

Managing chronic osteoarthritis? It is as easy as A,B,C

As the most common cause of chronic pain in dogs, Stuart Carmichael BVMS MVM DSAO FRCVS, managing director, AIM.OA discusses management of OA

Osteoarthritis (OA) is the most common cause of chronic pain in dogs. It is estimated 20% of the dog population is affected by the disease.¹ It is also a very common reason for euthanasia in older animals. The life expectancy of dogs with OA is reduced by 20% compared to unaffected animals. However, not all animals with pathological changes (see Figure 1) need to show overt clinical signs, and those that do can often be successfully managed, both in the short and long-term. Multimodal management has become a popular and successful way to address the complex requirements often present in the chronic OA patient with attention to pain management, nutrition and exercise. But, it can be difficult to plan, implement and sustain this programme. This is where the Aim.OA System plan can be a useful way of achieving this.



Figure 1: Pathology within joint showing cartilage damage, osteophyte formation and chronic synovitis.

PRINCIPLES FOR MANAGEMENT

Chronic OA is a complex disease that affects and involves multiple systems rather than just the joint alone. Traditionally, the management of OA has been focused on the pathological process within the affected joint, and especially on degrading cartilage. To this end, surgical alteration and medical intervention aimed at local anti-inflammatory control and chondroprotection have been the main goals of treatment. In a chronic-disease process, such as one we encounter in OA, we also must look beyond the target organ and try to understand the way the pain experience is processed and, importantly, how it may be modified to the benefit of the patient. One of the accepted wisdoms in chronic disease is that the pain experience has no protective effect, contrary to acute pain. This is part of the debilitating nature of the disease. So, pain plays no positive part in chronic osteoarthritis. By its very nature, OA is a disease that, once initiated, persists for the life of the affected patient. As such, all control strategies must take account of this need for long-term treatment. The objectives for management can be summarised as follows:

- Need a strategy that will endure for the life of the patient;
- Pain control and elimination is key;
- Modification of pain response outside the joint will benefit management; and
- Sustaining mobility of both joint and patient is essential for a reasonable lifestyle.

MULTIMODAL MANAGEMENT FOR OA

Achieving satisfactory pain control and maintaining it in the chronic-arthritis patient have been shown to be more effective with a more global approach to management than using a single analgesic or anti-inflammatory medical agent.² A multimodal approach involves targeting a number of different intervention modes simultaneously to achieve control as quickly as possible, and then to modify these as the disease progresses or the patients needs change throughout life.³ It adds therapeutic options, which are neither medical nor surgical. Obviously, a complex intervention like this requires careful planning and prioritisation.

There are different ways in which this can be established to give a logical approach.⁴

Here, we outline a method based on five separate domains for intervention plus a call to follow up the case. This is the six-point plan (Aim.OA System) with six different areas for intervention (labelled A-F) to form a multimodal approach to any arthritis case (see Table 1).

A	Analgesia	Non-steroidal anti-inflammatory drugs (NSAIDs) and adjunctive analgesics
B	Bodyweight and diet	Obesity control and eicosapentaenoic acid (EPA) diet
C	Care and environment	Toxicity-monitoring and practical changes
D	Disease and joint mobility	Chondroprotection, surgery, and local physical therapy
E	Exercise and rehabilitation	Physical rehabilitation and exercise planning
F	Follow-up	Next appointment

Table 1: Aim.OA multimodal system for OA management.

Targeting different domains, which are important in the disease, gives a wider, more global management. It also allows the therapy to be altered through the progress of the disease to better meet the patients needs which may change with time. Compliance is essential for this approach to an arthritis problem and the owner must both understand the objectives and be willing to show patience and commitment to achieve benefit. It is important to regularly reassess and record results to ensure improvement.

PLANNING OA MANAGEMENT

One of the main problems in arthritis management is processing all of the choices available and selecting the right combination to meet the objectives for treatment. The whole process can be summarised as follows:

1. Identification of a problem;
2. Assessment;
3. Review possibilities and select intervention strategy;
4. Assess success of this within a set time frame;
5. Continue, modify, replace or add to intervention(s); and
6. Re-assess etc (maintenance phase).

The process must be simple to use, have achieved rapid success, be sustainable over long-term and must bring the clinical problem under the control of all concerned. It must

also be practical and economically feasible.

One way of ensuring that there is a controlled approach to the problem is by using pre-determined management plans, which are customised for each patient. These have the multimodal approach imbedded but require judgements to be made about priorities and sequences of treatments used. They combine pharmacological and non-pharmacological methods and will evolve to meet changing needs in dealing with the chronic disease process. This last point provides sustainability. Successful plans depend on good clinical assessments being made at different times during the management process. These must be repeatable and allow comparison, not only with the last assessment but also with all assessments recorded. This is the key to exerting control over chronic evolving disease processes. Records must be reliable and assessment simple, but also accurate at detecting variations in the clinical state. Assessment of a complex disease like OA is not an easy feat and can be subjective.^{5,6} Many attempts have been made to construct a scale that can be used to give repeatable measurements of pain with limited success. Carefully constructed client questionnaires may be the most useful way of judging the subtle changes that can indicate early improvement or deterioration.^{7,8} A critical way in which the approach to the patient with OA can be improved is to develop a proactive maintenance approach and include it in the plans. Regular visits at set times are arranged for the animal rather than waiting until a problem occurs.

This approach is particularly useful in chronic disease where regular assessments can be used to map gradual improvements. It can also allow early identification of new developing problems allowing rapid adjustment of the plan to preclude serious deterioration. The approach is particularly useful in ensuring that non-pharmacological measures are being maintained and optimised. In many cases, veterinary nurses can manage a large component of the maintenance phase through specialised support clinics for arthritic patients.

	Mode	First visit	Second visit (28d)	Third visit (+28d)
A	Analgesia	NSAID started	NSAID continued	NSAID reviewed
B	Bodyweight and diet	Body condition score (BCS) 5 Diet planning for BCS 3 Introduce EPA diet	BCS 4 Diet continued Continue EPA	BCS 3 Maintenance diet EPA introduced As before
C	Care (Screening, Comfort, Common Sense)	Bloods (normal) Urine (normal) Environmental review Modification Bedding/car ramp	Plan future monitoring Mats for floor Other modifications	
D	Disease	Radiography Evaluate any surgical options Consider intra-articular therapy, if appropriate	Mobilisation started, if pain under control Possible intra-articular therapy	Continue with joint exercises Possible intra-articular therapy
E	Exercise and rehab	Exercise chart position 5 Warm-up exercises	Exercise chart position 4 Passive mobilisation (aquatherapy)	Exercise chart position 2 Activity monitors Rehab plan
F	Follow-up	More contact in seven days Check in 28 days	Check in 28 days	Check in 28 days

Table 2: Suggested maintenance plan and record.

PROPOSED MANAGEMENT STRATEGY FOR OA

The six-point plan for OA management (AimOA System) is proposed to satisfy the requirements outlined above. The plan identifies six separate areas of management or modes, which can be addressed simultaneously to deliver a multimodal approach. These areas are identified by alphabetic prompts A, B, C, D, E, F (analgesia, bodyweight and diet, care, disease exercise and rehab and follow-up; [see Table 1]) and presents them as a working plan (see Table 2).

MODE A – ANALGESIA

This is a key mode in any approach to management as most animals will present because they are suffering pain. Medical agents, which have the advantage of producing a rapid effect, can achieve pain control. Agents most commonly used for this purpose are the NSAIDs. There is a good range available for use in the dog and newer additions to the market have increased options for use.⁹ Analgesia can be augmented in a multimodal fashion by the use of adjunctive analgesics like tramadol, the synthetic codeine analogue,^{10,11} amantidine¹² and gabapentin. Acupuncture has also been used successfully in arthritic cases.¹³

MODE B – BODYWEIGHT AND DIET

Obesity (see Figure 2) is an obstacle in the management of the disease. There is strong evidence that controlling

bodyweight has a major influence on clinical improvement.^{14,15,16} Adipose tissue itself may not be biochemically inactive and has been implicated as a possible inflammatory influence through the action of leptin.¹⁷ Various nutraceutical agents can be considered in this domain. There is increasing evidence that the addition of an EPA rich diet can have a positive influence on the clinical diseases.^{18,19,20} Special diets formulated with EPA are the easiest way to make this adjustment. All dietary interventions will take a period of time to become effective, EPA, for instance, will take four weeks before any benefit is obtained and this must be considered in the timing and evaluation process. Other joint supplements (nutraceuticals) can be used in the maintenance period when signs are under control.

MODE C – CARE AND COMFORT

Here, vigilance is required for intercurrent disease, especially in older patients. Pre-management blood screening may be indicated, especially if medical agents like NSAIDs are going to be used. Monitoring for any toxicity or problems through the management phase is planned in this domain. The other factors considered are those of environmental modification such as provision of mats on slippery floors or ramps to help getting animals in and out of cars.



Figure 2: Obese dogs have higher levels of clinical signs and higher likelihood of developing OA compared to dogs of normal bodyweight.

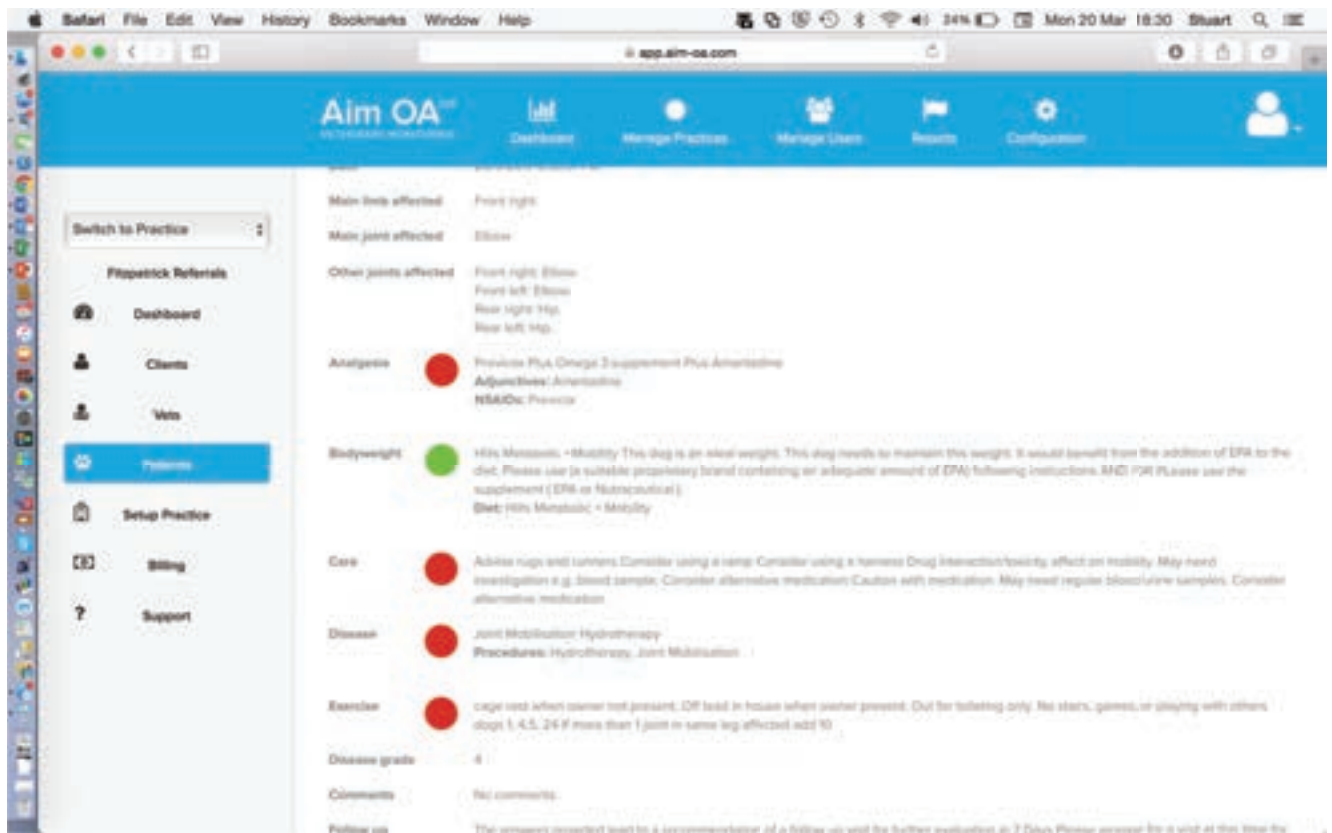


Figure 3: Multimodal plans are created and can be printed out for the owner or they can view them by logging into the site.

MODE D – DISEASE MODIFICATION AND JOINT MOBILITY

Although much of our clinical attention is focused on pain control, methods of altering the disease process and pathological changes within the joint must also be considered to preserve the function of the joint or the limb, especially in the early stages of the disease. Surgical interventions, including joint replacement or modification, can be considered here. There are an increasing number of novel intra-articular options available to alter the joint environment, local inflammation and local pathology. However, there is little convincing evidence at the present time for measurable disease-modifying effects as a result of therapeutic use.²¹

Use of polysulphated glycosaminoglycans and intra-articular visco-substitution with hyaluronic acid or polyacrylamide gel (PAAG) may be used to alter the physical characteristics of the joint. Other intra-articular techniques using biological-regenerative therapies, such as stem-cell therapy (MSC), platelet-rich plasma (PRP) and autologous conditioned serum (ACS) can be introduced in this domain.

Controlling and protecting mobility of the joints and ensuring protective muscle function are key to any successful arthritis management programme. These counteract the effects of progressive fibrosis and stiffness in affected joints, which are being poorly used. Various physiotherapy modalities including laser and shockwave can be employed to assist the process of physical mobilisation essential to continued pain free joint function.

MODE E – EXERCISE AND REHABILITATION

Great advances are being made in this area and appropriate management here can accelerate recovery and prolong function. This can be as simple as giving precise instructions for controlled exercise (using an exercise chart) or could involve sharing care with a rehabilitation specialist. This phase is of key importance in the maintenance phase of disease management, promoting cardiac fitness in addition to general exercise capability. Planning and using a multimodal approach ensures that measures in this domain still complement and are part of the whole approach.

MODE F – FOLLOW-UP

Planning follow-up visits, which allow re-assessment and re-adjustment of the plan, are as important as all of the individual interventions. The focus of the plan will need to change with time as the needs of the animal and challenges presented by the disease alter.

PRIORITISING AND SEQUENCING MANAGEMENT

When setting the first plan, certain modes should be identified as a priority depending on the presentation and stage of the disease. The targets for treatment in different phases of the disease progression or recovery can be identified as follows:

- Phase 1 – obvious pain and/or obesity;
- Phase 2 – Chronic pain and joint mobility;
- Phase 3 – Exercise capability and general well-being.

These phases track the course of the disease from acute needs (phase 1) to maintenance objectives (phase 3).

The plan simplifies the process by providing options in each area and tracking these over time (see Table 2). Each plan should be supported by the use of customised diet sheets, bodyweight monitoring or body score records and exercise charts to facilitate communication. Pre-prepared exercise or rehabilitation charts with a number of different levels of exercise clearly explained are a great time saver and will improve compliance with these plans. The key features of an approach like this can be listed as follows:

- It allows a multimodal plan to be set-up and implemented very easily;
- All of the practice members are working from the same strategy;
- Different members of the team may have different roles to play;
- The owner can be informed and instructed easily;
- Evolution of care progresses with the changing disease requirements; and
- Complex problems can be managed by extending into the secondary or tertiary options identified for each problem while still following the strategy. These may be non-responsive cases or cases with intercurrent disease (hepatic, renal, etc.)

It allows incorporation of new developments as they occur without altering the basic planning process.

Assessment sheets will be analysed to give a specific and global view of progress over time. In this way, a highly focused and sophisticated plan can be used and maintained with the minimum of effort but to the maximum benefit of the affected animal and owner.

Best practice can be easily delivered within realistic financial targets.

This allows complex plans to be constructed, which may be necessary in the management of ongoing complex cases.

DIGITAL SYSTEM

This whole system has been made simpler by incorporating the Aim-OA process into an electronic tool that can be used to generate multimodal plans in general practice. This accelerates the whole process so that it can be delivered in a commercially sensitive timescale whilst retaining the necessary rigorous assessment and complex planning. Using digital capture of assessment details, it can also be used to track improvement via an algorithm which also offers treatment options appropriate to the animals' clinical presentation (see Figure 3).

This encourages owner compliance as they can see evidence of progress themselves. Long-term management strategies and implementation are the goals of this approach as these will make a much bigger impact on improving quality of life in patients with chronic OA.

CONCLUSION

OA is a very complex disease process and, as a result, presents genuine challenges for management in practices. At present, there is not one simple single answer to this problem. Current management advances are being driven by new understanding of the disease and the identification

of new tools to control the problem. Early and aggressive treatment to protect and preserve function is indicated. Focusing on pain management and developing multimodal programmes that can evolve with the disease problems offer the best chance of successfully managing the clinical challenges of chronic osteoarthritis throughout the life of the animal.

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READER QUESTIONS AND ANSWERS

A METHOD FOR CONSTRUCTING AND IMPLEMENTING MULTI-MODAL PLANS FOR MANAGING OSTEOARTHRITIS IN DOGS IS PRESENTED. THIS HAS BEEN DEMONSTRATED TO BE A MORE EFFECTIVE WAY TO DEAL WITH CHRONIC DISEASE OVER THE LONGER TERM. IT DISCUSSES TREATMENT OPTIONS FOR OA MANAGEMENT CURRENTLY AVAILABLE AND IDENTIFIES A MODEL FOR USING THESE IN COMBINATIONS TO BETTER MEET THE PROBLEMS PRESENTED BY OA IN DOGS.

- 1: BY WHAT PERCENTAGE DOES HAVING OA REDUCE LIFE EXPECTANCY IN AFFECTED DOGS COMPARED TO UNAFFECTED INDIVIDUALS?**
- 2: WHAT IS THE KEY DIFFERENTIATING FACTOR BETWEEN THE FUNCTIONS OF ACUTE VERSUS CHRONIC PAIN?**
- 3: IDENTIFY THREE ADVANTAGES THAT A MULTI-MODAL APPROACH CONFERS COMPARED TO A UNIMODULAR ONE.**
- 4: WHAT ARE THE SIX COMPONENTS TARGETED IN THE AIM.OA SYSTEM?**

ANSWERS: 1: 20%; 2: CHRONIC PAIN HAS NO PROTECTIVE FUNCTION; 3: (I) WIDER MORE GLOBAL MANAGEMENT POSSIBLE; (II) COMBINES MEDICAL AND NON-MEDICAL (III) CAN BE ADJUSTED TO MEET THE CHANGING NEEDS OF THE PATIENT AND DISEASE IN LONG-TERM MANAGEMENT; 4: ANALGESIC, BODYWEIGHT AND NUTRITION, CARE AND ENVIRONMENTAL MODIFICATION, DISEASE, EXERCISE;