

STALLION EJACULATION INDUCED BY MANUAL STIMULATION OF THE PENIS

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ABSTRACT

This paper reports the use of a procedure for collection of semen from stallions by manual stimulation of the penis while the stallion is standing. Our use of this method with 18 stallions of various ages and types of semen collection experience indicates that this method may be an efficient alternative to traditional semen collection techniques using an artificial vagina and stimulus mare or dummy mount mare. Our observations, together with those of others who have tried the manual technique, suggest that both animals and handlers can be readily trained to use this method. Limited data suggests that semen samples obtained by manual stimulation are similar to those obtained using an artificial vagina.

Key words: equine, stallion, semen collection, artificial insemination

INTRODUCTION

A number of methods, including condom, vaginal sponge and artificial vagina, have been employed for collection of semen from stallions (1). Currently, the most widely recommended technique is the artificial vagina with a mare or dummy mount. Successful collection of semen using an artificial vagina with the stallion standing on the ground was recently reported (2). Since 1965, we have employed an even simpler method of collecting semen from the stallion using manual stimulation of the penis, and holding a disposable plastic bag over the end of the penis to catch the ejaculate. This technique gradually evolved during our first year of implementing artificial breeding on a small, remote farm, where semen collection equipment was not readily obtainable. Initially, we attempted to fashion a home-made Mississippi style artificial vagina (3) using a latex rubber tube occluded at one end by two sticks and foam rubber padding. While manipulating this flimsy device! we found that manual pressure applied to the penis elicited pelvic thrusting and ejaculation, even before the stallion mounted the mare. Accordingly, we proceeded to collect semen from stallions by manual stimulation and by substituting a plastic bag for the artificial vagina. We continued to use this method and it remains our preferred technique for obtaining semen for our artificial insemination and semen freezing programs.

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MATERIALS AND METHODS

Plastic bags of various sizes are successfully employed. A bag should extend 8 to 12 in up the shaft of the penis and be large enough for the glans penis to fully engorge. It is important to use a bag made of material which is not toxic to sperm. We presently use 6" x 10" polyethylene (1.5 mil) bags (Bel-Art Products, Pequannock, NJ). In addition to the bag, we use a 500-ml plastic squeeze bottle filled with warm water (48 to 52 °C), which is used to wash the penis and to warm the hand of the operator before manipulation.

The stallion is stimulated to achieve an erection, but is not allowed to mount. Some horses will respond adequately to a mare or gelding presented at a distance, or a brief glimpse of a mare or gelding walking past a doorway; others respond adequately to a dummy mare; still others will respond in their stalls to the operator rubbing the horse's chest, abdomen, flank or thigh. We have also used an *in vitro* olfactory stimulus (the urine of an estrous mare presented on a paper towel) to arouse a stallion for collection of semen. This stimulus seems to work particularly well with young, inexperienced stallions. We have found that intensely aroused stallions often fail to respond favorably to manipulation. Therefore, our aim is generally to present the least amount of stimulation to achieve and maintain erection.

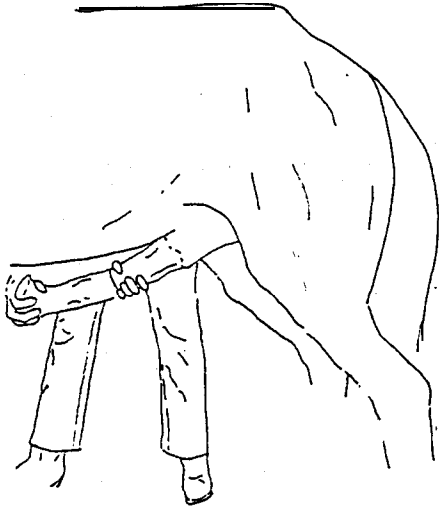


Figure 1. Placement of hands.

When erection is achieved, the penis is rinsed with warm water from the squeeze bottle. This usually elicits some engorgement of the glans penis as well as shallow pelvic thrusting. The plastic bag is then placed over the shaft of the penis and secured with one hand placed proximally to the preputial ring. The other hand is placed over the glans penis with the thumb behind the corona, as shown in Figure 1. While applying firm pressure, the shaft and glans are gently manipulated in a rhythmic fashion until the horse responds with pelvic thrusting. As the horse thrusts forward, the hands follow the thrusting motion. Steady pressure is maintained on the shaft. Simultaneously, the glans is rhythmically massaged with rotating motion, with the thumb massaging the firm protuberance of the corpus cavernosum penis into the glans penis. During initial training of a stallion, the position of the hands as well as the rhythm and strength of the pressure applied on the shaft and glans are

varied depending on the response of the stallion, with the goal of inducing deep pelvic thrusts and engorgement of the glans characteristic of normal copulatory response. The stallion must be allowed freedom to lower the head when thrusting. Ejaculatory pulses are easily palpated and visualized. Premature release of pressure seems to interrupt ejaculation in some stallions. In fact, a sperm rich portion of the ejaculate may be obtained by releasing manual pressure after one or two urethral pulses.

RESULTS AND DISCUSSION

Table 1 summarizes data on 18 stallions at our facility that were trained to ejaculate in response to manual stimulation. The ejaculates obtained have been used for insemination of mares, as fresh or processed semen (cooled for 24 to 36 h; 4,5).

Table 1. Summary of data on 18 stallions trained to ejaculate in response to manual stimulation

| <u>Animal</u> | <u>Age^a</u> | <u>Previous Experience</u> | <u>Number of Training Sessions Required^b</u> | <u>Number Attempts for Routine Collection^c</u> |
|---------------|------------------------|----------------------------|---|---|
| Arabian | 3 mo | none | 1 | 1 to 3 |
| Arabian | 3 mo | none | 2 | 1 to 3 |
| Arabian | | none | 1 | 1 to 3 |
| Arabian | 3 mo | none | 1 | 1 to 3 |
| Arabian | 5 mo | none | 1 | 1 to 3 |
| Arabian | 5 mo | none | 1 | 1 to 3 |
| Arabian | 1.5 yr | none | 1 | 1 to 3 |
| Arabian | 1.5 yr | none | 1 | 1 to 3 |
| Arabian | 1.5 yr | none | 1 | 1 to 3 |
| Arabian | 2 yr | natural | 1 | 2 ^d |
| Arabian | 2 yr | natural | < 3 | 1 to 3 |
| Arabian | 2 yr | none | 9 | 1 to 3 |
| Arabian | 3 yr | natural | 4 | 1 to 3 |
| Arabian | 4 yr | none | 1 | 1 to 3 |
| Arabian | 4 yr | natural | 1 | 1 |
| Arabian | 5 1/2 yr | natural | unsuccessful after 22 | |
| Arabian | 1 yr | natural | < 3 | 3 ejaculations in 28 sessions |
| Akhal-Teke | 12 yr | natural, AV | 1 | 1 |

a Age at time of training.

b The number of training sessions before successful ejaculation. Each session consisted of several attempts to collect semen during an approximately 15-min period.

c The number of attempts routinely required to collect semen. One attempt consisted of placing the bag on the erect penis and manipulating the penis.

d This stallion, over a period of 21 years, consistently would ejaculate during the second attempt.

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We have successfully employed this technique with novice and experienced stallions. To better understand developmental changes in semen characteristics and sexual behavior, we have trained several young colts to semen collection procedures and have periodically examined ejaculates throughout the first two years of life. The youngest stallion trained in this collection technique was 2 mo old (Crump, unpublished studies). Other stallions that were trained had previously been bred for many years by natural service or artificial vagina. Training time does not seem to vary systematically with the animal's experience. Generally, training is accomplished within one or two sessions. Novice stallions have produced ejaculates during the first attempt. Training time has varied from one to several attempts for each of 9 sessions. One stallion was never successfully trained after 22 training sessions over a 3-yr period.

The manual stimulation technique was used successfully to collect semen from one Arabian stallion for 21 yr, from 2 to 23 yr of age. The technique does not appear to interfere with natural breeding or other collection techniques, and many stallions with which we worked returned to or alternated between natural service or artificial vagina programs.

In our various uses of semen, we have not detected any systematic differences between ejaculates obtained by this manual method and by traditional artificial vagina methods. For example, Table 2 summarizes nine ejaculates obtained from one stallion over a period of 4 mo using four variations of artificial vagina and manual stimulation methods. As shown, there appear to be no systematic differences between samples obtained by the various collection methods.

Table 2. Summary of 9 semen samples from a 12-yr Akhal-teke stallion obtained by three methods

| Date | Collection Interval | Method of Collection | Volume (ml) Semen | Gel | Concentration ^a | Sperm Number ^b | %TM ^c |
|--------|---------------------|----------------------|-------------------|-----|----------------------------|---------------------------|------------------|
| Mar 31 | not known | AV/ground | 20 | 0 | 283.0 | 5.7 | 75 |
| Mar 31 | 1 hour | AV/mare | 65 | 2 | 94.0 | 6.1 | 75 |
| Apr 16 | 7day | AV/mare | 100 | 0 | 124.3 | 12.4 | 80 |
| May 23 | 9 day | AV/dummy | 82 | | 57.5 | 4.7 | 90 |
| Jul 6 | 11 day | AV/dummy | 65 | 11 | 9.5 | 6.2 | 85 |
| Jul 17 | 32 hour | AV/dummy | 68 | 4 | 56.0 | 3.8 | 90 |
| Jul 10 | 2 day | AV/dummy | 56 | 5 | 146.8 | 8.2 | 85 |
| Jul 12 | 2 day | Manual | 60 | 0 | 104.0 | 6.2 | 80 |
| Jul 14 | 2 day | Manual | 63 | 5 | 124.0 | 7.8 | 80 |

a (10^6 sperm/ml).

b Total number of sperm ($\times 10^9$).

c Visual estimate of percent total motility.

Some stallions stop thrusting before ejaculating, or they may achieve engorgement and appear to be near ejaculating, but stop just before. These animals appear to become distracted or over-aroused during collection. In our experience, these problems can often be avoided by providing the minimum stimulus to achieve response. The stallion may, for example, become distracted if he is too near an estrous mare during manipulation. In some instances, an extremely stimulated stallion can be induced to ejaculate simply by applying pressure to only the glans penis.

Most stallions readily become conditioned to this semen collection procedure. They appear to associate breeding with the operator and the plastic bag. Once trained, they often appear more attentive to the operator and the plastic bag than to a mare, much the same as stallions that are trained to an artificial vagina and dummy mare become conditioned to those breeding stimuli. One stallion we worked with routinely achieved erection in the stall when the operator approached with the plastic bag, and with manual stimulation, he ejaculated (**without** the stimulus of a mare or of an olfactory stimulus). In apparent **anticipation** of collection, two of our stallions consistently backed away from the stimulus mare toward the operator who was crinkling the plastic bag. Although we routinely use a stimulus mare, stallions experienced **with** this technique often require less stimulation from the mare than for traditional collection methods.

With minor modifications, this technique has recently been employed with pony stallions at the University of Pennsylvania (McDonnell, personal communication, 1987), where 10 stallions, subjects of a semen study, were readily trained for the collection of semen with a **plastic** bag and manual stimulation. Five of these 10 stallions consistently responded quickly and ejaculated while standing; the **remaining 5** responded with less vigor and were allowed to mount a mare for collection, in which case manual stimulation was performed in place of an artificial vagina. In addition, a warm (45 to 50 °C) wet towel compress was added to provide additional stimulation of the glans penis when necessary. All **stallions** successfully ejaculated within one to two attempts, and continued to be managed in this manner without any complications. Throughout the **3-mo** study, semen samples were collected two to three times a week; usually less than 1 h was required to obtain semen samples from the 10 stallions. In this study, the stimulus mare was tethered, so **collections** were accomplished by one stallion handler and one operator. In similar work (McDonnell, personal communication), collections were made from stallions tethered in their stalls with a stimulus mare tethered nearby. This arrangement permitted one person to conduct the collection. The breeding history of the stallions varied: some had been bred naturally and some had previously been trained to artificial vagina collection of semen. However, all animals **readily** responded and became conditioned to the manual stimulation method. Subsequently, several student operators have successfully collected semen from these ponies even in their first attempt to employ the technique.

The manual stimulation technique offers several distinct advantages over traditional semen collection methods (artificial vagina on a mount mare). These include 1) markedly reduced collection time and minimal preparation and clean-up time; 2) cleaner samples (plastic bag contacts only lower portion of the shaft of the penis), no lubricating jelly is **required**; 3) disposable materials, reduced risk of **infection**; 4) inexpensive materials; 5) heat damage to sperm from contact with artificial vagina reduced; 6) places less physical stress on stallions; 7) allows several ejaculates in quick succession (one stallion produced six ejaculates in less than 20 min, another produced three ejaculates in 6 min); 7) it is possible to obtain just the **sperm-rich** portion of the ejaculate; 8) generally requires fewer personnel; and 9) **does** not always require a stimulus mare.

While we have preferred to train stallions to ejaculate while standing on the ground, manual stimulation with a plastic bag can be substituted for the artificial vagina with the stallion mounted on a mare or dummy mount.

Potential disadvantages of this technique are that 1) a stallion and operator may require more training than is necessary when an artificial vagina and mount mare technique is used 2) large, tall horses may thrust with enough force to unbalance or knock down the handler, and 3) with tall horses, the operator may be at

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risk of injury should the horse kick during the procedure. In addition, it is difficult to adequately manipulate the larger glans penis typical of large, tall horses.

We have found collection of semen from stallions by manual stimulation of the penis to be a convenient and efficient technique. It **involves** a minimum of materials and time. Our observations over twenty years, together with recent observations of others, indicate that both stallions and operators can be readily trained to use this method.

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