Veterinary Parasitology

2 year experience

2010
Optional / 24-7 access to resources
Weekly info / emphasis during lectures
Slides with narratives

No quizzes
Students did not take notice (looked >> forgotten about it)

2011
Optional / 24-7 access to resources
Weekly info / emphasis during lectures
Slides with narratives

Quizzes with “large proportion” of slides
Students took notice (looked >> kept looking >> asked for more)

Outcome: If you use the slides you need to invest time to develop “quiz” that would allow student to feel confident that he/she improved her learning and effectively her/his mark.

.................................................. Slides without quiz are not worth it. ..................................................
<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="folder" alt="Home" /></td>
<td><strong>Home</strong></td>
<td>This is an introductory practical Virtual Microscopy module. You will have few examples of parasite groups there. Observe and use your textbook to learn about the specimens. Note that these preparations will be presented in practicals and thus may be seen again during the practical examination. Here you should get used to using this tool and recognise that observing parasites will help you to learn how they live, eat... etc. Do not forget to measure them, ask yourself - <em>can I see it with a naked eye</em>? or <em>do I need a microscope</em>? Size is an important attribute of parasites.</td>
</tr>
<tr>
<td><img src="folder" alt="Practical 1" /></td>
<td><strong>Practical 1</strong></td>
<td>Exercise to teach you morphology and identification of common fleas on dogs and cats, but humans as well. Observe under low or intermediate magnification to recognise the parasites. At the end you should be able to recognise and identify the most common fleas on dogs and cats that in fact will be found on humans (you) as well as possibly any animal in the backyard.</td>
</tr>
<tr>
<td><img src="folder" alt="Taxonomy" /></td>
<td><strong>Taxonomy exercise - Australian fleas</strong></td>
<td>This module will cover nematodes of dogs and cats. It will illustrate the parasites that were covered in lectures and practical. In this practical review the basic questions about these parasites. Answers to these questions will form the foundation supporting your arguments towards your recommended control measures. Use textbook to review these parasites.</td>
</tr>
<tr>
<td><img src="folder" alt="Practical 2" /></td>
<td><strong>Practical 2</strong></td>
<td>This exercise has quizzes included that will support your learning. You should complete them once you have reviewed the above information and the included images. This module will cover nematodes of ruminants. It will illustrate the most devastating</td>
</tr>
</tbody>
</table>
This worm is called “Whip Worms”: Trichuris vulpis

- At low power

By looking at the worm what do you see? You should orientate yourselves and note where the head and the tail ends is. The common name for these worms is “whip worms” coined because the anterior part of the body is longer and slender, and the posterior part is much thicker. The genus name itself Trichuris is in fact an error, because it literally means “hair-tail”. But you can see that the tail is fat and contrary to its name worm is “hair-head”.

Further looking at the worm you should decide on its sex. The posterior end of males is always curved. You are trying to identify copulatory apparatus of males or uterus with eggs of a female.

- At high power

Focus on the tail pointed tail and notice one spicule surrounded by a protrusible sheath which is armed with cuticular spines. Try to measure the size of the spicule and observe if there are any spines on the sheath.

- At low magnification of the histological section

Trichuris vulpis occurs in cæcum and other parts of the intestine of the dog and fox. Notice the cross section of several worms and the typical trichuris egg in the uterus of females (in soem you can identify the pedicles). The eggs are already in the intestinal content, a faeile can produce thousands each day for about a year.

Worms are usually 45-75 mm long and 3/4 of their body length is made up by the anterior part. The spicule is 9-11 mm long and the sheath bears small spines only on the proximal portion.
<table>
<thead>
<tr>
<th>Question</th>
<th>My Answer</th>
<th>Gold Standard</th>
<th>Statistics</th>
<th>Graph</th>
<th>Group Ans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the common name of Trichuris vulpis?</td>
<td>dog whipworm</td>
<td>dog whipworm</td>
<td>dog whipworm - 100% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the size of dog whipworm?</td>
<td>4-8 cm</td>
<td>4-8 cm</td>
<td>4-8 cm - 80% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What type of migration do dog whipworms undergo in dogs?</td>
<td>none</td>
<td>none</td>
<td>none - 95.83% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In what GIT part would you find the whipworm?</td>
<td>caecum</td>
<td>caecum</td>
<td>caecum - 95.83% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How long does such migration last?</td>
<td>there is no migration</td>
<td>there is no migration</td>
<td>there is no migration - 87.5% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the infective stage for dog?</td>
<td>lemmmon shaped egg with larva</td>
<td>lemmmon shaped egg with larva</td>
<td>lemmmon shaped egg with larva - 95.83% (consensus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the prevalence of whipworms based on presence of Trichuris vulpis eggs in adult dogs?</td>
<td>can be high in multidog places</td>
<td>can be high in multidog places</td>
<td>-</td>
<td>Not graphable data</td>
<td></td>
</tr>
<tr>
<td>What is the prevalence of whipworms based on presence of Trichuris vulpis eggs in &lt;3 month old dogs?</td>
<td>minimal</td>
<td>minimal</td>
<td>-</td>
<td>Not graphable data</td>
<td></td>
</tr>
</tbody>
</table>
Digital Slidebox Generated Graph

Question: What is the size of dog whipworm?

Your answer(s) is indicated by red border.

Options:
- a: 0.1-0.5 cm
- b: 10-15 cm
- c: 4-6 cm

User Choices:

a
b
c

Back
Pragmatic “students” approach

Will the use of “Virtual Microscopy” increase my mark?

Easier said than done!

How to do that without unethically not giving access to everyone?

Give access to everyone and let sort themselves on their own. Some will chose to use it some won’t. Then ask them a question in an exam if they used it (hope this is ethically sound). The question is totally voluntary.

Did you use VM-slides to prepare for this test?  YES  NO

Did you use WORMS to prepare for this test?  YES  NO  control

YES / NO / N/A (aka - not telling you)
## Veterinary Parasitology

<table>
<thead>
<tr>
<th>YES</th>
<th>WORMS</th>
<th>VM-slides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52%</td>
<td>70%</td>
</tr>
<tr>
<td>NO</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>N/A</td>
<td>15%</td>
<td>13%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VM/WORMS</th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>+/+</td>
<td>46</td>
<td>43%</td>
</tr>
<tr>
<td>+/-</td>
<td>28</td>
<td>26%</td>
</tr>
<tr>
<td>n.a. / n.a.</td>
<td>14</td>
<td>13%</td>
</tr>
<tr>
<td>-/+</td>
<td>10</td>
<td>9%</td>
</tr>
<tr>
<td>-/-</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>- / n.a.</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>+/ n.a.</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>
Section A – terminology
Section B – identification (VM enabled)
Section C – scenario (WORMS enabled)

Did those that used VM have better overall mark?
YES (p=0.007)

Did those that used VM have better mark for section B?
YES (p=0.001)

How about the WORMS?
NO (p=0.24)
Comments:

“Were very useful especially practice test with the eggs.”

“Needed more!! Especially on eggs but it was very useful.”

“Diagnostic quiz was helpful!! List of worms categorized as important to know & less important would be helpful in the future.”

“Both were very helpful.”

“Kind of (had no answers so wasn’t as useful as it could have been)”
Traditional microscopy instruction versus process-oriented virtual microscopy instruction: a naturalistic experiment with control group

Laura Helle, Markus Nivala, Pauliina Kronqvist, Andreas Gegenfurtner, Pasi Björk, Roger Säljö

From The 10th European Congress on Telepathology and 4th International Congress on Virtual Microscopy, Vilnius, Lithuania, 1-3 July 2010

Abstract

Background: Virtual microscopy is being introduced in medical education as an approach for learning how to interpret information in microscopic specimens. It is, however, far from evident how to incorporate its use into existing teaching practice. The aim of the study was to explore the consequences of introducing virtual microscopy tasks into an undergraduate pathology course in an attempt to render the instruction more process-

Results: The students voiced an appreciation for virtual microscopy for the purposes of the course and for self-study. As for learning gains, the results indicated that learning was speeded up in a subgroup of students consisting of conscientious high achievers.

Assignments in addition to attending demonstrations. A control group attended the demonstrations only.

Performance in microscopic pathology was measured by a pre-test and a post-test. Student perceptions of regular instruction and virtual microscopy were collected one month later by administering the Inventory of Intrinsic Motivation and open-ended questions.

Results: The students voiced an appreciation for virtual microscopy for the purposes of the course and for self-study. As for learning gains, the results indicated that learning was speeded up in a subgroup of students consisting of conscientious high achievers.

Conclusions: The enriched instruction model may be suited as such for elective courses following the basic course. However, the instructional model needs further development to be suited for basic courses.
Five years of experience teaching pathology to dental students using the WebMicroscope

Janusz Szymas, Mikael Lundin

From The 10th European Congress on Telepathology and 4th International Congress on Virtual Microscopy
Vilnius, Lithuania, 1-3 July 2010

Abstract

Background: We describe development and evaluation of the user-friendly web based virtual microscopy - WebMicroscope for teaching and learning dental students basic and oral pathology. Traditionally, students microscopes were replaced by computer workstations.

Methods: The transition of the basic and oral pathology courses from light to virtual microscopy has been completed gradually over a five-year period. A pilot study was conducted in academic year 2005/2006 to estimate the feasibility of integrating virtual microscopy into a traditional light microscopy-based pathology course. The entire training set of glass slides was subsequently converted to virtual slides and placed on the WebMicroscope server. Giving access to fully digitized slides on the web with a browser and a viewer plugin, the computer has

Conclusions: An overwhelming majority of our students regarded a possibility of using virtual slides at their convenience as highly desirable. Our students and faculty consider the use of the virtual microscope for the study of basic as well as oral pathology as a significant improvement over the light microscope.
Students:
Students welcome VM
Needs to be blended (2011) not an “add-on” (2010)

Me:
Flexible platform to demonstrate / annotate / narrate parasites
Reusable material
Time investment is worth the reward

Overall:
It has made a significant impact on students outcomes in an interim test
Circumstantial evidence indicates that VM has improved students understanding of parasitology (e.g. diagnostic parasitology, structure/function)