Tuesday Abstract Posters

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A COMPARISON OF TWO NASAL EXPIRATORY PAP DEVICES FOR THE TREATMENT OF OSA

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PURPOSE: Compliance with PAP therapy for OSA treatment remains problematic and the Provent device has previously been the only nasal expiratory PAP (nEPAP) alternative, yet patients may experience difficulty exhaling and sleeping, reducing acceptance (1,2). The Bongo Rx device is a conjoined set of soft nEPAP valves, providing mild dilation and nEPAP, cleared by the FDA for OSA treatment (3). We evaluated the devices to determine inspiratory and expiratory resistance to flow (RTF) and expiratory work of breathing (WOB) in the laboratory. We hypothesized that compared to Provent, the mean inspiratory and expiratory pressures related to the device resistance for a given set of flows would be significantly lower for the Bongo Rx resulting in a much lower expiratory WOB.

METHODS: RTF measurements were taken on 4 of each unit (UUT) by applying the UUT to a nasal fixture connected to a 4040 flowmeter (TSI Inc.) and pressure line adapter, with circuit flow provided by a CPAP device (Automated Control Systems). Flow rates were verified by the flowmeter, with pressure measured via the auxiliary pressure transducer on a Series 1101 Breathing Simulator (Hans Rudolph, Inc.). Pressures at inspiratory and expiratory flow rates of 10/20/30 LPM were recorded, and RTF values (in cmH2O/l/s) was then calculated. Airway pressure measurements (in cmH2O) were taken applying the UUT/nasal fixture to the airway port of the breathing simulator and generating 1:1 I:E, 500cc tidal breath patterns at breath rates of 10/15/20 BPM, with respective peak expiratory flow rates of 15/22/29 LPM. Airway measurements were recorded via the breathing simulator's airway flow and pressure transducers, and expiratory WOB (in J/l) per breath was calculated.

RESULTS: At flow rates of 10/20/30 LPM: Average inspiratory RTF was 1.0/1.3/1.7 vs 2.2/2.9/3.6 cmH2O/l/s for Bongo Rx vs Provent, average expiratory RTF was 17.4/34.1/49.1 vs 59.0/76.9/83.1 cmH2O/l/s for Bongo Rx vs Provent (all $p<0.0008$).

CONCLUSIONS: We conclude that Bongo Rx may result in a more comfortable OSA therapy experience by providing a significantly lower expiratory WOB, the result of significantly lower average inspiratory/expiratory RTF. Further clinical research of patient acceptance, satisfaction and treatment efficacy is ongoing.

CLINICAL IMPLICATIONS: This device gives clinicians another tool for treating newly diagnosed OSA patients and those who have failed other therapies, potentially improving outcomes.

Reference 1. Provent Sleep Apnea Therapy, "Instructions for Use". PST012-EN Rev E 05/2017.

Reference 2. Doshi R, Westbrook P. Nasal Expiratory Positive Airway Pressure (EPAP) for the Treatment of Obstructive Sleep Apnea: A Review of Clinical Studies of Provent Therapy. Respiratory Therapy 2011; 6(4):45-49.

Reference 3. Lankford A, Kram J. A Novel EPAP Device for the Treatment of Mild-to-Moderate Obstructive Sleep Apnea. Associated Professional Sleep Societies; 2019. (In Press)