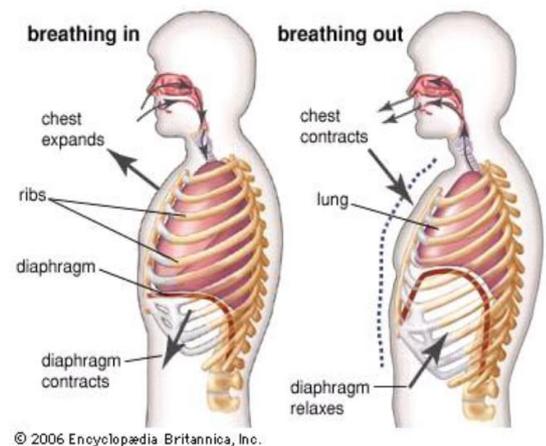


## Spinal Cord Injury Respiratory Health - Inspiratory Muscle Training (IMT) Protocol

- Weakness of the inspiratory muscles contributes to reduced lung volumes after spinal cord injury (SCI) and increases the risk of developing respiratory complications.
- Inspiratory muscles respond well to a training stimulus to increase their strength and function.
- A simple and effective treatment is resistance-based inspiratory muscle training (IMT).

### Research suggests....

**A Cochrane review identified that respiratory muscle training (RMT) is effective for increasing respiratory muscle strength and increasing lung volumes for people with tetraplegia, including vital capacity, maximal inspiratory pressure and inspiratory volume (1,2,3). RMT has been shown to improve lung function and reduce the severity of sleep apnoea (2). Higher inspiratory muscle power may reduce the risk of pneumonia, improve cough efficacy (4) and reduce the risk of developing respiratory complications (6). Importantly, no adverse effects of respiratory muscle training have been reported (1) and IMT is effective in both acute and chronic SCI(6).**



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### Strength Training Program

- Using the Phillips Threshold IMT (5), turn the white knob until the red line aligns with the black line at the setting 10cm H<sub>2</sub>O.
- Begin training with **3 – 5 sets of 10 – 12 repetitions, once/day for 5 days per week (6)**
- Attach the mouthpiece to the tube, apply the nose clip if you can, take a deep slow breath in
- If you hear a "whistling" sound – sounds like a "Kazhoo!" sound – this means you are breathing in *too hard, short and sharp*. Remember! It is harder (and better for your lungs ☺) to take a **deep and slow** breath in – expanding all the way down to your lung bases and really challenging your muscles.
- Inspiration should take around 5 secs: **Breathe in for 1.....2.....3.....4.....5; Relax and breathe out.**
- To progress the training stimulus, try increasing the pressure by **10% every 2<sup>nd</sup> or 3<sup>rd</sup> day, or at least every week**, and try to increase the number of repetitions until you reach 5 sets of 12 reps

### References:

1. Berlowitz DJ, Tamplin J. (2013). **Respiratory muscle training for cervical spinal cord injury**. Cochrane Database of Systematic Reviews 2013, Issue 7. Art. No.: CD008507. DOI: 10.1002/14651858.CD008507.pub2. [www.cochranelibrary.com](http://www.cochranelibrary.com)
2. Boswell-Ruys, C., Lewis, ., Gandevia, S., Butler, J. (2015) **Respiratory muscle training may improve respiratory function and obstructive sleep apnoea in people with cervical spinal cord injury**. Spinal Cord Series and Cases, 2, 15010; doi:10.1038/scsandc.2015.10
3. Tamplin, J and Berlowitz, D (2014). **A systematic review and meta-analysis of the effects of respiratory muscle training on pulmonary function in tetraplegia**. Spinal Cord, 52, 175–180
4. Raab, A., Krebs, J., Perret, C., Michel, F., Hopman, M., Mueller, G. (2016) **Maximum Inspiratory Pressure is a Discriminator of Pneumonia in Individuals With Spinal-Cord Injury**. Respiratory Care, 61, 12, pp. 1636 – 1643.
5. <https://www.philips.com.au/healthcare/product/HCHS730010/treshold-inspiratory-muscle-trainer>
6. Boswell-Ruys, C., Lewis, C., Wijesuriya, N., McBain, R., Lee, B., McKenzie, D., Gandevia, S., Butler, J. (2020). **Impact of respiratory muscle training on respiratory muscle strength, respiratory function and quality of life in individuals with tetraplegia: a randomized clinical trial**. Thorax, 75; pp. 279 - 288





## Inspiratory Muscle Training Diary

IMT Training Program: Resistance; 10cm H<sub>2</sub>O (to begin with)  
Duration; 5 seconds inspiration time  
Repetition; 3-5 x 10-12 repetitions per day  
Frequency; One session per day, 5 days per week

Week:	Pressure:	Mon	Tuesday	Wed	Thurs	Fri	Sat	Sun
Week 1	10							
Week 2	11							
Week 3	12							
Week 4	13							
Week 5	14							
Week 6	15							

Week:	Pressure:	Mon	Tuesday	Wed	Thurs	Fri	Sat	Sun
Week 7								
Week 8								
Week 9								
Week 10								
Week 11								
Week 12								

Week:	Pressure:	Mon	Tuesday	Wed	Thurs	Fri	Sat	Sun
Week 13								
Week 14								
Week 15								
Week 16								
Week 17								
Week 18								

**Purchase an Inspiratory Muscle Trainer here:**

<https://www.philips.com.au/healthcare/product/HCHS730010/treshold-inspiratory-muscle-trainer>