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Innovation in dental practice is indispinsible. The difficulty in getting the precise measurements in aesthetic dentistry has lead to a lot of "thought process". One result of such thought process is Chu's Aesthetic Gauges designed by Dr. Stephen J. Chu, which are designed to help the dentist diagnose tooth size discrepancies, measure them accurately and correct them appropriately. Present armamentarium for such diagnosis consists of calipers, millimeter rulers and polymer-based surgical templates. Chu's Aesthetic Gauges are designed to replace the present armamentaria allowing fast, simple analysis and diagnosis of tooth width and/or length problems as well as gingival length discrepancies.1

The Chu's Aesthetic Gauges come in three types with three different functions:

1. Proportion Gauge: This helps in measuring the length and width simultaneously, proportionately, quickly, easily. This also can be used as a standard reference guide between laboratory and the dentist.

2. Crown Lengthening Gauge :A color coded instrument aids in achieving the "biological width" during the crown lengthening procedures as well as in achieving the mid-facial clinical crown. Positioning of the interdental papilla aesthetically in relation to the incisal edge prior to flap suturing becomes much easier with this instrument.

3. Sounding Gauge : Interdental and mid-facial osseous crest location determination is the aid given by this guage, which is of prime importance in aesthetic crown lengthening.[1]

In conclusion , the invention of the Chu's aesthetic guages brings a new dawn in the field of aesthetic dentistry. with further modifications these instruments will revolutionalise the clinical dentistry.[1]

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An Innovative Three Part Prosthetic Rehabilitation of Class -1V Facial Defect: A Clinical Report

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ABSTRACT:

Loss of maxillo facial structures due to neoplasm or trauma, accidents gives inconsolable mental, physical and psychological agony to a person's dignified life in his living society. Surgical reconstruction was not feasible for all cases and certain cases needs prosthetic rehabilitation. In this clinical case report, an innovative simple three part maxillo orbital prosthesis fabrication using magnets was explained.

Key-words: maxillofacial prosthesis, Facial defects

INTRODUCTION

Replacement of body parts especially facial structures evolved since human civilization emerged with ancient Egyptians. Various materials like earthen ware, bronze, precious stones, ivory etc were used by them. Modern materials came into evolution only after Second World War. Since then the materials and methodology used in maxillo facial rehabilitation have grown exponentially.

Squamous cell carcinoma of maxilla invading and penetrating the floor of orbit often requires complete hemi maxillectomy and exenteration of the affected side. Orbital exenteration was a psychologically and anatomically disfiguring procedure reserved for the treatment of potentially life threatening malignancies or relentlessly progressive conditions unresponsive to other treatments1. The physical agony suffered by the patient during early surgical phase and the mental and psychological agony suffered by him at the later stages cannot be underemphasized. The added difficulty due to hemi maxillectomy greatly enhances his agony due to loss of masticatory function. The prime need for these cases requires surgical reconstruction but was not practically feasible for all cases due to systemic or psychological contraindication and so requires meticulous prosthetic rehabilitation. Rehabilitation of

these cases involves good coordination among ophthalmologist, plastic surgeon, oncologist, prosthodontist, dietician, physiotherapist, specialist nurses, speech therapist and dental technician.[1, 3]

Even though various materials were in use, acrylic and silicone still remain as the popular ones. But methodology became so advanced as developments in computerized three-dimensional (3D) data processing has lead to the fabrication of wax pattern without traditional impressions using CAD/CAM/CNC milling machine and Rapid Prototyping 3D systems [4,5] . Drawbacks of these sophisticated methods are that they are not available in most of rural places and are also costly to fabricate.

Even though various methodologies[3] including implants had been discussed in various literatures for fabrication of maxillo orbital defect, the need for a simple procedure always exist. The aim of this article was to present one such simple and economical method of three part maxillo orbital prosthesis fabrication using magnets [6, 7]. A dual combination of acrylic and silicone was used in this study to absorb and distillate the advantages and disadvantages of **acrylic and silicone materials.**

CASE REPORT

A fifty year old male patient reported to Vinayaka Mission Dental college, Salem, India, with complaints of missing eye and maxillary jaw on left side. Case history revealed that exenteration of left orbit with left hemi maxillectomy was performed due to squamous cell carcinoma of left maxilla invading the floor of orbit. Right maxilla was dentulous and mandible was partially edentulous. Typically it was found to be a Class 1V orbital defect1. Patient's systemic condition was healthy.

Fig 1:Pre-operative view

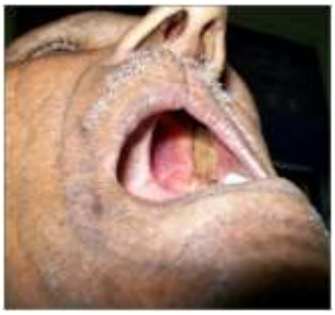

Fig 2: Pre-operative view (intra-oral view)

A three part maxillo orbital prosthesis was planned for this patient 6. The three parts constitute a) maxillary part, b) obturator part, c) Orbital part.

Procedure of Fabrication

Part-1 –Fabrication of obturator part

A preliminary impression of maxillary defect was made using silicone putty rubber base (Express STD, 3M ESPE, St Paul, MN) on edentulous stock tray. Care was taken to ensure that the material extend up to the floor of orbital defect. After the material has set and with the tray in patients mouth, white petroleum jelly (Vaseline, Hindustan Unilever, Mumbai, India) was applied on putty base representing the floor of orbit.

Now impression of orbital defect was made separately using putty, contacting the putty on the floor of orbit. After the material has set, the two parts were removed separately, re oriented outside the **mouth.**

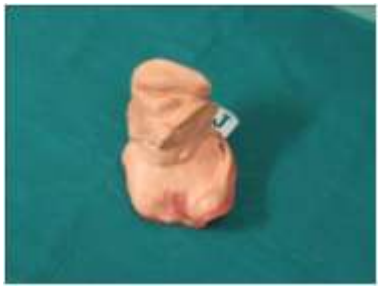

Fig 3

(Fig-3), beading boxing was done and cast was poured in dental stone (Kalabhai stone, Kalabhai Karson Pvt Ltd, Mumbai, India) extending slightly below the floor of orbit. After the dental stone has set, separating medium (Deepti Dental Products of India Pvt Ltd, Ratnagiri, Maharastra, India) was applied and now second pour representing the orbit was prepared. After the two parts are set completely, they are separated and verified for re orientation. The obturator cast part was now taken and undercuts are blocked out with dental plaster (Kalabhai plaster, Kalabhai Karson Pvt Ltd, Mumbai, India). A 0.5mm thin modeling wax sheet (Modeling Wax, Deepti Dental Products of India Pvt Ltd,) was taken and uniformly adapted along the walls and roof. Later auto polymerizing acrylic resin(DPI-RR, Dental Products of India Ltd, Mumbai, India) was flowed about 1 mm in all three surfaces (medial, lateral and roof). After acrylic has set, the palatal opening was closed with autopolymerizing acry**lic lid made by roll on method.**

Fig 4

Two acrylic cones (Fig-4) were attached on the outer surface for stabilization during processing. Later the entire assembly was flasked, dewaxed , packed with reinforced heat cure acrylic resin (Acrylin-HI, Asian Acrylates, Mumbai, India) and processed by conventional method. After processing, the acrylic cones were trimmed flat. The finished obturator gives a truncated pyramid appearance.

Attaching magnets

A 3mm high elliptical autopolymerzing acrylic ramp was created on the palatal part of hollow bulb obturator using modeling wax (Deepti Dental Products of India Pvt Ltd). Commercially available dental magnets (Omega Electronics, Ritchie St, Chennai, India) with 3 mm diameter and 2 mm thick were selected. Two holes are drilled on the acrylic ramp to freely accommodate the magnets. After the fit was verified, they were fixed with autopolymerizing acrylic resin. Care

was ensured that magnets surface flush with the surface of ramp. Finally the obturator was tried in patient's mouth and kept aside.

Part-2: Fabrication of denture part

Maxillary complete denture and mandibular partial denture was fabricated for this patient. All the procedures remain the same like processing a conventional maxillary complete denture versus mandibular removable partial denture. Before the maxillary primary cast was utilized for the fabrication of hollow bulb obturator, an acrylic special tray with wax spacer was fabricated. Border molding was done with low fusing compound (Tracing Stick, Dental Products of India Ltd), wax spacer removed; excess acrylic versus ramp area was removed. Later two ferro magnetic keepers (Omega Electronics) of same size are attached to the respective magnets on hollow bulb obturator and medium body elastomeric impression material(Express, 3M ESPE, St Paul, MN) loaded on special tray and definitive impression of maxillary arch was made (Fig-5).

Fig 5

After the material has set, tray was removed, obturator part was detached along with the keeper and master cast of maxillary arch was prepared in dental stone (Kalabhai Karson Pvt Ltd). Mandibular primary impression was made with irreversible hydrocolloid (Tropicalgin, Zhermack, Rovigo, Italy) and using acrylic special tray, a dual impression was made with zinc oxide eugenol impression paste (DPI Impression Paste, Dental Products of India Ltd) and irreversible hydrocolloid. Denture base was fabricated, bite blocks prepared, jaw relations recorded, wax trial verification done and dentures processed by conventional methods.

Finished dentures are tried in the mouth. The palatal surface of finished maxillary denture has two hollows to fit the keepers. The hollows are slightly enlarged to freely accommodate the keepers. Keepers are attached to the magnets on obturator which was inserted in the defect. Hollows on maxillary denture are filled with auto polymerizing acrylic resin (DPI-RR, Dental Products of India Ltd) and inserted in mouth against the obturator. After acrylic has set, when the maxillary denture was removed, the obturator comes out of mouth along with the denture. Now onwards the maxillary part and obturator part can be attache**d and detached at will (Fig-6).**

Fig 6

Addition of soft liner:

About 1mm of acrylic was uniformly trimmed from the surfaces of obturator which comes in contact with tissue. Later obturator was attached to maxillary denture. Soft permanent liner (UFI-GEL-P, Voco GmbH, Cox haven, Germany) was mixed and coated uniformly on the obturator as per instruction and inserted in the defect. Set assembly was removed after 15 minutes, excess trimmed and polished.

Part -3 Fabrication of orbital part

First, soft lined obturator with maxillary complete denture was inserted in the maxillary defect (Fig-6).

Fig 7

Then mandibular partial denture was inserted in the mouth. Patient was made to sit upright in dental chair comfortably. Light body rubber base elastomeric impression material (Express Light, 3M ESPE) was loaded in cartridge and injected into the peripheral and anterior half part of orbital defect and recorded. When the material was partially set, stapler pins are inserted for retention .Impression compound (DPI-Pinnacle, Dental Products of India Ltd) was adapted over rubber base for stabilization and wet gauze adapted over it to hasten setting. Set assembly was removed intact. The orbital impression was boxed and poured in dental stone. Orbital cast was separated after it has set. Pre fabricated eye shell matching the patient's opposite color and congruence was selected, set in wax pattern taking care to match with the interpupillary and naso canthal lines of opposite eye. Wax pattern was neatly carved to duplicate the skin contour and wrinkles. Orbital wax pattern was then tried on patient's orbital defect.

After satisfactory results were obtained with the orbital wax pattern, the assembly was flasked, dewaxed and after daylight color matching with patients face, packed with medical grade silicone (COSMESIL M511, Principality Medical Ltd, New Port, South Wales, U.K) kept for room curing for 36 hours and removed later . Set silicone prosthesis was trimmed, finished and polished.

Finished orbital prosthesis was inserted in the orbital defect and was retained by favorable anatomical undercuts and reinforced by silicone adhesives (COSMESIL G601, G602, G603, G604, Principality Medical Ltd) (Fig-8).

Fig 8

Matching colored spectacles as per patient's wish and esthetics can be given. Patient was given post insertion instruction regarding good maintenance and care.

DISCUSSION

Rehabilitation of acquired maxillofacial defects of patients remains a challenging task for the specialists especially the prosthodontist when surgical reconstruction was not feasible due to general medical contraindication, age, anatomical and surgical limitation, cost, patient's fear factor/psychology etc. This article presents one such simple, nonsurgical, economical, time saving and convenient method of fabrication of a three part maxillo-orbital prosthesis using magnets. The three parts denotes maxillary complete denture, hollow bulb obturator and orbital part. Complete denture was fabricated using heat cure acrylic resin, hollow bulb part made of auto polymerized acrylic resin on the inner side and heat polymerized acrylic resin on the outer side and the whole assembly lined with a soft permanent liner and orbital part was made of medical grade silicone.

The great advantage of this three part prosthesis was that all the three parts can be removed independently of each other[6]. Maxillary complete denture was made of reinforced acrylic resin which provides superior quality, hollow bulb obturator provides good speech resonance and was of light weight, detachable magnetic attachment between complete denture and obturator provides good retention, the soft permanent liner over the obturator provides cushioning effect on the surrounding maxillary tissue defect. No part of obturator which contains auto polymerizing acrylic resin comes in contact with tissue. The orbital definitive impression procedure was different from conventional methods in that there was no need to record the complete orbital defect but records only the peripheral and anterior half part. Recording the orbital apex part was needless as the prosthesis was seated only by engaging the favorable orbital undercuts **this** also reduces prosthesis weight, tissue trauma and irritation to the patient. Patient does not experience any difficulty during mastication and chewing function. The prolonged room temperature curing time of 36 hours for silicone can be reduced to 1 hour by heating in 1000 C water bath as an alternative as per manufacturer instruction. This saves time.

But we also need to discuss some disadvantages of this method. The magnetic alignment between opposing poles must be exact with no dead space between them which reduces retentive force[6, 7]. Candidal inhabitation and adherence on obturator soft liner was a drawback but minimal when compared to direct exposure to oral fluids1. This occurrence can be further minimized by proper antifungal treatment regime. Finally as with the other silicone prosthesis, this orbital prosthesis has guarded color stability and durability[1] but provides good blending with surrounding facial tissues. So research continues in search of that elusive material which provides superlative qualities.

CONCLUSION

Fabrication of the maxillofacial prosthesis is a time consuming labour intensive, artistic job. The art of replacing a missing facial defect has been carried out for many years and can be a stock or a custom made prosthesis. Loss of maxillofacial structures due to neoplasm, trauma or accident gives inconsolable mental, physical and psychological agony to a person's dignified life in his living society. Surgical reconstruction was not feasible for all cases and certain cases needs prosthetic rehabilitation. The technique presented here provides a three piece orbital prosthesis of light-weight. This promotes the physical and psychological healing for the patient and improve social acceptance. Thus the accumulation of positive effect as a result the use of the orbital prosthesis for a disfigured face has undoubtedly improved the quality of life of the patient.

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Ceramic veneer design and cementation

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ABSTRACT:

Ceramic veneers are often thought of as utilized for esthetic correction. Yet, they can also be utilized to correct structural issues with the teeth that in the past would have necessitated use of full coverage crowns thereby conserving more tooth structure. We will discuss a case where the patient presented with esthetic concerns and was unaware of the structural issues present on the teeth.

Key-words: Veneer, porcelain Veneer.

INTRODUCTION

A 94 year old female and long time patient of the practice presented for recall prophylaxis appointment and commented she was ready to improve the esthetics of her anterior teeth which had been discussed multiple times during her time with the practice. Examination revealed an edge to edge anterior occlusion with wear to the incisal edges. Additionally, a stained vertical crack was noted running vertically down the facial of the right central incisor and continuing to the mid lingual of that tooth, the left central incisor had a missing composite on the mesial-incisal with recurrent decay. Minor abfraction lesions were noted on the maxillary central incisor and left lateral incisor with some recurrent decay on the cervical restoration on the left canine. (figure 1) Cupping of the lower incisal edges was present with a thin wall of enamel at the incisal and discoloration of the exposed dentin. Periodontaly, probing was within normal limits (1-3mm) with no bleeding on probing or mobility noted. Existing fixed prosthetics was present on the teeth distal to the right lateral incisor and left canine. These had no marginal issues so it was decided to not include these teeth in the treatment plan to keep the treatment fee in the patient's budget.

Discussion with the patient regarding improvement in the esthetics as she requested resulted in two potential

treatment options; porcelain veneers on the right lateral incisor through the left canine or full coverage crowns on these same teeth. Porcelain veneers would be a more conservative option achieving the patients esthetic demands and conserve more natural tooth structure then full coverage crowns. Several options are available for the ceramic the veneers could be fabricated from, including: feldspartic, Lithium Disilicate or zirconia bases ceramics. The author selected Lithium Disilicate as this would allow bonding of the veneers to the tooth structure, not possible with zirconia but provide a stronger restoration then feldspartic porcelain. Additionally, Lithium Disilicate available as e.Max (Ivoclar Vivadent, Liechtenstein) would permit a more translucent and natural looking result similar as to what can be achieved with feldspartic porcelain and not have the opaque issues typically seen with zirocnia based restorations.

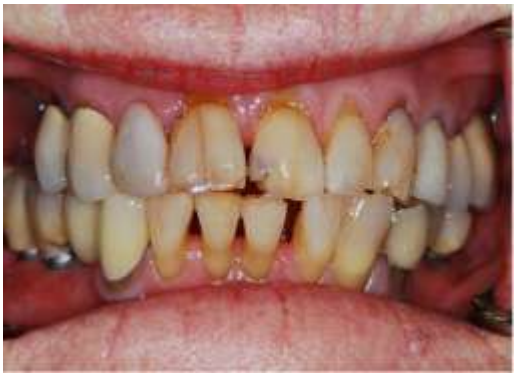

Figure 1:Note :- The vertical fracture lines with associated discoloration on the maxillary central incisors, cervical recession in relation to central incisors , left lateral incisor and canine with root caries. Incisal wear i.r.t teeth 8 to 11 and the patient , the edge to edge anterior occlusion.

As the lower anterior teeth were slightly flared facially it was decided to even the incisal edges of the lower anterior's eliminating the unsupported enamel edges and create a facial bevel to the incisal edge to help create anterior guidance in the final restorations. Impressions were taken in full arch trays using a medium body VPS (Correct Quick, Pentron Clinical Technologies. Orange, CA) and models poured. (figure 2) The teeth to be veneered were then cut back at the facial incisal edge and expired composite was utilized to "wax" the teeth to ideal contours and achieve a more natural looking anterior occlusion with slight overjet and overbite. (figure 3) A clear stent was fabricated on the modified maxillary model using TempSpan Clear VPS (Pentron Clinical Technologies).

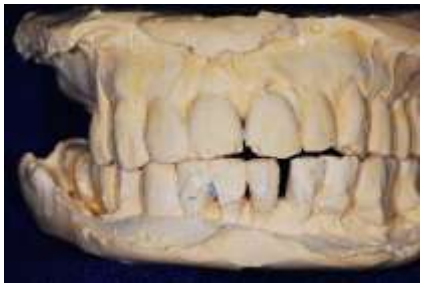

Figure 2: View of the master models prior to treatment demonstrating an edge to edge anterior bite on the central and lateral incisors and left canine.

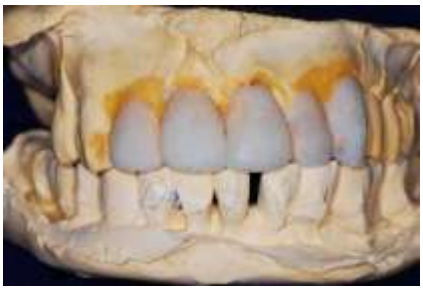

Figure 3: Wax up prior to veneer preparation on a study model to blueprint the desired esthetics with regard to incisal length and facial contour,

Figure 4: IPS e.max veneers (Ivoclar) fabricated on the master model and this material was selected for improved masking of the underlaying discolored tooth structure and higher strength then feldspartic porcelain would afford.

Local anesthetic was administered and the teeth were prepared in the maxillary arch with a veneer design that passed through the proximals creating a finish line ending on the lingual surface. This proximal placement of the finishing line on the lingual creates some mechanical retention to the veneer preparation, is easier for the lab technician to fabricate the veneer and facilitates finishing at veneer placement. Additionally, should any marginal staining occur the stain is positioned lingually where it can not be viewed by the patient or those they socially interact with. The incisal finish line was placed on the lingual at the junction of the incisal and middle 1/3 of the tooth. The overall design is similar to a ¾ crown preparation and will provide mechanical retention and is the authors preferred preparation design when veneering anterior teeth that present with proximal decay, existing restorations or have proximal spacing that needs to be corrected.

Following a final full arch impression using a medium body VPS (Correct Quick) and Correct Plus Thick-N-Thin fast set (Pentron Clinical Technologies) in a full arch tray an interocclusal record was taken with Correct Quick Bite registration VPS. A shade was selected to match the crowns present in the maxillary posterior. Next, the clear stent fabricated from the “wax-up” was filled with TempSpan provisional material (Pentron Clinical Technologies) and inserted over the prepared teeth. A light was used to cure the provisional material through the clear stent to create a “shrink wrap” provisional without the need to spot bond as the material locks interproximally. After waiting 4 minutes for the provisional

material to complete its self-cure cycle the clear stent was removed and any marginal flash was removed with a finishing bur and the provisional was polished intraorally with a prophy cup and diamond polishing paste.

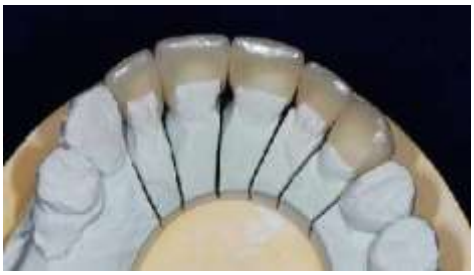

Figure 5: Lingual view of the IPS e.max veneers on the master model demonstrating margin placement interproximally and incisal wrap. Placement of the interproximal margins on the lingual makes lab fabrication easier as well as finishing for the practitioner plus any future marginal staining will be in a non-aesthetic area.

Figure 6: Facial view of the IPS e.max veneers demonstrating variation in shading from the cervical to incisal to provide a natural esthetic appearance.

The restorations were returned from the laboratory and examined on the models for fit and esthetics. (figures 4-7) The patient presented and no anesthetic was used at this appointment as minimal tooth preparation would be performed at the seating appointment. A needle diamond was used to make a small cut interproximally and a scaler and the provisional was “flicked” off in sections. The preparations were then cleaned using pumice and a prophy cup then thoroughly rinsed and dried. Cotton rolls were placed in the vestibules to isolate the teeth. The veneers were filled with Mojo veneer try-in paste (Pentron Clinical Technologies) in clear and tried in and checked for fit and esthetics intraorally. The patient was shown a mirror and approved the esthetics. The veneers were removed and the try-in paste rinsed from the veneers and they were dried. The preparations were then acid etched with a 37% phosphoric acid gel for 20 seconds then rinsed and dried. The internal surface of the veneers had silane placed for 60 seconds then air dried. Bond1, a 5th general dentin adhesive (Pentron Clinical Technologies) was applied to both the preparations and the internal of the veneers and not light-cured at this time. Mojo resin veneer cement in clear was placed into the veneers and they were seated. Upon seating a brush wetted with Bond1 adhesive was used to wipe away any excess resin cement at the margins to make

finishing easier. Each veneer was spot cured with a light at the middle of the veneer for 40 seconds, which was followed by application of the light at the proximals for 40 seconds each then the lingual for 40 seconds. A number 12 scalpel blade was used with care to remove any marginal flash and floss was run interproximally to remove any residual resin. A 12 bladed finishing carbide was used in a highspeed headpiece with profuse water to smooth the gingival margins. Occlusion was checked and football shaped finishing diamond used on the lingual to adjust any occlusal spots in centric as well as excursive movements. The final polishing was accomplished with diamond polishing paste in a prophy cup. (figure 8)

Figure 7: Lingual view of the IPS e.max veneers showing an etched internal surface for optimized bonding.

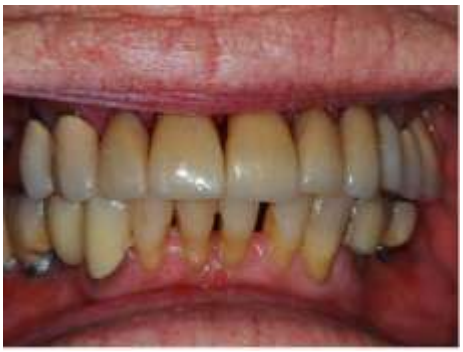

Figure 8: The IPS e.max veneers were silanted for 60 seconds then air dried then Bond1 total-etch adhesive (Pentron) was applied to the internal surface of the veneers. Next, Mojo try-in paste in shade dark (Pentron) was placed into the veneer and inserted on the preparation and shade match with the lower anterior teeth was confirmed. The try-in paste was removed from the interior of the veneers using an instrument. The teeth were acid etched then rinsed and dried. Bond1 adhesive was applied to the teeth and shade dark Mojo resin cement (Pentron) was placed and the veneers were inserted on the preparations. Excess resin cement that expressed at the margins was removed with a brush tip wetted with Protect-It composite surface sealant (Pentron) and the veneers were light-cured for 60 seconds each from the facial then 60 seconds each from the lingual. The margins were finished using to remove any excess flash of resin cement. Occlusion was checked with Accufilm II (Parkell) in centric occlusion as well as protrusive and lateral excursions. Fini finishing disks (Pentron) on a slowspeed handpiece in fine and extra fine were used at the margins then followed by a rubber cup and diamond polishing paste. Shown is the smile immediately following placement and finishing of the veneers.

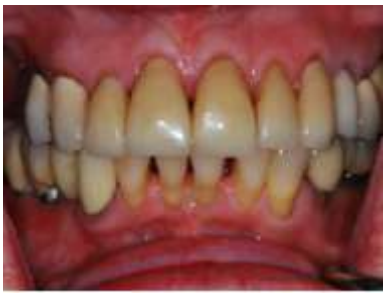

Figure 9: The patient was asked to return after two weeks to check the marginal soft tissue and verify the occlusion. Soft tissue demonstrates firm tone with a lack of inflammation and absence of bleeding on probing. The edge to edge occlusion present in the anterior prior to treatment has been corrected by building the teeth facially and incisally to provide a more esthetic appearance.

Figure 10: The patient showing a more youthful smile with better esthetics through the use of IPS e.max veneers.

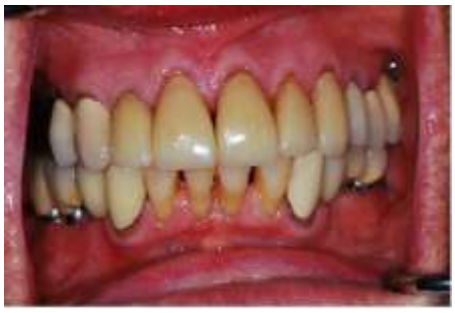

Figure 11: 18 months post insertion, the veneers remain stable and gingival tissue healthy. The incisal of veneer on the right lateral incisor was shortened 2 weeks post insertion for better esthetics.

The patient was asked to return after 2 weeks to check the occlusion and marginal gingiva. (figure 9) She expressed that she was happy with the esthetics and the occlusion felt comfortable. (figure 10). The patient maintained regular six month recall prophylaxis appointments and at 18 months post insertion the veneers continue to demonstrate great service with no chipping, cracks or marginal issues. The gingiva remains healthy with no inflammation or bleeding on probing with a stable occlusion and no drifting of the anterior teeth creating spaces between the veneers. (figure 11).

DISCUSSION:

Ceramic veneers are often thought of as utilized for esthetic correction. Yet, they can also be utilized to correct structural issues with the teeth that in the past would have necessitated use of full coverage crowns thereby conserving more tooth structure. These structural issues may include; defective old direct restorations, chips,

cracks and wear of the anterior teeth. Longevity of our restorations, specifically direct bonding or lab fabricated veneers is dependant on conservation of tooth structure to provide margins on enamel as bonding to enamel is more predictable long term the solely to dentin. Additionally, teeth maintain higher strength if we can preserve dentin especially in the cervical of the maxillary anterior teeth. Thus a veneer may show fewer issues long term then if the tooth had received a full coverage crown.

CONCLUSION:

Esthetics can be a concern for patients and is not age dependant. Porcelain veneers can be a conservative method to both improve esthetics as well as correct structural issues with the anterior teeth.