The use of tramadol in a Labrador Retriever presenting with self mutilation of the tail

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Abstract A 30 month old Labrador Retriever bitch with a history of atopy presented for acute onset tail biting which was leading to self mutilation. The problem began eight months prior to the consultation. It resolved after two months, but recurred three months later and continued for three months until the time of consultation. The current episode was difficult to interrupt and was being controlled through the use of an Elizabethan collar. There had been no history of injury to the tail. On examination of the tail an irregularity was palpated approximately mid way on the dorsal surface. Radiographs of the tail showed soft tissue swelling cranially and an ossicle present between the mid-caudal vertebrae. Mutilation stopped with administration of tramadol and paracetamol and started again when the medication was discontinued. No behavior modification was implemented. Although there is a possibility that the tramadol was treating a psychogenically driven self mutilation behavior, it is more likely that pain was the initiating cause for the behavior. This case report highlights the importance of careful medical evaluation of suspected behavioral problems and discusses the possible use of tramadol in self mutilation.

Keywords:

dog, tail, pain, self mutilation, obsessive-compulsive disorder, tramadol

Case presentation

A 30 month old spayed female Labrador Retriever was presented for recurrent and persistent self mutilation of her tail, the current incident having been present for just over two months. A previous bout of mutilation had lasted two months and ended three months prior to the current episode.

History and Presenting Signs

The patient had been acquired by the owner at the age of 18 months and had been in the owner's possession for 9 months at the time of onset of the first episode of tail biting.

When acquired she exhibited severe alopecia with erythema over parts of her body, predominantly her head, ventral neck, ventral abdomen and perineum. The dorsum of her neck, her back, her flanks, lower legs and tail showed no hair loss or dermatological changes of any kind. She also exhibited moderate pruritus over the affected areas (but could be distracted from scratching if her owner left the room and did not scratch if she was engaged with toys, food or dog chews). Her skin appeared erythematous, greasy and showed some scaling. Occasional pustule development was evident in the areas of alopecia.

Extensive dermatological investigations including multiple skin scrapings, treatment with selamectin, miconazole nitrate and chlorhexidine gluconate shampoo and the use of a commercially available exclusion diet for two months ruled out skin parasites, *malassezia* and food hypersensitivities. A

tentative diagnosis of atopy caused by house dust mites and exacerbated by nettle and dandelion pollen was made on the basis of allergen testing. Hyposensitisation therapy was implemented to help manage this condition and a course of antibiotics (cephalexin) was prescribed to treat a secondary superficial pyoderma present at the time of diagnosis of atopy.

Improvement in the patient's dermatopathy was evident with a reduction in both alopecia and pruritus over time, however improvement predated the implementation of the hyposensitisation therapy and it was therefore difficult to ascribe the improvement to any specific intervention.

At no time during the first 9 months of ownership did the patient exhibit pruritus of her tail. Subsequent to acquisition by her current owner, there had been no known trauma to her tail and she also had no known prior history of tail trauma. She had never been seen to show a response which could be interpreted as pain if she hit her tail against a solid object when wagging it or when performing retrieval work in the field. However according to her owner she tended to refuse to pass through doorways if the door was only slightly ajar and the gap narrow, even if her companion dog had negotiated the space successfully.

The patient lived with her female owner and shared her home with two entire male dogs, a 13 year old Rough Collie and a 6.5 year old Labrador Retriever (who had both been in residence at the time of her acquisition). During the day she was kennelled with the male Labrador at her owner's place of work, during the evening she had free access to her owner's house and at night she slept in a dedicated dog room with her Labrador companion. There was no conflict between the dogs in the household and she generally

interacted appropriately with dogs and people that she met, however she did not like to be handled by strangers when in a confined space. She had daily walks off lead across countryside and was not known to exhibit fear when exposed to any specific stimuli. She participated in and showed evidence of enjoyment of gundog training and work. At no time (except in a confined space) did her body language indicate fear, anxiety or behavioral conflict. Before the onset of the first incident of tail biting measures had been put in place to ensure that no strangers entered her kennel.

There had been no changes in her environment or routines prior to either incident of tail biting. The biting was not associated with specific situations or times when the patient was aroused or experiencing a situation with the potential to elicit frustration or conflict. In fact, during the first incident the biting was initially manifest at times when the patient was relaxed but then increased in frequency until she would focus on her tail whenever she was awake. She did not bite at her tail when she was eating, engaged in chewing a dog chew or when on a walk. During the second incident, once again the behavior was not linked to specific situations, but it was more severe in that she would interrupt other activities to suddenly bite at her tail.

Concurrent with the second episode of tail biting, the patient's skin was showing evidence of improvement with a reduction in pruritus, erythema scaling and alopecia.

The first episode of tail biting presented as a relatively minor nibbling of the dorsal surface about midway down the length of the tail. However as she had stripped the hair and caused mild inflammation, her owner bandaged the tail to prevent further trauma. The bandage consisted of a cardboard cylinder

placed over the injured area (so that nothing adhered to the lesion) and secured with vet wrap. Anti-lick strips were placed over the vet wrap to discourage the patient from removing the bandage. When the patient did remove the bandage, it was replaced by her owner. Within two months all chewing had stopped, the skin lesions had resolved and hair had re-grown.

For three months the patient showed no interest in her tail, but at the end of that period she exhibited a sudden recrudescence of the behavior. However, this time the behavior was more severe. The owner reported that she would suddenly interrupt other behavior to turn and bite her tail and that she could not be interrupted at these times (her owner would leave the room or call another dog over to her to distract her from her behavior. These techniques had worked to interrupt her behavior during the previous episode of chewing at her tail). She had to be physically restrained from biting. The behavior progressed to the point where, unless sleeping, the patient was focusing her attention on her tail and so her owner acquired an Elizabethan collar for her to wear to prevent the mutilation.

It was at this time that the owner presented the patient for a behavior consultation. At the time of presentation the owner reported that the dog had to wear the collar constantly to prevent her from chewing her tail. Whilst wearing the collar she did not attempt to bite at the tail but immediately resumed biting if the collar was removed. The owner presented the patient for behavioral assessment as the self mutilation was severe and had not resolved within the time frame of the previous episode (two months).

Please insert Table 1 about here.

Table. Timeline for progression of dermatopathy and behavior pertaining to self-mutilation of the tail

Date	History pertaining to skin	History pertaining to tail and behavior
October 2009, patient acquired by current owner	Alopecia and pruritus (head, ventral neck, ventral abdomen, perineum). From this period until consultation with dermatologist, various diagnostic procedures and treatments were implemented. Some improvement of skin over time.	Settled into home with no incidence of conflict with dogs currently within the home. All behaviors exhibited considered to be normal. No evidence of frustration or conflict in daily life.
November 2009		Some gundog training.
April 2010		Started gundog training more intensely.
May 2010	Deterioration of skin on head and neck	
July 2010	Exclusion diet started	Started biting her tail, bandaged.
August 2010	Full dermatological workup, as alopecia on head and neck still pronounced. Atopy diagnosed.	Stopped biting her tail, bandage removed. Hair on tail had regrown.
September 2010	Antibiotic therapy for skin. Improvement in skin condition.	
November 2010	Started immunotherapy (hyposensitization). Improvement in skin continued, with some regrowth of hair in areas of alopecia. Pruritus almost completely resolved.	
End November 2010	Immunotherapy	Started biting tail again.
February 2011	Immunotherapy	Behavior consultation.
		Radiographs of tail taken.
		Analgesia implemented.
March 2011	Immunotherapy	Stopped analgesia.
		Began biting tail again.
		Analgesia reinstituted.
April 2011	Immunotherapy	Biting at tail stopped and Elizabethan collar removed. Analgesia discontinued toward end of the month.
May 2011	Immunotherapy stopped	No biting at tail.
June 2011		Final scan, no further biting at tail.

Note: This table illustrated the timelines of progression of the patient's skin condition and its relationship to the episodes of self-mutilation of her tail. As can be seen, the progression of the 2 appears unrelated, and therefore, the dermatopathy was ruled out as the cause of the tail mutilation.

Physical and Laboratory Evaluation

A clinical examination was performed as part of the behavioral work up. In general the patient's skin was showing improvement at this time with a reduction in erythema, greasiness and scaling. The patient was experiencing hair re-growth in some of the areas previously severely alopecic and the patient was not pruritic over her body. The tail was carefully examined and showed no signs of generalized dermatological changes. A focal lesion approximately 10 cm in length and covering the dorsum of the tail and extending down both sides, but not ventrally, began approximately a quarter of the way from the base of that tail. This lesion consisted of hair loss and patchy areas of superficial ulceration consistent with lesions caused by licking and chewing. A suspected bony abnormality was palpated corresponding to the site of mutilation. The patient showed discomfort on handling of the tail, however she did not show any overt pain response when the tail was palpated or manipulated.

In light of the above, further behavioral evaluation was limited at this time, but she was referred for tail imaging.

Diagnostic Imaging

Thermography was performed from the dorsal rump and tail region using a Trotec IC120-L (IC 120-L Thermal Imager, Trotec, Germany). A temperature color scale of the skin surface was recorded adjacent to the

image. The procedure was performed in a darkened loose box with an environmental temperature less than 20 degrees centigrade and the dog had been allowed to rest in the loose box for a period of at least 15 minutes prior to imaging (Turner *et al* 1986). The thermography image showed focal patchy increased temperatures more than 6°C over the cranial half of the tail (Fig1).

Please insert Fig 1 about here.

Ventrodorsal and lateral radiographs were made of the tail. Radiographs showed moderate dorsal soft tissue swelling of the cranial quarter of the tail (Fig 2 A & B) and a mineralized 3 mm X 2 mm ossicle located ventrolaterally in the intervertebral disc region of two mid caudal vertebrae (Fig 3A & B). The soft tissue swelling was attributed to local inflammation (primary or self inflicted) and the ossicle was believed to be an incidental finding, but could have caused discomfort.

Please insert Figs 2A and 2B as well as Fig 3A and 3B about here.

Diagnosis

As the history did not support a behavioral diagnosis of self mutilation as a manifestation of compulsive behavior, a diagnosis was made of osseous and soft tissue changes of the tail, potentially associated with pain. It was decided that analgesic therapy would be implemented as a diagnostic aid before any additional investigations were undertaken.

Treatment

Treatment with tramadol (Tramadol, Bristol Labs Ltd) at a dose of 2 mg/kg b.i.d. was implemented and after a week paracetamol (Paracetamol, Galpharm Healthcare Ltd) at 10 mg/kg b.i.d. was added to the treatment. A week was allowed to elapse before implementing paracetamol therapy to enable an assessment of side effects of tramadol alone to be made. The combination of the two medications was used due to the assessment of pain severity and empirical experience of synergism between the two medications which allows for a lower dose of each to be used.

No behavior modification therapy was implemented as the owner was appropriately managing the patient's behavior with respect to the tail, taking care not to directly respond to attention the patient paid to the tail.

The owner was instructed to try removing the collar three days after starting the paracetamol treatment. Removal of the collar was to be attempted only when the dog was closely supervised and her behavior was to be carefully observed. The collar was to be replaced if she began biting her tail and at any time when she could not be supervised. Once she was exhibiting no interest in her tail when she was without the collar and supervised, she could be left with the collar off for progressively longer periods when unsupervised.

Follow up

Three days after the introduction of the paracetamol when the collar was removed for the first time, the patient showed no attempt to bite at her tail. The Elizabethan collar could be removed for lengthening periods of time when the patient was supervised and all attempts at chewing and biting the tail had stopped within two weeks.

Medication was withdrawn by the owner after three weeks and a severe episode of chewing at the tail occurred two days after withdrawal. At this time her general skin condition was good with no pruritus, some hair re-growth and no secondary lesions. Tramadol and paracetamol was reinstated and although interest was exhibited in the tail at times, within three days the patient could again be interrupted from the behavior (in the same manner as previously described) and the Elizabethan collar removed unless completely unsupervised. Once again over a period of time the collar was gradually withdrawn until after three weeks she no longer required the collar at any time. Analgesia was discontinued after approximately six weeks.

Follow up thermography (Fig 4) (following identical procedures to the previous investigation) 17 weeks after the first thermography was performed showed normalization of the heat profile of the tail with an increase in temperature over the area of interest of only approximately 1.5° C. No follow-up radiographs were taken as the owner opted not to expose the dog to further sedation. Environmental temperature was warmer on the occasion of the repeat thermography, however it was still below 20° C.

At the time of final follow up with this patient, 2 months after follow-up thermography had been performed, no residual tail mutilation was occurring at any time and the Elizabethan collar was not used.

Please insert Fig 4 about here.

Discussion

With respect to repetitive behaviors, Mills and Mills (2003) report that 14.5% of the general population (105/722 dogs included in a survey) chased themselves in circles whilst 12% licked or nibbled themselves until they were sore. Repetitive behavior focused on the tail is not uncommonly presented to behavior practitioners, however in most cases the dog will exhibit spinning or circling behavior as the most significant part of the behavior with the mutilation considered a less common secondary feature. Numerous etiologies need to be considered when repetitive behaviors are investigated, for example Mills and Luescher (2006) list 9 differentials for tail chasing behavior and included in this list is tail trauma.

Self mutilation behaviors in dogs can focus on various regions of the body and in general appear to be less common than repetitive behaviors (Mills and Mills 2003 reported that 69/722 dogs appeared to groom themselves excessively and 87/722 would lick or nibble themselves until they were sore) and most reports describe self mutilation as resulting from licking of carpi or tarsi (Moon-Fanelli and Dodman 1999), or flank sucking (Moon-Fanelli and Dodman 2007). Although self mutilation of the tail is referred to in the literature (Virga 2004), documented reports of self mutilation of the tail independent of a repetitive behavior disorder are generally uncommon. There is therefore a lack of precise documentation of the putative causes, and a need to establish

greater data on case studies. For example in this case, it is shown that the behavior can be highly persistent and apparently compulsive but not require a behavior modification plan for correction.

Compulsive behaviors, (sometimes referred to as obsessive compulsive behaviors) in dogs can take many forms, however in the majority of patients where a full behavioral history is available, the owner can describe a typical progression. In most patients the behavior will initially be exhibited at times when the dog is experiencing frustration or conflict (Luescher 2004) and over time the behavior will become emancipated from these specific situations until it will eventually be manifest irrespective of external stimuli (Luescher 2004). In many cases too, there will be a history of interventions from owners which may have led to a degree of conditioning of the behavior (Luescher 2004). None of these typical historical features were present in this patient and thus a differential diagnosis of compulsive disorder was considered less likely than that of localized pathology of the tail.

Thermography is the assessment of the surface temperature of an object by generating thermal patterns in the form of a color image. Medical thermographic imaging makes use of the fact that heat is one of the cardinal signs of inflammation and an increase in surface temperature may indicate inflammation of structures close by. Local blood flow and cell metabolism are the major factors influencing the temperature (Head and Dyson 2001). Thermography, like scintigraphy, can be considered a physiological imaging technique rather than an anatomic imaging technique such as radiography or ultrasonography. Thermography has been used in many clinical settings but lacks specificity. However it is relatively easy to use and results can be quite

straightforward to assess. This makes it a useful adjunct in behavioral assessment in the consideration of active inflammation and pain.

In the dog much has been published on its use including its value in assisting diagnosing dogs with limber tail due to coccygeal muscle injury (Steis *et al* 1999), general muscle injuries (Fitch *et al* 1997) and most recently in assessing cranial cruciate ligament deficient stifles (Infernuso *et al* 2010).

The increased tail temperature seen on the thermogram in this case may have been from underlying primary inflammation or have been secondary to the self inflicted trauma of biting or tail chasing. Similarly the soft tissue swelling seen on the tail may have been for the same reasons, so establishing causal associations can be difficult.

This technique could potentially be implemented as a convenient and non invasive mechanism for monitoring the presence of inflammation when decisions regarding withdrawal of medication need to be made as well as monitoring progress. Given that there was no certainty that the ossicle visualized is linked to pain and that neuropathic pain would be difficult to rule out definitively, there is in our opinion no diagnostic test which would be better to monitor the disease process in this dog.

The mineralized ossicle may originally have been due to a chip fracture, intervertebral disc mineralization or traumatic dystrophic mineralization but was currently believed to be an incidental finding due to its benign appearance and lack of surrounding osseous reaction or soft tissue swelling. Tail abnormalities seen more routinely include congenital block and hemivertebra, the latter being responsible for the appearance of screw tailed

breeds. The intervertebral ossicle seen here has not been described previously.

Pain in animals is generally assessed by examining changes in behavior (Hellyer *et al* 2007) and owners do report that behavior changes such as an increase in aggressive behavior may be manifested in dogs experiencing chronic pain (Wiseman *et al* 2001). In addition, local pain is frequently referred to as a differential for self mutilation (Luescher 2009) however evidence for this in the published literature is surprisingly lacking.

The assessment of pain in veterinary patients is notoriously difficult and in the absence of specific evidence of pathology, response to therapy is a valid means of confirming a suspicion of pain underlying the signs displayed (Hellyer *et al* 2007). Neuropathic pain is particularly difficult to diagnose, however in an area such as the tail where a radiological abnormality indicative of possible chronic pathology may heighten suspicion of centrally derived pain, pre-emptive initiation of analgesia is warranted.

In the case of the patient described in this case report, the presence of a radiological abnormality potentially associated with damage to caudal vertebrae together with the severity of the behavior and the acute onset which was not linked to any of the commonly described precipitating causes of repetitive behaviors (see Luescher 2009) led to a presumptive diagnosis of pain as the precipitating cause of the behavior being made. As there was a possibility that the pain may have been of neuropathic origin, analgesia was selected with this in mind (Matthews 2008). One of the means of maximizing compliance with therapy in the case of behavior patients is to target interventions to reduce wherever possible (without compromising welfare) the

effort owners need to expend. This helped inform the decision to implement only a precise drug therapy, without an additional behavior modification protocol, as the initial intervention in this patient.

Tramadol is classed as an opioid analgesic with two mechanisms of action, an agonistic effect on opioid receptors and an enhancement of serotinergic and adrenergic pathways through re-uptake inhibition, as well as stimulation of presynaptic 5-HT release (Ramsey 2008). It is indicated in the veterinary literature for the treatment of mild to moderate pain and is often chosen because of less severe side effects than some of the other opioid class medications. In the management of chronic pain it is commonly used in combination with other analgesics, especially the NSAIDs, for example paracetamol (Ramsey 2008).

Tramadol was selected in this patient chiefly as an analgesic however its effects on both opioid receptors as well as serotonin levels could potentially have reduced either pain or a “stereotypic” behavior. Although general advice available mentions the use of tramadol in the treatment of self mutilation (various references on popular internet sites) there does not appear to be any documented use for this purpose.

As a result of its effects on serotonin, tramadol has been used on occasion in the human literature in the management of obsessive compulsive disorder, both in refractory cases (Shapira *et al* 1997) and in cases where a rapid onset of effect is desirable and where the patient is later weaned onto a selective serotonin reuptake inhibitor (Goldsmith *et al* 1999). Although in our opinion the patient presented responded to tramadol as a result of its analgesic effects given the absence of any specific behavior modification

exercises, we believe that it is worth bearing in mind in cases of self mutilation both where pain control is needed and where rapid arrest of the behavior is desirable. Given the nature of the mechanism of action of tramadol, it is essential to note that should the patient need to be placed on a Selective Serotonin Reuptake Inhibitor, a Monoamine Oxidase Inhibitor, or Tricyclic Antidepressant the switchover from one drug to the other needs to be managed with care to avoid serotonin syndrome (Mahlberg *et al* 2004).

Interestingly, during the recovery phase it was reported by the owner that at times when the patient was supervised and thus the Elizabethan collar had been removed, the dog would largely ignore the tail unless she became aroused, for example at a mealtime. Two possible explanations are the existence of a “stereotypic” behavior triggered by arousal, and secondly sympathetic exacerbation of neuropathic pain (Matthews 2008). This too resolved over time with the continued use of tramadol, without behavior therapy.

Conclusion

This case illustrates the importance of veterinary involvement in the assessment of a behavior problem manifested by a patient, even in the absence of an obvious medical cause. In our opinion this patient’s response to analgesia supports our diagnosis of tail pain as the initiating cause of the self mutilation behavior.

The case also highlights the value of implementing interventions incrementally so that the relevance of different elements can be determined. For example it may have been tempting to implement a behavior modification protocol in this case, but it was felt that if pain was the primary concern medication alone should be sufficient. Thus in the first instance a precise if not necessarily specific treatment, which was easy for the client to implement, was chosen.

Tramadol should be considered when treating cases of this nature as it may be of wider benefit in treating stereotypic responses beyond the amelioration of pain.

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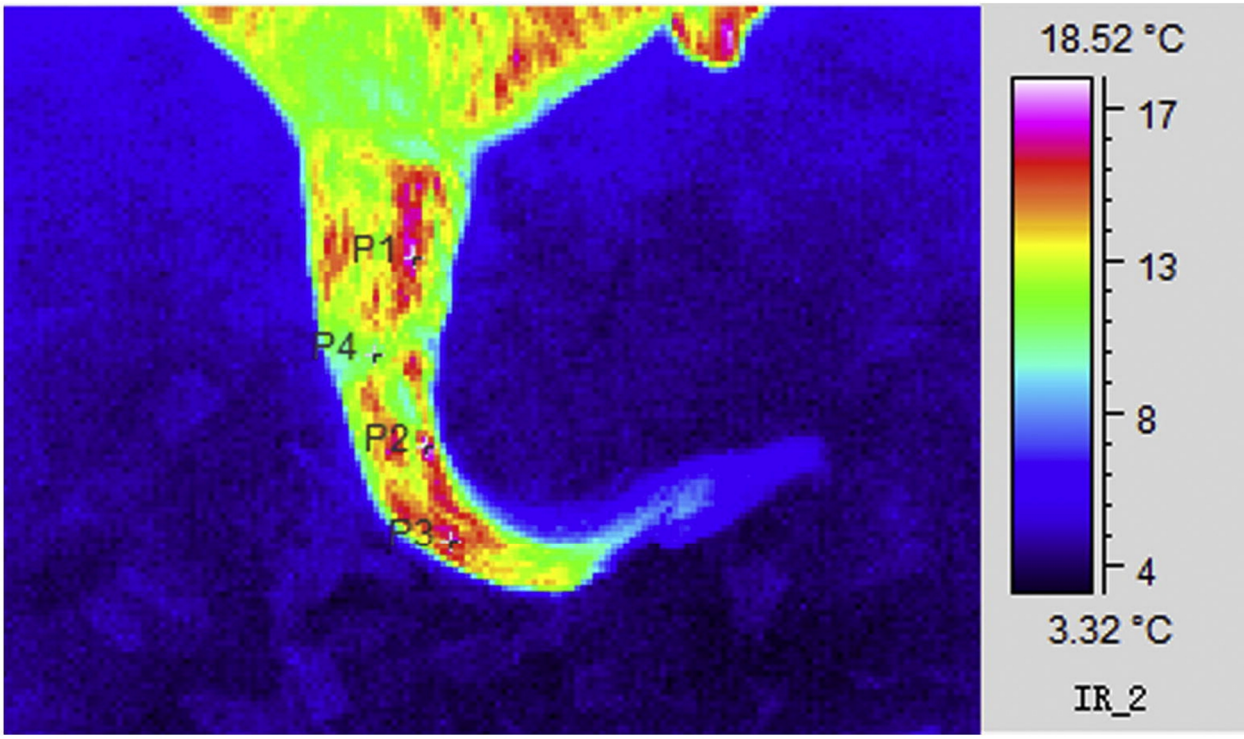


P1=18.22°C P2=18.52°C P3=16.70°C
P4=12.10°C

Figure 1. Dorsal thermogram of hindquarters and tail

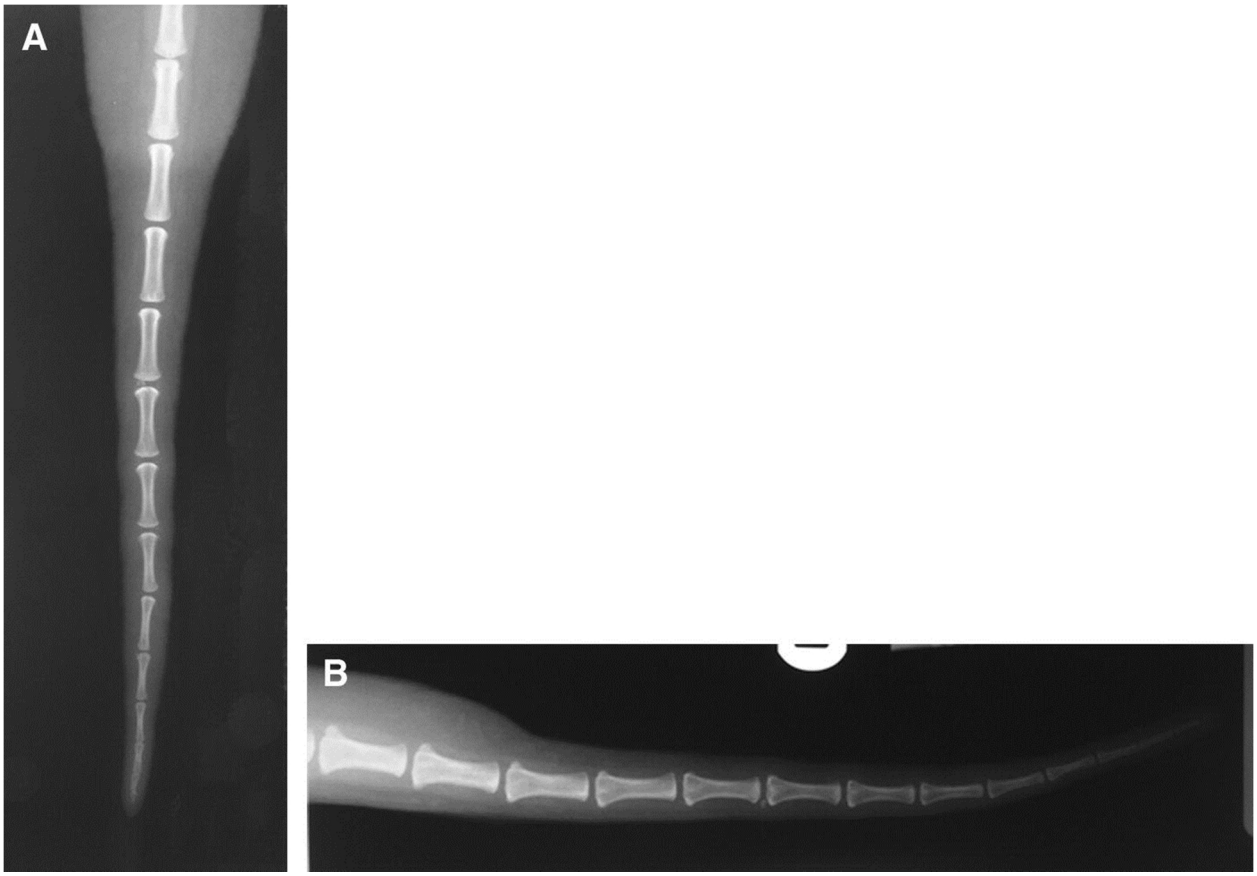


Figure 2. Radiographs of tail; (A) Ventrodorsal and (B) lateral views

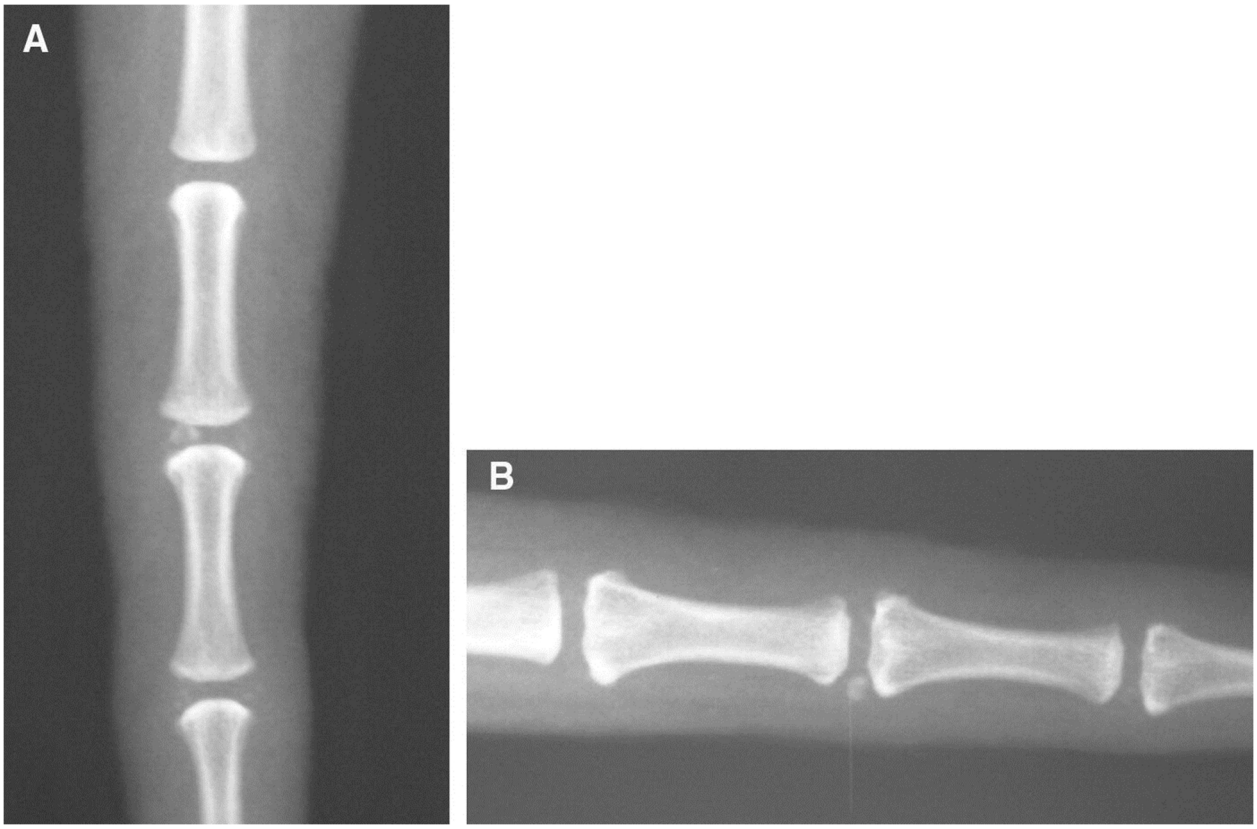
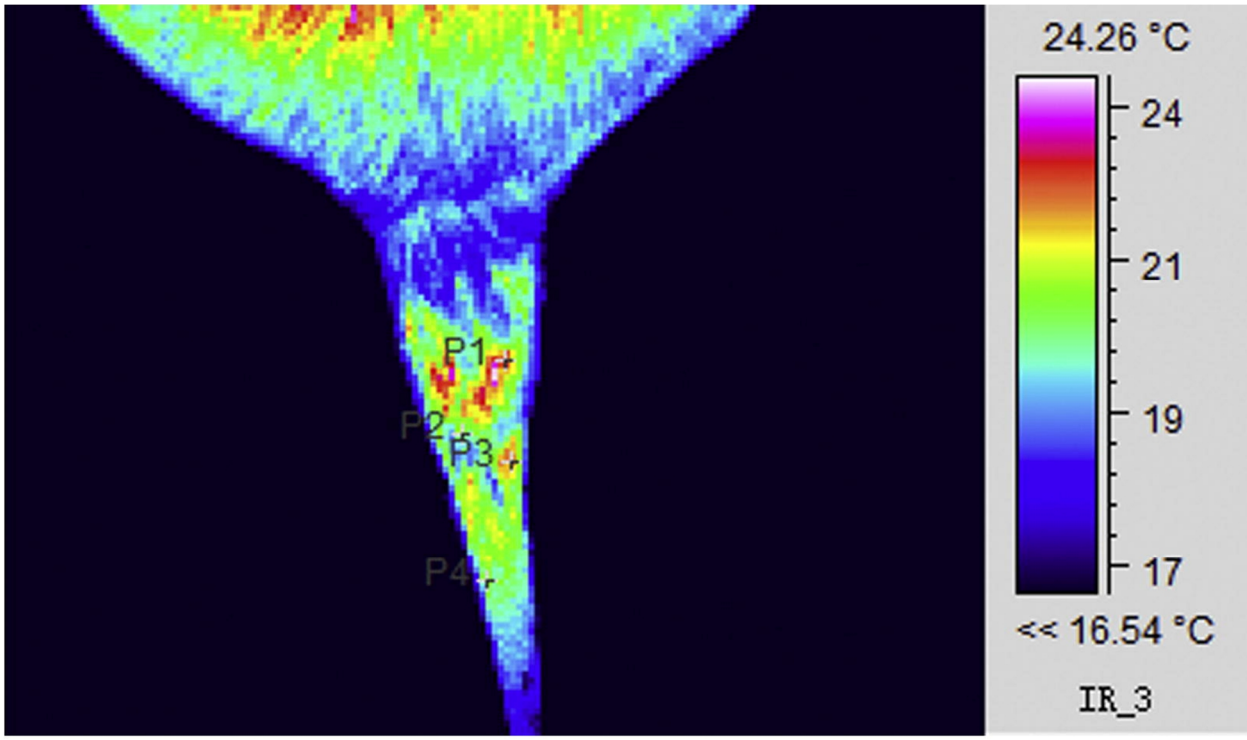


Figure 3. Close-up of the radiographs shown in Figure 2 to show the mineralized ossicle; (A) Ventrodorsal and (B) lateral views



P1=22.76°C P2=21.09°C P3=22.29°C
P4=21.06°C

Figure 4. Follow-up dorsal thermogram of hindquarters and tail