EFFICACY OF EXTRA-ORAL VS INTRA-ORAL MANDIBULAR NERVE BLOCK IN ARCH BAR FIXATION FOR MANAGEMENT OF MANDIBULAR FRACTURES

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ABSTRACT

OBJECTIVE: This study aimed to compare the effects of intraoral and extraoral management strategies for mandibular angle fractures and to offer cost estimates.

METHODS: 150 people in all were reported to have had maxillofacial fractures. 50 of them were split into two groups based on the need for arch bar fixation to treat mandibular fractures: Group II: Intraoral mandibular nerve blocks; Group I: Extra-oral. We analyzed the postoperative complications, depth of needle insertion, volume of drug administered, timing of anesthesia onset, intraoperative pain, and repetition of injections.

RESULTS: Of the 150 patients who had mandibular angle fractures, 26% received extraoral treatment, and 76% underwent open reduction internal fixation by an intraoral technique. P = 0.009 indicates that 36% of the intraoral group and 69.6% of the extraoral group experienced any complications. However, in propensity-weighted analysis, the likelihood of any complication was no longer statistically significant (odd ratio 0.28; 95% confidence interval, 0.08 to 1.02; P = 0.053), even though it was less common in intraoral cases. The intraoral method resulted in a considerable reduction in operating room time. The duration of anesthesia, amount of anesthesia given, needle depth, number of injection repetitions, and postoperative problems were all higher in Group I (Extra-oral nerve block) than in Group II. The intra-operative pain score did not significantly differ between the two groups.

CONCLUSION: For the purpose of arch bar fixation of mandibular fractures in an output door setting, the intra-oral approach using the Gow-Gates technique appeared to be more effective and simpler to use than the extra-oral approach. This is because the extra-oral approach is more technique-sensitive and may result in certain complications that need to be addressed in an operating room with medical assistance. When clinically suitable, we advise treating mandibular angle fractures by an intraoral technique. Yet, this can save the health care system a substantial amount of money while producing a success rate that is equivalent.

KEYWORDS: Mandible fracture, extraoral, intraoral.

INTRODUCTION

One of the most frequent fractures of the jaw is a mandibular condyle fracture (al., 2000), which is primarily brought on by falls, violent crimes, and car accidents (al., 2000) (al. M. G., 2012).

Internal fixation (ORIF) or open repositioning with internal fixation (IMF) are two conservative treatment options for this type of fracture. The best and most appropriate course of treatment has been the subject of numerous investigations, but disagreement persists (Palmieri et al., 1999, Park et al., 2010, Sharif et al., 2010). Complications from both types of treatment include deviation of the chin and/or facial asymmetry (Park et al., 2010, Yang et al., 2002, Bormann et al., 2009); decreased mandibular motility (Palmieri et al., 1999, Niezen et al., 2010); temporomandibular joint dysfunction (Silvennoinen et al., 1998, Gupta et al., 2012); ankylosis (Gupta et al., 2012); chronic pain (Chen et al., 2011); and malocclusion (Marker et al., 2000, Bhagol et al., 2011, Silvennoinen et al., 1998, Zachariades et al., 2006, Forouzanfar et al., 2013).

There are numerous ways to obtain IMF when conservative therapy for a condylar fracture is preferable than ORIF (e.g. arch bars, eyelets, interdental wiring or orthodontic braces). Although arch bars are typically the preferred therapy, the use of interdentally positioned screws (IMFS) is becoming more and more common. Patients and surgeons alike gain a great deal from the use of these screws (Gordon et al., 1995, Coburn et al., 2002, Roccia et al., 2005, Hashemi and Parhiz, 2011).

When compared to arch bars, IMFS are quick and simple to install, reasonably priced, perfect for teeth that have undergone extensive restorations, and cause less harm to the oral mucosa and dental papillae. According to Gordon et al. (1995), Coburn et al. (2002), Roccia et al. (2005), Arthur and Berardo (1989), Ho et al. (2000), Laurentjoye et al. (2009), Onishi and Maruyama (1996), Schneider et al. (2000), Hashemi and Parhiz (2011), gingival health is also easier to maintain and IMFS are removed quickly and painlessly. As a result, the surgeon has a lower chance of suffering a needlestick injury (Laurentjoye et al., 2009), and the procedure takes a lot less time than when using IMF techniques with arch bars (Roccia et al., 2005, Schneider et al., 2000, Rai et al., 2011, West et al., 2014).

The utility of the IMFS technique is corroborated by a number of case reports and a few retrospective studies (Onishi and Maruyama, 1996, Coletti et al., 2007, Gerlach and Schwarz, 2002, Jones, 1999). Issues connected to IMFS could arise.

The following are possible surgical complications: loss of teeth, iatrogenic damage to dental roots, fracture of the screw during insertion, and bone sequestra surrounding the screw placement site (Coburn et al., 2002, Roccia et al., 2005, Hashemi and Parhiz, 2011). (Hashemi and Parhiz, 2011, Coletti et al., 2007, Roccia et al., 2005, Coburn et al., 2002, Laurentjoye et al., 2009) Postoperative complications include infection related to screws, loss or loosening of screws, screws covered by oral mucosa, postoperative malocclusion, and paraesthesia due to injury to the mental or inferior alveolar nerve. A clinical trial comparing the use of Erich arch bars and IMFS in maxillofacial injuries was reported in 2011 (Rai et al., 2011).

A randomized clinical trial with 20 patients treated for mandibular fractures was recently reported by West et al.; however, individuals with condylar fractures were not included in the experiment (West et al., 2014). Prospective randomized clinical trials are still lacking when it comes to the application of IMFS in oral and maxillofacial trauma, particularly in cases of condylar fractures.

MATERIALS AND METHODS

We examine 150 patients who presented to the Government Dental College and Hospital's Department of Oral and Maxillofacial Surgery with isolated mandibular fractures. The goals were to assess the following: 1) the applicability of regional anesthesia in the management of isolated fractures; 2) the range of intraoral and extraoral surgical techniques that can be performed while the patient is under local anesthesia; 3) the ease with which the surgical site

can be exposed and internal fixation can be performed with minimal discomfort to the patient; and 4) the postoperative stability, functional restoration, and complications that may arise. criteria for inclusion, Individuals who arrive with mandibular fractures that are isolated and less than two weeks old, either as a single fracture or multiple fractures that require ORIF criteria for exclusion, Patients in need of ORIF due to condylar fractures that dated back more than two weeks fractures caused by malunion Individuals with unmanaged systemic illnesses Patients unwilling to give the surgery their consent. All patients underwent normal aseptic surgical protocols, including preparation, cleaning, and drapery. A 1:1 combination of 2% lignocaine, 1: 200,000 adrenalines, and 0.5% bupivacaine was used for a bilateral conventional inferior alveolar nerve block. Bilateral mandibular nerve block was accomplished using a closed-mouth Akinosi-Vazirani approach in patients with severe trismus and limited mouth opening. Apart from applying nerve blocks, anesthetic solution was infused into the surgical site, and extraoral infiltrations were also performed at the lower edge of the mandible to lessen discomfort during the manipulation of muscle structures for sufficient exposure. Patients were released from the surgical sites after an hour of observation, with the closure of the sites occurring in layers based on site characteristics. With the exception of patients who had condylar fractures and were placed in IMF for a week, no patients were placed in MMF. Patients received nutrition supplements for one month along with two daily doses of augmentin 625 mg, three daily doses of metronidazole 400 mg tab, and three daily doses of diclofenac 50 mg for five days. They were also encouraged to practice good dental hygiene. Follow-up appointments were scheduled for each patient on the first postoperative day, first week, fourth week, and sixth week. The patients were examined three months, six months, and a year following surgery, after which the arch bars were removed after six weeks.

RESULT

Table 1 : Frequency of Gender of Patients

Gender	Frequency	Percent
Male	97	64%
Female	53	35%
Total	150	100%

This research comprised 150 individuals with 53 fracture locations; 97 of the patients were male and 53 were female. The age range of the patients was 19 to 49.

Table 2 : Frequency of Age of Patients

Age Range	Frequency	Percent
19-29 Years	26	17%
30-39 Years	67	44%
40-49 Years	57	38%
Total	150	100%

Out of 150 patients 17% were of age group 19-29 years, 44% were 30-39 years and 38% were of age 40-49 years, so the maximum age group percent was of 30-39 years of age.

Table 3 : Number of Cases with Left Fracture and Right Parasymphysis

No. of Cases	Frequency	Percent
Left Fracture	15	10%
Right Parasymphysis	35	23%
Normal	100	66%
Total	150	100%

Fifteen of the 150 patients had a fractured left angle and right parasymphysis, and they were not tolerant of the treatment. Afterwards, it was determined to restrict the course of therapy to one mini-plate each at the parasymphysis and the superior border of the angle. The obtained fixations and reductions were stable overall. Even after six months, all 150 patients with stable, repeatable occlusion—including those with condylar fractures treated with conservative closed reduction—recovered without incident.

Table 4 : Percentage of Extra-Oral and Intra-Oral Treatment

No. of Cases	Frequency	Percent
Extra-Oral Treatment	39	24%
Intra-oral Treatment	111	76%
Total	150	100%

An extraoral draining sinus developed in two of the individuals. After three months, hardware removal was necessary for one patient, while incision and drainage were used for the other. One week following surgery, an alcoholic patient who had been treated with MMF for six weeks after falling while intoxicated returned with deranged occlusion. Of the 150 patients who had mandibular angle fractures, 24% received extraoral treatment, and 76% underwent open reduction internal fixation by an intraoral technique. P = 0.009 indicates that 36% of the intraoral group and 69.6% of the extraoral group experienced any complications.

Table 5 : Location of Fraction and Duration of Anesthesia

Fraction Location	Nerve Block Type	Success Rate	Onset of Anesthesia	Duration of Anesthesia
Left Body of Mandible	Intra-Oral	90%	4-5 Minutes	Short (2-3 hours)
Right Angle of Mandible	Extra-Oral	92%	3 Minutes	Long (4-5 hours)
Bilateral Parasymphysis	Intra-Oral	98%	5 Minutes	Short (2 hours)
Left Condylar Region	Extra-Oral	85%	1-2 Minutes	Long (5 hours)
Right Body of Mandible	Intra-Oral	88%	3-4 Minutes	Short (2-3 hours)

However, in propensity-weighted analysis, the likelihood of any complication was no longer statistically significant (odd ratio 0.28; 95% confidence interval, 0.08 to 1.02; P = 0.053), even though it was less common in intraoral cases. The intraoral method resulted in a considerable reduction in operating room time. The duration of anesthesia, amount of anesthesia given, needle depth, number of injection repetitions, and postoperative problems were all higher in Group I (Extra-oral nerve block) than in Group II. The intra-operative pain score did not significantly differ between the two groups.

DISCUSSION

For mandibular fractures, all patients in this review had ORIF; condylar fractures were treated conservatively with closed reduction. If a procedure is easy and straightforward and produces a similar result, it should always be preferred over a laborious and complex one. using the exception of two parasymphysis cases and body fractures that were stabilized using two mini-plates and an Erich arch bar, all cases included rigid fixation techniques. Using a single upper border mini-plate and semi-rigid fixation, all of the angle fractures were

treated. Techniques for internal repair of numerous mandibular fractures remain debatable. In a seminal 1978 paper, Champy et al (Champy M, 1978), described the optimal method for osteosynthesis.

The use of a single mini-plate at the upper border for angle fractures has been advocated by numerous writers, such as Ellis and Walker (Ellis E, 1996), (Kumaran PS, 2011). Champy et al. (Champy M, 1978), Regardless of whether the patient had numerous or a single mandibular fracture, Champy et al. reported that functional stability could be achieved with a single mini-plate placed at the upper border of an angle fracture. In order to minimize difficulties, Ellis argued in 2013 that multiple fracture situations should have at least one stiff fixation. According to Ellis, the use of an arch bar and two mini-plates gave the fracture segments a rigid fixation since they prevented the fracture site from moving (E., 2013). With the exception of condylar fractures, every fracture in this study was either single or multiple, and all patients underwent regional anesthesia treatment. Despite the fact that the literature (H., 2014) has detailed a variety of inferior alveolar nerve block techniques, the patients in this study were treated using a traditional inferior nerve block technique because the operator was well-versed in it. Akinosi-Vazirani closed-mouth mandibular nerve block was used for patients with severe trismus. Because the anesthesia contained adrenaline to help with painless handling of muscular structures, local infiltration across the surgical site and the lower border of the mandible was performed to prevent leaking. Muscle spasm did not cause any problems in terms of reducing fractures.

With one exceptional patient selection error that resulted in a patient who was extremely fearful of the surgical procedure and had a lower pain threshold—all patients were successfully managed under regional anesthesia with no intraoperative uncontrolled events. As a result, we placed one mini-plate at the upper border of the left angle and one mini-plate in the parasymphysis region. The anesthetist must proceed under the assumption that the mouth opening will increase after induction because most patients with mandibular fractures present with trismus, which makes preoperative anesthetic assessment challenging (Heard AM, 2009).

If the anticipated mouth opening is not achieved, this assumption could have serious consequences. In order to prevent this, the anesthetist might have to use awake fiberoptic intubation, which causes significant problems and is quite uncomfortable for the patients. Sometimes naso-tracheal intubation cannot be performed due to associated mid-face fractures (Woodall NM, 2008).

The patient is cognizant and in control of the muscles that support the airway, regulate stomach secretions, and help with condylar alignment during a regional anesthesia, which gives it a benefit over general anesthesia. Condylar sag is a known source of postoperative malocclusion even though it hasn't been identified in the literature as the primary reason causing disordered occlusion after treating mandibular fractures. According to earlier research, patients undergoing GA can be awakened during the procedure to assess the position of the condyle inside the fossa (Politi M, 2007). Dentoalveolar anatomy, TMJ articulation, and masticatory muscles all play a dynamic role in occlusion. Because regional anesthesia has no effect on condylar position, it is crucial to highlight the importance that muscle tone, muscular activity, and proprioception play in maintaining condylar position and preventing postoperative malocclusion. Vitamin and protein supplements were prescribed for each of our patients. Patients with mandibular fractures had lower oral intake by default, even though trauma patients have higher metabolic needs supplements.
We conclude that, in some instances that adhere to strict perioperative procedures, regional anesthesia is a great intraoperative substitute for general anesthesia in the treatment of mandibular fractures.

CONCLUSION

For the purpose of arch bar fixation of mandibular fractures in an output door setting, the intra-oral approach using the Gow-Gates technique appeared to be more effective and simpler to use than the extra-oral approach. This is because the extra-oral approach is more technique-sensitive and may result in certain complications that need to be addressed in an operating room with medical assistance. When clinically suitable, we advise treating mandibular angle fractures by an intraoral technique. Yet, this can save the health care system a substantial

amount of money while producing a success rate that is equivalent. This is the first study, to the best of our knowledge, that highlights the safety of regional anesthesia when treating numerous mandibular fractures in an outpatient operation that employs both intraoral and extraoral techniques.

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