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If Oral Breathing Does Not Determine Mask Choice for CPAP Delivery, What Does?

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To the editor:

As underlined by the 2020 American Thoracic Society Workshop Report, current evidence suggests that nasal masks should be the first option for the delivery of Continuous Positive Airway Pressure (CPAP) therapy for most patients with obstructive sleep apnea (OSA) (1). Some patients, however, may require an oronasal mask to optimize their treatment; but evidence to support the choice is lacking. We read the study by de Andrade Xavier et al. with interest, in particular their hypothesis that patients for whom an oronasal mask is well adapted breathe predominantly through the nose (2).

The data provided by de Andrade Xavier et al. suggest that oral breathing is not the main pathophysiological endotype (PE) associated with the choice of an oronasal mask since only one of the twelve patients investigated breathed exclusively through his/her mouth (2). These results therefore raise the question: if oral breathing is not the main reason for the choice of an oronasal mask, which other PEs determine the choice?

Oronasal masks are often used to prevent mouth opening which disturbs the patient and leads to adverse effects, in particular leaks and a dry mouth. Mouth opening may therefore be the main PE that leads to the choice of an oronasal mask. In our opinion, three main factors explain mouth opening during CPAP therapy in patients with OSA:

1) *Nasal-obstruction*, although evidence supporting this is conflicting. Two pathophysiological observational studies in our group found that the choice of an oronasal mask was related to severe nasal obstruction (3, 4), although this was not found by de Andrade Xavier et al. (2). This apparent discrepancy may be the result of differences in the severity of the nasal obstruction between the three studies. In the de Andrade Xavier et al. study, only 1/12 patients was classified with severe and 4/12 with moderate nasal obstruction (2). Current medical consensus is to treat nasal symptoms first

to improve acceptance of the nasal mask and to switch to an oronasal mask only if nasal treatment fails and nasal mask tolerance remains poor (1).

2) *Respiratory effort*. During obstructive respiratory events, the mandible drops progressively as the respiratory effort increases, which can lead to leakage through the mouth (5).

3) *Sleep stage*. Variability in masseter tone with sleep stage could also contribute to mouth opening (5, 6).

We suggest that since oral breathing is an infrequent reason for the choice of an oronasal mask, as shown by de Andrade Xavier et al., clinicians should assess and manage mouth-opening when possible (e.g., by treating nasal obstruction or sometime increasing CPAP pressure to reduce residual respiratory effort).

As interest in personalized medicine is growing within the medical community, it is important to develop new tools to optimize mask selection for individual patients. We congratulate de Andrade Xavier et al. (2) for providing new evidence regarding mask choice as this will lead to precision medicine and better patient outcomes. We fully agree with de Andrade Xavier et al. that patients who breathe through the nose should switch to a nasal mask, but the question remains whether patients whose main problem is mouth opening should also be switched. It is our opinion that the reasons for the mouth-opening should be managed first, in particular nasal obstruction and residual respiratory effort.

Competing interests

Dr. Dany Jaffuel reports personal fees from Philips Healthcare, personal fees from Resmed, personal fees and non-financial support from SEFAM, personal fees from Lowenstein, personal fees from GSK, personal fees from Boehringer Ingelheim, personal fees from Jazz, grants and personal fees from Novartis, personal fees from Astra Zeneca, personal fees from Chiesi Farma, personal fees from SANOFI, outside the submitted work. Dr. Dany Jaffuel also reports personal fees from NOMICS.

Dr. Jean Christian Borel is salaried by AGIR à dom (homecare provider) and is the shared owner of a patent with NOMICS.

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