A comparison of preparing curved canals using NiTi Engine-driven and K-flexo endodontic instruments

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Abstract

The purpose of this in vitro study was to evaluate the combined effect of ProTaper file rotary instruments to K-flexo file hand instruments in curved canals in terms of instrumentation time, change in working length, and spreader penetration depth. Thirty curved mesial canals of extracted mandibular molars were used in this study, divided into two groups (15) canals for each group. In group I the canals were prepared with NiTi ProTaper file with slow speed contra angle hand piece (300rpm). In group II the canals were prepared by step-back technique with Gates-Glidden using stainless steel K-flexo hand instruments. Students't-test revealed that there was a highly significant difference between group I and group II in preparation time, and change in working length. In group II spreader penetrated significantly closer to working length than in group I.

Key words:Rotary instruments, ProTaper file, instrumentation, K-flexo file

Introduction

One objective of root canal instrumentation is to clean and shape the root canal system to form a continuously tapered preparation from the coronal access to the apical foramen [1,2]. This shape provides enough space for irrigants that are important to complete the cleaning and allows the placement of spreader and effective root filling [2]. Canal shaping is relatively easy in straight roots but has always been challenging, demanding a high skill, when performed in curved roots [3]. This difference is a result of the stiffness of stainless steel files, which are unable to follow canal curvatures without developing high lateral forces responsible for canal aberrations and loss of working length[4].

In recent years, Nickel-Titanium (NiTi) alloy manual and rotary endodontic instruments have revolutionized endodontics. With the creation of these super-elastic NiTi instruments, achieving a correct canal shape, even in curved canals, appears to be more predictable and safe. Several studies demonstrate that, compared with instrumentation by stainless steel files, NiTi mechanical preparation are more centered in the canal lumen, rounder and better maintained in their original anatomy [5,6].

Once the value of the NiTi for endodontic applications was established, research was directed toward the study of various systems, able to reduce the number of files necessary for the working sequence and, at the same time, to lower the risk of file separation. This trend has leaded to the introduction to the market many of NiTi rotary instruments that are

different in taper and blade design. ProTaper file is the latest NiTi rotary products that available know in the market. ProTaper files introduce a new design with progressively increasing tapers with a multiple taper in a single instrument, Triangular section, active blades, and a moderately active tip [7]. The ProTaper system consists of shaping and finishing instruments that allow for even, safer shaping of the root canal system [7].

Obturation of canals prepared with NiTi rotary instruments may be achieved using a variety of thermo-plasticized or lateral condensation techniques [8]. To take advantage of the more uniform canal preparation produced by rotary files, progressively increasing tapers gutta-percha cones have been developed. These master cones are manufactured to have matching master apical sizes and taper of rotary NiTi file system. Bal et al.[8] found that Filling with a master cone with a larger taper may be advantageous in that a larger and more uniform mass of gutta-percha is introduced that potentially has less sealer entrapped in the filling mass, but less spreader penetration was observed with 06 tapered master cone than 02 tapered master cone.

The purpose of this in vitro study was to compare the preparation time, working length change, and spreader penetration depth in the curved canals prepared either by NiTi ProTaper file or Stainless Steel K-flexo files.

Materials and methods

Forty mandibular curved molars were used in this study. All teeth were scaled with a periodontal scaler to remove soft tissue and calculus, and then radiographically evaluated for the degree of curvature according to Schneider technique [9]. Thirty mesial canals with curvatures ranging from 20 to 30 degrees were chosen. Using a diamond disc bur with straight handpiece and water coolant, the coronal portion of the teeth were removed to eliminate the variables in the access preparation, as well as to standardize the length of the root (which should be 14 mm from the apex to the coronal end). The selected tooth were randomly divided into two groups of (15) canals each. The first group was prepared with rotary endodontic instrument ProTaper (Dentsply Maillefer, Switzerland) using high torque contra angle handpiece (INTRA surg500, Kavo, Germany) at speed of (300rpm). Each set of rotary instrument prepared of 3 canals. The range for using rotary instruments properly without any defects was recorded between 3-5 canals [10, 11].

The second group was prepared with stainless-steel K-flexo file (Maillefer, Switzerland) instrument using step-back technique. Copious irrigation with 2.5% NaOCL was performed repeatedly after each instrument. During the instrumentation, apical patency filing and recapitulation were performed frequently with K-flexo files. All canals were prepared to a working distance of 13 mm, and the final apical preparation was set to #30.

Canal preparation

Group 1: All canals were prepared mechanically with the ProTaper system (Maillefer, Ballaigues, Switzerland) a system made up of six instruments. According to the manufacturer's recommendations, using a low speed hand piece (300rpm) with crown- down technique, For coronal portion of the canal start with shaping file S1 (Purple colored) to achieve straight line access with brushing movement once resistance felt remove the file and force against

the canal walls on its removal, this action performed just to remove any cervical interference. After that shaping file SX is used with the same manner. When the canal is patent and working length is confirmed shaping file S1 is reused to the working length with brushing motion, followed by shaping file S2 (white colored ring) used with the same manner till it reached the working length, followed by irrigation and recapitulation. The apical portion is prepared with finishing files, first start with F1 file (yellow ring) to working length followed by F2 file (red ring) to the working length. Finally use F3 file (blue ring) is used to working length its tip size equal to #30 file, with that instrument the preparation of the apical portion is completed.

Group 2: was prepared with step-back technique. Apical preparation was performed using stainless steel 0.02 taper K-flexo files to the working length. Size 15 K-flexo file was inserted and placed to the working length with a combination of filing and reciprocal reaming action until it fit loosely in the canal. This was repeated with successive larger files until the apical portion of the canal was instrumented to # 30. Step-back were performed to 1 mm short of the previous file size until the mid-canal area was instrumented to # 60. Gates-Glidden drills # 2 to # 4 were used to create coronal and mid root preparation.

Measurement techniques

Preparation time

The time for canal preparation was recorded in seconds. This included the total active instrumentation, irrigation, recapitulation, and the time taken even when changing the instruments.

Change in working length

Final length of each canal was measured after preparation. A # 30 K-flexo file was inserted into the prepared canal, and its length was measured with vernier (scaled 0.05 mm). Any changes in working length were determined by subtracting the final length from the original length.

Spreader penetration depth

After instrumentation was complete, the canals were dried with paper points. ZOE sealer (Dorifil, Dorident) was mixed according to the manufactures instructions, and a thin layer was applied to the preparation walls with a file one size smaller than the master apical file.

In group (I): F3 gutta-percha size was placed in the canal to the working length. Finger spreader was inserted along side the master cone and the distance of the spreader tip from the working length was measured by subtracting the depth of spreader penetration from the working length in each canal.

In-group (II): the same procedure for group 1 was repeated using ISO #30 master cone gutta-percha gutta-percha.

Statistical analysis

Independent (T) tests were used to compare group I to group II in each of the three measurement technique.

Results

Preparation time

The mean preparation time to prepare the canals is shown in table (1). There was a very highly significant differences between group I and II ($P<0.001$) table (2).

Change in working length

The mean loss of working length is shown in table (1). In group I was 0.21 mm, in group II was 0.46 mm. A very highly Significant loss of working length took place in the step-back with K-flexo hand instruments (P<0.001) table (2) fig. (1).

Spreader penetration depth

The depth of spreader penetration, as measured by the distance of spreader from the full working length, was 2.75 mm and 1.13 mm in group I and II, respectively. The differences in spreader penetration between the two groups was highly significant (P<0.01) table (2) fig. (1).

Table (1): Descriptive statistics for experimental groups

Measurement techniques		No. of canals	Mean	S.D
Preparation time (sec)	Group I	15	288.66	33.446
	Group II	15	794.933	14.002
Loss working length (mm)	Group I	15	0.21	0.188
	Group II	15	0.46	0.163
Spreader penetration depth (mm)	Group I	15	2.75	0.552
	Group II	15	1.13	0.480

Table (2): Student's t-test

Measurement techniques	Comparison groups	Df	T	P-value	C.S.
Preparation time (sec)	I vs. II	14	-56.056	P<0.001	***
Loss working length (mm)	I vs. II	14	12.876	P<0.001	***
Spreader penetration depth (mm)	I vs. II	14	-5.129	P<0.01	**

**highly significant
***very highly significant

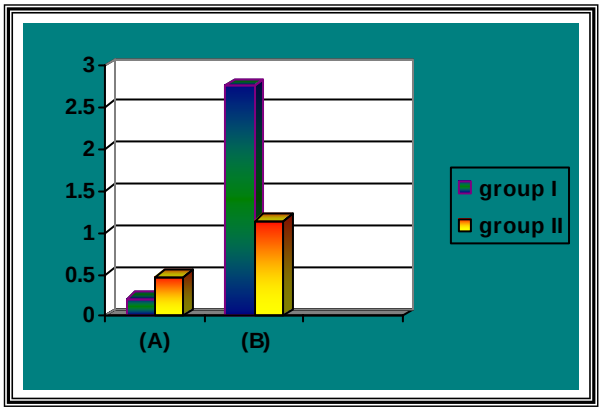

Fig. (1): Bar chart showing the differences in mean of

A-working length change in (mm)

B-spreader penetration depth in (mm)

Discussion

Canal shaping is a critical aspect of endodontic treatment because it influences the out come of the subsequent phases of canal irrigation and filling and the success of the treatment itself. Once the canal is prepared, it should have a uniformly tapered funnel shape, increasing in diameter from the end point to the orifice [(2)]. Recent advances in instrument designs and materials have resulted in the development of NiTi-rotary instrumentation for endodontic treatments of teeth. These NiTi endodontic instruments may reduce the difficulty of the instrumentation of curved canals compared with that of stainless steel files. Several systems have been produced with the aim of improving the canal shaping and to simplify and shorten the working sequences [(3)].

ProTaper files, one of the latest system, introduce the multiple taper concept, i.e., variable tapers in the same file are applied to specific areas of the canal, reducing the number of recapitulations necessary to arrive at the working length[(13)]. The mean preparation time noted in this study was least in ProTaper file group (288.66 sec.) Than K-flexo files (794.93 sec.) which involved fewer instruments change, compared with other group, furthermore the cross section of the ProTaper file which is a convex shape allow better cutting efficiency and more rapid root canal preparation, in the same time the non-cutting tip design ensure a non aggressive 'guiding" type of movement [(12,14)].

It's important in root canal therapy to control the working length to avoid over- and under extension. Controlling the working length during treatment maintain the apical constriction and allows effective obturation of the canal system. In the present study group I showed least change in working length than group II and the differences was a very high significant ($P<0.001$). As reported by Criffth et al. [(15)], the control of working length dose not appear to be a problem with NiTi rotary instruments the NiTi metal has a low bending moment, high spring back, and low stiffness contributing to its unique flexibility. Therefore rotary NiTi instrument seems to have more ability to preserve apical curvature than K-flexo hand instruments. Furthermore the shaping instruments of ProTaper file have a large coronal taper that improved initial cleaning and shaping, while the apical taper is smaller allowing penetration into apical curvatures. This results was concord with other reports [(16,17,18)]. Minimal decreases in working length also resulted in previous articles [(19,20)] but the authors of these studies doubted the clinical relevance of the findings. In group I spreader penetration was greater than 1mm from working length. This may attributed to the fact that greater taper gutta-percha cone (F3) that used in group I closed approximate to the prepared canal walls, that a potential disadvantage results from the inability of a spreader to predictably penetrated to within 1 to 2 mm of the working length [(8,21)].

In conclusion: our study showed that ProTaper systems have the advantage of quick preparation of canals with fewer instruments and maintain the correct working length than K-flexo files. However, in the same time less spreader penetration was observed with ProTaper system. Further study should be done to evaluate the quality of obturation or seal obtained using this technique.

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The Incidence of Three Roots and Four Root Canals in Endodontically Treated Mandibular First Molars in Iraqi Population

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Abstract

It is of utmost importance that the clinician be familiar with the variations in root canal anatomy and the characteristics features in various racial groups, since such knowledge can aid location and negotiation of canals as well as their subsequent management. The aim of the present study is to investigate the incidence of three roots and four root canals in the mandibular first molar in Iraqi population. A total of 327 endodontically treated mandibular first molars were investigated in this study. Radiographs of working length determination and canal obturation at different angles of each tooth were mounted, projected and evaluated. The clinical records were reviewed and the findings for the number of roots and root canals were then recorded and tabulated. Roots with multiple canal systems were categorized according to whether the canals exited the root by a common apical foramen or by separated apical foramina. The results showed that 81.96% of the examined teeth had three root canals and the remaining 18.04% had four root canals. Most of the teeth (99.08%) had two roots. Only three teeth (0.92%) had three roots. There was no significant differences between males and females in the incidence of three roots and four root canals ($P > 0.05$).

Key words: Mandibular first molar, root canals, variations.

Introduction

The main objectives of root canal treatment is the thorough mechanical and chemical cleansing of the entire pulp cavity and its complete obturation with an inert filling material and a coronal filling preventing ingress of microorganisms. One of the main reasons for failure of root canal treatment in molars is because the clinician has not removed all of the pulp tissues and microorganisms from the root canal system.(1)

It is of utmost importance that the clinician be familiar with the variations in root canal anatomy and the characteristics features in various racial groups, since such knowledge can aid location and negotiation of canals as well as their subsequent management. Therefore a number of studies have shown different trends in shape and numbers of roots and canals amongst the different races.(2-9) These variations appear to be genetically determined and are important in tracing the racial origins of different populations.(2)

The variations in the root canal morphology of mandibular first molars have been investigated by many authors in different populations. Some authors

reported that four canals are not unusual findings in this tooth (table 1) Others studied the presence of mandibular first molar with three roots and recorded a wide range of frequency (table 2). Although the incidence in different countries of four root canals and three roots in the mandibular first molar has been

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reported in most endodontic textbooks, there is a need to know this incidence among Iraqi population .The aim of the present study is to investigate the incidence of three roots and four root canals in the mandibular first molar in Iraqi population.

Table (1): Incidence of mandibular first molars with four canals

Author / year	No. of teeth	Percentage of teeth with four canals
Skidmore & Bjorndal. 1971[10]	45	28.9
Pineda & Kuttler .1972[11]	300	27.0
Vertucci & Williams. 1974[12]	100	30
Hartwell & Bellizzi. 1982[13]	846	35.1
Fabra-Campos. 1985[14]	145	47.6
Walker.1988[15]	100	45.0
Yew & Chan.1993[16]	832	31.5

Table (2): Incidence of three-rooted mandibular first molar

Author / year	No. of teeth	Percentage of teeth with three roots
Skidmore & Bjorndal. 1971[10]	45	2.2
De Souza-Defreitas. 1971[17]	422	3.2
Vertucci & Williams. 1974[12]	100	0.0
Curzon & Curzon.1971[18]	98	27.0
Curzon.1973[19]	377	3.4
Curzon.1974[2]	69	21.7
Hochtstetter. 1975[20]	400	13.0
Reichart & Metah 1981[21]	364	19.0
Walker 1988[15]	100	15.0
Loh 1990[22]	304	7.9
Younes et al.1990[23]	581	2.92
Yew & Chan.1993[16]	832	21.5
Gulabivala et al.2001[6]	139	10.1

Materials and methods

A total of 327 endodontically treated mandibular first molars were investigated in this study. These teeth were selected randomly from different dental clinics in Baghdad , all of these teeth were endodontically treated by a well qualified endodontists. Radiographs of working length determination and canal obturation at different angles of each tooth were mounted, projected and evaluated. In addition, the clinical records were reviewed and the findings for the number of roots and root canals were then recorded and tabulated. Roots with multiple canal systems were categorized according to whether the canals exited the root by a common apical foramen or by separated apical foramina. The examined teeth were free of root resorption, had no canal calcification, open apices, broken instruments , and no previous root canal therapy.

Results

The results of this study are summarized in tables 3 through 6 .

Of the 327 root canal treated mandibular first molar teeth in this study, 81.96% had three root canals and the remaining 18.04% had four root canals (Table 3). The fourth root canals were usually located in the distal roots. Statistical analysis using chi-square showed that there was no significant difference between males and females in the incidence of four canals ($P > 0.05$).

All the examined mesial roots were found to have two root canals while the distal root had two root canals only in 18.04% of the examined teeth. The two root canals in the mesial and distal roots were mostly confluent in the apical third ending in one foramen (Table 4 and 5). There was no significant difference between mesial and distal roots in the incidence of confluent two canals in the apical third (P > 0.05).

Most of the teeth (99.08%) had two roots. Only three teeth (0.92%) had three roots (Table 6). There was no significant difference between males and females in the incidence of three roots (P > 0.05).

Table (3): Distribution of teeth according to the number of canals per tooth in each sex.

Sex	No. of teeth	Teeth with 3 canals		Teeth with 4 canals	
		No.	%	No.	%
Male	154	123	79.87	31	20.13
Female	173	145	83.82	28	16.18
Total	327	268	81.96	59	18.04

Table (4): Distribution of teeth according to the configuration of two canals in each root of male patients.

Root	Apical foramen				
	joined	%	separated	%	total
Mesial	89	57.79	65	42.21	154
Distal	22	70.97	9	29.03	31

Table (5): Distribution of teeth according to the configuration of two canals in each root of female patients.

Root	Apical foramen				
	joined	%	separated	%	total
Mesial	98	56.65	75	43.35	173
Distal	16	57.14	12	42.86	28

Table (6): Distribution of teeth according to the number of roots per tooth in each sex.

Sex	No. of teeth	Teeth with 2 roots		Teeth with 3 roots	
		No.	%	No.	%
Male	154	152	98.7	2	1.3
Female	173	172	99.42	1	0.58
Total	327	324	99.08	3	0.92

Discussion

Study of the morphology of the root canal system using radiographic techniques might appear to have certain shortcomings. The operator can only see the tooth in a two-dimensional image, and conceivably extra root canals can be missed on the radiograph. Unfortunately the radiographic technique is still the most reliable method in the clinical setting. However, clinical examination remains the only noninvasive method available.

Previous studies revealed that the incidence of four root canals in mandibular first molars of different populations has been reported to range from 27% to 47.6 %.

(Table1). Two fine narrow canals (mesio-buccal & mesio-lingual) are usually present in the mesial root. The possibility of three root canals in mesial root has been reported by Vertucci & Williams [12], Fabra-Campos [14] and Martinez- Berna & Badanelli [25]. The distal root usually presents one wide canal that tapers evenly to the apex. However , a great variance in the number of canals in the distal root has been reported with up to 47.6 % having two canals, [14,15] few reports have indicated three canals in this root.[21,26] Although six root canals are rarely reported in mandibular first molars, four canals are not unusual. [25] In general a second distal root canal is the usual anatomy.

A comparison of the findings of this study with that of other studies (Table1) indicates that the incidence of four root canals in Iraqi population appears to be low. In addition, there was no significant differences in this finding between males and females patients.

Skidmore & Bjorndal [10] examined extracted mandibular first molar teeth and reported that 59.5 % of the two canals in the mesial roots and 38.5 % of the two canals in the distal roots had separate apical foramina . In this study these percentages were found to be low with one exception; the two canals in the distal roots of female patients is higher than that of previous study. On other hand the statistical analysis of the findings of the present study showed that there is no significant differences in the percentages of two canals having separated foramina between mesial and distal roots.

The incidence of three roots in mandibular first molars has been reported to range from 0.0 % to 32 % in different populations (Table 2). In the present study three teeth (0.92 %) of 327 mandibular first molars (two in male & one in female patients) were found to have three roots. The findings of this study indicated that the frequency of occurrence of three rooted mandibular first molars is less than that reported by other studies. Furthermore there was no significant differences in this mentioned frequency between males and females.

The variations of the anatomy of the root canal system in molars are not appreciated by a great number of general practitioners.[27,28] The variability of root canal anatomy in the distal root of mandibular first molars may not be a common knowledge. Next to the fourth distolingual canal, a third distolingual root in mandibular first molars with a wide range of incidence is possible in different populations (Table 1& Table 2).

The differences seen in this study compared with those listed in Table 1 & Table 2 indicate that there may be a genetically determined differences related to racial backgrounds.

Clearly, these findings are important in assisting the dentists to provide a successful root canal therapy. The access opening of the tooth should be reevaluated to facilitate the search and location of the fourth root canal. Thus, the clinicians should develop skills necessary to locate, clean and shape the entire root canal system to ensure a predictable and favorable prognosis.

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Apical and Coronal Microleakage using Mineral Trioxide Aggregate (Comparative Study)

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The purpose of this study was to evaluate the potential of using mineral trioxide aggregate (MTA) as a root canal filling material by comparing its apical sealing ability with that of laterally condensed gutta-percha with sealer in extracted one canal teeth. In addition, this study was evaluating the MTA and ZnPo4 cement as barriers to coronal microleakage.

Forty single canal extracted teeth, were prepared in a standard manner using GT file, randomly divided into two groups of 20 teeth, and obturated with laterally condensed gutta-percha or MTA.

In each group, 10 teeth received a 4-mm barrier of MTA or ZnPo4 cement. The sealing ability of each part was assessed by immersion in 1% methylene blue dye for 72 h. The leakage was recorded in apical and coronal part. Data were analyzed by One-Way ANOVA test, T-test, and LSD test.

Canal filled with laterally condensed gutta-percha showed significantly less apical dye penetration than canals obturated with MTA. However, coronal barrier filled with MTA showed significantly less dye penetration than ZnPo4 cement barrier.

Key wards: MTA, Apical microleakage, Coronal barrier.

Introduction

One of the objectives of a successful endodontic treatment is the total obturation of the root canal system. To achieve this, the root canal filling must seal the canal space both apically and coronally to prevent the ingress of microorganisms or tissue fluids into the canal space. Apical leakage is considered a common reason for the clinical failure of endodontic therapy (1). Likewise, coronal leakage is also reported to be an important reason for failure (2,3). Many studies have indicated that leakage, whether apical or coronal, adversely affects the success of root canal therapy. Therefore, leakage studies on sealers remain important and necessary to determine the most suitable materials and to gain more understanding of the factors influencing the sealing properties.

Many filling materials have been used in root canal therapy in an attempt to achieve success. The material most commonly recommended for obturation is gutta-percha combined with a sealer. Gutta-percha is considered an impermeable core material; therefore, leakage through an obturated root canal is expected to take place at the interfaces between sealer and dentin or sealer and gutta-percha, or through voids within the sealer. Hence, the sealing quality of a root canal filling depends much on the sealing ability of the sealer (4).

A review of a large number of published leakage studies points to general agreement that leakage occurs between the root filling and the root canal walls (5,6). Therefore, any thing that may influence the adaptation of the root filling to the canal wall is of great significance in determining the degree and the extent of leakage, and ultimately the prognosis of the endodontic therapy. Cold lateral condensation is widely used to obdurate root canals and has been

considered for years to be the standard by which other obturation methods are judged, but some authors (7) have reported that it produces voids that may remain empty or be filled by sealer that may resorbed in time and decrease the effectiveness of the root canal obturation (8).

Leakage studies have shown that the loss of the coronal seal provides a route for bacterial recontamination of endodontically treated teeth (9). A lack of the coronal seal may lead to endodontic failure (10). Coronal microleakage might be the major cause of non surgical endodontic failure (3). Delay in placement of a permanent restoration, fracture of the coronal restoration and/or tooth, in adequate thickness of the temporary restoration, and preparation of the post space with in adequate remaining apical filling are potential means of coronal recontamination of obturated root canals (3). In addition, recurrent caries and restorations within adequate margins may result in coronal leakage (11). The technical quality of the coronal restoration was conducted to be significantly more important than the technical quality of the endodontic treatment for periapical health, based on the radiographic evaluation of more than 1000 endodontically treated and restored teeth (10).

A variety of restorative materials have been used in an attempt to produce a coronal barrier with varying results and lack of agreement between the studies (12). One of these materials, Mineral Trioxide Aggregate (MTA) has been evaluated for a wide variety of application (13). These include pulp capping, apical barrier, perforation repair, and root end filling material. In addition, the use of MTA as an orthograde root-filling material has been suggested (14). One reason that MTA has gained attention is its superior ability to resist leakage (15). Such behavior may be explained by superior marginal adaptation of MTA (16). The purpose of this study was to evaluate the potential of using MTA as a root canal filling material and coronal barrier by comparing its sealing ability.

Materials and Methods

Forty, extracted single canal, human teeth were used in this study. The teeth were stored in 0.2% thymol solution immediately after extraction. All teeth were carefully debrided of any soft tissue with periodontal curette and decoronated of 3mm above the cemento-enamel junction using high speed fissure burs and water spray. An access opening was prepared using a high speed hand piece and a #2 round bur with a constant water spray. A #10 file was used to establish working length and maintain patency. Working length was determined by measuring the length at which a #10 file was first visible at the apical foramen and subtracting 1.0mm. The canals were instrumented with 0.08 to 20 GT rotary files to working length (Dentsply Tulsa Dental). During instrumentation, each canal was irrigated with a total of 5ml of 5.25% sodium hypochlorite. Canals were dried with paper points. The forty teeth were randomly placed into one of two groups, each group of 20 teeth.

In group I, a master gutta-percha cone was fitted to within 0.5mm of the working length and removed. The canal walls were coated with Dorifil sealer (Dorident, Austria) using lentulo spiral. The tip of the master cone was coated with sealer and reseated. Obturation was completed using a standard lateral condensation technique, excess gutta-percha was removed from the coronal portion of the root canal with a warm instrument, and the material was vertically compacted.

In group II, 1g of Pro Root MTA (Dentsply, Tulsa, OK) powder was mixed with 0.35g of the supplied root canal repair material water per the manufacturer's instructions. This mixture was applied to the canal walls using lentulo spiral until the material reached the canal orifice, because pilot work demonstrated that this technique produced the most consistently radio dense canal fills. Master gutta-percha was then placed into the canal to within 2mm of the working length to facilitate retreatment. Any apically extruded MTA was removed flush with the apical foramen. Excess gutta-percha and MTA cement was removed from the coronal portion of the root canal. In all the forty teeth, the coronal aspect of the gutta-percha and the pulp chamber was adjusted to terminate 4 mm apical to the level of decoronation as measured by a periodontal probe, the coronal 4 mm of the pulp was cleaned of gutta-percha and sealer with alcohol-moistened pellet, rinsed with sterile saline, and dried with air stream.

The twenty teeth of the group I were divided into 2 experimental groups of 10 teeth. In group (Ia), 10 teeth received a 4 mm barrier of MTA, in group (Ib), 10 teeth received a 4 mm barrier of zinc phosphate cement (Dorident, Austria). All materials were mixed to manufacturers instructions. MTA was placed using a messing Gun and condensed with a #5/7 endodontic plugger. MTA was leveled with the coronal root surface using a moist cotton pellet. The same procedure was done for the group II.

All teeth were wrapped in wet gauze, placed in closed individual vials, which were placed in an incubator at 37^0C for 24h to allow for a complete set of the barrier materials. The teeth were then covered with a two layers of fingernail varnish so that only the apical foramen and the coronal surface remained exposed. All specimens were immersed in 1% methylene blue dye for 72h. After removal from the dye, the roots were rinsed in tap water and the fingernail varnish was completely removed by scraping with a number II scalpel. After removal of nail varnish, the teeth were longitudinally sectioned in a bucco-lingual direction using a low-speed diamond wheel under constant water lubrication.

Dye penetration was measured in millimeters in both sites apically and coronally, using a calibrated stereomicroscope. One examiner, who had knowledge of the treatment, analyzed the sections. The section that had the greatest depth of dye penetration was used as the final score for that specimen. The results were tabulated, and the mean value for each group was calculated. Statistical significant differences were established using ANOVA, T-test and LSD test.

Result

The extended of dye leakage in millimeter, the means, and the standard deviations for each group are listed in table (I). All experimental groups demonstrated dye leakage. Data for apical leakage were subjected to a one-way ANOVA test. The differences in the median values among the groups were found to be statistically highly significant (table II). The T-test showed no significant difference between paired subgroups (table III) in coronal microleakage. The LSD test exhibited that ZnPo4 cement group significantly more leakage than MTA group (table IV) in coronal microleakage.

Table I : Descriptive statistics

Groups	No.	Minimum	Maximum	Mean	Std. Dev.
Gr.I	20	0.5	2.2	1.3	0.1163
Gr.II	20	2.9	5.0	3.8	0.1103
Gr.Ia	10	0.3	1.8	1.02	0.1718
Gr.Ib	10	0.8	2.3	1.51	0.1683
Gr.IIa	10	0.4	1.9	0.99	0.1703
Gr.IIb	10	0.7	2.2	1.49	0.1441

Table II: ANOVA Test

Source of variation	Sum of sq.	Df	Mean Sq.	F.	Prob.	Significant
Between Measures	62.5000	1	62.5000	336.4023	0.000	H.S.
Residual	3.5300	19				
Total	66.0300	20				

Table III: T-Test between paired sample groups

Groups	t	df	Sig.	
Gr.Ia Vs. Gr.IIa	0.519	9	0.616	N.S.
Gr.Ib Vs. Gr.IIb	0.480	9	0.642	N.S.

Table IV: LSD test

Groups	t	df	Sig.	
Gr.Ia Vs. Gr.Ib	-7.869	9	0.000	H.S.
Gr.IIa Vs. Gr.IIb	-5.441	9	0.000	H.S.

Discussion

Microleakage in the root canal is a complex subject because many variables may influence leakage, such as root filling techniques, the physical and chemical properties of sealers, and smear layer. When evaluation a new root canal sealer, analysis of its sealing ability under the different conditions is therefore, very important. Use of chemically active, adhesive root canal sealers may play an important role in minimizing both apical and coronal leakage. Therefore, root canal sealers must be examined for their ability to minimize both leakage (17).

Root canal filling materials are intended to prevent microorganism and toxins in the canal from passing along the root canal space and into the periradicular tissues (1). Difficulty obliterating accessory canals, fins, anastemoses, apical deltas, and other irregularities of the root canal space and failure to adequately seal the apical foramen have been reported to account for a large percentage of root canal space occurs, the ability to obtain an adequate seal is further compromised by the irregular shape and increased size of the area to be sealed. Clinical support for the use of MTA as an obturating material, however, was presented in a case report by O 'Sullivan et al (19), in which MTA was used as the obturating material for the root canal system of a retained primary second molar. At the four-month follow up, the patient was a symptomatic, clinical finding were within normal limits, and there was evidence of radiographic healing.

MTA was compared with gutta-percha because gutta-percha is the root canal filling material must commonly used today. The present study demonstrated a significant difference in the apical seal produced by lateral

condensation when compared with MTA. This result was surprising given the numerous studies reporting that MTA is an effective root-end filling material (16,20).

MTA powder consists of fine hydrophilic particles that set in the presence of moisture. Hydration of the powder results in a colloidal gel that solidifies to a hard structure in less than 4 h (21). In the present study, the MTA was mixed according to the manufacturer's directions and allowed to set in 100% humidity for 24 h. After that time period, the set of the material was confirmed by probing the MTA at the apical foramen with a No. 16 endodontic explorer, which was found to be brick hard. It was, however, impossible to determine the depth of set of the cement. MTA is not usually used in bulk; therefore, its possible that some of the mid root material deep to either the coronal or apical ends of the canal remained unset due to its lack of exposure to water for the setting hydration reaction, affecting the seal. Root-end filling studies, therefore, may not be comparable to root canal filling studies due to the disparity in preparation depths and resultant material thickness. We did, however, place a master gutta-percha point to within 2 mm of the working length in the MTA group to facilitate retreatment. This should have effectively reduced the MTA to a thickness comparable to a root end filling.

Amalgam, intermediate restorative material (IRM), TERM, glass-ionomers, resin-bonded cements, and recently, MTA have been tested for their ability to prevent microleakage when used as a barrier to augment the coronal seal (2,9,22).

All studies differ in methodological design, making comparison difficult. In this study, extracted intact teeth were used and a thickness of 4 mm of restorative material inserted. It has been reported (23) that a minimum of 3.5-4 mm of restorative material is necessary to prevent microleakage, however, clinically a 4-5 mm thickness of temporary restorative material cannot always be achieved, in particular not in severely broken-down teeth requiring endodontic therapy.

Placing a root canal orifice plug (13) offers an advantage over sealing the pulp chamber floor (3), because it can also be placed in canals prepared for post space. If retreatment becomes indicated, the 2-4 mm plug can be easily removed. Torabinejad and Chivian (13) suggested the use of MTA for this purpose, based on the materials proven sealing ability against microbial penetration. MTA was found to be suitable for use as an orifice plug. It was easily manipulated and compacted into the canal orifices. One disadvantage of MTA is the lengthy setting time and the moisture required to enhance setting. This suggests that restoration of the tooth cannot be performed immediately after the placement of the MTA plug.

The present study demonstrated a highly significant difference in the coronal seal produced by MTA when compared with ZnPo4 cement. This came in agreement with Torabinejad et al (21) who investigate the sealing ability of MTA as root-end filling material after root end amputation. MTA allowed significantly less dye penetration than the other materials. In addition, this study came in agreement with Lee et al (24) who compared the sealing ability of MTA for repair of experimentally induced root perforations in extracted teeth. The results showed that MTA allowed significantly less leakage and overfilling tendency.

To date, the relationship between dye penetration and the success of endodontic treatment is not clear.

Information provided by passive dye leakage techniques such as we employed does not include the volume of tracer that penetrates and is thus only semi quantitative. Multiple factors such as the size of the dye molecules, the immersion time, presence or absence of a smear layer, can make comparisons between studies difficult (6).

Under the conditions of our study, the apical seal produced by traditional gutta-percha techniques was superior to that produced by MTA. The coronal seal produced by MTA was superior to that produced by ZnPo4 cement. As MTA has proven successful in numerous other clinical applications, further investigation should be conducted to determine whether MTA itself or the technique for its placement could be modified for use as a root canal filling material in perforated roots.

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The Size and the Form of the Frontal Midsagittal Alveolar and Basal Bone of the Maxilla and the Mandible in Relation to the Over Bite.

Suhad Muhammad Ali Sadiq. B.D.S. M.Sc. *

Abstract

In this study, the relationships between the over bite and the structure of the frontal alveolar and basal bone were investigated. The over bite, lower face height, and the anterior alveolar and basal midsagittal cross-sectional area from the maxilla and the mandible were assessed on lateral cephalograms from (88) un-treated subjects. The open bite group showed significantly larger maxillary and mandibular alveolar and basal cross sectional areas compared with the normal over bite group. It is concluded that open bite subject with long face have a larger mandibular and maxillary alveolar height, which is more associated with elongated and narrowed shape of the symphysis.

Introduction

In the cephalometric literature, the associations between the over bite and the vertical skeletal pattern have been described many times. Several descriptions of facial structure have used, such as skeletal open bite, [1-5] skeletal deep bite, [2,3] long-face syndrome, [4,6] short-face syndrome, [7] high angle type, [8] low angle type, [9] hyper divergent, [3] hypo divergent, [10] vertical maxillary excess, [8] vertical maxillary deficiency,[7] cephalometrically, these descriptions are made on the basis of total and lower face height, [8] gonial angle, [4] ramus length, [4] mandibular plane angle, [8] and facial prognathism or retrognathism. [8] It has become very clear that the cephalometric characteristics of a long-face structure are predominantly located below the palatal plane. [1,4,6]

Many articles have dealt with cephalometric comparisons between groups of patients with open bite and normal over bite. Generally, anterior open bite has been defined as" that condition where upper incisor crowns fail to overlap the incisal third of the lower incisor crowns when the mandible is brought in to full occlusion" [11] whereas, a normal over bite was defined as a certain amount of overlap between the incisors. [12]

A dental open bite is limited to the anterior region in an individual with good facial proportions.[1] A skeletal open bite, on the other hand, typically involves increased anterior facial height, a steep mandibular plane, and excessive eruption of the posterior teeth. [13]

Some features described as being characteristic for the skeletal open bite, compared with patients with a normal vertical skeletal pattern are large lower facial height, [1,8,11,14-18] smaller upper/lower anterior face height ratio,[11,14-16,19] smaller posterior facial height, [8,16,17] large angle between the cranial base and the mandibular plane,[11,14,16-20] and a more obtuse gonial angle. [11,14-16]

Some investigators recorded a large dento-alveolar height in the frontal part of both jaws in patients with open bite,

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compared with patients with normal or deep bite.[15] Several authors [1,11.17,18] reported significant differences between patient with normal and deep bite in the dento-alveolar region of the maxilla only. Others [19] found no differences at all, and two authors [16,20] recorded smaller dento-alveolar height of the incisor region in patients with open bite.

A relation ship may exist between the structure of the frontal part of the maxilla and mandible and the lower face height, in such a way that in cases with open bite or a deep bite, the vertical dento-alveolar development may be insufficient to compensate for the large or small distance between the jaws.[21] This possible relation ship is illustrated in fig. (I).

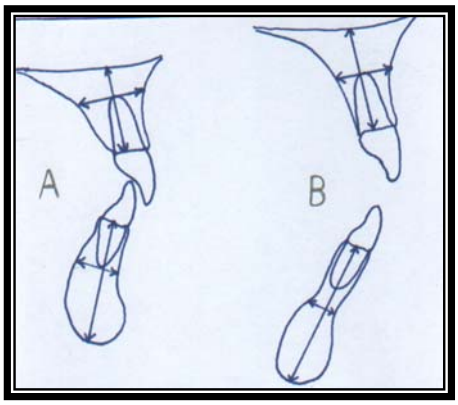

Fig.(I): Different projections of frontal alveolar and basal bone in average overbite (A), and Openbite (B).

Significant negative correlation between the lower face height and the over bite were found by Adams and Kerr [22] and Dung. [23] However, not all long-faced subjects have an anterior open bite. There fore not only the vertical size of the jaws may be related to the over bite. This is suggested by Fleming, [24] who found significant positive correlations between the over bite and dento-alveolar height.

Observations on long-faced subjects with anterior open bite demonstrate a narrow and elongated midsagittal projection of the maxilla and the mandible in the frontal region of the jaws. [12]

The objective of this study was to investigate the relations between the over bite, the lower face height and the structure of the frontal alveolar process and the basal bone in the maxilla and in the mandible in persons with an open bite compared with persons with a normal over bite.

We investigated that: (1) A longer lower face is associated with larger areas of the maxillary and mandibular frontal alveolar process and basal bone, and (2) A longer lower face is associated with a narrow and elongated shape of the maxillary and mandibular frontal alveolar process and basal bone.

Special measurements were developed to investigate the form and size of the alveolar and basal bone in the anterior region of both jaws including area measurements. The fallowing hypothesis was tested: the size and the form of the frontal alveolar and basal bone of the maxilla and the mandible are related to the over bite.

Material and methods

Pretreatment cephalograms of (88) subjects (14-16 years old) were selected. All cephalograms included in the study were taken of persons of Iraqi origin. No subject had sever craniofacial disorders, such as cleft palate, bridge or extensive prosthetic appliances. The cephalograms of all subjects were traced. Most landmarks were defined according to Riolo et al. [25]

For the statically analysis, the subjects of this study were divided into 2 groups based on the over bite.

The tow groups were as follows:

1- Subjects with a normal over bite between 2-4 mm were

selected as a control group (No. = 40).

2- Subjects with a negative over bite being smaller than (-1) were selected as a study group (No. = 48).

The normal over bite group was defined after careful analysis of literature. [26] The skeletal lower face height was evaluated and the group differences were compared. For all statistical analysis, the confidence level $p<0.5$ was considered significant.

Skeletal cephalometric landmarks, reference lines and measurements used in the study are described in fig. (II) and (III).

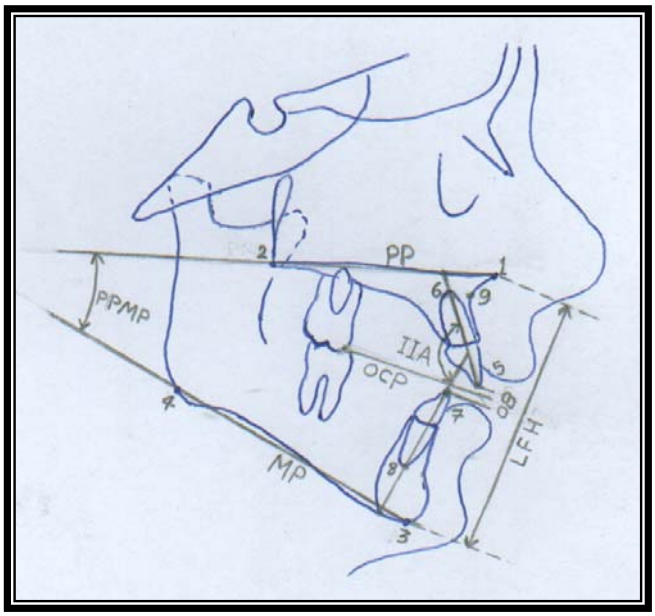

Fig. (II) Skeletal cephalometric landmarks, reference lines and measurements used in the study. Landmarks: **(Refer to Riolo)**[25] .1: Anterior nasal spine, tip of median sharp long process of maxilla at lower margin of anterior nasal opening; 2: Posterior nasal spine, most posterior point at sagittal plane on bony hard palate; 3: Menton, most inferior point on symphysial outline of chin; 4: Gonion, midpoint of angle of mandible found by bisecting angle at mandibular plane and plane through articular, posterior and along portion of mandibular ramus inferior to it; 5: Incisal tip of central maxillary incisor; 6: Apex of central maxillary incisor; 7: Incisal tip of central mandibular incisor; 8: Apex of central mandibular incisor**;** 9: A- Point: deepest point of curvature of frontal midsagittal section of maxilla. **Reference lines:** MP: Mandibular plane, line connecting menton and gonion, define according to Fields [4] , Schendel [8], Janson [27]. PP: palatal plane, line connecting posterior and anterior nasal spine. OCP: Occlusal plane, connecting mid points between incisal ridges of central incisors and mid point between mesio-buccal cusps of first molars. Measurements: LFH: lower face height, direct distance between Anterior Nasal Spine and Menton. OB: over bite, distance between incisal tips of maxillary and mandibular central incisor perpendicular to occlusal plane. Positive values for overbite indicated normal. Where as open bite was indicated by negative value. PPMP: palato-mandibular angle, angle between palatal and mandibular plane. IIA: inter incisal angle, angle between axes of maxillary and mandibular incisors.

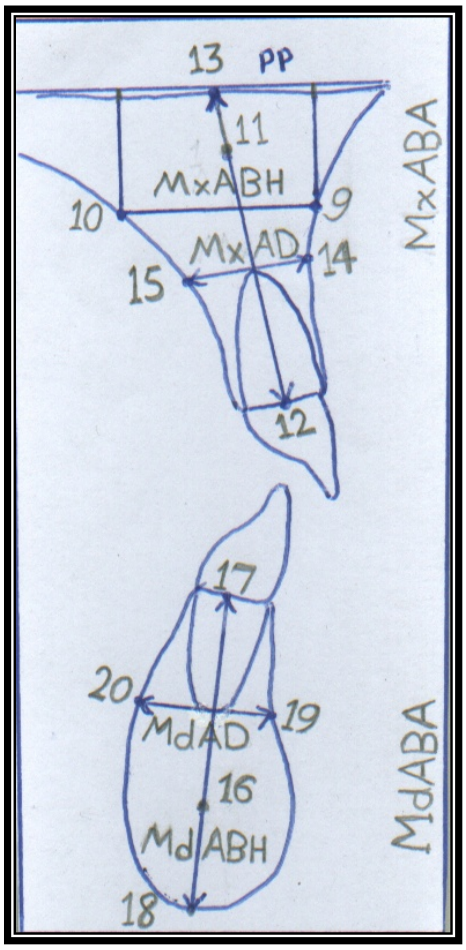

Fig. (III) Illustrations of dento-alveolar cephalometric landmarks, reference lines, and measurements used in study. **Landmarks**: 10: Palatal counter part of A-point on palatal cortical bone at same distance from palatal plane as A-point.11: Center of rectangle limited by line (9-10) and palatal plane. Rectangle represents midsagittal section of basal bone of maxilla. This point was defined as center point of maxillary alveolus. 12: Mid point of alveolar meatus of maxillary central incisor.13: Intersection between palatal plane and maxillary alveolar axis (maxillary alveolar axis runs from midpoint of alveolar meatus of maxillary central incisor through central point of maxillary alveolus). 14: Frontal point of shortest line above apex of maxillary central incisors between maxillary midsagittal labial and palatal alveolar cortical bone.15: Dorsal point of shortest line above apex of maxillary central incisors between maxillary midsagittal labial and palatal alveolar cortical bone.16: Center point of basal midsagittal bone of mandible.17: Midpoint of alveolar meatus of mandibular central incisor. 18: Inter section between symphysial surface and mandibular alveolar axis (mandibular alveolar axis runs from midpoint of alveolar meatus of mandibular central incisor through center point of symphysial).19: Frontal point of shortest line above apex of mandibular central incisors between mandibular midsagittal labial and lingual alveolar cortical bone. 20: Dorsal point of shortest line below apex of mandibular central incisors between mandibular midsagittal labial and lingual alveolar cortical bone. **Measurements**: MxABH: maxillary alveolar and basal height, distance between midpoint of alveolar meatus of maxillary central incisor and intersection between palatal plane and maxillary alveolar axis. MdABH: mandibular alveolar and basal height, distance between midpoint of alveolar meatus of mandibular central incisor and intersection between symphysial surface and mandibular alveolar axis. MxAD: maxillary anterior depth, defined as distance between point 14 and 15. MdAD: mandibular alveolar depth, defined as distance between points 19 and 20. MxABA: Area of alveolar and basal midsagittal cross-section of maxillary jaw. Line was drowning perpendicular to palatal plane, intersecting point A and forming anterior border of maxillary alveolar and basal area. From point A (9), line was drawn parallel to nasal plane intersecting dorsal contour of maxillary alveolar bone. Dorsal border of maxillary basal area was formed by line, perpendicular to nasal plane, intersecting point (10). Area was then measured between these lines and outer contour of maxillary alveolar and basal bone below line 9-10. MdABA: area of alveolar and basal midsagittal cross-section of mandible, area between outer contours of symphysis.

Results

Statistical Analysis

Student t-Test were performed between the first and the second group of recording to detect any systematic deference between the first and second tracing of the error study. No significant difference was detected between the initial and repeated recording (at $P>0.05$) indicating a good reliability of the method.

Student t-Test was used to determine the significant differences of all variables between normal and open bite groups. For all statistical analysis, the confidence level $P<0.05$ was considered significant.

The statistical comparison for the dimensions of the frontal alveolar and basal midsagittal cross-sectional bone from the maxilla and the mandible was evaluated and all measurements showed an over all-significant differences between the two different over bite groups as shown in table (I).

Open bite group showed a larger adjusted means for the maxillary and mandibular alveolar and basal heights and a smaller adjusted means values for the maxillary and mandibular alveolar and basal depth and a larger adjusted means for the mandibular alveolar and basal area than normal over bite group. In addition, the maxillary mandibular plane angle and the interincisal angle show a high significant differences for open bite group than the normal over bite group except for the difference in the maxillary alveolar and basal area was larger in the open bite group but not reach the significant level.

The vertical linear measurements of overbite and the lower face height and the angular measurements showed an over all high significant differences between the open bite group over the normal over bite group.

Correlations

Pearson correlation coefficients were calculated to assess the relation between over bite, lower face height, and the structure of the frontal – alveolar process and the basal bone in the maxilla and mandible in subject with open bite as shown in table (II).

The strongest positive correlation was found between the lower face height and the maxilla and the mandibular alveolar and basal height, the palato-mandibular plane angle, as well as the mandibular alveolar and basal area. The significant negative correlation was found between lower face height and the maxilla and mandibular alveolar depth.

Negative correlations coefficient were found between maxillary alveolar and basal height with the maxillary alveolar depth and the interincisal angle.

Positive correlations were found between the maxillary alveolar depth with the maxillary alveolar and basal area and inter incisal angle.

Mandibular alveolar and basal height show significant positive correlation with the mandibular alveolar and basal area and palato-mandibular angle and significantly negative correlated with the mandibular alveolar depth and inter-incisal angle.

Positive correlation was found between mandibular alveolar depth and mandibular alveolar and basal area.

Table (1): Student t-test.

Variables	Open bite (48)		Normal (40)		t-Test P-level
	Mean	S.D.	Mean	S.D.	
OB	-2.98	1.03	2.59	1.09	H.S.
LFH	75.25	5.04	63.31	1.95	H.S.
MXABH	24.47	3.36	21.0	2.39	H.S.
MXAD	8.91	1.31	12.93	1.9	H.S.
MDABH	35.72	3.9	31.93	2.14	H.S.
MDAD	6.10	0.92	9.37	1.14	H.S.
MXABA	110.43	20.32	96.70	30.32	N.S.
MDABA	205.75	25.65	193.41	28.15	H.S.
PPMP	32.39	3.70	23.18	3.37	H.S.
II	121.60	8.94	124.31	10.01	S.

Table (II): Pearson's correlation coefficient between all variables for openbite group.

VARIABLE	OB	LFH	MXABH	MXAD	MDABH	MDAD	MXABA	MDABA	PPMP	II
OB		- *							- *	
LFH			* *	- *	* *	- *		*	* *	
MXABH				- *	* *		*			- *
MXAD							*			*
MDABH						- *		* *	* *	- *
MDAD								* *		
MXABA										
MDABA										
PPMP										
II										

* = Significant correlation at P<0.05

** = Highly significant correlation at P<0.01

Discussion

The diagnosis and treatment of anterior open bite malocclusion continues to be one of the most difficult problems facing the practicing orthodontist. When dealing with an orthodontic patient, the clinician should begin the diagnosis process by looking for any skeletal problems.[28]

Usually, the study of open bite is carried out by analyzing the differences between selected groups of patients with open bite with a control group.[14-18,29] The Interactions between lower facial height and other measurements that may influence the overbite are often not taken into consideration.

In most articles concerning the long face syndrome, [1,4,8,17,30,31] the long-face groups also include anterior open bite cases.[1,4,32] A study of Haskell[30] demonstrated that the bony chin in subjects with open bite was smaller, compared with a normal over bite group. This suggests a relationship between the overbite and the structure of the alveolar and basal bone in the frontal part of the jaws. Therefore, in

this study, only subjects with a normal overbite (between 2and 4 mm) were selected for the group comparisons. To achieve the true distance between the jaw bases, the direct distance between the Anterior Nasal Spine and Menton was measured.

In many articles [8,32], the dento-alveolar height was measured but the structure, shape and size of the alveolar and basal bone in the frontal part of the jaws, which was the subjects of this study, were not investigated. A discrepancy between the vertical dimensions of the alveolar and basal bone on the one hand, the vertical dimensions of the lower anterior face on the other hand may reflect an abnormal vertical position of the incisors, and there by influence the over bite.

In this study, no differences were found to be significant among sex groups with open bite subjects.

The results of this study indicate that the over bite and the lower face height have a certain impact on the dimensions of the maxilla and the mandibular symphysis.

The correlation analyses showed that the lower facial height and the overbite were negatively related; subjects with an open bite generally had a larger lower facial height. This was also confirmed by previously reported findings.[1,11,16,17,33-35] Additionally, Gardiner(1998) [36] state" Although the teeth and alveolar processes are adaptable within limits and manage to compensate for moderate variations in vertical height of the lower part of the face ,the open bite will result", and accordingly an anterior open bite associated with an increase infra-nasal height. However, not all long-faced subjects have an anterior open bite. [4,8,23]

The results of this study indicate that a long-faced person with anterior open bite generally have a larger area of the maxillary alveolar and basal bone with no significant deviation of its shape. Although the cephalometric approach is only two-dimensional, this may indicate that the volume of the maxillary alveolar and basal bone coincides with a longer maxillary alveolus.

In the mandible, an even stronger relation between the symphysis and the lower face height is found. The vertical height of the symphysis is determined by its shape ,The increase in height of the symphysis seems to coincide more with a narrowing of its shape .Thus ,in open bite subjects, the sagittal dimensions of the mandibular apical area in the incisor region is reduced, but this reduction was associated with more increase in the dento alveolar height. In contrast to normal over bite subjects .This is in agreement with the results of Backmann et al (1998).[12] Another study [21] found that the open bite group showed significantly smaller maxillary and mandibular alveolar and basal cross-sectional areas compared with the end-to-end group ,the normal overbite group, or the deep bite group.

Only a slight relation was found between the dimensions of the corresponding maxillary frontal alveolar and basal bone and the over bite. The feasibility of over bite correction by orthodontic treatment may thus be assessed by using the measurements (the alveolar and basal areas, as well as the lower face height, depth, and areas.

In this study, the depth of the symphysis was measured only at the level of the apices of the central mandibular incisors, so it cannot be ruled out that the depth of the symphysis measured at another level (for example at the bony chin) [30] may have a different relation ship with the over bite.

Another study [12] showed that subjects with a short-face structure generally had a smaller area and amore widened and shortened shape of the symphysis.

However, this study revealed that in the open bite group with long face height, the area of the symphysis generally was larger and the shape of the symphysis generally was more narrowed and elongated.

Thus, in open bite with long faced patients, the sagittal dimensions of the mandibular apical area in the incisor region is reduced in contrast to normal overbite subjects who have normal sagittal dimensions of the mandibular apical area. Consequently, the possibilities of labiolingual movement of the mandibular incisors in long-faced patients with anterior open bite are limited. This suggests a compensatory mechanism simultaneously enlarging the vertical dimensions while reducing the labiolingual dimensions of the basal and alveolar bone in the frontal part of both jaws. Thus the structure of the alveolar and basal bone may be useful for predicting the treatment success of the over bite problems.

As the shape of the maxillary alveolar and basal bone is related to the vertical facial dimensions, the scope of anterior-posterior movements of the maxillary incisors is large.

In this study, the depth of the symphysis was measured only at the level of the apices of the central mandibular incisors, so it cannot be ruled out that the depth of the symphysis measured at another level (for example at the bony chin) [30] may have a different relation ship with the over bite.

The fact that the palato mandibular angle was larger in the open bite group compared with the normal over bite group. This is in agreement with the results of Fields, [4] Schendel, [8] and Ulgen. [32]

The inclination of the maxillary and mandibular central incisor seems to have an effect on the over bite. This study showed that in subjects with open bite, the interincisal angle was smaller in the open bite group, the maxillary and mandibular central incisor generally are protruded, where as in subjects with normal over bite, (more steeply inclined). Here a slight increase or decrease in the inclination of the central incisor will produce a large effect on its vertical height. This is in agreement with the results of Beckmann et al 1998. [21] Ulgen, [32] found no significant differences between the long face with open bite group and the control group for the inter incisal angle.

Several investigators [37,38] concluded that the lower anterior face height is largely determined by heredity. Because the lower anterior face height and the mandibular alveolar and basal shape seem to be related, it is possible that the shape of the frontal alveolar and basal bones is also at least partially influenced by the same genetic factors, which also determine the lower face height. As the maxillary alveolar and basal area also is correlated with the lower face height, the volume of the maxillary and basal might be influenced by the same genetic factor that controls the lower face height. This same factor also may influence the shape of the symphysis. Therefore, disharmonies between the effect of the size controlling genetic factor and the effect of the shape/lower face height controlling genetic factor may account for considerable variation in over bite.

Conclusion

The size and form of the mandibular symphysis are more

strongly related to the overbite and lower face height. With increasing lower face height, the symphysis is elongated and narrowed, where as its area is increased. The midsagittal alveolar and basal area and shape of the maxilla showed a slight relation with the overbite. Thus, an estimation of the feasibility treatment may be performed by using the area and the shape of the symphysis along with the lower face height.

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Dental Caries and Salivary Streptococcus Mutans in Relation to Primary and Permanent Dentition

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Abstract

Background : Streptococcus mutans has been implicated as a principle microbial agent in the pathogenesis of dental caries. The aim of this study was to compare caries experience and salivary Streptococcus mutans count among groups of children having primary dentition and adults having permanent dentition.

Materials and Methods: The sample consisted of 100 children with an age of 4 – 5 years old and 100 adults with an age of 21 – 22 years old in Baghdad city. Dental caries was examined for the whole dentition and bacteriological analysis was done for the salivary sample to estimate the count of Streptococcus mutans in saliva.

Results: Caries experience of adults was significantly higher than that of children while salivary S.mutans count was significantly higher among children than the adults. Positive correlation of S. mutans with decayed surface was stronger than that with (dmfs/DMFS) for both children and adults.

Conclusion : S. mutans count was significantly higher among children than adults and caries experienc of permanent teeth was significantly higher than that of primary teeth.

Keywords : Streptococcus mutans ,caries, primary and permanent teeth .

Introduction

Man , like all mammals has two sets of teeth the first set is called the primary teeth which begins to appear in the oral cavity at a mean age of 6 months , and the second one is called the permanent teeth which begins to appear at 6 years of age [(1)]

Children who have little caries in primary dentition are also likely to have little caries in the permanent dentition [(2)]. Therefore the dental condition of deciduous teeth may be reflected in the permanent teeth.

Streptococcus mutans has been considered as one of the prime etiologic agents of dental caries , this microorganism indicates a high caries risk when present in a high number in the saliva , which apparently reflects one of the variables involved in the development of caries lesion [(3)]

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Materials and Methods

The present investigation comprised a randomized sample of 200 subjects in Baghdad city, those subjects were composed of twogroups :

1 – The first group consisted of 100 kindergarten children (58 males and 42 females) aged 4 – 5 years and having primary teeth only .
2 – The second group consisted of 100 dental students (51 males and 49 females) aged 21 – 22 years and having permanent teeth .

The subjects examined were with no history of any systemic disease and not under medication therapy.

Clinical Examination:

The teeth were examined with mirror and explorer under artificial light using the criteria by Jackson for diagnosis of dental caries [(4)]. Examination concerning dmfs (for primary teeth) and DMFS (for permanent teeth) were calculated.

Bacteriological Analysis:

Paraffin stimulated saliva was collected for 2 minutes from each subject Tenfold serial dilutions of saliva were obtained by sequentially pipetting 0.1 m1 of the suspension in to 0.9 m1 of sterile normal saline through four sterile screw capped vials then 0.1 m1 of inoculum was taken from 10^{-3} and 10^{-4} salivary dilutions and inoculated on the surface of Mitis Salivarius agar media which is selective for S. mutans. The agar plates were incubated anaerobically in gas pak jars for 48 hours at 37 C. Identification of S. mutans on the media was made by colonial morphology which is of a highly convex surface, light blue in color and of frosted glass appearance[(5)]. Gram's stain was used to eliminate any doubt of the presence of species other than streptococci. Lastly fermentation of mannitol and sorbitol test were carried out.

Enumeration of S. mutans colonies on the surface of agar plates was carried out by the naked eye and the number multiplied by the dilution factor to express the salivary level of the microorganism in term of the logarithmic mean concentration of the colony forming unit per milliter saliva (cfu / m1).

S. mutans counts were divided in to four levels in this study, very low ($\leq 10^3$), low (10^4), moderate (10^5) and high ($\geq 10^6$) cfu / m1saliva.

Results

Table (1) demonstrates that caries experience was significantly higher in adults than in children ($t = -5.43$, $P < 0.005$). The dmfs / DMFS components for the whole sample was shown in table (2) the mean DS for the total adults was significantly lower than the mean ds for the total children (($t = 3.08$, $P<0.005$) , while the means MS and FS for adults were significantly higher than that for children. This means that the ds component constitutes the major part of the dmfs value for children, while the FS component constitutes the major part of the DMFS value for adults.

Figure (1) presents the occurrence of salivary S. mutans in the total sample. Positive occurrence for children was 96% and for adults it was 98%. The mean counts of S. mutans was significantly higher among children than adults ($t = 2.18$, $P < 0.05$). Although adult males and females had lower counts of S. mutans than children males and females respectively but the differences were not significant, table (3).

Distribution of subjects according to the level of salivary S. mutans was demonstrated in table (4). Statistically, highly significant differences were

found concerning the distribution of the levels of S. mutans between children and adults. Table (5) shows the mean values of S. mutans according children and adults according to severity of caries experience. It has been found that with the increase in the grades of dmfs / DMFS there is an increase in the level of S. mutans among both groups.

Positive correlations have been found between S. mutans and both dmfs / DMFS and ds / DS among children and adults. It has been found that the correlation of S. mutans with ds / DS was stronger than with dmfs / DMFS for both children and adults, table (6).

Discussion

Result of this investigation shows that the mean dmfs index for children was lower than that observed by other studies [6, 7].

Adults in the present study had a mean DMFS approximately the same as that found in previous Iraqi study [8] and lower than that reported in a study of other country [9]. This difference in the result may be attributed to the absence of radiographic examination in the present study, so one might expect an underestimation because clinical examination alone may fail to detect inter proximal lesions [10].

The mean dmfs for children was found to be significantly lower than the mean DMFS for adults , this comes in consistence with the results of others [8, 11] who reported a mean DMFS among dental students higher than the mean dmfs found by other study [6] among preschool children. The increased prevalence and severity of dental caries in adults may be attributed to the irreversibility and accumulative nature of the disease [12, 13].

The higher contribution of dmfs index was made of ds component; this confirms the result of other study [14] which may reflect an unawareness of the importance of the primary teeth or a negative attitude of parent towards dental treatment. The FS component constitutes the major part of the DMFS index in adult this support the finding of other [15] that the number of FS and MS would be increased with age.

In the present study the mean count of salivary S. mutans was found to be higher than that reported by other studies [9, 16]. The higher count of salivary S. mutans in this study might reflect differences in the dietary habits and dental health, as well as to differences in culturing procedure and techniques.

The highest percentage of children had a high level of S. mutans ($\geq 10^6$ cfu / m1 saliva) while the highest percentage of adults had a moderate level of S. mutans (10^5 cfu / m1 saliva). However the mean count of salivary S. mutans was significantly higher among children than adults, this disagrees with previous studies [17, 18] who reported a higher S. mutans count in adults than children. In the present investigation the higher count of salivary S. mutans in children may be explained by the fact that the decayed surfaces in primary teeth were significantly higher than those in the permanent teeth in which most of the decayed surfaces were restored and converted to filled surfaces. This confirms the results of other [19] who claimed that the restorative treatment results in a significant reduction of bacterial population including S. mutans. Chosack et al [20] explained the higher count of S. mutans in children to that in primary teeth caries advances move rapidly than in the permanent teeth and because of the lack of treatment or preventive measures that can affect the findings.

Results of this investigation also showed than with increasing severity

of dmfs / DMFS the mean number of S. mutans increased in both groups. This has been well documented earlier among children and adults in previous studies [21 , 22].

Significant positive correlations were found in both groups between the level of salivary S. mutans and the number of dmfs / DMFS and ds / DS. The correlation was stronger with ds / DS than with dmfs / DMFS in both groups, this is in accordance with finding of others [9 , 21]. This observation could support the concept that S. mutans is considered one of the prime etiologic agents of dental caries.

Table (1) : Caries experience (dmfs / DMFS) among children and adults according to sex.

Sex	Children		Adults		t- value
	dmfs		DMFS		
	No	Mean±SD	No	Mean±SD	
Male	58	9.78±9.70	51	17.86±12.53	t=-3.79**
Female	42	9.48±9.37	49	17.24±9.33	t=-3.95**
Total	100	9.65±9.52	100	17.56±11.03	t=-3.43**

**P<0.005

Table (2) : dmfs / DMFS component for the total children and adults.

dmfs / DMFS Components	Children Mean ± SD	Adults Mean ± SD	t-value
ds / DS	8.62±8.38	5.70 ±4.33	t=3.08*
ms / MS	0.92±2.72	2.55±4.87	t=-2.90
fs / FS	0.11±0.66	8.96 ±8.22	t=-10.66**

*P<0.5 , **P<0.005

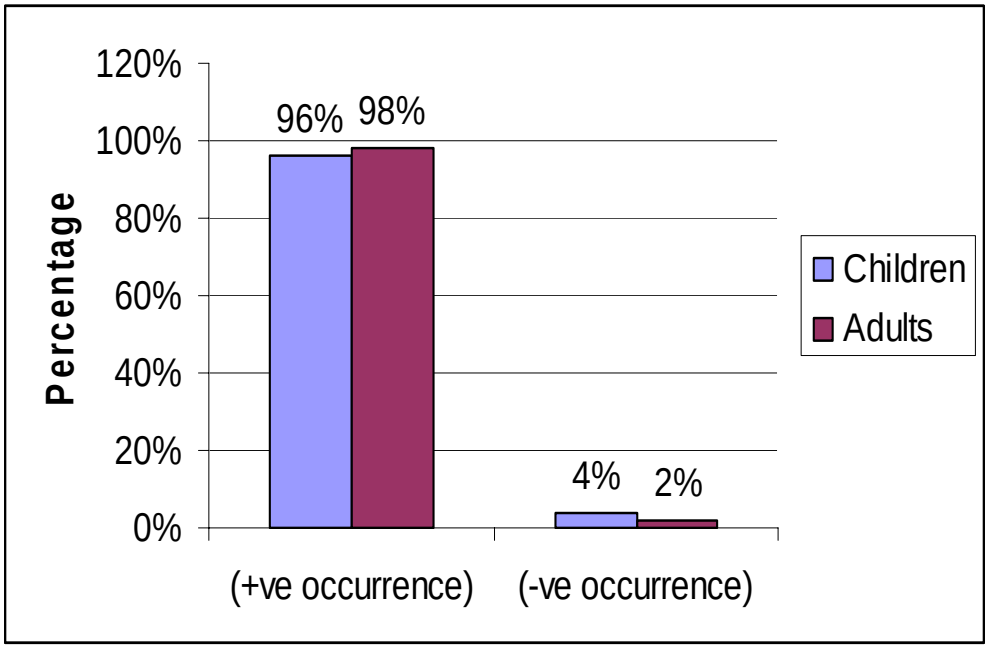

Figure (1): Occurrence of S.mutans in the total sample

Table (3) : Salivary mean counts of S. mutans among children and adults According to sex.

Sex	Children		Adults		t- value
	S. mutans		S. mutans		
	No	Mean*±SD	No	Mean*±SD	
Male	58	13.66±16.34	51	9.64±14.77	N.S
Female	42	12.51±11.22	49	8.22±11.28	N.S
Total	100	13.18±14.36	100	8.94±13.13	t=-2.18**

*The value expressed at level of 10^5 cfu / m1 saliva.
**P<0.05

Table (4) : Frequency distribution of the salivary levels of S. mutans

S. mutans levels	Children		Adults	
	No.	%	No.	%
$\leq 10^3$	8	8	8	8
10^4	1	1	24	24
10^5	45	45	41	41
$\geq 10^6$	46	46	27	27

$X^2 = 26.29$ d.f = 3 P<0.005

Table (5) : Severity of caries experience (dmfs / DMFS) in relation to the S. mutans among children and adults

dmfs / DMFS Grades	Children		Adults		Sig.
	S. mutans		S. mutans		
	No	Mean±SD	No	Mean±SD	
0	12	4.51±5.29	4	0.06±0.04	N.S
1-5	31	13.33±12.45	8	6.73±17.50	N.S
6-10	24	12.88±16.35	13	4.44±5.75	t=1.75*
>10	33	16.42±15.87	75	10.43±13.63	t=1.98

P<0.05

Table (6) : Correlation coefficient between S. mutans and caries experience

Caries experience	Children			Adults		
	S. mutans			S. mutans		
	r	t	p	r	t	p
dmfs / DMFS	0.22	2.23	< 0.01	0.21	2.12	< 0.05
ds / DS	0.28	2.88	< 0.01	0.46	5.12	< 0.005

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Dentistry as a cause of Endocarditis in Baghdad governorate

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Abstract

Endocarditis is a localized microbial infection of the heart valves or endocardium adjacent to congenital or acquired heart defects. It is the dentist's responsibility to prevent the occurrence of endocarditis by following the latest recommendations usually issued by the American Heart Association on prevention of endocarditis. The purpose of this investigation was to determine the role of Dentistry in causing endocarditis among Iraqi at risk patients. A retrospective study of patient's records in three major hospitals in Baghdad was done. Thirty three cases of bacterial endocarditis were found and examined .The results indicated that (18%) of cases were preceded by dental procedures. Compliance with the guidelines on prevention of endocarditis is necessary for all at risk patients.

Key Word: Endocarditis, AHA guides lines, Prophylactic antibiotics, and dentist's compliance.

Introduction

Endocarditis is a localized microbial infection of the heart valves or endocardium near congenital or acquired heart defects [(1)], in persons with rheumatic heart disease, congenital heart disease, or heart prosthesis, bacteria that enter the blood stream may lodge on damaged heart valves or other parts of endocardium and cause bacterial endocarditis. The disease is sometime described as occurring in a sub acute form in which the causative microorganisms are of low virulence namely Streptococcus Viridans. The acute form of endocarditis is caused by a highly virulent bacteria Staplylococcas aureus [(2)]. In spite of all advances in the antimicrobial therapy and cardiac surgery, there are still high morbidity and mortality rates. The three diagnostic features of endocarditis are fever, heart murmurs and positive blood cultures, in addition to anemia, splenomegally and embolic phenomena. Echocardiography usually reveals vegetations that develop on damaged valves; they consist of bacteria, fibrin and platelets. These vegetations are usually friable and may result in emboli that lodge in small blood vessels of kidneys, brain, eyes, skin and other tissues [(3,4)].

Bacteria normally live on parts of the body such as the skin, mouth, upper respiratory tract, and the intestinal and genitourinary tracts. Some dental and surgical procedures cause a brief entrance of bacteria into the blood stream. Endocarditis occurs in persons with pre-existing heart conditions [(5)]. Prophylactic antibiotics are recommended prior to all dental procedures that are likely to induce bleeding. They provide protection

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against development of endocarditis as a result of bacteremia produced by dental procedures. The present practice involves the identification of risk patient by good medical history, and the use of antibiotic prophylaxis according to the recommendations usually issued by the American Heart Association (AHA). During the last five or six decades AHA has issued eight sets of recommendations.

The first appeared in 1955, supervised by its committee on prevention of rheumatic fever. The second set appeared in 1960, then 1965,1972,1977,1984,1990, and 1997 [7,8,9]. Progressive changes and improvements have always been done according to advances in antibiotics, and clinical observations reported by different hospitals and medical centers concerning application of different sets of recommendations [10, 11]. It has been mentioned in the literature that a considerable number of patients with bacterial endocarditis have been seen shortly after having a dental treatment with or without antibiotic cover. This period have been determined to be between two days and two weeks [12, 13].

The purpose of this investigation was to determine the role of dentistry in causing endocarditis among Iraqi at risk patients.

Materials and Methods:

Medical Records of cardiology departments in three major hospitals in Baghdad city were searched for cases of Bacterial Endocarditis. These hospitals are Kathmia teaching hospital, Medical city hospital and Ibnil Beetar center for cardiac surgery. Each record was examined by the researcher and the following information were recorded: Patients age , gender, pre-existing disease , length of stay in the hospital , initial signs and symptoms, history of preceding dental treatment with or without antibiotic prophylaxis, laboratory investigations including blood cultures and causative microorganisms, echocardiography, and prognosis of the disease .

Results:

In Kathmia Teaching hospital there were around 10,000 admissions during the year 2004 in the department of Medicine. Around 2000 admissions were recorded as different cardiac disease .Only 6(0.3%) cases were admitted to the hospital as having endocarditis. This percentage is comparable to numbers reported elsewhere in the world. Only one case occurred 2weeks following a dental extraction , while in the other five cases there was no reference to the cause of endocarditis, or any previous surgical procedure.

In Medical city hospital there were 24,000 admissions during the year 2004, including around 6,000 admissions in cardiology department, the records revealed 22 cases of endocarditis. In 3 cases there was a history of dental extraction or dental surgery 1 day to 2 weeks before the patient feels ill. In 8 cases there was history of tonsillectomy and appendicectomy different periods before endocarditis most of them longer then few weeks .Again no history of antibiotic prophylaxis before dental procedures. Two deaths were recorded.

In Ibnil Beetar hospital for cardiac surgery, because of absence of a central record source, a random sample of one hundred records was examined looking for endocarditis. Only five cases of endocarditis were found, two of them indicated a history of dental extraction one day and one week

before the beginning of infection. One of these two cases had antibiotic prophylaxis prescribed by the dentist. From the above mentioned five cases one death was recorded, in which the patient had prosthetic heart valve. For the 33 cases of endocarditis that found , the number of deaths in these hospitals were three, that means the mortality rate of endocarditis in Iraq according to this study is 9%. Number of male patients were 29 (88%) while the number of female patients were only four (12%), that means the male to female ratio is 7:1.More details are shown in Tables (1 ,2 and 3).

Age range was between 11 years and 60 years with an average of 35 years. The length of stay in the hospital ranged between 1 week to 8 weeks. The causative microorganism in all 33 cases was bacterial, one caused by brucellosis. ESR was raised in all 33 cases. Fever, heart murmurs and positive blood cultures were present in all cases. Echocardiography was positive in all cases showing vegetations, valve dilatation and heart enlargement. In one of the six cases preceded by dental extraction antibiotic prophylaxis was given (Ampicilline capsules 500mg six hourly).

Table 1: Distribution of patients in the 3 Hospitals

Patient Distribution	Medical City Hospital	Kathmia Hospital	IbnilBeetar Hospital*
Total Admissions	24.000	10.000	100
Cardiovascular Admissions	6.000	2.000	100
Endocarditis Cases	22(0.37%)	6(0.3%)	5(5%)

*A random sample of 100 records was used

Table 2: relationship between endocarditis and pre-existing heart valve defect

Finding	No-of cases	Percentage
Congenital Heart disease	22	67%
Rheumatic Heart disease	9	27%
Heart prosthesis	2	6%

Table 3:prognosis, dental cause and gender ratio

No-of death	3	9%
Dental cause	6	18%
No-of Males	29	88%
No- of Females	4	12%

Discussion:

Once it is established that a patient has a heart valve defect his dental status must be thoroughly checked and all areas that provide foci of infection should be eliminated. All dental procedures that are likely to cause bleeding need antibiotic cover and that includes orthodontic bands placement, intra ligament anesthesia, and post insertion ulceration of complete dentures. All dentists should be familiar with the latest recommendations for prevention of endocarditis. It happened that the American Heart Association (AHA) took the lead in this respect and almost all the world follows its guidelines. The use of antibacterial mouth rinse such as chlorhexidine prior to dental procedures, and irrigation of gingival sulcus prior to extraction of teeth lowers the possibility of pushing bacteria into the blood stream, hence reduce the frequency and magnitude of bacteremia. It is advisable that dentists try to perform as much dental treatment as possible in each time antibiotic prophylaxis is given, then wait 10 days before the second session of antibiotic cover and dental treatment, to allow time for sensitive oral flora to be re-established, however, the development of resistant form of micro-organisms must be considered. If it happens that the patient forgets to take the prophylactic antibiotic and the dentist discovers that after completion of the dental procedure the AHA recommends that antibiotic administered soon after that. The results of this study indicated that the Frequency of congenital heart disease in Iraq as pre-existing heart valve disease is high (70%) and that of prosthetic heart valve is low (3%) when compared to similar situation in other countries. Dental procedures as a cause of endocarditis (18%) are higher than that in developed countries such as the United States. There was one case in this study in which antibiotic prophylaxis was used but did not prevent the occurrence of endocarditis, this can be explained by either the development of bacterial resistance due to long period of hospitalization (1-8 weeks) , improper use of antibiotic by the patient or inaccurately prescribed by the dentist. The higher percentage of bacterial endocarditis in Ibnil Beetar hospital (5%) as compared to other hospitals (0.3%), could be explained by the fact that this hospital is well known to the public as being specialized in Cardiac surgery, and receives more medical referrals from other hospitals and clinics all over Iraq. The old saying, prevention is better than cure is perfectly applicable to the problem of bacterial endocarditis in dentistry.

Conclusions:

Endocarditis represents a real medical problem in Iraq which needs special attention from dentists in general and the Iraqi dental association in particular. The frequency of endocarditis in Iraq is higher than the developed countries. There should be a real concentration on medical history when dealing with any dental patient. We suggest that the Iraqi dental association takes the responsibility to distribute the latest recommendations for prevention of endocarditis to all Iraqi dentists to encourage compliance with these recommendations and hence reducing the occurrence of endocarditis due to the dental procedures.

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New approach in Bisecting angle technique

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Abstract

Since the conventional radiograph was introduced in 1901, it seems that it has wide spectrum in it use in medical, dentistry & engineering branches.

The importance came from its value in diagnosis and predicate the causes of different effects. This lead to more researches for more advanced programs , which continued through last century lead to an advanced radiography like digital one, C.T. scan and M.R.I. Still the conventional radiographs are the baseline for this progress a far farther for future progression.

Aim of the study is to prove a new approach in "Bisecting angle technique".

The present study indicate the new approach in using the bisecting angle technique since the old one give instructions on three main lines:-

A. Patients positioning in the dental chair.
B. Positioning of dental intraoral film inside patient mouth.
C. The position of the cone of X-ray machine in both vertical and horizontal angles.

But Al-Safi method gives instructions number D- about the anatomical landmarks that lead to the apex of the tooth to which central beam is directed, by drawing a line from ala of the nose to the tragus of the ear called ala tragus line indicate the apecies of maxillary teeth , for the mandibular arch a line draw indicate apices of mandibular teeth from the angle of the chin to the angle of the mandible in proper manner.

In present study, two groups of fifth years students in the college of Dentistry in Baghdad had been taken. The first group had given instructions A-B-C-, second group had given instructions A-B-C- and D- according to Al-Safi method.

The statically analysis using t-test shows , a significant difference between the first and second group in the effectiveness of sharpness and allignments artifacts , from the same point of view there were no significant difference between members of second group while there is a significant difference between members of the first group.

The results indicate that the new approach in instructing the second group of students were gave wide predictors for their work and better results in decreasing the technical errors and dental artifacts.

Key words:Bisecting technique, Angulations, X-Radiation

Introduction

The bisecting-angle technique is based on simple geometric theorem , Cieszynski's rule of isometric (1 ,2 ,3), which state that two triangles are equal where they share one complete side and have two equal angles, (In addition their corresponding sides are equal). Dental Radiography applies the theorem as follows:

Position the film as close as possible in lingual surface of the teeth resting in the palate or in the floor of the mouth. The plane of the film and the long axis of the tooth form our angle with its

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apex at the point where the film is in contact with teeth, when an imaging plane bisects this angle, it forms two conguruent angles with the apices of the teeth perpendicular to the bisecting plane ; the two triangles are right-angle triangles and congruent, with the corresponding sides equal (4 , 5 , 6). Aim of the study is to prove a new approach in bisecting angle technique.

Materials and methods

For the present study we apply a certain point called point of entrance of central beam on patient face allow the operator for perfect positioning of the angulations of X-ray head in negative by drawing a line called ala-tragus line parallel to occlusal line when the patient in dental chair in up-right position looking forward , these point are for the maxilla:.

1- For the central incisor and lateral incisors, the tip of the nose.
2- For the canines, the ala of nose.
3- For the premolars, draw a line from the ala of the nose to tragus of ear which ala tragus line parallel to the occlusal line. Ask the patient looking forward then draw a line from the pupil of eye to be perpendicular on the ala tragus line this point of meeting represent in between the apices of premolars at which the central X -ray beam directed.
4- For the maxillary 1st molar one cm from the previous point will represent the apex of maxillary 1st molar at which central x -ray beam is directed through or one index finger width of the patient.
5- For the maxillary 2nd molar; also the patient look forward and then draw a line from the angle of the eye to be at right angle with ala-tragus line this meeting point represent point of entry of central X-ray to 2nd maxillary molars apecies.
6- For the 3rd maxillary molar one cm away from the previous point will representing the point entrance of central X -ray for 3rd maxillary molar apecies or one index finger width of the patient.

For the mandibular arch, the following points representing the apecies of mandibular teeth at which central X -ray beam should be directed in vertical angulations.

1-Central and lateral incisors: The symfesismenti is the point of entrance of X-ray beam.
2-Canines: angle of the chine is the point that representing the entrance of radiation of one lower canine.
3-One cm from the angle of the chin will represents the entrance of radiation of lower premolars since this point will located in between the apecies of the lower premolars.
4-Two cm form the angle of the mandible will representing the position of apices of lower 1st molar so it will be the entrance of central x -ray beam of 1st lower molar (or about one index finger width of the patient from the previous point).
5-One cm away from angle of the mandible will represents the position of apecies of lower second molar. Finger width.
6-For the lower third molar the angle of the mandible is the point of entrance of the central x -ray beam.

The present study indicate the new a approach in using the bisecting angle technique since the old one give an instructions on three main lines:-

A. Patients positioning in the dental chair.
B. Positioning of dental intraoral film in side patient mouth.
C. The position of the cone of X-ray

machine in both vertical and horizontal angle.

But the new approach gives instructions number D- about the anatomical landmarks that lead to the apex of the tooth to which central beam is directed (point of entrance of central X-ray beam).

To have a better idea of this approach in dental radiography practice and its effectiveness from points of sharpness and cone alignments artifacts .

Factors causing the unsharpness of the casting image:-

a. Source of radiation: Should be as small as possible, and any movement in head of X-ray tube may cause the source will form multi-sources of radiation and that cause the unsharpness.
b. Target object distance: should be as long as possible and constant.
c. Object film distance: should be as small as possible with no movement of film in patient mouth.
d. Patient stand still: Any movement of the patient will cause unsharpness.
e. Good positioning of point of entrance on patient during taking the dental radiography.

Two groups of 5th year dental school studied in university of Baghdad have been chosen, 1st group undergo cieszynski's rule , while 2nd group of students have been given instructions on the new approach .

Both groups have taken radiographs for forty patients coming to our dental radiology department whom their age range between (20 - 25) years with no teeth missing in maxillary and mandibular arches. Total number of students were 28 , subdivided into 14 students whom had been used 50 dental periapical film in total of 100 dental films using the same dental X - ray machine after processing in manual processor (time-temperature method) at (4 - 5) minutes , 68F the temperature of the processing solution .

Results

Table (1) shows 100 dental periapical films were taken for forty patients in the upper jaw 60 films, and 40 films for the lower jaw, in the anterior premolar and molar regions . Table (2) shows the main four factors were used for comparison between Ciezynski's rule, and the new approach. These factors are :

1. Sharpness : Outline of the image should be sharp penumbra : it is amount of unsharpness, its area of partial shadow of casting image, due to partial absorption of light by the object.

Disturbance of focal spot , object film distance or all of them cause penumbra while umbra is area of total shadow .

Applying the above five criteria for sharpness by the first group of students whom given instructions according to Cieszynski's rule , shows 0.5 and t-test $p<0.05$,while 2nd group of students whom given instructions according to new approach shows for the sharpness 0.081 & $p<0.01$ (Table - 2).

The comparison in sharpness shows in (Table -3) 26% for the first group & 10% for the 2nd group , so less technical artifact in sharpness appear in applying the new approach of teaching.

2. Over lapping: That artifact resulting from incorrect horizontal angulations that the central x -ray beam will not be directed at the area in between the teeth either more to the left or more to the tight resulting in over lapping sides of teeth on each other .

This factor shows in first group 0.61 & $p<0.05$, while 2nd group show 0.46

& p<0.01, so there is a difference in the overlapping. Table-3 shows that the 1st group gave 33% error in overlapping in comparison with the 2nd group who gave less error about 15% in overlapping.

3. Shortening: This artifact was resulted from increasing the vertical angulations more than needed position so the teeth appear shorter than its normal length.

Table-2 shows 0.32 & p < 0.05 in the 1st group, and 0.30 & p<0.01, so there is a difference between the two groups.

Table-3 shows 65% & p<0.05 in the 1st group, while it shows 18% & p<0.01, so there is a difference between the two groups, and the 2nd shows less error than the 1st one.

4. Elongation: this artifact results from decreasing the vertical angulations so the teeth appear longer than its normal length.

Table-2 shows o.43 & p<0.05 in the 1st group, while the 2nd group shows 0.23 & p<0.01.

Table-3 shows 85% technical error in elongation for the 1st group, while 2nd group give 30%.

Table (1): No.of dental x -ray film for 40 patients in the anterior, premolar & molar region

Maxilla position	No. of films	Mandible		No of dental x-ray films
21/12	10	21/12	8	18
3/3	15	3/3	9	24
4/4	20	4/4	12	32
876/876	15	876/678	11	26
	60	sum	40	100

Table (2): Comparison between Cieszynski's rule and Al-Safi approach according to four factors using t-test value

Factors	T -test (Cie-rule)	T -test	Al-Safi app.	T -test	Sign.
1st	0.5	P<0.05	0.081	P<0.01	N.S.
2nd	0.61	P<0.05	0.46	P<0.01	N.S.
3rd	0.32	P<0.05	0.30	P<0.01	N.S.
4th	0.43	P<0.05	0.23	P<0.01	N.S.

Table (3): Comparison between two groups of fifth year students according to the four factors using t-test value

	1st group	T –test	2nd group	T-test
Sharpness	26%	p<0.04	10%	p<0.01
Overlapping	33%	P<0.05	15%	P<0.01
Shortening	65%	P<0.05	18%	P<0.01
Elongation	85%	P<0.05	30%	P<0.01

Discussion

This approach called the Al-Safi method which is a new method of teaching in our dental school for about more than 5 years it proves it's effectiveness in easy learning and applying during dental radiography practice for both the under and post graduating dental students.

According to Arthur (6) , who discuses the importance of bisecting angle technique in dental radiography assuring that the instructions should

be strike and specific, unlike Miles in 1999 (5) who depends mainly on the paralleling technique because of lack of effectiveness in bisecting technique.

Langland in 1984 (4) preferred the parallel technique rather than bisecting technique while Goaz in 1987 (2) gave the importance to bisecting technique in dental practice if it can be developed in some manner like Jonson (3) , as mentioned in this study.

As a conclusion , in our study the good instructions to the students brought the decrease in the technical artifacts, so this approach proves it's effectiveness for faster learning to the students and decreasing the technical artifacts (7 , 8).

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Comparing required dislodging forces between different types of posterior palatal seal

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Abstract

Background: In this study forces required to dislodge a maxillary complete denture were compared for different types of posterior palatal seals " Group 1 single beading design , Group 2 double beading design and group 3 with butter fly posterior palatal seal.

Materials and Methods :Using a specially designed strain gauge force transducer and strain measuring device ,the force required to dislodge a maxillary complete denture measured and compared. Ten male subjects are selected with age range 55-65 yrs, the primary impression made in the usual manner and the final impression made with zinc oxide euogenol paste after the border seal made with tracing stick impression compound ,then the master cast duplicated using a heavy body silicone impression materials in order to produce a three additional casts, then the casts scraped to incorporate the posterior palatal seals and produce the three groups .a denture base constructed after postdum scraping.

Results: Comparing the three groups the results shows that a significant difference found between the group 1 and 2 and group 1 and 3 with no significant difference found between group 2 and 3. Using ANOVA Table with LSD.

Conclusion: No Design Provide superior priority than the other type of posterior palatal seals but a double beading and butter fly posterior palatal seal can improve the retention of a maxillary complete denture.

Key words: Maxillary complete denture, beading and posterior palatal seal.

Introduction

Denture retention has been expressed as the resistance to vertical and torsional stresses, or the resistance of a denture to removal in a direction opposite to that of its insertion. In effect, retention relates to the forces that are necessary to completely remove the denture from its basal seat. Wright (1) ,Jacobson and Krol (2) claimed that complete denture retention is the resistance to displacement of the denture base away from the ridge in vertical direction. Barbenel (3) stated that complete dentures are retained by a combination of muscular forces exerted by cheek, tongue and lips and by physical forces acting between the supporting tissues, the denture base, and the interposed film of saliva. The suggested physical mechanisms by which dentures are retained include adhesion, cohesion, surface tension, viscosity, and atmospheric pressure acting individually or in combination. Many clinical methods and techniques have been developed in the past to investigate the phenomenon of denture retention. These methods include the

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use of spring balances, hand scales, dynamometers, loading apparatus and various classes of levers (4-5). Laney and Gonzalez (6) stated that the posterior palatal seal is an essential feature in the retention of the complete maxillary prosthesis when properly placed; it enhances border seal and increases stability. In the Glossary of prosthodontic terms(7) The posterior palatal seal area is defined as the soft tissue area at or beyond the junction of the hard and soft palates on which pressure within physiologic limits, can be applied by a denture to aid in its retention. While the posterior palatal seal is defined as the seal area at the posterior border of a maxillary prosthesis. The rational of posterior palatal seal lies in completing the peripheral seal along the distal border of maxillary dentures. It provides an effective barrier against the ingress of air or foods under the denture during the functional movements of soft palate as also during the slight movements of denture in function thereby enhancing the denture retention, it also compensates towards a palatal discrepancy occurring either due to a curing shrinkage of acrylic resins or owing to a deflection of denture bases under functional stresses (8).

Laney and Gonzalez(6) discussed the need for knowledge of the oral cavity anatomy so that the static surface of the denture base can be balanced against one dynamic tissue surface in the posterior palatal seal area, the tissues are displaceable and the degree of displacement can be found by palpation with a "T" burnisher by closing both nostrils of the patient and having him blow gently or by visualizing the vibrating line as the patient says "ah",also by placing the tissue with various impression materials, a functional or physiologic posterior palatal seal can be made as early as the maxillary final impression. Another method, scraping the maxillary cast before final processing of the denture can be used to construct a posterior palatal seal. Therefore the posterior palatal seal takes on many various shapes, sizes and locations (9). Avant (17) reported a clinical study to evaluate the effectiveness of four different types of posterior palatal seals incorporated by scraping duplicate casts. All four types of seal substantially increased the retention of denture bases.

The present study was undertaken as an attempt to determine the effect of altering the type of the posterior palatal seal on the retention of maxillary denture bases.

Materials and Method

A- The testing apparatus:

For the purpose of this study , retention has been expressed in terms of the forces required to vertically dislodge a maxillary complete denture, so that the force values that required to dislodge the maxillary denture bases was measured by using a specially designed strain gauge force transducer and strain measuring device (10).

B- Selection of the patients

The study was carried out on ten healthy edentulous subjects seeking treatment at the prosthodontic clinic, college of dentistry, Baghdad University, the study group comprising of 10 males varying in age from 55-65 years. The criteria used for selection were relatively smooth firm alveolar ridge covered with healthy mucosa without any posterior undercuts.

C- Construction of test denture bases:

A preliminary impression with impression compound (Quayle Dental, England)was taken and a custom tray was fabricated on the study model and

a final impression for the maxillary arch was taken with zinc oxide eugenol (.S.S.white manufacturing, England). The vibrating line and the depressible tissue were marked using an indelible pencil. The final impression then reinserted in the patients mouth and the vibrating line marked transferred on to the final impression that poured with stone (Zeta, Selensor, Industria Zingardi s.r.i. Italy). The water to powder ratio recommended by the manufacturer was used. The master cast was then duplicated three times using heavy body silicon , the master cast was marked 0 while the duplicated casts was marked 1,2 and 3.

D- Scraping the casts for incorporation of posterior palatal seals:

The casts marked 1,2 and 3 were scraped to carve certain designs into their posterior palatal areas . Fig. 1. A No 4 round bur with a lacron carver were used.

On cast 1, a single bead design was carved as described by Boucher (11). A V – shaped groove 1 mm deep and 1 mm wide at the base was carved 2 mm anterior to the vibrating line, it passed to rough the hamular notches and flushed out on approaching the buccal sulcus.

On cast 2, a double bead design was carved as reported by Winland and Young (9). A groove similar to that on cast 1 was carved 1 mm anterior to the vibrating line .A second groove 1mm deep and 1mm wide at its base was then scraped just inside the anterior limit of the palatal seal area. Both grooves merged into each other in the hamular notches and leveled off as they approached the buccal sulcus.

On cast 3,"a butterfly shaped" configuration was carved as suggested by Hardy and Kapur (12). An angled groove 1.0 mm deep and 1.5 mm wide at the base was carved in the centre of the palatal seal area passing through the hamular notches and flushing out on approaching the buccal sulcus.

E- Construction of the duplicate test bases:

Identical denture bases except for the posterior palatal seal were made on cast 1, 2 and 3. and were designated 1,2 and 3 respectively . Base plate was formed for each of the casts using two mm thick layers of base plate wax, the bases were processed using heat – curing acrylic resin (Quayle Dental, England). They were checked clinically for stability.Fig.2

Clinical testing

Astringe of about 1 inch length was secured on the polished palatal surface of each of the maxillary denture bases in region relating to the second premolar and first molar teeth (13)(Fig. 3), with autopolemarizing acrylic resin so to serve as a mean of connection for the hook assembly . The dislodging force that is directed to the maxillary denture bases was applied at the middle of the denture base where the middle location is considered the most reliable region for testing the retention of complete maxillary dentures (14).

The patient head was held firmly on the headrest with occlusal plane parallel to the floor, all measurements of retention involving in a given subject were conducted at one sitting, each test denture base was subjected to three retention tests. The force values at which the denture base was dislodged completely from the palate at a steadily increasing force was displayed on strain measuring device represented by (milivolt) and by referring to the calibrated data , the force values in grams could be calculated.

Results

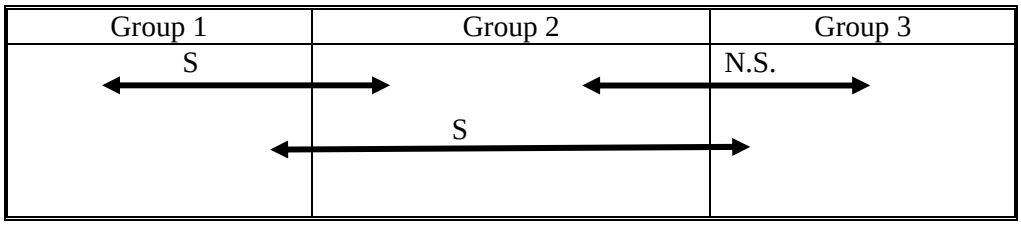
The mean values of the statistical analysis for the data between the three

groups of single beading, double beading and butter fly of the posterior palatal seal were shown in Table 1 where as the results of ANOVA table with LSD as shown in Table 2, The results explained that there was no significant differences between double beading and butter fly posterior palatal seal and there was a significant differences between single beading design and double beading one and single beading design and butter fly posterior palatal seal one.

Table 1 Represent the mean values of the forces required to dislodge each group.
Table 2 ANOVA Table with LSD comparison between the three groups

Patient No.	Denture base with single beading	Denture base with Double beading	Denture base with butter fly shape postdum
1.	1073.3	666.6	1066.6
2.	970.3	570.3	954.

	Sum of squares	df	Mean squares	Sig.
Between groups	938326.578	2	469163.289	3.448
Within group	4585085.622	27	169817.986	
Total	5523412.200	29		



Discussion

The rational of posterior palatal seal lies in completing the peripheral seal along the distal border of the maxillary dentures. It provides an effective barrier against the ingress of air or foods under the denture during the functional movements of soft palate also during the slight movements of denture in function. (15) Thereby enhancing the denture retention and reducing the gagging tendency it also compensate towards a palatal discrepancy occurring either due to shrinkage of acrylic resins (17) in this study a pulling dislodging force was used to evaluate the retention of maxillary denture (14)

The results of this study revealed that both butter fly design and the double beading were superior than the single beading this finding disagree with Lany and Gonzalez (6) and Dhir and Joneja (8) who reported that among the posterior palatal seals incorporated by suitably scraping the master cast. The butter fly design provides consistently higher retention compared to either single beading or the double beading configuration. It also disagrees with Avant (17) who reported that the single beading type of seal was superior to the butter fly design in four of his five subjects.

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Linear setting expansion of three different types of dental stones Available in Iraqi market , a comparative study.

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Abstract

Aims of the study: To identify the must appropriate type of dental stone produces with minimal setting expansion

Materials and methods: Three typee of dental stone compared, two groups produced depending on the mixing ratio so that the setting expansion values obtained by the aids of extensometer then compare them statistically.

Results and discussion: Comparing setting expansion within each group the lowest setting expansion found in Elite model stone while the highest value in Silky Rock model, in Q.D. dental stone While comparing the two groups with each other shows no considerable changes take place due to increase in the W/P ratio

Conclusion: Increasing the W/P ratio to a considerable limit results in a minimal changes in the setting expansion for Silky Rock stone, while for Q.D. dental stone & Elite model the setting expansion decreased. Heat generated from the mixture didn't affected by the changes in W/P ratio.

Introduction

Dental stone is a naturally hydrated from calcium sulfate dihydrates,' $CaSO_4$,.$2H_2O$" and the alpha-form of calcium sulfate hemihydrate with physical properties superior to the beta-form (dental plaster). The alpha-form consists of cleavage fragments and crystals in the form of rods or prisms, and is therefore more dense than the beta-form (1). Dental stone probably more useful than any other material to dental practitioner (2)

Stone Powder particles are uniform, regular, less porous, prismatic shape and absorb less amount of water called " –calcium sulfate hemihydrates" (3,4)

Regardless of the type of gypsum product employed, expansion of the mass can be detected during the changes from the hemihydrate to dihydrate form of gypsum.(5)

Depending on the composition of the gypsum product the linear expansion may be as low as "0.05%" as high as "0.5%".(6,7)

Lautenschlager and Grabin (8) noted that after mixing of hemihydrates and water, crystals of dihydrates formed as these crystals grow in size and number. They impinge upon one another. They did not deform each other but rather push each other outward into a large space volume, causing expansion.

The setting expansion my be controlled by different manipulative conditions, as well as by the addition of some chemicals, such as addition of borax, solution of accelerators and retarders to balanced the setting expansion with particular setting time are known as anti-expansion solution which can reduce the total expansion. (9), Setting expansion is also influenced by the W/P ratio. And its

inversely proportional to W/P ratio (10,11)

Temperature, as high as 65°C may have a certain effect on this property, as heating which drives off water of crystallization will result in contraction of gypsum and this contraction is sufficient to impair the ability of these material to withstand the necessary dimensional requirements of their usage.(12,7)

The time and rate of spatulation have a definite effect on the setting of gypsum material within practical limits an increase in the amount of spatulation will increase the setting expansion. (11)

Stone powder is mixed with water to produce a workable mix. The theoretical ratio of water that can be incorporated in to 100mg of gypsum to react chemically with all the available calcium sulfate hemihydrate particles is 18.36 ml (10,13)

This variation in the amount of water is due to the method of production, dehydration, temperature, particles size of gypsum, length of calcinations , time of grinding of finished product and addition of surface active ingredient to the final product (6)

Materials and Mthods

Three types of dental stones used to construct 18 samples subdivided into two groups:

Group I: With a mixing ratio according to manifactural ratio Table 1.
Group II: With a mixing ratio of 33ml/100g according top ADA specification.

Each group contains nine samples, three samples for each type of stone. So that the study designed to evaluate the effect of mixing ratio on setting for each type of dental stone used by the aids of extensometer apparatus in order to recognize the type of dental stone produce the lower setting expansion compared to other types.

Mixing procedure:

Group I: According to manufactural instruction the mixing was made by adding over a 10 seconds dry powder to the correct amount of water in clean scratch free rubber bowel, the mixture was allowed to soaked for additional 20 seconds and then mixed for 1 min. to smooth consistency then poured in mould of the extensometer as shown in Fig.1.

Testing procedure:

Six measurement reading obtained over 2 hr of the procedure starting from the initial setting time so that reading divided in to " 00,15,30,60,90,120 min."

Results and Discusion

When comparing setting expansion within each group as shown in table 2 and 3 and fig. 2 at the end of the second hour the lowest setting expansion found in Elite model stone while the highest value in Silky Rock model, in Q.D. dental stone delay its setting expansion starting after the first thirty minutes while the other types of dental stone start after the first fifteen minutes.

Setting expansion within the first few minutes caused by exothermic reaction that occurs within the bulk of the material, other setting expansion caused by the particles size growing against and They impinge upon one another. They did not deform each other but rather push each other outward into a large space volume causing expansion.(8)

Comparing setting expansion in the group I with the group II , no considerable changes take place due to increase in the W/P ratio so that the

mixture reach a manipulative form with minimal increase in setting expansion for Silky Rock stone while reverse effect occur for both Elite model and Q.D. dental stone this is in agreement with (10,11) who said that Setting expansion is influenced by the W/P ratio and its inversely proportional to W/P ratio.

Table 1:Manifactural mixing ratio for first group.

Stone Type	Water	Powder
Silky Rock	**23 ml**	**100g**
Q.D. stone	**25 ml**	**100g**
Elite model stone	**30 ml**	**100g**

Fig. 1 Represent the mould of extensometer apparatus with the stone poured in it.

Table 2: represents linear expansion in three different dental stone groups: with Mixing Ratio According to manifactural instruction

		Time Intervals In Minutes					
		00	15	30	60	90	120
Silky Rock	S1	0.00	0.01	0.03	0.045	0.05	0.053
	S2	0.00	0.01	0.032	0.048	0.055	0.058
	S3	0.00	0.009	0.03	0.043	0.05	0.057
Q.D. Stone	S1	0.00	0.00	0.015	0.038	0.045	0.049
	S2	0.00	0.00	0.011	0.034	0.041	0.046
	S3	0.00	0.00	0.012	0.036	0.043	0.048
Elite Model	S1	0.00	0.007	0.019	0.031	0.037	0.040
	S2	0.00	0.006	0.021	0.029	0.031	0.035
	S3	0.00	0.004	0.02	0.028	0.03	0.034

Table 3: represents linear expansion in three different dental stone groups: with Mixing Ratio 100g/33 ml

		Time Intervals In Minutes					
		00	15	30	60	90	120
Silky Rock	S1	0.00	0.02	0.035	0.05	0.055	0.061
	S2	0.00	0.02	0.034	0.048	0.055	0.06
	S3	0.00	0.018	0.035	0.049	0.054	0.06
Q.D. Stone	S1	0.00	0.00	0.01	0.034	0.042	0.044
	S2	0.00	0.00	0.011	0.033	0.043	0.045
	S3	0.00	0.00	0.01	0.034	0.042	0.044
Elite Model	S1	0.00	0.012	0.024	0.029	0.03	0.031
	S2	0.00	0.011	0.023	0.029	0.031	0.031
	S3	0.00	0.011	0.023	0.028	0.03	0.031

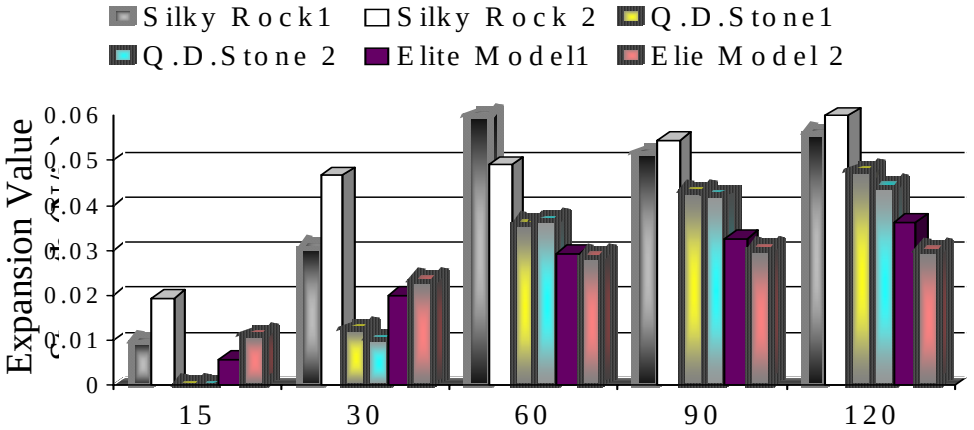

Fig. 2 Bar graph represents the comparison of setting expansion in Both group I and Group II.

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Destructive periodontitis, its prevalence among chronic periodontitis patients, with cohort incentive conditions

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Abstract:

Sixty-six patients have been diagnosed and distinguished as having destructive periodentitis out of one thousand slowly growing chronic periodontitis (S.G.Ch.P.), constituted 6.6%, females was 68.18%, male was 31.81%, a significant difference was found between male and female.

Possible activating and inverting factors was studied, restraint stress and depression appear having a significant relationship, nutritional factor as well showed a significant influence on inversion of S.G.Ch.P. into DP.

High gingival index, sever bone destruction; deep packet and an eventual tooth mobility with generalized distribution pattern were the characteristic clinical feature of the disease.

In conclusion local bacterial and systemic conditions either psychic or somatic may interfere in the activation and inversion of the adult periodentitis into destructive periodontitis under the basis of systemic and psychological factors .

Key word: Adult periodontitis, destructive periodontitis, stress, nutrition atherosclerosis.

Introduction

According to the clinical criteria of chronic periodontitis, the presence of periodontal pocket with radiological bone loss is essential in diagnosis and differentiation. Earlier histometric studies suggested that chronic periodontitis is a slowly progressing disease as it stayed inactive [(1)]. It could be activated to get harmful progression when take sever clinical gingival signs with unexpected bone loss followed with deep packet formation [(2)] , this activation associated with gingival invasion by pocket bacteria [(3,4)] , and invading the alveolar bone as well [(5,6,7)] . The bacterial invasion encourage the immunological reactions on gingival level to liberate a huge of destructive enzymes and proteins [(8,9)] which seemed to be already systemically stimulated by the antigens of periodontal pathogens [(10)] , this reaction may exposed clinically as an exacerbation of active inflammatory reactions [(11)] . A significant positive correlation have been found between the histomatic index, bacterial activation, especially that of black pigmented bacteria [(12)]. The clinical indicators had explained that the bacterial activation ends in active tissue destruction [(13)]. It has been demonstrated that the bacterial invasion into the connective tissue in advanced periodontitis were mostly cocci, mobile rods, filaments and spirocketts [(4,7)] . The bacterial flora of active sites of chronic periodontitis pockets have been demonstrated as predominated with B. forsythus, P. gingivalis, P. micrus, Actinobacillus actinomyces temcomitance, W. rectus and B. intermidius [(14, 15, 16)].

Many earlier studies showed that

nutrition is an essential systemic factor in periodontal health and disease. However, shortage in calcium intake is negatively influencing alveolar bone building, calcium has long been a candidate to modulate periodontal disease in influencing the mineral density of alveolar bone, low calcium intake is a risk factor for periodontal disease and could result in more sever periodontal breakdown [17].

Vitamin B. complex positively influencing wound healing and could result in statistically significant superior clinical attachment level gain, its shortage can give a contrary worse result [18].

The effect of menopausal period on periodontitis and osteoporosis are characterized by the loss of bone mass. Osteocalcin level have been postulated as a marker of inhibition of bone formation. It has been found that osteocalcin level in gingival cervicular fluid is correlated positively with periodontitis [19].

Periodontal disease, especially measured by alveolar bone loss is a strong and independent predictor tooth loss in postmenopausal women [20].

It seems important to estimate the prevalence of the destructive periodontitis and the possible cohort incentive systemic and/or psychological conditions which help in converting the slowly growing chronic periodontitis into a destructive type .

Materials and Methods

One thousand patients were diagnosed as having adult type periodontitis. Referred to the department of periodontology, college of dentistry, Mosul University to get periodontal therapy. The patient were submitted under a special regimen of diagnosis included a profound personal interrogation about their condition, precise notes about their social , economic , psychological and general health were taken , psychological and systemic events and landmarks were recorded . Profound history of oral illness complains of a past and present illness, previous treatments, and drugs intakes. All patients assessed for systemic check up, routine blood analyses, blood sugar and cholesterol as well. Female hormone analyses were recommended, as needed, especially the menopausal hormone imbalance, cholesterol analyses included VLDL, LDL, HDL total lipids, Triglyceride and finely the uric acid.

Gingival index (GI) [21], clinical pocket depth (CPD), was measured with WHO, CPITN probe [22]. Full mouth x- ray were taken (ortho-pantograph) and periapical films with long cone machine. Tooth mobility was also recorded according to modified miller Index [23].

The criteria used to identifying destructive type were the age , sex , pattern of lesion , mode of distribution , evidence and design of bone loss , variable degree of tooth mobility , gingival bleeding upon probing , gingival distortion , presence of variable amount of plaque and calculus . Pocket depth exceeded 4mm on any side of the tooth was considered as having chronic periodontitis.

Pregnant women and diabetic patients have been excluded from this study.

Bacteriologic culture of random pocket contents smears have been performed on blood agar and chocolate agar , gram stain to study the morphology and pattern of hymolysis , for identification ; IMVC , catalase , oxidase and coagulase biochemical's were used [MAST DIAGNOSTICA, U.K] .

Results

Table 1: Out of one thousand adult

periodentitis, 6.6% were diagnosed as having destructive evolution (66 patients). The average age of female was 31.8 2.8, whereas that of male was 35.4 3.3. Female constituted 68.1% (45 out of 66), male constituted 31.9% (21 out of 66). A significant difference was obtained according to t test in the distribution of the disease on sex ($P<0.01$), but insignificant on age distribution (Table 4.B).

The Gingival index scores of DP patients were 2.501, that of female were 2.301, and that of male was 2.707. Insignificant variables were obtained by their mean according to T test between the female and male gingival index scores.

The total number of teeth present in the oral cavity of all the 1000 patients was 20462 that of DP patient were 1782, which equal to 8.7088% of total teeth number. Female had 899 teeth equal to 4.3935% of total number and 50.4489% of DP teeth number. Male had 883 teeth, equal to 4.3153% of total teeth number and equal to 49.561% of DP teeth number.

Teeth showing loss of surrounding bone exceeded 20% of root length in x-ray were 1041 (58.4175%) of DP teeth, and 5.078% of total teeth number. Female had 609 teeth, equal to 2.97% of the total and 58.5% of DP teeth. Male had 432 teeth, equal to 2.112 % of total and 41.498% of DP teeth.

Mobile teeth with grade 1, 2 or 3 according to modified Miller index were 774 in both sex, equal to 43.433% of DP teeth number, and equal to 3.782% of total teeth number, represented 74.3515% of the teeth involved with bone loss 20% or more of root length [24]. Female showed 433 mobile teeth, equal to 55.943% of DP teeth, and 2.116% of total teeth number, and equal to 71.1% of teeth involved with 20% of bone loss. Male showed 341 mobile tooth, equal to 44.056% of DP teeth, and 1.66h% of total teeth number which equal to 78.935% of the teeth involved with 20% of bone loss. Insignificant differences were obtained in the intra oral distribution of the disease between male and female (T. test).

Table 2 : Slowly growing chronic periodontitis (S.G.Ch.P.) represented with the other 934 patient , constituted 93.4% of total patient number , female were 435, their age average was 38.1 2.8 , constituted 43.5% of total patients , equal to 46.5738 % of S.G.Ch.P. patients , male was 499 , their age , average was 42.7 3.1 , constituted 49.9% of total patients , equal to 53.426% of S.G.Ch.P. patients . Insignificant differences were obtained in patient's age on sex distribution.

The means GI scores showed that total S.G.Ch.P. scored 1.09 0.11, female-scored 1.17 0.12, male scored was 1.22 0.31. The difference was insignificant according to t test on sex distribution. The number of present teeth in S.G.Ch.P. patient was 18680, constituted 91.2911% of total present teeth, female had 8765 tooth, equal to 42.835% of total, and equal to 46.4556% of total patient teeth and equal to 53.078% of S.G.Ch.P. present teeth. The number of teeth involved with periodontal pockets exceeded 4mm in depth on any side of the tooth was 9691, constituted 51.879% of S.G.Ch.P. teeth number, and 47.3609% of total teeth number. Female had 5314 tooth, constituted 54.834% of S.G.Ch.P. present teeth, equal to 25.97% of total. Male had 4377 tooth, constituted 45.1656% of S.G.Ch.P. teeth and 21.3908% of total patient teeth. Insignificant intra oral distribution of disease was obtained between the two sexes. Significant difference was obtained in number of teeth involved with periodontal pocket in privilege to female over male (Table 4B).

The mobile teeth were 331, constituted 1.37% of S.G.Ch.P. teeth,

equal to 1.6176% of total teeth number, and 3.4155% of teeth involved with periodontal pocket ≥ 4mm in depth. Female had 167 mobile tooth , constituted 1.905% of S.G.Ch.P. present teeth , equal to 0.216% of total teeth , and equal to 3.142% of teeth involved with ≥ 4 mm pocket depth . Male had 164 mobile teeth, constituted 1.654% of S.G.Ch.P. teeth, equal to 0.8014% of total teeth number, and 3.7408% of teeth involved with ≥ 4mm periodontal pocket, insignificant differences were obtained in intra oral distribution of S.G.Ch.P. disease when comparing the two sex data.

High significant differences were obtained in GI , clinical pocket depth alveolar bone loss as seen in x-ray and tooth mobility data when comparing the DP data with that S.G.Ch.P. in exception of patients age ($P<0.01$) (Table 4A).

The Complementary test:

Table 3 : Direct personal interview revealed that 26 patient out of 66 showed diseases activation accompanied with the restraint stress , constituted 39.39% , female was 18 , equal to 27.272% male was 8 , constituted 12.12% , this result means that 40% of DP female and 38% of DP male had strain stress and depression . Eighteen patient had nutritional problems, constituted 27.27%, female was 11, constituted 16.67%, and male was 7, equal to 10.606% of total DP patients. Female constituted 61.11% of total nutritional factor number, while male constituted 38.89% of the nutritional factor number. Both , psycho logic and nutritional conditions appeared significant when compared to the total DP number , and also when compare female to male data ($P<0.05$) the females appeared more susceptible than male .

The menopausal factor included nine women, constituted 20% of DP female number, equal to 13.636% of total DP patient. It appeared significant according to t test when compare to total DP female. High total cholesterol level over 320 mg/dl was appeared in 8 patient , showed high risk level of HDL and LDL , constituted 12.12% of total DP patient , 4 female and 4 male , each constituted 6.06% of total DP patients . Female constituted 8.89% of female DP patient , male constituted 19.05% of male DP patients , thus male showed significant difference over female in cholesterol factor ($P<0.05$) , table 3 .

Other five patients , 2 male and 3 female showed that the disease activation could associated with a traumatic hand scaling , they constitute 7.576 % , female constitute 6.67% of female DP patients , while male constitute 9.523% of DP male .

Bacteriologic test:

Random smear of pocket contents, purified, cultured, stained then identified biochemicaly, revealed that the bacterial flora was rich with black pigmented bacteroids, while the S.G.Ch.P. pockets showed increased number of S. sangings. The microorganisms existed in both types were almost identical in species. Bacteroids, fusobacterium, spirochetes and streptococcus were clearly identified in both groups.

Discussion

High gingival index scores , spontaneous bleeding , distortion of gingival pattern and contours , generalized advanced destruction of alveolar bone , deep pockets, tooth migration with eventual tooth mobility were the common characteristic features of destructive periodontitis , this profile could be suggested as a specific entity differentiable from the slowly growing chronic periodontitis .

The major bacteriol components demonstrated in this study related to DP pockets was the bacteroids, while S.G.Ch.P. pockets showed increased number of streptococcus bacteria. This bacteriologic picture could suggest that there is inversion of bacterial flora from the predominated streptococcus into the predominated Bacteriod, which could be exposed as a progression of adult periodontitis into the destructive periodontitis.

A significant differences were obtained in comparing the data of DP to that of S.G.Ch.P., while the inter group variables were generally insignificant in both groups. In exception, and according to sex, females showed significant variable in their number over male in DP. On other hand, the disease history seemed to be sudden; the activation occurs on previously existent adult periodontitis, which could suggest that there is inversion of S.G.Ch.P. into DP. This result could support the concept of intense disease activity [5, 6], the inversion could be induced by systemic condition, either somatic or psychic [25]. A hypothesis of an increased risk for destructive periodontal disease due to psycho logic stress has long been promoted, however the research on the influence of stress on periodontal diseases is still in its infancy [26]. Recent study showed that restraint stress modulates the progression of periodontal inflammation with positive correlation [27, 28]. Positive correlations have been demonstrated between the severity of periodontal disease and the presence of antigen of periodontal pathogen in circulating blood [29]. A familial distribution of HLA-A and HLA-B antigens demonstrated that there is a family high risk of DP [30,31].

It has been suggested that stress have a negative influence on healing process [27] and positively influencing the periodontal breakdown [28].

In the present study, the psychological and nutritional factors appeared significantly influencing the inversion of S.G.Ch.P. into DP in both sex. The epidemiologic studies have shown that periodontitis may be associated with presence of atherosclerosis, DNA from periodontal pathogens has been detected in atherosclerotic lesions, the data confirm that DNA of periodontal pathogen can be detected in atherosclerotic plaque, especially that of porpheromonous entermidius[32].

The behavioral factor in this study appeared insignificant, previous studies have suggested that risk for adult periodontitis has genetic (heritable) component, it has been confirmed that approximately half of the variance in disease in the population is attributed to genetic variance, the basis for the heritability of periodontitis to be biological and not behavioral in nature [33]. In conclusion, there are a local bacterial and systemic either psychic or somatic factors could interfere in the activation of bacterial flora of S.G.Ch.P., and able to invert the adult periodontitis into destructive lesion under the basis of genetic and immunologic behavior. The clinical characteristic of DP could suggest a distinguishable clinical entity of the disease.

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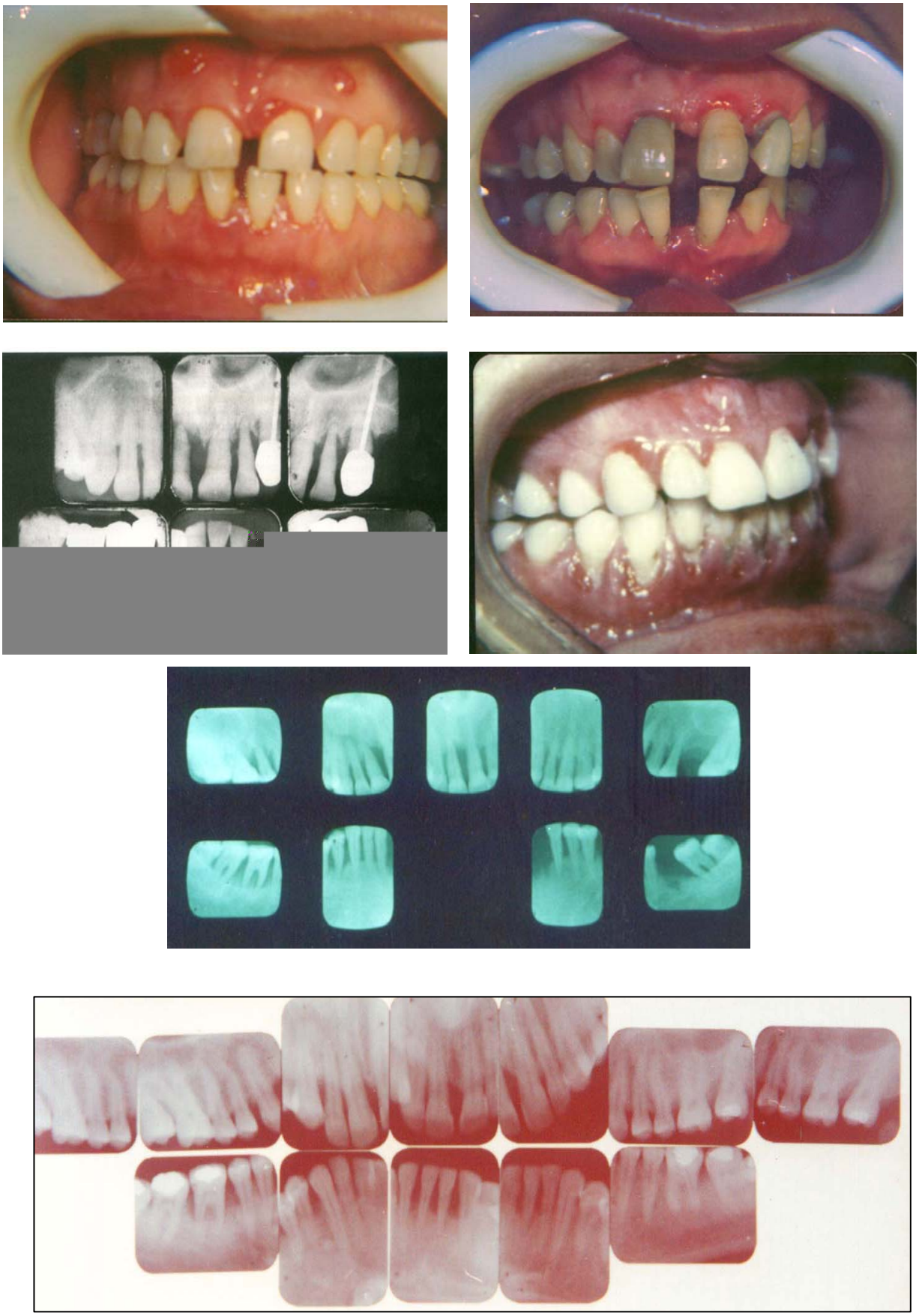

Figure (1): Different cases of Destructive periodontitis representing the clinical and radiological features.

Table 1: distribution of destructive periodontitis .

	Number of patients according to sex	Percent of the destructive periodontitis patients number according to the sex out of				Number of present teeth of DP patient sex	% of present teeth of DP patient / sex	Percent of present DP teeth out of total 1000 patient teeth (20462)	Number of teeth Involved with perio. Pockets and bone l oss >20% of root length			Tooth mobility			
		Percent of patient number out of 1000	D.P. patient Number out of 66	Age average of mean	GI average of mean				Number of teeth involved	Percent of involved teeth out of the		Number of mobile teeth	Percent of mobile teeth out of the		
										DP teeth number	Total of 1000 patients teeth (20462)		Present teeth with D.P.	Involved teeth with >20% of bone loss	Total number of present teeth (20462)
Total	66	6.6%	-	33.2±5.1	2.501±0.1	1782	-	8.7088 %	1041	58.4175 %	5.087%	774	43.434 %	74.3515 %	3.782 %
Female	45	4.5%	68.18 %	31.8±2.8	2.301±0.3	899	50.448 %	4.3935 %	609	58.501 %	2.97%	433	55.943 %	71.1%	2.116 %
Male	21	2.1%	31.81 %	35.4±3.3	2.707±0.21	883	49.551 %	4.3153 %	432	41.498 %	2.112%	341	44.056	78.056 %	1.666 %

Table 2: distribution of S.G.Ch.P. periodontitis.

	Number of patients according to sex	Percent of the destructive periodontitis patients number according to the sex				Number of present teeth of S.G.Ch.P. patient	% of present teeth of S.G.Ch.P. patient / sex	Percent of present S.G.Ch.P.teeth out of total 1000 patient teeth (20462)	Number of teeth Involved with perio. Pockets >4mm depth			Tooth mobility			
		Percent of patients number out of 1000	S.G.Ch.P. patient Number out of 943	Age average of mean	GI average of mean				Number of teeth involved	Percent of involved teeth out of the		Number of mobile teeth	Percent of mobile teeth out of the		
										S.G.Ch.P. teeth number present	Total of 1000 patients teeth (20462)		Present teeth with S.G.Ch.P.	Involved teeth with > 4mm depyh	Total number of present teeth (20462)
Total	934	93.4 %	-	40.9±5.2	1.09±0.11	18680	-	91.2911 %	9691	51.879 %	47.3609%	331	1.37%	3.4155 %	1.6176 %
Female	435	43.5 %	46.5738 %	38.1±2.8	1.17±0.12	8765	46.9218 %	42.9218 %	5314	54.834 %	25.97%	167	1.905%	3.142 %	0.8161 %
Male	499	49.9 %	53.426 %	42.7±3.1	1.22±0.31	9915	53.078 %	48.4556 %	4377	45.16456%	21.3908%	164	1.654%	3.7468 %	0.8014 %

Table 3: Possible factor associated with disease activation and inversion of S.G.Ch.P. into DP

	Sex	Number of DP patients according to sex	No. of patient per sex	Total factor number	% of patient number out of total factor No. according to sex	%of factor No. out of female DP (45 female)	%of factor No. out of male DP (21male)	% of factor No./sex out of DP total No.	%of total factor No. out of DP total patient	t-test
Psycho logic factor	M	21	8	26	30.769%	40%	38%	12.12%	39.39%	S p<0.05
	F	45	18		69.23%			27.27%		S p<0.05
Malnutrition factor	M	21	7	18	38.89%	24.44%	33.33%	1.606%	27.27%	S p<0.05
	F	45	11		61.11%			16.67%		S p<0.05
Menopausal factor	F	45	9	9	100%	20%	--	13.636%	13.636%	N.S.
Atherosclero tic factor	M	21	4	8	50.0%	8.89%	19.05%	6.06%	12.12%	N.S.
	F	45	4		50.0%			6.06%		
Behavioral factor	M	21	2	5	40.0%	6.67%	9.523%	3.03%	7.576%	N.S.
	F	45	3		60.0%			4.55%		

Psychological factor: Restraint stress and depression.
Atherosclerotic factor: High total cholesterol, HDL, LDL.