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PgC Advanced Veterinary Nursing (Exotics, Zoo and Wildlife): Critical Evaluation of Evidence (A6014HF)

Introduction

Pain response is described as the neural processing and subsequent rapid withdrawal from a noxious stimuli that may cause tissue damage.¹ This has been tested by the Thermal threshold (TT) nociceptive model using heat as a method to quantify pain in Bearded dragons.² Current research into the efficacy of analgesia in bearded dragons through response to noxious stimuli has been reviewed.

Review of current literature

Validation of TT using five bearded dragons in a two-part, blind study¹ saw a TT device fitted to a hind limb with temperatures increased to 62°C or until a leg kick/escape behaviour was displayed.³

TT was increased at 2,4 and 8 hours post morphine 10mg/kg administration compared to baseline, with 4 hours showing to be optimal.¹

While antinociceptive effects from morphine were observed, clinical pain can be more complex and multiple sources of stimulation would be required.⁴ One subject did not respond in phase 1. Therefore, a 5th of subjects were not responsive to the design of the study and so either a larger pool is required, or the results cannot be deemed satisfactory.¹

The frequency and last shed dates were not documented. While shedding is mentioned as an area to be considered, a thicker layer of shed may have reduced reliability of TT stimuli.²

Butorphanol has a low agnostic activity at the mu-opioid receptor. It has been noted that it caused some increases in TT after a 20mg/kg dose.⁴ This however is significantly higher than what is used commonly in the clinical setting and so may not be suitable for those of a critical status.⁵

Fentanyl via transdermal application at a dose of 1.0ng/ml is described in snakes as having no antinociceptive properties when tested using TT, however no studies in its use in bearded dragons we found.⁶



Figure 1: Probe placement of the thermal threshold device.

Conclusions and recommendations

The thermal threshold nociceptive model has a valuable role in bearded dragons to assist in gleaning further understanding into pain recognition and treatment.¹

Of the three analgesic drugs currently reviewed by TT, morphine appears to have the most promising outcome; however, a larger subject base would be required in a blinded, stepwise study to ensure a dose range was reliably confirmed as optimum.⁷

Very few studies were found for focusing on which analgesics in reptiles successfully act at each stage of the pain pathway, however; modulation, projection and perception are shown to be affected by opioids and would be an area warranted for further research by both thermal and mechanical threshold testing.⁸

Tramadol, pethidine and hydromorphone have all been studied in a broader range of reptiles with a reduction in both TT and capsaicin injections. Such study could be considered in the bearded dragon with ethical approval as true pain recognition and treatment cannot purely focus on pain derived from a heat source alone.⁹

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IDENTIFICATION OF ADVERSE LIBRELA-ASSOCIATED JOINT EVENTS

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AFFILIATIONS

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OBJECTIVE: To define and identify the appearance of atypical osteoarthritis and periarticular new bone formation in elbow joints of canine patients receiving long term Librela administration

METHODS:

Patients were diagnosed as having atypical elbow osteoarthritis after reviewing radiographs provided by the referring veterinarian or taken as part of the diagnostic work up. Complete histories were reviewed to determine current and previous drug administration, trauma, and surgical procedures such as elbow arthroscopy with cartilage curing with fragmented coronoid process removal. The reviewing veterinary surgeons considered the OA to be atypical when the following were identified on radiographs in combination:

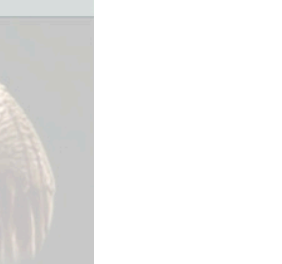
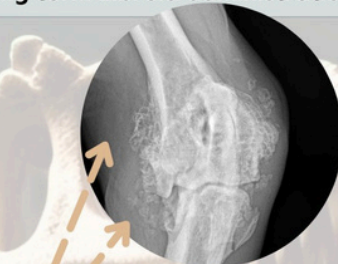
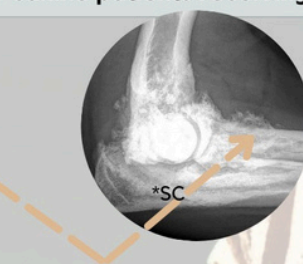
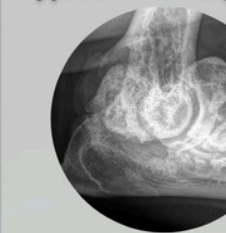
- Extensive periarticular osteophytosis
- Exostoses extending well away from the articular surfaces/joint capsule boundary along the metaphysis and diaphysis appearing like the bony plates along the back and tail of a stegosaurus skeleton
- Popcorn calcification of periarticular soft tissues/Heterotopic ossification
- Medial and lateral flexor mineralising enthesopathy
- Medial and/or lateral collateral ligament mineralising enthesopathy
- Subchondral sclerosis (*SC)



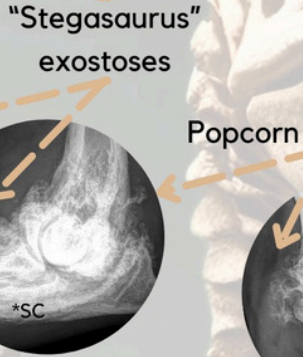
RESULTS:

Radiographs showing examples of normal & atypical OA with key features highlighted

Typical end stage OA



Atypical OA associated with long term Librela use



CONCLUSION

The incidence of atypical OA presenting at Greenside referrals has dramatically increased in the last 18 months. In all patients where radiographs had evidence of severe OA with other features than are not commonly associated with typical disease progression were found to have received multiple treatments with bedinvetmab. Although in many cases the deterioration in the joints occurred rapidly, the human medical term PROA does not describe the changes we are seeing in our canine patients and a new descriptor is required. Awareness and identification of this phenomenon will enable reporting of this AE. Further studies are required to determine pathophysiology, histopathological changes in the tissues, prevalence, and predisposing factors.

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Retrospective Analysis of 2.5% Injectable Polyacrylamide Hydrogel (2.5% iPAAG) in 701 Thoroughbred Racehorses

Clinical Relevance:

The management of joint-related conditions (including osteoarthritis) in Thoroughbred racehorses is crucial for maintaining athletic performance and career longevity. This study evaluates the long-term safety and efficacy of injectable 2.5% polyacrylamide hydrogel (2.5% iPAAG), providing evidence for its use in high-performance equine athletes¹.

Introduction:

Joint injuries are prevalent in Thoroughbred racehorses due to the intense physical demands of racing and training². Traditional therapies are focused on reducing symptoms and there are few effective treatments. In addition some treatments have been associated with significant toxicities and contraindications, and their use restricted across populations^{3,4}. This retrospective analysis aims to fill the knowledge gap⁵ regarding the long-term safety and efficacy of 2.5% iPAAG in Thoroughbred racehorses by reviewing clinical records from a single veterinary practice over six years (2017-2023).

Materials and Methods:

A total of 701 Thoroughbred racehorses treated with 2.5% iPAAG (Arthramid®, Contura, Denmark) were included in the study. Medical records were analysed for safety outcomes across 15,050 race starts and efficacy assessments for 214 horses receiving multiple treatments. The study was conducted in two phases:

- Phase 1 - Safety Assessment (n=701): Documentation of race starts, adverse events, catastrophic musculoskeletal injuries (CMI), treatment frequencies, and joint locations.
- Phase 2 - Efficacy Analysis (n=214): Tracking of horses receiving multiple treatments, recording treatment intervals, and evaluating performance using Timeform ratings pre- and post-treatment.

Statistical analysis was performed using descriptive statistics in Microsoft Excel 365.

Results:

Among the 701 horses receiving 1,156 total injections across 15,050 race starts, five CMIs were documented (0.0003 per 1000 starts). The adverse event rate was 0.17%, with two recorded events, both involving metacarpophalangeal joints.

Type of Joints Treated & Total Number of Treatments Per Joint

Joint	Number of Horses	Total number of treatments per joint
ICJs	135	262
Front fetlocks	113	219
Hind fetlocks	45	73
TMTs	41	64
RCJ	14	19
All fetlocks	7	10

Performance data indicated maintained or improved Timeform ratings post-treatment across all joint categories. The average treatment interval was 234 days, with 38.8% of horses remaining in active training at the study's conclusion.

Discussion:

The study documented a remarkably low CMI rate of 0.0003 per 1000 starts, significantly lower than the Australian industry standard of 0.52 per 1000 starts¹. This suggests that 2.5% iPAAG treatment does not increase injury risk, even with repeated administration. Only two adverse events were recorded (0.17% of injections), both involving metacarpophalangeal joints. One case resolved with conservative management; the other, complicated by septic arthritis, resulted in euthanasia. This compares favourably with published rates from other intra-articular treatments (approx. 2%)⁶. The most frequently treated joints were intercarpal (262/39%), front fetlock (219/ 33%), hind fetlock (73/9.5%), and tarsometatarsal (64/9.5%).

Performance data indicates that 2.5% iPAAG maintains athletic function across multiple joint types. The average treatment interval of 234 days suggests sustained therapeutic benefit, though intervals tended to decrease with subsequent treatments.

Career longevity data, showing an average of 28 races regardless of treatment frequency, supports the safety of repeated administration, unlike that of other intra-articular treatments³.

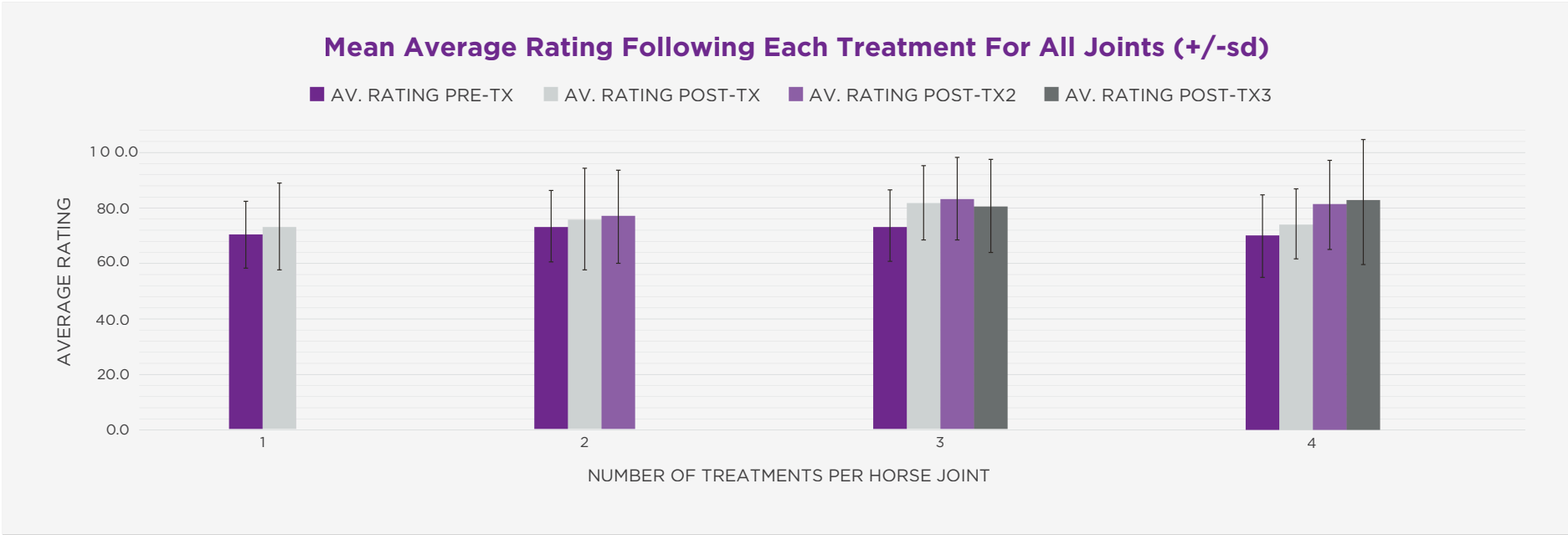
The high percentage of horses remaining in active training (38.8%) or retiring for non-joint related reasons (39.8%) further supports the long-term safety profile of 2.5% iPAAG. The low rate of joint-related retirement (1.9%) is particularly noteworthy in this high-risk population.

Despite the inherent limitations of retrospective analysis, the substantial dataset of safety data, performance outcomes, and career longevity metrics suggest that 2.5% iPAAG is a safe and effective long-term joint treatment option for Thoroughbred racehorses. The low rate of joint-related retirements (1.9%) and the high percentage of horses remaining active support its clinical application.

Conclusion:

This comprehensive retrospective analysis represents the largest safety study of 2.5% iPAAG in racing Thoroughbreds to date. Other studies have reported enhanced joint biomechanics and improved synovial function following the administration of 2.5% iPAAG^{5,7}. Our results indicate that 2.5% iPAAG provides a valuable treatment option for managing joint-related conditions, with low CMI rates, minimal adverse events and maintained athletic performance. This study underscores the need for effective joint therapies in equine sports medicine, highlighting the potential of 2.5% iPAAG to enhance the longevity and quality of life for high-performance equine athletes.

Stifle	6	6
DFTS	4	7
Front coffin joint	3	3
TCJ	2	2
DITs	1	1
Hind coffin joint	1	1
Total	372	667



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Veterinary Practice: Potential for mismatch between pain assessment and OA treatments for dogs.



Kai Crawshaw and Colin Capner

Introduction:

There has been a wealth of information published in recent years on the management of canine osteoarthritis (OA) in the veterinary press, through social media and the Veterinary Osteoarthritis Alliance itself during VOACON and via the Blue Paw scheme.

It is less clear how this information is being received and deployed within veterinary practices. Changes in medical practices can take time to evaluate and become embedded¹. Much of the research for OA focuses on the individual animal being treated, and there is far less evaluation of the way in which such information is used or interpreted by those providing the clinical care.

Method:

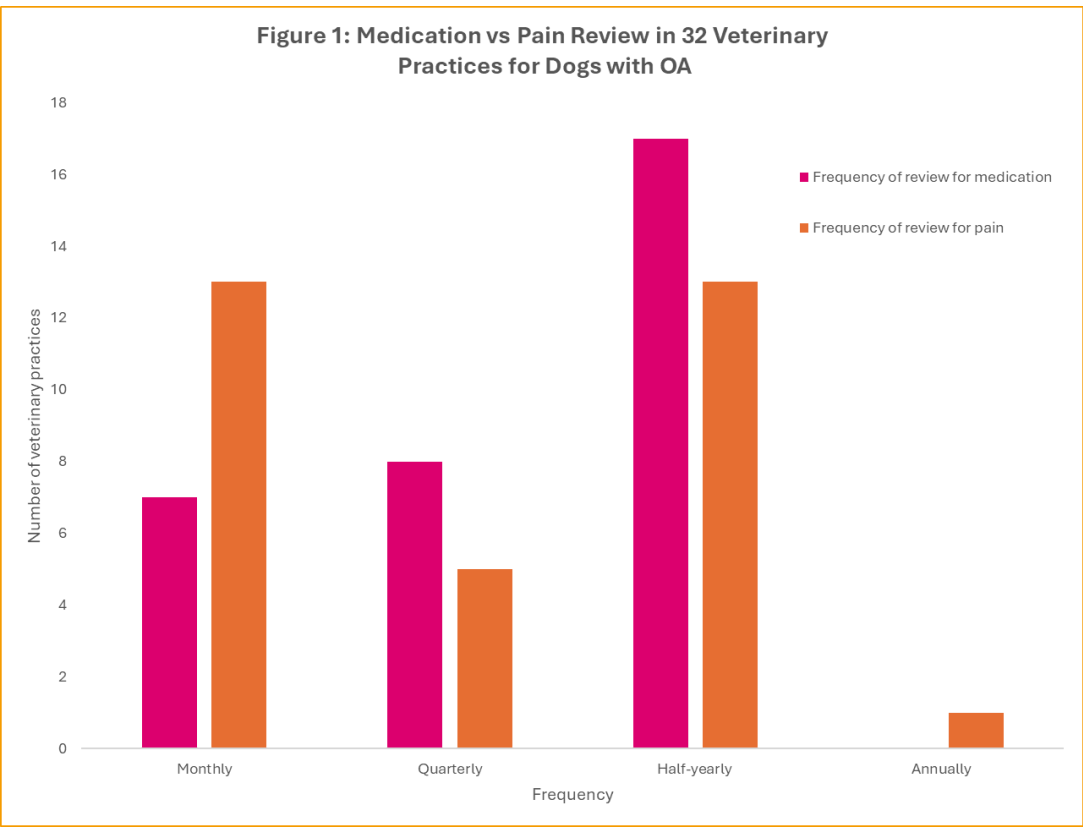
A questionnaire was posed to veterinary staff attending ‘lunch and learn’ presentations concerning an OA prescription product, from 32 practices between Feb and April 25. The questionnaire comprised seven questions shown in Table 1. Questions were displayed via a projector and consensus responses collected via pre-typed data forms from the presenter. No demographic data on the respondents were collected nor any identifying information.

Table 1.

Question	Available responses
1. Does your practice currently use any metrology instruments (such as LOAD, CPBI, etc) to aid in OA management?	Yes/No
2. Does your practice regularly (at least every 3 months) measure pain and activity of your canine OA patients using questions delivered in a different way to metrology?	Yes/No
3. Does your practice routinely ask owners about treatment options and their ability to follow them?	Yes/No
4. Does your practice check that all medications are administered in the timescale prescribed? (E.g. 30 days of medication are used in 30 days)	Yes/No
5. How frequently (on average) are OA cases reviewed; for medication?	Weekly Monthly Quarterly Half yearly Annually
6. How frequently (on average) are OA cases reviewed; for levels of pain/activity?	Weekly Monthly Quarterly Half yearly Annually
7. Which of the following does your practice offer (or refer) patients to support their OA diagnosis?	Weight clinics Physiotherapy Hydrotherapy Acupuncture At home adaptations Customised exercise plans

Results:

The use of metrology instruments in practice and influence on frequency of pain assessment; 25% of practices declared they used metrology instruments such as LOAD, COI questionnaires to assess OA pain. Practices also used methods unrelated to metrology to assess pain but only 43.8% of those responding suggested that this happened regularly (at least every 3 months). Interestingly of those practices that declared use of metrology instruments to assess pain (8 practices) then 75% of them were also likely to review pain more frequently (see Figure 1). Most practices seemed to review pain levels for dogs with OA on a semi-annual basis.



Most practices (93.8%) declared that they routinely asked owners about treatment options and their ability to follow them. Many practices offer a range of services that are key supports for dogs with OA, Table 2.

Table 2.

Supportive therapy	Number of practices
Weight clinics	29
Physiotherapy	26
Hydrotherapy	23
Acupuncture	18
At home adaptations	13
Customer exercise plans	11

The table is ranked from most to least frequently declared as available recommendations from the participating practices.

Medication review for repeat prescriptions or other purposes is a daily activity within veterinary practices. The frequency with which practices declared that they carried out reviews is shown in Table 3. The majority of practices (68.8%) did

Table 3.

Question	Number of practices and their declared frequency of review			
	Monthly	Quarterly	Half-yearly	Annually

Q5. Review for medication?	7	8	17	0
Q6. Review for levels of pain/activity?	13	5	13	1

check that medicines prescribed were also being used. In this sample the connection between medicines review and assessment of animal pain appeared to be balanced with a lower number (54.5%) applying the same frequency of review to an assessment of animal pain. 45.5 % of practices did not seem to make any assessment of level of pain associated with resupply of medication.

Conclusions and discussion:

This survey suffers several methodological drawbacks (low numbers of practices and limitations with questions) but still raises some interesting concerns relating to ongoing treatments for dogs with OA. Additional more controlled studies with more data would be required to determine the rigour of the following nevertheless intriguing findings. A limited use of metrology instruments within first opinion veterinary practice is reflected here, but interestingly because those using them have a greater interest in OA, or that use is demonstrative of pain, use could be a potential driver of structured pain monitoring in practice – use appeared related to more frequent assessment. That some practices may only review levels of pain once or twice per year is open to discussion. OA is a progressive disease and so regular measurement of pain is important to match effective therapy². That medicines review is not automatically associated with review of pain in this study is concerning. Determining if medicines are being administered as prescribed, on a weekly or daily basis, is important, but alone is insufficient. If the review fails to account for the level of pain that medicines are being used to treat, then the fundamental question- did it work? - cannot be answered. For animals with varying levels of pain - such as in OA -potentially needing treatment over a decade, this could be a significant animal welfare concern and cost. Supportive therapies are often recommended by practices, but they vary in frequency. This could be due to local availability of the discipline (including ability to refer), familiarity with the therapy, or that the therapy is able to be charged for. That animals might receive different therapeutic options might be useful for owner preferences, budgets, and a contextually variable disease.

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