

Comparison of Arch Bar, Eyelets and Transmucosal Screws for Maxillo Mandibular Fixation in Jaw Fracture

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ABSTRACT

The application of tooth supported appliances of various types to the jaws and immobilization by intermaxillary fixation is the customary form of treatment in the management of fracture of the mandible and maxilla. Wire ligatures, arch bars and splints aid in the treatment of jaw fractures. They are applied to the teeth, alveolar processes and skeletal parts of the face or cranium. They function in the fixation of injured skeletal parts among one another and to the uninjured portions as well as the immobilization of fractured or loosened teeth. To Compare Arch Bar, Eyelets and Transmucosal Screws for Maxillomandibular Fixation in Jaw Fractures. Various modalities such as wire ligatures, arch bars and splints have been recommended but they have their associated morbidity including periodontal damage, decalcification under the splints and loosening and extrusion of the supporting teeth. 36 patients requiring maxillomandibular fixation who had jaw fractures are divided into three groups (arch bar, eyelets and transmucosal screws) the duration maxillomandibular fixation is 3-4 weeks. The plaque accumulation index (primary outcome) showed significant difference between all three groups. Mucosal damage time of fixation and time of removal (secondary outcome) showed significant between all three groups. For our study of maxillomandibular fixation comparing all three groups transmucosal screws has significantly less plaque accumulation less traumatic and less operating time.

Keywords: Arch bar, Eyelets and transmucosal screws, Jaw fracture.

INTRODUCTION

The application of tooth supported appliances of various types to the jaws and immobilization by intermaxillary fixation is the customary form of treatment in the management of fracture of the mandible and maxilla. An ideal splint must provide stable attachment to the teeth or to the cranium- while doing minimal damage to the enamel, tooth-supporting structures, soft tissues and bones as well as affording good immobilization of the injured portions of the mandible and midface. The splint should be as inconspicuous as possible i.e. made of minimal amount of material and by allowing easy access to its elements, be amenable to easy

care and maintenance 1. These requirements are satisfied to different degrees by the appliances to be discussed.

Wire ligatures, arch bars and splints aid in the treatment of jaw fractures. They are applied to the teeth, alveolar processes and skeletal parts of the face or cranium. They function in the fixation of injured skeletal parts among one another and to the uninjured portions as well as the immobilization of fractured or loosened teeth. For example, the injured mandible is attached to the uninjured maxilla and midface, the injured midface to the forehead, to the mandible and midface if both are involved to the cranium 1.

The oldest known devices for immobilization of fracture jaws are extra oral bandages also known as Craniofacial bandages. These have been known since the time of Hippocrates. The bandages and head supports recommended then were made of cloth or leather. Specific forms of these bandages are "Tunda Maxillae", the "Capistrum Simplex" and "Duplex" 1.

The next step was the development of combined extra and intraoral appliances. With these, the teeth or the alveolar process of the fractured mandible were enveloped by a metal or rubber device and attached by means of bandages, screws, brackets or springs to the chin or a pressure pad located beneath the chin.

Today a good result of a mandibular fracture treatment should be considered nothing less than uneventful bony union with full recovery of function including a stable functional occlusion, as well as a full temporomandibular joint stabilization with a full range of motion. Other than fractures, various other definitive therapy include maxillomandibular fixation as an essential treatment plan.

The establishment of bone plating system as a treatment for fracture fixation has minimized the need of IMF, however short term IMF can be used intra operatively as a guide for alignment of fracture segments and to restore occlusion.

Dental circumferential wiring technique with or without IMF, has also been widely practiced to restore occlusion followed by fracture segment approximation, However these wires have some unfavorable effects on teeth and surrounding soft tissue and several workers have studied various aspects of this important issue.

Nevertheless these effects are reversible after removal of the splint. Occasionally progressive root resorption can be the most complex outcome after cementum injury in trauma fracture fixation.

Various complications of wire ligature, arch bar and splints include compromised periodontal health, demineralisation of tooth beneath the splint and mobility and extrusion of supporting teeth. Along with being time consuming, tedious and painful,

removal of these splints can turn out to be fatal when emergency removal of IMF is essential due airway obstruction

To bypass these disputes, the transmucosal screw has been advocated in the literature. The aim of this study is to compare arch bar, eyelets and transmucosal screws for maxillomandibular fixation in jaw fractures and to describe in detail the methodology and application of this system and to evaluate the merits and demerits of this system.

Materials and Methods ARCH BARS

Armamentarium

- Erich Arch Bar
- 0.5- and 0.4-mm wire of stainless steel
- Wire cutters and wiring forceps
- Cheek and tongue retractors
- Good light source and saliva ejector

Each arch bar is a flat stainless steel bar on which fleats or hooks are attached directed towards the gingival margin in each arch

Technique

If adequate number of teeth are available, it is recommended to place and secure the wire away from fracture site to avoid any unpredictable subluxation of the teeth adjacent to fracture site. In addition, provided there is sufficient fixation at the posterior segments, it is recommended to keep the inferior incisor portion unattached to arch bar to avoid their extrusion.

The arch bar initially is cut to a reasonable length and then is bent following the arch curvature. One-half of the arch is measured with the end of the loop, and then doubled the distance is cut off.

Stainless steel ligature wires of 0.4mm (some prefer 0.5mm specially for posterior region) are used for adapting the arch bar. The wires are inserted in the interproximal area around the neck of each available tooth (keep the wire below the greater circumference of the tooth by pressing the wire apically with the help of an assistant gripping the instrument like the Luniatschek while the wires are tightened closely with the tooth by twisting tightly to anchor the arch bar with the dental arch.

IMF is achieved using orthodontic elastic bands or wires inserted between the fleats of upper and lower arch bar. The wires are first pulled, tightened and then cut in a way so that the sharp ends of the wire are twisted and angled into the interdental area to avoid any soft tissue laceration. IMF is released by removing the elastic bands or wires.

Eyelets

Armamentarium

- 10 -20 prepacked autoclaved eyelet wires of 0.4-mm stainless steel wire lengthened 10% to a 5-cm length.
- Cluster of 20 tie wires, 0.5-mm diameter

and 15-cm long, of prestretched, soft stainless steel wire.

- Wire cutters and wiring forceps
- Luniatschek
- Cheek and tongue retractors
- Good light source and saliva ejector

Eyelets wires are fabricated of 0.4mm diameter soft stainless steel wire which should be extended by 10% of the actual length for as to maintain the close fit of the wires after insertion. Overstretching hardens the wire, which then becomes brittle.

Eyelets wire are formed by making a loop at the center of each length of the wire around

Table 6.4: Mean values

Variables		N	Mean	Std. Dev	Minimum	Maximum
Age	Erich Arc Bar	12	38.50	12.681	20	60
	Transmucosal Screws	12	28.58	9.385	18	49
	Eyelets	12	28.75	11.315	18	60
	Total	36	31.94	11.856	18	60
Plaque Accumulati on 1st week	Erich Arc Bar	12	3.08	0.289	3	4
	Transmucosal Screws	12	1.00	0.000	1	1
	Eyelets	12	2.00	0.000	2	2
	Total	36	2.03	0.878	1	4
Plaque Accumulati on 2nd week	Erich Arc Bar	12	3.50	0.522	3	4
	Transmucosal Screws	12	1.00	0.000	1	1
	Eyelets	12	2.00	0.000	2	2
	Total	36	2.17	1.082	1	4
Plaque Accumulati on 3rd week	Erich Arc Bar	12	3.92	0.289	3	4
	Transmucosal Screws	12	1.00	0.000	1	1
	Eyelets	12	1.50	0.522	1	2
	Total	36	2.14	1.334	1	4
Plaque Accumulati on 4th week	Erich Arc Bar	12	4.00	0.000	4	4
	Transmucosal Screws	12	1.00	0.000	1	1
	Eyelets	12	1.33	0.492	1	2
	Total	36	2.11	1.389	1	4
Fixation time	Erich Arc Bar	12	43.25	4.595	37	50
	Transmucosal Screws	12	10.17	2.918	5	16
	Eyelets	12	22.58	2.575	19	27
	Total	36	25.33	14.245	5	50
Removal time	Erich Arc Bar	12	33.83	5.589	25	45
	Transmucosal Screws	12	6.58	1.165	5	8
	Eyelets	12	16.17	1.697	14	20
	Total	36	18.86	11.924	5	45

a shaft of 3mm diameter rod which is held in a vice. Three or four twist suffice, and the edges are trimmed off obliquely to create a sharp point with uniform lengths of the wire, so that the wire can be smoothly passed through the interproximal area. A sum of approximately 14 eyelet wires are collected and assembled by passing through a prefabricated wire loop through each eyelet followed by packing and autoclaving for instant use.

For general consideration, if short term immobility of the fracture segment is indicated ,relatively few eyelets are necessary, for example, one or two in each quadrant.

Technique

The wire ends are turned and clenched with the help of modified hemostat or special clip at around halfway to the curve so as to assist the wires through the interdental spaces without damaging the gingival papillae, lingual tissue or palatal tissue.

After selecting the tooth to be wired, both wire ends are introduced from the buccal side across the interdental region entering the lingual or palatal side from where they are grasped by a second pair of forceps which is operated by an assistant who after bending them, lodge the wire back through the adjacent mesial and distal inter dental spaces. The operator grips each wire as it appears out of the spaces and pulls it through.

Each wires is drawn around the mesial and distal tooth respectively; the distal wire entering into and out of the previously formed loop of the eyelets, both wire tail ends pulled, crossed and twisted tightly together while simultaneously the assistant retains the palatal or lingual portion of the wire beneath the maximum bulbosity of both the teeth with an appropriate instrument. Alternatively the wire can be brought out from underneath the loop allowing greater fixation for the eyelets. In the upper jaw, the eyelets should project above, and in the lower jaw,

Table 6.5: Kruskal-Wallis Test compare the mean values between groups

Variables	P-Value
Age	0.043
Plaque Accumulation 1st week	0.001
Plaque Accumulation 2nd week	0.001
Plaque Accumulation 3rd week	0.001
Plaque Accumulation 4th week	0.001
Fixation time	0.001
Removal time	0.001

Table 6.7: Mann-Whitney Test compare mean values between Erich Arc Bar and Eyelets

Variables	P-Value
Age	0.022
Plaque Accumulation 1st week	0.001
Plaque Accumulation 2nd week	0.001
Plaque Accumulation 3rd week	0.001
Plaque Accumulation 4th week	0.001
Fixation time	0.001
Removal time	0.001

Table 6.6: Mann-Whitney Test compare mean values between Erich Arc Bar and Transmucosal Screws

Variables	P-Value
Age	0.045
Plaque Accumulation 1st week	0.001
Plaque Accumulation 2nd week	0.001
Plaque Accumulation 3rd week	0.001
Plaque Accumulation 4th week	0.001
Fixation time	0.001
Removal time	0.001

Table 6.8: Mann-Whitney Test compare mean values between Transmucosal Screws and Eyelets

Variables	P-Value
Age	0.817
Plaque Accumulation 1st week	0.001
Plaque Accumulation 2nd week	0.001
Plaque Accumulation 3rd week	0.006
Plaque Accumulation 4th week	0.032
Fixation time	0.001
Removal time	0.001

below the horizontal twist this averts the ends from disturbing each other.

The furthestmost part of the wire are trimmed and angled interdentially to protect the lips and the cheeks from irritation, provided there are no secondary wires that are passed through. Vertical , anterioposterior and lateral motions of the jaw must supervised correctly throughout the duration of immobilization.

Insertion of wires is challenging in the lower incisors due to unsuitable shape for retention and

crowded alignment, hence the wiring design can be refashioned avoiding the lower incisors teeth.

When some teeth are absent but not sufficient to necessitate an arch bar, or the fracture site is unsuitable, a wire can be connected to an isolated tooth by creating a clove hitch, and after tightening the wire loop, bringing about one end of the wire through the opposing jaw, anchoring it together with the other end.

Reduction of the fracture is mandatory prior to tightening the wires. Once the acceptable

Table 6.9: Friedman Test to compare the mean values of Plaque Accumulation between time points in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.001
Transmucosal Screws	-
Eyelets	0.001

Table 6.11: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 1st and 3rd week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.002
Transmucosal Screws	0.999
Eyelets	0.014

Table 6.10: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 1st and 2nd week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.025
Transmucosal Screws	0.999
Eyelets	0.999

Table 6.12: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 1st and 4th week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.001
Transmucosal Screws	0.999
Eyelets	0.005

Table 6.13: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 2st and 3rd week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.025
Transmucosal Screws	0.999
Eyelets	0.014

Table 6.14: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 2st and 4th week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.014
Transmucosal Screws	0.999
Eyelets	0.005

occlusion has been achieved, the posterior teeth should be secured to restrict excessive traction on the lower anterior teeth.

To withdraw the eyelets after the immobilization phase, it is recommended to remove the tie wires to permit a slight amount of jaw opening. Removal of eyelets can be postponed for one more week to control bony union by reconfirming the occlusion. Later eyelet wires are pulled out after releasing the wire untwining it in a counter clockwise rotations so that the buccal wire can be cut off.

Transmucosal screws

Armamentarium

The armamentarium used in this study, namely the transmucosal screw was indigenously

designed and fabricated in a cost effective way.

The armamentarium consisted of

- Transmucosal screws
- Instrument kit

Transmucosal Screws

The transmucosal screws are made up of stainless steel. These screws are 2 mm in diameter. They have a capstan head part and a thread part. The total length of the screw is 13mm, out of which the head measures 3 mm and the thread part measure 10 mm. The screws are self-tapping type.

Instrument kit

The instrument kit consisted of

- Screw driver; for tightening the screws
- Screw holder; for driving them into the predrilled holes
- Surgical bur; for drilling holes for the screws.

Surgical procedure

Maxillary technique

The placement of three screws is recommended. Position of the screws can be anywhere in the dental arch but in practice we found that it is preferred ideally to position them, one in the midline, between the apices of central incisors and the other two between the canine and the first

Table 6.15: Wilcoxon Signed Ranks Test to compare the mean values of Plaque Accumulation between 3rd and 4th week in each group separately

Plaque Accumulation	P-Values
Erich Arc Bar	0.317
Transmucosal Screws	0.999
Eyelets	0.157

Table 6.16: Fisher's exact Chi-Square Test to compare the proportions of Mucosal damage between groups

		Group								P-Value
		Erich Arc Bar		Transmucosal Screws		Eyelets		Total		
		N	%	N	%	N	%	N	%	
Gender	Male	12	100.0	11	91.7	9	75.0	32	88.9	0.294
	Female	0	0.0	1	8.3	3	25.0	4	11.1	
Mucosal damage 1st week	Present	12	100.0	12	100.0	12	100.0	36	100.0	-
Mucosal damage 2nd week	Absent	0	0.0	0	0.0	2	16.7	2	5.6	0.314
	Present	12	100.0	12	100.0	10	83.3	34	94.4	
Mucosal damage 3rd week	Absent	0	0.0	0	0.0	10	83.3	10	27.8	0.001
	Present	12	100.0	12	100.0	2	16.7	26	72.2	
Mucosal damage 4th week	Absent	0	0.0	12	100.0	12	100.0	24	66.7	0.001
	Present	12	100.0	0	0.0	0	0.0	12	33.3	
Traumatic	No	0	0.0	12	100.0	0	0.0	12	33.3	0.001
	Yes	12	100.0	0	0.0	12	100.0	24	66.7	
Total		12	100.0	12	100.0	12	100.0	36	100.0	

premolar, one in each arch. These self-tapping screws are implanted in the pre-drilled holes and the interface of the attached and reflected mucosa is the most favorable site.

First these areas are infiltrated with 2% lignocaine and 1:1,00,000 epinephrine. Tunnels/holes may be drilled transmucosally; there is no specific indication of a gingival incision. It is necessary to make certain that the drill passes in

the midst of the roots of the teeth without causing any harm to the adjacent teeth. The bur is passed through the buccal and palatal/lingual cortices under copious irrigation. The screw is incorporated with the help of a screw holder. The screw is inserted and later tightened with a screwdriver till the flat portion of the head is well adapted against the buccal mucosa. It is mandatory not to perforate the palatal or lingual mucosa with the screw as it can lead to soft tissue irritation.

Table 6.17: Fisher's exact Chi-Square Test to compare the proportions of Mucosal damage between Erich Arc Bar and Transmucosal Screws

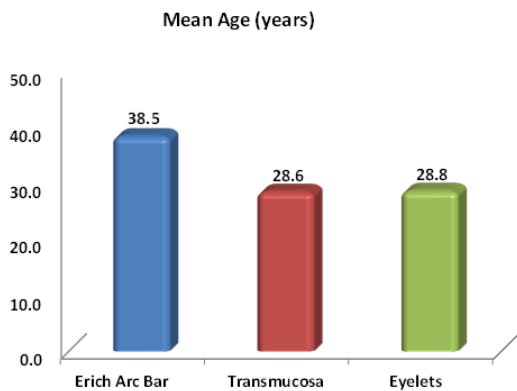
		Group				Total	P-Value	
		Erich Arc Bar		Transmucosal Screws		N	%	
		N	%	N	%	N	%	
Gender	Male	12	100.0	11	91.7	23	95.8	0.994
	Female	0	0.0	1	8.3	1	4.2	
Mucosal damage 1st week	Present	12	100.0	12	100.0	24	100.0	-
Mucosal damage 2nd week	Present	12	100.0	12	100.0	24	100.0	-
Mucosal damage 3rd week	Present	12	100.0	12	100.0	24	100.0	-
Mucosal damage 4th week	Absent	0	0.0	12	100.0	12	50.0	0.001
	Present	12	100.0	0	0.0	12	50.0	
Traumatic	No	0	0.0	12	100.0	12	50.0	0.001
	Yes	12	100.0	0	0.0	12	50.0	
Total		12	100.0	12	100.0	24	100.0	

Table 6.18: Fisher's exact Chi-Square Test to compare the proportions of Mucosal damage between Erich Arc Bar and Eyelets

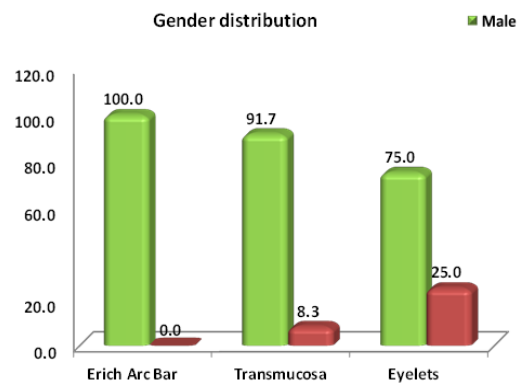
		Group				Total	P-Value	
		Erich Arc Bar		Transmucosal Screws		N	%	
		N	%	N	%	N	%	
Gender	Male	12	100	9	75	21	87.5	0.217
	Female	0	0	3	25	3	12.5	
Mucosal damage 1st week	Present	12	100	12	100	24	100	-
Mucosal damage 2nd week	Absent	0	0	2	16.7	2	8.3	0.478
	Present	12	100	10	83.3	22	91.7	
Mucosal damage 3rd week	Absent	0	0	10	83.3	10	41.7	0.001
	Present	12	100	2	16.7	14	58.3	
Mucosal damage 4th week	Absent	0	0	12	100	12	50	0.001
	Present	12	100	0	0	12	50	
Traumatic	Yes	12	100	12	100	24	100	-
Total		12	100	12	100	24	100	

Table 6.19: Fisher's exact Chi-Square Test to compare the proportions of Mucosal damage between Transmucosal Screws and Eyelets

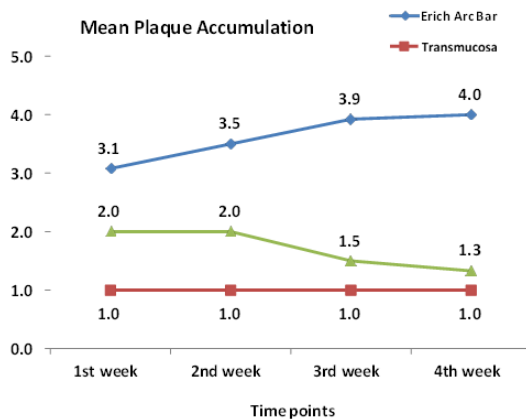
		Group				Total	P-Value	
		Erich Arc Bar		Transmucosal Screws				
		N	%	N	%			
Gender	Male	11	91.7	9	75	20	83.3	0.59
	Female	1	8.3	3	25	4	16.7	
Mucosal damage 1st week	Present	12	100	12	100	24	100	-
Mucosal damage 2nd week	Absent	0	0	2	16.7	2	8.3	0.478
	Present	12	100	10	83.3	22	91.7	
Mucosal damage 3rd week	Absent	0	0	10	83.3	10	41.7	0.001
	Present	12	100	2	16.7	14	58.3	
Mucosal damage 4th week	Absent	12	100	12	100	24	100	-
Traumatic	No	12	100	0	0	12	50	0.001
	Yes	0	0	12	100	12	50	
Total		12	100	12	100	24	100	



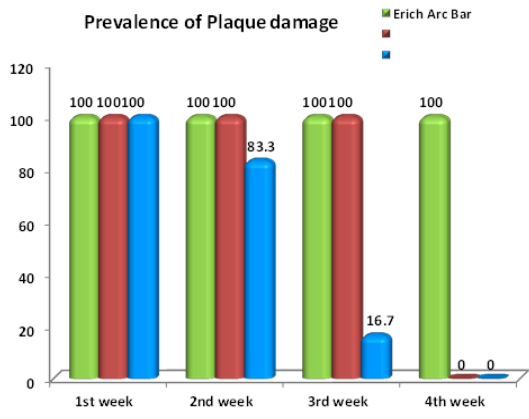
Graph 6.1



Graph 6.2



Graph 6.3



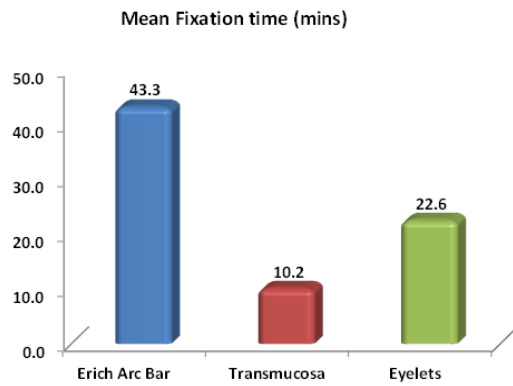
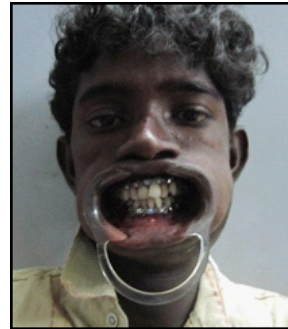
Graph 6.4

Mandibular technique

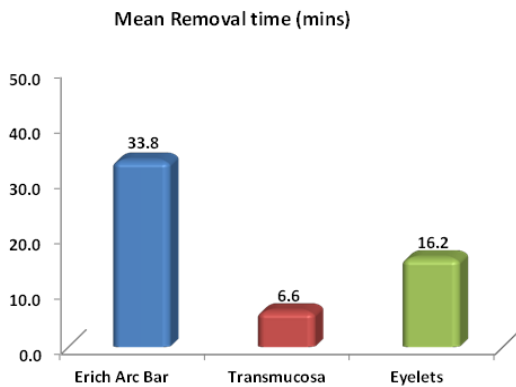
As in the maxillary technique, three screws are recommended. These screws should be ideally placed opposite to the maxillary screws. The procedure is the same as that of the maxillary

technique. In some patients with crowding of the dental arch, sometimes the screws cannot be placed exactly opposite to the maxillary screws, in

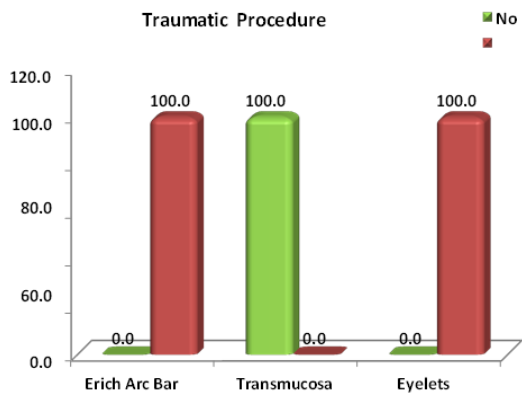
Case Photos Arch Bar



Graph 6.5



Graph 6.6



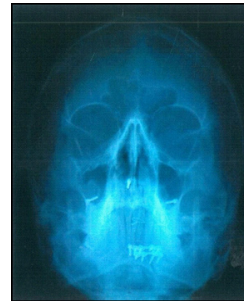
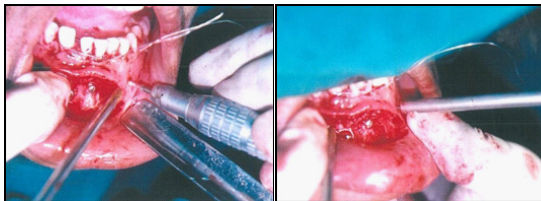
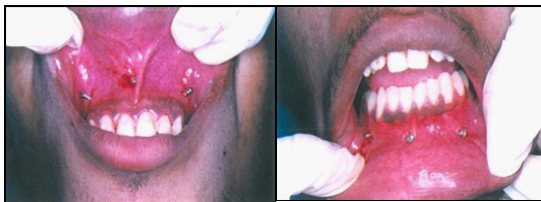
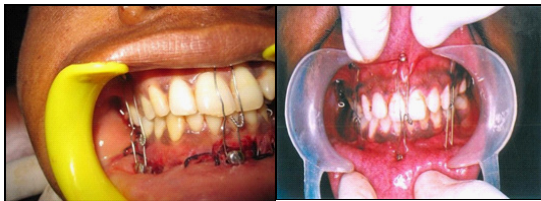
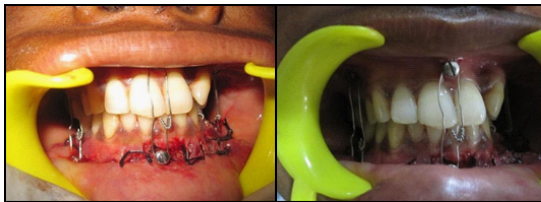
Graph 6.7



Eyelets



Transmucosal screws



the above-mentioned sites. In such cases it can be applied distally.

If the screws are placed in General anesthesia, it is easier to perform the surgical access and expose the fracture first. The screws are then placed while directly visualizing the teeth roots, nerves and fractures. When applied in this fashion, the screws do not interfere with the surgical access or placement of the reduction or fixation device. Temporary intermaxillary fixation is achieved using stainless steel wires (26 gauge) and occlusion is checked.

Results: The plaque accumulation index (primary outcome) showed significant difference between all three groups. Mucosal damage time of fixation and time of removal (secondary outcome) showed significant between all three groups.

DISCUSSION

Re-establishing the dental occlusion to the pre-trauma status has been the main stry of successful treatment of fracture of the jaws 4. Intermaxillary fixation with the use of arch bars has been the standard treatment for most mandibular and maxillary fractures with or without open reduction. Arch bars have been applied to respective arches with circumdental stainless steel wires. Stabilization of the fractures has been achieved using intermaxillary fixation wires or elastics 5.

An adverse sequalee of usage of arch bars or wire loops for splinting causes marginal conditions to be comprimsed causing gingivitis and increased tooth mobility. These conditions however, are reversible after the removal of splints³. in their article on effects of interdental wiring in jaw fractures, state that wiring of teeth to splint jaw fractures leads

to alterations in the periodontium. These changes may regress once the wiring is removed.

Tooth mobility after maxillo-mandibular fixation has been surveyed in some researches. 3, 6 and show a slow return to ideal values after cessation of maxillo-mandibular fixation. These may be the aftermath of the orthodontic forces that are originated by tightening of the wires on the teeth.

The wire encompassing the cervical region of the tooth theoretically accomplishes the conditions that may lead to start an external root resorption. The ligature may well be traumatizing element in itself that causing damage to the protective layer of cementoblasts and cementoid on the surface of the root. The wiring may aswell induce inflammation in the marginal tissues 7.

With the upcoming quantity of people infected with human immuno-deficiency virus, oral and maxillofacial surgeons need to take precautions to avoid inadvertent skin puncture. Scully and Porter has analysed the possibility of transmission of human immuno-deficiency virus amongst the patients and the dental staff 8. They verified that the primary occupational risk for the dental health care worker is from sharps injury. With the approach of using arch bars, usually 16 to 22 interdental wires are passed. Each wire passed has the plausibility for unintentional skin puncture. For the patients with a high probability of having HIV infection (i.e., intravenous drug abusers or homosexuals) who need maxillo-mandibular fixation, an alternative technique of transmucosal screws is best suited 9.

As surgical approach of rigid skeletal fixation by the method of open reduction have developed into a more sophisticated and widely used procedure hence, long-term maxillo-mandibular fixation no more seems to be needed. Consequently today the use of maxillo-mandibular fixation is generally narrowed down to a short ranged duration intra operatively and post operatively.

To circumvent the above-mentioned dilemma the use of transmucosal screws as an alternative method has been tried and analysed.

Intraoral cortical bone screw technique has concluded to be greatly advantageous. Primarily the jeopardy of percutaneous contamination to both, surgeon and patient has been scaled down. Learning the technique is straightforward and easy to practice. The operating time has been reduced from over one hour to nearly fifteen minutes. The fixation attained is comparable to that with arch bars. They are also absolutely compatible with bone plates. Increased compliance, enhanced oral hygiene and a reduced rate of infection have been realized.

The technique is not dependent on the number of teeth present and is suitable to be done under local anesthesia. In addition, undisplaced fractures in edentulous mandibular segments may be successfully treated as well, provided that dentures are available. They are peculiarly satisfactory for patients with extensive crown and bridgework.

There are of course a few disadvantages or limitations to these procedures. It demands the availability of specially made self-tapping bone screws, which must be subsequently removed. It is a advanced technique that requires a course of acclimation, and it is not convenient for all fractures.

The most suitable fractures are those that are relatively undisplaced. The technique is useful for both symphysis and para-symphysis fractures with or without intraoral bone plates.

The intraoral cortical bone screw technique is not generally preferred for severely comminuted fractures, extensive dentoalveolar bone fractures, missile injuries to the jaws and paediatric fractures.

Reports have been published cautioning the use of bicortical intermaxillary fixation screws 11-14. Careful handling is advised in the course of insertion of the screws with regards to both positioning and insertion torque. While the complications have been minor and comfortably managed, they have resulted in the need for further treatment. A cautious manipulation throughout the drilling of the bur hole is crucial, with passive drill speed and copious irrigation with sterile saline. The screw should be passively implanted at constant speed and should not be forced if resistance is perceived (Likely to be engaging the roots of the teeth).

CONCLUSION

From our study of maxillomandibular fixation with intraoral cortical bone screws, we found that it provides a comparable fixation, significantly decreased operating time and less plaque accumulation. Transmucosal screws include ease of use, quickness, shortened operating time.

Furthermore, compared with arch bars and eyelets there is nil injury to the gingival margin and gingival health is easier to maintain. So transmucosal screws is identified to better method in comparison with arch bar and eyelets for comparing the plaque index of each method. But the technique is acceptable for interim intraoperative fixation and elastic traction. Wound healing of the periodontium after the surgery should also be taken into consideration.

REFERENCES

1. Andreason J.O. Textbook and colour atlas of traumatic injuries to the teeth. 1994; 449 - 450.
2. Arthur G., Berardo N. A simplified technique of maxillo - mandibular fixation. *J. Oral Maxillofacial Surg.* 1989; 47:1234.
3. Avery C. M.E., Johnson P. A. Surgical glove perforation and maxillofacial trauma; to plate or to wire. *Br. J. Maxillofacial Surg.* 1992; **30**: 31 - 35 .
4. Benninger M.S., Gupta N., Gilmore K. Intraoperative infectious disease exposure to otolaryngology operating room personnel. *Laryngoscope.* 1991; **101**: 1276 - 1279.
5. Busch R.F. Maxillo – mandibular fixation with intraoral cortical bone screws. *Laryngoscope.* 1994; **104**:1048.
6. Carljones D.C. Trans alveolar screws. *O.O.O.* 84:458 (1997).
7. Champey M., Harle. Atlas of craniomaxillofacial osteosynthesis. Miniplates, microplates and screws. Chapter
8. Chotkowski. Stabilization of the occlusion. Atlas of the Oral Maxillofacial surgery. *Clinics of North America.* 1997; **5**:1.
9. Coburn D.C., Kennedy D.W.G. Complications with intermaxillary fixation screws in the management of fractured mandible. *Br. J. Oral Maxillofacial Surg.* **40**:241 -243 (2002).
10. Davidson T., Stabile B. Acquired immunodeficiency syndrome, precautions for otolaryngology-head and neck surgery. *Arch. Otolaryn. Head and Neck Surg.* **117**: 1343 - 1344 (1991).
11. Farr D.R., Whear N.M. Intermaxillary fixation screws and tooth damaged. *Br. J. Oral Maxillofacial Surg.* **40**: 84 - 85 (2002).
12. Homes, Ia Hopkins. Rowe and Williams maxillofacial injuries. 283 -327 (1994).
13. Issacs R.S., Sykes J.M. Maxillo –mandibular fixation with intraoral cortical bone screws. *Laryngoscope.* **105**: 109 -113 (1995).
14. Hutchinson. Caution in the use of bicortical intermaxillary fixation screws. *Br. J. Oral Maxillofacial Surg.* **38**: 5 (2000).
15. Prabhu MN, *et al.* Osteoporosis and Periodontal Disease – A Review". *International Journal of innovations in Dental Sciences*, **1**(1), 27-37 (2016).
16. Prabhu MN *et al.* Analgesics Used In Periodontal Surgery" *International Journal of innovations in Dental Sciences*, **1**(1), 1-9 (2016).
17. Prabhu MN, *et al.* The role of antibiotics in treatment of chronic Periodontitis". *International Journal of Dental Sciences and Research*, **2**(1), 16-18 (2014).
18. Prabhu MN, Priyavadhana Prabhu. Wound Healing in Periodontics, *Biosciences biotechnology research asia*, **11**(2), 791-796 (2014).