

Technique Report

Fetotomy: a declining art in theriogenology?

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Abstract

During my professional career in practice and as an educator, I have been convinced that fetotomy is an essential skill that should be taught in academia, and is a very important skill for large animal veterinarians to be effective in dealing with dystocias. Fetotomy has a definite role in theriogenology, a procedure that can save a dam's life. On many occasions on a dead fetus, fetotomy was used as a last resort to relieve dystocias. Extensive manipulations and force used on these fetuses prior to performing fetotomy resulted in variable outcomes. Furthermore, due to unfavorable results, veterinarians have moved away from performing this procedure. Selection of cases to perform fetotomy on a dead fetus is a very important decision that should be made earlier in clinical situations. Additionally, on numerous occasions, fetotomy is performed with lack of availability of essential instruments to perform this procedure effectively and safely, limiting probability of a good outcome. Presently, many veterinary schools no longer teach, demonstrate, or provide hands-on instruction on fetotomy to students. Fetotomy is an essential skill in theriogenology that must be developed and performed effectively to have a positive outcome. Not all dystocia cases need fetotomy; however, cases are chosen early in the decision process once determined that the calf is not viable.

Keywords: Cattle obstetrics, dystocia, dead fetus, fetotomy

Introduction

Fetotomy could be classified into subcutaneous and percutaneous fetotomy. Subcutaneous fetotomy was developed in the latter part of the 18th century, much earlier than the percutaneous fetotomy. Subcutaneous fetotomy or 'skinning' the fetus was mainly performed on oversized fetus in a cranial or anterior presentation dorsosacral position with front limbs extended. This procedure reduces the diameter of the thorax and enables the relief of dystocia. Subcutaneous fetotomy can only be performed on forelimbs due to scapular attachment to the body. Most often subcutaneous fetotomy is performed on 1 limb, occasionally on both forelimbs. Recently, it was described in detail with very good illustrations.¹

In the early 1900's, subcutaneous fetotomy was gradually replaced by percutaneous fetotomy, now commonly referred as 'fetotomy'. Availability of specific instruments that were able to reduce the size of the fetus made fetotomy more practical. Fetotomy gained popularity in 1930's in theriogenology after the development of caudal epidural anesthesia. It became more popular after the 50's with the availability of better instruments and the ease to perform this procedure

effectively. Fetotomy technique has been described, taught and practiced.²⁻²³ Goal of this report is to consolidate this previous information with a list of fetotomy instruments, describing patient preparation and methods of fetotomy and modifications.

Instruments

1. Utrecht fetotome
2. Wire threader with a brush
3. Wire handles - 2
4. Wire - need at least 2 rolls; change the wire after 1 or 2 cuts
5. Wire introducer
6. Gunther's finger knife
7. Krey-Shottler hook
8. Chain - 2 (60 inches)
9. Chain handles - 2
10. Head snare - cable snare
11. Fetotomy knife or scalpel blades (#22)
12. Lubricant - lube, mineral oil (vaseline for a dry fetus)
13. Calf puller
14. Stainless steel bucket with disinfectant
15. Stomach pump and a nasogastric tube for lubricant
16. Palpation sleeves

Patient preparation

Restraint of the dam

Preferably in a chute with sides open; 90% of cows or heifers will go down during delivery by manual traction, when hips are getting engaged to the pelvic inlet.

Epidural anesthesia

2% lidocaine (5 ml/1,000 lbs).

Relaxation of uterus

Subcutaneous or intramuscular epinephrine (10 ml [1 mg/ml]/1,000 lbs); animals weighing > 1,000 lbs, not > 12 ml.

Evaluation of dam

Vaginal examination is performed to evaluate if the cervix is dilated, calf is alive or dead and to determine fetal presentation, position and posture.

Decision

Live fetus

Cranial presentation

Second stage begins once chorioallantois breaks and lasts for ~ 30 minutes to 2 hours; longer in heifers (may go up to 4 hours).

Traction

Four tests for delivery in the cranial presentation (head, 1 shoulder, other shoulder and hips)

First test: determine if head will enter pelvis once forelimbs are extended with elbows at the pelvic inlet/brim

Second test: can 1 shoulder be brought into pelvis

Third test: can the other shoulder be brought into pelvis
Decision for **cesarian surgery** must be made before hip gets engaged into pelvis

Fourth test: can hips enter pelvis to prevent hip lock

Caudal presentation

Second stage of parturition is markedly shorter than cranial presentation, due to umbilical cord or navel engagement in the pelvic canal.

Traction

Tests for delivery; 4 tests for delivery (hips, last rib and shoulders)

First test: determine 1 hip and stifle entering pelvis is possible

Second test: determine entry of opposite hip and stifle into pelvis is possible

Third test: determine last rib entry into the pelvis is possible

Decision must be made to **perform cesarian surgery** if fetus is alive and if last rib entry into pelvis is not possible

Cesarian surgery

Live valuable, oversize and fresh fetus, lack of space between fetus and pelvis.

Dead fetus

Traction and avoid the obstacles.

Fetotomy

Dead, emphysematous, or fetus with postural defects and dam having signs of septicemia.

Subcutaneous fetotomy

Steps

1. Chain placed on 1 forelimb
2. If the head is an issue to perform subcutaneous fetotomy on the forelimb, head maybe removed (Figure 1) with a necropsy knife
3. Fetotomy knife or scalpel blade on a handle may be used
4. Make a deep **longitudinal incision** from the scapula caudally to the fetlock joint (Figure 1 and 2)

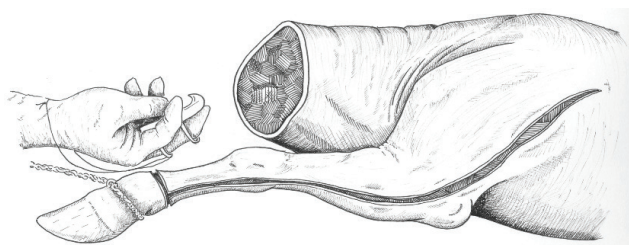


Figure 1. Fetal head removed using Gunther's finger knife and forelimb skin incised (note; location of chain)



Figure 2. Incised forelimb (note; location of chain)

5. Separate skin as wide from the incision was made. Blunt dissection around the incision utilizing fetotomy knife, pocket knife, scalpel blade, chisel etc., can be used to separate the skin from the underlying tissues
6. Make sure the skin is separated away from the underlying tissues
7. Separate skin all the way around elbow and knee joints (**very critical**)
8. Make a **circular incision** around the fetlock joint connecting to the longitudinal incision made earlier
9. Use manual traction or use of fetal puller to the chain applied on the limb, will separate the skin from the underlying tissues bone and joints, depending upon the decomposition of the tissues. Manual traction or use of fetal puller is applied to the limb to deglove the leg. Very rarely second forelimb is skinned.
10. Once skinned limb is degloved, thorax size is markedly reduced. Traction could be applied to the opposite limb and rest of the fetus is removed
11. Subcutaneous fetotomy¹

Percutaneous fetotomy

In the mid 90's a slight variation to the above procedure was developed by the author and colleagues at Oklahoma

State University with 3 or 4 cuts (Figures 5-13) and placement of the fetotome on the fetus. The key in this technique is placement of the head of the fetotome and wire for proper cuts in reducing fetal diameter; some evisceration may be necessary. It is very important plenty of lubricant is used, and if the fetus is very dry, vaseline is applied around the dried fetus followed by liquid lubricant, to prevent the wire from breaking frequently. Placement of the head of the fetotome is time consuming but is a very important to reduce the size of the fetus and remove the obstructive part of fetus when coming out through the birth canal with no sharp bones.

In general, partial fetotomy is preferred (rarely total or complete fetotomy is performed) to relieve a dystocia; however, decision must be made earlier to proceed with the fetotomy or cesarian surgery. If the fetus is dead, cervix dilated and the dam is not a good candidate for a cesarian surgery, fetotomy is performed with fewest cuts possible. Communication with the client regarding the status of the reproductive tract, any tears to the birth canal and the condition of the dam should be discussed. There have been few cases where the client decides not proceed with fetotomy or cesarian surgery, due to the prognosis, economics, dam's condition and welfare; dam has to be euthanized in such cases.

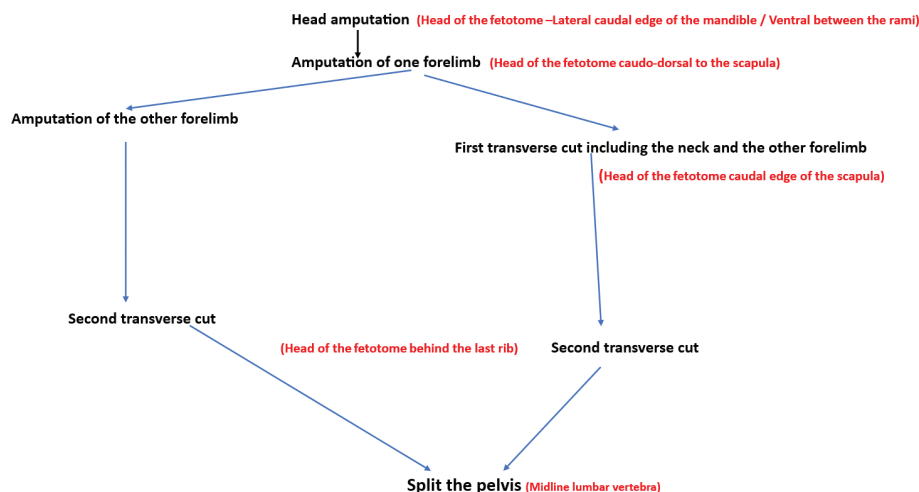


Figure 3. Flowchart for a fetus in a cranial presentation, dorsosacral position, with fore limbs extended between the head²

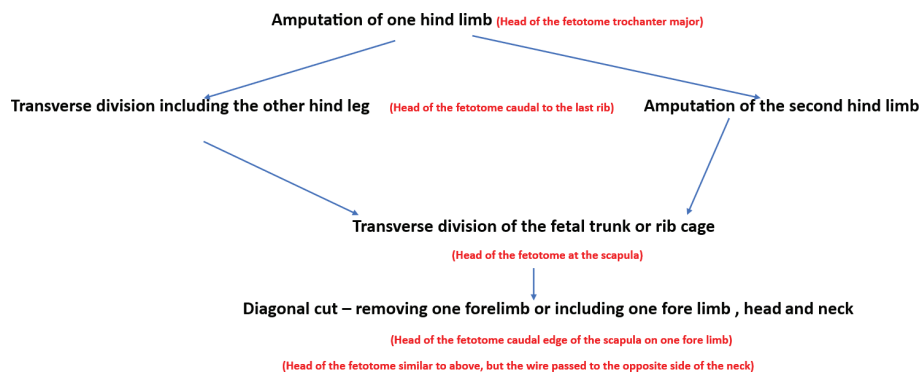


Figure 4. Flowchart for a fetus in caudal presentation, dorsosacral position, with hind limbs extended²

Summary of variations in a cranial presentation, dorsal-sacral position with extended forelimbs (Figures 5-9)

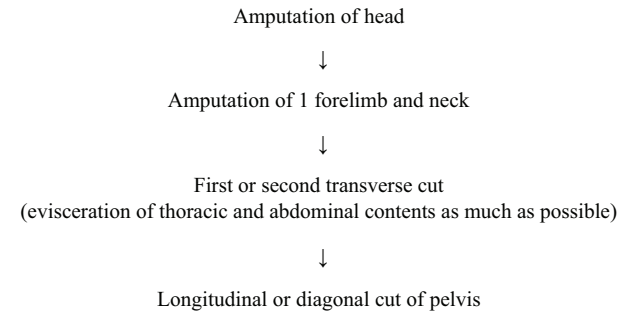
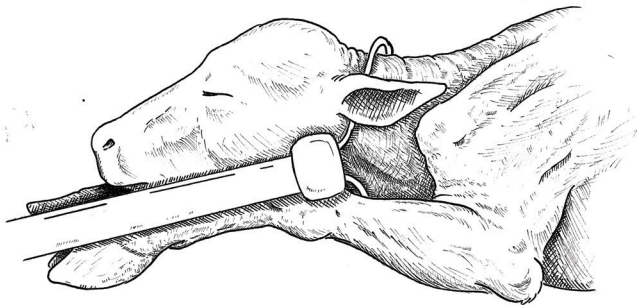


Figure 5. Head amputation in extended forelimbs; note placement of fetotome head (lateral or ventral on the mandible)

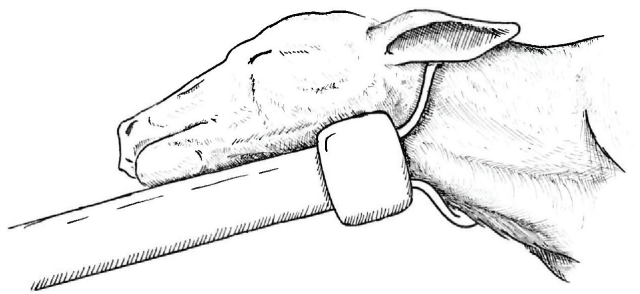


Figure 6. Head amputation; note placement of fetotome head (lateral or ventral on the mandible)

Summary of variations in caudal presentation, dorsal-sacral position with extended hindlimbs (Figures 10-13)

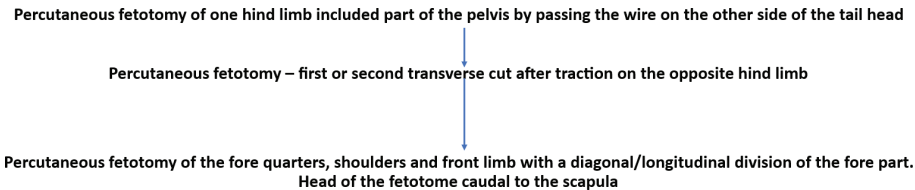


Figure 10. Flowchart of percutaneous fetotomy for a fetus in caudal presentation, dorsosacral position, with hind limbs extended; note the order of cuts

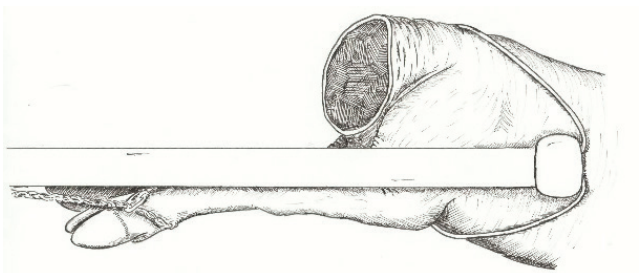


Figure 7. Forelimb amputation; note: fetotome head (caudo-dorsal edge of scapula) with the wire on the opposite side of the neck

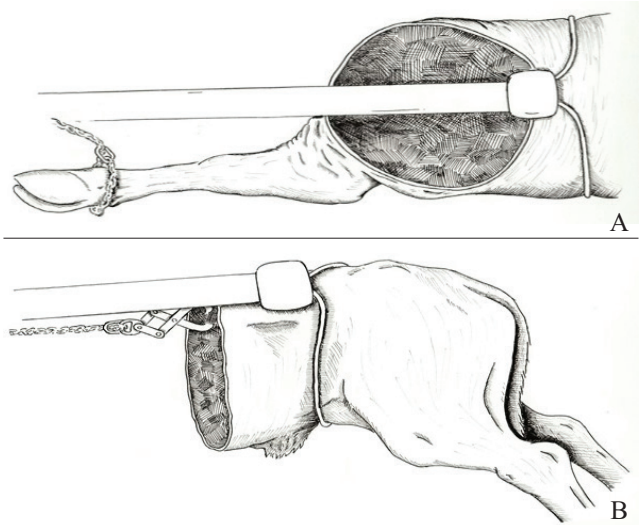


Figure 8. First traverse cut and second transverse cut, depending on fetal size, with part of the thorax removed, with traction on the opposite forelimb; note fetotome head (caudal edge of scapula for the first cut and caudal to last rib for the second cut, respectively) and Krey-Shottler hook (with chain) attachment

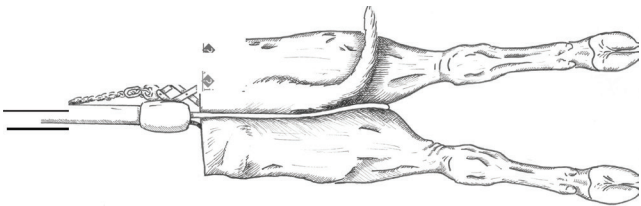


Figure 9. Longitudinal division of the pelvis; note fetotome head (midline lumbar vertebra) and Krey-Shottler hook (with chain) attachment

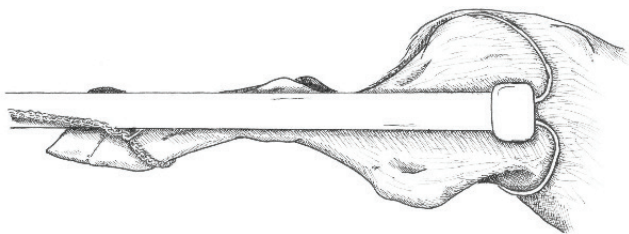


Figure 11. Removal of 1 hind limb; note fetotome head (greater trochanter of 1 hindlimb, with the wire on the opposite side or going on the other side of the tail head)

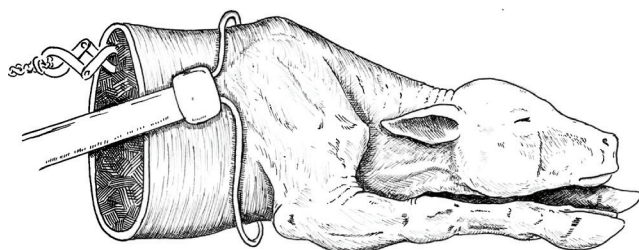


Figure 12. Removal of abdomen (first transverse cut); note fetotome head (caudal to last rib) and removal of thorax (second transverse cut); note fetotome head (or caudal to the scapula)

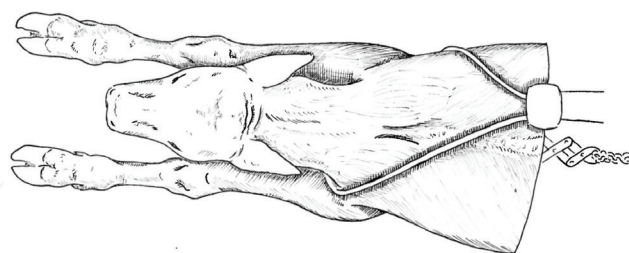


Figure 13. Removal of shoulders and forelimbs note: fetotome head (caudal to the scapula on one side, and the wire going on the opposite side of the neck or head on the mid line)

Fetotomy for postural deviations are provided (Figures 14-19)

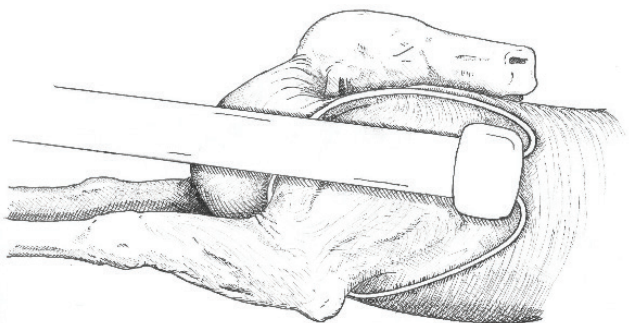


Figure 14. Amputation of 1 fore limb

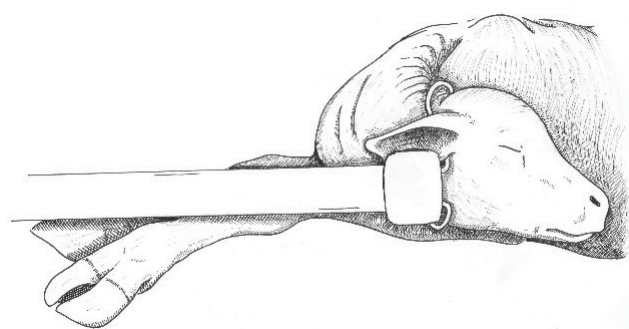


Figure 15. Amputation of deviated head; remove forelimb (note fetotome head [caudal to scapula] and then remove head (note fetotome head [lateral or ventral of mandible])

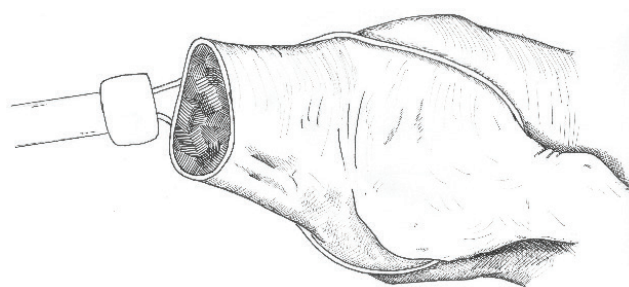


Figure 16. Amputation of flexed shoulder; note fetotome head (opposite side of the neck and the wire going around the limb with a flexed shoulder)

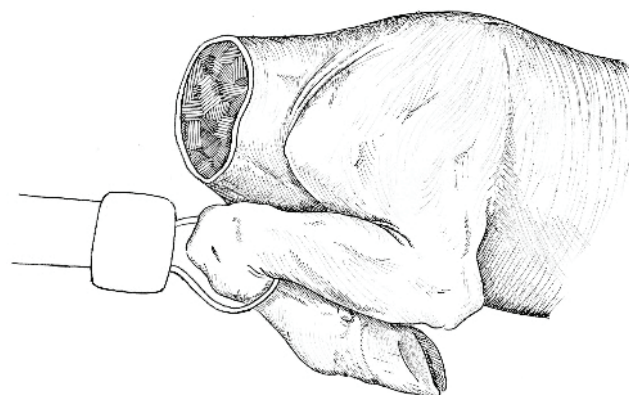


Figure 17. Amputation of flexed carpus; note fetotome head (on the flexed carpus)

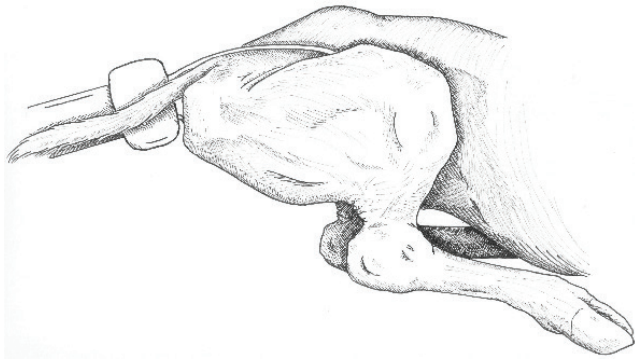


Figure 18. Amputation of flexed unilateral/bilateral (breech) hip; first step: removal of hip; note fetotome head (between the tuber ischium on the opposite side of tail head); refer (Figures 10 and 11) for subsequent steps

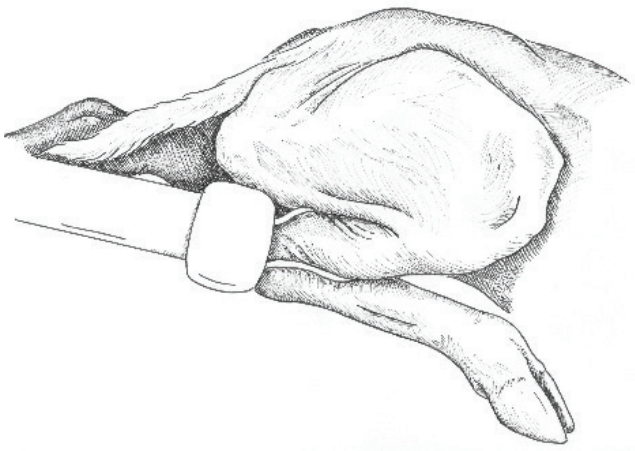


Figure 19. Removal of flexed hock; note the head of the fetotome placed below the flexed hock; refer (Figures 10 and 11) for subsequent steps (more applicable in equine dystocias)

Discussion

Fetotomy has been described, taught, practiced,³⁻²³ and is a procedure worthy of consideration in cases of dystocia where there is a dead fetus. Veterinarian is in a unique position to assist and improve the profitability of producers by educating clients on proper intervention and when to call for assistance. As academic educators, it is our responsibility to teach students the basic principles of managing dystocia; how to deal with difficult parturition, and options available to save lives of dam and fetus. Fetotomy has a definite role in theriogenology; a procedure and save dam's life. On many occasions on a dead fetus, fetotomy was used as a last resort in managing dystocia. Extensive manipulations and force used on these fetuses prior to performing fetotomy, resulted in variable results in saving dam's life. Due to unfavorable outcome, veterinarians have moved away from performing this procedure. Selection of cases to perform percutaneous fetotomy is very important; on a dead fetus, decision for fetotomy should be made earlier in the clinical process.

Our main goal as veterinarians is to save dam's life, with minimal complications after the procedure. On numerous occasions, fetotomy is not performed effectively and safely due to

lack of availability of essential instruments. Presently many veterinary schools in the United States no longer teach, demonstrate, or provide hands-on instruction to perform percutaneous or subcutaneous fetotomy to students. Fetotomy in theriogenology is an essential skill that should be developed and performed effectively to have positive outcome. Not all dystocia require fetotomy; however, cases are chosen early in the decision making on a dead fetus.

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Conflict of interest

None to declare.

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