Short Communication

Hoof renewal time from birth of Thoroughbred foals

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Abstract

A circumferential ring in the hoof horn of foals occurs at birth and grows down to the distal border as the fetal hoof is replaced. Horn growth and complete hoof capsule renewal have not been measured in Thoroughbred foals but the determination of time of hoof renewal may allow accurate predictions of healing time to be made in cases of hoof lesions. The objective of this study was to measure the time taken for the fetal hoof of newborn foals to grow to the distal border and be replaced by hoof grown since birth. The age of the foal in days on the day that routine hoof trimming removed the hoof ring of the front hooves was recorded. The mean age at which the fetal hoof was removed was 145 ± 15 days (95% CI, 141.8–147.2), range 120–165 days. Thoroughbred foals replaced the fetal hoof in approximately half the time taken for mature horses (270–365 days).

Keywords

Foal, Hoof growth, Fetal hoof, Hoof lesion, Thoroughbred

Thoroughbred foals stand within minutes of birth on hooves developed in utero which are covered by eponychium, also known as deciduous hoof. This is shed within a few days in a

healthy foal (Bragulla, 2003). From birth, a growth ring is present in the hoof wall parallel to the coronary band, and the horn proximal and distal to this line often differs in colour (Ellis, 1998). Smallwood et al. (1989) noted that in lateromedial radiographs of young foals an indent in the hoof wall, described in this paper as a 'foal hoof crease' (FHC), was seen on all four hooves, marking the event of foaling (Fig. 1). However, Butler and Hintz (1977) studied the rate of hoof growth in 14 Shetland pony foals aged 8–11 months and did not mention the FHC.

Figure 1: A foal, approximately 2 months old, showing the foal hoof crease (arrow), marking the time of birth.

Hoof wall renewal in all ages of horses has been poorly reported. Kainer (1987) stated that the time for the hoof at the toe to grow to the distal border was 270–365 days. Hoof growth rates in mature horses have been reported without stating hoof wall renewal time (Reilly et al, 1998, Faramarzi et al, 2009). A number of authors have speculated that the hoof wall grows faster in young horses but only two groups measured hoof growth rates in foals (Butler,

Hintz, 1977, Smallwood et al, 1989). Neither study investigated the time required from birth to replace the hoof capsule or wall.

Horses often suffer partial hoof wall avulsion that may cause lameness and threaten sale value (Parks, 2008). When there are lesions to the hoof wall it is useful to have an estimation of renewal time. The objective of the current study was to measure the time taken for the fetal hoof of newborn foals to grow to the distal border and be replaced by hoof grown since birth.

Ethical approval was given by the University of Central Lancashire Animal Projects Committee.

Thoroughbred foals from four stud farms (n = 150) were assessed prior to and after routine hoof trimming at 3 week intervals. Whether the fetal hoof was visible prior to hoof trimming or not was noted for each foal. All hooves were trimmed by the same experienced farrier. Following foot trimming the presence or absence of FHC was determined in both front hooves. Where the fetal hoof was no longer visible post trim the foal joined the cohort and the age of the foal was recorded. The data were tabulated (Microsft Excel), analysed (Minitab) and assessed for normality using the Anderson–Darling test. Only data from foals with no history of lameness, illness or stable confinement were analysed.

Forty-five foals fulfilled the study criteria. The mean age at which the fetal hoof was removed by trimming was 145 ± 15 days (95% confidence interval, 141.8–147.2), range 120–165 days (Fig. 2.). The Thoroughbred foals renewed their fetal hoof wall at twice the rate estimated in mature horses (Kainer, 1987). This is not surprising as the foot of a foal is smaller and therefore there is a shorter distance for the hoof to grow from the site of origin at the coronary band to the distal border. Additionally, it has been reported that the foal hoof grows faster than that of mature horses (Butler and Hintz, 1977).

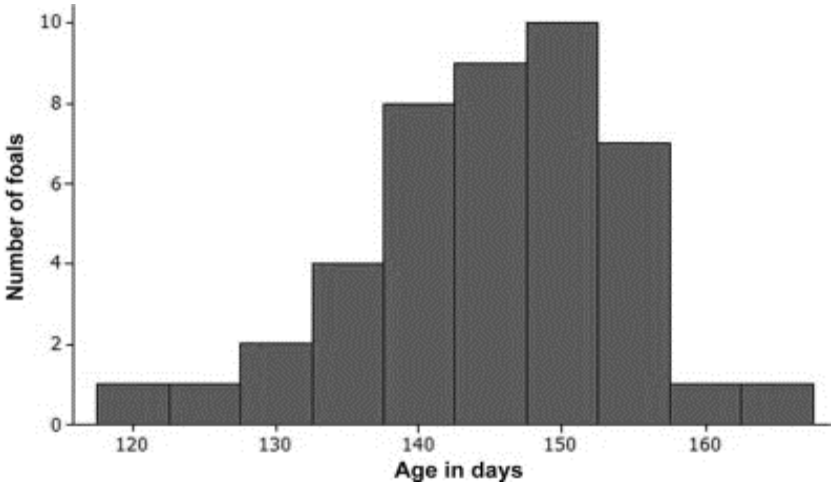

Figure 2: Histogram of the age at which the foal hoof crease (FHC) was removed by trimming.

The term 'foal foot' has been used to describe hoof distal to the FHC (Ellis, 1998). This is a misnomer as the the hoof distal to the FHC grows in utero and should therefore more correctly be termed 'fetal hoof'. The hoof proximal to the FHC, which grows post partum, should be termed the 'foal hoof'. The cause of the FHC is not known but may be a consequence of the foal changing from in utero non weight-bearing to weight-bearing following birth. Another factor that may cause the FHC is the change in diet of the foal associated with switching from nutients passed via the placenta to milk supplied by the mare and other feed such as grass taken orally (Huntingdon and Pollitt, 2005). In mature horses prominent growth rings have been associated with lameness and sudden changes in dorsal wall angulation (Dyson et al., 2011).

Knowing the time for hoof renewal may allow farriers, horse owners and veterinary surgeons to make an accurate prediction of healing time. In cases of partial hoof wall avulsion in horses, once the initial lesion has been treated and epithelialisation has begun it is useful to be able to predict the time that it will take for the new hoof generated from the coronary band to grow down to the distal border. Submural abscessation often erupts at the coronary band causing a horizontal crack in the hoof wall. The hoof wall will usually break when this crack nears the distal border, and again it is useful to be able to calculate when this may occur in order for preventive strategies to be employed.

The limitations of this study resided in the methodology. As the trimming schedule was every 21 days this may mean that the accuracy of the data was ±10.5 days. Further studies of hoof growth rates in foals and older horses would be beneficial to make similar calculations.

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