



European Veterinary Dental College

EVDC Guidance Document

Radiograph Submission Requirements (Dog & Cat)

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Radiograph Submission Requirements (Dog & Cat)

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Introduction

As part of their credentials package, applicants to the European Veterinary Dental College (EVDC) are required to provide PDF documents containing sets of mounted full mouth dental radiographs and sets of skull radiographs showing temporomandibular joint (TMJ) anatomy obtained by the applicant for both a cat and a dog. These may be submitted earlier (during a training program) for pre-approval, in which case assessment will be performed anonymously. Pre-approvals must be obtained before submitting a credentials package that relies on an item submitted for pre-approval. If submitted as part of a credentials package, radiographs will not be assessed anonymously.

The assessment of radiograph sets is performed by the EVDC Credentials Committee as these submissions will constitute part of an applicant's credentials package.

The purpose of the radiograph requirements

Radiographs of good quality are critically important for the diagnosis and treatment of oral diseases. The requirement to submit radiograph sets is to ensure that applicants have the skill to produce good quality diagnostic radiographs in a consistent manner. The required views represent a subset of views commonly used for diagnostic purposes.

Use of PDF documents

Submissions are required in the form of PDF documents as these provides the best level of uniformity in on-screen viewing conditions using different computer systems. There will still be variations in viewing conditions used by assessors due to different operating system, monitor settings and room lighting in the same way that viewing of conventional films is affected by the light box used and different room lighting.

When submitted for pre-approval, it is essential that documents are truly anonymous. The documents themselves and their file names must NOT contain information, characters or wording that could identify the origin of the document or language of the originator (or their supervisor). This also applies to the name of the PDF generator used to produce the document as this is nearly always embedded in the document, often along with details of the originating document and other potentially identifiable information such as who the programs are registered to. There is guidance on avoiding and removing identifying information in the EVDC Training Management System (TMS) help pages. Additional help on this issue may be requested from members of the Training Support Committee should it be required.

The originals document and the PDF files need to be prepared with the images scaled to approximate actual/life size, i.e. equivalent to conventional film images and of high resolution. Conventional films will need to be scanned or photographed for incorporation into the document. Digital images should be exported from the digital radiography systems as bitmap files for inclusion in the document.

When the original document is prepared, image resolution needs to be maintained at or above 300 dpi. The PDF file can then be prepared with image resolution set to 300 dpi to maintain a high enough definition for it to be viewed magnified to 200% or 400% on-screen during assessment, equivalent to use of a magnifying glass or loupes to examine a conventional film image. TMJ radiograph images from medium-large dogs are acceptable at 200 dpi, but both TMJ and dental radiograph images from cats need to be at least 300 dpi, with 400 dpi being best for small cats. (NOTE that the image resolution of a PDF file can never be higher than the document it was created from!)

General Requirements

1. The animals used must be adult and ideally have full normal permanent dentition with no significant dental or jaw/TMJ pathology.
 - a. Dental radiograph sets will not be penalised for the presence of supernumerary teeth that do not interfere with interpretation of images. All teeth present must be adequately visualised on at least one image.
 - b. If the first premolar teeth or mandibular third molar teeth are absent in the dog, the affected areas must be clearly shown on at least one film. In the case of missing third molar teeth the film should show an area extending at least 3 mm caudal to the expected location of the absent tooth.

- c. Feline dental radiograph sets will not be penalised if first and second incisor teeth are absent.
2. A dental radiograph set must have been obtained by the applicant/resident/trainee in one continuous session and from one animal.
 - a. They must perform the radiography without receiving assistance from anyone else, i.e. they must perform the radiographic positioning, exposure and any digital processing of images themselves.
 - b. The physical processes of developing and photographing conventional films, plus the conversion of digital photographs of films to an appropriate resolution, may be performed by someone other than the trainee.
 - c. They must organise, lay out, label and otherwise prepare the "mounted set document" for submission themselves.
3. The positioning, exposure, and processing of all images must all be appropriate to provide a diagnostically acceptable image. Guidance on radiographic positioning is available in the Training Support Documentation.
4. Radiographs that are correctly positioned but of poor exposure or with other technical defects sufficient to impair diagnostic assessment will not be approved.
5. Radiographic images including digitised images of radiographic films may only be electronically processed to adjust their brightness, contrast and/or gamma, and in such a manner that the whole image is processed evenly. Any evidence that suggests images have been electronically enhanced or modified in any other way will lead to their rejection.
6. Anaesthesia of live animals must not be prolonged beyond the stage of having obtained diagnostic radiographs in order to obtain additional and/or better images for submission to the College*. It is therefore acceptable to obtain radiographic sets using an intact cadaver, providing it has been prepared to simulate a normally anaesthetised animal, including having an endotracheal tube placed.
(To prolong anaesthesia for the purpose of this exercise is unethical and in some countries illegal. As such, doing so would disbar an applicant from admission to the college. Use of a cadaver eliminates the ethical issues in cases where it has not been possible to obtain an appropriate set for submission during normal clinical work.)*
7. Radiograph sets should be laid out neatly as mounted sets. Guidance on this is provided below and in the Trainee Support Documentation.
8. Sets of radiographs should only be labelled with the minimum required detail, i.e.:
 - a. The set title (eg. "Canine Dental Radiograph Set", "Feline TMJ Radiograph Set").
 - b. The date the set was obtained in numeric format (eg. 2012-02-08 or 8/2/12).
 - c. For dental radiograph sets, the modified Triadan identity of the tooth/teeth that can be assessed on each image.
 - d. The use of extra-oral positioning for a dental radiograph ("e/o" or "E/O").
 - e. The particular root or roots to be assessed on a particular image ("m"=mesial, "d"= distal, "p"=palatal).
 - f. For TMJ radiograph sets, left and right markers placed in the x-ray beam at the time of exposure and for the lateral views the word "Left" or "Right" to indicate which film is presented for which joint.

See the Trainee Support Documentation for guidance on positioning.
9. The assessors may request clarification or additional information when reviewing a radiograph set before making a decision.
10. The original images used to produce radiograph documents must remain available as they will be required to be submitted for verification of a proportion of submitted radiograph documents. If these cannot be produced when requested the set will not be accepted.

Dental Radiographic Set Requirements

1. Dental radiograph sets must show the entire dentition of the animal.
2. For each tooth, the entire crown, all root structure and sufficient surrounding tissue (at least 3 mm of the tissues adjacent to each root) must be clearly shown on at least one of the submitted images.
 - a. Where there is superimposition of other structures over part of the primary image, a second radiograph of the relevant part of the tooth may be submitted to show that area clearly.
 - b. Note that to fulfil the requirement of having a whole tooth appropriately imaged in a single view requires the use of suitably sized film when imaging larger teeth. Size 2 film and sensors are not suitable for imaging large canine and carnassial teeth.
3. Whenever possible, several adjacent teeth should appear on each image. It is strongly advised to minimise the number of exposures/images required. This is good radiographic practice and it simplifies both document production and assessment.
4. Imaging of all roots in multirooted teeth may require more than one radiographic view of that tooth. Such additional images will not be penalised if only part of a tooth is visible, but there must be the appropriate 3 mm minimum visible adjacent tissue.
 - a. It is accepted that clear imaging of all roots of maxillary molar teeth is not always possible.
5. If multiple views are submitted it is important that the additional image/s is/are clearly labelled with the Modified Triadan identification of the tooth and root to be assessed. *See General Requirements section 8 for advice on image labelling.*
6. Normal dental radiograph sets consists of 10 to 14 images.
7. Required radiographic views:
 - a. Rostro-caudal bisecting angle view of the maxillary incisor teeth incorporating the full length of both maxillary canine teeth (a 3mm area beyond tooth structure is not required for the canine teeth in this view). The canine teeth must be present but will not be assessed in this view.
 - b. Right lateral bisecting angle view of the maxillary canine tooth (and adjacent premolars).
 - i. A slightly oblique view is acceptable if necessary to avoid anatomical superimposition over the root apex.
 - c. Right lateral bisecting angle view/s of the maxillary premolars and molars not already included in the canine tooth view.
 - d. Additional view/s for imaging individual roots of the maxillary fourth premolar.
 - e. Left lateral bisecting angle view of the maxillary canine tooth (and adjacent premolars).
 - i. A slightly oblique view is acceptable if necessary to avoid anatomical superimposition over the root apex.
 - f. Left lateral bisecting angle view of the maxillary premolars and molars not included in the canine tooth view.
 - g. Additional view/s for imaging individual roots of maxillary fourth premolar.
 - h. Rostro-caudal bisecting angle (near occlusal) view of the mandibular incisor teeth, incorporating both mandibular canine teeth. The canine teeth must be present and will be assessed in this view.
 - i. Left lateral bisecting angle view of the mandibular canine (and adjacent premolars).
 - i. A slightly oblique view is acceptable if necessary to avoid anatomical superimposition over the root apex.
 - j. Additional view of the rostral premolars if not clearly imaged on the canine view.
 - k. Left lateral parallel view of the caudal mandibular premolars and the molars.
 - l. Right lateral bisecting angle view of the mandibular canine (and adjacent premolars).
 - i. A slightly oblique view is acceptable if necessary to avoid anatomical superimposition over the root apex.

- m. Additional view/s of the rostral premolars if not clearly imaged on the canine view.
 - n. Right lateral parallel view of the caudal mandibular premolars and the molars.
8. The radiographs are to be mounted using labial mounting.
- a. The maxillary teeth are to have the roots facing upwards and the crown downwards.
 - b. The reverse applies for the mandibular teeth.

See the Trainee Support Documentation for further guidance.

Temporomandibular Joint (TMJ) Radiograph Set Requirements

Whilst cross sectional imaging methods such as CT scanning often provide superior imaging of the temporomandibular joints, conventional radiography remains an important diagnostic method that is more widely available and more likely to be within many clients' financial means. Therefore, demonstration of the ability to obtain diagnostic sets of TMJ radiographs is a requirement of applicants to the EVDC.

1. TMJ radiographs must show all bony structures that form the left and right joints, including:
 - a. The condylar process of the mandible.
 - b. The mandibular fossa.
 - c. The retro-articular process of the temporal bone.
2. It must be possible to clearly see the TMJ on all views.
3. A set of TMJ radiographs consists of:
 - a. A dorsoventral (or ventrodorsal) view.
 - b. A right lateral oblique view.
 - c. A left lateral oblique view.

See the Trainee Support Documentation for guidance on positioning for these views.

4. Radiopaque Left and Right markers must be included within all the radiographic images to indicate which side is which.
5. The radiographs are to be mounted using conventional surgical layout.
 - a. A v/d or d/v view: nose towards the top of the document with the patient's right at the left of the image.
 - b. Both lateral views: facing to the left and the top of the head towards the top of the document (to permit direct comparison of the joints).
 - c. Lateral views must be externally labelled ("Left" or "Right") to indicate which joint is to be assessed in which image.

See the Trainee Support Documentation for further guidance.

Submission, Assessment and Reporting

Submission

1. Radiograph sets are to be submitted on-line using the EVDC Training Management System (TMS).
 - a. Anonymous radiograph documents may be submitted at any time during a Resident's training programme. These will be assessed at the latest following the next anonymous document submission deadline (see below).
 - b. Applicants who have not had radiographs pre-approved should NOT submit them anonymously. They should be included along with other credentials documentation. The whole credentials package will be assessed following the next credentials submission deadline.
 - c. If an applicant/resident/trainee has difficulties using the on-line upload system they should contact the EVDC Secretary or a designated member of Training Support for assistance.
2. Assessment of anonymous radiograph sets will be performed at regular intervals.
 - a. Assessments will be performed at least 3 times each year.
 - i. Any submitted radiograph sets not already assessed by a designated submission deadline will be assessed then.
 - b. Assessment results will be entered in the resident/trainee's TMS record as soon as they are available. This makes the information available to the Resident and their supervisor.
 - c. If a submission is rejected, a brief outline of the reason/s will be entered in the TMS record. Should further clarification be necessary, a Resident may request this by contacting the EVDC Secretary.
 - d. If an assessment result has not appeared in a Resident's TMS records within 2 months of the submission deadline immediately following the submission, they should contact the EVDC Secretary.
3. Radiographic sets submitted for pre-approval will be evaluated anonymously.
 - a. On submission, each radiographic set is automatically assigned a document reference number.
 - b. Residents should ask their supervisor to check the submitted document and if it meets expectations, to set it as "OK" in the TMS system.
 - c. If the supervisor is not available, the task can be performed on their behalf by the EVDC Secretary or a member of Training Support appointed to deputise for the supervisor.
 - d. If the supervisor (or their deputy) is not happy with the document they will inform the applicant/resident/trainee so that the document can be suitably amended and re-submitted or replaced with a new one.
 - e. When an anonymous document is set as "OK" by the supervisor, the system locks the document so that it is no-longer possible to change it and the system notifies the Secretary that it has been submitted. Even so, applicant/resident/trainee's are recommended to notify the secretary of the upload as soon as their supervisor has OK'ed it.
 - f. The secretary will screen the document for any obvious breach of anonymity. If there is a problem the lock will be removed and the Resident will receive an automated email with a brief explanation. The document should then be suitably amended and re-submitted or replaced with a new one which needs to be checked again by the Resident's supervisor.
 - g. If the Secretary is satisfied, the document is made available to the Credentials Committee who are notified of the document's availability.
4. On being made available to them, the Credentials Committee can only identify the document by its identity number. There is no information provided about who submitted it; however anonymity may not be complete due to different residents using various:
 - a. Radiographic methods.
 - b. Types of film or digital system.
 - c. Layout styles.

See the Trainee Support Documentation for document templates that will minimise layout related differences.

5. The CC may, at its discretion; request clarification from the applicant/resident/trainee if there are specific minor issues that would otherwise prevent approval of a radiograph set. In this case a final decision will be withheld until a response has been received from the Resident. In the case of anonymous submissions the response must be sent via the Secretary.
6. Occasionally an applicant/resident/trainee may be required to supply the original images used when creating the submitted radiograph set. In this situation, if these images cannot be produced promptly the submission is likely to be rejected.
7. Residents will normally be notified of acceptance or rejection of radiograph sets within two months of the first submission deadline date following submission. If they have been rejected a brief outline of the reasons will be supplied as a guide in preparing a new radiograph set.
8. Resubmission of a rejected radiographic set is not permitted.

Rebuttal and Appeal

Rebuttal

Following receipt of a non-approval decision, the applicant/resident/trainee may submit a rebuttal to the EVDC Secretary for forwarding to the CC. A rebuttal must:

1. Be submitted within 30 days of a notification of a non-approval decision.
2. Include an explanation of why the applicant considers each of the reasons listed by the CC to be inappropriate.

A rebuttal is not considered to be an appeal and it is sent to the members of the CC so that they can reconsider their decision. The decision on the rebuttal will be made as for any other item submitted to the CC and notified to the applicant/resident/trainee within 30 days.

Appeal

If the rebuttal does not result in approval of the item, the applicant has the right to request that the rebuttal is considered as an appeal of an adverse decision. The appeal must be lodged either within the permitted time limit detailed in the Constitution and Bylaws, or within 7 days of notification of the rebuttal decision, whichever is the later date. The appropriate administration fee (*details of current fees are available on the EVDC web site*) must be paid to the College before the appeal will be considered.

An appeal will be handled according to EVDC appeals procedures as detailed in the Constitution and Bylaws.

An appeal may be lodged at any time within the permitted time limit detailed in the Constitution and Bylaws without first submitting a rebuttal.

Evaluation of a Dental Radiograph Set

Each radiograph set is assessed individually by at least three members of the Credentials Committee. If there is significant disagreement in results between the assessors then the other members of the committee will also assess the set before a decision is made.

The assessment is performed by viewing the submitted document on a computer screen using a standard PDF viewer (ideally the then current version of the free Adobe Reader). The document may be viewed at magnifications of up to 400% in order to answer the questions set out below. [The notes in blue are for guidance.](#)

What is the document identity number :

What species is the set from? :

- 1. Are all the included radiographic images of diagnostic quality?** Y / N
 - a. Correct exposure
 - i.* There should be structural detail of both radiodense (enamel/dentine) and radiolucent (lip/palate/gingiva) structures.
 - ii.* Images that are overall very dark or light indicate exposure or processing errors.
 - b. Appropriate processing (contrast, definition, lack of artefacts)?
 - i.* Initial chemical or digital processing should produce good, clear images.
 - ii.* The brightness, contrast and gamma of each digital image (digital radiograph or scanned/photographed film image) should have been adjusted to give maximum clarity.
 - iii.* It should be possible to identify fine structures such as periodontal ligament spaces, fine trabecular bone patterns etc.
 - iv.* There should be very few, if any, significant artefacts on the images with none that affect image interpretation or mask important details. Minor scratches or processing marks at the edges of films will be ignored.

- 2. Are the radiographs mounted neatly in labial presentation?** Y / N
 - a. Inherent film/sensor corner markers should be consistent for all intra-oral views.
 - b. Inherent film/sensor corner markers should be consistent for all extra-oral views and reversed compared to those on intra-oral views.
 - c. The teeth should be correctly labelled
 - d. The tooth images should be close to life size when viewed at 100% scale (zoom) on a correctly set-up monitor.
 - e. The images of the teeth should be consistent in scale between different images, allowing for variations in radiographic techniques used to obtain them.

- 3. Are all the expected teeth clearly visible?** Y / N
 - a. A complete permanent dentition is expected, however, absence of the maxillary molar teeth and up to 2 incisors is acceptable in the cat and in the dog it is acceptable for the mandibular third molar teeth and up to two (first, second or third) premolar teeth to be radiographically absent.
 - b. Is the entirety of each expected tooth (crowns and all roots) clearly visible?
 - i.* It must be possible to see the whole tooth in at least one image.
 - ii.* Additional views may be used to view individual parts of a tooth, eg. root apices where they are superimposed on other roots in the whole tooth view.

4. Is there an anatomically accurate image of each tooth?

Y / N

- a. Beam angulation and film positioning should produce tooth images that are:
 - i. Not significantly foreshortened or elongated.
 - ii. Not significantly overlapping adjacent teeth, and if there is overlap on a standard view, a second view should be provided to show the affected area without significant overlap.
 - iii. Not superimposed by images of the opposing dentition.
- b. Beam angulation and film positioning should produce an anatomically accurate image of each root?
 - i. Each root must be seen in correct angulation in at least one image.

5. Is there adequate isolation of all roots with 3 mm space all the way around them?

Y / N

- a. Each root is to be sufficiently isolated on at least one radiograph.
 - i. Root separation must be sufficient to be expected to detect early periapical changes if they were present on just one root.
 - ii. There must be at least 3 mm of imaged tissue around each root on at least one view of that tooth.
 - iii. Leeway is allowed on the requirement of isolating individual roots of the maxillary molar teeth in dogs because the anatomy sometimes does not permit isolation.

Assessor's Result for Document Id. Number :

- All questions were answered "Y", recommending approval
- Clarification is required, not all questions can be answered
- One or more question answered "N", recommending failure

What date was this review performed :

Name of reviewer :

Date forwarded to the Chair of the CC :

Credentials Committee Dental Radiograph Set Evaluation Summary for :

Radiograph Set TMS Id. Number :
Species : **Canine / Feline**

- 1) **Are all the included radiographic images of diagnostic quality?** **Y / N**
If no, why not?
- 2) **Are the radiographs mounted neatly in labial presentation?** **Y / N**
If no, why not?
- 3) **Are all the expected teeth clearly visible?** **Y / N**
If no, why not?
- 4) **Is there an anatomically accurate image of each tooth?** **Y / N**
If no, why not?
- 5) **Is there adequate isolation of all roots with 3 mm space all the way around them?** **Y / N**
If no, why not?

Can all the above questions can be answered? **Y / N**

If so ignore this section.

If not:

- The CC chair should request clarification from the submitter by using the TMS document query form.
- Does the response from the submitter permit answering of the above questions? **Y / N**

Are all relevant questions above answered "Y"? **Y / N**

If yes, the CC chair/CC manager should set the document as approved in TMS.

If no, the CC chair/CC manager should copy the text from between the dotted lines above into the document comments section of the document approval form in TMS before setting the document as NOT approved.

CC Chair or CC Manager's Name :

Date assessment completed :

Date result entered into TMS :

Evaluation of a TMJ Radiograph Set

Each radiograph set is assessed individually by at least three members of the Credentials Committee. If there is significant disagreement in results between the assessors then the other members of the committee will also assess the set before a decision is made.

The assessment is performed by viewing the submitted document on a computer screen using a standard PDF viewer (ideally the current version of the free Adobe Reader). The document may be viewed at magnifications of up to 400% in order to answering the questions set out below. [The notes in blue are for guidance.](#)

What is the document identity number :

What species is the set from? :

- 1. Are all the included radiographic images of diagnostic quality?** Y / N
 - a. The images should be correctly exposed.
 - i. There should be structural detail of both radiodense (petrous temporal bone) and radiolucent (soft tissue) structures.
 - ii. Images that are overall very dark or light indicate exposure or processing errors
 - b. The images should be processed appropriately.
 - i. Initial chemical or digital processing should produce good, clear images.
 - ii. All the images should have similar densities and contrast ranges.
 - iii. The brightness, contrast and gamma of each digital image (digital radiograph or scanned/photographed film image) should have been adjusted to give maximum clarity.
 - iv. It should be possible to identify fine trabecular bone patterns
 - v. There should be very few, if any, significant artefacts on the images with none that affect image interpretation or mask important details. Minor scratches or processing marks at the very edges of films will be ignored.

- 2. Are all three required views present, correctly mounted and designated?** Y / N
 - a. A complete TMJ radiographic set must include:
 - i. VD (ventrodorsal) or DV (dorsoventral) view
 - ii. Left lateral oblique view
 - iii. Right lateral oblique view
 - b. Each image must show a radiopaque left and/or right marker and an endotracheal tube that was present at the time of exposure.
 - c. The DV or VD image should be mounted nose up with the patient's right side on the viewer's left (standard surgical viewing technique).
 - d. The lateral oblique views can be mounted individually or with the other images. Both lateral views should be arranged with the nose to the left and the top of the head up, to permit direct comparison of the left and right joints.

- 3. Are the TMJ's clearly visible on all three images?** Y / N
 - a. On the VD or DV view:
 - i. It must be possible to clearly see both TMJ's.
 - ii. There should be near bilateral symmetry (i.e. almost no lateral rotation of the skull). Allowance will be made for possible natural asymmetry.
 - b. On both lateral oblique views:
 - i. The appropriate TMJ must be suitably isolated from other structures.
 - ii. The condylar process of the mandible must be clearly shown.
 - iii. The mandibular fossa must be clearly shown.
 - iv. The retro-articular process of the temporal bone must be clearly shown.
 - c. The two lateral oblique views should be sufficiently close to being identical images to permit easy comparison of the anatomy on the two sides.

Assessor's Result for Document Id. Number :

- All questions were answered "Y", recommending approval
- Clarification is required, not all questions can be answered
- One or more question answered "N", recommending failure

Name of reviewer :

Date this review performed : Date forwarded to Chair of CC :

Credentials Committee TMJ Radiograph Set Evaluation Summary for :

Radiograph Set TMS Id. Number :
Species : **Canine / Feline**

- 1) **Are all the included radiographic images of diagnostic quality?** **Y / N**
If no, why not?
- 2) **Are all three required views present, correctly mounted and designated?** **Y / N**
If no, why not?
- 3) **Are the TMJ's clearly visible on all three images?** **Y / N**
If no, why not?

Can all the above questions can be answered? **Y / N**

If so ignore this section.

If not:

- The CC chair should request clarification from the submitter by using the TMS document query form.
- Does the response from the submitter permit answering of the above questions? **Y / N**

Are all relevant questions above answered "Y"? **Y / N**

If yes, the CC chair/CC manager should set the document as approved in TMS.

If no, the CC chair/CC manager should copy the text from between the dotted lines above into the document comments section of the document approval form in TMS before setting the document as NOT approved.

CC Chair or CC Manager's Name :

Date assessment completed :

Date result entered into TMS :