COAST
Canine OsteoArthritis Staging Tool

INTERNATIONAL CONSENSUS TREATMENT GUIDELINES

Canine Osteoarthritis

Digital Guide

START

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THIS DIGITAL GUIDE: THE PURPOSE

This digital guide is intended as a simple reference, summarizing the key points of the COAST International Consensus Guidelines for the Treatment of Canine Osteoarthritis.

FULL PUBLICATION
https://doi.org/10.3389/fvets.2023.1137888

The treatment guidelines describe the recommendations of the COAST Development Group for reducing the risk of osteoarthritis (OA) in dogs, as well as managing and treating dogs clinically affected by the disease.

The result is a practical, evidence- and clinical experience-informed, OA-stage appropriate record of recommendations to support clinicians building patient-specific management plans for dogs with OA.

This digital guide provides simplified overview of the COAST Development Group canine OA treatment recommendations. Please refer to the publication for full details.

Cachon, T., Frykman, O. et al. 2023. *"COAST Development Group's international consensus guidelines for the treatment of canine osteoarthritis"* Front. Vet. Sci. 10:1137888 doi: 10.3389/fvets.2023.1137888

GENERAL INFORMATION

COAST GROUP

COAST & COASTeR

VOTING

BASE & BUILD

RISK FACTORS

The COAST development group

A geographically diverse group of nine international veterinarians actively working in small animal orthopedics, anesthesia, and pain research and management.

COAST
Canine OsteoArthritis Staging Tool

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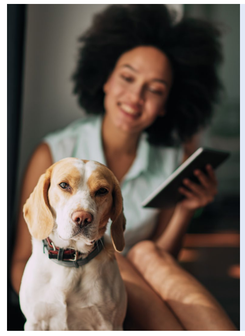
COAST & COASTeR: Explained

COAST (the Canine OsteoArthritis Staging Tool) provides the **diagnostic framework** for the treatment guidelines. This instrument captures input from both the pet caregiver and the veterinary team to classify dogs as pre-clinical or clinical, and stages them according to overall disease severity. COAST includes radiography of the joints. Radiography is needed for the exclusion of other pathologies and the confirmation of the OA diagnosis and is a fundamental part of the diagnostic workup of dogs with suspected OA. It is also needed for the reassessment of joints in complex cases.

COASTeR (the Canine OsteoArthritis Staging Tool **excluding Radiography**) provides the **treatment & re-evaluation structure** for the treatment guidelines. The COASTeR stage is simply the stage of OA once radiography has been removed from the COAST algorithm. Use of the COASTeR stage ensures that selection of treatment and the evaluation of response is based on clinical rather than radiographic signs of OA.



Evaluations by pet caregiver:
Validated questionnaire (e.g., LOAD) plus dog's level of discomfort.

Evaluations by the veterinary care team:
Observational and hands-on orthopedic examination (posture, motion, joint palpation & range of movement, and radiography)

Dogs are assigned to stage 0-4 as follows

0	Pre-clinical	Clinically Normal. No risk factors identified.
1		Clinically Normal. Risk factors identified.
2	Clinical	Clinical Signs. Mild Osteoarthritis
3		Clinical Signs. Moderate Osteoarthritis.
4		Clinical Signs. Severe Osteoarthritis.

VOTING

CLASSIFICATION (STRENGTH OR WEIGHT) OF RECOMMENDATION

General interpretation of this recommendation	
Unanimous recommendation	■ Unanimous support for this management approach/treatment for dogs with the specified stage of OA. ■ Sufficient high-quality evidence, supported by personal experience. ■ **The benefit:** harm evaluation favors treatment use
Majority recommendation	■ No unanimous support for this management approach/treatment for dogs with the specified stage of OA but sufficient evidence for most of the group to recommend it as a treatment option. ■ **The benefit:** harm evaluation favors use in the opinion of the majority
Minority recommendation	■ No unanimous support for this management approach/treatment for dogs with the specified stage of OA ■ Weaker evidence-base support relative to other options, with only a minority of the group recommending it as an option. ■ **The benefit** is considered at least equal or better than the risk ■ Individual patient factors are likely to be a significant consideration when considering use

The levels of recommendation are based on the sum of individual author's interpretations and voting, not a group consensus on a set of criteria. Voting for surgical procedure recommendations was limited to orthopedic surgeons in the group only.

THE COAST GROUP RECOMMENDATIONS

The COASTeR stages can be determined by looking at the illustrations found in this material.
It can also be done by filing out the COAST or COASTeR (excluding radiography) to reach a result.

Scan or click on the QR code to find and download these tools with a collection of relevant information - including a digital version of the guide

Info Page

A BASE and BUILD APPROACH

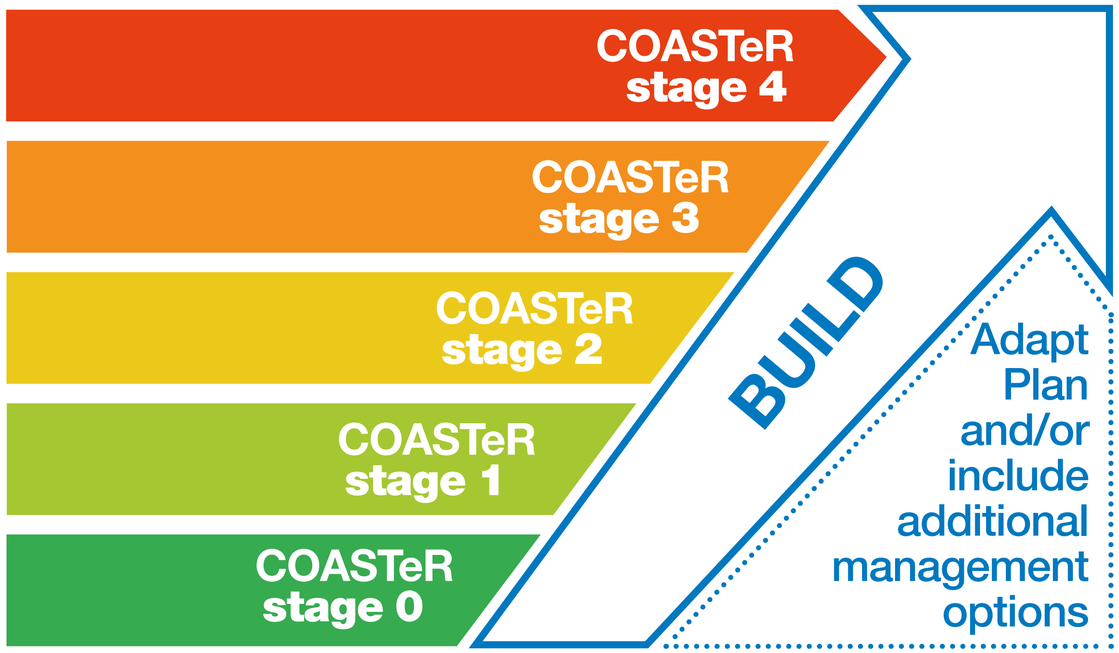
Canine OA patients have changing and generally expanding needs as disease severity increases, and only the consulting veterinary care team can develop a treatment plan appropriate to each dog's specific situation. The COAST International Consensus Guidelines for Treatment of Canine OA provide a reference to evidence- and expert opinion-based OA management recommendations to support informed choice.
The recommendations follow a stage-wise, simple but practical base and build approach.

Foundational elements such as pet caregiver education and the pro-active evaluation of lifestyle factors, form the **'base'** of the recommendations and are considered applicable to all dogs.

Recommendations by COASTeR stage are intended to expand or **'build'** on the foundational elements in a stepwise but flexible manner, according to strength of recommendation and the specific OA management needs of the dog.

BASE & BUILD

Treatment options & strength of recommendation may differ depending upon COASTeR stage:



All stage | **BASE** | **Foundational elements**

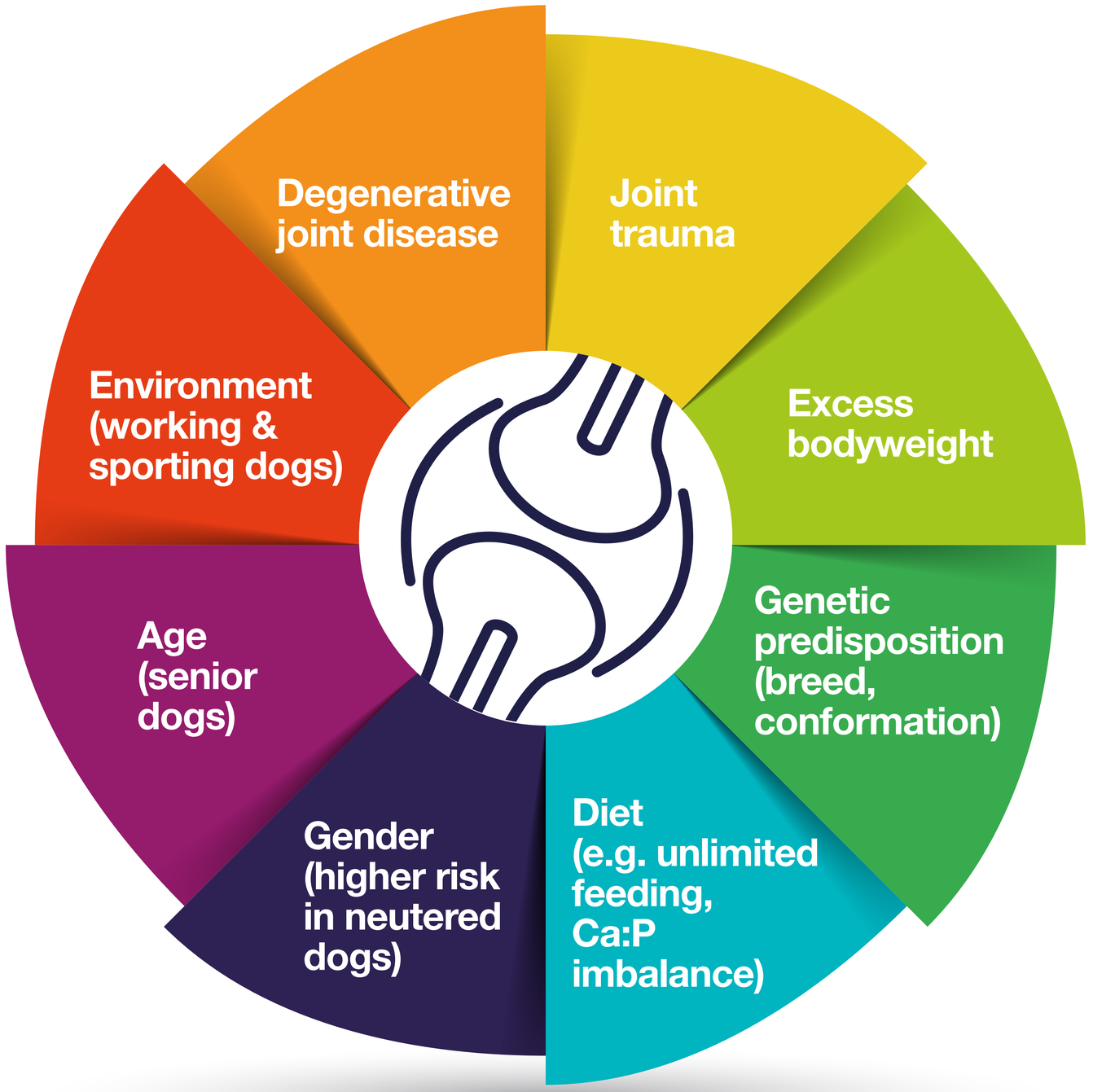
Additional considerations when choosing treatment options:

- Age of the dog
- Co-morbidities
- Concurrent medications
- Type of joint(s) affected
- Number of joints affected
- Impact of disease on the dog as a whole
- Pet caregiver circumstances

- Start with the foundational elements and then build according to disease severity.
- If build elements are not applicable to the patient, refer to COASTeR Stage 0. Otherwise, expand on the previous stage discussions and management approaches.
- Consider COASTeR stage recommendations with the strongest support and evidence (unanimous) first.
- Consider more weakly supported options (majority or minority) for dogs needing additional support:
  - Complex or challenging cases
  - Those already receiving unanimously recommended options (e.g., dogs on a plan but progressing to the next stage)
- Adapt protocols according to patient-specific needs (e.g., dosage adjustments, co-morbidity considerations, product intolerances).

Note: Relatively few of the drug and non-drug treatment modalities frequently incorporated into multi-modal OA management protocols have been rigorously studied and there only a limited number of pharmaceutical /biologic products approved for use in dogs.

OA RISK FACTORS



OPPORTUNITIES: Life Stage

The **foundational elements** are management recommendations applicable to dogs of all COAST(eR) stages. They are largely made up of education, awareness and health optimization strategies and form the base of the 'base and build' approach to protocol development.

Life stage	Evaluation opportunities	Objectives
Puppy	Health check and first vaccinations	Begin pet caregiver disease education (reduce risk factors)
		Introduce COAST (concept and terminology)
		Pre-neuter discussion (positives, negatives, and timing)
		Identify any individuals that could benefit from preventive surgery
Young adult	Health Check	COAST Stage to determine an individual baseline and open discussion about OA (e.g., at-risk breeds)
		Dietary/nutrition discussions
		Growth rate monitor
		Body weight monitor
		Determine body and muscle condition score
		Exercise plan
		Ongoing pet caregiver education
		Pre-neuter discussion (if applicable)
Mature adult	OA education programs	Focused education
		COAST Stage (adult baseline)
	Annual Health Check	Quick evaluation for clinical signs of OA
		Ongoing pet caregiver education
		Follow-up COAST evaluation if necessary
Senior	Senior/geriatric wellness	Increase OA evaluation visits for senior dogs (last 25% of estimated lifespan)
		COAST evaluation or re-evaluation
All ages	Opportune	Quick evaluation for clinical signs of OA
		Ongoing pet caregiver education
		Follow-up COAST evaluation when necessary

OPPORTUNITIES: Education

Focus Areas	Objectives
Pet Caregiver	Importance of young dog OA assessment (restricted window of opportunity for preventive surgery)
	Disease awareness and common causes of OA
	Basic understanding of OA risk factors & avoidance
	Importance of regular assessments (in-clinic and at-home observations)
Weight optimization	Body weight, body condition score and muscle condition score. Evaluate relative to age, breed, and lifestyle
	Importance of achieving/maintaining an optimal body weight
Nutrition/Dietary discussion	Diets balanced for life stage
	Energy and protein according to breed/size. Puppies: Caloric intake appropriate to rate of growth
	Nutrient deficiency OR excess can contribute to OA development • Calcium: Phosphorus imbalance ➡ joint incongruity • Calcium excess ➡ severe disturbances in skeletal development, growth, and mineralisation
Appropriate exercise	Age, breed, life-stage appropriate
	Benefits of exercise for musculoskeletal and general health
	Strengthening (core and joints)
	Regularity (daily and consistency in duration)
	Avoid/minimize high impact activities, sudden loading, or over-exercise unless conditioned
Rehabilitation/ Physical therapy	Professional guidance (appropriate exercise program ideally from a certified physiotherapist)
	Specific exercises to support balance, strength/tone, endurance, and flexibility
	Injury prevention strategies
	Mental stimulation
	Pet caregiver dog health advocacy: Easy, every day at-home exercise

TREATMENT RECOMMENDATIONS BY COASTER STAGE

0 No clinical signs of OA No risk factors

COASTeR stage

Optimising health

BUILD

NON-DRUG / NON-SURGICAL

9 out of 9

UNANIMOUS RECOMMENDATIONS	
Caregiver Education	▪ Increase awareness/understanding of OA ▪ Introduce COAST(eR) if unknown ▪ OA risk factor avoidance (maximize chance of staying OA free for as long as possible). ▪ Regular monitoring/appointments (by life-stage)
Body weight	Importance of maintaining an optimal ▪ body weight ▪ body condition score ▪ muscle condition score
Nutrition / Diet	▪ Adjust according to any changes in nutritional requirements ▪ A joint diet/functional food is not currently recommended
Exercise	▪ Breed and life stage appropriate ▪ Avoid high impact/ sudden direction changes if unconditioned ▪ Discuss injury risk and importance of conditioning in working/sporting dogs
Physical therapy	▪ Optional ▪ Benefit of programs to minimize the risk of injury

Unanimous recommendation

Majority recommendation

Minority recommendation

NEXT STAGE

Risk factor mitigation

BUILD

NON-DRUG / NON-SURGICAL

9 out of 9

UNANIMOUS RECOMMENDATIONS

Caregiver Education	▪ Disease progression ▪ Mitigate identified risk factors ▪ Awareness of other risk factors
Patient Evaluations	▪ Increased frequency according to management objectives (e.g., body weight optimization) **Dogs < 1 year of age:** 2-3 visits during growth phase; Radiographic screening encouraged **Dogs > 1 year of age:** Assess every 6 months; Pet caregiver questionnaire beneficial
Body weight	▪ Contribution to joint loading and inflammation ▪ Achieve and maintain optimal body weight
Nutrition / Diet	▪ Nutritionally balanced for breed and life-stage/-style ▪ Informed choice re joint diet or omega-3 fatty acid supplement ▪ See minority recommendations
Exercise	▪ Modify to address risk factors ▪ Minimize deleterious effects on joints
Rehabilitation/ Physical	▪ Consider a certified professional. ▪ Encourage a full rehabilitation program for joint injuries (current or previous)

Unanimous recommendation

Majority recommendation

Minority recommendation

If item is not a risk / progression factor for the patient, refer to COASTeR Stage 0

PREVIOUS STAGE

NEXT STAGE

1 COASTeR stage

No clinical signs of OA
One or more risk factors

Risk factor mitigation

BUILD

SURGERY

MAJORITY RECOMMENDATIONS

5 out of 6

Preventive

- Identify individuals that could benefit (e.g., Juvenile Pubic Symphysis)
  Curative Surgery (e.g., Total Hip Replacement) later in life is an alternative option
- Consider referral

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

1 COASTeR stage

No clinical signs of OA
One or more risk factors

Risk factor mitigation

BUILD

NON-DRUG / NON-SURGICAL

		MINORITY RECOMMENDATIONS
Nutrition / Diet	4 out of 9	▪ Joint diet / functional food
	1 out of 9	▪ Omega-3 fatty acid supplements as an alternative (consider other potential benefits of functional food)

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

2 Clinical signs of mild OA

COASTeR stage

Commitment to care

BUILD

NON-DRUG / NON-SURGICAL

9 out of 9

	UNANIMOUS RECOMMENDATIONS	
Caregiver Education	▪ Life-long, progressive disease that can be managed ▪ Commitment to care plan and re-evaluations ▪ Optimal early management focus ▪ Mitigate progression factors / new risk factors	
Patient Evaluations	▪ Average: 2 to 4 times / year ▪ More frequent for drug efficacy & tolerability checks ▪ Fewer visits once optimum function achieved ▪ Value of multi-disciplinary team (nurse/technician checks etc.) ▪ Blood work recommended	
Body weight	▪ Refer to COASTeR Stage 1	
Nutrition / Diet	▪ Joint diet / functional food for adult dogs ▪ Omega-3 Essential Fatty Acid supplements if preferred (consider potential additional benefits of functional food)	**Combined EPA/DHA Dosage (BW in kg):** Minimum 75-100 mg/kg/day. Potential to increase to 310*$BW^{0.75}$ (Upper safe limit = 370*$BW^{0.75}$)
Exercise	▪ Modify according to OA management requirements ▪ Develop plan with a physical therapist / rehabilitation specialist if possible	
Rehabilitation/ Physical therapy	▪ Support balance, strength, endurance, and flexibility ▪ In-clinic and at-home approaches ▪ Treatment modalities: Professional recommendation to address individual patient needs ▪ Adapt for caregiver needs (e.g., homemade equipment)	
Environmental modification	▪ Consider if problem areas identified (e.g., hard, slippery flooring)	

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

2 Clinical signs of mild OA

COASTeR stage

Commitment to care

BUILD

PHARMACEUTICALS OR BIOLOGICS

9 out of 9

UNANIMOUS RECOMMENDATIONS

NSAIDs

- Piprant, coxib, other COX inhibitor (see product information): Management option for OA pain & inflammation
- Target optimal functional improvement (obtain and maintain)*
  - Well-tolerated
  - Sufficient duration (cessation likely)
  - Efficacious dosage
  - Re-evaluation (in-person and other forms) for monitoring (efficacy and tolerability)

- First-line therapy option

Anti-NGF monoclonal antibody

- Anti-NGF (see product information): Alternative option for management of OA pain
- Target optimal functional improvement (obtain and maintain)*
  - Well-tolerated
  - Sufficient duration (cessation likely)
  - Efficacious dosage
  - Re-evaluation (in-person and other forms) for monitoring (efficacy and tolerability)

- See majority recommendations

Unanimous recommendation

Majority recommendation

Minority recommendation

It is unknown if the anti-NGF monoclonal antibody can be used safely together with an NSAID for the longer term

COAST GROUP EXPECTATIONS FROM EXPERIENCE*
A minimum of **4 weeks** duration of use at the **recommended dose** is often required
Note: The required level of improvement may be seen before or after experience expectations

*Choice of product, dose and duration of use is according to individual patient requirements
The recommended therapeutic dose has the strongest evidence of efficacy
Confirm that the product is well-tolerated and adjust protocols for specific needs

PREVIOUS STAGE

NEXT STAGE

Commitment to care

Unanimous recommendation

Majority recommendation

Minority recommendation

BUILD

PHARMACEUTICALS OR BIOLOGICS

MAJORITY RECOMMENDATIONS

6 out of 9

Anti-NGF monoclonal antibody

- First-line therapy option

BUILD

SURGERY

MAJORITY RECOMMENDATIONS

4 out of 6

‘Curative’ (Pain relief / ↑ quality of life)

- If can’t be managed with medical & non-drug options
- Seek specialist advice
- The need for surgery directed at the initiating causes of secondary OA is usually clear

PREVIOUS STAGE

NEXT STAGE

2 Clinical signs of mild OA

COASTeR stage

Commitment to care

BUILD

NON-DRUG / NON-SURGICAL

		MINORITY RECOMMENDATIONS
	Dietary Supplements	▪ Informed choice (single ingredient or combination products) ▪ Clinical benefit unlikely if joint diet contains similar ingredients ▪ *Supplements: Prioritize administration of omega-3 EFA (if given)*
4 out of 9		▪ Chondroitin sulphate ▪ Glucosamine ▪ Avocado-soybean unsaponifiables (ASU)
3 out of 9		▪ Undenatured collagen Type II (UC II) ▪ Green lipped mussel

BUILD

PHARMACEUTICAL OR BIOLOGICS

		MINORITY RECOMMENDATIONS
3 out of 9	**Other Treatments**	▪ Pentosan polysulphate (intramuscular) ▪ Polysulphated glycosaminoglycan (intramuscular)
1 out of 9		▪ Low molecular weight hyaluronic acid (intra-articular)

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

NON-DRUG / NON-SURGICAL

9 out of 9

	UNANIMOUS RECOMMENDATIONS
Caregiver Education	▪ Understand benefits of multi-modal approach ▪ Adjustments to established plans may be needed ▪ Reset outcome expectations if necessary
Patient Evaluations	▪ Average: 4 to 6 times / year ▪ More frequent for drug efficacy & tolerability checks ▪ Nurse / technician led appointments and multi-disciplinary team strongly encouraged ▪ Blood work of increased importance
Body weight	Refer to COASTeR Stage 2 Not a risk/progression factor. Refer to COASTeR Stage 0
Nutrition / Diet	Refer to COASTeR Stage 2 Not a risk/progression factor. Refer to COASTeR Stage 0
Exercise	▪ Modify according to patient needs & capabilities ▪ Build with physical therapy / rehabilitation program
Rehabilitation/ Physical therapy	▪ Benefits of referral to a specialist ▪ In-clinic and at-home approaches ▪ Individually tailored programs ▪ Potential benefits of machinery applied techniques
Environmental modification	Focus areas: ▪ Comfort: Beds and rest areas ▪ Access: Non-slip flooring, ramps, or steps

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

UNANIMOUS RECOMMENDATIONS

PHARMACEUTICALS OR BIOLOGICS

9 out of 9

NSAIDs

- A piprant, coxib, or other COX-inhibiting NSAID as a first-line option for management of OA pain & inflammation (see product information)
- Target optimal functional improvement (obtain and maintain when possible)*
  - Sufficient duration
  - Efficacious dosage
  - Re-evaluation for monitoring (efficacy and tolerability)
- Consider dosage adjustment once goal achieved (cessation may be possible)
  - Extended dosing interval preferred
  - Cease adjuncts prior to adjusting NSAID dosage
  - Monitor to minimize risk of sub-optimal pain relief

Anti-NGF monoclonal antibody

- Alternative first-line option for the management of canine OA pain (see product information)
- Target optimal functional improvement (obtain and maintain when possible)*
  - Sufficient duration
  - Efficacious dosage
  - Re-evaluation for monitoring (efficacy and tolerability)
- Consider dosage adjustment once goal achieved (cessation may be possible)
  - No data available to guide dosage adjustment
  - Limited knowledge of use with adjuncts but cease adjuncts prior to anti-NGF dosage adjustment
  - Monitor to minimize risk of sub-optimal pain relief

Unanimous recommendation

Majority recommendation

Minority recommendation

It is unknown if the anti-NGF monoclonal antibody can be used safely together with an NSAID for the longer term

COAST GROUP EXPECTATIONS FROM EXPERIENCE*
A minimum of **8 weeks** duration of use at the **recommended dose** is often required
Note: The required level of improvement may be seen before or after experience expectations

*Choice of product, dose and duration of use is according to individual patient requirements
The recommended therapeutic dose has the strongest evidence of efficacy
Confirm that the product is well-tolerated and adjust protocols for specific needs

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

SURGERY

UNANIMOUS RECOMMENDATIONS

6 out of 6

‘Curative’ (Pain relief / ↑quality of life)

- Refer to COASTeR 2
- Demands of more complex medical management protocols may strongly influence decision

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

NON-DRUG / NON-SURGICAL

		MAJORITY RECOMMENDATIONS
	Oral adjunct analgesics	If additional pain relief is needed ▪ Start ≥ 1 month after main pain management option ▪ Particularly for sensitization or chronic neuropathic pain ▪ Stepwise introduction if multiple adjuncts needed
8 out of 9		▪ Amantadine (Reserved for human use only in some regions)
7 out of 9		▪ Acetaminophen (paracetamol)
6 out of 9		▪ Gabapentin
5 out of 9	**Stem cells (intra-articular)**	▪ Refer to experienced centres ▪ Use licenced laboratories ▪ Regulatory policies may apply

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

NON-DRUG / NON-SURGICAL

MINORITY RECOMMENDATIONS

3 out of 9

Dietary Supplements

Single ingredient or combination products
- Chondroitin sulphate
- Glucosamine
- Avocado-soybean unsaponifiables (ASU)
- Undenatured collagen Type II (UCII)
- Green lipped mussel
- Cannabidiol (CBD) supplement

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

3 Clinical signs of moderate OA

COASTeR stage

Increasing complexity

BUILD

PHARMACEUTICALS OR BIOLOGICS

		MINORITY RECOMMENDATIONS
1 out of 9	**Oral adjunct analgesics**	Tramadol ▪ In addition to NSAIDs (not as sole therapy) ▪ Use other oral adjuncts in preference ▪ Consider for recurrent / relapsed cases (multiple adjuncts)
4 out of 9	**Other Treatments**	▪ Low molecular weight hyaluronic acid (intra-articular)
3 out of 9		▪ Pentosan polysulphate (intramuscular) ▪ Polysulphated glycosaminoglycan (intramuscular)
2 out of 9		▪ Platelet rich plasma (intra-articular)
2 out of 9		Corticosteroids (intra-articular) ▪ Particularly difficult to manage cases ▪ When other options are limited/ have failed

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

NEXT STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD

UNANIMOUS RECOMMENDATIONS

NON-DRUG / NON-SURGICAL

9 out of 9

Caregiver Education	▪ Understand severity of pet's condition ▪ Mobility impact (severe, chronic, OA pain & loss of strength) ▪ Commitment to rapid, more complex protocols / re-checks ▪ Include end-of-life preparation
Patient Evaluations	▪ Thorough patient assessment - radiography and bloodwork (aggressive protocols & exclusion of other pathologies) ▪ Frequent (patient welfare and response to treatment) ▪ Multi-disciplinary team approach strongly encouraged ▪ Incorporate home visits if needed / possible ▪ Influence of pain/quality of life on benefit: risk decisions
Body weight	▪ ↑ weight is more likely (restricted mobility). Clinical impact significant ▪ Focus on comfort / priority care first but introduce concept of weight management if caregiver isn't overloaded ▪ Increase emphasis once pain is better controlled
Nutrition / Diet	▪ Incorporate nutrition discussions if caregiver capacity but prioritize urgent care ▪ Functional food already likely for former Stage 3 dogs

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD

NON-DRUG / NON-SURGICAL

9 out of 9

UNANIMOUS RECOMMENDATIONS

Exercise	▪ Significantly impacted but range in ability ▪ Pain control mandatory to support mobility ▪ Determine exercise goal for individual patient
Rehabilitation/ Physical therapy	▪ Emphasize benefit of referral to a specialist ▪ Focus on home support if mobility factors limit transportation ▪ Multiple options make this approach particularly suitable for complex cases
Environmental modification	Crucial ▪ Comfort: Beds and rest areas ▪ Reduce distance to necessities (food, water, toileting) ▪ Access: Non-slip flooring, ramps, or steps
Mobility assistance devices	▪ Information to enable informed choice (see palliative care)

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD

UNANIMOUS RECOMMENDATIONS

PHARMACEUTICALS OR BIOLOGICS

9 out of 9

NSAIDs

- A piprant, coxib, or other COX-inhibiting NSAID as a first-line option for management of OA pain & inflammation (see product information)
- Target optimal functional improvement (obtain and maintain if possible)*
  - Sufficient duration
  - Efficacious dosage
  - Re-evaluation for monitoring (efficacy and tolerability)
- Lifelong requirement probable (cessation unlikely)
- Dosage adjustment may be possible with care
- Consider more rapid introduction of adjunct analgesics /other options if needed

Anti-NGF monoclonal antibody

- Anti-NGF mAb as an alternative first-line option for the management of canine OA pain (see product information)
- Target optimal functional improvement (obtain and maintain if possible)*
  - Sufficient duration
  - Efficacious dosage
  - Re-evaluation for monitoring (efficacy and tolerability)
- Lifelong requirement probable (cessation unlikely)
- Dosage adjustment may be possible with care
- Consider more rapid introduction of adjunct analgesics /other options if needed.
- Pain severity will influence benefit: risk evaluation of concurrent use

Unanimous recommendation

Majority recommendation

Minority recommendation

It is unknown if the anti-NGF mAb can be used safely together with an NSAID but pain severity will influence benefit:risk evaluation of concurrent use

COAST GROUP EXPECTATIONS FROM EXPERIENCE*
A minimum of **12 weeks** duration of use at the **recommended dose** is often required.
Note: The required level of improvement may be seen before or after experience expectations

*Choice of product, dose and duration of use is according to individual patient requirements
The recommended therapeutic dose has the strongest evidence of efficacy
Confirm that the product is well-tolerated and adjust protocols for specific needs

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD — **UNANIMOUS RECOMMENDATIONS**

PHARMACEUTICALS OR BIOLOGICS

9 out of 9

Stem cells (intra-articular)

- Refer to experienced centres
- Regulatory policies may apply
- High quality standards mandatory

BUILD — **UNANIMOUS RECOMMENDATIONS**

SURGERY

6 out of 6

‘Curative’ (Pain relief / ↑ quality of life)

- Refer to COASTeR 3
- Poor physical condition and other factors (e.g., co-morbidities) may influence decision

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD

NON-DRUG / NON-SURGICAL

6 out of 9

MAJORITY RECOMMENDATIONS

Dietary Supplements

- Cannabidiol (CBD) supplement
- Adjunct pain relief is a significant requirement at this stage
- Possible role in enhancing effect of concurrent analgesic drugs

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

BUILD

MAJORITY RECOMMENDATIONS

PHARMACEUTICALS OR BIOLOGICS

			▪ Consider more rapid, stepwise introduction if multiple adjuncts needed
8 out of 9		**Oral adjunct analgesics**	▪ Amantadine (reserved for human use only in some regions) ▪ Gabapentin
7 out of 9			▪ Acetaminophen (paracetamol)
6 out of 9			▪ Tramadol
8 out of 9		**Corticosteroids (intra-articular)**	▪ Concomitant use of steroids and NSAIDs contra-indicated · Consider NSAID withdrawal for 1 week. · Ongoing analgesia required
7 out of 9		**Platelet Rich Plasma (intra-articular)**	▪ Source from licenced laboratories ▪ Adhere to strict quality standards
6 out of 9		**Hyaluronic Acid [HA] (intra-articular)**	▪ Restrict to low molecular weight if first use ▪ Consider both low and high molecular weight HA if low molecular weight been used previously
6 out of 9		**Other Treatments**	▪ Pentosan polysulphate (intramuscular) ▪ Polysulphated glycosaminoglycan (intramuscular)

Unanimous recommendation

Majority recommendation

Minority recommendation

PREVIOUS STAGE

4 Clinical signs of severe OA

COASTeR stage

Rapid response

Unanimous recommendation

Majority recommendation

Minority recommendation

BUILD

NON-DRUG / NON-SURGICAL

MINORITY RECOMMENDATIONS

3 out of 9

Dietary Supplements

- Chondroitin sulphate
- Glucosamine
- Avocado-soybean unsaponifiables (ASU)
- Undenatured collagen Type II (UCII)
- Green lipped mussel

PREVIOUS STAGE

MORE DETAILS

REHABILITATION/ PHYSICAL THERAPY

Treatment Modalities

SUPPLEMENTARY INFORMATION

NSAID? Anti-NGF?

CHALLENGING SCENARIOS

Palliative care

CHALLENGING SCENARIOS

Breakthrough pain

CHALLENGING SCENARIOS

Switching and wash-out

Treatment Modalities (alphabetical order)

Professional administered or supervised techniques

Manual Therapy	Movement & Exercise	Machinery or instrument applied
Cryotherapy/ Thermotherapy	Hydrotherapy	Acupuncture/ Electroacupuncture
Massage	Proprioceptive Exercise	Electrical Nerve Stimulation
Myofascial release/ trigger point therapy	Therapeutic Exercise	Extracorporeal Shockwave Therapy
Range of motion (assisted)	Treadmill	Photobiomodulation
Range of motion (passive)		Pulsed Electromagnetic Field Therapy
Traction		Ultrasound

At home treatment modalities*

Manual Therapy or Exercise
Hot/cold therapy
Massage
Passive range of motion
Therapeutic exercise

*Only after professional consultation

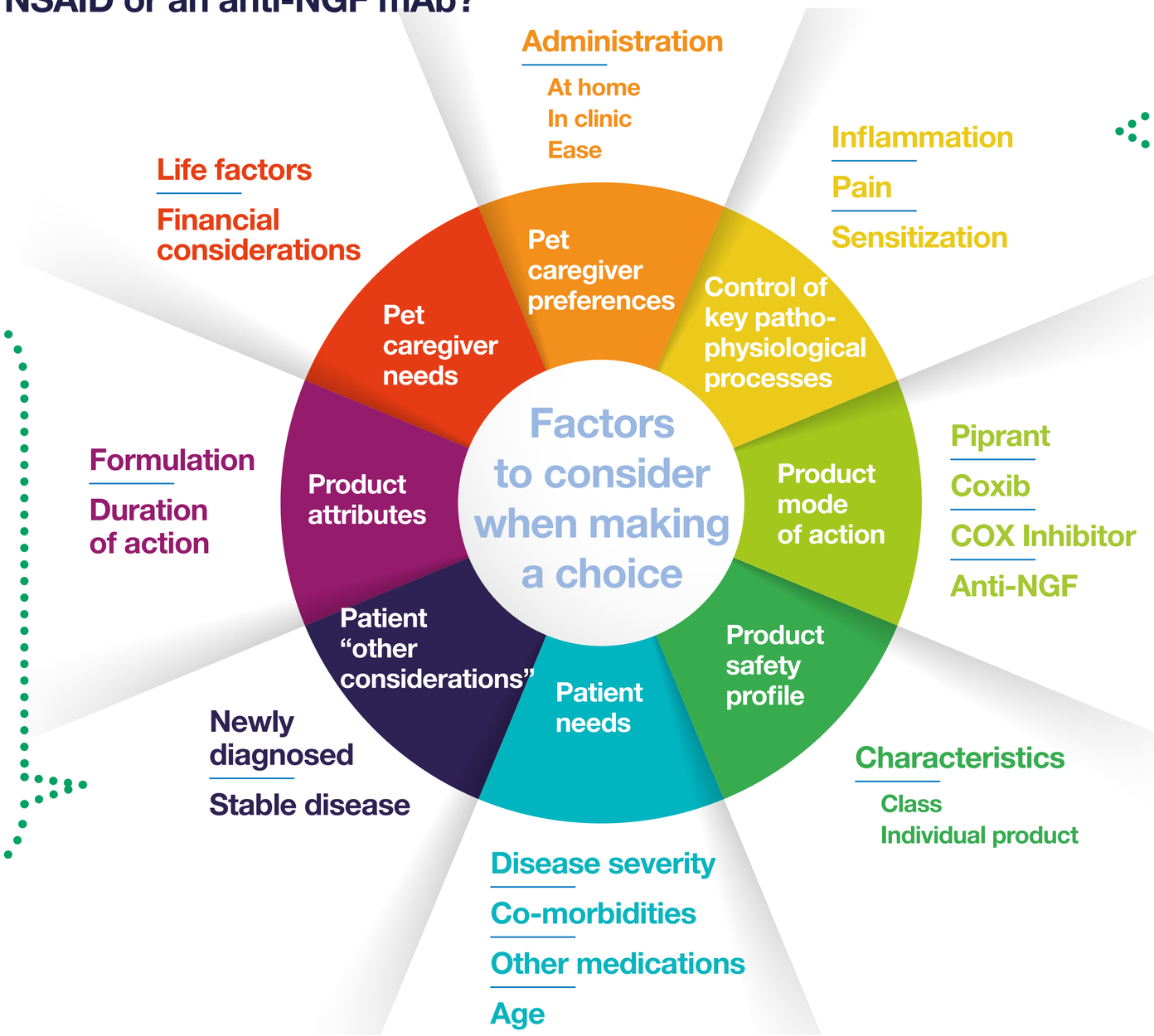
Professional guidance recommended. Treatment modalities have different levels of evidence to support use.

SUPPLEMENTARY INFORMATION

Which NSAID? An NSAID or an anti-NGF mAb?

- Flexibility in dosing can enable faster adjustments to care plans if needed (e.g., new or complex cases).
- Convenience and compliance can be of greater importance if the disease is stable.

COAST



- **Pain**
  A primary consideration in all dogs with clinical OA.
- **Inflammation**
  May be a more significant contributor in earlier stages of the disease.
- **Sensitization**
  As a driver of heightened levels of pain may be a greater consideration in more severely affected dogs.

COAST

It is currently unknown if the anti-NGF mAb can be used safely together with an NSAID for the long-term treatment of dogs with OA.

In human medicine, the longer-term, combined use of a human anti-NGF mAb with an NSAID further increased the risk of developing rapidly progressive osteoarthris (RPOA) above that seen with the use of the human anti-NGF mAb alone. RPOA has not been described or recognized in dogs to date, but neither has OA progression been extensively evaluated in this species.

Palliative care/ end-of-life management

Disease education

- Ensure pet owners are fully informed, supported
- Prepare carers for end of life decisions
- Veterinary nurse-led/multidisciplinary team appointments are strongly encouraged

Mobility assistance devices

- Orthotic braces for joint stabilization (particular circumstances)
- Wheelchairs or prams may be considered if pain is controlled at rest but not when mobile

Medication: oral corticosteroids

- For end-stage management only
- Only if all other options of pain control have failed
- Use instead of rather than in addition to other analgesics
- Inform pet carers about common adverse effects

Severe acute-on-chronic or breakthrough pain

Applies to all clinical OA stages, but to stage 4 in particular.

Consider short-term in-hospital administration of injectable analgesics.

- Ketamine or lidocaine IV infusions
- Opioids (IM or IV CRI)

Switching NSAIDs

e.g., change in preference or lack of tolerability or efficacy

Applies to all clinical OA stages.

- Change to a different NSAID (ideally a different class) after a suitable wash-out period (always consider the pharmacological profile of the previous drug, patient factors, and any clinical indicators of ongoing NSAID action). Conservative estimate = 5x to 10x drug half-life although prolonged tissue binding should also be considered).*
- Provide alternative analgesics during the wash-out period.
- Use product with a different mode of action if desired outcome not achieved with second NSAID.
- Due to its different action mechanism, patients may tolerate acetaminophen (paracetamol) even if NSAID intolerant.
- Local IA products may help to improve patient comfort.
- Adjuvant analgesics might be given for pain relief if NSAIDs are not tolerated.

Read More on MyElanco

- Scan or click on the QR code to find the MyElanco landing page

SUMMARY CHART

COASTeR stage	0 Clinically normal no OA risk factors	1 Clinically normal OA risk factor(s)	2 Clinical signs mild OA	3 Clinical signs moderate OA	4 Clinical signs severe OA
Non-drug					
Patient Evaluation (Multidisciplinary team)	Target 1 x/year	Target 2 x/year + at risk puppy radiograph screen	Target 2 to 4 x/year + blood/urine analysis	Target 4 to 6 x/year + blood/urine analysis	Frequent: at-home/ telehealth useful + blood/urine analysis
Foundational Elements	Introduce osteoarthritis, COAST, and life-stage specific topics Highlight optimization of body weight / condition, nutrition, and exercise				
Pet Caregiver Education	OA awareness Risk factor avoidance	Risk factor mitigation	Set expectations Commitment to care	Value of more complex OA plan	Rapid response + end-of-life prep
Body weight/ BCS	Keep optimal	Discuss joint loading and metabolic contribution Management plan if body weight reduction needed[3]			
Nutrition	Nutritionally balanced, breed, life-stage, and lifestyle appropriate				
	Keep optimal	Address if risk factor	Adapt for OA requirements[3] (Refer to diet/dietary supplements)		
Exercise	Breed, life-stage, and life-style appropriate				
	Keep optimal	Address if risk factor	Adapt for OA severity & management requirements[3]		
Physical Therapy/ Rehabilitation	Awareness Minimize injury risk	Conditioning Full program if joint injury	Patient specific OA care plan (supervised and at-home) preferably developed by a certified professional[3]		
Environmental modification			If problem areas identified	Comfort Facilitate access	Crucial (everyday life & comfort)
Surgery (medical management)		‘Preventive’[2] (specific criteria)	‘Curative’[2] Treat initiating causes or intractable pain	‘Curative’[2] Treat initiating causes or intractable pain	

Footers/ abbreviations on page 42

SUMMARY CHART

COASTeR stage	0 Clinically normal no OA risk factors	1 Clinically normal OA risk factor(s)	2 Clinical signs mild OA	3 Clinical signs moderate OA	4 Clinical signs severe OA
Pharmaceuticals and biologics					
NSAIDs Piprant, coxib or other COX-inhibitor (PO)			FIRST LINE Use as needed. Expert experience: Often ≥ 4 weeks ideally at RTD[1]	FIRST LINE Use as needed. Expert experience: Often ≥ 8 weeks ideally at RTD[1]	FIRST LINE Use as needed. Expert experience: Often ≥ 12 weeks ideally at RTD[1]
Choice: Consider mode of action & product attributes. Unknown if can be used safely together for the longer-term.			Achieve and maintain required level of functional improvement		
Anti-NGF mAb (SC)			FIRST LINE Use as needed. Expert experience: Often ≥ 4 weeks ideally at RTD[1]	FIRST LINE Use as needed. Expert experience: Often ≥ 8 weeks ideally at RTD[1]	FIRST LINE Use as needed. Expert experience: Often ≥ 12 weeks ideally at RTD[1]
Stem cells (IA)[4]				Quality standards/ licensed laboratory[2]	Quality standards/ licensed laboratory[2]
Amantadine, Acetaminophen, (paracetmol) Gabapentin (PO)				Adjunct analgesic (not replacement) Show clinical benefit before addition of next[3]	
Tramadol (PO)				Adjunct analgesic (not replacement)[3]	Adjunct analgesic (not replacement)[3]
PPS/PSGAG (IM)			Additional therapy		Additional therapy
Hyaluronic acid (IA)[4]			Low molecular weight (MW)[2]		Low MW if 1st use Low & High MW if used previously[2]
Platelet Rich Plasma (IA)[4]				Quality standards/ licensed laboratory[2]	Quality standards/ licensed laboratory[2]
Corticosteroid (IA)[4]				Difficult cases or failed treatment[2]	Difficult cases or failed treatment[2]

Footers/ abbreviations on page 42

SUMMARY CHART

COASTeR stage	0 Clinically normal no OA risk factors	1 Clinically normal OA risk factor(s)	2 Clinical signs mild OA	3 Clinical signs moderate OA	4 Clinical signs severe OA
Diet & dietary supplements					
Joint Diet Functional Food		Awareness/ informed choice	Provision of essential fatty acids plus other potential benefits		
Omega-3 EFA		Awareness/ informed choice	With balanced diet if preferred to functional food		
Chondroitin sulphate, glucosamine, ASU, green lipped mussel		Continuation at caregiver request	Awareness/informed choice		
Undenatured Collagen Type II		Continuation at caregiver request	Awareness/informed choice		
Cannabidiol Supplements				Awareness/ informed choice	Maladaptive pain & ⬆efficacy of meds

Clarifications by COAST:

1. Subject to regular monitoring of efficacy & tolerability and adapted for individual patient requirements as required.

2. Referral to be considered or recommended.

3. Stage 4: More rapid use of adjunct analgesics likely; ⬆comfort prior to weight, nutrition, exercise; palliative care & mobility device awareness.

4. Intra-articular: To ⬆functional improvement after unanimously recommended treatments or if medical options limited. Most applicable if 1 or 2 joints affected.

RTD = Recommended Therapeutic Dose; PO = per os, SC = subcutaneous; IM = intramuscular, IA = intra-articular

The COAST Treatment Guidelines for canine OA have been developed to provide a practical reference to evidence and expert opinion-based treatment recommendations and to support informed treatment choice. This handbook provides a quick reference to key recommendations. Clinical judgement and consideration of patient- and caregiver-specific requirements is required. Treatment familiarity and procedure expertise are also a factor. Only the consulting veterinary care team can develop treatment plans appropriate to each dog's specific situation. Please refer to the guidelines publication for full details*.

Although every effort has been made to ensure the completeness and accuracy of the information provided herein, neither the authors nor Elanco Animal Health assumes any responsibility for the completeness or accuracy of the information. All information is provided "as is" without any warranties, either expressed or implied.

*Cachon, T., Frykman, O. et al. 2023. *"COAST Development Group's international consensus guidelines for the treatment of canine osteoarthritis"* Front. Vet. Sci. 10:1137888 https://doi.org/10.3389/fvets.2023.1137888

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