General Examination of the Female Reproductive system

Examination of the genitalia should be part of any rebreeding examination of the maiden female as well as for pre purchase examination of breeding stock. The implications of thorough examination of the reproductive organs are not limited to fertility prognostication or diagnosis of reproductive problems but are also an important part of animal welfare in a breeding operation.

Breeding soundness examination of the female should include history of general health and reproductive performance, behavioral evaluation, general physical examination, and systematic and detailed gynecologic examination. Special examination of the reproductive function requires a thorough knowledge of the reproductive anatomy and physiology. History of the herd and of the individual animal, as well as general physical examination should always be part of the reproductive evaluation of the animal. Physical examination is detailed elsewhere in this text.

History

General and reproductive history is one of the most critical aspects available to the clinician for prognostication of future fertility or diagnosis of the cause of reproductive failure in animals. A history of previous illnesses and treatments is important because of the possible effect on reproductive performance and helps identify females with high-risk pregnancies.

Age

The impact of age on reproductive performance is clear, particularly in maiden and older females. In young females, special consideration should be given to the onset of puberty and the ability to carry a pregnancy to term.

Breeding young or underdeveloped females usually results in a high incidence of early embryonic death, abortion, complications at birth, and compromised reproductive future of the animal.

Reproductive performance decreases with increasing age and number of pregnancies.

Maintenance of a high level of fertility despite advancing age depends primarily on rearing conditions (health and nutrition) as well as adequate reproductive management.

Type of Management

One of the most common causes of reproductive failure is poor management practices, specifically management of breeding. Complete information about management of breeding will allow the clinician to

identify potential management errors or problems that may have a negative effect on fertility. These problems are usually associated with herd size and structure; origin of sires (on farm or external); method of breeding (in-hand mating versus free or paddock mating); criteria for mating; pregnancy diagnosis technique; management of birthing; and postpartum, nutritional, and health management of the herd and play an important role in reproductive efficiency. Obese or very thin animals are at risk of decreased reproduction performance because of lack of cyclicity or increased pregnancy loss.

Evaluation of Breeding Records

Evaluation of breeding records should be done at both the herd and individual levels. Evaluation of herd breeding records allows the clinician to have a clear idea about the fertility in the herd and appreciate the overall level of breeding management and reproductive performance. This evaluation should be as complete as possible. Current breeding records and results of reproductive examination should always be available in an easy-to-read format.

Information Required for Complete Reproductive History on Individual Animals:

1. General breeding history: maiden, primiparous, pluriparous
2. History of previous parturitions:
    - Number
    - Average pregnancy length
    - Number of breeding per pregnancy
    - Neonatal problems
3. Breeding history:
    - Dates of breeding
    - Behavior at breeding
    - Male used for each breeding
4. Previous reproductive problems:
    - Failure to conceive, number of years barren
    - Number of unsuccessful breeding
    - Parturition complications: dystocia, laceration, retained placenta, uterine prolapse
    - Previous diagnosis and treatment of reproductive problems such as uterine infection or failure to ovulate
    - Abortion (including stage of pregnancy) or early embryonic death, diagnosis attempts

Evaluation of Sexual Behavior

Historical and clinical evaluations of sexual behavior should be obtained, whenever possible. Receptivity to the male is a behavior characterized by the female assuming a sitting sternal position (Kush or

crush position). Receptivity to the male is not correlated with follicular dynamics or circulating estrogen levels. However, rejection of the male (spitting, kicking, or running away) is highly indicative of presence of high level of progesterone, particularly in females that have been receptive prior to a mating. This is an inexpensive and relatively efficient method for the verification of ovulation and corpus luteum (CL) formation after mating. The spitting behavior is usually noticed about a week after ovulation and intensifies within the first few weeks of pregnancy.

Examination of the Vulva and Perineum

The examination of the perineal region is usually done on the female restrained in stocks or in a sitting position. The vulva should be inspected for any discharge, lesions, and abnormal size and conformation. In aged or very thin animals, the labia may lie in a more horizontal plane. Also, the normal vertical conformation of the vulva is lost if scar tissue from previous birthing injuries is present or in the presence of congenital abnormalities. In old pluriparous animals, the vulva tends to lose its tone and becomes slightly parted in its ventral aspect.

FIGURE Normal Conformation of the Vulva .**A,** Llama. **B,** Alpaca. Note the small perineal body and the prominent clitoris.

FIGURE Abnormal Conformation of the Vulva.**A,** Tilted vulva. **B,**Third-degree rectovaginal tear. **C,** A bnormal appearance in an intersexed animal.

- The vulva may become slightly edematous when a mature follicle is present, particularly in maiden females or after mating. Perineal relaxation and vulvar elongation are observed normally in the last 2 to 4 weeks of pregnancy. In postpartum females, examination of the vulva is critical for the detection of traumatic injuries that may be life-threatening. Normally, the vulvar and perineal conformation return to normal within a few days of normal partition of a recent abortion.
- Abnormal size, as in vulvar atresia or stenosis, and position of the vulva in maiden females may occur in cases of congenital problems or in cases of intersexuality.

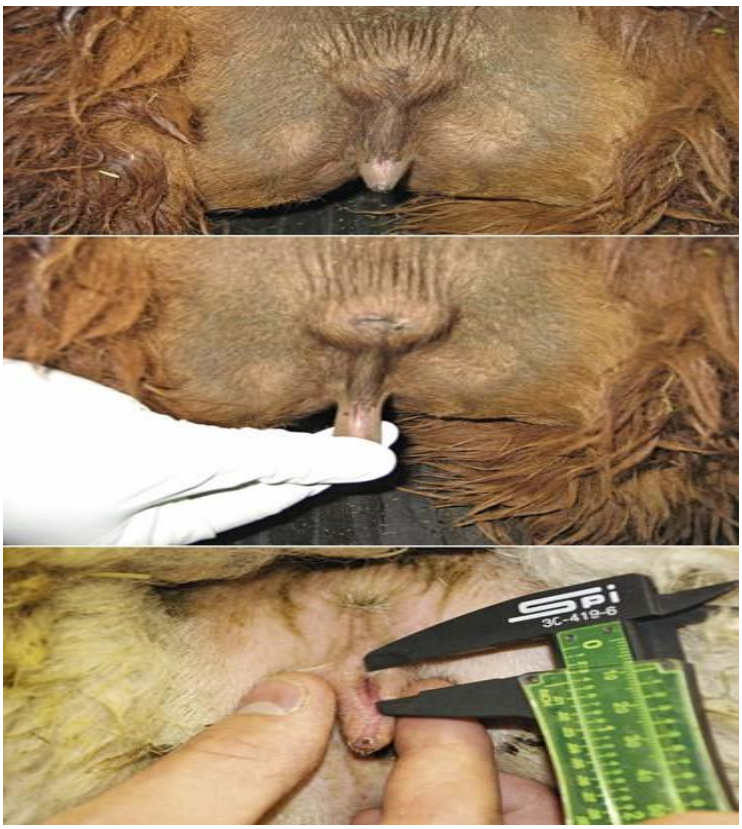

FIGURE Vulvar Atresia.Small vulvar opening is a common problem in llamas and alpacas. It is important to document the problem by measuring the vulvar opening and verify that no associated vaginal aplasia or persistent hymen exists. Other urinary tract problems have been associated this problem.

- The most common lesions of the vulva and perineum are caused by complications during breeding or parturition (abrasions, laceration, and hematoma), especially in primiparous females.

- Examination of the external genitalia in the female should be completed with the inspection of the vestibulum and the clitoris. This allows observation of the color of the mucosa, the size of the clitoris, and the presence of discrete discharge.

FIGURE Abnormally long clitoris

Examination of the Udder

The conformation of the udder is judged by evaluating the number of teats and the size, shape, and symmetry of the gland. The gland is better evaluated when the animal is lactating. Supernumerary teats are an undesirable trait. Inspection and palpation of the udder may reveal acute or chronic mastitis. Sedation may be necessary, especially if the mammary gland is swollen and painful at palpation. Abscesses of the udder skin or the glandular parenchyma are not uncommon and may be detected by palpation of the udder and confirmed with ultrasonography. Acute mastitis is also accompanied by hypertrophy of the mammary lymph nodes. In old females, dry quarters are usually a cause of untreated chronic mastitis. Abdominal and udder skin often presents areas of keratinization that should be differentiated from mage lesions.

Transrectal Palpation of the Nonpregnant Female

Transrectal palpation of the internal genitalia offers a great advantage for diagnosis of reproductive disorders, when possible. Per-rectum palpation of the reproductive tract is readily performed in large animals but is limited by the size of the operator's hand in small animals. The practitioner should practice as much as possible to develop this skill because it facilitates other examination techniques such as

ultrasonography, uterine biopsy, or cervical catheterization for embryo recovery and transfer.

Clinicians should exercise extreme caution and clearly communicate to clients the risks of transrectal palpation. (1) Rectal tears or colonic injuries have been reported following excessive manipulation of the rectal wall during palpation or ultrasonography. (2) Other problems commonly encountered during per-rectum palpation include bleeding from the anal sphincter or irritation of the rectal mucosa, which can become severe and even lead to partial rectal prolapse. If irritation is severe, we usually start a prophylactic anti biotherapy.

- Palpation of the genital organs starts at the cervix and continues to the uterine horns, broad ligaments, and ovaries. Experience with bovine and equine species makes learning the technique in camelids easier.

The cervix may be felt by the hand positioned flat on the pelvic floor. The cervix is difficult to differentiate from the uterine body in open females during the follicular phase. The cervix is tight and short during the luteal phase and during pregnancy. Cervix location changes to a more abdominal location beyond 4 months of pregnancy. Lack of cervical tone is often caused by the absence of follicular activity resulting from acquired anestrus or ovarian hypoplasia.

The uterus is often described as being "T" or "Y" shaped, with the horns curling slightly downward and backward at times, and may lie inside of the pelvic cavity or just at the brim of the pelvis in open females.

- The parameters recorded during palpation of the uterine horns are size, consistency, tone or contraction, and content. The nonpregnant uterus is always retractable, and the uterine horns are freely movable. The uterus is retracted by gently grasping it in a cupped manner at the level of the bifurcation and then flipping it dorsally.
- Length and diameter of the uterine horns are variable and depend on the age of the animal and number of pregnancies. However, the left horn is invariably larger than the right horn particularly in pluriparous females.

- Increased size of the uterus in the absence of pregnancy may be attributed to collection of fluid in the uterine cavity (pyometra or mucometra) or incomplete postpartum uterine involution. Accumulation of various amount of fluid may be caused by congenital abnormalities (cervical or vaginal aplasia).
- Thorough palpation of the uterine horn may sometimes reveal localized pathologic processes such as periuterine or intrauterine abscesses, and periuterine adhesions.

Transrectal Ultrasonography of the Genital Tract

Ultrasonography is widely accepted as the technique of choice for a thorough examination of the genital tract in small animal. In the hand of a trained clinician, this technique is extremely useful for monitoring of ovarian function and diagnosis of several abnormalities of the reproductive tract. In addition, ultrasonography allows an early pregnancy diagnosis and monitoring of fetal well-being.

Ultrasonographic examination of the ovarian structure, the uterus, and their relationship to each other at different stages of the cycle has allowed better and more efficient management of breeding.

Ovaries

When thorough examination of the uterine horns is complete and the cow has been determined to be non-pregnant, or is pregnant but there is concern that there has been fetal death, one may proceed with palpation of the ovaries. Palpation of the ovaries in the normal, pregnant cow is not recommended because it may induce luteolysis and subsequent loss of the pregnancy. The ovary is located by finding it in relation to the tip of the uterine horn, or by recapturing the broad ligament and locating the ovary which is suspended by the mesometrium. Once the ovary is found, it is held so that the ventral "free" border faces dorsally, while the dorsal "attached" border rests in the hand, placing the mesovarium between the middle and ring fingers. The surface of the ovary is then explored using the forefinger and the thumb, allowing the examiner to evaluate ovarian size, consistency, presence of functional structures, and any abnormalities. Characteristics of the ovary vary between ovaries in the same individual, and between individuals, ages, and breeds. In the prepuberal heifer, the ovaries are small and smooth. Some increase in ovarian size is associated with developing follicles, but the greatest changes in sizes are due to the presence of the corpus luteum. If an ovary is found to be abnormally large, this may be due to a follicular or luteal cyst or to neoplastic change