Italian breed-specific legislation on potentially dangerous dogs (2003): assessment of its effects in the city of Florence (Italy)

Chiara Mariti[1,*], Carlo Ciceroni[2], Claudio Sighieri[1]

[1] *Dipartimento di Scienze Veterinarie, Università di Pisa - Italy*
[2] *Unità funzionale di igiene urbana e veterinaria, ASL 10 Firenze - Italy*

Abstract: Canine aggression is a very discussed topic, especially when a person is injured. The problem of dog bites towards human beings must be tackled and scientifically analysed, in order to address the policy makers to effective measures. The aim of this study was to assess the effects of Italian breed-specific legislation on potentially dangerous dogs (Sirchia's Ordinance issued on the 9th September 2003 called "Protection of the public safety against the risk of aggressions by potentially dangerous dogs") on the trend of dog bites towards people in the city of Florence (Italy). Data for the current study were collected by the Veterinary and Urban Health, Local

Sanitary Enterprise 10 in the city of Florence (Italy). Reports drew from the certifications of medical reports coming from different Hospital Emergency Departments in Florence, from the denunciation done at the canine registry office, and from the observational reports carried out at the observatory for the prophylaxis of the rabies. Reports referred to dog bites occurred in the city of Florence from September 2002 to August 2005. In total, 556 cases were gathered. The characteristics of injuries, dogs, owners and victims involved in dog bites in the year preceding the Sirchia's Ordinance were compared to the same characteristics in the two years after the issue of such Ordinance (short and long-term effects) using the χ^2 test ($p<0.05$).The findings suggest that the above-mentioned ordinance has not caused any significant change on the trend of dog bites in the taken sample, nor in the short-term neither in the long-term. In fact, even if a numerical decrease has been observed in the period following the ordinance, a trend of reduction was already in progress since 1986. In addition, the characteristics of owners, injured people and dogs involved in the aggressive episodes remained unvaried, apart from a decrease in minor injuries. Finally, after the Ordinance the number of dog owners whose personal details were unknown increased. These findings suggest that restrictive legislative measures regarding potentially dangerous dogs are not effective for the control of canine aggression towards people.

Key Words: aggression, bite, breed-specific legislation, dangerous, dog, Sirchia's Ordinance.

* *Corresponding Author*: c.mariti@vet.unipi.it

Introduction

Dogs are known to be "man's best friends", establishing a reciprocal, complex and deep bond with the owner (Blouin, 2003; Mariti et al., 2013). However, the relationship is sometimes impaired.

Behavioral problems are one of the major reasons behind dog abandonment, disposal (Arkow and Dow, 1984; Scarlett et al., 2002), and euthanasia (Landsberg, 1991; Overall, 1997). After all, an animal's behavior plays an important role in influencing owners' perception of, and attachment to, their pet (Serpell, 1996). It is important, therefore, to take measures early on to prevent the onset of behavioural problems, both by properly managing the genetic selection of pets and by providing information about breed, gender, age, and individual pet characteristics to the future owner to make a well-considered choice (Landsberg, 1991; Overall, 1997), and to act properly during the puppy development (Gazzano et al., 2008).

Among canine behavioural problems, aggression towards people is the most impairing, creating inconvenience for dogs, owners and other people. From an ethological point of view, aggression is

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not an abnormal behaviour, being part of the domestic dogs' ethogram. However, depending on the type of aggression, on the target, and on other factors, it can be a major problem to deal with.

In the last years, in many Western countries, *mass media* have reported cases of canine aggression towards people, including fatal attacks, that have increased the public perception of this risk. Specific attention has been paid by the *mass media* first, and by public audience (Gazzano et al., 2013) and policy makers then (American Veterinary Society of Animal Behavior, 2014), to the breed of dogs involved in those episodes. As a matter of fact, although there is a lack of scientific data demonstrating a higher rate of aggression in certain canine breeds (Federation of Veterinarians of Europe, 2000; American Veterinary Society of Animal Behavior, 2014), many Countries have a breed-specific legislation, with wide variations across countries.

In Italy, from 2003 to 2009, the legislative intervention provided a list of dangerous breeds, in which certain dogs, together with their caretakers, were subjected to some restrictions. In detail, on the 9th September 2003, the Italian Minister of Health Sirchia issued an Ordinance called "Protection of the public safety against the risk of aggressions by potentially dangerous dogs", providing a list of dogs considered to have a "marked predisposition to aggression": Pit Bulls (not recognised as a breed in Italy) and other mixed-breeds or pure-bred dogs belonging to groups 1 and 2 of the Fédération Cynologique Internationale (group 1: Sheepdogs and Cattle Dogs; group 2: Pinschers and Schnauzers, Molossoids and Swiss Mountain Dogs). Such dogs were subject to limits, e.g. wearing a muzzle and staying on the leash in any public area and place; they could not be owned by criminals and minors; owners of such dogs had to stipulate an insurance. One year later (27th August 2004), another Ordinance was issued by Sirchia on the same topic, and the list of dogs considered as at a high risk of aggression was formed by: American Bulldog, Yugoslavian Shepherd Dog - Sharplanina, Anatolian Shepherd Dog, Central Asia Shepherd Dog, Caucasian Shepherd Dog, Estrela Mountain Dog, Dogo Argentino, Fila brasileiro, Neapolitan Mastiff, Perro da canapo majoero, Dogo Canario, Majorca Mastiff, Pit bull, Pitt bull mastiff, Pit bull terrier, Rafeiro do alentejo, Rottweiler, and Tosa inu.

The aim of this study was to assess the effects of the Italian breed-specific legislation (Sirchia's Ordinance 2003) on the trend of dog bites towards people and to evaluate the possible presence of certain canine breeds among the recorded aggressive episodes.

Subjects, materials and methods

Data for the current study were collected by the Veterinary and Urban Health, Local Sanitary Enterprise 10 of Florence (Italy). Reports drew from the certifications of medical reports coming from different hospital Emergency Departments in Florence, from the denunciation done at the canine registry office, and from the observational reports carried out at the observatory for the prophylaxis of the rabies. Reports referred to dog bites occurred in the city of Florence from September 2002 to August 2005. In total, 556 cases were gathered and included in a database reporting information about: injury (site and type), characteristics of the person who was attacked (sex and age), characteristics of the owner (sex and age), and characteristics of the dog (sex, breed, size and age).

The analysed period was divided into:

1) Pre-Ordinance period (P.O.): 1st September 2002 - 31st August 2003, the year preceding the first Sirchia's Ordinance. It was regarded as a control group.
2) Short-Term period (S.T.): 1st September 2003 - 31st August 2004, the year following the issue of the first Sirchia's Ordinance. It was used to analyse the possible short-term effects of the Italian breed-specific legislation on dangerous dogs.
3) Long-Term period (L.T.): 1st September 2004 - 31st August 2005, the year following the issue of the second Sirchia's Ordinance. It was used to analyse the possible long-term effects of the Italian breed-specific legislation on dangerous dogs.

Data referred to the three periods were compared using the c^2 test ($p<0.05$).

Results and discussion

The episodes of dog bites towards people recorded in the 3-year period were so distributed: 210 in P.O., 172 in S.T., and 174 in L.T. The decrease in the number of dog bites registered after the issue of the Sirchia's Ordinance may be interpreted as a positive outcome due to the ordinance itself. However, in a study carried out in the same area (Ciceroni, 2004), a trend of decrease in the number of dog bites towards people was already observed in previous years (see Fig. 1). Therefore, it cannot be excluded that the reduction observed after the breed-specific legislation was part of an ongoing phenomenon.

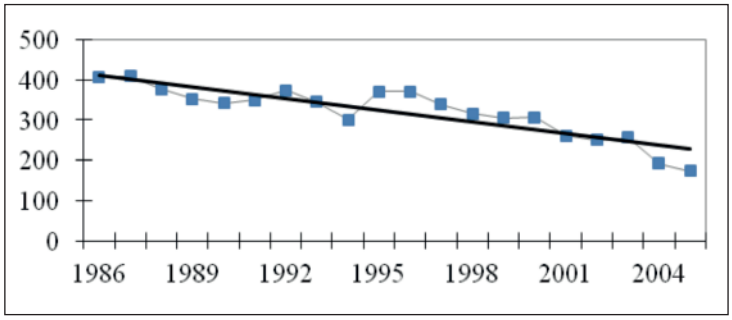

Fig. 1. Trend of dog bites towards people in Florence from 1986 to 2005 (modified from Ciceroni, 2004).

In addition, such reduction may be related to the decrease in minor injuries register after the issue of the Sirchia's Ordinance (see below).

The statistical analysis comparing the S.T. to the L.T. period did not reveal any relevant difference. For this reason, it was excluded that possible short-term effects differed from long-term effects, and for further analyses the two datasets were put together (After-Ordinance period=A.O.) and compared as a whole to the Pre-Ordinance period.

Injuries

Limbs (arms and legs) were involved in 87% of cases, resulting the site that was more frequently bitten by dogs, in agreement with the findings of Beck and Jones (1985) in United States of America. The torso was interested in 8% of cases, while head and neck in 15%.

According to the type of injury recorded in the medical reports, injuries were grouped into minor (scratch, contusion, and excoriation) and moderate-severe (lacerated wound, lacerated and contused wound, and multiple wounds). In the period after the Ordinance, a statistically significant reduction of minor injuries was recorded (52%versus 27%; χ^2=22.33; p=0.000). This finding cannot be easily explained. It can be hypothesized that, in some cases, the owners of biting dogs who provoked minor injuries preferred to come to an agreement with the victim of the aggression, without passing through the hospital, in order to avoid possible problems with the insurance and restriction provided for by the Sirchias's Ordinance. This possibility could also be related to the decrease observed in the number of recorded dog bites.

A comparison with scientific literature on injuries provoked by dog bites is difficult, due to the type of injuries collected for the studies, usually severe injuries, such as fatal attacks (Sacks et al., 1989) or leading to hospitalization (Raghavan et al., 2013; Súilleabháin, 2015). In addition, there is a lack and incompleteness of data coming from hospital emergency departments. As a matter of fact in Italy (as well as in other Countries), especially in the past, there was the habit of not reporting dog bites and not being examined by a doctor. This bad custom seems to exist also when the notification of dog bites is mandatory by law and when a dedicated emergency service has been created (Beck & Jones, 1985; Moss & Wright, 1987).

Characteristics of the injured people

Men resulted to be more often victims of dog bites compared to women (59% *vs* 41%) in both periods, before and after the issue of Sirchia's Ordinance, in agreement with previous literature (Wright, 1985; Súilleabháin, 2015). It is likely that men's way of acting and interacting more easily triggers dog aggression towards them.

As for age, people 41 to 65 years-old were more often bitten (34%; Z= 3.149; p=0.002), whilst children were less bitten (6 to 10 years-old=3%; 0 to 5 years-old=5%). However, this data should be cautiously discussed, integrating it with the distribution of age ranges in the human population of Florence. The disagreement with previous literature can be due to the differences in the methods of collecting data: for instance, Wright (1985) and Thompson (1997) found that children were most likely bitten compared to older people, but in their studies only severe attacks were taken into account.

Characteristics of the owners

Personal details of biting dogs' owners were unknown in around 1 out of 3 cases. This was for the most part due to the fact that the dogs were not recorded at the canine registry office, suggesting that at that time it was not completely working yet. However, it is likely to be partially due to the lesser willingness of owners to provide their personal details after the issue of the Sirchia's Ordinance, probably for fear of incurring in bureaucratic problems and penalties. The latter hypothesis is supported by a higher number of dog owners who remained anonymous in the A.O. period (37% versus 27%; χ^2=3.851; p=0.050).

No significant differences were found concerning the other personal details of biting dogs' owners. The range age was 26 to 40 years-old in around 31% of cases, and 41 to 65 years-old in around 50% of cases in both analysed periods. Owners were balanced for sex in the two analysed periods (male owners were respectively 55.8% and 48.1%).

Characteristics of the biting dogs

Data revealed that the majority of dogs involved in registered aggressive episodes were medium-large sized (31% of dogs weighted 11 to 20 kg and 24% weighted 21 to 40 kg). No difference was found for the range of weight over 40 kg in the two analysed periods (86.6% P.O. versus 86.7% A.O.). As for age, most biting dogs (70%) were 1 to 8 year old, without differences between the period before and after the Ordinance.

Concerning the sex of biting dogs, most of them were males both in the period before and after the Ordinance (respectively 70% and 85%). However, the number of female dogs statistically decreased (30% versus 15%; χ^2=7.007; p=0.008). This finding is hard to explain, unless it is hypothesized that it is somehow associated with the reduction of minor injuries, which may be more frequently provoked by female dogs.

It must be stressed that this data is in disagreement with the equal distribution of sexes in the canine population of Florence in the analysed period, as reported in the canine registry office (51.5% males and 48.5% females). This suggests that, as previously found in other studies (Gershman et al., 1994; Mason, 1991), male dogs are more often responsible for biting.

Concerning the breed, biting dogs belonged to 46 different breeds, and the four more represented were: German Shepherd dogs (10.1%), Pit Bulls (4.5%), Dobermann (4.0%), and Maremma Sheepdog (1.8%). Mixed-breed dogs were the more common category of biting dogs (32.2%). In total, dogs belonging to the group 1 and 2 of the Fédération Cynologique Internationale represented respectively the 12.4% and 15.1% of biting dogs.

Many authors have reported that in the United States of America aggressive episodes were more commonly carried out by mixed-breed dogs, German Shepherds and their crosses, or by Pit Bulls and their crosses (Kizer & Town, 1979; Pinckney & Kennedy, 1982; Sacks et al., 1989; Wright, 1991).

However, the risk of breed misidentification is very high (American Veterinary Society of Animal Behavior, 2014). For instance, the term Pit Bull is often used to indicate a category of dogs rather than a breed, regardless from the underlying genetics; and this aspect is likely to be magnified in areas in which attacks by Pit Bull dogs have already occurred and publicized (Overall, 1997). It is possible that the same phenomenon occurs with German Shepherds; mixed-breed dogs having similar features are often confused with that breed. For this reason, the numbers reported for breeds cannot be regarded as completely reliable.

In addition, although data obtained in the current study seems to suggest a predisposition to aggression in certain canine breeds, such conclusion cannot be drawn, as data could not be linked to the true composition of the canine population in the Florence area. This would be the only way to estimate the proportion of biting dogs within each breed. Such problem occurs in many studies on the epidemiology of dog bites. For instance, in a study carried out in Canada (Guy et al., 2001), it was found that Labrador Retrievers were among the most aggressive dogs, whilst that breed is not present in the records in Italy and United States due to their lower presence. The opposite occurred for Maremma Sheepdogs, present in the current list but not in others, as that are quite uncommon outside Italy.

The distribution of the four common breeds in the population of biting dogs in Florence (German Shepherd, Dobermann, Pit Bull, and Maremma Sheepdog) did not show any statistically significant change ($p>0.05$) after the issue of the Sirchia's Ordinance, suggesting that the latter was ineffective in reducing the aggressive episodes in the breeds that the Ordinance itself defined potentially dangerous and aimed at targeting. This is in line with previous studies aimed at assessing the effectiveness of breed-specific legislation in other Countries (Spain: Rosado et al., 2007; Netherlands: Cornelissen & Hopster, 2010; Canada: Calrke & Fraser, 2013; Ireland: Súilleabháin, 2015). Different results emerged in a study of Raghavan and colleagues (2013), who found a reduction in the rate of dog-bite injury hospitalizations in some municipalities in Canada in which Pit Bulls were banned. However, the difference in the type of dog bites studied (only severe cases in Raghavan et al., 2013), can explain the discrepancy. As a matter of fact, although any dog can bite, not all of them can cause severe injuries: characteristics such as the size, the type of jaw, the predisposition to shaking and holding the bite etc., determine a different risk in the degree of provoked damage.

In summary, the current study found that:

- a reduction of dog bites was found after the issue of the Sirchia's Ordinance, but it could be part of an ongoing phenomenon observed in the same area since 1986;
- indeed, a lower number of minor injuries was registered;
- the number of dog owners whose personal details were unknown increased;
- characteristics of injured people did not change;
- men were more frequently bitten than women;
- male dogs bit people more often than female;
- the breed of dogs involved in aggressive episodes did not change;
- at the current state of the art, the breed cannot be considered a reliable discriminating factor in terms of predisposition to aggression towards people.

Such findings seem to confirm the positions of the Federation of Veterinarians of Europe (2000) and American Veterinary Society of Animal Behavior (2014): although some Countries have adopted breed-specific measures, there is no scientific or statistic evidence to suggest that these effectively reduce the frequency or severity of injuries to people.

Due to the peculiar and tight bond linking dog and man (Johnson et al., 1992; Mariti et al., 2013), and the actual presence of biting dogs, canine aggression to people is an issue that need to be properly and carefully dealt with. As the issue of a breed-specific legislation seems to be ineffective, policy makers should take into account the scientific literature and the support of experts in dog behaviour (e.g. veterinary behaviourists). Responsible dog ownership and public education must be a primary focus of any dog bite prevention policy (American Veterinary Society of Animal Behavior,

2014). In particular, both dogs (Gazzano et al., 2008) and humans (Love & Overall, 2001; Mariti et al., 2011) would benefit from an appropriate education to establish a good inter-specific relationship, reducing the risk of dog bites.

Conclusions

This study represents an example of how the issue of dog bites can be tackled and scientifically analysed, avoiding the bias in the perception of risk due to single resounding episodes.

Although the study is based on a limited and local sample, findings suggest that Italian breed-specific legislation on dangerous dogs did not lead to remarkable changes in the trend of dog bites nor in the canine breeds involved.

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La legge italiana sui cani potenzialmente pericolosi (2003): valutazione degli effetti nella città di Firenze

Chiara Mariti[1], Carlo Ciceroni[2], Claudio Sighieri[1]

[1] *Dipartimento di Scienze Veterinarie, Università di Pisa - Italia*
[2] *Unità funzionale di igiene urbana e veterinaria, ASL 10 Firenze - Italia*

Sintesi

L'aggressività canina è un tema largamente dibattuto, soprattutto quando vede coinvolto l'uomo come parte lesionata. Il problema delle morsicature canine rivolte all'uomo deve essere affrontato ed analizzato in modo scientifico, al fine di permettere l'individuazione dei fattori di rischio, di indirizzare il legislatore verso misure efficaci, e di evitare errori nelle misure preventive e restrittive. Lo scopo di questo lavoro è stato quello di valutare gli effetti della legge italiana sulle razze e sui cani potenzialmente pericolosi (Ordinanza Sirchia del 9 settembre 2003 intitolata "Tutela dell'incolumità pubblica dal rischio di aggressioni da parte di cani potenzialmente pericolosi") sull'andamento delle morsicature canine rivolte all'uomo nella città di Firenze.

Per questo studio sono stati raccolti dati relativi alle morsicature di cani verso persone desunti dalle certificazioni dei referti medici dei vari Dipartimenti Emergenze Accettazioni di Firenze, dalle denunce effettuate all'ufficio dell'anagrafe canina e dalle schede di osservazione per la profilassi della rabbia. I report si riferiscono a morsicature canine verificatesi nella città di Firenze nel periodo compreso tra settembre 2002 ed agosto 2005. In totale sono stati raccolti 556 casi. Le caratteristiche delle lesioni dei cani, dei proprietary e delle vittime coinvolte nelle morsicature nell'anno precedente all'entrata in vigore dell'Ordinanza Sirchia sono state comparate alle stesse caratteristiche nei due anni successive all'emissione di tale Ordinanza (effetti a breve e lungo termine) utilizzando il test del χ^2 ($p<0,05$). I risultati suggeriscono che la suddetta Ordinanza non sull'andamento delle morsicature canine nel campione esaminato, né nel breve né nel lungo termine. Infatti, anche se è stata osservata una diminuzione del numero di morsicature nel periodo successive all'Ordinanza, una tendenza alla riduzione era già in corso fin dal 1986. Inoltre le caratteristiche dei proprietari, delle persone lesionate e dei cani coinvolti negli episodi aggressive sono rimasti invariati, ad eccezione di una riduzione delle lesioni più lievi. Infine, dopo l'emissione dell'Ordinanza è aumentato il numero di proprietari di cani i cui dati anagrafici erano ignoti. I risultati della presente ricerca suggeriscono pertanto che le misure restrittive legislative riguardo ai cani potenzialmente pericolosi non sono efficaci nel controllo dell'aggressione di cani verso le persone.