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Chris graduated from the Royal Veterinary College in 2005. He then spent a year in first opinion practice in Gloucestershire before undertaking an 18-month internship at RosSDales. This was followed by a stud internship under the supervision of RosSDales' former Senior Partner, Professor Sidney Ricketts. He subsequently completed a southern hemisphere stud season at Windsor Park Stud in New Zealand. Chris is currently a reproductive and ambulatory veterinary surgeon at RosSDales and spends much of his time undertaking artificial inseminations (AI) with fresh, chilled and frozen semen at a large local AI stud. He is additionally involved in embryo transfer procedures at RosSDales Equine Hospital and, together with colleagues who specialise in reproductive techniques, he has developed the practice's semen freezing service and the Defra-approved dedicated semen freezing laboratory. In 2011, Chris was awarded the prestigious Certificate in Advanced Veterinary Practice, focusing on equine soft tissue surgery, by the Royal College of Veterinary Surgeons (RCVS). He is particularly interested in stallion reproduction, especially sub-fertility examinations, and is planning to help further develop this area of the practice.


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Artificial Insemination

By **Chris Phillips** BVetMed, CertAVP, MRCVS



Frozen-thawed semen must be inseminated immediately before (within 6 hours) or after (within 4 hours) of ovulation.

Although not permitted in breeding Thoroughbreds, artificial insemination (AI) has in recent years become a very popular and routine procedure for breeding sports and heavy horses.

Health and safety benefits are well recognised and conception rates with fresh or chilled semen can often equal or exceed expectations from natural service.

The process involves monitoring the oestrus cycle of the mare to be bred and inseminating her close to ovulation with either freshly collected semen, fresh chilled semen or frozen semen. Successful AI depends on a detailed understanding of the mare's oestrus cycle, a comprehensive understanding of the mare's breeding history and in some cases the use of advanced reproductive techniques.

Before launching into breeding from a mare, new breeders should consider the reasons for breeding from their favourite animal and how they are going to manage the

pregnancy, birth and rearing of the foal. It is well worth seeking advice from experienced breeders, breed societies and veterinary surgeons. Breeding can be a costly endeavour. It's worth setting a budget based on three oestrus cycles when committing oneself to such a venture.

Initial assessment

Before breeding your mare, a full reproductive examination should be carried out by your veterinary surgeon to assess her suitability for breeding and to highlight any potential problems. A full reproductive history of the mare is very useful, as this will enable prompt initiation of treatment prior to or after insemination if required. If insemination is to be performed at an AI centre, often clitoral swabs for contagious venereal disease will be required alongside blood samples for infectious disease prior to entering the centre. This is a routine requirement for all major insemination centres across the



country.

An initial reproductive examination will allow assessment of the stage of your mare's oestrus cycle and will determine timing of repeated examinations prior to insemination. Your veterinary surgeon may take an endometrial swab and smear from your mare at this stage to determine whether there is a requirement for pre or post breeding intrauterine treatment such as antibiotics.

Follicular activity is followed closely alongside other parameters and when the follicle has reached a suitable size for breeding, hormones will be given to induce ovulation.

Fresh, chilled or frozen semen?

Semen may be available either fresh, chilled or frozen and management of the mare and timing of insemination will be

determined by which semen is chosen. For fresh or chilled semen, conception rates are highest when insemination is performed within 24 hours preceding ovulation. Frozen-thawed semen has a relatively short life span and therefore requires that mares be inseminated immediately before (within 6 hours) or after (within 4 hours) ovulation. Subsequent management of mares for insemination with frozen-thawed

semen is more intensive and mares require multiple ultrasound examinations to assess the correct time for insemination. Per (oestrus) cycle conception rates for mares using frozen-thawed semen are often lower and therefore ideally this should be reserved for mares with the best reproductive histories. Insemination with chilled semen requires good communication with the stallion stud so that semen is delivered on time. Beware of bank holidays and weekends when using commercial courier services!

Semen Collection and Processing

Semen is collected from the stallion by the use of a temperature controlled artificial vagina. The collection is performed with the use of either a 'phantom' or 'live' mare. If a live mare is used, she will stimulate the stallion, who will then be allowed to mount her. Once the stallion has mounted, the stallion's penis is inserted into the artificial vagina which has been warmed to an internal temperature of approximately 44 degrees Celsius. The stallion then ejaculates into the artificial vagina and the semen is taken to the laboratory for processing. Many stallions can be trained to mount a phantom mare without requiring prior stimulation by a live mare.

Once in the laboratory, the gel fraction is removed from the sperm-rich portion of the ejaculate. The sperm is examined under a microscope for motility (movement), as well as for any obvious abnormalities. The

concentration of sperm cells is then determined. A warmed extender or substitute carrier is then added to the semen sample to maintain its viability. The extended sample is then either divided into doses and distributed for insemination, or is further processed if it is to be frozen. It is very important to prevent large temperature changes of the collected semen. Temperatures that are either too hot or too cold will affect the viability of the sperm and may even kill it, resulting in the loss of its fertility. Overexposure to direct light will also damage sperm cells.

Insemination

When your mare is ready for insemination, her perineum and vulva should be thoroughly cleaned and the semen should be prepared. Using a sterile glove, the semen is inseminated through the vagina into the uterus via a uterine catheter. Semen may be deposited into the uterine body or into the horn of the uterus on the side where the ovulation will occur by deep intrauterine insemination. Occasionally advanced techniques such as low dose insemination or endoscopic guided insemination are used. This is mainly performed in either problematic mares or mares where only a small volume of semen is available.

Following insemination

Following insemination, your mare will be checked for ovulation and for post-breeding inflammation in her uterus. Such inflammatory responses are more likely when frozen semen is used. Treatment may be required following insemination, especially



Chris Phillips performing a deep horn insemination in a mare at RosSDales Equine Hospital

in older or problematic horses. Providing all is well, your mare will be scanned at 16 days following ovulation and if pregnant, it is advised that scans be performed at 28 and 45 days to make sure the pregnancy is developing normally and to avoid missing the presence of twins. An older or problematic mare may require treatment to maintain her pregnancy. Supplementing the mare's diet with daily doses of artificial progesterone (Regumate) is thought to have a supportive effect on the pregnancy in some cases.

Problematic mares

Maiden mares, older mares or mares with predisposing reproductive problems may find it very difficult either to conceive or maintain their pregnancy. Advanced techniques may be required in these cases prior to, during and following insemination. These might include repeated uterine treatments with sterile saline fluid and antibiotic solutions accompanied by stitching of the vulva to prevent infections entering the reproductive tract. These cases can often be hugely time consuming and costly, however, if successful, they are usually the most rewarding to get in foal.

Code of Practice

The British Equine Veterinary Association (BEVA) provides a list of equine practices that comply with the 'BEVA Guide to the Use of Artificial Insemination in Horse Breeding' and their facilities



Semen is collected from the stallion in an artificial vagina