

Certificate in Advanced Veterinary Practice
C-VDI.3 Small Animal Diagnostic Imaging
(Soft Tissue)

Module Outline



Module Leader:

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Enrolment guidance

The aim of the module is to enable you to extend and consolidate clinical knowledge and skills gained at undergraduate level, and to develop an in-depth understanding of the application of that knowledge in a practice environment in relation to Veterinary Diagnostic Imaging.

Before embarking on this module, you should fulfil the following criteria:

- a) You ideally should have completed module B-SAP.1.
- b) If you have completed a B Practice module at another institution, you may submit one imaging report for feedback by RVC assessors.
- c) If you are only enrolling for the VDI C modules with RVC, it is highly recommended that you write one DI report from your relevant B Practice module and this will be reviewed by the assessors prior to assessment of any C module work.

Coverage of this module may be integrated with others, particularly other B and C modules. You will normally have completed A-FAVP.1 Foundations in Advanced Veterinary Practice module and at least one of the practice B modules, before undertaking a C module, although you can choose to work through modules in a different order if you wish. In whichever order modules are tackled, compliance with best practice for all the topics covered by module A-FAVP.1 will be expected whenever these are appropriate in C modules. For example, awareness of, and compliance with, all relevant legislation, welfare and ethical principles will be required throughout.

You are advised to plan a structured programme of continuing professional development to help you achieve your objectives. Involvement in 'learning sets' and networks of other candidates working towards the same or similar modules is encouraged; this could be initiated by the candidates themselves via RVC Learn. The RCVS considers that candidates will need advisers/mentors to support them through the programme. You are free to choose your own advisers/mentors and the RCVS guidelines strongly advise you to seek advice from your mentor regarding 'seeing practice' with specialist surgeons.

The module is focused on taking images (radiography) rather than interpreting images (radiology), which is the concern of the other Veterinary Diagnostic Imaging C modules. You should develop the practical skills that allow appropriate case selection for imaging studies,

ensure the taking of diagnostic radiographs, while complying with the relevant legal requirements for safe radiographic practice.

For a designated Certificate in Advanced Veterinary Practice (Veterinary Diagnostic Imaging) you must complete this module, module C-VDI.1, one further C-VDI module, a fourth 10 credit module of your choice and an RCVS synoptic assessment.

Learning outcomes

This module relates to soft tissue problems affecting the digestive, cardiovascular, respiratory and urogenital systems, and other organs in the thorax and abdomen.

The aim of this module is to enable the you to extend and consolidate clinical knowledge and skills gained at undergraduate level, and to develop an in-depth understanding of the application of that knowledge in a practice environment in relation to Veterinary Diagnostic Imaging.

You should demonstrate:

- a knowledge of the radiographic features relating to the more commonly encountered clinical conditions seen in veterinary practice relevant to this module
- a knowledge of normal radiographic anatomy of the dog and cat relevant to this module
- a recognition of the effects of poor radiographic procedure and poor film processing on a radiograph
- an understanding of the principles of radiological physics and interpretation
- an understanding of the principles of diagnostic ultrasonography
- an understanding of the general principles of contrast radiography

Content

At the end of the module, you should be able to:

- Use an x-ray machine to produce optimal quality radiographs for the diagnosis of soft tissue conditions described in the commentary
- Recognise faults and deficiencies in radiographic procedure and describe corrective measures
- Recognise and describe normal radiographic anatomy of the organ systems described in this module. You should possess a detailed knowledge of the normal

radiographic anatomy of the dog and cat and of their variations with breed and age. In other species a knowledge compatible with current use would be expected.

- Recognise and describe the radiographic appearance of disease affecting the organ systems described in this module, and where appropriate, list the differential diagnoses that should be considered
- Interpret and produce written reports of imaging examinations suitable for the requirements of this module

Apply the principles of radiological interpretation

- recognition of tissue types
- formation of shadowgraphs
- effects of superimposition and multiple shadows
- changes in opacity, size, shape, position and function of organs
- the use of simple positional and contrast aids to elucidate radiographic problems
- the applications of these basic principles to the evaluation of radiological signs in relation to soft tissue problems in small animals

Understand the principles of diagnostic ultrasonography in veterinary practice

- physical principles of ultrasound
- image production
- display modes
- artefacts
- normal ultrasound appearance of major organs (heart, liver, kidney, spleen, bladder, prostate and uterus)
- recognition of major alterations to the normal architecture of these organs and the possible diagnostic significance of these changes

Special techniques

You should be familiar with the general principles of contrast examinations and the performance and interpretation of the more commonly used techniques. You should understand the principles and appropriate use of fluoroscopy with image intensification. You should understand the basic principles and appropriate use of diagnostic ultrasonography in veterinary practice

Commentary on the content

Interpretation applies to the diagnostic radiological features of the more commonly encountered clinical conditions seen in veterinary practice. You should be able to form a differential diagnosis based on these features:

Digestive system

- Common abnormalities affecting the teeth, pharynx, oesophagus and gastrointestinal tract
- Obstructive lesions and functions disturbances
- The significance of gas shadows
- The use of contrast media

Abdomen

- Recognition of changes in outline, position and opacity of organs
- Abdominal masses and displacements caused by them
- The presence of free gas or fluid

Urogenital System

- Common abnormalities affecting the kidneys, ureters, bladder, urethra, male and female genital organs
- The use of radiology and ultrasound in pregnancy diagnosis
- Intravenous urography, retrograde, cystography and urethrography (positive and negative)

Cardiovascular System

- Common abnormalities affecting the heart and blood vessels and evidence of cardiovascular disease which may be recognised on plain films
- The principles of cardiac catheterisation and angiocardiology

Respiratory System

- Common abnormalities affecting the nasal cavity, sinuses, hyoid apparatus, larynx, trachea, thoracic wall, pleural cavity, mediastinum, diaphragm and lungs
- Pulmonary patterns

Soft Tissue

- Trauma
- Foreign bodies
- Sinuses
- Calcification
- The use of contrast media

Assessment

- A single case report of up to 2,500 words in length (this may be eligible to receive formative feedback prior to marking).
- A formal examination paper consisting of Multiple Choice Questions (MCQs) and Extended Matching Questions (EMQs).
 - Section A (30 minutes) - 20 MCQs on x-ray physics, equipment (including film-screen and computed/digital radiography) and radiation safety. Section A is only sat once for both C-VDI.2 and C-VDI.3.
 - Section B (30 minutes) – 20 MCQs on contrast media, contrast radiographic studies, ultrasound principles and applications.
- 2 hour film reading exam to include 8 cases for radiograph interpretation, 2 individual examples of film faults and 2 radiographs to test anatomy.

Assessment weighting

1 x Case Report	2,500 words	33%
1 x Practical/Written Exam	Exam of up to three hours	67%

Annual assessment timetable

1st March	If you are submitting work for assessment and plan to sit the exam in the current year, please inform CertAVP team by 1 st March.
1st April	You are given the opportunity to have one case report reviewed for either this module or C-VDI.2. It is recommended that the review be submitted for the first module you tackle. Please submit your report by this date if you haven't already had a review.
18th May	Case report feedback returned to you
Early July	Case report to be submitted on/by the date of the exam, exam date tbc
Early September	You will be notified of your case report result with accompanying feedback, and your exam result

Learning support

Learning support is provided to aid self-directed learning and to provide easy access to published articles. You will be given a username and password which will allow you to log on to 4 different systems:

- **RVC Learn (<http://learn.rvc.ac.uk/>)**

- Imaging articles
- Sample reports
- Access to presentations from the CertAVP Induction Day
- Discussion boards between other candidates enrolled on the module and with VDI tutors
- Guidelines for mentors
- Access to SCOUT, RVC's solution for the discovery and delivery of resources including books, ebooks, journal articles and digital objects, all in one single search. Log in to SCOUT using your RVC username and password to save items on your eshelf. If you are able to use the library in person, you can borrow a book for one week with photo ID. IT and Library support is available for this facility (email library@rvc.ac.uk or helpdesk@rvc.ac.uk).

- **RVC Intranet (<https://intranet.rvc.ac.uk>)**

Access to all information available to all RVC students and employees, for example, news, events, policies, committees, services, Library, IT helpdesk, etc.

- **Athens (<http://www.openathens.net/>)**

A huge amount of any library's information is now available online, e.g. electronic journals, e-books and databases. 'Athens' is a system used by UK universities for controlling access to these type of online services and with your username and password, you can access many of a library's online databases, electronic journals and e-books seamlessly.

- **Email (<http://mail.rvc.ac.uk>)**

You are given an RVC email address, which is **compulsory** to use for CertAVP communication and submission of work.

Guidance on writing the case report

This case should be selected by you to demonstrate your ability to use the diagnostic imaging competences that have been acquired to cope with a challenging situation, rather than necessarily using classic “textbook cases” of particular conditions. The case should be selected from the caseload seen by you while enrolled on the CertAVP. It should be presented “editor-ready” in a format appropriate to one of the main veterinary journals. Illustrations should be in a digital format and demonstrate the important features of the case. The original radiographs (or DICOM-format images where digital radiography is used) should accompany the case report.

Previous submissions have occasionally failed because of failure to demonstrate the desired level of knowledge and understanding of the learning objectives. Although diploma-level detail is not expected, it is anticipated that to reach the required level to pass, you will have needed to attend some advanced level diagnostic imaging CPD, spent some time with a specialist in diagnostic imaging, or spent the suggested learning hours reading relevant textbooks and scientific literature at an advanced level.

Note that the case selected does not need to represent ideal or perfect management, and frequently well-written reports highlight where things went wrong or how they could have been done differently. You are in no way disadvantaged because of lack of availability of advanced equipment; you are supposed to make good use of low power portable or mobile machines if that is what you have at your disposal. However, discussion of how management could be improved if alternative equipment was available or if costs allowed may provide a valuable component of the case report. If included, this should be explained in the context of how it would be helpful, rather than merely listing all the additional equipment/drugs that would be used in a different setting.

The report (excluding Patient Identification) should follow the following outline:

- Brief summary including signalment
- Introduction: Why is this case interesting to you?
- History and clinical examination
- Diagnostic Imaging methods and Radiography: Description of the equipment used, method of chemical restraint, views obtained, critique of technique (positioning, exposure, centering, processing, collimation, artefacts/faults, safety factors)
- Radiological interpretation

- List of problems identified on the radiographs
- Differential diagnoses for such findings in order of likelihood and explanation why
- Further imaging studies implemented and interpretation
- Further studies recommended

The factors that help to produce a good case report include:

- Keeping it simple when selecting the case
- An adequate series of radiographs to assess the region of interest
- Good quality radiography: radiographs should be well positioned, well centred, correct exposures, and show good attention to processing
- Good inspiratory thoracic radiographs where appropriate
- Appropriate radiographic criticism, however, repeated instances of poor radiography, even when correctly criticised, would not be considered appropriate for a good casebook, as it would be expected that these errors would be corrected over time as you gain experience
- The use of accepted radiological terminology where appropriate
- A differential diagnosis list that is appropriate to the particular case after consideration of history, clinical findings and imaging findings
- A justification of the differential diagnosis list that is brief and pertinent to that case

The factors that would contribute to producing a poor casebook include:

- Failure to follow the required format outlined above
- Exceeding the word limit
- An inadequate series of radiographs to assess the region(s) of interest
- Misinterpretation of radiographic errors and faults, and deciding that they represent disease
- Not identifying significant lesions
- Inadequate radiographic description of changes seen
- Poor patient preparation (e.g. faeces-filled colon when performing a urinary contrast procedure)
- Gloved or ungloved fingers in the primary beam (results in a failure of the report)
- Inappropriate differential diagnosis list, particularly if this led to inappropriate further investigations or inappropriate treatment options; regurgitation of a textbook list that has not been individualized to the case should be resisted
- Positioning and/or processing faults unrecognised and therefore uncorrected
- Discussing radiographs that were not included in the films submitted with the report

References:

- These should be properly cited in the text, in accordance with the style in the Journal of Small Animal Practice (JSAP). Avoided listing references that were not cited in the text or vice versa.
- We recommend using Harvard referencing as described by the Anglia-Ruskin University (<http://libweb.anglia.ac.uk/referencing/harvard.htm>).
- You will find it very helpful to use a program such as Endnote® or Reference manager® to organise your references.

Appendices:

- You may include appendices but please note that the examiners are not obliged to read them (so please do not include essential case information).
- The original radiographs (or DICOM-format images where digital radiography is used) should accompany the report.
- Laboratory reports may be included here but all abnormalities need to be written in the text and reference ranges must be included. It is acceptable to scan printed reports rather than re-type them if you prefer, but any case details or details of your name or practice must be blanked out.

Instructions for submitting work

Each piece of work you submit must be anonymous and emailed to certavp@rvc.ac.uk.
Dropbox may be used for large images, contact the CertAVP office for account details.

Please save and name your report like this:

CVDI3 student number – Case report review

CVDI3 student number – Case report

Please ensure that the beginning of your document includes:

1. your student number
2. module name
3. title
4. word count (excluding the above, tables, photo titles and references)

Tables, figure legends, appendices and reference list are NOT included in the word count. The report title and titles within the report ARE included. You should not put important information, such as the physical examination, in to a table to avoid the word count; only numerical data should appear within a table (such as laboratory results). In the interests of fairness to all candidates the word count is adhered to strictly and reports that exceed it will be returned unmarked.

All written work submitted to the Royal Veterinary College is passed through plagiarism detection software. Work submitted for this module should not have been submitted for any other courses at RVC or other institutions.

Suggested reading

The following list is given as a guide as to where to start and for this reason cannot be considered 'complete'. We also don't expect you to read texts from cover to cover or to use all of the texts listed, however we do recommend you make use of the most recent edition of textbooks where available. We apologise if you feel a particular favourite is missing - feel free to use the Learn discussion board to pass on additional suggestions to other candidates.

Small Animal:

- Coulson A, Lewis N. An Atlas of Interpretive Radiographic Anatomy of the Dog and Cat; Blackwell Scientific Publications, Oxford. 2008.
- Thrall DE (Ed). Textbook of Veterinary Diagnostic Radiology. WB Saunders Co, Philadelphia. 2018.
- Kealy K & McAllister H. Diagnostic Radiology and Ultrasonography of the Dog and Cat; WB Saunders & Co. 2010.
- Schwarz T, Johnson V (Eds). BSAVA Manual of Canine and feline thoracic imaging. Cheltenham: BSAVA Publications. 2008.
- O'Brien R, Barr FJ (Eds). BSAVA Manual of Canine and feline abdominal imaging. Cheltenham: BSAVA Publications. 2009.

Radiography and Physics:

- Douglas SW, Williamson HD & Herrtage M. Principles of Veterinary Radiography; Bailliere Tindall, London. 1987.
- Ticer JW. Radiographic Technique in Veterinary Practice. WB Saunders Co, Philadelphia. 1984.

Journals:

Relevant imaging articles and case reports in the previous 5 years of:

- Journal of Small Animal Practice
- In Practice
- Veterinary Radiology and Ultrasound *

* *Veterinary Radiology and Ultrasound* provides a comprehensive range of imaging articles much of which is beyond the scope of the modular assessment. However, you should be familiar with those articles relevant to the learning objectives set out in each module.