John F. Innes, BVSc, CertVR, Diplomate SAS (Orthopaedics), MRCVS,
University of Liverpool Small Animal Teaching Hospital, Wirral, UK

Management of the Osteoarthritic Canine Patient

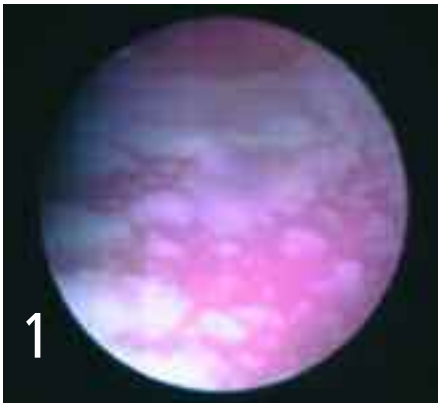
Profile

Osteoarthritis (OA) is the most common form of joint disease in dogs. It is estimated that up to 20% of the adult canine population has some form of osteoarthritis.

OA involves pathology of all tissues of the synovial joint, but the gradual loss of articular cartilage is central to the process (**Figure 1**). Managing the osteoarthritic patient is challenging and requires a multimodal, persistent approach with regular review.

Indications

Management of OA is required if the pathology is associated with pain. However, many patients are clinically silent in the early stages. Agents aimed at supporting synovial joint health, such as essential fatty acids or glucosamine, may be used at this stage, but more evidence is required to determine whether they have a significant effect at the preclinical stage.



Arthroscopic view inside an elbow joint with chronic osteoarthritis. There is widespread exposure of subchondral bone with small islands of cartilage remaining.

Pain Index (Severity of Pain)

Pain can be variable in OA. Typically, pain is less severe in early disease but may become intractable and severe with time. Some patients are euthanized because of unmanageable pain from OA. Modern, multimodal pain management techniques are indicated in advanced disease to attempt to provide a good quality of life.

Diagnosis

Examination/Assessment

Assessment of a patient with suspect OA should include a full physical, neurologic, and orthopedic examination. The clinician should aim to identify:

- sites of joint pain
- decreased range of motion
- joint enlargement
- effusion
- instability
- crepitus.

OA in dogs is usually secondary to a primary joint disease (eg, dysplasia, joint instability, osteochondrosis). The clinician should try to identify a primary cause and it may be pertinent to consider treatment of this primary condition, especially in early-stage disease.

Imaging

Radiography (**Figure 2**) and joint fluid analysis are key diagnostic tests to support the diagnosis of OA. Typical radiographic features of OA are:

- osteophytosis
- joint remodeling
- subchondral sclerosis
- soft tissue swelling/joint effusion.

Radiograph of a dog with bilateral hip dysplasia showing typical features of osteophytosis, joint remodeling, and sclerosis.

Laboratory Analysis

Cytologic analysis of joint fluid may show a small increase in mononuclear cells (typically 2–5 × 10^9/L) (**Figure 3**). Synovial fluid analysis also helps to rule out other forms of suppurative joint disease such as immune-mediated disease and infective arthritis.

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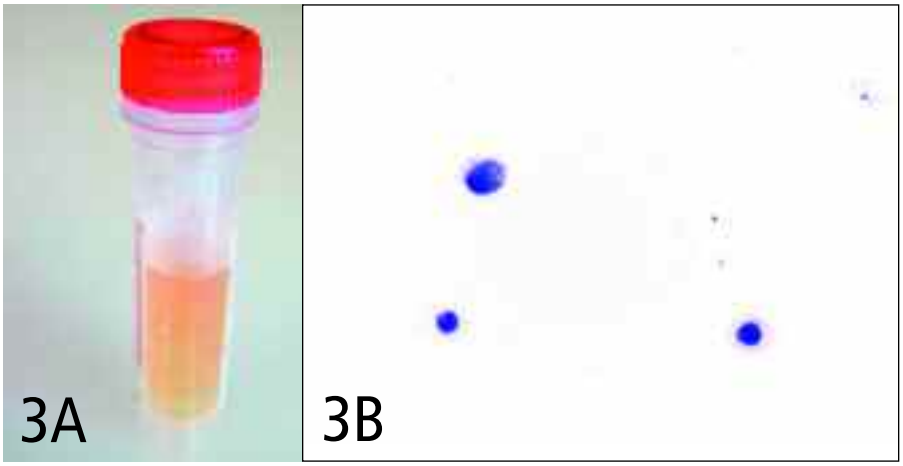


Synovial fluid (A) from osteoarthritic joints may be slightly yellow and, in the early stages, there may be an increased volume (in later-stage disease there may be a decreased volume). Cytologic examination typically reveals low numbers (2–5 × 10^9/L) of mononuclear cells (B).

Treatment

Client Education

Ensure the client understands what OA is and that management is probably a lifelong process. Lifestyle changes for the affected pet are probably required.

First-Line Treatment ($–$$)

Pain Relief

- Provision of analgesia is critical in managing the OA patient. NSAIDs provide a convenient form of long-term pain relief. There is evidence for a range of NSAIDs being effective in the management of OA pain in dogs. Several are available for long-term use in dogs with OA (see **Table**). Newer COX-1–sparing agents may have some advantages in terms of decreased toxicity.
- Be aware of the contraindications for NSAID therapy, such as a history of gastrointestinal disease, renal disease, hepatic disorder, cardiac disease, or clotting disorder.
- Inform the client about possible adverse events, including gastrointestinal upset (vomiting, diarrhea); withdraw the NSAID if adverse events occur. Gastroprotectant agents (eg, ranitidine, cimetidine, sucralfate, omeprazole) may help alleviate side effects and may be administered concomitantly.

Dietary Management

- If an animal is overweight, instigate a weight reduction program. Monitor this closely, set targets, and review regularly. (See Consultant on Call: Obesity Management in Dogs, April 2007, available at www.cliniciansbrief.com)
- Consider use of a functional food, such as one supplemented with omega-3 essential fatty acids. A functional food is a complete diet containing supplements aimed at either managing OA pain, supporting joint health, or both.
- Consider use of a nutraceutical, which is a food supplement delivered in tablet, capsule, or liquid form. Examples include glucosamine hydrochloride, chondroitin sulfate, and manganese, used alone or in combination. In the author's opinion there is insufficient evidence to strongly recommend the use of nutraceuticals at this time.

Exercise Management

- Educate the client regarding controlled exercise for the dog. Controlled leash exercise is the general recommendation.
- Consider a physical therapy program. Recent evidence supports its use in therapy in dogs with joint disorders.
- Consider hydrotherapy. Studies are

Cost Key

$ = < $100	$$$$ = $500-$1000
$$ = $100-$250	$$$$$ = > $1000
$$$ = $250-$500	

Drugs for Treatment of Canine Osteoarthritis

Drug category	*Generic drug name*
NSAID	Carprofen
	Deracoxib
	Etodolac
	Firocoxib
	Meloxicam
	Tepoxalin
Centrally acting analgesics	Acetaminophen
Oral opioid	Tramadol

COX = cyclooxygenase; NSAID = nonsteroidal antiinflammatory drug; OA = osteoarthritis

required in dogs to demonstrate efficacy in canine OA, but there is some evidence of efficacy in human OA patients.

Second-Line Treatment ($–$$)

Some patients, particularly those with severe OA, require further analgesia.

- Consider concurrent use of an NSAID and acetaminophen (10 mg/kg). Acetaminophen is a centrally acting analgesic with proven efficacy in human OA and it can be used together with a traditional NSAID for synergistic effect. Such concurrent use with an NSAID in dogs may be off-label and the clinician should gain consent from the client and explain the implications of this. Careful monitoring of such patients for any hepatic toxicity is recommended. ***Do not use acetaminophen in cats.***
- Consider concurrent use of an NSAID and tramadol. Tramadol is an analgesic and antitussive agent that is metabolized to O-desmethyltramadol (M1), which is also active. Tramadol and M1 exert their mode of action through complex interactions between opiate, adrenergic, and serotonin receptors. Anecdotal experience suggests that tramadol is useful in the medical management of dogs with severe pain from OA.
- Consider treatment with polysulfated glycosaminoglycan (PSGAG). In the author's opinion, the use of PSGAG remains controversial. The only FDA-approved PSGAG is Adequan Canine (Novartis, www.adequancanine.us), which is delivered by intramuscular injection.

Surgical Treatment

- If a patient is refractory to second-line medical management, one may consider surgical salvage procedures.
- The ideal surgical procedure for end-stage OA is joint arthroplasty ($$$$$).
- Total hip arthroplasty is well established and is now a common procedure at specialist surgical centers.
- Total elbow replacement (**Figure 4**) is a more recent innovation, but has supporting evidence for efficacy.
- Total knee replacement is in its infancy, but is an option in selected cases.
- Autogenous osteochondral transplanting is a technique that is also at the clinical trial stage, but has been reported at recent clinical research meetings.

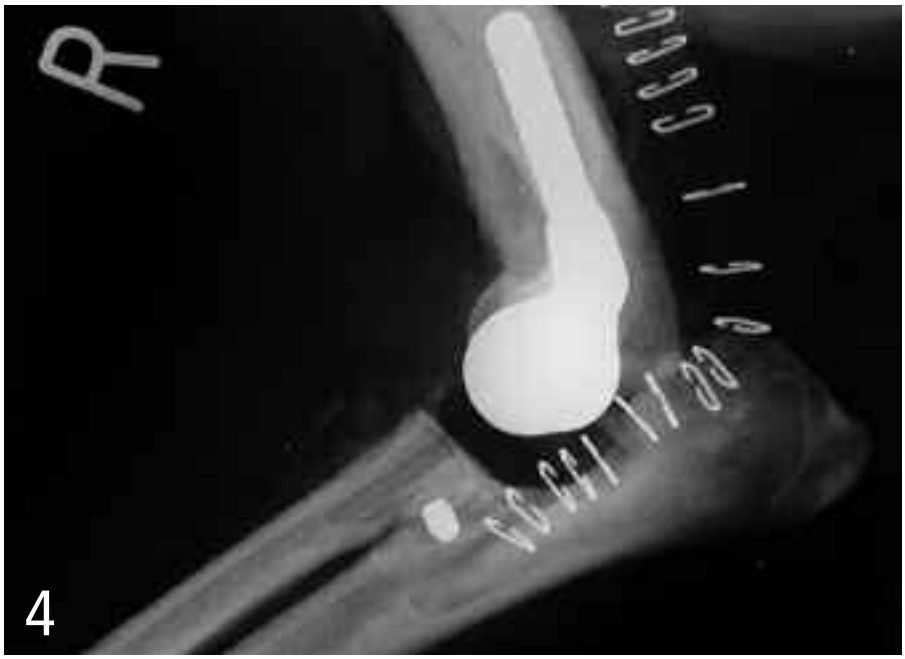
Other surgical salvage procedures may be indicated for particular joints ($$$$):

- femoral head and neck excision for the hip, shoulder, and temporomandibular joints
- arthrodesis.

Follow-up

Following initial assessment and instigation of therapy, regular monitoring is essential to reassess the patient and reeducate the client. Therapy may need to be redirected if the response is unsatisfactory. Use of an alternative NSAID may be indicated, because response to a particular NSAID varies on an individual basis. For dogs on long-term NSAID treatment, it may be prudent to run 6-monthly routine hematology and blood biochemistry profiles to preempt adverse events.

See Aids & Resources, back page, for references, contacts, and appendices.



Total elbow replacement is a relatively new technique for surgical treatment of the intractably painful elbow joint. Success rate is approximately 80%.

M1 = O-desmethyltramadol; OA = osteoarthritis; PSGAG = polysulfated glycosaminoglycan