Aims:

• Run through current physiotherapy practice
  – Airway clearance
  – Pulmonary rehabilitation
  – Dysfunctional breathing
• What information to provide when referring a patient in an acute situation as well as a general inpatient/outpatient referral
• If time try some of the airway clearance adjuncts
**Pathophysiology of Mucociliary clearance**

- **MCC** – critical host defence mechanism of upper & lower airways
  - Incl Cough
  - Anatomical barriers
- **Mucus transport** – dependent on:
  - Integrity & function of ciliated epithelium
  - Periciliary fluid
  - Mucus properties (volume, rheology, viscosity)
- **Aerodynamic changes**
  - Shear forces, alterations in airflow
Impact of abnormal muco-ciliary clearance

- Sputum plugging
  - Pain, hypoxia, alveolar collapse
- Bacterial binding facilitates bacterial growth
- Vicious cycle hypothesis
- Impact of lung disease
  - Ion transport (eg CF)
  - Cilia dysfunction
  - NMD - impaired cough
  - Airway damage
Airway Clearance Techniques

- Short-term aims:
  - ↓ airway obstruction
  - ↓ airway resistance
  - ↑ ventilation
  - ↑ airflow
  - Mucus viscosity

- Long-term aims:
  - to delay progression of disease
  - maintain optimal respiratory function

Clinical status/Social circumstances/
Personal preference
# A summary of current techniques used for airway clearance

<table>
<thead>
<tr>
<th>Category</th>
<th>Techniques</th>
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| Independent Techniques                | ACBT- Active cycle of breathing  
|                                       | AD – Autogenic drainage                                                    |
| Device dependent techniques           | PEP- Positive Expiratory pressure  
|                                       | OPEP – oscillating positive expiratory pressure.  
|                                       | Intrathoracic: Flutter/acapella  
|                                       | Extrathoracic: High frequency chest wall oscillations                      |
|                                       | IPPB: Intermittent positive pressure                                      |
|                                       | NIV: non invasive ventilation                                              |
| Assistive components to techniques    | Manual techniques  
|                                       | Chest percussion  
|                                       | Chest wall vibrations  
|                                       | Overpressure  
|                                       | Gravity assisted positioning  
|                                       | Modified postural drainage                                                |
| Adjunction to assist techniques       | Humidification  
|                                       | Nebulised therapy  
|                                       | Mucolytics  
|                                       | Saline (0.9%)  
|                                       | Hypertonic saline 7%  
|                                       | Mannitol                                                                  |
Evidence and Guidelines

Very brief synopsis: key points

- All patients producing daily mucus +/- evidence of mucus plugging on HRCT should be taught an airway clearance technique

- Airways humidification +/- hypertonic saline should be considered for patients with daily sputum

- Positive pressure may augment airway clearance in selected patients

- Exercise may benefit patients with COPD/Bx/CF/Asthma

- Cough augmentation is important to consider in patients with neuromuscular disease
ACT evidence discussions

• Very difficult to plan future ACT research
  – Inadequate research design/S-T studies/Powering studies
• ST studies 1-14 days. 6 x Cochrane reviews 2011-2014
  – Airway clearance techniques have short-term effects in the terms of increasing mucus transport
  – No evidence was found on which to draw conclusions concerning the long-term effects; quality of life or survival with chest physiotherapy.
• Other guidelines offer ‘Good practice points’
Why is exercise important?

“Those who do not make time for exercise will eventually have to make time for illness”

Earl of Derby (1863)
Pulmonary Rehabilitation

AIMS:
• Improve symptoms of breathlessness
• Increase physical function
• Reduce reliance on healthcare providers
• Support secondary pathophysiology
• Help the patient take responsibility for their own health
• Allow the patient to regain or maintain independence
• Improve health enhancing behaviors
Typical Programme

- Outpatient based
- Twice weekly supervised exercise sessions (aerobic, specific training)
- Education session(s)
- Multidisciplinary
- 6-8 weeks duration
Recommendation and Guidelines

BTS Guidelines and ACPRC/BTS Guidelines

- PR should be offered to individuals who have breathlessness affecting their activities of daily living with an Medical Research Council Dyspnea score:
  - MRC 3-5 for COPD patients
  - MRC 2 or above for patients with confirmed respiratory diagnosis affecting function
COPD
• Pulmonary rehabilitation should be offered to patients with chronic obstructive pulmonary disease (COPD) with a view to improving exercise capacity by a clinically important amount. (Grade A)

NON CF Bronchiectasis
• Patients with non-CF bronchiectasis who have breathlessness affecting their ADL should have access to and be considered for pulmonary rehabilitation. (Grade D)
• No evidence to have concerns re: cross infection unlike in CF (PSA/nTM)

ILD
• If healthcare professionals consider referring certain patients with **stable ILD** who are limited by breathlessness in ADL to pulmonary rehabilitation, they should discuss with the patient the likely benefits. (√)
• Patients with idiopathic pulmonary fibrosis (IPF) have a potential for significant desaturation during exercise related activities. (√)

Asthma
• **Routine referral of patients with asthma to pulmonary rehabilitation is not recommended.** (Grade D)
  – Patients with severe asthma: considerations of age/working status/likelihood of completing the course.
  – The benefits of exercise and the recommendation of incorporating exercise activities into a healthy lifestyle should be discussed with all patients with asthma. (√)
  – If healthcare professionals consider referring certain patients with stable asthma who are limited by breathlessness in ADL to pulmonary rehabilitation when on optimal therapy, they should discuss with the patient the likely benefits. (√)

ACP/PRC/BTS Guidelines recommend
• Physical training should be advised for improvements in fitness and cardio respiratory performance in patients with asthma. (Grade B)
• Physical training should be advised to help reduce breathlessness and improve health-related quality of life in people with asthma. (Grade B)
• Physical training programmes should aim to reach a minimum of activity as per the American College of Sports Medicine guidelines. (Grade A)
Dysfunctional Breathing

BPD

Hyperventilation

POLO – Periodic occurrence of laryngeal obstruction

Upper airway irritation/ Chronic cough

ILO – induced laryngeal obstruction

EILDO – Exercise induced laryngeal obstruction
Breathing control: key messages

- Can co-exist with disease
  - Symptoms tend to be disproportionate to disease severity
- Essential to identify trigger.
- Nose breathing at rest and low level exertion with appropriate response during exercise.
- Nasal Hygiene
- Hydration
- Over breathing: ‘box breathing’
- Not all over breathers have a high respiratory rate
- Difficult to capture symptoms e.g. high level athletes need the adrenaline of a race environment. If patient consents, ask coach or parent to video symptoms.
Physiotherapy referrals: what physiotherapists need to know from the referral

• Acute
  – PMH
  – What condition is currently being treated?
  – What has acutely occurred: all observations/recent CXR, ABG’s
  – What they have already tried
    • Patients may have strategies that need encouragement
      – Nebs
      – Airway clearance
      – Changed position
      – Breathing control techniques
  – Give us a means of contacting you back after we have seen the patient. Bleep/mobile/ext

• Standard referral
  – Detailed relevant PMH/ last clinic note
  – What you would like us to particularly assess:
    • Airway clearance
    • Ex Tolerance/ functionality
    • Breathing pattern

• Remember to tell the patient for what reason you are referring them to a respiratory physiotherapist.
References


Thank you for listening...

- Any questions?