

# SEMEN COLLECTION VIA URETHRAL CATHETER IN EXOTIC FELINE AND CANINE SPECIES

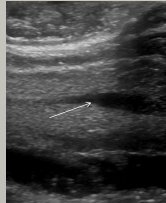
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In cooperation with Ukutula Lion Center and National Zoological Gardens of South Africa<sup>6</sup>

Here we present urethral catheterisation (UC) as an alternative approach to electro ejaculation (EE) in order to obtain high quality semen samples in various wild carnivores. We tested this method, which was previously described for domestic cats (Zambelli *et al.*, 2008), in six feline and two canine species (Table 1). The collected semen may be used for male fertility assessment, to cryopreserve genetic material, for artificial insemination or research purposes.



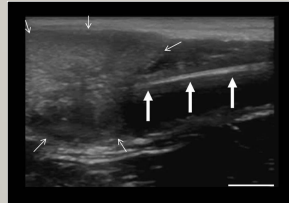
**Fig. 1** transrectal ultrasound in a lion



**Fig. 2** ultrasound: semen within urethral lumen (→)



**Fig. 3** inserting the catheter into the urethra



**Fig. 4** ultrasound image: inserting the UC (big arrow) until the prostate is reached (small arrow)



**Fig. 5** semen sample in the catheter after retraction



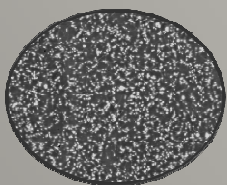
**Fig. 6** lion semen is typically white and creamy

## METHOD

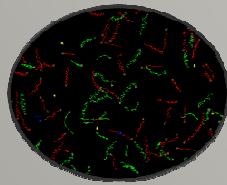
Animals were anaesthetised with a variety of anaesthetic drugs, but always in combination with medetomidine (Table 1). Medetomidine (like any  $\alpha_2$ -adrenergic agonist) is believed to have an effect on the smooth muscle of the ductus deferens. This results in a release of sperm into the urethra. Prior to collection, we performed a transrectal ultrasound (GE Logic e, 3.5-10 MHz linear probe) to check the semen content (Fig. 1-3) and the location of the prostate (Fig. 4). A commercial dog urethral catheter (diameter ranged from 2.2 to 3.3 mm, depending on species, Table 1) was advanced through the penis up until the prostate (Fig 3,4). Ultrasound monitoring was helpful to check the progress of the catheter within the urethra (Fig. 4).

## RESULTS

The sperm cells collect within the UC lumen via capillary forces. After removing the catheter, ejaculate volumes ranged from 50-1000  $\mu$ l (Fig. 5,6). Sperm parameter were assessed by CASA (*Computer Assisted Semen Analysis*) or microscopy (Fig. 7,8). The samples in all species were generally characterized by high sperm concentration and low volume, which is due to a reduced amount of seminal plasma (Table 1). Thus, these semen samples may be used directly for cryopreservation. We also performed a successful intrauterine artificial insemination with fresh UC semen in an Asiatic golden cat (Fig. 9).



**Fig. 7** microscopic view of concentrated lion semen



**Fig. 8** CASA view of sperm tracks showing hyperactivation proving excellent motility and velocity

**Table 1:** Parameter of semen collected via urethral catheterization from captive canine and feline species. Evaluated via CASA or \* microscopy

Species	n	Catheter diameter (mm)	Depth of catheter insertion (cm)	Volume ( $\mu$ l)	Concentr. ( $\times 10^6$ /ml)	Motile sperm (%)	Progr. Motile sperm (%)	Total drug dosage	Remark
<i>Felid</i>									
Lion ( <i>Panthera leo</i> )	7	2.6-3.3	30-40	100-1000	130-4860	62.5-97.2	35-96	12mg Medetomidine 150mg Ketamin	Lueders <i>et al.</i> , 2012
Tiger ( <i>Panthera tigris</i> )	2	3.3	30-40	50-300	0-2500	0-84.6	0-67	4mg Medetomidine 120mg Zoletil	one male infertile, no sperm retrieved
African leopard ( <i>Panthera pardus</i> )	1	2.6	30	250	635	92	59	2mg Medetomidine 10mg Midazolam 15mg Butorphanol	
Snow leopard* ( <i>Panthera uncia</i> )	1	2.6	30	500	3.1	40	10	1.5mg Medetomidine 100mg Ketamin	sample thin, mated prior collection
Cheetah* ( <i>Acinonyx jubatus</i> )	2	2.2	25	50-100	0-455	0-60	0-45	2mg Medetomidine 80mg Ketamin	one male pre-pubertal, just fluids
Golden cat* ( <i>Catopuma temminckii</i> )	1	1.3	12	250	70.6	65	35	0.8mg Medetomidine 75mg Ketamin	
<i>Canid</i>									
African wild dog ( <i>Lycaon pictus</i> )	1	2.6	30	400	540	93	82	1mg Medetomidine 30mg Zoletil	
Maned wolf ( <i>Chrysocyon brachyurus</i> )	1	2.6	35	100	10.0	40	30	0.5mg Medetomidine 50mg Ketamin 5mg Butorphanol	

## CONCLUSION

- UC semen collection is an inexpensive and simple method
- No equipment or special skills necessary
- No adverse reactions of the patient (hyperthermia, contraction)
- No urine contamination of semen sample
- High sperm concentration
- Small ejaculate volume with small seminal plasma component

**Fig. 9** UC semen has been used successfully for a non-surgical artificial insemination and resulted in the birth of two Asiatic golden cat cubs in April 2013. This is one of only three successful non-surgical AI's in exotic felids worldwide.



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 6. We would like to thank W. and G. Jacobs from Ukutula, Brits, South Africa and Prof. A. Kotzé (NZG, Pretoria, RSA)

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 LUEDERS *et al.* (2012) Improved semen collection method for wild felids: Urethral catheterization yields high sperm quality in African lions (*Panthera leo*). *Theriogenology* 78, 696–701.  
 ZAMBELLI *et al.* (2008) Quality and in vitro fertilizing ability of cryopreserved cat spermatozoa obtained by urethral catheterization after medetomidine administration. *Theriogenology* 69, 485–490.