

Basic Research Overview

High-Frequency Chest Compression: Mechanisms of Action/Physiological Effects

This investigation of the ability of high frequency chest compression (HFCC) to clear secretions from peripheral lung regions showed significantly enhanced rates of mucus clearance in both peripheral and central regions.

Title	Gross D, Zidulka A, O'Brien C, Wight D, Fraser R, Rosenthal L, King M. Peripheral mucociliary clearance with high frequency chest-wall compression. <i>J Appl Physiol</i> 1985; 58:1157-1163.
Objectives	To investigate the effect of high frequency chest compression (HFCC) on clearance of secretions from peripheral lung regions
Method	<p>5 anesthetized, spontaneously breathing dogs received 30 minute treatments of HFCC at 13 Hz & cuff pressures at 50-60 cm H₂O</p> <ul style="list-style-type: none"> • HFCC was administered by oscillating the pressure in a thoracic cuff with a piston pump • Regional lung retention of a technetium – 99 sulfur colloid aerosol was monitored with a gamma camera • A peripheral mucus clearance index (PMCI) was defined for each region of interest • Tracheal mucus clearance rate (TMCR) was determined by bronchoscopic visualization of a marker particle transport
Results	<p>HFCC enhances both central AND peripheral mucus clearance in normal dogs</p> <ul style="list-style-type: none"> • Correlations between peripheral mucus clearance indices (PMCI) and tracheal mucus clearance rates (TMCR) in two outer peripheral regions located under the cuff were statistically significant (13.0 ± 2.6; $p < 0.05$) • Lower-middle outer PCMI was also significant (9.1 ± 3.0; $p < 0.05$) • Overall, HFCC enhanced both central and peripheral mucus clearance in normal dogs • HFCC appears to be safe when moderate pressures are applied; post-mortem, study dogs showed no evidence of pulmonary hemorrhage

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