International Journal of Early Childhood Special Education (INT-JECSE)
DOI:10.9756/INTJECSE/V14I6.303 ISSN: 1308-5581 Vol 14, Issue 06 2022

INCIDENCE OF SURGICAL REMOVAL OF MINI PLATES FOLLOWING MANDIBULAR FRACTURE FIXATION

Type of Research: Original Research - Retrospective
Running title: Incidence of surgical removal of miniplates following mandibular fracture fixation

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ABSTRACT:
AIM:
To evaluate the number of mini plates removed following mandibular fracture fixation
INTRODUCTION:
Mini plate acquired utility for the treatment of maxillofacial injury and orthognathic medical procedure. The main advantages of internal fixation are prompt stabilization and pain-free mastication.Mini plates have normally been made out of titanium, as it has a higher biocompatibility and better physical properties over different metals.There have been different reports of inconveniences, like metal poisonousness and hypersensitivity, stress protecting, metallosis, movement, tangibility, and warm affectability, brought about by the utilization of little plates. Stainless steel or cobalt chrome plates can cause corrosion, metal sensitivity, harmfulness, or dangerous change.
MATERIALS AND METHODS:
A retrospective study was conducted in patients undergoing miniplates fixation removal at Saveetha dental college and hospitals. The data was obtained from (Dental Information Archiving Software) DIAS.The collected data was compiled using excel and data analysis was carried out using SPSS software version 21. Chi square test was used for test associations between categorical variables.
RESULTS AND DISCUSSION:
From the study 21-50(66%) year old patients have the highest number of miniplates being placed and 33% of the male patients have mostly removed the miniplates due to pain and19.05% of the patients have removed their miniplates from their parasymphysis region due to the exposure of miniplates
CONCLUSION:
Within the limits of the study, it was observed that the removal rate of miniplates is more ampng the age group 15-50, and is mostly in the male population. Mini plates were mostly removed in the parasymphysis region mainly due to exposure of the miniplates.

KEYWORDS: Miniplates, titanium, infection, surgical removal, novel analysis, mandibular fracture

INTRODUCTION

The use of mini-plates in the oral and maxillofacial area was introduced in the 19th century, since then there has been an increase in the use of mini-plates. Management of maxillofacial trauma has proved the best results by internal fixation The available types of internal fixation methods are macroplates, miniplates, and microplates. The mini plate acquired utility for the treatment of maxillofacial injury and orthognathic medical procedure(1). The main

advantages of internal fixation are prompt stabilization and pain-free mastication.Mini plates have normally been made out of titanium, as it has a higher biocompatibility and better physical properties over different metals.There have been different reports of inconveniences, like metal poisonousness and hypersensitivity, stress protecting, metallosis, movement, tangibility, and warm affectability, brought about by the utilization of little plates. Stainless steel or cobalt chrome plates can cause corrosion, metal sensitivity, harmfulness, or dangerous change. Titanium and its combination have the most elevated biocompatibility, amazing malleability, elasticity, nontoxic, and protection from consumption than different metals. These properties are a result of the uninvolved layer of self-recovering oxide surface called titanium dioxide layer.Titanium plates don't interfere with CT output, MRI, or radiography. These properties make titanium well known to utilize.(2)

In the administration of mandible breaks, it is fundamental to reestablish occlusion, temporomandibular capacity, and facial appearance. Medicines range from non-surgical administration to surgeries with osteosynthesis plates, as per the fracture complication. In situations where surgery is required, inner inflexible treatment procedures advance better adjustment and union of cracked bone. All things considered, a successful treatment is based on different components, like the area and intricacy of the break, and the plate framework and its calculation. Disease, paresthesia, and malocclusions are accounted for as conceivable post-usable entanglements after osteosynthesis of mandibular fracture. The reasons for removal of mini plates were classified into the following categories: cases in which the patient made a request for re- moval; cases in which the patient exhibited infection; cases in which the mini-plate was exposed without any symptoms of infection; cases in which there were no symptoms, but the mini-plate was exposed in the process of tooth extraction, necessitating immediate removal; cases in which the mini- plate was removed to recover an implant prosthesis; cases in which a screw was loosened; and cases in which the patient experienced pain without signs of infection(3).

Mandibular angle fractures are commonly encountered in the practice of oral and maxillofacial surgery. Open reduction and internal fixation (ORIF) is one of the treatments of choice. Simple (linear) mandibular angle fractures are primarily treated via an intraoral approach(4,5). Fixation by miniplate is generally made on the external oblique ridge along the ideal osteosynthesis line proposed by Champy*et al.* This technique provides stable fixation with minimum intervention and results in good postoperative healing(4). The plate used for fixation is usually left after surgery because it has been previously thought that these plates seldom cause complications requiring surgical intervention. However, a plate left in this area could be exposed or could be a focus of infection because the external oblique ridge is covered with mobile mucosa close to the molar teeth, which lack an adequate width of attached gingiva. Our team has extensive knowledge and research experience that has translated into high quality publications.(6),(7),(8),(9),(10–19)(20),(21–23).(24,25)

This study therefore sought to evalue about the different reasons for the removal of miniplates and on which region of the mandible is the miniplates mostly removed.

MATERIALS AND METHODS

The study was conducted in a private dental institution,Chennai. The data was collected from a dental hospital management system. 76 patient details were analysed between September 2020 to January 2021 out of which 21 patients who fulfilled the inclusion and exclusion criteria were included in the study. Inclusion criteria includes age, gender, reason for removal of mini plates. Exclusion criteria include postoperative complications such as infection are excluded. Ethical clearance for this study was obtained from the institutional review board. The data included a varied children population of age 20- 60 years old predominantly South Indian. All the case sheets were reviewed and were cross verified by another examiner. The internal validity included diagnosed cases as per criteria, medical history, chief complaints and clinical findings. The data collected was tabulated under following parameters: Gender, Reason for removal of patients.The independent variables includes age, gender and dependent variables includes removal of plates for infection.The data analysis was performed using SPSS software of version 19. The chi square test and pearson correlation was done . p value < 0.005 was considered statistically significant.

RESULTS:

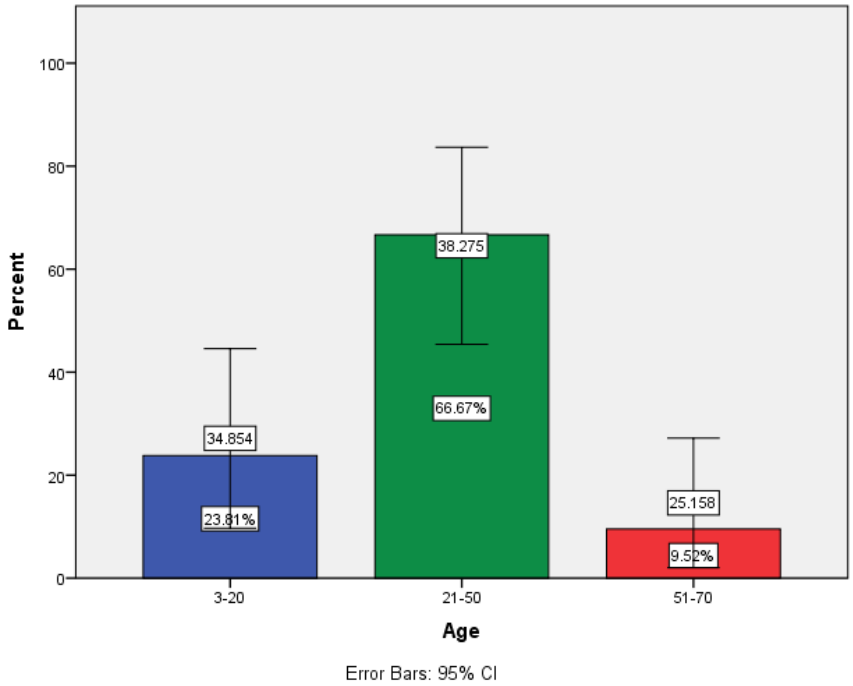

Figure 1- It shows a graph showing the percentage distribution of the age group, blue colour represents age group between 3- 20 years, green colour represents age group from 21-50 years, and red colour represents age group from 51-70. Out of which 23% of the population of age 3- 20 have undergone surgical removal of mini plates, 66.67% of the population among the age group 21-50 have undergone surgical removal of mini plates, and finally 9% of the age group from 51-70 have undergone surgical removal of miniplates.

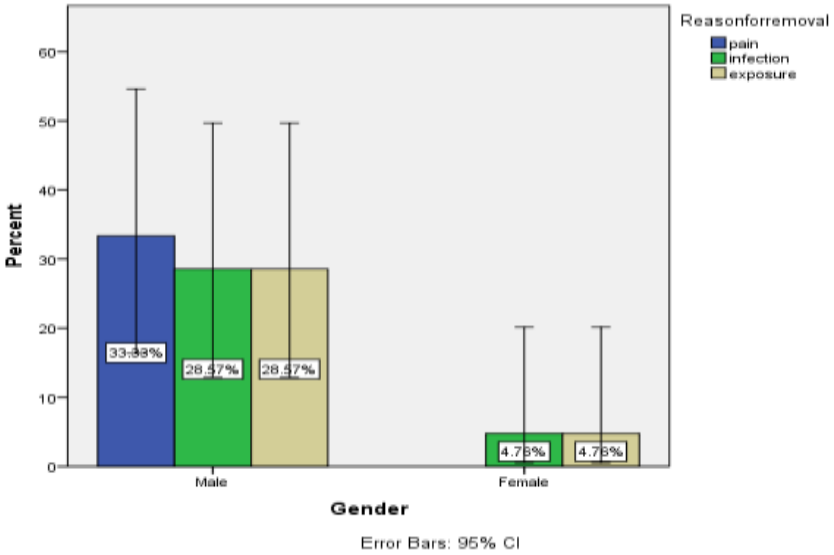

Figure 2- The graph shows a correlation between gender and the reason for the removal of mini plates,here the blue colour represents pain, green colour represents infection and brown colour represents exposure of the mini plates, among the male population 33.3% of them removed the mini plates due to pain, 28.57% of the population removed due to infection, and 28% of the male population removed due to exposure of the miniplates, whereas in the female

population 4.75% removed the miniplates due to infection and 4.75% of them removed due to exposure of the miniplates.

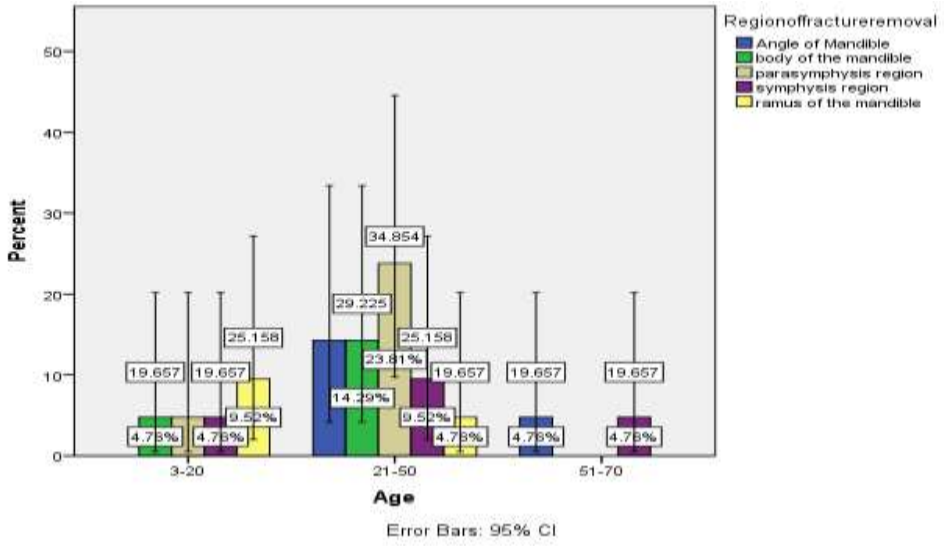

Figure 3- This is a correlation graph between age and region of fracture where the miniplates have been placed, here green colour represents reason for removal of miniplates.Here blue colour represents infection and green colour body of the mandible, blue represents angle of the mandible, brown represents the parasymphysis region , violet represents the symphysis region and yellow represents the ramus of the mandible. In 3-20 year old patients, 4.75% of them have placed miniplates in relation to the body of the mandible; the parasymphysis and symphysis region of the and 9.52% of them have placed in the ramus of the mandible. In 21-50 year old patients, 14.29% of the patients in relation to angle and body of the mandible, 23.81% of them have in the parasymphysis region, 9.52% have in the symphysis region and 4.75% of them have in the ramus of the mandible. In 51-70 year old patients 4.75% of them have miniplates in relation to angle of the mandible and symphysis region.

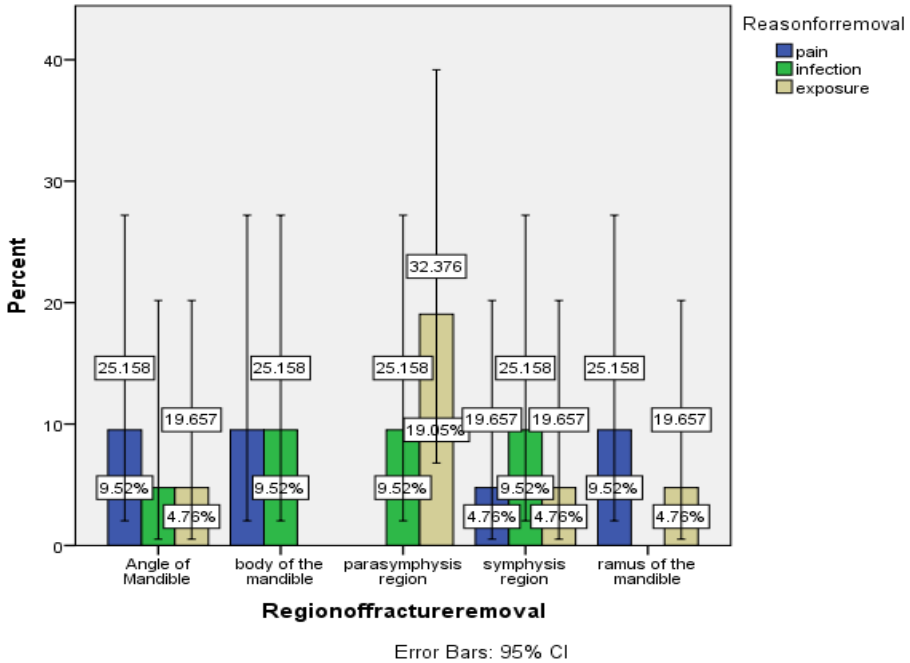

Figure 4 - this represents a correlation graph between the region of fracture removal and reason for the removal. 9.57% of the population have removed their miniplates from the angle of the mandible due to pain,4.75% of patients removed their miniplates angle of the mandible due to pain and exposure of the miniplates. 9.52% of the patients have removed their miniplates from the body of the mandible due to pain and infection. 9.52% of the patients have been removed from the parasymphysis region due to infection and 19.05% of the patients have been removed due to the exposure of miniplates. 4.75% of the patients have removed from the symphysis region due to pain, 9.52% of the patient have removed from the symphysis region due to infection and 4.75% have removed due to the exposure of the miniplates. 9.52% of the patients have removed miniplates from the ramus of the mandible due to pain, and 4.75% have removed it due to exposure of the miniplates.

DISCUSSION

From the study it can be understood that, 66.6% patients of age group 21-50 are mostly affected with mandibular fracture and have a higher chance of placing miniplates compared only 23% of the patients have placed among the age group 3-20% and 9% have placed among the age group 51-70. figure 1). Since medical procedure with the utilization of mini plates in the oral and maxillofacial region was presented in the nineteenth cen-tury, there has been an expansion in the utilization of mini plates (26). In 1978, Champy presented a careful method in which mini plates were utilized in the oral and maxillofacial region, and the mini plate acquired utility for the treatment of maxillofacial injury and orthognathic medical procedure(27). Small scale plates have com-monly been made out of titanium, as it has a higher biocompatibility and preferable actual properties over different metals. The utilization of mini plates has expanded in ongoing years. Be that as it may, there have been different reports of difficulties, like metal poisonousness and sensitivity, stress protecting, metal-losis, migration, palpability, and thermal sensitivity, caused by the use of mini-plates, and the appropriate removal of mini-plates remains controversial. Some researchers recom- mend removal in general, while others do not recommend removal unless clinical symptoms occur. . Clear evidence for such a recommendation has not yet been established, and recent studies have been controversial(28).Among the male population 33.3% of them removed the mini plates due to pain, 28.57% of the population removed due to infection, and 28% of the male population removed due to exposure of the miniplates, whereas in the female population 4.75% removed the miniplates due to infection and 4.75% of them removed due to exposure of the miniplates(figure 2). Among the age 21-50 (23%) of them have had mandibular fracture in the parasymphysis region group 20-40, 60% of the patients removed the miniplates due to infection and 20 % of the patients removed the miniplates due to pain and infection (figure 3).(29)

In many studies, the removal of mini-plates has remained controversial. Evidence has not yet supported a general con- sensus for the removal of mini-plates. Some researchers argue that a standard mini-plate should be removed, whereas others maintain that mini-plates shouldn't be removed until it shows some clinical symptoms. (figure 4) 19.05% of the patients have removed their miniplates from their parasymphysis region due to the exposure of miniplates. Those who oppose removal of a standardmini-plate argue that its biocompat- ibility, low incidence of complications, the risks of general anaesthesia during removal, possible damage to adjacent anatomical structures,and therefore the expense of removal(30). On the contrary, researchers who favor removal argue that the mini- plate could possibly act as a far off object with the potential to cause complications, which mini-plates generate growth restrictions among pediatric patients.

CONCLUSION:

Within the limits of the study it can be concluded that, that the removal of miniplates is among the age group 21-50, mostly in the male population. Mini plates were mostly removed in the parasymphysis region mainly due to exposure of the miniplates. However, the removal rates due to infection, pain and exposure of the miniplates are more, and more of the miniplates have been removed from the parasymphysisregion.Thus, mini-plates may not generally require removal, as various complicating factors must be considered when the mini-plate is removed.

ACKNOWLEDGEMENT:

The authors sincerely acknowledge the support from Saveetha institute of Medical and Technical sciences (SIMATS) and also the authors would like to thank Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical sciences (SIMATS), Saveetha University for providing a platform to carry out this study.

AUTHORS CONTRIBUTIONS:

Data Collection: Yazhlini.P.1
Data Analysis and Interpretation: Yazhlini. P.1
Drafting the article: Yazhlini. P.1
Critical Revision of the article: Dr.Arun Murugaiyan.2
Final approval of the version to be published:Dr.Arun Murugaiyan.2

CONFLICT OF INTEREST:
No potential conflict of interest relevant to this article was reported.

SOURCE OF FUNDING:
The authors would like to thank
- Saveetha Dental College and Hospitals,
- Saveetha institute of Medical and Technical sciences (SIMATS),
- Saveetha University
- SIENNA CORPORATIONS for providing the necessary funds to carry out this study.

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