# Gravity Assisted Positioning Guidelines for Practice

<table>
<thead>
<tr>
<th>Full Title of Guideline:</th>
<th>Gravity Assisted Positioning Guidelines for Practice</th>
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<tbody>
<tr>
<td>Author <em>(include email and role):</em></td>
<td>Fiona Haynes, Clinical Specialist Physiotherapist <a href="mailto:Fiona.haynes@nuh.nhs.uk">Fiona.haynes@nuh.nhs.uk</a></td>
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<tr>
<td>Division &amp; Speciality:</td>
<td>Clinical Support, Physiotherapy</td>
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<td>3</td>
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<tr>
<td>Ratified by:</td>
<td>Senior Physiotherapists at NUH</td>
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<tr>
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<td>Trust wide physiotherapists</td>
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<td>Review date <em>(when this version goes out of date):</em></td>
<td>September, 2021</td>
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<td>Explicit definition of patient group to which it applies <em>(e.g. inclusion and exclusion criteria, diagnosis):</em></td>
<td>For use with patients who have excessive pulmonary secretions e.g. Cystic Fibrosis and Bronchiectasis patients. Excluding patients with cardiovascular instability, gastro-oesophageal reflux, hypertension and a number of other cautions/contraindications listed in the guideline.</td>
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<tr>
<td>Changes from previous version <em>(not applicable if this is a new guideline, enter below if extensive):</em></td>
<td>Review of research, minor changes to wording, grammar and spelling errors corrected.</td>
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<tr>
<td>Summary of evidence base this guideline has been created from:</td>
<td>Review of randomised controlled trial. Well–designed non-experimental descriptive studies (i.e. comparative / correlation and case studies) Expert committee reports or opinions and / or clinical experiences of respected authorities. Recommended best practice based on the clinical experience of the guideline developer.</td>
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*This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date or outside of the Trust.*
Gravity Assisted Positioning (GAP) Guideline for Practice 2018

Version: This replaces the GAP guideline for practice, March 2015
Review Date: September 2021
Contact: Fiona Haynes Clinical Specialist Physiotherapist and Eleanor Douglas, Lecturer/Practitioner Physiotherapist. Ext: 56141 or 56142

Disclaimer
This guideline has been registered with the Nottingham University Hospitals Trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in any doubt regarding this procedure, contact a senior colleague. Caution is advised when using guidelines after the review date. Please contact the named above with any comments / feedback.

Introduction/ Indications For Use
Gravity Assisted Positioning involves specific body positioning to utilise gravity to drain a specific bronchopulmonary segment, another name for GAP is Postural Drainage (PD). Each lung segment is a functionally independent unit of lung supplied by a separate bronchus. Appropriate positioning can place the bronchus of each bronchopulmonary segment perpendicular to gravity. This allows gravitational forces to assist the movement of bronchial secretions (Jones & Moffatt, 2002) Refer to Hough, 2003 for the specified drainage positions for each lung segment.
GAP can assist the clearance of excess bronchial secretions in adults and children and can improve ventilation and perfusion. GAP should be taught and used as part of a self-treatment regime in patients were it further aids secretion clearance with no detrimental effect.

This guideline is to be used in conjunction with the Active Cycle of Breathing Technique (ACBT) guideline (September, 2018 and the Manual Techniques Guideline, September, 2018)

Contraindications / Precautions
The following co-morbidities, contraindications/precautions should be taken in to account prior to commencing head-down tilt positions:

- Cerebral oedema e.g. acute head injury or recent stroke
- Hypertension
- Surgical emphysema
- Trauma, burns or recent surgery to the head or neck
- Recent pneumonectomy or surgery to the aorta, oesophagus or cardiac sphincter of the stomach
- Headache
- Breathlessness (consider offsetting increased load of breathing by the use of non-invasive ventilation or intermittent positive pressure breathing were GAP is essential to clear secretions)
- Symptomatic hiatus hernia
- History of seizures
- Epistaxis or recent haemoptysis
- Abdominal distension, pregnancy or obesity
- Spinal cord lesion (use with extreme caution and monitor signs of hypoxaemia carefully)
- Pulmonary oedema, arrhythmias, cardiovascular instability
- Undrained pneumothorax
- Bronchopleural fistula
- Risk of aspiration
- Gastro-oesophageal reflux
- Patient preference and adherence

Hough, 2001 and Bott et al, 2009
Complications
The head-down position may:
Increase the work of breathing
Reduce tidal volume
Decrease functional residual capacity in normal lungs
In critically ill patients, positioning may elicit exercise or stress like responses, resulting in increased oxygen consumption.
GAP may have significant effects on ventilation homogeneity that may predispose the patient to arterial desaturation

Limitations
GAP is unlikely to be of effect in patients with very tenacious secretions due to the surface forces limiting drainage in the smaller airways. If used with such patients ie Cystic Fibrosis patients, then it is advisable to administer a mucolytic such as Dnase or hypertonic saline prior to treatment.

Procedure

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<tr>
<th>Action</th>
<th>Rationale</th>
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<td>Consider the timing of GAP as part of your treatment</td>
<td>GAP in the early morning helps clear the night's secretions GAP an hour before sleep reduces night coughing Avoid straight after meals to prevent sickness</td>
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<td>Prepare the patient by giving a clear explanation of the treatment</td>
<td>Minimises distress and informs the patient of the procedure</td>
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<td>Obtain consent from the patient</td>
<td>Confirms the patient is willing to undertake GAP</td>
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<td>Auscultate the patients chest</td>
<td>To ensure no bronchospasm is present prior to the treatment and to assess which area of the lung is to be treated.</td>
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<td>Check the patients SpO₂ level</td>
<td>To monitor if desaturation or if hypoxaemia occurs during treatment</td>
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<td>Prepare the patient with the area to be drained uppermost and/or in accordance with the GAP appropriate to the lung segment to be treated (Refer to Hough, 2003 for appropriate positions)</td>
<td>Appropriate positioning allows gravitational forces to assist the movement of secretions. Bear in mind that these positions may need modification for patient comfort or if lung architecture has been distorted by surgery, fibrosis, a large abscess or bullae</td>
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<td>Allow for adequate drainage time with each segment and consider using breathing and manual techniques in conjunction (refer to ACBT and manual techniques guidelines for practice) The most peripheral lung segment should be drained first if a number of segments are to be drained</td>
<td>Drainage time may vary, however a minimum of 10 minutes is recommended for each segment (Hough, 2003) draining the most peripheral segment first avoids the potential of leaving (infected) secretions in the more proximal airways to the segment previously drained</td>
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<td>The procedure should be discontinued if the patient complains of headache, discomfort, dizziness, palpitations, breathlessness or fatigue or becomes hypoxaemic. Or if no further secretions can be expectorated</td>
<td>The head down position has not been tolerated on this occasion or secretion drainage is complete</td>
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<td>Document the treatment and its outcome in the medical notes</td>
<td>To provide a legal record of the treatment and to communicate it’s outcome with other health care professionals</td>
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**Best Practice Points**

Individuals should be assessed on the effects and acceptability of GAP

Modified positioning (no head down tilt) should be used if it is as effective as the GAP or if using GAP is problematic

The modified horizontal position has been shown to be as effective as head-down position in terms of wet sputum production in *bronchiectatic* subjects. Furthermore, the sensation of breathlessness during treatment was reduced with the horizontal position, and was generally preferred by patients (Cecins, et al 1997)

**References**


