Evaluation of the Squeeze-Induced Somnolence in Neonatal Foals

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The squeeze-induced somnolence resembles the compression of the fetus in the birth canal, leads to inhibition of voluntary activity, and causes slow-wave sleep. Authors’ addresses: Department of Medicine and Epidemiology (Toth, Madigan), the William R. Pritchard Veterinary Medical Teaching Hospital (Aleman, Nogradi, Williams), Department of Surgical and Radiological Sciences (Dickinson, Brosnan), and Department of Population Health and Reproduction (Conley), School of Veterinary Medicine, University California, Davis, One Shields Avenue, Davis, CA 95618; Thurman Laboratory of the California Animal Health and Food Safety Laboratory, University California, Davis, CA 95618 (Stanley); e-mail: toth4@purdue.edu. *Corresponding author. © 2011 AAEP.

1. Introduction
The behavioral and postural responses of neonatal foals to body compression restraint have been described; however, the contributing mechanisms of this phenomenon have not been investigated. Our hypothesis was that the restraint produces behavioral, electroencephalographic, and humoral changes consistent with sleep and analgesia in neonatal foals.

2. Materials and Methods
Rope restraint was performed in eight healthy neonatal foals. After acclimatization, measurements were taken before and during restraint to investigate changes in mentation, behavior, vital parameters, stress hormone levels, neurosteroid levels, pain tolerance, and electroencephalographic patterns.

3. Results
Foals would lie down and remain in lateral recumbency while exhibiting a relaxed, somnolent behavior during the period of restraint. Vital parameters uniformly decreased during the procedure. Electroencephalographic recordings revealed patterns consistent with slow-wave sleep. Foals had significantly elevated plasma adrenocorticotropic hormone, dehydroepiandrosterone-sulphate, and androstenedione levels during restraint compared with baseline. Foals exhibited significantly increased tolerance to noxious stimuli during restraint; however, this finding was independent of the level of circulating β-endorphin.

4. Conclusions
Restraint activated the hypothalamo-pituitary-adrenal axis and favored slow-wave sleep with its accompanying decrease in vital signs. Whether this technique could be used to safely restrain neonatal foals during minor procedures warrants additional evaluation.