

# TURBINE RIDEWISER HIGH PERFORMANCE PRODUCT TRIAL

RESULTS - MAY 14 2014

## RHINOMED

- Rhinomed Limited is a Melbourne, Australia based listed (ASX:RNO) medical technology company
- Focus on nasal and respiratory management technology that provides high value solutions to problems in the Health, Wellness and Clinical environments
- World class board and management team supported by highly credentialed sports medicine advisory team including Doctors, Sport Physiologists, Pro Cyclists, Triathletes & Olympians.
- Launched the Turbine in January 2014 at UCI event – 2014 Santos Tour Down Under
- Strong adoption by Elite Cycling, Triathlete and Ironman communities



2014 Jayco Herald Sun "Turbine"  
Best Team Winners - Orica Green  
Edge

 RHINOMED

ASX.RNO

# TURBINE

MAKE **EVERY BREATH** COUNT

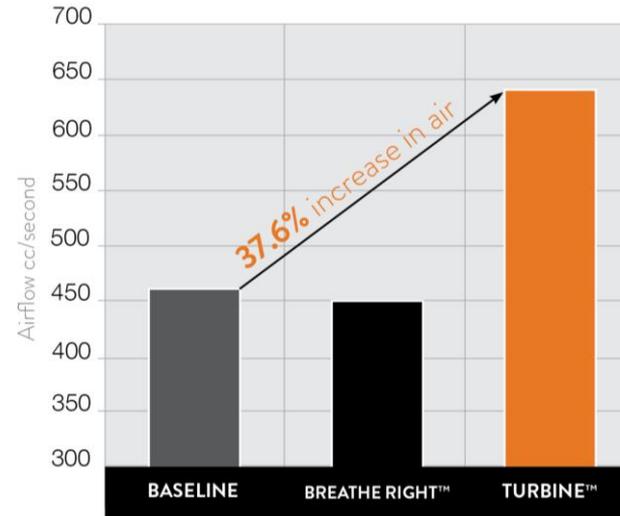
## TURBINE TECHNOLOGY

- Radical new sport technology;
- Fits discreetly and comfortably in the nose;
- Increases airflow by 38%
- Adopted by leading international athletes and teams in Cycling, Triathlon and Ironman.
- Available NOW at [www.theturbine.com](http://www.theturbine.com) and in growing number of specialty retailers



# CLINICAL TRIAL

**TURBINE**  
 increases  
 airflow,  
 on average, by  
**38%\***



Original 2003 clinical trial carried out at the Royal Victorian Eye & Ear Hospital established that the BreatheAssist™ technology suite (the Turbine) increases airflow through the nose.

## BACKGROUND INFORMATION

The Turbine technology is a nasal dilation device that is placed internally to expand the nasal valves. Each side is independently adjustable for each nostril to maximize the amount of expansion whilst enabling the user to control the amount of pressure produced to assist with comfort and fit. The Turbine is made of medical grade polymers approved by the US FDA and European health agencies for human use.

Initial clinical trials indicated that the technology was able to improve airflow through the nose by an average of 38%. This finding required further investigation to determine the impact of the technology on Athlete performance in aerobic sport and exercise.

Anecdotal evidence reported to the company by Turbine customers, and confirmed by the qualitative findings of earlier market research and user trials, reported an improvement in airflow and a perception of improved power, speed and endurance.

## RIDEWISER TURBINE PRODUCT TRIAL

Prior to the launch of the Turbine Rhinomed identified the need for further investigation into the impact of nasal breathing and dilation on the performance of athletes. Specifically, the need for real world evidence of the impact on performance during endurance and threshold exertion.

Rhinomed commissioned Ridewiser to design, recruit, manage an independent trial and report on the outcomes of the trial.

### **Principal Investigator:**

Mr Rob Crowe OAM

- B.App.Sci
- Director and Head coach at Ridewiser
- Former Olympian and pro-cyclist
- 1991 Australian Road Race Champion
- 1992 Barcelona Olympic Time-Trial team
- 2000 Australian Olympic Committee
- 2002 World Masters M1 Criterium Champion
- 2004 World Record 4000m Tandem Pursuit
- 2004 Athens Paralympic Games Gold Medalist (Pilot)

## TRIAL SYNOPSIS

A group of A and B Grade qualified racing cyclists (n=9) demonstrated a marked trend of increased power output while working at threshold exertion levels when riding with the Turbine breathing assistance device as compared to riding the same test efforts without using the device. In the High Exertion trials riders rode further as a group with the Turbine as compared to riding without the Turbine. Qualitative feedback from all riders indicated they felt their breathing was enhanced at lower exertion levels.

# STUDY DESIGN AND METHODOLOGY

A and B Grade qualified racing cyclists were recruited to participate in the Trial over an 8-week period. Inclusion criteria included a high base level of fitness that would negate or minimize any ‘training improvement that may occur during the 8 week program.

The study was designed as a crossover, un-blinded trial. Riders committed to specific exertion cycling in four (4) endurance-output test sessions and four (4) threshold output test sessions, with and without the Turbine device, at the Ridewiser Studio in Melbourne, Australia.

All eight (8) test sessions were at the same time each week, with riders prepared over a similarly intense 45-minute warm-up routine before completing either the 10-minute cycling output test at Endurance exertion (65-75%) or at Threshold exertion (80-90%). To control the riders consistency on their Rate of Perceived Exertion (RPE), all tests post week 1 required riders to work at similar heart rate zones in each subsequent test.

WEEK	ACTIVITY	INTENSITY
1	ENDURANCE 10 MINS	TURBINE EXERT AT 65-75% OF MAX HEART RATE
2	THRESHOLD 10 MINS	TURBINE EXERT AT <b>80-90%</b> IF MAX HEART RATE
3	ENDURANCE 10 MINS	EXERT AT 65-75% OF MAX HEART RATE
4	THRESHOLD 10 MINS	EXERT AT <b>80-90%</b> IF MAX HEART RATE
5	ENDURANCE 10 MINS	TURBINE EXERT AT 65-75% OF MAX HEART RATE
6	THRESHOLD 10 MINS	TURBINE EXERT AT <b>80-90%</b> IF MAX HEART RATE
7	ENDURANCE 10 MINS	EXERT AT 65-75% OF MAX HEART RATE
8	THRESHOLD 10 MINS	EXERT AT <b>80-90%</b> IF MAX HEART RATE

# OBJECTIVES AND MEASURES

## OBJECTIVES

To demonstrate the impact of the Turbine device on:

1. Rider Endurance
2. Rider Power output

## MEASURES

Measure of average heart-rate (bpm) and distance covered (metres) over the 10-minute exertion tests were taken from each rider in each of the 8 sessions. A calculated measure of power output (Watts) was captured using the Ridewiser Ergo machine which includes an SRAM Quarq power meter crank sets. On the high intensity exertion “threshold power’ output tests, rider weight (kg) after each session was also taken to observe measure of Power:Weight Ratio (watt/kilogram).

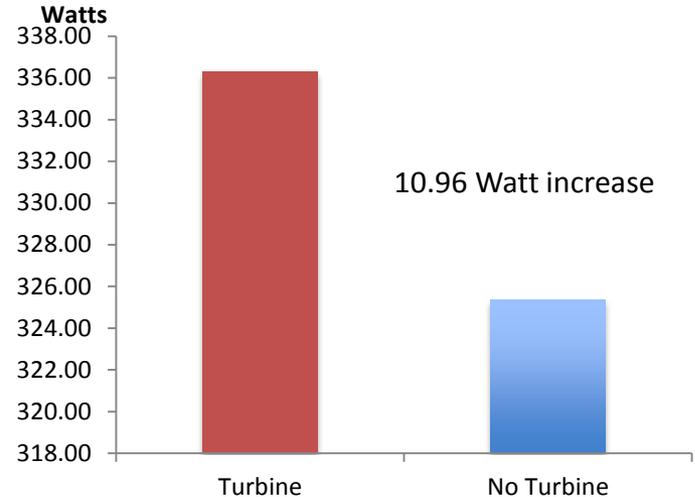
# FINDINGS - POWER

The most notable difference of rider performances in both Endurance-exertion and Threshold exertion tests during the trial was an increase in power produced (Watts) for most riders while using the TURBINE compared to tests without the TURBINE.

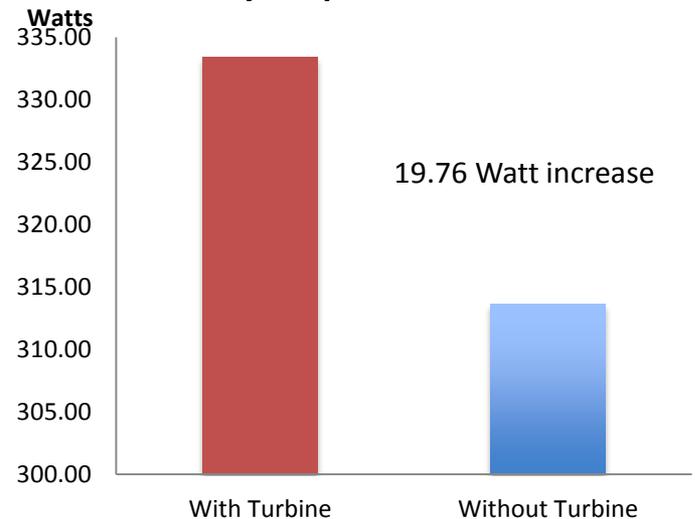
The overall cohort (n=9) improved power output by 10.96 watts using the Turbine compared to without the Turbine. Two thirds of the cohort responded to the Turbine with the responders (n=6) showing an increase in power on average of +19.76 Watts or 6% with the TURBINE. The largest improvement by a responder was 37 watts or a 12% increase.

To cross check the consistency of exertion levels and to control the riders consistency on their Rate of Perceived Exertion (RPE), all tests post week one required riders to work at similar heart rate zones in each subsequent test.

Study Cohort



Study Responders



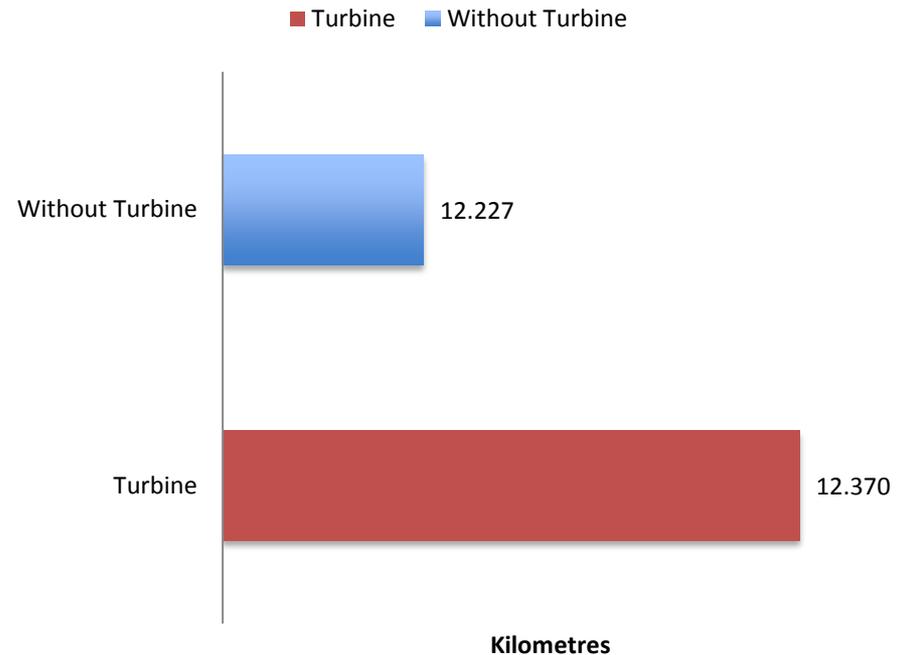
## FINDINGS - DISTANCE

An increase in Distance while using the TURBINE was demonstrated in the comparison of Distance for both low intensity endurance testing and high intensity threshold power testing performances.

The average Distance improvement for the whole group was evident for low intensity Endurance tests with a difference of 60 metres further travel WITH TURBINE compared to WITHOUT TURBINE.

More notably, an increase in the average Distance travelled by the whole group across the 8-week program was particularly evident for the 10 minute High Intensity Power Threshold tests. During these tests riders with the TURBINE travelled on average 143 metres further (1.2% improvement) compared to riding without the TURBINE.

**Average Distance Travelled in Threshold Exertion Trial**



## FINDINGS – RIDEWISER CONCLUSION

Riderwiser concluded that a trend can be seen for fit club-level racing cyclists to increase their power output at high intensity threshold power exertion levels when using the Turbine breathing-assistance device.

An increase in distance travelled while using Turbine was also demonstrated in both low intensity endurance testing and high intensity threshold power testing performances. Distance improvements for high intensity testing were particularly evident when using the Turbine device when compared to riders not wearing the Turbine.

## **R H I N O M E D   C O M M E N T A R Y**

The Ridewiser trial sought to identify whether the Turbine had any impact on the performance of athletes at both high and low exertion levels.

The trial clearly shows the Turbine can impact an athletes ability to produce more power (watts) and to travel further (kilometres) within a set time frame.

Having established this, RhinoMed will continue to undertake research into how and why the Turbine and nasal breathing impacts the performance of athletes.

A silhouette of a runner stands on a wooden bridge, looking out over a vast, cloudy sky. The runner is positioned on the left side of the frame, with their back to the camera. The bridge has a simple wooden railing. The sky is filled with dramatic, dark clouds, with a bright light source breaking through near the horizon, creating a silhouette effect on the runner and the bridge. The overall mood is one of determination and endurance.

WE'LL SUPPLY THE AIR  
YOU SUPPLY THE GUTS

**TURBINE**  
MAKE EVERY BREATH COUNT

**RHINOMED**

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**C O N T A C T R H I N O M E D**

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