

COMPREHENSIVE MANAGEMENT & RECONSTRUCTION OF COMMUNUTED MANDIBULAR FRACTURE

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INTRODUCTION

Management of comminuted mandibular fractures is so challenging specially in the presence of infection in order to achieve a good functional and esthetic outcome (1). The resection of an osteonecrotic area results in a large sized bony defect which can be reconstructed by non-vascularized bone graft such as rib graft or free tissue transfer (2).

The objective was to study the use of a rib graft with endosseous implants in reconstructing a large gap that resulted from resection of an infectious area occurring after trauma.

METHODOLOGY

A 30 years old male patient was admitted due to a road traffic accident suffering from right ramus and comminuted left parasymphiseal fracture. The fracture was treated by open reduction and fixation with miniplates.

Infection occurred so the patient underwent several surgeries for debridement, resection of the necrotic bony segment, and reconstruction of the bony defect using a split rib graft. Finally, implant placement and loading was done to accomplish the final restoration.

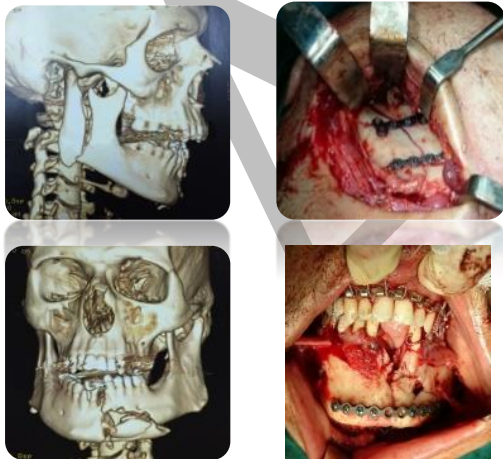


Figure (1): Showing pre- and post-treatment of the initial fracture



Figure (2): Showing the resected fragment due to the occurring infection

RESULTS AND DISCUSSION

In this case, it was found out that poor oral hygiene is a very detrimental factor in the outcome of fixation and healing of fractures, that can not even be overcome by antibiotic coverage. This was in accordance to a study performed by Gutta et al (3). However, proper management of this infection by debridement and removal of infection source proved to be successful, which allowed subsequent reconstruction of the defect. Therefore, teeth replacement by implant fixation and fixed partial denture was feasible later.

Rib graft was a successful bone substitute, allowed the reconstruction of the defect, without further complications and minimal resorption of the graft.

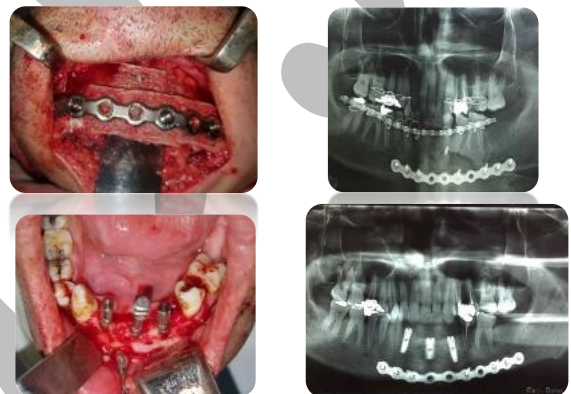


Figure (3): Showing reconstruction with rib graft and placement of endosseous implants.

CONCLUSION

Non vascularized split rib grafting can be successfully used in reconstruction of mandibular defects where it is easy, less time consuming and gives excellent results. Implant restoration on mandibular defect reconstructed with rib graft is also feasible allowing rehabilitation of patient's esthetic and functional aspects.

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TRANSCONJUNCTIVAL VERSUS SUBTARSAL APPROACH IN OPEN REDUCTION OF ZYGOMATICOMAXILLARY FRACTURES

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INTRODUCTION

The zygomaticomaxillary complex (ZMC) fracture occurs in about 42% of facial fractures (1). The principles of treatment of ZMC fractures involves a variety of methods, ranging from conservative treatment to surgical treatment by closed reduction of the fracture or open reduction with fixation (2). Conventional lower eyelid incisions that are commonly used for the exposure and treatment of ZMC fractures include the infraorbital, subciliary, subtarsal, and transconjunctival approaches (4)

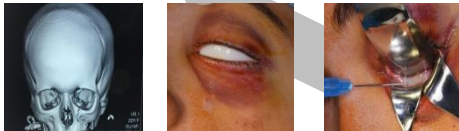
The objective was to compare between transconjunctival approach and subtarsal approach in open reduction of zygomaticomaxillary fracture in terms of clinical or esthetic outcomes.

METHODOLOGY

This study was conducted on sixteen patients who were selected according to the inclusion and exclusion criteria and were operated upon in the Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Alexandria University. The patients were allocated randomly into:

Group A (study group): Eight patients in which transconjunctival approach was used to gain access to the fracture site (Fig.1).

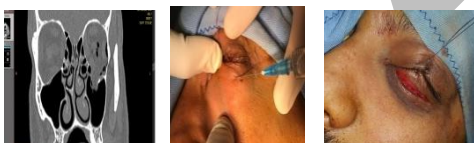
Group B (control group): Eight patients in which subtarsal approach was used to gain access to the fracture site (Fig.2).



Preoperative 3D CT scan of left ZMC fracture, corneal shield & vasoconstrictor injection



Exposure, reduction, fixation with miniplates & suturing (Fig.1) Group A



Preoperative coronal CT of left orbital floor fracture, vasoconstrictor injection & Subtarsal incision



Exposure, reconstruction of the orbital floor with ready made bone graft & suturing (Fig.2) Group B

RESULTS AND DISCUSSION

There was a statistically significant difference between the two groups in exposure time, scar & esthetic appearance (Fig.3 & Table 1) While there was no statistical significance accessibility pain, edema, wound healing, ocular complications & sensory nerve function.

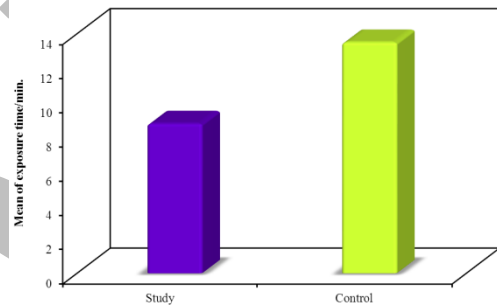


Figure 3: Comparison between the two studied groups according to exposure time

Table 1: Comparison between the two studied groups according to ocular complications, wound healing, sensory nerve function & scar at 6 w

	Study (n = 8)		Control (n = 8)		χ^2	P
	No.	%	No.	%		
Ocular complications					0.291	1.000
No	6	75.0	5	62.5		
Yes	2	25.0	3	37.5		
Wound healing					2.286	0.467
Normal	8	100.0	6	75.0		
Disturbed	0	0.0	2	25.0		
Sensory nerve function					2.286	0.467
Not affected	8	100.0	6	75.0		
Affected	0	0.0	2	25.0		
Scar at 6w					16.000*	<0.001*
No	8	100.0	0	0.0		
Yes	0	0.0	8	100.0		

CONCLUSION

From the results of this study it was concluded that the transconjunctival approach is a very convenient, time saving and highly technique-sensitive approach with minimal reported postoperative complications.

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FRACTURE RESISTANCE OF THREE UNIT FIXED PARTIAL DENTURE FRAMEWORKS FABRICATED FROM HIGH PERFORMANCE POLYMER BY TWO DIFFERENT METHODS

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INTRODUCTION

High-performance polymer (BioHPP) is a relatively new material in dentistry, but it has been believed that it has a promising future. It is an interesting material for metal-free fixed prostheses due to its mechanical properties which are improved when filler components, such as glass or carbon, are incorporated. Polyetheretherketone (PEEK) framework can be fabricated using thermo pressing procedures or can be milled with CAD/CAM techniques (1).

METHODOLOGY

Three groups each of eleven (n=11) according to the material used for fabrication of the FPD frameworks : **group I:** CAD/CAM BioHPP, **group II:** pressed BioHPP Granulate, **group III(control)** : CAD/CAM zirconia. Group I and group III FPD frameworks were fabricated using CAD/CAM technique . The wax pattern of group II were milled using CAD/CAM technique utilizing the same design of group I and III. All FPDs frameworks were adhesively luted on epoxy resin models with dual cure resin cement .

The test specimens were subjected to thermal and load cycles to stimulate the clinical condition. Finally compressive load was applied on each specimen until fracture using universal testing machine to indicate the fracture resistance for each FPD framework. Data were statistically analyzed using ANOVA test.

RESULTS AND DISCUSSION

The mean value of failure load in Newton and the statistical analysis revealed that Group I mean of failure load was 4264.82±230.97 N. Group II mean of failure load was 4415.91±361.11 N. Group III means of failure load was 1173.36±186.90 N. All these data presented in (Table 1). There was a statistical significance difference in (Force/N) among the three studied groups ($X^2_{(KW)}(df=2)=22.218$ p=0.000*). No significance difference was found between Group I and Group II P= 1.000. Perwise Statistical comparison revealed that Group III showed lower force / N when compared to both Group I (BioHPP CAD/CAM P = 0.001 , Z=3.539) and Group II (Bio HPP press P=0.000 Z= 4.466) . On comparing Group I and Group II mean values of failure load 4264.82±230.97 N and 4415.91±361.11 with no significant difference between them (p= 1.000), . This was in agreement with **KURTZ et al (2007)**⁽³⁾ who concluded the relatively rigid molecular chain structure, with considerable ductility can accommodate large deformation plastic flow in both uniaxial tension and compression . Mode of failure in Group I and II (figure 1): plastic deformations in the form of rounded indentations on the occlusal surfaces of the three units of the frameworks . Three specimens of Group II showed fractures at the occlusal surfaces of premolars indicated increased compressive stresses exceeding the limit of the Pressed BioHPP causing cracks then fracture.

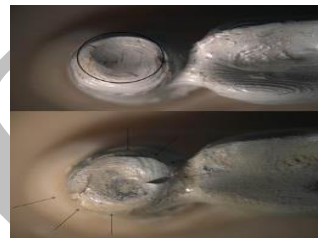


Figure (1): Showing mode of failure in Group I and Group II This was in agreement with Stawarczyk et al(2014)⁽²⁾ who concluded that the optimized mechanical properties of BioHPP due to the combination with inorganic fillers (20 wt%) with high modulus of elasticity (4-GPa) , increased fracture resistance showing only slight plastic deformations .The industrial pre-pressing process for the CAD/CAM blanks and increases the mechanical properties

Table (1): Showing Comparison among the three studied groups according to the median and mean of failure load in newton

	HPP CAD/CAM	HPP press	Zirconia CAD/CAM
Force (N)			
n	11	11	11
Min	3988.00-	3500.00-	900.00-1500.00
Max	4730.00	5000.00	1173.36±186.90
Mean	4264.82±230.97	4415.91±361.11	1047.80-
Test of significance	$X^2_{(KW)}(df=2)=22.218$ p=0.000*		

CONCLUSION

Within the limitation of this *in-vitro* study, it can be summarized that, based on the findings in this study: BioHPP fixed partial denture showed sufficient fracture resistance to be used in posterior regions. Industrial pre-pressing of CAD/CAM blanks increase the stability and reliability of PEEK restorations

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EVALUATION OF STRESS INDUCED FROM IMPLANT-TOOTH ASSISTED TELESCOPIC PARTIAL OVERDENTURES USING DIFFERENT CLASP DESIGNS (IN VITRO STUDY)

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INTRODUCTION

Posterior free end edentulous areas are more prevalent among population. The incorporation of dental implants for the support of removable prostheses offers a practical functional stability, preservation of remaining alveolar bone and minimizing the resultant rotational forces. Telescopic crown retained RPD is one of the options which provides satisfactory support and preservation of the supporting structures (1). This design could be more easily accepted by patients.

METHODOLOGY (2)

Removable partial telescopic overdentures were constructed and the sample will be classified in to two groups; group (I) resilient clasp (RPA clasp), group (II) rigid clasp (Aker clasp), The stress evaluation will be done around crest of the ridge & the buccal and lingual surface of the abutment tooth and implant with strain gauge on the study model which has distal implant placed restoring the missing second molar bilaterally. The universal testing machine was used to apply a central & unilateral load of about 200 N on the loading point record it in computer. This amount of force is regarded as maximal occlusal force for overdentures at the first molar area.



Figure (1): Vertical loading using the universal testing machine.

RESULTS AND DISCUSSION

Statistically, there was a Significant difference between groups and between sites of strain gauges were detected with p value < 0.05. Strains recorded for all groups were compressive in nature. Group II demonstrated the highest strain followed by group I during central & unilateral loading with significant different in micro strains around the buccal surface for implant. (figure 2) (table 1) this could be attributed to the implant does not have periodontal ligament and so there is no cushion effect. (3)

Another explanation of this result may be attributed to the mesial placement of occlusal rest provides an axis of rotation that directs applied forces in a more vertical direction, decreases the tipping of the distal abutment and reduces the stress on the alveolar ridge. While the distal rest

in conjunction with circumferential retainers develop greater horizontal forces within the supporting structures (4).

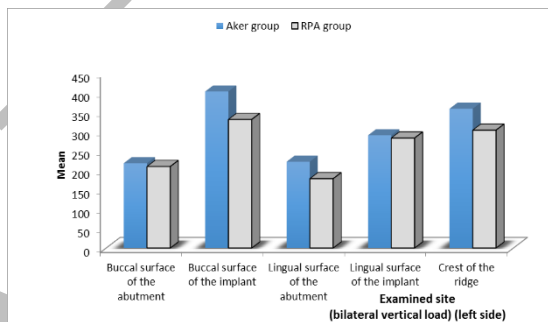


Figure (2): comparison between the Aker and RPA group regarding central vertical load at left side.

Table (1): comparison between the Aker and RPA group regarding central vertical load at left side.

Examined site (central vertical load) (left side)	Aker group	RPA group	T p
Buccal surface of the abutment			
Range	153.8-257.2	170.4-247.8	0.685
Mean	218.0	209.6	
S.D.	46.4	40.3	
Buccal surface of the implant			
Range	250.0-540.0	260.0-412.8	0.038*
Mean	402.6	330.7	
S.D.	118.7	73.3	
Lingual surface of the abutment			
Range	150.2-320.6	160.8-207.8	0.071
Mean	221.9	178.3	
S.D.	73.2	21.1	
Lingual surface of the implant			
Range	224.8-319.2	270.4-308.9	0.642
Mean	290.0	282.9	
S.D.	42.0	17.6	
Crest of the ridge			
Range	218.3-450.2	267.8-411.1	0.077
Mean	358.2	303.1	
S.D.	66.5	101.2	

CONCLUSION

He lowest strain recorded at the group I(RPA), and the highest strain recorded at the group II(Aker).

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ALGINATE/ HUMAN TREATED DENTIN MATRIX HYDROGEL AS A DRUG DELIVERY SYSTEM FOR REGENERATIVE DENTISTRY APPLICATIONS: A PRELIMINARY STUDY

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INTRODUCTION

Regenerative endodontics is one of the most exciting new developments in dentistry field, a novel alginate/human treated dentin matrix (hTDM) hydrogel can be used as a drug delivery system for regenerative dentistry application.

(1)

METHODOLOGY

This study was conducted on freshly extracted human teeth. The pulp tissues were removed and the roots were treated with Ethylene diamine Tetra-acetic Acid (EDTA) solution and then were ground to produce dentin powder by Wise Tis® Homogenizer (figure 1) which were characterized by Scanning electron microscopy (SEM) to achieve particle size (120µ).

Group I: Sodium alginate(SA) 5% (w/w) + human TDM with mass ratio of 1:1, the mixture solution of SA and hTDM was dripped into 1.10% (w/v) calcium chloride solution.

Group II: Sodium alginate alone 5% (w/w) was dripped into 1.10% (w/v) calcium chloride solution as control group.

Degradation of the gels was analyzed by immersion each sample in phosphate buffer saline (PBS) solution (ph=7.4) for 13 days. The gels were removed from the solution and weighted. The degradation degree of the gel was expressed as follows: $Q = \frac{Ww - W_0}{W_0} \times 100$ where Q is the weight change, W_0 is the initial weight gel and Ww is the wet weight of gel. (2)

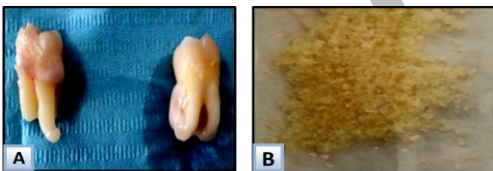


Figure (1): After specific treatment, teeth (A) were fabricated into human TDM powder (B).

RESULTS AND DISCUSSION

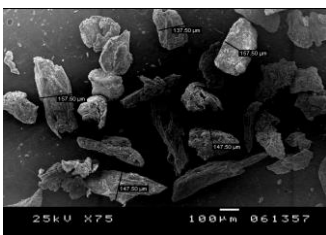


Figure (2): SEM micrograph showing the particle size of hTDM ranged from 120µm.

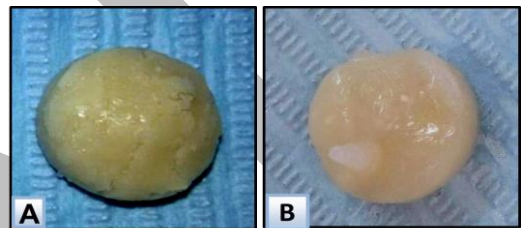
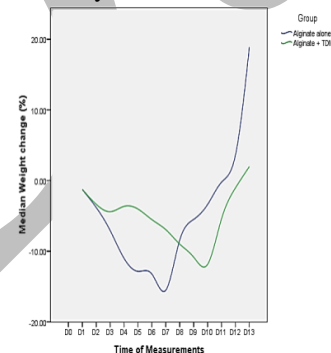


Figure (3): A showing group I, B showing group II

- For group I and II showed a statistically significant difference for percentage weight change from 10 days till 13 with P 0.037.



Graph (2): Group II showing decrease in the weight till the 7th day and then increase till the gel was completely degraded at 13 days, group I showing decrease in the weight till the 10th day and then increase till it was completely degraded after 20 days.

The presence of human(TDM) decreased the degradation rate of alginate hydrogel which retained its shape well up to 20 days compared to Ca²⁺ crosslinked alginate alone.

CONCLUSION

A novel alginate/human treated dentin matrix hydrogel may serve as a potential drug delivery vehicle as the combination was able to slow down the degradation rate of alginate which may allow sustained release of the contained drug.

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DENTIN TOPOGRAPHIC FEATURES FOLLOWING CARIES EXCAVATION USING CERAMIC BUR IN PRIMARY TEETH: SEM STUDY

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INTRODUCTION

The advent in caries removal techniques and in the field of filling materials allowed us to use more “selective” caries removal methods⁽¹⁾. The Ceramic bur (Cera Bur) by Komet, Germany is a new bur believed to have selective caries excavation properties with high minimal invasive potential⁽²⁾.

The aim of the study was to describe the surface topographic features of dentin of primary teeth after caries removal with ceramic bur compared to tungsten carbide bur.

METHODOLOGY

The sample consisted of 10 freshly extracted carious primary canines. Teeth were mounted in acrylic discs and sectioned into two halves producing two specimens. Specimens were randomly allocated into two groups. **Group I:** (n=10) Caries excavated by ceramic bur (figure 1). **Group II:** (n=10) Caries excavated by tungsten carbide. Specimens were coated with gold-palladium layer (figure 2) and examined under Scanning Electron Microscope.



Figure (1): Ceramic bur with round ended cutting end.



Figure (2): Specimens coated with Gold-Palladium.

RESULTS AND DISCUSSION

The dentin surface excavated by the ceramic bur showed a wide range of features with variable amount of patent dentinal tubules and smear layer deposits in different sections. In specimens excavated by the tungsten carbide bur, the dentinal tubules were exposed with minute remnants of smear layer partially occluding some openings. The dentin surface excavated by the ceramic bur showed smooth dentinal surface. This probably indicates that the ceramic bur was more conservative preserving as much dentin structure as possible.

CONCLUSION

Ceramic bur produced a smooth dentin surface with partial removal of the smear and patent dentinal tubules compared to the tungsten carbide bur.

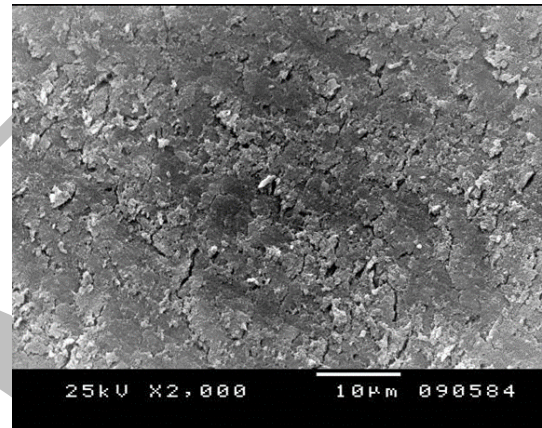


Figure (3): Scanning electron micrograph (X 2000) of dentin after excavation with ceramic bur showing few scattered dentinal tubules opening (arrow) with a noticeable smear layer covering the dentinal floor.

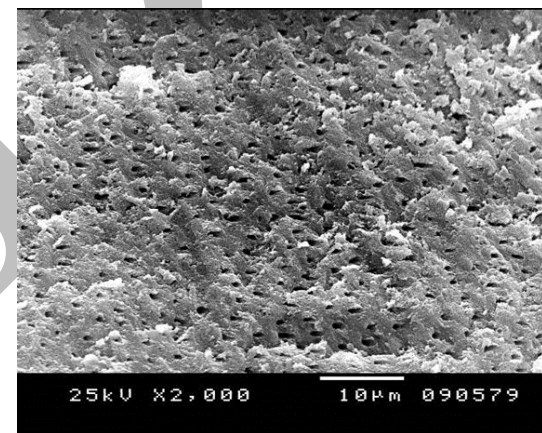


Figure (4): Scanning electron micrograph (X 2000) dentin after excavation with tungsten carbide bur showing great number of dentinal tubules openings with minute remnants of smear layer partially occluding some openings.

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ACKNOWLEDGEMENT

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PREVALENCE OF DENTAL EROSION IN A GROUP OF COMPETITIVE SWIMMERS IN ALEXANDRIA, EGYPT

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INTRODUCTION

Dental erosion is irreversible loss of dental hard tissues caused by acids without any bacterial involvement. (1) Erosive lesions constitute a problem for competitive swimmers who spend a considerable length of time in pool water. (2) Erosion in swimmers may be due to low pH value of inadequately monitored swimming pools. (3) The aim of the study was to determine the prevalence of dental erosion among group of competitive swimmers in Alexandria.

METHODOLOGY

A cross sectional study was performed in 2017 including four public clubs in Alexandria. The study population consisted of 90 competitive swimmers who were trained gas chlorinated pools. The sample was divided into two age groups 11-14 years (junior swimmers) and 15 years and over (senior swimmers). There were 45 swimmers in each group. Participants underwent clinical examination for dental erosion. Basic Erosive Wear Examination (BEWE) system was used for recording erosive lesions. (Table 1) Buccal/facial, occlusal/incisal, and lingual/palatal surfaces are examined for all teeth in six sextants with the highest score only recorded for each sextant then a cumulative score is calculated.

Table (1): Criteria for grading erosive wear

Score	Criteria
0	No erosive tooth wear
1	Initial loss of surface texture
2*	Distinct defect, hard tissue loss <50% of the surface area
3*	Hard tissue loss ≥50% of the surface area

*in scores 2 and 3 dentine often is involved.

RESULTS AND DISCUSSION

Out of 90 swimmers, 60% (54/90) presented the signs of dental erosion. Erosion was more prevalent in senior swimmers 68.89% (31/45) compared to junior swimmers 51.11% (23/45), but the difference was not significant ($p=0.085$). No significant difference in erosion regarding gender ($p=0.786$), although a tendency of higher prevalence of erosion among the participants was observed as 66.7% of subjects with erosion were males and 33.3% were females.

There was positive correlation between prevalence of dental erosion and participant's age and years of practice which was statistically significant ($r_{s(89)}=0.321$, $p=0.002$, $r_{s(89)}=0.300$, $p=0.004$, respectively). However, there was no significant correlation with training hours per week. Similarly, a previous study reported a significant correlation between ages of the swimmers, years of practice and erosion prevalence. (2)

Erosion developed more frequently on buccal/labial and occlusal/incisal surfaces of the anterior teeth, whereas only 6.7% (6/45) of competitive swimmers had erosion on palatal/lingual surfaces of their teeth. (Figure 1). Most of swimmers had erosive lesions limited to enamel surfaces

which were equal to score 1 in BEWE index. Only 16.67% (15/90) had lesions cupping into dentin. This agrees with a previous study by Zebrauskas A. et al. (3) which showed same results.

Long term exposure to pool water with lowered pH could be the main cause of damaged dental tissues in swimmers. However, ions undersaturation of pool water with respect to dental hydroxyapatite especially phosphate and calcium might lead to demineralization of enamel and dentine. Therefore, pH and degree of ions saturation of pool water should be regularly monitored. (4)

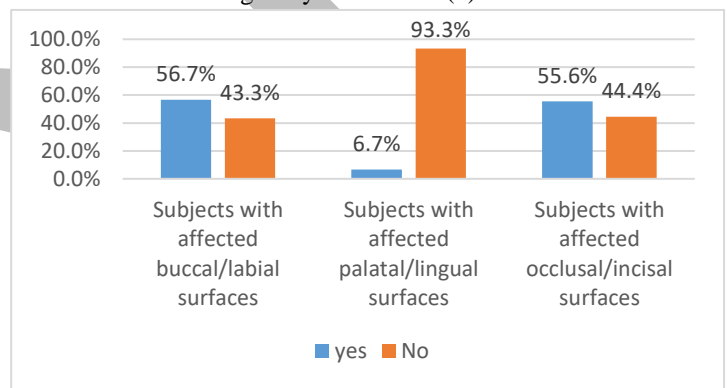


Figure (1): Localization of dental erosion in competitive swimmers



Figure (2): Erosive lesions on the labial, incisal and palatal surfaces in a senior swimmer

CONCLUSION

Dental erosion is a noticeable problem among competitive swimmers. Senior swimmers are at a higher risk for erosion. Labial and incisal surfaces of the anterior teeth are the most affected.

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DENTAL SCIENTIFIC PRODUCTION OF AUTHORS AFFILIATED WITH ARAB INSTITUTIONS IN THE 21ST CENTURY

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INTRODUCTION

Bibliometric analysis of dental journals showed growth in the number of published papers and an upward trend for citation indices (1). Inadequate information is available about the share of Arab dental institutions in the global scientific production and the need for future research planning. The aim of this study was to assess the quantity of dental articles indexed in the World of Science (WoS) database that are produced by authors from Arab institutions and its change over time in the period 2000-16.

METHODOLOGY

We selected a random sample of journals from WoS, “Dentistry, Oral Surgery and Medicine” category, 2000-2016. We counted articles by authors affiliated with institutions from the 22 Arab countries and the total number of articles and calculated the percentage of Arab contribution and its change across time. Journals were categorized into (a) general and (b) specialized and the difference between them was compared using t test.

RESULTS AND DISCUSSION

Out of the 53 journals included, 24.5% were for general dentistry. Authors from Arab institutions contributed 1.9% (1,383/ 73,728) of the global dental scientific production; a small percentage that may be attributed to economic factors affecting research expenditure in several Arab countries. Similarly, a previous study reported a significant positive correlation between the number of publications and gross domestic product (GDP) of a country (2). In some cases, authors may publish in journals that are not listed in WoS.

There was 345.78% increase in the number of Arab publications between 2000-2016 (Figure 1) which may be caused by the increasing number of dental schools in Arab countries (3) or to some of these schools requiring a certain number of publications for promotion.

Three countries; Egypt, Saudi Arabia and Jordan produced 78.4% of all articles (Figure 2). This agrees with a previous study showing the geographic concentration of dental scientific output in few countries where the USA, Brazil, Japan, England and Germany accounted for 54.5% of all articles in ISI Dental journal (4). In that study, Saudi Arabia’s and Jordan’s dental research output formed the majority of each respective country’s total research output. Comoros, Djibouti, Somalia and Morocco had no articles (5).

Although the greatest absolute number of articles were about Periodontics/ Implants (26.2%) and Endodontics (16.1%), there was no significant difference in the percentage of Arab contribution between general and specialized journals; mean ± SD = 1.9±1.6 and 2.1±1.3, P >0.05. Previous literature showed that globally, general dentistry had the highest number of articles in 1980-2010 (6).

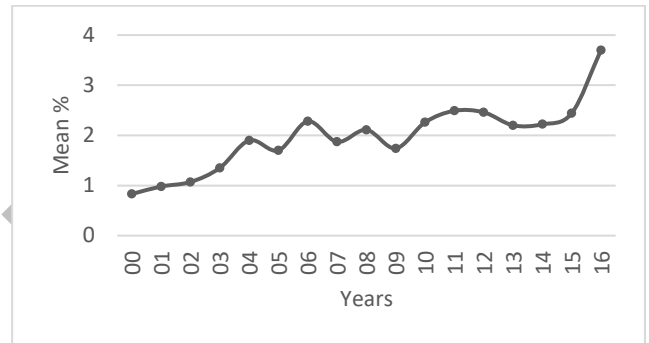


Figure (1): % of Arab to global dental articles 2000-16

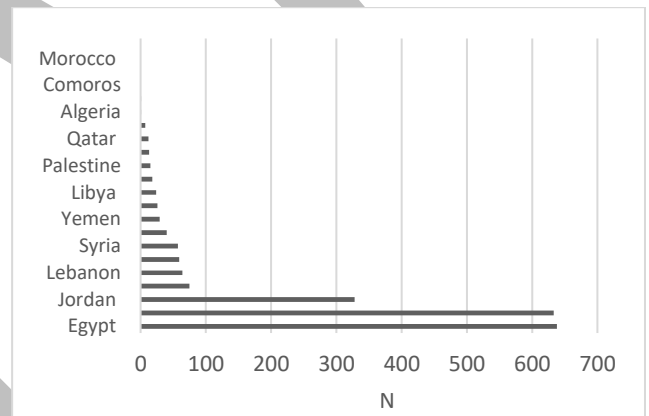


Figure (2): Number of dental articles by Arab countries 2000-16

CONCLUSION

1. Arab dental production increased between 2000-16 but still contributed a very small fraction globally.
2. Arab dental articles were concentrated in 3 countries and 4 countries had no articles in WoS.
3. The percentage of articles published in general and specialized journals was equal and the greatest number of articles were about Periodontics and Implants.

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THE EFFECT OF TWO DIFFERENT SURFACE MODIFICATIONS OF ZIRCONIA IMPLANTS OSSEONTEGRATION (IN VITRO AND HISTOLOGICAL STUDY)

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INTRODUCTION

Zirconia is a promising alternative to titanium regarding to dental implant field. Implant surface characteristics are considered as factors that affect the rate and extent of the implant bone response as well as the mechanical quality of the bone/implant interface (1). This study aimed to evaluate the influence of laser and UV surface modification strategies to enhance osseointegration of zirconia implants.

METHODOLOGY

Three different zirconia implant surfaces were tested in this study: 1) zirconia with unmodified surfaces (control), 2) zirconia with Nd:YAG (Neodymium-doped Yttrium Aluminum Garnet) laser modified surfaces, 3) Zirconia with UV light modified; CAD/ CAM zirconia discs (8mm x 3mm) (N=30) and 36 implant zirconia cylinders were milled and sintered according to manufacturer instructions. Specimens modified with laser were exposed to Nd:YAG laser at wavelength 1064 nm, power 2w, 240 pulses per minute with pulse width 7 ns, repetition rate 10 hz and the distance between laser source and disc is 30 cm for 2 minutes (Continuum corporate 140 Baytech Drive San Jose, CA 95134 USA). While zirconia specimens modified with UV were exposed to UV lamp at wavelength 365 nm for 48 hours (Philips Lighting Company). Surface roughness topography (Ra) values of all discs were analyzed using confocal laser scanning microscopy and surface wettability was studied using a contact angle rane-hart instrument. For in vivo histological study the zirconia cylinders were inserted into the femur's heads of rabbits' models. the osseointegration around the implants in the experimental animals was evaluated by using light microscope.

RESULTS AND DISCUSSION

Confocal laser microscope exhibited the surface roughness (Ra) mean values in micrometer. Nd: YAG laser modified surfaces recorded the significantly highest (Ra) mean value of [0.76um], followed by [0.14um] for UV light modified surfaces, while unmodified surfaces revealed the lowest (Ra) mean value of [0.13um]. Surface roughness topography for all specimens were automatically displayed and represented by colored 3D images at X100 magnification, Figure 1.

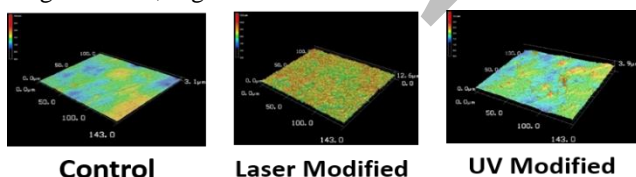


Figure (1): CLSM 3D images showed highest roughness profile for laser modified surfaces, while both control and UV modified surfaces reflected homogenous low roughness topography

Contact angle mean values were recorded. The highest values were recorded for the control group (131.65) reflecting the lowest surface wettability, followed by laser treated group (84.03) and the UV one revealed the lowest

values (71.89) indicating the highest surface wettability. The contact angle values of the studied groups were represented in Figure 2.

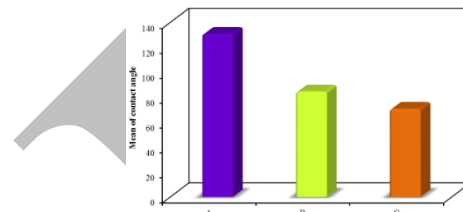


Figure (2): (A) Unmodified control surfaces recording the highest contact angle. An observed decrease is recorded for the laser treated surfaces (B), and the lowest contact angle is registered for the UV modified surfaces (C).

Histological results after two months healing period revealed that laser group showed the best bone formation quality and osseointegration surrounding the zirconia implants compared to other groups, Figure 3.

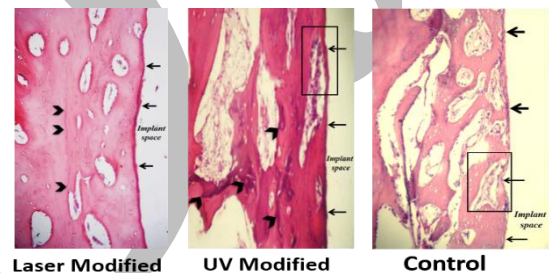


Figure (3): Superior osseointegration around laser modified implants, then UV modified implants, while poor osseointegration was observed around control implants

Laser modification improving the implant osseointegration through generating a pattern of micro- and nano-scale microchannels. These microchannels have been proposed to act as a micromechanical and biologic seal by connecting the attachment of connective tissue and bone (2). UV light application on zirconia transform the hydrophobic surface property of zirconia to be hydrophilic and thus enhancing the osteoblast response (3).

CONCLUSION

Nd:YAG laser and UV modifications succeeded to alter smooth hydrophobic zirconia surfaces to be rough and hydrophilic with enhanced biological performance which was proved with the histological outcomes that displayed enhanced osseointegration features.

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AN IN-VITRO STUDY OF MICROLEAKAGE OF A NEW ORMOCER BULK-FILL COMPOSITE RESIN

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INTRODUCTION

Over the last 30 years, manufacturers have focused on reducing the shrinkage stress generated in resin based composites (RBC) materials and increasing the strength by exploring beyond Bis-GMA matrix. The use of Ormocer as the matrix in composite resins is considered as an alternative method in obtaining low-shrinkage resins with improved mechanical properties.⁽¹⁾ Moreover, in an effort to reduce RBC placement time and technique sensitivity manufacturers have introduced bulk fill flowable base materials and/or bulk fill restorative materials.⁽²⁾ The aim of the study was to assess the microleakage of a new Ormocer-based bulk fill composite in class II cavity preparations

METHODOLOGY

Class II cavity was prepared on 30 caries free, extracted human molars teeth.⁽³⁾ All teeth were randomly divided into 3 groups (n=10) according to the composite to be used as follow (Figure 1) : **Group 1** was restored with Ormocer-based bulk fill RBC (Admira Fusion x-tra, VOCO) **Group 2** was restored with nanohybrid bulk fill RBC (Tetric N-ceram bulk fill, Ivoclar Vivadent) and, **Group 3** was restored with universal nanohybrid RBC (Filtek Z350 XT, 3M ESPE) which served as a **control group**. All samples were thermocycled⁽⁴⁾ for 500 cycles, that correspond to 6 months clinical service, between $5 \pm 2^\circ\text{C}$ and $55 \pm 2^\circ\text{C}$ with a 15 second dwell time, stained then microleakage scores was evaluated using stereo-microscope at magnification of 45x.⁽³⁾

Table (1): The materials used in the study, composition and manufacturers.

Material	Type	Organic matrix	Filler	Fillers amount	Manufacturer
Admira Fusion x-tra	Ormocer-based Nanohybrid Bulk fill composite	Aromatic and aliphatic dimethacrylates , methacrylate functionalize polysiloxane	Ba-Al-glass(1 um), SiO2 nanofillers	84 (w/w) 69 (v/v)	VOCO GmbH, Cuxhaven , Germany
Tetric N-ceram bulk fill	Bis-GMA based Nanohybrid Bulk fill composite	Bis-GMA , Bis-EMA	Barium glass filler, ytterbium fluoride ,spherical mixed	78 (w/w) 55 (v/v)	Ivoclar Vivadent, Liechtenstein , Germany
Filtek Z350 XT	Bis-GMA based Universal Nanofilled composite	Bis-GMA, TEG-DMA, UDMA, Bis-EMA	Silica nanofillers (5-75 nm) zirconia/silica	78.5 (w/w) 59 (v/v)	3M-ESPE, St. Paul, MN, USA.
Futurabond M+	One component , self-etch Universal Adhesive				VOCO GmbH, Cuxhaven , Germany

RESULTS AND DISCUSSION

Results were reviewed with ANOVA and Kruskal–Wallis Tests (Table 1). Statistically significant difference was found between the average of microleakage scores of the three tested materials ($p < 0.01$). However, there was no Statistically significant difference between Admira Fusion X-tra and the control group regarding the occlusal ($P=0.502$) or cervical ($P=0.689$) walls. The microleakage values were the greatest for Tetric N-ceram bulk fill and least for Filtek Z350 xt with Admira Fusion X-tra ranked between the two.

Table (1): Comparison of microleakage scores at occlusal and cervical margins among the three studied materials.

Scores	Filtek z350 xt		N-ceram		`Admira	
	Occ	Ging	Occ	Ging	Occ	Ging
0	60%	50%	10%	10%	30%	20%
1	30%	20%	50%	20%	60%	50%
2	10%	20%	40%	40%	10%	30%
3	0%	10%	0%	30%	0%	0%

CONCLUSION

Ormocer based composite filling material showed an acceptable results in direct class II composite restorations even in bulk filling technique.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

ACKNOWLEDGEMENT

All Voco materials were generously supplied by VOCO company, Germany.

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IN-SITU ORAL MUCOSA REGENERATION IN DIABETIC RABBITS

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INTRODUCTION

Protracted wound healing in diabetes mellitus is related to many factors including retardation in cell proliferation and migration, obstructive vascular diseases that cause hypoxia and release of oxygen free radicals which impair wound healing process(1). The new generation of tissue engineering is based on using a 3d biomimetic scaffolds to stimulate in situ body regeneration capacity(2). Borate bioactive glass nanofibers(BBGNF) is well known with its angiogenic, antibacterial properties and stimulation of cell proliferation and differentiation in addition to its architecture which similar to fibrin clot(2).

METHODOLOGY

Twelve male News Zealand white rabbits were involved in this study.

1-Phase I: Chemical Induction of type I diabetes mellitus by Intravenous injection of alloxan monohydrate(AMH).

2-Phase II: Rabbits induced with diabetes were divided into two groups; an experimental group that received BBGNF in a 10*3mm elliptical mucosal defects that were created in the maxillary mucobuccal fold and control group where defects were left to heal without any intervention. Tissue samples were collected at 1,2,3 weeks and histological assessment was done.



Figure (1): Intravenous injection of AMH and confirmation of diabetes (a-d)(a) Insertion 26gauge cannula in marginal ear vein .(b)AMH powder and solution. (c)Injection of AMH solution (d) blood glucose level after 2w of AMH injection. Creation of elliptical oral mucosal defect and grafting with BBGNF (0.087-0.09g) (e-g).(e) BBGNF.(F)10*3 mm elliptical mucosal defect (g) grafting of BBGNF.

RESULTS AND DISCUSSION

Macroscopic evaluation at one week time interval after wound creation showed complete wound closure of the mucosal wound grafted with BBGNF while control wound showed incomplete wound closure with signs of infection represented by purulent exudate fig (2). On the other hand both control and experimental groups showed complete wound closure at 3 weeks' time intervals. Histological assessment of wounds at 3 weeks time interval revealed Complete epithelization and high vascularization of the experimental wound in addition to, absence of any sign of inflammatory infiltration (fig 3c,d). For the control wound there was incomplete epithelization at the center of the wound defect with inflammatory infiltration all over the submucosal layer (fig3a,b).

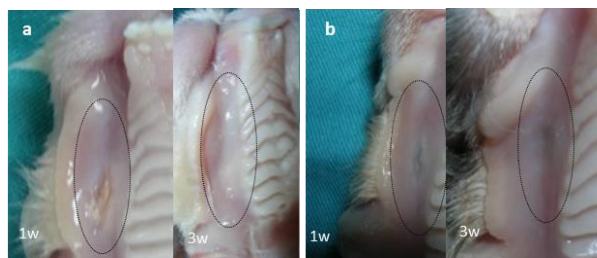


Figure (a-b): Control and experimental wounds at 1-3w time intervals.

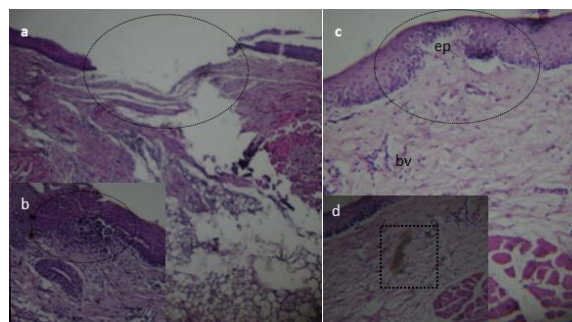


Figure (3): Histological evaluation at 3w.(a-b) absence of epithelium in the control wound with inflammatory cell infiltration in submucosa. (c-d) Epithelization of the experimental wound with no inflammatory infiltration+ tissue pigment in submucosa.(100x)

CONCLUSION

BBGNF has a soft tissue regenerative, angiogenic and antibacterial ability that make it one of the important scaffolds in the new generation of tissue engineering.

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THE EFFECT OF TWO SINTERING METHODS ON THE DENSIFICATION & TRANSLUCENCY OF MONOLITHIC TRANSLUCENT ZIRCONIA (IN-VITRO STUDY)

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INTRODUCTION

Microwave sintering of zirconia has been found to have several benefits such as reducing sintering temperature and time, improved mechanical properties, & higher densification⁽¹⁾. The lowered temperature and time is able to reduce the grain size of zirconia which should also improve the low light transmittance of dental zirconia affecting its translucency compared to conventional sintering⁽¹⁾

METHODOLOGY

Prettau zirconia blocks (Zirkonzahn) were used to mill 56 Zirconia discs with presintering dimensions 10 mm in diameter and 1.5mm thickness.

The discs were divided into 2 groups I. Conventional sintering (n=8) (1530°C, dwell time 2 hours) & II. Microwave assisted sintering (n=48) with subgroups MIA(1300°C, 1 hour), MIB(1300°C, 2hours) MIIA(1400°C, 1 hour), MIIB(1400°C, 2 hours), MIIIA(1500°C, 1 hour), MIIIB(1500°C, 2 hours).

The post-sintered density for all the specimens was measured & percentage densification in relation to theoretical density of zirconia was calculated. Translucency parameter⁽²⁾ was calculated for all the specimens after measuring L,a&b values using spectrophotometer.

RESULTS AND DISCUSSION

The ANOVA suggested a significant difference in densities between the control group and groups MIA, MIB, MIIA (p<0.01), and no significant difference for the remaining groups, MIIB (p=0.162), MIIIA (p=0.997), and MIIIB (p=0.392).

The mean percentage densification in relation to the theoretical density of sintered zirconia (6.06 g/cm³) for groups MIIB, MIIIA, MIIIB were 94.7%, 97.5% and 99% respectively compared to 97% for the control group, with mean densities MIIB (5.74 ± 0.11 g/cm³), MIIIA (5.91 ± 0.12), MIIIB (5.99 ± 0.10), control (5.88 ± 0.10) (Figure 1). This indicates the improved densification of zirconia by microwave sintering at lower temperatures and time compared to conventional sintering.

For the translucency parameter a significant difference was found between the control and MIA, MIB, MIIA, MIIB, (p<0.01), and no significant difference for the remaining groups, MIIIA (p=0.919) and MIIIB (p=0.420).

The mean translucency parameter for groups MIIIA and MIIIB were (10.27 ± 1.08) and (12.58 ± 1.36) respectively in comparison to the control that was (11.09 ± 0.74) (Figure 2). This indicates that the microwave has a

significant effect on the grain size, hence translucency of zirconia.

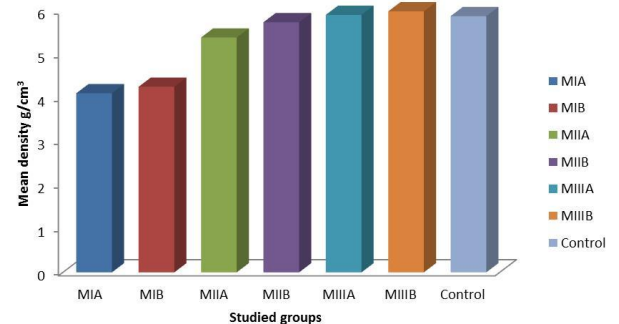


Figure (1): Comparison between the different studied groups according to density (g/cm³)

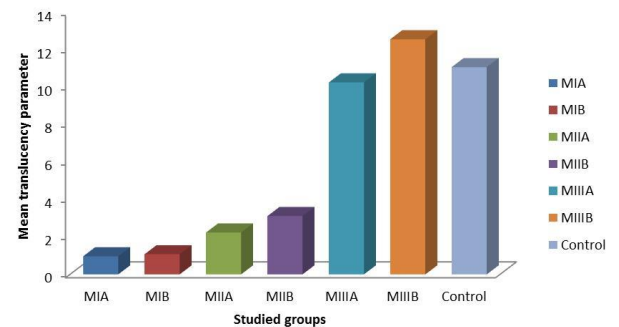


Figure (2): Comparison between the different studied groups according to translucency parameter

CONCLUSION

Based on the results no statistical significance was found in the density between groups MIIB, MIIA, MIIIB and the control group, with even higher mean densities for groups MIIA & MIIB. No statistical significance was found in translucency parameter between MIIIA, MIIIB and the control group with even higher mean translucency parameter for groups MIIIA & MIIB. In conclusion, microwave sintering can produce zirconia with higher densification and translucency than conventional sintering.

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COMPARISON BETWEEN THREE NOVEL INTRACANAL MEDICAMENTS USED FOR REGENERATIVE ENDODONTICS (IN VITRO STUDY)

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INTRODUCTION

One of the most critical challenges in regenerative endodontic procedures is achieving root canal disinfection. Recently, new disinfection methods have been developed to overcome the limitations of conventional disinfecting protocols.

METHODOLOGY

One hundred and twenty radicular dentin specimens were prepared and inoculated with *Enterococcus faecalis* for three weeks. Then samples were divided into three treatment groups where n=30. Group (1): were treated with double antibiotic paste 1mg/ml (DAP), group (2): were treated with silver nanoparticles gel (AgNPs) (0.02%), group (3): were treated with tailored amorphous multiporous bioactive glass 100 mg/ml (TAMP-BG) and control group. Each group was assessed after 24 hours and 7 days where n=15 per time interval. Among each time interval ten samples were assessed using colony forming units test (CFUs/ml) and five samples were examined by SEM×10000 M. The mean differences amongst groups were compared by the Kruskal–Wallis test using SPSS version 20.

RESULTS AND DISCUSSION

The results showed that Both DAP and AgNPs significantly reduced bacterial counts after 7 days when compared to 24 hours. Furthermore, TAMP-BG had a comparable anti-biofilm effect, but it was less than DAP and AgNPs. (Fig.1) (Fig.2) (Graph 1). Besides the anti-biofilm effect of DAP recent study indicated no cytotoxic effect of it against stem cells.⁽¹⁾ However, another recent study has also shown that even lower concentrations of it may affect viability of dental stem cells.⁽²⁾ On other hand the antibacterial effect of AgNPs gel (0.02%) was attributed to the nanoparticles ability to penetrate dentinal tubules besides its substantive action.⁽³⁾ The antibacterial behavior of TAMP-BG could be attributed to its reaction in the aqueous media as leaching of alkali ions may lead to bacterial cells calcification.⁽⁵⁾

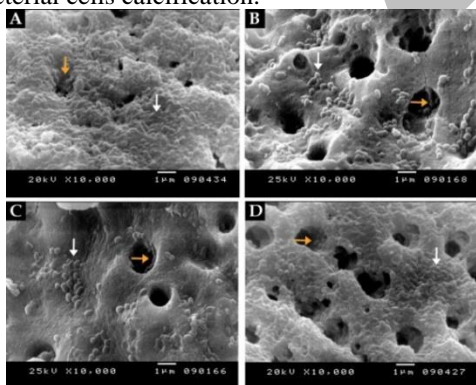


Figure (1): SEM showing samples after 24 hours (A)Control ;(B) DAP;(C) AgNPs;(D) TAMP-BG.

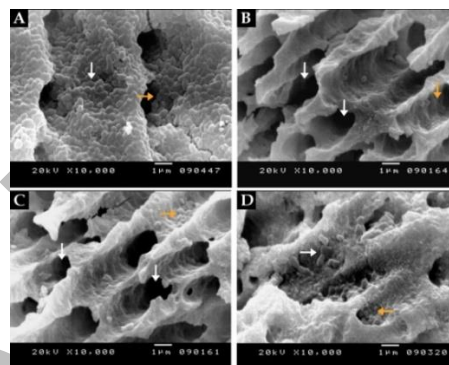


Figure (2): SEM showing samples after 7days. (A)Control ; (B) DAP;(C) AgNPs;(D) TAMP-BG.

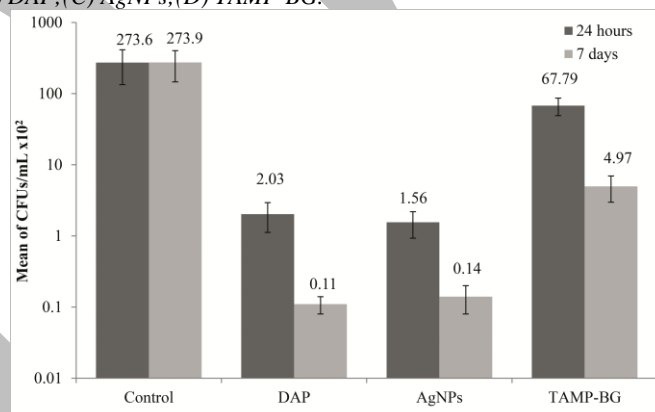


Figure (3): Bar chart representing the mean of bacterial count for each group in both time intervals.

CONCLUSION

DAP (1mg/mL), 0.02% AgNPs and TAMP-BG (100 mg/mL) can significantly reduce *E. faecalis* biofilms. However, complete elimination was only possible with DAP and AgNPs.

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EFFECT OF IMPLANT DESIGN ON STRESS DISTRIBUTION AROUND IMPLANT SUPPORTED DISTAL CANTILEVER FIXED PARTIAL DENTURES. (CLINICAL AND REALISTIC THREE-DIMENSIONAL MODELS)

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INTRODUCTION

A key factor for the success or failure of a dental implant is the manner in which stresses are transferred to the surrounding bone. In this regard, there have been technological improvements in dental implant designs, an increased understanding of biomechanics related to cantilever bridges and emerging data indicating a high survival rate for short-span cantilever fixed partial dentures (1).

One-piece design implant was introduced to offer several advantages over the conventional two-piece implant design, such as elimination of second-stage surgery, the use of an interim removable partial denture, and reduction in treatment cost (2).

METHODOLOGY

A total of 24 implants (DENTIUM Co. Ltd. Korea) were divided on 12 systemically healthy patients (N=6) with unilateral mandibular free-end saddles, every patient received two implants at the location of the second premolar (3.5(Ø) diameter X10mm length) and first molar (4(Ø) diameter X10mm length), they referred as primary and secondary abutment respectively. Group (1) received porcelain fused to metal three unit implant-supported cantilever FPDs over conventional two-piece implants. Group (2) received porcelain fused to metal three unit implant-supported cantilever FPDs over one-piece implants. All groups were subjected to clinical parameters as specific plaque index (PI), gingival index (GI), and periodontal probing depth (PPD) and then Cone beam computerized tomography for densitometric analysis and marginal bone height detection around each implant at time of FPD loading (baseline), 6, and 12 months. Also both biological and technical success and failure were verified during the follow up period.

RESULTS AND DISCUSSION

Plaque index (PI) remained unchanged during the follow up periods in both groups. The gingival index (GI) was significantly increased from the base line to the second follow up period in group I, and there was a significant increase of GI between both study group $P=0.045$ for the primary abutment and 0.025 for the secondary abutment (figure 1a). The bleeding on probing and plaque accumulation in our study were within the ranges of previous studies. The evidence suggests that regular patient follow-ups to remind them about soft food mastication and good oral hygiene can reduce plaque accumulation and increase the success rates (3). The mean PPD was increased in group I and II from the baseline to reach its highest mean at the second follow up especially around the secondary abutment, there was a significant difference between both groups at secondary abutment (figure 1b). The average amounts of bone loss around the implants increased one fold in group I, lead to significant difference between both groups especially around distal surface of secondary abutment during all the periods of follow up $P=0.001$, which results in a positive correlation between PPD and

marginal bone loss at group I (figure c, d). Bone resorption of 1 to 1.5 mm is acceptable for implants in year one, as is continued 0.1-mm bone resorption annually (4). The design of one-piece implants result in minimal bone resorption by eliminating the implant/abutment junction and its microgap and by minimally irritating the mucosa during the implant procedure (2). No significant difference in bone density between the two groups during the follow up period. 98% survival rate after 12 months, none of the one piece implant cases failed. Comparative Von Mises stress analysis of all models showed that the maximum stress overall was in the cervical portion of the secondary abutment. The maximum stress was when the two-piece implant was used compared to the one-piece implant.

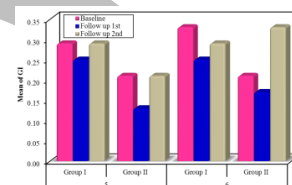


Figure 1(a): GI

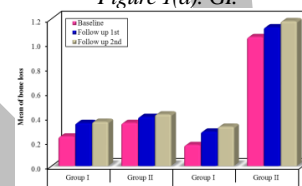


Figure 1(c): Average Bone loss.

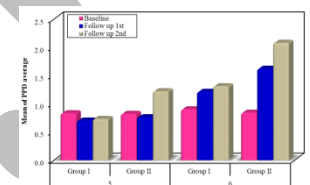


Figure 1(b) PPD average

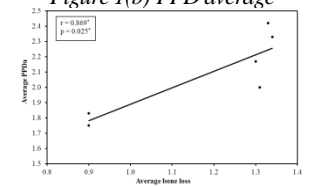


Figure 1(d): Correlation between average bone loss and PPD

CONCLUSION

Stress distribution on cantilever FPD is better in a one-piece implant design when compared with the two-piece implant design, with stress concentration being more at the junction of the abutment and the implant fixture in the two-piece implant. When implants are used as abutments (either primary or secondary), the secondary implant shows the maximum amount of stresses.

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EVALUATION OF STRESSES INDUCED FROM TOOTH IMPLANT ASSISTED PARTIAL OVERDENTURES USING RESILIENT ATTACHMENT WITH DIFFERENT CLASP DESIGN (IN VITRO STUDY)

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INTRODUCTION

Distal-extension removable partial dentures (RPDs) are associated with several problems related to their stability, retention, esthetics, and masticatory efficiency. Kennedy class I classified as one of the most challenging situations. Placement of posterior implants if anatomically possible, converts the edentulous defect from a distal extension Kennedy Class I or II situation to a more biomechanically favorable Kennedy Class III.

METHODOLOGY

For this study, two different designs of removable partial dentures were made on epoxy resin model representing mandibular bilateral distal extension edentulous areas with the first premolar as the main abutment and implant was placed at the site of the second molar on both sides. For group (A), The design principle was (Aker clasp on the first premolar abutment on both sides, lingual bar major connector and (ball & socket) attachment retained the implant). For group (B) the design principle was ((RPA clasp on the first premolar abutments and (ball & socket) attachment on the implants). A self-protected linear strain gauge was used for this study to measure the micro-strain induced on the buccal and lingual sides of the implants, premolar abutments and on the crest of the ridge.



Figure (1): Epoxy resin model with strain gauges sensors.

RESULTS

SPSS software program was used in the statistical analysis of the results. With significant level 0.05 the results revealed that maximum stresses induced were in case of group (A). Strains recorded for all groups were compressive in nature; under central loading the highest strain value was recorded at the buccal side of right implant for group (A) (419.5) while the lowest strain value recorded at the lingual side of left abutment for group (B) (178.7).



Figure (2): study model under central loading

Table (1): Comparison between the Aker clasp and RPA clasp at right side under central vertical load.

Examined site (under central vertical load at right side)	Aker clasp Group(A)	RPA clasp Group (B)	P1
Buccal side of abutment	175.2-325.6 240.1	145.6-239.2 182.9	0.038
Range	63.8	40.3	
Mean			
S.D.			
Buccal side of implant	325.2-582.4 419.5	234.5-490.4 342.2	0.0335*
Range	113.1	123.9	
Mean			
S.D.			
Lingual side of abutment	168.9-325.2 247.8	107.6-285.5 200.9	0.2467
Range	69.2	76.9	
Mean			
S.D.			
Lingual side of implant	254.5-310.5 286.9	256.1-308.1 266.1	0.239
Range	23.4	21.6	
Mean			
S.D.			
Crest of the ridge	216.2-411.2 291.2	159.6-358.5 277.1	0.106
Range	88.0	64.6	
Mean			
S.D.			

CONCLUSION

Within the limitation of the present study; stresses induced on the implants, abutments and crest of the ridge in case of using RPA clasp as a direct retainer for implant assisted overdenture was lower than those induced from using Aker clasp.

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BIOLOGICAL MARKERS AND SOCIODEMOGRAPHIC FACTORS AS INDICATORS FOR EARLY CHILDHOOD CARIES

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INTRODUCTION

Early childhood caries (ECC) is a critical problem in both developing and developed countries that adversely affects children's overall health and oral health-related quality of life. Sociodemographic factors are important variables with regards its relationship with ECC (1).

Non-invasive salivary analysis contains a wide spectrum of analytics, which can serve as biomarkers in caries risk assessment that can identify patients at high caries risk for preventive therapies (2). The aim of the present study was to determine the ability of biological markers and sociodemographic factors to classify preschool children based on their ECC status.

METHODOLOGY

Ethical approval was obtained by Dental Research Ethics Committee at the Faculty of Dentistry, Alexandria University, prior to commencement of study.

The present case control study sample consisted of 145 healthy preschool children aged 3-5 years (73 children with ECC and 72 caries free). A questionnaire was used to collect sociodemographic data including age, gender and father's education. Caries status was clinically assessed according to the WHO criteria using dmf Index (3) and oral hygiene status using Plaque Index (4).

Unstimulated salivary samples were collected by spitting method from the children to measure the levels of salivary nitrate (NO) (5), pH and buffering capacity (6). Salivary biochemical analysis was carried out at the Biochemistry Laboratory in the Faculty of Medicine, Alexandria University.

Tests of significance (t-test and chi square tests) were calculated to compare sociodemographic and biological factors between the groups. Regression analysis was used to assess the relationship between the variables.

RESULTS AND DISCUSSION

Table 1: Description of the study sample

Variables		ECC children n= 75	Caries free children n= 75	P value
Age	Mean ± SD	4.52 ± 0.62	3.79 ± 0.79	<0.0001*
Gender	Male: n (%)	34 (46.6%)	31 (43.1.5%)	0.87
	Female: n (%)	39 (53.4%)	41 (56.9%)	
Father's Education	Illiterate: n (%)	12 (16.4%)	1 (1.4%)	0.001*
	Secondary or less: n (%)	58 (79.5%)	57 (79.2%)	
	College completed: n (%)	3 (4.1%)	14 (19.4%)	
Plaque Index	Mean ± SD	0.78 ± 0.33	0.54 ± 0.23	<0.0001*
Salivary pH	Mean ± SD	7.46 ± 0.41	7.71 ± 0.47	0.001*
Buffering capacity	Mean ± SD	0.91 ± 0.18	0.97 ± 0.14	0.04*
Salivary NO	Mean ± SD	59.82 ± 45.86	62.33 ± 42.83	0.59

Table 2: Association of sociodemographic factors and biological markers with ECC

Variables	Model 1		Model 2		Model 3	
	P value	Odds ratio (95% C.I.)	P value	Odds ratio (95% C.I.)	P value	Odds ratio (95% C.I.)
Plaque index			<0.0001*	37.71 (8.29, 171.52)	<0.0001*	40.72 (6.53, 254.01)
Salivary pH			0.001*	0.16 (0.05, 0.49)	0.022*	0.22 (0.06, 0.80)
Buffering capacity			0.89	1.21 (0.07, 20.91)	0.85	1.38 (0.05, 36.31)
Salivary NO			0.89	1.00 (0.99, 1.01)	0.89	1.00 (0.99, 1.01)
Age	<0.0001*	4.82 (2.74, 8.46)			<0.0001*	4.94 (2.54, 9.58)
Male vs female	0.53	1.29 (0.58, 2.87)			0.85	1.09 (0.44, 2.70)
Secondary educated or less vs illiterate	0.003*	0.04 (0.00, 0.34)			0.022*	0.06 (0.005, 0.66)
University educated vs illiterate	<0.0001*	0.01 (0.00, 0.13)			0.006*	0.21 (0.001, 0.32)
%Correctly classified		72.7%		73.8%		81.4%

The results of the regression analysis showed that the model including biologic markers correctly classified 73.8% of the children compared to 72.7% of children classified using socioeconomic factors. When both were combined in the same model, 81.4% of children were correctly classified based on ECC.

CONCLUSION

Assessment of sociodemographic data coupled with measurement of oral hygiene status may efficiently identify ECC risk among preschool children similar to biological markers.

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ACCURACY OF CONE BEAM COMPUTED TOMOGRAPHY IN MIXED DENTITION ANALYSIS

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INTRODUCTION

Mixed dentition space analysis has become a valuable tool in orthodontic diagnosis and treatment planning. ⁽¹⁾ CBCT imaging provides three dimensional volumetric data construction of dental and associated maxillofacial structures with high resolution and high dimensional accuracy.⁽²⁾ This study aimed to evaluate the accuracy of cone beam computed tomography in the mixed dentition analysis and compare cone beam computed tomography for mixed dentition analysis to Moyers analysis and Tanaka and Johnston analysis.

METHODOLOGY

An observational comparative study. This study was conducted on 30 participants with an age range from 13 to 18 years selected according to certain criteria after approval of ethical committee. Each participant had an impression taken using alginate impression material. A stone dental cast was poured immediately, then each participant's upper and lower arch were scanned using CBCT. Measurements of mesiodistal widths of the canines and premolars were obtained from the cast using digital caliper and from the CBCT using special software. Then the measurements were statistically compared using paired t test. Bland-Altman plot was used to test accuracy of CBCT. The sum of the widths of canines and premolars obtained from the dental cast and from the CBCT were compared to the Moyers method and Tanaka and Johnston method.

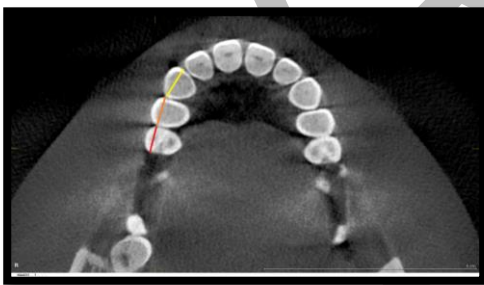


Figure (1): measurement from CBCT using the distance tool

RESULTS AND DISCUSSION

There was high agreement between measurements of canines and premolars obtained from the dental cast and those obtained from the CBCT. However, CBCT measurements were slightly larger than the dental cast measurements yet no statistically significant differences were found in most teeth and even if a slight difference appeared it did not exceed 0.3 mm which was clinically insignificant. The results also showed that the sum of widths of canines and premolars from the CBCT were comparable to the value obtained from the dental cast and

Moyers method. The Bland-Altman plot revealed that the measurements from casts and CBCT had an agreement with mean differences close to zero for all plots indicating accuracy. These results agree with other authors ^(3,4)

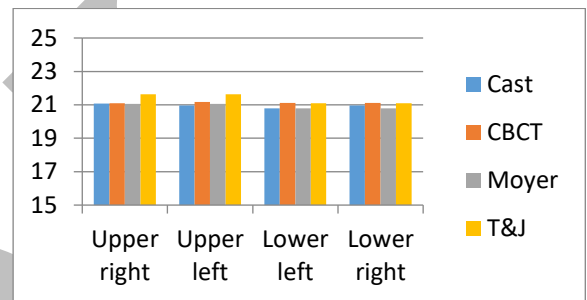


Figure (2): A comparison of the three methods with the cast measurements

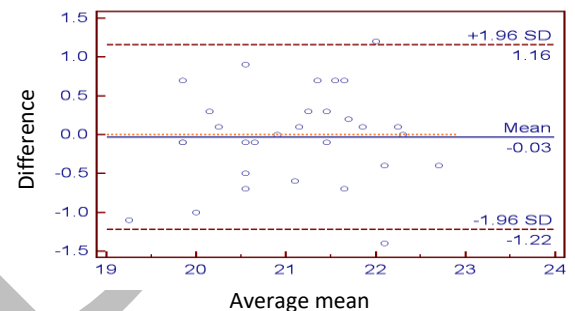


Figure (3): An example of Bland-Altman plot for the maxillary right quadrant.

CONCLUSION

There is an agreement between Cone Beam Computed Tomography measurements and the cast measurements of canines and premolars. CBCT and Cast measurements as well as Moyers method of analysis showed comparable results.

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NANOLEAKAGE COMPARISON BETWEEN DIFFERENT ADHESIVE RESTORATIVE MATERIALS SYSTEMS IN DENTIN OF PRIMARY TEETH (IN-VITRO STUDY)

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INTRODUCTION

For the clinical success of composite resin, an effective bond between dental materials and tooth substrates is critical. The overall reduction in the application steps is expected to reduce the probability of handling mistakes. (1) A recent innovation in adhesive dentistry is the introduction of a self-adhering flowable composite resin that does not require preliminary treatment of the dental substrate. This simplification in the restorative procedure can be particularly relevant in pediatric dentistry. (2) Nanoleakage is a pattern of leakage occurring within the hybrid layer in nanometer scaled spaces, may be due to the presence of residual water around collagen fibrils, collagen network collapse, or incomplete resin infiltration into the exposed collagen network and polymerization. (3) In-vitro studies determining the adhesive with least nanoleakage in primary teeth dentin are still lacking. Therefore, evaluation of their nanoleakage to primary teeth dentin surface will be the scope of this study. The null hypothesis is that no statistically significant differences in nanoleakage to primary dentin will exist among the test groups.

METHODOLOGY

This in vitro, experimental study was conducted on 60 extracted human primary molars. Class V cavities were prepared in the labial surface and the teeth were divided randomly into 4 groups and restored with the material of choice:

Group 1: Self-adhering flowable composite (Vertise Flow, Kerr, USA). Group 2: Total etch adhesive system with flowable composite (Phosphoric Acid/OptiBond Solo Plus/Herculite ultra flow, Kerr, USA). Group 3: Self etch adhesive system with flowable composite (Optibond All-In-One/Herculite ultraflowable, Kerr, USA). Group 4: Glass ionomer based material (Fuji II LC, GC Japan). Nanoleakage test: (2) After tooth preparation, restoration and thermocycling the restored tooth was be immersed in 50% ammoniacal silver nitrate solution for 24 hrs, sectioning and examination was conducted using EDX Unit (Energy Dispersive X-ray Analyses) to measure the quantity of silver-ion penetration (Figure 1)(Table 1) followed by SEM to evaluate the quality of the hybrid layer(Figure 2).

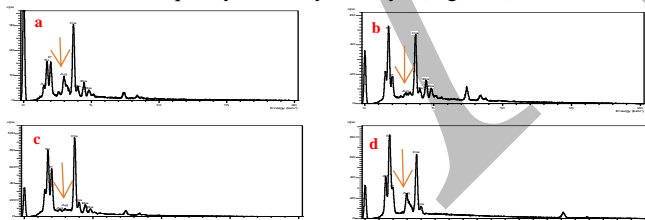


Figure (1): Graph indicate the amount of several dominant element, especially metallic silver (red arrow), through the elemental energy spectra, (a) Group 1 (b) Group 2 (c) Group 3 (d) Group 4

RESULTS AND DISCUSSION

By using Kruskal Wallis H test, it was found that there is a statistically significant difference in the percentage of silver penetration between the 4 groups, $p < 0.001$. Pairwise comparisons revealed significant difference between group 1 and group 3 ($p = 0.003$) and between group 2 and group 3 ($p < 0.001$) and between group 3 and group 4 ($p < 0.001$). However, no significant difference between group 1 and group 2 ($p = 0.363$) and between

group 1 and group 4 ($p = 0.056$) and between group 2 and group 3 ($p = 0.597$). (Table 1)

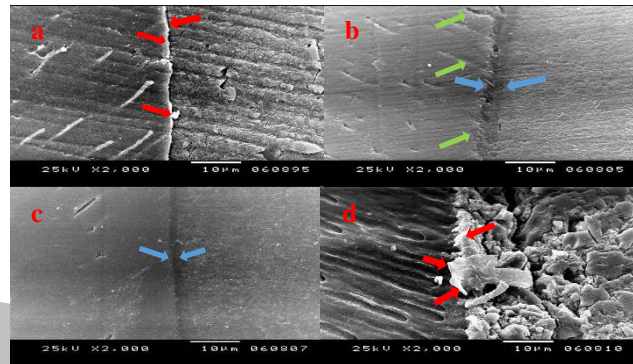


Figure (2): Showing SEM image evaluating the quality of hybrid layer and showing silver deposits. (a) Group 1 (b) Group 2 (c) Group 3 (d) Group 4, metallic silver deposits (red arrow), thickness of hybrid layer (blue arrow), resin tags penetrating dentinal tubules (green arrow) Left side is dentinal tubules while right side is the filling

SEM images showed distinct hybrid layer present in group 2 and 3, but group 1 and 4 didn't show a clear hybrid layer. The extent of silver penetration in the examined areas was most visible in group 1 followed by group 2 and 3

Table (1): Comparison between the different groups according to Ag %

Ag %	Group 1 (n = 15)	Group 2 (n = 15)	Group 3 (n = 15)	Group 4 (n = 15)	P
Min. – Max.	0.97 – 5.40	1.25 – 3.43	0.70 – 3.0	4.90 – 6.50	<0.001*
Median	4.34	2.70	1.0	5.40	
IQR	0.96-5.40	1.25-3.43	0.70-3.00	4.90-6.50	
Sig. between groups	$p_1=0.061, p_2<0.001^*, p_3=0.009^*, p_4=0.100, p_5<0.001^*, p_6<0.001^*$				

CONCLUSION

Self-etch adhesive system showed the least nanoleakage in primary teeth dentin and the most uniform hybrid layer. There is no significant difference between self-etch and total etch adhesive systems.

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A HISTOPATHOLOGICAL STUDY TO EVALUATE THE EFFECT OF OZONE AS A PULPOTOMY MEDICAMENT IN PRIMARY TEETH

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INTRODUCTION

Pulpotomy is the ablation of infected or affected coronal pulp tissues leaving the residual radicular vital pulp tissues intact, thus preserving its vitality and function. Pulpotomy is the most controversial technique, as, its results can be satisfactory; depending on case selection, capping material and hermetic seal (1). Although many materials have been suggested, Formocresol (FC) has long been considered the gold standard medicament used for this procedure (2). However, the use of FC has been questioned because of its adverse effects as; potential carcinogenicity, mutagenicity and cytotoxicity, so it is still important to identify an effective and preferably natural pulpotomy medicament to increase the therapeutic arsenal and successfully perform pulpotomy procedure.

METHODOLOGY

The present study was conducted on 3 puppies in a split mouth design, where 24 pulpotomies were performed. Every puppy received 8 pulpotomies, where; the remaining pulp tissue in half of the molars was covered with ozone cream and the other half was covered with FC leaving 2 untreated molars for histological comparison. The effect of both materials was evaluated both coronally and apically after 1,2 and 4 weeks regarding; the degree of inflammation using the Adrian scale and the status of the odontoblastic layer was evaluated according to Qvist and Qvist.

The procedures were designed in accordance with the guidelines for the responsible use of animals in research as a part of scientific research ethics recommendation of the Ethical Committee at Faculty of Dentistry, Tanta University.

RESULTS AND DISCUSSION

It was found that at different sacrificing times (1,2&4 weeks), the grades of inflammation recorded in the ozone specimens were less than that recorded in the FC specimens. Also the grades of inflammation recorded in the apical portion of the pulp was less than that recorded in the Coronal portion of the pulp under both materials. (figure 1)

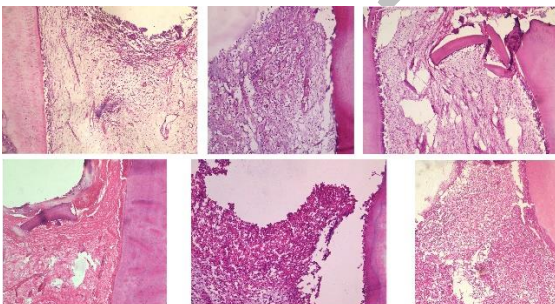


Figure (1): Photomicrograph showing the pulp status coronally; 1a,b&c ozone capped pulp at 1,2 &4 ws respectively 1d,e&f FC capped pulp at 1,2&4ws respectively

The ozone was found to be more preservative to the odontoblastic layer than FC both coronally and apically at the three study periods. (figure 2)

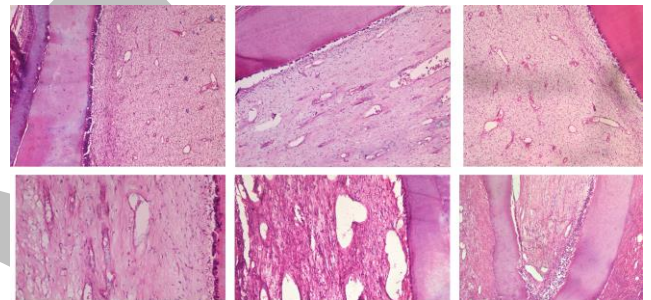


Figure (2): Photomicrograph showing the pulp status apically; 2a,b&c ozone capped pulp at 1,2 &4 ws respectively, 2d,e&f FC capped pulp at 1,2&4ws respectively

There was a statistical significance between the two materials at 4 weeks coronally regarding the degree of inflammation and 1 week apically regarding the degree of inflammation and preservation of the odontoblastic layer.

The biochemical role of antioxidants is to function as coenzyme precursors in healing processes. The trace elements essentially act as cofactors for antioxidant enzymes involved in the destruction of toxic free radicals produced in the body as a normal consequence of the healing processes (3). Ozone has a strong antioxidant capacity that enhances the immune system to release growth factors. It stimulates the expression of the adaptive inflammatory responses and induces synthesis of interleukins and leukotriens. It helps the secretion of vasodilators and activation of aerobic processes. Most importantly it is a powerful antimicrobial against bacteria, fungi and viruses (4).

CONCLUSION

The ozone was found to be less irritant and more preservative to the odontoblastic layer than FC.

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ORAL REHABILITATION OF A CHILD WITH ECTRODACTYLY ECTODERMAL DYSPLASIA CLEFTING SYNDROME: A CASE REPORT

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INTRODUCTION

Ectrodactyly Ectodermal Dysplasia Clefting syndrome (EEC) is a rare syndrome inherited as autosomal dominant or as a de-novo transfiguration due to mutations of *TP63* gene, affecting the early development of ectodermal tissues and other organs. It is characterized by ectodermal dysplasia, ectrodactyly and syndactyly of some fingers and/or toes. Hypodontia, malformed teeth, dental caries and clefting are commonly seen.¹ This report presents a clinical case of oral rehabilitation of an EEC child under general anaesthesia with further chairside treatment stages.

CASE REPORT

A male child aged 5.6 years from a non-consanguineous marriage and no familial predisposition was presented to the Pediatric Dentistry Clinics in Alexandria University. Upon general and extra-oral (EO) examination, fine fair hair, sparse eye lashes, and a postsurgical scar on the upper lip were evident. Ectrodactyly of the 2nd and 4th right toes and the 2nd left toe was detected. The intraoral (IO) examination displayed mobile teeth and multiple carious lesions. The panoramic radiograph confirmed the presence of: remaining root of # 62, gemination of #81, congenitally missing # 32, 42, undetected crypts of #15, 25, 35, 45 and ectopically positioned, unerupted # 11, 12, 21, 22. Supernumerary teeth were suspected in the pre-maxillary region. (Figure 1).



Figure (1): EO views showing facial features [1a] and ectrodactyly [1b, 1c] Panoramic radiograph showing germination, undetected permanent teeth buds, ectopically positioned teeth and suspected supernumerary teeth. [1d]. Pre-operative IO views showing multiple carious lesions [1e-1g].

MANAGEMENT AND FOLLOW UP

The treatment was firstly done under general anesthesia due to the definitely negative behavior of the child. Treatment approval has been provided by the Ethics Committee, Faculty of Dentistry, Alexandria University, Egypt (IRB 0010556)-(ORG 0008839) and the guardians' consent was obtained. Oral health related quality of life (OHRQoL) was assessed using a validated arabic version ² of the (16-items short-form) child perceptions questionnaire (CPQ₁₁₋₁₄).³ During the operation, all needed preventive, restorative and surgical treatments were carried out. The

OHRQoL was reassessed 3 months after the operation.³ (Figure 2)



Figure (2): Post-operative IO views showing restorations and extractions of the needed teeth [2a-2d] Post-operative Panoramic radiograph [2c]. A Removable SpM [2d]. Reverse band and loop SpM [2e].

RESULTS AND DISCUSSION

The child's acceptance to the chairside treatment were improved after dental rehabilitation. A removable functional space maintainer was placed to guide the eruption of tooth #

26. After its emergence, a reverse band and loop was placed.

(Figure 2) The improvement in the child's quality of life was evidenced by the reduction in the overall scale scores of the (CPQ₁₁₋₁₄) after oral rehabilitation. (Table 1)

Table (1): Comparison of the OHRQoL before and after treatment using the CPQ

Domains	Response scores before treatment	Response scores after treatment
Oral symptoms	12/16	4/16
Functional Limitation	11/16	4/16
Emotional wellbeing	13/16	11/16
Social wellbeing	11/16	2/16
Overall scale score	47/64	11/64

CONCLUSION

Treatment under general anesthesia was mandatory to fulfill the unmet dental needs of such definitely negative child. The treatment outcomes positively influenced his attitude towards treatment procedures. The enhancement in esthetics and function boosted the child's self-esteem and consequently improved his quality of life.

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