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"A Prospective Comparative Clinical Study On Hybrid Arch Bars And Conventional Erich Arch Bars "

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I. INTRODUCTION

Intermaxillary fixation (IMF) is a critical step in the management of facial trauma and reconstruction. This is done to ensure the inter-relationship of surfaces of dental occlusion, which is necessary in the reduction of traumatic or surgically induced fragments of the mandible and maxilla. IMF is used both intra-operatively to aid in Open Reduction Internal Fixation (ORIF) or in the conservative post-operative management of of closed reduction of fractures.

Several techniques are used for IMF. Various types of IMF are Direct Inter-dental Wiring, Multiple-loop wiring, Ivy eyelet wiring, Risdon wiring, Cap splints, Circumferential wiring, Transmucosal screws, Pre-cast Arch Bar, Modified Pre-cast Arch Bars, Resin Bonded Arch Bars, Transalveolar Screws, Embrasure Wires, Leonard Buttons, MatrixWAVE Arch Bars, Rapid IMF device, Erich Arch Bars and Hybrid Arch Bars.

BACKGROUND : Intermaxillary fixation (IMF), is a method used to secure the maxilla and mandible to each other into the appropriate dental occlusion. It is used to treat maxillofacial fractures. Currently, Erich Arch Bar (EAB) is the most widely used device for IMF. The Erich Arch Bar is applied to dental arches with circumdental wires. The application of EABs is associated with mucosal, dental and needle stick injuries. The patients with Erich Arch
Bars in mouth feel difficulty to maintain oral hygiene. The procedure of application of Erich Arch Bars is time consuming. The EABs cannot be fixed to complete or partially edentulous dental arches. Recently, Hybrid Arch Bar (HAB) has been introduced. The Hybrid Arch Bar (HAB) comes with eyelets, through which self-drilling locking screws are placed and directly fixed to bones of maxilla and mandible. The HABs are bone anchored arch bars. The application of HABs is less time consuming. The HABs can be applied to complete or partially edentulous dental arches. The patients with HABs in mouth can maintain proper oral hygiene easily. The application of HABs will not produce gingival injuries, and also the chances of needle stick injuries are less. The possible disadvantages of HABs are injuries to roots of teeth, mucosal injury, screw loosening, and hardware failure. There are very few studies comparing the conventional Erich Arch Bars with Hybrid Arch Bars and hence this study was carried out.

AIMS : The aim of this study was to compare the efficacy of Hybrid Arch Bar IMF method with Conventional Erich Arch Bar IMF method.

METHODOLOGY : 50 patients between age range of 18 to 60 years were randomly selected and distributed equally into two groups as Group A and Group B consisting 25 patients in each group. Group A patients were treated with Hybrid Arch Bar IMF method, and Group B patients were treated with Conventional Erich Arch Bar IMF method. The patients were assessed for the duration of the procedure from the beginning of device fixation till the end of IMF, the incidents of wire prick injuries to operator and iatrogenic injuries to patients, physical stability of the devices and oral hygiene status of the patients immediately after removal of the devices.

II. RESULTS

The purpose of this study was to compare the efficacy of Hybrid Arch Bar IMF method with Erich Arch Bar IMF method.

A total of 50 patients were randomly selected. Out of 50 patients, 31 patients were below 30 years of age, and 19 patients were 30 and distributed equally into two groups as Group A, and Group B consisting 25 patients in each group. Group A patients were treated with Hybrid Arch Bar IMF method, and Group B patients were treated with Erich Arch Bar method. Post operative follow up was done upto 6 weeks. The parameters

were recorded and subjected to statistical analysis, and following results obtained.

In Group A 17 (68%) patients were of age below 30 years. 8 (32%) patients were of age 30 years and above. The mean age was 29.40±9.8

In Group B 14 (56%) patients were of age below 30 years. 11 (44%) patients were of age 30 years and above. The mean age was 29.76±9.17

In Group A 24 (96%) patients were Male and 1 (4%) patient was Female. In Group B 22 (88%) patients were Male and 3 (12%) patients were Female.

Among 50 patients, 15 fractures were Right Parasymphysis fractures, and 6 were Left Parasymphysis fractures. 8 were Right Body fractures. 3 were Right Angle fractures. and 5 were Left angle fractures.. 1 was Right Ramus. fracture. 7 were Right Condylar fractures, and 9 were Left Condylar fractures. 3 were Right Subcondylar fractures and 1 was Left Subcondylar fracture. 1 was Left Coronoid fracture. 7 were Symphysis factures and 5 were Bilateral Condylar fractures.

In Group A the mean value of time to place device was 59.60 minutes, and the mean value of time to remove the device was 38.32 minutes.In Group B the mean value of time to place the device was 87.92 minutes and the mean value of time to remove the device was 46.96 minutes.

In group A there was 1 incident of wire prick injury to operator which is 4%. In Group B there were 6 incidents of wire prick injuries to operator which is 24%.

In Group A, the mean value was 0.04 and in Group B, the mean value was 0.28.

In Group A, 1 incident of iatrogenic injury was noted which is 4%. In Group B, 5 incidents of iatrogenic injuries were noted which is 20%.

In Group A, the mean value was 0.04 and in Group B, the mean value was 0.20

In Group A, there was no any incident of wire prick injury to Operator while removing the devices, which is 0%. In Group B, there were 5 incidents of wire prick injuries to Operator while removing devices, which is 20%

In Group A, the mean value was 0.00 and in Group B, the mean value was 0.2

In Group A, there were no iatrogenic injuries to patients during removal of the devices. In Group B, there were 4 patients injured with wire prick once, and 2 patients injured twice. There wer In Group A, the mean value was 0.00 and in Group B, the mean value was 0.32e total 6 incidents of iatrogenic injuries to patients in Group B, which is 24%.

The patients in both the groups were followed up for up to 6 weeks and the stability mobility / hardware failure was recorded

In Group A, after 1st follow up, all devices were stable. After 2nd follow up 20 devices were stable and 5 were unstable/mobile. After 3rd follow up 22 devices were stable and 3 devices were unstable/mobile. After 4th follow up 21 devices were stable and 4 were unstable/mobile.

In Group B, after 1st follow up all devices were stable. After 2nd follow up 22 devices were stable and 3 were unstable/mobile. After 3rd follow up 23 devices were stable and 2 were unstable/mobile. After 4th follow up 24 devices were stable and 1 was unstable/mobile.

In Group A, the mean value was 1.32 and in Group B, the mean value was 2.48

In Group A, 19 patients were comfortable with the devices in mouth and 6 patients were not comfortable . In Group B, 22 patients were comfortable with the devices in mouth and 3 patients were not comfortable.

III. SUMMARY

The aim of this study was to compare the efficacy of Hybrid Arch Bar IMF method with Conventional Erich Arch Bar IMF Method.

A prospective comparative clinical study was conducted on patients with maxillofacial trauma, requiring intermaxillary fixation (IMF), visiting the Department of Oral and Maxillofacial Surgery, at Government Dental College and Research Institute, Bangalore.

The study was conducted between the year November - 2018, and May - 2020. The sample of 50 patients, who were interested to participate in the study were randomly selected and divided into two groups, as Group A and Group B. Each group consisted 25 patients. Group A patients with maxillofacial trauma requiring IMF, treated with Hybrid Arch Bar IMF technique. Group B patients with maxillofacial trauma requiring IMF, treated with conventional Erich Arch Bar IMF Technique.

The patients of age group of 18 to 60 years with mandibular fractures requiring IMF were added to the study. The patients with pathologic fractures, edentulous patients, patients with systemic disorders unfavourable for IMF were excluded from the study.

A standard proforma was used to collect the necessary information regarding each patient after inclusion. The clinical evaluation and detailed case history of patients was taken. Routine blood investigations and radiographic investigations were done. OPG was taken as baseline radiographic record. Medical opinion was sought from appropriate specialists as required for the

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procedures.

The patients were informed about the study which they were undergoing, and the procedures were thoroughly explained to participating patients and their attenders in their own mothertongue. A written informed consent was taken from these patients before treatment.

All necessary pre-operative, intra-operative, and post-operative records were maintained for these patients. Oral prophylaxis was done pre-operatively. IMF procedures were done under aseptic conditions. Various parameters were assessed between the two groups and subjected to statistical analysis.

The mean age of the patients were 29.40±9.8 in Group A and 29.76±9.17 in group B. In Group A 24 patients were male and 1 was female. In Group B 22 patients were male and 3 were female.

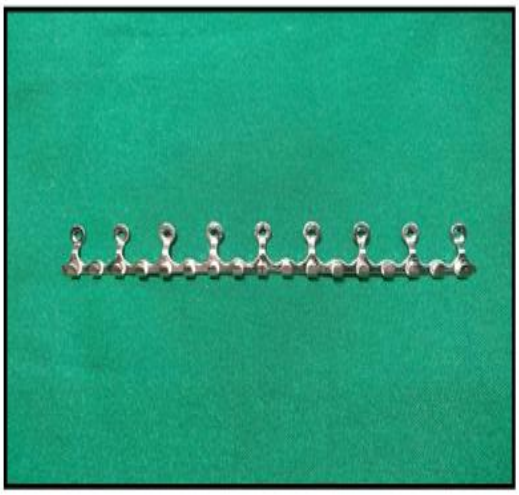
In our study we found that the time taken to place and remove Hybrid Arch Bar was lesser than the time taken to place and remove Erich Arch Bar. The number of wire prick injuries to operator and patients in Hybrid Arch Bar were lesser than in Erich Arch Bar. The oral hygiene status of patients treated with Hybrid Arch Bar IMF method was better than the patients treated with Erich Arch Bar IMF method. The physical stability of Erich Arch Bars was better than Hybrid Arch Bars. The device acceptance of Erich Arch Bars was more than the Hybrid Arch Bars.

In our study it was found that the Hybrid Arch Bars offer a number of advantages over Erich Arch Bars including shorter placement and removal times, greater margin of safety for the operator and patients, due to less number of wire prick

injuries, better oral hygiene status of patients. The device stability and patient acceptance was more in Erich Arch Bars as compared to Hybrid Arch Bars. However further study needed with large sample size and long follow up period to study advantages and potential complications associated with Hybrid Arch Bars.

IV. CONCLUSION

Within the limitations of this study we can conclude that The Hybrid Arch Bars can definitely decrease the time of placement and removal of the device. The wire prick injuries to operator and also iatrogenic injuries to patients during device placement and removal is less in Hybrid Arch Bars than Erich Arch Bars. The oral hygiene status of patients with Hybrid Arch Bars in mouth is better than the patients with Erich Arch Bars in mouth. But the rate of device mobility/failure is more in Hybrid Arch Bars than in Erich Arch Bars. The device acceptance by patients is less in case of Hybrid Arch Bars than in Erich Arch Bars. However further study needed with large sample size and long follow up period to study advantages and potential complications associated with Hybrid Arch Bars.



Hybrid Arch Bar

Hybrid Arch Bar Applied

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Hybrid Arch Bar Post-OP OPG

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