**Application** Headshaking Syndrome (HS) is a poorly understood facial pain condition in horses that affects 1% of all equines, with geldings generally overrepresented. Symptoms include uncontrolled violent flicking of the head, snorting, rubbing the face and striking at the nose. Therapeutic options for HS are limited, and only partially successful. This study provides a preliminary evaluation of the effectiveness of a new non-invasive treatment for the condition that has the potential to improve the welfare of affected horses globally.

**Introduction** HS presents a major welfare concern for affected horses. Clinical signs include involuntary and recurring violent jerking, striking, and flicking or rubbing of the head and muzzle (Pickles et al., 2014). More than 60% of owners report an onset or exacerbation of clinical signs in spring and summer, indicating a strong seasonal component (Madigan and Bell, 2001; Pickles et al., 2014). Following elimination of common causes of the behaviour by a veterinarian, involvement of the trigeminal nerve is assumed (Pickles, 2023; Roberts, 2019). Increased firing of GnRH neurons during spring and summer months is thought to overstimulate the trigeminal nerve in seasonally affected HS horses (Pickles et al., 2011). It has been proposed that prolonged elevated levels of gonadotropins in geldings, who lack the ability for negative feedback on GnRH release by testes derived testosterone, may cause instability of the trigeminal nerve that somehow gives rise to neuropathic pain (Pickles et al., 2011). Previous attempts to alleviate symptoms by pharmacologically manipulating photoperiod signals showed only limited success. The present preliminary study aimed to ablate the seasonal photoperiodic signal using a blue light treatment that maintained exposure to the same daylength from autumn through to spring.

**Materials and** **Methods** Seventeen owners of 17 HS horses were recruited via an online recruitment survey in Australia. Study eligibility was confined to owners of geldings with a history of moderate to severe headshaking behaviour, who had received a veterinary diagnosis of HS, and whose horses displayed seasonal onset of clinical signs during the spring/summer months. Each horse acted as their own control in a longitudinal study spanning 12 months. Horses were fitted with Equilume™ light masks that provided 15 h of blue light exposure from 08:00 to 23:00 daily for six months, starting at the autumn equinox (March 21st in Australia). Participants were instructed to only remove the light masks for exercise, grooming and to charge weekly. In addition to the pre-study recruitment questionnaire (where details were collected on peak symptomology during spring/summer), questionnaires were circulated to collect information on HS clinical signs and intensity at the start (March/April), middle (June/July), and end-of-study period (October/November). Clinical signs evaluated were vertical ticcing (flicking head towards chest); tossing head up and down; striking at head with front feet; rubbing face on objects/self and humans; and tightness of muzzle/mouth/lower lip. Clinical sign intensity was assessed on a 5-point scale: Not observed = 0; Very occasionally (i.e. observed once per week) = 1; Sometimes (i.e. observed several times per week) = 3; Often (observed at least once per day) = 4; Constantly = 5 (observed multiple times per day). The end-of-study questionnaire also asked owners to comment on perceived changes in their horse’s quality of life (QoL) and assess overall changes in HS clinical sign intensity compared to the same period the previous year. Repeated measures ANOVA was conducted on normally distributed data to assess changes in the total number of clinical signs observed over time. Tukey’s multiple comparison tests were used to identify differences between specific time points. Friedman tests were used to explore differences in clinical sign intensity scores reported at the start, middle and end of the study period. Analyses were carried out on GraphPad Prism (Version 10.2.3, 2024) and Microsoft Excel (Microsoft® Excel® for Microsoft 365, Version 2405, 2024).

**Results** Of the 17 initial study participants, data from 10 who were fully compliant with providing survey responses, and whose horses met the study eligibility criteria were included in the data analysis. The number of reported HS clinical signs reduced over time (P = 0.02, Fig. 1A). There was no difference in the number of clinical signs reported between the pre-study period and the start of study (P > 0.05). A decrease in clinical signs from the pre-study period to the mid-study timepoint (P = 0.03) and from the pre-study period to the end-of-study period (P = 0.02, Fig. 1B) was observed. Friedman tests indicated no differences in clinical sign intensity scores for vertical ticking (P = 0.06), snorting (P = 0.05), tightness of muzzle (P=0.44), head swinging (P = 0.07) and face rubbing (P = 0.08). ‘Striking at face’ was a clinical sign reported by two participants in the pre-study questionnaire, but was not reported at the mid-study and end-of-study periods. Seven out of 10 participants reported a reduction in the overall severity of their horses’ clinical signs. Of these, two participants reported complete resolution of the condition in their horse. Finally, 6/10 participants reported improvements in QoL.

**Conclusion** Results suggest that blue light treatment used to ablate perception of the shorter winter daylengths may offer a treatment option for managing HS clinical signs and warrant further studies.

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Figure Changes in clinical signs of Headshaking Syndrome over time in response to blue light treatment (A). Total number of headshaking clinical signs reported by participants at the pre-study recruitment stage, the start of the study in Mar/Apr, mid-study in Jun/Jul and the end-of-study in Oct/Nov (B). The blue panel indicates the time period during which horses were exposed to blue light for 15 h/day after being fitted with an Equilume™ light mask. \* indicates (P<0.05).