

EFFECT OF CALIBRATION METHODS ON SPIROMETRY RESULTS

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To calibrate spirometers, the American Thoracic Society recommends at least 3 trials where the flowrates are varied between 2 and 12 L/s. No recommendations exist for the use of a filter during calibration. **Aims:** 1) To determine if spirometry results are affected by: a) the use of a filter during calibration, b) the flowrates at which the spirometer is calibrated. 2) To compare differences in results caused by the use of filters during calibration between two spirometer types. **Method:** Jaeger pneumotach and Sensormedics Rolling Seal 2130 spirometers were calibrated with a 3L syringe with and without a filter. The Jaeger pneumotach was calibrated using 1 flowrate method and 3 flowrate method; the rolling seal was calibrated using 3 flowrate method. Normal subjects (N=10) were tested in a random order to compare the effects of the use of a filter and flowrate during calibration on FEV₁, FVC, FEF_{25-75%} and PEF. An explosive decompression device (EDD) (N=11) was used to simulate patient results. Results were analysed using two way repeated measures ANOVA and t-test. **Results:** 1) Normal subjects showed no significant difference in results due to the use of a filter or the use of 1 or 3 flowrates during calibration (all P>0.05). EDD results on the Jaeger were unchanged by the use of a filter except for FVC measurement, with differences between 3 and 1 flowrates:

Parameter	Flowrate Effect (Mean difference)	P Values	Filter Effect (Mean Difference)	P Values
FEV ₁	38 ml	0.001	5 ml	0.47
FVC	71 ml*	<0.001	7 ml	0.28
FEF _{25-75%}	0.02 L/s	0.016	0.01 L/s	0.18
PEF	0.05 L/s	<0.001	0.005 L/s	0.78

* mean difference with filter 80 ml, without filter 62 ml. 2) Comparison of two spirometers for differences in results caused by calibrating with and without a filter only showed a significant difference in PEF (p=0.04) (0.05L/s) with the EDD device. **Conclusion:** The differences in calibrating with 1flowrate and 3 flowrates are statistically but not clinically significant. No differences were seen in using a filter during calibration. Machine type does not affect the results except for PEF, which is not clinically significant.