

DLCO Zero Test

1 Introduction

The standardization paper for DLCO measurement provided by ATS and ERS (Eur Respir J 2005; 26: 720-735) suggests three methods for equipment quality control:

- Equipment calibration
- DLCO test with a calibrated syringe, resulting in a DLCO value of zero:
“Secondly, a DLCO test with a calibrated 3.0-L syringe should be used, which is performed by attaching the syringe to the instrument in the test mode. Test gas is withdrawn from the DLCO machine by the syringe and then reinserted at the end of the breath-hold. The measured DLCO should be near zero and the measured VI should be, 3.3L (3.0 L at the body temperature, ambient pressure, saturated with water vapour (BTPS) factor). This procedure checks the inhaled volume accuracy in the DLCO test mode, which may be in error when spirometry measurements are not.”
- Biological control with a ‘standard subject’.

The first method is automatically performed by EasyOne Pro when a test is performed. The third method using a ‘standard subject’ may easily be performed by the technicians.

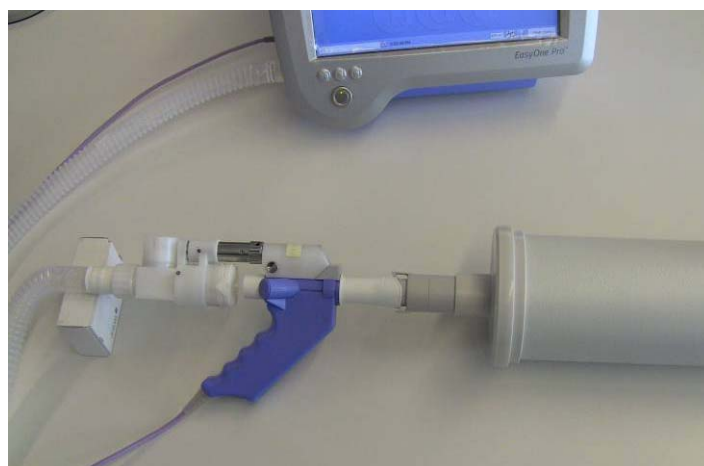
This Application note describes the second method using EasyOne Pro.

2 Preparation

In order to perform the test a calibrated 3 to 5 Liter syringe is required. Divide the piston rod with 2 marks into 3 sections which are approximately in the same size (approx. one liter for each part).



Attach the EasyOne Pro flow sensor tightly to the 3L calibration syringe using the special ndd calibration adapter. Make sure that the flow path is properly aligned.



3 Test procedure

In order to perform the test, execute the following steps (the test procedure is also shown in the video DLCO-ZeroTest.wmv):

1. Select a patient or enter a new patient for this test.
2. Flush the syringe (see the video DLCO-ZeroTest-Flushing.wmv).
3. Pull the piston to the second mark; approx. 2 liters are now inside the 3 liter syringe.
4. Select a patient in EasyOne Pro.
5. Select Perform Test and the DLCO in EasyOne Pro.
6. Check the measured ambient temperature, humidity and pressure and confirm.
7. The DLCO test will start. Wait until it is initialized.
8. Perform a tidal breathing around the 2nd mark (tidal breathing volume approx. ½ liters).
9. Exhale (push) until the 1st mark is reached. It is important that approx. one third of the syringe is not exhaled; this simulates the residual volume.
10. Select “Activate” on EasyOne Pro (do not wait). The valve will close now.
11. Inhale (i.e. pull the syringe piston) with medium flow speed until the syringe is full. Do not move the piston during the breath hold time.
12. When the breath hold time elapsed and the valve opens, immediately exhale with moderate speed the complete syringe volume and then inhale again to complete the test.
13. EasyOne Pro stops the test automatically and computes the result.
14. The measured DLCO value should be zero with a tolerance of ± 2 ml/min/mmHg (or ± 0.67 mmol/min/kPa).

Remarks:

- Always flush the syringe between the test trials. Push the syringe to the stop (no air inside), pull in about ½ liters and push again to the stop. Repeat this at least twice.
- Do not use the (already existing) patient called “Calibration Check” for this test.