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Internship Students' Knowledge About The Role of Microorganisms in Root Canal Infections (Survey-Based Research)

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Abstract: *Apical periodontitis is an infectious disease, so the goal of endodontic treatment is to eradicate the occurring infection or prevent microorganisms from infecting or re-infecting the root canal or the periradicular tissues.*

Objective: *The aim of this study was to evaluate the background knowledge of internship students in Alfarabi dental college about the role of microorganisms in root canal infections .*

Methods: *Anonymous survey forms were emailed to 81 internship students in Alfarbi dental college. They were asked to fill it and forward it again to the author's E-mail.*

Results: *70.4% of students assured that microorganisms can be transported in the blood or lymph to an area of tissue damage, where they leave the vessel, enter the damaged tissue, and establish an infection. While 38.3% of them agreed that antagonism is not a positive interaction among bacteria.*

Conclusion: *Endodontic microbiology is an important part of dentists knowledge, this means that internship students have to refresh there information and update it continuously ,to understand the different signs and symptoms of endodontic cases.*

Keywords: *Infection; microbiology; bacteria; internship; antagonism.*

I. Introduction

Apical periodontitis is an inflammatory reaction in the periapical area to the presence of bacteria inside the root canal system (1,2). It is clear that an infected root canal system is a suitable environment for the selective species of microorganisms (3). A very important information which is begun to be evident during these years is that microbes in the root canals can grow not only as (non attached) planktonic cells or in aggregates, (attached) co-aggregates, but they can form biofilms of a complex network of different microorganisms (4,5). The morphology of root canal systems is complex and enhance the growth of bacteria in the form of biofilms (5). Biofilms protect microorganisms from adverse environmental changes and effects of biocides more than one thousand times if compared with the same microorganisms in non attached form (6,7,8). The biofilm concept was a great forward step to the understanding of endodontic infections, especially those of the persistent nature.

II. Materials And Methods

81 survey forms were sent to the internship students by E-mail and they were asked to return the survey forms after filling them . The questionnaires included questions about the kinds of microorganisms found in different types of endodontic infections ,microbial colonization of root canal system ,dentinal tubules and its irregularities ,microbial interactions, and the development of odontogenic apical cysts.

III. Results

81 survey forms had been received by the author , the data collected ,ordered ,and analyzed .The students were distributed to 65.4% for male and 34.6% for female . Table 1 includes all the answers given by

the internship students. The students answered the question about the most common microorganisms isolated in endodontic infection with approximately an equal percentage between true and false (true: 49.4% ,false 50.6%). Whereas a high percentage of students (75.3%) showed a good understanding about the term" Anachoresis" . 71.6% agreed that the apical cyst has an epithelial source of some granulomas. 63% of student chose that dominated microorganisms in Secondary Intraradicular Infection are aerobic Gram-Positive Bacteria.

IV. Discussion

The aim of this survey was to evaluate the outcome of endodontic microbiology lectures in Alfarabi dental college through a set of questions related to the course items . Fungi and most recently archaea and viruses have been found in association with endodontic infections(9).and this part of survey was well answered by about 69.1% of students . Only 50.6% of answers were correct about that anaerobic bacteria accounted for more than 90% of the isolates in endodontic infections(10),The low percentage of correct answers means that more effort should be spend to make this point clear.

Anachoresis is a process by which microorganisms can be transported in the blood or lymph to an area of tissue damage like inflamed pulp and causing infection in it (11).this concept was well understood by students and the right answers ranging from 70%-75% reinforce that. The main bacterial species implicated in independent extraradicular infections are Actinomyces species and Propionibacterium propionicum, in a pathologic entity named apical (or periapical, periradicular) actinomycosis(12) and 53.1% of students was familiar with this information through their undergraduate study as they commented in the survey. Bacteria in the root canal system may exist as planktonic (unattached) cells suspended in the fluid phase of the main root canal. However, the dominant pattern of bacterial colonization of the root canal system is through the formation of a biofilm that adheres to the root canal walls(attached) (13). 56.8% of students has a good knowledge about the planktonic and co aggregate colonization of microorganism inside the root canal system. The establishment of certain species in the root canal is also influenced by interactions with other species. Positive interactions (mutualism and commensalism) enhance the survival capacity of the interacting bacteria and increase the probability of certain species to coexist in the habitat. Negative interactions (competition and antagonism) limit population densities(14).61.7% of student had the information about the bacterial interaction , most of them through learning the basics of microbiology in other courses not in endodontics as they declared.

Tables

Table (1) The distribution of students according to the gender, and the survey answers.

	N	%
Gender		
Male	53	65.4%
Female	28	34.6%
Fungi and viruses are found in endodontic infections		
Yes	56	69.1%
No	25	30.9%
Aerobic bacteria accounted for more than 90% of the isolated microorganisms in endodontic infections		
True	40	49.4%
False	41	50.6%
Microorganisms can be transported in the blood or lymph to an area of tissue damage ,where they leave the vessel, enter the damaged tissue, and establish an infection		
True	57	70.4%
False	24	29.6%

Bacteria have been isolated from traumatized teeth with necrotic pulps with apparently intact crowns		
True	42	51.9%
False	39	48.1%
Anachoresis has been suggested to be the mechanism through which the traumatized teeth become infected		
True	61	75.3%
False	20	24.7%
Periradicular inflammation can be observed even before the frontline of infection reaches the apical foramen		
True	36	44.4%
False	45	55.6%
Lateral canals, apical ramifications, and isthmuses connecting main canals may be clogged with bacterial biofilm		
True	45	55.6%
False	36	44.4%
Apical cysts develop as a result of epithelial proliferation in some granulomas		
True	58	71.6%
False	23	28.4%
Dentin exposure does not represent a significant route of pulpal infection		
True	36	44.4%
False	45	55.6%
Dependent extraradicular infection: caused mainly by Actinomyces species		
True	38	46.9%
False	43	53.1%
Antagonism is a positive interaction among bacteria		
True	50	61.7%
False	31	38.3%
An aggregates Bacteria (attached) cells suspended in the fluid phase of the main root canal		
True	46	56.8%
False	35	43.2%

V. Conclusion

- Percentage of correct answers on this survey was around 50% , this reflects the difficulty of microbiology course , so it needs some modifications in the syllabus to make this subject more interesting .
- No more studies measuring the knowledge about endodontic microbiology among dental students in other dental schools so the comparison was so difficult.
- During the communication with internship students they focused on the necessity of using more teaching methods to explain the topics of microbiology course and endodontic microbiology lectures.

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