



Palatal Lift Speech Aid

- A CASE REPORT

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Speech as formulated, perceived, and decoded is unique to humans and develops to become an individual's identity. As a learned function, speech is easily disturbed by ablative surgery or congenital malformation of the palatopharyngeal complex. Yet, speech is amenable to improvement by accommodation or training therapy.

CASE REPORT

An 8-year old girl was referred to the Department of Prosthodontics, Nair Hospital Dental College, Mumbai by the Department of Speech Pathology, Ali Yavar Jung National Institute for Hearing Handicapped. Her chief complaint was a nasal twang in her voice which deteriorated her speech tone and quality. The uniqueness lies in the fact that this change in her voice was of a sudden onset (one year back) without any specific underlying cause and no relevant medical history.(Fig 1).

EXAMINATION

Clinically, the hypernasal voice quality was present in normal conversation.

On intra-oral examination, a long low draped firm soft palate was seen (Fig. 1).

Movement of left side of the soft palate lagged slightly behind that of right side, thereby not facilitating velopharyngeal closure during articulation of speech. Voice quality seemed to improve upon elevating with a mouth mirror.

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INVESTIGATIONS

Previous report of Brain MRI, Audiogram, X-ray chest were normal. Neurologic examination revealed paresis of IX and X nerve due to unknown etiology.

RADIOLOGIC FINDINGS

Lateral Profile Cephalogram revealed a low draped palate leaving a wide space in the velopharyngeal part between the soft palate and the posterior pharyngeal wall (Fig2).

SPEECH EVALUATION

A thorough speech evaluation was carried out on a nasometer. (A nasometer is a microcomputer based system which measures the relative amount of nasal acoustic energy in an individual's speech). (Fig.3)

The patient's voice was low pitched, nasal and slightly hoarse. Her speech was characterised by nasal articulation of vowels and distortion of fricatives like |S| |Sh| |H| (स्, श, ह,) and affricates like |Ch| |J| |Al| (च, ज, अ) with occasional substitution by plosives |P| |T| |K| (प, त, क,) Nasalance scores revealed mild to moderate hypernasality.

DIAGNOSIS

The case was diagnosed as velopharyngeal incompetency with hypernasality of voice due to compromised motor control of palate.

MANAGEMENT

The case demanded a multidisciplinary approach. It was decided to treat the patient with a palatal lift appliance, which would act as a speech aid coupled with supportive speech therapy. Counselling of the patient as



well as parents was needed for positively reinforcing their attitude towards acceptance of the problem and also to receive their co-operation for effective treatment results.

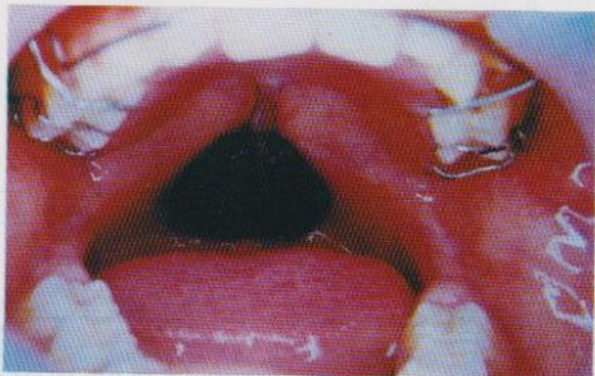
FIG. 1 LOW-DRAPED SOFT PALATE



PROCEDURE FOR FABRICATION OF THE PROSTHESIS

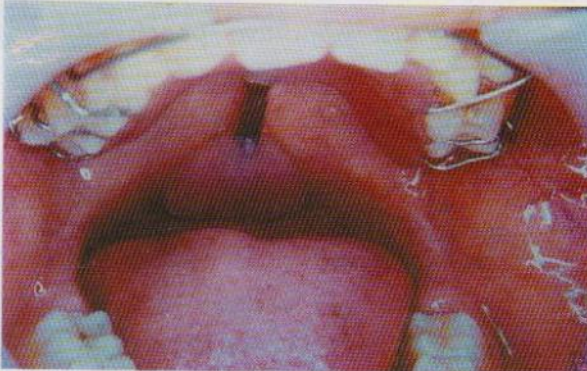
After selection of an appropriate stock tray, an initial lift was achieved with impression compound. The Final Impression was made in Alginate impression material and final casts procured. A prosthesis was fabricated with 2 Adams Cribs on $\overline{6}$ and a labial bow acting as the retentive components. A half cut palatal bar extended posteriorly to retain the velar bulb

FIG 2 PALATAL LIFT PROSTHESIS (SPEECH BULB MODIFICATION WITH LOW FUSING COMPOUND)



which was shaped like a beaver's tail. The prosthesis was tried in the mouth for the accuracy of fit. A lateral cephalogram was again taken with prosthesis in mouth which demonstrated elevation of soft palate.

FIG 3 PALATAL LIFT PROSTHESIS IN PLACE



NASOMETRIC EVALUATION AFTER WEARING THE PROSTHESIS

A speech evaluation was again carried out with the prosthesis in the patient's mouth and an instantaneous improvement in speech was noted. Necessary modifications were made with low fusing compound to alter the size and shape of velar bulb to achieve the required lift until the nasalance scores were satisfactory. The distinctive character of consonant articulation was greatly improved and hypernasality reduced considerably.

The prosthesis was delivered to the patient and she was advised to undergo regular speech therapy training as the palatal lift prosthesis is a speech aid and not a means of speech correction.

RECALL

The patient has been wearing the prosthesis for over a year with no reported discomfort. After complete eruption of permanent teeth, a definitive prosthesis will have to be fabricated. The patient would have to wear this speech aid till there is sufficient return of muscle function for production of normal speech quality.

DISCUSSION

The rationale for construction of restoration providing the palatal lift has evolved from speech problem associated with insufficient velopharyngeal closure.



Prosthodontic Rehabilitation Following Maxillary Cancer Surgery

- An A.I.I.M.S. Experience Over 2 Decades

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ABSTRACT

Oral cancers are commonly encountered in India and are treated widely by maxillectomy. Obturators are used in the rehabilitation of such patients. Surgical, intermediate and definitive obturators are designed to rehabilitate the maxillectomy patients at different post-operative stages. A retrospective analysis of 278 maxillectomy patients treated with 545 obturators at a tertiary care centre in India was carried out. According to Aramany's classification for maxillary defects, Class I & II were the commonest defects in partially edentulous patients. Acrylic resin was the commonly used material in the fabrication of obturators. Patient turnout for intermediate and definitive obturators was low. Better patient education and integrated team approach are essential for the successful rehabilitation of maxillectomy patients. An A.I.I.M.S. experience of prosthodontic rehabilitation following maxillectomy is discussed.

KEY WORDS : Maxillectomy, Obturators

INTRODUCTION

Oral cancer constitutes the 6th most common cancers in the world. One third of the Indian cancers are estimated to be oral cancers and

95% of them are related to oral habits. The common treatment modalities of oral cancer include surgery, chemotherapy and radiotherapy. Radical surgery for the cancer of maxilla creates extensive loss of hard and soft tissues. Maxillary defects often result in abnormal connection between the mouth and the nasal cavity or between the mouth and the maxillary sinus causing speech impediments, nasal regurgitation, restricted mastication and also cosmetic disfigurement. The patients with small oro-antral and oro-nasal defects may be amenable to surgical closure, however patients with large defects need to be rehabilitated by prosthodontic means using obturators². Aramany³ classified these defects of maxilla into six classes depending on location of resection i. e. Class I - midline resection, Class II - unilateral resection, Class III - central resection, Class IV - bilateral ant - post resection, Class V - posterior resection and Class VI - anterior resection.

Obturators were first introduced by Ambroise Parie, a French maxillary surgeon. It consisted of a simple disc attached to a sponge. The sponge was inserted into the defect and increased in size by absorbing secretions and drew the disc tightly over the defect. Gutta percha was used for surgical obturators in 1957 by Steadman. In 1965, Payne and Welton⁴ presented an implantable obturator with mechanism similar to airvalve tyre and in 1966 Boucher and Heupel⁵ used magnets between obturator and maxillary dentures. Ampil⁶ and associates designed the hollow obturator bulb with silicones in 1967.

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Subsequently Ohayama⁷ and associates in 1975 presented a technique using heat cured acrylic resin, autopolymerizing acrylic resin and room temperature vulcanising (RTV) silicone rubber to construct silicone obturators over hollow resin shims. Materials like heat vulcanising (HTV) silicones, polyurethane, soft acrylic resins were also developed and used in construction of obturators. From 1980's, the implants played a successful role in the retention of maxillary obturators. Recently, light-cure acrylic resins⁸ have also been used in the construction of obturators.

Obturators are therefore classified into 3 types on the basis of time of fabrication :-

i) Surgical ii) Intermediate iii) Definitive

I. Surgical Obturator

Surgical Obturators are fabricated prior to surgery from preoperative impressions and inserted at the time of surgery in the operation theatre. The main advantages are :-

- a) Provides a matrix for placement of surgical dressing.
- b) Reduces oral contamination of wound during immediate post-surgical period
- c) Reproduces normal palatal contour for effective speech
- d) Permits deglutition and early removal of naso-gastric tube
- e) Reduces psychological impact of surgery by making post operative course easy to bear
- f) Reduces period of hospitalisation
- g) Reduces scar contracture and disfigurement

II. Intermediate Obturators

Intermediate obturators are fabricated from post operative impressions and inserted normally 2-4 weeks after surgery. The main advantages are :-

- a) Improves speech and mastication and reduces nasal regurgitation better than

surgical obturator by extension completely/partially into the defect and utilisation of undercuts to enhance retention and stability.

- b) Improves esthetics by preventing collapse of tissues.

III. Definitive Obturators

Definitive obturators are given 2-3 months after the surgery, when there is no evidence of recurrence of any malignant lesion. Its advantages are :-

- a) Production of near normal speech sounds
- b) Improvement in facial esthetics because of anterior teeth and in mastication due to posterior occlusion
- c) Emerging of a reassured happy individual

AN A.I.I.M.S. EXPERIENCE

Despite a high incidence of oral cancer and wide usage of maxillectomy as therapeutic procedure, obturators have not been widely employed as a rehabilitation modality in India. To recapitulate the evolution of prosthodontic management of maxillectomy defects in India, we have conducted a retrospective study of 278 maxillectomy patients treated at All India Institute of Medical Sciences, New Delhi over a period of last twenty years from 1978 to 1997.

THERAPEUTIC PROTOCOL

Therapeutic protocol included a detailed pre-operative dental evaluation at least 48-72 hours prior to surgery. During this examination pre-operative impressions of the oral cavity were made. The extent of resection and the teeth to be extracted during surgery were determined after discussions with the surgeon. The maxillary cast was altered to simulate the proposed surgical resection. Teeth to be included in the resection were removed from the cast but the alveolar ridge was maintained. Residual alveolar ridge was trimmed mostly on the labial and buccal surface to reduce stresses during soft tissue closure. Surgical obturators



were fabricated using cold cure acrylic resin and stainless steel wire clasps in dentulous patients (Fig.1). Surgical Obturator in position

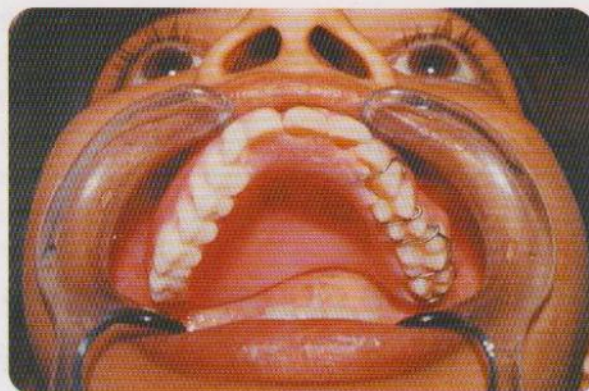


Clear resin was used so that extensions and possible pressure areas could be easily visualized during surgery.

2-4 weeks after the surgery when the defect had stabilized i.e. the continuous changes had become minimal, intermediate obturators were considered. Impressions were made extending partially or completely into the defect and hollow bulb heat cure acrylic resin obturators were fabricated (Fig.2). Intermediate obturator



2-3 months after the surgery, depending on individual patient response to surgery, radiation, and chemotherapy, definitive obturators were considered. Impressions were made extending completely into the defect. Hollow bulb obturators were constructed following the principle of conventional denture fabrication in heat cure acrylic resin (Fig.3).



The artificial anterior and posterior teeth improved esthetics, phonetics and functions of mastication and swallowing. In majority of the patients, heat cure acrylic resin was used as the material of choice for fabrication of definitive obturators.

RESULTS

The patients in this study belonged to the age range of 11 to 80 years with 47.5% patients in the 5th - 6th decades of life. Two-third (64.02%) of the patients were males reflecting a high incidence of oral malignancies among the male population in India (Table-1)

TABLE - 1
DISTRIBUTION OF CASES ACCORDING
TO AGE GROUP AND SEX

NO. OF CASES				
Age group (Yrs)	Male	Female	Total	n (%)
11-20	18	11	29	(10.4)
21-30	23	23	46	(16.5)
31-40	25	18	43	(15.5)
41-50	44	25	69	(24.8)
51-60	47	16	63	(22.7)
61-70	18	5	23	(8.3)
71-80	3	2	5	(1.8)
Total	178	100	278	(100)



Oral carcinomas constituted the etiologic lesion in about 69.4% of the patients, squamous cell carcinoma being the commonest followed by adenocystic carcinoma (Table-2)

TABLE - 2

DISTRIBUTION OF CASES ACCORDING TO HISTOPATHOLOGICAL DIAGNOSIS

DIAGNOSIS	NO. OF CASES	
	n	(%)
Squamous cell carcinoma	142	(51.1)
Adenocystic carcinoma	27	(9.7)
Other carcinomas (Mucoepidermoid, Basal Cell, Verrucous etc.)	24	(8.6)
Sarcomas	13	(4.7)
Miscellaneous	72	(25.9)
TOTAL :	278	(100)

Out of the 278 patients who received surgical obturators, 8.6% (n=24) of the patients were completely edentulous. Only 59% (n=164) of the patients received intermediate obturators and only 37% (n=103) received definitive obturators. The remaining were lost to follow up. No change was seen in the percentage of patients who were provided intermediate and definitive obturators during the 4 quarters of the analysis period. (Histogram Ref. Next Page). 66.1% (n=168) of the defects belonged to Class-II type indicating them as the commonly encountered defect. The next common defects were Class-I 21.7% (n=55) followed by Class-IV 5.5% (n=14), Class VI comprising 0.4% (n=1) was the least encountered defect. 2.8% (n=7) of the defects were Class-III and 3.5% (n=9) of the defects were Class-V. Surgical obturators were provided for all the 254 partially edentulous patients. Intermediate obturators were provided in only 55.1% (n=140) of the patients and patients with Class-II type defects received the maximum number of intermediate obturators 51.4% (n=72), while only 33.5% (n=85) of the patients received definitive, obturators. (Table-3).

TABLE - 3

Distribution of obturators according to Aramany's Classification for maxillary defects

Type of Defect	Surgical (n%)	Intermediate (n%)	Definitive (n%)	Total (n%)
Class-I				
(R)	25 (21.7)	20 (33.5)	14 (32.9)	130 (27.2)
(L)	30	27	14	
Class-II				
(R)	88 (66.1)	45 (51.4)	23 (48.2)	281 (58.7)
(L)	80	27	18	
Class-III	7 (2.8)	4 (2.9)	4 (4.7)	15 (3.1)
Class-IV	14 (5.5)	11 (7.9)	8 (9.4)	33 (6.9)
Class-V	9 (3.5)	5 (3.6)	3 (3.6)	17 (3.5)
Class-VI	1 (0.4)	1 (0.8)	1 (1.2)	3 (0.6)
TOTAL	254	140	85	479 (100)



The maxillectomy defects in completely edentulous patients were classified into 2 types - non-central and central defects.

The non-central group included bilateral maxillectomy defects where both the alveolar ridge and the palate were

resected. In the central defects, only the center of the palate was excised and the alveolar ridge was left intact. All the patients received surgical and intermediate obturators but only 75% (n=18) received definitive obturators (Table-4).

TABLE - 4

**DISTRIBUTION OF DEFECTS AND OBTURATORS
IN THE COMPLETELY EDENTULOUS GROUP**

Type of Defect	Surgical (n%)	Intermediate (n%)	Definitive (n%)	Total (n%)
Non Central	21 (87.5)	21 (87.5)	15 (83.3)	57 (86.3)
Central	3 (12.5)	3 (12.5)	3 (16.7)	9 (13.7)
TOTAL	24	24	18	66 (100)

DISCUSSION

Oral cancer constituting about 1/3 of the total body diagnosed cancer, were most often related to oral habits. According to present study, squamous cell carcinomas were the commonly encountered malignancies seen more often in the 5th and 6th decades of life. The male preponderance could be attributed to higher tobacco use by men and the gender bias in our country facilitating more male availing medical care than women.

The successful rehabilitation of maxillectomy defects depends upon team approach where the surgeon, radiotherapist, maxillofacial prosthodontist, speech therapist, oncologist, psychologist and social workers are involved. The retrospective analysis of the patients rehabilitated during the last 20 years from 1978 to 1997 showed that out of the 278 patients who received surgical obturators, only 59% received intermediate and 37% definitive obturators. It was also seen that the total

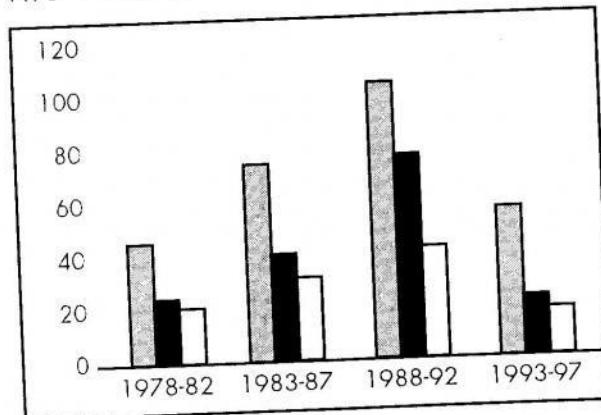
number of maxillectomies performed over the last 20 years was much more but only 278 patients were being referred for obturators. This shows that though prosthodontic rehabilitation is an important aspect of the total health care, yet this is the most neglected phase of the treatment, probably due to ignorance or lack of knowledge regarding the benefit of prosthodontic rehabilitation. Other reasons include lack of motivation among the patients to come back for intermediate and definitive prostheses after the surgical prosthesis is inserted.

The acrylic resin is still commonly used even today in the construction of obturators mainly because of its tissue compatibility, environmental resistance (does not deteriorate by loss of colour or contour) and ease of adjustment. Though it is associated with number of disadvantages including lack of flexibility, pressurised areas due to rigidity and no compensatory movement of the prosthesis



with movement of adjacent facial tissues, yet it still remains the material of choice. The majority of our patients received obturators made up of acrylic resin.

Histogram - Distribution Of Surgical, Intermediate and Definitive Obturators In Two Decades



SUMMARY

Treating patients with maxillectomy defects is a challenge and needs an integrated team approach. Timely referral by the treating surgeon helps the prosthodontist to adequately design and deliver a suitable surgical obturator. It is critical for the treating prosthodontist to have a thorough knowledge of the malignancies of the oral cavity, their early diagnosis and treatment modalities, as they influence the prosthodontic intervention. The final prosthesis can be a simple temporary treatment for a terminal patient or it can be a definitive treatment for the surgically compromised patient but there is no doubt that these people are most beneficially rehabilitated by the maxillofacial prosthodontist. There is a need for more efficient and co-ordinated patient education programmes to increase the patient awareness and acceptability of intermediate and definitive obturators. It is an

accepted fact that unless a well coordinated, efficient and integrated rehabilitated approach is not developed, total care and rehabilitation of maxillectomy patients will remain a distant dream.

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Reprint Request

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Immediate Treatment Partial Denture Incorporating The Patient's Natural Teeth - A Treatment Modality

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ABSTRACT

A patient with grade III mobility of 21,22 reported to the Department of Prosthodontics. Treatment modality which was followed consisted of extraction of the teeth, root resection of the involved teeth with biomechanical preparation in order to remove the necrotic pulp and obturation of pulp chamber with glass ionomer cement. The crowns of the extracted teeth were then incorporated in the immediate treatment partial denture.

INTRODUCTION

The immediate denture serves as much more than a stepping stone between extractions and a temporary denture. A temporary denture is constructed as soon as it is discovered that the immediate denture does not fulfil the requirements of function and esthetics. A patient may maintain an immediate denture for long periods of service without any pathologic changes of the ridge or border tissues. Hooper states that the patient who is about to lose his natural teeth is usually concerned about the probable results^{1,2}.

Schlosser states that immediate dentures are indicated for practically all patients, if age and general health permit.

Swenson feels that "immediate denture construction must be planned to give the patient long range services."²

The psychologic impact is great when the patient is confirmed with the loss of his maxillary anterior teeth. He can recover quickly from the emotional shock of losing the teeth, however if esthetic appearance and masticatory functions are provided. In sensitive patients, the reaction is quite acute and these patients must be provided with an adequate, immediate substitute for their natural teeth. Some men associate the loss of their remaining teeth with a loss of virility. Many women associate it with reaching old age. The dentist must explain that these are misconceptions and are based on fantasy.

Visual charts, photographs and casts of previous immediate prosthetic replacements are available, with the help of which, if explained properly, the fears of the patient can be allayed.

If the denture does not restore function, facial contours and proper tooth positions, a serious psychologic situation may arise. The initial denture experience of many patients is a serious one; one cannot treat this phase of prosthodontics lightly.

DEFINITION

An immediate treatment partial denture is defined as a dental prosthesis constructed to replace the lost dentition and inserted immediately after extraction of the teeth.

REQUIREMENTS

- Compatibility with surrounding oral environment
- Restoration of masticatory efficiency.

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- Harmony with the functions of speech, respiration and deglutition
- Esthetic acceptability.
- Preservation of remaining tissues

ADVANTAGES

- The denture acts as a bandage or splint to help control bleeding, to protect against trauma from the tongue or adjoining teeth, to keep mouth fluids and particles of food from entering the tooth sockets and to protect the blood clot and thus promote rapid healing.
- Patients seem to regain adequate function in speech and mastication much sooner than when the lips, tongue and cheeks are unsupported for a time.
- Many patients are not as reluctant to have diseased teeth removed if they can have them replaced immediately. They can carry on social and business activities without embarrassment.
- The technique is simple.
- No articulator is required unless major changes from the existing dentition are planned.
- The denture teeth duplicates the existing teeth in appearance and occlusion³.
- The natural teeth aid in establishing the vertical dimension of occlusion.
- The technique can be used where anterior teeth replacement is needed.
- These dentures will serve as temporary dentures until a permanent solution is sought.
- The patient can be conditioned to accept permanent dentures at a later stage.

DISADVANTAGES

- The immediate denture does not replace the stimulation that was supplied to the bone by the natural teeth.
- The resorption of bone and the shrinkage of unhealed soft tissue are greater and faster than the changes of healed tissue. These changes require new impressions to keep the denture base adapted to the basal seat. The remounting of dentures to refine the occlusion is necessary whenever the denture base has altered.
- There is no opportunity to observe the anterior teeth at the try-in appointment therefore the esthetics cannot be evaluated until the denture is inserted.
- The procedures are precise and required more appointments particularly during the adjustment phase.
- When patient's natural teeth are incorporated, the chance of accumulation of plaque and debris is increased compared to artificial teeth incorporation. This may be due to the organic and inorganic nature of natural teeth.
- Discoloration of natural teeth may occur.
- Retention grooves to be incorporated in natural teeth for retention in the acrylic.

INDICATIONS

1. Severe mobility of certain teeth.
2. Bleeding problems make it desirable to limit the coordination with the physician to a single episode.
3. High esthetic requirements and/or extensive esthetic changes are desired.
4. Rapid results are desired.
5. Full mouth extraction is desired (complete dentures)³.



CONTRAINDICATIONS

1. In patients with diseases of a debilitating nature. It would be desirable for people with debilitating diseases to have dentures for masticatory purposes but with modern methods of preparing food and the availability of vitamin therapy, the presence of teeth is not necessary to meet nutritional requirements over short periods of time⁴.
2. In patients in whom multiple extractions might be unwise because of systemic conditions including cardiac disturbances, endocrine gland disorders, blood dyscrasias and those with a slow healing potential.
3. In patients who are emotionally disturbed.
4. In patients whose mental capacity does not allow them to comprehend their responsibility in this service. These include aged individuals who are incapable of remembering instructions.
5. In patients who are indifferent or unappreciative. They do not follow advice and attempt feats with their dentures which they could not perform on natural teeth.
6. In patients with acute periapical or periodontal pathosis.
7. The patients who have extensive bone loss adjacent to the remaining teeth. They will have a rapid, ever changing support for the dentures. These changes are reflected in the occlusal relations of the teeth and unless these relations are kept in harmony, extensive bone loss will result.

CASE REPORT

A male aged 26 yrs. with Grade III mobility of 21 & 22 reported to the Department of Prosthodontics, S.D.M.C.D.S. for evaluation and possible future replacement of the same.

INTRA ORAL EXAMINATION

It showed presence of stains on the teeth with chronic generalised gingivitis and localised periodontitis in relation to 21 and 22. Grade III mobility was present on 21 and 22.

EXTRA ORAL EXAMINATION

It showed protrusion of 21 & 22 which was unacceptable to the patient.

Due to poor oral hygiene the patient was referred to Department of Periodontics for oral prophylaxis and oral hygiene instructions.

Patient later reported back to the Department of Prosthodontics where the various treatment modalities were explained. Since the patient was 26 years of age and was very conscious of his appearance, the treatment modality selected for him considering his socioeconomic status was an immediate treatment partial denture incorporating his natural teeth.

PROCEDURE

Maxillary and mandibular impressions were made with an irreversible hydrocolloid impression material (Kromopan). Casts were poured with dental stone. The patient was then referred to the Department of Oral Surgery for extraction of 21 and 22. The teeth were extracted carefully so as not to remove or damage the buccal plate of cortical bone. The interseptal bone was removed and the buccal and lingual plates were compressed by finger pressure. The sharp gingival bony points were smoothed.

The palatal and buccal flaps were approximated and sutured to aid in primary healing. The extracted teeth were cleaned of blood and soft tissue and kept in normal saline during the postextraction period.

The roots of the two teeth were resected so that the crown could be approximated in the



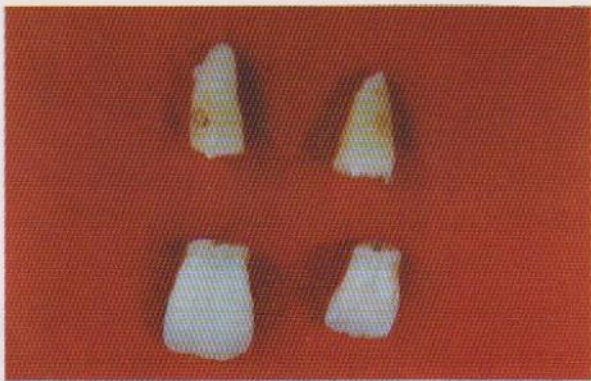
edentulous space. The severed crowns were undercut with an inverted cone bur. The pulp chamber was debrided with a root canal instrument and dessicated. It was filled with glass ionomer cement.



The teeth in the stone cast were cut off and the surface of the cast was prepared and rounded. The extracted teeth were placed on the stone cast and alignment with the other teeth was done using auto polymerising acrylic resin. The treatment partial denture was then fabricated using auto polymerising acrylic resin.

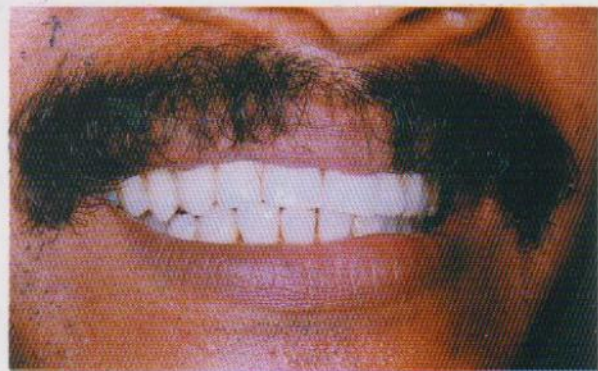
The entire assembly was placed in warm water for a few minutes. The denture was then removed from the cast and placed again in warm water bath.

The excess was then trimmed and the denture was polished and inserted in the patient's mouth.



CONCLUSION

A technique has been described which permits the development of esthetic harmony. This



technique makes it possible to use desirable natural anterior teeth in immediate dentures. Treatment partial immediate dentures must have specific requirements. There is little written information concerning diagnosis of an immediate treatment partial denture. Some of the advantages are questionable unless the treatment plan includes the application of basic sciences. It does not seem possible to consider these dentures as stimulus to formation of bone. The removal of osseous support at the time of placement of the immediate denture is not advisable⁴. The use of interim dentures provides an easier transition from natural teeth to dentures. The surgical phase is expedited, and patients progress to dentures which are similar in appearance to their natural teeth.