Behavior and Showing: Can We Stop The Cycle?

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Mare behavior problems are a hot topic in the performance industry, and many owners look to veterinarians to aid in the control of reproductive or poor behavior during training and showing. These behavior problems are often attributed to hormonal changes associated with the estrus cycle. However, poor behavior can also be due to a variety of medical or training problems. Careful examination of historical data including diaries or calendars which describe behavior and document dates can be very useful in the identification of the source of the problem. Medical problems may include pain in the back or limbs, urogenital abnormalities, gastrointestinal problems, or training issues. Therefore, thorough examination of the animal is warranted in all cases of behavior abnormalities with special attention directed to these systems. Treatment of any conditions found must be incorporated in the plan for that individual in order to achieve a successful outcome. Behavior modification and training changes may also be necessary to fully correct the problem. While training and medical problems are very important, this presentation will focus on estrous cycle manipulation techniques.

The normal estrus cycle is composed of a 5-7 day period of estrous followed by a 14-15 day period of diestrus. Estrous is the period of time in which the mare is receptive to the stallion, has low circulating levels of progesterone and rising levels of estrogen. Diestrus is the period of time in which the mare is not receptive to the stallion, has rising/high levels of progesterone and low levels of estrogen. Mares can show undesirable behaviors associated with either portion of the cycle, but behavior problems are most commonly linked to estrous. Therefore, many behavioral control strategies are aimed at prolonging diestrus or suppressing/eliminating estrous.

Because of the high progesterone levels present during diestrus, the use of progesterone and progesterone analogs are commonly employed to suppress estrous. Some options include progesterone in oil, oral altrenogest, injectable altrenogest, and medroxyprogesterone. Progesterone in oil is available through compounding pharmacies and is given intramuscularly daily to weekly. However, this formulation can be irritating to the surrounding musculature and is therefore not recommended in performance horses. Oral altrenogest (27 mg for 15 days) has been shown to effectively suppress estrous in 94% of mares. However, human safety issues and daily administration needs reduce its long term usefulness. Some mare owners utilize oral altrenogest in a more periodic fashion by giving the medication 2-3 days prior to showing, however, no studies have been performed to determine the effectiveness of this protocol. Injectable altrenogest is available from several compounding pharmacies in regular and bio-release formulations. One study compared several injectable formulations of altrenogest and medroxyprogesterone. All doses and forms of altrenogest were able to successfully delay the onset of estrous, with the longest delay (~30 days) being achieved by a bio-release formulation containing 500 mg of altrenogest encapsulated in lactide-glycolide microparticles. This study also demonstrated that medroxyprogesterone acetate was ineffective in the control of estrous in cycling mares and medroxyprogesterone acetate treated mares did not have significantly different behavioral, hormonal, or ultrasound characteristic when compared to control mares. Other synthetic progestins have also been shown to be ineffective in the control of estrous in mares (hydroxyprogesterone caproate, norgestomet, and megestrol acetate) and, therefore, are not recommended.
Another way to maintain a progesterone influence on the reproductive tract of mares is to prolong the function of the corpus luteum (CL). This allows the mare to remain under the influence of the progesterone secreted by the CL for greater than 14 days. This can be accomplished by implantation of a glass ball to mimic pregnancy, breeding the mare and subsequently reducing the pregnancy, inducing a mid-diestrus ovulation, administration of intrauterine plant oils or administration of oxytocin post ovulation. Placement of intrauterine glass balls to mimic pregnancy was once a popular option for prolonging estrous in mares, but these glass balls often become problematic for the mare. Intrauterine infections, fracture of the ball, or irritation to the uterus are a few of the known complications. Therefore, alternative methods are preferred for the prolongation of CL function in mares. Induction and subsequent reduction of pregnancy can be helpful in prolonging CL function in mares, but it carries significant ethical concerns for both the veterinarian and mare owner. Induction of mid-diestrus ovulation can be useful in prolonging endogenous progesterone release. Once a mid-diestrus follicle reaches 30-35 mm in diameter and ovulatory drug such as hCG or deslorelin is administered. The newly formed CL will not be susceptible to the prostaglandin release at the end of diestrus and will, therefore, continue to function for up to 80 days. The limitations of this method are that it requires routine ultrasound examination of the mare and many mares will not develop a large enough mid-diestrus follicle to induce ovulation. Another technique to prolong CL function is administration of intrauterine plant oils. Intrauterine administration of fractionated coconut or peanut oil on day 10 post ovulation has been shown to inhibit luteolysis in 80-90% of mares. These mares were followed for 30 days post ovulation through which time they maintained CL function and high progesterone concentrations. Further research is needed to determine the duration of progesterone release and the long term effects of plant oils on the endometrium. Oxytocin administration post ovulation has also been found to be useful in the inhibition of luteolysis. Oxytocin is involved in the intrauterine release of PGF 2alpha and can induce release of the prostaglandin during late diestrus; however, during early diestrus (prior to day 10) it disrupts luteolysis. Administration of 60 IU of oxytocin IM once daily from days 7-14 post ovulation has successfully resulted in prolonging CL function in 60-70% of mares for a mean of 69 days. This dose of oxytocin does not seem to cause significant adverse clinical signs in mares at this stage of estrous which makes it a viable option for prolongation of CL function.

More permanent mechanisms to reduce signs of estrous in mares include administration of GnRH vaccines or ovariectomy. Administration of a GnRH vaccine was effective in reducing estrogen and progesterone levels and behavior responses to a stallion that lasted at least 3 months. These mares were clinically similar to mares in anestrus, with inactive ovaries, and low estrogen and progesterone concentrations. The long term effects of GnRH vaccine on fertility have yet to be determined and no studies have evaluated repeated use of the vaccine in mares. However, this might provide a good alternative to ovariectomy for behavioral reasons in mares. Ovariectomy is a permanent solution to estrous related behavior changes. Surgical removal of the ovaries has been performed for years, however, there is some concern among veterinarians about the ethics of this procedure for behavioral control. A recent review evaluated the justifications for ovariectomy for behavioral reasons. This review determined that the current data did not support ovariectomy as an effective treatment for estrous behavior problems. Several of the reviewed articles demonstrated that estrous behavior continued after ovariectomy and sometimes increased in frequency. This is likely due to extragonadal hormone production. Therefore, care must be taken when considering this treatment option for mares.
As you can see there are several options for estrous cycle control in the mare. The best option is one that works for both the horse and owner to create a positive working environment. Encouraging the owner to investigate behavioral modification strategies may also be useful for a successful long term outcome.

**Suggested Reading:**


**References:**