Nasal dilators are non-invasive devices, which may improve nasal breathing remarkably. They are used by sportsmen, but also by patients with impaired nasal breathing for different reasons. Snoring and even symptoms of mild sleep apnea may be reduced, but the effect is not predictable. Publications reporting about the results of application are coming to different conclusions. Pregnant women report an improvement of obstructive symptoms by spreader devices.

It can be shown that by measuring the effect of the dilator by means of 4-Phase-Rhinomanometry is predictable. There are significant differences in the effectiveness between different devices as well as in increasing the nasal air stream as well as in the subjective compliance.

4-Phase-Rhinomanometry is recommended for the selection of patients. AIRMAX spreaders showed the best results compared with other types.

Pathophysiology of impaired nasal breathing during sleep

Basically, the reasons for an impaired nasal air stream may be of temporary nature as common cold or allergic rhinitis or are persisting due to deviations of the septum or nasal septum. Chronic rhinitis and polyps are causing nasal obstruction, which may persist for a long time. A well-known fact is that the effect of surgical treatment of the nasal septum by plastic surgery or sinus surgery on snoring and sleep apnea is unpredictable. The restoration of nasal breathing may also lead to increased snoring.

Dynamic changes, e.g. alterations caused by the onset of the airstream itself, are called “valve phenomena”, which is the premature onset of the nasal air stream already in low flow rates. The “jet stream” through the nasal entrance and its BERNOUILLI-effects are the aerodynamic background.

On the other hand, the physiological airstream is subjected to circadian changes, the “nasal cycle” and changes depending on body position, which are the effect of the skin pressure of the same side. These are some hints, that also the soft tissue structures at the nasal entrance are affected by nocturnal swelling.

Advantages of 4-phase-rhinomanometry (4PR)

While the classic rhinomanometry is measuring the relation between the nasal airflow and the differential pressure necessary for 1st generation, 4PR differentiates between the ascending and descending inspiratory and expiratory breathing phases. In that way it is possible to see the effect of elastic behavior of the nasal entrance, the „valve phenomena“. Furthermore, new parameters have been introduced, which are Proofed as being significantly correlated with the subjective feeling of obstruction: These parameters are the Logarithmic Verseau Resistance (LVR) and the Logarithmic Effective Resistance (LER). Furthermore, the flow resistance at both nasal channels can be calculated by means of KHÖHLE’s law.

These principles are realized in the rhinomanometer HR 3 (Rho Lab, Rendsburg/Germany).

Recent studies about the effectiveness of AIRMAX in nasal breathing and snoring

Study 1 (Veit and Merkurub, 2009, WASM): In a pituitary study of 127 cases of nose or mild OSA with impeded flow due to different causes, the averaged nasal resistance could be reduced by AIRMAX about 20%, accompanied by an increase on a QOL scale.

Results

The results of the subjective improvement of the QOL are depicted below:

The results show clearly a remarkable improvement of QOL by reduced snoring within all groups. The effect in patients with severe morphological impediments as nasal polyps or posterior septal spares or manifestified deformities was small, while patients with a visible improvement in their “PR-rhinomanometry showed the best results.

Study 2: Comparative study about the effectiveness and compatibility of different nasal dilators

Prospective study performed from November 2009 to April 2010. During the study the users subjective opinions about comfort, effectiveness and side effects of nasal dilators were compared and analyzed. Subsequently the effects of two nasal dilators were objectively analyzed by means of 4-Phase-Rhinomanometry. The study population were 24 people aged from 17 to 57 years old without serious health problems and without rhinological diseases.

Results:

Most of the users considered subjectively the Breathe Right® (71%) and Airmax® (21%) dilators to be the most comfortable in use and effective in improving nasal breathing. Nozavent® and Nasair® were inferior to the Breathe Right® and Nasair® as the latter were more comfortable and effective in everyday use and had more side effects or provoked inconvenient feelings. In the objective part of the study the Breathe Right® and Airmax® were most effective, but the results of the 4-Phase-Rhinomanometry did not show a significant difference between the nasal dilators.

The Airmax® is more effective than the Breathe Right® in reducing these resistance parameters.

CONCLUSIONS:

Nasal dilators may reduce the nasal resistance remarkably, but the reduction of the nasal resistance depends on the nasal patho-ogy. The best effect can be achieved in widening the nasal entrance, in particular in so called „valve phenomenon“. The effect is pre-dictable by 4-Phase-Rhinomanometry. The improvement is better in inspiration as in expiration, because the nasal valve reduces the inspiratory airflow. To exclude the influence of the nasal cycle, it is recommended to calculate the Total Nasal Resistance or measure the resistance by Active Posterior Rhinomanometry.