

## **Balanoposthitis and paraphimosis in the stallion. A novel support for an inflamed penis and prepuce**

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### **Abstract**

Balanoposthitis with associated paraphimosis is an uncommon medical emergency in a stallion. Immediate support of the prolapsed tissues in conjunction with associated medical and physical treatments is paramount for a successful outcome. This reliable method of support that can be readily, quickly, easily and inexpensively applied to all cases of prolapsed preputial and penile tissues by a practitioner in the field. This report illustrates a method using a pair of underpants, baler twine and other readily available materials to support the swollen prepuce and penis of four stallions that suffered traumatic injury to their external reproductive organs.

**Keywords:** Balanoposthitis, paraphimosis, inflammation, penis, prepuce, stallion

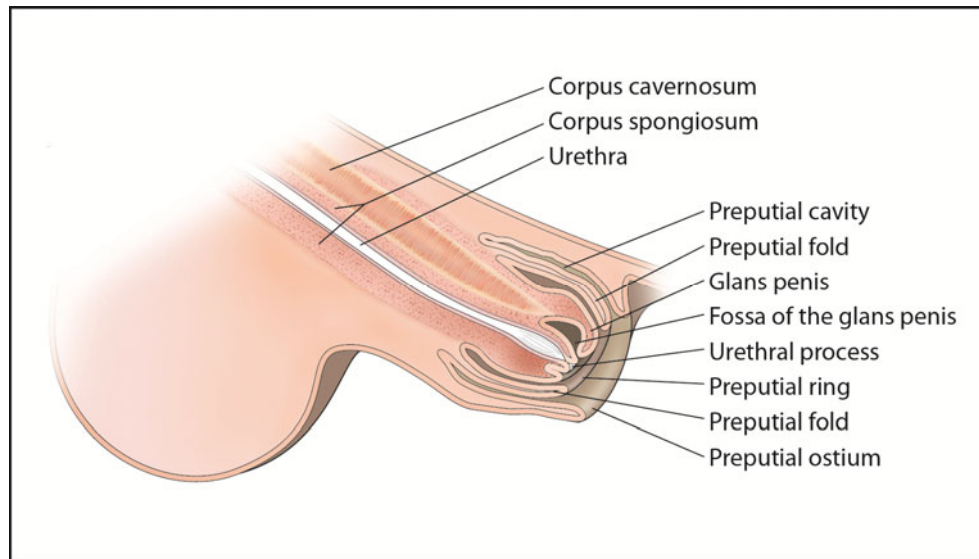
### **Introduction**

A pendulous and protruding penis and/or prepuce in the horse is typically the result of inflammation. Inflammation of the free body or glans of the penis is known as balanitis, and inflammation of the laminae of the prepuce is known as posthitis.<sup>1</sup> As they often appear as a combined entity, the condition often presents clinically as balanoposthitis.<sup>2,3</sup> Priapism is characterized by an erection that persists in the absence of sexual stimulation while paraphimosis is characterized by the inability to retract the penis into the preputial cavity. All have a similar clinical presentation.

Due to the different treatment options, the definitive diagnosis of a pendulous penis and/or prepuce is more than an academic exercise.<sup>4</sup> To prevent the inevitable cycle of inflammation that is likely to occur, supporting the organs is an important part of the treatment regimen. Balanoposthitis, as a result of the associated swelling of the penis and decrease in size of the preputial orifice, results in paraphimosis. Prolonged protrusion impairs venous and lymphatic drainage exacerbating preputial edema, particularly swelling of the relatively inelastic internal preputial ring. An inflammatory cycle is induced.<sup>3</sup> The primary aim in the treatment of balanoposthitis is to reduce inflammation. Ensuring the continued integrity of the urogenital tract including urethra and integument, and prevention or control of any associated infection are ancillary objectives. The normal anatomy is illustrated in **Figure 1**.<sup>5</sup> Attempts to limit potential behavioral aberrations induced by a traumatic event is an ancillary aim in a breeding stallion. Diazepam has been reported to reduce anxiety, possibly induced by traumatic incidents in some breeding stallions.<sup>6</sup>

There are a number of etiologies of balanoposthitis. By far the most common is acute and often blunt trauma from breeding incidents,<sup>2,7</sup> typically a kick by the mare. There are reports of methods of supporting the pendulous organs including nylon mesh, firm support methods such as the use of modified plastic bottles, pantyhose, proprietary supports,<sup>2</sup> purse-string sutures<sup>8</sup> and the use of a probing.<sup>9</sup> Beltaire et al report the application of a non-adherent dressing, wrapped by elastic bandage material supported by the application of a mesh sling.<sup>10</sup>

This report describes the use of underpants (briefs, 'Y'-fronts'), baler (or other) twine, rubber tubing, and a neck strap or surcingle to quickly, easily, safely and effectively support a stallion's swollen penis and prepuce. This support procedure was used on four stallions described in the following case summaries.



**Figure 1.** Diagram illustrating the normal sagittal cross-section of the prepuce and penis. (From O'Brien et al.<sup>5</sup>; used with permission)

## Case reports

### Case 1

A ten year old thoroughbred stallion was kicked by a mare in a breeding barn accident. The penis and prepuce were immediately treated with cold hydrotherapy for 20 minutes. On examination the penis and prepuce were obviously swollen and protruding from the preputial orifice. Other clinical parameters were within normal limits. The stallion was sedated with intravenous xylazine (200 mg) and butorphanol (20 mg), and the swollen area more closely examined (**Figure 2**). Edema was visually and palpably obvious, which was reduced with manual pressure. There was no obvious free fluid present. The area was scanned ultrasonographically using a 5 MHz linear probe. No obvious abnormalities were detected in the integrity of the penis, no free fluid was detected, and preputial edema was visualized.

The stallion was treated with intravenous flunixin meglumine (600 mg), and intramuscular procaine penicillin (15,000,000 IU). Manual reduction of the swelling was initiated after a further 10 minutes of cold hydrotherapy. The swelling reduced appreciably after massage, but was insufficient to permit return the penis and remaining prepuce through the preputial orifice. Lanolin ointment was liberally applied to the affected area. A support mechanism was difficult to obtain quickly and easily. The use of underpants, supported by soft bandaging and attached to a crudely fashioned neck strap was instigated (**Figure 3**) and the stallion was re-examined the following day.

The following day the horse was again sedated and his condition reassessed. The balanoposthitis was no worse. The prolapsed tissues were treated with cold hydrotherapy and massaged to reduce the dependent edema; emollient ointment was liberally applied to the exposed skin, and the "underpants support mechanism" reapplied. Medical treatment consisted of procaine penicillin (as above) and oral phenylbutazone (2 g) twice daily. The horse was hand walked for 10 minutes at a time four times daily, ensuring the support mechanism remained in the correct position. He was not exposed to mares. The support was removed in the evening, followed by cold hydrotherapy, massage, emollient ointment application, and replacement of the support mechanism.

On the third day, the swelling was minimal. After hydrotherapy and massage, the penis and prepuce were retracted through the preputial orifice by the stallion. The support was not replaced during the day, and the stallion was hand walked as on the previous day. In the evening, hydrotherapy, massage, emollient application, and replacement of the support was carried out in conjunction with continued medical treatment.

By the morning of the fourth day, the swelling was markedly reduced, and paraphimosis was no longer evident. Hydrotherapy, massage and emollient application were carried out twice daily.

The stallion was allowed into his small yard for the day, and stabled overnight. No further paraphimosis occurred. The antibiotic treatment was discontinued, and the dose of phenylbutazone decreased to 1 g twice daily. Hydrotherapy and emollient application continued twice daily. On the fifth day erection was induced under veterinary supervision in the presence of a mare. The penis, although slightly swollen was easily protruded and retracted. Erection was induced in the presence of a mare for another five days, with continued improvement in the integrity of the penis and prepuce. Medical treatment terminated at this point.

Ten days after the initial insult the stallion served a mare with no detrimental effects. Dismount samples<sup>11</sup> to confirm ejaculation contained motile spermatozoa. Two days later he was serving twice daily, and two days after that he was serving as necessary. Two weeks later pregnancy rates of approximately 65% per cycle, similar to those prior to the incident, were detected in the mares he had served.



**Figure 2:** Left side view of Case 1 showing the enlarged and swollen penis and prepuce protruding from the preputial orifice.



**Figure 3.** View from the front left side of the horse in Case 1. The supporting bandages are attached to the neck strap. The horse is shown urinating through the underpants.

#### Case 2

In 2005, a maiden four year old thoroughbred stallion that was being schooled for the breeding season was presented due to the sudden onset of swelling of the penis and prepuce after mating. The stallion had not been kicked and the swelling was noticed immediately after copulation. A putative diagnosis of superficial blood vessel rupture or shearing trauma to the erect penis was made.

Cold hydrotherapy, application of ice packs, and massage with emollient antibiotic ointment (Nitrofurazone Cream, RanvetPL, Botany, NSW) was instigated immediately. The stallion was treated with diazepam (20 mg) and butorphanol (20 mg) within 20 minutes of the occurrence. Ultrasonographic examination of the penis did not reveal any free fluid, and the penile tunica albuginea was intact. Edema and swelling were obvious on ultrasonography. Flunixin meglumine (750 mg) was administered intravenously, and procaine penicillin (15,000,000 IU) intramuscularly. Due to the balanoposthitis, associated paraphimosis was evident, which was not reduced after treatment. The “underpants support mechanism” was applied. On this occasion it was attached to a surcingle with a breast plate.

The stallion was able to retract the penis and prepuce within the preputial cavity without assistance on the third day. On the fifth day erection was induced under veterinary supervision in the presence of an estrus mare. Similar to Case 1, supervised erection was induced for another four days. The stallion was serving mares ten days after the original incident. There was no recurrence of balanoposthitis. Pregnancy rates 14 days after mating were 50% per cycle. Dismount samples revealed the presence of motile spermatozoa.

#### Case 3

A pony teaser stallion was kicked on the erect penis by a maiden broodmare while she was being assessed for suitability for breeding. This resulted in the sudden onset balanoposthitis and associated paraphimosis.

He was immediately treated with 20 mg diazepam and 350 mg flunixin meglumine intravenously. The penis and prepuce were treated with cold hydrotherapy for 15 minutes. Examination revealed a swollen and edematous penis and prepuce. Ultrasonography confirmed the presence of preputial edema, absence of free fluid and lack of damage to the penis. Massage, application of emollient antibiotic ointment, and application of the “underpants support mechanism” followed the initial examination and treatment. Systemic antibiotic and anti-inflammatory drugs were administered. Hydrotherapy, massage, and application of the support mechanism continued in conjunction with medical therapy for three days. On the fourth day preputial and penile swelling was minimal, and the stallion was able to fully retract the penis and prepuce into the preputial cavity. He was able to obtain an erection and to retract his penis unsupported. After a two week break, the teaser returned to his duties with no apparent physical or behavioral abnormalities.

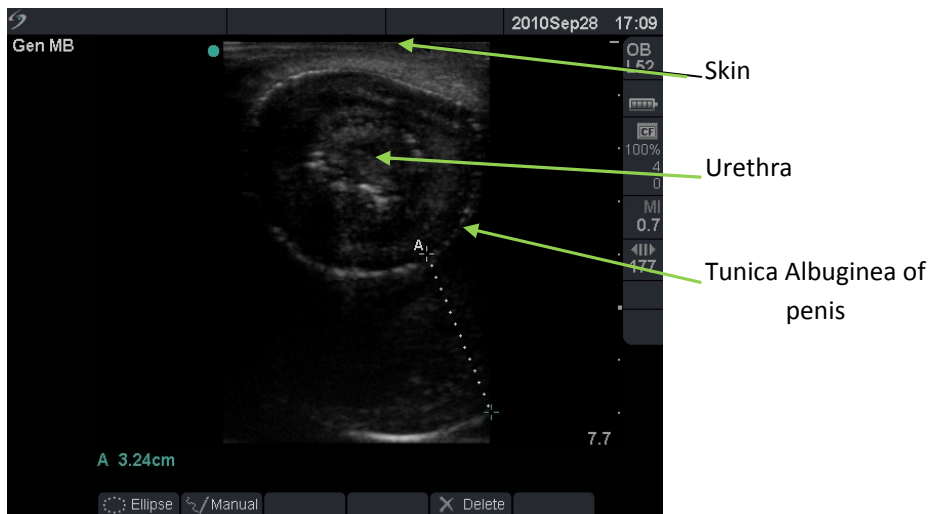
#### Case 4

An approximately five year old 500 kg Australian Stock Horse stallion was presented having been found in the paddock adjoining an “in season” mare, with a very large and swollen penis and prepuce (**Figure 4**). There was also an obvious wound on the left dorsal mid-shaft of the penis. The stallion appeared to have jumped into the paddock adjoining the mare, and attempted to serve her through the fence.



**Figure 4:** Left view of the inguinal area of Case 4 following cold hydrotherapy. There is obvious swelling of the penis and prepuce. There are signs of abrasions and hemorrhage. The swollen penis and prepuce could not be retracted through the preputial orifice.

Initial treatment was cold hydrotherapy for approximately 20 minutes. When examined approximately three hours later, the stallion was bright, alert and responsive with obvious balanoposthitis resulting in paraphimosis. Clinical examination was otherwise unremarkable. The stallion was sedated with 20 mg romifidine and 20 mg butorphanol, and 750 mg flunixin meglumine was administered intravenously. Procaine penicillin (10,500,000 IU) was administered intramuscularly. The penis was extended with manual traction, palpated, examined visually, and scanned ultrasonographically (**Figure 5**). There was an obvious full-thickness wound on the left dorso-lateral aspect of the internal preputial lamina at the level of the internal preputial ring. The wound was left to heal by second intention. Ultrasonography did not reveal any free fluid, the penile tunica albuginea was intact, and edema was obvious. Massage was instigated to decrease the edema and assist in returning the penis to the prepuce. The penis was cleaned with water and very dilute iodine surgical scrub, rinsed and dried. Emollient antibiotic ointment was applied to the swollen area.



**Figure 5:** Ultrasonogram of a cross section of the protruding penis and prepuce of Case 4 at initial presentation (top is ventral.) The integrity of the penile tunica albuginea appears intact. There is obvious preputial edema evident between the calipers- 3.24 cm.

The “underpants support mechanism” was applied to this horse. He was hand walked four times daily, and treatment was similar to that in the cases described above. The support was deviated to the side twice daily for hydrotherapy, and application of the antibiotic ointment. The support was changed daily for three days. On the fourth day, the stallion was able to retract his penis and prepuce into the preputial cavity. The support was removed as it was no longer required.

Daily hydrotherapy of the penis and prepuce, and antibiotic ointment application continued for seven days. After obtaining an erection the stallion was able to retract his penis into the preputial cavity. The wound had granulated, epithelialization was occurring, and contraction of the area was evident. A triangular wound without any adhesions was evident (**Figure 6**). Erection was induced daily for two weeks. The penile wound was substantially reduced and hemorrhage was not evident when the stallion served a mare that was used successfully as an embryo donor.



**Figure 6:** Extended penis of Case 4 approximately two weeks after the insult. The wound at the distal end of the inner preputial fold is showing signs of granulation, epithelialization and contraction.

### **Materials and methods**

- Pair of men’s (or possibly ladies’) underpants (briefs/Y-fronts)
  - Baler or other twine or rope (approximately 9 m depending on the size of the horse)
  - A surcingle with chest strap or a broad neck strap
  - Rubber tubing (optional)
  - Scissors
  - Elastic bandage (optional)
- (**Figure 7**)



**Figure 7:** Materials (top to bottom, left to right): girth strap or surcingle; chest straps; underpants, scissors, elastic bandage (optional); baler (or other) twine; rubber tubing (optional).

Four small holes are cut through the material of the underpants. One hole on each side of the ‘gusset’ between the leg openings of the underpants, ensuring the stronger elastic material is preserved. The cord is attached to this stronger material. One hole is made on each outside edge of the waistband, maintaining the integrity of the reinforced elastic such that the baler twine can be attached to the four corners of the underpants. The strings attached to the gusset area are longer (approx. 2.5 m) than those attached to the waist (approx. 2 m; **Figure 8**).



**Figure 8:** Underpants laid out with bandaging as straps.

The surcingle and breast band or neck strap, are then applied to the stallion. The gusset strings are then pulled caudally and dorsally between the legs of the stallion, with one string on each side of the tail, along the dorsal midline, and loosely tied to the surcingle or neck strap. The gusset of the underpants should be approximately at the level of the scrotum. The strings from the waist part of the underpants are attached to either side of the surcingle or neck strap, travelling cranio-dorsally from the caudal-ventral abdominal area. This is usually well tolerated by the horse, however safety of the personnel attaching the support is paramount.

The position of attachment and the length of the strings are altered as deemed necessary for the underpants to provide the required support for the prolapsed penis and prepuce. With correct manipulation the underpants can be made to fit snugly under the swollen organs. The strings from between the legs that run cranially along the dorsum can be tied together along the midline. Some rubber tubing can be used to attach the cranial diagonal supports to the dorsal supports or to the girth strap to alter the angle, thereby enhancing support. This also allows flexibility of the supporting mechanism (**Figure 9**). The knots are then secured with the underpants in the desired position (**Figures 10 and 11**).

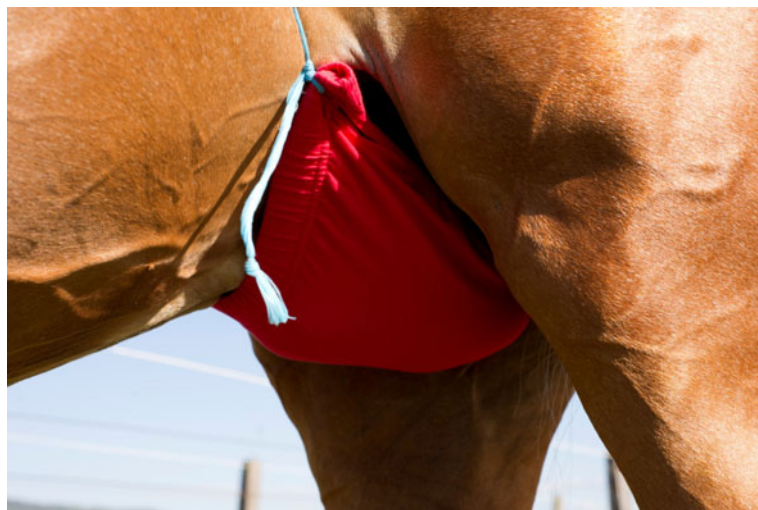


**Figure 9:** Illustrating the position of the gussett straps between the legs, over the dorsum to be attached to the girth strap.





**Figure 10:** Attached “underpants support mechanism”.



**Figure 11:** Close-up of the applied underpants showing the snug and uplifting support.

## Discussion

Protrusion of the penis and/or prepuce from the preputial orifice is a medical emergency in the stallion. Authors of published reports<sup>1-4,8-10</sup> are unanimous in recommending immediate support of the inflamed penis and prepuce when balanoposthitis with associated paraphimosis is evident, especially as a result of a traumatic incident. Fortunately these incidents are not common in breeding stallions or other intact males. Supporting the swollen penis and prepuce is paramount in decreasing the inflammation that occurs with stagnation of edema and other fluids.<sup>2,3</sup> Supporting the organs decreases the chances of further trauma to the exposed and swollen tissues. Balanoposthitis is uncommon in neutered males, however this support mechanism could be used in geldings with a protruding and/or pendulous penis. This support mechanism could also be used in a horse with priapism.

Appropriate medical treatment is essential when dealing with paraphimosis. The primary benefit of the support mechanism used in the cases described in this report is the ease and speed with which it was made. Support can be applied immediately using materials readily available on the farm (and personnel). The underpants material is usually cotton or cotton based and is soft and porous. This allows the stallion to urinate unhindered, but the material is sufficiently resilient to support the

swollen organs without any apparent discomfort to the stallion.<sup>2</sup> The material is relatively inexpensive, readily available and replaceable with a clean new support as often as required. Urine scalding and abrasions were not noticed in the cases in which it was used. The size of underpants is not important, however medium or large size tends to offer the best compromise between support and stability.

The potential effects of inflammation and hyperthermia of the testes is another important consideration regarding the future fertility of the stallion.<sup>12</sup> Twelve hours of hyperthermia have been shown to affect spermatozoal function. Limiting inflammation in the surrounding tissues diminishes the likelihood of testicular hyperthermia.

Hydrotherapy, physiotherapy and the use of hypertonic (hyperosmotic) agents such as sugar, salt or glycerin may assist in reducing edema.<sup>3</sup> The use of these agents would not preclude the use of the “underpants support mechanism”. Purse-string sutures around the preputial orifice have been advocated by some authors,<sup>8</sup> whereas others<sup>2</sup> advise caution as sutures may induce further inflammation and possibly result in abscesses.

The probang device<sup>9</sup> is limited to cases in which the penis and prepuce can be replaced through the preputial orifice. This method could be used after preputial swelling has been reduced following the use of the support mechanism. The success of retention bandaging<sup>10</sup> may be limited depending on the size and temperament of the stallion.

The “underpants support mechanism” was well tolerated by the patients described in this report. Importantly, it does not appear to require full-time surveillance, although frequent surveillance is recommended. The device appears to maintain its position regardless of stallion behavior such as rolling. If the device does happen to move, it is unlikely to have any detrimental effects on the stallion, or the penis and prepuce.

Mesh support mechanisms<sup>2</sup> are reportedly very useful, and can be purchased or homemade. However the materials are not always readily available at the time and place of need. Immediate support is paramount for successful of treatment. The use of pantyhose has many advantages, including availability and they are made of porous non-irritant material. However, the material is slippery and tends to evolve into a rope-like structure when placed under tension to elicit support of the protruding penis and/or prepuce. As a result they tend to slip off to the side of the swollen organs. Firmer materials such as modified plastic bottles or planks of wood, have the disadvantage of easily slipping to one side when the stallion moves. The above mentioned drawbacks are minimal when using the “underpants support mechanism”, with all of the advantages of a snug and uplifting fit.

Treatment with diazepam as soon as possible (preferably within 20 minutes) after a traumatic occurrence is reported to alleviate or decrease aberrant behavior that may be induced in the stallion.<sup>6</sup> This has been used in conjunction with butorphanol and/or alpha 2 adrenoceptor agonists to assist in managing stallions for examination and treatment. Application of the support, especially the caudal strings, have potential risks to personnel which requires judicious management.

The “underpants support mechanism” is an effective, inexpensive, readily available resource for a clinician dealing with a stallion with balanoposthitis and paraphimosis, or any protrusion from the preputial orifice requiring support.

## Acknowledgement

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(Editor's Note: The photographs in this paper appear in color in the online edition of *Clinical Theriogenology*.)

