

## **Dystocia in Pembroke Welsh Corgis**

Caesarean Sections in Pembroke Welsh Corgis. A Veterinary Study by Line Vinde Carlsen, Veterinary Student. May 2012.

In June 2009 the Danish Kennel Club (DKK) established the PKS-group (Profiling, Quality and Health) to profile dogs registered with DKK. A questionnaire was sent to all breed clubs in Denmark with questions regarding the health of their specific breed(s). When returning the completed questionnaire, the Welsh Corgi Club (WCK) which represents both corgi breeds in Denmark mentioned that caesarean sections (c-sections) were an increasing problem in Pembroke corgis. Consequently a study was launched in cooperation with the Faculty of Health and Medical Sciences of the Copenhagen University, DKK and WCK.

The WCK estimated that about 60% of the Pembroke corgis needed a c-section compared to about 23% of the Cardigans and that the number of c-sections had increased since 2003. There are, however, no data to support this assumption. Some breeders had a feeling that the problem started about 10 years ago.

The study was primarily based on questionnaires sent to Pembroke and Cardigan breeders who had registered puppies with DKK from 1991 to 2011. The questionnaires contained questions regarding the bitch, oestrus cycle, mating, whelping and puppies. The Cardigan breeders returned 40 out of 173 questionnaires while the Pembroke breeders returned 41 out of 105 questionnaires. This is not quite enough for the compilation of reliable statistics and the results of the study may therefore not fully reflect the true situation.

The results show a significant difference between the risk of a caesarean section in Pembroke corgis (35%) compared to the risk in other breeds. According to a study by Evans & Adams (2010), based on insured dogs in England (BSAVA Scientific Committee Purebred Dog Health Survey), which comprised 13'141 bitches from 1151 breeds with a total of 22'005 litters over a 10 year period, the corgis, with 35.7% c-sections in Pembrokes and 21.9% in Cardigans, were among the 20 breeds with the highest incidence of c-sections.

During 2005-2011, there were significantly more c-sections (61%) compared to 1991-1997 (12.5%). On the other hand there was no significant difference between c-sections in Pembrokes (35%) and in Cardigans (22.5%).

In order to find the cause for the significant increase in c-sections in Pembrokes during the years 2005-2011, the following factors were investigated: uterine inertia, breeding lines, incest coefficient, age, weight, daily exercise, feeding, bobtail, conformation, litters of  $\leq 3$  or  $\geq 9$  puppies, still born or big puppies at birth.

In this study, dystocia was defined as the bitch's incapability to give birth without veterinary intervention, whereby the cause can be maternal or fetal.

Maternal causes include primary or secondary uterine inertia, stress, age (too young or too old), obesity, distortion of the uterus because of too many or too big puppies, small litter, unbalanced ratio between oestrogen and progesterone or calcium/magnesium, insufficient release of oxytocin or deformity of the bony or soft birth canal.

Fetal causes can be due to malposition of the fetus, too big puppies in small litters, dead puppies or fetal deformity.

The questionnaires did not explain whether the bitch had been bleeding, whether the temperature had dropped or whether the first stage of labour (cervical dilation) had started. It is possible that the bitch was not ready yet and that she could have whelped naturally if only she had been given the chance. Perhaps the breeder was too impatient or the vet inexperienced. On the other hand it is also possible that the bitch suffered of primary uterine inertia.

Uterine inertia and malposition of the fetus are the most common causes for dystocia in the dog.

### **Uterine inertia**

In this thesis the definition of uterine inertia was divided into primary and secondary uterine inertia:

*Complete primary uterine inertia:* the bitch has not delivered a puppy before the vet was consulted.

*Incomplete primary uterine inertia:* the bitch has delivered one puppy before the vet was consulted.

*Secondary uterine inertia:* The bitch has delivered several puppies before the vet had to be consulted.

According to Jones & Joshua (1988) and Forsberg & Persson (2007) primary uterine inertia can be hereditary.

In this study a significant difference was observed: Bitches that due to primary uterine inertia were delivered by c-section have a significant higher risk to need a c-section instead of whelping the normal way. This fact can be useful for future breeding plans in that only bitches which were delivered freely should be bred or if it can be ascertained that the c-section was necessary for other reasons than primary uterine inertia.

As secondary uterine inertia is not hereditary, there is therefore no reason to exclude a bitch from breeding because there is no higher risk that the bitch will need a c-section even after one or two previous c-sections.

Future studies could investigate how primary uterine inertia is inherited and which genes are responsible so that breeders in future can breed away from primary uterine inertia in Pembroke corgis as well as in other breeds.

### **Breeding lines, incest coefficient, age and parity**

When comparing the pedigrees of the bitches that needed a c-section from 1991-2011, no direct connection could be found.

### **Incest coefficient and age**

The code of ethics of both DKK and WCK recommends that the incest coefficient should not be higher than 6.25%. WCK further recommends that a bitch should not have her first litter before the age of 21 months and the last litter not later than 7 years.

35 bitches had an incest coefficient of 0%, four had one of 6.25% and one bitch had one of 12.5%. There was no significant difference in the frequency of c-sections in relation to the incest coefficient.

Some breeders were under the impression that the risk of dystocia increased with the age of the bitch at the time of her first whelping. This study showed no proof that the age of the bitch at the time of her first whelping or the parity (number of litters) involves a higher risk for a c-section.

### **Weight**

The bitches in this study weighed between 11 and 16 kg (24 and 35 lbs) at the time of mating and 13.5 to 24 kg (30 and 53 lbs) at the time of whelping. There is a significant higher risk of c-section in connection with the bitch's weight at the time of mating, but not at the time of whelping or during pregnancy. As the calculations were only made on the basis of the bitch's weight and not her body fat percent, it is unknown whether overweight or obese bitches were part of the investigation.

### **Exercise**

In this study the amount of exercise was divided into categories of 0-60, 60-120 or 120-180 minutes daily walks and whether the bitch was on or off leash. There was no significant difference between the length of the walks or how these took place. 18 of 37 bitches were taken for daily walks between 0 and 60 minutes, and 2 of 20 bitches were always on leash. The study did not take into account whether the bitches, in addition to the walks, were able to exercise freely in a big garden or not. None of the bitches were apparently in such a poor condition that they could not whelp normally.

### **Food**

Some Corgi breeders believed that the increase in c-sections was related to the increased feeding with commercially produced food and the recommendation of latter years to feed the bitch during pregnancy with puppy food.

Puppy food contains more protein than food for adult dogs and some of the breeders thought that the higher protein content was responsible for the fetus growing too fast and getting so big that the bitch could no longer whelp them naturally.

There was no significant difference between the type or amount of food during pregnancy and the risk of a c-section. However, a significant lower risk for a c-section was found when the bitch during pregnancy was fed with homemade food.

### **Bobtail**

Some breeders assumed that a natural bobtail could cause a higher frequency of c-sections.

13 of 26 bitches taking part in this investigation had a natural bobtail and showed a tendency to a significantly higher risk of c-section.

In the literature no indication could be found that a bobtail can be the cause of a higher risk of c-section.

### **Conformation**

In order to find out whether the conformation of the bitches over time had changed and whether too wide shoulders in relation to the pelvis, or a body that is too short, could lead to whelping complications, the shoulder/pelvis and chest/belly ratio was calculated on the basis of the measurements supplied by the breeders. However, as the amount of data was too small,

it could not be tested whether a significant higher risk of c-section was caused by a higher ratio. Also with regard to the body length there were too few data.

### **Puppies**

A large or small litter, as well as dead puppies can cause dystocia.

The WCK assumed that the cause for the increase in c-sections in Pembroke corgis from 2005-2001 compared to 1991-1997 could be puppies that were getting too big.

In a study by Kutzler et al. (2003), the average number of puppies for dogs weighing from 9 to 20 kg is 6, with a standard deviation of 3, i.e. 3 to 9 puppies per litter.

In this study the size of litters was between 2 and 12 puppies with an average of 5.54 puppies. There was no significant difference in the frequency of c-sections in litters of  $\leq 3$ ,  $\geq 4 - \leq 8$  and  $\geq 9$  puppies.

In singleton litters the fetus are often so big that they can no longer be whelped naturally.

Dead fetus can cause obstruction in the birth canal. In this study the risk of c-section was highest when the litter contained dead puppies.

It was investigated whether the death rate of puppies had increased from 1991 to 2011 and it was found that there were 1.13 times more litters per year with dead puppies. It was not investigated whether the puppies were dead prior or during whelping.

It is possible that dystocia in Pembroke Corgis causes more dead puppies. On the other hand, it is also possible that the death rate of puppies over time has increased leading to more c-sections.

In this study no significant difference was found between the weight of the puppies on their 2<sup>nd</sup> day and the risk of c-section.

However, there was a significant difference in the number of c-sections in relation to the amount of protein in the food given to the pregnant bitch, but no significant difference in the number of c-sections in relation to the puppies' weight at birth.

The puppies' weight on their 2<sup>nd</sup> day varied between 180 and 500 g (6.3 and 17.6 oz.), with an average of 293 g (10.3 oz.). In a study comprising 780 Pembroke corgis, Fiszdon & Kowalczyk (2009) found that the average weight of the puppies corresponded to 3.1% of the dam's weight.

In the present study, the average weight of newborns in a litter was 1.1-2.6%, i.e. less than in Fiszdon & Kowalczyk's study. The data were too few to calculate whether the puppies' birth weight had increased from 1991 to 2011.

### **Summary**

The following factors played a significant role in the risk of c-sections in Pembroke corgis: The breeder's experience and the primary uterine inertia together with the fact that the bitch herself was delivered by c-section. Furthermore, whether the bitch was fed with homemade instead of commercial dry food for puppies or adult dogs. Also the bitch's weight at the time of mating, bobtail and dead fetus in a litter contributed to a higher risk of c-section.

On the other hand, breeding line, incest coefficient, previous c-sections, the bitch's age, litters of  $\leq 3$  or  $\geq 9$  puppies and the size of puppies did not have a significant influence on the risk of c-section in Pembroke corgis.

## **Conclusion**

Bitches that due to primary uterine inertia were delivered by a caesarean section should not be bred.

## **References**

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25.10.2012