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CAST OR ACRYLIC SPLINTS-THEIR APPLICATION IN ORAL AND MAXILLOFACIAL SURGERY

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Acknowledgment

I am deeply grateful to my advisor, Dr BEHZAD RAHSEPAR chairman department of oral and maxillofacial surgery whose efforts made possible for me to complete this thesis.

Dedicated to : my parents

The most valuable teachers of my life , with whose excellent guidance and percious encouragment I found in my path of life.

And to ***my brothers and sisters*** that always support me .

CONTENTS

Preface

The use of various types of splints in the management of maxillary and mandibular fractures, in cosmetic, reconstructive and orthognathic surgery and in a variety of other surgical procedures involving the oral cavity is not new. (1)

In brief, one should strive to develop a technique that will assure the most accurate and positive reduction and fixation of the fragments. one should also seek to achieve this result by the simplest method that guarantee the desired end effect. (1)

Through the efforts of pioneers and creative thinkers our specialty continues to move forward to new heights. we must spread to people throughout the world the good things we have learned from them. (23)

As Einstein expressed so forcefully: A hundred times everyday I remind myself that my inner and outer life depend on the labours of the other man, Living and dead, and that I must exert my self in order to give in the same measure as I have received and am still receiving. (24)

ACRYLIC SPLINTS AND FRACTURE

INTRODUCTION

The following technique of applying splint is based upon experience derived from treating a large number of facial injuries over a period of time, including both world war II and the korean conflict. (1)

During this time a consicentious effort was made to develop an approach to these cases that incorporated practicability of approach, simplicity in application-and the greatest chance of eliminating future complications. (1)

Acrylic splint can be applied to many kinds of fracture and ensure good fixation.(2)

The dentist is admirably suited, owing to his knowledge of impression and laboratory techniques. (1)

JAW FRACTURES USING ACRYLIC SPLINTS

MMF (Max. Man Fix) is the most widely used method of treating maxillofacial fractures. (3)

Although the most complicated of fractures of the mandible can be successfully treated with a suitable selection of arch bar and ./45 mm soft stainless steel wire the other traditional techniques should not be lightly discarded. (4)

Acrylic splint has proved to be an effective method for the accurate reduction and stabilization of displaced anterior teeth and fractures of the alveolus encountered so frequently in children. (1)

Fractures of the jaw in children is rare by comparison with the incidence in adult, it is interesting to consider the possible reasons for this relative immunity. (5)

Below 5 years of age a child leads a protected life and is usually under strict personal supervision. and also possessed as it is of a greater degree of elasticity than that present in the older patient. Furthermore, the crowns of the developing permanent teeth are completely developed and the ratio of bone to tooth substance is comparatively high (5)

The immature mentality of the child makes cooperation with the operator difficult during treatment in many instances. Thus it will be seen

that a child is more likely to sustain a green stick type of fracture but that the union will occur within a relatively short period of time (5)

In children it is more difficult to make use of the teeth for fixation because deciduous teeth may either be insufficient in number or their roots may be resorbed and permanent teeth may be incompletely erupted. The shape of the deciduous crown is also not favorable for retention of wires and splints, being bell - shaped with little undercut area. (6)

Where immobilization was thought to be undesirable a prefabricated acrylic splint was used on the mandible(6)

Open reduction and Intra osseous wiring at the lower border was performed only in cases where the fracture was behind the tooth bearing area. (6)

Graham and peltier (1960) pointed out that callus forms early in children, and therefore late manipulation of displaced fragments is difficult. In children with mixed dentition slight derangement of the occlusion of deciduous teeth should be accepted because imperfections will be overcome with the eruption of the permanent teeth. (7)

In children a short peroid of 2 weeks of maxillomandibular fixation was used and was successful in every instance. (6)

Rowe and killey recommended a 3to4 weeks period of immobilization, but later workers found that a shorter duration period could be effective. (6)

A short period of fixation is advantageous because functional impairment following prolonged of degenerative changes in the joint cartilage has been noted in experimental animals subjected to jaw immobilization. (6)

The excellent blood supply of the facial region and the healing power of young bone seem to ensure rapid and uncomplicated healing. (6)

Ankylosis of the temporomandibular joint, which is a possible complication in fractures of the condyle, may be prevented by avoiding prolonged immobilization. (6)

It is possibe that the reduction in maximal mouth opening could also be minimized by shortening the duration of immobilization. (6)

We must stress that prosthetic acrylic described in many reports are very effective in treating mandibular fractures. (8)

We also use such splints in cases of difficult comminuted and unfavorable fractures, or when there is delayed healing. (8)

CLASSIFICATION OF ACRYLIC SPLINT

Acrylic splints were classified into four types: intermaxillary, lingual, labiolingual and cap.

INTER MAXILLARY TYPE

This type of splint is somewhat similar to the gunning splint that was described by gunning in 1866 [9]. Moodie applied this type of splint for the reduction and fixation of all kinds of fractures. [2] (FIGURE 1-1)

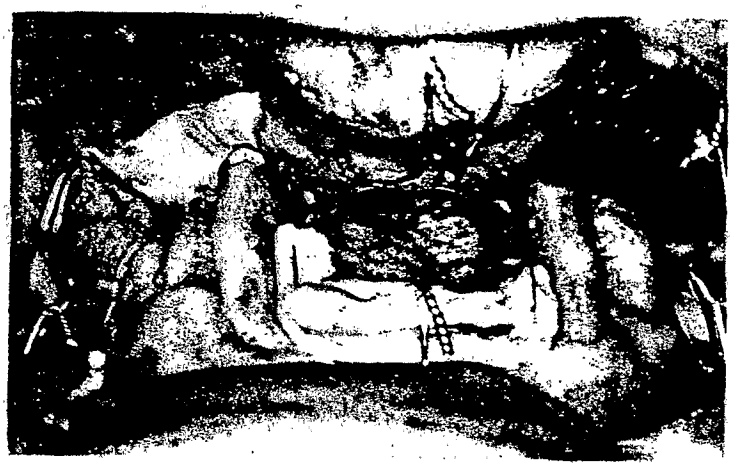

FIGURE 1-1

The intermaxillary types are used in cases who has lost multiple teeth or in edentulous cases. [2]

In particular, fracture of the mandibular condyle was frequently treated with this type of splint, because the fracture of the mandibular condyle needed prevention of mandibular retraction and restoration of the vertical dimension. (2)

Maxillary and mandibular splints placed using circumzygomatic wiring (around zygomatic arch) and circummandibular wiring. (20) furthermore, it can by combined with extraoral fixation by means of a chin cap. (2)

LINGUAL TYPE

The lingual type is used in cases of marked displacement of the fractured segments or in the repositioning of fracture of the alveolar process. This splint was also used in cases with more than two fracture lines or cases with a complicated fracture line that extended to both side of the arch, because the fractured segments in such cases tend to introvert medially this lingual type which fixes the fracture site from inside the dental arch is considered best for such cases. (2) (FIGURE 1-2)

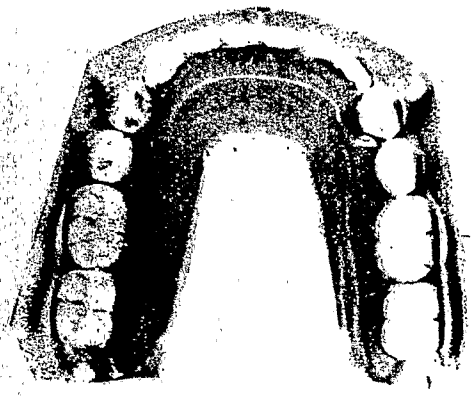

FIGURE 1-2

Fixation was achieved by wiring of the splint and teeth. furthermore, intermaxillary fixation using on arch bar on the labial aspect of the teeth was performed.

This was considered to add firmness of the fixation. (2)

LABIOLINGUAL TYPE

The labiolingual type is used to cases with a partially edentulous arch.(2)

We used this splint in cases in which the remaining teeth lacked firmness. It was also used in cases with primary or mixed dentition, because in such cases the crowns were not long enough to ensure effective fixation. Therefore, the labiolingual type that clasp, the teeth and alveolar process between the labial and lingual splint seemed best indicated for primary or mixed dentition. (2) (FIGURE 1-3)

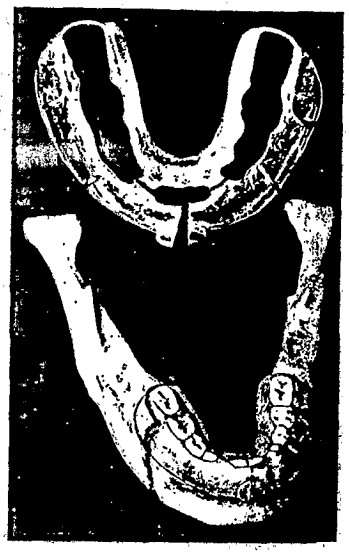

FIGURE 1-3

Fixation was achieved by circumferential wiring.

Furthermore, in adults, the labial and lingual splints were wired together with the teeth and supplemented by intermaxillary fixation. This caused more firmness in fixation. (2)

CAP TYPE

The cap type may be morphologically comparable to the cap splint* .(2)

It also resembles the fenestrated splint. This splint is used for fixation of permanent teeth with short crowns or the primary dentition. In agreement

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* These are constructed of a silver copper alloy. (11) For nearly 50 years the cast metal cap splint was the method of choice, in the united kingdom, for the immobilisation of dento-alveolar, mandibular and maxillary fractures. In recent times it has been superseded by alternative methods of fracture fixation. (12)

In the post-war years this device was adapted for segmental orthognatic procedures to hold the jaw fragments in the corrected position as planned on the models. (13)

with this scheme, we also use this type in cases of early stage of primary dentition. (FIGURE 1-4)

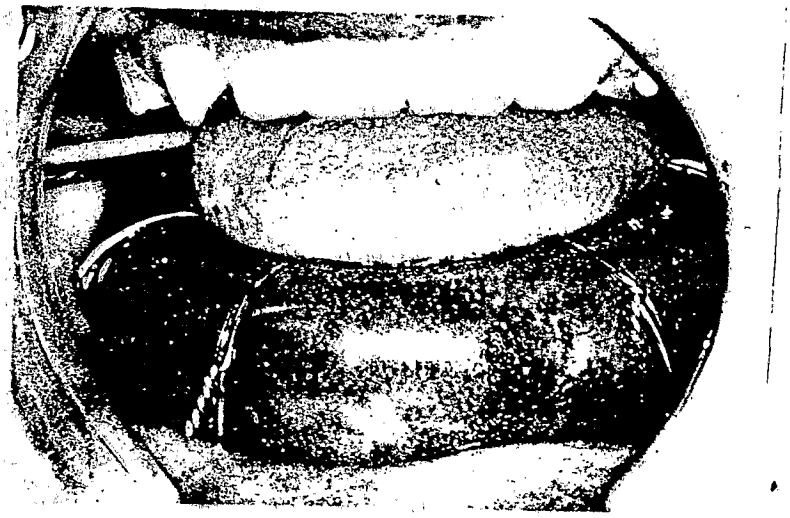

FIGURE 1-4

Fixation was achieved by circumferential wiring. (2)

This method seemed to ensure fixation in cases of incomplete eruption of deciduous teeth. (2)

IMPRESSION TECHNIQUE

The teeth should be properly cleansed and any heavy calcareous deposits removed. After this, impressions of jaws may be secured in alginate material with the regular tray. (1)

FABRICATION OF ACRYLIC SPLINT (Lingual type)

Clear acrylic material is preferred because it affords the opportunity to observe the tissues under the splint.

It is much easier to place the holes accurately, and wiring of the splint to the teeth is simpler. (1)

Root canal therapy, which fre quently becomes a necessity in the treatment of traumatic injuries involving the anterior portion of the mandible or maxilla, may be initiated without removing the splint by simply boring a hole through the acrylic material (1)

For fabrication: 1-Hydrocal cast which has been made from an alginate impression of dental arch. A pencil mark has been made to indicate the line along which the cast will be cut. (FIGURE1-5)

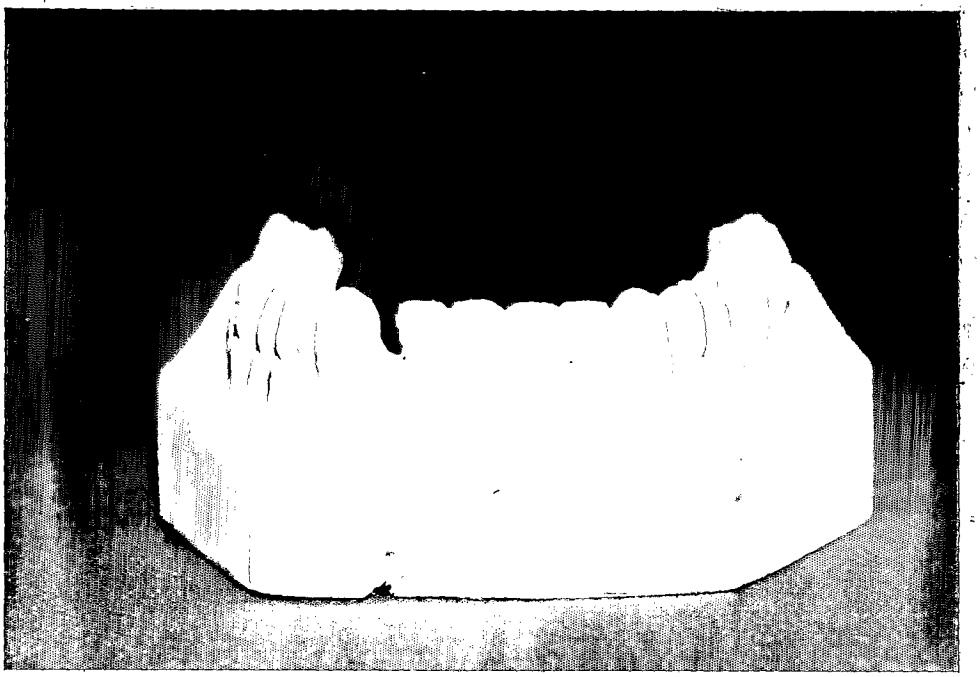

FIGURE 1-5

2. The two sections of cast have been reassembled to correct occlusion. Sticky wax is used to hold the two segments in their correct relationship until the base is reinforced with plaster. (1) (FIGURE 1-6)

3. Duplicate model are made from the reassembled cast.

4. Clear acrylic is replaced on the duplicate model.

5. Splints has been prepared for insertion by placing a hole through the splint at each interproximal space opposite the cervical line of the tooth. A shallow groove is fashioned between each two holes to accommodate the wire, and a notch is made in the distal ends of the splint. (1) (FIGURE 1-7)

After final polishing the splint is placed in the mouth, and the fracture is manually reduced and secured by wires around each tooth. (1)

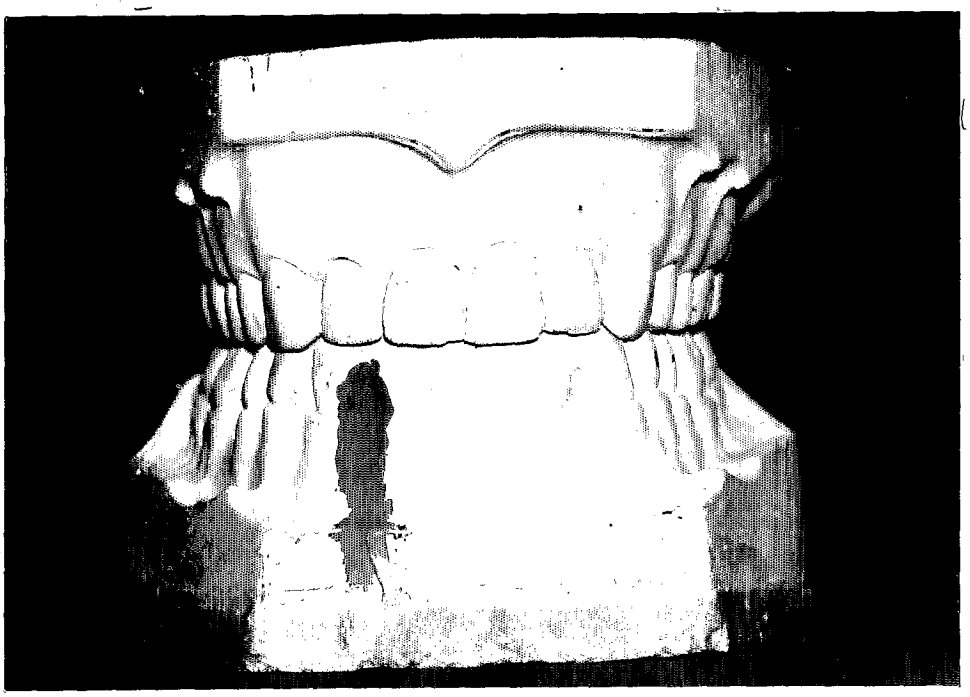

FIGURE 1-6

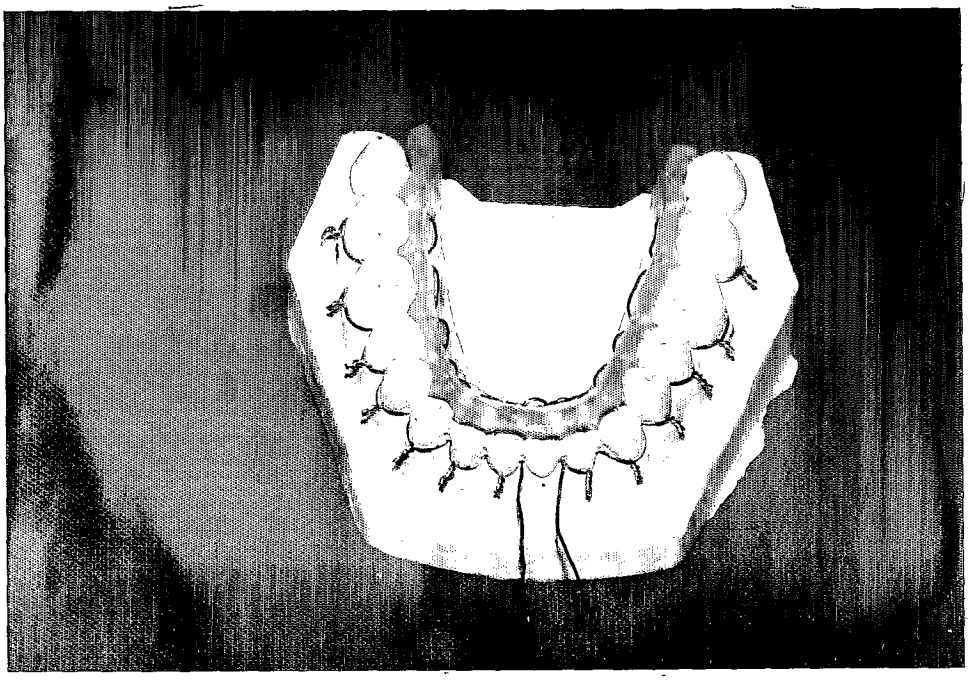

FIGURE 1-7

POSTOPERATIVE CARE

Daily irrigation with normal saline solution or mild antiseptic solution is desirable for the maintenance of good oral hygiene. The patient is taught to brush and irrigate the splint without disturbing the wiring.

He is also informed about a proper diet and cautioned to avoid hard candies, caramels, and other sweets. (10)

OTHER INDICATIONS OF ACRYLIC SPLINT

It has been emphasized repeatedly that both the general practitioner of dentistry and the specialist have the advantage of being able to utilize an almost unlimited variety of prostheses as adjuncts to surgical procedures.

The list that follows includes some of the prostheses that have proved effective in planned surgical procedures for the oral and supporting structures. (1)

1. Splints may be helpful in prevention of hemorrhage in certain instances. (14)

Surgery involving extensive palatal stripping with bleeding from the incisive foramen is an example. An alginate impression is taken of the teeth and palate preoperatively.