Ambulatory

Lynn McDonnell
Clinical Specialist Physiotherapist
Guy’s and St. Thomas’ NHS Foundation Trust
Case–study – Mrs P

- 69 year old lady with newly diagnosed COPD on recent hospital admission
- FEV1 35% predicted
- 40 Kg, 5 feet tall (152 cm) BMI=17.2
- PO2 7.0 on room air in clinic
- Prescribed LTOT and standard cylinders
- Highly active until diagnosis
- Housebound since due to weight of cylinders & now becoming depressed!!
Case–study– Mrs P

After review :

- Liquid oxygen was a life-saver for this lady
- She could carry it herself
- It got her out of the house again
- Her mood improved
- She was able to start pulmonary rehab
- She became an expert patient in PR and stayed for 4 years!
Device Comparisons


- McDonnell et al, 2009. N=12. Compared refillable cylinder, portable concentrator, standard cylinder and standard cylinder plus conserver. Found no statistically significant difference between devices, but...
Mean Values of ESWT Distance for Each Oxygen Delivery Device
CONSERVERS
(present in all devices except cylinders on their own)
Technical Parameters

- Trigger sensitivity
- Trigger delay
- Bolus shape
- Minute volume limits
- Respiratory rate limits
Clinical: Patient Breathing Pattern

Variables:
- Inspiratory Flow Rate
- Breath Rate
- Negative Pressure
- Tidal Volume (TV)
- Dead Space
- Mouth Breathing

Bliss, McCoy AARCIC 2000
Trigger Sensitivity

Criteria: Pressure

The level of negative pressure (vacuum) needed to cause a conserving device to be triggered.

The lower the sensitivity the less effort required to activate the conserver.
Trigger Delay

Criteria: Time

The delay from the start of the patient inhalation to the start of the pulse delivery in a conserving device.

Measured in Milliseconds.
Bolus Shape

Criteria: Flow & Time

The flow rate and pulse duration of the oxygen delivered by the conserving device valve.

The shape will vary according to setting and breath rate.

Bliss, McCoy AARCIC 2000
Bolus Shape

Each manufacturer has their own design philosophy.

Bliss, McCoy, Adams Resp Care Aug 1999. Vol 44 No8
Minute Volume

The amount of oxygen delivered to the patient per minute.

Measured in ml (milliliter)

A device may be limited to a specific Minute Volume (MV) by a reduction in oxygen concentration or skipping of delivery pulses.
Respiratory Rate Limits

If the rate of breathing is high, a point is reached whereby the O2 generator/supply fails to keep up.

Often a breathing rate of over 40 breaths per minute -- twice the 20 bpm design standard -- causes the system to start “skipping” breaths.
Useful Social History Questions

- Do they live in a house or flat?
- What floor do they live on?
- Do they use the stairs or is a lift available?
- Do they live with anyone else?
- What is their weekly routine?
- How often do they leave the house each week?
- How long they are out for?
- Do they walk when they leave the house or go in a wheelchair / scooter / car?
- Do they go out alone or with someone?
- Do they use a walking aid?
- Would they be able to carry oxygen themselves or push or pull a trolley safely?
- Do they smoke?
- Do their family smoke indoors?
- What is their cognitive capacity?
Risk Assess for Walking Test

Check medical history for:
- Angina
  If present, check if it’s stable / unstable.
  If stable, check they have GTN on them
- Heart failure
- History of falls
- Recent MI / AECOPD / surgery

Take BP & HR prior to walking test and check they are within normal limits
Why use walking tests?

- No test is 100% reproducible but...
- Standardised, repeatable tests are most effective way of demonstrating a treatment effect (or lack of it) from ambulatory oxygen
- Each test has their own pro’s and con’s
- If no room for 10m course consider alternative e.g. Chester step test
## Comparing Walking tests

<table>
<thead>
<tr>
<th></th>
<th>6MWT</th>
<th>ISWT</th>
<th>ESWT</th>
</tr>
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<tbody>
<tr>
<td>Type</td>
<td>Sub-maximal</td>
<td>Maximal</td>
<td>Endurance</td>
</tr>
<tr>
<td>Pacing</td>
<td>Self-paced</td>
<td>Externally paced</td>
<td>Externally paced</td>
</tr>
<tr>
<td>Course</td>
<td>30m / 10m</td>
<td>10m</td>
<td>10m</td>
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<tr>
<td>Cones</td>
<td>29m apart / 9m</td>
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<tr>
<td>Rest allowed</td>
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<td>no</td>
</tr>
<tr>
<td>Time taken</td>
<td>6 mins</td>
<td>Up to 20m</td>
<td></td>
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<tr>
<td>Minimum Practices</td>
<td>1</td>
<td>1</td>
<td>1 Practice ISWT, then ISWT</td>
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<tr>
<td>required</td>
<td></td>
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<tr>
<td>MCID</td>
<td>54m</td>
<td>48m</td>
<td>60–115m</td>
</tr>
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</table>
10m-6MWT

- Cones 9m apart
- Chair at each end of the course
- Patient should walk as far as possible in the time given
- Report distance walked and number of stops
- Check SpO2 and HR pre test & every minute
- Check BORG before and after
Process

- Complete a baseline walking test on air / LTOT setting
- Note lowest SpO2, distance walked & change in BORG
- Check they meet criteria for prescription of AO
- Estimate the flow rate of oxygen which will be required to correct the desaturation above
- Explain to patient what oxygen devices are available and together determine the most appropriate device for them
- Complete a walking test on the above flow rate of oxygen using the most appropriate device
In Summary

- Subjective and risk assessment are vital
- Assess when stable
- Appropriate, reproducible exercise test
- Assess on the device to be provided
- Patient should carry / wheel device exactly how they will once delivered to compensate for oxygen cost of carrying the device
Any Questions?