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## Canine and Feline Cryptorchidism (1-Jul-2001)

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### Cryptorchidism in Dogs and Cat

There should be two normal testes present in the scrotum of a male to be used for breeding (Fig. 1). A non-castrated male with no testes present in the scrotum is a bilateral cryptorchid (i.e., a bilaterally cryptorchid individual). A male with only one testis present in the scrotum (Fig. 2) is a unilateral cryptorchid. The term cryptorchid means hidden testicle. Unilateral cryptorchidism occurs more commonly than the bilateral condition.



Figure 1. Normal anatomy of the scrotum and testicles in the dog. Testicular descent should be completed by 6 months of age. The testicles should be readily palpable within the scrotum. - To view this image in full size go to the IVIS website at [www.ivis.org](http://www.ivis.org) . -



Figure 2. Unilateral cryptorchidism in a 9-month old dog. - To view this image in full size go to the IVIS website at [www.ivis.org](http://www.ivis.org) . -

The owners of such animals often inquire "how long should I wait before giving up that the undescended testis is going to come down?" Testicular descent is complete by about day 10 after birth in normal dogs [1]. Some owners of cryptorchid animals may report presence and disappearance of scrotal testes. In a newborn puppy or kitten, the testes are small, soft and can move between scrotum and inguinal canal, especially when the pup is stressed or frightened [2,3]. It is recommended to wait up to about six months of age before declaring a dog or a cat cryptorchid. The reason for the six months wait is that the inguinal rings of most dogs are closed by 6 months of age, precluding movement of the testes from the abdomen to the inguinal canal if that has not already occurred [4].

Cryptorchidism is heritable and is a sex-limited autosomal recessive trait in dogs [4]. The incidence of cryptorchidism seems to be higher in purebred and inbred dogs than in mixed-breed dogs. High prevalence of cryptorchidism within lines of inbred cocker spaniels and miniature schauzers has been reported [5,6]. High frequency of other congenital defects noticed in cryptorchid dogs include inguinal and umbilical hernias, patellar luxation, and preputial and penile problems. Retained testes also have a tendency to develop neoplastic changes. The risk of neoplasia in retained testis has been reported to be 9 to 14 times higher than in the scrotal testis [7,8], with Sertoli cell tumors and seminomas being the most common tumors [9]. In cats, however, there is no information available to show cryptorchidism as a hereditary condition [10]. Some clinicians consider it hereditary condition because of its hereditary nature in other domestic animals.

A unilaterally cryptorchid animal can produce sperm, whereas a bilateral cryptorchid male usually does not produce sperm and is sterile. Testes should be scrotal and thus 4 to 5 degrees cooler than the body temperature to produce normal sperm. Even though unilateral cryptorchids produce abnormal sperm quality, due to adverse affect of high body temperature in the abdominal cavity, they can impregnate a female in estrus. Cryptorchidism however does not affect testosterone production [11,12]. Therefore, most of the cryptorchids show sexual desire and can achieve erection [13]. Retained testes are smaller and, viewed histologically, the diameter of seminiferous tubules is reduced by up to 60 % compared to those of scrotal testes [14]. In cryptorchid cats, testes produce testosterone and the cats show typical secondary sex characteristics of urine marking, aggressive behavior, and urine odor.

A higher incidence of cryptorchidism has been reported in small-breed compared to large-breed dogs [15]. Reported

incidences in dogs range from 1.2 to 10 % [16-18]. The top ten breeds with increased incidence of cryptorchidism are Toy poodles, Pomeranian, Yorkshire terrier, Miniature dachshund, Cairn terrier, Chihuahua, Maltese, Boxer, Pekingese, and English bulldog [4]. In the cat, incidence of cryptorchidism ranges from 0.37 - 1.7 % [19,20].

#### Diagnosis -

Visual examination and careful digital palpation of the scrotum and inguinal area is helpful. However, scrotal fat and inguinal lymph nodes may be confused with the retained testis. Abdominal testes are difficult to palpate or visualized by ultrasonography (US). The use of Human Chorionic Gonadotrophin (HCG) or Gonadotropin Releasing Hormone (GnRH) Stimulation Test for inducing a measurable testosterone increase is recommended. Commercial bovine GnRH products, Cystorelin ® or Factrel ® may be used. The standard protocol for this test is to determine testosterone level in a blood sample drawn before and 60 minutes after injection of GnRH at doses of 2 µg/kg or 50 µg/dog, IM [21]. Testosterone being increased in the post-treatment blood sample would, in such cases, be diagnostic for a cryptorchid dog.

In a cryptorchid cat, an examination of penis for presence of spines is an excellent diagnostic technique. Penile spines, which are testosterone dependent, become atrophied after 6 weeks of castration.

#### Treatment -

Castration or removal of both testes is the treatment of choice for cryptorchidism. As discussed above, in dogs, cryptorchidism is considered hereditary and a dog with this condition should not be used for breeding. There is an increased incidence of Sertoli cell tumors in abdominal testes. Although not a common occurrence, torsion of the spermatic cord may occur with an abdominal testis, and may lead to sudden abdominal pain and other complications. The surgical approach for finding and removal of the cryptorchid testis is dependent on the location of the testis. The key for finding the retained testis is to identify and follow the ductus deferens leading to the testis. The retained testis may be removed by laparoscopy [22].

Orchiopexy or surgical placement of the retained testis into the scrotum is not recommended, although it can be done successfully. Kawakami, et al have reported pregnancy results in bitches bred with dogs following orchiopexy [14,23]. Gradual improvement in semen quality was noticed and 3 out of 11 bitches bred were diagnosed pregnant. However, cryptorchid dogs cannot be shown in American Kennel Club shows and treatment by orchiopexy may be considered fraudulent [4].

The most common medical treatment, not including acupuncture and herbal medicine, is the use of drugs providing luteotrophic hormone (LH) activity, such as HCG hormone, or use of GnRH to induce an increase in endogenous LH [24]. Most of the studies reporting the success of the hormonal treatment are based on clinical case follow-ups and lack control cases. Control of cryptorchidism can be accomplished by removal of the cryptorchid dogs and preferably their dam and sires from breeding programs.

#### **Case of feline cryptorchidism - adapted from Memon et al., 1992 [25].**

A 4-year-old male domestic long hair cat was referred because of aggressive masculine behavior and urine spraying. He was obtained as a 3-month-old kitten, and when he was 6 month old, only 1 testis was found in the scrotum. When he was 1 year old, surgery was performed to remove the scrotal right testis. The left testis was not found either within the scrotum or within the abdomen. He developed male behavior and another laparotomy was performed 1 year later; however, the left testis again could not be located. He continued to show male behavior such as spraying urine, loud vocalization, and aggressiveness. At referral, digital palpation and ultrasonography did not reveal the left testis in the scrotum or in the inguinal canal. The penis was well developed and had penile spines (Fig. 3) instead of absence of penile spines, which is characteristic of castrated cats (Fig. 4).



Figure 3. Penis of a normal cat showing penile spines. This anatomical characteristic is androgen dependent and does not develop in male cats castrated before puberty. - To view this image in full size go to the IVIS website at [www.ivis.org](http://www.ivis.org) . -



Figure 4. Cat penis without spines in a castrated male. - To view this image in full size go to the IVIS website at [www.ivis.org](http://www.ivis.org) . -

This was an evidence of testosterone production. The cat was irritable and difficult to handle. A blood sample was taken for baseline testosterone concentrations, and 500 IU of HCG was administered IV. Blood samples were taken again at 30 minutes and 2 hours after HCG administration. Testosterone values (ng/ml) for samples taken at baseline, 30 minutes, and 2 hours after HCG administration were 0.68, 5.0, and 10.5, respectively.

With the cat under general anesthesia, a midline laparotomy was performed. The left ductus deferens was identified and followed from the prostate gland. The ductus deferens was found to course through the inguinal ring caudally in to the subcutaneous tissues overlying the pubis. The left testis was located in the facial plane lateral to the pubic symphysis. Histological examination of the testis revealed impaired spermatogenesis, seminiferous tubules lined almost entirely by Sertoli cells, and diffuse interstitial (Leydig) cell hyperplasia.

Six weeks after the surgery, the HCG stimulation test was repeated. Testosterone was not detected in any sample. Within a few weeks after the surgery, improvement in cat's behavior (urine spraying, loud vocalization, and aggressiveness) was reported by the owner.

Case summary - HCG stimulation test proved to be a useful diagnostic method for detection of the cryptorchid testis. On exploratory surgery the cryptorchid testis was found by following the ductus deferens. In this case, previous attempts to locate the retained testis had been frustrated by the inability to palpate the testis subcutaneously and locate the testis intra-abdominally. The most practical solution to locate undescended testis would have been to follow the intact ductus deferens to the small testis adjacent to the pubic symphysis.

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