lower airway obstruction (eg asthma):
- asthma produces a smooth concave trace as obstruction is more fixed;
whereas, COPD sometimes shows an 'angled' appearance due to a more
sudden forced end-expiratory collapse.

fixed upper airway obstruction (eg tracheal stenosis):
- normal inspiratory flow with a constant reduction in expiratory flow.

variable intrathoracic upper airway obstruction (eg tumour in the lower trachea):
- normal inspiratory flow with a constant reduction in expiratory flow.

variable extrathoracic upper airway obstruction (eg vocal cord paralysis)
- normal expiratory flow with a constant reduction in inspiratory flow.

restrictive lung disease (eg pulmonary fibrosis)
- total lung capacity and FRC are both reduced and the expiratory part
of the loop has a steep upslope.

DLCO abnormalities:
- forced expiratory volume in 1 second (FEV1), forced vital capacity
(FVC) and the ratio of FEV1/FVC are the primary measurements.

restrictive lung disease (eg pulmonary fibrosis)
- total lung capacity and FRC are both reduced and the expiratory part
of the loop has a steep upslope.

spirometry

- pressure-time waveform showing SIMV plus pressure support

Flow-volume loops

abnormalities of DLCO

- the diffusion capacity of carbon monoxide assesses the transfer of gas from the alveoli to the pulmonary
capillaries. A low concentration of CO is inspired and the breath is held for 10 seconds. The expired CO
concentration is measured and the difference between the inspired and expired concentrations is used to
calculate the DLCO.

Pressure-volume loop

- a graphical representation of the relationship between
pressure and volume during inspiration and expiration

- the slope of an imaginary line drawn between the start of
inspiration and expiration represents lung compliance
- the curve is shifted to the right with conditions causing reduced
lung compliance (eg ARDS) & to the left with increased lung
compliance (eg emphysema)
- a lower inflection point on the inspiratory limb of the loop
where the compliance suddenly increases may be recognised
- a 'beak-like' appearance to the junction between the end of
inspiration and the start of expiration represents over-distension
as too much volume is delivered.

Other examples of abnormal ventilator waveforms include:
(i) circuit leaks - the baseline of the pressure-time waveform drifts down
(ii) cardiac oscillations - the baseline of the pressure-time waveform shows slight up and down movement with heartbeat; these may trigger breaths
(iii) inadequate inspiratory flow rate - on the pressure-time waveform there will be a 'scooped-out' appearance to the synchronised breaths.