

Course Evaluation of a new Undergraduate Oral Radiology Course

David MacDonald

Odontologisk institutt

e-mail: david.macdonald@odont.uib.no

Introduction and Background.

Radiology is as integral to modern dental clinical practice as is the dental surgeon's own eyes and hands in the examination of the patient and the diagnosis on which his/her treatment plan will be based. As the physical clinical examination must precede the radiological, the clinician is encouraged throughout his/her training to determine if the radiological examination is indicated so as to reduce unnecessary radiation exposure and thereby the risks of radiation induced tumours and fetal damage. The differential diagnosis is the short list of lesions that the clinician is expected to produce having completed each stage of the investigation of the patient's complaint. It is expected that upon completion of each stage, the list becomes steadily shorter until a single diagnosis is reached upon which the patient can be treated or managed in the most appropriate manner. The diagnostic process is set out in Figure 1.

A major problem that students encountered was that the texts and many courses were, and still largely are, based on the pathological classification. Not only is this approach contrary to the diagnostic process set out in Figure 1, but it places undue emphasis on pathology. Figure 2 displays the diagnostic activity on 100000 patients who were registered at Hong Kong Dental Hospital between 1982

and 1992. 98% were successfully diagnosed and treated without recourse to biopsy and pathological investigation. In general dental practice this percentage would rise to 99.9%.

The new course had three elements:-

- a. The handbook.
- b. Decision trees (flowcharts) (Figure 3.)
- c. The seminar slide-shows lectures.

Through earlier experience I was aware that students can vary quite considerably in the way they learn. Therefore, it was my aim to develop a course that would equally advantage all students regardless of their modes of learning. I had been influenced by Tony Buzan's 'mind mapping' concept,¹ which evolved into the present decision trees. The purpose of these trees was to take the student from a central clinical or radiological feature to the desired destination which was then a differential diagnosis. Since then I have begun to take the next step and produce a decision tree which takes the student to a specific or definitive diagnosis as shown in Figure 3.

The assessment of the students' performance in tests and examinations in the traditional method places the onus on the student to master the course material and achieve the course standards. This is rather unfair, particularly if the subject is complex and the time available in the curriculum is limited. Therefore, at least some of that onus should be shifted to the course itself. As I had some experience of questionnaires in research,² I decided to also assess the effectiveness of my course from the students' point of view by questionnaire.

Methods

A fundamental problem of questionnaire studies is the response rate. Many epidemiological journals will not consider a questionnaire study unless it has a response rate of 67% or over. In order to improve response I considered three elements: brevity and conciseness of the questionnaire, time and location of issuing and collecting the questionnaire, and anonymity. I reduced the number of questions to the minimum compatible with my own immediate need, which was to know whether my course was on the right path, namely to reach the overall aim of the course which **“is to encourage the student to generate a reasonable differential diagnosis when faced by common clinical and radiological features.”** I issued my questionnaire at the time of the examination, because that was when I was most likely to have all my students in the same place. It also had a second major advantage in that the completed questionnaire would represent the views of the individual student. The students were compensated for the time expended in filling in the questionnaire by an extra 5 minutes to the examination time. The questionnaire was to be anonymous.

A filled-in copy of the questionnaire is shown in Figure 4. The questionnaire began with a preamble and contained 6 questions of which 5 required the students to ring the appropriate response. The students were invited to comment further on their responses on 2 of these questions. The sixth question was a comment-only question.

The preamble was:- “The radiology course was amended according to the results from the questionnaire submitted to your predecessors. This resulted in a substantial revision of the handbook, which proved to be popular. This was enlarged to cover more chapters and incorporate more decision trees. The seminar/slide show type of lecture was increased in number. **The overall aim of the course is to**

encourage the student to generate a reasonable differential diagnosis when faced by common clinical and radiological features.”

Results

Out of 25 questionnaires issued, 22 were returned, a 88% response rate.

	Yes	No	Don't know
1. Do you think that the aim is being achieved?	95%	0%	5%
2. Do you think that the course has related the radiology well to the clinical presentation?	91%	0%	9%
3. Do you think that the course has related the radiology well to the underlying histopathology?	36%	18%	45%

	Hand-book	Decision Trees	Seminar-slide show lectures	2 parts	All 3 parts
4. Which part of the course contributed most to your understanding of radiology?	23%	14%	45%	14%	5%

Students' Comments were as follows:-

Handbook

“Good detailed account given.”

“Correct amount of detail.”

“It is all-encompassing.”

Decision trees

“Quick and easy to read.”

“Made one think in terms of the differential diagnosis.”

Seminar-slide show lectures

“Connected up clinical knowledge with theory.”

“Group work made me think of points I had not thought of before.”

“Relates clinical knowledge and helps to enhance clinical ability - most useful.”

“More practical.”

“Required me to relate knowledge obtained to radiographic presentation and gave examples of examination type questions.”

“Because this is what we will be faced with in practice.”

Others

“A combination of the handbook and the seminar–slide show type lecture brought it all together.”

“All three used together- it provided a large basis of knowledge and the slides helped put this into practice.”

	Hand- book	Decision Trees	Seminar- slide show lectures	None	Nil comment
5. <i>Which part of the course contributed least to your understanding of radiology?</i>	32%	27%	14%	14%	14%

Students' Comments were as follows:-

Handbook

“..took up too much time discussing histopathology and not radiology.”

“The other two were an easier method of learning.”

Decision trees

“Personally I need to understand what is going on to be able to learn it.”

“Can be difficult to remember.”

“The other two were so good you didn't really need them until a last minute revision.

Seminar-slide show lectures

“Not enough different radiographs/pathology included.”

Others

“None - I found everything contributed to my understanding.”

6. *What improvements do you think can be made?*

59% of students responded

“The exam being more practical i.e. showing X-rays and making diagnosis from them.”

“More slide-shows.”

“Problem-solving tutorials where a group is given a number of radiographs and at the end of a certain time they have to present their diagnosis to you with an explanation of why it is this (or why another).”

“None”

Discussion

1. The very high approvals for Questions 1 and 2 indicate that the course aim was being met.
2. The low approval for Question 3 was not surprising as this is an important if not crucial area which has been given scant attention hitherto in maxillofacial research. The course was initially based on the best general information available namely standard text-books, but is now incorporating findings from 'systematic review' of the literature.
3. The seminar style slide show lectures contributed most to the students' understanding of radiology, which perhaps reflects the immediate needs of the students to pass a practical examination, which in turn was based on the kind of diagnostic problems they would encounter in practice. The comments by the students would confirm this. Furthermore, my style of lecturing particularly to groups of 30 to 50, the standard dental class size, is to invite appropriate comment from the students whenever the occasion presents. It means that difficulties in the subject matter can be cleared up there and then for the students, gives me a feel for the effectiveness of my course as I go along, without awaiting for the examination.
4. Although the manual and decision-trees did less well in both questions 4 and 5 as can be seen from the accompanying comments, this would appear to have been largely relative and therefore a result of the questionnaire design. The words 'most' and 'least' in questions 4 and 5 respectively implicitly demand that one item is selected. This format was selected by me at this time, because at this stage in course development I wanted definite answers as to determine whether I was on the right track. It is interesting to note that in response to question 4, a number of students ignored that demand and nominated 2 or even all 3 parts. This is not contrariness on their part, but reflects their under-

standing that the slide shows were based upon the decision trees and/or manual.

5. At this stage in course development I am confident that the course is on the right track. What is now required is to improve upon each element. This would require a different type of questionnaire. Therefore, I would dispense with questions 4 and 5 and instead present each element in the following manner:

	Very Poor	Poor	Average	Good	Very Good
Handbook	1	2	3	4	5
Decision Trees	1	2	3	4	5
Seminar-slide show lectures	1	2	3	4	5

Nevertheless, I would still invite the students to comment on each area, because a 'very good' or 'very poor' may be awarded by the student for reasons which are very peculiar to that student and therefore far from my own perception of what these terms mean.

6. Another important outcome was that the course had been wholly based in what I had discerned from standard texts and papers while I was training both in pathology and, later, radiology. This has since encouraged me to pursue evidence-based research, encompassing systematic review. This has in itself led to revision of some of these decision-trees, which in turn has altered both the manual and the seminar-slide show.

Conclusions

1. The course aim was being met.
2. Comment resulting in further important steps in course development

References

1. Tony Buzan. Using your head. BBC
2. MacDonald-Jankowski DS., Barrie WJMcK. and Wohlgemuth B. The contribution by medical radiology departments to dental radiology in general dental practice in Scotland. *Dentomaxillofac Radiol* 2000; 29:176-179.

MacDonald©

The Diagnostic Pathway

Pathway in General / Public Practice / Pasientmottak

In the above areas almost all diagnosis leading to treatment is as follows:-

Presenting Complaint
History Taking
Clinical Examination
Differential Diagnosis
Radiology and other tests
Definitive Diagnosis
Treatment

Pathway in Oral Surgery

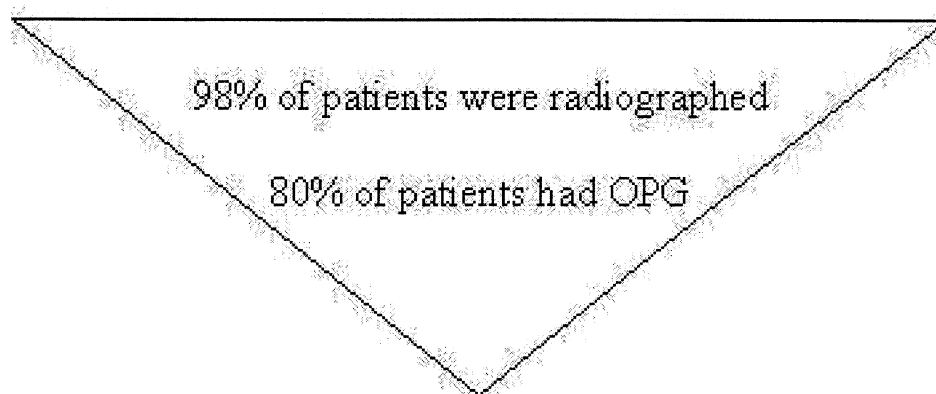
Presenting Complaint
History Taking
Clinical Examination
Differential Diagnosis
Radiology and other tests

Majority of cases	Minority of cases
Definitive Diagnosis	Narrower Differential Diagnosis
	OR
Treatment	Provisional Diagnosis
	Pathology(cytology,biopsy)
	Usually Definitive Diagnosis
	Treatment

FIGURE 2:

Hong Kong Patient Pyramid 1982-1992.

Over 100000 Hospital Numbers (Individual Patients)



Less than 2% of patients had a histopathology report

FIGURE 4:

QUESTIONNAIRE ON THE ORAL RADIOLOGY COURSE

The radiology course was amended according to the results from the questionnaire submitted to your predecessors. This resulted in a substantial revision of the handbook, which proved to be popular. This was enlarged to cover more chapters and incorporate more decision trees. The seminar/ slide show type of lectures were increased in number. **The overall aim of the course is to encourage the student to generate a reasonable differential diagnosis when faced by common clinical and radiological features.**

Please ring the most appropriate response

1. Do you think that this aim is being achieved? Yes / No / Don't know
2. Do you think that the course has related the radiology well to the clinical presentation? Yes / No / Don't know
3. Do you think that the course has related the radiology well to the underlying histopathology? Yes / No / Don't know

4. Which part of the course contributed **most** to your understanding of radiology:-
the handbook / the decision trees / the seminar-slide show type lectures

All 3 used together.
Why? It provided a large basis of knowledge & the slides helped put this into practice.

5. Which part of the course contributed **least** to your understanding of radiology:-
the handbook / the decision trees / the seminar-slide show type lectures

Why? The other two were so good you didn't really need the until a last minute revision.

6. What improvements do you think can be made?

Putting solving tutorials where a group of give a number of radiographs and at the end of a certain time they have to present their diagnosis to you with an explanation of why it is this (or why not).

Thank you for filling in this questionnaire.

David MacDonald
Senior Lecturer in Oral Radiology

