Pep/Rmt™

Multi-application respiratory training
Respiratory therapy made simple, effective and measurable

Pep/Rmt™ offers an easy and proven respiratory training method that can, depending on therapy objectives, be implemented under clinical supervision or at home.

The device comprises a mask or mouthpiece fitted to a valve, which separates the inhalation flow from the exhalation flow. One or two resistor/s are then fitted to the valve depending on the intended type of training.

One interface, multiple options

Pep/Rmt has several areas of application. The product can be used for breathing training with expiratory and/or inspiratory resistance, known as:

- PEP (Positive Expiration Pressure).
- IMT – previously RMT (Inspiratory Muscle Training).
- IR-PEP (Inspiratory Resistance – Positive Expiratory Pressure) – combinations of resistance to exhalation and inhalation.
- HiPEP (High Pressure PEP) – forced expiration against an expiratory resistance.

PEP to normalise reduced lung volumes. PEP can be used to normalise reduced lung volumes which can occur as a result of immobilisation, anaesthesia/surgery and neurological diseases.

PEP to normalise increased lung volumes. PEP can be used to reduce excessive functional residual capacity as in the case of severe stages or exacerbation in obstructive pulmonary disease.

All the above therapies can be undertaken with a mask or mouthpiece. The pressure in the system is...
Respiratory therapy made simple, effective and measurable

Getting the best from Pep/Rmt

There is always a risk of incorrect use when a therapy technique is introduced. To avoid mistakes, the following should be considered:

• If a mask is used, it must be fitted tightly against the face to prevent air leakage.
• If a mouthpiece is used, the lips must be closed tightly around it.
• For optimum effect, in addition to measuring the pressure in the system, the patient’s breathing movements should be observed so that the patient is using an appropriate technique and the desired lung volume effect is achieved.

If the patient requires additional oxygen during the therapy, oxygen can be connected to the valve’s inhalation leg using the T-connector (which belongs to the manometer).

Inspiratory Muscle Training.
IMT can be used to exercise strength and endurance in the inspiratory muscles in patient groups with impaired muscle function, as in chronic obstructive pulmonary disease (COPD) and various neurological diseases. It is also used to lower the risk of post-operative lung complications in patients undergoing heart surgery and for athletes to increase performance.

Secretion elimination with PEP and HiPEP. PEP can be used in the case of increased secretion in the airways, as in cystic fibrosis and COPD and in the case of infection in people with multiple severe disabilities. HiPEP is a method for eliminating secretion from the airways using forced exhalation, against an expiratory resistance, to residual volume.

“The resistance that the Pep/Rmt device creates during expiration results in increased functional residual capacity and tidal volume. This results in a lowered risk for post-operative complications for patients undergoing thoracic or abdominal surgery.”

Monika Fagevik Olsén, PhD, Associate professor

In the next few pages, we will take a closer look at considerations and proper applications of Pep/Rmt in four therapeutic areas.
Many patient categories, such as post-operatively after thorax or abdominal surgery, immobilisation and various neurological injuries/diseases, suffer from reduced lung volumes. Resistance to exhalation increases the tidal volume as well as the functional residual capacity. In diseases in which a lot of secretion is produced in the airways, PEP is used in combination with ‘huffing’ to evacuate the secretion from the airways.

Select the resistor on the exhalation side of the valve with which the patient can breathe without difficulty for 2 minutes or 10–15 breaths for 3 sessions with an exhalation pressure of approximately 10–15 cm of water. Since increased flow results in increased pressure, but often also reduced lung volumes, it is preferred that the patient concentrates on becoming familiar with the technique, rather than the achieved pressure on the manometer.

For adolescents, a guideline level of resistance is 1.5–2.0 mm. The level of resistance is then gradually increased for young people and adults, tested on an individual basis and altered if the symptoms change.

To normalise breathing rhythm during PEP, an additional inhalation resistor can be applied, known as IR-PEP. The guideline for this resistor is 4–6 mm.

Instructions

**Inhalation:** Encourage the patient to breathe through the mask/mouthpiece at their usual rate but with deeper breaths.

**Exhalation:** Instruct the patient to breathe out slightly activated but without forcing. It is important that the patient adapts to the resistance and allows the body to change its functional residual capacity according to the new conditions. The clinician should therefore not correct the technique too much. Instead, point out to the patient not to breathe out too hard or for too long as this will reduce the lung volume.

For increased quantities of secretion, PEP is used in sessions interspersed with huffing/coughing. Alternate between PEP, resting and huffing/coughing until the patient feels that his/her airways are clear, is too tired to continue the therapy or has spent a reasonable amount of time on the therapy.

For acute conditions, such as after surgery, PEP therapy should be undertaken frequently, preferably every/every other hour. For chronic conditions, the training should be done 2–3 times a day.
Increased functional residual capacity is a big problem for patients with obstructive pulmonary disease in severe stages or exacerbations.

- A resistor with a relatively large diameter can control the rate of flow during exhalation. This enables calmer exhalation, the breathing work is more effective and the positive pressure can prevent unstable airways from collapsing.
- If one of the symptoms is increased secretion, PEP combined with huffing can also be used as a therapy for evacuating secretion.

Apply the resistor to the exhalation side (3.5–6 mm) so that the patient can breathe with reduced shortage of breath while resting.

**Resistance guide:**

- **Inhalation:** Encourage the patient to breathe in calmly.
- **Exhalation:** Encourage the patient to breathe out calmly against the resistance and to try and blow out slightly more than an usual exhalation.

For increased quantities of secretion, PEP is used in sessions interspersed with huffing/coughing. Alternate between PEP, resting and huffing/coughing until the patient feels that his/her airways are clear, is too tired to continue the therapy or has spent a reasonable amount of time on the therapy.

In the case of hypercapnia and hypoxemia, PEP therapy should be undertaken frequently, preferably every/every other hour. For chronic conditions, the training should be done 2–3 times a day with a personal Pep/Rmt set.
The strength and endurance in the inspiratory muscles can be affected in many different types of injuries and diseases. During inspiratory training a resistance is applied on the valve on the inspiration side on the Pep/Rmt set. Regular training can increase the inspiratory muscle strength and endurance and reduce the work of breathing.

The following is an example of how training can be carried out: Apply a resistor to the valve’s inhalation side. Start with a relatively large resistor diameter and allow the patient to train with the system for 2 minutes. If the patient can breathe without exertion, increase the resistance by changing to the next nipple with a smaller diameter.

**Inspiratory Muscle Training**

**Resistance guide:**

- **Inhalation:** Breathe in deeply, slowly and evenly.
- **Exhalation:** Breathe out normally.

Combining this with an exhalation resistance (5.0–6.0 mm) can make it easier for the patient to achieve a more normal breathing pattern.

The patient's respiratory situation controls the training plan. The training can be carried out continuously for up to 20 minutes a time or divided into shorter sessions several times a day. The longer the training session lasts, the lower the resistance that should be used. In the case of pronounced paresis in the breathing muscle, there is a risk of muscle fatigue. This is why it is important to monitor the breathing pattern and level of exertion, especially when planning the training.

The inhalation resistance should be adjusted regularly during training. Approximately every second week to start with, then with gradually increasing intervals.
For diseases and conditions involving secretion in the airways, PEP can be used in cycles with breathing control interspersed with huffing, see pages 3 and 4.

Children, adolescents and adults with multiple severe disabilities can find it difficult to evacuate the increased quantities of mucus which can result from an infection in the airways. When these types of patients start training with PEP it is important to allow them to get used to the mask and training slowly. It can help to use only the mask at first. Once the patient accepts having the mask fitted tightly to the face, the valve can be fitted and then the resistor. For children in this group, 10 breaths may be insufficient to increase the lung volumes allowing for mucus clearance. Instead, allow the child to breathe for 1 minute, which can be repeated 3 times each session. Once this is established, the time can be increased to 2 minutes x 3 per therapy session. The expiratory pressures should be approximately 10–15 cm of water.

In diseases with hypersecretion in the small airways, HiPEP can be used to evacuate the secretion from the more peripheral parts of the airways. The increased positive expiratory pressure controls the flow during the whole expiration, making it just as difficult for all parts of the lungs to empty themselves. This means that the airways, which would have otherwise closed during the later part of exhalation, can be kept open for longer. Using this exhalation flow from the small airways, secretion can be evacuated from smaller airways than otherwise is possible.

Apply the resistor to the exhalation side of the valve that gives the greatest expiratory volume on forced exhalation through the mask/mouthpiece. This can be measured with the PEP mask fitted to a spirometer. In the absence of a spirometer, the mucus sound that the patient produces on forced exhalation through different sizes of resistor can be used. The resistor that produces the most mucus sound towards the end of exhalation is used in the therapy. HiPEP is combined with standard PEP with the purpose of increasing the functional residual capacity. After a session of PEP breathing, 2–3 HiPEP manoeuvres are carried out with a couple of breaths at rest without resistance between each one.
**Instructions**

**Inhalation:** Encourage the patient to breathe through the mask/mouthpiece at their usual rate but with slightly deeper breaths.

**Exhalation:** Force an exhalation through the resistor.

Alternate between PEP, resting, HiPEP and huffing/coughing until the patient feels that his/her airways are clear, is too tired to continue or has spent a reasonable amount of time on the therapy.

The high pressure during exhalation means that patients may suddenly feel like their ears are blocked. To avoid this the patient can start exhalation with a lower lung volume than total lung capacity. However, it is important that the patient does not start exhalation into the PEP equipment too late, as there will not be sufficient air left in the lungs to achieve the purpose of this method.

“Breathing towards a resistance is a very useful ‘tool’ that is being utilised in respiratory therapies of different kinds. Treatment success is dependent on knowledge about the physiological aim that each of the different therapies is based upon.”

Louise Lannefors, Reg physiotherapist
Product range

Pep/Rmt sets – mask/mouthpiece, valve and resistor set
71100 Pep/Rmt™ set with infant mask
71101 Pep/Rmt™ set with child mask
71102 Pep/Rmt™ set with adolescent mask
71103 Pep/Rmt™ set with adult mask
71104 Pep/Rmt™ set with adult mask large
71108 Pep/Rmt™ set with mouthpieces

Accessories
71109 Mouthpieces
71110 Infant mask
71111 Child mask
71112 Adolescent mask
71113 Adult mask
71114 Adult mask large
71118 Tracheostomy adaptor
71119 Pep/Rmt™ valve
71120 Resistor set, 8 pieces
71121 Resistor 1.5 mm black, 5 pieces
71122 Resistor 2 mm white, 5 pieces
71123 Resistor 2.5 mm yellow, 5 pieces
71124 Resistor 3 mm blue, 5 pieces
71125 Resistor 3.5 mm green, 5 pieces
71126 Resistor 4 mm orange, 5 pieces
71127 Resistor 5 mm brown, 5 pieces
71128 Resistor 6 mm purple, 5 pieces
71130 Pep/Rmt™ manometer -100 to +150 cm H₂O
71131 Pep/Rmt™ manometer -30 to +30 cm H₂O
71132 T-connector for manometer
71133 Spare glass for manometer
References:

PEP to normalise reduced lung volumes

PEP to normalise increased lung volumes

Inspiration Muscle Training

Secretion elimination with PEP and HiPEP
Wellspect HealthCare offer comprehensive assistance and education together with our products. We pride ourselves in offering premium quality products which are thoroughly tested and easy to use. Do not hesitate to contact us for any matter regarding our Pep/Rmt system. We will be delighted to assist you.