

Use of manual stimulation for collection of semen from an **atactic** stallion unable to mount

Sue M. McDonnell, PhD; Malgorzata A. Pozor, Lek Vet; Jill Beech, VMD;
Raymond W. Sweeney, VMD

A 9-year-old Thoroughbred stallion was donated to the University of Pennsylvania because of ataxia that rendered the horse unable to breed. The horse had a history of having raced and of having been retired at age 4 after a long, debilitating illness. Details of the illness were unknown. Since the period of illness, the stallion had displayed an awkward gait and abnormal standing postures, and leaned against the walls of the stall. Musculoskeletal or neurologic evaluation had not been performed. The stallion had been bred to a few mares for each of the preceding 4 years, showing normal sexual arousal and response. However, he had become increasingly clumsy and eventually had become unable to remain mounted on a mare long enough to ejaculate. The most recent successful breeding had been 1 year earlier, at which time, and during subsequent attempts to breed, the stallion fell off the mare while mounted. A variety of techniques had been used without success to assist the stallion in breeding, including handler support, stabilization of the hindquarters, and use of an artificial vagina while the stallion was standing.

On admission, the horse had neurologic deficits confined to his limbs. He had a markedly atactic pelvic limb gait and appeared imprecise and weak in his pectoral limbs. The stallion was dysmetric and swayed his hindquarters, and tended to abduct or circumduct the hind limbs when trotting. He occasionally "stubbed" a front hoof and knuckled mildly in his pelvic limbs. When circling to the left, he circumducted his right hind limb, and when circling to the right, he tended to hit 1 hind fetlock with the other foot and lose his balance. When backing up, he dragged his front feet, especially the right. His signs were suggestive of a low cervical and distal thoracic or low lumbar lesion.

For evaluation of breeding behavior, the stallion was presented to an estrous mare (ovariecto-

mized, estrogen-primed) restrained in stocks. The stallion showed a high level of sexual interest and arousal and immediately achieved erection. With increasing sexual excitement, the stallion's ataxia became more severe and he lost his balance and stumbled to his knees. Although the horse appeared frightened by his instability, and at one point stood quivering in a sawhorse stance, he maintained an erection and interest in the mare. The stallion also exhibited pelvic thrusting while standing on the ground.

On the basis of the history of falling off the mare during breeding and the observed severity of ataxia, we decided to attempt to induce ejaculation by manual stimulation of the penis with the stallion standing on the ground, as described by Crump and Crump.¹ For initial training, the stallion was presented briefly to an estrous mare that was restrained in stocks at the corner of the breeding shed. He was then walked to approximately 6 m from the mare where he maintained erection, but where his sexual excitement was reduced to a level that was safer for the handlers. A handler stood at the horse's head and allowed him to assume a stable position with the head lowered. Warm (45°C) wet towel compresses were positioned at the glans and base of the penis. This elicited pelvic thrusting, and the horse lunged forward, stumbled, and fell to 1 knee. On the subsequent attempt, the handler at the head discouraged the horse from lunging forward and effectively stabilized the stallion by supporting the shoulder with one hand. The technician provided further support with a shoulder pressed against the horse's abdomen. The stallion ejaculated after 6 pelvic thrusts. The procedure was repeated 1 hour later with a plastic bag placed over the end of the penis as a collection vessel. The stallion ejaculated after 8 pelvic thrusts. The procedure was repeated every 2 to 5 days for 3 weeks. During this period, it was found that a stimulus mare was unnecessary, and the stallion then showed somewhat reduced arousal and associated ataxia in the breeding shed. The stallion readily became conditioned to the collection procedure and would begin to thrust during, or even before, washing of the penis. To forestall this behavior, the stallion

From the Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, New Bolton Center, 382 West Street Rd. Kennert Square, PA 19348-1692. Work performed at the Hofmann Center for Reproductive Studies, New Bolton Center.

The authors thank Drs. Loren Evans, Charles Love, and Ms. Nancy Kate Diehl for technical assistance, and Mr. Mike Barlow for donation of the stallion.

Table 1-Mean (\pm SD) semen values of 42 ejaculates (July to November) from an *atactic* stallion

Variable	Mean value (SD)	Reference Values*	
		Mean	Range
Semen volume (ml)	58 (17.6)	41.1	20 to 90
Gel volume (ml)	7 (13.2)	9.1	0 to 125
pH	7.35 (0.11)	7.35	7 to 7.85
Sperm concentration (million/ml)	122 (67.3)	211.8	70 to 438
Total No. of sperm (billions)	6.58 (3.29)	7.99	2.34 to 19.80
% Total motile sperm	47 (15.9)	75	50 to 95
% Progressive motile sperm	37 (16.9)	64.8	30 to 85
% Morphologically normal sperm	62 (10.1)	66.2	35 to a5
Total morphologically normal progressively motile sperm (billions)	1.8 (1.4)	3.8	0.5 to 13.4

*Determined on the basis of one ejaculate from each of 40 stallions classified as satisfactory prospective breeders. Ejaculates were obtained by artificial vagina under similar conditions during the same months of our facility.

was trained over the next 3 collection sessions to stand quietly for washing and placement of the plastic bag, and to commence thrusting only when signaled by the technician. Training methods included use of cool wash water and verbal praise or reprimand associated with postural adjustments (eg, quickly raising the stallion's head and walking him forward, deflection of the penis toward the floor) to discourage or interrupt thrusting. Semen collection was conducted in a deliberate, ritualized manner to provide the horse with clear visual and auditory cues to distinguish the preparation and collection phases of the procedure.

Semen was collected daily or twice weekly from the stallion for 90 days. As during the initial training period, collections required only 2 people. Several different persons successfully served as handler and technician. All ejaculates yielded semen with volume, sperm numbers, pH, and motility characteristics within the range for normal stallions (Table 1) evaluated according to the method described by Kenney et al.² After 1 month of daily or twice weekly collections during which no mare was used, the stallion became slow to achieve erection, so we used a stimulus mare for the remainder of the semen collections.

At the conclusion of the semen evaluation period, CSF was obtained and myelography was performed with the horse under general anesthesia to further characterize the neurologic disorder. With the horse's head in an elevated position, a sample of CSF was drawn from the subarachnoid space, after which 60 ml of 24% iohexol solution was injected. After 5 minutes, the head and upper neck

were placed level with the body, while lateral, ventroflexed, and dorsoflexed radiography was done. These revealed no evidence of spinal cord compression. Cerebrospinal fluid values were within normal limits. These results together with the history and physical examination findings were consistent with chronic parenchymal spinal cord disease, such as equine protozoal myeloencephalitis.

At the request of the original owner, the horse was subsequently returned to the donor's farm for occasional breeding. The farm manager was provided with verbal instruction and a videotape of the stallion during training and semen collection procedures at our facility. For each of the 2 subsequent breeding seasons, the horse efficiently ejaculated in response to the technique. Several mares were inseminated each year, and all became pregnant. All collections were accomplished by 1 person, with the stallion loosely tethered to a fence post during the procedure. The stallion responded adequately without the use of a stimulus mare. It was the opinion of the manager that the horse's ataxia had not worsened during the 2 years following discharge from our clinic.

Collection of semen by manual stimulation of the penis can extend the breeding life of certain stallions that cannot mount or breed naturally. The severely *atactic* stallion in this study readily learned the procedure and continued to perform adequately without mounting. This technique may also be useful for collecting semen from horses with musculoskeletal problems that are aggravated by mounting.

The technique of semen collection by manual stimulation has been used on clinically normal horses as an efficient alternative to conventional collection methods.⁷ Sport horse owners have requested that we train their stallions in this procedure so as to avoid the risk inherent in mounting. Previous work has shown that training time for manual stimulation semen collection is not appreciably greater than that for semen collection by use of an artificial vagina, and ejaculates obtained by the 2 methods are similar.³

1. Ctump J, Crump J. Stallion ejaculation by manual stimulation of the penis. *Theriogenology* 1988;31:341-346.

2. Kenney RM, Hurtgen JP, Pierson R, et al. Clinical fertility evaluation of the stallion. Hastings, Neb Society for *Theriogenology*. 1983.

3. McDonnell SM, Love CC. Manual stimulation collection of semen from stallions: training time, semen quality, and sexual behavior. *Theriogenology* 1990;33:1201-1205.