

# Physical therapy after thoracic surgery

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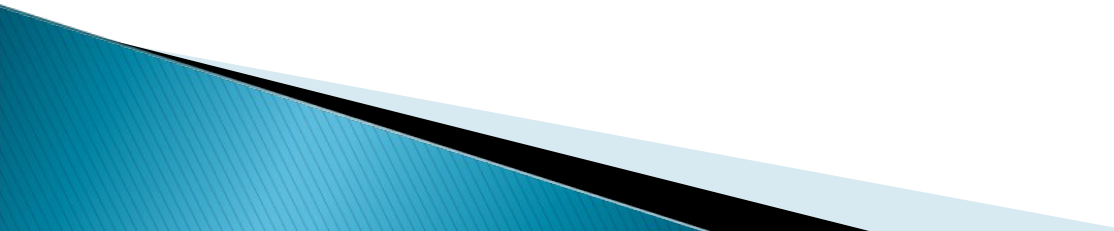
# Surgical procedures in the thoracic region

- ▶ Pulmonary indications - lung tumors or lung tissue reductions
- ▶ Cardiac indications - bypass or transplants


# Thoracic surgery

- ▶ Posterolateral thoracotomy
- ▶ Anterolateral thoracotomy
- ▶ Sternotomy

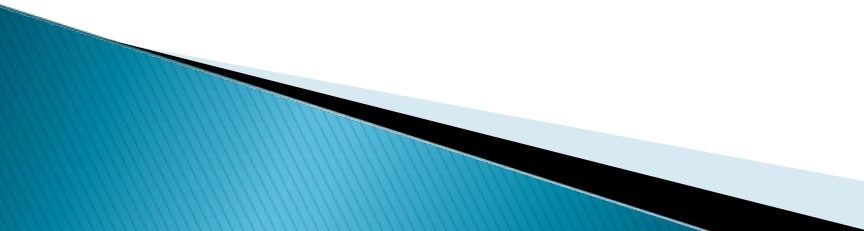
# Pulmonary surgery

- ▶ Lung segmentectomy
  - ▶ Lobectomy
  - ▶ Pneumonectomy
  - ▶ Transplantations
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# The goals of physical therapy

- Clearance of respiratory tract
  - Decreasing of bronchial obstruction
  - Improvement of ventilator parameters
  - Prevention of post-operative pulmonary complications such as pneumonia
  - Prevention of decubitus
  - Prevention of cardiovascular complications such as thromboembolism
  - Prevention of muscle contractions, weakness and joint stiffness
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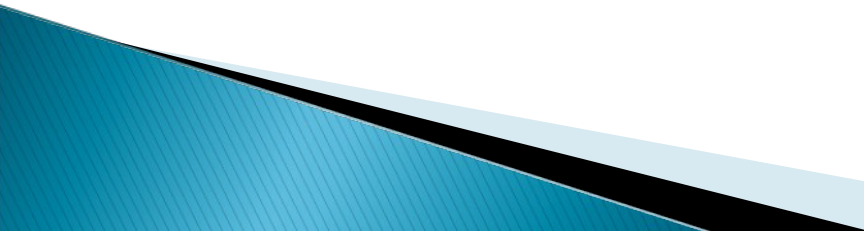
# Pre-operative phase

- Preconditioning is important and involves increasing endurance fitness and minimizing functional deficits of the movement system prior to surgery
  - Having already increased the patient's fitness during the pre-operative phase is an important benefit during the post-operative recovery period
  - Any strengthening prior to surgery increases and accelerates the period of post-surgical recovery
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# Pre-operative phase

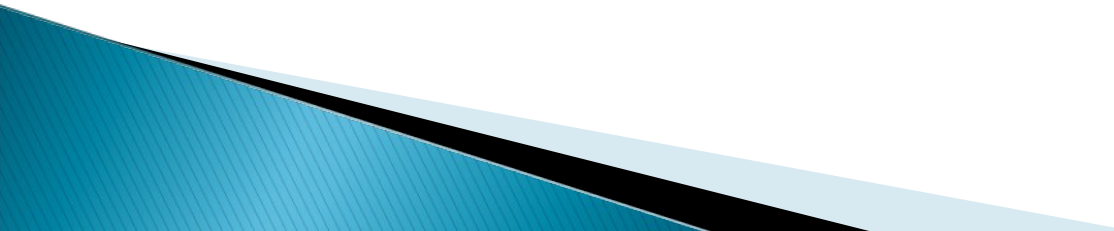
- ▶ The practice of pulmonary physical therapy practical skills prior to surgery gives patients the needed peace and certainty during the post-surgical stay in Intensive Care Unit

# Physical therapy in the pre-surgical period

- ▶ Includes the explanation of physical therapy before and after surgery
  - ▶ Training of pulmonary physical therapy practical skills
  - ▶ Breathing techniques emphasizing respiratory thoracic excursion
  - ▶ Breathing practise with inspiratory and experatory breathing simulators
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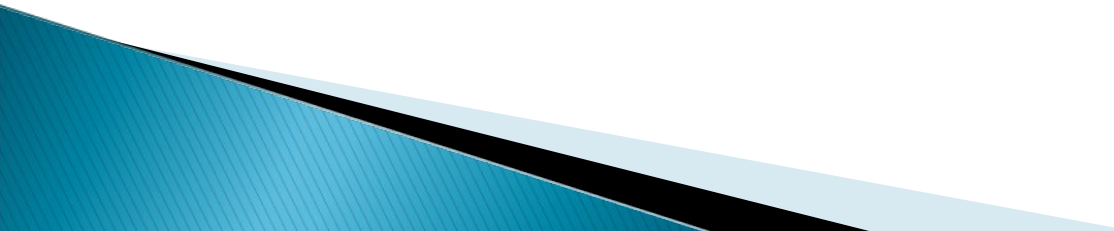
# Physical therapy in the pre-surgical period

- ▶ Relaxation
  - ▶ Expectoration
  - ▶ Corrective work of the postural system
  - ▶ Lower extremity movements
  - ▶ Movements of the arms
  - ▶ Trunk muscle stretching
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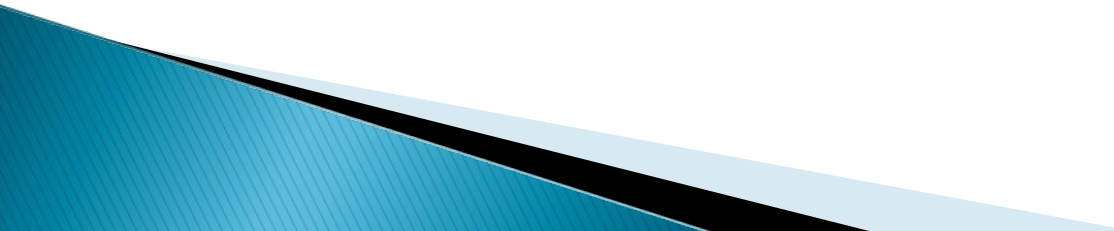
# Physical therapy in the post-operative period

- ▶ We continue with the pre-surgical physical therapy
- ▶ As soon as possible and following a consultation with the doctor, we initiate the intensive exercises that should be repeated 2-4 times per day

# Exercise methods after surgery

- ▶ Active expiratory techniques
  - ▶ Standard respiratory tract hygiene
  - ▶ Training of expectoration
  - ▶ Restoration of spontaneous breathing through breathing excursions of thorax
  - ▶ Manual compression of the thorax
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# Exercise methods after surgery

- ▶ Cardiovascular exercises – ankle pumping exercises to prevent deep vein thrombosis
  - ▶ Lower extremity movements
  - ▶ Movements of arms, movements in shoulder especially on the operated side
  - ▶ Splinting chest incisions during coughing or sneezing
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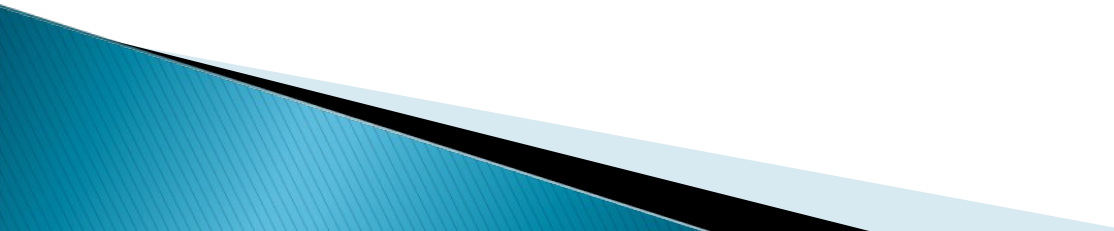
# Exercise methods after surgery

- ▶ Training of verticalization processes (sitting, standing, walking)
- ▶ Scar care (incision mobilization) after stitches extraction

# Respiratory Physical Therapy

- ▶ Modern methods and techniques of respiratory pathway hygiene, also known as Airway Clearance Techniques (ACT)

# ACT include:

- ▶ Active cycle of breathing techniques ACBT
  - ▶ Autogenic drainage AD
  - ▶ Breathing simulators
  - ▶ Inhalation treatment
  - ▶ Physical exercise PE
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# Active Cycle of Breathing Techniques

## ACBT

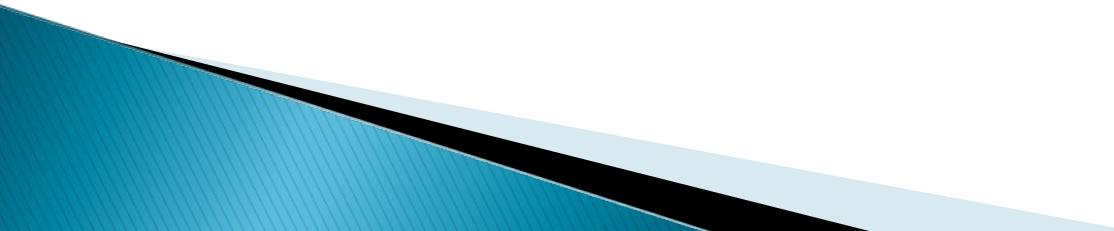
- ▶ Contains three independent breathing techniques
- ▶ ACBT is performed in sitting or while laying down, wherever and whenever it is needed and necessary for the patients, in the hospital, health resort, at home, at the office, at a table, in standing, in bed or in an armchair



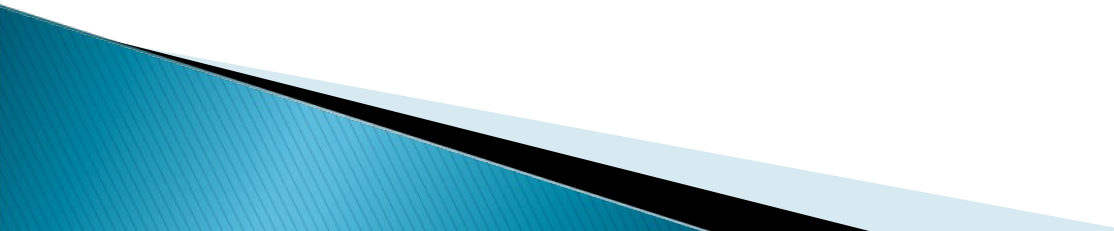
# ACBT

- ▶ **Thoracic expansion exercises** are inspiratory techniques emphasizing maximum volume of slowly (through the nose or the mouth) inspired air and a short and without force passively blown out expiration through the mouth

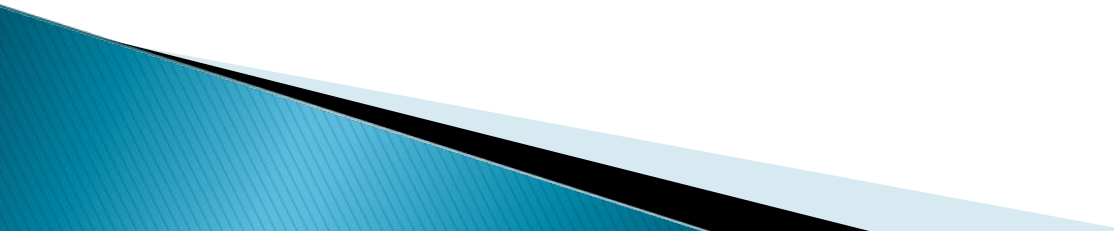
# ACBT

- ▶ **Forced expiration and huffing techniques** are active, muscle supported expirations with modified speed completed by huffing with an expectorate, which occurs instead of coughing
  - ▶ **Controlled breathing** is relaxed, resting and movement-centered in the abdominal region but without activation of the abdominal muscles
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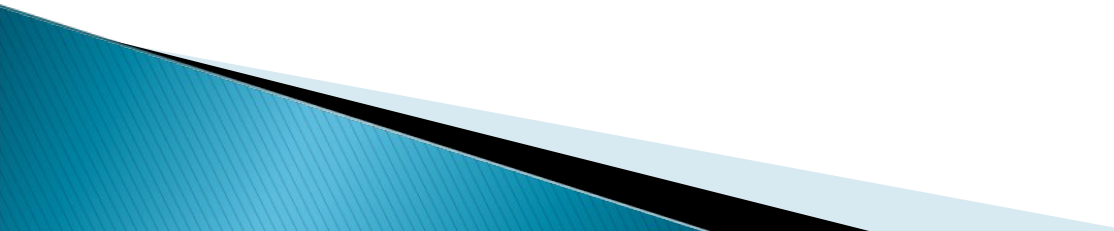
# Autogenic Drainage

- ▶ In the last 20 years, AD gradually replaced classic percussion postural drainage
  - ▶ High effective and gentle
  - ▶ Performed in sitting or laying down
  - ▶ The basic principles of AD include the following: release, collect and evacuate the released mucus from the respiratory tract
  - ▶ AD is consciously controlled and patient-modified breathing
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# AD

- ▶ Breathing in the form of a slow, smooth inspiration mainly through the nose with a inspiratory pause at the end of inspiration
  - ▶ Followed by consciously controlled, slow and long, but mainly muscle supported active expiration through pursed lips via the relaxed upper respiratory pathways
  - ▶ Is not time limited
  - ▶ In sitting or supine position
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# Breathing simulators

- ▶ As soon as possible, we instruct the patients how to independently exercise while using breathing simulators
  - ▶ Flutter
  - ▶ Accapella
  - ▶ Triflow
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# Flutter



# Acapella

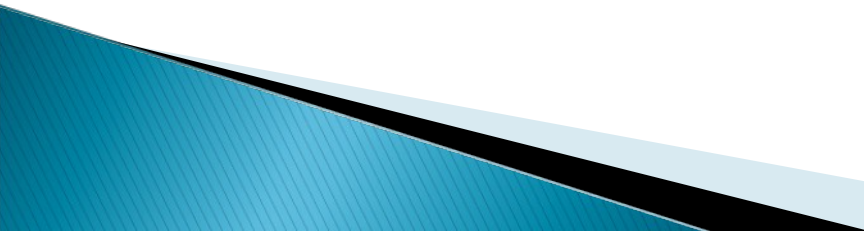


# Tri-flow






# Breathing Gymnastics

- ▶ Also known as breathing exercises, form the practical content of respiratory rehabilitation
  - ▶ **Static breathing gymnastics** - is designed to renew the basic breathing pattern and it is based on respiratory training. SBG is independent breathing without any accompanied co-movement of other body parts, including the upper or the lower extremities
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# Breathing gymnastics

- ▶ **Dynamic breathing gymnastics** - when breathing movements of the thorax the abdominal wall are accompanied by extremity movements
- ▶ **Mobilization breathing gymnastics** - is a higher form of breathing and movement exercises. It is combination of breathing and movement sets during which large muscle groups are activated

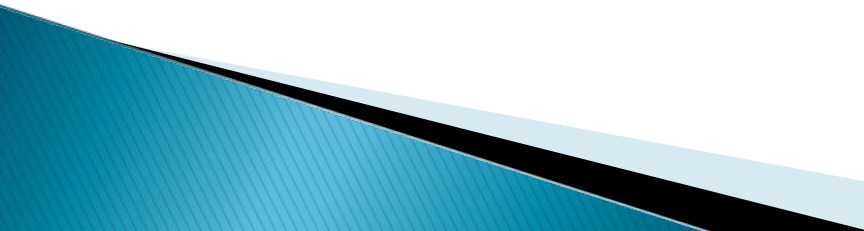
# Verticalization process

- ▶ Bed mobility – movement toward either side of the bed or up and down in the bed
  - ▶ Rolling to the side – toward the operated or healthy side
  - ▶ Sitting at the edge of the bed, legs in contact with the floor
  - ▶ Balance training in sitting
  - ▶ Training of getting out of bed **over the operated side**
  - ▶ Training walking and stair training
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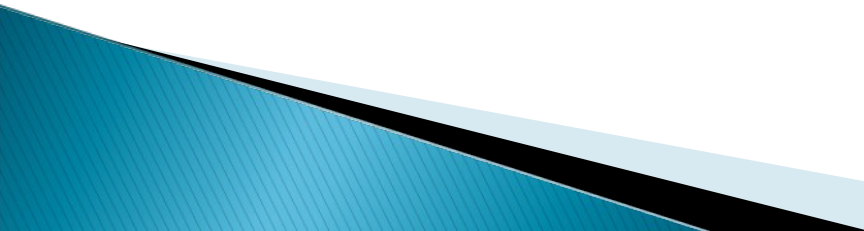
# During verticalization process take notice

- ▶ Orthostatic disorders
- ▶ Such as pale in face, sweat, bad balance, nauzea, feeling dizzy
- ▶ Hart rate, blood presure when the patients are monitoring in the Intensive care unit
- ▶ Post-operative patients may have inserted multiple lines, tubes and drains (such as peripheral line, central line, chest tube, wound drains, urinary catheter etc.).  
Before mobilization, ask the nurses about disconnection of lines

# Rehabilitation process day by day

- ▶ 1st.day - respiratory physical therapy, cardiovascular gymnastics, conditioning training in laying position, bed mobility, training verticalization - sitting?, standing?, walking around the bed?
  - ▶ 2nd.day - respiratory physical therapy, cardiovascular gymnastics, conditioning training in laying position, in sitting position, walking around the bed, walking in the room...
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# Rehabilitation process day by day

- ▶ 3rd.day - respiratory physical therapy, cardiovascular gymnastics, conditioning training in laying position, in sitting position, walking around the bed, walking in the room, in the corridor, with our assistance or without
  - ▶ Approximately after 2 or 3 days the patients are moved from Intensive care unit to standard wards and we continue with higher level of physical therapy
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- ▶ Of course the patients continue with rehabilitation at home following physiotherapist instructions