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**EARLY NEUTERING of KITTENS**  
**Knowledge and practices. Impact on cats' population control/ management and welfare.**

**DRAFT FOR MEMBER CONSULTATION**  
**DEADLINE 31 MARCH 2019**  
**COMMENTS TO [NANCY@FVE.ORG](mailto:NANCY@FVE.ORG)**

### **FVE position**

- Cats are routinely surgically castrated. While traditionally this was done around the age of 6 months, neutering can also be done earlier e.g. between 2 and 4 months. 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.
- In the underneath document, you can find an overview of the advantages and dis-advantages of neutering between 2 and 4 months of age.
- FVE concludes that no specific method can be advised (early vs late neutering), but recognises that both methods have advantages and disadvantages. Preference should depend on conditions (e.g. material available, vet's preferences, anaesthesia protocol used, ..).
- To control cat population, if the clinical conditions are met, early neutering is encouraged.
- For all cat neutering, more knowledge should be obtained before encouraging early neutering unanimously. At a population level, potential detrimental effects for purebred cats exists; at individual level, we have not enough scientific evidence that early neutering do not impact animal welfare.

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### **BACKGROUND**

Surgical castration by bilateral removal of the gonads is the only technique used in routine that allows the definitive control of reproduction in domestic carnivores. Although this represents 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. Today indications and especially consequences of early surgery of puppies and kittens remain highly controversial. We will only focus on kittens and consider the current state of knowledge on early neutering from an animal welfare perspective/ point of view.

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## 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.

As kittens aging less than 8 weeks do not ingest enough solid food to recover in the best conditions from surgery, making neutering before this age unsuitable, we will consider early neutering between 2 and 4 months.

**Castration:** Bilateral surgical removal of the gonads, in other words: removal of the testes in a male cat or the ovaries in a female 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 ovaria)

**Ovarioectomy:** surgical removal of the ovaria

**Overiohysterectomy:** surgical removal of the ovaria and the uterus

**Neutering:** means the removal of the reproductive organs of a male or female cat. In a male cat it has the same meaning as 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 anaesthesia and surgical risks. While respecting physiological and behavioural characteristics of young animals, and under good

97 conditions of surgery (clinic, available anaesthesia, protocol etc.), for more than 20 years  
98 several authors consider that early neutering entails no greater risk than at a later age.  
99 According to them, early surgery is easier, faster, less traumatic for animals and cheaper  
100 (Stubbs et al 1996; Aronsohn et Fagella, 1993 ; Grandy et Dunlop 1991; Lieberman, 1988 ;  
101 Gourley, 1987). Per and post-operative complications seem equivalent (Aronsohn et  
102 Fagella, 1993) or less important (Howe, 1997) in early neutering compared to late  
103 neutering.

104

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

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109 LONG-TERM potential RISKS:

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111 *Mammary tumours:*

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113 Due to the limited evidence available and the risk of bias in the most published results,  
114 the evidence that neutering reduces the risk of mammary neoplasia, and the evidence  
115 that age at neutering has an effect, are judged to be weak and are not a sound basis for  
116 firm recommendations in dogs (Beauvais et al, 2012). In cats, studies showed that the risk  
117 of developing mammary tumours was greatly reduced if the cats were sterilised before  
118 the age of 6 months (Overley et al, 2005). To our knowledge, the advantage of sterilisation  
119 before 4 months to reduce mammary tumours remains to be verified.

120

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

123

124 *Growth:*

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126 Stubbs et al (1996-31 kittens) and Root et al (1997-36 kittens) studied the radius or ulna  
127 growth in both sexes depending on the age at neutering (at 7 weeks old vs at 7 months  
128 old). Delay of growth of proximal ulnar cartilages closing is seen in early sterilised females,  
129 suggesting that growth is slower in kittens early neutered. The rate of growth is not, *per*  
130 *se*, modified by sterilisation, whether early or not: growth seems prolonged due to  
131 sterilisation, especially when it is carried out at early age. The clinical relevance of slower  
132 physéal maturation remains unclear (Perry et al 2014).

133

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

137

138 *Weight:*

139

140 Regardless of the age at which the act is performed, neutering induces hyperphagia and  
141 weight gain hence requires food restriction. Few studies have specifically addressed the  
142 relationship between age at time of neutering and the development of overweight in cats  
143 (Stubbs et al 1996, Root et al 1996, Alexander et al 2011, Porters et al, 2014). Stubbs et al  
144 (1996-31 kittens) suggest that surgical neutering at 7 weeks vs 7 months old prevents  
145 weight gain. In her study, Porters (2014) observed that plasma leptin concentrations in

146 cats at six–eight months of age were higher in early neutered cats (8-12 weeks) compared  
147 with late neutered cats (6-8 months).

148

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

151

152 *Urogenital disorders:*

153

154 Any neutering leads to a significant regression of penile spicules in cats, but early  
155 neutering leads to a lack of their development (Stubbs et al 1996). There is a total lack of  
156 knowledge about the consequences of this. But there is no scientific evidence that the age  
157 of neutering impacts emergence of urinary disorders (Porters et al 2014).

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

161

162 *Infectious diseases:*

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164 There is no infection risk increase if neutering is performed early rather than after 6  
165 months (Howe, 2000-263 cats) or early rather than after 5.5 months (Spain et al, 2004-  
166 1660 cats). On the contrary, fewer gingivitis are observed in cats neutered before 5.5  
167 months. To our knowledge, effects of early neutering on infection risks has not been yet  
168 performed.

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

172

173 *Others health disorders:*

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

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

184

185 *Behaviour:*

186

187 Most studies investigated the impact of early neutering on behaviours such as  
188 inappropriate elimination (Porters, 2014; Wright et Amoss, 2004; Howe et al, 2000),  
189 fearfulness (Spain et al, 2004), aggression against conspecifics or human beings (Porters,  
190 2014; Wright et Amoss, 2004) and destructions (Porters, 2014). Unfortunately, age of  
191 early neutering and age where impacts on behaviour were investigated depend on  
192 studies.

193

194 ✓ Inappropriate elimination: Porter (2014-800 cats neutered between 8-12 weeks  
195 old versus 6-8 months old), Howe et al (2000-263 cats neutered before/after 6

196 months old), Wright and Amoss (2004-126 cats neutered between 6 to 13 weeks  
197 versus between 5 to 7 months) describe an equivalent urinary marking and  
198 uncleanliness in early and late castrated male and female cats. Nevertheless, the  
199 latter study shows a significant decrease in urinary uncleanliness during the first  
200 month following adoption in early neutered females compared to those neutered  
201 later. Among male cats (neutering <5.5 months of age), the occurrence of urine  
202 spraying was decreased compared with cats that underwent neutering at an older  
203 age (Spain et al, 2004-1660 cats).

204

205 ✓ Aggressions against conspecifics: read article Among male cats (neutering <5.5  
206 months of age), the occurrence of abscesses (also likely aggressions with  
207 conspecifics) was decreased compared with cats that underwent gonadectomy at  
208 an older age (Spain et al, 2004-1660 cats). Wright and Amoss (2004-126 cats  
209 neutered between 6 to 13 weeks versus between 5 to 7 months) showed  
210 increased intra specific aggressions during the first month following adoption but  
211 then this effect disappears.

212

213 ✓ Aggressions against human beings: According to a study (Wright and Amoss  
214 (2004-126 cats neutered between 6 to 13 weeks versus between 5 to 7 months),  
215 the incidence of aggression towards human beings is significantly reduced in  
216 adulthood in females neutered early compared to those that have been neutered  
217 later.

218

219 ✓ Fearfulness: Among cats that underwent early-age gonadectomy (<5.5 months of  
220 age), the occurrence of hiding (males) and shyness (males and females) was  
221 increased, compared with cats that underwent gonadectomy at an older age  
222 (Spain et al, 2004-1660 cats).

223

224 ⇒ In terms of behaviours, we can only conclude that early neutering reduces  
225 undesirable behaviours in kittens coming from shelters. More research is needed for  
226 the harm-benefit balance between early /late neutering on behaviours.

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## 228 **THE WELFARE OF EARLY NEUTERED CATS**

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230 At the feline population level:

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232 ✓ Early neutering has undeniable advantages. Performed before the adoption of  
233 kittens, usually carried out when cats are more than 8 months old, it prevents any  
234 accidental reproduction by new owners and thus permit a better control of  
235 populations and less diseases in stray cats (Looney et al 2008). Given that  
236 neutered kittens are less likely to be abandoned (Patronek et al 1996), early  
237 neutering can even more have beneficial effects.

238

239 ✓ Early neutering has same detrimental effects than late neutering in terms of  
240 genetic diversity. Mainly performed in non-pure bred, early and late neutering  
241 can lead to a lack of non purebred cats and this pushes future owners towards  
242 buying a purebred cat.

243

244 There are many health problems in many purebred cats. Care should be taken to  
245 avoid an increase of non responsible breeding of pure bred cats. This can lead to

246 a decrease in genetic diversity, which can lead to an increase in breed related  
247 hereditary diseases.

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251 ✓ Early neutering can have detrimental effects for purebred cats. In this case, the  
252 phenotype is not fixed at three months of age. In breeds with low genetic pool,  
253 early neutering is therefore not indicated since it will be a brake on diversity (risk  
254 of increasing homozygosity, consanguineous depression and hereditary recessive  
255 conditions).

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257 At the individual level:

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259 ✓ Early neutering has some advantages: in cats originating from shelters it reduces  
260 unwanted behaviours such as urinary marking, urinary dirtiness, and aggressions.  
261 It can be inferred that this necessarily promotes the quality of the relationship  
262 with the owner, and thus the welfare of the cat.

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264 ✓ For other considerations (weight, lameness, skin disorders, infectious diseases),  
265 most of studies show no disadvantage of early neutering compared to late  
266 neutering and thus no impact on the cat's welfare.

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268 ✓ Several questions remain about the effects of early neutering on individuals: the  
269 development of kittens originating from families or breeders have not been taken  
270 into account in previous studies because most of studies evaluating impacts on  
271 early neutering have been carried out in cats originating from shelters. In  
272 addition, many fields have not been yet investigated, such as impact of early  
273 neutering on other behaviours than those that are undesirable. For example,  
274 nothing is known about impact on cognitive skills or on social abilities that could  
275 impair the animal welfare. In dogs (Scandurra, 2018) gonadectomy impacts the  
276 progression in cognitive impairment in aging dogs. It has not been investigated if  
277 early neutering has more important effects or not. In rats, prepuberal  
278 gonadectomy reduces the expression of a sexually dimorphic behaviour, juvenile  
279 rough-and-tumble play, as well as the level of excitatory synaptic transmission  
280 assayed in adulthood (Cooke and Wooley, 2009).

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