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Primary Teeth of Children

Computer-Aided Implant Surgery

Highlights

Strength Behavior of Veneered

Melkersson-Rosenthal Syndrome

Discovering Thoughts, Inventing Future

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Eating Disorders within the Dental Practice: A Literature Review

By Sara E. Askounes & Kristin A. Williams

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Abstract- Eating Disorders (ED) affect a great deal of individuals around the world, yet initial diagnosis continues to be elusive to detect. Many of the physical and psychological manifestations that occur in patients suffering from an ED can be seen by both medical and dental professionals; however the mentality behind this diagnosis is complex. The task of discussing the disorder with the patient has a tendency to be passed amongst practitioners even though current literature agrees that early diagnosis is key to prevention and successful treatment. Two areas of focus that need to be addressed are who is responsible for making the initial diagnosis and what needs to be included for prevention and/or successful treatment.

Keywords: *eating disorder, anorexia, bulimia, bing-eating disorder, dentistry, prevention.*

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Eating Disorders within the Dental Practice: A Literature Review

Sara E. Askounes [α] & Kristin A. Williams [σ]

Abstract- **Eating Disorders (ED) affect a great deal of individuals around the world, yet initial diagnosis continues to be elusive to detect. Many of the physical and psychological manifestations that occur in patients suffering from an ED can be seen by both medical and dental professionals; however the mentality behind this diagnosis is complex. The task of discussing the disorder with the patient has a tendency to be passed amongst practitioners even though current literature agrees that early diagnosis is key to prevention and successful treatment. Two areas of focus that need to be addressed are who is responsible for making the initial diagnosis and what needs to be included for prevention and/or successful treatment.**

Keywords: eating disorder, anorexia, bulimia, bing-eating disorder, dentistry, prevention.

I. Introduction

An Eating Disorder (ED) is a complex multi-faceted disease that contains both physical and psychological complications. The American Psychiatric Association has given full diagnostic criteria for each subcategory of ED to include: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge-Eating Disorder (BED), Other Specified or Unspecified Feeding or Eating Disorder, Pica, Rumination Disorder, and Avoidant/Restrictive Food Intake Disorder (1). Regardless of the specific diagnosis, ED's affect over 5 million people in the United States alone (2). According to one review on medical complications and clinical nutrition, complications with the disorder present in many different forms (3), and yet these physical manifestations are just the tip of the iceberg when it comes to discussing the side effects associated with an ED.

Clinical signs of EDs can be fairly easy to diagnose during a dental exam. The oral manifestations are relatively specific to the disorder and with a limited amount of preliminary knowledge a dental professional can make a diagnosis quickly and noninvasively. One study highlighted salivary flow as a contributor to increased dental caries. This study examined dental erosion scores of persons with BN and those without to conclude that those with the disorder are at significantly higher risk for dental erosion and thus dental caries. This has been found to be the most distinct oral finding with BN specifically (4). Another study names what they call "cues" of ED manifestations which include dentin hypersensitivity, parotid enlargement, parotid dysfunction, periodontal disease and gingival inflammation, as well as erosion and xerostomia (5). Self-reported findings in one study compared those diagnosed with an ED to the control patient who does not have the disorder and found significant distinctions in the presence of oral symptoms (6). Research overwhelmingly agrees that those affected by the disorder are at significantly higher risk for oral complications compared to their counterparts.

Extensive research has been conducted to evaluate the oral manifestations of EDs that present in the dental office. There is conclusive evidence that EDs typically present first within the oral cavity, and can be seen as early as six months after behavior has begun (7). Enamel erosion, dental caries, mucosal membrane trauma, xerostomia and salivary gland swelling have all been identified as common oral findings associated with ED's (4).

The dental team is in the optimal position to make early detection screenings and step in to begin the intervention process (8). While there is a plethora of information available for physicians and nurses to utilize in assisting with prevention, screening, recognition, and management, there is very little information accessible to assist dentists caring for the same population (2).

Diagnosis based solely on oral findings may be risky and problematic; therefore familiarization with dermatological signs is necessary. The effects of starvation on the body appear outwardly in many forms. These can include xerosis, lanugo-like body hair, acrocyanosis, pruritus, purpura, or even acne. These signs are relatively common for AN, while BN exhibit slightly different presentations such as Russell's sign- a small callus or cut on the knuckles of the hand used to induce vomiting (9). While educating the medical/dental professional on physical signs and symptoms is important, these signs do not encompass the story as a whole.

The common theme within EDs typically involves food; however psychological issues are more often than not a root cause (10). It has been suggested

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that EDs may develop as a coping mechanism for underlying personality disorders (11). The development of the disorder has also been suggested to be the product of situational prompting, or triggering. Depression, loneliness or the feeling one has lost control have all been identified as possible triggers for an ED. As a result, EDs have been linked with a need to be in control. Enforcing a compulsory daily routine is one example of maintaining control exhibited quite frequently (12). It is therefore typical for a person with an ED to hide their behaviors for as long as possible because they do not believe relinquishing control is an option. Without diagnosis and medical and psychological therapy, these destructive behaviors continue to progress (13). Even with treatment, if the approach to recovery is insufficient, relapse is extremely common (14).

As a result of the complexity of the disorder, an interdisciplinary team-based approach to treatment has been recommended for successful treatment of all ED's. The recommended team composition includes a physician, psychologist or psychiatrist, a registered dietitian, and a dentist (15). All of these disciplines include, within their general curriculum, a basic overview of the disease (16). Despite the general knowledge presented within the professional curriculum however, multiple barriers have been identified. Dental professionals in particular have discussed that they do not feel knowledgeable enough to converse with patients or referral agencies about such a sensitive subject, though they do feel it is within their scope of practice. A fear of causing further detriment or offense is at the root of this thought process as a result of a lack of clinical instruction on patient education and communication. Another barrier deals with interdisciplinary collaboration specifically in the form of dissonance between professions (17). Despite these barriers, it still remains clear that signs present first in the mouth.

As mentioned previously, an ED is primarily a psychiatric disorder; those who are affected will typically attempt to avoid arousing suspicion (6). As a result, it is unlikely a person struggling with an ED will be forthcoming with information; therefore clinicians must be observant (18). Acquiring genuine answers without embarrassing the patient is a challenge that must be overcome. Consequently, a survey was developed as a screening tool to identify individuals with ED's (19). It was designed to quickly interview participants, and can be completed relatively effectively. For ease of use, the survey is referred to as SCOFF to represent each individual question asked to determine if patients made themselves sick, felt out of control, had lost a significant amount of weight, believed themselves to be fat, and if food played a dominant role in their lives (Figure 1). The questionnaire was later examined more closely to be used as a screening tool specifically for the oral health care professional (20). It was concluded that the survey could be easily administered in dental offices to more effectively identify patients in need of diagnosis and ED treatment (20).

II. Conclusion

Referral and maintenance of EDs is not thoroughly covered in the literature. While it has been concluded that the dental professional is in the optimal position to diagnose a person suffering from the disorder, it is unknown to what extent one participates in communicating appropriately with the target age group. Continued research should focus on determining if the diagnosis is being made, to what extent, and what current maintenance of those patients looks like.

The SCOFF Questions
Do you make yourself sick because you feel uncomfortably full?
Do you worry you have lost control over how much you eat?
Have you recently lost more than 15 pounds in a three month period?
Do you believe that you are fat when others say you are too thin?
Would you say that food dominates your life?

Figure 1: The Scoff Questionnaire (12).

III. Practice Implications

The aim of this review was to provide a knowledge base to begin the process of recognizing the need for research in the area of ED's. While continuing education specific to ED recognition does exist, it is limited in form and relatively rare. The evidence presented within this paper clearly suggest that inter-professional connections are extremely important in ensuring that all healthcare providers remain united and identification of a disorder is swift. Detection and management of ED's is key to prevention and treatment, therefore a plan of action set in motion for all members of the team is crucial to ensure that all individuals affected are cared for quickly and action is taken to ensure prevention. Further research is necessary to determine what approaches are currently being utilized within the dental practice. Research should investigate how private practices can increase their involvement in the prevention, or initial detection, and subsequent treatment of eating disorders.

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Computer-Aided Implant Surgery: A Literature Review

By Lauren Bohner, Rafael Prestes, Eduardo Mukai, Sueli Mukai
& Rogério de Lima Romeiro

Abstract- *Purpose:* To update the literature regarding the computer-aided implant surgery.

Material and Methods: A literature search was applied in electronic database using the key-words: "Guided surgery", "dental implants", "computer-aided surgery", "stereolito-graphic guides".

Results: The procedure involves the use of diagnostic imaging and CAD – CAM technology with the purpose of obtaining a surgical guide, which transfers the virtual implant planning to the surgical field. The technique allows to couple the desired prosthesis into the anatomical structures in order to determine the implant positioning. Thus, the method provides greater safety during surgery, accurate knowledge about position of anatomical structures and their relationship to the future prosthesis. Besides, it allows a flapless surgery, providing a shorter surgical time and reducing the post-surgical discomfort.

Conclusion: Guided surgery requires specialized knowledge and high standards of care. However, when performed in accordance with patient´s specific needs, it may represent a faster and safety procedure.

Keywords: *guided surgery, virtual planning, surgical template.*

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Computer-Aided Implant Surgery: A Literature Review

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I. Introduction

Dental implant has becoming a common procedure in clinical practice due to the long-term predictability of the treatment (Tortamano et al., 2009). In order to ensure the treatment success, an accurate treatment planning is required, which comprises the association between the surgery and prosthetic treatments.

Treatment planning is usually performed with the aid of radiographic and clinical examinations. In this respect, both the examination of anatomical structures by means of cone-beam computed tomography (CBCT) such as the use of a surgical stent to transfer the prosthetic planning to the surgical procedure are essential aspects to determine an accurate implant placement (Carvalho et al., 2006).

However, the conventional technique does not allow to associate the prosthetic requirements to the bone availability, which may result in errors during the surgical procedure. Furthermore, the manual process of manufacturing may also result in errors inherent to the surgical stent fabrication (Gulati et al., 2015).

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Guided surgery allows to overcome the limitations related with the conventional process by associating the surgical and prosthetic treatment planning. The techniquecomprises the digital workflow on which the virtual planning considers both surgical and prosthetic needs of the patient. In addition, by means of a stereolitographic template, it is possible to transfer the virtual planning to the surgical procedure (Aaschen et al., 2012).

The main advantage of the technique is the positioning of dental implants based on surgical and prosthetic requirements, allowing a safety, easiness and faster surgical procedure. Furthermore, it decreases the postoperative discomfort of the patient (Greenberg et al., 2015). Despite of the several advantages provided by the technique, the accuracy of the guided surgery and the success rate of the procedure are still controversial. Hence, the purpose of this study was to update the literature regarding the computer-guided implant surgery.

II. Materials and Methods

The literature search was performed in the electronic database Pubmed/Medline, using the following key-words: "Guided surgery", "dental implants", "computer-aided surgery", "stereolitographic guides".

Inclusion criteria comprised studies evaluating the accuracy of the technique for dental implant placements. Articles containing insufficient information and case reports were not considered for this study. The articles were chosen based on title and abstracts, followed by the full-reading of the paper, from which data were extracted.

III. Results

a) *Initial considerations*

Guided surgery is the digital workflow on which the placement of dental implants is virtually planned based on surgical and prosthetic needs of the patient. The technique associates the location of anatomical structures, bone availability and prosthetic requirements (Bornstein et al., 2014). Thus, it is mainly indicated to complex rehabilitations, on which the bone availability is limited or in cases on which a minimal invasive procedure is required (Yilmas et al., 2015).

The following advantages regarding the guided surgery are described in literature: the integration

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between the virtual planning and the surgical procedure; the possibility to guide the perforation according to the bone availability and location of anatomical structures; the possibility to perform a minimal invasive procedure by means of flapless technique and the greater precision provided by the virtual treatment planning (Greenberg et al., 2015).

However, the use of technique is limited due to the complexity, higher costs and the need of learning curve. Furthermore, there are risks inherent to the procedure, as the deviation of implant positioning due to the manufacturing of an inaccurate surgical guide. Therefore, it is not indicated in cases on with the mouth opening is limited, as it may cause the wrong positioning of surgical instruments (Gulati et al., 2015).

b) Virtual planning

The virtual planning begins with a tomographic exam, which allows to determine the positioning and angulation of the dental implant. In this respect, cone-beam computed tomography provides a tridimensional image on which the placement of implant is simulated (Figure 1).

After, the definitive restoration is designed and coupled to the tomographic exam, associating the surgical planning to the prosthetic treatment. In this case, functional and aesthetic aspects related to the prosthesis are provided during the prosthetic planning. Thus, the positioning and angulation of dental implants are chosen based on both bone availability and occlusal relationship (Ganz et al., 2015).

During the prosthetic planning, a diagnostic wax-up is fabricated to obtain a diagnostic model. After, the design of the future prosthesis is added to the virtual planning by scanning a radiographic template containing radiopaque materials. The tomographic scan in performed with the template positioned into the patient mouth, allowing the visibility of tooth position in relation to the underlying bone (Ganz et al., 2015). A second possible approach is to scan the diagnostic model by means of an optical scanner. Furthermore, CAD-CAM (computer-aided design/computer-aided manufacturing) technology allows to virtually plan and design the future prosthesis by direct scanning of the intraoral arch (Figure 2).

The prosthetic planning is associated to the CBCT data to design the surgical guide, which is then fabricated by means of prototyping (Figure 3). The association between these digital techniques increases the accuracy of the technique (Patel et al., 2010; Reyes et al., 2015).

c) Surgical guides

The fabrication of customized surgical guides is possible due to the association between digital technologies. The surgical guide is virtually designed and fabricated by prototyping. Three types of surgical guides are available, and they differ according to the tissue type used as support: bone, mucosa or tooth-supported guides. The bone-supported guide offers a greater precision, as it allows the visualization of the surgical field. On the other hand, by using mucosa-supported guides it is possible to use minimal invasive procedures, as flapless surgical techniques (Gallardo et al., 2016).

IV. Discussion

Guided surgery offers several advantages to implant surgery due to the possibility of transfer the virtual planning to the surgical procedure. The key factor for the implementation of guided surgery is the use of digital techniques, such as CBCT, virtual software and CAD-CAM system (Gulati et al., 2015). Although the technique present some limitations, when correctly performed, it allows a safe and accurate procedure (Katsoulis et al., 2009), presenting a survival rate similar to the conventional technique (Hultin et al., 2012). On the other hand, Schneider and al (2009) claim different errors may occur during the planning and surgical phases. Hence, there is a need of improvement of the technique in order to avoid prosthetic complications.

Arisan et al. (2015) evaluated the deviation of 108 implants placed by mucosa-supported surgical guides when using CBCT or computed tomography for virtual planning. Both technique presented similar deviations. Petersson et al. (2010) evaluated the accuracy of technique by comparing the virtually planned position of implants to the positioning after the surgical procedure. The authors emphasized the need of a rigid protocol to avoid errors during the procedure.

The accuracy of guided surgery relies on the stability of the surgical guide into the patient mouth (Gulati et al., 2015). However, studies are still controversial regarding the fidelity presented by surgical guide to transfer the implant positioning from the virtual planning to the surgical procedure (Petersson et al., 2010; Arisan et al., 2012). According to Sicilia et al. (2012), deviations up to 6 mm on implant positioning may occur due to the instability of the surgical guide, especially in cases of multiple implants.

Arisan et al. (2010) compared the conventional procedure to the computer-aided implant surgery when using bone and mucosa-supported guides. The evaluation was based on surgical duration and postoperative complications. With this regard, the use of mucosa-supported guides for flapless technique decreased the surgical time and postoperative discomfort of the patient. In addition, Vasak et al., (2010) reported the flapless surgery is a reliable technique, as the deviation of implant positioning did not exceed the safety distance recommended by the planning software.

Micromovements of the surgical guide, which occur during the surgical procedure, are the main responsible to the instability of the template. Di Giacomo

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et al. (2012) showed a rate of 34,43% of complications resultant from the guided surgery. The implant deviation commonly occurs in posterior region due to the difficult in positioning the surgical guides, especially in cases on which the patient present a reduced mouth opening. Even though, the technique is considered effective for complex rehabilitations and minimal invasive procedures (Fortin et al., 2010).

V. Conclusion

Guided surgery requires specialized knowledge and high standards of care. However, when performed in accordance with patient´s specific needs, it may represent a faster and safety procedure.

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Figure Legends

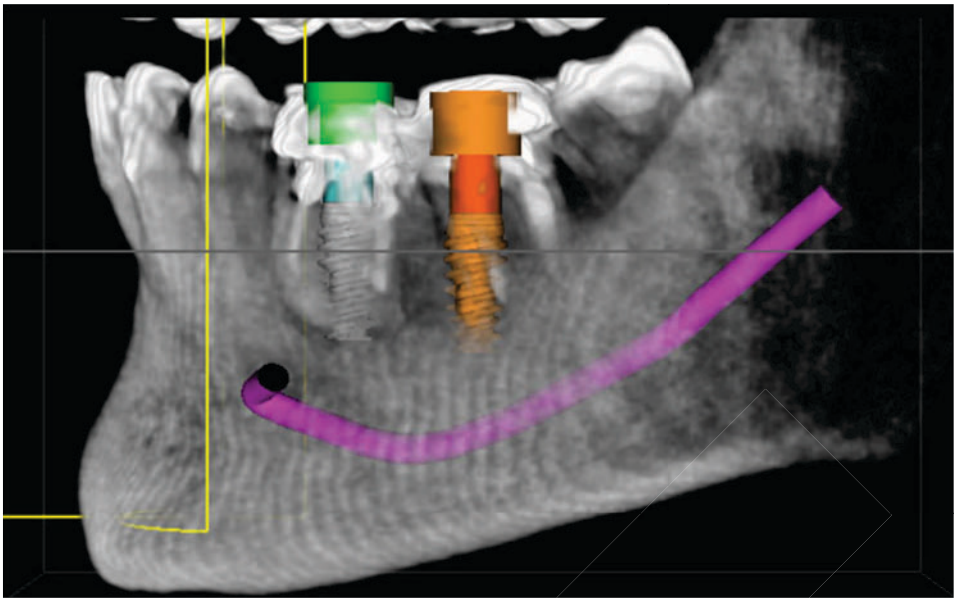


Figure 1: Virtual planning by means of CBCT.

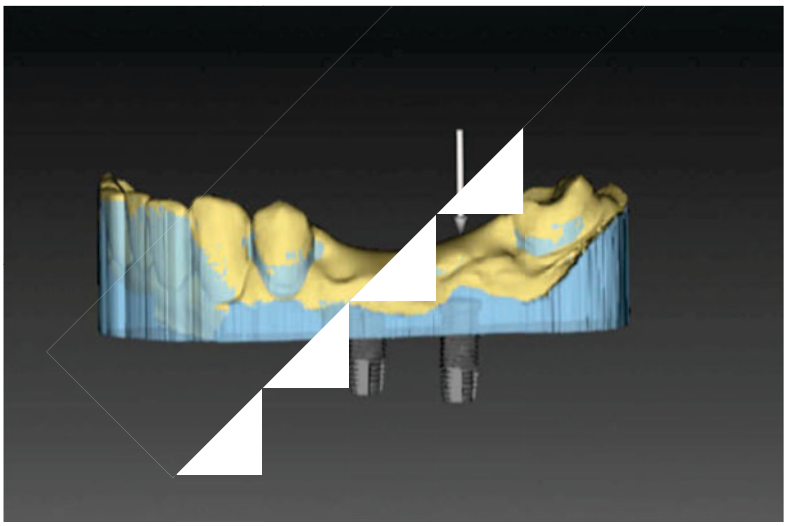


Figure 2: Virtual planning by means of CAD-CAM.

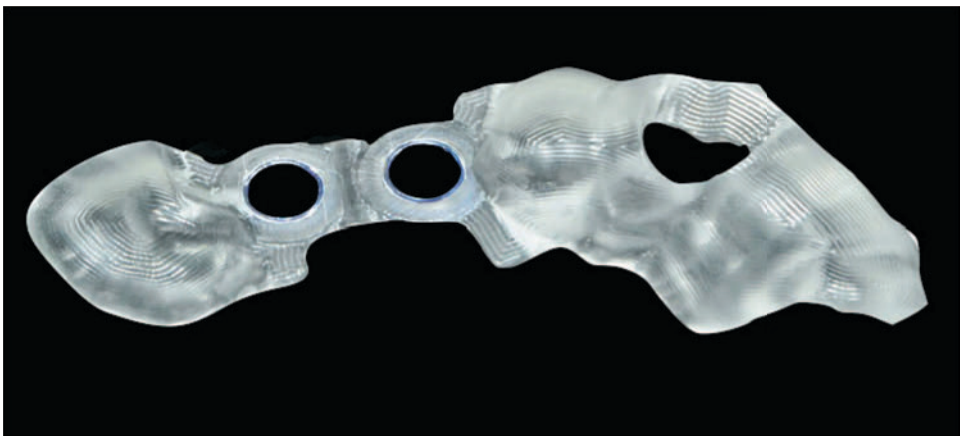


Figure 3: Surgical guide.

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Strength Behavior of Veneered Zirconia after Different Surface Treatments

By Sheila P. Passos, Bernie Linke, Carolyn M. Berendt & John A. Nychka
University of Alberta

Abstract- *Purpose:* The aim of this study was to evaluate the flexural strength of a veneered zirconia system after different surface treatments as a pre-cementation procedure and before veneering.

Methods: Translucent Y-TZP ceramic bars, for four-point bend testing, were prepared and divided considering the compressive (surface treatment for cementation) and lower tensile surfaces (surface treatment for veneering). Two different surface treatments were evaluated: 1- glass interlayer; 2- sandblasting + glass interlayer. Four-point bending test data were statistically analyzed using ANOVA.

Results: The flexural strength was significantly affected by sandblasting the surface for cementation. Sandblasting + glass interlayer on the surface for veneering combined with sandblasting the surface for cementation presented the highest flexural strength and better strength reliability.

Conclusion: Sandblasting + glass interlayer on the surface for veneering combined with sandblasting the surface for cementation presented better results regarding flexural strength and reliability.

Keywords: *flexural strength; all-ceramics; Y-TZP; delamination.*

GJMR-J Classification: *NLMC Code: WU 105*



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Sheila P. Passos [α], Bernie Linke [σ], Carolyn M. Berendt [ρ] & John A. Nychka [ω]

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Keywords: flexural strength; all-ceramics; Y-TZP; delamination.

I. Introduction

To improve the bonding between zirconia core and veneer, surface treatments have been investigated before veneering the zirconia restoration. Such surface treatments include sandblasting[1-3] and application of a graded interlayer between the veneer and zirconia or alumina core.[4] Therefore, the combination of airborne-particle abrasion and a graded interlayer between a translucent Y-TZP core and the veneer layer of an all-ceramic system will be evaluated in the present investigation. To our knowledge such a protocol has never been investigated. As external and internal restoration surfaces are sandblasted to improve veneering and cementation bonding, respectively, the aim of this study was to evaluate the flexural strength of a veneered zirconia system after different surface treatments before veneering and as a pre-cementation procedure.

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II. Materials and Methods

Eighty bar-shaped specimens from partially sintered zirconia (Lava™ Plus, 3M ESPE, St. Paul, MN, USA, LOT: 480872) were obtained and sintered (25 mm x 4 mm x 0.7 mm), according to the manufacturer's instructions. Specimens were divided into four groups considering the compressive (surface treatment for cementation) and lower tensile surfaces (surface treatment for veneering). Two different surface treatments were evaluated: 1- glass interlayer; 2- sandblasting + glass interlayer. For the first group, the glass layer was applied on the lower surface (veneering surface; tensile surface in the bend test). The second test group had the lower surface sandblasted, and then the glass interlayer was applied on the same surface and sintered. The glass interlayer (SiO_2 – 60 mol%; Al_2O_3 – 3.13 mol%; CaO – 9.4 mol%; Na_2O – 14.64 mol%; BaO – 6.56 mol%; B_2O_3 – 6.27 mol%) was obtained from The Center for Advanced Ceramic Technology, Alfred University.

The porcelain material (VM9, Vita Zanhfabrik, Bad Säckingen, Germany, LOT: 32260) was applied on the lower specimen surface and sintered. The veneer surfaces were leveled and polished using silicon carbide papers in sequence (600, 800 and 1200 grit) under water cooling. Half of the specimens from each core-veneer group were randomly divided into 2 sub-groups (n=20) according to the presence or absence of the sandblasting procedure on the cementation side (Table 1). Air-abrasion, with 30 μm SiO_2 particles (RocatecTM Soft, 3M ESPE, Seefeld, Germany, LOT: 450384) was performed making circular movements at a distance of 10 mm with 2.5 bar pressure for 15 s with aid of a custom made jig, as previously reported.[4]

Specimens from each group were investigated by X-ray diffractometry. The relative amount of transformed monoclinic, *m,* phase (F_M) on the zirconia surfaces was determined as described by Toraya et al.[5] The transformed zone depth (TZD) was determined on the treated zirconia surface and calculated according to the amount of the monoclinic phase. The TZD was obtained based on the equations described by Kosmac et al.[6]

The specimens' edges were chamfered using a holding device according to ISO 14704 recommendations. All specimens were submitted to a four-point bending test in a universal testing machine

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having the veneering porcelain surface under tensile stresses.

The fracture surfaces of the tested specimens were inspected by stereomicroscopy and SEM. The flexural strength (MPa) data were statistically analyzed using two-way analysis of variance (ANOVA). To assess material strength reliability, the flexural strength values were also analyzed using Weibull distribution by the equation:

$$P_{(\sigma)} = 1 - \exp[-(\frac{\sigma}{\sigma_0})^m]$$

Where P is the probability of failure, σ the fracture strength, σ_0 the characteristic strength at the fracture probability of 63.2%, and *m* is the Weibull modulus. The values were ranked using a median ranking criteria.

III. Results

Monoclinic peaks were not observed after polishing the specimens, which confirms that phase transformation (*t-m*) occurred only after sandblasting. The reverse transformation (*m-t*) took place after the sandblasted surfaces for veneering were submitted to the porcelain firing cycle. However, after sandblasting the cementation surface, phase transformation (*t-m*) was only observed on the cementation side (Fig. 1a). TZD is showed in Figure 1b.

The flexural strength was significantly affected by sandblasting the surface for cementation (P = .008). The group which had the surface for veneering sandblasted + glass interlayer combined with sandblasted cementation surface presented the highest flexural strength and highest strength reliability – Weibull modulus (Table 2). Results of Weibull distribution (63.21% probability of failure) are shown in Table 2 and Figures 2 and 3. The fractured surfaces were analyzed by SEM to identify the origin of failure (Fig. 4b).

IV. Discussion

The sandblasted veneering surfaces submitted to the porcelain firing cycle presented no detectable monoclinic phase which confirms the reverse phase transformation generated by the heat procedure (*m-t*).[3,4] The greatest flexural strength values exhibited from G4 may be attributed to the formation of compressive stresses on the tensile surface (surface for veneering). As a consequence, the YTZ-P crystalline structure was altered (XRD analysis). Partial delamination occurred regardless of the sandblasting the surface for veneering. For the majority of the specimens, volume-distributed flaws were located at the surface where the fracture originated (Fig. 4a,b).

V. Conclusions

Sandblasting + glass interlayer on the surface for veneering combined with sandblasting the surface for cementation presented the best treatment option based on the flexural strength and strength reliability exhibited in this study.

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Table 1: Experimental groups considering the surface treatment on the veneering and cementation surfaces

Surface treatment for veneering	Surface treatment for cementation	Groups*
Glass interlayer	No sandblasting	G1
	Sandblasting	G2
Sandblasting + glass interlayer	No sandblasting	G3
	Sandblasting	G4

*n=20

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Table 2: Mean values (MPa) and standard deviations of the flexural strength, and Weibull analytical results obtained for the different experimental conditions

Group	Flexural strength (MPa)*	Characteristic strength (σ) (MPa)	95% Confidence intervals for characteristic strength (σ)	Weibull modulus (*m*)	95% Confidence intervals for Weibull modulus	R^2 (%)
G1	146.3 (49.9)	163	92-289	3.32	2.94-3.71	94.8
G2	152.2 (48.7)	170	87-334	3.31	2.86-3.75	93.0
G3	129.1 (38.4)	143	53-386	3.99	3.17-4.81	85.2
G4	178.9 (45.2)	196	114-338	4.31	3.86-4.76	95.7

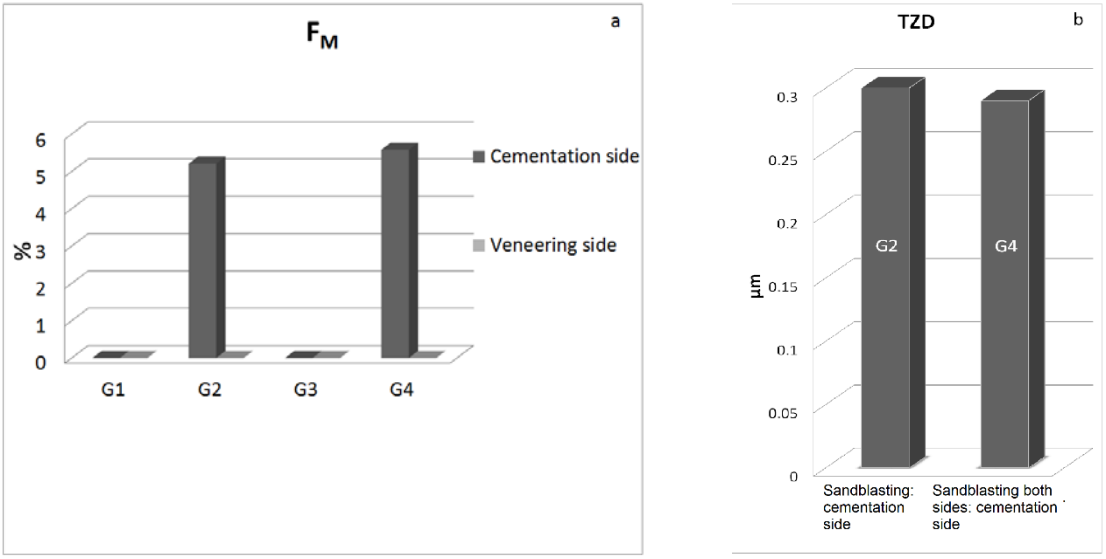


Figure 1: (a) Relative amount of monoclinic phase (F_M) revealed by XRD on zirconia surface after different surface treatment. (b) Transformed zone depth (TZD) on zirconia sandblasted without porcelain sintering cycle.

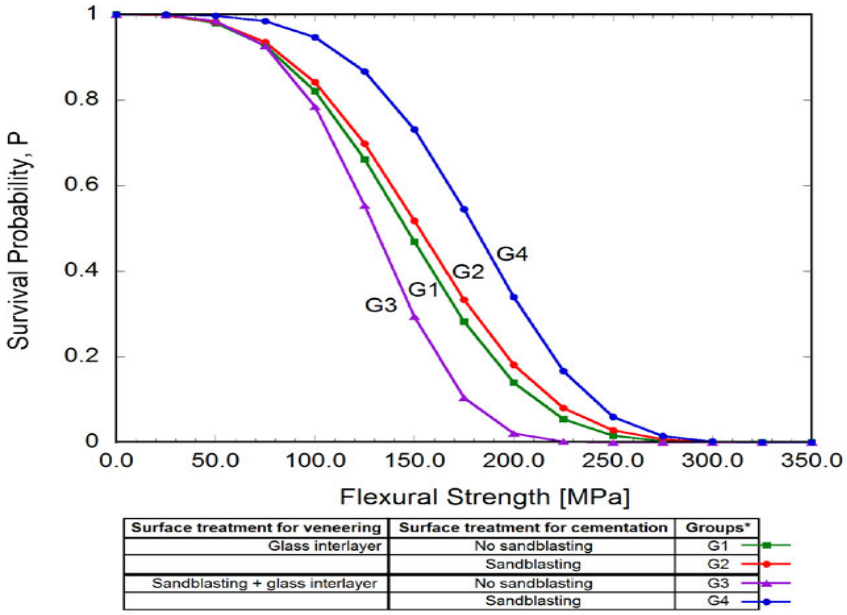
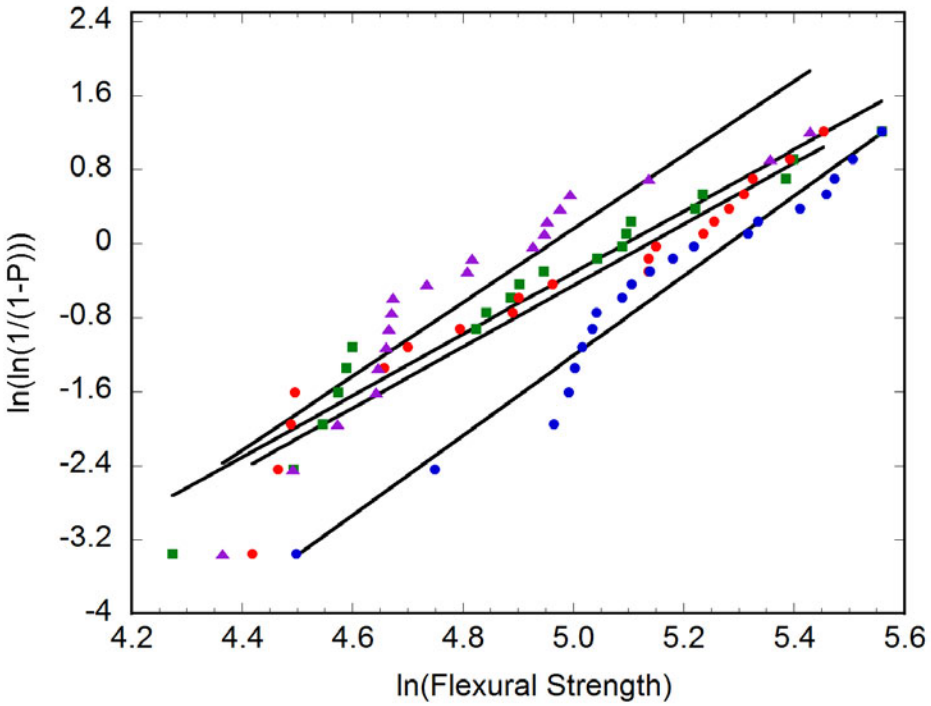


Figure 2: Weibull survival probability plot for tested groups. G4 group exhibited the highest flexural strength and Weibull modulus.

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Surface treatment for veneering	Surface treatment for cementation	Groups*
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	Sandblasting	G2
Sandblasting + glass interlayer	No sandblasting	G3
	Sandblasting	G4

Figure 3: Weibull plot of tested groups. The similar slope of the curve fits (black lines) indicates similar strength reliability (similar Weibull modulus; 3.31<m<4.31).

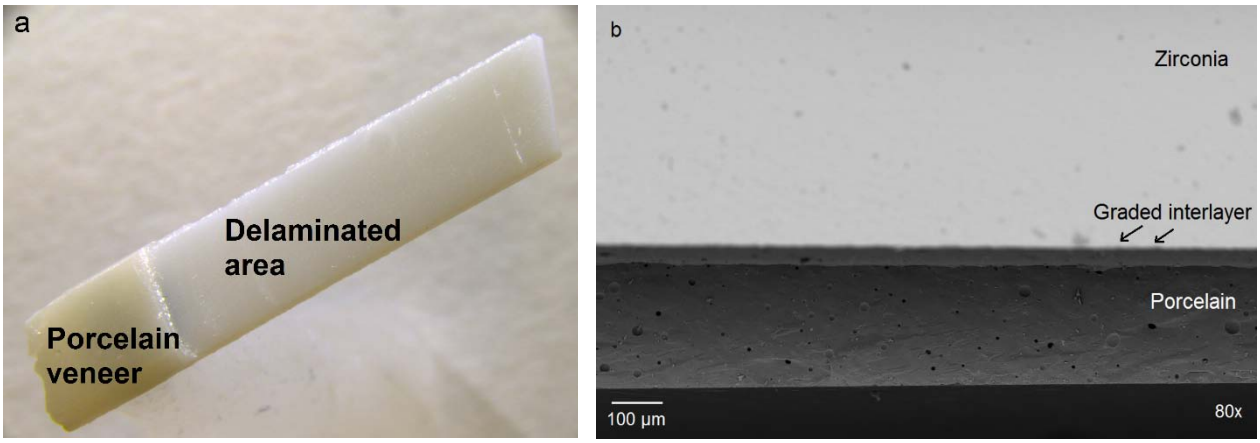


Figure 4: (a) Stereo microscope image of a fractured specimen: specimen from G1 exhibiting extensive delaminated area of veneering porcelain. (b) Representative side view SEM micrograph image showing tested sample from G2.

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Melkersson-Rosenthal Syndrome: An Atypical Presentation with Facial Diplegia (A Case Report and Literature Review)

By Ait-el-kerdoudi M, Chafiki Z, Merzouki B, Rouadi S, Abada R, Roubal M & Mahtar M

Ibn Rochd University Hospital

Abstract- Melkersson-Rosenthal Syndrome is a rare entity of unknown etiology, characterized by the triad of symptoms: recurrent face and / or lip swelling, cracked or scrotal tongue and peripheral facial palsy. This symptomatology is often incomplete. It usually begins in childhood and relapses are common. We report a case of a patient with MRS followed in the ENT and Neck Surgery department of the University Hospital August 20th of Casablanca.

Keywords: *facial paralysis - fissured tongue - macrocheilia - melkersson-rosenthal- facial diplegia.*

GJMR-J Classification: *NLMC Code: WU 100*



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Melkersson-Rosenthal Syndrome: An Atypical Presentation with Facial Diplegia (A Case Report and Literature Review)

Ait-el-kerdoudi M [α], Chafiki Z [σ], Merzouki B [ρ], Rouadi S [ω], Abada R [¥], Roubal M [§] & Mahtar M [χ]

Abstract- **Melkersson-Rosenthal Syndrome is a rare entity of unknown etiology, characterized by the triad of symptoms: recurrent face and / or lip swelling, cracked or scrotal tongue and peripheral facial palsy. This symptomatology is often incomplete. It usually begins in childhood and relapses are common. We report a case of a patient with MRS followed in the ENT and Neck Surgery department of the University Hospital August 20th of Casablanca.**

Keywords: facial paralysis - fissured tongue - macrocheilia - melkersson-rosenthal- facial diplegia.

I. Introduction

Melkersson-Rosenthal Syndrome (MRS) is an orofacial granulomatosis of unknown etiology, characterized by one or more of the following symptoms: hypertrophy of eyelids and / or lips, intermittent facial nerve palsy and fissured tongue. The diagnosis of this affection is mainly clinical and the evolution is often marked by relapses or unsightly scars. We report a very rare form of MRS and through a literature review, we discuss the diagnostic and therapeutic difficulties of this condition.

II. Case Report

A 29 year-old male with no noticeable medical history, presented to the ENT department of university hospital August 20th of Casablanca with a lower macrocheilia with repeated facial nerve palsy (two episodes of left-sided facial paralysis) lasting for 4 years, in a context of apyrexia and conservation condition. Physical examination found facial diplegia and hypertrophy of the lower lip (Figure 1), there was no fissured tongue. The rest of examination of the ENT area showed no signs of infection. Neurological examination was unremarkable: no paralysis of other cranial nerves nor limbs.

Before the Facial diplegia, MRI of the brain and the cerebellar pontine angle was considered and showed no abnormalities (figure 2). Other investigations performed in search of tuberculosis and sarcoidosis were negative. A biopsy of the lower lip has confirmed the diagnosis showing: a connective tissu with abundant noncaseating nodules rich of lymphocytes bordered by plasma and histiocytic cells in edematous and fibrotic connective tissue by place. Given these clinical, paraclinical and evolutionary findings, the diagnosis of MRS was retained. The patient was put under medical treatment, based on long-term corticosteroid cure spread over 6 weeks decreasingly. The initial dose was 1 mg / kg / day. The evolution was marked by the improvement of symptoms from the first week of treatment. Both facial paresis and labial hypertrophy resolved 3 weeks later. During 14 months of follow-up there were no recurrences.

III. Discussion

The association of orofacial edema and intermittent facial palsy was initially described by Melkersson in 1928. Three years later, Rosenthal has added fissured tongue as a third symptom of this affection. This triad was named and known as MRS by Lüscher in 1949 (1). However, this association is rarely complete, only found in 8-18% of all cases (2, 3), which makes its diagnosis and eventually its management difficult. This rare syndrome represents only 0.08% of facial paralysis (1, 4) with less than 300 cases reported in the literature until now. Bilateral facial palsy in MRS is even rarer. These symptoms usually occur in the second decade of life, with no racial or gender predilection (3, 5), although some authors have reported female predilection with sex ratio of 1/8 (4, 6). The etiology of MRS remains unknown, many theories have been suggested, including the involvement of infectious agents, allergic, autoimmune or genetic factors (4, 5, 7). MRS may be secondary when associated with a known condition as sarcoidosis, tuberculosis, Crohn's disease, a tooth abscess, a facial trauma, an insect bite, or an orofacial granuloma. (4, 5). Histological examination (5, 8) mostly shows lymphocytes and epithelioid granulomas without caseous necrosis with a vasculotrope character. However, at the early stage of the disease, there may be just a perivascular lymphocytes infiltrate. Treatment remains discussed, primarily based on systemic and/ or intralesional steroids, sometimes supplemented by a Cheiloplasty (5, 8, 9). Antileprosy (clofazimine and dapsone) may be an alternative therapy in case of failure of corticosteroids (10) or may be combined with the latter. Others are also

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used as cyclins, hydroxychlorine, sulfasalazine, metronidazole, methotrexate, azathioprine and cyclosporine, but with no proven results (9, 10).

Despite the benign nature of its various symptoms, MRS course remains random often marked by frequent relapses with dreadful unsightly complications (5).

IV. Conclusion

The rarity of MRS limits the researches which still required to understand the mechanism generating this condition and try to find effective remedies.

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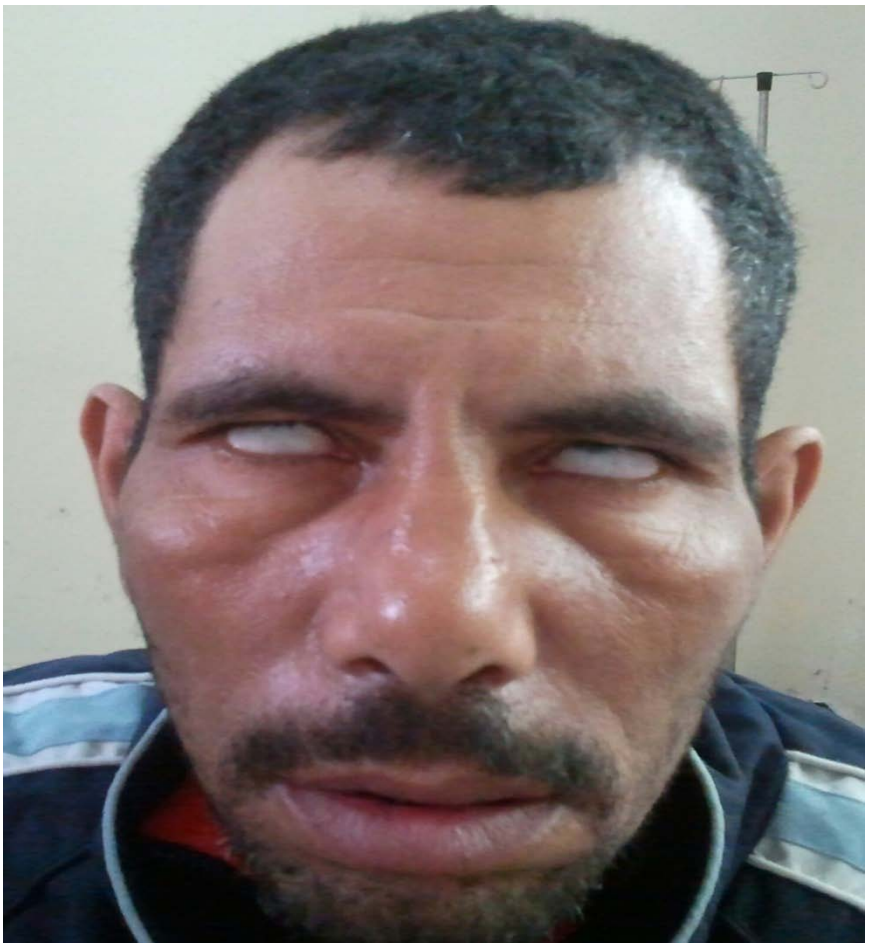


Figure 1: Physical examination found facial diplegia and hypertrophy of the lower lip

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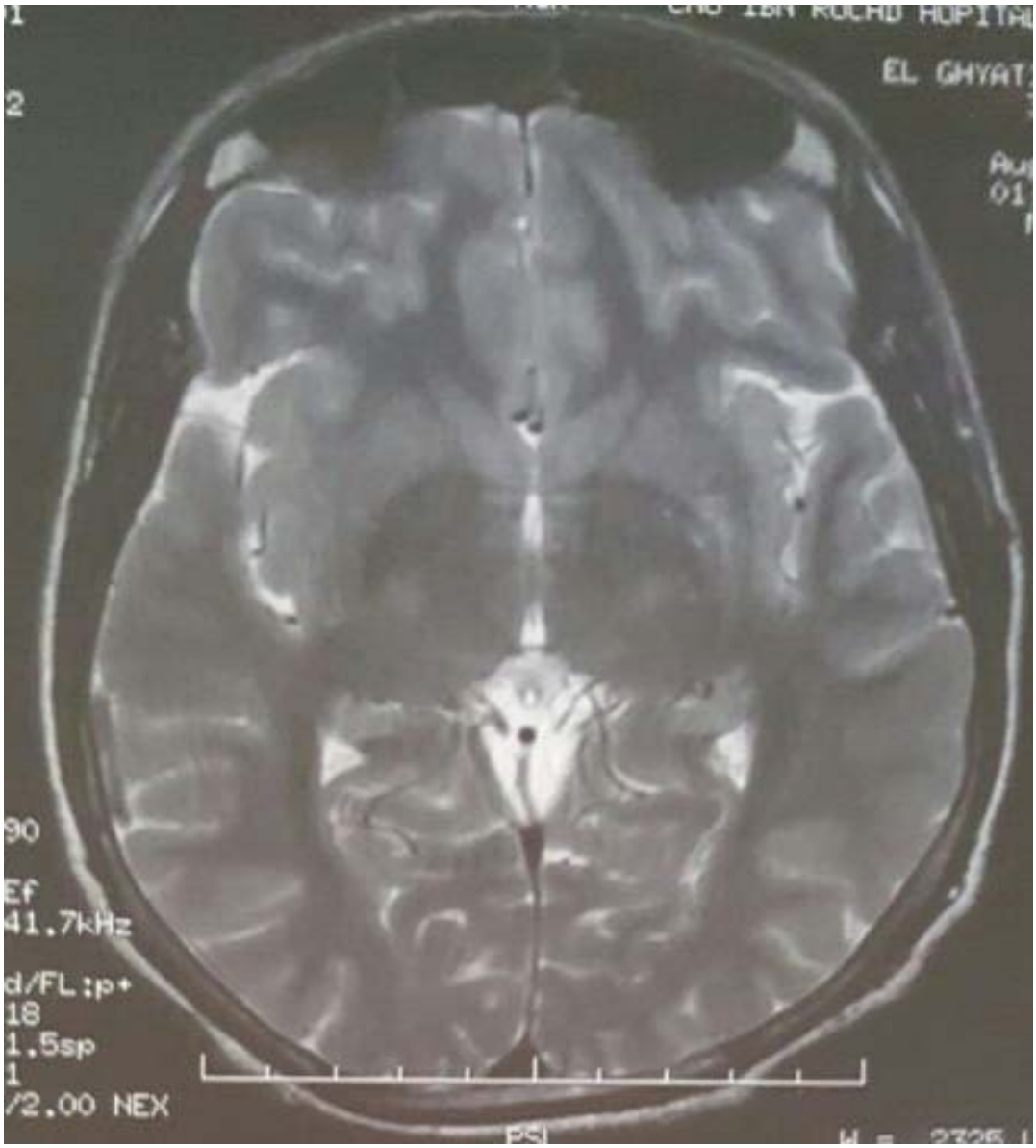


Figure 2: MRI of the brain and the cerebellar pontine angle was considered and showed no abnormalities

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Lead Levels in the Primary Teeth of Children in Tehran, Iran

By Sara Ehsani & Ghasem Meighani
Tehran University of Medical Sciences

Abstract- *Objective:* Young children are very susceptible to the toxic effects of lead, one of the most common pollutants in the environment. Therefore, monitoring the level of lead in primary teeth to prevent its harmful effects might be necessary. The aim of this study was to investigate lead concentrations among all types of primary teeth and to determine if age could affect the lead levels in primary teeth.

Method: In this cross-sectional study, 250 shed or nearing exfoliation caries-free primary teeth were collected from patients, aged 6-12 years old, in dental clinics of Tehran, Iran from 2009 to 2010. The lead concentrations in these teeth were measured using atomic absorption spectrophotometry.

Result: Primary canines showed the highest mean concentration of lead [1.67 ± 0.75 **µ**g/g dry weight (DW)], followed by incisors (1.15 ± 0.74 **µ**g/g DW) and molars (0.78 ± 0.59 **µ**g/g DW). Statistically significant differences were seen between canines and molars ($P=0.000$) and also between canines and incisors ($P=0.036$). The Analysis of Variance (ANOVA) test showed no significant differences between lead levels regarding age ($P>0.05$).

Conclusion: The results of the present study showed that tooth type affected the tooth-lead level concentrations. Mean concentration of lead in primary canines was higher than that in incisors and molars in the studied society. Our results suggested that age was not related to the lead concentration in human primary teeth.

Keywords: *lead, lead concentration, lead level, primary teeth.*

GJMR-J Classification: *NLMC Code: WU 101.5*

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Keywords: lead, lead concentration, lead level, primary teeth.

I. Introduction

Lead is one of the most important and widely distributed pollutants in the environment. In the human population, children are particularly associated with an increased risk of toxic effects of lead due to being in the growth phase and their increased capacity for absorption and retention(1-4).It has been proved that lead is an unnecessary nutrient with no biological values(1). The lead level in blood is the best indicator of a recent exposure because lead in blood has a short half-life of one month(3, 5, 6). However, for long-term exposures, determination of the lead level in hard mineralising tissues (e.g. skeleton, deciduous teeth) is more predictable (7). Epidemiological studies have shown that the skeleton contains most of the burden of lead in humans(8, 9). Dental hard tissues are relatively stable and they can retain the deposited metals during mineralization to a large extent. Unlike in skeleton, there is no turnover of apatite in teeth. Therefore, deciduous teeth are the most useful material for assessment of long-term internal exposure to lead during early life (10-13).

Use of lead in industry results in its release in the environment, which leads to contamination of air, water, and food and causes a significant rise in lead concentration in human blood and body organs including the nervous, haemopoietic, endocrine, renal, and skeletal systems(1).The source of lead may vary considerably. It may originate from industrial areas, gasoline, paint, plumbing and food(14). In general, it is recognised that the most important source of lead pollution is through leaded gasoline because most of this lead is redistributed into the atmosphere. Leaded gasoline accounts for ≈90% of the total amount of lead released from all sources into the air (13-15).

Wherever leaded gasoline is an air pollutant, children are exposed to levels of lead that reduce intellectual performance throughout their lives. Some investigators have shown that prolonged pre-school exposure to low doses of lead in childhood results in the reduction of intelligence quotient (IQ) scores (4, 16). Uptake of lead can be very dangerous during the critical development periods of infants and young children due to the possibility of causing permanent impairment (17).

In addition to the systemic effects of lead through blood and saliva, gaseous forms of lead have a more direct effect through the oral environment. This might explain the higher levels of lead measured in hard dental tissues from children living in industrial cities (18).

Lead exposure is estimated by measuring lead levels in the blood and teeth. The US Center for Disease Control and Prevention has established a "level of concern" for children at 10µg/dL (blood lead) and at 5µg/g (tooth lead). According to Pococok et al., doubling of the body lead burden (from 10 to 20µg/dl) blood lead or (from 5 to 10µg/g) tooth lead is associated with a mean deficit in full-scale IQ of around 1 to 2 IQ points (7). Therefore, even lower exposures of lead are associated with unfavorable effects and no level of lead exposure could be considered safe enough (3, 19).

Tehran, the capital city of Iran, is a highly industrialised city where lead has been used in industry and as a gasoline additive for many decades. However, there are also other lead sources and occupations in Tehran: jewellery workers, traffic police, emissions from glass, pigment and paint industries, pottery, non-ferrous

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metal smelters, accumulator gratings, battery manufacturing plants and crops and vegetables irrigated by lead-polluted sewage. Since Tehran is one of the most polluted cities in the world and they still use the leaded gasoline for the cars, the present study was carried out to investigate lead concentrations among all types of primary teeth. The other objective was to determine if age could influence lead levels in the primary teeth of children in Tehran, Iran.

II. Methods

This was a cross-sectional study in which 250 teeth (117 molars, 74 canines, 59 incisors including shed or nearing exfoliation caries-free primary teeth) were collected from 250 children (1 tooth from each individual), aged 6–12 years, residing in the city of Tehran, Iran after obtaining written informed consent of the parents from 2009 to 2010.The research has been conducted in full accordance with the World Medical Association Declaration of Helsinki. The study has been independently reviewed and approved by ethics committee of Tehran University of Medical Sciences. Information about age, sex, lifestyle, place of residence and medical history of children were collected form their parents. Teeth with fillings, caries or developmental defects were excluded from the study.

To prevent sample contamination with exogenous lead, all laboratory glassware was cleaned with surface detergent and distilled water. To remove organic material, each tooth was cleansed and soaked in a 3% solution of hydrogen peroxide and then washed several times with distilled water and the final rinse was with deionized water. Each tooth was air dried and weighed. The tooth was then digested in a mixture of 1mL of 70% perchloric acid ($HClO_4$) and 3 mL of 70% HNO_3 and in a 50-mL beaker. The mixture was heated slowly until a clear and colorless solution was reached. The solution was then evaporated until dry. The digest was then rinsed with distilled water, made up to 10 mL and shaken(1).

The lead concentration in the final digested solution was determined by using Flame Atomic Absorption Spectrophotometer with electrothermal atomization (Varian Inc., Palo Alto, CA, USA). The specifications of the instrument were: lamp current 9.0 mA, wavelength 217.0 nm, band pass 0.5–1.0 nm, ash temperature 800°C and atomization 2300°C without temperature control(1).

After natural logarithmic transformation of lead data the Kolmogorov-Smirnov test was used to verify the normal distribution of the data. The values obtained were subjected to statistical analysis using the Statistical Package for Social Sciences (SPSS-16) software for windows. Group comparison between tooth types was carried out by using the independent *t-test*. The level of significance was set at $P<0.05$.

III. Results

The current study was performed to determine the lead levels in teeth of children from Tehran and evaluate if tooth type and age of the child could affect the concentration of lead in the primary teeth.An analysis of the tooth levels of children showed that primary canines had the highest mean lead level [1.67 ± 0.75 µg/g dry weight (DW)], followed by incisors (1.15 ± 0.74 µg/g DW) and molars (0.78 ± 0.59 µg/g DW) [Table 1]. Statistically significant differences were seen between canines and molars ($P=0.000$) and also between canines and incisors ($P=0.036$). There were no statistically significant differences between incisors and canines with respect to lead levels ($P>0.05$) [Table 2]. There were no significant differences between lead levels with respect to age ($P>0.05$).

IV. Discussion

In general, lead poisoning occurs gradually from the accumulation of lead in skeleton and hard tissues after repeated exposures to lead. This is especially evident in children who are exposed to heavy traffic during where leaded petrol is used. Lead in exhaust fumes from cars, affects children much more than adult due to their lower height and weight (14).

Lead poisoning can damage many internal organs including the nervous, haemopoietic, endocrine, kidney, and skeletal systems (1-4). Blood-lead levels indicate recent exposure and correlate poorly with lead levels in shed deciduous teeth(20). Shed primary teeth can reflect long-term lead exposure during early life because of their increased capacity for absorption and retention during mineralization(17).

In epidemiologic studies of childhood lead toxicity, levels of lead in the hard dental tissues of primary teeth have been served as proxy measures for skeletal lead and total body lead burden. Also studied have shown higher lead levels in primary teeth than adult teeth because of the more prominent lead burden of children (21-24). Therefore, We analyzed the lead concentration in primary teeth that were either shed or nearing exfoliation in the current study.

The results of the present study indicated that lead concentration varied according to tooth type, which is in accordance with the results of other studies (3, 10, 15, 25). Some studies have reported that the mean concentration of lead in incisors was higher than that in canines and molars which is inconsistent with the results of our study (3, 15, 25). In the present study, canines had the highest lead concentration, followed by incisors and molars which is parallel with the findings of other studies (10, 17). This could be explained by the difference in morphology and size between canines and incisors and also the fact that the formation of the enamel and dentin of the upper canines begins during the fifth month of gestation and the crown calcifies

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during the 4–9th month after birth(3). Compared with other teeth, this leaves canines with a greater exposure time to lead.

Some researchers reported that lead levels in teeth increased with age (5). However, the results of the present study showed that tooth-lead concentration was independent of age. This finding is consistent with the results of other studies which suggest that exposure levels from various environmental and dietary sources could contribute more than age to the uptake of lead in teeth(3, 10, 17, 25, 26).

V. Conclusion

The following conclusions could be drawn from the present study:

- The tooth type affected the tooth-lead level concentrations. Primary canines had the highest concentrations of lead, followed by incisors and molars.
- The tooth-lead level concentrations were independent of age.

Further research of different Iranian populations with larger sample sizes is necessary to confirm the results of the present study. In addition, future studies need to be carried out on carious teeth as higher lead levels have been reported in carious than in non-carious teeth (26).

Tehran is a highly industrialised city with more than 2 million motor vehicles, and a large percentage of them use leaded gasoline. In recent years, a partial reduction of atmospheric lead levels has been observed due to the reformulation of leaded gasoline. However, there are other lead sources in Tehran: emissions from glass, pigment and paint industries; pottery; non-ferrous metal smelters; accumulator gratings; battery manufacturing plants and crops and vegetables irrigated by lead-polluted sewage. These sources could have effects on lead accumulation in the human body, especially teeth. Therefore, we suggest that the Iranian authorities should eliminate lead from all types of fuels and other environmental sources of this city.

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Author Disclosure Statement

No competing financial interests exist.

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Table 1: Lead distribution in different primary tooth types

Type of tooth	*n*	Lead level (µg/g) (mean ± SD)	Min–max (µg/g)
Molar	117	0.78 ± 0.59[a]	0.04–3.2
Canine	74	1.15 ± 0.74[a]	0.11–3.08
Incisor	59	0.89 ± 0.64[a]	0.05–2.8

a: not significantly different

Table 2: Independent Sample T-test

Teeth	Leven test for quality of Variance		Mean ± SD (difference)	t	df	Sig. (2-tailed)
	F	Sig.				
Molar & incisor	9.408	0.002	0.376 ± 0.102	−3.786	130	0.000
Canine & incisor	1.969	0.163	0.259 ± 0.122	2.115	131	0.036
Canine & molar	1.949	0.164	−0.108 ± 0.097	−1.113	174	0.267

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A Simple Cost-Effective Technique for Chair- Side Facial Moulage in Cleft Infants

By Ajay Jain & Ugrappa Sridevi
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Abstract- Patients with cleft lip and palate undergo various problems and managing these patients by prosthesis has been a challenge for many years and the problems begin with making of impression. The authors describe a chair-side technique for facial moulage in cleft infants that is simple, efficient and inexpensive while still being safe for the infant.

Keywords: *chair-side facial moulage, cleft lip, cleft palate, nasoalveolar molding, cost effective.*

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A Simple Cost-Effective Technique for Chair-Side Facial Moulage in Cleft Infants

Ajay Jain [α] & Ugrappa Sridevi [σ]

Abstract- **Patients with cleft lip and palate undergo various problems and managing these patients by prosthesis has been a challenge for many years and the problems begin with making of impression. The authors describe a chair-side technique for facial moulage in cleft infants that is simple, efficient and inexpensive while still being safe for the infant.**

Keywords: chair-side facial moulage, cleft lip, cleft palate, nasoalveolar molding, cost effective.

I. Introduction

Rehabilitation of maxillofacial defect is a challenging task at each and every step of the treatment. But, most difficult job is to make impression and replicate the defect. Various techniques have been mentioned in the literature for making impression by using different methods and materials employed. The first stage of management would be the fabrication of a feeding plate or passive maxillary obturator. The crucial step in fabrication of any appliance or obturator is the impression procedure. Patient positioning, tray, and impression material selection are the important factors to consider in any impression procedure[1-4].Facial moulage as a diagnostic, treatment planning and outcome assessment tool for craniofacial dysmorphology provides accurate three dimensional representation in a simplified, convenient and cost effective manner. Although the validity and reliability of recent clinical innovations in facial morphometry such as 3D stereophotogrammetry and laser scanning systems have been well established[5,6]but high cost, low mobility and accessibility and requirement of working knowledge of sophisticated software have been a major deterrent towards their widespread usage. The value of maintaining serial facial casts for monitoring the treatment progress in cleft infants during Nasoalveolar Molding therapy cannot be understated. Presurgical Nasoalveolar Molding (PNAM) is a non-surgical method of reshaping the gums, lips and nostrils previous to cleft lip palate surgery, thus lessening the severity of the cleft. The technique mentioned below has been incorporated by the authors in their PNAM protocol[7].

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II. Technique

The patient visited to the private clinic, Delhi, India with the chief complaint of defect in his upper lip since birth. On examination, there was intraoral palatal defect in line with the lip defect. Patient was referred to the government hospital in oral and maxillofacial unit for the treatment. Treatment planned for the patient to perform pre-surgical nasoalveolar molding procedure before go with surgical procedure of cleft lip and palate. After taking consent from the patient's parents, diagnostic impression was made by using modified tray with Impression compound. The authors advocate the use of red wax type II impression compound to fabricate an oval, concave and perforated specialized impression tray **(Figure 1)**. The appliance is made from a single cake of impression compound (Y-Dents Impression Compound, MDM Corporation, New Delhi, India). The dental material is first placed in hot water (60*C) for approximately 30 seconds in order to soften it followed by thorough kneading to obtain workability. It is then molded into the desired contour and extended from the upper lip to the hair line and up to the lateral canthi on either side. The handle, also made from red wax type II impression compound is attached along the length of the appliance. The tray is now perforated using a tapered carbide bur on a laboratory low speed hand piece.

All impressions are recorded in the outpatient department which is in close proximity to the operation room, if any airway emergency arise. A high speed suction machine is kept accessible. While recording an impression, the infant is fully awake and placed supine with the head tilted upwards. A thin smear of petroleum jelly is applied on the face, particularly around the nose to facilitate easy removal of the impression. Fast setting alginate (Cavex CA37 Normal Set/ Dustfree) is used to record the negative impression **(Figure 2)**. It is loaded in 2 steps: a thin mix directly placed over the nose for accurate recording of surface details followed by a slightly thicker mix loaded onto the impression tray. The tray is carefully positioned over the face such that the oral airway is left patent while recording the impression. Tissue distortion is prevented by avoiding excess pressure while seating the tray. Casts are prepared using type III dental stone (Kalstone, Kalabhai, Mumbai, India) **(Figure 3)**.

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III. Discussion

The authors have successfully used the above mentioned technique in cleft infants aging from 4 days – 7 months achieving uniformly good results in a large series of patients. The oval shape (instead of circular) of the impression tray allows it to be positioned either with its greatest dimension vertically (in case of older infants: e.g. 3 - 7 months) or horizontally (in case of younger infants) depending upon the child's facial dimensions, thereby facilitating its use as a universal stock tray in most instances. Moreover, the stock tray can easily be customized by immersing in hot water, softening the compound and then molding it to the required contour.

The appliance can be conveniently fabricated chair-side in approximately 10 – 15 minutes while incurring little cost to the operator (pack of 5 cakes costs about $1.00). Type II impression compound has superior bio-compatibility, is less allergenic than heat or chemically cured acrylic resin and is easily available worldwide.

This technique does not require the use of general anaesthesia. The authors concur with the views of Aizenbud and Ronen[8] that while recording the impression, positive nasal airflow pressure prevents alginate from entering the nasal cavity while spontaneous closure prevents alginate from entering the eyes.

The utility of facial moulage in quantifying congenital/ acquired facial defects as well as understanding the effects of clinical intervention cannot be denied. Furthermore, it presents potential research applications. The chair-side technique for facial moulage in cleft infants presented in this article is simple, efficient and inexpensive while still being safe for the infant.

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Figure Legends



Figure 1: Use of the specialized impression tray for facial moulage in an infant with complete unilateral cleft lip and palate.

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Figure 2: Impression obtained using fast setting alginate.

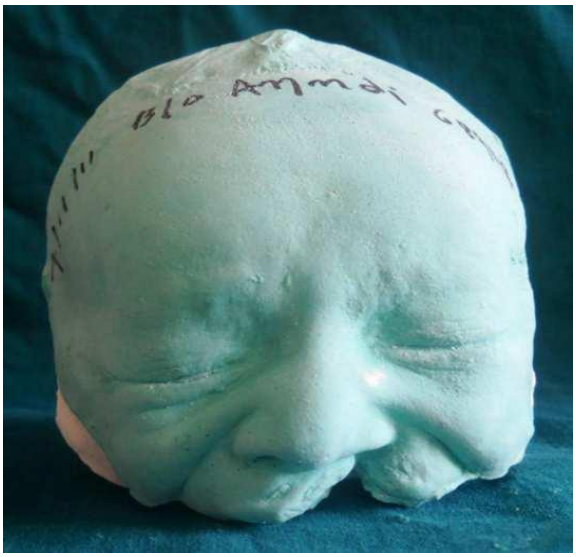


Figure 3: Facialmoulage using type III dental stone. Spontaneous closure of the eyes is evident.

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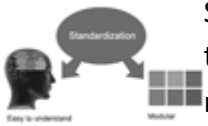


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Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

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It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

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Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

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One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

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Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

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28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

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30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

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Key points to remember:

- Submit all work in its final form.
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A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

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- Fundamental goal
- To the point depiction of the research
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- Significant conclusions or questions that track from the research(es)

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- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
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- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

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- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
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- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

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- Skip all descriptive information and surroundings - save it for the argument.
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The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



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Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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