Free whelping Boston Terriers - A thing of the past… or not?

Our Sierra Gold Boston Terrier Club's health committee chair, Valerie Korff, recently gave a presentation related to a study on why dogs can and cannot free whelp. The study included Boston Terriers and Scottish Terriers, so the information was particularly interesting to those of us who breed Boston Terriers. This issue's article is summary of the presentation she gave. I hope you find it as informative and eye opening as I did.

A summary by Valerie Korff:
"Radiographic pelvimetry for the assessment of dystocia in bitches:
a clinical study in two terrier breeds(Eneroth et al., 1999)"

A significant issue currently facing the Boston Terrier breed is dystocia (abnormal or difficult whelping). Presently, dystocia is typically avoided by performing caesarian sections causing as little stress to the bitch as possible. Still too often C-sections result in loss of one or more puppies and, in severe cases, even death of the dam. Some breeders strive to avoid these downfalls of difficult births by analyzing the history of free whelping and incidence of dystocia in their lines, but this is complicated as many other breeders perform C-sections as a matter of practice, rather than as a treatment only when needed. This make a pattern hard, if not impossible, to identify in a pedigree. Keeping this in mind, a bitch's probability of free whelping should be supported by more technical means and, considering the recent advancements in canine health testing, there may be a way to accomplish this goal.

In a study involving Boston Terriers and Scottish Terriers, pelvic x-rays of free whelping bitches and bitches affected by obstructive dystocia were compared in addition to an accompanying analysis of dam and puppy conformation, litter size, and puppy weights (Eneroth et al., 1999).

Obstructive dystocia, such as caused by narrow birth canals, breach or oversized puppies, fetal death, malformations, or any combination thereof, may be the cause of over 25% of canine dystocia cases (Darvelid and Linde-Forsberg, 1994). Taking this into consideration, this study evaluated the usefulness of canine radiographic pelvimetry (the analysis of pelvic measurements from an x-ray to assess potential ease of delivery). Using 20 Boston Terrier and 14 Scottish Terrier bitches, two even groups for each breed based on past free whelping ability or a prior obstructive dystocia experience were created. In the dystocia groups, they looked at bitches that had dystocia due to fetal-pelvic disproportion, which was defined as normal, but unproductive labor without fetal anomalies or breach presentations (Eneroth et al., 1999).

All bitches had both a physical and radiographic examination performed while they were out of season to avoid any errors caused by hormonal changes on pelvic dimensions. For the physical examination, the bitches were deemed healthy, weighed, and certain measurements were taken, including height at withers, width, height, and circumference of the head, as well as a few external hip measurements.

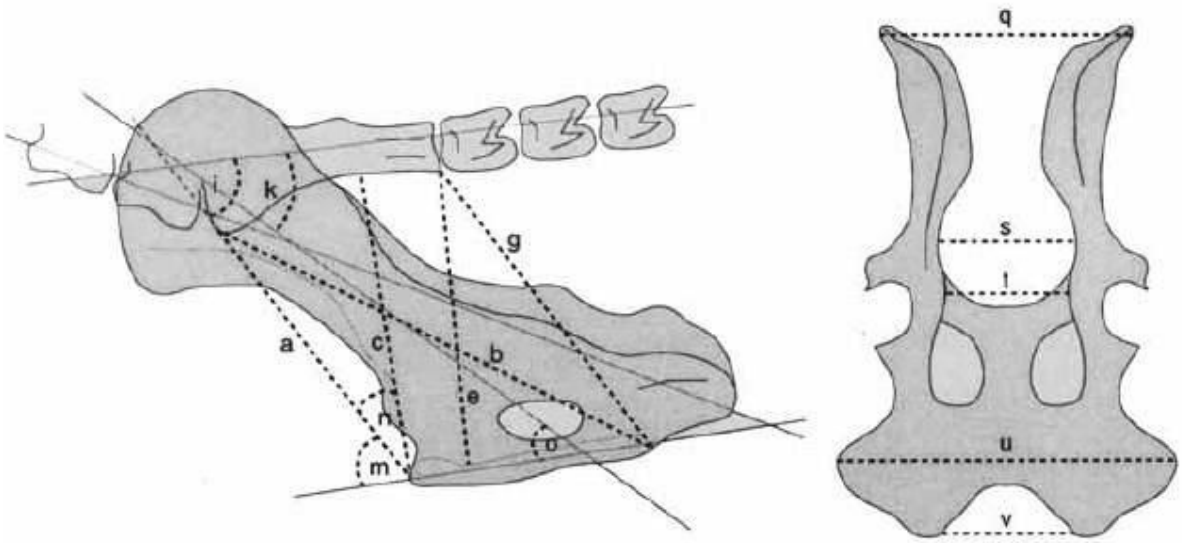

FIG 1. Distances and angles between structures of the pelvis measured in the bitches: (a) conjugate vera, (b) conjugate diagonalis, (c) diameter verticalis, (e) sacral diameter, (g) sagittal diameter, (l, k, m, n, o) angles of the pelvis, (q) the distance between the two tubera coxae, (s) diameter transversa, (t) the inner distance between the two acetabula, (u) the distance between the two lateral tubera ischiadica, (v) the distance between the two medial tubera ischiadica.

For the radiographic examination, two x-rays were taken, one on their left side and one on their back. The author notes that they were careful to have the animals perfectly straight to get a symmetric image. From these x-rays, many pelvic distances were measured and later compared between the breeds and groups (Figure 1). It was found that in Boston Terriers, the relation (c/u) between the vertical width and the distance between ischiadic tubera as well as the relation (c/s) between the vertical width and the horizontal width were significant in regards to dystocia. The latter relation is highly evident in side by side images of normal bitches and bitches with dystocia (Figure 3). The study also found that there is no relation between body mass or height and dystocia in Boston Terriers, while the opposite is true for Scottish Terriers.

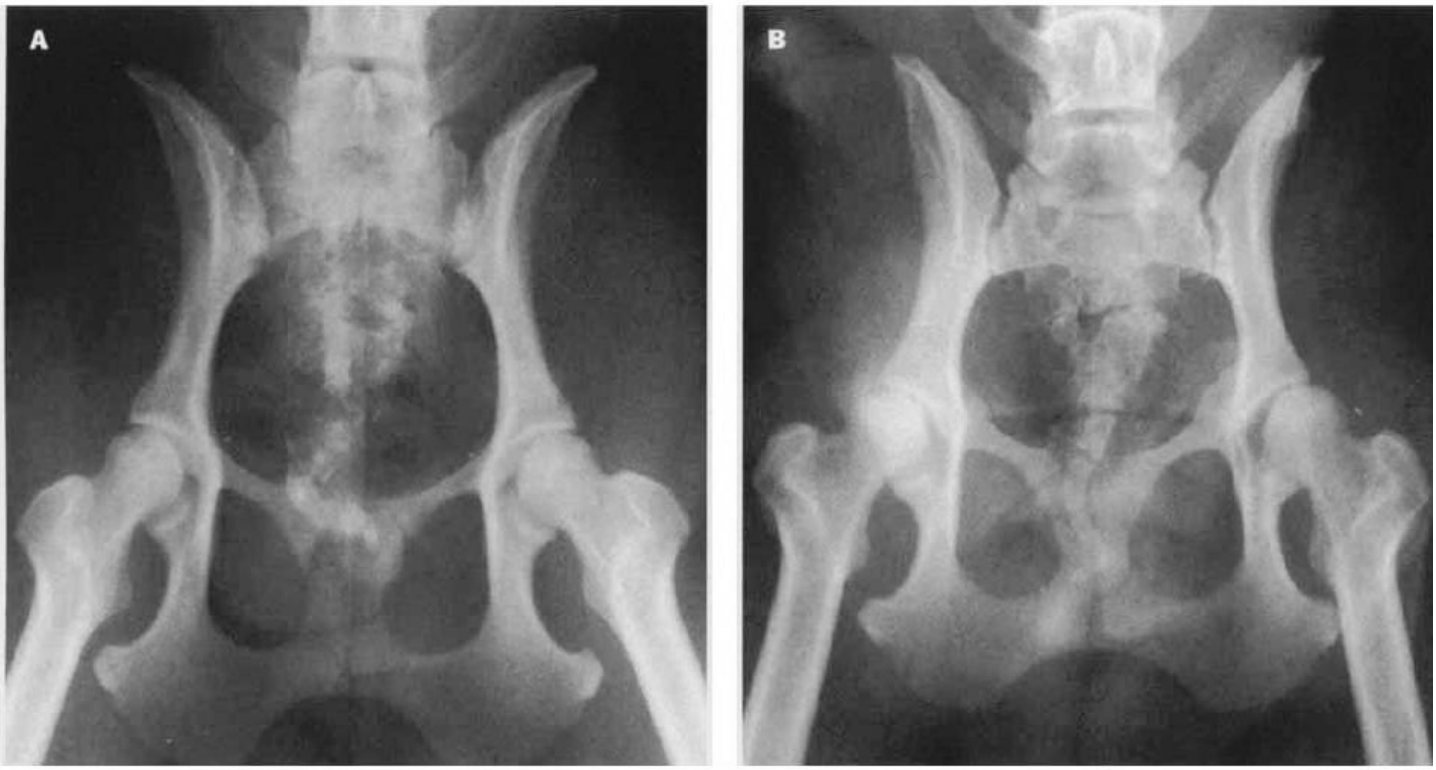

FIG 3. Ventrodorsal radiographs of a normally whelping Boston Terrier (A) and one experiencing obstructive dystocia (B). The pelvic inlet may be objectively assessed by looking at the shape (rounding), and by comparing the visible distances between the shafts of the ilium and between the sacral and the pubic bones in the radiograph. Note the dorsoventrally flattened pelvic inlet in the bitch with dystocia (B); the horizontal diameter exceeds the vertical and there is a visible compression of the normally rounded shape of the inlet.

In addition to the physical and radiographic examination, they also evaluated litter data from the normal and abnormal groups (Table 6). Between groups for Boston Terriers, the litter size was the same, but average puppy weight was larger in the group with dystocia than the normal group, where it was 209g (7.4 oz) versus 189g (6.7 oz), respectively. As a result, the puppy weight as a percentage of maternal body weight was significantly larger, with 3.1% vs. 2.5%. In addition, puppy measurements including birth weight and various head and body dimensions were taken from many more animals that were not necessarily included in the x-ray study (Figure 2). Not surprisingly, the Boston Terrier puppies showed a strong relation between puppy weight and head circumference, which is highly significant for bitches that already have a poor vertical pelvic width.

Table 6. Pup and litter data comparisons between normally whelping bitches and bitches with obstructive dystocia included in the clinical and radiographic examination.

	Boston terrier		Scottish terrier	
Clinical measurements	Bitches with normal parturition (n = 10)	Bitches with dystocia (n = 6)	Bitches with normal parturition (n = 5)	Bitches with dystocia (n = 5)
Number of litters	23	7	11	9
Number of pups	78	27	47	27
Mean litter size	4·0	4·3	4·6[c]	3·2[d]
Mean pup weight (g)	182[a]	209[b]	214	221
Mean pup weight (%)	2·5[a]	3·1[b]	2·1[a]	2·5[b]

Mean pup weights are given in grams and in percent of the dam's weight
n = Number of bitches
Different superscript letters within a row (within breed) means significant difference between groups [a,b](P<0 001). [c,d](P<0 05)

Overall, the study supported that radiographic pelvimetry is a potentially useful way to determine the presence of a narrow pelvis in Boston Terriers (Eneroth et al., 1999). This is exciting because the difference in pelvic dimensions are readily apparent to the untrained eye and the x-ray positions are those used in other common health tests, such as OFA hips, so a breeder may evaluate a bitch's pelvis when these tests are performed. The one caution the author of the study notes is that the ventrodorsal (on their back) x-ray may give a false vertical diameter based on position and recommends that this measurement instead be taken from the left lateral (on their side) x-ray. This is still viable because the OFA spine test requires two x-rays, conveniently in a lateral and then ventrodorsal recumbency. So, if a pelvis appears narrow on the ventrodorsal view, a breeder can measure the vertical distance on the lateral view (or have their veterinarian do it, if they are not sure) to confirm. Even more exciting, a separate study found that the pelvic shapes of the sire and dam could explain 26% of the pelvic shapes of the offspring, meaning that breeders can slowly move towards an animal that is far less likely to experience obstructive dystocia (Linde-Forsberg, 2003). With this knowledge, breeders can not only assess the potential free whelping ability of a bitch, but, because it is heritable, can also actively select and improve upon this trait within their line. By taking advantage of this technology, the Boston Terrier as a breed, can move towards a healthier and more natural whelping experience - something it desperately needs.

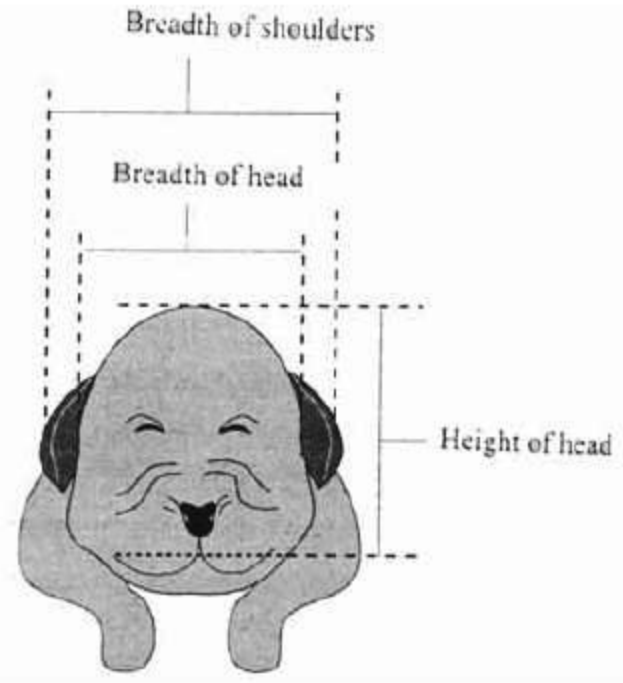

FIG 2. Measurements of the pups taken by breeders within hours after birth

While the article this month is a bit technical in nature, it is an informative and can certainly be referenced as we try to improve our breeding programs. For those who already (or plan to) x-ray their Boston Terriers for hips, spine, and trachea, using those x-rays to help evaluate the pelvis of your dogs can only help in making more informed breeding decisions. Who knows…. Maybe one day our Bostons will free whelp more than they require assistance via C-sections. ☺

Thank you Valerie for this very interesting summary!

Article References:

Darvelid, A.W., Linde-Forsberg, C., 1994, Dystocia in the bitch: A retrospective study of 182 cases. Journal of small animal practice 35, 402-407.

Eneroth, A., Linde-Forsberg, C., Uhlhorn, M., Hall, M., 1999, Radiographic pelvimetry for assessment of dystocia in bitches: a clinical study in two terrier breeds. Journal of small animal practice 40, 257-264.

Linde-Forsberg, C., 2003, Pelvimetry to diagnose dystocia in the bitch. http:/www vincom/Members/Proceedings.