Early Spay/Neuter Research
on Dogs and Cats (8 - 12 Weeks)

by Marci Hess on behalf of Angel's Wish, Inc.

Background and historical information

In the 1940's and 1950's, veterinarians had primitive anesthetics, monitoring equipments, and surgical tools. Anesthetics were not terribly safe, especially for young animals; sophisticated surgical instruments that are now used to find a tiny uterus did not exist. Veterinarians were mainly men, working with horses and cattle — heavy, physical work. They had big hands, and had to find that uterus with their fingers. Since a uterus is bigger and much easier to find after an estrus or after having a litter, the advice of waiting until after the first estrus or after a litter began and persists decades later. Often the practitioner selected the spay/neuter age of the animals based on his convenience and what was appropriate to his skill and equipment.

Now jump forward to the 1960's. It is discovered that the incidence of mammary cancer (which is four times higher in intact bitches than in human women) can be reduced by over 96.4%, if we spay before the first estrus. So the veterinary profession begins teaching this, and now with better equipment, better drugs, and safer methodologies, veterinarians began to spay before the first estrus. Determining when the first estrus begins presents problems, however. It differs among large dogs (12-14 months), small dogs (around 6 months), and cats (as early as 4-5 months). Since it's too confusing to tell owners different ages for different size dogs (and how do you guess on the mixed breeds) six months becomes the standard, with the goal being to neuter the majority of dogs before their first estrus. Although this practice is not based on objective scientific data (and is too late for many cats), for decades this is what veterinarians are taught.

As for cats, they received little attention and respect until the 1980s. Veterinarians were trained, for the most part, to treat them like little dogs and the 6-month standard was applied, with no thought to the fact that many cats became pregnant at 4 and 5 months of age. The 6-month standard simply evolved. It was not based in research or particular scientific reason.[1]

[1] Dr. Tracy Land, DVM, August 14, 2002 e-mail correspondence and "Early Spay/Neuter: The New Standard", a paper

Owner compliance and the overpopulation

A study reported in 1990 demonstrated a mere 60% neuter compliance rate for pets adopted at animal shelters despite preadoption screening, prepayment of surgical fees, reduced surgical fees, neuter contracts, and follow-up activity by shelter personnel.[2,3] In 6 telephone surveys, about 84% of the cats and 70% of the dogs in pet owning households were reported as neutered, however, about 20% of the owners said the female dogs and cats had 1 or more litters beforehand..[4]

Another interesting piece of information to consider: The US Census Bureau estimates that 450 citizens are born every hour. In contrast, the Humane Society of the United States estimates that 2,500-3,000 dogs and cats are born every hour.[5] A more recent estimate states 10,000 humans are both in the United States each day and 70,000 puppies and kittens are born daily.[6]

Conclusion

Pediatric spay/neuter is safe and effective when anesthetic and surgical guidelines are followed. The theorized concerns such as the potential for stunted growth, obesity, perivulvar dermatitis vaginitis, urinary incontinence, behavioral changes, impaired immunocompetence, and urethral obstruction in male cats for early age neutering (8 weeks) are unfounded. In fact, benefits of early spay/neuter surgery include, less bleeding, less stitching, less time required for surgery, fewer drugs required, quicker recoveries, near zero complications, less fasting time, and less healing time.

At this time, pediatric spay/neuter is the best way to stem the staggering pet overpopulation and allows us to combat the single largest cause of death in companion animals: homelessness due to overpopulation. Regardless of the industry, with the continual and sometimes rapid technological improvements and trends, some will be on the leading edge, some in the middle, and others left behind. This is no different for the animal industry. In over 100 years of adopting animals in the United States, the overpopulation problem continues to increase. It is not possible to adopt our way out of the overpopulation crisis. A "neuter before adoption" policy is a solution that is practical, possible, and healthy,

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[2] C. Moulton, "Early spay/neuter: risks and benefits for shelters", *American Humane Shoptalk* 1990; 7: 1-6

[3] Eno and S. Fekety. "Early-age spay/neuter: a growing consensus", *Shelter Sense,* November 1993: 1-7

[4] Marvin Mackie, DVM. *Veterinary Practice News*; September 2002

[5] Humane Society of the United States, *Close-Up Report*, Washington, DC, 1983

[6] Humane Society of the United States, *Did you Know*, Washington, DC, 2002.

Abstracts & bibliography

The following includes abstracts of each of the references used to prepare this report. These are arranged in chronological order starting with the most recent reports and studies. Complete bibliographical information is also included for those who wish to delve further into the matter.

University discussions and papers

Cornell University
Phone conversation and *Pediatric Spay/Neuter*, a paper by Dr. Leslie Appel

Cornell highly supports and endorses pediatric spay/neuter. They have a 10-12 year study which will be released for publication next year. Dr. Appel has offered her time to assist or answer questions from any of our local veterinarians. As she says in reference to pediatric spay/neuter and efforts to eliminate the pet overpopulation "We're in this together." Dr. Appel provided a handout entitled "Pediatric Spay/Neuter" which she uses in lectures and presentations.

Other comments:

- 8% risk of urinary incontinence in spayed (female) cats and dogs occur regardless of the age at which they are spayed
- Puppies have a slight increased risk of parvovirus when neutered prior to completion of their vaccinations. There is no similar risk for kittens.

Tufts University
E-mail from Dr. Gary Patronek, DVM, PhD, Director, Tufts Center for Animals and Public Policy, Tufts University School of Veterinary Medicine. August 21, 2002 and September 4, 2002.

"I have not seen any adverse effects of early spay. Given the huge number of animals that have been done over the past 15 years, if something serious was going to show up, it would have by now. There have been some very solid attempts to look at this procedure, and I haven't seen anything that suggests a problem…the work is being done by very reputable people at good institutions."

Journal of the American Veterinary Medical Association

Long-term Outcome of Gonadectomy performed at an early age of traditional age in cats*, Lisa M. Howe, DVM, PhD, DACVS; Margaret R. Salter, DVM, PhD; Harry W. Boothe, DVM, MS, DACVS; H. Phil Hobson, DVM, MS, DACVS; Theresa W. Fossum, DVM, PhD, DACVS; Angela C. Spann, BS; W. Scott Wilkie, BS. Journal of the American Veterinary Medical Association, Volume 217, No. 11, December 1, 2000: 1661-1665.*

A 37-month study of 263 cats to determine long-term results and complications of early age gonadectomy:

- 3 years allows for an evaluation of a substantial portion of a cat's life
- This study found that cats neutered at the traditional age (6 months) appeared to be at increased risk for urinary tract problems (including cystitis). Reasons for this increase risk were not determined.
- Urethral obstruction in male cats neutered before puberty are unfounded. Two of 38 cats neutered at the traditional age had obstructive episodes; 0 of 70 of the early-age neuters experienced this. Because urinary tract disease is most commonly recognized in young to middle-aged adult cats, studies of longer duration are unlikely to yield different results.
- Many of the concerns over early-age neuter initially expressed have been proven unfounded by studies done to date.

Long-term Outcome of Gonadectomy performed at an early age of traditional age in dogs
Lisa M. Howe, DVM, PhD, DACVS; Margaret R. Salter, DVM, PhD; Harry W. Boothe, DVM, MS, DACVS; H. Phil Hobson, DVM, MS, DACVS; Theresa W. Fossum, DVM, PhD, DACVS; Angela C. Spann, BS; W. Scott Wilkie, BS. Journal of the American Veterinary Medical Association, Volume 218, No. 12, 2001: 217-221.

A 4-year study of 269 dogs: "Prepubertal gonadectomy may be safety performed in dogs without concern for increased incidence of physical or behavioral problems."

Survey of the Coalition of Spay/Neuter Veterinarians
Tracy Land, CVM and Samantha Walls, BS. Published as a letter to the editor in the Journal of the American Veterinary Medical Association, Volume 216, No. 5, March 2000.

This survey was completed in 2000 with some veterinarians reporting surgeries as far back as the late 1980s; many had only a few years experience with pediatric spay/neutering techniques. Eighty-five (85) veterinarians responded. Having collectively performed 235,053 early spay/neuters, their unanimous opinion is that these procedures are easier, faster, and safer.

Short-term Results and complications of prepubertal gonadectomy in cats and dogs
Lisa M. Howe, DVM, PhD., Journal of the American Veterinary Medical Association, Volume 211, No. 1, July 1, 1997: 57-62.

An 18-month study of 775 cats and 1,213 dogs to determine results and complications of prepubertal gonadectomy in cats and dogs.

- Short-term complications were reported more frequently in traditional age animals than pediatric animals. Animals neutered at 4 months and older had significantly higher overall complication rate than animals under 12 weeks (10.8% vs. 6.5% respectively)
- Analysis of evidence from controlled experiments and small clinical studies indicate that prepubertal gonadectomy is a safe procedure.
- Prepubertal animals have similar complication rates to those of traditional-aged animals during the first week after surgery.

Early-age Neutering of Dogs and Cats
Peter Theran, VMD, Journal of the American Veterinary Medical Association, Volume 202, No. 6, March 15, 1993: 914-917.

Study by Angell Memorial Animal Hospital and Boston Animal Shelter (both MSPCA facilities) over 2 ½ years and involving 350 neonatal animals (6-14 weeks) to examine anesthetic protocols and surgical techniques.

- Serious complications or deaths were not observed
- Early-age neutering is an appropriate sterilization procedure (after-surgery effects weren't included in this study)

Gonadectomy in Immature Dogs: Effects on Skeletal, Physical, and Behavioral Development
Katherine R. Salmeri, DVM, Mark S. Bloomberg, DVM, MS; Sherry L. Scruggs, BS; Victor Shille, DVM, PhD, Journal of the American Veterinary Medical Association, Volume 198, No. 7, April 1, 1991: 1193-1202.

A 15-month study on the effects of prepubertal gonadectomy on skeletal growth, weight gain, food intake, body fat, secondary sex characteristics, and behavioral development in 32 mixed breed dogs. The study divided dogs into 3 groups: group 1 was neutered at 7 weeks of age, group two at 7 months of age, and group three unaltered.

- Skeletal growth: Greater in those neutered at 7 weeks than at 7 months; greater in 7 week old females than the males
- Body weight: Unaffected
- Food intake: Unaffected
- Secondary sex characteristics: Did not "grossly appear to reflect differences" Group of 7 week old had mean of 17.8mm; 7 months had mean of 16.8mm; and unaltered were a mean of 19.8mm
- "Concluded that neutering pups at 7 weeks affected skeletal, physical, and behavioral development much the same as did neutering pups at 7 months."

A Case for Neutering Pups and Kittens at Two Months of Age
Leo L. Lieberman, DVM. Journal of the American Veterinary Medical Association, Volume 191, No. 5, September 1, 1987: 510-512.

- Dr. Lieberman published information on the neutering of over 100 pups and kittens, 8-10 weeks old. Two years later, the owners reported no undesirable side effects.
- Florida SCPA performed 1,600 neuter surgeries on 8-12 week olds during the past 5 years with no undesirable effects.
- Vancouver, British Columbia, 1976-1983: 90,000 surgeries performed on animals as young as 4 months. The owners did not report undesirable effects.
- Medford, Oregon SPCA: 1974-1980 performed neuters on 8,000 pups and kittens at 8-12 weeks of age. The owners had not reported undesirable effects. Persistent concerns that there might be long term undesirable effects led the SPCA to sponsor a retrospective study. Questionnaires were sent to 200 owners of male and female dogs who were neutered at 6-12 weeks of age and are now 3-14 years old and to the owners of 200 dogs neutered after 6 months of age. Results: fewer behavior problems, fewer weight problems, fewer medical problems in the dogs neutered at 6-12 weeks. Questionnaires were also sent to the owners of 120 cats neutered at 6-12 weeks of age who are now 4 to 14 years old. The owners did not report undesirable effects.

- Feline urologic syndrome (frequent inflammation of lower urinary tract) was reported with equal frequency in males and females and with no differences between sexually intact and neutered (regardless of age) cats.
- Age of castration does not affect the diameter of the urethral lumen
- Early neutering does not predispose an animal to urinary incontinence

The Effect of Prepubertal Castration on the Penile Urethra of the Cat
Mary A. Herron, DVM, MS. Journal of the American Veterinary Medical Association, Volume 160, No. 2, January 15, 1972: 208-211.
10 month study by Texas A&M University of 30 male cats ages 8-14 weeks of age divided into 3 groups: 10 unaltered, 10 neutered at 5 months, 10 neutered at 8-14 weeks with subsequent treatment of testosterone.

- Epithelial height of the urethra is not dependent on testosterone
- Urethral circumference was not significantly different in any of the treatment groups
- "Since prepubertal castration apparently does not influence urethral size, castrated cats would not be more susceptible to urethral blockage resulting from narrowing of the urethra."

Compendium on Continuing Education for the Practicing Veterinarian

Prepubertal Gonadectomy in Dogs and Cats -- Part II
Lisa M. Howe, DVM, PhD., Compendium on Continuing Education for the Practicing Veterinarian, Volume 21, No. 3, 1999:197-201.

Findings suggest that instead of stunted growth, prepubertal gonadectomy may actually increase an animal's stature.
"Preliminary evidence from experimental and clinical studies indicates that prepubertal gonadectomies are safe when evaluated on a short-term basis."

DVM Newsmagazine

Early Neutering Doesn't Hamper Development of Dogs
Karen L. Overall, VMD, PhD, Dip ACVB, DVM Newsmagazine, June 1997.
Dr. Overall heads the Behavior Clinic at the University of Pennsylvania.
"Finally, in the studies that have been done on puppies and kittens that were early spayed and neutered (6-8 weeks of age) there appeared to be no physical effects except a lengthening of long bones (i.e., these animals are bigger)."

Position on Early-Age Spay/Neuter of Dogs and Cats
Excerpt from an interview that appeared in DVM Magazine, November 1996 with Johnny Hoskins, DVM, PhD, ACVIM and author of *Veterinary Pediatrics: Dogs and Cats from Birth to Six Months*, 2nd edition.

"There is no evidence in the literature that supports claims that early sterilization increases the risk of urinary incontinence, stunted growth, obesity, perivuvular dermatitis, vaginitis, behavioral changes, immuno-incompetence, or urethral obstruction."

Seminars in Veterinary Medicine and Surgery (Small Animal)

*Implications of Early Neutering in the Dog and Ca*t
W. Preston Stubbs and Mark S. Bloomberg., Seminars in Veterinary Medicine and Surgery (Small Animal), Volume 10, No 1, February 1995: 1037-1039

- In response to concerns about urinary incontinence, the authors measured urethral pressures (a diagnostic test for incontinence). Male cats of all three groups had similar urethral diameters.
- The external genetalia remained smaller in pups and kittens neutered early. No problems were associated with this finding.
- "Prepubertal gonadectomy does not seem to adversely affect skeletal, physical, or behavioral development in the dog and cat."

Current Veterinary Therapy

Early Neutering of the Dog and Cat
W. Preston Stubbs; Katherine Salmeri; and Mark S. Bloomberg. Current Veterinary Therapy XII, 1995 edition.

Two parallel but separate studies conducted at the University of Florida. The study divided dogs into 3 groups: group 1 was neutered at 7 weeks of age, group two at 7 months of age, and group three unaltered.

- "Rather than causing stunted growth, prepubertal gonadectony may actually result in normal or greater stature."
- Male cats in all groups had similar urethral diameters as measured by urethral pressure profilometry. In 1971, urethral obstruction was cited as a *potential* problem.
- Male cats had no penile spines, but the penis could be fully exteriorized, indicating separation of the balanopreputial fold (lack of separation was thought to predispose cats to ascending urinary tract infections)
- No problems with vaginitis or perivulvar dermatitis were noted.

Organizations supporting early spay and neuter

Alley Cat Allies
American Animal Hospital Association
American Humane Association
American Veterinary Medical Association
Association of Veterinarians for Animal Rights
Best Friends Animal Sanctuary
Dr. Dale Bjorling, DVM, MS, Professor and University of Wisconsin
Chair of Dept of Surgical Sciences
(personal support, no university-side policy)
California Veterinary Medical Association
Cornell University
Humane Society of the United States
Ontario Veterinary College, University of Guelph
Texas A&M Veterinary
Tufts University

A whole host of humane societies and animal control agencies