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Influence of the transnasal insufflation (TNI) on respiratory pressure amplitude and respiratory middle pressure in comparison to spontaneous respiration and CPAP in people with healthy lungs

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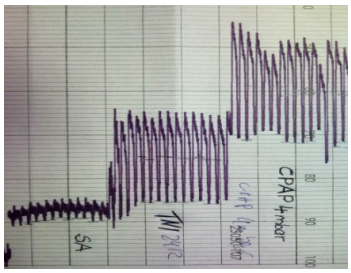
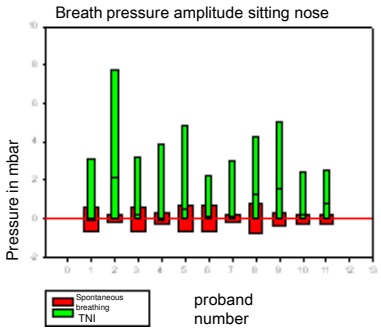
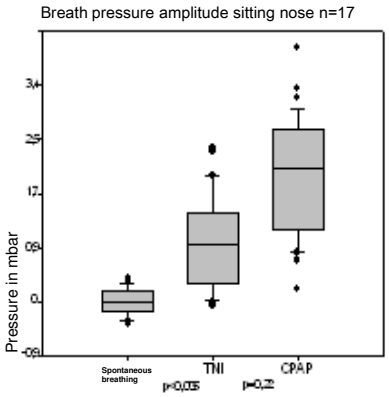
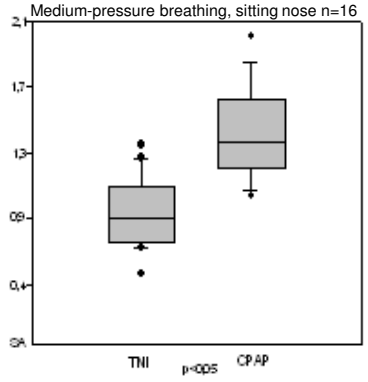
Introduction: The already in neonatology established transnasal insufflation implies application of a heated, humidified and continuous airflow between 16 and 24 l/min.
The clinical application shows significant decline of pC02.
The therapeutic mechanisms and efficiency of this method are however indistinct in adults. First examinations showed increased respiratory pressure, decline of dyspnea, decrease of respiratory frequency and enhanced oxygenation.

Method: By means of a thin water-filled tube system the measured pressures in nose and tounge area were transferred via amplifier to a recorder. The experiments were executed nasal and orally, while sitting, lying and under spontaneous respiration, TNI and CPAP. Pressure gradients between in- and exspiration as well as variation of respiratory middle pressures were detected while using the corresponding methods.
As test persons people with healthy lungs were adducted.









Results: All combinations showed significant increase of respiratory pressure amplitude under TNI in comparison to spontaneous respiration. Application of a CPAP with low pressure (4 mbar) did not show significant modifications. All experiments showed significantly increased respiratory middle pressure by transnasal insufflation in comparison to spontaneous respiration. Application of CPAP resulted in reaffirmed increase of respiratory middle pressure.

1 McGinley et al. (2007): A nasal cannula can be used to treat obstructive sleep apnoe. 2 Chatila et al. (2004): The effects of High-flow vs. Low-Flow oxygen in exercise in advanced obstructive airway disease.

Discussion: At continuous compliance the transnasal insufflation increases the ventilation by accentuation of the respiratory pressure amplitude and increase of respiratory middle pressure. The middle respiratory pressure will hereby only be increased slightly, thus an alveolar recruitment not being in the foreground. Ventilation work seems to be minimized by overcoming the statical and dynamical resistances. As how far the respiratory muscle pump will be released is not yet defined. Using TNI leads to a shifting on the pressure-volume-curve. Whether or not an additional elution effect supports CO2-decrease , i.e. which patients profit from this breathing support, has to be subject to further investigations.