

Physiotherapy- How to Breathe and Cough Out Secretion Efficiently with less strain.

COVID-19 Patients and survivors has residual Symptoms such as Breathlessness and excess Secretion In Lung. They will be Coughing Out less Sputum and will be having Shallow Breathing due to low energy, and tenderness in chest because of continuous cough. This Technique helps in improving their symptoms efficiently with less strain.



Step 1: Relaxed Breathing

Relax yourself breath in and breath out the air at your comfortable depth and phase.

Repeat for 3 seconds



Step 2: Chest Exercise

- Place your hands behind back of the head,
- Move your elbow front and back like butterfly wings. Synchronize with breathing breath in to move elbow away and back, breath out and move your elbow closer and bend forward.
- Repeat 4 to 5 times as tolerated



Step 3b: Breath Out Air

Step 3(cont): Controlled Breathing Out

- Flow out slowly with your mouth like whistling (5 to 8 sec)
- Feel with your hand stomach should draw in.
- Extend the slow blowing out time as tolerated



Step 3a: Breath in Air

- Place your hands above stomach
- Breathe in air and blow your stomach out as you breath in, feel stomach moving up (like balloon) with your hands
- Hold your breath as tolerated (4 to 6 sec) increase holding time as tolerated



Step 3c: Skinning the secretion

Place your hands on your chest

- Take deep breaths and blow out forcefully, simultaneously draw the stomach in
- Note blow out with relaxed throat like make sound haa...haa...
- First repeat with taking in small amount of air, followed by moderate and high volume of air.
- Repeat 2 to 3 times as tolerated.
- Doing this This will draw secretion upwards (setting phase)



Step 3d: Coughing Normally

- Place your hands on your chest
- Take deep breaths and blow out forcefully, simultaneously draw the stomach in
- Note blow out with tight Throat like make sound khaa...khaa...
- First repeat with taking in small amount of air, followed by moderate and high volume of air.
- Repeat 3 to 4 times as tolerated.
- This will help clear more secretion efficiently. With less strain





NATIONAL INSTITUTE FOR EMPOWERMENT OF PERSONS WITH MULTIPLE DISABILITIES

Department of Empowerment of Persons with Disabilities (Divyangjan),
Ministry of Social Justice and Empowerment, Govt. of India.



Incentive Spirometry for Respiratory Care in Covid-19 Patients

Covid-19 or corona virus directly affects a person's lungs. This is the reason that serious COVID-19 positive patients have been requiring a constant oxygen supply to survive. One such method to improve oxygen level in the lungs is the incentive spirometer.



Incentive spirometer is designed to mimic natural sighing or yawning by encouraging the patient to take long, slow, deep breaths. It is also referred to as Sustained Maximal Inspiration (SMI). It provides visual feedback to the patients that desired flow or volume has been achieved

STEP 1:
Hold the spirometer in an upright position

STEP 2:
Exhale normally



STEP 3:
Place the mouth piece of the spirometer in your mouth and hold tight with your lips

STEP 4:
Slowly breath in. While breathing in, the balls will raise up. Try to lift all the three balls up. Hold breath for at least 5 seconds

STEP 5:
Take the mouthpiece out from your mouth and then breath out.

FREQUENCY: 10 breaths every 1 to 2 hours or 15 breaths every 4 hours

KEEP IN MIND:

- ✓ Avoid Sharing
- ✓ Frequent washing of mouthpiece in warm water is mandatory
- ✓ Wash the mouthpiece in warm water before and after every session to maintain hygiene

References :
1. PubMed Journals
2. Google Images

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Postural Drainage Positions for COVID-19 Patients

Postural drainage consists of positioning the patient to allow gravity to assist the drainage of secretions from specific areas of the lungs.

Duration: 15 to 20 minutes in each position can be maintained

Other techniques can be combined like Chest percussion and vibration, Forced Expiratory Techniques for better result.

Lower lobe (APICAL SEGMENTS)



Patient Position: Lie on your tummy with the head turned to one side, and a pillow under your hips.

Lower Lobe (ANTERIOR BASAL SEGMENTS)



Patient Position : Lie flat on your back with the buttocks resting on a pillow and the knees bent. Foot of the bed: raised 46cm (18 in) from the ground

Lower lobe (POSTERIOR BASAL SEGMENTS)



Patient Position : Lie prone with your head turned to one side and a pillow under his hips. Foot of the bed: raised 46cm (18 in) from the ground.

Lower Lobe (MEDIAL BASAL (CARDIAC) SEGMENT)



Patient Position : Lie on your right side with a pillow under the hips. Foot of the bed: raised 46cm (18 in) from the ground.

Lower Lobe (LATERAL BASAL SEGMENT)



Patient Position: Lie on the opposite side with a pillow under the hips. Foot of the bed: raised 46cm (18 in) from the ground

ALTERNATIVE METHOD OF POSTURAL DRAINAGE OVER CHAIR



Patient Position : Choose a flat surface, such as the floor or the bed. Lean forward over the back of a chair at an angle of 30 degrees.

Reference:

Cash's Text book of Chest, Heart and Vascular disorders for Physiotherapist -4th Edition, Edited by Patricia A Downie

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Upper lobe (APICAL SEGMENTS)



Patient Position :
Sit upright in half lying position

Upper lobe (POSTERIOR SEGMENT)



Patient Position : Lie on your left side and then turn 45° on to your face, resting against a pillow. Right arm resting on the supporting pillow; the right knee should be bent.

Upper lobe (POSTERIOR SEGMENT)



Patient Position: Lie on your right side turned 45° on to your face with three pillows arranged to raise the shoulder 30cm. Left arm resting on the supporting pillows.

Upper lobe (ANTERIOR SEGMENTS)



Patient Position : lie flat on your back with arms relaxed to your side; the knees should be slightly over a pillow.

Middle lobe (LATERAL SEGMENT: MEDIAL SEGMENT)



Patient Position : Lie on your back with your body quarter turned to the left maintained by a pillow under the right side from shoulder to hip. Foot of the bed - raised 35cm (14 in) from the ground

Lingula (SUPERIOR: INFERIOR SEGMENT)



Patient Position : Lie on your back with your body quarter turned to the right maintained by a pillow under the left side from shoulder to hip. Foot of the bed - raised 35cm (14 in) from the ground.

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BLOWING EXERCISES IN COVID 19

The novel SARS- CoV enters the respiratory system and cause lung damage and weakness in the respiratory muscles leads to breathlessness and reduces oxygen level.

Blowing exercise (long the exhalation phase) will activates abdominal muscles which pushes the diaphragm further into the thorax , pushes more air out(co2). Inspiration after every blowing will increases entry of air to the lungs(O2)

When to do it?

After COVID infection(COVID negative). If there is a difficulty in forced expiratory maneuvers like huffing and coughing

When to reduce or stop it?

Experiencing fatigue or abdominal pain or cramps

Benefits:

Improves breathing, improves lung capacity, improves posture, reduces pain and induce relaxation.

Blowing candle

Procedure: Keep a candle in front of the patient and ask to blow out the candle.

Variations: Use paper pieces, thermo balls.



Straw exercise:

Procedure: Blow air through straw into the soap water cup to make bubbles as much as possible.

Take a deep breath in and repeat the blowing.

3 cycles for 3 sets.

Effect: Mild resistance to the flow of air increases the Respiration.

Variations: Use paper cups, pomp balls, thermo balls, water in a cup.

Incentive Spirometer:

Procedure: keep the incentive spirometer in the reverse manner. Take a deep breath and blow air into the tube. Check for the raise of ball. Repeat the activities 10-15 times/2-3 times a day.

Effect: It will improves your respiration and gives you feedback.



Balloon blowing

Procedure: Deep Inhale and exhale into the balloon

3 sets and 3 breaths

Effect: increase resistance and strengthen your diaphragm and abdominal muscle.

90-90 bridging and balloon blowing:

Procedure: Lie on your back and rest your feet on the wall, keep one hand near your head. Take a deep breath hold it for 3-4 sec and blow it into balloon hold for 3-4sec again take breath repeat it 2 times.

Effect: It will increases you lung capacity as well as maintain a good posture reduces the pain.



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DIAPHRAGMATIC AND INTERCOSTAL STRETCHING EXERCISES FOR RESPIRATORY CARE IN COVID-19 PATIENTS

➤ The novel corona virus disease 2019(Covid-19) is a lower respiratory tract infection caused by a newly emergent beta corona virus, the SARS-CoV-2, that predominantly affects the air way epithelial cells.

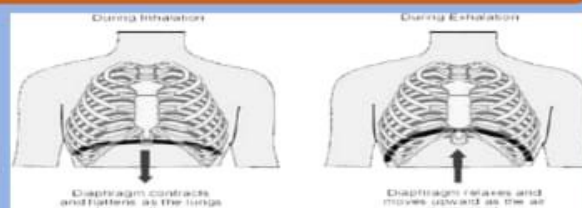
➤ Physiotherapy plays an integral part in critical care and rehabilitation of the covid 19 patient.

➤ When breathing becomes compromised as it does with Covid-19, patients not only have damaged lungs tissue from the virus, but the muscles diaphragm and ribs don't operate properly making breathing even more difficult.

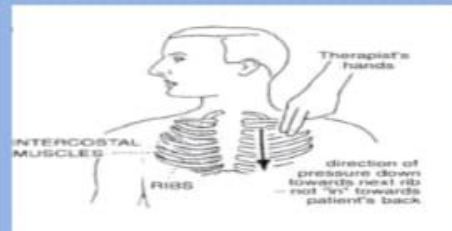
➤ Stretching of tight muscles allow the chest wall to expand and the diaphragm to move more effectively.

Diaphragm-an inspiratory muscle generates a craniocaudal movement of its dome during contraction.

The diaphragmatic stretch technique is designed to relax the resting state of the diaphragm, thereby creating a greater pressure gradient between thorax and abdomen.

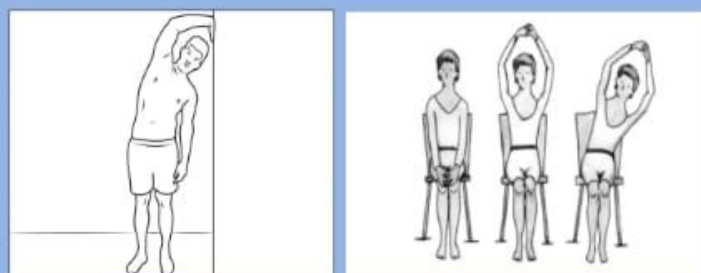


Diaphragmatic Stretch—with the patient in supine , during the inspiratory phase, the therapist will gently pull the points of contact with both hands in the direction of the head accompanied by the elevation of the ribs.



Intercostal stretch is provided by applying pressure to the upper border of a rib in order to stretch the muscle in a downward(not inward) direction. The stretch position is then maintained while the patient continues to breathe in his/her usual manner.

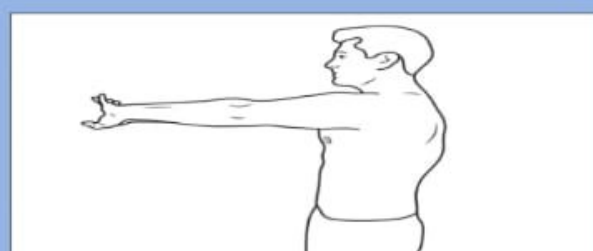
Intercostal Stretching - in standing position, stretch arms over the head, inhale deeply and on the exhale, stretch arms to the right. Repeat on other side. The same exercise can be done in sitting also.



Chest Wall Stretching –standing upright in the center of a doorway, with elbows bent, place your forearms on the sides of the doorway at a 90-degree angle from your sides. Take a small step forward until you feel a stretch in the front of your shoulders.



Chest Wall Stretching - Round your back, extending arms in front of you. Inhale. Clasp hands together, palms facing out. Focus on increasing the gap between your hands and your chest, feeling your shoulders stretch across your back.



DEPARTMENT OF THERAPEUTICS - PHYSIOTHERAPY

BASIC BREATHING EXERCISES FOR THE PATIENTS WITH MILD TO MODERATE COVID-19 SYMPTOMS



DEEP BREATHING

- LIE ON YOUR BACK.
- PLACE YOUR ONE HAND ON YOUR ABDOMEN AND ANOTHER HAND ON YOUR MID-CHEST.
- BREATHE IN SLOWLY AND DEEPLY THROUGH YOUR NOSE.
YOUR ABDOMEN SHOULD RISE BUT YOUR CHEST SHOULD REMAIN SAME.
- BREATHE OUT SLOWLY THROUGH YOUR MOUTH.

10 TIMES, 3 TIMES PER DAY

LOWER RIB BREATHING

- 
- SIT IN THE TALL CHAIR WITH YOUR ARMS RESTING AT SIDES.
 - BREATHE IN AND FOCUS ON ONLY EXPANDING THE BOTTOM PORTION OF YOUR RIB CAGE.
 - EXHALE AND REPEAT.
 - REMEMBER TO KEEP YOUR SHOULDERS IN RELAXED POSITION.

10 TIMES, 3 TIMES PER DAY

PURSED LIP BREATHING

- 
- SIT IN A COMFORTABLE POSITION.
 - BREATHE IN SLOWLY AND DEEPLY THROUGH YOUR NOSE.
 - PURSE YOUR LIPS AND EXHALE.
- (EXHALING SHOULD BE RELAXED-DO NOT TIGHTEN YOUR ABDOMEN MUSCLE).

10 TIMES, 3 TIMES PER DAY

WINDMILL BREATHING

- 
- STAND WITH YOUR HEELS AND TOES TOGETHER.
 - EXHALE AND LET YOUR BODY RELAX AS SHOWN.
 - BEGIN BREATHING IN WHILE LIFTING YOUR ARMS OUT TO THE SIDE AND UP.
KEEP YOUR PALMS FACING UPWARD.
 - CONTINUE INHALING UNTIL YOUR ARMS ARE OVERHEAD AND YOU RISE UP ON YOUR TOES.
 - STAND WITH YOUR HEELS AND TOES TOGETHER.

10 TIMES, 3 TIMES PER DAY



CHEST PERCUSSION AND VIBRATION IN COVID 19 PATIENTS

Severe case of COVID 19 needs mechanical ventilator. Most of the patient with mechanical ventilator reports sputum production which blocks the airway.

Few literature is available on physiotherapy during COVID-19 pandemic, especially regarding chest physiotherapy in ICU patients shows reduction in pathological hallmarks of the diseases.

When to do it?:

Patients intubated in Mechanical ventilator, Post extubation and discharged patient with copious secretions.

Benefits:

Used to loosen the secretions
Early weaning of from the ventilator
Improves oxygen level

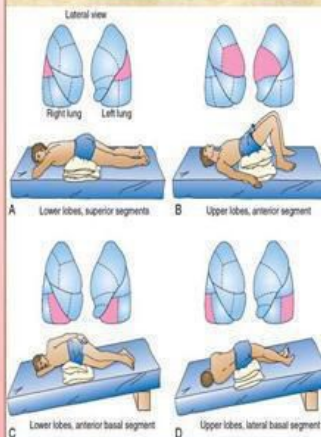
Chest percussion



Percussion is a treatment technique that consists of rhythmically and alternately striking the chest wall with cupped hands to dislodge retained secretions in underlying lung segments.

Percussion is performed with the patient in the appropriate bronchial drainage position for each segment.

Positions for chest physiotherapy



Precaution: Monitor the patient's oxygen saturation, as it may fall during percussion.

Chest vibration



Vibration consists of gentle, high-frequency oscillations combined with compression of the chest wall produced by tensing all muscles in the upper extremities in co-contraction.

It can be done during exhalation, to achieve more rapid and efficient mobilization of secretions by moving the secretions that were dislodged during percussion toward the larger airways in the bronchial tree, from which they can be expectorated

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POSITIONS TO EASE BREATHLESSNESS IN COVID-19 PATIENTS

Positions to ease breathing



Sitting leaning forward

Sit leaning forward with your elbows resting on your knees. Make your wrists and hands go limp.

Sitting Upright

Sit upright against the back of a firm chair. Rest your arms on the chair arms or on your thighs. Make your wrists and hands go limp.



Standing

- Stand with your feet shoulder width apart.
- Lean your hips against a wall.
- Rest your hands on your thighs.
- Relax your shoulders, leaning forward slightly and dangling your arms in front of you.



--OR--

- Rest your elbows or hands on a piece of furniture, just below shoulder height.
- Relax your neck, resting your head on your forearms.
- Relax your shoulders.



Improve Lung Oxygenation by Lying in Prone Position

If the oximeter reading shows **SpO2 levels below 94%**, patients in home care are advised to lie prone on their stomachs. This will improve breathing and increase oxygen saturation.



1. Begin by lying in prone position on a flat bed for 30 minutes to 2 hours



2. Switch to lying on your right side for 30 mins to 2 hours



3. Switch to 30 minutes to 2 hours of sitting up (30-60 degrees)



4. Switch to lying on your left side for 30 minutes to 2 hours



5. Switch to semi-prone position for 30 minutes to 2 hours



6. Return to prone position for 30 minutes to 2 hours. Repeat cycle...

Prone is medically approved technique to help improve oxygen deprivation

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