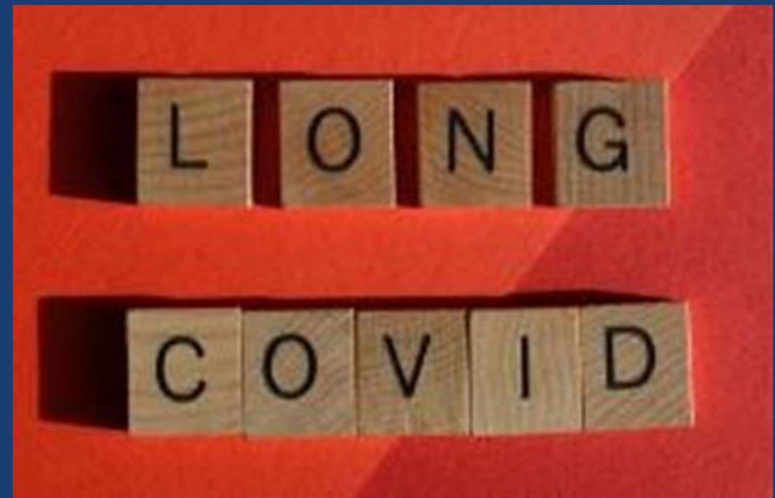


Post Acute Sequelae of COVID-19 and Physical Therapy

John Scherry, PT, CCS, CSCS



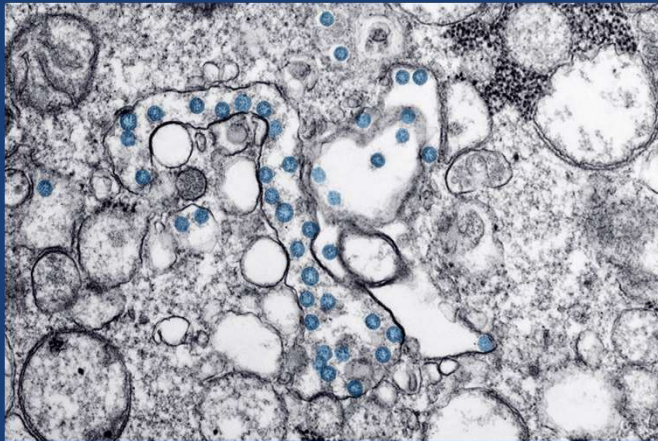
Beth Israel Lahey Health 
Beth Israel Deaconess Medical Center



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

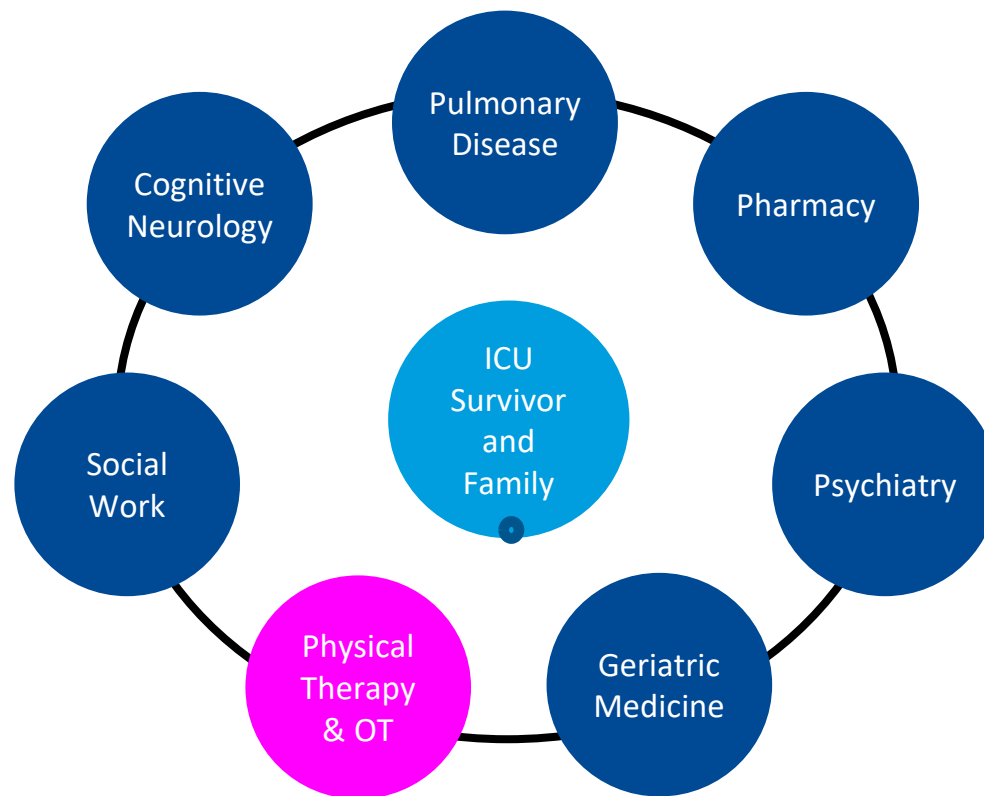
Objectives

- Discuss symptoms of long covid treatable by physical therapy
- Diagnosis of impairments and limitations in physical therapy
- Treatment of long covid in physical therapy
- Patient resources

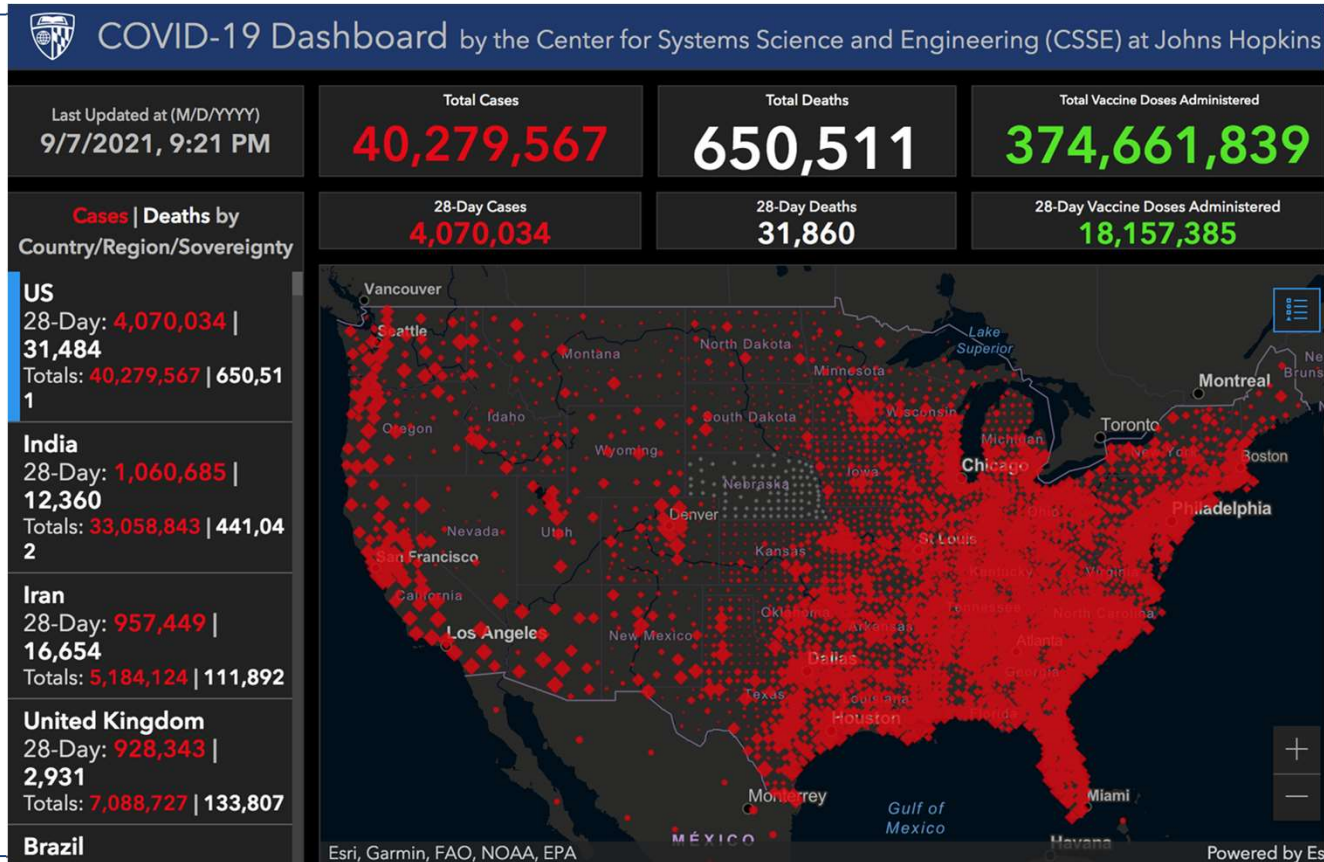


¹ <https://www.cdc.gov/media/subtopic/images.htm>

.....   **BETH ISRAEL
DEACONESS PROGRAM.....
FOR CRITICAL ILLNESS
SURVIVORSHIP**

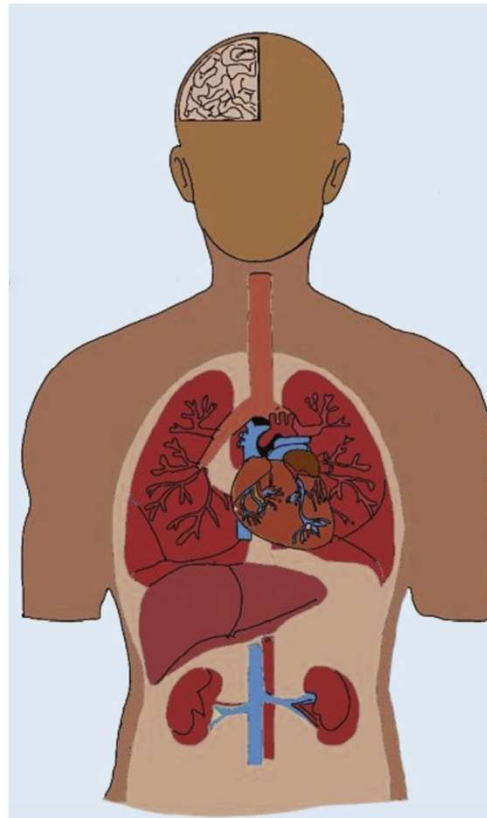


Lives Affected by Covid-19



Symptoms of PASC¹

¹ CHEST. 2021;159(3):949-958



Post-COVID Symptoms, Sequelae

Neuropsychiatric

- Neurocognitive deficits
- Mood changes
- Sensory & motor deficits
- Chronic fatigue and sleep disruption

Respiratory

- Persistent dyspnea
- Chronic cough

Cardiovascular

- Chest pain
- Palpitations

Hematologic, Vascular

- Persistent or recurrent thrombosis

Renal

- Chronic kidney disease

Gastrointestinal, Hepatobiliary

- Persistent liver dysfunction

Musculoskeletal

- Muscle wasting
- Weakness
- Deconditioning

Dermatologic

- Hair loss

Physical Therapy Tests and Outcome Measures¹

- Functional Status & QOL:
 - Short Form-36, Post Covid-19 Functional Status Scale, EuroQol-5D, **Fatigue Severity Scale (FSS)**², Wood Mental Fatigue Index (WMFI)

	Scores						
	1 = Strongly Disagree; 7 = Strongly Agree						
1. My motivation is lower when I am fatigued.	1	2	3	4	5	6	7
2. Exercise brings on my fatigue.	1	2	3	4	5	6	7
3. I am easily fatigued.	1	2	3	4	5	6	7
4. Fatigue interferes with my physical functioning.	1	2	3	4	5	6	7
5. Fatigue causes frequent problems for me.	1	2	3	4	5	6	7
6. My fatigue prevents sustained physical functioning.	1	2	3	4	5	6	7
7. Fatigue interferes with carrying out certain duties and responsibilities.	1	2	3	4	5	6	7
8. Fatigue is among my three most disabling symptoms.	1	2	3	4	5	6	7
9. Fatigue interferes with my work, family, or social life.	1	2	3	4	5	6	7

¹ https://www.apta.org/news/2021/06/21/cdc-long-covid-guidance?_zs=iUJfV1&_zl=RCNj7

² <https://www.sralab.org/rehabilitation-measures/fatigue-severity-scale>

Physical Therapy Tests and Outcome Measures¹

- Exercise Capacity:
 - **Six Minute Walk Test (6MWT)²**
 - **Duke Activity Status Index (DASI)³**
 - **Sit-to-Stand in 30 or 60 Seconds**



		Yes	No
1	Can you take care of yourself (eating, dressing, bathing or using the toilet)?	2.75	0
2	Can you walk indoors, such as around your house?	1.75	0
3	Can you walk a block or two on level ground?	2.75	0
4	Can you climb a flight of stairs or walk up a hill?	5.50	0
5	Can you run a short distance?	8.00	0
6	Can you do light work around the house, such as dusting or washing dishes?	2.70	0
7	Can you do moderate work around the house, such as vacuuming, sweeping floors or carrying in groceries?	3.50	0
8	Can you do heavy work around the house, such as scrubbing floors or lifting and moving heavy furniture?	8.00	0
9	Can you do yard work, such as raking leaves, weeding or pushing a power mower?	4.50	0
10	Can you have sexual relations?	5.25	0
11	Can you participate in moderate recreational activities, such as golf, bowling, dancing, doubles tennis or throwing a baseball or football?	6.00	0
12	Can you participate in strenuous sports, such as swimming, singles tennis, football, basketball or skiing?	7.50	0

Duke Activity Status Index (DASI) = sum of "Yes" replies _____

$VO_{2peak} = (0.43 \times DASI) + 9.6$

$VO_{2peak} = \text{_____ ml/kg/min} + 3.5 \text{ ml/kg/min} = \text{_____ METS}$

¹ https://www.apta.org/news/2021/06/21/cdc-long-covid-guidance?_zs=iUJfV1&_zl=RCNj7

² Am J Respir Crit Care Med. 2002;166:111-117

³ <https://www.mdcalc.com/duke-activity-status-index-dasi>

Physical Therapy Tests and Outcome Measures¹

- Frailty:
 - **Short Physical Performance Battery (SPPB)**
- Balance:
 - **5 Times Sit-to-Stand, Tinetti Gait & Balance Assessment, Dynamic Gait Index (DGI), Functional Gait Assessment (FGA), Berg Balance Scale**

¹ https://www.apta.org/news/2021/06/21/cdc-long-covid-guidance?_zs=iUJfV1&_zl=RCNj7

Physical Therapy Tests and Outcome Measures¹

- Hemodynamic Testing:
 - **Orthostatic Testing**, Tilt-Table Test, **10 Minute Stand Test**

¹ https://www.apta.org/news/2021/06/21/cdc-long-covid-guidance?_zs=iUJfV1&_zl=RCNj7

Physical Therapy Tests and Outcome Measures¹

- Breathing:
 - **Modified Medical Research Council (mMRC) Dyspnea Scale, Borg Scale Rating of Perceived Exertion (RPE)** **BORG SCALE FOR RATING OF PERCEIVED EXERTION**

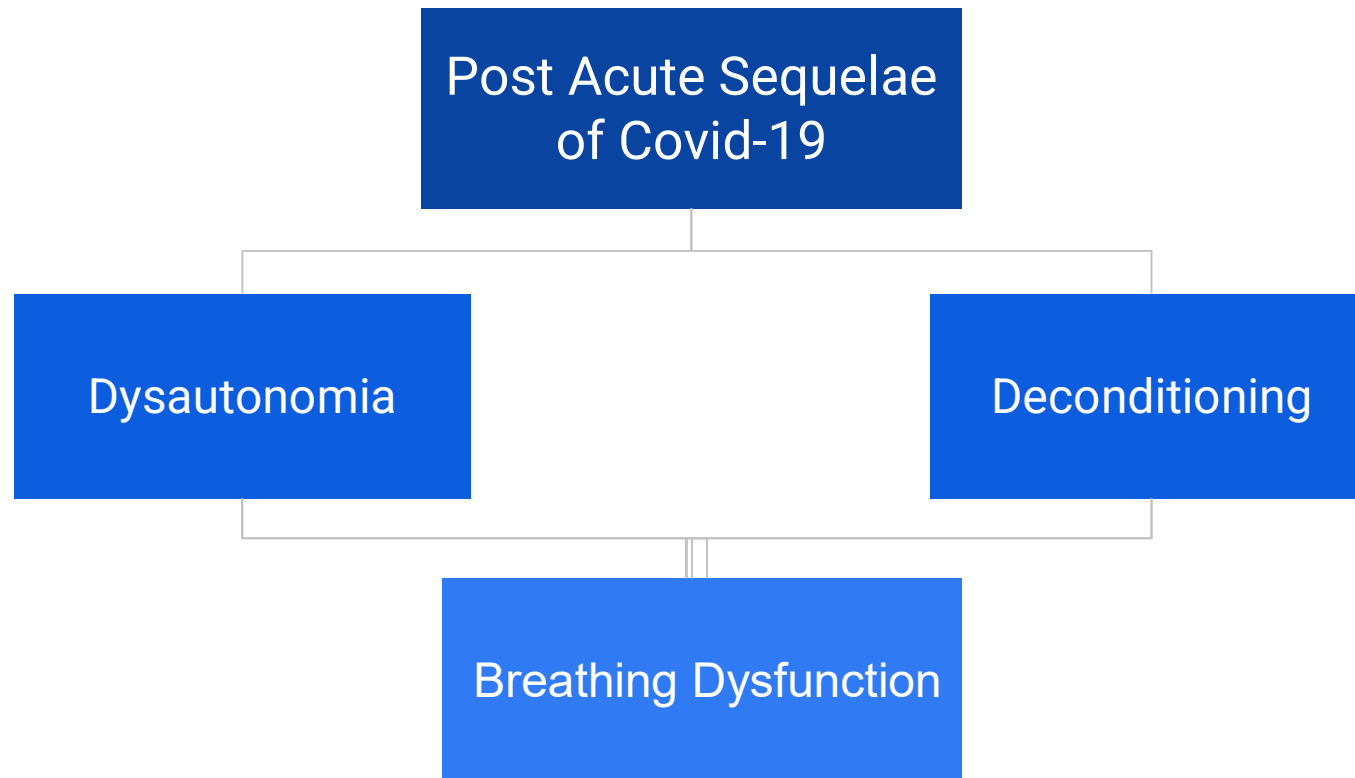
mMRC Breathlessness Scale

Grade	Description of Breathlessness
0	I only get breathless with strenuous exercise
1	I get short of breath when hurrying on level ground or walking up a slight hill
2	On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace
3	I stop for breath after walking about 100 yards or after a few minutes on level ground
4	I am too breathless to leave the house or I am breathless when dressing

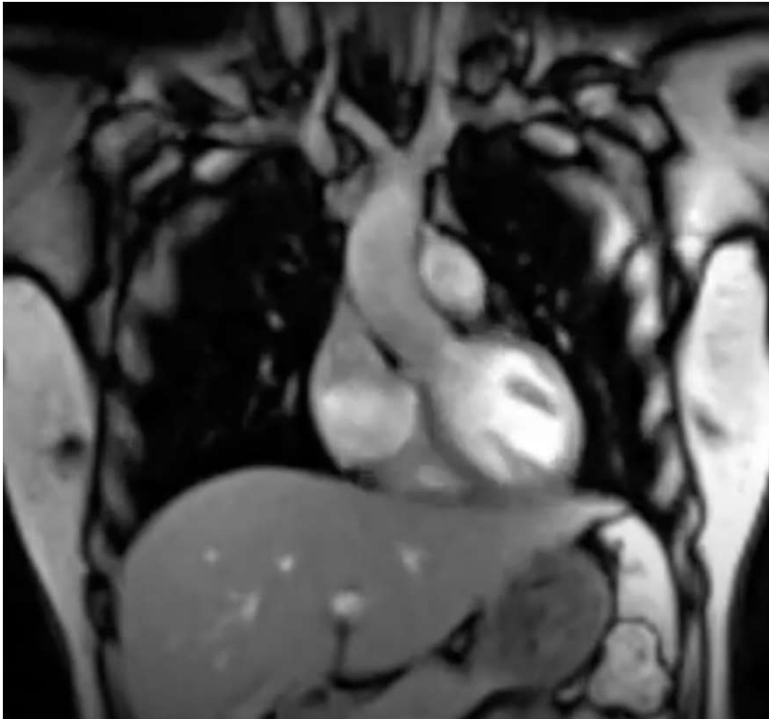
0	Nothing at all
0.5	Just noticeable
1	Very light
2	Light
3	Moderate
4	Somewhat hard
5	Hard
6	
7	Very hard
8	
9	
10	Very, very hard

¹ https://www.apta.org/news/2021/06/21/cdc-long-covid-guidance?_zs=iUJfV1&_zl=RCNj7

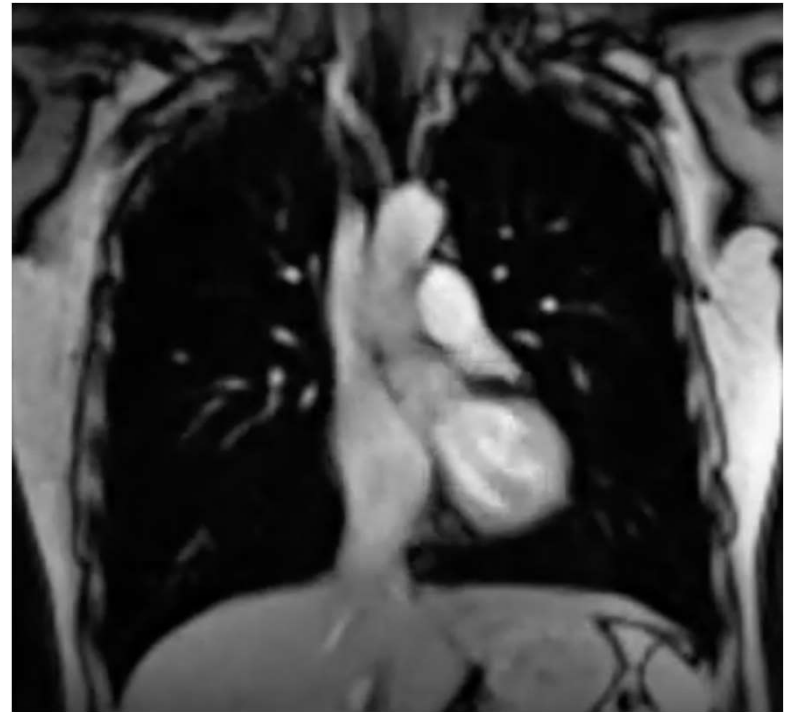
Physical Therapy Algorithm



The Diaphragm Is a Muscle

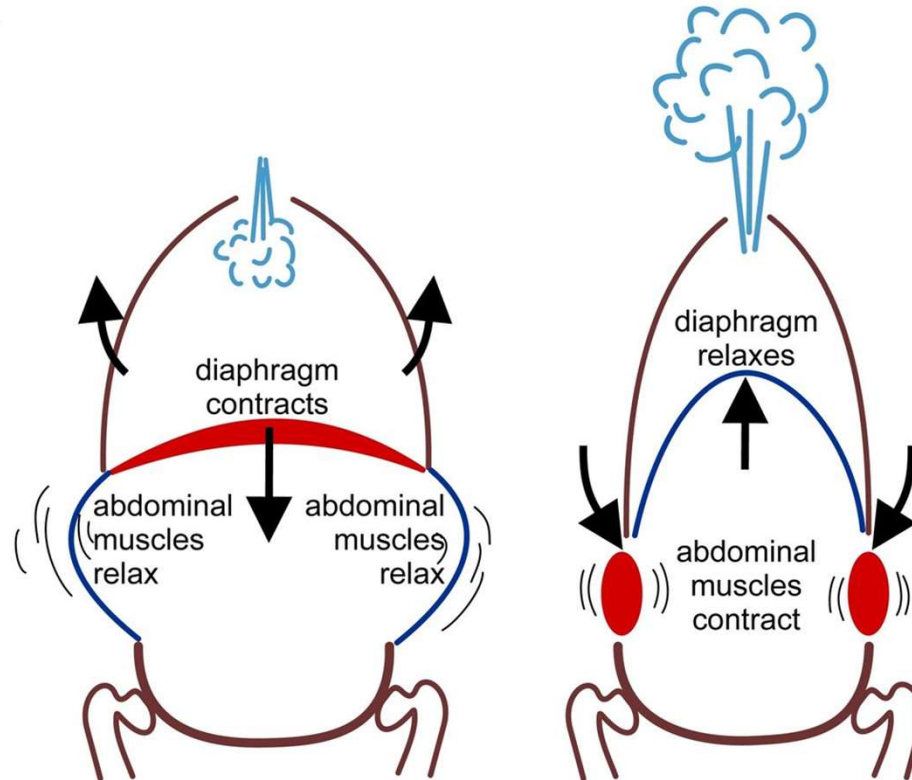


Exhalation



Inhalation

How the Diaphragm Works

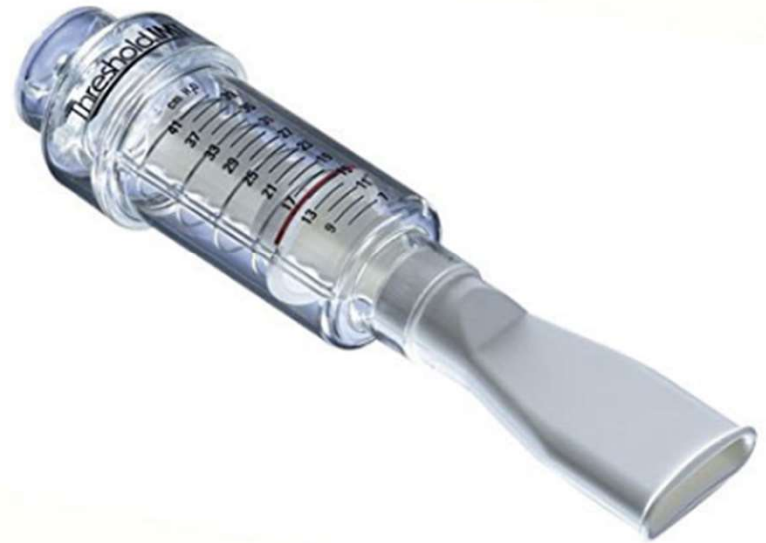


¹ <https://jennyputtp.com/2020/05/09/the-diaphragm-more-than-just-a-muscle/>

Respiratory and Inspiratory Muscle Trainers (RMT/IMT)



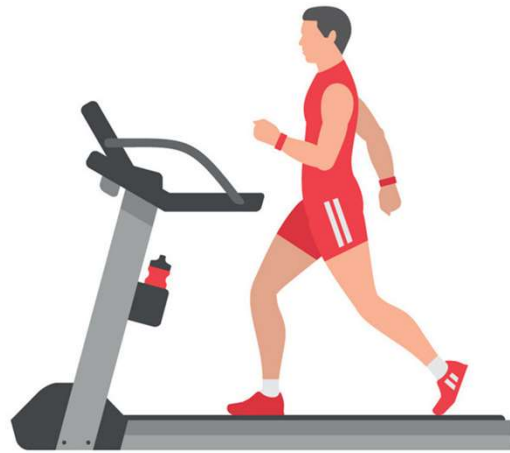
The Breather RMT



Respironics Threshold IMT

Physical Therapy Treatment

- Address breathing dysfunction and inefficiencies
- Address core, strength, flexibility, and balance
- Address endurance
- Address exercise intensity



Metabolic Equivalents (METs)

- Average patient with PASC at maximal exercise evaluated at BIDMC: 2-4 METs
- Grocery shopping: 2 METs
- Cooking: 2.5 METs
- Walking up stairs: 5 METs
- Gardening: 3-7 METs
- Shoveling snow: 4-8 METs
- Dancing: 4-9 METs
- Hiking: 3-8 METs
- Golf: 5 METs
- Basketball: 11 METs
- Non-competitive swimming: 2-4 METs
- Yoga: 3.2 METs



¹ <https://onlinelibrary.wiley.com/doi/pdf/10.1002/clc.4960130809>

Physical Therapy Resources for Patients with PASC

- <https://www.choosept.com/resources/detail/physical-therapy-pasc-long-covid>
- <https://www.choosept.com/resources/detail/3-steps-returning-to-physical-activity-after-covid>
- <https://www.lung.org/lung-health-diseases/lung-disease-lookup/covid-19/treatment-recovery>
- <https://www.aacvpr.org/Practice/Resources-For-Professionals/COVID-19-Resources>
- <https://www.choosept.com/resources/detail/surviving-covid-19-ards-what-you-should-know>