

A Comparison of Spirit and Helios Portable Oxygen Systems

Patient Response to Dose Setting With Exercise

A White Paper

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Introduction

The long term oxygen therapy (LTOT) market is changing. Historically, patients were prescribed home oxygen as a last resort and sent home with a stationary system and an emergency back up. These patients were typically too sick to be ambulatory so a portable oxygen system was not a priority. All that has changed. Patients are diagnosed early in their disease and the trend is to prescribe oxygen as early as necessary to prevent complications related to hypoxemia.

Now, younger patients are using oxygen in the home and their lifestyle needs dictate that the oxygen system keep up with them. Bulky portables of the past have been replaced with light-weight long lasting portable systems. These systems can be compressed gas or liquid oxygen (LOX) with oxygen conserving devices (OCD) incorporated to reduce waste. Two of the newest systems utilize LOX as the gas source since LOX has the best performance related to weight and range. These new systems provide many advantages, yet the clinician must understand the operation, capabilities and limitations of any oxygen system they provide.

Oxygen conserving devices have become popular as a means to effectively use smaller portable systems to address the needs of the patient. Oxygen conserving devices perform differently¹ and it is important to understand the operation of the unit being utilized. There is little clinical research on patient's response to OCDs and less related to long term studies that evaluate applications, benefits and outcome.

The Helios portable oxygen system was introduced several years ago and became a popular portable and the patient's choice. Since the introduction of the Helios, questions and concerns have risen related to the operation of the unit and its capabilities. The Spirit was introduced in 2002 as a competitive unit with similar weight and range capabilities and different performance capabilities.

The objective of this evaluation was to determine the patient's response to oxygen therapy with exercise utilizing the Spirit and Helios at the same oxygen setting.

Method and Material

Five patients were selected from volunteers of the Minnesota chapter of the American Lung Association. These patients were highly motivated and very active utilizing their portable oxygen system on a daily basis. There were 3 men and 2 women all having a primary diagnosis of Emphysema.

The study monitored patients on a treadmill at a set speed and incline for 10 minutes per product. The patients would randomly use either the Helios or the Spirit set on their prescribed setting and have a minimum of 30 to 60 minutes rest between testing on each unit.

Patients were monitored on an oximeter every minute recording saturation and heart rate. Respiratory rate was counted manually. Blood pressure was taken before the patient started on the treadmill and again within 2 minutes of exiting the treadmill. The patients were monitored on the oximeter until their oxygen saturations returned to starting values.

Equipment used:

Oximeter:
Palmsat 2500
Nonin Medical



BriteSensor blood pressure monitor
Fore Care, Inc

Helios Portable
TYCO/Puritan Bennett



Spirit Portable
CAIRE Inc.



Data Collection:

Patients randomly chose which portable to use first. The patient's resting saturation; heart rate; respiratory rate and blood pressure were recorded prior to the evaluation. The patient's dose setting was selected for each unit based on prescription. The treadmill speed was selected by the patient based on prescription received from their rehabilitation classes. The range of treadmill speeds were between 1 and 1.3 miles per hour. The incline of the treadmill was set to 0 for all patients.

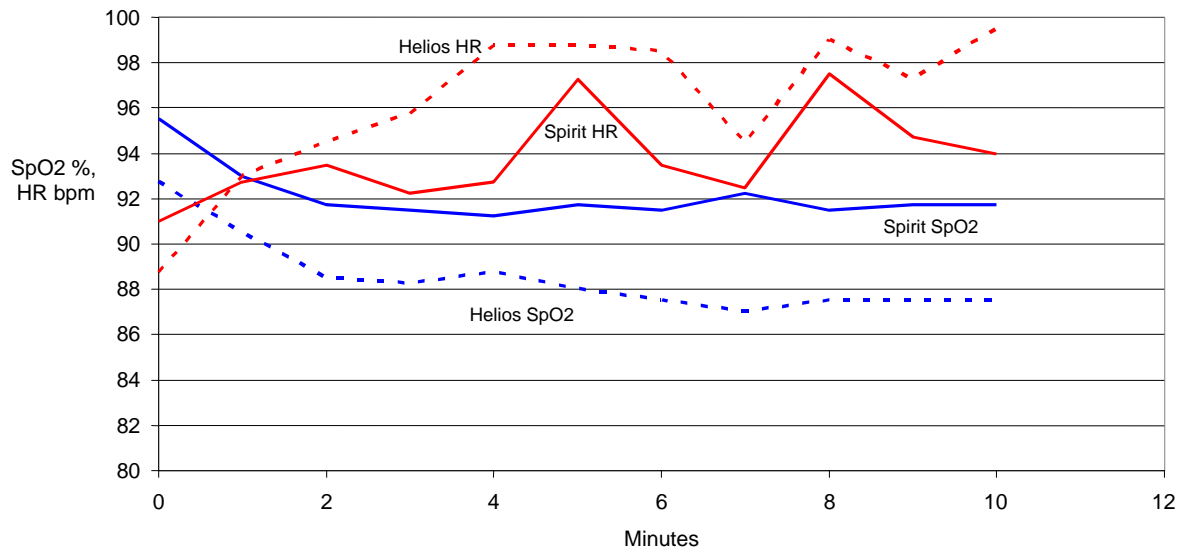
Saturation, heart rate and respiratory rate were collected each minute. The oximeter was used for saturation and heart rate, respiratory rate was counted manually. At the completion of the ten minute treadmill walk, the patients sat in a chair and resting data was again collected. Patients rested for 30 to 60 minutes between studies.

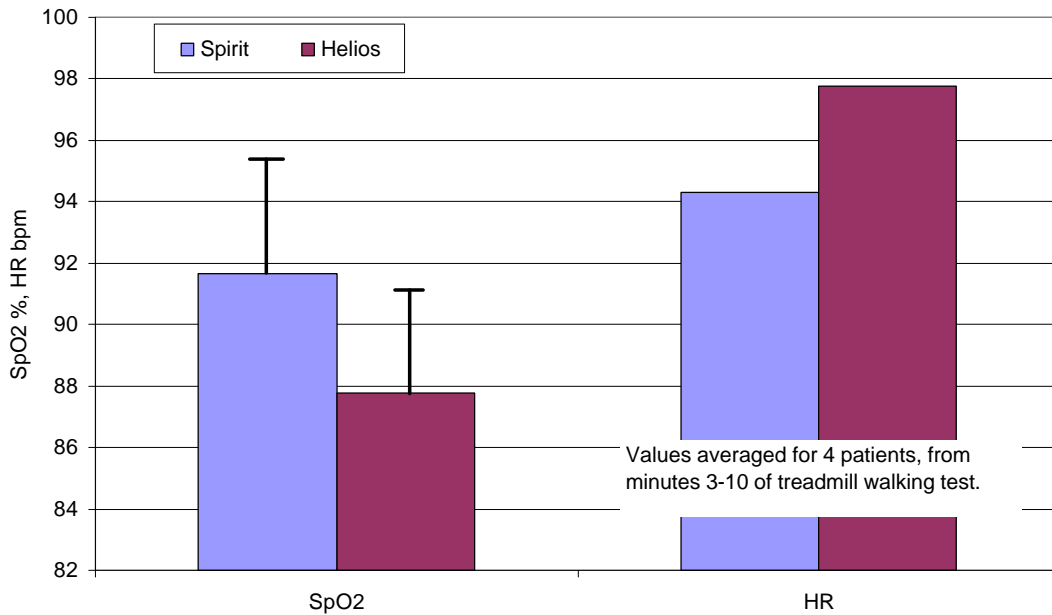
One patient was not able to complete the cycle with only five minutes of data recorded for use with the Helios. That patient's data was dropped and four patients were included in the final analysis.

The average of SpO2 and HR was collect for each patient

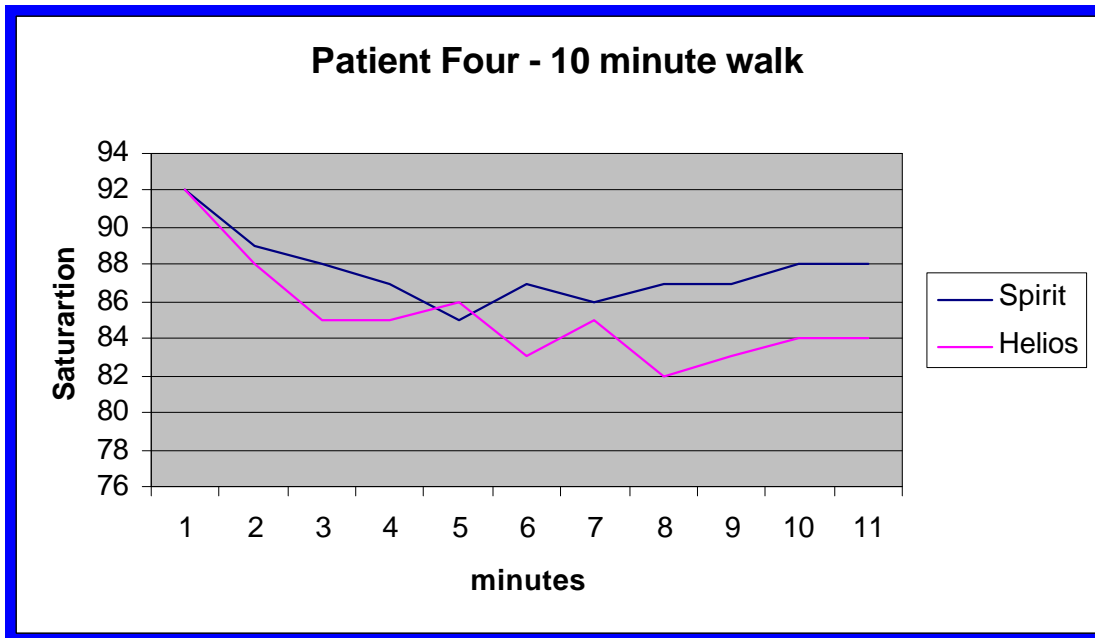
Patient	Spirit <u>SpO2</u>	Helios <u>SpO2</u>	Spirit <u>HR</u>	Helios <u>HR</u>	Spirit <u>RR</u>	Helios <u>RR</u>
1	91.8	86.0	76.0	78.8	24.5	27.5
2	96.1	92.0	85.8	94.1	20.5	19.4
3	91.9	89.0	109.0	114.8	23.3	24.0
4	86.9	84.0	106.5	103.4	18.9	21.5

Average of Four Patients During Treadmill Walk





Two patients (one and four) were not able to maintain 88% saturation on the Helios set at 4. This is the maximum setting for the Helios so these two patients were not candidates for that product due to its maximum setting not meeting the patient's oxygenation needs. The Spirit could have the setting increased to 5 and retested on each patient to evaluate saturation. If adequately saturated, the physician could increase their prescription to 5 if they were placed on the Spirit.



Discussion

The four patients tested showed a lower oxygen saturation and higher heart rate with exercise on the Helios as compared to the Spirit at the same dose setting. The volume of oxygen delivered between Helios and Spirit is different at the same dose settings so it is expected that the patients would have a lower saturation on the same settings. Patients on the Helios at a lower dose setting than four could increase the dose setting up to four to receive more oxygen if necessary. Patients on the four setting with Helios, that cannot maintain saturation at that setting, would need to have another oxygen system provided that can increase the dose volume to improve saturation.

In this study, two patients were not able to maintain saturation over 88% at the four setting for the entire 10 minute walk on the Helios. They had a higher saturation on the Spirit at the four setting; yet moving the dose setting on the Spirit to the five setting would have provided more oxygen per dose and might improve their oxygen saturation and exercise performance.

The patients in this study are active and use their ambulatory oxygen on a daily basis. This 10 minute walk test reflected their minimal activity with a steady speed and incline in a controlled environment. The ability of their oxygen system to keep up with their changing oxygen saturations is an important part of their daily life.

Conclusion

It is important to know the dose volume and maximum dose capabilities of portable home oxygen therapy equipment. This study indicated that at the same dose setting, on two different portable oxygen system, the oxygen saturation for four patients with exercise was different and in some cases below acceptable saturation levels.

Reference:

1. Oxygen-Conserving Techniques and Devices. R McCoy. Respiratory Care Journal Conference on Long Term Oxygen Therapy Respir Care 2000;45(1):95-103