS: Tongue retaining device, Genioglossus muscle, Sleep, Obstructive sleep apnea.

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