SOP #3001

Peak Expiratory Flow (PEF) and Peak Cough Flow (PCF) tests

- Always review the SOP before beginning administration of the measurement tool.
- Always read the SOP instructions verbatim to the participant.
- Never modify the procedure or instructions (a modified test is invalid/incomplete).
- Always notify the coordinator if you have any doubt or questions about the SOP.

Description

Peak Expiratory Flow (PEF) and Peak Cough Flow (PCF) tests are used to assess glottal efficiency (ability to clear the airways).

Equipment



- □ Peak flow meter (MEDIFLUX Mini Wright Standard Peak Flow Meter [60 to 800 L/min.])
- □ Standard chair with or without armrests
- □ Nose clip
- □ Footrest (if necessary)
- □ Tissues (if necessary)

Participant preparation

- □ The participant must wear comfortable clothing.

Examiner instructions (PEF and PCF)

- □ The examiner stands next to the participant and records the results of the trials.
- □ The examiner (or the participant) places the nose clip on the participant.
- □ Flexion and extension movements of the head and trunk must be monitored. The neck should remain in a neutral position.
- □ The examiner makes sure the participant closes their lips tightly around the mouthpiece, does not place their tongue against the mouthpiece, and does not inflate their cheeks, as this could distort the test results.
- □ The examiner makes sure the participant takes a deep breath and does not hesitate when placing the mouthpiece in their mouth. A delay or reduction in inspiratory volume may result in lower reading.
- □ It is important that the participant does not cough during the Peak Expiratory Flow (PEF) measurement.
- □ If the participant hesitates or coughs during the PEF measurement, the result is recorded on the scoring sheet, and the trial is recorded as invalid. The procedure is repeated for a maximum of five trials.
- □ Note: A facemask may be used if the participant is unable to use the mouthpiece.

Test administration

Demonstration

The examiner demonstrates the PEF and PCF tests without placing the device in their mouth.

Practice

The examiner may ask the participant to cough once or twice without the flow meter before measuring PCF.

Procedure

Peak Expiratory Flow (PEF)

1. The marker is moved to the bottom of the numbered scale on the flow meter.
2. The participant sits with their back against the chair backrest, and their feet flat on the floor.
3. The participant is instructed to hold the flow meter in their hands so that it is horizontal, without obstructing the mouthpiece.
4. The participant is provided by the following instructions: *"Take a deep breath to fill your lungs with air. Then, put the flow meter in your mouth and close your lips tightly around the mouthpiece to prevent air from leaking out. Then, breathe out through your mouth as hard and as fast as you can into the device."*
5. The result and the validity of the trial are recorded on the scoring sheet.
6. The marker is moved back to the bottom of the numbered scale on the flow meter.
7. The test is repeated 3 to 5 times (*read the information in the Trial(s) section below).

Peak Cough Flow (PCF)

1. The marker is moved to the bottom of the numbered scale on the flow meter.
2. The participant sits with their back against the chair backrest, and their feet flat on the floor.
3. The participant is instructed to hold the flow meter in their hands so that it is horizontal, without obstructing the mouthpiece.
4. The participant is provided by the following instructions: *"Take a deep breath to fill your lungs with air. Then put the flow meter in your mouth and close your lips tightly around the mouthpiece to prevent air from leaking out. Then cough as hard as you can into the device, as if something is stuck in your throat."*
5. The result and the validity of the trial are recorded on the scoring sheet.
6. The marker is moved back to the bottom of the numbered scale on the flow meter.
7. The test is repeated 3 to 5 times (*read the information in the Trial(s) section below).

Trial(s)

Three trials are performed; however, up to two other trials must be performed if any of them are considered invalid (hesitation or cough during PEF) or if a staircase effect is observed (flow rate 1st trial < 2nd trial < 3rd trial). If the difference between the two best trial results exceeds 40 L/min., additional trial should be performed, up to a maximum of 5 trials.

Result

The flow rate results in L/min. are recorded on the scoring sheet for the PEF test and the PCF test. The validity of the result for each of the trials is recorded on the scoring sheet (valid or invalid).

Calculation of glottal efficiency

The best result (PEF and PCF) from the trials is used to calculate glottal efficiency using the following equation:

$$\text{Glottal efficiency} = \frac{PCF}{PEF}$$

References

1. Ayres, J. G., & Turpin, P. J. (1997). Peak flow measurement: An illustrated guide.
2. Gonzalez-Bermejo, J., Prella, M., Prigent, H., Orlikowski, D., Derenne, J. P., & Similowski, T. (2005). Conséquences respiratoires chroniques des maladies neuromusculaires. EMC - Pneumologie, 2(2), 86-104. doi: https://doi.org/10.1016/j.emcpn.2005.04.002
3. McCoy, E. K., Thomas, J. L., Sowell, R. S., George, C., Finch, C. K., Tolley, E. A., & Self, T. H. (January 01, 2010). An Evaluation of Peak Expiratory Flow Monitoring : A Comparison of Sitting Versus Standing Measurements. Jabfm, 23, 2, 166-170.
4. Miller, M. R., Hankinson, J., Brusasco, V., Burgo, F., Casaburi, R., Coates, A., ... Wanger, J. (2007). Standardisation de la spirométrie. Revue des Maladies Respiratoires, 24(3, Part 2), 27-49. doi: https://doi.org/10.1016/S0761-8425(07)91117-1
5. Self, T. H., George, C. M., Wallace, J. L., Patterson, S. J., & Finch, C. K. (May 09, 2014). Incorrect use of peak flow meters : are you observing your patients?. Journal of Asthma, 51, 6, 566-572.
6. Vaswani, R., Moy, R., & Vaswani, S. K. (January 01, 2005). Evaluation of Factors Affecting Peak Expiratory Flow in Healthy Adults : Is It Necessary to Stand Up ? Journal of Asthma, 42, 9, 793-794.
7. Quanjer, P. H., Tammeling, G. J., Cotes, J. E., Pedersen, O. F., Peslin, R., & Yernault, J. C. (1993). Lung volumes and forced ventilatory flows. The European respiratory journal, 6, 5-40.