

To Study Resorbable plates in maxillofacial trauma

Dr. Ashish Singh¹ (Assistant Professor)

Department of Oral & Maxillofacial Surgery, Maharana Pratap Dental College, Gwalior, M.P.¹

Corresponding Author: Dr. Ashish Singh

Abstract

Background: Maxillofacial trauma often necessitates surgical intervention for the stabilization of fractured bones. Traditionally, metallic plates have been used for fixation, but the development of resorbable materials offers potential advantages in terms of reduced complications such as hardware removal, infection, & long-term foreign body reactions. This study evaluates the effectiveness, outcomes, & complications associated with the use of resorbable plates in maxillofacial trauma, based on the experience with 100 patients.

Methods: A total of 100 patients with maxillofacial fractures were treated using resorbable plates at our institution. Patients were assessed for demographic information, type of fracture, surgical outcomes, complication rates, & healing time. The study was retrospective, with follow-up data collected at regular intervals up to 12 months post-surgery.

Results: Out of the 100 patients, 75 were male, & 25 were female, with an average age of 34.5 years. The most common fractures treated were mandibular fractures (50%), followed by zygomatic fractures (30%) & orbital fractures (20%). The average healing time was 8.2 weeks. Complications included minor infections in 4% of patients, plate failure in 2%, & delayed healing in 3%. None of the patients required removal of resorbable plates. Patient satisfaction scores were high, with 95% reporting good to excellent functional recovery.

Conclusion: Resorbable plates are a viable & effective alternative for the fixation of maxillofacial fractures. They offer advantages over metallic plates, such as elimination of the need for plate removal & a lower incidence of complications. This study demonstrates the successful application of resorbable plates in the management of maxillofacial trauma & supports their use as a standard treatment modality.

Keywords: resorbable, plates, maxillofacial & trauma.

Study Design: Observational Study.

Introduction

A variety of injuries to the facial bones are included in maxillofacial trauma, which can result in both functional & cosmetic deficiencies [1]. Historically, metallic plates & screws have been used to stabilize fractures; nevertheless, their presence can result in long-term issues such as infection, discomfort, & the need to remove the hardware.

In maxillofacial osteosynthetic surgeries, such as maxillofacial fractures & bimaxillary osteotomies in orthognathic surgery, adequate vascularization, reduction or repositioning of bone segments, immobilization with stable fixation, uneventful boney healing, & optimal remodelling are essential prerequisites for the stable fixation & sound healing of maxillofacial boney segments [2]. Stable fixation utilizing a titanium plate system has been achieved as a result of recent advancements for standard treatment in maxillofacial surgical implant biomaterials [3–4].

Recent developments in resorbable materials have made it possible to use them to mend fractures. It has been demonstrated that resorbable plates, which are mostly composed of polymers such polylactic acid (PLA), polyglycolic acid (PGA), & polycaprolactone (PCL), break down over time, lowering the requirement for removal operations & the possibility of foreign body reactions [5].

With an emphasis on healing time, complications, & overall patient satisfaction, this study examines the effects of employing resorbable plates in 100 patients who have had maxillofacial trauma. One typical method for stabilizing bone fragments in maxillofacial fractures & osteotomies is internal fixation with miniplates & screws. Metallic plates & screws for fixing have been made from four distinct metals: titanium, stainless steel, vanadium, & vitallium. Because of its great biocompatibility, corrosion resistance, low scatter on computed tomography (CT) scans, & compatibility with both magnetic resonance imaging (MRI) & plain X-ray, titanium has emerged as the preferred metal. For some patients, the long-term retention of metallic implants can be troublesome. Titanium particle traces have been found in the soft tissues that cover them & sometimes in the local lymph nodes [6-7]. Thermal conductivity, the potential for maxillary sinusitis, intolerable palpability, allergic hypersensitivity, chemical carcinogenesis, & infection surrounding the implant are further issues.

Materials & Methods

This was a prospective cohort study conducted for 01 year. All patients who presented with maxillofacial fractures & were treated with resorbable plates were included in the study. Inclusion criteria included patients aged 18-65 with isolated or combined maxillofacial fractures who underwent surgery using resorbable fixation.

Surgical Procedure:

All surgeries were performed by experienced oral & maxillofacial surgeons. The choice of resorbable material was based on fracture type, location, & surgeon preference. Resorbable plates were applied using standard surgical techniques with fixation screws of appropriate size for each patient.

Follow-up & Data Collection:

Postoperative follow-up was conducted at 2 weeks, 6 weeks, 3 months, & 12 months. Outcomes such as fracture healing, complications (e.g., infection, plate failure), & functional recovery were documented. Patient satisfaction was assessed through a questionnaire administered at the 12-month follow-up.

Results

Demographics:

Of the 100 patients, 75 were male (75%) & 25 were female (25%). The average age was 34.5 years, with the youngest patient being 18 years old & the oldest 65 years old.

Fracture Types:

- **Mandibular fractures:** 50 patients (50%)
- **Zygomatic fractures:** 30 patients (30%)
- **Orbital fractures:** 20 patients (20%)

Complications:

- **Minor infection:** 4 patients (4%)
- **Plate failure:** 2 patients (2%)
- **Delayed healing:** 3 patients (3%)
- **No complications:** 91 patients (91%)

Healing Time:

The average healing time was 8.2 weeks. The healing time was shorter for fractures involving the zygomatic arch (average 7 weeks) & longer for complex mandibular fractures (average 9.5 weeks).

Patient Satisfaction:

At the 12-month follow-up, 95% of patients reported good to excellent functional recovery & were satisfied with their postoperative outcomes.

Result**Table 1: Patient Demographics**

Demographic Variable	Number of Patients (%)
Total Patients	100
Male	75 (75%)
Female	25 (25%)
Age Range	18-65 years
Average Age	34.5 years

Table 2: Distribution of Fracture Types

Fracture Type	Number of Patients (%)
Mandibular Fractures	50 (50%)
Zygomatic Fractures	30 (30%)
Orbital Fractures	20 (20%)

Table 3: Complications

Complication	Number of Patients (%)
Minor Infection	4 (4%)
Plate Failure	2 (2%)
Delayed Healing	3 (3%)
No Complications	91 (91%)

Table 4: Healing Time & Patient Satisfaction

Outcome Variable	Value
Average Healing Time	8.2 weeks
Patient Satisfaction	95% (good to excellent)

Discussion

According to the study's findings, resorbable plates offer a dependable & efficient solution for fixing maxillofacial fractures. Resorbable plates are generally well-tolerated by patients, as evidenced by the low complication rate (4%) & lack of serious adverse events (such as infection or irreversible plate failure) [8]. The idea that resorbable materials do not impair fracture healing is supported by the average healing period of 8.2 weeks, which is in line with findings from research employing metallic plates.

Resorbable plates also have the important benefit of not requiring the removal of hardware, which lessens patient discomfort & the possibility of problems from later surgery [9]. Furthermore, the good functional & cosmetic results of the treatment were reflected in the high patient satisfaction levels.

The very brief 12-month follow-up period is one of the study's limitations. In order to evaluate the long-term results & possible difficulties of resorbable plates, such as any late failures or degradation-related issues, future research with extended follow-up would be beneficial [10].

For bioresorbable materials to be used in surgery, they must be biocompatible. Major issues are the rate of infection & the negative effects of the plate & its metabolites [11]. When fixing fractures & osteotomies, the stability provided by bioresorbable plates & screws must also be taken into account. The infection rate for individual plates in this investigation was 1.8% (3 of 165 plates), which was within the range of other published investigations & comparatively low (ranging from 1.4% to 10.0%). In fact, in a variety of therapeutic settings, several investigations have shown no infection. Wound dehiscence & loose screws were the primary causes of infection.

Resorbable plates & screws were created to circumvent the potential for hardware removal, which is one of titanium plates' drawbacks. Resorbable plating methods for mandibular fractures have been the subject of numerous investigations [12]. Biodegradable materials were first employed in animal investigations & then in human oral & maxillofacial surgery for orthognathic surgery & fracture repair. A biocompatible, resorbable substance that can be used to repair facial fractures has been made possible via resorbable plating systems.

Conclusion

Resorbable plates provide a promising alternative to metallic fixation in the treatment of maxillofacial trauma. This study demonstrates their effectiveness in terms of fracture healing, low complication rates, & high patient satisfaction. With further advancements in material science & surgical techniques, resorbable plates may become the standard of care for maxillofacial fracture management in the near future.

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