

A Microbiological Study On Patients With Fixed Orthodontic Appliance In Ramadi City.

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ABSTRACT

The present study aimed to isolate and identify the microorganisms associated with causing problems to patient in all period of wearing fixed orthodontic appliance (FOA) in Ramadi city. Sixty-six patients treated with FOA for a period ranged from 14 – 35 years included in this study wabs were collected from gingival area around fixed orthodontic appliance to be cultured aerobically. Many important pathogens were isolated and identified in all age groups and in all duration include candida albicans, E.coli, Klebsiella spp., Staphylococci and many α .Hemolytic and β .Hemolytic Streptococci. The study recommended the use of antibiotic and antifungal drugs during wearing appliance in addition to the maintenance of a good oral hygiene. Further study is also recommended to cover the role of anaerobic bacteria.

Introduction:

The oral cavity is colonized by natural micro flora, which is relatively stable in individual and the composition of which is the result of along term relationship between the microorganisms and the host(1).

For years, the use of fixed orthodontic appliance FOA for correction of malocclusion has been vague. The placement of fixed appliance lead to increase the volume of dental plaque as well as increase in the number of bacteria and concentration of carbohydrate in each milligram of plaque (2,3).

It has been reported that the presence of fixed orthodontic appliance inhibit oral hygiene and create new retentive area for plaque and debris which in turn predispose to increase carriage of microbes and subsequent infection (4,5).

Bloom and Brown 'have reported that after orthodontic band and arch wires have been placed, there is increase in the facultative microbial population (2,6).

The aim of the present study was to isolate and identify the microorganisms responsible of causing problems in the patients treated with FOA in Ramadi city in a trial to know the types of these pathogens to control complications and infections in these groups of patients.

Materials & Methods:

Patients: A total of 66 patient (22 males and 44 females) who where treated with FOA were included in the study. Ages of patients ranged from 14 to 35years. Duration of treatment ranged from 1 month to 24month. Non of the patients had history of smoking, debilitating disease, antibiotic or steroid therapy.

Before the investigation all individuals received oral hygiene instructions.

Methods: the swabs were collected from the gingival area around orthodontic fixed appliance with endodontic paper point from several site (so-called multisite sampling). all the points were transported aseptically to sterile wooden stick swabs containing transport media to be cultured in the medical laboratory in the Maternity and Children Hospital in Ramadi .

In the laboratory, all samples were cultured aerobically on Macconkey agar, blood agar, chocolate agar and saberoids - dextrose agar. After 24-48 hrs. all isolates were identified according to their culture characteristics, biochemical reactions and microscopical appearance as described by Collee et.al (7) .

Results and Discussion:

The total number of patient under study was 66 Patients were grouped according to age and gender as shown in table 1.

The duration of treatment with FOA was grouped in to five groups as shown in table 2 .

The majority of mycotic agents that were isolated from patients under study were found to be Candida albicans in addition to few other agents (table 3)

Cultures yielded growth of some types of gram negative bacteria in different durations of FOA treatment (table 4)

The majority of gram positive bacteria isolated in all durations of treatment with FOA were Staphylococcus aureus and Streptococci as shown in table 5 .

It is well known that wearing orthodontic appliances leads to increase carriage of oral bacterial population which may cause gingivitis and periodontitis which may cause complications in the orthodontic working . However, the present study was designed to identify the types of organisms that cause these problems to control them.

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Age of persons ranged from 14 – 35 years (Table 1) females consisted 66.7% while the remaining were males, however, it is well known that females take care of their expression more than males so they visits orthodontic clinic in larger number. many investigators support these facts (8,9).

The duration of wearing appliances play an important role in causing problems. In the present study patients were grouped into 5 groups according to the period of wearing appliances (table 2). The existence of orthodontic appliances in the mouth of patients can stimulate many environmental changes e.g. drop of PH, increase of carbohydrates, accumulation and retention of bacterial plaque (10) which interprets the increase in number in all age groups after 5-10 months duration.

Among the pathogenic agents that were isolated in the present study , *Candida albicans* was isolated in high number in all groups (Table 3).

The possible causes to the increased growth of *Candida* sp. After wearing orthodontic appliance is because these foreign objects may alter the oral environmental by mechanism yet unknown, that the proliferation of organisms such as *Candida* (4).

Colonization of oral cavity by *Candida albicans* is a crucial step in the sequence of events leading to an inflection. Salivary proteins and glycoprotein can act as receptors for binding of *Candida albicans* cell to enamel surfaces (11).

The prevalence of oral *Candida* in all groups of patients and the increase in percentage when the duration of treatment increased and with role of *Candida* in causing problems to the patients with FOA is supported by many authors (1,12,13,14)

Bacterial cultures revealed growth of many types of pathogenic bacteria. The majority of gram negative bacteria were found to be like *Klesiella* and *E. coli* (Table 4) while gram positive bacteria isolated were prescribed as *Staphylococcus. Aureus*, α *Haemolytic Streptococci* and *B. Haemolytic Streptococci* (Table 5). These pathogens may represent a significant risk not only for periodontal disease but also for patients general health however, these pathogens are all aerobic and the possibility of the presence of anaerobic bacteria is also conceivable(15). *Streptococci* are early colonizers of salivary pellicles and their ability protein and glycoprotein is important in plaque development which is may result from a adsorption of the proteins to the bacterial cell surface. This binding may enable the *Candida albicans* and the bacterial pathogens to multiply on tooth when FOA is present and cause problem to the patient. Warat et.al(10)reported that excess bonding composite around the bracket base is the critical site of plaque accumulation associated with FOA due to the rough surface texture and a complex community of bacterial plaque may present on the excess composite within one month after bonding which supports our findings.

The present study highlights the importance of maintenance of a good oral hygiene during treatment with FOA include the use of some antibiotic and some antifungal drug to eradicate the pathogenic microorganisms in addition to proper use of tooth brushes and medical tooth paste to maintain a good general health to all patients with FOA in all periods of wearing this appliance.

Further future study on the role of anaerobic bacterial is recommended.

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Table (1) Distribution of the patients according to Age group and gender

Age group In years	Male		Female		Total
	No	(%)	No	(%)	
14-20	8	(30.7)	18	(69.3)	26
<20-25	8	(38)	13	(62)	21
<25-30	4	(33.3)	8	(66.7)	12
<30-35	2	(28.6)	5	(71.4)	7
Total	22	(33.3)	44	(66.7)	66

Table (2) Distribution of the patients according to duration of treatment with FOA and age

Age group	1-5 month No (%)	5-10 month No (%)	10-15 Month No (%)	15-20 Month No (%)	20-25 Month No (%)	Total
14-20	8 (30.7)	93 (4.6)	51 (9.3)	2 (7.7)	2 (7.7)	26
<20-25	5 (23.8)	8 (38)	2 (9.6)	3 (14.2)	3 (14.3)	21
<25-30	3 (25)	3 (25)	2 (16.7)	2 (16.7)	2 (16.7)	12
<30-35	- (0)	1 (14.2)	1 (14.2)	2 (28.7)	3 (42.9)	7
Total	16 (24.3)	21 (31.8)	10 (15.1)	9 (13.7)	10 (15.1)	66

Table (3) Results of growth of fungi according to duration of treatment of FOA

Duration in months	<i>Candida albicans</i> No. (%)	Other fungi No. (%)	Total
1-5	6 (100)	-	6

5-10	10	(100)	-	-	10
10-15	6	(100)	-	-	6
15-20	8	(88.9)	1	(11.1)	9
20-25	8	(88.9)	1	(11.1)	9
Total	38	(95)	2	(5)	40

Table (4) Results of growth of gram negative bacteria according to duration of FOA

Duration in months	<i>Klebsiella</i> sp No. (%)	<i>E.coli</i> No. (%)	Others No. (%)	Total
1-5	-	-	-	-
5-10	-	-	1 (100)	1
10-15	2 (100)	-	-	2
15-20	3 (75)	-	1 (25)	4
20-25	3 (75)	1 (25)	-	4
Total	8 (72.8)	1 (9)	2 (18.2)	11

Table (5) Results of growth of gram positive bacteria according to duration of FOA

Duration in months	<i>Staph. aureus</i> No. (%)	α .Hemolytic streptococci No. (%)	β .Hemolytic strep No. (%)	Others No. (%)	Total
1-5	-	3 (60)	2 (40)	-	5
5-10	1 (10)	5 (50)	4 (40)	-	10
10-15	1 (8.3)	6 (50)	4 (33.4)	1 (8.3)	12
15-20	21 (8.2)	65 (4.6)	32 (7.2)	-	11
20-25	21 (6.7)	75 (8.3)	3 (25)	-	12
Total	6 (12)	27 (54)	16 (32)	1 (2)	50

دراسة ميكروبية على المرضى المعالجين بأجهزة التقويم الثابتة للأسنان في مدينة الرمادي

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الخلاصة:

هدفت الدراسة إلى عزل وتشخيص مسببات المرضية المرافقة للمعالجة بأجهزة التقويم الثابتة للأسنان خلال فترات متفاوتة من وجود الجهاز في الفم في مدينة الرمادي . شملت الدراسة 66 شخصاً من الذين يحملون جهاز التقويم الثابت وتراوح أعمارهم بين 14 - 35 سنة جمعت المسحات من اللثة من منطقة تواجد الجهاز وعزلها هوائياً بينت نتائج الزرع نمو عدد كبير من مسببات المرض منها *E.coli* و *Klebsiella* و *Staphylococci spp.* و *a.Hemolytic* و *β .Hemolytic Streptococci* . أوصت الدراسة على ضرورة استعمال بعض المضادات الحيوية ومضادات الفطريات أثناء المعالجة إضافة إلى توعية المريض بالاهتمام بنظافة الفم والأسنان. وأوصت الدراسة بضرورة إجراء دراسة مستقبلية شاملة على البكتريا اللاهوائية لمعرفة دورها .