Does nasal obstruction mean that the nose is obstructed?

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OBJECTIVE
It is still a matter of controversy to what extent the sense of nasal obstruction is associated with objective measures for nasal space and air flow. We evaluated the relationship between subjective nasal obstruction and the corresponding anatomic and physiological nasal parameters using Acoustic Rhinometry (AR) and Peak Nasal Inspiratory Flow (PNIF).

CONCLUSION
Our study indicates significant associations between subjective nasal obstruction and corresponding measures of nasal space, area and air flow. We conclude that AR and PNIF are valuable objective investigational tools well correlated with the sensation of nasal obstruction.

METHOD
2341 consecutive patients referred to ENT specialist for evaluation of obstructive sleep apnea, snoring or nose related complaints were included in this cross-sectional study. Associations between Nasal Obstruction Visual Analogue Scale recordings (NO-VAS) and measurements of PNIF and AR were evaluated with ANOVA (crude associations) and linear regression adjusted for age, sex, body mass index and asthma, allergy and smoking history.

SAMPLE DEMOGRAPHICS

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>min - max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (yr)</strong></td>
<td>46</td>
<td>16 - 87</td>
</tr>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>26.0</td>
<td>15 - 85</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1761</td>
<td>(70)</td>
</tr>
<tr>
<td>Female</td>
<td>762</td>
<td>(30)</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td>278</td>
<td>(11)</td>
</tr>
<tr>
<td><strong>Allergy</strong></td>
<td>732</td>
<td>(29)</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td>833</td>
<td>(33)</td>
</tr>
</tbody>
</table>

RESULTS
Subjective nasal obstruction was correlated to PNIF, volumes and minimal cross-sectional areas in the nasal cavities.

CRUDE ASSOCIATIONS

MULTIPLE LINEAR REGRESSION -adjusted estimates†

CONCLUSION
Our study indicates significant associations between subjective nasal obstruction and corresponding measures of nasal space, area and air flow. We conclude that AR and PNIF are valuable objective investigational tools well correlated with the sensation of nasal obstruction.

SMOKER’S NOSE

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OBJECTIVES
Do smokers have more upper airway complaints than non-smokers? The aim of our study was to evaluate the role of cigarette smoking in relation to upper airway symptoms.

METHOD
2294 consecutive patients referred to ENT specialist for evaluation of obstructive sleep apnea, snoring or nose related complaints were included in this cross-sectional study. Subjects completed a detailed questionnaire including 13 mainly upper airway symptoms which were graded using Visual Analogue Scales (VAS). Associations between VAS recordings and smoking status were evaluated using ANOVA (crude associations) and linear regression analysis adjusted for age, sex, body mass index, asthma and allergy. Bonferroni correction was applied to correct for multiple testing and p<0.01 was considered statistically significant. Differences of 10% or more were regarded as clinically relevant.

RESULTS
Smokers had higher VAS scores in 10 out of 13 symptoms compared with non-smokers (including one incident of borderline significance), indicating more subjective complaints. Further, there was a positive association between VAS scores and daily cigarette consumption.

CRUDE ASSOCIATIONS -smokers vs. non-smokers

Smokers had higher mean VAS-scores than non-smokers in 10 out of 13 symptom categories (ANOVA), including one incident of borderline significance. Differences in mean VAS scores between smokers and non-smokers were 12-27% and therefore considered clinically relevant.

ADJUSTED ASSOCIATIONS -smokers vs. non-smokers

Linear regression confirmed the crude associations: smokers had more subjective complaints from the upper airways than non-smokers. Estimates were adjusted for age, gender, asthma, allergy and BMI.

CONCLUSION
Our study indicates that smokers have more subjective complaints from the upper airways than non-smokers. Further, there seems to be a trend towards dose-response relationship between symptoms and daily cigarette consumption.