Consistent under-advancement in tibial tuberosity advancement (TTA) surgery

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INTRODUCTION

Canine cranial cruciate ligament rupture is a very common orthopaedic condition and Tibial Tuberosity Advancement (TTA) is a popular technique to achieve dynamic stabilisation of the stifle joint. Critical to this procedure is the correct advancement of the tibial crest. It has been shown in a mathematical model that the advancement achieved is typically less than the desired pre-operative advancement deemed necessary, however this has not been demonstrated clinically. It was hypothesised that achieved advancement was likely to be affected by tibial tuberosity conformation (with a more distal insertion of the patella tendon thought to decrease the advancement), and size of cage placed.

MATERIALS AND METHODS

Straight lateral pre and post-operative radiographs from dogs treated with a Kyon TTA were reviewed using OsiriX. Tibial tuberosity conformation as assessed by measurements of proximal tibial tuberosity angle and the advancement achieved was

also calculated, based on published literature. Data was assessed for normality and interrogated with a Student's T-test and linear regression as appropriate.

RESULTS

172 cases seen at the Queen Mother Hospital between September 2010 and May 2014 met the inclusion criteria. Age ranged from 15–138 months with a mean of 63 months. The most common breeds seen were Cross breeds, Retrievers and Rottweilers. Average tibial tuberosity advancement was 84.4% of expected ($P < 0.0001$), range 62.4–99.5%. The mean expected advancement was 10.3mm whilst the mean advancement achieved was 8.7 mm. Average under advancement for 3 mm, 6 mm, 9 mm, 12 mm and 15 mm cages were 0.2 mm, 0.7 mm, 1.4 mm, 2.0 mm and 2.0 mm respectively. Under advancement increases as the cage size increases with a significant difference seen between 6 and 9 mm cages, and 9 and 12 mm cages ($P < 0.0001$).

DISCUSSION

The achieved advancement of the tibial tuberosity was significantly less than the advancement predicted from the cage size selected. Under-advancement of the tibial crest may reduce the dynamic stabilisation of the stifle and hence predispose to ongoing lameness or late meniscal injuries. Under advancement increases as cage size increases, confirming the previously published mathematical model. However, a clear effect of tibial tuberosity conformation and under advancement was not found.