

# NASAL AIR-CONDITIONING DURING N-CPAP THERAPY

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## **Bioengineering**

Over 40% of people who undertake n-CPAP breathing therapy report problems of rhinitis or nasal congestion despite not having these symptoms prior to treatment. Heated humidification is often used to condition inhaled air and to minimise these symptoms by eliminating the need for the airway mucosa to provide or recover heat or moisture during breathing. This research focuses on developing an appropriate mathematical model which describes air-conditioning within the nose during the application of CPAP therapy. The model will incorporate the regulation of airway fluid supply which is partially controlled through epithelial cell stress stimulation induced during tidal breathing. Model outcomes will be the quantification of the effect of air pressures on this regulation. Laws of mass and heat transfer will be used to incorporate data from clinical trials to predict the nasal heating and humidification requirements. This includes: (1) heat and humidification supplement to make up for the dynamic state of mucosa dysfunction encountered during n-CAP therapy (2) maintenance of normal airway fluid volume within the upper airway (3) maintenance of mucociliary clearance (4) prevention of inflammation because of fluid imbalances or thermal injury.