A Hollow Bulb Obturator With A Partial Denture - A Case Report

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Abstract :

A patient with the chief complaint of an ill-fitting prosthesis reported to the Department of Prosthodontics. Considering her socio-economic status as well as her aesthetic and functional needs, the treatment plan formulated for the patient was a maxillary "Hollow Bulb Obturator" with a partial denture.

Introduction :

Deformities of the oral and facial structures may be classified under congenital deformities such as cleft palate and hare lip and acquired deformities such as war injuries, accidental injuries and radical disfiguring surgery of tumors undertaken in an effort to obtain better survival rate. Following such tumor surgery, the prosthodontist is called upon to play a major role in patient rehabilitation. Patients with these deformities present various problems, both physical and psychological and should be handled with utmost care. In the practice of maxillofacial prosthetics, the patients needs must be considered from a rehabilitative standpoint. The history of present illness is of a more direct concern
from the standpoint of treatment and prognosis and it aids in focussing the potential rehabilitative course. Although much difficult but excellent work has been performed to correct these conditions in recent years, it is still a regrettable fact that many persons suffer from the defects of these deformities and further are unaware that much can be done for them either surgically, by prostheic means or by a combination of these methods. Furthermore, many of these patients because of their recent illness and the expenses which they have incurred may not be in a position to afford the time or the cost of plastic surgery or by prostheses made of materials like silicon. Therefore the only treatment left for these patients is a maxillofacial prosthetic appliance made of acrylic resin material.

These appliances must restore the functions of deglutition, speech and sense of taste. Although restoration for the loss cannot always be entire, any measure of improvement over the existing situation is of benefit to the patient. Each patient's problem is different and therefore, each should be treated on an individual basis.

Case Report :

A female patient aged 46 years reported to the Department of Prosthodontics, SDM College of Dental Sciences, Dharwad with a chief complaint of an ill-fitting maxillary prosthesis.

Extra-oral examination showed lack of support to the skin over the zygomatic part of the maxilla on the affected side. There was also a lack of support to the upper lip on the affected side.

Intra-Oral examination showed an ill-fitting maxillary obturator prosthesis in a maxillary defect on

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the right side. All the teeth on the affected side were missing and the teeth missing on the contra-lateral side were 21, 22, 26 and 27. All the teeth in the lower arch were present with crowding, supra-eruption and shift of the midline in the anterior region. Fig. 1

Figure 1

Treatment Plan :

Considering her socio-economic and her aesthetic and functional requirements, treatment plan decided was to fabricate a hollow bulb obturator prosthesis made of acrylic resin.

Procedure For Fabricating A Custom Tray For Impression Of Defect as well as the Dentulous Part Of The Maxillary Arch :

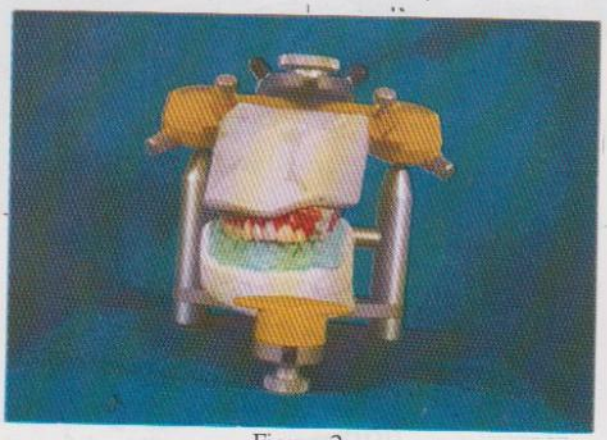

Figure 2

Unfavourable undercuts in the defect were blocked out with gauze piece impregnated with petroleum jelly. Primary impression of the defect and the lower arch were made with an irreversible hydrocolloid impression material (Kromopan).

Primary casts were poured in dental stone (Kalstone). The maxillary cast was surveyed and the excessive undercuts in the defects in the selected path of insertion were blocked with dental plaster. Separating medium (Cold Mould Seal) was applied to the maxillary cast and a custom tray was fabricated for making an impression of the defect.

Working Impression :

Peripheral tracing was done with the custom tray using low fusing compound (Pinnacle

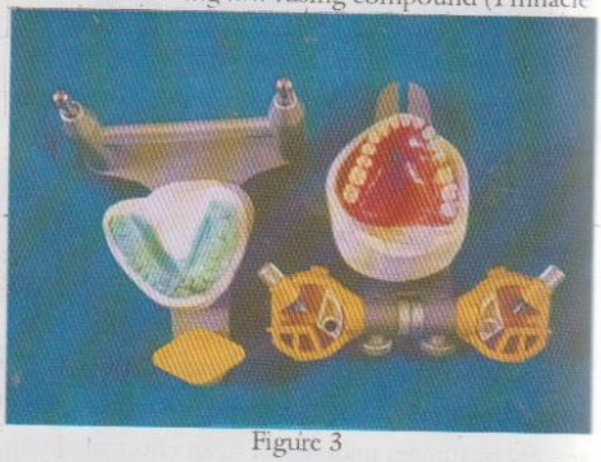

Figure 3

DPI). The unfavourable undercuts of the defects in the patient's mouth were blocked out with gauze piece impregnated with petroleum jelly. A secondary impression was then made with medium body rubber base impression materials (Reprosil). The custom tray with the impression was allowed to seat in the oral cavity and a second impression or pickup impression was made using

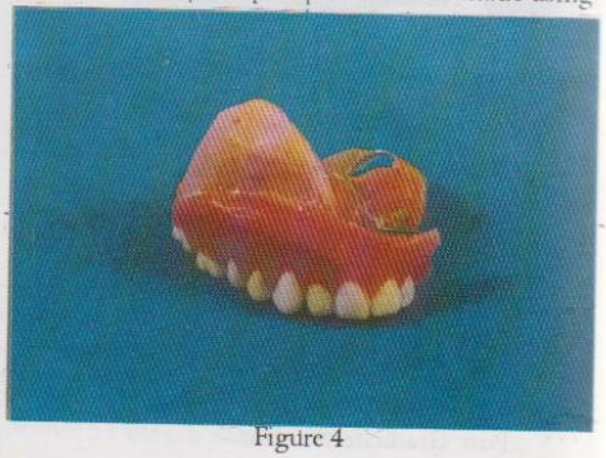

Figure 4

a perforated stock metal tray and irreversible hydrocolloid impression material.

Figure 5

The master cast was then poured in dental stone. The master cast was surveyed and the unfavourable undercuts were blocked using dental plaster. This cast was duplicated using reversible hydrocolloid (Agar). This duplicated cast was used to make the walls of the hollow bulb with heat cure acrylic resin. Modelling wax was adapted on the walls of the hollow and sealed. This was then invested, dewaxed and acrylized with heat cure acrylic resin material (DPI - India). The acrylized hollow was trimmed and polished. This was placed in the master cast and table salt was then used to fill the hollow. Auto-polymerizing resin was then used to seal the hollow. Two holes were then made in the hollow and the salt was flushed out with the hollow bulb in place. An occlusal rim was fabricated in the area of the missing teeth. The height of the occlusal rim was adjusted at the bite

Figure 6

registration stage. An inter-occlusal record was made with the help of which the maxillo-mandibular relation was transferred to the articulator.

Teeth selection was done according to the size and colour of the remaining natural teeths. The posterior teeth were trimmed so as to have only the occlusal and buccal surfaces of the teeth. C-clasps were constructed on 23, 25 and 28 to aid in the retention of the prosthesis. Fig. 2,3,4.

The teeth arrangement was verified for aesthetics, phonetics and occlusion at the try-in stage. The occlusion on the affected side was kept to a point contact to prevent excessive occlusal forces.

The cast with the waxed prosthesis was then invested and wax elimination was carried out. The hollow bulb was retained, grooves made in the bulb to augment the union with the heat cure acrylic resin (DPI - India). Heat cure acrylic resin was then mixed and adapted over the teeth and the surface of the mould. In the area over the teeth a thin layer of resin dough depression was made and it was filled with table salt and the remainder of the mould was again packed with heat cure acrylic resin. This was cured by the short curing cycle.

The final prosthesis was then removed, trimmed and highly polished. The table salt was flushed out by making two holes in the area where salt was packed. The holes were later closed using autopolymerizing resin. This was done to make the obturator more light in weight. The finished and polished prosthesis was then placed in the patient's mouth and occlusal corrections were made intraorally. Fig. 5,6.

Conclusion :

A technique has been described for the construction of a hollow bulb obturator with a denture for a patient who had undergone partial maxillectomy. The whole procedure was carried out keeping in mind the aesthetic and functional value of the obturator.

Every prosthodontist should help the afflicted by replacing anatomic deficiencies. restoring physiologic functions, correcting impaired speech, improving aesthetic and in doing so, building up the patient's morale. It is hoped that more prosthodontists would provide this type of service and that they would take an interest and realize the importance of this branch of dentistry as a healing art.

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Esthetic Considerations Of Smile

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The character of smile influences to a great extent the attractiveness and personality of an individual. The dentist is probably the best person to recognise and identify the quality of smile. Further, he is also able to change the quality of smile with the recently available innovative techniques and state of the art restorative materials and to plan restoration which harmonize with smile. Therefore it is important that he is aware of the various factors which contribute to a good smile.

The location and shape of smile line, the extent of exposure of the facial surfaces of upper teeth and gingiva, buccal corridor and the outline form of vermilion border of lips are some of the factors which contribute to a pleasant smile. These are harmoniously interrelated to each other. A disharmony can be injurious to the attractiveness of smile. An illustrated description of these components of smile is presented.

Esthetic Smile :

The perception of smile is subjective. To define an esthetic smile and to assess the beauty smile requires esthetic appreciation. The term esthetic is derived from the Greek root 'esthesia' meaning sensibility or capacity for sensation. As an example to this, anaesthesia means no capacity for sensation. 'Esthetic' is an adjective form which denotes a pleasant sensation created in an individual or an object which creates such a feeling in a person's mind. An esthete is one who perceives and enjoys pleasant sensation in response to the beauty in nature. Dental restorations are objects of creation which can give such a feeling to the dentist who fabricates the restoration, as well as to the possessor of the restoration and the observer. It is a feeling in one's heart and imagination. A persons pleasant smile can also elicit such a feeling to oneself and to the observer. Appreciation of esthetic smile is not in seeing but in visualisation, to quote Dr. Pankey, "Look through your eyes and see through your mind."

Expressions of Smile :

Smile is a generalised term, it requires to be specified in order to understand its features. There are many expressions of smile. It ranges from silent smile (Fig.1) with the upper and lower lip in apposition and a passive smile (Fig. 2) with very little separation of lips which gives a minimal exposure of teeth, to an active smile (Fig. 3) and laughter (Fig. 4) when the labial and buccal surfaces, of teeth, gingival papilla, the labial and buccal mucosa are exposed. Prior to the commencement of smile, upper and lower lips assume a rest posture known as pre-smile lip posture. From this passive lip posture, upper lip moves upward to expose the maxillary teeth, gingiva and mucosa and at the same time laterally to expose on both the sides the dark vestibular space of buccal corridor which gives an esthetic character to smile. The mandibular teeth do not play a significant role in enhancing smile.

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CRITERIA TO ASSESS THE QUALITY OF SMILE

Shape of Vermilion Border :

The outline form of vermilion border of lips during smile to a large extent governs the type of smile in an individual. Three distinct shapes of vermilion border of upper lip can be seen during smile viz. Convex, concave and straight. The vermilion border of lower lip is usually concave, while the shape of the vermilion border of upper lip in smile varies.

Enclosed between the upper and lower vermilion borders of lip during smile is the smile space/ smile zone which contains the dental arches with its various smile lines, buccal corridor and the inter-incisal and the interocclusal dark spaces. Based on the three different shapes of vermilion border of upper lip in smile, three types of smiles are recognised viz. convex smile straight smile, and concave smile (Fig. 5,6 and 7).

Smile line / Smile curve :

Smile line is seen as a straight line or curve continuous with incisal margins of the upper anterior teeth. When smile line is parallel to the general curvature of lower lip, the two are in harmony and this gives a pleasant effect to smile. Parallelism between smile line and lower lip is therefore an asset to smile. Smile line however may not always follow the curvature of the lower lip during smile. When it is not parallel, a triangular space is seen between them (Fig. 1).

Generally three types of smile lines are observed; the convex, straight and concave (Fig. 8,9 and 10). When smile line is convex or concave it is also referred as smile curve. Convex smile line accentuates the quality of smile and therefore it is a positive smile line. The concave smile line gives an unpleasant, harsh, distracted character to smile and it is therefore a negative smile line. Straight smile line can have a positive or negative effect depending on its harmony to the lip curvature and to the presence or absence of buccal corridor. A convex smile line and parallelism of smile line to lower lip are two desirable qualities of smile which gives pleasantness to smile (Fig. 3).

Contact between lower lip and incisal edges or the labial surfaces of upper anterior teeth is also an important feature which contribute to esthetic effect of smile. For an attractive smile, contact should preferably be present between the incisal edges of upper teeth and vermilion border of lower lip (Fig 8 and 9). Absence of parallelism between smile line and lower lip together with no contact of incisal edges with lower lip gives a negative effect to smile. When smile is not parallel to lower lip curvature, there is a break in the harmonious relation existing between the incisal edges of upper anterior teeth with the lower lip. A triangular space or area is identified between the incisal edges of upper teeth and the lower lip. This is an undesirable feature as it distracts the observer's attention to neutralize the harmony existing between smile line and lower lip during smile (Fig. 11)

Exposure of teeth, gingiva and mucosa during smile:

Depending on the extent of exposure of maxillary anterior teeth, interdental papilla, gingiva and mucosa during smile, three types of smiles are identified (Fig. 12,13,14 and 15)

Type I : Tooth smile
Exposure of labial surface of the maxillary anterior teeth only.

Type II : Papilla smile / Gingiva smile
Exposure of the labial surface of the teeth and interdental papilla/ gingiva.

Type III : Mucosa smile
Exposure of the labial surface of teeth, interdental papilla, free marginal gingiva and the labial and buccal mucosa.

Gingival and mucosal smile imparts attractiveness to smile. Failure to expose the upper anterior teeth gives a negative smile, which lacks expression. Exposure of only the upper anterior teeth produce a static smile. When the upper anterior teeth interdental papilla and certain extent of gingiva and mucosa are exposed, a dynamic, pleasant and attractive smile is produced.

A gingival or mucosal smile in posterior region is also desirable. In an attractive smile, gingiva and mucosa of posterior teeth are exposed to compliment the anterior gingiva-mucosa exposure. This is a commonly noticeable feature in a beautiful smile.

Buccal Corridor - Visible buccal vestibular space - VBVS :

It is a common observation that in persons with an attractive smile, a space is present between the facial surface of posterior teeth and corner of the mouth. This corridor of space enhances the esthetic quality of smile (Fig. 16). In a dentulous subject, mucosa of the lips and cheek are in passive contact with the labial and buccal surfaces of the upper and lower dental arches. With the commencement of passive smile and with progress of smile, this relationship begins to change and a well defined space frequently appears between the facial surface of posterior teeth and the mucosa of cheek.

This space which is seen between the buccal surface of teeth and the corner of the mouth appears as a dark space and it is known as buccal corridor. Buccal corridor is a three dimensional space which varies with the extent of smile. It is not always present in a passive smile, minimal to pronounced in active smile and maximum during laughter. Buccal corridor is a positive component which gives dynamism and enhances the character of smile. This space should preferably be maintained in a denture wearer to obtain a natural appearance.

It is ideal to have buccal corridor when there is parallelism between smile line and lower lip curvature. These two components should co-exist to compliment an attractive smile. When smile line changes from convex or straight to a concave smile line, there is a reduction in the size of the buccal corridor. Pronounced buccal corridor is invariably seen when there is a convex or straight smile line. The intensity of buccal corridor is critical to the quality of smile.

It is also desirable to have a positive relationship between the extent of tooth and gingival exposure in smile and the buccal corridor. Tooth smile with poor buccal corridor negates the quality of smile, where as tooth smile with buccal corridor greatly enhances it. Gingival and mucosal smile with a large buccal corridor is very esthetic.

Conclusion :

Convex, concave and straight smile are the three basic types of smile. Nature of smile line / curve, presence of buccal corridor and the extent of exposure of gingiva and mucosa, impart character and dynamism to smile. These are related to each other to give a positive effect to the smile. A discrepancy in the tooth, gingival and lip components of smile can effect the quality of smile. Lower teeth are generally less conspicuous and their contribution to smile is not very significant.

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Table I - STAGES OF SMILE

Stage I	Pre-smile lip Posture	Lips are in rest position, vermilion border of upper and lower lip in passive contact.
Stage II	Silent smile (Closed mouth smile)	Initiation of smile reflex, lips, are still in apposition, teeth are not visible. The muscles of facial expression begin to contract. This changes the shape of lip seal.
Stage III	Open smile Passive smile	Lips slightly parted, muscles of facial expression levator labi superioris and levator anguli oris in action. Labial surface of anterior teeth exposed.

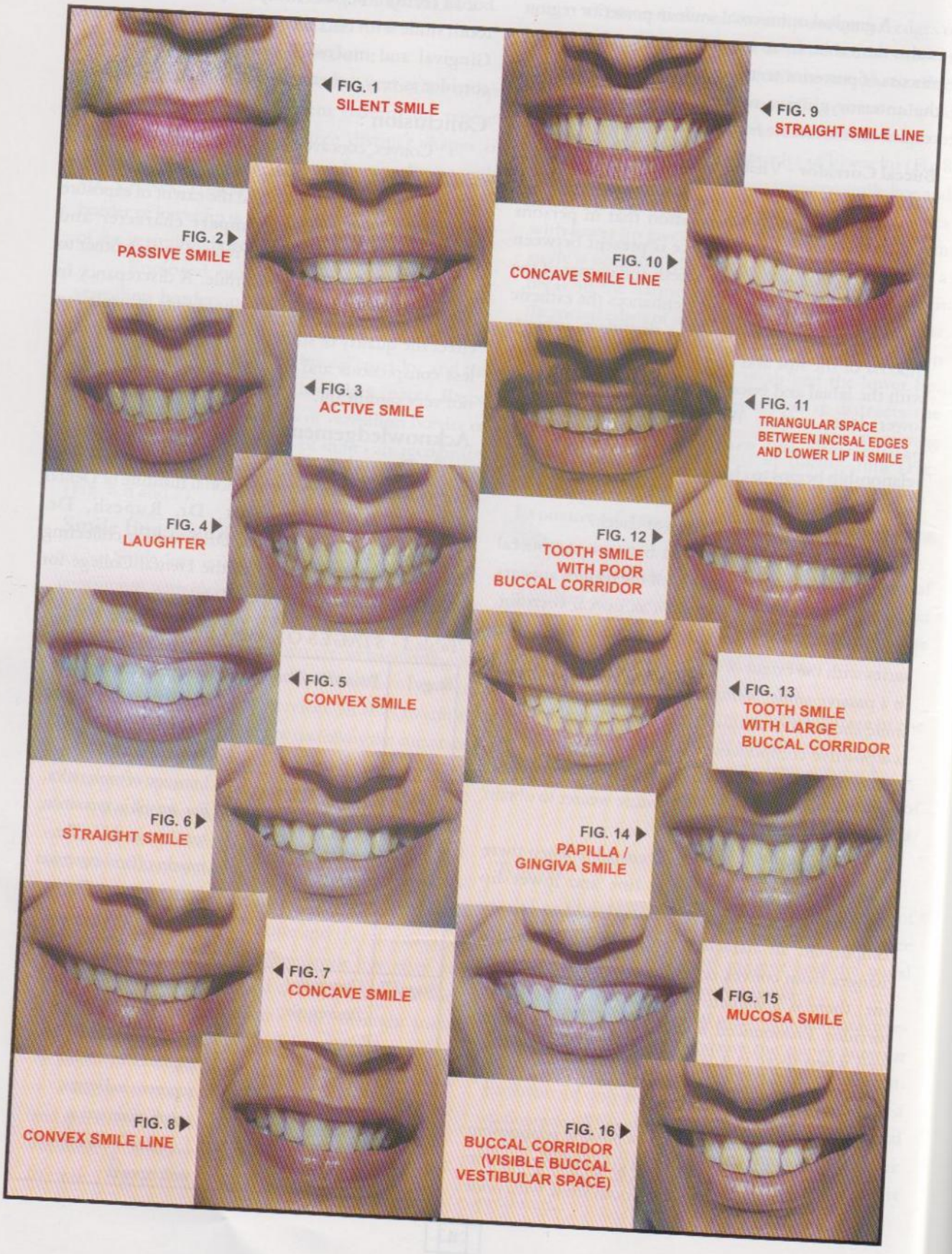
FIG. 1
SILENT SMILE
FIG. 2
PASSIVE SMILE
FIG. 3
ACTIVE SMILE
FIG. 4
LAUGHTER
FIG. 5
CONVEX SMILE
FIG. 6
STRAIGHT SMILE
FIG. 7
CONCAVE SMILE
FIG. 8
CONVEX SMILE LINE
FIG. 9
STRAIGHT SMILE LINE
FIG. 10
CONCAVE SMILE LINE
FIG. 11
TRIANGULAR SPACE BETWEEN INCISAL EDGES AND LOWER LIP IN SMILE
FIG. 12
TOOTH SMILE WITH POOR BUCCAL CORRIDOR
FIG. 13
TOOTH SMILE WITH LARGE BUCCAL CORRIDOR
FIG. 14
PAPILLA / GINGIVA SMILE
FIG. 15
MUCOSA SMILE
FIG. 16
BUCCAL CORRIDOR (VISIBLE BUCCAL VESTIBULAR SPACE)

Active smile	Lips expose teeth, gingiva and mucosa to varying extent. Muscles of expression active, smile folds appear on both sides at the angle of the mouth to compliment smile.
Stage IV Laughter	An exaggerated extreme form of smile accompanied by sound. Lips expose teeth, gingiva, labial and buccal mucosa to a much greater extent. The muscles of expression are in maximum contraction, intense smile lines, smile folds appear in cheek around the corner of mouth.

Table II - COMPONENTS SMILE

Tooth component	Size, shape, form and other morphological characteristics, colour and arrangement of teeth. Smile line / smile curve, dark incisal embrasure space.
Gingival/mucosal component Teeth - cheek component	Extent of exposure - visibility of interdental papilla, gingiva and mucosa in smile. Visible buccal vestibular space (VBVS) (buccal corridor - positive dark space)
Lip component	Shape and outline form of vermilion border of lips dictates the shape of smile space / smile zone. Movement of upper lip in vertical and horizontal direction expose teeth, mucosa and buccal coridor. Curvature of upper lip in smile :- convex, concave, straight.

Teble III - Classification of smiles

Depending on the shape of upper vermilion border from commissure of lips during smile, three basic types are identified.

Basic types

1. Convex smile
2. Concave smile
3. Straight smile

Viables

1. Plane of incisal margins of maxillary anterior teeth during smile.

Smile Line/Smile Curve		Type of Smile
Convex smile line	-	Positive smile line
Concave smile line		
Straight smile line	-	Negative smile line

2. Relationship of vermilion border of upper lip to maxillary teeth during smile.

Extent of exposure	Type of smile line	Type of smile
Only teeth	-Tooth smile line	-Tooth smile - Low smile
Teeth and interdental papilla	-Papilla smile line	Papilla smile (-Medium smile)
Teeth, papilla and marginal gingiva	-Gingiva smile line	-Gingiva smile
Teeth, papilla, gingiva and mucosa	-Mucosa smile line -Laughter line	-Mucosa smile -High smile -Maximum exposure of teeth and mucosa

Table IV - TYPES OF SMILE

Basic Types	Variables		
Convex smile	Convex smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Straight smile line	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Convex smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
Concave smile	Convex smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Straight smile line	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Concave smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
Straight smile	Convex smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Straight smile line	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent
	Concave smile curve	Tooth smile Papilla smile Mucosa smile	Buccal corridor present / absent

Smile Terminology

Presmile lip posture	Tooth smile, papilla smile, gingiva smile
Silent smile - static smile	Tooth/papilla smile, mucosa smile
Passive smile - closed mouth smile	Low smile, high smile
Active smile - open mouth smile	Tooth smile line
Exaggerated smile - laughter	Papilla / gingiva smile line
Convex smile	Mucosa smile line, laughter line
Concave smile	Buccal corridor (Visible buccal vestibular space)
Straight smile	Negative smile space
Convex smile line / curve	Positive smile space
Concave smile line / curve	
Straight smile line	

A pleasing smile is a convex or convace smile having positive smile curve parallel to lower lip or touching lip with a mucosa or gingiva smile and an adequate exposure of buccal corridor.

Table V - SMILE ANALYSIS CHART

Parameters to assess the quality of smile

Parameter	Observation
Convex smile	
Convace smile	
Straight smile	
Tooth smile	
Papilla / Gingiva smile	
Mucosa smile	
Straight smile line	
Convex smile curve	
Concave smile curve	
Smile line parallel to lower lip curvature a. Incisal edges not in contact with lip b. Incisal edges in contact with lip curvature	
Smile line not parallel to lower lip curvature	
Objectionable triangular space between smile line and lower lip	
Visible buccal vestibular space (buccal corridor)	
Lower teeth predominate Upper teeth in smile	

Quality of smile ❑ Negative smile ❑ Average ❑ Pleasing / Attractive (Positive Smile)

Dentist ability to change smile ❑ Possible ❑ No

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Disinfection Of Irreversible Hydrocolloid Impressions

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Introduction :

Infection control is a cardinal issue in dental practice. As dental professionals, we are exposed to a wide spectrum of micro-organisms from the blood & saliva of patients. Prosthodontic treatment procedures primarily begin with making of dental impressions which may be the first link in microbial contamination during dental care. The challenge of preventing cross contamination at the very first stage has sparked universal concern in the dental profession and has stimulated research in the field of disinfection of impressions.

Washing the impression thoroughly as it is practised does not clear away all the micro organisms.

Estimation of the level of the risk of transmission of diseases is difficult, therefore the clinician should consider every patient as a potential source of infection regardless of whether the patient is known to have the disease or not. Hence we must take precautions at each and every level.

Aims & objectives :

The purpose of the present study was to evaluate:

- The efficacy of disinfectant Cutasept(R) F on irreversible hydrocolloid impressions.
- Effect of Cutasept(R) F spray on dimensional accuracy of various alginate impression materials routinely used in prosthodontic work.
- The effect of the disinfecting Cutasept(R) F spray on the surface quality of stone dies.

Materials & methods :

For the purpose of this study, five commercially available impression materials commonly used in prosthodontic practice were used. They are as follows (1) Hydrogum (Zhermack) (2) Vival (Vivodent) (3) Kromopan (Lascod) (4) Polygel (Polydent product Gujrat) (5) Zelgan Imprint (D.P.I. Ltd.) (Fig. 1)

The Cutasept(R). F (Raman & Weil Pvt. Ltd.) disinfecting solution was employed to disinfect the impressions & Ultra Rock (Kalabhai) improved die stone was used for fabrication of cast,

Composition of Cutasept(R). F

Each 100 gms contained

Isopropanol 63.00 gms

Benzal konium chloride 0.025 gms.

METHODS

Part-I **In Vivo study**

Antimicrobial Potential

To assess the efficacy of Cutasept(R) F disinfectant in eliminating oral flora on impression materials under realistic clinical conditions, complete upper arch impressions were made from 20 dental students (10 Male, 10 Female. 20 to 25 yrs. of age).

Irreversible hydrocolloid was mixed using sterile water, according to manufacturer's directions & was placed in the sterile perforated stock tray and a complete upper arch impression was made. Then these were rinsed in sterile water and the excess water was shaken off.

The sample of impression material in the form of 13 mm. diameter disk were removed aseptically from the palatal impression surface with the help of a sterile syringe used as corkborer. The removed

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disks were released into test tubes containing 10ml T.S.B. (Trypticase soya broth) (Fig.2) & whirlmixed for 40 sec. to assure release of adherent organisms into the T.S.B.

The same impression was disinfected by spraying with Cutasept(R) F spray & placed in an airtight container for 10 minutes. After disinfection, the impression was rinsed again with sterile water & the samples were removed from the other side of palatal impression surface with the help of sterile syringe (13 mm dia) & released into test tube containing 10 ml T.S.B.

The T.S.B. was incubated overnight at 37°C & sub-cultured on to a Blood Agar Plate for bacterial colony formation. The Blood Agar Plates were then evaluated for bacterial growth after aerobic incubation at 37°C for 24 hours.

Part - II - **In Vitro study**

Dimensional accuracy.

In order to study the dimensional change, a master die was used. (Fig. 4) A circular steel disk was subjected to carbon-di-oxide laser treatment and 50μ, 80μ & 100μ wide groves were prepared on the disk, Two 325 μ wide parallel grooves were prepared perpendicular to 50μ, 80μ, 100μ wide grooves.

Special tray was fabricated by moulding the tray material ie. auto-polymerising acrylic resin.

An appropriate amount of impression material was mixed with tap water as recommended by the manufacturer. After proper manipulation, the impression material was loaded in the special tray and the impression of the master stainless steel die was made. Impression were removed after respective setting times.

The impression surface was rinsed with a gentle stream of tap water for 20 seconds. The excess water was shaken off and the surface was then subjected to the disinfection treatment.

Two sets of 10 impressions each were made with the impression materials, one for control (water rinsed) & the other for disinfection solution.

The rinsed impression surface was sprayed with cutasept(R) F disinfectant until the excess disinfectant ran off the surface. The impression was then stored in a closed container for 10 minutes.

The plastic container was lined with a disinfected saturated paper towel to maintain an environment of 100% humidity. Impression tray hanger was used to hang the impression.

On completion of the disinfection treatment, the impression was rinsed with tap water for20 sec. to remove the disinfectant. Excess water on the impression surface was removed with a gentle stream of air from chip blowers and then poured with the Ultra Rock(R) die stone. The poured impression was stored in a humidor for 45 minutes before it was separated from the cast. After separation, the cast was duly numbered for the purpose of identification.

Observation of the AB distance & BC distance was done under Nikon Measuring Microscope which gives direct reading having a least count of 0.001 mm.

Ten samples were measured for control group & 10 samples were measured for spray group, each for different brands of alginate.

Part III

In addition to assessment of dimensional change, the quality of the stone cast surface was evaluated for smoothness and reproduction of surface detail. The visual evaluation for smoothness and surface detail was made under a Nikon Measuring Microscope at magnification 10X. Each sample was rated on the basis of a 1 to 4 scoring system. [36]In rating the surface detail, only the finest line (50um) was evaluated in order to increase discriminative capability.

Evaluation criteria :

Smoothness of the cast surface at magnification of 10X was scored as follows :

Score 1 : A dense smooth surface or localized mild roughness in one to two quadrants

Score 2 : Localized mild roughness in three to four quadrants or localized moderate roughness in one quadrant

Score 3 : Localized moderate roughness in two to three quadrants

Score 4 : Moderate to severe roughness in all four quadrants

Sharpness of surface detail at a magnification of 10X, which evaluated only the finest line, was scored as follows.

Score 1 : Sharp and well-defined 50 μm line or a mild degree of loss of sharpness in the 50 μm line

Score 2 : Blurring of less than half the length of the 50 μm line.

Fig. 1 - Material used in the study (Hydrogum, Vival, Polygel, Kromopan, Zelgan Imprint, Ultra Rock® & Cutasept® F)

Fig. 2 - Impression disk is introduced into 10ml of T.S.B. in the test tube

Score 3 : Blurring of greater than half the length of the 50 μm line.

Score 4 : Failure of reproducing part of the 50 μm line.

In this study group for each parameter, we have calculated average & standard deviation. To find out the significant change between the two impression materials, we have used unpaired 't' test and to check the significant difference within the group we have used paired 't' test

Observations and results :

For the first part of the study, the impressions made were subjected for microbiological test of the control & spray treated impressions.

The result of the microbial growth on the Blood Agar Plate indicate that water rinsing was a poor approach for eliminating the growth of oral microorganisms on the impression surface. 20 out of 20 alginate impressions that had been subjected to water rinsing exhibited positive microbial growth. Only one impression in 20 of the spray treatment impressions displayed positive growth.

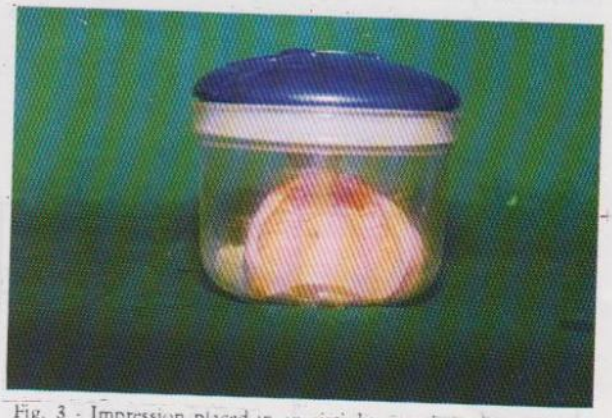

Fig. 3 - Impression placed in an airtight container after spray.

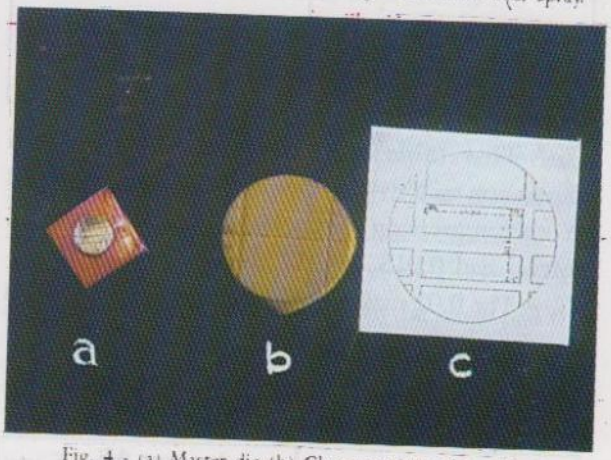

Fig. 4 - (a) Master die (b) Close up view of sample (c) Schematic representation of reference points A, B & C.

Table - I : Comparison of changes in AB distance after spraying Cutasept® F disinfectant between all the groups (impression materials)

Materials	Average AB (x + SD)
Hydrogum	0.001 + 0.021
Vival	0.004 + 0.049
Kromopan	0.007 + 0.052
Polygel	0.007 + 0.048
Zelgan Imprint	* 0.0313 + 0.044

* P < 0.05 Significant

Above data shows that Hydrogum impression material had less changes as compared to all other impression materials. Vival had 0.004 change followed by 0.007 by Kromopan and Polygel impressions. The Zelgan imprint had significantly more change as compared to all other impressions.

Table - II - Comparison of changes in BC distance after spraying disinfectant solution between all the impression materials.

Materials	Average BC (x + SD)
Hydrogum	0.004 + 0.039
Vival	0.015 + 0.046
Kromopan	0.015 + 0.047
Polygel	0.017 + 0.041
Zelgan Imprint	* 0.020 + 0.051

This table too shows that Hydrogum impression material has lowest changes as compared to other impression materials. Vival and Kromopan, Polygel had 0.015 - 0.017 change.

The 0.02 maximum change was in the Zelgan imprint group.

Table - III - Comparison of smoothness between all the impression materials.

Materials	Average AB (x + SD)
Hydrogum	1.1 + 0.32
Vival	1.1 + 0.32
Kromopan	1.0 + 0.60
Polygel	1.2 + 0.42
Zelgan Imprint	* 3.1 + 0.74

* P < 0.001 Significant

Above data reveals that average score for smoothness in all the impression materials were in the range of 1.0 of 1.2 except 3.1 for Zelgan Imprint which is significantly more as compared to others.

Table - IV - Comparison of sharpness between all the impression materials.

Materials	Average AB (x + SD)
Hydrogum	1.2 + 0.42
Vival	1.2 + 0.42
Kromopan	1.2 + 0.42
Polygel	1.4 + 0.52
Zelgan Imprint	* 2.9 + 0.88

* P < 0.001 Significant

Average score of sharpness for Zelgan Imprint impression material was 2.9 which is significantly more as compared to all other materials.

The actual measurement for line AB on the stainless steel die was 13.261 mm and BC was 8.111 mm. Differences in means of the AB line when compared with controls were from - 2μ to 18μ and BC line 5μ to 28μ.

Minute discrepancies of microns are not considered clinically significant because the crystalline structure of die stone does not reproduce detail of that magnitude[12] and the margin of error of the microscope is within this range.

Discussion :

The risk of infection transmitted by saliva and blood is considered a potential occupational hazard in dentistry. One area which has received attention in the recent times is the potential hazards due to transmission of infection during the handling of dental impressions.

Studies revealed that organisms have been shown to survive up to 5 hours on an impression, also gypsum casts will act as potential surces for contamination.

Retention of bacteria is two to three times greater on irreversible hydrocolloid compared with elastomeric impression materials. A reason for this may be the irregular topographical features of irreversible