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Critical Comparisons of the Clinical Performance of Oxygen Conserving Devices

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Rationale: Clinical testing of oxygen conserving devices is not mandated before marketing. Consequently, little is known about individual or comparative therapeutic effectiveness. **Objective:** To relate oxygen delivery from prototypical instruments to physiological performance. **Methods and Results:** Thirteen subjects with obstructive lung disease performed progressive treadmill exercise while inhaling either room air, 2 L of oxygen/minute, or bolus oxygen from 4 commercially available conserving devices at regulator settings of 2, 5, and continuous. The devices were studied blindly in random order after first being tested to determine performance characteristics. Pulse oximetry, oxygen delivery, and nasal and oral ventilations were monitored at rest and with exertion. At a setting of 2 at rest, all conservers maintained saturation > 90% but there were significant differences in oxygenation between systems. Only one equaled 2 L of oxygen/minute. With exertion, saturation fell with all conservers but not with 2 L O₂/min. One device did not perform any better than room air. Two systems provided less oxygen than predicted, one more, and in one the expected and actual amounts were equal only at rest. Breath by breath performance was highly variable with irregular activation and inconsistent oxygen bolus size delivery. Increasing oxygen pulse volume to the point of eradicating conservation with the continuous setting did not eliminate all disparities. **Conclusions:** The mechanical and clinical performances of current oxygen conservers are highly variable and in some instances actually contribute to limitations in exercise ability. Seemingly equivalent technical features do not guarantee equivalent therapeutic functionality.

Key words: Oxygen • Conservers • Physiology • Engineering • COPD

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