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Inconvenient Desires:

Should we Routinely Neuter Companion Animals?[1]

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Abstract

Influential parts of the veterinary profession, and notably the American Veterinary Medicine Association, are promoting the routine neutering of cats and dogs that will not be used for breeding purposes. However this view is not universally held, even among representatives of the veterinary profession. In particular, some veterinary associations in Europe defend the view that when reproduction is not an issue, then neutering, particularly of dogs, should be decided on a case by case basis. However, even in Europe the American view is gaining ground. In light of this situation, this paper considers whether or not routine neutering of cats and dogs, in cases where uncontrolled reproduction is not an issue, can be ethically defended. The starting point of this consideration is a review of the veterinary literature on the effects of neutering on companion animals. The focus is both on the welfare of neutered animals themselves, and on behavioral and other effects that may not directly affect the animals' welfare, but that may be motivating factors for owners to neuter their companion animals. Here it becomes clear that justification for *routine* neutering, particularly of confined male dogs, does not follow from claims about the dogs' own welfare. The costs of neutering male dogs, in terms of the increased risk of very serious diseases, may well outweigh the benefits. Then, building on this veterinary material, but including some other, ethical considerations, the paper goes through some possible ethical approaches to routine animal neutering. These ethical approaches offer different degrees of concern about, or opposition to, routine neutering. Finally, based on this ethical exploration, it is argued that *routine*

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neutering, at least in the case of non-free-ranging companion animals, raises significant ethical questions, and from some ethical perspectives, looks highly problematic.

Key words: neutering, cats, dogs, ethics, companion animals, welfare

Introduction

In a leaflet published by the American Veterinary Medical Association (AVMA 2010), owners of pet dogs and cats are strongly urged to have their animal neutered. "Having your pet spayed or neutered is a part of responsible pet ownership", the organisation maintains, adding "by having your dog or cat surgically sterilized, you will do your part to prevent the birth of unwanted puppies and kittens and enhance your pet's health and quality of life". The leaflet emphasizes that neutering will be good for the health and quality of life of the affected animals, and maintains that for both male and female companion animals, the benefits of neutering by far outweigh the risks.

However, this is not a view shared by veterinarians all over the world. In large parts of Europe, for example, veterinarians are traditionally much more reluctant to neuter, particularly to neuter dogs. In Sweden, for example, it was illegal to castrate a male dog until 1988, unless there was a specific medical reason for doing so. And the official view of Swedish veterinarians is still much more restrictive than that of their American counterparts. The section of the Swedish Veterinary Association dealing with companion animals issued a statement (last revised in 2011) in which routine surgical neutering of dogs is rejected as sound policy (SVS 2011). This statement maintains that culturally based differences between countries concerning how dogs are kept affect the extent to which unwanted puppies are a problem. It's claimed that in Sweden, despite the fact that only about seven percent of bitches, and an even smaller percentage of male dogs, are neutered, any problem with unwanted stray dogs is insignificant. Furthermore, the statement notes, scientific veterinary literature gives reasons both for and against the routine surgical neutering of dogs.

In other parts of Europe the position is somewhere between that expressed by the American and the Swedish veterinary associations. In Britain, a position paper developed by the Ethics and Welfare Group of the British Veterinary Association (BVA 2011), and policy statements issued by the British Small Animal Veterinary Association (BSAVA 2006a, 2006b & 2006c) unanimously recommend neutering of male and female cats and of female dogs, but argue that decisions about castration of male dogs should be taken on a case by case basis. In Denmark, where one of the authors of this paper is located, common practice has traditionally been much like that in Sweden. However, the Danish Veterinary Association has no official policy on the issue, and some of its members seem to be increasingly influenced by the American attitude. Through shared

international media – such as television channels focused on animal issues - the idea is spreading that routine neutering is the normal thing to do. Some small animal clinics in Denmark, which likely have a vested interest in the matter, have started to advertise and advise accordingly.

In light of these contrasting approaches, there is reason to suspect that the issue is not just about the best way to weigh costs and benefits for the affected animals. Of course, as indicated in the statement from the Swedish Veterinary Association, there may also be significant local differences regarding problems with the control of stray and feral populations of cats and dogs. However, we suspect that this does not fully explain the policy differences. Rather, we think that there are also *value* differences involved, and it's these that we'll be discussing in this paper.

We have already seen that two broad arguments are made in favor of routinely neutering companion animals: to control stray and feral animal populations, and to benefit the neutered animals themselves. We will not be addressing the question of stray and feral populations here. Instead, we will explore the ethical acceptability of recommending routine neutering for companion animals that do not roam outdoors in any uncontrolled fashion, as it is the case for many companions across North America and Europe. Such companion animals typically have no opportunity to become pregnant or to make other animals pregnant.

More precisely, we will focus here on two claims often put forward as reasons for why companion animal neutering should be routine: (1) Neutering is good for the health and well-being of the animals actually neutered; and (2) Neutering makes the animals into better companions and thereby benefits the owner – and thereby indirectly the animals which will then have an easier time with their owners. Thus fundamentally, the argument is that routine neutering is a good thing since all the parties concerned benefit from the practice.

In considering this argument, we'll first look at some of the veterinary literature on the effects of neutering on companion animals. We'll concentrate on the neutering of cats and dogs, since these are the animals most frequently kept as companions, and the animals that are most frequently routinely neutered. In reviewing this veterinary research, we'll focus on the welfare of neutered animals themselves, but we'll also include behavioral and other effects that may not directly affect the animals' welfare, but that may be motivating factors for owners to neuter their companion animals (and may therefore indirectly affect welfare, since they affect owners' interactions with the animals).

Then, building on this veterinary material, but including some other, additional considerations, we'll work through some possible ethical approaches to routine animal neutering. These ethical approaches, we'll suggest, offer different degrees of concern about, or opposition to, routine neutering. Finally, based on this ethical exploration, we'll argue that routine neutering, at least in the case of non-free-ranging companion animals, raises significant ethical questions, and from some ethical perspectives, looks ethically highly

problematic. We should emphasize, however, that we are only concerned with *routine* neutering here – that is, neutering of healthy animals as a matter of course. Thus we do not want to question that in many cases, even amongst non-free-ranging companion animals, neutering is the right thing to do. This paper is concerned with what's taken to be routine, not with what's justifiable in specific cases and contexts.

Neutering and Animal Welfare: Veterinary Perspectives

Neutering is carried out at the behest of the individuals responsible for particular animals, individuals who are often concerned about the animals' welfare. Were they to reflect on the matter - which admittedly many people don't – they would ask something like: If I try to take the point of view of this animal, will neutering, all things considered, be a good thing? That is, will the costs to the animal be outweighed by benefits in terms of welfare? This is the question we will first try to address here, in the context of existing veterinary literature.

The answer to this question will clearly depend on what's understood by *animal welfare*. There's a long and complicated discussion about this subject (Fraser et al. 1997; Appleby & Sandøe 2002), different elements of which will be developed later in the paper. In this part of the paper, though, in order to make use of the veterinary literature, we will narrow the welfare concern down. By welfare, we'll refer to what's most commonly discussed in veterinary journals, that is to avoid premature death, and pain, fear and other forms of suffering. As noted above, we'll also include effects of neutering that may not be directly welfare-affecting in terms of the animals neutered, but that are of significance to those who live with companion animals, and so (via human treatment) may indirectly impact on the animals themselves.

Neutering involves surgery. Any surgical procedure involves stress to an animal: the stress of being taken to the vet, being left in unfamiliar surroundings with strangers, undergoing general anesthesia and surgical trauma, and enduring some degree of pain. Most potential pain can be avoided by means of anesthesia and subsequent use of pain-killers, but there will inevitably be some, relatively short-term, pain from surgery. Additionally, all surgery can have negative unintended side-effects. These can be minor (e.g. inflammation at the site of the incision) or major (e.g. bleeding, wound breakdown, infection, or death). Complication rates vary with the procedure, but Pollari et al (1996), in a study of 1,016 dogs and 1,459 cats undergoing elective surgery, reported post-operative complications in 6.1-19.4 % of dogs and 2.6-12.2% cats, most of which were minor.

There is also the potential for longer-term costs and benefits to neutered animals, in terms of reducing or increasing incidence of disease, suffering, and length of life which, however, will vary considerably according to the species and sex of the animal being neutered. We'll use four categories here: female dogs (*bitches*) female cats (*queens*), male dogs and male cats (*toms*).

Bitches

Neutering female animals normally involves removal of the ovaries. In bitches, traditionally not only have the ovaries have been removed (ovariectomy [OE]), but also the uterus (ovariohysterectomy [OHE]). A large retrospective review of studies (1969-2004) comparing OHE and OE concluded that OHE is more invasive, technically more complicated, takes longer, may be associated with greater negative side-effects than OE, and no distinct advantages were identified for removing the uterus from otherwise healthy bitches (van Goetham et al 2006). Nor was any difference in long-term side-effects between the procedures found (Jannssens and Janssens 1991: Okkens et al 1997). Yet the majority of bitches seem to undergo OHE. Thus Diesel et al (2010) report that 97.4% of vets in Great Britain perform OHE's compared to the 1.2% who perform OE's. There are relatively straightforward reasons, then, for preferring OE to OHE, although this is not current practice. But since the concern here is with *any* form of neutering, not with the *method* of neutering, we'll not go further into this here. We will, in the rest of the paper, focus on the broader question of neutering in general.

Obviously, neutering bitches prevents pregnancy and its potential complications, such as going through difficult births, pseudopregnancy (in which the remains of an ovulated ovarian follicle persists) and potential diseases in the ovaries and the uterus. The most common of these diseases is an infection of the uterus, pyometra, which is reported to occur in 15.2% of entire bitches by 4 years of age, and 23-24% by 10 years of age (Fukuda 2001; Egenvall et al 2001; Hagman 2004), and is associated with mortality rates of 0-5% (Stone et al 1988; Wheaton et al 1989) Occasionally, infection of the residual uterine stump (a 'stump pyometra') may still occur after neutering; however this is unusual, tending only to happen if a portion of ovarian tissue is left behind, or the animal is given progestational hormones.

Neutering also significantly reduces the risk of mammary tumors, which have a reported incidence of 3.4% (Fidler and Brodey 1967; Dorn et al 1968; Moe 2001; Richards et al 2001) with 50.9% being malignant (Cotchin 1951; Dorn et al 1968; Moulton et al 1970; Brodey et al 1983). Compared to intact bitches, neutering before the first season reduces the risk to less than 0.5%; after the first season, the risk is 8%, after the second, 26%, with no preventative effect if performed after 2.5 years (Schneider et al, 1969).

However, there are also some negative side-effects of neutering bitches. Complication rates of 14.2-19.4% have been reported following OHE (Pollari et al 1996; Burrow et al 2005), and the most common cause of death is bleeding (Pearson 1973) (though obviously, this could be reduced by switching from OHE to OE).

Urinary incontinence post-neutering is a major concern for the owner (although this may not directly affect the animal's own welfare). Acquired urinary incontinence occurs in < 1% of intact bitches (Holt and Thrusfield 1993), but incontinence rates after spaying have been reported as being between 3.1% and 20% (von Ruckstuhl 1978; Arnold et al 1989; Holt and Thrusfield 1993; Okkens et al 1997; Angioletti et al 2004;

Veronezi et al 2009). Thrusfield et al (1998) reported that neutered bitches have a 7.8-fold greater risk of developing urinary incontinence compared with entire bitches. The risk of developing post-neutering incontinence is increased in large and giant breeds, with increasing bodyweight, and in dogs that have also been tail-docked (Arnold et al 1989, Holt and Thrusfield 1993; Okkens et al 1997; Nickel et al 1999; Angioletti et al 2004: Veronezi et al 2009; de Bleser et al 2009). In many cases, though, post-neutering incontinence can be successfully treated; a 1985 study of 150 bitches reported treatment to be successful (i.e. continence was regained) in 40% with medical treatment, and 50% following surgical intervention (colposuspension) (Holt 1985).

As well as urinary incontinence, increased aggression has been reported in neutered bitches in a number of studies (Dodman 1996; O'Farrell and Peachey 1990; Hart and Eckstein 1997; Grandin and Johnson 2006; Houpt 2006; Overall 2007) but it is not always clear whether the aggression was the reason for neutering, or a consequence of the procedure. And again, this may not directly impact on welfare, though it may impact on the bitch's relations to other dogs and people.

Overall, there are some documented and significant welfare benefits following from neutering bitches. These are mainly related to a lower incidence of certain serious hormonal and reproduction-related diseases; and as consequence, neutered female dogs are likely to live longer than intact ones. It is true that some research suggests that compared to entire animals, neutered bitches do have an increased risk of *other* diseases in addition to the ones already mentioned (Ru et al 1998; Ware and Hopper 1999), but this, in turn, may be a consequence of their longer lifespan (Kraft 1998; Michell 1998; Waters et al 2000: Moore et al 2001; Greer 2007). Indeed, studies suggest that neutered animals may in general have a longer life span than intact animals (Kraft, 1998; Waters et al, 2000: Moore et al, 2001; Michell, 1998; Greer 2007), possibly due to a reduction in risky behaviours such as roaming, and prevention of certain reproductive and other diseases (Reichler, 2009). Longer life may also reflect the increased level of care given by owners who neuter their animals (Root Kustritz, 2007). There are, then, some negative side effects of neutering, not only related to the surgery, but also in the form of a higher risk of incontinence and increased chance of rupture of the cranial cruciate ligament (Slauterbeck et al 2004). However, on balance, the welfare of bitches in terms of longevity and avoidance of suffering may, in the long term, be enhanced, or at least not reduced, by neutering.

Queens

When it comes to *female cats* (queens), as with bitches, neutering eliminates the risk of pregnancy and its complications. Since more queens than bitches are allowed to roam relatively freely, pregnancy without neutering is more likely in the case of cats than dogs; and pregnancy gives rise to health risks. As with bitches, queens are usually neutered using OHE (though OE is more prevalent in a few countries) and similar

complications can occur. Pollari et al (1996) report the complication rate following OHE in cats to be 16.3% (7/43 cats); Freeman et al (1987) reported a higher rate of 33% (22/66 cats), but this was mostly associated with suture reactions using materials that are no longer used.

Research suggests that neutering queens has some positive and negative long-term welfare effects. Intact queens have a seven times greater risk of developing mammary tumors than neutered ones (Dorn et al 1968), and 80-90% of them are malignant; but nonetheless, the incidence is much lower than in bitches. Neutering cats before 6 months of age results in a 91% reduction in the risk of developing mammary carcinomas (Overly et al 2005), and prevents mammary fibroadenomatous hyperplasia, which can lead to severe tissue necrosis, ulceration and infection (Little 2011). In contrast to bitches, neutering female cats has not been associated with an increased incidence of any urinary tract problems (Stubbs et al 1996; Root et al 1997; Howe et al 2000), and neutered free-roaming queens actually showed reduced aggression compared to intact cats (Finkler and Terkel 2010). However, neutered cats of both sexes are 3.4 times more likely to become obese than entire cats (Fettmen et al 1997; Kanchuk et al 2002; Nguyen et al 2004). Diabetes occurs in 0.4% of entire cats, and neutered cats have a 2 to 8.7-fold increased risk of becoming diabetic (Panciera et al 1990; McCann et al 2007). Of course, obesity can in most cases be controlled by careful diet management, so this is not a *necessary* negative outcome of neutering.

There are, then, some welfare reasons in favor of neutering queens, especially if they are allowed to roam outdoors, though in terms of avoiding serious disease, these seem considerably weaker than reasons to neuter bitches. Fewer complications result from neutering queens than bitches, though there are rising concerns about increased levels of obesity and health problems following from neutering.

Male dogs

Male dogs are typically castrated by surgical removal of the testicles. This surgery itself rarely causes immediate complications. However, over the lifespan of a male dog, the welfare consequences of castration may be significant.

Obviously, castration removes the possibility of testicular disease (eg testicular cancer), and it reduces the risk of androgen-dependent diseases such as perineal hernias, perineal adenomas, prostatitis and benign prostatic hyperplasia (Teske and others 2002; Reichler 2009). However, the positive health effects of neutering are significantly smaller than in bitches, and the long-term negative effects on health, seem more severe. Castration increases the risk of prostate cancer by 2.4 - 4.3 times (Obradovich et al 1987; Bell et al 1991; Teske et al 2002; Sorenmo et al 2003; Bryan et al 2007). While this kind of cancer is rare in male dogs (0.2-0.6% incidence), it is almost always malignant (Weaver 1981; Bell et al 1991; Teske et al 2002). Castration also increases the risk of bladder cancer and bone cancer by as much as fourfold (Knapp et al

2000; Cooley et al 2002), and results in a 2.4 times greater risk of cardiac and splenic cancer (Prymark et al 1985; Ware and Hopper 1999).

One common reason for castrating male dogs is to limit aggression and other behavioral problems (which can cause injury to the dogs themselves, as well as being problematic for their owners to manage). However, the effect of neutering on male behavior seems to be variable. Guy et al (2001) reported that gender and reproductive status were significantly associated with aggression in dogs over 1 year of age: neutered male dogs were most likely of all to have bitten someone, but it is not clear from this and other studies whether the behavior was pre-existing, and the animal was neutered as an attempted treatment. Other studies suggest that aggression reduces after neutering (Hart 1976; Hopkins et al 1976). Neutering is reportedly effective in reducing roaming behavior (94% of dogs) and urine marking (50% of dogs) (Hart 1976; Hopkins et al 1976; Hart and Eckstein, 1979) and reportedly makes male (but not female) dogs of some breeds (Rottweilers and Shetland Sheepdogs) more trainable (Serpell and Hsu, 2005). However, in welfare terms, the costs of neutering dogs, in terms of the increased risk of very serious diseases, may well outweigh the benefits. Justification for *routine* neutering of confined male dogs, then, does not follow from claims about the dogs' own welfare.

Toms

In male cats (toms), as in male dogs, castration is the only practiced form of neutering. Testicular and prostate disease is very rare in male cats (Reichler, 2009), so neutering has little positive or negative direct impact on these aspects of welfare. However, toms are often neutered in an attempt to eliminate perceived problem behavior such as urine spraying, aggression and roaming. A study by Hart and Barrett (1973) found that castration was effective in eliminating problem behavior in 80-90% of cats: urine spraying rapidly reduced in most cats, whereas aggression towards other males and roaming behaviour changed rapidly in about 50%, and more slowly in the other half. A quarter of the cat owners reported that their cat had also become more docile.

The drop in risky outdoor behaviors such as fighting and roaming that results from neutering may be why Kalz (2001) report that neutered male cats are healthier and have a lower mortality rate. And the behaviors of many unneutered confined male cats – in particular, urine spraying – makes them into difficult companions for humans, with corresponding indirect impacts on welfare.

There are some significant long-term health effects of neutering cats of both sexes, as noted above: increased food intake, increased risks of obesity, and, relatedly, of becoming diabetic, though as also noted, strict control of diet will limit these effects. On balance, though there are some welfare reasons for neutering toms, the overall welfare benefits are not clear.

In summary, with the exception of bitches, where the benefits of neutering in terms of avoiding serious disease seem significant, there doesn't appear to be a clear welfare case for routine neutering of companion animals that are kept confined; and in the case of male dogs, the welfare evidence seems to weigh *against* routine neutering.

So far, we've considered concerns about longevity, and experiences of suffering caused or averted by neutering discussed in the veterinary literature. But these are not the only relevant concerns. Thinking about the ethics of routinely neutering companion animals raises a number of additional issues that we haven't so far discussed. To explore these issues, we'll outline three significant, but contrasting, approaches to ethics. Each of these approaches takes potential early death and suffering of animals seriously, but adds additional concerns, and understands the importance of these factors differently. A presentation of these three approaches should help to give a broader ethical picture of what may be at stake in routine companion animal neutering.

Neutering and ethical theories

The three approaches to be presented here are theorized versions of common ethical stances taken towards animals. Each person must find her or his standpoint and we, the authors of this paper, of course, have our own ethical views (not necessarily shared). However, we think it important to present the main ethical contenders for at least two reasons. First: it is important for work in ethics to make clear what's at stake and what choices are available. Second: we consider that the only rational way to make up one's mind about ethical issues is to be exposed to a number of competing perspectives, which present different available options. (See Sandøe & Christiansen 2008, Introduction for further defense of this view.)

The ethical approaches that we present here are biased in the sense that one important kind of view, i.e. a view that considers only human interests to be valuable in their own right, is omitted. We omit this view because the different parties to the discussion outlined the introductory section all appear to assume that animals matter in their own right, and this certainly seems to be a plausible starting point.

Consequentialist approaches

One of the major families of ethical theories is *consequentialist*. On this view, only the consequences of our actions/practices matter directly, not (for instance) our intentions. Utilitarianism is one particularly well known kind of consequentialist theory (though utilitarianism, too, has a number of forms). More specifically, standard forms of consequentialism are based on the idea that we should bring about the *best* consequences, measured in terms of whatever the good is construed as being. There are a number of different interpretations

of the good, and these differences are of relevance here. One is the idea of good associated with classical utilitarianism, primarily understood in terms of pleasure (as good) and pain (as bad). A second idea of good, found in many recent forms of utilitarianism, concerns preference or desire satisfaction (and the avoidance of desire frustration). A third form of good is perfectionist: on perfectionist views, what's good is the excellence of a being's life, and here what's good is therefore not the same as what's desired or as pleasant mental states).

From a consequentialist point of view we will therefore think about neutering through these lenses, of maximizing what's good and minimizing what's bad.

To begin with pleasure and pain: neutering certainly creates some degree of pain – usually not long lasting or serious, if anesthetic and pain-killers are used, although as we've seen (especially with OHE) there are small risks of more painful outcomes. Still, the unpleasant nature of a surgical procedure (and the accompanying fear, discomfort and so on) would count against it on a consequentialist view in which minimizing pain is a good. Performing painful medical procedures on animals for no benefit at all (to the animal concerned, or anyone else) would clearly be unethical. In the case of neutering bitches, however, the possible benefit of averting pain from disease later in life may be sufficient to outweigh the certain pain of neutering now. This isn't the case for male dogs (in fact, since neutering actually increases health risks for male dogs, the likelihood of pain later increases too, which adds to the negative cost of neutering.) And for cats of either sex that are kept indoors, it's at least debatable how pleasure and pain add up. Particularly in the case of male cats, problem behaviors may give rise to difficult relations with their owners, with eventual consequences for the cats too, in terms of confinement or euthanasia. If only these factors were at stake, a consequentialist is likely to find routine neutering male dogs – and perhaps also indoor female cats – ethically problematic, but the routine neutering of male cats and female dogs to be permissible or even desirable.

However, there are other factors at stake. One further issue – which may at first glance seem to count more strongly against neutering from a consequentialist standpoint – concerns not just the negative experiences neutering might bring, but also the positive experiences it will foreclose. The veterinary research we've so far summarized doesn't consider experiences not actually undergone. But once an animal is neutered, it will never be able to enjoy the experience of expressing certain important natural capacities – that is, sexual or maternal feelings. To be clear, the concern here is not that neutered animals undergo *negative* experiences of frustration or longing (since it's very implausible that neutered animals could feel these in relation to their missing sexual opportunities) but rather that they don't have relevant *positive* experiences. They are deprived of experiences that would have been enjoyable, even if they do not know what they are missing, or indeed that they are missing anything. There is, as it were, less good in the world because of the absence of these positive feelings.

But we should counter this worry by considering what the alternatives actually are for most companion animals. After all, *not* neutering an animal would raise similar concerns, if the animal is not allowed to mate or breed. In fact, the concerns here may be stronger, if the animal additionally has feelings of frustration. So, perhaps an unneutered tom may undergo negative experiences if consistently prevented from accessing queens; and if a bitch on heat is kept indoors and not walked during the time of the heat, then even if she has no sexual desire related to being in heat, her desire to be walked is frustrated. If animals are not to be allowed to breed, nor to behave sexually, then leaving them entire may mean not only that they don't have *pleasurable* experiences but that they actually have *frustrating* ones. From classical utilitarian and other consequentialist points of view a frustrated entire animal may be worse off than a neutered one.

A further factor to consider here concerns the nature of the experiences that flow from the human/companion animal relationship. Are neutered companion animals generally treated better by their owners than entire animals? If so, then they are likely to live happier lives if neutered. Answering this question is difficult, and surely contextual (and may depend on sex and species). There will be cases, as mentioned above, where better treatment ensues with neutering, because ”inappropriate” animal behaviors (such as urine spraying) that evoke negative human reactions are likely to be removed. But neutering may increase aggression (in bitches) and does not clearly decrease it in male dogs; and while male urine spraying may decrease with neutering, incontinence in bitches is likely to increase. So, the effects of neutering on human/animal relations in this sense is likely to vary.

In any case, from this kind of consequentialist point of view, such arguments don't necessarily settle the matter. Human behavior is, after all, amenable to change. To the extent that humans will treat their entire companions well *despite* their ”inappropriate” behavior, and the animals will gain experientially from being entire, that will surely be the ”best outcome” of all. In terms of maximizing pleasure and minimizing pain, if it's the case that an entire animal will - all things considered - live an experientially more pleasant life than a neutered one, then neutering looks to be a less than ideal compromise, even in cases where the behavior of entire animals provokes negative responses from those with whom they live.

Consequentialist approaches give different answers, though, if instead of pleasure and pain we focus on the satisfaction and frustration of desires or preferences as “the good”. It seems reasonable to say that at the time of surgery, and in the period of recovery, animals would prefer not to be in the negative states of fear, pain or discomfort that may ensue. But that seems to conclude the relevant animal preferences. Prior to surgery, an entire animal doesn't, after all, desire not to be neutered (since animals can't comprehend what this could mean); nor does a neutered animal have frustrated sexual desires. Nor do such animals have second-order desires to have such desires (as one might imagine in the case of a human being that had been castrated at a young age, longing to have, or to understand, sexual or parental feelings). On this view, then, if a human

desires an animal to be neutered, an animal can have no desires beyond those involving immediate pain and discomfort, either before or after the procedure. So the only animal desire frustrations that matter are those associated with the immediate surgical procedure itself, and, in the case of male dogs, the potential frustration of desires resulting from disease in later life. With the possible exception of male dogs, then, these desire frustrations are unlikely, over time, to outweigh the gains in human satisfaction in terms of having a more amenable companion; and the corresponding greater fulfillment of the animal's desires from having a better-disposed companion human. So on this form of consequentialism, routine neutering looks morally unproblematic, except in cases where the effects of neutering cause directly negative experiences that animals would desire not to have (and this, as we have seen, is likely to vary by sex and species).

The third form of good we outlined above is *perfectionist*; where what's good is understood in terms of what constitutes the most excellent life for a being of that kind – in this case, a cat or dog, which is not based only on its subjective experiences or desires (Appleby & Sandøe 2002). Of course, what would constitute such a "good life" for an animal would be contested (as it is for human beings). It is, though, at least plausible to argue that the expression of sexual behavior and/or producing offspring is part of flourishing for a cat or a dog, even if the animal itself does not miss such experiences when neutered. Of course, the alternative view is also not implausible: that whatever makes for an excellent cat or dog life, given the kinds of beings that they are, it need not include sexual activity or reproduction. But the plausibility of the view that sexual activity and reproduction is a good should at least give pause for thought. It's possible that by routine neutering, on this view, humans are denying animals the possibility of living the best lives possible for them, and thereby reducing the amount of flourishing in the world.

The consequences of neutering we've considered so far have been relatively short term. But there are other, long-term potential consequences of routinely neutering young animals. Take dogs as an example. Though modern dogs represent an extraordinary variability in phenotypic traits, the majority of the breeds emerged from a limited gene pool (Savolainen et al. 2002). Inbreeding and use of popular sires formed the basis of many breeds. This has led to a progressive loss of genetic diversity (Karlsson et al. 2007). Yet for populations to maintain good health, they need genetic diversity. A number of studies have evaluated diversity and the structure of dog populations (Koskinen and Bredbacka 2000; Irion et al. 2003; Parker et al. 2004; Lupke and Distl 2005; Schelling et al. 2005). A common recommendation from these studies is to ensure adequate effective population sizes and prevent further loss of diversity. Routine neutering of many young animals in a breed has the contrary effect. Some of the neutered dogs will, as they mature, turn out to possess valuable characteristics with respect to health, hunting, herding or other traits. But if they have been neutered, the door has already been closed to breeding from these individuals. If they are not neutered, the possibility of breeding from them remains open (though of course they will have to be mated, or the genes will anyway be lost). So one outcome of routine neutering is a decrease in genetic options available in terms

of health issues and (in the case of dogs) working performance. Of course, this is not to say that we should breed from every dog. But it suggests that we should not prevent the possible good outcomes that would result from leaving breeding options open. This might have implications at least for forms of consequentialism based on pain and pleasure (since it could prevent breeding healthier dogs); and perhaps for perfectionist consequentialisms too, meaning that certain excellences could not be reproduced.

In summary, then: Classical and perfectionist forms of consequentialism are likely to be critical towards the idea of routine neutering. Only from a desire-consequentialist perspective will routine neutering seem relatively untroubling.

Rights approaches

Conceptions of ”animal rights” form a second ethical approach to be discussed here. We will, for the sake of argument, just assume here that animals do have some basic rights, such as the right not to be killed, and see where a rights assumption takes us. Would neutering infringe on any animals' rights? Little has been explicitly written about this, and it's not clear what rights (if any) might be at stake. Some possible candidates, though, would be: a right to reproduce (it's sometimes argued that humans have this right); a right not to be harmed; and a right to bodily integrity.

Let's begin with the ”right to reproduce”. There's some dispute about whether even humans have a “right to reproduce” – or, indeed, what this right amounts to. Where rights in reproductive matters are claimed (e.g. UN 1994) they are usually understood as rights to autonomy in reproductive matters – rights to be able to decide whether to have children, when to have them, and how far apart to space them. These kinds of autonomy rights to reproduction look very implausible in the animal case, since animals are obviously not able to make these kinds of reflective decisions. However, *coercive sterilization* has, historically, been viewed as an infringement upon human rights. This includes past episodes of coercive sterilization of those humans with disabilities, some of whom were not able fully to understand what was happening to them – for instance, during the eugenics programs of the 1920s and 1930s. Nonetheless, it still seems likely that these humans were better able to understand what was happening to them than companion animals are. But it may still be possible to maintain that coercive sterilization infringes on an animal's rights (though in an animal's case, no other kind of sterilization is possible).

However, none of the major advocates of animal rights have argued for this view, and Francione (2007) – one of the most vehement defenders of animal rights - explicitly denies that domesticated animals have such a right. This denial is based on the complete rejection of animal domestication, including companion animal domestication. On his view, domestication is based on the practice of breeding animals to be dependent and

servile, thus creating what are "truly animal slaves" (Francione 2007). To allow domesticated animals to breed is, therefore, to perpetuate this cycle of vulnerability and dependence. Neutering, on the other hand, serves as a means to prevent the creation of more vulnerable and dependent domesticated animals.

There is something problematic in this argument, though, even if one accepts other of Francione's premises. The argument seems to be that individuals born into an institution that (ethically) shouldn't exist, shouldn't have the same rights as those possessed by similar individuals born outside this institution. (One way of ending *human* slavery might have been to sterilize all the existing slaves so that they couldn't produce more slaves, but this would presumably be a morally problematic way of going about it.) So, while Francione would probably find it wrong coercively to sterilize wild animals, according to his view, this wouldn't apply to domesticated companion animals. This attaches the rights animals have partly to their contexts rather than their capacities – a view that perhaps could be defended in this case (assuming one rejected the institution of domestication), but which would require much more argumentative support than we've so far seen.

However, the "right not to be coercively sterilized" is not the only kind of rights argument that might be relevant here. Neutering plausibly falls under a more general right: a right not to be harmed, or a right to respectful treatment. The latter right is defended by Regan (1984); and Boonin (2003) suggests that, in principle, this right applies to neutering. After all, Boonin argues, neutering an animal imposes non-trivial harms on it – for instance, the risks from being anesthetized, and pain and disorientation after the surgery. And neutering is not (usually) carried out for the significant benefit of the particular animal being neutered, unlike, say, surgery to remove a tumor (where we might be able to say either that the animal would voluntarily relinquish its rights, were it to be able to understand what was happening; or that surgery to cure an animal is not harmful or disrespectful in the first place). That neutering may bring about better consequences overall cannot itself justify the violation of the rights of the particular individual to be neutered.

Boonin himself – who thinks that an animal rights view that can't endorse companion animal neutering is indefensible - proposes an amendment. He argues that "it's permissible to impose relatively minor harms on animals (and relevantly analogous humans) in at least some cases, where this produces great benefits for others, and that is not only consistent with the attribution of rights to animals, but is motivated by the same sorts of considerations that justify such attribution" (Boonin 2003, p.7). On this view, neutering is a relatively minor harm in comparison with avoiding the production of potentially miserable offspring. But (while not unproblematic in other situations) this argument does not apply to the cases we're considering, where the companion animals are *not* free-ranging, and thus would not be producing miserable offspring anyway. So, Boonin's view raises serious questions about whether a rights approach can permit routine neutering of companion animals.

A third possible right at stake is a right to bodily integrity. It's sometimes claimed that humans have a right to bodily integrity (and in an alternative but related view, Nussbaum [2000, p. 7] argues that "bodily integrity" is a basic human capability that must be protected). One example of this arises in claims by anti-circumcision campaigners (both in the male and female case) that circumcision infringes on a human right to bodily integrity.

What might be meant here in the animal case is not easy to articulate, but it's something like this: Individual animals were born in particular ways, with specific bodily features: tails, ears, claws - and gonads. These features are all part of an animal's bodily integrity – part of what it is to be *that* physical individual. Surgically to remove or alter any of these parts is to infringe on this bodily integrity, and can be seen as a rights violation. Interestingly, a related view seems to be influential when it comes to so-called cosmetic surgery (such as tail docking) on companion animals in the many countries where it is banned by law – often with strong backing from the veterinary community. The question is whether neutering can be regarded in a similar way as a piece of surgery done to please the owners rather than to benefit the affected animals.

In the human case, the right to bodily integrity can, presumably, be voluntarily relinquished where there are significant welfare benefits from doing so. Even though animals are not able to understand nor to choose to relinquish rights voluntarily, it seems reasonable to say that if a dog has testicular cancer, for instance, it would be permissible to remove the testes, even though this would affect his bodily integrity. However, as we've seen, the welfare benefits from neutering are not so substantial and obvious that we could say that if *healthy* animals (perhaps with the exception of bitches) were able, they would choose voluntarily to relinquish their right to bodily integrity in order to allow routine neutering.

It might reasonably be objected, however, that if neutering (or cosmetic surgery) is not welfare- or experience-affecting, then why should we be concerned about animals' bodily integrity, and why should there be a right to protect it? If an infringement of bodily integrity also harms (as it will in many cases, either immediately or in the long term) then it's causing harm that's the problem, rather than that it's wrong *qua* infringement. And this takes us back to the right not to be harmed. Since neutering is, *prima facie*, a non-trivial harm, and since benefits to *others* may not standardly outweigh rights infringements, unless one accepts an argument something like Boonin's, which as we have argued in this case does not seem to be relevant, routine neutering appears impermissible from a rights perspective. So most arguments flowing from animal rights are very unlikely to support the practice of routinely neutering companion animals.

Relational Approaches

A third – rather diverse – family of theoretical approaches focuses neither on consequences, nor on rights, but on the relationships between the particular parties concerned (in this case, companion animals and their owners). Different kinds of relational approaches, though, would regard the neutering of animals in rather different ways.

One particularly well-known relational approach is the ethics of care (though this, too, has a number of forms). Key features of an ethic of care include: the importance of responsive attention to others, recognition of the particularity of relationships (and hence the possibility of privileging those to whom one is close), the value of emotional bonds, and the special significance of caring for those who are vulnerable or dependent. Abandonment, neglect and failure to take account of the needs and desires of those for whom one is in a caring relationship are particularly morally troubling from this perspective (Gilligan 1982, Donovan & Adams 2007).

Companion animals are particular individuals, cared for by their owners who usually describe them as members of the family – classic subjects of a caring relationship (as is accepted by ethicists of care eg Donovan & Adams 2007, Noddings 1984). Given this, could neutering be seen as part of this caring relationship? Ethicists of care have, to our knowledge, not explicitly discussed this.

One possible approach here is to understand neutering as a way of *enhancing* the bond between humans and companion animals. After all, companion animals have already been bred in ways that make them well-suited to live alongside humans, and ill-suited to any other lives. What's best for them is to fit well into domestic households and to bond well with their owners. Animals whose behavior is disruptive bond less well with those they live with (in fact, bad behavior is one of the main reasons animals end up in animal shelters or are euthanized [Newby 1997]). And both humans and companion animals gain from the establishment of close bonds (Barker and Wolen 2008; Friedman and Son 2009). Seen this way, neutering can be defended as a means to foster closer and more harmonious relationships between humans and companion animals.

Ethicists of care, who emphasize the importance of particularity in thinking about the ethics of relationships are, however, wary of generalized ethical principles. (This might, in itself, be sufficient to rule out the *routine* – i.e. generalized - neutering of companion animals.) Each owner would have to ask themselves whether neutering their companion fits into an emotionally attentive relationship that takes care of the needs, interests and desires of the other. It's clearly possible to imagine situations where this question is answered positively. Suppose some owner is driven to desperation by an animal whose behavior is unmanageable in ways that are fundamentally undermining the caring relationship. The owner might conclude: the companion

animal is not capable of having desires about remaining entire; it will have no desires about sexual behavior once neutered; *and* neutering will greatly help the development of a deeper, more caring bond between the owner and the companion animal by reducing the stress in the relationship. So neutering appears permissible.

But on the other hand, we can imagine a different story being told (even about a similar case). For companion animals are, almost always, ultimately vulnerable to their owners, and neutering can be seen as one (of many) sanctions that humans have over "badly-behaved" animals. It has been suggested that neutering is a form of – or, indeed, may even promote – human *domination* over companion animals (Palmer 2001); that its purpose is not so much to strengthen the human-animal bond, but rather to make animals more docile, less habitually offensive (so for instance, less liable to urine spraying behavior) or, more generally, into better companions. When animals are routinely neutered, they are being shaped to fit more easily into human households, irrespective of whether neutering prevents them from enjoying the expression of natural behaviors or infringes on their integrity. After all, companion animals are permanent dependents. The owners can, if they choose, withdraw support, give them to animal shelters or have them euthanized. This caring relationship (like many caring relationships) is not an equal one.

Unequal caring relations are not necessarily problematic. But neutering, nonetheless, has the potential, from this perspective, to look like another dominating move in this power relationship, a move that companion animals cannot resist; they are completely vulnerable to this intrusive procedure (Palmer, 2001). Could this really be a routine part of a relationship that's supposed to be built on care, responsive attention, and on taking account of the others' needs and desires? The language of companionship, it might be argued, serves to conceal the ways in which such animals are actually coercively manipulated to meet human preferences.

Clearly neutering can be seen in different ways from a relational perspective. It may be seen, broadly as a caring way of deepening a bond between animal and owner, or it may be seen as a dominating, manipulative practice to be rejected. In fact, a thoroughgoing relational approach is likely to see some instances of neutering as caring, and others as dominating, depending on the particular factors at stake in any particular case. But what does seem clear here is that neutering should not, at least, be *routine* from the perspective of a relational approach, because there are likely to be factors present in one relationship and context that are absent from another.

Summing up the ethical discussion

We've looked, then, at three different ways of thinking about the ethics of neutering companion animals: consequentialist, rights and relational approaches. These approaches add significant insights to the previous review of the veterinary literature in at least two ways:

Firstly, they point to considerations that may matter in deciding whether or not routine neutering is a good idea, and that do not emerge in the veterinary literature: It might be that positive experiences foregone are of moral importance, or that sexual and reproductive behavior might be part of the most excellent life for a cat or dog, irrespective of animals' experiences and desires. Furthermore it might be that companion animals have a right to bodily integrity, or at least not to be harmed. And neutering might contribute to a better, more caring relationship between humans and companion animals – although it might also be seen as part of a practice of domination.

Of course, pointing to a possible consideration is not the same as saying that that consideration should be assigned a significant weight in one's final view of the matter. And here the approaches differ dramatically, which leads on to the *second way* in which the ethical discussion may serve to add to the veterinary literature. The three approaches all seem to agree that animal welfare (understood in a slightly wider sense than the one implied in the veterinary literature) matters, but they differ in what *more* than welfare matters and on how different considerations should add up in the final decision about whether or not routine neutering of companion animals can be supported.

However, despite their rather wide disagreement on what more than welfare matters, the three approaches (with the possible exception of the preference-oriented consequentialist approach) seem to agree that *routine* neutering is not morally acceptable for companions where reproduction control is not an issue, although neutering will be called for in *particular* instances.

Conclusion

The starting point for the discussion in this paper was the observation that influential parts of the veterinary profession, and notably the American Veterinary Medicine Association, are promoting routine neutering of cats and dogs that will not be used for breeding purposes. This view is not universally held, even among representatives of the veterinary profession. In particular, some veterinary associations in Europe defend the view that when reproduction is not an issue, then neutering, particularly of dogs, should be decided on a case by case basis. However, the American view seems to be gaining ground in Europe; and it is worth noting that the veterinary profession has obvious commercial interests at stake in the practice of routine neutering. In light of this situation the present paper considers whether or not routine neutering of cats and dogs, in cases where companions are anyway prevented from producing, can be ethically defended. Our overall conclusion is that *routine* neutering of companion animals, and notably male dogs, is *not* morally justified. This conclusion is based on the following two arguments:

Firstly the view of the American Veterinary Medicine Association does not seem to be justified even if one only looks at the kind of evidence-based veterinary arguments that this organization seems to take as the main basis of its policy recommendations. Rather it should, in the case of companions where uncontrolled reproduction is not an issue, recommend that decisions on neutering should be taken on an individual and case by case basis. Particularly in the case of male dogs, given the long term health risks involved, specific reasons are required to recommend castration.

However the veterinary literature takes a rather narrow view, both concerning which concerns are relevant when deciding whether or not to neuter a companion animal, and how to weigh these concerns. Therefore, there's a need to bring in a wider set of ethical considerations, as we have tried to do here. There is no unanimously agreed ethical framework that can serve as the basis for such an analysis. So to give a fair account of the matter, in which the authors don't impose a specific moral view on the readers, three approaches that cover much of the relevant ethical spectrum (however, excluding purely anthropocentric approaches) are presented and applied to the issue of routine neutering. This leads on to the *second argument* which is that even though the three ethical approaches differ regarding many specific issues, they do seem largely to converge on the view that routine neutering of companions where reproduction is otherwise under control is not justified.

Thus there are good reasons both from a narrow point of view considering only veterinary evidence, and from wider ethical reflection, to be skeptical of the idea of routine neutering of companions. This of course does not mean that no-one can rationally claim that routine neutering of companions is morally acceptable. However for someone to claim this, they must argue either that there are relevant considerations of animal welfare that have been overlooked in our review, or they must endorse an ethical approach (possibly a combination of consequentialism and a definition of welfare in terms of preference satisfaction) that will permit, or even prescribe, routine neutering.

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References

Angioletti, A., Francesco, D.E., Vergottini, I. and Battocchio, M. 2004. Urinary Incontinence after spaying in the bitch: incidence and oestrogen therapy. *Veterinary Research Communications* 28: 153-155.

Appleby, M. C. and Sandøe, P. 2002. Philosophical debate on the nature of well-being: implications for animal welfare. *Animal Welfare* 11: 283-294.

Arnold, S., Arnold, P., Hubler, M., Casal, M. and Rüsch, P. 1989. Incontinentia urinae bei der kastrierten hündin: haüfigkeit und rassedisposition. *Schweizer Archiv für Tierheilkunde* 131: 259–263 (in German). [English translation: Urinary incontinence in spayed bitches: prevalence and breed predisposition. *European Journal of Companion Animal Practice* 2 1992: 65–68].

Arnold, S. 1992. Relationship of incontinence to neutering. In *Current Veterinary Therapy XI*, 875-877, ed. R.W. Kirk and J.D. Bonagura. Philadelphia: W.B. Saunders.

AVMA (American Veterinary Medical Association). 2010. Spaying & Neutering. <https://ebusiness.avma.org/EBusiness50/files/productdownloads/spay_neuter_brochure.pdf> Accessed on December 2, 2011.

Barker, S and Wolen, A. 2008. The benefits of human-companion animal interaction: A review. *Journal of Veterinary Medical Education* 35/4: 487-495.

Bell, F.W., Klausner, J.S., Hayden, D.W., Feeney, D.A. and Johnson, S.D. 1991. Clinical and pathologic features of prostatic adenocarcinoma in sexually intact and castrated dogs: 31 cases (1970–1987). *Journal of the American Veterinary Medical Association* 199: 1623–1630.

Boonin, D. 2003. Robbing PETA to spay Paul: Do Animal Rights Include Reproductive Rights? *Between the Species* III: 1-8.

Brodey, R.S., Goldschmidt, M.H. and Roszel, J.R. 1983. Canine mammary gland neoplasms. *Journal of the American Animal Hospital Association* 19: 61–90.

Bryan, J.N., Keeler, M.R., Henry, C.J., Bryan, M.E., Hahn, A.W. and Caldwell, C.W. 2007. A Population Study of Neutering Status as a Risk Factor for Canine Prostate Cancer. *The Prostate* 67: 1174 -1181.

BSAVA (British Small Animal Veterinary Association). 2006a. *Policy Statement on Castration of Dogs.* <http://www.bsava.com/Advice/PolicyStatements/CastrationofDogs/tabid/160/Default.aspx> Accessed on December 2, 2011.

BSAVA (British Small Animal Veterinary Association). 2006b. *Policy Statement on Spaying of Bitches*. <http://www.bsava.com/Advice/PolicyStatements/SpayingofBitches/tabid/159/Default.aspx> Accessed on December 2, 2011.

BSAVA (British Small Animal Veterinary Association). 2006c. *Policy Statement on Neutering of Cats*. http://www.bsava.com/Advice/PolicyStatements/NeuteringofCats/tabid/161/Default.aspx> Accessed on December 2, 2011.

Burrow, R., Batchelor, D. and Cripps, P. 2005. Complications observed during and after ovariohysterectomy of 142 bitches at a veterinary teaching hospital. *Veterinary Record* 157: 829-833.

BVA (British Veterinary Association). 2011. *Neutering – cats and dogs*. <http://www.bva.co.uk/activity_and_advice/2391.aspx> Accessed on December 2, 2011.

Cooley, D.M., Beranek, B.C., Schlittler, D.L., Glickman, N.W., Glickman, L.T. and Waters, D.J. 2002: Endogenous gonadal hormone exposure and bone sarcoma risk. *Cancer Epidemiology, Biomarkers & Prevention* 11: 1434–1440.

Cotchin, E. 1951. Neoplasms in small animals. *Veterinary Record* 63: 67–72.

De Bleser, B., Brodbelt, D.C., Gregory, N.G. and Martinez, T.A. 2009. The association between acquired urinary sphincter mechanism incompetence in bitches and early spaying: a case-control study. *Veterinary Journal* 187: 42–47.

Diesel, G., Brodbelt, D. and Laurence, C. 2010. Survey of veterinary practice policies and opinions on neutering dogs. *Veterinary Record* 166: 455-458.

Dodman, N. 1996. *The Dog Who Loved Too Much: Tales Treatments And The Psychology Of Dogs.* New York: Bantam.

Donovan, J. and *Adams, C. 2007. The feminist care tradition in animal ethics: a reader. New York: Columbia University Press.*

Dorn, C.R., Taylor, D.O., Schneider, R., Hibbard, H.H. and Klauber, M.R. 1968. Survey of animal neoplasms in Alameda and Contra Costa Counties, California. II. Cancer morbidity in dogs and cats from Alameda County. *Journal of the National Cancer Institute* 40 (2): 307–318.

Egenvall, A., Hagman, R., Bonnett, B.N., Hedhammar, A., Olsen, P. and Lagerstedt, A.S. 2001. Breed risk of pyometra in insured dogs in Sweden. *Journal of Veterinary Internal Medicine* 15: 530–538.

Fettman, M.J., Stanton, C.A., Banks, L.L., Hamar, D.W., Johnson, D.E., Hegstad, R.L. and Johnston, S. 1997. Effects of neutering on bodyweight, metabolic rate and glucose tolerance of domestic cats. *Research in Veterinary Science* 62: 131-136.

Fidler, I.J. and Brodey, R.S. 1967. The biological behavior of canine mammary neoplasms. *Journal of the American Veterinary Association* 151 (10): 1311-1318.

Finkler, H. and Terkel, J. 2010. Cortisol levels and aggression in neutered and intact free-roaming cats living in urban social groups. *Physiology and Behavior* 99: 343-347.

Francione, G. 2007. Animal Rights and Domesticated Nonhumans. <http://www.abolitionistapproach.com/animal-rights-and-domesticated-nonhumans> Accessed on December 6, 2011.

Fraser D., Weary D. M., Pajor E. A. and Milligan B. N. 1997. A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare 6*: 187-205.

Freeman, L.J., Pettit, G.D., Robinette, J.D., Lincoln, J.D. and Person, M.W. 1987. Tissue reaction to suture material in the feline linea alba – a retrospective, prospective and histological study. *Veterinary Surgery* 16: 440.

Friedmann, E. and Son, H. 2009. The human-animal companion bond: How humans benefit. *Veterinary Clinics of North America Small Animal Practice: Veterinary Public Health* 39 (5): 291-332.

Fukuda, S. 2001. Incidence of pyometra in colony-raised Beagle dogs. *Experimental Animals* 50: 325–329.

Gilligan, C. 1982. *In a Different Voice*. Cambridge: Harvard University Press.

Grandin, T. and Johnson, C. 2006. *Animals in Translation: Using the mysteries of autism to decode animal behavior*. Harcourt, Florida: Simon and Schuster.

Greer, K.A., Canterberry, S.C. and Murphy, K.E. 2007. Statistical analysis regarding the effects of height and weight on life span of the domestic dog. *Research in Veterinary Science* 82: 208-214.

Guy, N. C., Luescher, U. A., Dohoo, S. E., Spangler, E., Miller, J. B., Dohoo, I. R. and Bate, L. A. 2001. Demographic and aggressive characteristics of dogs in a general veterinary caseload. *Applied Animal Behaviour Science* 74:15-28.

Hagman, R. 2004. New aspects of canine pyometra. Habilitation Thesis. Department of Small Animal Clinical Sciences, Acta Universitatis Agriculturae, Suecia.

Hart, B.A. and Eckstein, R.A. 1997. The role of gonadal hormones in the occurrence of objectionable behaviours in dogs and cats. *Applied Animal Behavior Science* 52: 331-344.

Hart, B.L. 1976. Behavioral effects of castration. *Canine Practice* 3(3):10.

Hart, B.L. and Barrett, R.E. 1973. Effects of castration on fighting, roaming, and urine spraying in adult male cats. *Journal of the American Veterinary Medical Association* 163: 290-292.

Holt, P. E. 1985. Urinary incontinence in the bitch due to sphincter mechanism incompetence: prevalence in referred dogs and retrospective analysis of sixty cases. *Journal of Small Animal Practice* 26: 181-190.

Holt, P.E. and Thrusfield, M.V. 1993. Association in bitches between breed, size, neutering and docking, and acquired urinary incontinence due to incompetence of the urethral sphincter mechanism. *Veterinary Record* 133: 177–180.

Hopkins, S.G., Schubert, T.A. and Hart, B.L. 1976. Castration of adult male dogs: Effects on roaming, aggression, urine marking, and mounting. *Journal of the American Veterinary Medical Association* 168 (12): 1108-1110.

Houpt, K.A. 2006. Sexual and maternal behavior problems: More common than you think. In *American Veterinary Medical Association Convention Proceedings.*

Howe, L.M., Slater, M.R., Boothe, H.W., Hobson, H.P., Holcom, J.L. and Spann, A.C. 2000. Long-term outcome of gonadectomy performed at an early age or traditional age in cats. *Journal of the American Veterinary Medical Association*. 217:1661-1665.

Irion, D.N., Schaffer, A.L., Famula, T.R., Eggleston, M.L., Hughes, S.S. and Pedersen, N.C. 2003. Analysis of genetic variation in 28 dog breed populations with 100 microsatellite markers. *Journal of Heredity* 94:81-87.

Janssens, L.A.A. and Janssens, G.H.R.R. 1991. Bilateral flank ovariectomy in the dog – surgical technique and sequelae in 72 animals. *Journal of Small Animal Practice* 32: 249-252.

Kalz, B. 2001. Populationsbiologie, Raumnutzung und Verhalten verwildeter Hauskatzen und der Effekt von Maßnahmen zur Roproduktionskontrolle. Inauguraldissertation, Mathematisch-Naturwissenscaftliche Fakultät I, Humboldt-Universitat, Berlin.

Kanchuk, M.L., Backus, R.C., Calvert, C.C., Morris, J.G. and Rogers, Q.R. 2002. Neutering induces changes in food intake, body weight, plasma insulin and leptin concentrations in normal and lipoprotein lipase-deficient male cats. *Journal of Nutrition* 132 (Suppl 2): 1730–1732.

Karlsson, E.K., Baranowska, I., Wade, C.M., Salmon Hillbertz, N.H., Zody, M.C., Anderson, N., Biagi, T.M., Patterson, N., Pielberg, G.R., Kulbokas, E.J. III, Comstock, K.E., Keller, E.T., Mesirov, J.P., von EH, Kampe, O., Hedhammar, A., Lander, E.S., Andersson, G., Andersson, L. and Lindblad-Toh, K. 2007. Efficient mapping of mendelian traits in dogs through genome-wide association. *Nature Genetics* 39: 1321-1328.

Knapp, D.W., Glickman, N.W., DeNicola, D.B. and Glickman, L.T. 2000. Naturally-occurring transitional cell carcinoma of the urinary bladder. *Urologic Oncology* 5: 47-59.

Koskinen, M.T. and Bredbacka, P. 2000. Assessment of the population structure of five Finnish dog breeds with microsatellites. *Animal Genetics* 31: 310-317.

Kraft, K.W. 1998. Geriatrics in canine and feline internal medicine. *European Journal of Medical Research* 21; 3(1-2): 31-41.

Little, S. 2011. Feline Reproduction: Problems and clinical challenges. *Journal of Feline Medicine and Surgery* 13: 508–515.

Lupke, L. and Distl, O. 2005. Microsatellite marker analysis of the genetic variability in Hanoverian Hounds. *Journal of Animal Breeding and Genetics* 122: 131-139.

McCann, T.M., Simpson, K.E., Shaw, D.J., Butt, J.A. and Gunn-Moore, D.A. 2007. Feline diabetes mellitus in the UK: the prevalence within an insured cat population and questionnaire-based putative risk factor analysis. *Journal of Feline Medicine and Surgery* 9: 289–99.

Michell, A.R. 1998. Neutering and longevity in dogs. *Veterinary Record* 142:288.

Moe, L. 2001. Population-based incidence of mammary tumors in some dog breeds. *Journal of Reproduction and Fertility* Suppl 57: 439–443.

Moore, G.E., Burkman, K.D., Carter, M.N. and Peterson, M.R. 2001. Causes of death or reasons for euthanasia in military working dogs: 927 cases (1993- 1996). *Journal of the American Veterinary Medical Association* 219: 209-214.

Moulton, J.E., Taylor, D.O., Dorn, C.R. and Andersen, A.C. 1970. Canine mammary tumors. *Pathologia Veterinaria* 1970 (7): 289–320.

Newby, J. 1997. *The Pact for Survival.* Sydney: Australian Broadcasting Corporation.

Nguyen, P.G., Dumon, H.J., Siliart, B.S., Martin, L.J., Sergheraert, R. and Biourge, V.C. 2004. Effects of dietary fat and energy on body weight and composition after gonadectomy in cats. *American Journal of Veterinary Research* 65: 1708–1713.

Nickel, R. F., Vink-Noteboom, M. and van den Brom, W. E. 1999. Clinical and radiographic findings compared with urodynamic findings in neutered female dogs with refractory urinary incontinence. *Veterinary Record* 145: 11-15.

Noddings, N. 1984. *Caring: A Feminine Approach to Ethics and Moral Education*. Berkeley: University of California Press.

Nussbaum, M. 2000. *Women and human development: the capabilities approach*. Cambridge: Cambridge University Press.

O'Farrell, V. and Peachy, E. 1990. Behavioural effects of ovariohysterectomy on bitches. *Journal of Small Animal Practice* 31: 595–598.

Obradovich, J., Walshaw, R. and Goulland, E. 1987. The influence of castration on the development of prostatic carcinoma in the dog: 43 cases (1978–1985). *Journal of Veterinary Internal Medicine* 1:183–187.

Okkens, A. C., Kooistra, H. S. and Nickel, R. F. 1997. Comparison of long-term effects of ovariectomy versus ovariohysterectomy in bitches. *Journal of Reproduction and Fertility* Suppl. 51: 27-231.

Overall, K. L. 2007. Working bitches and the neutering myth: sticking to the science. *Veterinary Journal* 173: 9-11.

Overley, B., Shofer, F.S., Goldschmidt, M.H., Sherer, D. and Sorenmo, K.U. 2005: Association between ovariohysterectomy and feline mammary carcinoma. *Journal of Veterinary Internal Medicine* 19: 560–563.

Palmer, C. 2001. 'Taming the wild profusion of existing things'? A study of Foucault, power and human/animal relationships. *Environmental Ethics* 23: 339-358.

Panciera, D.L., Thomas, C.B., Eicker, S.W. and Atkins, C.E. 1990. Epizootiologic patterns of diabetes mellitus in cats: 333 cases (1980-1986). *Journal of the American Veterinary Medical Association* 197(11): 1504-1508.

Parker, H.G., Kim, L.V., Sutter, N.B., Carlson, S., Lorentzen, T.D., Malek, T.B., Johnson, G.S., DeFrance, H.B., Ostrander, E.A. and Kruglyak, L. 2004. Genetic structure of the purebred domestic dog. *Science* 304: 1160-1164.

Pearson, H. 1973. The complications of ovariohysterectomy in the bitch. *Journal of Small Animal Practice* 14: 257-266.

Pollari, F. L., Bonnett, B. N., Bamsey, S. C., Meek, A. H. and Allen, D. G. 1996. Postoperative complications of elective surgeries in dogs and cats determined by examining electronic and paper medical records. *Journal of the American Veterinary Medical Association* 208: 1882-1886.

Prymak, C., McKee, L.J., Goldschmidt, M.H. and Glickman, L.T. 1998. Epidemiologic, clinical, pathologic, and prognostic characteristics of splenic hemangiosarcoma and splenic hematoma in dogs: 217 cases (1985). *Journal of the American Veterinary Medical Association* 193: 706–712.

Regan, T. 1984. *The Case for Animal Rights*. Berkeley: University of California Press.

Reichler, I.M. 2009. Gonadectomy in Cats and Dogs: A Review of Risks and Benefits *Reprod Dom Anim* 44 (Suppl. 2) 29–35.

Richards, H.G., McNeil, P.E., Thompson, H. and Reid, S.W.J. 2001. An epidemiological analysis of a canine-biopsies database compiled by a diagnostic histopathology service. *Preventive Veterinary Medicine* 51: 125–136.

Root Kustritz, M.V., Johnston, S.D. and Olson, P.N. 1997. The effect of prepuberal and postpuberal gonadectomy on radial physeal closure in male and female domestic cats. *Veterinary Radiology and Ultrasound* 38: 42-47.

Root Kustritz, M.V. 2007. Determining the optimal age for gonadectomy of dogs and cats. *Journal of the American Veterinary Medical Association* 231 (11): 1665-1675

Ru, G., Terracini, B. and Glickman, L.T. 1998. Host related risk factors for canine osteosarcoma. *Veterinary Journal* 156: 31–39.

Sandøe, P. and Christiansen, S.B. 2008. *Ethics of Animal Use.* Oxford: Blackwell.

Savolainen, P., Zhang, Y.P., Luo, J., Lundeberg, J. and Leitner, T. 2002. Genetic evidence for an East Asian origin of domestic dogs. *Science* 298: 1610-1613.

Schelling, C., Gaillard, C. and Dolf, G. 2005. Genetic variability of seven dog breeds based on microsatellite markers. *Journal of Animal Breeding and Genetics* 122: 71-77.

Schneider, R., Dorn, C.R. and Taylor, D.O.N. 1969. Factors influencing canine mammary cancer development and postsurgical survival. *Journal of the National Cancer Institute* 43: 1249–1261.

Schrameyer, T., Dekomien, G., Pasternack, S.M., Reinartz, B.S., Santos, E.J.M. and Eppien, J.T. 2005. Long- and short-haired Weimaraner dogs represent two populations of one breed. *Electrophoresis* 26:1668-1672.

Serpell, J. and Hsu, Y. 2005. Effects of breed, sex and neuter status on trainability in dogs. *Anthrozoos* 18(3): 196-207.

Slauterbeck, J.R., Pankratz, K., Xu, K.T., Bozeman, S.C. and Hardy, D.M. 2004. Canine ovariohysterectomy and orchiectomy increases the prevalence of ACL injury. *Clinical Orthopaedics and Related Research* 429: 301–305.

Sorenmo, K., Goldschmidt, M. and Shofer, F. 2003. Immunohisto- chemical characterization of canine prostatic carcinoma and correlation with castration status and castration time. *Veterinary Comparative Oncology* 1: 48–56.

Stone, E.A., Littman, M.P., Robertson, J.L. and Bovee, K.C. 1988. Renal dysfunction in dogs with pyometra. *Journal of the American Veterinary Medical Association* 193: 457-464.

Stubbs, W., Bloomberg, M., Scruggs, S., Shille, V. and Lane, T. 1996. Effects of prepubertal gonadectomy on physical and behavioral development in cats. *Journal of the American Veterinary Medical Association* 209: 1864 – 1871.

SVS (Sveriges Veterinärförbund) 2011. *Norm angående kirurgisk kastration av friska hundar* [Norm regarding the surgical neutering of healthy dogs]. <http://www.svf.se/sv/Sallskapet/Smadjurssektionen/Normgruppen/Normer-av-medicinsk-karaktar/Norm-angaende-kirurgisk-kastration-av-friska-hundar> Accessed on December 2, 2011.

Teske, E., Naan, E. C., Van Dijk E. M., Van Garderen, E. and Schalken, J. A. 2002. Canine prostate carcinoma: epidemiological evidence of an increased risk in castrated dogs. *Molecular and Cellular Endocrinology* 197: 251-255.

Thrusfield, M.V., Holt, E. and Muirhead, R.H. 1998. Acquired urinary incontinence in bitches: its incidence and relationship to neutering practices. *Journal of Small Animal Practice* 39: 559-566.

United Nations. 1994. *Human Rights: Supporting the Constellation of Reproductive Rights*. <http://www.unfpa.org/rights/rights.htm> Accessed on December 6, 2011.

van Goethem, B., Schaefers-Okkens, A. and Kirpensteijn, J. 2006. Making a Rational Choice between Ovariectomy and Ovariohysterectomy in the Dog: A Discussion of the Benefits of Either Technique. *Veterinary Surgery* 35: 136-143.

Veronezi, M.C., Rota, A., Battocchio, M., Faustini, M. and Mollo, A. 2009. Spaying-related urinary incontinence and oestrogen therapy in the bitch. *Acta Veterinaria Hungarica* 57 (1): 171-182.

von Ruckstuhl, B. 1978. Die Incontinentia urinae bei der Hundin als Spatfolge der Kastration. *Schweiz. Arch. Tierheilk* 120: 143-148.

Ware, W.A. and Hopper, D.L. 1999. Cardiac tumors in dogs: 1982–1995. *Journal of Veterinary Internal Medicine* 13: 95-103.

Waters, D.J., Shen, S. and Glickman, L.T. 2000. Life expectancy, antagonistic pleiotropy, and the testis of dogs and men. *Prostate* 43: 272-277.

Weaver, A.D. 1981. Fifteen cases of prostatic carcinoma in the dog. *Veterinary Record* 109: 71–75.

Wheaton, L.G., Johnson, A.L., Parker, A.J. and Kneller, S.K. 1989. Results and complications of surgical treatment of pyometra: a review of 80 cases. *Journal of the American Animal Hospital Association.* 25: 563-568.