

## Introduction

Headshaking Syndrome (HS) is a poorly understood neuropathic pain condition of horses that presents as involuntary and recurring violent jerking, striking, and flicking of the head. The condition affects around 1% of the equine population, is more prevalent in geldings and >60% of owners report seasonal onset of symptoms, primarily in spring and summer. When other causes of HS have been ruled out by a veterinarian, involvement of the trigeminal nerve is assumed. A seasonal, gonadotropin-mediated alteration in trigeminal nerve neurochemistry was postulated as a pathophysiological cause of HS<sup>1,2</sup>.

Manipulation of the seasonal signal in HS horses was previously attempted via melatonin administration<sup>3</sup> and the use of a gonadotropin-releasing hormone vaccine<sup>4</sup>, both with limited success. There is currently no effective treatment.

**Hypothesis:** Manipulation of the seasonal signal via exposure to continued long day photoperiod from the autumn equinox will dampen the subsequent gonadotropin-mediated alteration in trigeminal nerve neurochemistry associated with spring daylength increases and reduce seasonal symptoms of headshaking.

## Materials and Methods

Study participants were recruited via an online survey designed to gather information on triggers, seasonality, and treatment efficacy for equine headshaking syndrome<sup>5</sup> that was distributed publicly to Australian equine interest groups on Facebook. Study eligibility was confined to owners of geldings (castrated male horses) with a history of moderate to severe headshaking behaviour, and that displayed seasonal onset or intensification of symptoms during the spring/summer months.



Beginning just after the autumn equinox in Australia (March/ April), 17 owners fitted their HS horses with an Equilume Light Mask that provided 15 h of blue light to one eye from 08:00 to 23:00 daily for a period of 6 months. The blue light automatically activated and deactivated each day and was charged once weekly. This mask was previously shown to effectively manipulate seasonal physiology in the horse<sup>6</sup>.

Study participants completed questionnaires related to the number and intensity of HS symptoms observed in their horses at the time of year associated with peak symptomology (Oct/Nov '22), the start of the study (Mar/Apr '23), midway through the study (Jun/Jul '23) and at completion of the study (Oct/Nov '23). Symptom intensity was assessed on a 5-point scale. Data from 10 fully compliant participants were used for statistical analysis.



## Results

Results showed a reduction in the number of symptoms reported over time ( $P < 0.05$ ; Fig. 1). Multiple comparison tests revealed significant differences between Oct/Nov '22 and the mid-study questionnaire conducted in Jun/Jul ( $P < 0.05$ ; Fig.2), confirming that study horses exhibited seasonal HS intensity changes. Importantly, there was a significant reduction in the number of symptoms reported between Oct/Nov '22 and Oct/Nov '23 ( $P = 0.02$ ; Fig. 2).

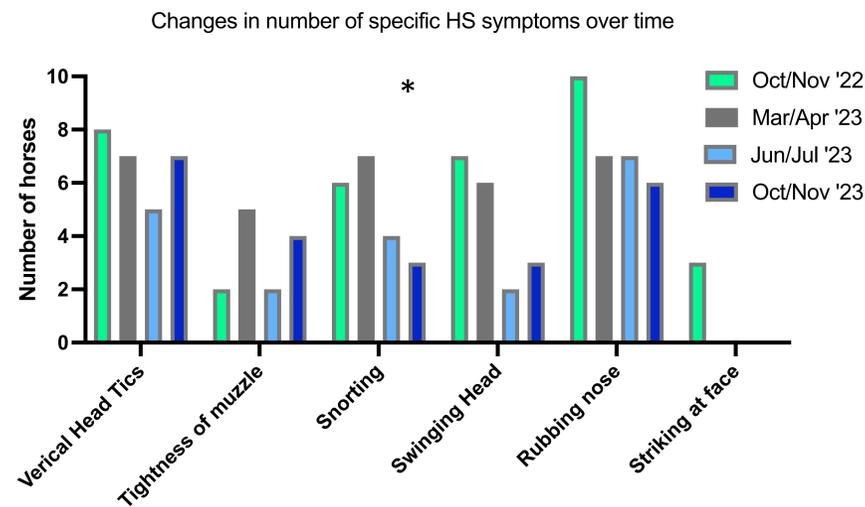


Fig. 1

No statistical differences in symptom intensity for vertical ticking ( $P = 0.063$ ), snorting ( $P = 0.055$ ), head swinging ( $P = 0.067$ ), face rubbing ( $P = 0.82$ ) and tightness of muzzle ( $P = 0.92$ ) were observed (Fig. 3). However, 8/10 participants reported a reduction in the overall severity of their horses' symptoms (Fig. 4), and 6/10 reported improvements in their horses' quality of life (Fig. 5).

## Results

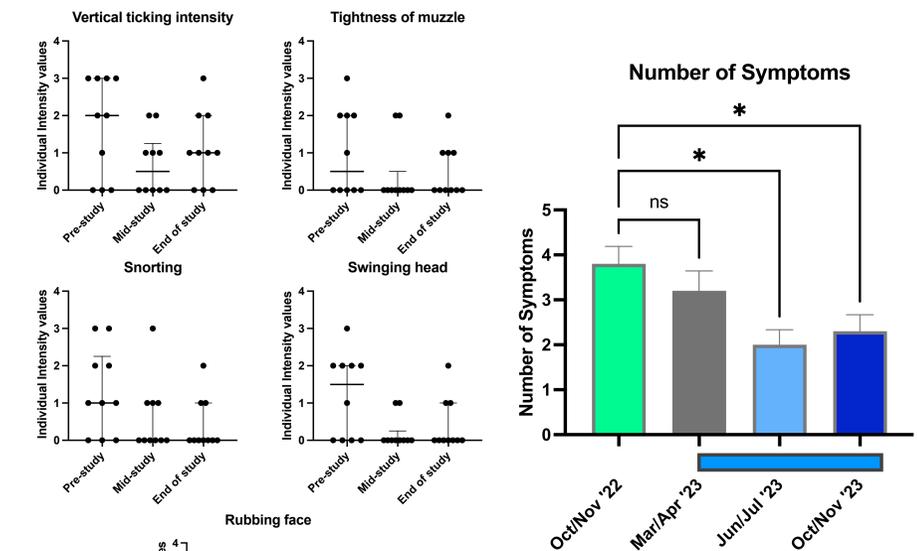


Fig. 2



Fig. 3

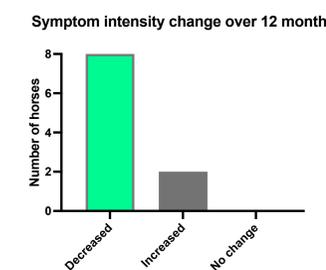


Fig. 4

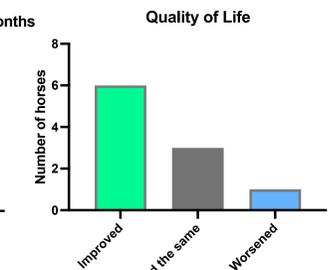


Fig. 5



## Conclusions

The results of this preliminary study suggests that blue light treatment used to ablate perception of the shorter winter daylengths may have merit as a treatment for Headshaking Syndrome in horses.

Study limitations included the subjective nature of symptom reporting, the small sample size and the fact that participants were not blinded to the treatment.

To further validate these findings, a larger scale trial is planned that will employ improved methods of quantifying HS symptom expression and intensity.

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## References

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## Conflict of interest

This research was funded by Equilume Ltd. B.A. Murphy is Founder of Equilume Ltd. and a member of the Board of Directors. B.A. Murphy is a named inventor on patents related to the Equilume Light Mask