Airway Clearance and Suctioning

Choosing a technique, postural drainage, PEP and oscillation, cough assist, and suction catheter size, pressure and time

CHOOSING A TECHNIQUE

PROBLEM	FIRST CHOICE
Weak cough (peak cough flow under 270 L/min)	Assisted cough, breath stacking, insufflation–exsufflation
Good cough, thick secretions	Huff, active cycle of breathing, oscillating PEP
CF or bronchiectasis	Daily clearance; no technique proven best; add exercise
After surgery	Walk, deep breathe, analgesia; incentive spirometer not alone
Mucus plug not clearing	Therapeutic bronchoscopy

- AARC 2013: no chest physiotherapy for uncomplicated pneumonia, no routine clearance in COPD, and none for a patient who clears secretions by coughing.
- Give a bronchodilator or hypertonic saline before the session, and inhaled antibiotics after it.

POSTURAL DRAINAGE AND PERCUSSION

Place the affected segment above the carina for 3–15 minutes, before meals or an hour after; percuss with a cupped hand and vibrate on exhalation, then cough or suction. In the ICU, every 4–6 hours, with the order reviewed every 48 hours.

- Any position: ICP over 20; unstabilized head or neck injury and bleeding with instability (absolute); recent spine surgery, active hemoptysis, empyema, bronchopleural fistula, CHF edema, large effusion, PE, rib fractures.
- Head-down: raised ICP risk (neurosurgery, aneurysm, eye surgery), uncontrolled hypertension, distended abdomen, esophageal surgery, aspiration risk.
- Head-up (reverse Trendelenburg): hypotension or vasoactive drugs.
- Percussion: subcutaneous emphysema, burns or grafts, new pacemaker, suspected TB, contusion, bronchospasm, osteoporosis, coagulopathy, chest-wall pain.

SAFETY Desaturation, rising ICP, hypotension or hemoptysis during treatment: stop, return the patient to the resting position, give oxygen and call the physician.

PEP, OSCILLATION AND COUGH ASSIST

PEP also: active hemoptysis, sinusitis, epistaxis, ruptured eardrum, facial surgery, nausea.

TECHNIQUE	HOW	AVOID
PEP, oscillating PEP	10–20 cm H_2O; 10–20 breaths, then huff	ICP over 20, untreated pneumothorax
Flutter (pipe-shaped)	Tilt until vibration is felt	Works only upright
Chest wall oscillation vest	5–20 Hz for 20–30 min	Unstable chest or spine
Intrapulmonary percussion	High-rate bursts with aerosol	Untreated pneumothorax
Insufflation–exsufflation	Often +40/–40 cm H_2O, 4–5 cycles	Bullae, recent barotrauma

SUCTIONING: SIZE, PRESSURE, TIME

PATIENT	CLASSIC RANGE (AARC 2004)	UPPER LIMIT (AARC 2022)
Neonate	–60 to –80 mm Hg	–120 mm Hg
Infant	–80 to –100 mm Hg	–120 mm Hg
Child	–100 to –120 mm Hg	–120 mm Hg
Adult	–100 to –150 mm Hg	–200 mm Hg

- Suction only when needed: visible or audible secretions, sawtooth flow waveform, rising peak pressure.
- Catheter under 50% of the tube's lumen (under 70% in neonates): ETT mm × 3 ÷ 2 = largest French (8.0 → 12 Fr).
- Preoxygenate; 15 seconds or less; shallow first; no routine saline.
- Closed suction for high FiO_2 or PEEP, derecruitment, or neonates.

SAFETY Bradycardia, arrhythmia or desaturation: stop, withdraw the catheter and oxygenate. Never pass a nasotracheal catheter in epiglottitis or croup.

EXAM PEARLS

EXAM TIP Craniotomy patient: no head-down drainage. Rib fractures, osteoporosis or low platelets: no percussion, use PEP. Weak cough in ALS: insufflation–exsufflation. Desaturation with every disconnect: closed suction. Non-CF bronchiectasis: clearance and hypertonic saline, no dornase.

Sources (12) are listed with links at icubasics.com/sheets/rt-airway-clearance.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.