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Tunisian Dental News

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RESEARCH • KNOWLEDGE • CULTURE

Actualités Tunisiennes d'Odontologie

Editorial

Scientific Articles

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Editorial

Pr. Lotfi Bhouri
Vice Dean of the Dental Medicine
Faculty of Monastir - Tunisia

Scientific Articles

in Prosthetic Dentistry...

Success Story of a colleague beyond national borders
Dr. Kais Chebbi : From Monastir to L.A* ...What a journey !
* Los Angeles

Ongoing Training

QUIZ : Veneers
Assoc. Prof. Moncef Ommezzine

Institutions & Associations Space

Research Laboratory (LR12 ES 11) - ATREO - ATEDEC



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Pr. Lotfi Bhouiri

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As recently recalled by the president of the University of Monastir, the internal and external communication quality of a university is a criterion of performance and maturity.

The journals and news bulletins are classical means of communication.

Meanwhile, the appearance of the Tunisian Dental News journal has not become regular until recently thanks to the initiative and perseverance of this dynamic team of educators whose efforts are praiseworthy. Apart from the pleasure of seeing this volume coming out right on time, I feel a great satisfaction reading the table of contents which announces rich and varied topics.

Indeed, our colleagues, actual and future ones, are going to find the articles varied and up-to-date. We can cite for instance ceramic restorations, impressions, full denture, anatomy and veneers.

A quiz on veneers, theme of the last 'Dentistry Debate' pre-congress session "EOM", comes to support the Veneers theme.

Finally, the section 'success story' sheds light on our colleague, Dr. Kais Chebbi, who spent his residency in the dental morphology department of our faculty. We were in the same cohort, but he opted to practice overseas.

So once again, I congratulate the editorial team and wish a long life for this journal.

Pr. LOTFI BHOURI

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Scientific articles



Effect of Preprosthetic corono-radicular reconstructions on the optical quality of all-ceramic restorations

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Abstract

Before receiving a fixed prosthesis, the pulpless tooth presenting an important decay requires a preprosthetic coronoradicular reconstruction. Despite the changes in the pulpless teeth optical properties, it is often possible to indicate all ceramic restorations to obtain an optimal esthetic result.

The choice of the preprosthetic coronoradicular reconstruction is therefore an important factor for the all-ceramic prostheses optical integration.

The advent of adhesive dentistry has allowed the reconstruction of a dental abutment having optical properties close to those of the residual dental tissues.

Keywords

Esthetic ; Ceramic; Fiber post ; Resin composite; Translucency; Optical integration.

Introduction

Contrary to the common ideas, optical integration in all-ceramic prostheses is not limited to color restoration. It directly depends on the nature of the materials used, the thickness of the ceramic core, the surface state, the assembly method and the type of underlying substrate. In several clinical cases, this last factor is a preprosthetic coronoradicular reconstruction.

The aim of this article was to shed light on the effect of preprosthetic corono-radicular reconstructions (CRR) on the optical quality of all-ceramic restorations.

Optical properties of pulpless teeth

Pulpless teeth have different optical properties compared to pulped teeth. After the pulp loss, the tooth becomes opaque and gray. This is due to the necrosis of the organic matrices (1-4-7) of the enamel, especially those of the dentin, by the loss of intradental saliva-pulp exchange and the destruction of odontoblast extensions. The gray coloring can range from a slight change in color into a very unsightly discoloration accompanied by brown, blue or green shades.

Different colors can be distinguished depending on the pulp loss etiology, the filling materials, etc.

The following are some most common cases (Fig. 1, 2, 3).



Fig. 1: Moderate discoloration of the maxillary right central incisor due to endodontic therapy (1)



Fig. 2: severe discoloration of the maxillary left central incisor (7).



Fig. 3: Discoloration of two maxillary central incisors due to endodontic therapy and surface discoloration of restorative resins

Optical properties of dental ceramic

In general, dental ceramic can have all the optical properties of a natural tooth. Therefore, the primary advantage in using an all ceramic restoration is improving esthetics by increasing translucency.

Dental ceramic can be highly translucent, semi-translucent, semi-opaque or opaque (Table 1).

Table 1: All-ceramic systems classified according to their translucency (15).

Translucent	Semi-translucent	Semi-opaque	Opaque
Feldspathic	Procera Alumina	In-Ceram Alumina	In-Ceram Zirconia
IPS e.max HT,LT	IPS e.max MO	Zirconia $\geq 0.6\text{mm}$	IPS e.max HO
In-CeramSpinell			

As it is known, dental ceramic is generally composed of a glass phase and a crystalline phase. Increasing the crystalline phase improves the mechanical properties but it results in lower translucency. It is therefore logical that ceramic which offers better mechanical properties are less likely to diffuse light (Chart 1) (3).

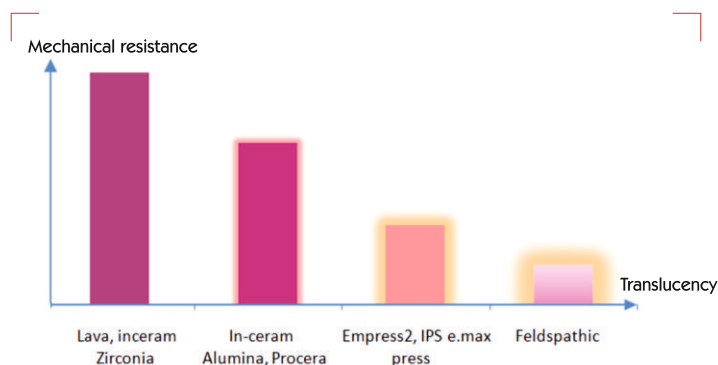


Chart 1: The high translucency of ceramic is accompanied by a decrease in mechanical resistance

Factors influencing the optical performance of all ceramic prostheses

Nature of the ceramic material

The optical behavior of all-ceramic systems is mainly based on their translucency. This translucency allows to achieve the closest light diffusion to that of the natural tooth.

Nevertheless, the use of highly translucent ceramic requires special attention when choosing the type of preprosthetic CRR (Fig. 4) (5).



Fig.4: Central incisor reconstructed and crowned (Empress). Note the grayish reflection circled in yellow due to the use of a carbon fiber post.

Thickness of the ceramic core

The ratio and thickness of the ceramic core and the veneering materials influence the final shade of a layered porcelain restoration. An aluminium-oxide ceramic core thickness of 0.7 mm was found to be sufficient to mask the underlying dentin color. Since IPS Empress restorations were found to require up to 2.0 mm of thickness to mask an underlying substrate, other less translucent core materials should be considered (3).

Surface state of the veneering ceramic

The surface of the veneering ceramic plays an important role in the optical interpretation of the observer. Thus, the stratification artisanal mastery of the veneering ceramics determines the natural appearance of the restoration (Fig. 5). The lack of fluorescence in the zirconia material is compensated by the addition of a fluorescent oxide in the cosmetic ceramic (9).



Fig. 5: Esthetic integration of an anterior zirconia restoration. Note the characterization work of the ceramist

Type of underlying substrate (4-12-15)

The color of the abutment on which the ceramic is placed influences the final result because the more the ceramic is translucent, the more the color of the underlying surfaces interferes.

To take advantage of the ceramic translucency, we have to neutralize the color of the abutment.

If it is a discolored pulpless tooth, lightening the abutment beforehand will allow the choice of a more translucent ceramic (2) (Fig.6). When the tooth abutment is decayed, its reconstruction using materials of a color approaching that of the dentin is an important element for a final esthetic result.



Fig. 6: Incisors lightened, then treated using a fiber post and a composite resin

Cementation procedures

The assembling material which makes the interface between the prosthesis and its support determines directly the restoration longevity. However, it can also influence the progress of the light and disturb the general translucency of the restoration.

This clinical parameter is essentially taken into account with glass-ceramic. Indeed, there is no influence of the luting agent on the optical result of polycrystalline ceramic (2). However, we must also consider other parameters such as the ceramic thickness and the visible surface of the restoration.

It emerges from the studies a total superiority of the influence of abutment color compared to the adhesive resin color (2-13).

Preprosthetic Coronoradicular reconstruction (CRR) and optical integration of all-ceramic prostheses

Nowadays, there is a consensus that the fabrication of CRR is justified only in cases of significant tissue loss, where post is used as an adjunct to coronal portion retention without any function in strengthening the tooth (12).

Depending on the type of material used, there are different types of CRR:

- Metallic CRR, also known as metallic post-cores, which may be veneered or not (Fig. 7 and 8)



Fig.7: Metallic post-core cemented on 11



Fig. 8: Veneered post-core

- Adhesive CRR using a combination of fiber reinforced post (FRP) and resin composites can be direct or indirect (Fig. 9 and 10);



Fig. 9: Direct CRR using a quartz fiber post and resin



Fig.10: Indirect CRR

- All-ceramic post and core (CosmoPost-Empress ®) (Fig. 11);
- All-ceramic post and core transfixated by fiber posts (In-Ceram) (Fig 12);



Fig. 11: All-ceramic post and core (CosmoPost-Empress) (4)



Fig. 12: In-ceram inlay-core transfixated with a carbon fiber post (14)

For an optimal esthetic result, the reconstruction materials must transmit and refract light almost identically to the natural tooth (Fig. 13).

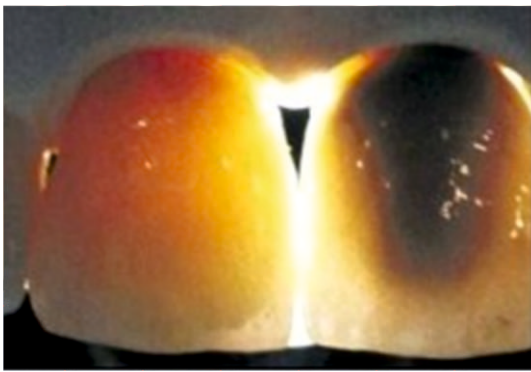


Fig.13: Note the difference in light transmission between these two all-ceramic restorations due to the underlying metallic post-core (right) (6).

The advent of adhesive dentistry has allowed the practitioner to move closer to the ideal appearance, while practicing a more conservative technique. The type of CRR is then a determining factor, and the choice is directed towards CRR which optimizes the optical integration of all-ceramic prostheses (4).

To achieve this goal, a new approach is followed in the coronoradicular reconstruction of endodontically-treated pulpless teeth. It consists in the awareness of the importance of restoring the optical properties while reconstructing the decayed walls.

Discussion

Brightness is the first success factor for the color of a prosthetic tooth. The more it is similar to that of the tooth, the more the esthetic appearance will be natural. Brightness is evaluated by the refractive index (5) (Table 2).

Table 2: Refractive index of the various biomaterials compared to the enamel and dentin.

	Enamel	Dentin	Composite resin	Feldspathic ceramic	Aluminum oxide	ZIRCONIA
Refraction index	1.63	1.54	1.54	1.51	1.8	2.3

Among the ceramic materials, zirconia has the highest brightness. However, the feldspathic ceramic has the lowest brightness which is closest to that of the dentin.

Table 3: Relative brightness of various types of preprosthetic CRR.

	Metallic inlay-core veneered or not	All ceramic post and core + fiber post (In-Ceram)	All ceramic post and core (zirconia / Alumina)	Adhesive CRR reinforced by fiber
Brightness	Very superior to the dentin	Superior to the dentin	Superior to the dentin	Close to the dentin

A metallic post-core is opaque and grayish. It does not present opalescence and fluorescence; it is thus far from restoring the optical properties of the dentin. On the contrary, it reinforces the cervical area darkening. This is much more accentuated in the case of abutment discoloration and thin periodontium. A grayish cervical border often described as a "shadow effect" can compromise the esthetic result, mainly all-ceramic restorations. Placing metal CRR under all-ceramic restorations leads to poor esthetic results due to metal resurgence through ceramic (15) (Fig. 14).

The problem persists even when the post and core are veneered with ceramic, with the absence of light transmission at the coronal part of the tooth toward its root, and therefore toward the periodontal tissues (8). The opaque porcelain required for masking the metal is responsible for reflecting light and decreasing translucency.



Fig. 14: The difference in transmission of UV light (light curing) at an all-ceramic restoration on a metallic post core veneered with ceramic (left) and a natural tooth.

Therefore, the metallic post and core, veneered or not, are unfavorable to the optical integration and decrease the esthetic results of all ceramic prostheses.

The properties of translucency are shown in the table above. Thereby, the fluorescence and the opalescence of the different types of preprosthetic CRR can be compared:

Table 4: Optical properties of the different types of preprosthetic CRR

	Metallic post and or not	All ceramic post and core + fiber post (In-Ceram)	All ceramic post and core (zirconia / Alumina)	Adhesive CRR reinforced by fiber
Translucency	Opaque	Semi-opaque	Semi-opaque	Near to dentin
Fluorescence	Yes	No	No	Yes
Opalescence	Yes	Yes	Yes	Yes

To completely remove the metal, the use of indirect ceramic CRR was suggested: first in glass ceramic with Dicor process, then in infiltrated aluminum oxide glass with In-Ceram process.

The ceramic coronal reconstruction is transfixed by a carbon fiber post which assures the root anchoring (15). This is an option that contributes to the cervical region lightening and to the light diffusion.

Two techniques were described: CosmoPost-Empress technique and manufacturing technique in an In-Ceram Zirconia block. These solutions may seem attractive; however, the use of zirconia post (CosmoPost) in the first technique, and alumina-reinforced ceramic zirconia in the second technique present a great risk of root fracture. Indeed, these two materials have a higher rigidity than that of the dentin (9-15).

Numerous authors prohibit the use of zirconia posts. Concerning the fiber posts, the unsightly appearance of carbon fiber limit its use to the posterior segments. Glass and quartz fiber posts offer the best esthetics when restoring anterior pulpless teeth before receiving an all-ceramic restoration (9).

Composite resins used in bonded CRR are of dentinal shade and have the advantage of presenting a fluorescence which promotes the optical continuum between the crown and the abutment. These post-core composites have very variable fluorescence depending on manufacturers (11).

It is admitted nowadays that bonded fiber-based CRR, direct or indirect, are an excellent alternative to coronoradicular restorations designed with cast or prefabricated metal posts. As a part of the concept of "adhesive dentistry", less invasive and more respectful of residual dental structures, these restorations can respond to the current esthetic requirements (8).

The ultimate objective is to reach a homogeneous and globally resistant reconstructed structure in addition to an optimal optical integration.

Clinical illustration



Fig. 15: The 21 broken and endodontically treated.



Fig. 16 : Choosing a glass fiber post.
The post is cut 2mm above the occlusal plane



Fig. 17 : Choice of prefabricated transparent mold.

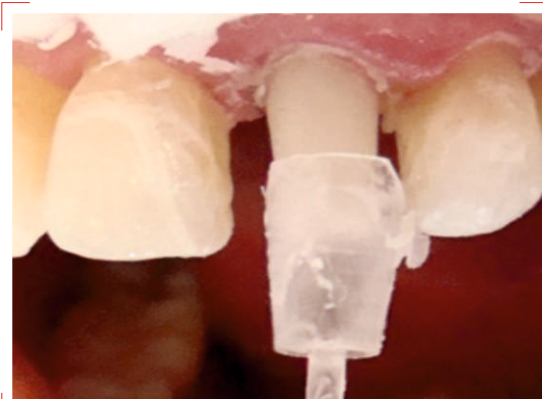


Fig. 18 : The mold deposited after light-curing the composite resin



Fig. 19 : Preparation of the reconstructed tooth to receive all-ceramic crown.
Note that the optical properties are similar to those of a natural tooth.



Fig. 20 : Final esthetic result

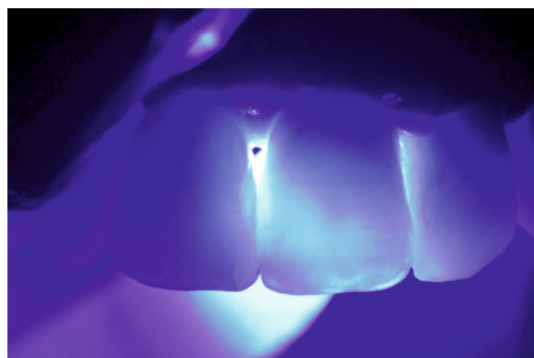


Fig. 21 : The same light transmission through an all ceramic crown on a corono-radicular reconstruction with resin composite reinforced by fiber post and a natural tooth

Conclusion

In all-ceramic prostheses, the final esthetic result requires the management of several parameters. A rational approach in choosing the type of preprosthetic CRR is essential to the construction of a tooth abutment that restores as much as possible the dentin color, translucency, fluorescence and opalescence.

In the case of pulpless teeth, the reconstitution of the central tooth body using a composite material is interesting on the mechanical and esthetic levels. This paves the way to use high translucency ceramic to achieve quality frameworks that are at the same time optically successful and mechanically resistant.

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Scientific Articles



A customized impression technique using a multiple-use resin cap for a metal-ceramic restoration

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Abstract

This article describes a customized technique in which an impression cap is fabricated intraorally with a burn out resin and used to reproduce the details of the prepared tissue on the master cast. The originality of this procedure is that the resin postcap designed to generate an accurate impression is modified at the laboratory to be cast into the future support of the ceramic material thus contributing to a final restoration with favorable esthetic and functional outcomes.

Keywords

Impression technique; Prosthesis; Marginal adaptation; Casting; Resin.

Prosthetic restoration of non-vital decayed teeth with subgingival limits can be challenging mainly if it involves a single unit post and crown. This is closely related to the complexity inherent in master impression which is compounded by the necessity of an accurate registration of the geometry of the prepared abutment and the post space. Besides the finish line and the non-prepared apical portion beyond need to be transferred to the working cast via the impression (1,2). Moreover, the esthetic outcome and health of periodontal tissue is closely related to the quality of the marginal fit of a restoration (1,3,4).

Currently, gingival displacement set the standard for initiating master impressions when finish lines are equigingivally placed in unavoidable conditions like esthetic anterior restorations and short crowns (5). The aim of gingival retraction is to allow access for the impression material beyond the abutment margins by creating a space for a regular and sufficiently thick amount of impression material (6-8).

A less sulcular width prones impression material to voids, tearing after removal or pouring and this leads in less marginal accuracy (7). Hence, an effective management of the sulcus environment is needed for successful subgingival impression (1,3).

Unfortunately, in some cases with deep gingival preparation, after removing the cord a narrowing or a closure of the sulcus not allowing the ingress of the impression material in the subgingival area can be noticed preventing its adequate reproduction in the master cast (8,9). Authors describe this rapid gingival collapsing as displacing the impression material setting (10).

Thus, placing the finish line into the gingival sulcus without sufficient displacement of the gingival margin lead dentists to experience poor impressions (1-3) despite the wide range of impression procedures involved in fixed prosthodontics practice and the wider choice among the materials. Almost all literature results have provided little indication of consent on the best method to assess the dimensional accuracy of impressions (11) and reported that it is mostly influenced by the impression technique and the finish line placement (2,12-15).

For a post crown, the operator is more likely limited by the one step master impression technique, where the low viscosity material is injected around the prepared tooth then putty impression material immediately placed to

polymerize simultaneously (16), the post must be incorporated in the impression.

The second method is to make the impression with the putty phase, and when it is set it is trimmed to allow the post placement and sufficient bulk of the low viscosity material. However, this includes bending of the post and distortion of the impression. Whereas Single impression techniques using a cap have been experimentally reported to be dimensionally accurate (12) as the cap carries the impression material and displaces the gingiva. Moreover, elastometric impression material can be used along with this cap (11).

This article describes a customized technique. Unlike other techniques that a laboratory manufacturing of the cap in which an impression cap is built up intraorally with Duralay after a post was fitted in its lodging and used as a single tray for the wash material to carry it mechanically to the margins providing accurate impression.

A previous widening of the gingival sulcus provided the access of the cap margins to the finish line and beyond. The cap was relined to enhance accuracy of the marginal area.

An internal trimming allows little and necessary space for a thin layer of the wash material. This is followed by an over impression.

After pouring the impression, the post cap within the master cast is modified and shaped as well as being waxed at the margins to enhance further marginal fit to be finally used as a pattern for the cast core supporting the ceramic material.

Technique

1. Shape the canal to a final configuration with the appropriate rotary drill.
2. Prepare the abutment tooth and remove undercuts in the pulpal chamber.
3. Place a cord in the sulcus to create a space between the prepared abutment and the gingiva (Fig. 1).



Fig. 1 : After preparation, a cord is placed to widen the sulcus

4. Lubricate the canal and coronal preparation and insert a loosely fitting plastic post that engages the whole length of the canal preparation.
5. Ensure that the post end extends above the coronal aspect of the preparation to provide a grasping end.
6. Place the post and cover the intracoronal preparation with fluid resin.
7. Remove the cord and immediately inject fluid Duralay to fill the crevicular space, and then roughly shape the impression cap with a hand instrument.
8. Before the Duralay material is polymerized, remove the cap and seat it again. This avoids any retention of the cap related to the set shrinkage of the resin.
9. Reline the margin. This step offers more precision of the finish line and beyond as well as mechanical widening of the crevicular space preventing the margin reclosure (Fig. 2).
10. After the resin sets, trim the extracoronal excess material mechanically then develop the final shape closely shaping the metallic infrastructure for ceramic (Fig. 2).

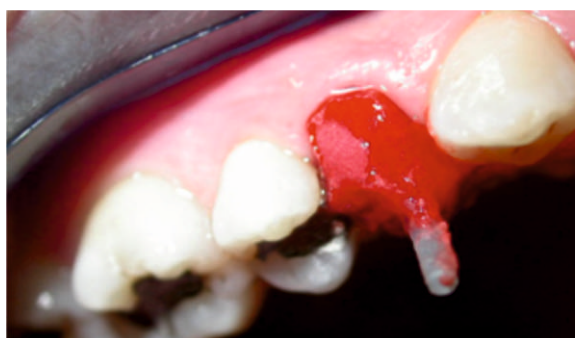


Fig. 2 : Post cap after being relined at the margin. Note that the post end below the occlusal plane.

11. Slightly trim the inner surface to allow space for the low viscosity material which allows refinement (record the finer details).
12. Coat the inner surface with the adhesive provided with the impression material.
13. Inject the light-body material into the canal and into the cap.
14. Gently tap the post cap into place after the canal has been slightly overfilled (Fig. 3).



Fig. 3 : The post cap after being shaped, the post end functions as means of apprehension and allows retention of the post cap within the overall impression

15. Remove impression from the oral cavity and inspect for accuracy.
16. Load the syringe with the light-body material. While the material is being injected all around the cap, load the mixed putty material in the stock tray.
17. After the material sets, inspect the whole impression (Fig. 4).

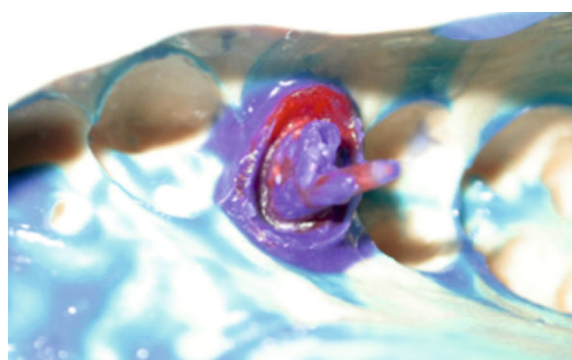


Fig. 4 : The post cap held in the overall impression. Note the wash material records margin details as being supported by the cap, the post enrolled by the wash material providing a precise recording of the post space.

18. Pour the impression with hard stone then shape the cap into a pattern of a post crown core. Wax it at the margins for more precision then cast it immediately (Fig. 5).
19. Check the core intraorally. Note minimal or no touches are needed (Fig. 6).
20. Seat the definitive ceramo-metallic post crown (Fig. 7).



Fig. 5 : The post end was removed and the post cap transformed to a pattern that will be waxed and casted to obtain the metallic framework.



Fig. 6 : The post framework is placed to be checked. Note the appropriate marginal fit and sufficient space for the ceramic material.



Fig. 7 : View after final seating of the crown.

Discussion

This post cap rapidly replaces the retraction cord avoiding sulcus closure. As relined at margins, resin reaches beyond finish lines. Thanks to its rigidity, the cap supports wash material and conveys it mechanically for accurate capturing. This offers more precision compared other impression techniques.

Furthermore, this same cap is shaped by the dental technician and serves as a pattern for the cast core ,support for ceramic material so a less time-consuming approach at the laboratory.

The cap has the role of a custom tray that diminishes the volume of the polymerizing material so reducing the final contraction and the accuracy of the impression can be improved. In fact, the one step technique includes occasional ledges at the junction of the putty and wash material and uncontrolled bulk of the light-body material as well as difficulties related to placing the post after material injection. Any defect requires remaking the whole impression (12). However, the single unit impression allows inspection of the refining impression before moving to the full arch. Although this technique leads to accurate impressions, it is time consuming. In addition, the impression requires immediate pouring to avoid any polymerization constraints. This technique is suitable for post crown single impressions as it removes difficulties related to the accurate post placement within the impression material involved in the one or two step impressions using two viscosity materials. Further studies are needed to confirm its benefits and effects of the resin on periodontal tissues.

Conclusion

The use of resin cap fabricated chairside for master impressions shows evidence of accurate impressions. However, it requires meticulous procedures and immediate casting. Nevertheless, current impression materials with improved penetration in narrow spaces may limit the indication of the described impression technique .

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10 tips to achieve an ideal master impression.

By Assoc. prof Dalenda Hadyaoui

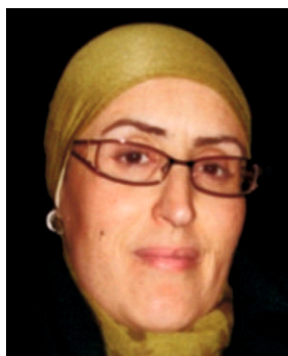
Successful master impressions include a precise duplication of the prepared teeth and an accurate production of the working cast to achieve adequate marginal integrity of the fixed restoration. The involved key factors are managing the soft tissue as well as appropriately selecting the tray and the impression material. Accurate and detailed impressions require both clinical expertise and mastering the impression technique. For this, some tips are suggested for an optimal master impression:

1. Select mandibular arch-shaped trays for maxillary full arch impressions as they are less cumbersome in the oral cavity and reduce the material amount.
2. When preparing more than four to six teeth, consider using acrylic custom trays to enable optimal material impression flow. To ensure this flow, prevent prepared teeth from touching the tray to avoid future ill-fitting crowns. They should not be used on the same fabrication day unless they are boiled in water for 5 minutes to avoid shrinkage.
3. If a hydrophilic material is used for the impression process, then it will be better to soak retraction cords in water to help prevent tissue damage and to ease placement and retrieval of the cord. This helps to slightly hydrate and optimize the dentin surface to improve its angle contact with the syringed material.
4. Before the cord placement, small amounts of local anesthetic with vasoconstrictor can be applied inside the sulcus using a micro brush. This prevents bleeding and prepares gingiva for a non-painful displacement.
5. In subgingivally located margins, it is highly recommended to syringe light bodied material simultaneously to cord removal. Hold syringes with tip's orifices smaller than the sulcus width. This guarantees the flow of the wash material apical to the margin by preventing gingival collapsing back. Moreover, smaller orifices result in significantly fewer bubbles.

6. For taking the impression of more than one preparation, regular set impression materials are better than fast set impression materials as the required time for syringing and seating the tray is $\geq 20''$. This avoids the early wash material setting before placing the tray which could lead to voids.
7. To lengthen the working time for large restorations, refrigerate the impression material. This will significantly increase working time without jeopardizing its physical properties.
8. To avoid the effect of using disposable latex gloves on retarding the setting time of rubber impression materials, wash them thoroughly with soapy water then dry them before mixing. Mixing should be quick and using fingertips as much as possible to avoid heat transfer from the palms.
9. To accurately determine if it is the operator's error that may have contributed to a critical cast defects or it is the laboratory technician's error, the following rule is suggested: any excess on the cast appearing after pouring demonstrates an operator's error in the impression whereas any voids on the casts explain only the technician's pouring mistakes.
10. When an impression is evaluated for success or failure, photograph the impression then put it on screen for evaluation. The optical perception and accommodation by the human eyes will convert it into a virtual cast. Thus, the clinician can better assess the finish lines and the sulcus widening and finally rate the impression as acceptable or not before casting.



Scientific Articles



A post-orthodontic diastema closure using direct bonding restorations : A case report

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Abstract

After orthodontic appliance removal, some interproximal spaces result in the maxillary anterior segment. These displeasing diastemas cause esthetic damage to the smile and dentofacial harmony and represent the chief complaint of patients after conclusion of orthodontic treatment.

The improvement of the adhesive restorative dentistry enabled esthetic adhesive restorations strongly bonded to the dental structure, particularly when they are made in tooth enamel.

Modern nano-filled resin materials achieve natural life-like restorations with optimal optical properties reproducing the color, translucency, texture and brightness of the natural teeth.

Thus, for a small extension diastema, size between 0.5 and 2 mm, direct restorative treatment is chosen. The use of proximally applied resin composite seems to offer a low cost, single visit, reversible and conservative procedure of enhancing one's smile.

The aim of this study is to report a restorative esthetic closure of anterior diastemas after the stabilization of an orthodontic treatment through a clinical case using the free-hand stratification technique of nano-particulated composite resins.

Keywords

Post orthodontic gingival embrasures; diastema closure; direct resin restoration; minimally invasive treatment; unilateral technique; bilateral technique.

Introduction

Orthodontic correction of the crowding problem of incisors results often in an amazing upswing in the anterior teeth esthetics. Severe tooth crowding/overlap especially with triangular-shaped crowns can lead to frustrating open gingival embrasures (black holes/triangle); by reducing the apparent heights of the interdental papillae, after orthodontic treatment (10,11), source of significant patient dissatisfaction.

The mean prevalence of black triangles in adolescent patients after correction of malposed incisors was reported to be 41.9 % and 38 % in adult patients post orthodontic treatment (2).

Black spaces may cause chronic retention of food debris and subsequent gingival inflammation leading to the loss of periodontal health and abnormal gingival morphology affecting the esthetics of smile .

Case report

A 23-year-old female was referred by her orthodontist. She requested diastema closure before bonding a permanent retention. The patient and her parents expressed a desire to create an esthetically pleasing smile through a treatment as conservative as possible. Records and radiographs were obtained from the orthodontist and an oral examination was completed. Intraoral situation is presented in (Fig. 1 and 2).



Fig. 1: Pre-operative frontal view.

Consideration is given to creating an ideal emergence profile for gingival health, as well as managing "black triangles."

Direct composite is a minimally traumatic, simple, cost-effective and predictable approach that offers dentists the opportunity to create an esthetic change in the anterior region. Orthodontic treatment or re-treatment , prosthetic intervention are other traditional treatment modalities that are available to resolve this clinical dilemma (4).

Depending on the clinical situation, esthetic diastemas will be closed by the application of composite on adjacent teeth, or aside (Unilateral technique) or both sides (bilateral technique).



Fig. 2: Preoperative Right lateral view revealing a 1mm space between maxillary right lateral incisor and canine

Periodontal status was within normal limits for the patient's age, and there was no radiographic evidence of hard tissue disease.

The patient showed Angle class I occlusion with normal overjet (2mm) and overbite (2mm).

An estimation of the space to be closed was calculated by means of diagnostic casts obtained from irreversible hydrocolloid impressions of both arches. Since a proper size relationship in anterior teeth is very important to achieve an esthetic result, mesio-distal widths of anterior teeth of both arches were recorded to calculate intermaxillary tooth-size ratio. The sums of mesio-distal widths of maxillary and mandibular teeth were 47.1 and 37.2 mm, respectively. Tooth size ratio was then calculated according to the following formula:

$$\text{Anterior Bolton ratio (\%)} = \frac{\text{sum of mesio-distal widths of mandibular anterior teeth} \times 100}{\text{sum of mesio-distal widths of maxillary anterior teeth}}$$

When comparing the obtained value, the maxillary teeth appeared to be smaller (78.93%) than the average value (80.1%) and needed to be enlarged (9).

Various treatment options were discussed with the patient and her family. It was decided to close the diastema by applying direct composite restorations on the distal-incisal aspects of lateral incisors and mesial aspects of the canines to enhance the smile.

Technique

The placement of the dam is mandatory to facilitate the sulcular fluids and saliva control, firmly retract the interproximal soft tissues allowing the establishment of a correct emergence profile of the teeth to be restored (Fig. 3 and 4).

The maxillary lateral incisors and canines sides were cleaned with a pumice slurry and the surface was roughened with a flexible disk (Soflex, 3M Espe) to clean the surface for optimal adhesion. No tooth preparation was performed.



Fig. 3 and 4: Frontal and lateral aspect of dam placement providing sufficient lateral pressure to seal the gingival margins

A Contour Strip matrix was placed, held tightly against the adjacent tooth across the diastema space, secured with the Permaflo® resin (Ultradent Products, Inc., South Jordan, USA) that was applied to the outside of the matrix onto the dried tissues, and light cured for 10 seconds. This process created a matrix- formed molding in which the partial composite veneers were completed.

The acid etchant was applied on the distal aspect of tooth 12 and the mesial aspect of tooth 13 for 30 seconds, removed with a stream of water for 30 seconds, and dried with a stream of air (Fig. 5).



Fig. 5: Application of a 37% orthophosphoric acid (etchant) on the distal face of tooth 12 for 30 seconds.

Total etch agent was preferred in this case due to the conservative nature of the preparations being only in enamel. It remains the most robust method when bonding to large enamel areas, especially on uncut enamel.

The bonding agent was applied on the etched areas with a brush, pressed into the gingival and proximal areas, thinned with a light stream of air and was then cured before the addition of the first layer of composite (Fig.6).



Fig. 6: Application of an adhesive bonding agent to the etched surface.

To block the "shine-through" of the oral cavity, avoid a gray translucent appearance of the restoration and allow the light to be reflected back to the eyes. It was necessary to use a dentine shade composite (A2) with higher color saturation on the palatal portion.

To reproduce the optical effects of enamel, a layer of translucent composite (EN) was overlaid over the dentine shades (A2) and (A1). The composite used in this case was Amelogen Plus® resin composite (Ultradent Products, Inc., South Jordan, USA) in dentin shades A1 and A2 and enamel shade EN.

Each increment is polymerized for 10 seconds allowing placement of subsequent increments without deforming the underlying composite layer.

After removal of the Contour Strip matrix, the composite restoration was shaped and polished with a fine fluted diamond bur; and abrasive cups and disks (Fig. 7).



Fig. 7 : Composite restoration on tooth 12 is achieved and a lingual layer of composite is layered against the matrix on the mesial side of tooth 13 and light-cured for 10 s.

After curing, the strip was released.

Adjustment was performed, as well as in working and non-working excursions, and in protrusion. The final views of the esthetic results are shown in (Fig. 8,9,10,11)

The subsequent diastemas were closed between 12 and 13, 22 and 23.



Fig. 8: Facial increments of composite are placed, adapted to the proper contour of tooth 13 and light-cured.

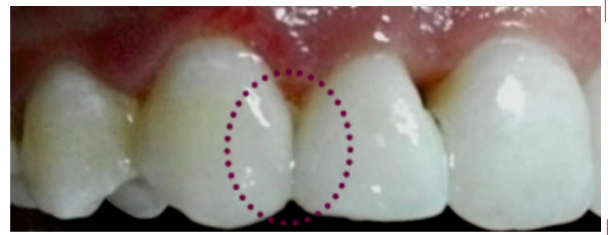


Fig. 9: Postoperative right lateral view after diastema closure using direct resin build up to the contact point. The restoration's final luster and surface anatomy after use of finishing disk and polishing cups .

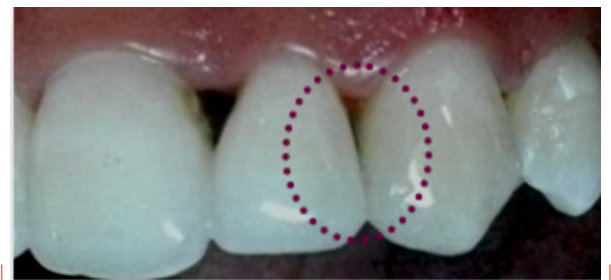


Fig. 10 and 11 : Left lateral views before and after space closure using bilateral composite restorations on tooth 22 and 23.

Case report

Remaining post orthodontic spaces due to arch and tooth size discrepancies are a reality in many cases and there is often a need for esthetic care after active therapy.

The dreaded "Black Triangles" or gingival diastema can be a source of significant patient dissatisfaction .

Increased patient demand for optimal aesthetics with less invasive procedures has resulted in the extensive utilisation of free hand composite resin bonding in the anterior region (6).

Direct restorative techniques can be applied to properly manage "black triangles" improving the esthetic integration between soft and hard tissues in anterior teeth. These areas are restored in a conservative, creative and esthetic manner. The diastema are successfully closed, creating an ideal emergence profile compatible with a better gingiva health.

Usually, tooth preparation is not required when closing a diastema.

The proximal aspect, where the composite begins its new emergence profile may be restored without tooth reduction. In fact, direct composite restorations margin can be thinned to "infinity" without finish line preparation (6).

Roughening of the enamel is recommended only when self-etch adhesives are to be used (3).

An efficient acid etching is mandatory for adhesive system penetration into the dental enamel surface. The enamel surface cleanliness and the conditions of operative field isolation are also very important.

The composite resin used in this case was Amelogen Plus (Ultradent Products, Inc., South Jordan, USA). It is a direct restorative composite developed for restoring anterior and posterior teeth. It presents smooth surface after finishing and polishing.

Adequate occlusal adjustment and periodic controls will contribute to the longevity of the orthodontic and restorative treatments (5).

Conclusion

To improve the patient's smile, the closure of diastemas in the anterior zone has been performed with direct composite resin bonding.

These restorations are practically invisible and blend harmoniously with the natural dentition.

The development of form, function and esthetics with direct resin can be achieved with a proper and meticulous technique to provide the patient with a natural looking smile with minimal economic and biologic cost.

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Scientific Articles



A selective pressure impression technique

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Abstract

Much has been spoken about secondary impression in making complete denture. In fact, it must exploit all the positive landmarks giving the prosthetic stability and retention.

Generally, an immediate recording of the denture support area is possible while the fibromucosa is adherent and firm, but due to anatomical and pathological particularities, the impression could be postponed after surgical treatment or preprosthetic tissue conditioning.

Therefore, in case of disinserted fibromucosa or present of flabby ridge with proscription of surgical option, an impression with selective pressure is imperative.

Keywords

Impression; Occlusion; Flabby-ridge; Stability; Full denture.

Introduction

A fibrous ridge is a superficial area of mobile soft tissue affecting maxillary or mandibular alveolar crest. It develops when hyperplastic soft tissue replaces the alveolar bone and it is a common finding, particularly, in the upper anterior region of long term denture wearers. The proliferation of the floating zone is quite frequent in the maxilla compared to the mandible; the reported prevalence has varied, but has been demonstrated in up to 24% of edentulous maxillae and 5% edentulous mandibles (5).

In fact, soft tissue supporting denture may become compromised because of continuing pathological resorption. It may also result from uneven or rough forces being directed to the underlying mucosa and these tend to cause distortion of the surface and the contours of the residual ridge.

Furthermore, an overvalued occlusal vertical dimension promotes the appearance of this mucosal development.

Finally, the presence of the mandibular incisor-canine block opposed to a removable maxillary complete denture results in anterior occlusal overload. Thus, the mucosa is detached from the underlying periosteum: reproducing the tissue in their distorted state leads to the mobilization of the prosthesis during chewing movements.

The purpose of this paper is to describe the basic principles in making impression in case of displaceable tissue (4,5).

Case report

A 62-year-old man presented to the complete removable prosthodontics department at the faculty of dental medicine of Monastir, requesting a complete prosthetic rehabilitation.

Clinical examination revealed that:

- He has had a prosthetic valve for 7 years .
- Patient had Kelley syndrome due to upper complete denture opposing the lower partial denture.
- A floating maxillary ridge widely extended to the left tuberosity (Fig. 1,2).

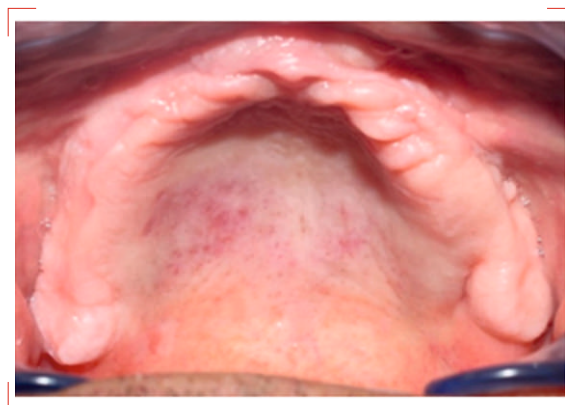


Fig. 1

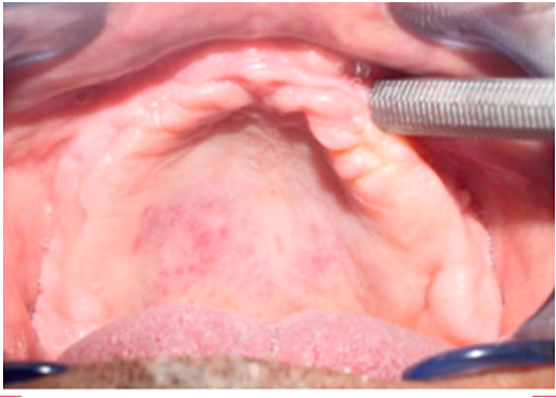


Fig. 2

After a comprehensive examination, the secondary impression should be taken with a selective pressure technique which will require the use of custom tray spaced out with regard to the floating ridge and adapted to the adhering mucosa.

Preliminary impression

The maxillary preliminary impression is made using irreversible hydrocolloid. The objective is to record the negative form of the oral cavity tissue. This positive replica of the shape is meticulously taken and the compression is minimized (8,9).

During the tray selection, the following points should be considered:

- The tray should be correctly positioned in the mouth and slightly extended over the tuberosity.
- At least 2-3 mm clearance must be uniform between the stock tray and the ridge.
- Soft boxing wax should be added along the posterior border of the tray to create a rim that helps insertion (Fig. 3).



Fig. 3

Once the impression is taken, the dentist should:

- verify that the impression captures all of the anatomical landmarks and the peripheral extensions (Fig. 4).
- verify there are no major pressure spots.
- pour quickly the impression: the plaster should cover the peripheral borders (3).



Fig. 4

Custom tray fabrication

The floating zone is perfectly defined by the clinician; the delineation is performed by palpation and scribed on the cast (Fig. 5).



Fig. 5

The area between the anterior and posterior vibrating line is scrapped in the cast to the depth of 2 mm on either side of the mid palatine raphe in which the scrapping-depth should be decreased (1,10).

After blocking out the flabby alveolar ridge, the separating medium is applied with a brush to prevent the special tray from bonding to the cast.

The special tray is made using self-curing resin by mixing 3:1 powder to liquid. At the dough stage of the polymerization, the material is kneaded in the hand to achieve an homogeneous mix, and then it is shaped in 2 mm-thickness and adapted over the cast from the centre to the periphery. The excess should be cut off with a blade before the resin sets (Fig. 6,7).

After the exothermic reaction, the acrylic resin tray is removed from the preliminary cast and the wax is removed out (1).

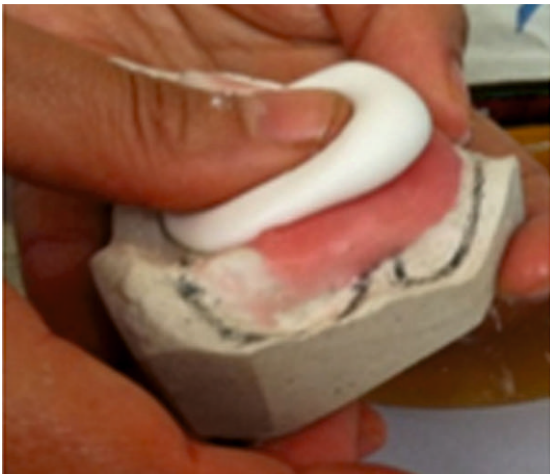


Fig. 6 & 7

Custom tray adjustment

The tray is trimmed with an acrylic bur to the desired extensions and contours, the periphery should be 2-3 mm thick and the edges are rounded. A particular attention is given to those elements:

- the borders of the tray are reduced so that the modeling compound can be added.
- the posterior border of impression tray is adjusted, respecting the amount of extent onto soft palate. (2mm beyond the fovea palatine)
- an available space for the green stick should be checked in the patient's mouth regarding buccal and labial flanges (1,5).

Occlusion record

Two occlusion rims are contoured and adjusted (Fig. 8).

- The upper occlusal rim represents approximately the length of the natural anterior teeth, the incisal plane is parallel with interpupillary line. Occlusal plane is roughly parallel to the ala-tragus line.
- Lower occlusal rim is used to record centric relation at the adequate occlusal vertical dimension.

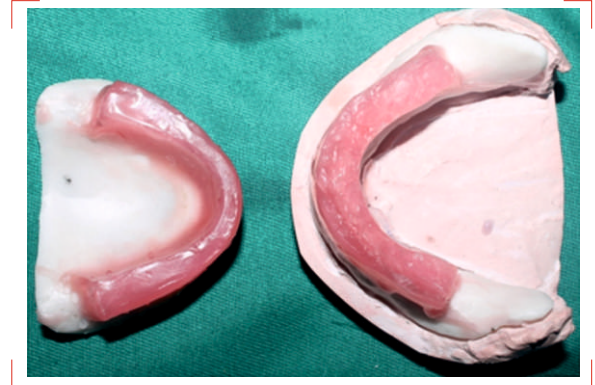


Fig. 8

Border molding

Border molding is the process by which the shape of the borders of the tray is made to conform accurately to the contours of the buccal and labial vestibules:

The material of choice for this procedure is the green stick compound, it is softened by the flame and added on the flange of the tray (Fig. 9).

Thus, the tray should be properly positioned in the mouth during border molding procedure (4).

The clinician starts molding the posterior palatal seal, then the buccal vestibule and finally the labial vestibule (7).



Fig. 9

Final impression

After testing the retention, holes are created into the palate of the custom tray with a round bur to remove the excess of impression material (Fig.10). It prevents the extra pressure which could displace the ridge and dislodge the denture after insertion (2,3).

The mixed impression polysulfide is placed on the tray with borders covered and inserted in the mouth ,no excess of material should be loaded (Fig. 11).

Using the occlusal pressure, this technique eliminates tissue displacement and distortion (Fig. 12,13,14).

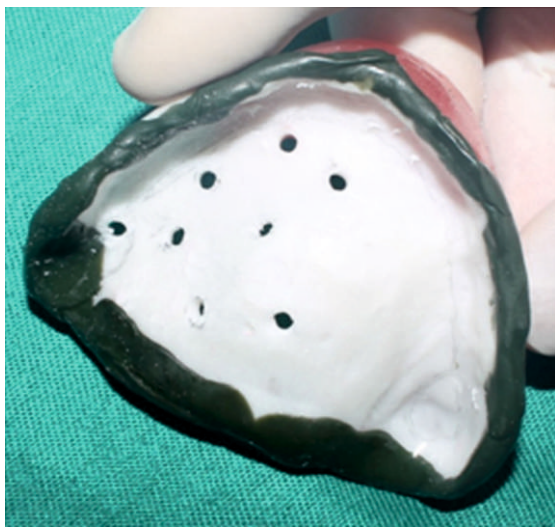


Fig. 10



Fig. 11



Fig. 12

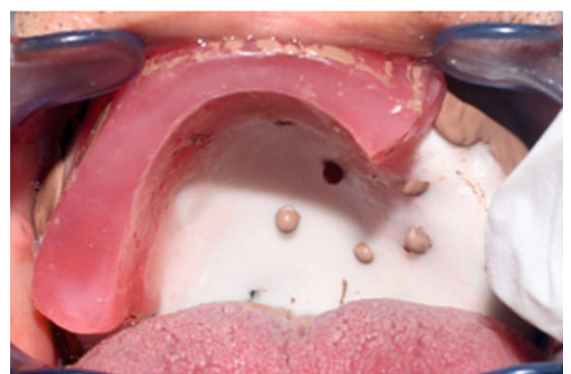


Fig. 13

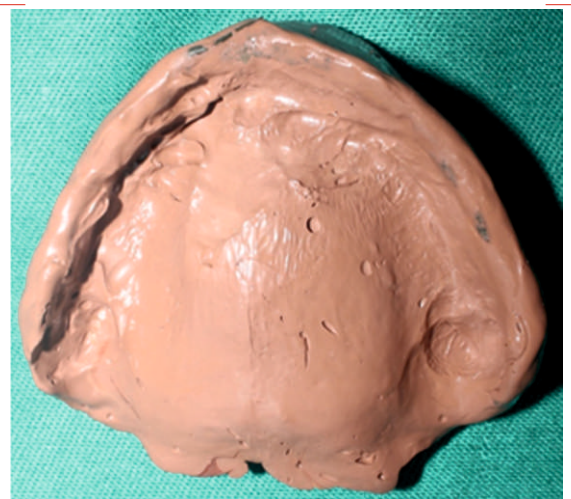


Fig. 14

Discussion

The impression making in total denture treatment is of great importance, not only for dental retention and stability but also for the mucosa status which should be kept without any distortions.

The mucosa over the alveolar ridge is with different thickness and mobility, the vertical pressure causes depression of the mucosa. Mostly, we conventionally take the impression by border molding and zinc oxide eugenol or polysulfide, but in case of flabby ridges there is a need to use a special technique in order to achieve best results. In fact, physiological registration of the attached and unattached tissue reduces pressure on displaceable tissue which cannot support the denture, while it remains mucocompressive in hard zone (4, 6).

Standard mucocompressive impression techniques are likely to result in an unretentive and unstable denture as this latter will be constructed on a model of the flabby tissue in a distorted state. This technique may not allow the best use of the available tissue support of the denture base. The use of selective pressure impression techniques should help to overcome some of these limitations (8,9).

Conclusion

The basic objectives of complete denture are the restoration of function and esthetic appearance. Sometimes, the mucosa has no bone support and becomes loose and flabby.

A rational impression technique is required to compress the non flabby tissues in order to obtain optimal support and at the same time avoid the displacement of the flabby tissues.

The aim of this work is to explain the different steps of taking impression using the occlusal pressure and dealing with flabby ridge.

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Scientific Articles



Succeed an all-ceramic crown on a single central incisor: guidelines to follow

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Abstract

The prosthetic integration of a maxillary central incisor is always a challenge for the practitioner. Due to its anterior central position a ceramic crown on the central incisor will be immediately compared with the natural counterpart incisor and smaller differences of shape and color will be immediately perceived.

This article shows the different guidelines to follow in order to obtain a successful all-ceramic single crown on the maxillary central incisor.

Keywords

Central incisor; Esthetics; All-ceramic systems; Preparation.

Introduction

The maxillary central incisors are front and center in a smile. More than any other pair of teeth in the mouth, these two set the tone for a person's appearance, positively or negatively.

The restoration of a single central incisor is a demanding procedure; the patient's expectations in this case are normally very high.

When attempting to match natural adjacent teeth, all ceramic crowns offer better potential for color match than traditional porcelain fused to metal crowns (1).

The aim of this article is to determine the guidelines for esthetic success when restoring a single central incisor.

Symmetry and mirror image

'The esthetic beauty of a composition cannot be achieved without considering symmetry' (2).

If an object presents a mirror image on both sides it can be said that there is a static symmetry.

Dynamic symmetry corresponds to a situation in which two opposing sides are very similar but not identical are opposed. Such minor deviations give the smile a more lively and dynamic natural effect.

According to a study, a perfect symmetry of the maxillary central incisors is observed in only 14% of cases, A slight asymmetry is often found both in length and in width. This should not exceed 0.3 mm in width (Fig. 1) and 0.4 in length (Fig. 2,3) otherwise even an occasional observer will appreciate the difference (3):

- Human nature presents a form of dynamic rather than static symmetry.
- Recognition of these characteristics made prosthetic restorations move from stereotyped design to a desired personalization. This must be taken into account in the realization of anterior restorations (2).



Fig. 1: Maxillary central incisors do not always show a perfect symmetry. A difference of width of more than 0.3 mm causes an asymmetry that may be denoted by an observer as in this case the difference is about approximately 0.5mm (3)



Fig. 2 : A small difference in length between two incisors denoted when the lips are at rest is esthetically acceptable. If the smile line is high, it is offset by a similar height difference of collars that balance the overall length edges.



Fig. 3 : In this case, the two incisors seem to have the same length when the lips are at rest. If the smile line is high with a different collar levels, symmetry can be compromised

Which ceramic system to choose?

Several all-ceramic systems have been developed in dentistry to meet the increased expectations of patients and dentists for highly esthetic, biocompatible, and long-lasting restorations. The increased number of all-ceramic systems available can make it difficult to choose an appropriate restoration.

All-ceramic restorations are usually categorised depending on either the type of porcelain (feldspathic, leucite reinforced, low-fusing etc) or alternatively the method of fabrication (infiltrated ceramic, pressed ceramic by the wax lost technique; or machinable materials CAD-CAM, etc).

These classifications are often confusing. Thus, in the interest of simplicity, all-ceramic restorations may be classified according to their translucency (Table 1).

1-Translucent

2-Semi-translucent

3-Semi-opaque

Table 1: Classification of all-ceramic systems according to their translucency (4)

Translucent	Semi-translucent	Semi-opaque	Opaque
Feldspathic porcelain	Procera Alumina	In-Ceram Alumina	In-Ceram Zircona
Empress	IPS e.max MO	Zircona $\geq 0,6$ mm	IPS e.max HO
IPS e.max HT, LT	Zircona $\leq 0,4$ mm		
In-Ceram Spinell			

Generally speaking, as we progress down the list, the ceramic increases in opacity and ability to mask out dark underlying tooth structure.

There is also an increase in inherent strength.

Clinicians should reserve dental ceramics with high translucency for clinical applications in which high-level esthetics are required and the restoration can be bonded to tooth structure. Ceramics with high strength tend to be more opaque and pose a challenge when trying to match natural tooth color, but they can mask discoloration when present (5-6-7) (Table 2).

Table 2: Clinical use selection guide (8)

Material	Anterior Crown	Translucency
Leucite / Felspar-Based Pressable	Yes	1
Lithium Disilicate	Yes	2
Alumina	Yes	3
In-Ceram Alumina	Yes	3
In-Ceram Spinell	Yes	1
In-Ceram Zircona	Yes	4
' Pure Zircona '	Yes	3
Vitablocs	Yes	1

TOOTH PREPARATION

In order to obtain the primary retention, sustenance, stabilization, mechanical resistance and more broadly the biological, functional and esthetic integration of the prosthesis, the following preparation criteria should be respected:

MARGINS

- Cervical margins preferably take the form of a deep chamfer (Fig. 4) or better a shoulder with a rounded inner corner (Fig. 5). This profile allows the reduction of stress by more than 50% at the ceramic (9).
- Margins should be extremely smooth and uniform to allow the technician to fabricate precise, well-fitting and strong ceramic margins. Any unevenness on the ceramic margins will lead to increase fragility of the margin with and increased susceptibility to cracking.

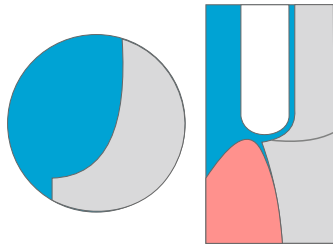


Fig. 4:
Deep chamfer

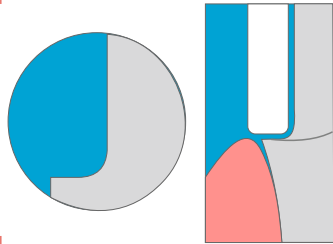


Fig. 5: Shoulder with
a rounded inner corner

PROXIMAL WALLS

The establishment of a relief angle on top of the preparation remains ideally between 7 and 10° and can go up to 12° to 15° (Fig. 6). In addition, tooth preparation edges for all ceramic crowns should be rounded with no sharp angles to create internal stresses in the crown.

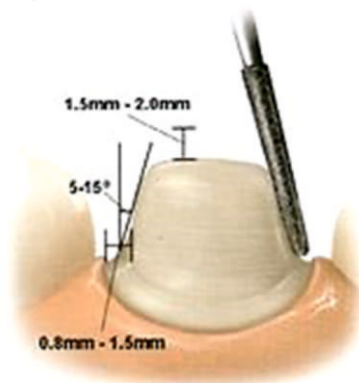


Fig. 6: Tooth preparation for all-ceramic restoration

LINGUAL WALL

Under the effect of horizontal or oblique dislodging force (propulsion path or chewing force), the crown may be dislodged from its denture base (preparation). Only the lingual wall or resistance area (PR) defined by HegdahlSilness between the lingual margin and cingulate, by opposing the buccal portion, is able to avoid this dislodgement effect (Fig. 7). Magne and Belser report a minimum height of 3 mm for this vertical portion (10).

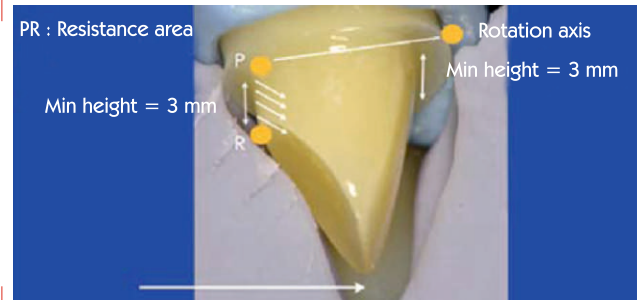


Fig. 7 :The lingual wall or resistance area (PR) between the lingual margin and cingulate, by opposing the vestibular portion is able to avoid the dislodgement effect (10)

REDUCTION

- Incisal edge: axial reduction of 2 mm
- Proximal surfaces: 6 to 8/10th of a millimeter
- Labial surface: 12 15/10th mm matching 8/10th to 1 mm cosmetic ceramic + 4 to 5/10th for the framework.
- Palatal surface: 8/10th to 1 mm

FINISH OF PREPARATION

In the final step the preparation is finished to a smoother surface with the same size tapered diamond used to make the preparation margin, but with medium diamond grit. All sharp line angle edges of the prepared teeth, as well as any sharp internal line angles must be eliminated. To perform all these imperatives, specific set for all-ceramic preparation can be used (Fig. 8).

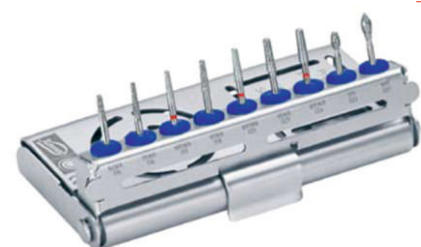


Fig. 8: Specific set for all-ceramic preparation

TEMPORARY CROWN

Another important factor for success in these cases is the temporary crown.

Since it is not uncommon for the crown to be remade if the esthetic objectives are not achieved at first, the treatment time may be increased and it is essential to inform the patient.

A well-made temporary crown will immediately satisfy the patient then time becomes a friend rather than an enemy (1).

Moreover, temporary crown can help the dentist assess the space needed to the restorative material, especially in the median area of the buccal surface which is often exposed to a lack of preparation (9). This can lead to a lack of space for the prosthetic reconstruction at this strategic location.

ESTHETICS

One of the most important features of the natural enamel is its ability to spread the light peripherally. All the dental organ is illuminated.

When trying to restore anterior teeth, the esthetic imperative is paramount and the challenge is precisely to meet these light interactions.

Shade mapping as well as surface texture allows us to meet a perfect mimicry of the natural look of enamel.

Shade mapping

In terms of shade matching, the single central incisor can be the most difficult tooth for a dental technician to fabricate (1).

Comprehensive shade mapping is a time-consuming process. No single base shade can provide an adequate esthetic match. Different shades are needed in the gingival, body, and incisal thirds of the tooth (11).

If the dental technician cannot meet the patient in person, photography must be used to supplement and enhance communication with the dentist.

VITA 3 Master shade guide (Fig. 9) should be preferred to other shade guides since it is based on the selection of luminosity.



Fig. 9 : VITA PAN 3D Mastershade guide

Surface texture

Matching the surface texture is just as important as matching the shade, since it can affect brightness, color saturation, luster, and so forth (Fig. 10).

A natural tooth does not present an absolutely smooth surface; it is generally a gently undulating surface, traversed by very fine horizontal grooves. The horizontal parallel ridges or growth lines and the small vertical ridges

that run parallel to the marginal ridges help it to blend into the oral environment. If light should reflect off the crown in a different manner from the neighboring teeth, it will betray the fact that it is an artificial restoration even if the shade is perfect (11).

The central incisor can be erased or dominant sensual and feminine or evoke virility. Its shape, its color, wear facets and texture are directly evocative of the age of the patient, and gives each central incisor his personality and uniqueness (12).

The technician who seeks perfection in the illusion of natural should consider this individual variability.

Periodontal tissues

Meyenberg does not limit the notion of light to the tooth. He defines what he calls the optical unit.

$$\begin{array}{c} \text{The tooth} \\ \text{(crown + root)} \\ + \\ \text{Periodontium} \\ = \\ \text{OPTICAL UNIT} \end{array}$$

Thus in the case of thin periodontium with a discolored underlying tooth, strengthening the gum is essential to mask the cervical greyish reflection (13).

CASE REPORT

A 33 year-old male patient in good health consulted our department. His main complaint concerned tooth #11 (Fig. 11). The tooth was root treated and restored with a composite restoration. Over the years, the composite became discolored and the patient requested a restoration with improved esthetics.

After preparing the tooth (Fig. 12) and due to the discolored underlying tooth substrate and the sub-gingival margins, it was decided to utilize a zirconia based crown.

On the study cast, the shape of the tooth was modified with wax. A matrix was then made to be used for:

1-Fabrication of the chair-side temporary crown (Fig. 13).

2-Assessment of the space available for restorative material (Fig. 14).

First, the framework was tried-in clinically (Fig. 15). Then, several esthetic try-in of the crown have been made before final staining and glazing were carried out. This allowed verification of the crown morphology and color both of which can still be modified at this stage. A slight asymmetry was performed to give a 'natural look' to the restoration.

Only once the esthetics, fit and function of the crown have been approved by the patient, the crown was cemented using glass-ionomer. (Fig. 16).



Fig. 10: The texture and the amount of translucency together result in a varying degree of light reflection.



Fig. 11: Pre-op view of discolored composite restoration on tooth 11. Both shade and shape have to be improved.



Fig. 12: Preparation of the central incisor: Note the discoloration at the cervical aspect of the preparation.



Fig. 13: Temporization of the central incisor



Fig. 14: The space available for restorative material can be assessed via the temporary crown.



Fig. 15: Clinical try-in of the framework



Fig. 16: Final restoration after cementation

Conclusion

As far as esthetics is considered, the single central incisor poses the greatest restorative challenge for the clinician; not surprisingly, it can also be the most difficult tooth for the dental technician to match.

Many different factors influence the successful outcome of such restorative procedures. Among them are the tooth preparation design; materials used; skill of the involved laboratory technician(s); and the effectiveness of communication between the treating dentist and the laboratory technician (14).

The dentist should indicate the appropriate system for each clinical situation and the preparation should make enough room for the restorative material. If not, the crown will be either over contoured or unesthetic.

Adequate time should be allowed for the technician to fabricate the crown. A good temporary crown will remove any time constraints from the technician.

Acknowledgements

We would like to thank Mr Fathi Troudi for his technical support.

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Scientific Articles



Benefits of tooth root preservation for prosthetic retention in subtotal mandibular edentulism: a case report.

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Abstract

The preservation of dental roots and their exploitation to realize supra-root prostheses is ancient, but it is still relevant as it allows the maintenance of the periodontal proprioceptive system, the slowing down of the resorptive process of the alveolar ridges after extraction and the preservation of a favorable crest profile to support the future prostheses. It also allows a better retention for the prostheses if an attachment system above the roots is envisaged.

Through this work, we proposed to present the indications and the benefits of root preservation as well as the technique of root canal preparation to maintain the chosen retention system.

Keywords

Removable partial prosthesis; Overdenture; Prosthetic retention; Subtotal mandibular edentulism; Attachement.

Benefits of tooth roots preservation (1,3,4)

The benefits of tooth root preservation below the prostheses are no longer questionable, especially when they are well implanted in the bone. Among the benefits, which are multiple, we note:

- Maintenance of the bone structure: The bone resorption obtained in the first two months following the extractions represents 50% of the total resorption; after the third month, a slow and continuous resorptive process will continue throughout the life of the individual. This resorption will have a direct effect on the balance of the prostheses given that a resorbed alveolar crest is a supporting area of low value. In addition, the loss of the ridge height will considerably reduce the stability of the prostheses; this will undoubtedly be negatively reflected on the prosthetic retention.

Therefore, preserving the roots maintains the bone capital and avoids the alveolar resorptive process observed in the recently edentulous areas.

- Maintenance of the proprioception: The periodontal fibers that surround the tooth root play an important role in the dimensional and textural perception of food and in the assessment of the forces applied on the artificial teeth which will prevent occlusal overload and increase the

patient's comfort.

- Stimulating salivation: The periodontal proprioception is also a positive factor for saliva. The importance of this phenomenon deserves to be highlighted as we frequently note a decrease in salivary flow among the elderly.

Indications for the use of attachment-supporting roots in supra-dental prostheses (1,5,6)

- Patient's health status: the use of attachments on the residual roots is indicated for patients whose general health is not deficient.

- Mechanical factors :

- The use of two teeth located on either side of the median sagittal axis allows a prosthetic stability through a good bone height and a good retention provided by the chosen attachment system. This seems to be mostly indicated in the mandibular arch, due to the effectiveness often precarious of the peripheral prosthetic joint. Using the attachment bar improves retention. If it is contra-indicated, the axial attachment finds its indications.

- If several teeth are used, the distribution of the teeth in the arch should constitute a polygon of retention. Thus, in

the cases where two canines and two molars are still present, which constitutes three straight edentulous crests, three bars can be placed. If the anterior crest is curved, two side bars may be used.

- Periodontal Factors: If we hesitate to restore a tooth in its integrity, it is because the clinical and the radiological examination revealed a slight periodontal atrophy. Crown sectioning allows to improve the mechanical conditions. However, a sufficient bone height, the absence of periodontal pocket and tooth mobility are essential.

- Dental factors: A perfect endodontic treatment is required.

Contra-indications of using attachment-supporting roots in supra-dental prostheses (4,7,8)

·General factors: The use of attachments is a more complicated and expensive treatment. It requires a more rigorous maintenance.

We must not compromise this treatment by indicating it for patients whose health status is deficient (uncontrolled diabetes, advanced state of senility, etc).

·Loco-regional Factors :

-Oral Hygiene: In general, prostheses with attachment make oral hygiene a little more difficult on the yokes as well as the underside of the plate, especially in the case of using bars. So, we have to be sure of the patient's cooperation.

- Mechanical factor: An isolated tooth used to retain the prosthesis, undergoes harmful forces that threaten its prognosis. Moreover the additional contribution of retention does not prevent in any way the prosthetic imbalance and its consequences.

- Available Height: A lack of height may therefore counter-indicate the use of an axial or bar attachment, knowing that the necessary height for an axial attachment is more important.

-Lingual crowding: The use of a bar attachment at the mandible causes a lingual over thickness of the prostheses, reducing the functional tongue space which can therefore disturb speech.

-Apparallelism of roots: In the case where two or more roots have diverging axes, radicular posts cannot be parallel to each other, which seems contra-indicated the use of bar attachment. However, a two-stage system solves this problem: the bar attachment is screwed on the yokes that are sealed independently.

Case report

A fifty one-year-old patient presented himself to the department of removable partial prosthodontics at the dental clinic of Monastir.

-In the maxilla, he presented an edentulism of Kennedy applegate class I with a defective provisional bridge having the 13, 12, 21, 22 and 23 as abutment teeth (Fig.1).



Fig. 1 : Defective provisional Bridge

In the mandible, he presented a subtotal edentulism with persistence of two canines (Fig. 2), but with cervical caries limited to the dentin. We also noted a periodontal recession from about 2 to 3 mm.

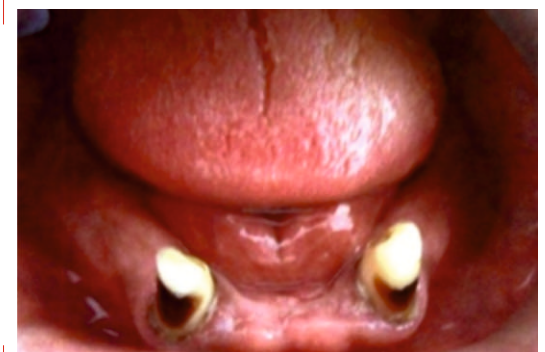


Fig. 2 : Mandibular subtotal edentulism

The retroalveolar radiography of the teeth shows a ratio (radiological crown / radiological root ≤ 1) (Fig.3, 4). The hygiene is moderately sufficient.

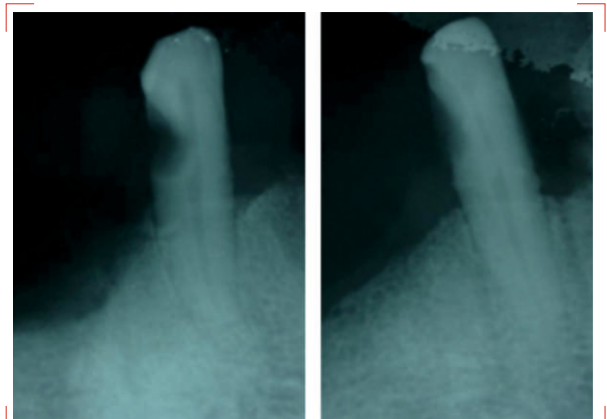


Fig. 3, 4: Retro alveolar Radiography which shows a ratio RC/RR ≤ 1 .

The anterior edentulous mandibular crest is straight, relatively high and covered with an adherent fibromucosa while the ridges of the posterior sectors have a relatively favorable form.

Discussion of the treatment choice

The treatment of this mandibular edentulism could be performed in two ways:

* By resin removable partial prostheses:

·Advantage: Simplicity of the treatment.

·Disadvantages:

-Difficulty to realize an esthetic prosthesis (presence of clasps, residual teeth difficult to harmonize with the prosthetic teeth).

-Biomechanically, the ratio RC/RR is limited.

* By a mandibular supra-dental prosthesis with attachments:

·Advantages:

-Responds to the esthetic requirements

-Facilitates occlusal equilibration.

-Biomechanically, the crown section improves the prognosis of these teeth by improving the ratio RC/RR.

-This type of prosthesis provides excellent retention.

·Disadvantage: Depulcation

Taking into account these benefits, our choice is oriented to restoration using a total mandibular prosthesis with attachments.

In the maxillary, our decision was to use a mixed prosthesis with two extracoronal attachments.

Justification for the choice of bar attachment

The choice was between axial or bar attachments, but due to the presence of an anterior straight ridge with residual teeth situated symmetrically on both sides of the sagittal axis, we opted for the use of the bar system which offers more retention than the axial attachment. However, this choice can only be confirmed following a preprosthetic study to check the following points:

-The roots parallelism

- The available vertical height: it will be evaluated after the mounting of diagnostic casts on an articulator in correct vertical dimension of occlusion. The situation of the bar in the vertical plane requires a director mounting of the prosthetic teeth realized on the diagnostic casts after the elimination of residual canine crowns (Fig. 5). Then, a silicone key of this director mounting will be carried out (Fig. 6). It will allow visualizing the relationship between the prosthetic teeth and the root plates (Fig. 7). This operation also allows to choose the type of bar attachment depending on the volume available.

-The free space in the horizontal direction: A lingual key (Fig. 8) of the mandibular cast helps to locate the bar attachment in such a way that does not encroach on the space reserved for the tongue.



Fig. 5: Diagnostic wax and director mounting



Fig. 6: Key of the vestibular situation



Fig. 7: Visualization of the available vertical space



Fig. 8: Key of the lingual position

Presentation of the selected bar system

The Preci-Horix system includes:

- 1- A burn-out plastic bar of circular section
- 2- Female riders in three retention level to choose from
- 3- Two space maintainers
- 4- Instrument for placement of the rider

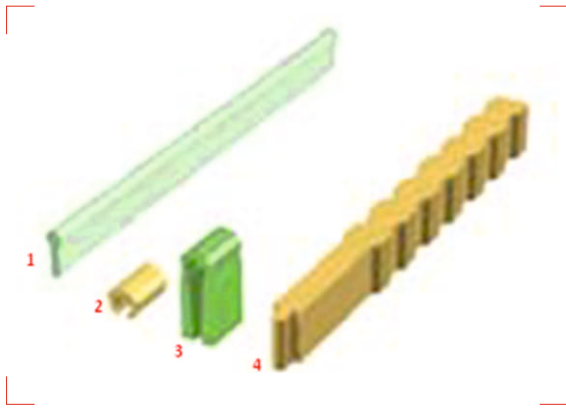


Fig. 9: The Preci-Horix bar system

Sequences of prosthetic realization

* After scaling and endodontic treatment, the two canines were prepared with Richmond type preparation (Fig. 10).

* Impression :

-In The maxilla: Final impression of the prepared teeth by the wash technique (Fig.11).

In the mandible: The impression has a double objective. In fact, it has to take into account the preparations of the roots with their radicular posts to realize yokes with attachments, as well as the osteo-mucous support area. The impression support is an individual impression tray (IIT). The peripheral prosthetic joint is made with a polyether and the impression is taken with calcinable posts in place (Fig. 12).



Fig. 10 : Richmond preparation of canines

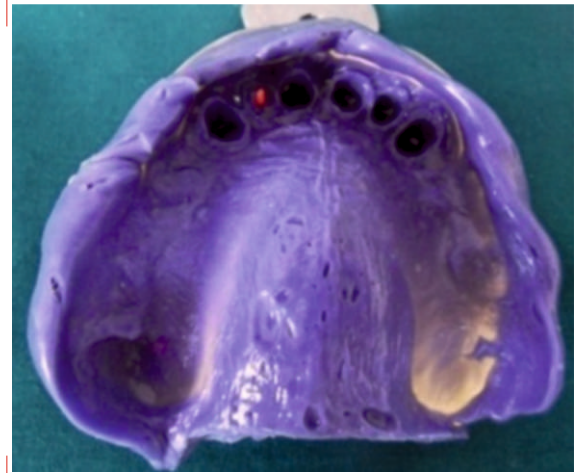


Fig. 11 : Final maxillary impression



Fig. 12: Impression with calcinable posts in place

* Occlusion recording and articulator mounting (Fig.13).

* Sculpting of the yokes and positioning of the mandibular attachment bar: Two parabolic yokes are fabricated at the laboratory and they will be fixed in the bar attachment (Fig. 14).

Sculpting of the antero-superior bridge and positioning of the extracoronary attachments (Fig. 15).



Fig. 13: Recording of occlusion reports in central relation and correct vertical dimension of occlusion



Fig. 14: Checking the position of the bar in relation to the anterior teeth

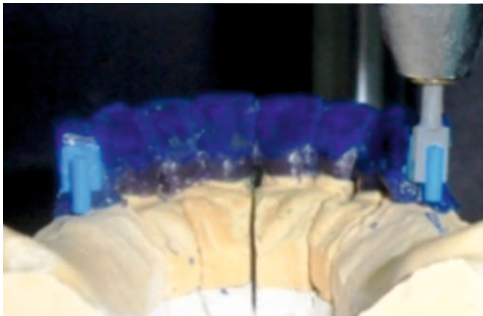


Fig. 15: Setting up of extra-coronal attachment

* Metal Casting of the yokes and the attachment bar system as well as the maxillary bridge.

* After that, we will move to fitting in the patient's mouth (Fig. 16, 17 and 18).

After fitting of the maxillary bridge in the patient's mouth, the prosthetist sculpts the esthetic veneer, and we proceed by taking an impression with the maxillary bridge in the patient's mouth (Fig. 19). This impression will serve to realize the maxillary metallic framework (Fig. 20).



Figure 16 and 17: Fitting of the maxillary bridge in the patient's mouth



Fig. 18: Fitting of the bar attachment in the patient's mouth

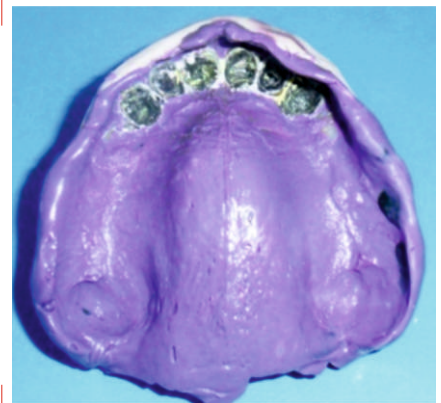


Fig. 19: Impression with maxillary bridge in place.



Fig. 20: Mouth fitting of the framework

* Fabrication steps of the mandibular complete denture at the laboratory:

-The Transfer riders are placed on the bar attachment (Fig. 21).

-A discharge on plaster should be performed, in order to make polymerization directly on the initial model (Fig. 22).

-The polymerization of two inox housing provides a perfect positioning of the riders in the prosthesis (Fig. 23).

-The silicone key taken from the director mounting will be used in the final assembly of teeth.

-After polymerization, the back of the complete mandibular denture is found to contain hollow spaces for riders.



Fig. 21: Setting up of the transfer riders on the bar

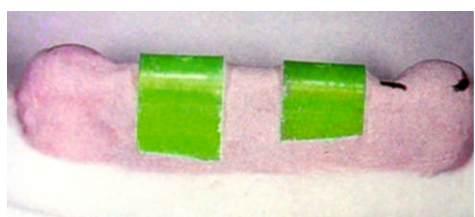


Fig. 22: Discharge on plaster

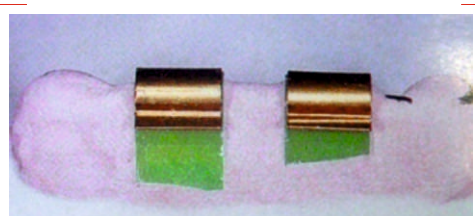


Fig. 23: Positioning of inox housing

-Next, a record of the occlusion is carried out for the mounting of maxillary prosthetic teeth; the support of this record is the maxillary framework and the complete mandibular prosthesis (Fig. 24).

-Once the mounting of maxillary teeth is validated in the patient's mouth, we move to the next step: polymerization.

On the day of the mouthing, we proceed by the occlusal equilibration of the prostheses and then sealing the bar attachment in the mouth, the setting up of the retention riders at the prosthesis intra- back (Fig. 25).



Figure 24: Occlusion recording for the mounting of the maxillary teeth



Fig. 25: Sealing of the retention riders in prosthesis intra-back



Fig. 26: Final result

Conclusion

The complete denture with bar attachment is an excellent prosthetic restoration thanks to the retention efficiency it provides, and the esthetic result obtained. However it can be reproached for the lingual crowding which may interfere with speech at least during the adaptation period.

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Scientific Articles



A radioanatomic investigation of the mental foramen

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Abstract

The mental foramen (MF) is a strategically important landmark during osteotomy procedures. Its location and the possibility that an anterior loop of the mental nerve may be present mesial to the mental foramen needs to be considered before implant surgery to avoid mental nerve injury.

The objectives of this study were to find the most common sites of this MF in relation with teeth then to determine the dimension between the MF and the lower limit of the basilar edge and the distance between the MF and the apex of the nearest tooth and finally to Seek intra individual asymmetry of the location of the MF in the horizontal direction. It is a descriptive and retrospective study based on 50 CT scans using recovery software Dentascan of 50 patients consulting from 5 governorates (Gabes, Monastir, Sousse, Tunis, Sfax) during 2008.

The most common location of the MF is between the first premolar and 2nd premolar both of the left and right side with respectively 59,1% and 70,7%

The distances most frequently found are those between 3mm and 6mm and the most common distance were 10,12 and 13mm.

Symmetry of the situation of the MF from tooth's apex is found in 70%.

The interforaminal distance varies between 37 and 62 mm with an average 49.2 ± 5.9 mm

Anatomy describes the elements in their most usual configuration but the surgeon must take the clinical anatomy interindividual variations into account because we can also handle cases with a low percentage of occurrence.

Keywords

Mental foramen; Dentascan; Interforaminal distance; Mandibular premolar; Implant.

Introduction

The great development of surgical techniques in the mandible and the progress of radiological imagining procedures have brought much interest in the clinical anatomy of the mental foramen (MF). The nerve bundles emerging from MF can be injured during surgical procedures resulting in paresthesia or anesthesia of the chin, lower lip and gingiva from the MF to the midline of the ipsilateral side.

Consequently, to avoid damage to these vital structure, the exact localization of this anatomical structure should be identified prior to surgery using appropriate radiographic techniques. Hence, the purpose of this research which studies the localization of the MF aiming at finding out the most frequent localizations of this foramen in terms of teeth. These studies have been conducted on dry bones and on tomodensimetrical examinations.

Mental nerve's anatomy:

The inferior alveolar nerve which is the mandibular division of the trigeminal nerve (V3) enters the mandibular foramen. As the inferior alveolar nerve proceeds anteriorly in the mandibular canal, it traverses the mandible from the lingual to the buccal side. The nerve is midway between the buccal and lingual cortical plates in the first molar vicinity.

In the molar region, the inferior alveolar nerve usually divides into the mental and incisal nerves.

In the mental canal, the mental nerve continues upward and emerges from the mental foramen in conjunction with blood vessels. Normally, four nerve branches come out of the mental foramen.

One innervates the skin of the mental area, and the other two proceed to the skin of the lower lip, mucous membranes, and the gingiva as far posteriorly as the second premolar. The mental nerve may provide innervation to tissues adjacent to the canine and incisor areas.



Fig. 1 :The mental foramen is located on the anterior surface of the mandible



Fig. 2 : Mental nerve's branches :
1- mucogingival/ 2- labial/ 3- mental/ 4- buccal

Materials and methods

Materials

To achieve the objectives of this study, we used 50 CT scans using recovery software Dentascan. These examinations were performed on 50 patients (23 men and 27 women) as part of a preoperative evaluation (oral or implant surgery).

The CT-scan examinations were performed in different radiological centers in five governorates (Sfax/ Monastir/ Tunis/ Gabes/ Sousse).

Methods

In this study we have focused on :

1. Localizing the mental foramen in relation to the teeth's apex.
2. Measuring of the distance between the mental foramen and the dental apex (a) the distance between The mental foramen and the basilar bord (b).
3. looking for the symmetry between right and left mental foramen situation.
4. Measuring the interforaminal distance.

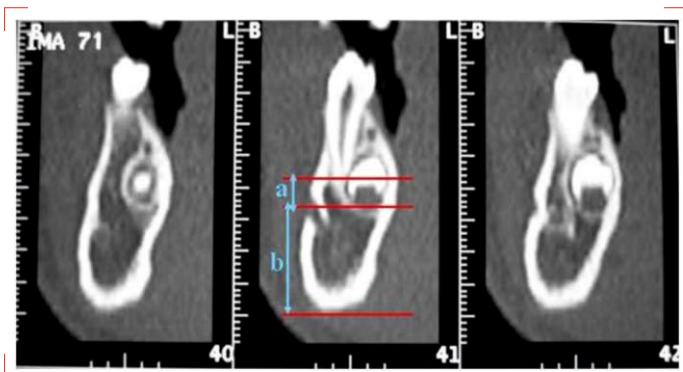


Fig. 3 : Dentascan: finding the left mental foramen on coronal reconstruction

a : the distance between the mental foramen and the nearest dental apex
b : the distance between the mental foramen and the basilar bord

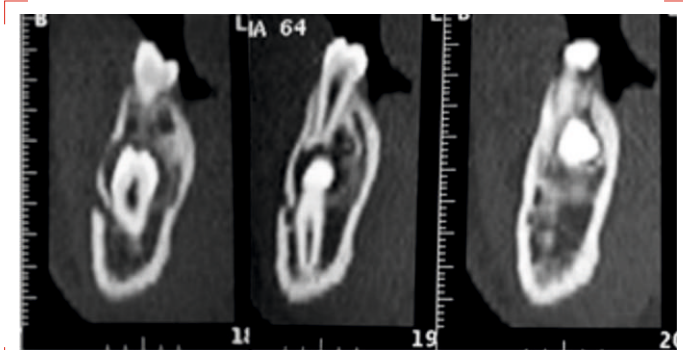
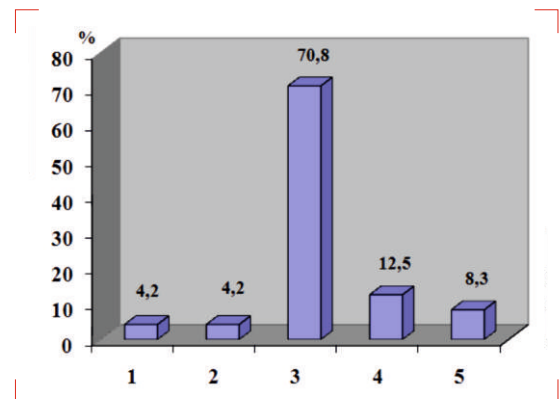


Fig. 4 : Dentascan : finding the right mental foramen on coronal reconstruction

Results

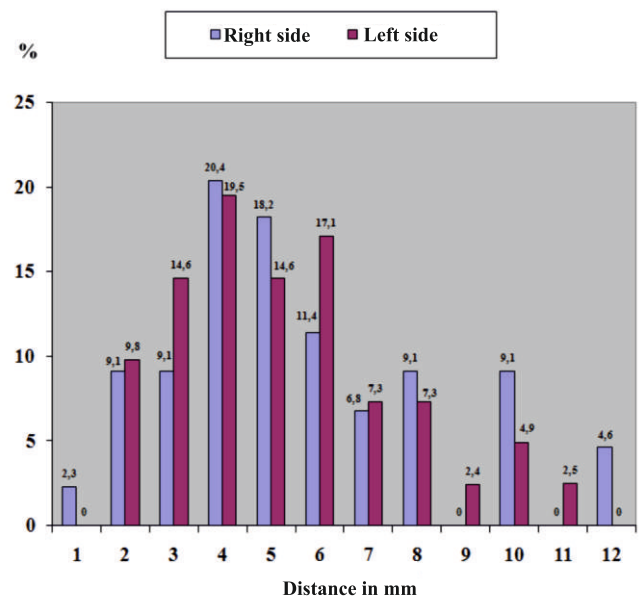
Distribution of the mentioned foramen situation in relation to the teeth apaxes.



1-Between C and 1st PM ; 2-Under 1st P ; 3-Between 1st and 2nd PM
4-Under 2nd PM 5-Between 2nd PM and 1st Molar ;
6-Under 1st molar's mesial root

It is found that the most common location is between the first and second premolar both of the right and left side with respectively 59.1% and 70.7%.

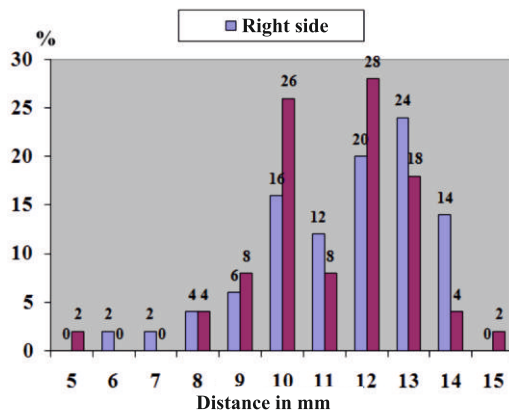
Distance between the mental foramen and the apex of the nearest tooth



The distances most frequently found are those between 3 and 6 mm and the most common distance are 10, 12 and 13 mm.

The average distance between the center of the mental foramen and the apex of the nearest tooth is 5.5 ± 2.7 mm and 5.2 ± 2.3 mm on the right and left side, respectively and we found extreme values ranging from 1 to 12 mm.

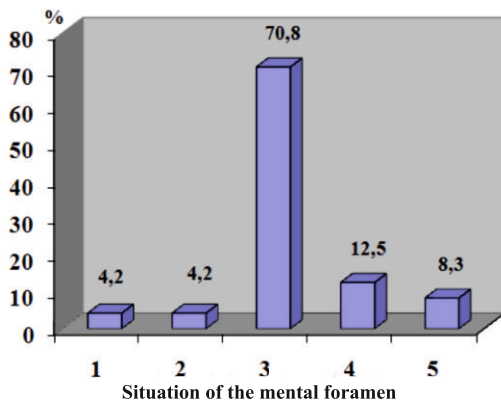
Distance between the mental foramen and the basilar bord



The average distance between the center of the mental foramen and the lower limit of the mandibular edge is 11.5 ± 2 mm on the right side (ranging from 6 to 14 mm) and 11.2 ± 1.8 mm on the left side (ranging from 5 to 15 mm).

We Note that the most common distances are 10, 12 and 13 mm. Values less than 8 mm and 14 mm above values are limited.

Symmetry of the mental foramen's situation



1. Mental foramen is situated between the canine's apex and premolar's apex.
2. Mental foramen is situated below first premolar's apex.
3. Mental foramen is situated between the first premolar's apex and the second premolar's apex.
4. Mental foramen is situated below the second premolar's apex.
5. Mental foramen is situated between the second premolar's apex and the first molar's apex.

Symmetry of the mental foramen situation : (70%, 70.8%) of the foramens lie under PM1/PM2

Interforaminal distance

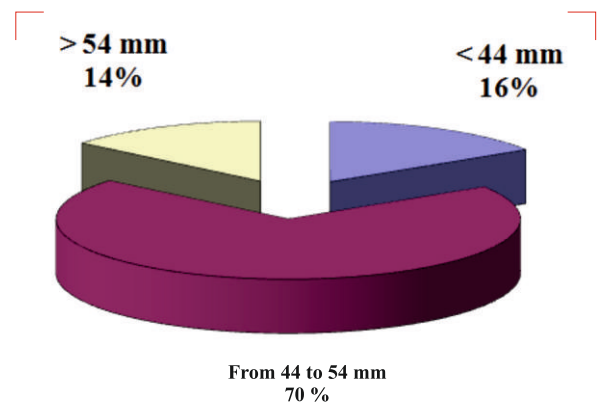


Fig. 8

The distribution of cases according to interforaminal mandibular's distance

The interforaminal distance varies from 37 to 62 mm with an average of 49.2 ± 5.9 mm. It is found that the distance in 70% of cases ranges from 44mm to 54 mm.

The correlation between the different evaluated factors (the position of the mental foramen, the distance a, b and the interforaminal distances) with the age and gender were insignificant.

Discussion

Localization of the mental foramen in the horizontal plane

In the mesiodistal direction, the MF is located between canine's apex and the first premolar's apex for the mesial limited position and the mesial root's apex of the first molar to the distal limited position. The most frequent position is in under the second premolar or between the first premolar and the second premolar. 13 studies identified the location of the mental foramen in relation to the teeth. Most of these studies report that the foramen is under the second premolar with an incidence of 40-69%. Four studies mentioned, have found a higher incidence of the situation of the foramen between the first and second premolar with values ranging from 41 to 63% which is consistent with our results.

Localization of the mental foramen in the vertical plane

In the vertical direction, a large variability is noted which depends on the height of the mandibular body and the crestal resorption degree if they are edentulous.

Distance between the mental foramen and the dental apex :

The mental foramen is located, typically under the tooth's apex. Moiseiwitsch JRD (1998) reported that it can have in the absence of any edentulous mandible more cranial locations. In our study, no similar cases were found.

A distance of 1 to 12 mm separates the MF and tooth's apex.

Distance between the foramen and the basilar bord :

Agthong (8) found in 2005 that the distance between the middle of the mental foramen and the lower limit of the basilar edge is 14.5 ± 0.2 mm on the right and 14.4 ± 0.1 mm on the left but Oguz and Bozkir (7) in 2002 found 14.61 mm and 14.29 mm on the right and the left respectively.

The values obtained in our study are lower than those reported by the above two studies with 11.5 ± 2 mm from the right side and 11.2 ± 1.8 mm on the left.

Symmetry of the localization of the right and left mental foramens :

In our study, we focused on the symmetry of the localisation of mental foramen to the teeth which represents 70% of cases. This symmetry was found by Moiseiwich (1998) in 28% of cases (3).

According to Smajilagić and Dilberović (2004), the panoramic radiograph is able to find the symmetry and asymmetry by direct measurement (9).

Interforaminal Distance :

The distance measured between the two mental foramina right and left, has an average value ranging from 50 to 55.8 mm according to the authors (Alwakil et al, Smajilagić and Dilberović, Suaoga et al). In our study, the average is 49.2 ± 5.9 mm with a minimum value of 44 mm and a maximum value of 54 mm, very close to those reported in the literature.

Conclusion

The interforaminal mandibular region is considered as an ideal implant site owing to its easy accessibility, density and the quality of its bone and the absence of surgical risks, hence its assimilation to an anatomic desert.

Practically, obstacles could exist and real risks of neurological and vascular complication are expected. That's why the dentist should first at all realize a pre-implantal check-up capable of precisely localizing the anatomic elements, then ensure a precise surgical gesture. The only real treatment of the neurological side effects is the prevention. Finally, the clinician should keep the recommended security distance.

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Scientific Articles



The loss of posterior wedging associated with a loss of anterior dental substance: A clinical case report.

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Abstract

The etiology of OVD loss is very difficult to determine clinically if it is associated with a loss of posterior wedging and a loss of anterior dental substance by attrition. This attrition presents an esthetic problem when the degree of destruction becomes excessive. It also leads to alteration the occlusal plane and the functional curves. The prosthetic rehabilitation using composite prostheses with attachment has an esthetic and functional objective.

Keywords

Tooth wear; Hybrid prostheses; Esthetics; Vertical dimension; Posterior tooth loss.

Introduction

The phenomenon of pathologic dental wear corresponds to a progressive mechanical destruction of the dental hard tissues.

The loss of the anterior coronal substance due to dental wear (erosion, attrition or abrasion) combined to a bilateral loss of posterior wedging generally causes OVD loss.

In this case where posterior edentulism of great extension is accompanied by attrition of residual teeth, the prosthetic rehabilitation by prostheses combined to attachments and the implementation of clinical and laboratory steps must be conducted rigorously and should be the result of a profound study and appropriate pre-prosthetic treatments.

The etiology of OVD loss

Study of the observed relations between the bilateral loss of posterior wedging, the phenomenon of pathological dental wear and OVD loss

The loss of posterior wedging due to the uncompensated dental extractions has been cited by Turner and Missirlian (16) since 1984 as the probable main cause of the OVD loss in the dentate person.

A study conducted by Sarita et al. (14) confirmed the fact that patients having a very reduced posterior wedging (less than two dental units in occlusion) tend to present at the level of their residual teeth:

- Anterior diastema
- Strong and remarkable occlusion contacts
- A remarkable occlusal wear process
- Tooth mobility
- Interarch occlusal overlap

In fact, each of these elements, initially caused by the loss of initial posterior wedging, is later susceptible to cause OVD loss.

Pathologic dental wear is therefore described here as one of the reasons of OVD loss in a dentate person presenting a bilateral loss of posterior wedging.

Study of the observed relations between OVD loss by bilateral loss of posterior wedging and the increase of the pathologic dental wear phenomenon

Abduo and Lyons (1) note that the loss of OVD associated with a bilateral loss of posterior wedging could generate:

- Occlusal overload on the residual anterior teeth,
- increased dental wear process.

The pathological tooth wear is therefore described as one of the possible results of OVD loss in dentate subjects presenting a bilateral loss of posterior wedging (8,9,10).

Finally, it is still difficult in current clinical practice to determine if the pathological tooth wear in a dentate person presenting OVD loss with a non-compensated bilateral loss of posterior wedging should be considered as a cause or a consequence of OVD loss.

A clinical case report

Initial state

A 58-year-old patient, non insulin dependent and well-balanced diabetes, consulted the department of Removable Partial Prosthodontics. He hoped to:

- Regain his lost smile due to teeth becoming very short.
 - Restore his masticatory function (Fig.1).
- He presented neither para functions nor particular tics. He was very motivated, ready to attend the numerous sessions required for such treatment. He would gladly accept removable prostheses and did not opt for implants (7).

The extra-oral examination revealed:

- Symmetry of the face,
- Reduced facial height,
- Painless temporal mandibular joint at palpation,
- Straight opening-closing path.

The intra-oral examination revealed: (Fig.2a, 2b, 3a, 3b)

§At the maxilla

- The 13 presented an amalgam restoration;
- The 12, 11 and 21 presented arrested caries;
- The 24 presented a calcified pulp canal;
- All the teeth presented attrition surfaces except the 25;
- We noted the absence of contact areas dots of maxillary teeth;
- Well-formed crests with moderately profound palate.



Fig.1: The patient's initial smile.



Fig.2a, 2b: Occlusal views of maxillary and mandibular arches.



Fig.3a, 3b: Lateral views of dental arches in occlusion.

§ At the mandible

- The 38 and the 48 presented mesio-buccal tipping outside the crests;
- The 34, 44 and 45 had minor abrasions and a periodontal recessions of 4 mm;
- The 33, 32, 31, 41 and 43 presented extended attrition areas with a significant periodontal recession in 31 and 41;
- The 31 presented grade 2 mobility with pain in the axial percussion;
- The crests were highly resorbed.
- All the residual teeth did not respond to the vitality tests. A yellow color was marked with low brightness and a high saturation at the tooth cervix (7).
- The periodontium is healthy and thick with sufficient amount of attached gum. The fibromucosa is adherent and firm.

The radiographic examination (Fig.4).

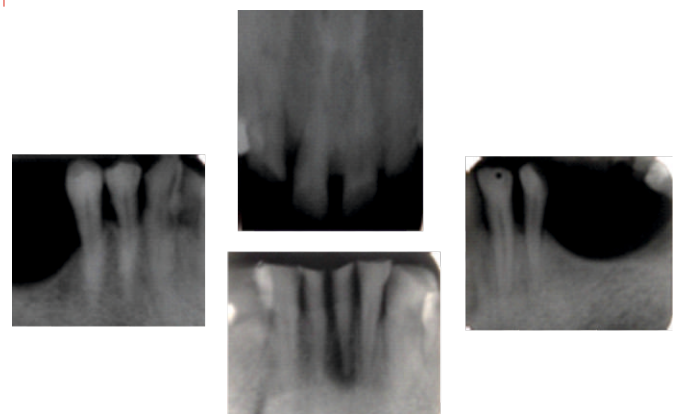


Fig.4: Radiographic examination at the time of consultation

- The 31 presented a periapical lesion with bone growing scarcity and a desmodontal widening;
- Horizontal bone lose in the cervical third of maxillary teeth and the middle third of mandibular teeth;
- RC Relation (Radiographic Crown) /RR \leq 1 (Radiographic Root) for all the teeth exceptionally the 31 with relation RC/RR $>$ 1.

Case study

In order to refine our diagnosis, a mouting study cast on articulator in correct CR-OVD was realized. We noted (Fig.5):

- A perturbation in the occlusion plane.
- A sufficient occlusion height permitting the use of articulated extra-coronal attachments as means of retention in response to the patient's esthetic requirements.
- The 24 must be extracted given its distal tipping, the important diastema between the 23 and the 24 and the difficulty to treat it endodontically.
- The 38 and 48 presenting mesio-buccal tipping which is superior to 30°, were to be extracted. It has been shown in case of mandibular molars having a mesio-version above 30°, the occlusion forces are harmful and adverse to the periodontal support (2).
- given the periodontal and endodontic context, the 31 and the 41 must be extracted.
- After extractions, edentulism became Class 1 mod 1 at the maxillary and mandibular level.



Fig.5: Mounting the study casts on articulator in correct CR-OVD: (a) right lateral view; (b) left lateral view.

Treatment objectives (7, 11).

- §Replace all missing teeth;
- §Preserve the present teeth and ensure their durability on the arch;
- §Restore occlusion and masticatory function at the correct vertical dimension;
- §Ensure esthetic integration by dissimilating the retention means.

Therapeutic choice.

Our therapeutic choice is simulated on the study casts by means of diagnostic casts mounting (Fig.6).

Given that it is in CI1 mod 1 and that the use of articulated extra-coronal attachments required the reinforcement of several teeth; we opted for a bridge at the maxillary level from the 13 to the 25 replacing the 24 with attachments and drillings.

At the mandibular level, we also chose to realize a bridge from the 34 to the 45 replacing the 31 and 41 with attachments and drillings.

These drillings took into consideration the conception of the future metal frame.

Two metal frames with sculpted teeth to support the attachments will be realized.

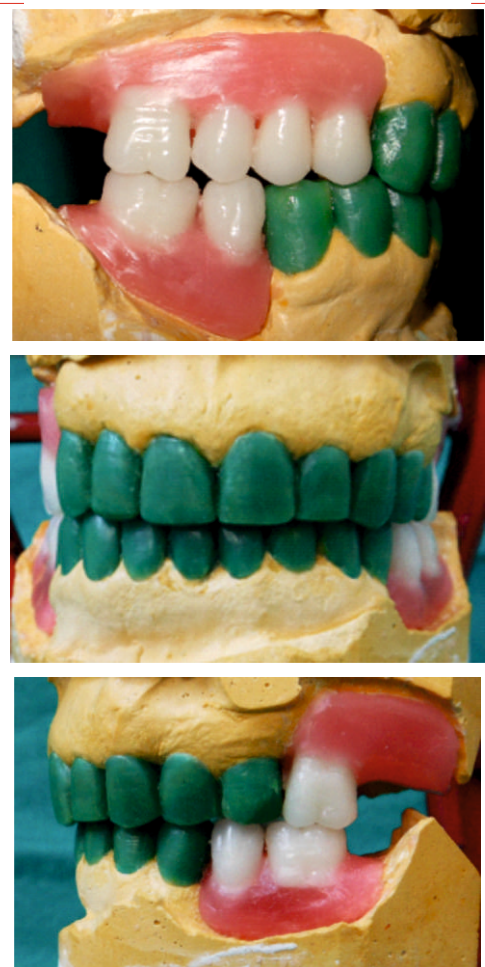


Fig 6: Simulation of the prosthetic project by means of diagnostic casts mounting. (a) right lateral view; (b) frontal view; (c) left lateral view.

Pre-prosthetic treatment

§The 24, 38, 31, 41 and 48 were extracted.

§Performing endodontic treatments on all teeth present on the arch except the 13 (already treated) (Fig.7).

§Coronal substance loss was substituted with inlay-cores at the 13, 12, 11, 21, 22, 23 and with an amalgam restoration at the 34, 33, 32, 42, 43, 44, 45, 25 (Fig.8, 9).

§Maxillary temporary bridge was realized (Fig.10).

§Mandibular temporary bridge was performed with a black hole at the pontic (Fig.11). It will play a healing role and will function as a guide for the soft tissues remodeling allowing the creation of pseudo-papilla and giving the illusion that emergence from the tissues as natural as possible and resembles that of the adjacent teeth (Fig.12) (13).

§Polymerization of the directing model and using it as a temporary Removable Partial Prosthesis (Fig.13).

Fixed and removable temporary prostheses allow to validate the prosthetic project and to test the retained occlusal scheme from an esthetic and functional point of view .

“The establishment of a physiologic occlusion in the patient candidate for complex restorations is generally considered during realization of the temporary prosthesis, ie, in the temporizing stage.” (15).

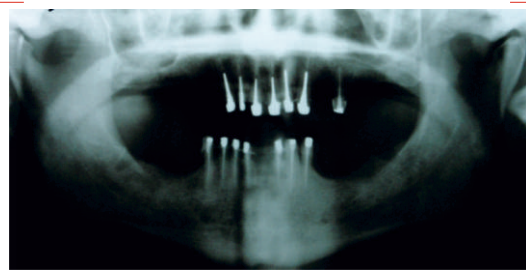


Fig.7: Panoramic radiograph presenting the pre prosthetic treatments.



Fig.8: Peripheral preparations and reconstructions at the maxillary level.



Fig.9: Peripheral preparations and reconstructions through the mandibular level.



Fig.10: Occlusal view of maxillary temporary bridge.



Fig.11: Frontal view of temporary maxillary and mandibular bridges in occlusion.



Fig.12: Mandibular temporary bridge after 21 days. We notice the disappearance of the black hole and the creation of the pseudo-papilla.



Fig.13: Polymerisation of directing montage.

Prosthetic stages of realizing composite prostheses

Stages of the of fixed prostheses realization.

§Taking the impression for the maxillary fixed prostheses silicone by addition in two times and two viscosities (Fig.14).

§Recording occlusion relationships using a model resting on the dental preparation and the edentulous crests.

§Mounting the maxillary cast on the articulator depending on the mandibular cast with temporary bridge (Fig.15).

To optimize the occlusion registration, the use of temporary prostheses allows to preserve and exploit the previously established and validated occlusal data (12,6).

§Constructing at the laboratory a metallo-resinous bridge from the 13 to the 25 with articulated extra-coronal attachments of Rhein 83R type.

Attachments of the selected system are manufactured in calcinable resin. They are incorporated directly into the model wax.

The prosthetist performed the drillings and took into account the conception of the future metal frame designed in advance by the dentist.

In fact, fixed prostheses must always be elaborated depending on the removable partial prostheses (7) (Fig.16).

§Taking the impression for the fixed mandibular prostheses with silicone by addition in two times and two viscosities (Fig.17).

§Recording the occlusal relationships using a model resting on the dental preparation and the edentulous crests.

§Mounting the mandibular cast on the articulator according to the maxillary cast with definitive maxillary bridge (Fig.18).

§Constructing at the laboratory a metallo- resinous bridge from the 34 to the 45. The wax model of the mandibular bridge containing articulated extra-coronal attachments and drillings always depends on the previous conception of the future metal frame.

§In case of a great extension bridge and in order to avoid any possible alterations, it would be better for the practitioner to validate the attachments positioning, the drillings quality and the morphology when it is still in wax (Fig.19).

§Trying the mandibular bridge in relation to the maxillary bridge (Fig.20).

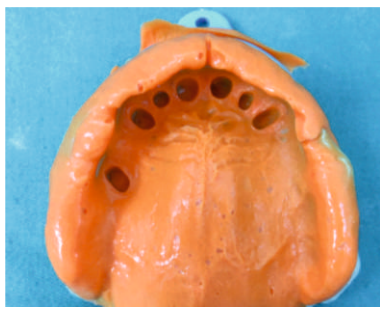


Fig.14: Impression of teeth preparations for maxillary fixed prostheses.



Fig.15: Mounting the maxillary cast on the articulator according to the mandibular cast with temporary bridge.

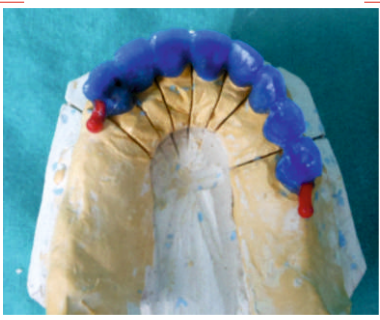


Fig.16: The model wax of maxillary bridge with attachments and drillings.



Fig.17: Impression of teeth preparations for the fixed mandibular prostheses.



Fig.18: Mounting the mandibular cast on the articulator according to the maxillary bridge.



Fig.19: The model wax of mandibular bridge with attachments and drillings.



Fig.20: Frontal view of bridges in occlusion.

Stages in realizing removable partial prostheses

The elements of fixed prostheses are numerous with the presence of delicate structures, their reproduction in plaster can be altered on the working cast.

A positioning impression (Fig.21) allows us to directly fabricate the metal frame on the fixed prostheses which will not undergo any alterations [3].

The impression was taken with the help of the individual tray with peripheral joint using heated thermoplastic paste and using Polyether (Imprégum ®) impression material.

§The bridges are in place when the frames are tested, controlled and then validated (Fig.22,23).

§At the mandibular level, it is necessary to perform a second impression. It is a sectorial anatomical and functional impression using the frame as a support. The frame was then equipped with resin saddle and the impression was taken with medium viscosity silicone.

§The cast was fractioned and new prosthetic saddles were prepared.

§Recording the intermaxillary relationships with the frames equipped with casting wax.

§ The prosthetic teeth were chosen according to the fixed restorations, ie, composite resin. It presents an attractive alternative between the PMMA which does not offer sufficient resistance to abrasion and ceramics that offers no absorbance to the occlusal shocks [6].

§ Occlusion was controlled and refined in the mouth, both on the static and dynamic occlusal surfaces.

§The female parts of attachments were placed, then the bridges were sealed with frames in place under the occlusal pressure (Fig 24-27). The excess of ciment was eliminated and recommendations for use were provided (5).

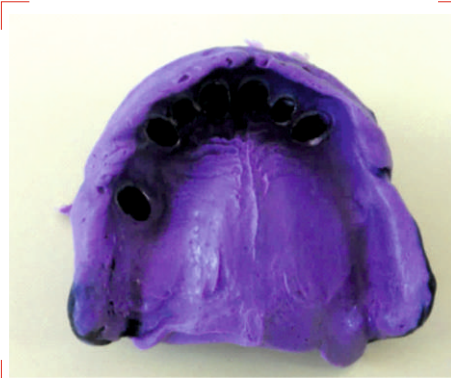


Fig.21: Maxillary positioning impression.



Fig.22: Occlusal view of the maxillary frame.



Fig.23: Occlusal view of the mandibular frame.

Conclusion

The analysis of the clinical case is paramount; this leads to a prosthetic project conception.

This project first undergoes validation by the temporary prostheses. The validated data must be reproduced on the definitive prostheses. Moreover, a reasonable choice of materials is essential for the therapeutic success.

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Fig.24, Fig.25: Lateral views of the final prostheses in the mouth



Fig.26: Frontal view of prostheses in occlusion

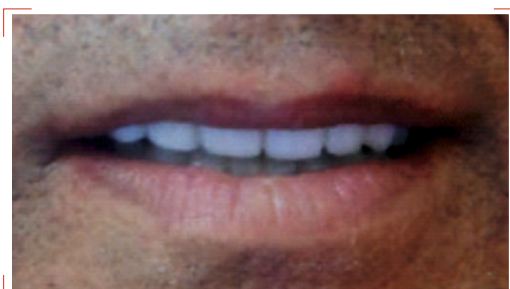


Fig.27: The final esthetic result



Success Story of a colleague beyond national borders



During his studies at Monastir's Faculty of Dental Medicine, 1983

Dr. Kais Chebbi

From Monastir to L.A

What a journey !!!

I still remember when I went back home in June 1992 from Paris where I spent two years of Residency at the "School of Dentistry of Paris VII – Garanciere" at the Department of Anatomy and Dental Morphology. I thought that I was ready to start a career as an assistant of Morphology with the head of Department Pr. Hechmi Bouslama (Dentistry Faculty of Monastir - University of Monastir - Tunisia), but shortly after I found myself attracted to another project which was getting the American experience in Dentistry.

That is how it started in October 1992, and then the next month I arrived in the U.S.A. in the State of Colorado. It was not an easy path to get the equivalence and practice Dentistry in the U.S., especially for a foreign graduate. It was very challenging as I have to go through many tests and exams before I get the license and start practicing. In September 1996, I finally got the equivalence and the License to practice Dentistry in the State of California. My final and fourth exam took place at the famous "School of Dentistry of San Francisco" at the University of the Pacific. Another important stop I made during my journey was the "School of Dentistry of Loma Linda" of California, where I acquired an extensive training and expertise in Restorative Dentistry.

Currently, I own a multi-disciplinary Dental Clinic in Los Angeles neighborhood, where I manage my practice and does Cosmetic Dental work only.

My team is composed of five Dentists who covered all aspects of Dentistry: Oral Surgery, Pedodontics, Orthodontics, etc...

I have been back home to Tunisia every year and I always enjoy the time I spend with my family and colleagues.

I can't wait to go back again soon...





Ongoing Training



QUIZ

What about Veneers ?

Assoc. Prof. Moncef Ommezzine



1 Esthetic project is used

- ☐ a. To make a mock-up
- ☐ b. Only to validate the mouth changes made through the wax-up
- ☐ c. With the mock-up as a guide for preparation to control thickness reduction
- ☐ d. Esthetic project together with silicone key for provisional prosthesis

2 Tooth preparation

- ☐ a. Must be limited to enamel
- ☐ b. Has an exact amount of 0.3 mm
- ☐ c. Is varied from one case to another
- ☐ d. Is varied in the same tooth

3 The thickness of ceramic veneers are

- ☐ a. 0.3 to 0.5 mm
- ☐ b. 0.5 to 0.7 mm
- ☐ c. 0.7 to 0.9 mm
- ☐ d. All of the above.

4 Which of the following describes ceramic veneers ?

- ☐ a. Thin porcelain shells that cover the front of our tooth
- ☐ b. A porcelain restoration that replaces the crown of one's tooth
- ☐ c. A filling for a cavity
- ☐ d. Thin porcelain shells that cover the lingual and buccal face of one's tooth

5 The incisor edge reduction of ceramic veneers is:

- ☐ a. 0.3 mm
- ☐ b. 0.5 mm
- ☐ c. 1mm
- ☐ d. 1.5 mm

6

The treatment of the etched ceramic veneers with a silane produce:

- ☐ a. Chemical bond
- ☐ b. Mechanical bond
- ☐ c. Enhanced ceramic/composite mechanical bond
- ☐ d. All of the above

7

The treatment surface of the ceramic veneers requires:

- ☐ a. Etching surface of the ceramic with hydrofluoric acid
- ☐ b. Etching the ceramic surface with phosphoric acid.
- ☐ c. Sandblasting with aluminate 250 um and 2 psi.
- ☐ d. Etching , silanate surface and adhesive.

8

The function of silane coupling agent:

- ☐ a. Is to increase the bonding strength of ceramic to composite resin
- ☐ b. Is to provide a chemically bonding to silane in both ceramic veneers and composite resin to increase tensile strength
- ☐ c. Is to increase the high compressive strength

9

The factors affecting a durable bond:

- ☐ a. Use of a ceramic that demonstrates a high mechanical strength.
- ☐ b. Good fit of porcelain restoration to dental substructure .
- ☐ c. Use of a good silane bond on the teeth enhancer prior to bonding.
- ☐ d. Use of appropriate resin with optimal proprieties.

10

The factors that influence color:

- ☐ a. Only the ceramic shade selected and the amount of opacity of resin luting agent.
- ☐ b. The original tooth color
- ☐ c. The thickness of enamel reduction
- ☐ d. The ceramic surface texture

11 Desirable features for luting material:

- ☐ a. Thin film thickness of 10 to 20 um
- ☐ b. Low tensile strength
- ☐ c. Ability to opaque tint and characterize
- ☐ d. High polymerization shrinkage

12 Ceramic veneers require:

- ☐ a. Deep finish line
- ☐ b. Rounded lines angles
- ☐ c. Subgingival finish line
- ☐ d. A simple path of insertion with no under-cuts

13 Ceramic veneers is used in:

- ☐ a. Highly fluoridated teeth
- ☐ b. Slightly malposition teeth
- ☐ c. Defective enamel
- ☐ d. Unsuccessful bleaching.

14 The final decision on whether or not to perform enamel reduction depends on :

- ☐ a. The color of the teeth to be veneered
- ☐ b. The relative position of the teeth in the arch.
- ☐ c. Ceramic translucency and strength
- ☐ d. Type of resin bonding.

15 The acid etching ceramic will be efficient with:

- ☐ a. Feldspathic ceramic
- ☐ b. Vitro ceramic
- ☐ c. Inceram zirconia ceramic
- ☐ d. All types of ceramic

16 The veneers are indicated for:

- ☐ a. Only maxillary central incisor
- ☐ b. Only maxillary incisor- canine groups
- ☐ c. Maxillary and mandibular incisor-canine groups and premolars.

17 To repair chips in our teeth, we need:

- ☐ a. Veneers
- ☐ b. Bonding
- ☐ c. Invisalign
- ☐ d. A and B
- ☐ e. None of the above

18 Veneers can be fabricated from different materials like

- ☐ a. Zirconia
- ☐ b. Alumina
- ☐ c. Composite
- ☐ d. Ceramic

19 A smile with misaligned front teeth can be corrected using:

- ☐ a. Braces
- ☐ b. Veneers
- ☐ c. Invisalign
- ☐ d. All of the above
- ☐ f. None of the above

20 If lingual retour is indicated, it will end

- ☐ a. Systematically in the occlusal third
- ☐ b. In the lingual concavity
- ☐ c. In convexity area like occlusal third and cervical third

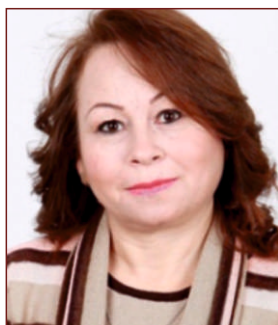
21 True or False ?

- ☐ a. Porcelain veneers are stain resistant.
- ☐ b. Porcelain veneers are one-size fits all.
- ☐ c. Porcelain veneers provide an alternative to crowns for the front teeth
- ☐ d. Each veneer will be custom-made.
- ☐ e. Veneers are usually not repairable once they chip or crack
- ☐ f. Porcelain veneers can make one's teeth whiter, but they cannot correct structural flaws.
- ☐ g. The veneers are extremely fragile and difficult to manipulate
- ☐ h. The bond of the etched porcelain veneer to the enamel surface is considerably stronger than any other veneering system.
- ☐ i. The ceramic veneer can be easily repaired once they are luted to the enamel.

1. a, c, d / 2. c, d / 3. d / 4. a / 5. d / 6. a, c / 7. d / 8. a / 9. b, d / 10. b, d / 11. a, c / 12. b, d / 13. b, d / 14. a, b / 15. a, b / 16. c / 17. d / 18. c, d / 19. d / 20. c, d / 21. a, b, c, d, e, f, g, h, i, f



Institutions and Associations Space



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Head of the research laboratory

Editor-in-Chief of "Tunisian Dental News"



LABORATOIRE DE RECHERCHE EN SANTÉ ORALE ET RÉHABILITATION BUCCO-FACIALE

LABORATORY OF RESEARCH IN ORAL HEALTH AND MAXILLO-FACIAL REHABILITATION

مخبر بحث في صحة الفم و تأهيل الوجه و الفكين



- LR12 ES 11-

RESEARCH THINK TANK

Dear colleagues, this is a call for innovative ideas
For all dental medicine professionals

E-mail: revueato@gmail.com



Pr. Samir Tobji

E-mail: samir.tobji@gmail.com

ATORECD President

First Vice-President of the Tunisian National Council of the Order of dentists

Head of the research team 1

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Responsible: Pr. Jamil Selmi

Members of Axis 1 : Pr. Hajer Hentati – Assoc. prof. Sameh Sioud – Dr. Chokri Abdellatif

Axis 2: Precocious, rapid and invisible orthodontics

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Members of Axis 2: Assoc. prof. Nedra Kheder – Dr. Ines Dallel – Dr. Saloua Ben Rejeb

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Institutions and Associations Space



ATREO

Tunisian Association of Orthodontics Research and Studies



Pr. Adel BEN AMOR
ATREO chairman

ANNUAL ACTIVITY REPORT

On March 29-30, the 2nd International Francophone meeting in Orthodontics was organized by the Tunisian Association of orthodontics research and studies, ATREO (Association Tunisienne de Recherches et d'Etudes en Orthodontie) in partnership with the French Society of Orthodontics, SFODF (Société Française d'Orthodontie Française) and in the presence of professionals in the field. This event gathered the flagship of Francophone orthodontics from different parts of the map: Africans, Maghrebians, Europeans and Mediterraneans in the presence of the Dean of the faculty of Dentistry of Monastir, president of the Tunisian Board of Dentistry, president of the SENAME, president of the SFODF as well as the permanent secretary of the French Academy of Oral Surgery. The latter awarded the Academy medal to Pr. Jean Jacques Aknin and Pr. Adel Ben Amor, head of the Orthodontics Department of the Faculty of Dental Medicine of Monastir and president of the ATREO.

On this occasion, Pr. Adel Ben Amor was unanimously elected by his international colleagues as president of the International Francophone College of Orthodontics, CIFO.

A pre-congress day was allocated to research within the activities of the Laboratory of Research in Oral Health and Maxillofacial rehabilitation « Laboratoire de recherche en santé orale et réhabilitation bucco-faciale » (LR12ES11). In this event, workshops were organized to provide practical training on anchorage miniscrews and invisible orthodontics for dentists and assistants.

Four e-poster sessions were organized for the residents and assistants. Four prizes were awarded to residents:

Dorra Sediri (Ortho.), Wiem Marouane (Ortho.) & Sondes Kalai (OMS) as well as Mrs. Samia Ayachi, Hospital University assistant in the department of Maxillo-facial Surgery, Sahloul Hospital – Sousse.

Twenty eight internationally renowned speakers covered the themes of esthetics, interception, publishing, sleep apnea in children, lingual orthodontics and rapid orthodontics.



Laboratory of Research in Oral Health
and Maxillofacial rehabilitation day.



2nd International Francophone meeting in
Orthodontics : a full house.



Institutions and Associations Space



Pr. Adel Ben Amor : President of the ATREO
Pr. Neila Zokkar - Pr. Anissa Zinelabidine



Opening Ceromony of the 2nd International Francophone meeting in Orthodontics :
Left to right : Pr. Ali Ben Rahma - Pr. Gilberto Sammartino - Pr. Michel Jourde - Pr. Jean Jacques Aknin - Pr. Adel Ben Amor - Dr. Faouzi Chelly



Pr. Faten Ben Amor - Pr. Michel Limme - Pr. Samir Tobji - Pr. Alain Bery with Pr. Birte Milsen, honor guest of the 2nd International Francophone meeting in Orthodontics

ATREO Posters Awards



On the left : Dr. Nidhal Romdhani (Medical English Award) - Orthodontics Departement of Monastir
On the right : Dr. Wiem Marouen (Orthodontics Departement of Monastir)



In the middle : Dr. Dorra Sediri
(Orthodontics Departement of Monastir)



Dr. Sondes Kalai
Oral surgery - Dental Medicine Departement
Sahloul Hospital - Sousse, Tunisia



Institutions and Associations Space

ATEDEC

The Tunisian Academy of aesthetic
and surgical dental Study



Dr. Khaled AOUADI
ATEDEC chairman

Smile Design Through The Tablet, 2 Days Course & Hands-on
2-3 Mai 2014, Regency Hotel Gammarth-Tunisia



The time and strength have surely been devoted in a variety of ways during a tiring, but undeniably worthwhile, process of preparation to finally set up and launch into the work inside "The Tunisian Academy of esthetic and surgical dental Study. The ATEDEC is an association created by young dentists to promote the continuing education of dental practitioners and to provide them with up-to-date evidence-based protocols and techniques in different specialties as in interceptive orthodontics, cosmetic dentistry, filler injections, periodontics, etc ... And as we've always been willing to serve as the vehicle for the diffusion of all trailblazing innovations in the field of dentistry; we managed to organize another new dental training course, on the 2nd and 3rd of May 2014, about "boosting communication, efficiency and clinical performance through iPad and Applications" that took place in the "Regency Hotel" in Gammarth-Tunis, with Dr. Mario Lamburgia who graduated with honors in Dentistry at the University of Palermo, where he also earned his PhD degree in Periodontology. Dr. Lamburgia is an assistant Clinical Teacher at the University of Warwick, a member of the International Academy for Dento-Facial Esthetics, a national and international lecturer and the author of the book "iPad for dentists: digital communication for patients and team" not to mention some great scientific papers published in national and international journals. Mainly, the course offered the participating dentists a chance to go in for a wholly new and upwardly desired method for digital planning that invited them to familiarize with the use of esthetic previews and smile designing techniques in prosthetics and implant dentistry. Bringing this new approach of smile designing into their daily practice will allow clinicians to genuinely improve the communication with the rest of their team members by actively sharing a digital mock-up. This process increases, without fail, the predictability of the esthetic result of the restorations in the esthetic zone and therefore optimizes the clinical performance of the entire dental team while running an amazingly smooth communication with the patient.





ATORECD

The Tunisian Dental Association of Researches and Studies in Surgery and Pain (ATORECD) is a scientific association based at Monastir's Faculty of Dental medicine. Its objective is to share knowledge at the national and international levels. Since its creation, the association has opened up to international dentistry with a frequency of one congress every two years or even annually. The first ATORECD congress was francophone; the second Mediterranean; the third Tunisian-Hispanic; as for the fourth event, it was Tunisian-Belgium. The last one was a mega congress which united keynote speakers from all over the world in partnership with the SENAME. It was held at Hammamet on the 27th-28th and 29th of September 2013. Be sure not to miss the next event which will be Tunisian-Italian in Mahdia on the 13th & 14th of February 2015.

ATORECD holds its elective meetings every three years. Therefore, three presidents have administered the ATORECD since its creation in 2006. A new space for the juniors was founded during the meeting of 2012: ATORECD Junior.

The cooperation with international associations such as the ICOI, SENAME, DENTAL XP, SFMBCB, JEMO, PADI having been achieved, our greatest pride is building a close collaboration with the national associations and all the Tunisian hospital university dental medicine departments.

The Tunisian Dental News journal is an open space for all publications from all the dental medicine professionals. We work together for the progress of our profession as well as the ongoing professional development.

Bulletin d'Adhésion à l'ATORECD et à la Revue ATO

☐ Oui, je souhaite devenir membre de l'ATORECD

25 DT

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