

# CHEST PHYSIOTHERAPY • 1/3

## INTRODUCTION

- The neonatal toolkit recommends that all units caring for babies requiring intensive and high dependency care who provide chest clearance should have access to a paediatric respiratory physiotherapist/specialist neonatal physiotherapist
- All staff undertaking percussion must be competent and seek advice where required
- Before considering percussion ensure all other airway clearance options optimised, including:
  - variety and frequency of position changes
  - adequate hydration to prevent tenacious secretions
- Ensure best practice suction technique
- Contact respiratory physiotherapist to review babies with difficulties clearing secretions

## PERCUSSION

### Definition

- Rhythmic patting over chest wall using a palm cup percussor to generate pressure changes stimulating mucus clearance by ciliary stimulation

### Indications

- Tenacious secretions not cleared effectively with suction
- Signs of respiratory compromise
  - changes in ventilation suggestive of secretion retention (e.g. tidal volumes, peak pressures)
  - decreased SpO<sub>2</sub>/PaO<sub>2</sub>
  - increased PaCO<sub>2</sub>
- Auscultation findings
- Chest X-ray changes e.g. focal collapse/consolidation
- Consider neuromuscular pathologies resulting in poor airway protection, and respiratory conditions such as cystic fibrosis. These conditions may require prophylactic physiotherapy and parental training before discharge – refer to physiotherapist

### Contraindications

- Cardiovascular instability
- Undrained pneumothorax/bullae
- Pulmonary interstitial emphysema (PIE)
- Acute pulmonary haemorrhage
- Metabolic bone disease/fractured ribs
- Intraventricular haemorrhage (IVH) within 48 hr
- Extreme prematurity (<1500 g/<26 weeks' gestation) in first week of life
- Platelet count <50 × 10<sup>9</sup>/L and/or prolonged clotting and/or active bleeding

### Precautions

- Poor skin integrity
- Platelet count <100 × 10<sup>9</sup>/L
- Avoid chest drain sites and Broviac lines/proximity of wounds/stomas
- Effectiveness reduced in chest wall oedema
- Distended abdomen
- Recent cranial or eye surgery (including ROP laser surgery)
- Acute necrotising enterocolitis
- Recent surfactant therapy
- HFOV (percussion unlikely to be effective)

## PROCEDURE

- Always assess cardiorespiratory status before intervention
- Perform with continuous monitoring
- Pre-oxygenation with increased pressure/rate where necessary
- Ensure nesting and developmental care support throughout procedure (see [Developmental care and Positioning guidelines](#))
- Plan treatment episodes pre-feed or >30 min post-feed
- Preterm babies should not receive routine physiotherapy treatment
- Minimise stress responses throughout procedure

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## Positioning

- See [Positioning guideline](#)
- **Do not** disconnect baby from the ventilator for a turn
- A variety of positions is the most important intervention for optimising ventilation distribution and mobilising secretions. Unless contraindicated use:
  - kangaroo care
  - supine
  - prone
  - semi-prone
  - full side-lying
  - side tilts/cot tilts
- If secretion retention problematic increase frequency of turns
- Do not leave baby in same position for prolonged periods – risk of collapse of dependant (lower) lung
- Different positions can be used to target specific areas of collapse and/or consolidation
- Ventilation/perfusion mismatch may necessitate increasing oxygen delivery
- **Never** use head-down tilt due to risk of IVH/reflux/respiratory compromise

## Percussion

- **Stabilise head** with 1 hand at all times
- Ensure whole circumference of the percussor makes contact with baby's chest, ideally directly on baby's skin. If not practical, a layer of vest is acceptable. The pressure should not cause any movement of baby/skin reaction
- Ideal rate approximately 3/sec
- Use short percussion episodes according to baby's stability/tolerance/gestational age
  - generally maximum of 1–2 min (up to 2–3 min for more robust self-ventilating babies)
- Address signs of stress by pacing baby or giving time-out/comfort holding
- Treat only when clinically indicated and maximum of 4-hrly, except when acute deterioration necessitates additional treatments
- Use maximum of 2 positions
  - avoid using excessive force by moving just the wrist and fingers, not the whole forearm
- Suction following percussion
- Keep percussor in incubator. Wash with soap and warm water and alcohol wipe

## Risks of percussion

***Vigorous percussion without stabilisation of the head in vulnerable extremely preterm babies and poor use of supportive developmental care techniques have previously been linked with IVH and encephaloclastic porencephaly***

## Suction

- ETT suctioning (see **Endotracheal tube (ETT) suctioning** guideline)
- Suction only when indicated, not routinely
- Maintain normal saturation range for gestational age by titrated pre/post-oxygenation. **Avoid hyperoxia** (see [Oxygen saturation targets](#) guideline)
- Catheter for open suction must be graduated and have a Müllly tip (larger end hole and 2 opposite pressure relieving side-eyes) and no larger than two-thirds diameter of ETT
- Use measured suction to minimise cardiovascular instability and trauma
- Suction pressures
  - ≤100 mmHg/13 kPa
  - apply on withdrawal only
- Apply suction continuously on withdrawal
- Oral suction must follow to clear secretions from around ETT – use ≤10 FG catheter
- When not in use, turn suction off to reduce noise

## Other considerations

- Do not routinely use sodium chloride 0.9% to mobilise tenacious secretions/mucus plug(s); risk of dislodging bacterial colonies from ETT into lower respiratory tract
  - if concerned ETT blocked, instil 0.2–0.3 mL (up to 0.5 mL in term baby) via ETT before suction to lubricate catheter (this should be exception, not routine practice) warm unopened ampoules in incubator
- **High frequency oscillatory ventilation (HFOV)**
  - after suction, increase mean airway pressure by 1 cm H<sub>2</sub>O to recruit lung at discretion of medical staff

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- **Mucoactives**
- may be helpful for viscous secretions with persistent collapse/consolidation. Discuss with medical team
- **Non-ventilated babies**
- oral suction with size 8 or 10 catheter. Always position side-lying for suction – reduces risk of aspiration if baby vomits

## AFTERCARE

- Assess and document effectiveness of interventions
- If baby shows no improvement, or is worse, seek advice from MDT and refer to physiotherapist
- Assess indication and contraindication for percussion at each episode and discontinue when desired outcomes achieved
- Ensure timely and detailed documentation including time, indications, intervention and outcomes

## FURTHER INFORMATION

- For babies with difficulty clearing secretions and for individual/group training, contact a neonatal respiratory physiotherapist