

Compendium Equine

Consultant's Corner: "Why Do Some Castrated Horses Still Act Like Stallions, and What Can Be Done About It?"

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Objectionable masculine behavior, such as penile erection, mounting, copulation, and aggression toward other horses or humans, is not always eliminated completely by castration.

Proposed Causes of Masculine Behavior After Castration

Extragonadal Production of Androgens

A horse that has had both testes removed but still exhibits overt masculine behavior is sometimes called a *false rig*.¹ One cause ascribed to persistence of masculine behavior after castration is extragonadal production of androgens, and one alleged source of extragonadal androgens is the epididymis. Failure to remove all epididymal tissue during castration is sometimes credited for persistence of masculine behavior, and a horse that exhibits such behavior as a result is often referred to as being *proud cut*.¹ The epididymis is close and firmly attached to the normal, descended testis, making it unlikely to be accidentally left during castration. However, the epididymis neither produces nor releases androgens; thus the cause of masculine behavior should

not be credited to failure to remove all epididymal tissue.² Therefore, there is no such thing as a proud-cut horse.¹

Persistence of masculine behavior has also been attributed to testosterone production by the adrenal cortex stimulated by an increase in plasma concentration of luteinizing hormone that occurs in response to the decrease in plasma testosterone concentration after castration.² However, the serum concentration of testosterone or dihydrotestosterone in false rigs is no greater than that of geldings that display no masculine behavior¹; therefore, persistence of masculine behavior after castration should not be attributed to testosterone production by the adrenal cortex.

Innate Behavior

Masculine behavior of a false rig should be attributed to innate behavior that occurs during normal social interaction between horses rather than to extragonadal production of androgens.^{1,3} After castration, approximately 20% to 30% of geldings display masculine behavior toward mares and aggression toward other horses, and approximately 5% display aggression toward humans.³ The prevalence of masculine behavior of horses castrated before puberty is comparable with that of horses castrated after puberty. Therefore, at the time of castration, owners should be advised that the procedure may fail to completely eliminate or prevent development of masculine behavior so that, if the horse continues to display some form of objectionable masculine behavior, a misconception about the surgeon's ability to perform castration properly can be avoided.

Incomplete Castration

Masculine behavior sometimes persists after castration because the surgeon has, by mistake, incompletely castrated the horse.⁴ This occurs when the tail and a portion of the body of the epididymis of an abdominal testis has descended through the vaginal ring into the vaginal process and lies within the inguinal canal (i.e., the horse is a partial abdominal cryptorchid; **Figure 1**).

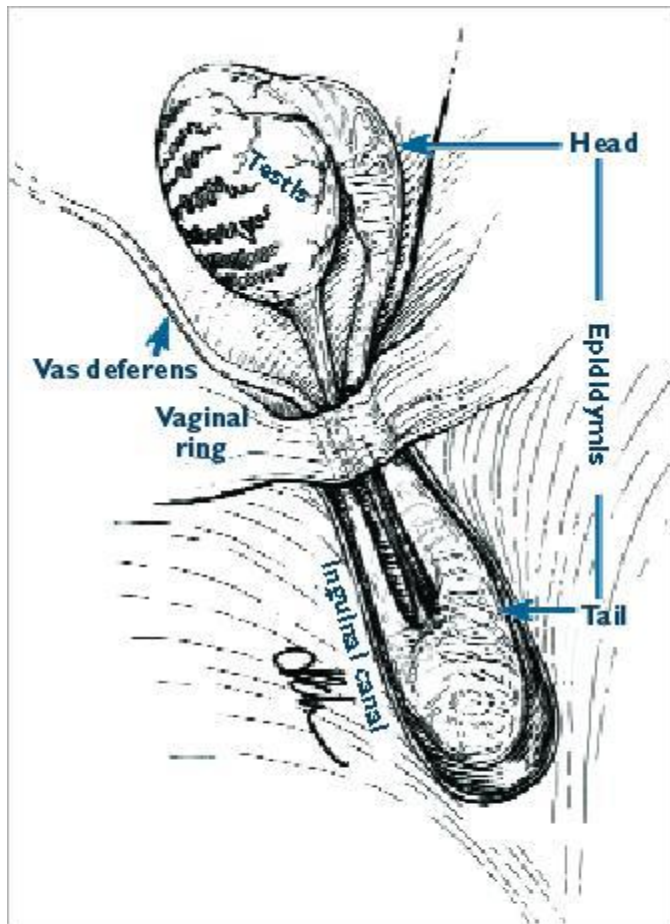


Figure 1. The appearance of a testis and epididymis of a partial abdominal cryptorchid stallion. A portion of the epididymis lies within the inguinal canal, enclosed in the vaginal process. An inexperienced surgeon could mistake the tail of the epididymis for a small inguinal testis and excise it. (©2005 University of Tennessee College of Veterinary Medicine)

The tail of the epididymis is improperly identified as a hypoplastic, inguinal testis and is excised. In my experience, the overlooked testis is usually the right one because the epididymis of a right abdominally retained testis is more likely to descend through the vaginal ring than is the epididymis of a left abdominally retained testis. The horse naturally continues to exhibit stallion-like behavior because it is still a stallion, but the owner and surgeon are convinced that both testes have been removed. Before excision of what appears to be an inguinal testis, the vaginal process should be incised and its contents examined to ensure that a testis, and not just a portion of the epididymis, is contained within.

Diagnosis

The first step in determining the cause of persistent masculine behavior after castration is to

establish whether the behavior is hormonally induced. Examination of each vaginal ring and surrounding area by per rectum palpation may be useful in determining whether failure to remove an abdominal testis is the cause of continued testosterone production and the persistence of masculine behavior. Per rectum palpation of an abdominal testis is irrefutable evidence that a horse has been incompletely castrated. However, palpating an abdominal testis is difficult because the testis is small and flaccid and an abdominal testis usually has a wide range of movement allowed by the elongated proper ligament of the testis. An abdominal testis can often be palpated per rectum by an experienced examiner, but failure to palpate the testis should not be considered conclusive evidence that one does not exist. Likewise, per rectum palpation of a vaginal ring should not be taken as evidence that the testis has descended through the ring because the vaginal ring can also be palpated when only the epididymis has descended through it.

Ultrasonographic examination of the abdomen, performed per rectum or transabdominally, may be useful in identifying a cryptorchid testis.⁵ To image an abdominal testis with the transducer inserted rectally, the abdomen should be examined in a "to-and-fro" pattern in the region of the vaginal rings as the transducer is advanced cranially.⁵ To transabdominally image an abdominal testis, the transducer should be applied longitudinally to the inguinal region and advanced cranially in a to-and-fro pattern between the midline and the flank. Via ultrasonography, the testicular parenchyma appears as a spherical homogenous structure surrounded by a more echogenic testicular capsule.⁵

Hormonal assays may be necessary to determine whether masculine behavior after castration is hormonally induced. Horses with testicular tissue have significantly higher concentrations of androgens and estrogens than do geldings, and the concentration of these hormones in the plasma or serum can be used to distinguish between false rigs and horses with an inguinal or abdominal testis.^{2,6-10}

In different studies,^{1,2,6} the basal serum testosterone concentration in geldings was generally less than 40 pg/ml, and that of horses with testicular tissue was greater than 100 pg/ml and often greater than 1,000 to 2,000 pg/ml. The serum testosterone concentration in horses with testicular tissue depended on age and season, with the concentration being lowest in horses younger than 3 years of age and during the winter. In some studies,^{2,6,7,9,10} the wide variation in basal serum testosterone concentrations caused the testosterone concentrations in geldings and in horses with testicular tissue to overlap, leading to error in interpretation. One investigator reported⁷ a 14% error using basal serum testosterone concentrations to differentiate geldings from horses with testicular tissue.

Elevation in the serum testosterone concentration in response to administration of human chorionic gonadotropin (hCG) increases the accuracy of predicting the presence of testicular tissue to over 94%.^{2,6,7} Serum is obtained for hormonal analysis before and at any time between 30 minutes and 2 to 3 days after intravenous administration of 6,000 or 12,000 U of hCG.^{1,6,9} Horses are classified as having testicular tissue if the testosterone concentration increases (and exceeds 100 pg/ml) in response to hCG administration or as geldings if the concentration fails to increase (and is less than 40 pg/ml). The response to hCG administration is poorest during the winter and in horses younger than 18 months of age.⁶

The presence of testicular tissue is highly correlated with circulating concentrations of conjugated estrogen (i.e., estrone sulfate) in horses older than 3 years of age.^{6,7} When horses younger than 3 years of age are excluded, the estrone sulfate concentration is about 96% accurate in predicting the presence of testicular tissue in horses of unknown castration status. An estrone sulfate concentration less than 50 pg/ml in plasma or serum indicates that the horse is a gelding, whereas a concentration exceeding 400 pg/ml indicates that the horse has testicular tissue.⁷

The standard values for normal hormonal concentrations in geldings and horses with testicular tissue may vary between laboratories, so knowing the laboratory's standards is important when assessing the results of a hormonal assay. Comparing test results with those of a known gelding may be necessary if the laboratory cannot provide standards.

Treatment

Approximately 30 years ago, shortening the stumps of the spermatic cords was reported to abolish objectionable masculine behavior in three-quarters of 18 false rigs, but the author of that report¹¹ offered no valid explanation to account for the apparent success of this procedure. The spermatic cords contain no tissue capable of producing androgens; thus shortening cords to eliminate masculine behavior of false rigs seems unlikely to be effective. Because objectionable masculine behavior of false rigs is innate rather than hormonally induced, it is best eliminated or reduced by eliminating or limiting social interactions with other horses or by imposing firmer discipline.¹

To permanently eliminate hormonally induced masculine behavior after incomplete castration, the abdominal testis must be located and removed. Finding a severed epididymis during exploration of the inguinal canal confirms the diagnosis of incomplete castration and identifies the abdomen as the location of the overlooked testis.⁴ The retained abdominal testis can be removed either through the vaginal ring or through a parainguinal incision, but because the contralateral testis has been removed, the retained testis is likely to have undergone compensatory hypertrophy, making its removal through the vaginal ring difficult.

The abdominal testis of a partial abdominal cryptorchid can also be identified and removed laparoscopically, either with the horse standing or recumbent. Finding and removing the testis laparoscopically may be advantageous because the side of testicular retention usually cannot be determined definitively before surgery. The testis is located laparoscopically by inspecting the region surrounding the vaginal ring. The testis is more easily located when the horse is standing rather than recumbent because the viscera are less likely to obscure the vaginal ring and surrounding region. When the horse is standing, an abdominal testis is most commonly located cranioventral to the ring and the epididymis of a partial abdominal cryptorchid can be seen entering the vaginal ring. The contralateral vaginal ring and the region surrounding it can be observed by manipulating the laparoscope under the descending colon or by elevating the descending colon either with an instrument placed through an abdominal portal or with a hand inserted in the rectum.¹²

Immunization against either luteinizing hormone-releasing hormone (LHRH) or gonadotropin-releasing hormone (GnRH) can be used to temporarily suppress hormonally induced masculine behavior.¹³⁻¹⁵ However, frequent immunization is necessary to maintain a sufficient titer to completely neutralize LHRH or GnRH and to inhibit the reproductive endocrine axis. Because stallions respond differently to immunization, it does not always totally suppress the libido.¹⁴ A vaccine for immunization against LHRH or GnRH is not commercially available.

Conclusion

Stallion-like behavior after castration is highly unlikely to be caused by extragonadal production of androgens and is most likely to be caused by innate, psychic behavior or incomplete castration of a partial abdominal cryptorchid. Tests to determine whether the cause of persistent masculine behavior after castration is psychic or incomplete castration include per rectum palpation of the abdomen, ultrasonographic examination of the abdomen, and hormonal assay. A horse that displays objectionable, psychic masculine behavior can be treated by using stricter discipline or isolating the horse from other horses. To ameliorate objectionable masculine behavior in a horse that has been incompletely castrated, the retained testis must be removed via either a conventional surgical approach or laparoscopy. Hormonally induced masculine behavior can be temporarily suppressed by immunizing against either LHRH or GnRH, but these vaccines are not commercially available.

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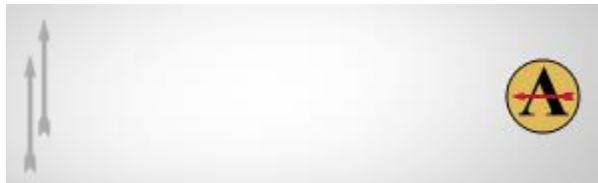
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Geldings: Does The Ultimate Equipment Change Actually Impact Performance?

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Glen Hill Farm's Chiropractor win the G1 Hollywood Derby

As rules surrounding the reporting of a horse's first start as a gelding have changed around the country recently, handicappers have formed opinions about whether or not to bet geldings — and when. It's well-accepted among horsemen that gelding a horse has its benefits, but does it actually result in an improved performance?

Statistics have not been compiled about the performances of first-time geldings, but the experts say that the procedure usually has several upsides, including improved training — if done under the right circumstances.

Many male horses may need to reach the age of two before they can successfully breed a mare, but they begin to reach sexual maturity around 12 or 14 months of age. That's about the time they can begin showing interest in fillies and can become more challenging for handlers on the ground. As they age, sperm output increases along with scrotal width, and those behaviors can become more pronounced.

“Sometimes they're walking up to the track on their back legs,” said Karen Dreaver, farm manager at Glen Hill Farm in Florida. “Or sometimes if they see a filly, or something they think

is a filly, they just go nuts. It can be the lead pony that's clearly not a filly and they just cannot handle it. It's not safe for the people or the horse.”

That behavior can be even more problematic if the horse is injured and requires stall rest for an extended period of time. Extended confinement can give even the kindest horse cabin fever, but for intact colts, it can seem like they've been tossed in a pressure cooker.



Chiropractor, winner of the Grade 1 Hollywood Derby, suffered a major accident as a yearling and required six months of stall rest followed by six months of hand walking to heal from a back injury. In his case, the gelding procedure seemed like a practical consideration to help him through the recovery process, according to Dreaver.

The presence of testosterone naturally in a horse's system also predisposes him to building extra muscle mass and retaining more fat as he develops the thickened neck, larger jaw, and wider body build of a stallion. For some individuals, that growth pattern can outstrip the maturity of their joints.

“Sometimes it's about their weight,” said trainer Kieran McLaughlin. “Sometimes gelding will help them lose some weight and keep them sounder.”

Some horsemen also believe that horses with undiagnosed testicular abnormalities may experience discomfort while galloping as a result. This could include ridglings or cryptorchidism, which occurs when one or both testicles are undescended. In Dreaver's experience, it could even include horses whose testicles appear descended but could be partially caught in the inguinal ring, which surrounds the inguinal canal they must pass through during the descent into the scrotum.

The gelding procedure is generally a simple one and is usually performed outside of the clinic. Dr. Jose Bras, surgeon and ambulatory veterinarian at Rood and Riddle Equine Hospital, said the

procedure may be done while the horse is standing under sedation or while the horse is lying down under anesthesia.

In Bras's experience, post-surgical complications are usually minimal. However, he prefers to give his patients about two weeks to recover before advising they return to heavy work. He does not notice that horses need a race to “adjust” to their movement in the hind legs following a surgery.

McLaughlin has found that behavior changes, either in the form of a calmer demeanor or improved work ethic in training, follow quickly after the surgery. Studies show that testosterone levels in the blood drop within 48 hours after gelding. Changes in body shape and musculature could take as long as six months.

Bras doesn't believe there are any drawbacks to gelding from an athletic perspective.

“People talk about gelding a horse and say that they won't have the same energy that a stallion would have, but you're going to have pros and cons,” said Bras. “A horse might be all built up because he's intact, but he might not be training well because he's not concentrating on his job.”

Bras delivered an important caveat — gelding only works to improve behavior if the horse is fairly young at the time of the procedure.

“It depends on a horse's age. There are two things — learned behavior, and a reaction to hormones,” said Bras. “You will have horses that if you geld them when they are four, five, six years old, they already have a learned behavior. Once the testosterone decreases, they are not going to be that interested in females but they still have behavior that they learned and may act a little bit studdish.”

Gelding has another important benefit after the racetrack, too. As Old Friends founder Michael Blown attests, many rescue organizations are not equipped to house stallions, who require special handling and private paddocks. Just as importantly, Dreaver said Glen Hill often gelds horses with pedigrees the farm thinks should not be reproduced.

“It's more when you lose them at the track, that they aren't a stallion, so that someone doesn't get the idea 'Let's breed this horse,’” said Dreaver. “There are already a lot of bad stallions out there.”

<https://www.paulickreport.com/news/ray-s-paddock/geldings-does-the-ultimate-equipment-change-actually-impact-performance/>

Gelding Behaviour

As spring approaches many animals begin to display signs of sexual activity. The drive to reproduce dominates the minds of many animals however it can cause problems for our equine friends and their paddock mates. It is common to hear reports that an otherwise friendly gelding has started to herd his paddock mates, show aggression towards other geldings and display signs of sexual arousal towards mares. This can sometimes cause issues in herds or at public agistment facilities and can cause confusion and worry for owners.

False Rigs

Continued stallion-like behaviour can be a complication of castration. Geldings that display stallion-like behaviour are sometimes called *false rigs*. False rigs may display masculine behaviour ranging from genital investigation and squealing to mounting and even copulating. False rigs are often said to be proud cut, indicating that some epididymal tissue was left with the horse at the time of castration. Only if testicular tissue remained would stallion-like behaviour be the result of incomplete castration.

Quite a few completely castrated geldings with normally low steroid hormones continue to show stallion-like behaviour, particularly under social pasture conditions. While estimates vary, it has been estimated that almost 50% of geldings continue to show considerable residual stallion-like behaviour.

Because some sexually experienced stallions castrated late in life continue to display masculine behaviour, stallion-like behaviour in geldings has been attributed to learned behaviour. One study found no difference in the prevalence of stallion-like behaviour between horses castrated before puberty and those castrated after puberty.

Changes in management or stricter discipline may alleviate sexual behaviour or reduce it to a tolerable level.

What can you do for your gelding?

You can consider manipulating his social housing conditions to minimise the behaviour and/or the resulting problems. For example, you can house him away from other horses all together. Geldings eventually quiet down after prolonged separation from their “herd.” You might consider trying to take advantage of natural social suppression of stallion-like behaviour by housing your gelding within reasonable proximity to one or more stallions. Most geldings become socially submissive to stallions, and will appear to become demoted to the rank of immature male or bachelor stallion.

If the conservative method does not give your gelding relief, he should be tested for the possibility of remaining testicular tissue. This is a small blood test which can be done in geldings older than 3 years of age in an attempt to rule out a cryptorchid or incomplete

castration. If you wish to arrange for your gelding to be test please feel welcome to [make an appointment](#).

Alternative methods

Regumate is the female hormone progesterone used in behaviour modification in mares, geldings and stallions. The administration of female hormones such as progesterone, appear to somewhat subdue stallion-like behaviour. It can be effective in quieting a stallion or gelding for show or working situations however it is not effective for a gelding or stallion for long term social pasture situations.

<https://www.canberraequinehospital.com.au/gelding-behaviour/>

**OBSERVATION**

What you see. The starting point for addressing any equine health related issue is your observation.

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Stallion-Like Behavior in Gelding

SUMMARY

A fairly common complaint in veterinary practice is the gelding that acts like a stallion. These geldings may mount mares, act possessive of mares in a band, achieve an erection, or pursue mares even while being ridden. They may be generally more aggressive and harder to handle than a typical gelding. They may or may not show stallion physical characteristics like heavy muscling of the neck and jowls. Stallion behavior is caused almost exclusively by the presence of testosterone.

In most cases, the cause of stallion-like behavior actually DOES relate to the presence of testosterone in the circulation. A normal gelding should have a very low blood testosterone level. The term "Proud Cut" refers to a horse that has been gelded (or has no visible testicles) but some testosterone producing tissue still exists. This should not happen if a gelding has been properly castrated. A retained testicle is referred to as "cryptorchid", and occasionally a horse will have the visible testicle removed and the retained testicle left in. This is considered unethical and negligent.

In rare cases, there is no hormonal explanation for the behavior (the horse is found to have very low levels of testosterone). Firm handling and training will be necessary to counteract this tendency. The gelding may also need to be managed separate from mares.