The successful transcervical insemination
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Endoscopic transcervical insemination (TCI) was pioneered by Marion Wilson about ten years ago. Dr. Wilson recognized TCI as a viable technique and noted that “the learning process will be discouraging”. With knowledge of the anatomy and hand/eye coordination the procedure is rapidly and easily performed. Requirements for the procedure are a rigid endoscope with sheath, a light source, and a video camera. The video camera is an integral part of the procedure and any money saved in not buying a camera will be dramatically offset by the difficulty in performing the procedure. The camera allows for rapid and much more radical movement of the endoscope during the procedure.

We utilize a cart with the light source, camera and viewing screen adjacent to the procedure. The use of a 13-inch or larger flat panel television is excellent and will provide a view of the procedure from many feet away. Extremely large dogs are positioned on a rug on the floor and the clinician is seated behind the dog on a low chair. Smaller dogs are on an examination table with a rug and the clinician is standing behind the dog. This positioning allows the clinician and observers full view of the procedure and the video screen.

Transcervical insemination has been shown to be an excellent and rapid insemination technique in the canine. Studies have also been done that show that conception may take place as much as 200 hours after cervical closure. Once mastered, the clinician will have the ability to do the procedure with average time of five minutes or less.

Ovulation is timed in almost all bitches that we breed by serial measurement of progesterone and when frozen semen is to be used we will also measure luteinizing hormone (LH). Pinpointing the ovulatory surge of LH will give a greater degree of accuracy for frozen semen breeding. The bitches will be in standing heat and are receptive to insertion of the TCI endoscope. With the fractious bitch we may use acepromazine or dexmedetomidine in extremely low doses. Very little sedation is required to have a bitch in heat stand without heavy restraint. However, this has only been needed in fewer than ten bitches out of over 2500 breedings.

We use a non-spermicidal jelly on the endoscope and only use enough for ease of insertion. The sheath extends beyond the end of the endoscope allowing for visualization during insertion and insemination. The sheath does not cover the forward or dorsal view of the endoscope because most have a $30^\circ$ angle facing dorsally. A caudal dorsal approach to the vestibule is done for two reasons; the first is to keep the tip of the endoscope away from the clitoral hood that is very painful if pressure is applied, the second reason is to keep the end of the endoscope clear of contamination for better visibility. The endoscope is inserted until it contacts the dorsal aspect of the vestibule and is then rotated upright and inserted over the pelvis in a cranial dorsal direction. When the endoscope has cleared the pelvis the insertion is continued in a cranial ventral motion. The vaginal folds may be examined for crenulation and the insertion is continued cranially. The vaginal vault may be widely dilated or collapsed depending on the bitch. When dilated the insertion to the level of the dorsal median fold is very easy; if collapsed, the endoscope is advanced carefully trying to find the most direct route to the cranial vagina and the dorsal median fold.

As the endoscope approaches the cranial vagina the dorsal median fold will become apparent. The dorsal median fold is a singular fold dorsally in the cranial vagina that is in a cranial caudal linear position and is the landmark for access to the area of the cervix. The cranial vagina will narrow significantly ventral to the dorsal median fold and may cause difficulty with insertion of the endoscope. The smaller diameter endoscopes will have little problem, the larger endoscopes may need rotation and gentle pressure to pass this narrow area to the cervix. The fold is followed and a fissure will be seen dorsally as the start of the cervical tissues. The cranial vagina enlarges again at the cervical os giving room for manipulation of the cervix with the tip of the endoscope. Identification of the cervix is necessary to prevent further advancement of the endoscope to the level of the fornix. The fornix is the
cranial ventral end of the vagina and pain is caused if the endoscope is advanced to this area with even small amounts of pressure.

The cervix is easily identified and may be flat or be significantly pediculated extending into the cranial vagina. The cervix will have a very different appearance from the vaginal tissues and dorsal median fold. The surface will have a rounded “brain coral” appearance with many small folds and, in some cases, what appear as deep fissures around the cervical os. The canine cervical os varies dramatically in position and may appear in any position from straight caudal to straight ventral. Deviation of the cervical os to the right is often caused by a full bladder or colon and may cause inability to catheterize the cervical os. When attempts have failed to catheterize the cervix the endoscope is removed and the bitch is taken outdoors to void urine or feces. Evacuation of the bladder and/or colon will frequently leave the cervical os in a much more accessible position. Insertion of the catheter is also extremely difficult in the bitch with a pediculated cervix.

The tip of the endoscope is used to manipulate the cervix into proper position for catheterization. Wide movement at the operator end may be necessary for proper cervical alignment. We use 8 French 56 cm polypropylene catheters (Sovereign®, Kendall, Mansfield, MA) for almost all inseminations; the cost savings are significant compared to endoscopes needing specialty catheters. In smaller breeds we use a rhinoscope with a 5 French catheter. The cervical os needs to be positioned just dorsal to the viewing area because the catheter is in the channel of the sheath dorsal to the lens of the endoscope. Manual abdominal palpation may also be used to help position the cervix if mobility is a problem.

Sovereign® catheters have a rounded tip with two opposing openings 0.5 cm apart at the end of the catheter. The catheter is inserted in the cervical os to the level of the second opening and the syringe containing the semen is attached. All semen samples to be used are centrifuged (Semen Separating Solution™, Synbiotics, Kansas City, MO) and extended (Fresh Express Extender™, Synbiotics). The total volume is never more than 2 cc and is 1cc to 1.5 cc for smaller bitches. The uterus has a very small lumen and larger volumes of semen may reflux into the cranial vagina or may be lost completely. After the syringe is attached to the catheter the semen column is advanced to the level of the cervix allowing the air in the catheter to escape into the vagina instead of into the uterus. When the semen is at the level of the cervix the catheter is then inserted into the uterus and the semen is slowly introduced into the uterus. During insemination the cervical os is observed for leakage of semen. When leakage is noted decreased pressure is applied to the semen column and the catheter is inserted further into the uterus when possible. When the air column replaces the column of semen at the cervical os it is indicative that all semen is in the uterus. The catheter is left in place and the endoscope is moved caudally into the vaginal vault. The catheter is then removed from the cervix while removing the endoscope from the vagina. Removing the endoscope before the catheter allows the cranial vagina to collapse around the cervix and may help prevent retrograde movement of the semen.

The difficulties encountered during TCI are usually related to the inability to find the cervix or inability to catheterize the cervix when it is visible. Finding the dorsal median fold is crucial to finding the cervix and repeated vaginal examinations will make this a very simple part of the procedure. Once in the vagina the advancement of the endoscope in a cranial ventral direction will assist in progression to the dorsal median fold. In some bitches vaginal and uterine fluids will accumulate in the cranial vagina or in the vestibule at the cervix. This fluid may be removed by suction with a syringe attached to the catheter but in some cases the fluid may need to be flushed out for visibility. We use a 60 cc syringe filled with 0.9% saline and flush the cranial vagina then aspirate the remaining fluid. Visibility is dramatically increased and the saline solution will not harm the extended semen. The catheter may be changed after flushing if needed. We have encountered several dogs in which the vaginal diameter at the dorsal median fold is too narrow for advancement of the endoscope necessitating that the semen be deposited at the cervix. These dogs have not have problems with delivery likely due to relaxin levels at term.

Movement of the cervix with the endoscope is often needed for catheterization. It is important to find the cervical os before starting any manipulation of the cervix. After the endoscope is in contact with the ventral aspect of the cervix it is retracted slightly to relieve pressure on the cervix allowing the tip of the endoscope to be used for manipulation of the cervix in a dorsal direction. In some cases the
manipulation of the cervix will require large range of movement on the camera end. In these cases the camera is critical because of the limited motions allowed when viewing with the eye. If the cervix will not move into position in a relatively short time the endoscope may be retracted to the middle of the dorsal median fold and then turned or aimed to either side to assist in the proper approach to the cervix. With endoscopes that will accommodate the 8 French catheters it is possible to place a 90° bend in the catheter about 5 to 8 cm from the tip. The bend is made using heated olive oil in a small container and the tip of the catheter is cut with 0.5 to 0.8 cm of catheter remaining beyond the bend. The olive oil is heated until the catheter will bend but not melt. The catheter will retain the bend after being forced though the inlet on the endoscope allowing the curved end to be rotated while at the cervix. The curve will readily advance into the cervical os. When the catheter is in the cervix a 5 French catheter is placed through the 8 French catheter and advanced into the uterus for insemination.

We have found that certain breeds are very easily catheterized; German Shepherds and Bull Mastiffs may be the best for training while Labrador Retrievers may be among the most difficult. Transcervical insemination is a very simple procedure once the clinician is comfortable finding landmarks and manipulating the cervix. The fear of failure in cervical catheterization may make many clinicians reluctant to do the procedure with owners present. You have invested in the endoscope, camera and all necessary equipment to do TCI work but are worried you cannot catheterize the cervix. Tell your breeders that you will do the TCI for the same fee as a vaginal artificial insemination until you are comfortable with catheterization of the cervix in most of your cases. Have the assistant watch the clock and take only five to ten minutes for the procedure, if the catheter is not in the cervix by that time inseminate at the cervix. You will have provided the client with an excellent vaginal insemination at the least, and with a full TCI at the best, providing yourself with valuable training. Marion Wilson is correct that “the learning process will be discouraging” but repetition will lead to confidence and success.

References
5. Synbiotics Corporation 12200 NW Ambassador Drive, Suite 101 Kansas City, MO 64163; http://www.synbiotics.com/