

Old Dog. New Tricks...



The latest
osteoarthritis
solution


chanelle
PHARMA



OSTEOARTHRITIS OVERVIEW

- Osteoarthritis (OA) is a degenerative joint disease that progressively causes loss of joint function¹ and can affect not only the articular cartilage but the entire joint²
- There are multiple causes of OA, including trauma, sepsis, age-related degeneration and obesity.
- An increased strain on cartilage can induce the inflammatory cascade that results in OA.
- The inflammatory process can start in any of the synovial tissues, resulting in inflammatory mediator production.
- These then affect other tissues within the synovial articulation, which in turn produce inflammatory mediators resulting in a “domino” effect.

THE KEY ASPECTS TO EFFECTIVELY MANAGING OA

Weight management

**Exercise modification
and physiotherapy**

NSAIDs



Improving joint health

Nutritional management

Additional analgesics

Surgery

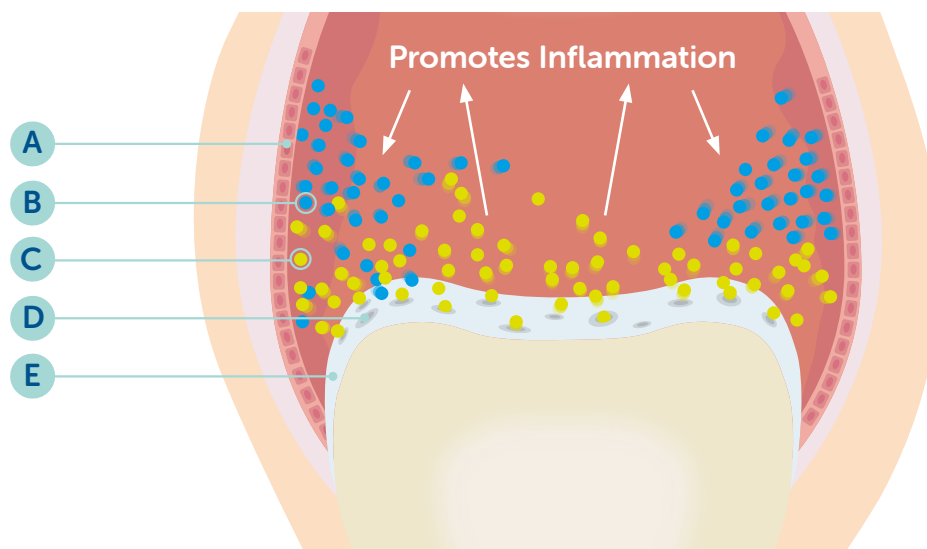
DIAGNOSIS

- Pain is one of the common signs of OA but in dogs this can be subtle and sometimes go unnoticed as owners may not recognise the signs.
- The vet will initially perform a physical exam by palpating the limbs and joints to assess for painful response, thickening of the joint capsule, accumulation of joint fluid or osteophytes and muscle atrophy.
- An x-ray should follow the physical exam but it is limited as this will only highlight changes to the bone not the soft tissue changes.
- The veterinarian should assess the dog along with the client. Please refer to our pain scoring booklet for further information.

INFLAMMATORY PROCESS

- The inflammatory process involves the release of metabolites of arachidonic acid, which initiates pain³.
- The release of free radicals from neutrophils, macrophages, lysosomal enzymes and enzymes from injured synoviocytes results in degradation of Hyaluronic acid (HA).
- Hyaluronic Acid is a key ingredient of the synovial fluid and acts to increase its viscosity and lubricating functions.

- A** Blood vessels & Synovial membrane
- B** Pro-inflammatory mediators released by synoviocytes
- C** Damaged cartilage and damaged chondrocytes releasing Matrix Metalloproteinases (MMPs) and other products of degradation
- D** Chondrocytes
- E** Cartilage



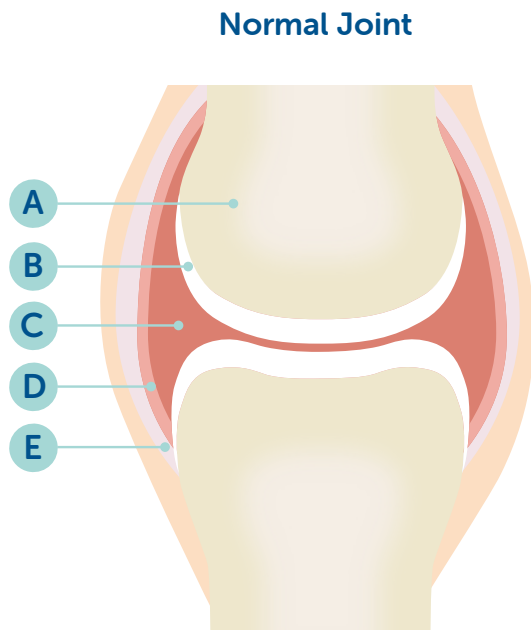
Synovitis leads to abnormal synoviocyte metabolism, resulting in a decrease in HA. Changes in HA levels or the length of the HA chains results in reduced viscosity and lubrication leading to further cartilage breakdown.

Breakdown of collagen and loss of proteoglycans results in increased cartilage water uptake. This results in softer cartilage that is more easily damaged with mechanical forces. Sclerosis of the subchondral bone, secondary to increased stress, contributes to the progression of OA.⁴ The synovium is also affected, becoming thickened and congested.

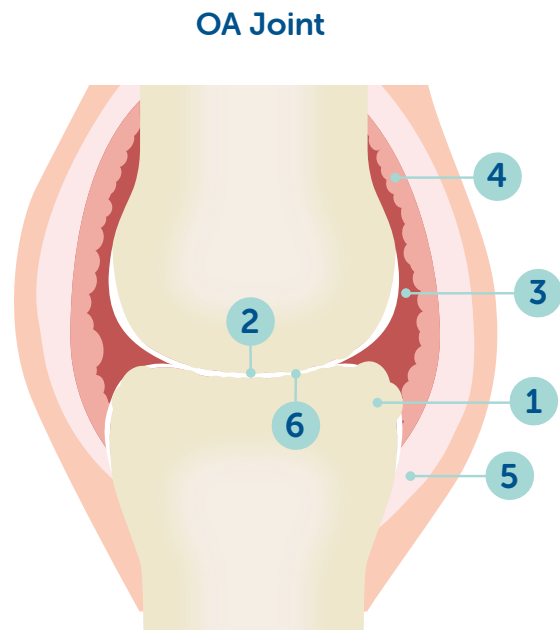
OA can be characterised by a loss of balance between synthesis and degeneration of articular cartilage leading to the erosion of the joint cartilage, destruction of the underlying bone, osteophytes (bone spurs) and synovitis.⁵

It is the most common and costly⁶ form of arthritis a small animal vet will see and, while 80% of dogs over 8 years old are affected, it should be remembered dogs of any age can have OA – 1 in 5 of all dogs have OA.⁷

THE EFFECT OF OSTEOARTHRITIS ON THE JOINT



- A Bone
- B Cartilage
- C Synovial fluid
- D Synovial membrane
- E Capsule



- 1 Osteophyte / Thickened bone
- 2 Destroyed cartilage
- 3 Reduced viscosity of synovial fluid
- 4 Inflamed synovium
- 5 Thickened capsule
- 6 Narrowed joint space

TREATMENT WITH PENTOSAN

- Pentosan polysulphate (PPS), is a semi-synthetic polysaccharide that has been shown to improve synovial and subchondral blood flow to limit cartilage degeneration and to stimulate hyaluronic acid and proteoglycan synthesis⁸ and thus results in analgesic and regenerative effects.
- PPS is classed as a disease-modifying osteoarthritis drugs (DMOAD), which has chondroprotective properties and retards the progression of osteoarthritis. PPS reduces cartilage degradation by directly and indirectly affecting inflammatory mediators and in addition PPS has an anti-inflammatory function.⁹



**Osteopen contains
Pentosan polysulphate sodium**

OSTEOPEN 100 MG/ML SOLUTION FOR INJECTION FOR DOGS

Osteopen 100 mg/ml Solution for injection for dogs contains the active ingredient pentosan polysulphate sodium (PPS) and is indicated for the treatment of lameness and pain of osteoarthritis and related musculoskeletal disorders. Osteopen is given by subcutaneous injection.

A course of 4 injections should be given, with 5-7 days between each injection.

Osteopen will alleviate the clinical signs of osteoarthritis by acting on the underlying cause of the disease. Research has shown that PPS acts on a number of pathways responsible for the pathogenesis of osteoarthritis.

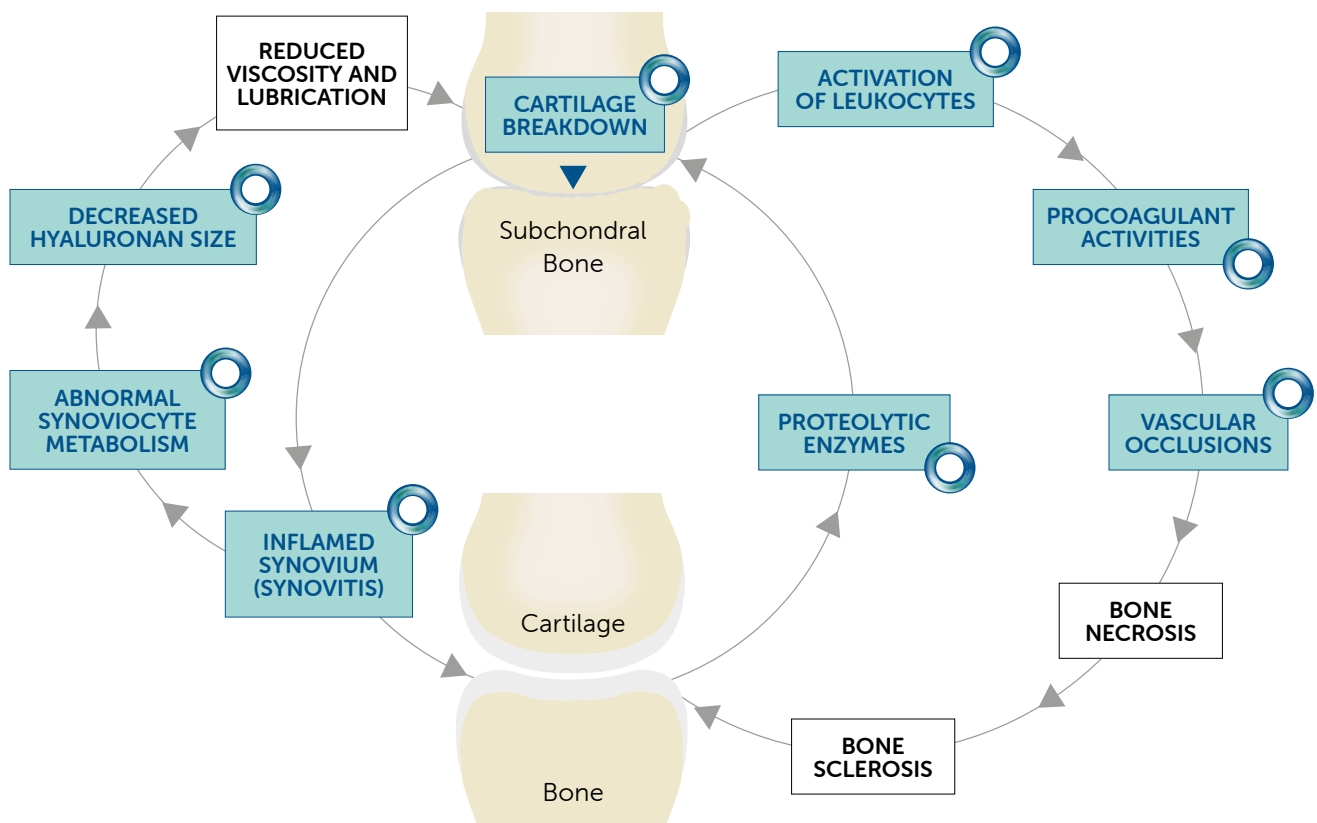
OSTEOPEN HAS BEEN SHOWN TO EXHIBIT THE FOLLOWING ACTIONS¹⁰

- Binds to damaged cartilage and stimulates synthesis of new glycosaminoglycan (GAG) molecules
- Inhibits pro-inflammatory mediators and has the ability to inhibit proteolytic enzymes
- Modulates cytokine action
- Stimulates hyaluronic acid secretion – hyaluronic acid has been shown to reduce synovial inflammation and pain and improve synovial fluid characteristics
- Stimulates articular cartilage blood flow resulting in analgesic and regenerative effects
- Exhibits Anti-Thrombotic actions



Identifies potential sites for pharmacological intervention.⁹

Osteoarthritis results in pathological changes in several joint tissues but most particularly in cartilage, synovium, and subchondral bone. These tissue pathologies are interdependent, and the manner in which they interact is summarised in this diagram.



DOSAGE

- Osteopen is given by aseptic subcutaneous injection.
- A course of 4 injections should be given, with 5-7 days between injections of 3 mg pentosan polysulphate sodium / kg bodyweight (equivalent to 0.3 ml/10kg bodyweight).



Sample Dosage Chart Dogs

3 mg pentosan polysulphate sodium / kg bodyweight (equivalent to 0.3 ml/10kg bodyweight)	Weight
0.15 ml	5 kg
0.30 ml	10 kg
0.45 ml	15 kg
0.60 ml	20 kg
0.75 ml	25 kg
0.90 ml	30 kg
1.05 ml	35 kg
1.20 ml	40 kg
1.35 ml	45 kg
1.50 ml	50 kg

MANAGING OA WITH OSTEOPEN

It is easy to manage canine OA with the Osteopen support pack.

1. Assess your patients in the practice
2. Start treatment with Osteopen
3. Schedule them in for their repeat visit
4. Send them home with an Osteopen support pack

Remember, Osteoarthritis in canines requires a multimodal approach.



REFERENCES: 1. Krasnokutsky S, et al. Current concepts in the pathogenesis of osteoarthritis. *Osteoarthritis Cartil.* 2008; 16 Suppl 3: S1-3. 2. Hellio Le Graverand-Gastineau M-P. OA clinical trials: current targets and trials for OA. Choosing molecular targets: what have we learned and where we are headed? *Osteoarthritis Cartil.* 2009; 17: 1393-1401. <https://doi.org/10.1016/j.joca.2009.04.009> PMID: 19426849. 3. Todhunter R J and Lust G. Pathophysiology of synovitis: clinical signs and examination in horses. *Comp Contin Educ for the Prac Vet* 1990; 12: 980-992. 4. Kawcak C E, et al. Clinical effects of exercise on subchondral bone of carpal and metacarpophalangeal joints in horses. *Am J Vet Res.* 2000; 61: 1,252-1,258. 5. Johnston SA. Osteoarthritis. *Veterinary Clinics of North America: Small Animal Practice* 1997; 27: 699-720. 6. Bwalya EC, et al. Effects of pentosan polysulfate and polysulfated glycosaminoglycan on chondrogenesis of canine bone marrow-derived mesenchymal stem cells in alginate and micromass culture. 2017; 1. *J. Vet Med. Sci.* 7. Capon H and Dycus D. How to manage the osteoarthritic dog. *BSAVA Companion*, May 2018: 14-19. 8. Vaughan-Scott T and Taylor JH. The pathophysiology and medical management of canine osteoarthritis. *J S Afr Vet Assoc.* 1997; 68: 21-25. PMID: 9186936. 9. Ghosh P. The pathobiology of osteoarthritis and the rationale for the use of pentosan polysulfate for its treatment. *Semin Arthritis Rheum* 1999; 28: 211-267. 10. Rogachefsky RA, et al. Treatment of canine osteoarthritis with insulin-like growth factor-1 (IGF-1) and sodium pentosan polysulfate. *Osteoarthritis Cart* 1993; 1: 105-14. **Contains:** Pentosan Polysulphate Sodium 100 mg/ml. **Target species:** dogs. **Indications for use:** the treatment of lameness and pain of degenerative joint disease/osteoarthritis (non-infectious arthrosis) and related musculoskeletal disorders by therapeutic activity on the underlying pathological processes (disease modifying osteoarthritis drug) in the dog. Refer to product packaging and leaflets for full indications, side effects, precautions, warnings and contra-indications. **Use medicines responsibly.** Further information can be found on the datasheet, SPC or at www.chanellepharma.com. **Distributed by:** Chanelle Pharmaceuticals Manufacturing Ltd, Loughrea, Co. Galway, Ireland. UK: Vm 08749/4086 Copyright ©Chanelle 2020 All rights reserved.

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