Preference for Smaller Diameter Mouthpiece in Performing Dynamic Lung Function Tests: A Consideration for Patients

Keywords: Mouthpiece; Diameter size; Spirometry; Peak flow meter

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Short Commentary

Many have suspected that mouthpiece with a smaller diameter is easier to make a forced expiration in spirometry or peak flow meter. This may be related to the ease of making a tight lip seal over a smaller opening than a larger one while operating the maneuver of a forced expiration. Those who are breathless or having diseased lung may struggle more over this. Some may prefer a smaller mouthpiece to conduct this maneuver because of the same reason. To our knowledge, this aspect of personal preference has not been studied before.

In a prospective cross-sectional study, we compared the individual preferences of mouthpiece size when conducting either spirometry (MicroLab™ spirometer) in 51 young adults (mean (SD) age 23 (1.5) years) or peak flow meter measurement in 50 older adults [age 59 (10.6) years]. Both groups were gender-matched (overall 47% male) and recruited among from a medical college and a large urban-based teaching hospital. Subjects with any acute or chronic lung diseases were excluded. The bigger mouthpiece studied was the commonly available single-use cardboard disposable mouthpiece (30 mm diameter) [Micro Medical Adult Disposable Mouthpiece; code: MMPSA 1000] and the smaller one studied was a reusable 22 mm-diameter mouthpiece [Micro Medical Universal Mouthpiece (code: MMPSA 2200)]. The issue of interest here was about the mouthpiece size. Verbal consent was obtained from all subjects. This study was performed as part of a larger COPD study approved by the local research and ethics committee.

Mean Forced Expiratory Volume in One Second (FEV₁) was not statistically different when either big or small mouthpiece was used [Mean (SD) 3.06 (0.083) vs. 3.08 (0.083) litres; p = 0.32, paired t-test] in young adults (Figure 1A). Mean Peak Expiratory Flow Rate (PEFR) was also not statistically different when either big or small mouthpiece was used [Mean (SD) 336 (11.4) vs. 343 (11.8); p = 0.16] in older adults (Figure 1B). The number of subjects who preferred the smaller mouthpiece was about twice the number who preferred the bigger one [young adults, 29 (56.8%) vs. 16 (31.3%); older adults, 33 (66%) vs. 14 (28%)]. Six (11.7%) young and three (6%) older adults did not have a preference (Figure 2).

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may be caused by a less-than-maximal effort of the subject than by genuine airflow obstruction or diseased lung. A preferred mouthpiece to optimize lip seal and these dynamic breathing maneuvers may optimize this effort-dependent measurement. Our findings suggest that a smaller mouthpiece should be available more widely for patients since it appears to be a preferred option. This may improve adherence especially if subjects are asked to conduct such tests by themselves like in the case of home PEFR measurement in self-management of asthma [3].

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![Figure 1](A) Mean FEV₁ (litres) using big and small mouthpiece in young adults. (B) Mean PEFR (L/min) using big and small mouthpiece in older adults.

![Figure 2](Preference for the two mouthpiece sizes in young and older adults.)
References

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