

Evaluation of Undergraduate Orthodontic Courses at the Faculty of Dentistry in King Abdulaziz University

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Abstract. The undergraduate orthodontic courses at the Faculty of Dentistry, King Abdulaziz University are two and a half academic year, starting from the 4th year with an introduction to orthodontics. During the 5th year, students get exposed to different treatment modalities. During the 6th and final year, students are exposed to clinical cases. The aim of this study was to evaluate the content of these courses, teaching techniques, and the importance of teaching orthodontics to the undergraduate students. Nineteen questions were distributed to the graduating class of 2011-12 (40 male and 55 females). The topics covered were: 1) the importance of orthodontic teaching to the undergraduate students, 2) the importance of the laboratory projects, 3) the teaching methods, and 4) the competency of the student after finishing the orthodontic courses. Answers were analyzed according to gender and final grades. Pearson's chi-squared test was used to evaluate significance. There was no significant difference between male and female in all of the 19 questions. When analyzing the data according to the final grades, there were also no significant differences in most of the questions. Most of the graduating students were satisfied with the content of the orthodontic courses.

Keywords: Orthodontic teaching, Orthodontic education, Undergraduate, King Abdulaziz University

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Introduction

Orthodontics is one of the most popular specialties in dentistry^[1]. The content of the undergraduate orthodontic courses in the dental schools is of great importance to qualify students with adequate knowledge to be able to recognize and deal with orthodontic problems appropriately.

The amount of orthodontic information given in the undergraduate curriculum in dental schools was studied by Noble *et al.*^[2] in 2009. They found that 60% of the orthodontic residents in Canada had the right amount of orthodontics exposure in the dental school, while 36% of the residents did not have enough information^[2].

In recent years, there have been an alarming generalized opinion among colleagues in other dental specialties within dental schools that orthodontics is a postgraduate subject, and therefore it should not be taught at an undergraduate level^[3]. Following the publication of the General Dental Council (GDC), *The First Five Years* (FFY), document^[4] in 2001; the second addition of the GDC stated "*all dental students should be able to recognize and describe the developing occlusion and malocclusion and able to make an orthodontic assessment for the purpose of identifying and describing any manifest and developing malocclusion- whilst recognizing the significance, timing and likely outcome of such intervention*"^[5]. Misinterpretation has led to the report being cited as reason to justify further cuts to orthodontic course hours. Orthodontic undergraduate teaching courses are now under further pressure with the proposed increase in the numbers of undergraduate students, and further training programs for dentists with special interest in orthodontics and orthodontic therapists^[4]. The last survey of undergraduate orthodontic teaching carried out in 1997 for the University Teachers Group of the British Orthodontic Society^[2], assessed only the total course hours, lecture, seminar, laboratory and clinical hours, and patient treatment numbers. In view of the radical changes in courses that have taken place in recent years, this survey is no longer up-to-date and lacks on many details of the course contents. A new survey giving current details of the content of each course, the changes that have taken place in the courses over the last three years, and future course developments is clearly needed.

Subsequently, there are no previous studies that evaluated undergraduate orthodontic courses by the students themselves as well as

the overall with their undergraduate program. Therefore, the aim of this study was to assess the dental graduates' perception of the undergraduate orthodontic courses given at the Faculty of Dentistry at King Abdulaziz University in Jeddah.

Materials and Method

A set of 19 questions was developed to assess the importance of teaching orthodontics to the under graduate student at King Abdulaziz University Faculty of Dentistry (Table 1). The questionnaires were distributed to the graduating class (Dental Interns) who graduated during the academic year 2011-12. A total of 95 dental interns (40 males and 55 females) participated in this survey. Responses were checked for completeness, summarized and analyzed. The data was correlated to both gender and achieved grades. Chi-squared test was used to evaluate significant differences between the groups (genders) for each question.

Table 1. Summary of the 19 questions and comparisons of the response for male and female students.

Question	Gender	Agree	Neutral	Disagree	Total	Significance
1. The Orthodontic course in the 4th year is important.	Male	52.5%	27.5%	20.0%	100%	0.343
	Female	54.5%	16.4%	29.1%	100%	
2. The Orthodontic course in the 5th year is important	Male	87.5%	12.5%	0%	100%	0.222
	Female	94.5%	5.5%	0%	100%	
3. The Orthodontic course in the 6th year is important	Male	80%	15%	5%	100%	0.581
	Female	76.4%	12.7%	10.9%	100%	
4. The Orthodontics course should be taught in the 5th year only.	Male	80.0 %	15%	5.0%	100%	0.581
	Female	76.4 %	12.7%	10.9%	100%	
5. The Orthodontics course should be taught in the 6th year only.	Male	17.5%	25.0%	57.5%	100%	0.023*
	Female	10.9%	7.3%	81.8%	100%	
6. Nothing is learned from the 5 th year laboratory class.	Male	32.5%	25.0%	42.5%	100%	0.780
	Female	30.9%	20.0%	49.1%	100%	
7. The growth and development lectures given in the 4 th year are important.	Male	60.0%	15%	25.0%	100 %	0.257
	Female	52.7 %	29.1%	18.2%	100%	
8. The non-skeletal problems lectures given in the 5 th year are important.	Male	95.0%	5.0%	0 %	100%	0.511
	Female	89.1%	9.1%	1.8%	100%	
9. The orthogenetic surgery lectures should be given for master students not for undergraduate students.	Male	50.0%	17.5%	32.5%	100%	0.822
	Female	56.4%	14.5%	29.1%	100%	
10. The skeletal problems lectures given in the 5 th year are important	Male	92.5%	7.5%	0%	100%	0.351
	Female	96.4%	3.6%	0%	100%	

Table 1. (Continuation) Summary of the 19 questions and comparisons of the response for male and female students.

Question	Gender	Agree	Neutral	Disagree	Total	Significance
11. Orthodontics teaching methods are confusing.	Male	45.0%	35.0%	20.0%	100%	0.881
	Female	49.1%	34.5%	16.4%	100%	
12. I did benefit from the clinical cases in the 6 th year CCC orthodontic class.	Male	77.5%	12.5%	10.0%	100%	0.538
	Female	70.9%	10.9 %	18.2 %	100%	
13. Instead of the clinic in the 6 th year, a complete case every week from the start to finish covering all treatment modalities will be more beneficial.	Male	45.0%	32.5%	22.5%	100%	0.274
	Female	54.5%	18.2%	27.3%	100%	
14. After completing orthodontic courses, I am confident that I can treat minor orthodontic problem.	Male	42.5%	30.0%	27.5%	100%	0.096
	Female	32.7%	18.2%	49.1%	100%	
15. The information given in the orthodontic courses is too much.	Male	57.5%	20.0%	22.5%	100%	0.046*
	Female	34.5%	41.8%	23.6%	100%	
16. Orthodontic lectures are too long.	Male	32.5%	45.0%	22.5%	100%	0.015*
	Female	29.1%	21.8 %	49.1%	100%	
17. The instructors are giving too much information during the lecture.	Male	37.5%	37.5%	25.0%	100%	0.086
	Female	27.2%	25.5%	47.3%	100%	
18. After completing orthodontics classes, I am confident to diagnose most of the orthodontic problems.	Male	75.0%	17.5%	7.5%	100%	0.437
	Female	67.2%	16.4%	16.4%	100%	
19. After completing the orthodontic courses, I know when to refer cases to the orthodontist.	Male	90.0%	7.5%	2.5%	100%	0.728

A total of 95 intern completed the questionnaires, 40 (42%) males and 55 (58%) females. The response was 100%. In addition, the response to all 19 questions was also 100%. Most resident (98%) were in the range of 24 years of age. Table 1 showed the response of all interns based on gender. No significant difference was found between male and female interns except for questions 5, 15 and 16. The significances were 0.023, 0.046 and 0.015, respectively.

When correlating the response of the interns to their undergraduate grades as shown in Table 2. All the response was not statistically significant except for question 8 and 16. The significant level was 0.045 and 0.005, respectively.

Table 2. Responses to each question based on academic grades.

Question	Grades	Agree	Neutral	Disagree	Total	Significance
1) The Orthodontic course in the 4th year is important.	A	7.3%	1.1%	2.1%	10.5%	0.439
	B	37.9%	13.7%	17.9%	69.5%	
	C	8.4%	6.3%	4.2%	18.9%	
	D	0.0%	0.0%	1.1%	1.1%	
2) The Orthodontic course in the 5th year is important.	A	8.4%	2.1%	0%	10.5%	0.480
	B	65.3%	4.2%	0%	69.5%	
	C	16.8 %	2.1%	0%	18.9%	
	D	1.1%	0.0%	0%	1.1%	
3) The Orthodontic course in the 6th year is important.	A	9.4%	1.1%	0.0%	10.5%	0.798
	B	51.6%	11.6%	6.3%	69.5%	
	C	15.8%	1.1%	2.1%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
4) The Orthodontics course should be taught in the 5th year only.	A	1.1%	0.0%	9.4%	10.5%	0.494
	B	20.0%	7.4%	42.1%	69.5%	
	C	6.2%	3.2%	9.5%	18.9%	
	D	0.0%	0.0%	1.1%	1.1%	
5) The Orthodontics course should be taught in the 6th year only.	A	1.1%	2.1%	7.4%	10.5%	0.900
	B	8.4 %	9.5%	51.6%	69.5%	
	C	4.2%	3.2%	11.6%	18.9%	
	D	0.0%	0.0%	1.1%	1.1%	
6) Nothing is learned from the 5 th year laboratory class.	A	4.2%	1.1%	5.3%	10.5%	0.385
	B	20.0%	17.9%	31.6%	69.5%	
	C	7.4%	2.1%	9.5%	18.9%	
	D	0.0%	1.1%	0.0%	1.1	
7) The growth and development lectures given in the 4 th year are important.	A	3.2%	3.2%	4.2%	10.5%	0.497
	B	41.1%	16.8%	11.6%	69.5%	
	C	10.5%	3.2%	5.3%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
8) The non-skeletal problems lectures given in the 5 th year are important.	A	7.3%	1.1%	1.1%	10.5%	0.045*
	B	64.2%	2.1%	0.0%	69.5%	
	C	18.9%	5.3%	0.0%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
9) The orthogenetic surgery lectures should be given for master students not for undergraduate students.	A	5.3%	1.1%	4.2%	10.5%	0.886
	B	36.8%	10.5%	22.1%	69.5%	
	C	10.5%	4.2%	4.2%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
10) The skeletal problems lectures given in the 5 th year are important	A	10.5%	0.0%	0.0%	10.5%	0.874
	B	65.3%	4.2%	0.0%	69.5%	
	C	17.9%	1.1%	0.0%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
11) Orthodontics teaching methods are confusing.	A	6.3%	2.1%	2.1%	10.5%	0.523
	B	29.5%	27.4%	12.6%	69.5%	
	C	11.6%	4.2%	3.2%	18.9%	
	D	0.0%	1.1 %	0.0%	1.1%	
12) I did benefit from the clinical cases in the 6 th year CCC orthodontic class.	A	9.4%	1.1%	0.0%	10.5%	0.795
	B	48.4%	8.4%	12.6%	69.5%	
	C	14.7%	2.1%	2.1%	18.9%	
	D	.1.1%	0.0%	0.0%	1.1%	

Table 2. (Continuation) Responses to each question based on academic grades.

Question	Grades	Agree	Neutral	Disagree	Total	Significance
13) Instead of the clinic in the 6 th year, a complete case every week from the start to finish covering all treatment modalities will be more beneficial.	A	5.3%	0.0%	5.2%	10.5%	0.273
	B	36.8%	17.9%	14.7%	69.5%	
	C	7.4%	6.3%	5.3%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
14) After completing orthodontic courses, I am confident that I can treat minor orthodontic problem.	A	3.2%	2.1%	5.3%	10.5%	0.509
	B	27.4%	13.7%	28.4%	69.5%	
	C	6.3%	6.3%	6.3%	18.9%	
	D	0.0%	1.1 %	0.0%	1.1%	
15) The information given in the orthodontic courses is too much.	A	5.3%	2.1%	3.2%	10.5%	0.005*
	B	23.2%	28.4 %	17.9%	69.5%	
	C	15.8%	2.1%	1.1%	18.9%	
	D	0.0%	0.0%	1.1%	1.1%	
16) Orthodontic lectures are too long.	A	3.2%	2.1%	5.3%	10.5%	0.377
	B	18.9%	22.1%	28.4%	69.5%	
	C	8.4%	7.4%	3.2%	18.9%	
	D	0.0%	0.0%	1.1%	1.1%	
17) The instructors are giving too much information during the lecture.	A	3.2%	4.2%	3.2%	10.5%	0.054
	B	16.8%	21.1%	31.6%	69.5%	
	C	11.6%	4.2%	3.2%	18.9%	
	D	0.0%	1.1%	0.0%	1.1	
18) After completing orthodontics classes, I am confident to diagnose most of the orthodontic problems.	A	7.3%	2.1%	1.1%	10.5%	0.982
	B	49.5%	10.5%	9.5%	69.5%	
	C	12.6%	4.2 %	2.1%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	
19) After completing the orthodontic courses, I know when to refer cases to the orthodontist.	A	10.5%	0.0%	0.0%	10.5%	0.774
	B	61.1%	4.2%	4.2%	69.5%	
	C	16.8%	2.1%	0.0%	18.9%	
	D	1.1%	0.0%	0.0%	1.1%	

Discussion

Most dental schools try to evaluate their undergraduate programs in all disciplines to prepare their graduates with the necessary information, both theoretical and practical. This study was constructed to help evaluate the undergraduate orthodontic courses to help develop them to a contemporary level.

Other orthodontic programs in their quest to evaluate their orthodontic teachings for the undergraduate, postgraduate and continuing education level^[5], found that most of the European countries have difficulties in the undergraduate program because of the funding, and in the post graduate programs and the continuing education progress due to the lack of teachers^[1]. However, this is not the case in our undergraduate

courses, the data shows that the students are getting enough education and have enough teachers, and getting the required material to attain the adequate educational level. Furthermore, the undergraduate orthodontic course at King Abdulaziz University is a two and a half year course, which is similar to most of the dental school curriculum in the United Kingdom^[3].

The results of this study showed that there is an agreement between males and females regarding the importance of the 5th and 6th year orthodontic courses (90% and 80%, respectively). This could be due to fact that the students are exposed to most of the orthodontic problems during the lectures or at the clinical session. In the 4th year about one half of the students agreed on its importance, and when analyzed the ones who did agree, it was found that most of them scored A and B in the grades.

Although some students are getting the benefit from the 4th year lectures, more than one half are not, and due to the increase in number of enrolled students, the school, recently, decided to discontinue the 4th year's orthodontic course. This is similar to what transpired in most of the programs in the United Kingdom due to funding and lack of teachers and an increase in the number of students^[3,6].

Regarding limiting the curriculum to 5th year only, the response of the majority of interns was to limit the course to the 5th year only. One explanation is that a limited number will pursue postgraduate studies in orthodontics.

Regarding the laboratory work during the 5th year, most of the student did not like the laboratory work and they believed that they did not learn from it. Our finding supports the data from Derringer work^[6], where four of the dental schools in UK did cancel the laboratory work hours which were reduced from 60 to 9 hours in total^[3].

There was a lot of conflict in teaching methods among student. Several studies tried to find the best teaching method for the undergraduate. They tried the e-learning^[7] and Computer Assisted Learning (CAL)^[8-10]. The outcome of all these studies was that there is no best way of teaching. Some authors believe the conventional method of teaching is the best and some think the CAL is better^[8,9]. While

Linjawi *et al.* believes that e-learning is supplement to the conventional method^[7].

Retrouvery and Finkelstein^[10] gave an idea about the interactive orthodontic course for the undergraduate students and assessed its acceptance. Their finding was that after 5 years of use at McGill University, the interactive orthodontic computer program has been well received by the student, and seems to offer an interactive and successful method for learning the complexity of the orthodontic discipline^[10].

Rosenberg *et al.*^[11] reviewed four studies of Computer-Assisted Learning (CAL) in orthodontic teaching and reported conflicting results. Clark *et al.*^[12] identified no significant difference between the two methods of learning, whereas Irvine and Moore^[13] and Luffingham^[8] reported a significant advantage for CAL over conventional methods. In contrast, Hobson *et al.*^[14] reported a superior effect using conventional methods.

The data from the present study showed that almost half of the male interns and close to third of the female interns were confident to treat minor orthodontic cases. This could be due to the extensive amount of information given to the student during their undergraduate courses. In addition, the data support the work of Noble *et al.*^[2], where they found that about of 87% of the Canadian orthodontic residents are ready to enter the workforce after graduation, while 14% were not sure^[2].

No agreement was seen between genders regarding the amount of information given in the lecture. About one third of the students believed it is long where one third was neutral and the rest disagreed.

Most of the students above 70% were confident to diagnose orthodontic problems and can refer the patient to the orthodontist in contrast to the findings of Noble and colleagues^[2]. In addition, the finding of this study was in concert with the philosophy that is adopted by the Newcastle undergraduate orthodontic^[14].

The limitation of this study is that the results are based on one graduating class, and cannot be applied to all KAU graduates. Further studies are required that incorporate similar questions to graduating classes from different years to confirm the current results.

Conclusions

In this survey the response rate is 100% which is excellent and reflects the opinion of all intern students. The response to questions from the interns was anonymous, this was to ensure comfort to the interns and reflect the interns perspectives. Overall, the majority of the intern reported satisfaction with their undergraduate teaching of orthodontic courses. The data indicated that the students sufficient theoretical and clinical exposure in their undergraduate orthodontic course. This study also provides valuable information about perception of the interns about the entire orthodontic course and the method of teaching.

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تقييم منهج تقويم الأسنان بكلية طب الأسنان في جامعة الملك

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جدة - المملكة العربية السعودية

المستخلص. أجريت هذه الدراسة لتقييم منهج تقويم الأسنان من قبل طلاب الامتياز بكلية طب الأسنان بجامعة الملك عبدالعزيز بجدة. تم توزيع استبيان مكون من ١٩ سؤالاً إلى ٩٥ طالب امتياز (٤٥ ذكر و ٥٥ أنثى) بكلية طب الأسنان جامعة الملك عبدالعزيز بجدة. حيث تحتوي الأسئلة على أهمية تدريس مادة تقويم الأسنان إلى كل من السنة الرابعة والخامسة والسنة السادسة على التوالي. كما تحتوي على أهمية وجود العملي في السنة الرابعة والخامسة. كما احتوي الاستبيان على طرق شرح أعضاء هيئة التدريس للمنهج. وقد تم تحليل كامل ١٩ سؤالاً وفقاً لنوع الجنس والدرجات النهائية للطالب المتدرب. تم استخدام اختبار مربع كاي بيرسون لتقييم الأهمية.