Point-by-point response to reviewers

Reviewer 1
We thank the reviewer for their kind introductory comments. We apologize for the problems with accessing the supplementary files. We are not sure why this occurred and hope that it will be remedied so that the reviewer may access these files with this current revision.

Specific comments:
Line 50: I will leave it up to the AE and EIC on determining terminology usage. However, in this reviewers opinion I would not use the word "injury" unless the objective of this study is to evaluate CCL injuries (damage inflicted on the body by and external force) in agility dogs assuming this is different from the degenerative process of CCL disease in most canines. Personally I believe this can get confusing because agility dogs are susceptible to injuries not otherwise seen in companions so one could technically suffer injury to the cranial cruciate ligament. However, it appears the authors are describing the typical degenerative process of CCL disease. I would recommend changing "injury" to "disease". In addition, the authors use the word "disease" in line 53. I would recommend remaining consistent in terminology to avoid confusion. Thank you. We agree with this concern and appreciate the reviewer's comments. After some discussion we have chosen to use the term CCLI "rupture" or CCLR throughout the document. The literature is quite variable in terminology. Our choice of the term "rupture" is consistent with terminology used by Dr. Peter Muir in the 2nd edition (published in 2018) of his book "*Advances in the Canine Cranial Cruciate Ligament*". We have added a paragraph to the discussion to include this reference and provide a rationale for the terminology used **(Lines 280-291).**

Line 56: Pending the journals requirements this reviewer would prefer to see the Odd ratios or p values reported in the results section of the abstract along with the findings. We agree that it would be very helpful to have that information in the abstract. Unfortunately, the abstract is limited to 350 words and adding odds ratios with confidence intervals or p values would greatly exceed the word limit given the relatively large number of variables (15) which were significant in final models. We would be happy to add selected odds ratios for individual variables upon request and will rely on the editors for their recommendations as to how to proceed.

Line 103: How was the questionnaire designed? Was it by the 2 authors and what was it based on? The questionnaire was designed by the authors with the assistance of individuals mentioned in the acknowledgements section of the manuscript. The draft questionnaire was evaluated by a small number of agility handlers, primarily those not directly involved in the veterinary profession, and minor modifications to improve clarity were made based on their input and suggestions. This information has been added to the methods section of the manuscript **(Lines 127-131)**.

Line 110-112: I did not see access to the supplementary files. Was the pre-injury physical activities section within both groups the same set of questions? Yes. The pre-injury physical activities section was the same for both sets of respondents. We have clarified this information in the Methods section **(Lines 114-116)**.

Line 120-122: Why was the date range of when the questionnaire was available different between the 2 groups? The initial questionnaire for dogs with CCLR received such an enthusiastic response from the agility community that we realized that we could conduct very robust data analysis for agility-specific risk factors for CCLR. We immediately revised the questionnaire by removing all questions related specifically to the CCLR and treatment and requested data for agility dogs that had no cruciate injury.

We believe the second survey provides a contemporaneous "snapshot" of the agility community. The very large number of dogs in the control data set helps to lessen concerns related to bias which may have occurred with differential distribution of the survey.

Line 169: I assume the body condition score was based on owner provided feedback so I would question the validity of this. In addition in looking at Table 1 the BCS median along with the 25th and 75th percentile are exactly the same. How was there a statistical difference? The body condition score was based on owner responses. They were provided with descriptions and pictures to assist with their scoring, but we acknowledge that this data may be subject to considerable bias. This is a screen shot of the question related to body condition scoring:

Q22

How would you classify your dog's weight? *Reference the guide below in answering this question.*

| Underweight | Thin | Moderate | Heavy | Overweight |
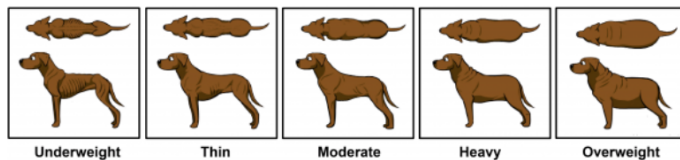
○ Underweight (spine, pelvis, and ribs prominent from a distance; lack of muscle mass; hollow rump; obvious waist; thin neck)

○ Thin (spine, pelvis, and ribs easily felt and visible on short-coated dogs; minimal body fat; obvious waist)

○ Neither thin nor heavy (spine, pelvis, and ribs easily felt; last few ribs may be visible, rounded rump; tucked-up waist)

○ Heavy (spine, pelvis, and ribs felt but never visible; flat abdomen; dog appears square from the side and above)

○ Overweight (spine, pelvis, and ribs difficult to feel; rolls of skin around neck and tail base; rounded abdomen; broad rump)

We did not place much emphasis on this information in the data analysis. We relied more on the height, weight, and weight:height ratio. Most agility dog handlers are aware of the exact height of their dog because of the role that height plays in determining the division in which they participate in competitions. They also tend to have a good knowledge or close approximation of the weight of their dog.

With the Mann Whitney rank sum test it is possible for the medians to be the same, yet the test detects a significant difference. The test compares mean ranks – it does not compare medians and does not compare distributions. We have included a footnote in the table with the means of the 2 groups and some explanation of the similar medians *(Lines 195-199)*. The CCLR dogs had a significantly higher body condition score, as provided by owners, than the control dogs.

Line 277-279: I'm confused how this conclusion was reached? Is this an assumption that younger dogs would be competing at a lower level simply because they are younger? Or did the data breakdown and find that a higher % of younger dogs competed at a lower level compared to older dogs?

Yes. This statement assumes that most dogs competing in lower levels are younger dogs. We are confident of the accuracy of this assumption. Dogs must complete the lower levels before advancing to

higher levels and most dogs begin agility at a young age. Dogs are not allowed to revert to lower levels of competition after advancing.

Reviewer 2

General comments:

1) This study would not be ethical review exempt in our Institution and I think you need to at least talk about getting these participants to give their consent and show how you did this on your questionnaire. An example of the actual questionnaire and how it was laid out would be useful in the Supplementary material. More information on how you stored and processed the data and how this was aligned with GDPR would be useful again related to owner consent.

The questionnaires in their entirety are included as Supplementary Items 1 and 2. We are unsure why they were not available for the reviewers to examine. Both surveys were completed by March 2016, considerably prior to implementation of GDPR for the European Union in May 2018. As a result, GDPR compliance is not applicable to this study. We believe that the confusion around exempt status may be a difference in terminology used in different countries. In the US, this type of study is reviewed by the Institutional Review Board (IRB) of our university. If the committee determines during their review that the research is "exempt", it means that the research has no risk or minimal risk to subjects and is exempt from most requirements of the U.S. Federal Policy for the Protection of Human Subjects. Even though we have "exempt" status, we are required to maintain data confidentiality standards, obtain consent, etc. The research is not exempt from state laws, institutional policies, or the requirements for ethical research. Before beginning this project, our research plan, including the questionnaires, was reviewed by the IRB and the main investigators completed required trainings. We are unsure of how to clarify this in the methods section without adding a lengthy paragraph to explain these nuances of ethical review. We would be happy to entertain suggestions on this point from the reviewer or the editor.

We will ensure that a pdf copy of each questionnaire is included in the uploaded revision. If it is not visible to the reviewers, we hope that reviewers will request access to the file from the journal editors. The first page of each survey includes all required ethical information regarding participation, review, and mechanisms for contact with the researchers.

2) CCLI as described in your paper, does not have the same aetiology I suspect as CCLD/R and I think this need to be much clearer in their potential differences in the Introduction, Discussion and Conclusion. Have all of these dogs had surgical management of their CCLI or how have they been diagnosed? I think this needs to be much clearer in your methods.

Thank you. Based on the comments of all reviewers, we have revised the manuscript to refer to CCLR (rupture) rather than CCLI (injury). We have made this change throughout the manuscript and added a paragraph in the discussion to explain the uncertainties related to etiopathogenesis *(Lines 280-291)*.

Not all dogs were managed surgically. Of the 260 dogs in the final data set, 202 (77.7%) were treated surgically. A closer examination of treatment and outcome (e.g. return to competition) is planned for a separate manuscript. We have included discussion of the uncertainties surrounding diagnosis in the absence of surgery or review of veterinary records. Despite this methodological weakness, we believe

that the conclusions reached with our data analysis are accurate given their overall consistency with risk factors identified in previous studies (referenced in the manuscript) which were based on review of veterinary medical records (e.g. risk associated with reproductive status, large breed dogs, etc.).

Specific comments:

Typographical error? – line 41 If you are referring to the last name of Ms. Sarah Fernandezlopez in the Acknowledgements section, this is not a typo. Her surname is spelled correctly.

Abstract, Line 50 – CCLI – not really commonly used in the literature – it is usually CCLD/R. I agree that within this population it may be CCLI but this is not well reported so should probably not be used in reference to the previous literature. Thank you. We agree with the reviewer on this point and have made appropriate changes. We now use the term CCL "rupture" or CCLR throughout the document. The literature is quite variable in terminology. Our choice of the term "rupture" is consistent with terminology used by Dr. Peter Muir in the 2nd edition (published in 2018) of his book "*Advances in the Canine Cranial Cruciate Ligament*". We have added a paragraph to the discussion to include this reference and provide a rationale for the terminology used ***(Lines 280-291)***.

Abstract, Lines 58-64. I think more specific detail on odds ratios should be added. We agree that it would be very helpful to have that information in the abstract. Unfortunately, the abstract is limited to 350 words and adding odds ratios with confidence intervals or p values would greatly exceed the word limit given the relatively large number of variables (15) which were significant in final models. We would be happy to add selected odds ratios for individual variables upon request and will rely on the editors for their recommendations as to how to proceed.

Abstract, Line 68. Yes I agree in this population but it is different to the CCLD/R group. As above in general comments. It is impossible to tell what additional or primary role the trauma/stress of agility played in the etiopathogenesis of individual dogs. We believe that CCL disease (degeneration) affected many (most?) of the dogs in this study. We have added a paragraph describing this conundrum in the discussion section ***(Lines 280-291)***.

Introduction, Lines 77-84. I think you need to define the difference here with CCLI vs CCLD/R. We agree and have made changes throughout the manuscript as described above.

Introduction, lines 90-96. Suggest include more references. We have included additional references. ***(Lines 93-100, references 16-21)***

Introduction, Line 97. What is your hypothesis. We have deleted the statement related to study objectives and rephrased that statement in the form of a hypothesis ***(Lines 100-103)***.

Introduction, Line 104. link to this software or example in appendix? Qualtrics is widely used by academic institutions in the United States. It is the only internet-based survey software that is approved for research use by Washington State University. We have included a web link in the methods ***(Line 111)*** and we have included pdf copies of the questionnaires produced by this software as Supplementary Items 1 and 2.

Introduction, Lines 103-112. What was this questionnaire based on? Any previous work? Had it been validated? Why is this questionnaire exempt from ethical review as you are collecting data from clients

on their dogs? It would be a requirement to have ethical review for this type of study in the UK/EU. This questionnaire had some similarities to a questionnaire used for previous investigations of digit injuries in agility dogs. We have included references to that research. There was no formal validation of the questionnaire. This project, including the questionnaire in its entirety, did receive ethical review. Please see our explanation of "exempt" status as provided above.

Introduction, Lines 114-118. Were there any exclusion criteria? The only exclusion criteria were the inverse of the information stated in this paragraph. Incomplete, duplicate, or illogical responses were excluded from the final data set as described in the first paragraph of the results section.

Line 126 – ok but how did the owners give their consent to give their data/responses. Also did you collect the data anonymously straightaway or how did you store the data? On the introductory page of each survey, respondents were informed that all responses were voluntary, and they could quit at any time. They were asked, but not required, to provide some contact information. Data was stored on password-protected computers and only accessed by the core research team. The security plan was reviewed and approved by the IRB board.

Table 1 – dog BCS - ? how was this different as the data presented here look the same. They are not of course I assume but this is not very clear on how you got these results. So might be good to see the spread of the data. Using a Mann Whitney rank sum (MWRS) test, BCS differed statistically between the CCLR and control groups even though the median and 25%/75% values were identical for both groups. The dogs in the CCLR group had a slightly higher BCS than control dogs. The MWRS test compares mean ranks and not median values. The mean value for CCLR dogs was 2.7 and the mean value for control dogs was 2.6. A footnote has been made at the bottom of Table 1 to provide this information **(Lines 196-199)**.

Discussion, Line 391 – reference for this? We have added a reference from the equine literature. This is now reference 46 **(Lines 355-357)**:

Fenner K, Hyde M, Crean A, McGreevy P. Identifying sources of potential bias when using online Survey data to explore horse training, management, and behaviour: a systematic literature review. Vet Sci. 2020;7:140.