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RESEARCH ARTICLE

COMPARATIVE EVALUATION OF EFFICACY OF CONVENTIONAL ERICH ARCH BAR VS IMF SCREWS FOR INTERMAXILLARY FIXATION

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ABSTRACT

Aim: Evaluation of efficacy of Conventional Erich arch bar Vs Intermaxillary Fixation screws. ***Material and methods:*** This study we compared the efficacy of Conventional Erich arch bar and intermaxillary fixation screws with respect to plaque accumulation, time required for procedure, postoperative stability after achieving the intermaxillary fixation, mucosal growth and complications encountered for intermaxillary fixation. The participants were divided into two groups of 10 in each and designated as Group A and Group B. In Group A, Intermaxillary fixation was achieved by the conventional method using Erich arch bar, fastened with 26 gauge stainless steel wires. In Group B, Intermaxillary fixation was achieved by prefabricated intermaxillary fixation screws. ***Results:*** In present study total of 20 patients were analysed, The average working time for Group A and Group B were 96 minutes and 16 minutes respectively. Oral hygiene scores through modified Turskey Gilmore plaque index which was taken at immediate post operative, after 15 days, 30 days and 45 days. Maximum hygiene was maintained in intermaxillary fixation screws than conventional arch bar group but maximum stability was seen in the conventional arch bar group. In respect to mucosal coverage, mucosal growth was seen over intermaxillary fixation screws. ***Conclusion:*** This study emphasizes, the use of intermaxillary fixation screws is quick method than conventional arch bar. Conventional arch bar was significantly stable when compared with intermaxillary fixation screws therefore the patients who require long-term intermaxillary fixation, conventional arch bars would be a better option but it requires longer duration for the placement and had complications like needle sticks injury.

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INTRODUCTION

The treatment of Maxillofacial fractures depends on reduction and fixation by using open or closed techniques to achieve normal occlusion (Nandini *et al.,* 2011). Occlusion is necessary before fracture reduction and there are various techniques for intermaxillary fixation in this article we compare conventional arch with intermaxillary fixation screws.

MATERIALS AND METHODS

All the procedures were performed by same operator under local anesthesia. The study was conducted in following steps. The patients with fracture of mandible like Parasymphysis, Symphysis and condylar fracture who needed intermaxillary fixation and agreed to participate in the study were included in this study. The patients with pan facial and comminuted fractures, angle or body fracture of mandible, maxillary fracture, edentulous arch, respiratory problems, primary and mixed dentition, mobile teeth in upper and lower arch, bone pathology, history of radiation therapy and partially dentate patients whose dentition 'precluded were excluded in this study. A detailed case history was taken with clinical examination. Pre-treatment OPG were obtained. The selected patients were divided on the basis of lottery system into two groups of 10 each, and designated as Group A and Group B. In Group A, Intermaxillary fixation was achieved by the conventional method using Erich Arch Bar, fastened with 26 gauge stainless steel wires. (Fig. 1). In Group B, Intermaxillary fixation was achieved by IMF screws (Fig. 2). Oral hygiene scored through modified Turskey Gilmore plaque index which was taken at immediately after placement of arch bar or IMF screws, after 15 days, 30 days and at 45 days.

RESULTS

In present study total of 20 patients were analysed, amongst which 10 patients with conventional arch bar (Group A) and 10 patients with IMF screws (Group B) were divided. Each group consists of 2 female and 8 male patients. The average working time for Group A, and Group B were 96 minutes and 16 minutes respectively. Oral hygiene scores through modified Turskey Gilmore plaque index which was taken at immediate post operative, 15 days, 30 days and at 45 days.

The mean score for conventional arch bar at immediate post operative was 1.55 +\- 0.45 which was increased significantly at 15 days to 2.72 =\- 0.29 which was slightly reduced to 2.28 +\- 0.32, the difference from immediate post operative to 45 days was statistically significant with P value <0.001. In IMF screws group there was no significant difference was seen from immediate post operative to 45 days post operatively and P value came to be 0.12. Thus, we can say that maximum hygiene was maintained in IMF screws group when compared conventional Erich arch bar group. After the placement of IMF screws and conventional arch bar shows significant statistical difference in the stability, maximum stability was seen in the conventional arch bar group than IMF screws group. In group A not a single arch bar were unstable but in group B it was found that there were 3 cases of unstable IMF screw post 30 days . Thus we found that on stability parameter, conventional Erich arch bar was found to be significantly stable, with the p value of 0.04 than IMF screws. In respect to mucosal coverage there were six cases reported with partial coverage seen after 30 days and no mucosal coverage was seen in conventional arch bar. When complications were taken in to consideration in Group A with 8 patients reported cases of gloves puncture while in Group B. There was one case with tooth root injury while placing the IMF screws.

Fig. 1. Conventional Arch bar

Fig. 2. IMF Screws

DISCUSSION

The management of maxillofacial fractures includes different techniques from closed reduction to open reduction and internal fixation (ORIF) and requires control of the dental occlusion with the help of IMF which is time consuming with the use of conventional technique (Nandini *et al.,* 2011).

The arch bar has been the backbone for the administration of maxillary mandibular fracture since First World War. The originators of this technique, Gilmer in US and Sauer in Germany used an regular round bar flattened on one side that was ligated by using brass ligature wires to the teeth (José *et al.,* 2010). *Ivy and Blair's* modification was "flattened on one side" which was about 2 mm in width to confine better to the teeth and provide greater stability. Introduction of "bone plating system" has reduced the duration of IMF though there is often a need for temporary intermaxillary fixation intra-operatively and sometimes postoperatively to correct dental occlusal discrepancies by elastic traction (Nandini *et al.,* 2011). Erich arch bar or eyelet wires are the most common methods of achieving IMF, although other techniques are described. These methods are relatively time-consuming for application and removal of arch bars besides having an inherent risk of perforation of the surgeons gloves and consequent "needle stick injury" caused by the sharp-ended wires (Fabio Roccia, 2005). Moreover this technique is difficult to use when the teeth are grossly carious, periodontaly compromised, crowded and extensive crown and bridgework in oral cavity (Gibbons *et al.,* 2003). Final tightening of wires during the placement of conventional arch bars around the teeth may cause "necrosis of the mucosa" "extrusion" and subsequent loss of vitality of the tooth. It is also not easy to maintain the gingival health (Tracy *et al.,* 2014).

To overcome drawbacks of conventional arch bars, IMF screws technique was described by "*Arthur and Berardo* in 1989" which utilizes at least 4 "self-tapping titanium or stainless steel screws" inserted through the mucosa, one for each quadrant (Satish *et al.,* 2014). *Ansbul Rai* studied the comparison between IMF screws and conventional Erich arch bar he found that the oral hygiene maintenance is better in patients with IMF screws than with conventional arch bars with fewer complications and required less operating time but conventional Erich arch bars are the preferred choice in patients who required long-term inter maxillary fixation, because the screws start loosening after 5 to 6 weeks (Coburn *et al.,* 2002). In our study IMF screws starts loosening after 30 days. *G. D. Nandini* also studied comparison between the Erich arch bar and Self tapping IMF screws. The parameters were considered, duration, perforations in the gloves, and acceptance in patients, oral hygiene, iatrogenic tooth root injuries, and needle stick injuries during intermaxillary fixation with both the techniques. The author were concluded that the intermaxillary fixation by using self tapping intermaxillary fixation screws is effective technique as compared to the conventional arch bars in the management of mandibular fractures as it shows less number of gloves perforations and comparatively better oral hygiene status (Nandini *et al.,* 2011). In this study we compared the efficacy of intermaxillary fixation screws and conventional arch bar with respect to plaque accumulation, time required for procedure, postoperative stability after achieving the intermaxillary fixation, mucosal growth and complications encountered for intermaxillary fixation. The average working time for Group A and Group B were 96 minutes and 16 minutes respectively. More over it was confirmed that the IMF screw technique is the quick method to achieve intermaxillary fixation than conventional arch bar. Oral hygiene of the patients was assessed by using Turesky Gilmore Glickman modification of the Quigley Hein plaque index. Oral hygiene scores through modified Turskey Gilmore plaque index which was taken at post operative, 15 days, 30 days and at 45 days.

The mean score for conventional arch bar at post operative was 1.55 +\- 0.45 which was increased significantly at 15 days to 2.72 =\- 0.29 which was slightly reduced to 2.28 +\- 0.32, the difference from post operative to 45 days was statistically significant with P value <0.001. IMF screws was statistically not significant difference from post operative to 45 days with the p value of 0.12. Thus, we can say that maximum hygiene was maintained in IMF screw than conventional arch bar group. When stability was checked in both the groups and a statistically significant difference was seen in the stability, with maximum stability seen with conventional arch bar compared with IMF screws group. In Group B three IMF screws became unstable post 30 days while entire group of conventional arch bar was found to be stable throughout the follow up period. Thus we found that on stability parameter, conventional arch bar was found to be significantly stable than IMF screws. In respect to mucosal coverage there were six reported cases with partial mucosal coverage seen after 30 days in IMF screws group but no mucosal coverage was noted in conventional arch bar group during period of entire follow up. The most common complication faced in conventional arch bar group was glove perforations. The gloves perforation was identified in all the cases by water retention test after the procedure in which water was field within the used gloves, to check for perforation within the gloves. This test was negative in all the patients in Group B. During the procedures, the complications of tooth root injury were noted in Group B which was 10% i.e. one patient. In our study no such sequestration occurred around the screws. During drilling initial resistance was felt on penetrating the outer cortex followed by minimal resistance in the cancellous bone (Sahoo, 2009). In case of continuous resistance, drilling may be abandoned and an alternate site may be selected to avoid tooth root injury. Inadvertent penetration of the IMF screws shaft or tip into the maxillary sinus does not matter and will heal spontaneously unless the antrum wall is thin and fragile (Carl-Peter Cornelius and Michael Ehrenfeld, 2010). Thus, we can say that the IMF screws technique is quickest method than conventional Erich arch bar. Oral hygiene maintenance is comparatively better in patients with IMF screws but less stable when compared with conventional arch bar. The small sample size could be considered the limitation of this study.

Conclusion

This study emphasizes, the use of IMF screws is quick method than conventional arch bar. Oral hygiene maintenance was comparatively better in patients with IMF screws than conventional arch bar. Conventional arch bar was significantly stable when compared with IMF screws therefore the patients who require long-term intermaxillary fixation, conventional arch bars would be a better option but it requires longer duration for the placement and had complications like needle sticks injury.

REFERENCES

Carl-Peter Cornelius and Michael Ehrenfeld, The Use of MMF Screws: Surgical Technique, Indications, Contraindications, and Common Problems in Review of the Literature; craniomaxillofacial trauma & reconstruction, 2010; 3:2.

Coburn DG, Kennedy DWG, Hodder SC. 2002. Complications with intermaxillary fixation screws in the management of fractured mandibles. *Br J Oral Maxillofac Surg,* 40:241.

Fabio Roccia, Amedeo Tavolaccini, Maassino Fasolis, 2005. An audit of mandibular fractures treated by intermaxillary fixation using intraoral cortical bone screws. *J Cranio Maxillofacial Surg,* 33: 251-4.

Gibbons AJ, JM Baden, AM Monaghan, DK Dhariwal, SC Hodder, 2003. A Drill-free Bone Screw For Intermaxillary:Fixation In Military Casualties; *J R Army Med Corps,* 149: 30-32.

José M. López Arcas, 2010. Intermaxillary Fixation Techniques An EACMFS workbook on keying occlusion and restoring bony anatomy by intermaxillary fixation techniques: Brujes.

Nandini GD, Balakrishna R, Rao J. 2011. Self tapping screws v/s Erich arch bar for intermaxillary fixation: a comparative clinical study in the treatment of mandibular fractures. *J Maxillofac Oral Surg.,* 10:127–31.

Rai, A., Datarkar, A. and Borle, R. M. 2011. Are maxillomandibular fixation screws a better option than Erich arch bars in achieving maxillomandibular fixation? A randomized clinical study. *J Oral Maxillofac Surg.,* 69:3015–8.

Sahoo NK. *et al.* 2009. Retrospective Study on Efficacy of Intermaxillary Fixation Screws, *MJAFI*, 65 : 237-239.

Satish M, Rahman NM, Reddy VS, Yuvaraj A, Muliyar S, Razak PA. 2014. Use of Cortical Bone Screws in Maxillofacial Surgery – A Prospective Study. *J Int Oral Health,* 6(2):62-7.

Tracy K, Gutta R. 2014. Are embrasure wires better than arch bars for intermaxillary fixation? *Journal of Oral and Maxillofacial Surgery,* 15; 45-54.

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