



# Performance Medicine Institute

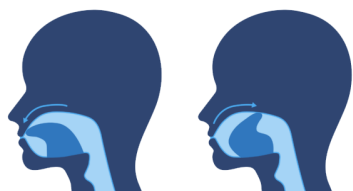
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## Sleep Apnea Muscle Training

Cardio and resistance training improve overall respiratory health and reduce fat deposits around the airway, while throat and facial muscle exercises directly strengthen the muscles responsible for keeping the airway open. For sleep apnea, strengthening muscles during the inspiratory phase of breathing is particularly helpful, while training expiratory muscles does not appear to provide much direct benefit.

### Tongue, Throat and Facial Muscle Exercises

**Tongue Slide:** Place the tip of your tongue against the back of your top front teeth. Slowly slide your tongue backward with the tip moving along the roof of your mouth. *Repeat 5 to 10 times.*



**Tongue Stretch:** Stick out your tongue as far as you can. Try to touch your chin with your tongue while looking at the ceiling. Hold for 10 to 15 seconds and increase the duration gradually. *Repeat 5 times.*



**Tongue Push Up:** Stick your tongue upward against the roof of your mouth and press your entire tongue against it. Hold this position for 10 seconds. *Repeat 5 times.*



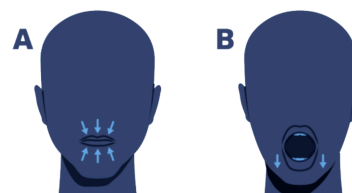
**Tongue Push Down:** Put the tip of your tongue against your lower front teeth and then push the back of your tongue flat against the floor of your mouth. Hold this position for 10 seconds. *Repeat 5 times.*



**Cheek Hook:** Use a hooked finger to lightly pull your right cheek outward, and then use your facial muscles to pull your cheek back inward. *Repeat 10 times on each side.*



**Jaw Stretch:** Tightly close your mouth by pursing your lips. Then open your mouth, relaxing your jaw and lips. *Repeat 10 times.*



## Inspiratory Muscle Training

The Breather is an inspiratory muscle training device that uses progressive increasing resistance to strengthen throat and chest muscles. Breathing against resistance causes increased motor control of respiratory muscles in the throat, and hypertrophy of the diaphragm muscles. You can purchase the Breather on Amazon or pnmedical.com.



The following is a protocol that can be used with the Breather to improve respiratory muscle function and reduce sleep apnea. The exercises should be performed 4-6 times per week, twice a day (morning and evening). Upon reaching week 12, you can continue a maintenance phase with exercises 2-3 times per week at the same resistance level and sets/ reps as week 12.

Week	Resistance Level	Sets/Reps	Week	Resistance Level	Sets/Reps
1	1	3x10	7	4	3x15
2	2	2x12	8	5	2x12
3	2	3x15	9	5	3x15
4	3	2x12	10	6	2x10
5	3	3x15	11	6	3x10
6	4	2x12	12	6	3x15

## Transcutaneous Electrical Nerve Stimulation

Transcutaneous electrical nerve stimulation (TENS) has shown promise in treating sleep apnea. The hypoglossal nerve controls many of the throat muscles that play an important role in maintaining an open airway during sleep. For many patients with sleep apnea, these muscles can be weak or not functioning properly. By stimulating the hypoglossal nerve, TENS can help to improve muscle function and reduce the symptoms of sleep apnea.

TENS units can be purchased from Amazon or medical device stores. The general protocol is to set TENS stimulation frequency at 20Hz, with a 100 $\mu$ s pulse width. Electrodes are placed over the hypoglossal nerve as shown in this diagram, and the current intensity is adjusted to the maximum tolerable dose without pain. The stimulation should run for 15 minutes at a time, once a day, 3 to 5 days per week. This should be performed for a 6 to 8 week period, and can be extended beyond this. For best results, please bring your TENS unit into our office for fitting and instruction.

