Patient Testing – MVV Testing Procedure on Ultima & Elite Plethysmograph

Audience All personnel in the Pulmonary Function Clinic.

Purpose Maximal Voluntary Ventilation (MVV) is a spirometry test that measures the largest volume that can be moved into and out of the lungs during a 10-15 second interval with voluntary effort.

Subjects who have pulmonary disease will show decreased absolute values. The MVV may decrease significantly as the maneuver progresses because of respiratory muscle fatigue, increased work of breathing, or because of air trapping.

Requirements

The following are required for Maximum Voluntary Ventilation Testing:

- Patient breathes in and out as deep and fast as possible for 10 to 15 seconds.
- During the breath countdown, have the patient initiate the MVV maneuver.
- If the patient is clearly unable to complete the 12 seconds, pressing the spacebar will end the test and extrapolate results.
- Patients who cannot easily take full breaths may benefit more from higher respiratory rates.
- Patients with significant obstruction may benefit more from bigger breaths and slower respiratory rates.
- Generally, the optimal MVV is achieved by matching an FEV1 type effort with a respiratory rate of 60 bpm.

Procedure The following is the correct procedure for performing a Maximal Voluntary Ventilation on a patient:

- Before beginning the test, click Zero Flow to zero the pneumotach. There must be no flow through the pneumotach during this procedure.
- Click the MVV tab to display the MVV test screen.
- Place nose clips on the patient.
- Instruct the patient to begin breathing deeply and rapidly through the mouthpiece. If you have the Keystroke to Start Test option turned on (default) press the spacebar to begin data collection. If not, breathing on the system starts the testing procedure and begins data collection. Data collection begins after the number of breaths specified in Countdown Breaths on the Tools/Options/MVV tab (default is three). A Countdown Bar in the upper left part of the screen displays the number of breaths needed before data collection beings.
- Encourage the patient throughout the entire testing time to breath as deeply and as fast as possible. If the patient is unable to continue the effort through the pre-configured time, stop the test manually by pressing

the spacebar or clicking the Stop button. When the test is stopped manually, data (but not the graphic display) is extrapolated to the selected time interval).

- After the pre-configured time (set by right clicking on the graph and setting the maximal field for the time axis), data collection stops automatically. Instruct the patient to resume normal breathing.
- The results in the data table are displayed immediately and the Volume/Time graph is rescaled if needed.
- To perform another effort, repeat the above test procedure. The computer will rank the efforts according to the largest MVV.

Acceptability Criteria

The following are the acceptability criteria for MVV testing:

- Two acceptable maneuvers should be obtained with values being within 10% of each other.
- MVV is approximately equal to 35 x FEV1.

This form documents the approval and history of the policies and procedures for the Pulmonary Function Laboratory. The Medical Director signs all policies verifying initial approval. Annually thereafter, the Director and/or designee may approve reviews and revisions.

Date	Approved by:	Signature
11/07	V. Cardenas, MD Medical Director Pulmonary Laboratory	
6/09	V. Cardenas, MD No changes to the policy	
7/10	V. Cardenas, MD No changes to the policy	
2/12	A. Duarte, MD Medical Director Pulmonary Laboratory No changes to the policy	
5/14	A. Duarte, MD Medical Director Pulmonary Laboratory Changes made to policy	
11/17	A. Duarte, MD Medical Director Pulmonary Laboratory No changes made to policy	
9/19	A. Duarte, MD Medical Director Pulmonary Laboratory No changes made to policy	
8/21	A. Duarte, MD Medical Director Pulmonary Laboratory No changes made to policy	

8/23 **A. Duarte, MD**
Medical Director Pulmonary Laboratory
No changes made to policy