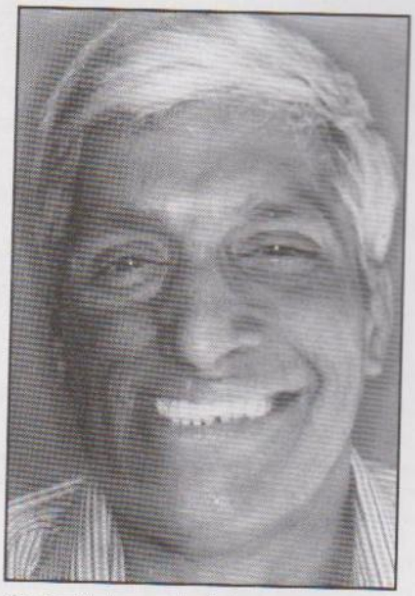

Fig. 7 : Photograph of obturator inserted.

CONCLUSION

To conclude, living with such a defect causes a lot of psychological trauma to the patient because of impaired esthetics and function. Hence we as prosthodontists must try to restore the lost form and function of the oral and perioral structures, that will enable the patient to re-enter the society with confidence, which is every patients' right.

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Abstract [ORIGINAL ABSTRACT]

OCCLUSAL STABILITY IN SHORTENED DENTAL ARCHES

Purpose: *In a previous study, it was proposed that minor tooth migration in shortened dental arches may result in an occlusal equilibrium and subsequent stabilized occlusion. This study evaluated 9 years of follow-up data obtained from patients with shortened dental arches to confirm or reject this hypothesis.*

Material and methods : *Seventy-four subjects with shortened dental arches (SDA) participated in the study. Their dental arches were intact anteriorly and possessed 3 to 5 occlusal units in the posterior regions. An occlusal unit was defined as a pair of occluding premolars; occluding molars were equal to 2 occlusal units. Seventy-two patients with complete dental arches (CDA) formed a control group. All participants were examined at 3 year intervals from baseline to 9 years. The recall rate at the last observation for both groups was 57%. Five parameters were used as indicators for occlusal stability: interdental spacing, occlusal contacts of anterior teeth in the intercuspal position, vertical/horizontal overlap, occlusal tooth wear, and periodontal support. Repeated measurement regression analysis were used to examine the data.*

Results : *The premolar regions in the SDA group demonstrated significantly more interdental spacing than those in the CDA group. Significantly more anterior teeth in the SDA group that in the CDA group were in contact in the intercuspal position. The SDA group showed similar vertical overlap and occlusal tooth wear when compared with the CDA group. The SDA group exhibited lowered alveolar bone scores than the CDA group. Finally, no significant effect over time was observed with any of the studied parameters.*

Conclusion : *Because the differences observed within the parameters studied remained constant over time, it was concluded that SDAs can remain occlusally stable over time. The occlusal changes observed were self limiting and led to an equilibrium.*

(Witter DJ, Creugers NH, Kreulen CM, de Haan AF, J Dent. Res 2001; 86 432-6)

Comparative Evaluation of the Effect of Microwave Oven Drying on the Strength of, Die Stones

RAGHUNATH A. PATIL, M.D.S.*, SUPRIYA NERLI, M.D.S.**, RAVANI JHEJOVATHI***

ABSTRACT

Dentists often find it necessary to work on dies, soon after separating them from the impression. Since the wet dies do not have enough surface hardness and strength, one must wait 24 to 48 hours till the material gains maximum strength. To save time microwave oven drying technique has been suggested. However, the effect of microwave oven drying on the properties of the die stone has to be throughly examined. Therefore, the present study was done to evaluate the effect of microwave drying on the compressive and tensile strength of die stone which are very vital properties.

A standard metal die was fabricated, polyvinyl siloxane impression material was used to make the molds of the metal die. 640 specimens of two different die stone i.e., ultrarock and silkyrock were prepared. They were grouped and were air dried and microwave oven dried and were subjected to compressive and diametral compressive testing at four different time intervals (2,4,24,48 hrs) in the universal testing machine. The tensile strength of the material was calculated as per the formula and then the results of tensile strength and compressive strength were subjected to statistical analysis.

According to the results the microwave oven dried specimens of both ultrarock and silkyrock tested for compressive strength and diametral tensile strength were significantly higher than air dried specimens at all time intervals. The two hours microwave oven dried specimens were almost as strong as air dried specimens at 24 hours.

Thus, with the microwave technique it is now possible to dry dies in a much shorter period of time and to be confident of its strength.

INTRODUCTION

Dentists often find it necessary to work on dies soon after separating them from the impressions. Since wet dies usually have inadequate surface hardness, one must normally wait 24-48 hours before the die is strong enough for manipulation. But in today's rapid pace of world, services should be given fast. Commercial microwave oven has revolutionized domestic cooking into fast food or instant food technology. Similarly microwave oven has been suggested to dry the dies to save considerable time[5].

Microwave radiation in dentistry is used for sterlization[3,10], acrylic resin polymerization[2,8] removal of wax from the molds[6], and shorten the dough stage of denture base acrylic resins[4]. The present study investigates the use of microwave radiation to dry die materials, so as to save drying time and to evaluate its effect on the compressive and tensile strength of two commonly used die materials.

MATERIALS AND METHODS

Standard metal dies, with a hook soldered onto the superior aspect of it were prepared with internal diameter of 15mm and length 10mm. Plastic cylindrical container was used as a tray and putty wash impression of metal die was made using double mix double impression technique. The impressions were poured with two types of type IV die materials, viz ultrarock and silkyrock. A total of 640 specimens were prepared and grouped as -

Group A : Ultrarock 320 specimens.

Group B : Silkyrock 320 specimens.

This group A and B were further divided into two groups as-

a) Air dried - 160 specimens.

b) Microwave oven dried - 160 specimens.

This 160 - specimens of group A and B were again subdivided into four groups of 40 specimens. Out of these 40 specimens, 20 specimens were tested for compressive strength and 20 specimens for tensile strength at four time intervals i.e. 2,4,24 and 48 hours.

Similiarly group B was subdivided into groups and tested for compressive strength and tensile strength at 4 time intervals. All the specimens dried by this method were placed in microwave oven, 50 minutes after pouring and dried for 5 minutes. A beaker with 400ml of water was placed in the microwave oven as a heat sink when all specimens were microwaved to protect magnetron from excess energy of the microwave oven[5]. This allowed testing at 2, 4, 24 and 48 hours for the microwave oven dried specimens. Similarly the air dried specimens were tested for compressive strength and tensile strength at 2, 4, 24, 48 hours.

The compressive and tensile strength testing was

Key Words : Microwave, Die stone

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conducted on universal testing machine. A compressive load was placed on flat surface of the cylindrical specimen with a 5000 kg load capacity at a crosshead speed of 0.05 cm/min and the results were recorded in kg/cm², for each die material specimens, fracture at definite end points which was characteristic of compression testing was noted. To test tensile strength, the diametral compression test was used, in which compressive load was placed on the curved surface of the cylindrical specimen. Ideal fragmentation into two segments which was characteristics of diametral compression test was noted[7], the results were recorded in kg/cm² and then diametral strength was computed according to the following formula :

$$\text{Diametral tensile strength} \quad \frac{2P}{\pi \times D \times T}$$

Where P = load, D = diameter, T = thickness.

RESULTS

All 620 samples were tested and subjected to statistical analysis to compare microwave oven dried with air method on compressive and tensile strength of die materials.

At the one hour interval, all the specimens had a chalky appearance on the surface and were easily broken by handling, so test was not performed at o[...] hour.

Table 1 shows comparative values of compre[...] strength and tensile strength of air dried specime[...] ultrarock to that of microwave oven dried specime[...] Compressive strength and tensile strength [...] microwave oven dried specimens were more than [...] dried specimens at all time intervals. Statist[...] analysis showed by unpaired 't' test value was hi[...] significant (P<0.001). This is shown in graph-I.

Table 2 shows comparative values of compres[...] strength and tensile strength of air dried specime[...] silkyrock to that of microwave oven dried specime[...] Compressive strength and tensile strength [...] microwave oven dried specimens were more than [...] dried specimens at all time intervals. Statist[...] analysis showed by unpaired 't' test value was hi[...] significant (P<0.001). This is shown in graph II.

Table 3 and 4 shows comparison of mean va[...] of compressive strength and tensile strength [...] ultrarock and silkyrock specimens at two hou[...] microwave oven dried with that of 24 hours o[...] dried specimens. Statistical analysis showed [...] unpaired 't' test showed nonsignificant (P<0.05). T[...] two hours strength of die materials dried [...] microwave oven were more or less similar to that [...] twenty four hours strength of air dried specimen[...] This is shown in graph 3 and 4.

TABLE 1

Statistical results of Ultrarock specimens dried by microwave oven compared with air dried on Compressive strength and Tensile strength (kg/cm²)

Time intervals in hrs	Mean CS - AD	Mean CS - MD	't' value	Mean TS - AD	Mean TS - MD	't' value
2	69.2244 ± 16.1726	179.5987 ± 17.8693	20.4808***	34.4579 ± 6.1798	96.4821 ± 6.3461	31.3146***
4	105.7594 ± 11.4017	258.8222 ± 16.6048	33.9839***	53.1226 ± 6.6857	124.3356 ± 8.9892	28.4279***
24	178.8296 ± 16.9022	603.4056 ± 38.5368	45.1221***	95.0464 ± 6.3118	322.7557 ± 8.6597	95.0320***
48	179.9833 ± 17.1808	637.2486 ± 23.3131	70.6131***	99.9279 ± 6.2911	336.2517 ± 13.8779	69.3609***

***-Highly Significant (p<0.001)

AD-Air dried

MD-Microwave oven dried

CS-Compressive strength

TS-Tensile strength

TABLE 2

Statistical results of Silkyrock specimens dried by microwave oven compared with air dried on Compressive strength and Tensile strength (kg/cm²)

Time intervals in hrs	Mean CS - AD	Mean CS - MD	't' value	Mean TS - AD	Mean TS - MD	't' value
2	53.8412 ± 18.3380	117.6814 ± 15.4034	11.9213	23.5462 ± 4.5259	80.6889 ± 14.1259	17.2282***
4	54.6103 ± 9.9507	145.7557 ± 15.0714	22.5701***	34.1708 ± 7.5629	87.0062 ± 11.8248	16.8338***
24	117.2968 ± 22.3028	330.7386 ± 16.3640	34.5071***	73.7973 ± 12.8113	196.1229 ± 14.7039	28.0511***
48	127.2959 ± 31.5138	359.1975 ± 16.1918	29.2716***	84.1347 ± 12.3981	200.7173 ± 16.8185	24.9528***

***-Highly Significant ($p<0.001$)
AD-Air dried
MD-Microwave oven dried
CS-Compressive strength
TS-Tensile strength

TABLE 3

Compressive and tensile strength of Ultrarock comparing two hours microwave dried specimens with twenty-four hours of air dried specimens (kg/cm²)

	Ultrarock		
	2 hrs M.D.	24 hrs A.D.	't' value
C.S.	179.5987	178.8296	0.1398 N.S.+
T.S.	96.7821	95.0464	0.717 N.S.

D-Air dried
D-Microwave oven dried
S-Compressive strength
S-Tensile strength
S-Not significant ($p>0.05$)

TABLE 4

ompressive and tensile strength of Silkyrock mparing two hours microwave dried specimens with enty-four hours of air dried specimens (kg/cm²)

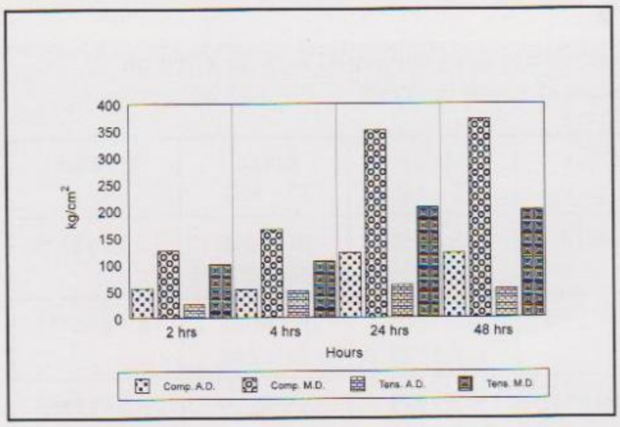
	Silkyrock		
	2 hrs M.D.	24 hrs A.D.	't' value
C.S.	117.6814	117.2968	0.0635 N.S.
T.S.	80.6889	73.7973	1.6161 N.S.

AD-Air dried
MD-Microwave oven dried
CS-Compressive strength
TS-Tensile strength
NS-Not significant ($p>0.05$)

DISCUSSION

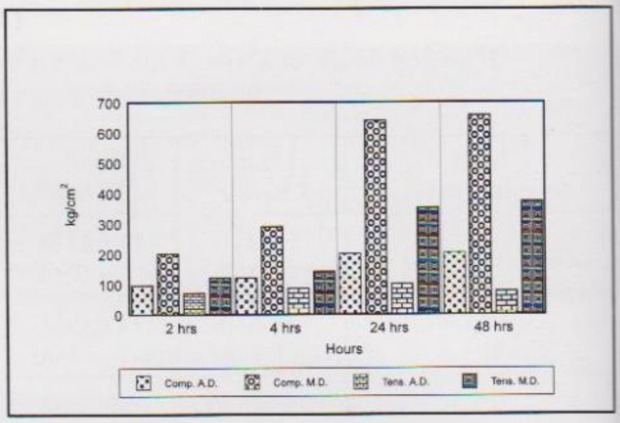
The clinical success of restorations fabricated by indirect means is dependent on impression materials and die materials used. Thus, as the die is a direct link between the clinical phase of treatment by dentist and technical phase in the laboratory, this material should have important properties like setting time, setting expansion, compressive and tensile strength, that are necessary for the success of treatment. At the same time the die should achieve dry strength in a much shorter period of time, so as to avoid a waiting period in the laboratory for the dies to be strong enough for manipulation. the microwave oven offers considerable time saving advantages for drying of gypsum[1,5,9].

In this study, effect of microwave drying and air drying on compressive and tensile strength of die stones which are properties of practical significance were compared. All the specimens dried by microwave had more compressive and tensile strength than those dried by air, at all time intervals (Graph I and II). The two hours strength of die material specimens dried by



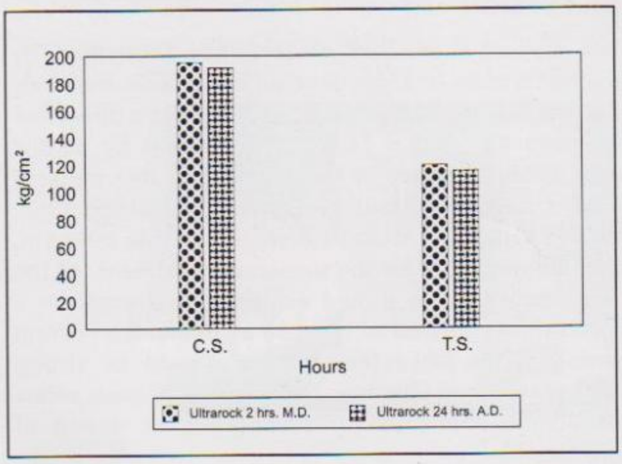
Comp. A.D. : Compressive Strength Air Dried
Comp. M.D. : Compressive Strength Microwave Oven Dried
Tens. A.D. : Tensile Strength Air Dried
Tens. M.D. : Tensile Strength Microwave oven Dried

Graph 1 : *Comparison of Drying Technique on Mean Compressive Strength and Tensile Strength (kg/cm²) of Ultrarock for different time intervals.*



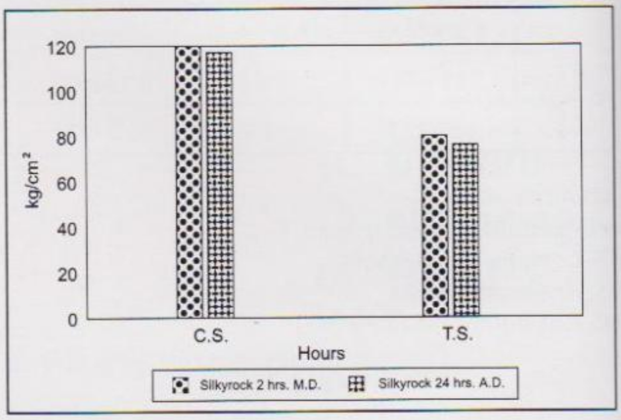
Comp. A.D. : Compressive Strength Air Dried
Comp. M.D. : Compressive Strength Microwave Oven Dried
Tens. A.D. : Tensile Strength Air Dried
Tens. M.D. : Tensile Strength Microwave oven Dried

Graph 2 : *Comparison of Drying Technique on Mean Compressive Strength and Tensile Strength (kg/cm²) of Silkyrock for different time intervals.*



Comp. A.D. : Air Dried
Comp. M.D. : Microwave Oven Dried

Graph 3 : *Comparison of tensile strength (kg/cm²) of ultrarock specimens compaired for two hours of microwave dried with that of twenty four hours of air dried specimens.*



Comp. A.D. : Air Dried
Comp. M.D. : Microwave Oven Dried

Graph 4 : *Comparison of tensile strength (kg/cm²) of silkrock specimens compaired for two hours of microwave dried with that of twenty four hours of air dried specimens.*

microwave oven were more or less similar to that of twenty four hours strength of air dried specimens. (Graph III and IV). Thus microwave oven drying technique offers considerable dry strength in minimum time interval. Canay Senay et al also reported the similar findings in their studies[1].

The further increase in the strength of die materials at 48 hours could be due to the calcium sulfate dihydrate being converted to anhydrous calcium sulfate as it was loosing its water of recrystalization. This is a phenomenon common to calcium sulfate materials at temperatures above 200F[5].

Tuncer N. et al[9]. observed the optimal length of drying time and degree of power for the microwave oven drying method. They recommended use of microwave oven with low power level. The microwave used in this study had a output power of 800 W and a frequency of 50 Hz model OM 9925-E (Kenstar company).

This study has supplied some preliminary information about the use of the microwave oven in drying die materials. However, follow up testing must be performed on optimum length of microwave oven drying, the ideal time for microwave oven drying on the different gypsum products available, different power level of microwave oven and its effect on properties of die stone, effect of microwave oven drying on other properties of die stone like dimensional stability, hardness etc.

CONCLUSION

According to this study, the microwave oven dried specimens of both ultrarock and silkyrock tested for compressive strength and diametral tensile strength were significantly higher than air dried specimens at all time intervals. The two hours microwave oven dried samples were almost as strong as the air dried samples at 24 hours.

Thus microwave oven drying method of die materials is simple, effective and time saving as compared to conventional air drying method. This method could be considered for clinical applications in prosthodontics.

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Maxillofacial Rehabilitation for A Cancer Patient – A Clinical Report

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ABSTRACT

The challenge of restoring large maxillofacial defects has always perplexed the maxillofacial prosthodontist. This is especially so, when it is a postoperative cancer patient with an intraoral defect combined with an extension of the lip & cheek musculature leading to a facial deformity.

The successful restoration of these grossly mutilated faces is highly rewarding as the life of the patient is made worthwhile. However the factors limiting the success are lack of availability & cost effectiveness of the material, lack of definite prognostic end point of the treatment & inadequate mouth opening usually found in such cases.

A patient treated for squamous cell carcinoma of left cheek was provided with a combined intra and extra oral prosthesis. The oval shaped defect extending from left commissure was accompanied by erosion of maxillary & mandibular bone & antral communication. The intraoral prosthesis received retention from the teeth present on the contralateral side & tissue undercuts. The facial prosthesis was supported by intraoral prosthesis & the frame of spectacles. Improved speech, mastication, control on dribbling saliva & most importantly masking of facial disfigurement were the purposes served by the prosthesis.

INTRODUCTION

The challenge of restoring large maxillofacial defects has always perplexed the maxillofacial prosthodontists. The situation is even more complex with postoperative cancer patients having an intraoral defect combined with excision of lip and cheek musculature leading to a facial deformity.[5]

Cancer is a potentially life threatening disease with both physical and psychological components and to overlook the biobehavioural interdependence of this disease is to provide less than optimal management for the patient. In addition to fear and anxiety common with other cancer patients head and neck cancer patients carry the burden of functional disability and facial disfigurement. These patients not only suffer the inconvenience of loss in performance but also a psychological loss.

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Cobb in 1975 has written, "It is traumatic to experience mutilation of body image by loss of a limb, but to endure agony of a face, made grotesque to the point that even friends and family members avert their eyes while speaking or betray repulsions in other ways, is an excruciating punishment" and it is very true. Great strides have been made in the areas of reconstructive plastic surgery, however this treatment modality is often contraindicated in high risk or terminally ill patients having large defects. Prosthetics offer the advantage of being quick, reversible and medically uncomplicated rehabilitation.

REVIEW OF LITERATURE

In patients with maxillary defects treatment is always limited by difficulties with retention, movable tissue beds and lack of sufficient bone support[2]. Intraoral prognostic considerations are dependent on extent and nature of remaining maxilla, status of remaining dentition, the tongue and quality and amount of potential prosthesis bearing tissues. Preservation of periodontally sound teeth is important for retention and stability. Extraoral factors include status of upper and lower lips, margin location of the defect, mobility of supporting tissues, available undercuts, nature of supporting tissues and amount of scar tissue contracture. Taking into consideration all these factors, Leanne Sykes et al (2000) provided a combined intraoral and extraoral prosthesis for a patient treated for cancrum oris-an acrylic resin obturator to which a silicone facial section was attached[5]. According to Taylor T. D. (1985) solid acrylic obturators are not advocated due to their bulk, increased weight, insertion difficulties and discomfort when in place, especially with periodontally comprised dentition or limited intraoral opening[2]. Rouse and Chalian in 1985 stated that when there is an associated skin involvment, facial aspect of the defect is surrounded by tissues that move under function, changing the shape of the defect[3]. This requires replacement with a separate prosthesis made of a lighter, more resilient material than acrylic resin, thus forming a two piece prosthesis. It may be connected to the obturator by magnets, clips, resilient attachments or other mechanical retentive features.

To overcome the problems with availability and cost effectivity of silicone materials, heat processed acrylic resins are routinely used for maxillofacial restoration. Dr. Chandrasekharan Nair and colleagues have reported (1997) such a combined prosthesis made entirely of fiber reinforced acrylic resin.[4]

CLINICAL REPORT

A 52 years old female patient, Ajijbi Patel was referred to the Dept. of Prosthodontics, G. D. C. and H. Aurangabad by a team of surgeons for restoration of her facial and oral defect (Fig. 1). The patient herself was chiefly concerned about facial disfigurement followed by inability to eat and drink, difficulty in speech and lack of control on dribbling saliva. The oval shaped defect on the left side of face extending from the left commissure, measuring about 3 cm x 4 cm in size, up to the external oblique ridge area, was accompanied by erosion of maxillary and mandibular bone and oroantral communication on left side of the face. Intraoral examinations revealed totally edentulous upper and lower left quadrants except 21. An oroantral communication was present in left posterior region about 1.5 cm x 2 cm in size. Patient also had trismus, causing inability to open the mouth to the fullest extent.

Prosthodontic Management

Primary intraoral impressions were made with condensation silicones (putty consistency) without impression trays, due to lack of adequate mouth opening necessary for insertion of the tray. Impressions were carefully sectioned, removed and reassembled outside the mouth and diagnostic casts obtained.

Master casts were obtained by recording final impressions with the help of sectioned custom trays prepared on these primary casts. Routine clinical and laboratory procedures were followed to obtain the completed maxillary and mandibular prosthesis. Retention for the maxillary prosthesis was provided by clasps on 13 and 17 and use of favourable anatomical undercut in the defect. Magnets were used to join the

Fig. 1 : Preoperative photograph.

Fig. 2 : Maxillary Prosthesis.

2 parts of maxillary prosthesis (Fig. 2).

A preliminary impression for extraoral defect was made with irreversible hydrocolloid impression material and a facial moulage was obtained. A special tray was fabricated on the defect part of this model was used to record the borders of the defect (Fig. 3), silicone impression material was used for the same. A trial facial prosthesis was fabricated on the master model. It was tried on the patient's face for form and contours. After a satisfactory trial, it was processed in heat cured acrylic resin, to which suitable colour tints were added, to match the colour with facial skin. After proper finishing it was tried on patient's face, and borders and contours were adjusted accordingly. Surface of the properly adjusted prosthesis was reduced uniformly by about 1 to 2 mm. Silicone impression of a patients face with similar contours was impressed on the prosthesis with freshly mixed acrylic in it. After polymerization of the resin the surface of the prosthesis was properly finished. This completed the fabrication of facial prosthesis (Fig. 4). Superomedial portion of the prosthesis was joined to

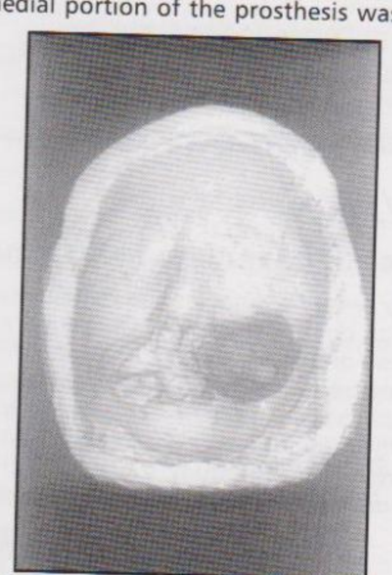

Fig. 3 : Facial moulage with special tray.

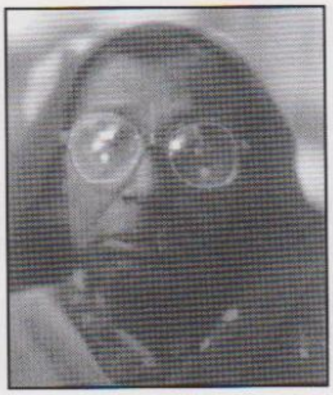

Fig. 4 : Completed Facial Prosthesis

the frame of spectacles with chemically cured acrylic resin.

DISCUSSION

A combined intraoral and extraoral prosthesis was provided for the patient treated for squamous cell carcinoma of left cheek mucosa. Trismus due to various causes, limited the intraoral procedures. This led us to use putty silicones without impression trays for primary intraoral impression and sectioned custom trays for final impressions.

Nonanatomic teeth were used as the patient was unable to produce repeatable CR position. Though silicones are the best known materials for facial restorations, heat cured acrylic resin was used due to lack of availability and cost effectivity of silicones.

Magnets allowed sectioning of that maxillary prosthesis and thus facilitated easy insertion and removal.[1] Merging the superior border of the prosthesis with frame of spectacles helped in retention of the prosthesis along with masking the most prominent border of the same.

Basically surgical reconstruction of the facial defect would have best served the purpose (in an otherwise healthy individual) but the debilitated condition of the patient, unpredictable response of surrounding tissues to surgery and terminal nature of the disease, left us with only the prosthetic choice of treatment.

SUMMARY AND CONCLUSION

The remaining life of the patient was made tolerable with provision for intraoral and extraoral prosthesis, by closing facial and oral defects.

Restoration of speech, mastication and control of dribbling saliva were the associated benefits all due to re-creation of an oral seal.

This prosthodontic rehabilitation boosted the self esteem of the patient enabling her to lead a normal social life in her social circle.

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Abstract

INFLUENCE OF CORE BUILD UP MATERIAL ON THE FATIGUE STRENGTH OF AN ALL-CERAMIC CROWN

Clinically relevant variables and testing methods have not been used to investigate the effects of core build-up materials on the strength of all-ceramic restorations.

The aim of this study was to evaluate the compressive strength of Optimal Pressable Ceramic (OPC) all-ceramic crowns supported by 1 of 3 different core materials and subjected to static all cyclic loading in air or water.

Within the limitations of this study, the mean compressive strength of OPC crowns tested in water was significantly different under cyclic versus static loading.

The results of this study suggest that, under simulated oral conditions, cyclic loading may provide a more realistic indication of the clinical performance of all-ceramic crowns than static loading.

Shereen S. Azer B.D.S., M.Sc., Ms. et all
(J Prostnetic Dent 2001; 86:624-31)

Feature for Post Graduate Students in Prosthodontics

Mrs. S. J. Nagda, M.D.S.*

"No biological entity is a point, it is always a range". The statement is true to its last word. We cannot be rigid and dogmatic in our views while treating a patient. The response to treatment is differently shown by every patient. Adaptation is in the nature of every living being. Yet we have to begin in a disciplined manner, follow certain procedures meticulously and yet remember to deviate as per the needs of the case. This column will deal with all those questions we have in our mind regarding the 'School of thought' as we put it when controversies arise. Here, care has to be taken lest we create further controversies and ambiguous situations. How often it comes to the mind of a candidate who is appearing for Post Graduate exams as to what a "Particular examiner likes or accepts?" May it be a clinical step, procedure or a concept. Post graduation, as the degree suggests, gives us the status of 'Master' in the field we specialise in.

Justification, critical evaluation and yet confidence to accept others view point if necessary, are the qualities a 'Master' has to develop. It is not what you or I want, but it is what is best suited for the particular case. So we have to have a "Patient Centered approach". In this issue, I put forward the impression concepts, techniques, materials and the different custom tray design for a complete edentulous case. I invite the Post Graduate Students, teachers and members of IPS to come forward and give their contributions to make this feature interesting worthwhile and interactive.

A prosthesis can be as true or as accurate as the impressions we have made.

The primary objective of making an impression of a dentulous arch is to obtain retention, support, stability, comfort, aesthetics and preservation.

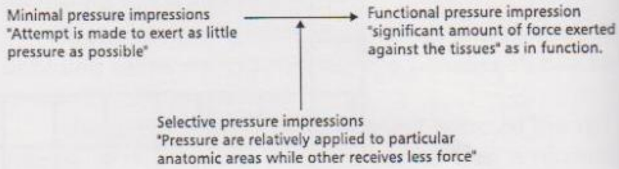
The principles to be kept in mind while making impressions are

1) Intimacy of contact of the material to the tissues so that fine details are recorded.

2) Broad tissue coverage within physiologic limits

Discussion continues to focus on whether the impression of denture bearing tissues is recorded in resting form or under load to simulate function. The forces directed to tissues during impression making can be decreased or increased by the viscosity and flow of the material, type of impression tray made and pressure extended upon the tray during making of the impression.

DIFFERENT METHODS SUGGESTED FOR MAKING IMPRESSIONS FOR AN EDENTULOUS CASE



Mucostatic principle in complete denture impression making is not considered by Prosthodontists today. Moreover minimum pressure impression technique suggests making impressions in a state of rest within the given limits possible. The pressure if any is minimum & widely distributed (The contemporary available materials & techniques do not permit pressureless impressions).

PRELIMINARY IMPRESSIONS

In complete denture prosthodontics success of every step is based on the precision with which every step has been carried out and accurate preliminary impressions help to control the accuracy of the remaining impression procedures.

Fig. 2 Materials used for making primary impressions.

1. Impression compound.
2. Irreversible hydrocolloid
3. Elastomers.

CUSTOM TRAY DESIGN

A planned relief is designed in order to carry out the impression procedure best suited for the case. It depends fig. 1(a) and (b) on the tissue tonicity and difference in displacablity of tissues in every patient and in same patient in different areas are dissimilar. The dentist should consider the following key aspects of design when preparing a special tray in a given clinical situation.

1. The material from which the tray is to be made.
2. The desired extension of the tray.
3. The thickness of any spacer to be placed on the cast.
4. The location of tissue stops.
5. The position, number and form of handle.

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used	Type of tray	Type of impression	Salient feature
n Compound	Stock metallic non perforated tray	Muco-Compressive	Can Support itself and modification of stock trays rarely needed
	Perforated tray	(Min. Pressure)	Extension of tray border with tray extension material as material cannot support itself.
s	Stock metallic tray with Adhesive applied	Mucocompressive	Putty type material used

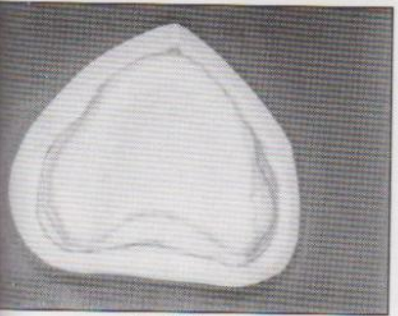

Fig. 1(a) :

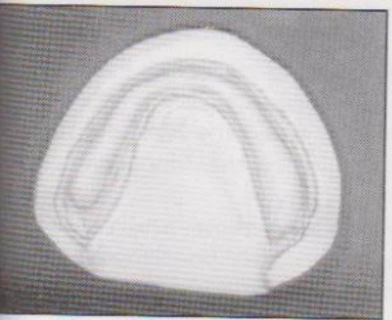

Fig. 1(b) :

ICKNESS AND DESIGN (fig. 2 (a) -g)

d by the material to be used in making ive impression. It is an important as the impression material to be used optimal even thickness to help improve accuracy. (It also ensures that the loaded o bulky and allows ease of placement in In addition the special circumstances that ccur in a given clinical situation may the supporting tissues are recorded in a ate of displacement. The technique by gests peripheral relief provided by the t an uniform space for border moulding correct positioning of tray is achieved g).

Impression material	Spacer thickness
Plaster	2mm
ZOE	0.5mm
Alginate	3mm
Elastomer	1.5mm

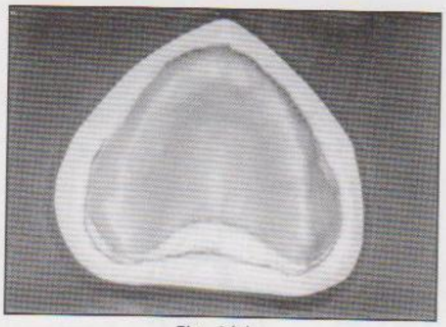

Fig. 2(a) :

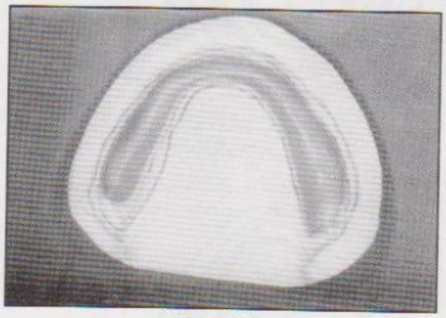

Fig. 2(b) :

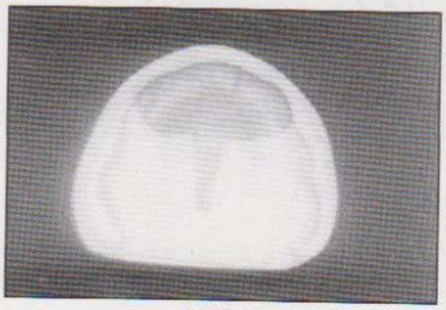

Fig. 2(c) :

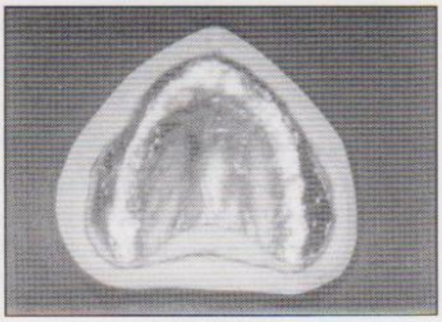

Fig. 2(d) :

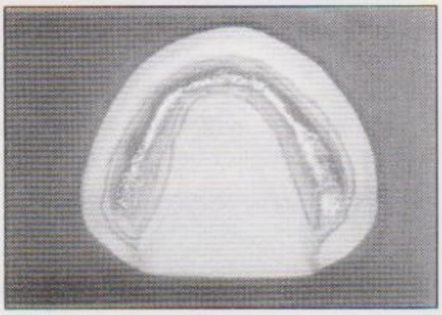

Fig. 2(e) :

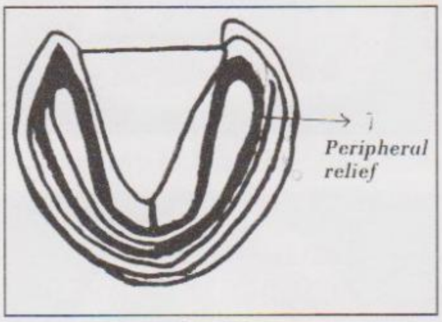

Fig. 2(f) :

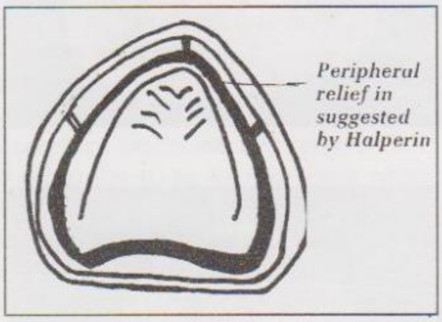

Fig. 2(g) :

TISSUE STOPS (fig. 3a)

It was suggested that tissue stops allowed the tray to be located in the mouth while maintaining the desired spacing for the impression material of choice. They are not essential in all cases, indeed they may not be effective in complete denture impression due to the compressibility of the supporting mucosa. They should ideally be located at three, preferably four spaced points around the arch.

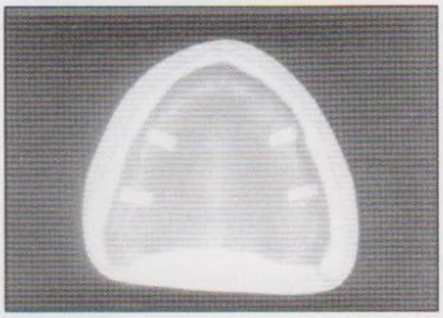

Fig. 3(a) :

TRAY HANDLES (fig. 4a and 4b)

Tray handles are particularly helpful when loading and placing custom trays in the mouth. They are also a potential source of inaccuracy especially in impression making for complete denture cases. This problem usually occurs when the handle distorts the form of the lip and hence the functional sulcus would be obliterated.

To overcome these problems it is advised to specify a single handle positioned in the midline of the upper tray which should be stepped or angled to avoid interference with the upper lip. For the lower tray, three handles are suggested, one in the midline in anterior region and the other two in the premolar region. The latter may be used to support the tray while the material is setting, thus preventing the distortion of the peripheral form. (Refer schematic diagram 4c.)

Fig. 4(a) :

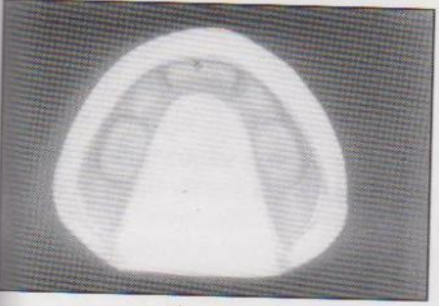

Fig. 4(b) :

...sue stops may appear in the final impressions ...sure areas and many times not all stops are ... as required. Hence, the contemporary books ...hors do not suggest the tissue stop inclusion. ...tomy of the maxillary arch in the zygomatic ...alar area) and posterior tuberosity area help to ... the tray.

...e pressure applied during an impression ... procedure is a subjective phenomenon. ...al tactile ability to assess the compressibility ...s depends on the practitioner's clinical ability ...erience.

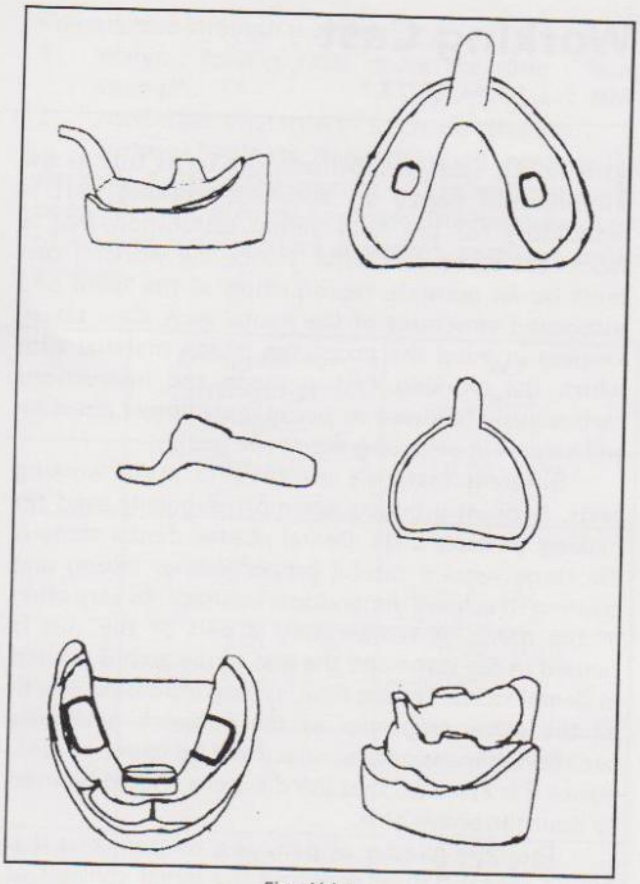

Fig. 4(c) :

...l used	Type of tray	*Type of impression*	*Salient feature*
...on ...nd	Stock tray. Can support itself and little modification of the tray required.	Mucocompressive	Non crystalline. Thermoplastic Good flow before intial setting time has been reached.
	Perforated tray. Extension of tray border of wax as material cannot support itself.	Minimal Pressure	
...rs	Stock metal tray with Adhesive applied	Mucocompressive	Hydrophobic Intimacy of contact is compromised in presence of moisture.

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Working Cast

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It is rightly said - a prosthesis can be as true as the impression hence an accurate working cast is mandatory for the final dental restoration that is fabricated to be successful. Hence the working cast must be an accurate reproduction of the teeth and associated structures of the dental arch. Care taken, keeping in mind the properties of the material with which the working cast is made and instructions meticulously followed as per manufacturers direction will help us in achieving the above goal.

Different materials are used to make working casts. Gypsum products are most popularly used for making working casts. Dental plaster, dental stone & die stone require careful proportioning, mixing and pouring to achieve dimensional accuracy. So very often in the name of economising a part of the cast is poured in die stone and the rest of the arch is poured in dental stone. Setting time, setting expansion & with all the other properties of the materials exhibiting variation, dimensional accuracy will be compromised. Hence it is essential that the die stone should be used to pour the entire arch.

The term 'plaster of paris' is a misnomer as it is only a nomenclature denoting the initial concept of wide spread use of plaster for sculpting & other purposes in the medieval ages in Europe. In dentistry we use the term dental plaster for which properties, working time, setting time are laid out as per ADA specification No.25 for dental gypsum products. Hence care should be taken in the laboratory to use dental grade plaster & gypsum products.

The cast should not be removed from the impression until it has initially hardened. The minimum time allowed for setting will vary from 30-60 min. depending on the rate of setting of gypsum products & the type of impression material used.

PROPORTIONING

Determine the optimum W:P ratio as per the manufacturers instructions. It should have adequate flow. A graduated cylinder is used for water. Powder should always be preweighed and never be measured by volume.

MIXING

The bowl should be parabolic, smooth and resistant to abrasion. Spatuala should have a stiff blade. After mixing a vibrator of high frequency and low amplitude can be used to decrease the air bubbles.

HAND MIXING

Measured amount of water is poured in the bowl. Preweighed powder is sifted in and mixing is continued until a smooth mix is obtained.

The guesswork of repeatedly adding water and powder to achieve proper consistency must be avoided. It yields an uneven set within the mass, resulting in low strength and distortion which is one of the main causes of inaccuracy in the use of gypsum products.

The preferred method is hand mixing for 15 sec. followed by 20-30 sec. of mechanical mixing under vacuum.

CARING FOR THE CAST

When the dry cast is immersed in water, it should be saturated with Ca_2SO_4. It should not be placed under running water as there may be abrasion of cast.

SETTING TIME

Increasing the amount of water in the mix results in fewer nuclei of crystallisation per unit volume and adds to the setting time.

The finer the particle size the faster the mix hardens, as not only the rate of solution of hemihydrate is increased but the gypsum nuclei are more numerous. Thus a rapid rate of crystalisation occurs.

The longer and faster the hemihydrate is mixed the shorter the setting time is.

SETTING EXPANSION

The setting expansion of gypsum is 0.06% on an average & can be as high as 0.5%. It is possible to control it to some extent to obtain the desired accuracy. Following are the guidelines.

1. Smaller the ratio of water to powder, the more the mix expands.
2. A longer mixing time results in formation of more nuclei of crystallization, and consequently more expansion.
3. Hygroscopic expansion follows the immersion of gypsum products in water during setting process.

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PRESSIVE STRENGTH

trengths of gypsum products are recognized : trength and dry strength. A gypsum product et strength has water in excess of the amount ed for hydration of hemihydrate left in the en. A gypsum product with dry strength has cess water driven off. Dry strength, which is at least twice the wet strength, is of extreme ance.

Compressive strength is affected by

1. Water : Powder ratio, more the ratio - lesser strength.
2. Accelerators/Retarders - Decrease strength.

Surface hardness depends upon compressive strength. Soaking the gypsum cast in water, glycerin, or oil does not alter the hardness. The only advantage of soaking is to produce a smooth cast that resists abrasion.

of Gypsum Product	Use	Compressive Strength at 1 hr/kg/cm^2	W:P ratio
ster Impression	For impressions and occlusal records	40 ± 20	0.50 - 0.75
ster Model	For primary working casts, flasking, mounting, etc.	90	0.45 - 0.50
ntal Stone drocal	For final working casts for RPDs & CDs.	210	0.28 - 0.30
ntal Stone h strength Densite	As die stone for FPD	350	0.22 - 0.24
ntal Stone h strength h expansion	For newer alloys like the base metal alloys that have greater casting shrinkage than noble metal alloys.	490	0.18 - 0.22
thetic gysum	Is a recent development.		

n to small details for the preperation of a working cast will go a long way towards the success of the is.

Abstract

THE USE OF PRE-BORDER MOULDED CUSTOM TRAYS IN COMPLETE DENTURE FABRICATION

During the fabrication of a complete denture, border moulding the custom tray can be a time consuming procedure. An alternate technique is presented that may be less tedious than the traditional procedure and may reduce chairtime for the clinician.

The traditional method involves the use of a custom tray that has been fabricated with borders that are trimmed 2-3 mm short of the final expected extension.

This article describes a method of border moulding in which the modeling compound is first added to the custom tray on the preliminary cast and then modified in the mouth.

Ali Bolouri, DMD, DDS and Sandra L. McCarthy
(J Prosthet. Dent. 2001; 86:655-7)

CLINICAL TIP

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Registration of the centric relation position is an important factor in the long range functioning of dentures and the preservation of supporting structures. Teeth are seldom lost all at once and therefore, the last position of the mandible is not always normal. When the patient remains edentulous for a considerable time, the meniscus and other tissues around the head of the condyle within the capsular ligament, gradually fill in the space created by the continually protruded mandible. This condition prevents the immediate placement of mandible in its most retruded position. For that reasons, the prosthodontist must expect to spend considerable time in establishing centric relation, because these tissues work back in their normal position rather slowly. However, this time is well spent since if the condition is not corrected the patient works back into the retruded position after the dentures have been inserted, with the result that the case will have to be remade.

One of the most difficult tasks to accomplish and one of the most important is to retrude the mandible to its centric relation. The following is one of the several methods which aids in retruding the mandible.

A bead of Wax about 3-4 mm in diameter is sealed near the posterior border of the maxillary record base. The patient is instructed to close the mandible with the tongue touching the bead of wax. This pulls the mandible back. The procedure is repeated several times until the operator is satisfied that he has achieved the retruded position. The patient is now instructed to bite. This method is very useful in securing tentative jaw relation.