

Early Age Neutering

Early-age neutering — a veterinary perspective concentrating on cats (with some reference to dogs)

by Anne Haughie

Published January 2001

Neutering is one of the oldest surgical procedures performed on domestic animals but there is little scientific information regarding the ideal age for neutering cats. Traditionally, in the UK, cats have been neutered after the age of 6 or 7 months but many female cats, particularly those living in the feral state, become pregnant before this age. The current practice of neutering cats after the age of 6 months, rather than being based on objective scientific data, has evolved into convention because most veterinarians feel comfortable with the anaesthetic and surgical protocols they learned in veterinary school for neutering young adult cats. As there is no veterinary evidence to the contrary, when to neuter is more to do with a practitioner's personal views than anything else.

Early-age neutering is defined as sterilisation before the onset of reproductive capability. The onset of puberty is quite variable in cats, being between 4 and 21 months in queens and 8 and 10 months in males. Factors that can influence the age of puberty include season of birth, environment, rate of growth, nutrition and presence of infectious disease. Puberty is often early in queens exposed to an environment of sexually active queens and males and in queens born in late spring or in summer. Feral queens are frequently precocious, often reaching puberty between 4 and 5 months; thereafter they come into oestrus three times a year.

This paper describes the veterinary aspects of early-age neutering. The experiences of WSPA's veterinary surgeons working on stray and feral cat control programmes around the world have demonstrated that provided young kittens are healthy and there is good surgical technique, with careful attention to pre and post anaesthetic care, there is unlikely to be a problem. Factors such as differences in respiratory and cardiovascular physiology, drug metabolism and thermo-regulation do need to be observed. It is emphasised that special care must be taken to select healthy kittens for surgery and it is essential to prevent, hypothermia, hypoglycaemia and blood loss.

When performing surgery on stray or feral cats, it is not always possible to do so under good clinical conditions and lack of perfect conditions should not discourage veterinarians from attempting the procedure. Although the young kittens may look fragile, they recover far more quickly than older cats and, provided certain simple criteria are followed, they are much easier to operate on. The stress of surgery is low and kittens are the ideal patients in recovery. Modern anaesthetics make operating on 7 to 12 week old kittens routinely safe. Young kittens must be kept warm during recovery, which occurs remarkably quickly — they usually bounce back in 30-90 minutes as though nothing had happened. The surgical skills involved are the same as the procedure on adult cats. The organs are easily identified and there is no fat. The procedures allow for decreased operative time, improved visibility of intra-abdominal structures and rapid recovery from anaesthesia, with less pain.

Veterinarians who have become experienced in early-age neutering always comment how much easier it is to neuter 7 week olds than 7 month olds. Spays are easier and faster at 6 to 7 weeks than at 6 to 7 months because there is little subcutaneous fat to hinder entrance to the abdominal cavity

and the lack of vasculature reduces haemorrhage. Finding organs is no more difficult than in the older cat. In a young female kitten, although the uterus is small, the ovaries are disproportionately large and their size is more in line with those of the older kitten. A tiny incision is all that is required and there is no problem, regardless of whether the kitten is spayed mid-line or on the flank. Castrations performed at 6 to 7 weeks take a similar time to those undertaken at 6 to 7 months, and the testicles are easier to remove. If the testicles are going to descend, they will do so during the first two weeks of life and technically, there is no reason why castration cannot be performed as soon as the testes have descended — if these are visible, they can be removed.

To help prevent hypothermia, hypoglycaemia and blood loss, the following precautions are advised:

1. Hypothermia

The anaesthetised animal loses body heat and this is more pronounced in the young kitten. To counteract this problem, the following steps are helpful:

- When preparing the kitten for surgery, clip away as little hair as possible and do not apply alcohol, which evaporates rapidly and draws heat off the body. Use warm Chlorhexidine diluted with saline or warm water and Betadine.
- Use plenty of towelling or equivalent on the operating surface to help conserve heat, particularly if it is stainless steel.
- Position a hot water bottle wrapped in a towel alongside the supine kitten. A used surgical glove filled with hot water works well, as does a plastic mineral water bottle.
- Keep the kitten warm during recovery by wrapping a hot water bottle in a blanket and placing it next to the kitten. Be aware of air conditioning. Do not use electric heat pads because of the high risk of burns.

2. Hypoglycaemia

In the young kitten, blood glucose levels can quickly get too low. Allow one quarter of the usual meal one hour before surgery or give small amounts of Karo syrup prior to induction. As soon as the kitten is up, or within one hour of sternal recumbency, give small amounts of food. As an added precaution, keep some glucose solution to hand for post operative, intra-peritoneal or intravenous administration if required.

Honey is also excellent and can be applied directly to the gums, where it will be rapidly absorbed and should have a positive effect very quickly.

3. Be gentle

The uterus is very small and needs to be handled gently. In a six month or older, it is possible to apply quite a lot of pull to the horn of the uterus in order to exteriorize the ovary. In the very young kitten, this must be done gently as the junction between the horn and the ovary is fragile and can break and the ovary go back into the abdomen. However, in a small kitten, the ovary is easy to find even if this does happen.

Anaesthetic protocols

It is best to weigh kittens on a paediatric or even a kitchen scale to ensure correct dosage of anaesthetic. In ideal conditions, premedication is followed by gas anaesthesia, preferably Isoflurane via a mask. This is obviously ideal but more often than not, veterinarians working overseas on stray cat control programmes will be working where there is no anaesthetic machine. A Rompon/Ketamine combination works well and is readily obtainable throughout the world.

Rompon (Xylazine) is usually given at the same time in the same syringe intra-muscularly. This stings a little momentarily but is simple to administer, particularly if the cat is feral and has to be restrained in a crush cage. Additional Rompon given subcutaneously will calm a very fractious cat before anaesthesia. If more anaesthetic is needed, give Ketamine IM again using a dose of half the original amount. Airway patency is not usually a problem, so it is not necessary to intubate — but it is useful to have tubes to hand just in case. Reversing injections are not usually necessary.

Surgery

For a mid-line spay, an incision 1 cm in length should be made 2.5cms from the umbilicus. This usually allows adequate exposure of the ovaries and uterus. The incision should be extended by a further half cm if excessive traction is a problem.

A spay hook is used to find the horn of the uterus and the ovary exteriorized. One clamp is placed proximal to the ovary and another distal to it. The ovary is cut away and a tie placed below the clamp on the pedicle. The horn is followed to the bifurcation and the process repeated with the other ovary. The body of the uterus is then tied off and the uterus removed. Catgut or stainless steel can be used to tie off. Some veterinarians prefer to use Vicryl to close the muscle layer in cats and stainless steel in dogs — but this is a matter of each surgeon's preference. Vicryl is used to close any subcutaneous fat and to place a subcutaneous suture under the skin. (In the young kitten, there will be little, if any subcutaneous fat). If the skin suture shows any eversion, tissue adhesive (surgical superglue, eg, Vet Bond or Vetseal) can be applied. No outside sutures should be used since kittens very often remove them and, in most cases, it is not practical for feral kittens to be returned to a clinic for their removal. The same procedure works equally well in a flank incision for those

Xylazine (Rompon) and Ketamine Anaesthesia

Peggy W. Larson, DVM

Xylazine 20mg/ml (small animal)
or dilute Xylazine 100mg/ml (2ml Xylazine
+ 8ml sterile water)

Mix Xylazine and Ketamine in syringe and
give IM

Dogs

Wgt (lb)	Ketamine	Xylazine	Total
5	0.5	0.5	1.0
10	0.75	0.5	1.25
15	1.0	0.75	1.75
20	1.5	1.0	2.5
25	1.75	1.25	3.0
30	2.25	1.5	3.75
35	2.75	1.75	4.5
40	3.0	2.0	5.0
45	3.5	2.25	5.75
50	3.75	2.5	6.25
60	4.5	3.0	7.5

Add more if needed if the dog is over
60lbs. Most dogs over 60lbs will go down
on the 60lb dosage.

Cats

Routine cat spay

7-8lbs	0.3ml	0.3ml	0.6ml
--------	-------	-------	-------

(we use 0.27ml Ket. & 0.33ml Xyl. IM)

Kittens

2-3lbs	0.15ml	0.15ml	0.3ml
3-4lbs	0.2ml	0.2ml	0.4ml

If the cat begins to move during surgery
give IM or IV 0.1ml Ketamine and 0.05
Xylazine (kittens 0.05ml and 0.05ml).

Dosages for cats really vary depending on
how long the surgery takes. Kittens under
4lbs go down fast and come up fast. Our
routine spays in kittens take about 5
minutes so we use the minimum dosage.
An excitable adult cat may take a higher
dosage.

Xylazine depresses respiration. 0.25ml
Dopram stimulates respiration.

Yohimbine reverses Xylazine dramatically.
0.1ml to 0.15ml IV or 0.2ml to 0.25ml IM
arouses the cat almost immediately. We use
Yohimbine routinely. You can expect the
cat to be in sternal recumbency in about 5
minutes.

Safety: No anaesthetic deaths in over 500
kittens. One and possibly another
anaesthetic death in over 15,000 cats.

who prefer the method. The procedure for a male kitten is the same as for an adult cat except the tiny testicles can be pulled straight out and no tying is required.

At the end of surgery, feral kittens should have their left ear tipped — now universally recognised as identifying a neutered cat. (See WSPA information on ear-tipping)

Benefits of early-age neutering

Ovariohysterectomy not only prevents unwanted kittens from being born but also protects the queen from future ovarian and uterine disease. The benefits of neutering are the same at either age: reduced risk of reproductive disorders and of mammary neoplasia.

Feline Immunodeficiency Virus (FIV) which leads to a slow destruction of the immune system, with most cats developing uncontrollable secondary infections, is thought to be spread by cat fights and cat bites amongst un-neutered cats. Some epidemiological studies have shown that the incidence of FIV is higher in free-roaming male cats, particularly those with a history of cat bite abscesses. If a queen is infected during mating, current estimates would suggest that around 25% of kittens born to her are likely to be infected themselves. Feline Leukaemia Virus (FeLV) is an oncogenic virus, having the capability of producing cancerous tumours. Many infected cats will also develop other serious non-cancerous conditions such as anaemia that result in the death of many more cats. FeLV can also cause immunosuppression which, as in FIV, causes cats to become vulnerable to infections against which they would normally have a natural resistance. The virus is found in all bodily secretions, with transfer of the virus through the saliva being one of the main routes of transmission, so biting again places cats at high risk of infection. An infected queen will almost certainly pass on infection to any kitten she has. Early-age neutering is therefore a major contribution in protecting cats from these fatal diseases.

Are there any long-term adverse effects on health?

Several recent studies have specifically evaluated the effects of early neutering in kittens at 7 weeks of age compared with the more traditional age of 7 months. These studies have in general found no appreciable differences in early neutered versus conventionally neutered cats and no increased perioperative risks. Behavioural development appears to progress similarly in these two groups of cats, as does physical development. No differences in urethral diameter have been found between these cats, suggesting that early neutering is not likely to increase the risk of urethral blockage. It has also been demonstrated that kittens neutered at an early age often become more people-oriented and are calmer and gentler, less likely to wander and retain juvenile behaviour longer, all of which are desirable traits for many pet owners who want to enjoy their cat as a kitten for as long as possible.

Conclusion

Stray and feral cat control is a great challenge facing animal welfare organisations around the world. Those cute little kittens become determined breeding machines in a very short space of time and the nearer to six months feral kittens become, the more difficult they are to catch. If veterinarians were to adopt the routine neutering of kittens at an early age, the result would be a significant decrease both in unwanted animals and mass euthanasia.

Early-age neutering gives veterinarians the opportunity to work with animal welfare organisations to reduce numbers of unwanted animals and to be seen as leaders in animal welfare in the community. As a tool in helping to overcome massive stray and feral problems, early-age neutering is priceless.

References and further reading

Early Spay-Neuter in the Cat: Effect on Development of Obesity and Metabolic Rate

Root MV, *Veterinary Clinical Nutrition* 1995; 2:132-134

Effect of prepubertal and postpubertal gonadectomy on heat production measured by indirect calorimetry in male and female domestic cats

Root MV, et al. *Am J Vet Research* 1996; 57:371-374

Early Spay-Neuter in the Cat: Effect on Development of Obesity and Metabolic Rate

Root MV, *Veterinary Clinical Nutrition, Vol 2, no 4, pp132-4,1993*

Effect of prepubertal and postpubertal gonadectomy on penile extrusion and urethral diameter in the domestic cat

Root MV, Johnston SD, Johnston GR, Olson PN, *Veterinary Medicine and Surgery, (Small Animal) Vol 10 (1) 8-12, 1995, Veterinary Radiology & Ultrasound* 1996; 37:363-366

Castration and Physeal Closure in the Cat

Houlton JEF, McGlennon NJ, *Veterinary Record* (1992) 131, pp 466-7

Effects of Prepubertal Gonadectomy on Physical and Behavioural Development in Cats

Stubbs WP, Bloomberg MS, Scruggs SL, Shille VM, Lane TJ, *JAMVA* 209 (11) 1864-1871, 1996

Short-term results and complications of prepubertal gonadectomy in cats and dogs

Howe LM, *JAMVA* 211 (1) 57-62 July 1997

Early-age neutering of dogs and cats

Theran P, *JAMVA, Vol 202, No 6, March 15 1993*

Gonadectomy in immature dogs: Effects on skeletal, physical, and behavioural development

Salmeri KR, et al, *JAVMA* 1991; 198:1193-1203

JAVMA News Spaying/neutering comes of age,

JAVMA 1993; 203:591-593

Surgical techniques for neutering 6 to 14 week-old kittens

Aronsohn MG, Faggella AM, *JAVMA* 1993; 202:53-55

Anaesthetic techniques for neutering 6 to 14 week-old kittens

Faggella AM, Aronsohn MG, *JAVMA* 1993; 202:56-62

Evaluation of anaesthetic protocols for neutering 6 to 14-week-old pups

Faggella AM, Aronsohn MG, *JAVMA* 1994; 205:308-314

When to Neuter: the Controversy

Guarneri-Boe MA, Lange D, *Iowa State University Veterinarian* 1995; 57:6-9.

It's Time For Early Age Neutering

Mackie WM, *California Veterinarian* 1992; 46:19-21

Should dogs in animal shelters be neutered early?

Crenshaw WE, Carter CN, *Veterinary Medicine* 1995; 90:756-760

Early Spay/Neuter: Risks and Benefits for Shelters

Moulton C, *American Humane Shoptalk* 1990; 7:1-6 and 8:1-9

Illinois Veterinary Bulletin Volume 6, Number 1, April 1998

Early Neutering of the Dog and Cat: Pros and Cons

Johnston SD, *BSAVA Congress, Birmingham, April 1998*

What about early neutering

Haughie A, *Feline Advisory Bureau Journal*, Vol 36, 1998

Paediatrics: Dogs and Cats from Birth to Six Months, Second Edition

Hoskins J, *DVM Magazine*, November 1996

Implications of Early Neutering in the Dog and Cat

Stubbs WP, Bloomberg MS, *Seminars in Veterinary Medicine and Surgery (Small Animal)* Vol 10, No 1 pp 8-12, February 1995

Short-term results and complications of prepubertal gonadectomy in cats and dogs

Howe LM, Olson PN, Johnston SD, *JAMVA*, Vol 202, No 6, March 15 1993, *JAMVA* 211 (1) 57-62 July 1997

Early neutering of cats and dogs

Poole C, *Vet Rec* 1997, Dec 6; 141(23):608

AVMA News Spaying/neutering comes of age

JAVMA 1993; 203:591-593

Early spay/neuter in the cat

Summary prepared by Diana Cruden, PhD, A progress report on a study funded by The Winn Feline Foundation, 1991, continuation funded February 1992

WSPA

World Society for the Protection of Animals (WSPA) is an international organisation working in over 90 countries with a network of more than 400 member societies. WSPA has representation at United Nations (UN), Council of Europe (CoE) and works in co-operation with the World Health Organisation (WHO) and the Federation of European Companion Animal Veterinary Associations (FECAVA).



Pet Respect is a department of WSPA which seeks to improve the status and treatment of companion animals.



World Society for the Protection of Animals

89 Albert Embankment, London, SE1 7TP, UK.

Tel: +44(0)20 7587 5000 Fax: +44(0)20 7793 0208

e-mail: petrespect@wspa.org.uk

www.wspa-international.org