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Personal View

Face validity of a proposed tool for staging canine osteoarthritis: Canine OsteoArthritis Staging Tool (COAST)☆

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Introduction

Canine osteoarthritis (OA) is a gradually progressive degenerative disease most commonly caused by developmental abnormalities of the joints, such as hip dysplasia, elbow dysplasia, osteochondrosis dissecans and also conditions such as non-traumatic cranial cruciate ligament failure (Fox, 2011; Innes, 2012[1]). Traumatic joint injury is another important inciting factor (Fox, 2011; Innes, 2012[1]). Pain, inflammation, impaired mobility, and functional and structural changes characterise the disease and contribute to its progression (Lascelles, 2009; Loeser, 2010). Pain results in both local and distant deterioration of the musculoskeletal system as a result of decreased and altered mobility. The pathological processes of OA, such as joint capsule thickening and periosteal reactions, contribute to altered range of motion that compounds the musculoskeletal changes. Additionally, the ongoing nociceptive input into the central nervous system results in somatosensory system deterioration and central sensitization (Knazovicky et al., 2016), which contributes to the overall perception of pain. At the present time, the functional and structural changes associated with canine OA are incurable.

Early intervention has the greatest potential for providing the most effective management of OA since it provides an opportunity to initiate an appropriate long-term care plan and disrupt the progressive, vicious cycle of multidimensional deterioration. Unfortunately, greater than 50% of canine arthritis cases are diagnosed in dogs aged between 8–13 years (Mele, 2007). Even though advancing age, increasing bodyweight and obesity contribute to the progression and severity of OA (Marshall et al., 2010), this high percentage of first time diagnosis in a more elderly age bracket is concerning given the known link between OA and developmental orthopedic disease in young dogs (Innes, 2012). It highlights the probability of dogs living with undetected OA for a large proportion of their life. Identifying signs of OA-associated pain can be difficult (Sharkey, 2013), especially earlier in the disease process, and is a likely contributing factor.

Pet owners have the greatest opportunity to observe changes in their dog's behaviour because they spend the greatest amount of time with them in familiar, stress free environments where canine behaviour is expressed most normally. Unfortunately, subtle or intermittent behavioural alterations may go undetected or can be initially dismissed, especially if owners do not associate the changes with evidence of their dog being in pain (WSAVA Global Pain Council, 2014). As a result, veterinarians are frequently not consulted until the dog's behavioural changes are more marked.

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[1] See: Lascelles, B.D.X., 2016. Joint Pain in Pet Dogs and Cats. Fact Sheet No 9. International Association for the Study of Pain. Global year against pain in the joints. https://www.iasp-pain.org/GlobalYear/JointPain (Accessed 12 February 2017).

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Routine veterinary assessments can provide opportunities to detect orthopaedic changes that owners have not realised the significance of, or simply not recognised. However, practical comprehensive guidelines, incorporating both owner and veterinarian aspects for the diagnosis and staging of canine OA are lacking, and this probably contributes to the under-recognition of OA-associated pain earlier in life.

Pain and impaired activity have negative implications on canine quality of life (McMillan, 2000) and a desire to improve the situation for dogs with OA has encouraged the authors to propose an instrument, the Canine OsteoArthritis Staging Tool (COAST), to help veterinarians with the pro-active, stage-specific diagnosis and monitoring of OA in dogs. Several potential benefits are envisaged through adopting such an approach:

- Regular evaluation of preclinical dogs as well as those dogs clinically affected by OA, facilitating early detection of changes and the timely implementation or adaptation of their care plan;
- Improved understanding of the impact that OA has on the dog as a whole through the use of multiple approaches to assessment;
- A consistent approach to evaluation and use of a common terminology; and
- A multi-disciplinary team approach to care, encouraging better communication and understanding.

This article outlines the rationale and thought processes behind the construction of this proposed instrument and the 'item generation' — determination by expert opinion of what the instrument should contain and look like (face validity). It gives a detailed overview of COAST, and practical details on how it is proposed to be used.

The development of COAST

COAST was developed by a group of international specialists actively working in the fields of small animal orthopaedics, anesthesia and pain management. The group is a long-standing board of advisors purposefully recruited from nine countries to ensure geographical diversity and promote understanding of differences in local or regional approaches to veterinary medicine during discussions. In 2013, a meeting was convened to assess the current means of diagnosing and managing canine OA and to specifically identify any unmet needs or areas for improvement. The group unanimously recognised that a system defining the stages of OA, with guidance on how to effectively utilise the system for assessment and monitoring of dogs either 'at risk' or with clinical signs of the disease, was a deficiency in veterinary medicine. Since then the group has been working to address that unmet need. The authors have met in person every 2 years and refined ideas remotely during interim periods. Discussions have culminated in the development of COAST; a tool that can be applied anywhere independently of geographical area.

The selection of COAST assessment criteria

The majority of canine OA evaluations are undertaken in first opinion practice, so a key objective for the authors was to ensure that COAST would be applicable for use in primary care. Assessment procedures were therefore only incorporated in COAST if they were relatively cost effective and could be implemented by general practitioners in the majority of clinics. The authors included both pet owner and veterinarian observations to harness the strengths of each technique and balance out some well-documented weaknesses (Sharkey, 2013). The decision to incorporate these contrasting evaluations was also to encourage a 'team approach' to care and to help evaluate multiple aspects of the disease. The authors further minimised weaknesses in methodology by advising use of the most robust techniques wherever possible: For example, the subjectivity of pet owner assessments is reduced through the use of validated clinical metrology instruments (CMIs). Objective measures such as gait analysis using force plates or pressure sensitive mats were not included in COAST because they are not routinely available in most general practices. However, these tools can provide repeatable, quantitative measurements of limb use if used correctly and can be a useful source of additional information, if available, for assessment. Alternative forms of objective measurements such as accelerometers are becoming increasingly technologically advanced, easier to use and analyse and have the potential to monitor a dog's activity within its home environment. They are interesting options for the future, but further validation of these tools is required before they can be recommended as part of this diagnostic aid.

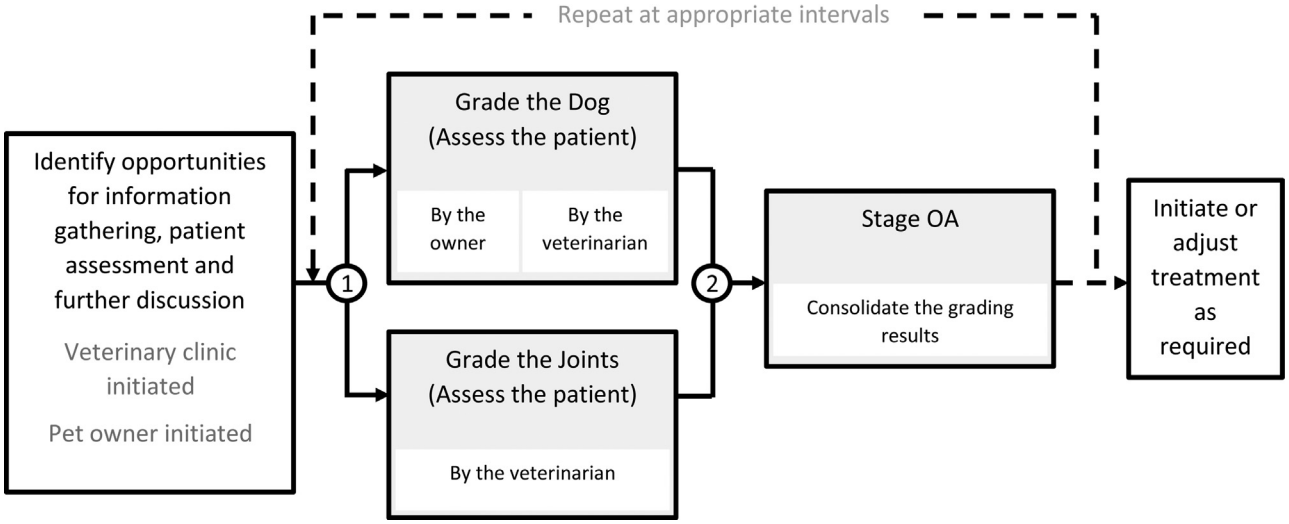

Fig. 1. Flow chart illustrating the two main steps in Canine OsteoArthritis Staging Tool (COAST; 1 = grading and 2 = staging). Regular evaluations and a two-pronged approach to grading ('grade the dog' and then 'grade the joints') in order to stage and track osteoarthritis are the fundamentals of this diagnostic aid.