Applied Animal Behaviour Science 205 (2018) 68–73

Contents lists available at ScienceDirect

Applied Animal Behaviour Science

journal homepage: www.elsevier.com/locate/applanim

# Dually Noted: The effects of a pressure headcollar on compliance, discomfort and stress in horses during handling

Carrie Ijichi*, Shelby Tunstall, Ella Putt, Keith Squibb

*University Centre Hartpury, Hartpury, Gloucester, GL19 3BE, UK*

ARTICLE INFO

*Keywords:*
Infrared thermography
Handling
Horse Grimace Scale
Dually
Proactivity
Ethical equitation

ABSTRACT

Horse handlers often encounter problem behaviour resulting from a lack of stimulus control. Handlers are often only 15% of the weight of horses, which evolved strong flight responses. Therefore, many riders and handlers resort to the use of "aids" to maintain control of their animals. However, there are increasing concerns about the efficacy and welfare implication of such devices, particularly when applied to sensitive facial structures. One such device is a Dually® headcollar which aims to increase compliance. Despite its popularity, little is known about the effects of this aid on behaviour or stress. The aim of the current study was to determine whether the use of a Dually headcollar improves compliance during handling and, if so, whether this might be achieved with concomitant increases in stress or discomfort. Subjects completed two novel handling tests, one wearing a Dually with a line attached to the pressure mechanism and one attached to the standard ring as a Control. Crossing time and proactive behaviour were recorded as indicators of compliance. Core temperature and the discrepancy between eye temperatures were measured using IRT before and after testing as an indicator of stress. The Horse Grimace Scale (HGS) was used to measure discomfort caused by each configuration of the device. The Dually did not result in more compliant behaviour, compared to the Control ($p = 0.935$; $p = 0.538$). However, the Dually configuration did result in a significantly higher HGS scores ($p = 0.034$). This may indicate that there is an impact on animal welfare by using this device that is not justified by improved behaviour. However, IRT readings of core temperature ($p = 0.186$) and discrepancy between the eyes ($p = 0.972$) did not indicate the Dually increased stress in subjects. Taken together, this suggests the Dually is ineffective in naïve horses but causes increased discomfort.

## 1. Introduction

The owners and carers of horses often encounter problem behaviour resulting from a lack of stimulus control (McGreevy and McLean, 2007). In this instance, random environmental stimuli exert more control over the horse's behaviour than the handler or rider is able to. Humans are often only 15% of the weight of their horses (Halliday and Randle, 2013) and horses have evolved strong flight responses (Lansade et al., 2008). Therefore, it is not surprising that many riders and handlers resort to the use of training aids to maintain control. These may restrain the animal in some way, rendering them less able to express flight responses. Alternatively, they magnify the pressure that can be applied, increasing the salience of human stimuli as they compete with those of the environment. However, there are increasing concerns about the efficacy and welfare implication of such devices (McLean and McGreevy, 2010b), particularly when they are applied to sensitive facial structures (Doherty et al., 2017; McGreevy et al., 2012).

One such device is a Dually® headcollar designed and promoted by natural horseman Monty Roberts (Roberts, 1997). This is available commercially to aid owners in controlling their animals and is a standard tool used in many natural horsemanship demonstrations across the world. The headcollar fits around the horse's face in a similar manner to a conventional headcollar. It differs in that it is fitted more closely to the horses' face (though not in such a manner that would cause discomfort) and has an inbuilt pressure mechanism (Fig. 1). This mechanism works when a line is connected to either side-ring. When the horse pulls back, or fails to walk forward upon pressure applied to the line, a rope just below the traditional noseband constricts, putting pressure around the jaws and nose of the horse. Proponents of the device state that it works by triggering the horses' *"…instinctive reaction… to move out of the pressure zone and come back towards you"* (Intelligenthorsemanship.co.uk, 2018). This headcollar can also be worn in a standard configuration with the line clipped to a ring under the chin of the horse, thus negating the pressure mechanism (Fig. 2). The patent for this product states *"It is extremely effective for training the animal to lead, to stand still, to walk into a truck or trailer, to walk slowly*

* Corresponding author.
*E-mail address:* carrie.ijichi@hartpury.ac.uk (C. Ijichi).

https://doi.org/10.1016/j.applanim.2018.05.011
Received 12 February 2018; Received in revised form 9 April 2018; Accepted 6 May 2018
Available online 09 May 2018
0168-1591/ 

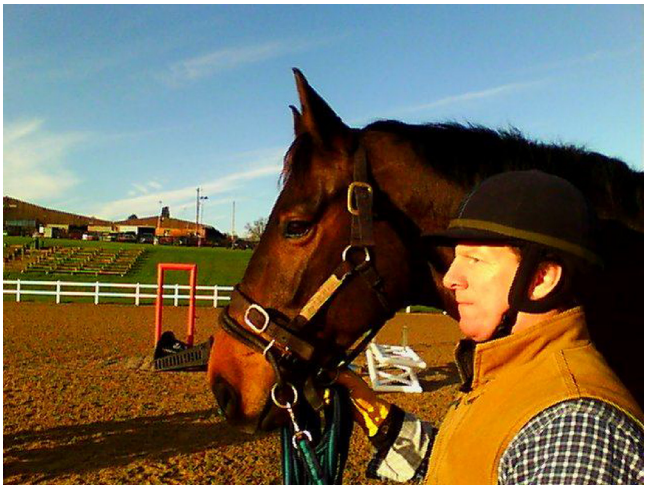

**Fig. 1.** The headcollar in the Dually configuration with the lunge-line attached to one of two side rings. This results in pressure being applied via the rope noseband which sits below the standard fixed noseband.

**Fig. 2.** The headcollar in the Control configuration. Here the lunge-line is attached to the standard ring under the chin of the horses, as per typical headcollars.

*through narrow passages, to walk over unfamiliar objects…"* (Roberts, 1999). Despite these claims, little is known about the effects of this aid on behaviour or stress.

Stress in horses may be non-invasively measured using mobile devices such as infrared thermography (IRT). Core temperature detected using IRT increases in response to arousal or stress (Stewart et al., 2008a, 2007) but decreases in response to pain and discomfort (Lush and Ijichi, 2018; Stewart et al., 2008b; Stubsjøen et al., 2009). This method has been used in a range of species including dogs (Travain et al., 2015), cats (Foster and Ijichi, 2017), cattle (Stewart et al., 2008a) and horses (Lush and Ijichi, 2018; Yarnell et al., 2013). Further, there is preliminary evidence that the discrepancy in temperature between eyes may indicate an emotional response to stress (Lush and Ijichi, 2018). The right hemisphere is typically more active than the left during the emotional processing of experiences (Farmer et al., 2010). Discrepancies in lateralised temperature may indicate lateralised cerebral blood flow indicated of hemispheric dominance (Riemer et al., 2016).

If the use of a Dually headcollar were to cause increases in stress response, this may be explained by discomfort caused by the pressure mechanism. Horses are typically trained using aversive sensations that the horse can avoid by offering the desired response (McLean, 2005). The Dually is no different in this respect, in that it is designed to increase the motivation of the horse to offer the desired response (stepping forward) by magnifying the aversive sensation a handler can apply. Aversive techniques are only ethical if they are proportional to the desired response, predictable and immediately release when the correct response is offered (McGreevy and McLean, 2009). However, there is currently no research on the effect of Dually pressure that would indicate whether this device causes proportional aversion. The Horse Grimace Scale is a novel means of measuring the discomfort or pain experienced by equine subjects (Dalla Costa et al., 2014). This system divides the horses' face into pertinent areas that have been shown to alter in response to pain. Each area is then scored to give a total which has been found to have high inter-rater reliability. This provides a second non-invasive method of determining the effect of the Dually on welfare.

The aim of the current study was to determine whether the use of a Dually headcollar improves compliance during handling and, if so, whether this might be achieved with concomitant increases in stress or discomfort. To this end, subjects completed two novel handling tests (Squibb et al., 2018), one wearing a Dually with a line attached to the pressure mechanism and one attached to the standard ring as a control. Crossing time and proactivity were recorded as indicators of compliance (Ijichi et al., 2013). Core temperature and the discrepancy in temperature between eyes were measured using IRT as an indicator of stress and arousal (Stewart et al., 2007). The Horse Grimace Scale was used to measure discomfort caused by each configuration of the device (Dalla Costa et al., 2014). It was hypothesised that the Dually would be associated with decreased crossing times and reduced proactive behaviour but increased core temperature, right eye dominance and Horse Grimace Scale scores, when compared with the control configuration.

## 2. Methods

A total sample number of 20 privately owned horses were sourced from the liveries at Hartpury College (12 geldings and 8 mares). The participant ages varied between 4 and 15 years old (mean = 9 years ± 2.83). Subjects were housed and managed as per owner preferences on a large livery yard. In general, subjects were provided forage three times a day with hard-feed dependent on workload and nutritional requirements and constant access to fresh water. They were individually stabled with a minimum of 1 h of exercise each day but received limited turn-out at the time of testing.

The study took place within an enclosed outdoor area at Hartpury College Equestrian Centre, Gloucestershire (UK) during November 2017. Subjects completed two novel handling tests in randomised test order, wearing a Dually® headcollar (Roberts, 1999) during both tests. The leadrope was attached to the side ring which applies increased pressure for the Treatment and the standard under-chin ring for the Control. Treatment order was randomised. Subjects were randomly allocated one of two experimental handlers (C.I. & K.S.) for both tests. Handlers wore protective footwear, a correctly fitted riding helmet and gloves.

### 2.1. Novel handling tests

Subjects completed two novel handling tests where they were asked to navigate two distinct obstacles (Squibb et al., In Press). Test order was randomised and horse order was pseudo-random depending on the availability of owners. The start of each test was marked by a horizontal pole placed on the ground 2 m in front of the obstacle. Task A consisted of a 2.5 m x 3 m blue tarpaulin secured to the ground by 20 individual tent pegs. To complete this test, the subject walked over the tarpaulin (Video 1). Test B consisted of two jump wings extended to a height of approximately 2.5 m with a 1.6 m long pole suspended over-head, from which hung 2 m long plastic streamers. To complete this test, the subject walked under the overhead pole, causing the streamers to touch the face and body of the subject as they passed through (Video 2). The