The equine cervix is thought to be essential for reproductive health in the mare. Based on published anatomical descriptions of its folded architecture and heavily ciliated epithelium, it was hypothesized that the cervix has a functional mucociliary apparatus. The objectives of this study were to: (i) develop a method for high magnification (200 X) video endoscopy of the equine cervix; and (ii) demonstrate the behavior of carbon particles in aqueous suspension applied to the cervical epithelium. Three reproductively sound Standardbred mares were used for the study. To reduce movement, mares were sedated with 5 mg detomidine IV and examined in stocks during estrus. A high magnification endoscope (Fuginon Inc, Wayne, NJ; #EG-590ZW) was introduced manually per vaginam to the level of the external cervical os on the first examination in the first mare. In all subsequent examinations the endoscope was immobilized by introducing it through a 14 mm x 52 cm endotracheal tube (Jorgensen, Loveland, CO) anchored to the internal cervical os by an inflatable cuff, the close fit serving to stabilize the endoscope. A 1 cm x 3 cm window (with edges smoothed) was cut in the endotracheal tube, with the long axis oriented longitudinally. Cervical folds flowed through the cut window into the lumen of the tube, allowing visualization by the endoscope. A suspension of 100 mg of carbon powder in 3 ml of sterile water was deposited, via aspiration catheter, onto the visualized cervix. Behavior of visible carbon particles was then video recorded for up to 20 minutes. Following initial survey of the recordings, more detailed observations were performed in which the following events were searched for: bulk flow of carbon suspension resulting from mare movement; unidirectional movement of carbon, not due to bulk flow, relative to a fixed reference point on the cervical epithelium; bidirectional movement in which carbon particles in close proximity were seen moving in different directions or at different speeds; tumbling of carbon particles. Due to high magnification, breathing movements, which could not be eliminated, were sufficient to cause frequent loss of focus. However, for periods of a few seconds, observations were made in each mare, including movement of red blood cells in capillaries, possible lymphatic flow, and bulk movement of the suspension, all correlated with breathing or body movement. In one mare, consistent with mucociliary clearance, unidirectional and bidirectional flow were observed, along cervical folds, at high speed, with possible tumbling. However, body movement may facilitate propulsion, by the cervix, of fluid, carbon, blood and lymph.

Keywords: Equine, mucociliary, endoscopy, cervix, carbon