

## ECVM - General Information & X-ray Protocol

Dear Equine Veterinarian,

Thank you for taking time from your busy schedule to review this material. As part of a global group studying ECVM (currently recognized in a multitude of breeds), I am conducting a genetic study in collaboration with [Etalon Diagnostics](#) in an attempt to identify the gene(s) responsible for the malformations involved. For this study to succeed, Etalon Diagnostics needs an abundance of hair samples from both ECVM-Affected and "Normal" horses as determined by radiographs.

**The owner of the horse(s) you are about to see has agreed to be part of the genetic study and asked that I send this information to you to avoid confusion.**

Please understand that this is not a request to perform a full lameness/neurological examination (although the owner may want you to). Nor is this an attempt on my part to correlate the malformation with clinical signs. This is simply a request to obtain 4 good quality radiographs of the C5-C7 region so that I can assign a hair sample from each horse to the correct category (C6 malformation vs Normal C6) for the genetic assay.

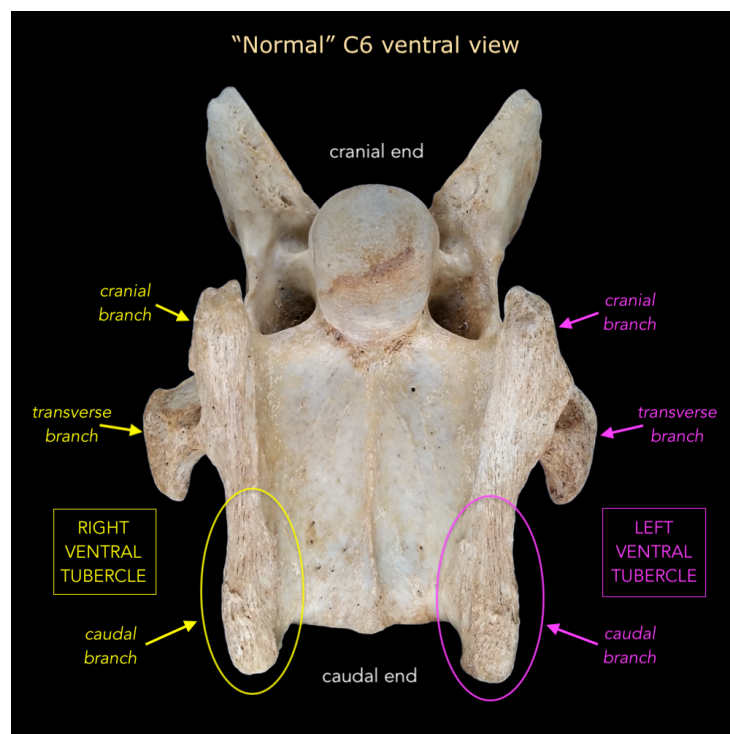
If you are not yet up to speed on what ECVM entails, here is a brief overview:

**ECVM (Equine Complex Vertebral Malformation)** is the acronym recently assigned to a particular group of malformations that affect the normal development of C6 and sometimes C7, as well as, the 1st & 2nd sternal ribs. These malformations are congenital ... the horse is born with it. The current thought is that the mutations are inherited, possibly from both sire and dam. Thus the importance of the genetic study.

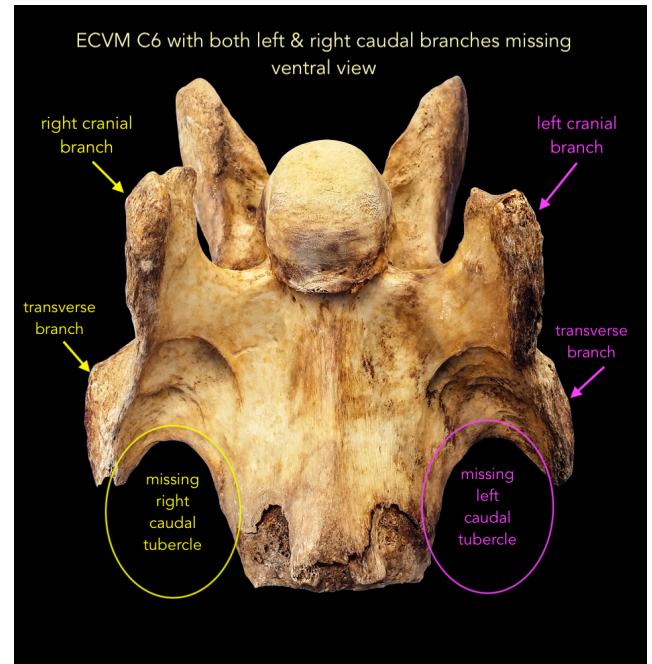
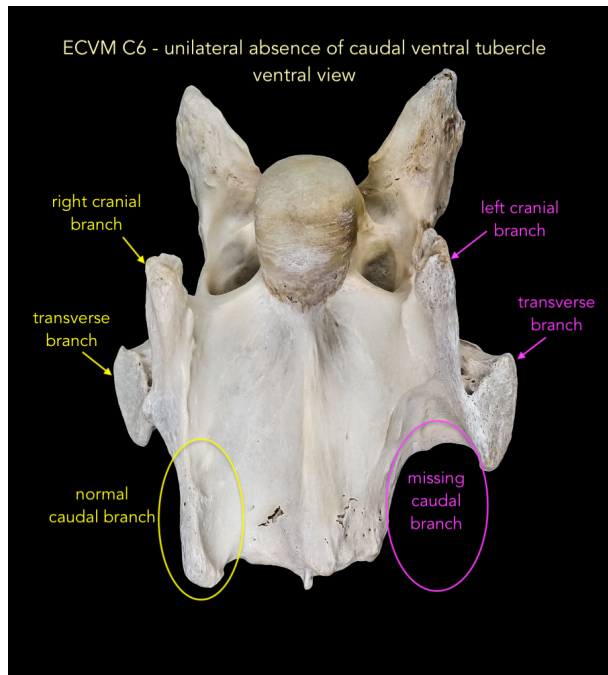
Specifically, the proposed mutation(s) affects the development of the ventral tubercles (laminae) of C6 in such a way that one or both of the caudal branches are missing. As such, the attaching musculature (*Longus colli*) needed for stabilizing the lower neck, as well as, the associated neural and vascular pathways, may be altered (as seen in dissections). This is believed to set up asymmetrical, compensatory patterns throughout the body.

**Important:** ECVM is **NOT** the same as CVSM, structurally. Although compression of the spinal cord and/or arthritic changes to the APJs of C5-C6 and C6-C7 may accompany this malformation (as seen in radiographs and dissections), the primary focus for the requested radiographs is to assess the **morphology of the ventral tubercles on C6** for abnormality.

Below is a ventral view of a **normal** C6. The areas of interest are in the yellow and pink ovals.



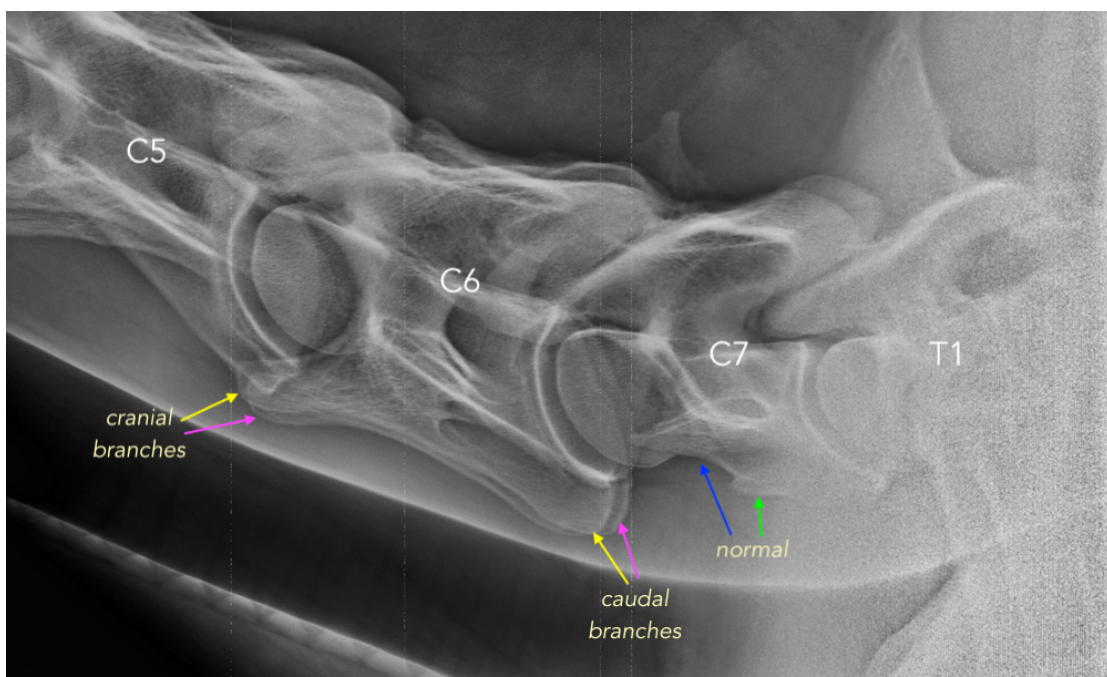
Below are examples of 2 common variations of a malformed C6. The C6 on the left has the **unilateral absence** of the left caudal ventral tubercle. On the right is the malformed C6 of a Friesian where **BOTH** caudal branches are missing (bilateral variation).



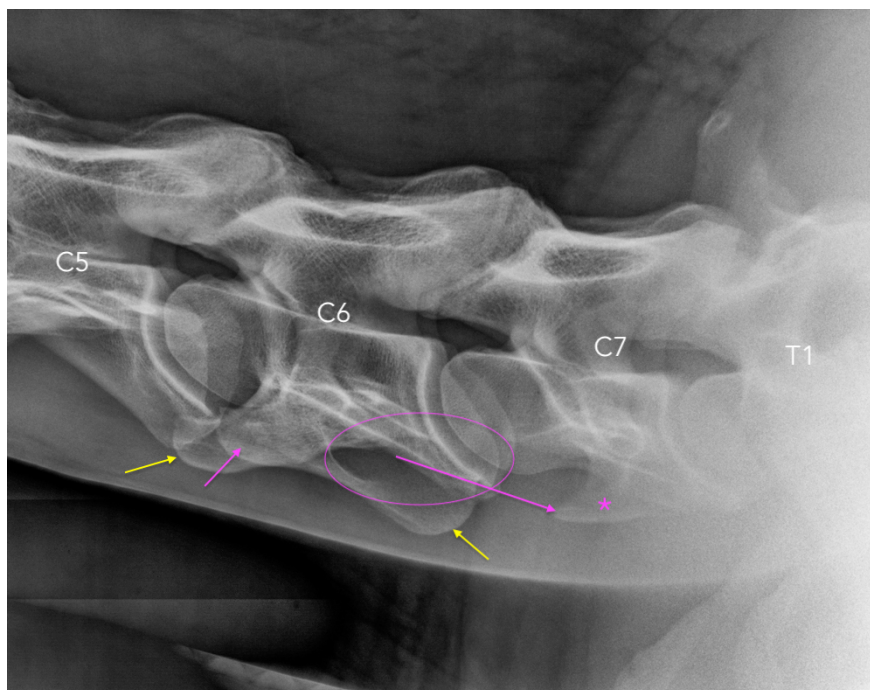
**For the purpose of our genetic study**, please follow the simple X-ray protocol summarized below. More complete details can be found in [Gee \(2020\)](#).

1) Take both **left & right lateral-lateral** views and try to include the caudal half of C5, **ALL of C6** and as much of C7 as possible. **\*\*The focus being to evaluate the morphology of the left & right ventral tubercles on C6 especially the presence or absence of one or both caudal branches.**

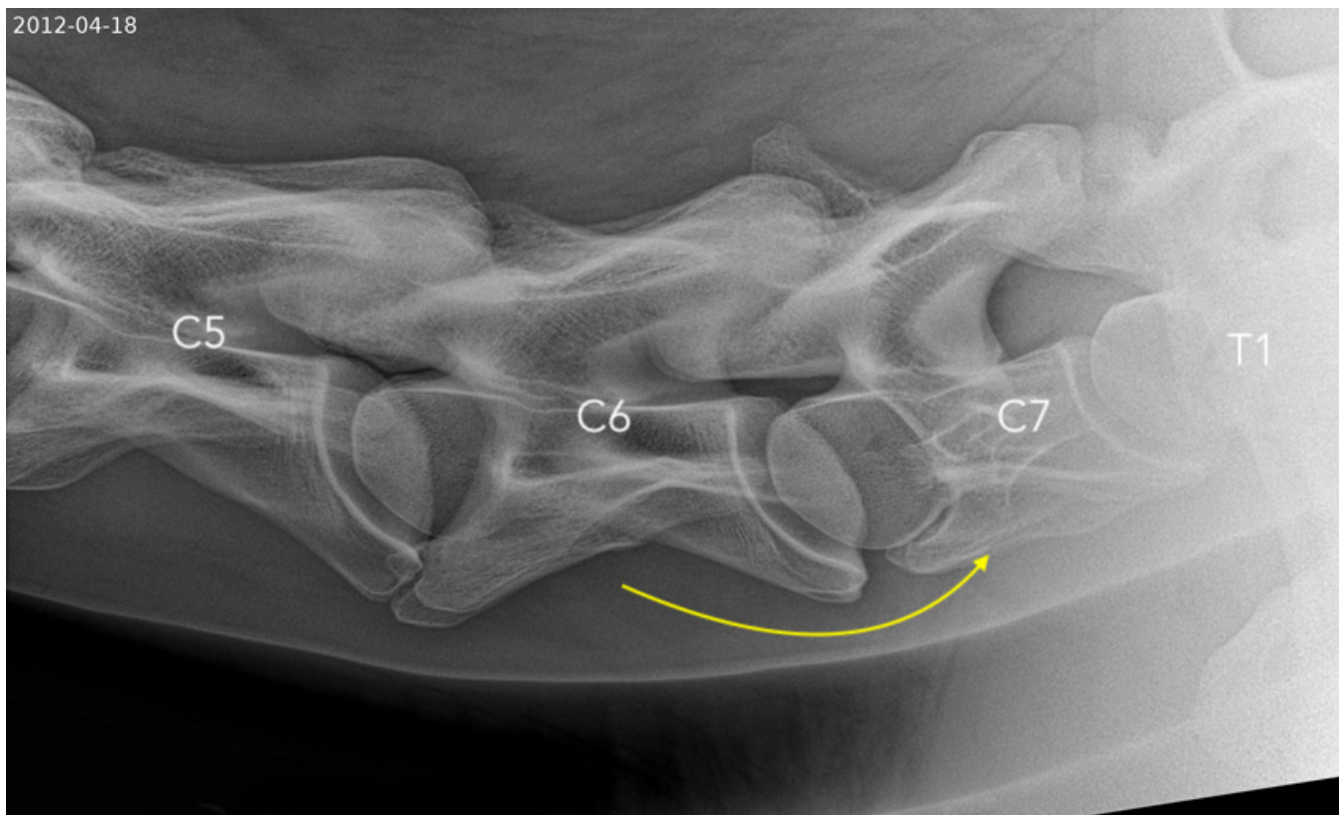
Below is an example of a morphologically "normal" C6 and C7. The yellow arrows indicate one tubercle and the pink arrows the other. Note that *both tubercles extend the full length of the ventral surface of C6*. Note also that the ventral surface of C7 normally appears smooth (blue arrow) and one of the paired, central tubercles can be seen (green arrow)



Below is an example of a "unilateral C6" where one caudal branch is missing (pink circle). In about 60% of horses with this variation, C7 will be normal. However, **in this horse the tubercle transposed onto C7(\*)**. Yellow arrows indicate the cranial and caudal branches of the "normal" tubercle on C6.



**\*\*\*NOTE: when both caudal branches are missing (Friesian above), C6 will take on the appearance of C5, and if both tubercles are transposed to C7, it will look like C6. Be aware when evaluating the X-rays!\*\*\***

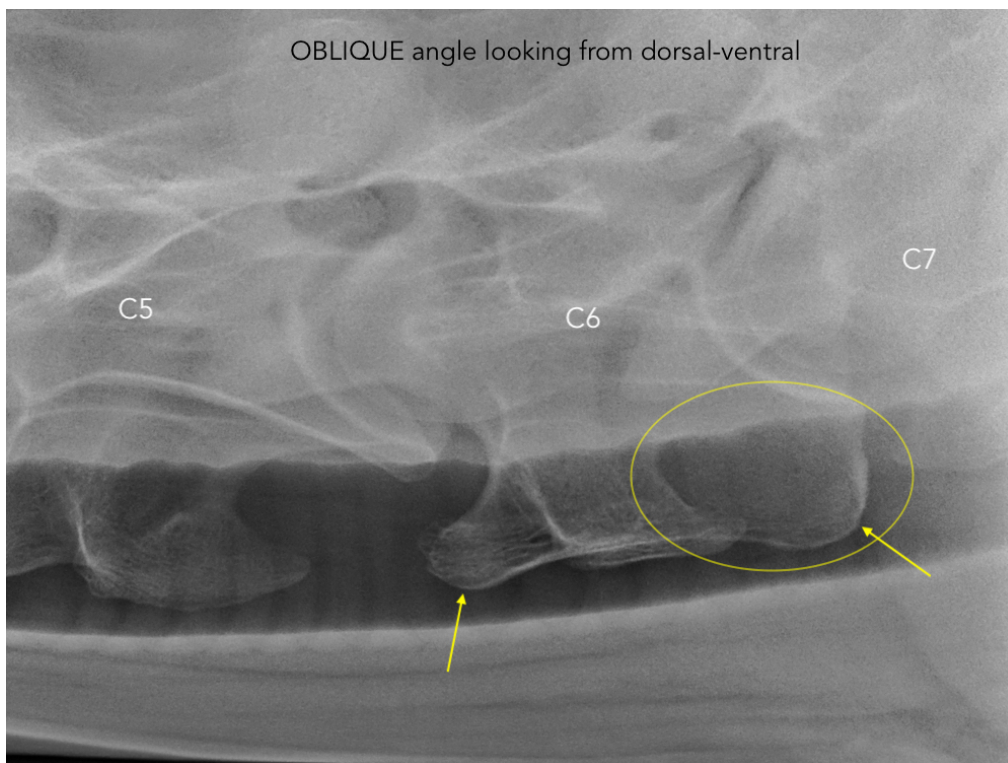


Many times, the lateral-lateral views will be unclear with respect to seeing both caudal branches.

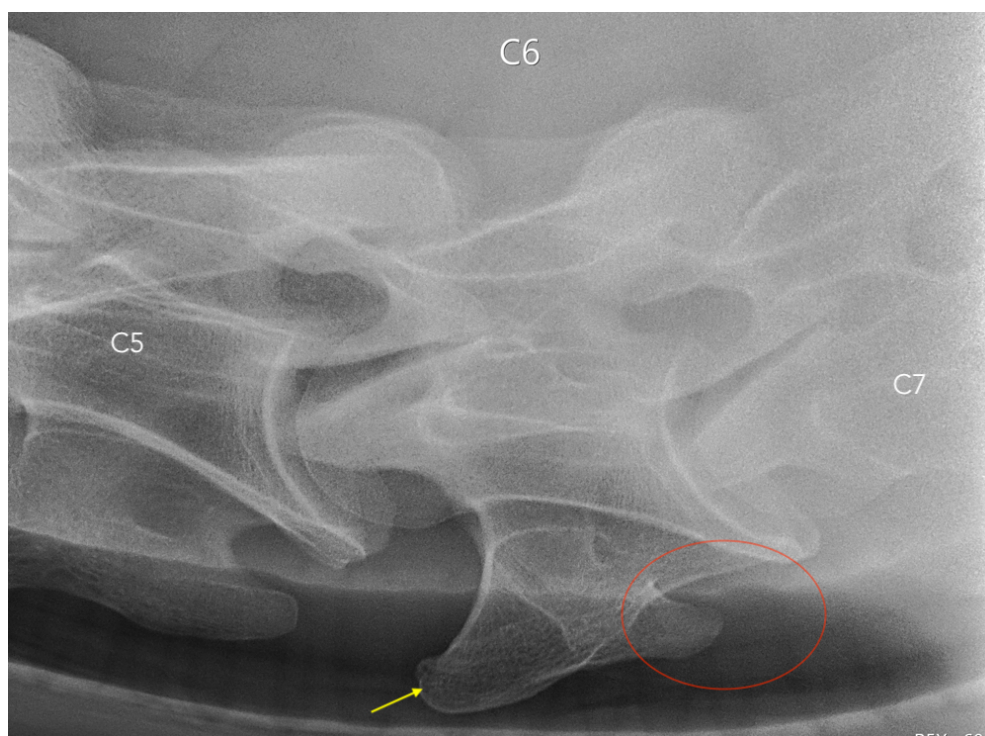
**Therefore:**

2) Also take **dorsal to ventral oblique views of both left and right** sides (superimposing the tubercles over the trachea helps). If you are more comfortable taking ventral to dorsal oblique that is fine too. **Gee's** publication suggests a 30° angle.

Example of an oblique view showing the presence of the caudal branch which is normal (yellow circle). (Yellow arrow on the left indicates it's cranial branch.)



Example of an oblique view showing the **absence of the caudal branch** on this side (red circle).



**\*\* It is important that all 4 of these views be taken as ECVM presents in a multitude of variations relative to the morphology of the tubercles (on one or both sides) that cannot always be determined from a single lateral-lateral view.\*\***

As I am required by Etalon Diagnostics to view the X-rays prior to sending hair samples, kindly e-mail the link to the radiographic study to me. This has been approved by the horse owner.

Again, thank you so very much for your time in reviewing this rather lengthy information and cooperating with taking the requested X-rays. This genetic study is immensely important for the future of healthy breeding practices throughout the world and I cannot gather the samples without your help!

Do not hesitate to contact me at anytime with questions.

Most Sincerely,  
Pamela

*Pamela Blades Eckelbarger, MS  
1165 Shaws Fork Rd.  
Aiken, SC 29805  
207-542-6132*

[info@equus-soma.com](mailto:info@equus-soma.com)

EQUUS-SOMA ~ [Equine Osteology & Anatomy Learning Center](#)

Should you desire references for me, feel free to contact:

Sharon-May Davis, PhD - [maydavis@bigpond.com](mailto:maydavis@bigpond.com)

Christa Lafayette @ Etalon Diagnostics - [clafayette@etalondx.com](mailto:clafayette@etalondx.com).

More information can be found here:

[www.equus-soma.com/ECVM](http://www.equus-soma.com/ECVM) and [www.equus-soma.com/references](http://www.equus-soma.com/references)

**IMPORTANT:** I am not a licensed veterinarian and am not making claims to diagnose, treat or cure. The observations, assessments and suggestions I provide are based on my experience and training in the study of equine osteology and anatomy, in particular, ECVM and should not be considered a formal diagnosis. Your horse may have other physical issues involved and only your veterinarian is legally allowed to make those diagnoses.