

EARLY NEUTERING of KITTENS

Knowledge and practices. Impact on cats' population control/ management and welfare.

Cats are routinely surgically neutered. While traditionally, this is done around the age of 6 months, neutering can also be done earlier e.g. between 2 and 4 months. FVE in this document defines early neutering as neutering before the age of 4 months. In some countries, early neutering is widely used whereas in other countries this practice is not common.

In the document below, you can find an overview of the advantages and dis-advantages of early neutering.

FVE position

- No kitten should be neutered before they are weaned (~8 weeks).
- No specific recommendation can be made universally to perform the neutering of cats early (between 2-4 months) or late (after 4 months), as both methods have advantages and disadvantages. The decision should be taken considering the risks and benefits for the individual animal taking into account updated scientific knowledge's and decision-making should include veterinary clinical judgement particularly in relation to anaesthesia and analgesia.
- To prevent unwanted breeding and to control a cat population, if the clinical conditions are met, early neutering is encouraged. Early neutering must go in line with identification.
- For individually owned cats, FVE recommends to neuter them from 4 months. Before advising early neutering for private owned cats, more scientific knowledge should be obtained.

BACKGROUND

Surgical neutering by bilateral removal of the gonads and spaying are the only routinely techniques that allows definitive control of reproduction in domestic, stray and feral cats. Although being a routine surgery, the veterinarian must take into account (as for any surgery) the balance between the benefits and the risks for the animal, in the short and long term. Currently, indications and especially consequences of early neutering of kittens remain controversial in some countries/regions. In this paper, we will only focus on kittens and consider the current level of knowledge on early neutering from an animal welfare perspective/ point of view.

DEFINITIONS

Early age: What is considered an early age of neutering varies according to countries and also scientific publications: around the age of 6 to 12 weeks (Olson, 1997), between 6 and 16 weeks of age (Root 1999, 2013) or before 6 months of age (Howe, 2000). In the literal sense of the word, “early neutering” means before puberty. Because sexual maturity occurs at 4 months of age in some cats, with possible litters at this age, as well as a change in the urine smell in males, we propose to define early neutering in cats as neutering before 4 months of age.

Unweaned kittens (less than 8 weeks) do not ingest enough solid food to recover in the best conditions from surgery, thereby making neutering before this age unsuitable. In this paper, we consider early neutering between 2 and 4 months.

Castration: Bilateral surgical removal of the gonads, mostly used in relation to removal of the testes in a male cat

Spay or Sterilisation: These words are often used in a female cat when talking about the removal of the ovaries and sometimes also the uterus. However, the correct wording is castration or ovario(hyster)ectomy.

Gonadectomy: surgical removal of the gonads (= testes or ovaries)

Ovarioectomy: surgical removal of the ovaries

Overiohysterectomy: surgical removal of the ovaries and the uterus

Neutering: means the removal of the reproductive organs of a male or female cat. In a male cat it means castration, however in female cats it refers to either removal of the ovaries or removal of the ovaries and the uterus. **In this paper we use the word neutering.**

STATE OF CURRENT PRACTICES:

In some countries (such as the United Kingdom, Belgium, the United States, Australia, etc.), early neutering is widely used whereas in other countries this practice is not common. The situation differs widely between countries regarding veterinary conditions, such as availability of equipment (e.g., anaesthesia), level of training in veterinary schools, or availability of information about growth, behavioural development and risk of obesity in early neutered kittens. Surveys in United States (Spain et al 2002) and in Great Britain (Murray et al 2008) show that advocates of early neutering are those who have the experience and *vice versa*.

OVERVIEW OF AVANTAGES AND DISAVANTAGES OF EARLY NEUTERING BETWEEN 2 AND 4 MONTHS

SHORT-TERM RISKS:

Anaesthesia and surgery:

Characteristics of very young animals (size, predisposition to hypoglycaemia and hypothermia, etc.) can lead to anaesthetic and surgical risks. While respecting physiological and behavioural characteristics of young animals, and under good conditions of surgery (keep warm, available anaesthetic, protocol, starving max 3hours,

etc.), several authors consider for more than 20 years that early neutering entails no greater risk than at a later age. They report that early surgery is easier, faster, less traumatic for animals and cheaper (Stubbs et al 1996; Aronsohn et Fagella, 1993; Grandy et Dunlop 1991; Lieberman, 1988 ; Gourley, 1987). Pre and post-operative complications seem equivalent (Aronsohn et Fagella, 1993) or less important (Howe, 1997) in early neutering compared to late neutering.

In terms of anaesthesia and surgery, the harm-benefit analysis between early and late neutering depends mainly on conditions of safe practices taking into account particularities of very young cats.

Effects of LONG-TERM potential RISKS:

Mammary tumours:

In cats, studies showed that the risk of developing mammary tumours was greatly reduced if the cats were sterilised before the age of 6 months (Overley et al, 2005). To our knowledge, an additional advantage of neutering before 4 months to reduce mammary tumours remains to be verified.

⇒ In terms of mammary tumours risks, more investigation is needed to know advantages and disadvantages of early neutering.

Growth:

Stubbs et al (1996-31 kittens) and Root et al (1997-36 kittens) studied the radius or ulna growth in both sexes depending on the age at neutering (at 7 weeks old vs at 7 months old). Delayed proximal ulnar cartilages closing is seen in early sterilised females, suggesting that growth is slower and prolonged in kittens early neutered. The clinical relevance of slower physal maturation remains unclear (Perry et al 2014). Studies also show no evidence of an increased risk in physical fractures, most likely as neutering may shorten the period of risk behaviour for traumatic fractures and because castrated cats less wander around (Yates).

⇒ In terms of growth, the harm-benefit analysis would require more longitudinal or retrospective studies to conclude if slower growth and increased bone final length are good or not for the health and welfare of the cats.

Weight:

Regardless of the age at which the act is performed, neutering can be associated with hyperphagia and weight gain hence requires food restriction (Wei 2014). Few studies have specifically addressed the relationship between age at time of neutering and the development of overweight in cats (Stubbs et al 1996, Root et al 1996, Alexander et al 2011, Porters et al, 2014). Stubbs et al (1996-31 kittens) suggest that surgical neutering at 7 weeks vs 7 months old prevents weight gain. In her study, Porters (2014) observed that plasma leptin concentrations in cats at six–eight months of age were higher in early neutered cats (8-12 weeks) compared with late neutered cats (6-8 months).

⇒ In terms of weight, the harm-benefit analysis seems in favour of early neutering.

Urogenital disorders:

Any neutering leads to a significant regression of penile spicules in cats, but early neutering leads to a lack of their development (Stubbs et al 1996). There is a total lack of knowledge about the consequences of this. While there is no solid scientific evidence that the age of neutering impacts emergence of urinary disorders (Porters et al 2014), some studies think neutering might be a predisposing factor for the development of urethral obstructive disease in later life (Borges 2017).

⇒ In terms of urinary disorders, the harm-benefit balance between early/late neutering seems equivalent.

Infectious diseases:

There is no infection risk increase if neutering is performed early rather than after 6 months (Howe, 2000-263 cats) or early rather than after 5.5 months (Spain et al, 2004). To our knowledge, studies on effects of early neutering on infection risks have not been yet performed. On the contrary, in a feral colony where cats aren't neutered prepubertally, if there consequently end up being more intercourse, more kittens may end up being susceptible to infectious diseases such as FPV or FIP.

⇒ In terms of infectious diseases, the harm-benefit balance between early /late neutering needs more investigation.

Others health disorders:

Few studies have specifically addressed the relationship between early neutering and musculoskeletal disorders risks (Houlton et Mc Glennon, 1992-12 reported cases; Porters et al 2014-800 cats). The first authors show an increased risk of fractures in neutered male cats with delayed growth cartilage closure whereas Porters et al shown no significant differences between cats neutered between 8-12 weeks vs cats neutered between 6-8 months in terms of lameness, fractures and hypersensitivity disorders.

A lower incidence of gingivitis is observed in cats neutered before 5.5 months (Spain et al, 2004).

Although a genetic predisposition seems likely, neutering might be a predisposing factor for development of epiphysiolysis in Maine Coon cats as well (Borak, 2017).

⇒ In terms of fractures, lameness, skin disorders, the harm-benefit balance between early /late neutering needs more investigation.

Behaviour:

Most studies investigated the impact of early neutering on behaviours such as inappropriate elimination (Porters, 2014; Wright et Amoss, 2004; Howe et al, 2000), fearfulness (Spain et al, 2004), aggression against conspecifics or human beings (Porters, 2014; Wright et Amoss, 2004) and destructions (Porters, 2014). Unfortunately, these studies were mostly not consistent with regard to the age of neutering and/or impacts found.

- ✓ Inappropriate elimination: Porter (2014-800 cats neutered between 8-12 weeks old versus 6-8 months old), Howe et al (2000-263 cats neutered before/after 6 months old), Wright and Amoss (2004-126 cats neutered between 6 to 13 weeks versus between 5 to 7 months) describe an equivalent urinary marking and inappropriate urination in early and late castrated male and female cats. Nevertheless, the latter study shows a significant decrease in inappropriate urination during the first month following adoption in early neutered females compared to those neutered later. Among male cats (neutering <5.5 months of age), the occurrence of urine spraying was decreased compared with cats that underwent neutering at an older age (Spain et al, 2004-1660 cats).
 - ✓ Aggressions against conspecifics: among male cats (neutering <5.5 months of age), the occurrence of abscesses (also likely aggressions with conspecifics) was decreased compared with cats that underwent gonadectomy at an older age (Spain et al, 2004-1660 cats). Wright and Amoss (2004-126 cats neutered between 6 to 13 weeks versus between 5 to 7 months) showed increased intra specific aggressions during the first month following adoption but then this effect disappears.
 - ✓ Aggressions against human beings: According to a study (Wright and Amoss (2004-126 cats neutered between 6 to 13 weeks versus between 5 to 7 months), the incidence of aggression towards human beings is significantly reduced in adulthood in females neutered early compared to those that have been neutered later.
 - ✓ Fearfulness: Among cats that underwent early-age gonadectomy (<5.5 months of age), the occurrence of hiding (males) and shyness (males and females) was increased, compared with cats that underwent gonadectomy at an older age (Spain et al, 2004-1660 cats).
- ⇒ In terms of behaviours, we can only conclude that early neutering reduces several undesirable behaviours in kittens coming from shelters. More research is needed for the harm-benefit balance between early /late neutering on behaviours.

THE WELFARE OF EARLY NEUTERED CATS

At the feline population level:

- ✓ Early neutering has undeniable advantages.
 - Performed before the adoption of kittens, it prevents any reproduction and thus permit a better control of populations. Early neutering also leads to less diseases in stray cats (Looney et al 2008). Given that neutered kittens are less likely to be abandoned (Patronek et al 1996), early neutering can even more have beneficial effects.
 - If carried out with identification as one procedure, neutering and identification, this is benefit for stray population management and, of course for animal.
- ✓ Early neutering has same detrimental effects than late neutering in terms of genetic diversity. However, when mainly performed in non-purebred cats, this

can potentially lead to a lack of non-purebred cats which could push future owners towards buying a purebred cat.

Inherited disorders tend to be more common among purebred/pedigree cats because the selective breeding and in-breeding used to develop particular characteristics of the breed may also increase the risk of inherited disorders.

At the individual level:

- ✓ Early neutering has some advantages: it reduces unwanted behaviours such as urinary marking, inappropriate urination, and aggressions. This promotes the quality of the relationship with the owner, and thus the welfare of the cat. Early neutering can induce on the other hand also increased fearfulness.
- ✓ For other considerations (weight, lameness, skin disorders, infectious diseases), most of studies show no disadvantage of early neutering compared to late neutering and thus no impact on the cat's welfare.
- ✓ There is still ongoing research questions about the effects of early neutering on individuals: the development of kittens originating from families or breeders have not been taken into account in previous studies because most of studies evaluating impacts on early neutering have been carried out in cats originating from shelters. In addition, many fields have not been yet investigated, such as impact of early neutering on other behaviours than those that are undesirable. For example, nothing is known about impact on cognitive skills or on social abilities that could impair animal welfare. In dogs (Scandurra, 2018) gonadectomy impacts the progression in cognitive impairment in aging dogs. It has not been investigated if early neutering has more important effects or not. In rats, prepuberal gonadectomy reduces the expression of a sexually dimorphic behaviour, juvenile rough-and-tumble play, as well as the level of excitatory synaptic transmission assayed in adulthood (Cooke and Wooley, 2009).

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