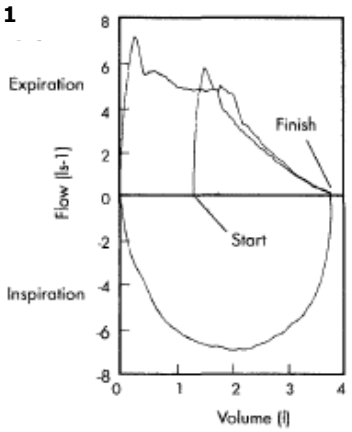
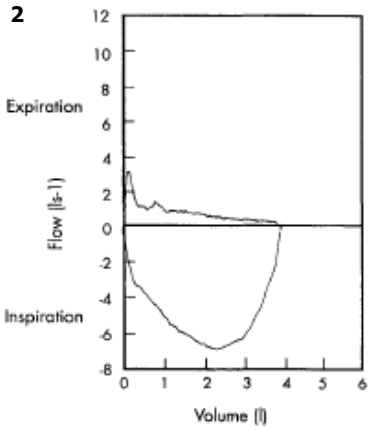
Figure 3.10 Examples of flow volume curves obtained in different disease states

1



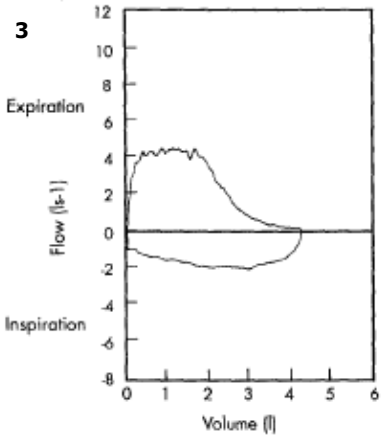
A recording of a partial followed by a full flow volume loop. The starting position for the partial loop should start from a point below full inspiration which is at least equal to 20 % of the full FVC.

2



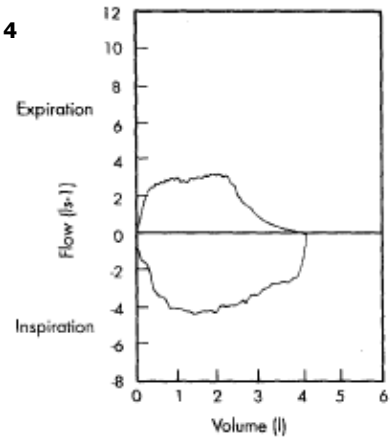
The patient with chronic obstructive lung disease shows early collapse of large airways and a sudden drop in flow early in the expiratory part of the manoeuvre. The inspiratory limb is unaffected since the airways are being opened up by transmural pressure.

3



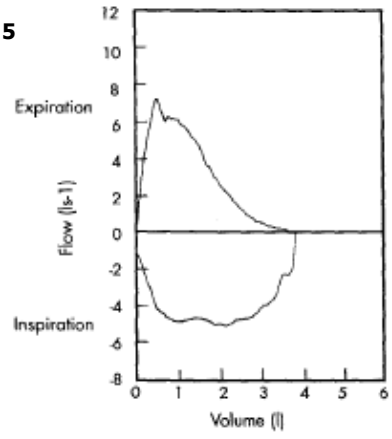
Variable extrathoracic upper airway obstruction due to goitre showing decapitation of the expiratory part of the loopwith more extreme limitation of the inspiratory limb due to collapse of the trachea during inspiration.

4



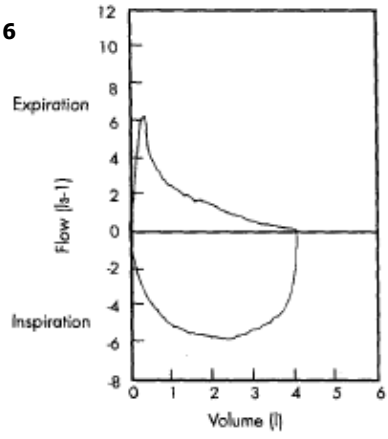
Intrathoracic central airway obstruction showing decapitation of the expiratory limb of the loop but little, if any, reduction in the inspiratory limb. This wasa due to an intrathoracic restrosternal goitre.

5



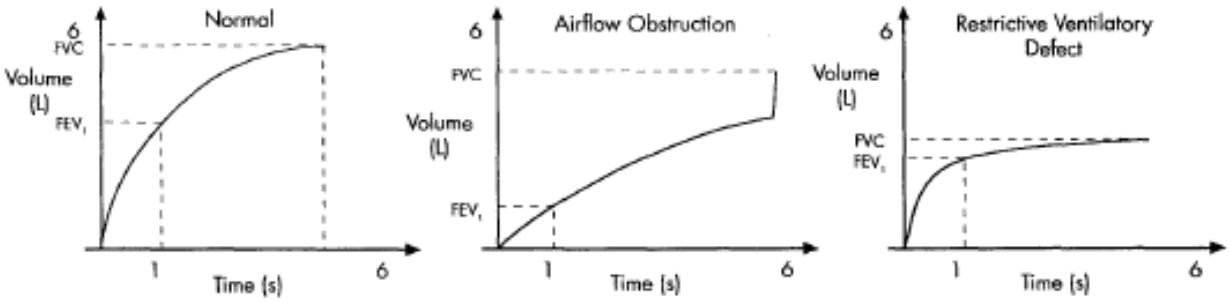
An example of a maximal flow volume loop from an elderly subject showing the curvilinearity in the latter part of the expiratory limb.

6



This patient with asthma shows a smooth curvilinear drop in flow with respect to volume indicating intrapulmonary airflow limitation. The inspiratory limb is relatively unaffected.

Figure 3.11 Examples of characteristic volume time graphs obtained in different disease states



Traces

Many spirometers enable you to overlay each separate attempt and this can help in judging the reproducibility or to detect decreasing flow with subsequent efforts. Superimposing the patient's effort of the predicted normal curve can show the amount of ventilatory defect if present. Post bronchodilator tests can also be overlaid to show any improvement in the ventilatory defect.

3.9.6.2. Criteria for Acceptability

The criteria is as follows:

1. Rapid rise at start of trace until peak flow is reached
2. Maximum effort maintained through put the procedure with no sudden cessation of flow (indicated by a sudden drop at the end of the attempt and flow drops to zero instantaneously giving a rounded shape at FVC)
3. Maximum inspiratory effort (if measured) is attained so that the curve is rejoined at the point of maximum inspiration
4. At least three acceptable, reproducible attempts with the same criteria for FEV_1 and FVC as the volume time graph

3.9.7 Reporting Results

Data from all the acceptable attempts should be examined. The largest FVC and the largest FEV_1 should be reported even if the two values are taken from different attempts. A problem that may occur if you use these criteria and include a spirogram in your report is that the spirogram trace may not include the same figures as your report. Therefore, it is advisable to keep recordings of all raw data for all the acceptable manoeuvres.

Example:

Parameter	Test 1	Test 2	Test 3	Report
FEV_1 (L)	2.45	2.46	2.42	2.46
FVC (L)	3.80	3.78	3.70	3.80
FEV_1/FVC%	64	65	65	65
PEF ($l.min^{-1}$)	355	360	354	360