

Original Article

MANAGEMENT OF DENTO-ALVEOLAR FRACTURES WITH TRANS-GINGIVAL LAG-SCREWS: A NOVEL TECHNIQUE

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ABSTRACT

Background:- Dento-alveolar fractures are one of the most common forms of maxillofacial injuries .The most common site of dento-alveolar fractures in upper anterior region and they may occur as isolated fractures or with other facial injuries.

Aim:- To evaluate the efficacy of transgingival lag screws in Dento- alveolar fractures

Purpose:- Maxillofacial injuries have been documented worldwide . Incidence in Indian scenario show significant percentage of reported dento alveolar fracture. Various modalities of treatment include bridled wiring, figure of 8 wiring, arch bar fixation, intermaxillary fixation , cap splints , using orthodontic wire with composite resin and Transgingival lag screws (TGLS).

Material Method:- Efficacy of transgingival lag screws was assessed in terms of demographic data , time taken for placement and removal , Intra operative and post operative pain and complications if any were noted .

Result:- 15 patients were treated for dentoalveolar fractures, 12 males and 3 females participated in the study with mean age 46.67 years (± 10.004). Mean time taken for placement of TGLS was 21.33mins (± 8.27) while mean time for removal of TGLS was 9.73 mins (± 4.99).Mean intraoperative pain was 4.4(± 2.19) and 1.06(± 1.16) during postoperative phase.Gingival over growth and loosening of screw were major complications noted during our study

Conclusion :- Use of TGLS in management dento-alveolar fractures makes it a viable alternative as satisfying outcome in terms of duration of surgical procedure, patient discomfort and oral hygiene maintenance have been achieved. The only disadvantage this technique was the cost when compared other methods.

KEYWORDS: Dento-alveolar fractures, maxillofacial injuries, transgingival lag screws

INTRODUCTION

Maxillofacial trauma is defined as trauma associated with facial skeleton. Dento- alveolar

fractures (DAF) in maxillo-mandibular complex region cannot be neglected as these contribute significantly. Trauma to this region due to various etiologies has been well documented in the literature. Considering the Indian scenario, recent demographic studies in the past decade demonstrate an exponential rise in Road Traffic Accident (RTA) injuries¹⁻³. Majority of Maxillofacial injuries is associated to RTA (85.06%) followed by falls (8.29%) and assaults (6.52%)¹. At any given age group Males are approximately four times more prone to trauma when compared to female counter part⁵. Dento-alveolar fracture is defined as a fracture in the bone surrounding the teeth without any extension to the basal bones of the maxilla or mandible⁶. Occurrence of traumatic dental injuries is maximum due to falls during childhood while the development of motor coordination takes place. In adults road traffic accidents contribute most followed by violence and sports injuries⁷. Treatment options described in literature till date are splinting by using different wiring techniques like figure of 8, Risdon and bridal wiring, loops with incorporation of arch bar⁸, orthodontic wires and composite resin⁹, use of conventional and modified cap splint¹⁰. Recently Nyarady Z et al⁶ mentioned a study on the use of lag screws for the management of dento-alveolar fractures and the authors suggest a better outcome when compared to the conventional methods. Any surgical or non surgical mode of intervention has never been able to yield ideal results in all situations. All the fore mentioned techniques have advantages but are either traumatic or tedious or have problems like stability and improper support leading to unsatisfactory outcome. Hence, this study with an aim to evaluate the efficacy of Trans Gingival Lag Screws (TGLS) for treatment of dento-alveolar trauma.

METHODOLOGY

This study was conducted in the department of maxillofacial surgery between January 2015 January 2017. Total 15 cases with maxillary or mandibular DAF were taken up for the study between the age range of 15 to 60 years were included in the study. All systemically healthy patients with fair periodontal status participated for the clinical trial. The parameters assessed were time taken for placement and removal of TGLS, number of lagscrews used, intraoperative

and postoperative assessment of pain using VAS (visual analog scale), and complications of the treatment if any. Under all aseptic precautions and conditions, fractured dento-alveolar segments were stabilized initially using temporary stay wire on both the ends. A pilot drill of size 0.5 mm smaller than the screw diameter is passed through fractured alveolar segment and basal bone up to the desired screw length. Master drill of diameter equal to screw width is used to enlarge the hole of the alveolar segment. Standard 1.5mm * 10 mm titanium lag screws were used for reduction in maxillary DAF while 2mm*10mm titanium lag screws were used for mandible (Figure I-II). While, Eric's arch bar was used to initially fix the segment in casualty followed by lag screw fixation. (Figure III-IV).



Figure I - Radio graph showing Dento-alveolar fracture

RESULT

15 patients were treated for dento-alveolar fracture. 12 males and 3 females participated in the study with mean age 46.67 years (± 10.004). Mean time taken for placement of TGLS was 21.33mins (± 8.27) (Graph I). After a follow up period of 6-8 wks TGLS were removed, mean time taken for removal of TGLS was 9.73 mins (± 4.99) (Graph I). Visual analog scale (0-10) was

used to assess pain during the placement of screws and during its removal. Mean intra operative pain was $4.4(\pm 2.19)$ and $1.06(\pm 1.16)$ during postoperative phase (Graph II).

DISCUSSION

Conventional methods for the management of DAF include bridals wiring technique, figure of eight wiring and placement of arch bar to stabilize



Figure II -Post operative radiograph showing stabilized Dento-Alveolar Fracture with lag screws

the fractured fragment with or without inter-maxillary fixation. Dehen M et al¹⁰ suggested a

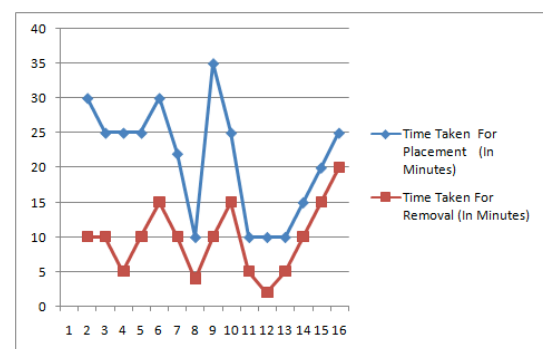


Figure III – Lag screws with Arch bar

modified cap splint made of clear acrylic fabricated in such a way that the occlusal harmony is maintained covering not less than 2 teeth on either side of the DAF. Rahpyema et al⁸ suggested placement of apical force with the use of wire around the tooth followed by MMF or with IMF screws or circum-mandibular or suspension wiring. Pediatric DAF are often more isolated with little association to maxillary or mandibular basal bone fractures due to elasticity of developing bone. Das UM et al⁹ suggested placement of a semi-rigid arched orthodontic wire (0.7mm) on the lingual or labial surface of affected teeth with composite resin for minimum three weeks. This method is being widely used till date. Nyarady et al⁶ introduced the use of trans gingival lag screws for



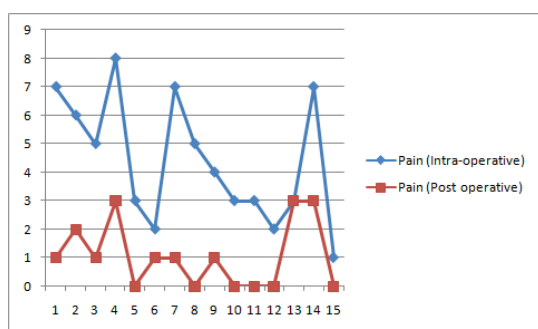
Figure IV –OPG showing stabilized Dento-Alveolar Fracture with lag screws and arch bar



Graph I - Time take for placement / Removal of TGLS

management of DAF in six cases and concluded it to be a easy, quick, flapless method of DAF repair with minimal complications in cases where splinting was not indicated. Our results show

similarity to the above mentioned study but there



Graph II - Intra Operative and Post operative Pain on VAS scale (10)

were a few differences in the method of treatment as all our patients were operated chair side under local anesthesia, this study was exclusively done on patients with DAF. Wiring techniques are often cumbersome and requires more intra-operative time for placement. In addition twisted and cut ends of the wires and arch bar are sharp and it may cause trauma to buccal mucosa and may penetrate the gingiva²³. This makes eating and postoperative maintenance difficult. Stabilizing the DAF with composites in combination with orthodontic wires may help to overcome this disadvantages but their stability is questionable as they are indirect methods of reduction. TGLS technique has several advantages over conventional methods. By this technique, the mean time taken for placement and retrieval of the implant was drastically reduced. At the same time, minimal amount of pain and discomfort was observed. Another notable advantage is negligible chances of “needle stick injury” to the operator as wires were not used. Patients could maintain good hygiene, after this procedure. Trauma to the surrounding structures during screw placement was minimal and augmentation of bone was not required in any case after implant removal. In the present study, mean time taken for the placement of the TGLS was 21.33 mins and 9.73 mins for removal. This procedure is less time consuming and at the same time it leads to less fatigue for the surgeon as well as for the patient. Also TGLS are less traumatic. Being technique sensitive, initially the time required for this procedure was more. It is observed that lag screws can be applied more rapidly as compared with the arch bar as the latter requires contouring and adjustments. Intra operative pain assessment showed reduced pain

(4.4 -VAS Scale) as local anesthetic action prevailed till the procedure was completed. Post operative pain was less as only lag screw heads were present on the mucosal surface and were flushed to it. No patient had ulceration around the surgical site or any other region of oral mucosa. This is opposite when the same is treated using arch bar or wire fixation. In the present study there was no inter-segmental mobility postoperatively after four weeks. Anatomical reduction of fractured fragments plays a vital role in primary healing. All conventional wiring procedures including arch bar fixation provides indirect fixation of the fracture that may result in delayed union or mal-union. Whereas, TGLS fixation is a direct method which leads to approximation of alveolus to basal bone providing stable fixation and accelerating the healing process. Screws can only be placed in segments with adequate bone support hence proper case selection is the key to success of this procedure. Inappropriate selection of drill may lead to increase in hole diameter leading to screw loosening and improper engagement of screws thereby reducing the stability. Incorrect direction of drill placement may lead to further fracture of the alveolus or root perforation. Cost of material is a major issue in Indian setup as each Lag screw costs 10 times more than conventional methods. Although it provides an edge over other methods, is technique sensitive with no scope of adjustment once the screws are placed in position. Various local complications may arise during the treatment phase. Infection, damage to vital structures like root, loosening of the lag screws and tissue overgrowth. Injury to tooth root may occur when screws are placed in close approximation to root apex. Loosening of screw and gingival growth over the screw were noted in one case each but they did not hinder the outcome of this study. This study yielded a satisfying outcome in terms of duration of surgical procedure, patient discomfort and oral hygiene maintenance. The only disadvantage this technique we found out was cost being 5 folds when compared to arch bar.

CONCLUSION

It becomes mandatory for all treating surgeons to understand and consider practical feasibility of each option and rightfully use the best modality either singly or in integration with other

techniques to provide most satisfactory outcome. Our results prove TGLS as a feasible alternative procedure for the management of Dento-alveolar fractures taking into consideration that it requires less time for the treatment, minimal trauma and stable fixation when compared to other conventional methods.

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