Biological Times

Volume No. 2 | Issue No. 8 | Pages 3-4

The Importance of Breeding Soundness Examination in Mares and Optimal Reproductive Success Procedures

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ABSTRACT

Reproductive Evaluation of the mare can be assessed through the breeding soundness examination. The breeding soundness examination is valid for the entire period of the respective breeding season. It includes the general physical examination, breeding history evaluation, and thorough examination of the external and internal genitalia. The reproductive evaluation comprises of the physical assessment of the mating ability as well as the laboratory testing of the reproductive tract samples such as endometrial biopsy in order to declare the mare sound for the breeding or to work for the better management and treatment in case of any abnormality prior to breeding season. An in time and thorough breeding evaluation of a mare can save the money as well as time of the breeder for a profitable business.

1. Introduction

A breeding soundness check assesses the mare's reproductive potential with a full reproductive history, physical examination, and several diagnostic protocols. The BSE helps veterinarians determine if a mare is foal able during the breeding season. If the mare has problems foaling in the past or is having trouble foaling this season, the BSE may be recommended. Examining a mare for her "breeding soundness" roughly 50-60 days before a planned breeding project or season can alert you to any existing reproductive problems that can prevent the mare from getting breeded. This allows for the possibility of treating the illness even if the breeding season has already begun, which has the added benefit of saving the breeders time and money [1]. Breeding soundness Examination in mares comprises of the following steps;

1. Breeding History Evaluation
2. General Physical Examination
3. External Reproductive Examination
4. Internal Reproductive Examination

Breeding History Evaluation:

Evaluation of the mare's breeding history, including the mare's age when first bred, the dates of any known breeding or conceptions, and the breeding method (artificial insemination, embryo transfer, or live cover), is the first step in the BSE examination. As a side benefit, cycle history (initial heat age, previous heat ages) dates/cycles/intervals, teasing method), Pregnancy (number of normal/abnormal pregnancies and duration of gestation), and Foaling (foaling dates, date of last foaling, abnormal/assisted foaling, milk production, maternal responses) records. The mare's pedigree can be evaluated using these factors. Now, one thing that should be kept in mind is that the type of BSE evaluation or inspection relies upon the purpose for the examination, stage of the reproductive cycle, current status of the reproductive tract, and the skill level of the individual examiner [1]. Considering the mare's past breeding performance and estimated foaling dates, an assessment of her breeding history record is crucial in deciding whether or not to include the mare in the breeding plan. In addition, the breeder can use this document as a tool for breeding management based on the needs of his farm or stud, whether those need to be for live cover or modern reproductive technologies like artificial insemination or embryo transfer [2].

General Physical Examination:

It centers on the results of standard laboratory tests such the Coggins, Serum Chemistry, Urinalysis, Hematological Analysis, and Fecal Egg Count, as well as the animal's Body Condition Score (BCS) and the presence or absence of any obvious abnormalities that would affect its normal breeding potential [2]. A horse's overall health can be gauged by looking at its body condition, which is mostly determined by its level of fat cover. Using the body condition score (BCS), one may determine whether a horse is underweight, overweight, or at an ideal weight [3]. Horses are given a score between 1 and 9 based on the amount of fat they have stored in six different areas: the neck, withers, tail head, and ribs, behind the shoulder, spinous processes, and transverse processes of the spine [Table 1]. Pregnancy rates increase and the risk of loss decrease in mares with a BCS of 5 or above at the beginning of the breeding season [4].

External Reproductive Examination:

The perineal/breeding conformation is assessed in the external reproductive examination. The anus and vulva should be completely vertical in this. The Caslick's Procedure should be performed on the mare if there is any evidence of tilt. Fecal or urinary contamination of the vagina can lead to pooling of urine, uterine infection, and a difficult foaling. Age, excessive activity (racing), foaling injuries, and genetics all play a role in mares' poor breeding conformation. If a mare has poor breeding conformation, it's not advised to use her for pregnancy. Because the poor conformation can lead to conception/foaling problems [5].

Internal Reproductive Examination:

The evaluation of internal reproductive organs (from vestibule to ovaries) by using ultrasound or rectal palpation method. The trans-rectal palpation is cannot be replaced by the use of ultrasonography. Manual cervical examination is the integral part of the complete vaginal examination. In the estrus, cervix is found swollen and relaxed with collapsing folds. If the reproductive problems are assumed due to the cervical laceration, then the best time for the digital examination for the cervix evaluation is during diestrus approximately 10 days after the ovulation when the cervix should be closed [5]. The examination of the uterus is done for confirming if the mare is pregnant/ non-pregnant, and suffering from endometritis. The palpation of the uterus is also performed for the detection of uterine tone which occurs as a result of ovarian activity during estrus. We can categorize the uterine tone from excellent to poor one but this requires a lot of expertness for a veterinarian [6]. Moreover, the endometrial biopsy can be performed in order to detect any histological changes in the lumen of uterus that can hinder the probability of pregnancy and foaling or cause any infections in the uterus. Normal uterus should be of T shaped and the uterine horns have the shape of cross bars or V. The palpation of the ovaries is an important part for the estrus detection. The structures which can be palpated on the ovary include Follicles (normal/abnormal), ovarian depressions, corpora hemorrhagic (after 4 to 5 days of the ovulation), and ovarian cysts [1]. At this point of palpation, the confusing moment is to differentiate between a Graafian follicle, ovarian tumors, and cysts which is tricky and needs a good level of skill set. Follicle has a soft structure and liquid consistency upon palpation while tumor has uncontrolled growths which can increase from day to day, and cyst has a hard structure which cannot move from one point to other upon palpation. With a number of serial palpations for the uterine tone as well as the cervix and comparison of the current follicular size with the previous sizes in the breeding record along with the previous dates of ovulation we can closely assume the time of ovulation as well if a mare is in estrus. Usually, the breeders perform the BSE around 1 and half month before starting of the breeding season but it varies under different regions of America. The results of a breeding soundness assessment are valid for the duration of the current or upcoming breeding season, providing valuable insight into the state of a horse's reproductive and overall health [7].

Endometrial Biopsy:

The horse endometrial biopsy is the most crucial method for determining a mare's potential as a broodmare in the field of equine reproduction research [Table 2]. A mare's likelihood of becoming pregnant and carrying a foal to term can be inferred from the findings of a biopsy. [8]

To cite this article: Usman CAA, Q Akram, F Ali, H Hayder & H Idrees. The Importance of Breeding Soundness Examination in Mares and Optimal Reproductive Success Procedures. 2(8): 3-4

Score	body Health	Interpretations
1	Very Weak	The poor horse seems terribly thin. Prominent spines, ribs, tail tips, hooks, and pins are also present. The withers, shoulders, and neck bones are clearly defined. There is no discernible fat layer.
2	Very thin	A thin layer of fat covers the base of the spinous processes, and the transverse processes of the lumbar (loin region) vertebrae feel rounded. Spinous processes, ribs, the tail head, hooks, and pins are all visible. The structures of the withers, shoulders, and neck are hardly visible.
3	Thin	The fat builds up halfway on the spinous processes, while the transverse processes are entirely invisible. A thin layer of fat covers the ribcage. The ribs and spinal columns stand out clearly. The base of the tail is clearly visible, but the individual vertebrae are obscured. Hook bones are deceptively rounded in appearance. There is no clear separation between pin bones. The highlighted areas are the withers, shoulders, and neck.
4	Intermediate Thin	The disparity between the spinal cord and the surrounding tissue (a negative crease down the back). One may make clear the faint shape of ribs. The fat around the tail head may be felt; however, depending on the breed, the tail head itself may or may not be visible. No hook bones may be seen. There is no noticeable thinning of the withers, shoulders, or neck.
5	Moderate	Straight back. Although they are invisible to the naked eye, ribs are simple to feel. The fat on my tailbone becomes squishy. The withers have smoothed out over the spines. There is an unbroken continuity between the head and neck.
6	Medium Fleshy	A crease down the back is possible. Ribs with much fat feels like spongy. The padding of fat around the top of the tail is really comfortable. The withers, the area behind the shoulders, and the neck are the first places to show signs of fat deposition.
7	Fleshy	Possible creasing around the back. The ribs themselves can be felt, however there is a substantial amount of fat padding them out. The fatty area surrounding the top of the tail is very fatty and very soft. Excess fat accumulates in the withers, behind the shoulders, and along the neck.
8	Fatty Body	Back crease. Ribs aren't easily palpable. The fat surrounding the top of the tail is particularly tender. Fat accumulates in the flanks and along the withers. Fat accumulates and makes the area behind the shoulder look the same as the rest of the body. The neck has visibly gotten thicker. Inner thigh fat accumulation.
9	Extremely Fatty Body	Visible crease along the spine. Ribs start to get flabby in places. Having extra fat around the neck, shoulders, and withers. Inner thigh fat may rub against each other. There is a lot of fat in the flank, and its level with the rest of the body.

Category	Histological Findings	% Probability of Foaling
I	Normal Uterus with no abrupt changes	80 to 100
IIA	Mild changes; mild fibrosis and lymphocyte infiltration	50 to 80
IIB	Moderate changes; Moderate fibrosis and lymphocyte infiltration	10 to 50
III	Severe changes; Formation of gland nesting would be clear	Less than 10

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