




# EVALUATION GRADING CRITERIA- SPECIFIC GUIDE

Please utilize the following as a guide to verify that you have fulfilled all the requirements for your case study report. Do not submit your report until you have completed each section as outlined below and marked the corresponding box on the case study preparation guide checklist.

Grading Criteria
Presentation (15 pts)
Clinical Report & Clinical Outcome (25 pts)
Discussion (30 pts)
References (10 pts)
Critique of Pain Management (20 pts)
<b>TOTAL</b>

# EVALUATION GRADING CRITERIA-SPECIFIC GUIDE



PRESENTATION (15 POINTS)		
1.	12-point font, Times New Roman, double-spaced	
2.	Application Registration Number (ARN) on each page, upper right-hand corner	
3.	Correct sections within the report as stated in the guidelines: <ul style="list-style-type: none"> <li>• Separate title page</li> <li>• Introduction on a separate page</li> <li>• Clinical report</li> <li>• Clinical outcome</li> <li>• Discussion</li> <li>• Summary</li> <li>• References</li> </ul>	
4.	Grammatically correct. The case report does not have to be publication-ready but should be easy for the reviewers to read and understand.	
5.	Correct spelling (there is no excuse for misspellings in clinical reports, please check the case report with a spelling program before submitting)	
6.	With the correct number of pages allowed: <ul style="list-style-type: none"> <li>• 1 title page</li> <li>• 10 for the body of report</li> <li>• 2 or less for references</li> <li>• 2 or less for appendices</li> </ul>	

# EVALUATION GRADING CRITERIA-SPECIFIC GUIDE



## CLINICAL REPORT & CLINICAL OUTCOMES (25 POINTS)

1.	Signalment, adequate history, thorough subjective and objective assessment including measurements if applicable	
2.	Statement/Diagnosis of type/types of pain involved	
3.	Lab data in table form if included	
4.	Detailed description of pain management protocols, techniques, and therapeutic modalities employed (doses of pharmaceuticals must be in mg/kg)	
5.	Subjective and objective response to therapy	
6.	Long-term pain management protocol for chronic cases	
7.	The use of an accepted pain scale is required within this section	

## DISCUSSION (30 POINTS)

1.	Must include rationale for chosen treatment (both pharms and physical) as they pertain to the type of pain being treated	
2.	Should include a critical evaluation of patient care, addressing deficiencies and areas of possible improvement	
3.	Discussion of the physiology of pain should be included here	

# EVALUATION GRADING CRITERIA-SPECIFIC GUIDE



## REFERENCES (10 POINTS)

Use JAVMA format as the reference format

1.	All non-original information must be referenced	
2.	Should be placed as end notes	
3.	Must include page numbers	

## CRITIQUE OF PAIN MANAGEMENT (20 POINTS)

1.	<p>Was the choice of treatment appropriate and adequate within the scope of the applicant's response? The applicant should make efforts to discuss types of management that could have been used were they available; with the purpose of showing that the applicant is aware of and understands advanced techniques for managing pain.</p> <ul style="list-style-type: none"><li>• IVAPM recognizes that there are differing circumstances within the veterinary community. As such, each applicant is evaluated individually without specific requirements for choices in therapy. That being said, if there are glaring deficiencies in the pain management protocols, the applicant should address them within the discussion. This type of critical thinking should be expected of an applicant for CVPP</li></ul>	
2.	Were deficiencies addressed and alternative therapies considered?	
3.	Did the applicant display a thorough knowledge of pain physiology and management?	
4.	Was a long-range plan implemented for cases involving chronic pain?	

# EVALUATION GRADING CRITERIA-SPECIFIC GUIDE



## FATAL FLAWS THAT WILL AUTOMATICALLY FAIL YOUR CASE REPORT

1.	Cases that do not utilize some form of pain scale to evaluate pain will fail. Pain scoring is required for all patients.
2.	Blatant disregard for Case Guidelines is grounds for failure. Please follow the checklist!
3.	Plagiarism will not be tolerated. All non-original material needs to be referenced correctly. If failed for plagiarism, the case report is not eligible for correction and resubmission.

**Attached is a sample case study report to serve as a guide for your own case study writing. This example represents a passive case study report.**

## **CASE STUDY #1**

# Multimodal Pain Management for Bilateral Cranial Cruciate Ligament Ruptures

**ARN #1**

# INTRODUCTION

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This case demonstrates an integrative approach to multimodal management of acute and chronic pain in a patient suffering from bilateral cranial cruciate ligament tears and consequential osteoarthritis. Pharmaceutical analgesia as well as physical therapy and therapeutic modalities were utilized to modulate central and peripheral pain pathways to appropriately manage both inflammatory and neuropathic pain. (1) Although osteoarthritis and degenerative joint disease are commonly used interchangeably, in this report the term osteoarthritis or the abbreviation OA will be used. (2) Cranial cruciate ligament rupture will be referred to as CCL in this case study. (2)

## **Therapeutic modalities used:**

- Superficial Agent Therapy: Thermotherapy, Cryotherapy
- Manual Therapy: PROM, Massage
- Laser Therapy
- Therapeutic Exercise
- TENS Therapy
- Hydrotherapy: Underwater Treadmill

## **Pharmaceuticals (Medications and Supplements):**

- Meloxicam (Metacam): PO (0.1mg/kg) q 24 hours with food (35kg dose)
- Gabapentin: PO 8.5mg/kg q 12 hours, later increased to q 8 hours
- Cartrophen (Pentosan Polysulfate): SQ 3mg/kg q 7 days for 1 month, then monthly
- Royal Canin: Advanced Joint Mobility + Satiety

# CLINICAL REPORT

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Patient is a 35.7kg, 5 year old, male neutered Siberian Husky. In late March, patient became acutely non-weight bearing on the right hind limb while running in the yard, 1 week later, patient became acutely non-weight bearing on the left hind limb. Patient was brought into family veterinarian on May 7, 2020, after minimal improvement was seen with rest at home.

Veterinarian performed a physical exam and radiographs were taken of stifles and hips. Patient was diagnosed with chronic bilateral cranial cruciate ligament ruptures, with meniscal injury in the right stifle. Radiographs revealed, cranial displacement of the tibia, moderate increase in synovial fluid and mild osteoarthritic changes bilaterally. 3, Appendix 2.2

At this time, patient was prescribed Metacam (0.1mg/kg) q 24 hours with food for inflammation, and Gabapentin (8.5mg/kg) q 12 hours for neuropathic, maladaptive pain. 4, 5, 6, 7

Due to the global Coronavirus pandemic, elective surgeries such as CCL repairs were being cancelled and post-poned, and surgical consultations were being triaged by urgency. Given the patient's sedentary lifestyle, owners opted to medically manage the bilateral CCL ruptures. Rehabilitation was recommended and patient was scheduled for a rehabilitation consultation 1 week later.

Patient was strictly exercise restricted, carried up and down stairs, restricted from jumping and only going for short elimination walks. Owners reported, patient began to mildly weight bear on the left hind limb after addition of pain medication. Patient was consuming 5 cups per day of Royal Canin.

Weight Control dry diet, with a handful of Hills T/d dry diet. No additional supplementation was given. Pain scoring had not been performed by the patient's veterinarian.



# CLINICAL REPORT

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Prior to initial rehabilitation examination, patient's owner was asked to complete a pain assessment using the Canine Brief Pain Inventory Scale. Appendix 1 Patient's description of pain was noted as a 4/10, and description of function was evaluated as a 6/10. Patient had a body condition score of 7/9, and an estimated lean weight of approximately 29kg. 8 Patient presented to initial rehabilitation assessment exhibiting a 3/5 left pelvic limb lameness and 2/5 right pelvic limb lameness at a walk.9 Strides were short and both stifles showed mild external rotation on stance phase of gait. Stifles showed reduced active flexion on swing phase of gait, and in turn, scuffing of the pelvic limb toes was audible during ambulation. Decreased weight bearing on the left hind limb, moderate cranial weight shifting and mild kyphosis of the lumbar spine were noted during gait and during a standing posture. Gait was not evaluated at a trot, as patient was physically unable to trot comfortably at this time.

Joint angles of the forelimbs were within normal, comfortable range.10 Mild muscle tension was palpated in the long head of the right triceps muscle, the left triceps palpates normally.11 Several myofascial trigger points were palpated in the latissimus dorsi muscles bilaterally. 11

Medial buttresses were palpated bilaterally in the hind limbs, joint thickening around the stifle joints was considered moderate, bilaterally.12 Moderate and mild joint effusion was palpated respectively in the left stifle and right stifles.12 Cranial drawer test and cranial tibial compression tests were positive bilaterally.12 The left stifle joint showed marked instability (~1cm) while the right stifle showed moderate (~6-7mm) instability with cranial drawer manipulation.12 With manipulation to the stifles, pain was scored 2/4 on a simple pain assessment score on the left and 1/4 on the right.13 An audible click was noted on bilateral stifle flexion, the click was repeatable and more frequent with flexion of the left stifle.12 With full flexion of the left stifle as well as extension with internal rotation pain was scored 2/4.13

# CLINICAL REPORT

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Upon goniometry, normal angles of extension were noted in both stifles.<sup>10</sup> Patient showed angles of 55 and 53 degrees flexion in the right and left stifles respectively.<sup>10</sup> Both hips were restricted to 150 degrees of extension with a capsular end-feel present at end range of extension.<sup>10</sup> Muscle atrophy was moderate bilaterally in the hind limbs, most significantly in the quadriceps region.<sup>14</sup> Girthometry measurements were 35cm and 37cm in the left and right hind limbs respectively. <sup>14</sup>

Patient had a pain score of 2/4 with palpation of the left iliopsoas muscle and 1/4 with palpation of the right iliopsoas.<sup>13</sup> Pain was palpated along T13-L7 epaxial muscles, pain was scored 1/4.<sup>13</sup> Patient was comfortable with a tail jack manipulation. Patient's neurological exam was normal. <sup>15</sup>

On enrollment of the patient into a rehab program, it was requested that the patient's owner complete a Canine Brief Pain Inventory each week before the patient's rehab session. Patient continued to receive Metacam PO (0.1mg/kg) q 24 hours with food, Gabapentin PO (8.5mg/kg) was increased to q 8 hours to enhance analgesia.<sup>4, 5, 6</sup>

Long term use of the current weight control diet had yet to show successful weight loss. Royal Canin Advanced joint Support + Satiety was recommended to assist in achieving the patient's ideal weight more effectively. This diet is composed of multimodal joint supplementation, and is particularly rich in EPA's to promote added joint support. Owner complied with this recommendation. After a transition period, 3 ¼ cups of food per day was recommended as patient's daily intake. <sup>16</sup>

Patient was immediately started on Cartrophen injections SQ (3mg/kg) at a loading dose of once weekly, then once monthly for maintenance.<sup>17</sup> Patient was enrolled into an osteoarthritis management program of once weekly, in-clinic rehabilitation consisting of laser therapy, electrotherapy, hydrotherapy and therapeutic exercises. <sup>2</sup>

Photobiomodulation in the form of low-level laser therapy (class 3b) was provided to the patient (Dosage: 810nm, 4x500mW, continuous wave). Both stifles, iliopsoas muscles, and the lumbar spine were irradiated with 8 J/cm<sup>2</sup>, 8 J/cm<sup>2</sup> and 10 J/cm<sup>2</sup> respectively. Such treatment allowed for appropriate tissue penetration depth to accurately stimulate microcirculation, pain relief and tissue healing. <sup>18</sup>

# CLINICAL REPORT

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TENS therapy was applied using 2 channels placed in a criss-crossed pattern with electrodes placed on medial and lateral joint aspects.<sup>19</sup> High frequency settings of 150us and 50 Hz were used on a continuous wave to stimulate segmental pain inhibition processes.<sup>19</sup> Intensity was increased to 14mA as this was most comfortable for the patient, this was continued for 10 minutes with the patient in lateral recumbency.<sup>19</sup> TENS therapy was used over the left stifle joint as needed to treat acute episodes of lameness and pain, in addition to weekly laser therapy. Patient responded favourably to TENS therapy, with professional guidance owner purchased a TENS unit for home use.

Hydrotherapy consisted of short intervals of slow paced, full buoyancy to the level of the hip, walking in the underwater treadmill. Intervals were 2-3 minutes in length and speed was kept at a slow paced walk to start. Intervals of time and speed were increased as patient's weight bearing improved. The patient responded favourably to aquatic therapy, showing increase in stride length, going flexion and limb use when compared to ambulating on land. 20

Patient was prescribed a home exercise program consisting of anti-inflammatory thermal agent therapies, manual therapies, active therapeutic exercises and exercise restriction guidelines. Thermotherapy was applied to the lumbar spine and iliopsoas regions, using a microwavable oat bag to improve joint and connective tissue flexibility, prior to manual therapies.<sup>21</sup> Massage was done to both iliopsoas regions to improve myofascial trigger point tension.<sup>11</sup> Passive range of motion was performed to the hips, stifles, hocks and digits for joint flexibility and maintenance of joint health.<sup>22</sup> Low cavalettis and 4-legged weight shifting exercises were performed to promote limb weight bearing, active joint flexion and proprioception training.<sup>23</sup> To avoid increasing pain levels, more therapeutic exercises would be added to the home program gradually, as weight bearing improved. Cryotherapy to the stifles was recommended at the end of the home rehabilitation program to reduce exercise induced pain and inflammation.<sup>21</sup> The entire home program was to be completed twice daily for best results.

# CLINICAL OUTCOME

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In week 2 of rehab, owner reported a description of pain of 3/10 and description of function of 4/10, as well as improvement in weight bearing when standing and ease with rising. Appendix 1 Patient displayed a 3/5 left pelvic limb lameness and 1/5 right pelvic limb lameness at a walk.<sup>9</sup> At this time short, 5 minute, controlled leash walks were incorporated into the home program, with plan to increase walks by 2-3 minutes weekly as tolerated.<sup>23</sup> Elevated standing was added twice daily, to promote hind limb strengthening and active hip and stifle extension. <sup>23</sup>

On week 4 of rehab, after missing a week's rehab due to a family emergency, patient displayed a 3/5 left hind limb lameness and owner reported increased stiffness when rising.<sup>9</sup> Owner reported a description of pain score of 3/10 and a description of function of 5/10. Pain score with palpation over the left stifle had increased to 3/4.<sup>13</sup> Laser therapy to the left stifle was increased (irradiated a second location to medial stifle) and TENS therapy over the left stifle joint was initiated. Patient's hydrotherapy speed and time was reduced, and walks were reduced from 10 to 5 minutes. Mobility in the house and pain levels had improved greatly in less than 24 hours after treatment, as per the patient's owner.

In week 5, patient's walks were 15 minutes three times daily, no increase in lameness or pain was observed. Girthometry measurements were 37cm and 35 on the right and left hind limbs respectively. Flexion of the left stifle had improved from 53 degrees to 48 degrees, the right stifle remained unchanged. Lameness was scored at 1/5 bilaterally in the hind limbs and pain was scored at 1/4 with manipulation of both stifles and palpation of both iliopsoas muscles, 3 legged stands with weight shifting was added for strengthening. <sup>9, 13, 23</sup>

# CLINICAL OUTCOME

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Throughout 10 weekly sessions of rehabilitation, despite one minor setback, the patient responded very well to treatment. Patient displayed 1/5 bilateral hind limb lamenesses at a walk and 1/5 left hind limb lameness and 0/5 right hind limb lameness at a trot.<sup>9</sup> Patient was comfortable with manipulation of the stifles and palpation of the iliopsoas and lumbar regions, with a pain score of 0/4.<sup>13</sup> Muscle mass improved 2cm in girth on each hind limb. At this time, treatment frequency was transitioned to every other week. Gabapentin 8.5mg/kg was reduced from q8 hours to q 12 hours.<sup>4,6</sup> On week 12, patient's description of pain was scored 1/10 and description of function as 2/10. Patient was able to walk for 25 minutes three times daily, climb stairs and had begun running in the yard again.

Patient currently attends rehab once monthly for maintenance including, weigh-ins, Cartrophen boosters, laser therapy, therapeutic exercises, and hydrotherapy. Patient is currently maintaining well on 8.5mg/kg of gabapentin q 12 hours, and was weaned to 25kg dose of Metacam (0.1mg/kg) without compromise. Plan is to wean to lowest effective dose, and if pain remains well managed, discontinue NSAID use. As patient's osteoarthritis progresses, plan to increase dose of Gabapentin to 10-30mg/kg q 8-12 hours as needed. <sup>4,6</sup>

# DISCUSSION

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Laser therapy was utilized as a therapeutic modality for this case to produce biostimulatory effects on cells within the stifle joint and surrounding muscles, promoting tissue healing and reduction of acute and chronic pain and edema.<sup>25</sup> TENS therapy was used to treat acute episodes of breakthrough pain<sup>1</sup> by depolarizing peripheral somatosensory fibres via the Gate Control theory to inhibit nociception pathways at the level of the spinal cord.<sup>26</sup> Additionally, TENS therapy is anti-hyperalgesic by mechanism of activation of endogenous release of opioids in the central nervous system.<sup>19</sup> TENS therapy can efficaciously promote pain relief via multiple pain pathways. <sup>19</sup>

Cartrophen was combined with an EPA rich joint support diet to promote multimodal chondroprotection.<sup>17</sup> Cartrophen helps to reduce cartilage degradation and subsequent inflammation as well as promotes synthesis of cartilage matrix.<sup>27</sup> EPA's have anti-inflammatory effects on tissue by providing an alternate substrate for COX metabolism to reduce proinflammatory cytokines as well as suppression of catabolic enzymes on joint cartilage.<sup>28</sup> Long term joint supplementation was recommended for this patient to reduce joint inflammation, preserve synovial fluid, maintain cartilage integrity and slow progression of osteoarthritis. <sup>17, 28</sup>

CCL tears and subsequent OA promote both inflammatory and neuropathic pain states.<sup>29</sup> Multimodal pharmaceutical analgesia is required to appropriately modulate central and peripheral sensitization.<sup>29</sup> Metacam was used for its COX-1 sparing and COX-2 selective mechanism to suppress prostaglandins, primarily PGE<sub>2</sub>, to promote anti-inflammatory effects and pain relief.<sup>30</sup> Gabapentin (8.5mg/kg) was used for its downregulatory effects on synaptic influx of calcium, and inhibition of excitatory neurotransmitter release at the central dorsal horn relieving inflammation-induced and neuropathic pain when combined with Metacam.<sup>7</sup> Gabapentin was used at a q 8-12 hour dosing frequency as an antihyperalgesic agent to treat this patient's pain associated with OA.<sup>7</sup> If pain was not well managed with Metacam and Gabapentin alone, Amantadine was to be added at a dose of 3-5mg/kg

PO q 24 hours.<sup>31</sup> Amantadine is an NMDA receptor antagonist which blocks depolarization and wind up of C-afferent fibres, to enhance chronic neuropathic pain management preventing central "wind up". <sup>7, 32, 33</sup>

# DISCUSSION

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Joint pain as well as compensatory myofascial pain of the quadriceps and iliopsoas regions were a factor during this patient's recovery.<sup>34</sup> Heat therapy acts by stimulating thermoreceptors, which block nociception in the spinal cord.<sup>35</sup> In this patient, heat therapy was applied as an adjunctive analgesic, to break the cyclic pain associated with painful muscle spasms.<sup>35</sup> Heat therapy, massage, passive range of motion and stretching were all used cohesively to increase circulation to target tissues, enhance tissue flexibility, and treat adaptive shortening and myofascial trigger points.<sup>22</sup> These manual therapies were successful at improving the patient's myofascial pain.

Cryotherapy was applied post-exercise to the stifles, to reduce local circulation, nerve conduction velocity to treat exercise induced inflammation and pain.<sup>35</sup> Cryotherapy works via neurologic and vascular mechanisms to promote pain relief both locally and centrally. <sup>35</sup>

Therapeutic exercise and hydrotherapy were used to aid in weight bearing, muscle strengthening and improving postural alignment.<sup>23</sup> The buoyancy of the water alleviates body and gravity forces on painful joints.<sup>20</sup> Buoyancy promotes increased active range of motion of the joints, allowing the patient to perform greater stifle flexion more comfortably.<sup>20</sup> Hydrotherapy involves the use of resistance, hydrostatic pressure, viscosity and fluid dynamics to promote limb and muscle strengthening, which aims to improve pain and disability. <sup>20</sup>

Although the patient's weight and calories were monitored closely each week, the patient's weight frequently fluctuated, and no significant weight loss was achieved. The main limitation to this patient's weight loss, was the abundance of table scraps from young children in the house. Calories could not be reduced further, as the patient was currently consuming less than their recommended daily intake. Further caloric reduction may have resulted a nutrient deficiency.<sup>36</sup> Pain management may have been achieved in a reduced time period, if less body forces were to be placed on the affected joints. <sup>37</sup>

Custom bracing for the left stifle was recommended, however, the global pandemic restrictions had halted production of custom braces in our region. Bracing the left stifle could have prevented tibial subluxation when weight bearing, improving joint stability, limb biomechanics, and reducing pain during ambulation. <sup>38</sup>

# SUMMARY

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This case demonstrates an integrative approach to successful management of maladaptive pain associated with bilateral CCL ruptures and subsequent OA.<sup>1,29</sup> Furthermore, a comprehensive multimodal pain management plan composed of pharmaceutical, nutraceutical, therapeutic modality and physical therapy treatments, promoted inflammatory and neuropathic pain relief as well as return to function.<sup>29</sup> Lowest effective dose of all treatment interventions was achieved and pain management was maintained<sup>1</sup>. OA is both an acute and chronic disease, resulting in nociceptive activation, peripheral and central sensitization, so it is crucial to utilize various pain management techniques to achieve optimal multimodal pain control. <sup>29</sup>



# APPENDIX

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## Appendix 1:

[https://www.vet.upenn.edu/docs/default-source/VCIC/canine-bpi.pdf?sfvrsn=6fd20eba\\_0](https://www.vet.upenn.edu/docs/default-source/VCIC/canine-bpi.pdf?sfvrsn=6fd20eba_0)

### *Canine Brief Pain Inventory*

#### Description of pain:

Rate your dog's pain:

1. Fill in the oval next to the one number that best describes the pain at its **worst** in the last 7 days.

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
No pain   Extreme pain

2. Fill in the oval next to the one number that best describes the pain at its **least** in the last 7 days

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
No pain   Extreme pain

3. Fill in the oval next to the one number that best describes the pain at its **average** in the last 7 days.

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
No pain   Extreme pain

4. Fill in the oval next to the one number that best describes the pain as it is **right now**.

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
No pain   Extreme pain

#### Description of function:

Fill in the oval next to the one number that best describes how during the last 7 days **pain has interfered** with your dog's:

5. **General Activity**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

6. **Enjoyment of Life**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

7. **Ability to Rise to Standing From Lying Down**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

8. **Ability to Walk**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

9. **Ability to Run**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

10. **Ability to Climb Stairs, Curbs, Doorsteps, etc.**

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6   ☐ 7   ☐ 8   ☐ 9   ☐ 10  
Does not interfere   Completely interferes

#### Overall impression:

11. Fill in the oval next to the one number that best describes your dog's overall quality of life over the last 7 days.

☐ Poor   ☐ Fair   ☐ Good   ☐ Very Good   ☐ Excellent

# APPENDIX

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## Appendix 2.1:

Test	Results	Reference Interval	LOW	NORMAL	HIGH
ProCyt Dx (May 7, 2020 10:58 AM)					
RBC	7.60 x10 <sup>12</sup> /L	5.65 - 8.87			
HCT	50.6 %	37.3 - 61.7			
HGB	17.1 g/dL	13.1 - 20.5			
MCV	66.6 fL	61.6 - 73.5			
MCH	22.5 pg	21.2 - 25.9			
MCHC	33.8 g/dL	32.0 - 37.9			
RDW	19.4 %	13.6 - 21.7			
%RETIC	1.2 %				
RETIC	89.7 K/ $\mu$ L	10.0 - 110.0			
RETIC-HGB	23.9 pg	22.3 - 29.6			
WBC	* 14.58 x10 <sup>9</sup> /L	5.05 - 16.76			
%NEU	* 64.0 %				
%LYM	* 20.4 %				
%MONO	* 4.5 %				
%EOS	* 10.6 %				
%BASO	* 0.5 %				
NEU	* 9.33 x10 <sup>9</sup> /L	2.95 - 11.64			
LYM	* 2.98 x10 <sup>9</sup> /L	1.05 - 5.10			
MONO	* 0.66 x10 <sup>9</sup> /L	0.16 - 1.12			
EOS	* 1.54 x10 <sup>9</sup> /L	0.06 - 1.23			HIGH
BASO	* 0.07 x10 <sup>9</sup> /L	0.00 - 0.10			
PLT	* 114 K/ $\mu$ L	148 - 484	LOW		
MPV	* 14.9 fL	8.7 - 13.2			HIGH
PDW	* 8.8 fL	9.1 - 19.4	LOW		
PCT	* 0.17 %	0.14 - 0.46			

Test	Results	Reference Interval	LOW	NORMAL	HIGH
Catalyst Dx (May 7, 2020 11:06 AM)					
GLU	4.12 mmol/L	4.11 - 7.95			
CREA	80 $\mu$ mol/L	44 - 159			
UREA	6.4 mmol/L	2.5 - 9.6			
BUN/CREA	20				
TP	70 g/L	52 - 82			
ALB	36 g/L	23 - 40			
GLOB	34 g/L	25 - 45			
ALB/GLOB	1.1				
ALT	32 U/L	10 - 125			
ALKP	215 U/L	23 - 212			HIGH
Na	151 mmol/L	144 - 160			
K	4.7 mmol/L	3.5 - 5.8			
Na/K	32				
Cl	114 mmol/L	109 - 122			
Osm Calc	300 mmol/kg				

# APPENDIX

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## Appendix 2. 2:

Diagnostic Images: May 7, 2020 VD Pelvis Right Lateral Stifle Left Lateral Stifle



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