

Does Simultaneous Third Molar Extraction Increase Intraoperative and Perioperative Complications in Orthognathic Surgery?

Derek M. Steinbacher, DMD, MD* and Katrina L. Kontaxis, DMD†

Background: Prior to orthognathic surgery, most surgeons recommend third molar extraction. Espoused reasons include potential risk for infection, untoward osteotomies, and worsened postoperative discomfort. However, in addition to being another procedure for the patient, this may necessitate a longer preorthognathic surgery phase. The purpose of this study is to compare the outcomes of orthognathic surgery with staged versus simultaneous third molar extractions.

Methods: This was a retrospective analysis of patients who underwent orthognathic surgery from 2013 to 2014, with at least a 1-year follow-up period. Patients were stratified into 2 groups: Extraction of third molars at the time of surgery and prior extraction of third molars. Primary outcomes included the occurrence of unfavorable splits, infection, bleeding, malocclusion, and hardware failure. Secondary outcomes were procedure time, postoperative pain, and length of stay. Pearson χ^2 tests and 2-tailed unpaired *t* tests were performed to determine if there was an association between the simultaneous removal of third molars and the primary and secondary outcome measures, respectively.

Results: One hundred patients were included in the study. Forty-nine patients had third molars extracted at the time of surgery and fifty-one did not. Complications included unfavorable split, postoperative infection, mild postoperative bleeding, postoperative malocclusion, and hardware failure. There was no significant difference in the incidence of complications in both groups. Procedure time was not considerably increased with extractions. There was no significant difference in postoperative pain or length of stay between both groups.

Conclusions: Removing third molars concurrently with orthognathic surgery does not increase the risk of adverse outcomes, nor does it significantly influence hospital course.

Key Words: Orthognathic surgery, surgery first, third molar extraction

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From the *Department of Dentistry and Oral and Maxillofacial Surgery; and †Yale New Haven Hospital, New Haven, CT.

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Address correspondence and reprint requests to Derek M. Steinbacher, DMD, MD, FACS, FAAP, Yale Plastic Surgery, PO Box 208062, New Haven, CT 06510-8062; E-mail: derek.steinbacher@yale.edu

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Third molars have traditionally been extracted 6 months prior to orthognathic surgery.^{1,2} Outpatient removal of third molars can be a source of anxiety for patients, and often involves an additional anesthetic and recovery period. With the increased popularity of “surgery-first” protocols, extraction of teeth is often part of the treatment plan early on. Some studies have suggested an increase in the incidence of unfavorable splits when third molars are left in place before a sagittal split osteotomy.^{3–6} However, this has recently been refuted.^{1,7} The aim of the present study is to determine if extraction of third molars at the time of orthognathic surgery influences hospital course and if it results in increased intraoperative and postoperative complications. The specific objectives were to ascertain the incidences of unfavorable splits, nerve injury, infection, bleeding, malocclusion, and hardware failure and to compare operative time, postoperative pain, and length of stay in the hospital. We hypothesize that the extraction of third molars at the time of orthognathic surgery does not increase complications or significantly influence hospital course.

METHODS

This is a retrospective cohort study of all patients who underwent orthognathic surgery by a single surgeon (DMS) at Yale, from 2013 to 2014, with at least a 1-year follow-up. Approval was obtained from our institution’s human investigation committee. All patients received perioperative antibiotics and steroid taper. Patients who had post-traumatic maxillary or mandibular repositioning, distractor placement, concomitant gap arthroplasties, isolated genioplasty, or Lefort 3 osteotomies were excluded. The patients’ age at the time of surgery, sex, medical history, type of procedure, and status of third molars (extracted during surgery or not) were recorded. Patients were then divided into 2 groups: simultaneous extraction of third molars (E3M) and prior extraction of third molars (PE3M). The patients were distributed in both groups based on whether their third molars had been extracted prior to being referred to our institution for surgery. If the third molars were still in place, the decision was made to remove them at the time of orthognathic surgery. Primary outcome variables were the occurrence of unfavorable splits, infection requiring secondary intervention, bleeding, malocclusion, and hardware failure. Secondary outcome variables were procedure time, postoperative pain (represented by days of intravenous pain medication required), and length of stay. The findings were entered into a data-processing software (Microsoft Excel V14.4.7). Pearson χ^2 tests were performed to determine if there was an association between the simultaneous removal of third molars and the primary outcome measures. Two-tailed unpaired *t* tests were performed to determine the effect of extractions on the secondary outcome measures. Statistical significance was determined to be $P < 0.05$.

RESULTS

One hundred patients were included in the study and were divided into 2 groups. Forty-nine patients had their third molars extracted at

TABLE 1. Sex Distribution of Study Groups

Sex	E3M	PE3M
M	15	16
F	34	35
	49	51

E3M, extraction of third molars; PE3M, prior extraction of third molars.

the time of surgery and 51 did not. Table 1 shows the sex distribution in both study groups. Table 2 displays the distribution of patients by the procedure. The median age of patients was 17 in the E3M group and 21 in the PE3M group whereas the mean age was 19.36 and 26.69, respectively (Table 3).

The only intraoperative complication encountered was 1 unfavorable split in a BSSO. This occurred in the PE3M group. There were no patients with uncontrolled bleeding, inferior alveolar nerve transection, or anesthesia complications.

One patient in the E3M group and no patients in the PE3M group experienced a postoperative infection requiring incision and drainage. Mild postoperative bleeding, which was controlled with conservative measures and did not require return to OR, was encountered in 1 patient in each group. One patient in each group also had postoperative malocclusion. There was 1 case of hardware failure in the PE3M group. Table 4 shows that there is no statistically significant difference in the incidence of complications in both groups.

Procedure time was not considerably increased when third molars were extracted (Table 5). Patients in the E3M group required an average of 1.1 days of IV pain medication, whereas patients in the PE3M group used IV pain medication for an average of 1.24 days (Fig. 1). This was not shown to be statistically significant ($P = 0.66429$). The mean length of stay for patients in the E3M and PE3M groups was 1.82 and 1.88 days, respectively, and the difference was not statistically significant ($P = 0.18453$) (Fig. 2).

DISCUSSION

The patients in the E3M and PE3M groups were similar in sex distribution and procedures performed. The patients in the PE3M group were older (mean age 26.69). This finding is not unexpected, as many people have their third molars removed as teenagers or young adults, as there is generally considered to be a higher risk of complications after the age of 26.⁸

TABLE 2. Procedure Types

Procedure	E3M	PE3M
LF	6	8
LF + BSSO	5	4
LF + G	2	5
LF + BSSO + G	15	18
MPLF	5	5
MPLF + BSSO	1	1
MPLF + G	4	2
MPLF + G + BSSO	7	6
BSSO	1	0
BSSO + G	3	2
	49	51

BSSO, bilateral sagittal split osteotomy; G, genioplasty; LF, Lefort; MPLF, multi-piece Lefort.

TABLE 3. Age Distribution of Study Groups

Age	E3M	PE3M
Median age	17	21
Mean age	19.36	26.69
SD	6.65	11.63

E3M, extraction of third molars; PE3M, prior extraction of third molars, SD, standard deviation.

There was only 1 unfavorable split in our series of patients (1%). This is lower than the reported incidences of up to 2.88%.⁹ Some authors have hypothesized that younger patients with impacted third molars have an increased risk of fracture during BSSO.⁹ In this case, the patient was a 24-year-old woman in the PE3M group. The segments were fixed with a mini-plate and monocortical screws and the event did not affect her final outcome. The presence of third molars during sagittal split has been shown not to be associated with increased unfavorable fractures.¹⁰ It has also been shown to decrease neurovascular bundle entrapment during the split.¹⁰ Other intraoperative complications reported in the literature include severe bleeding, root injury, and nerve injury.¹¹ None of these were encountered in this study.

One of 49 patients (2.04%) who had simultaneous extraction of third molars and no patients who did not have extractions experienced an infection. This difference was not shown to be statistically significant. The infection occurred in a 46-year-old man with obstructive sleep apnea who had simultaneous extraction of erupted teeth #1 and 16, and full bony impacted #17 and 32. He required an incision and drainage for a submandibular infection on the left side. Infection rates ranging between 0.8 and 19% have been reported following orthognathic surgery.¹¹⁻¹³ Verweij et al⁴ found that the incidence of infection was 10.7% in BSSO sites with third molars and 6.9% in sites without third molars.

Postoperative bleeding occurred in 2.04% of E3M patients and 1.96% of PE3M patients. These numbers are low when compared with the reported range, which varies from 0.39 to 38%.^{11,12} The bleeding was controlled with local packing in both patients.

Only 1 patient required osteosynthesis material removal. This patient was an 18-year-old healthy man who was involved in a motor vehicle collision postoperatively, resulting in facial injuries, which may have contributed to the symptomatic removal of his hardware. Osteosynthesis material removal has been reported in up to 8% of patients.¹⁴

There were no recorded patients of prolonged hypoesthesia or paresthesia. Neurosensory impairment is common after orthognathic surgery.^{15,16} Due to the retrospective nature of this study, we were unable to evaluate neurosensory deficits objectively. However, the absence of neurosensory complaints at follow-up appointments is indicative of functional return of sensation.

TABLE 4. Incidence of Complications

Complication	Occurrences		χ^2 Test
	E3M	PE3M	
Unfavorable split	0/49	1/51	$P = 0.32456$
Infection	1/49	0/51	$P = 0.32456$
Bleeding	1/49	1/51	$P = 0.97729$
Malocclusion	1/49	1/51	$P = 0.97729$
Hardware failure	0/49	1/51	$P = 0.32456$

TABLE 5. Procedure Time

Procedure	Procedure Time (Mean in Minutes)		T Test
	E3M	PE3M	
LF	133.3	148.2	0.72296521
LF + BSSO	258.5	230	0.52540926
LF + BSSO + G	278.9	274	0.85205688
MPLF	247.3	219.8	0.37184815
MPLF + G	264	209.5	0.38412855
MPLF + BSSO + G	325.1	351	0.44467128

There was no significant difference in procedure time when third molars were extracted at the time of orthognathic surgery. Some authors have reported that the presence of third molars does not increase osteotomy time.¹⁰ Once the osteotomies are completed, access to the third molars facilitates their removal. This could explain why the added surgical time was not significant.

The patients in this study did not require additional IV pain medication when third molars were extracted at the time of surgery. Although this measurement was subjective, it suggests that the patients in the E3M group did not experience increased pain when compared with the PE3M group. Alveolar osteitis has been reported as a complication of third molar removal in up to 6.3% of patients.¹⁷ Interestingly, no patients in this series exhibited signs or symptoms of alveolar osteitis. This could be explained by the transient neurosensory disturbances encountered after orthognathic surgery.

Length of stay in the hospital was not significantly impacted when third molars were extracted. This result is expected since third molar extraction is typically an outpatient procedure. No other studies have reported data on length of stay with orthognathic surgery and concomitant third molar extractions. Some authors have published that most patients who undergo bimaxillary surgery spend 2 nights in the hospital.¹⁸

In this cohort of patients, extraction of third molars at the time of orthognathic surgery did not increase complications or hospital course. Extraction of third molars at the time of surgery can shorten overall treatment time by obviating the need to wait 6 to 9 months for bone healing after extractions. It also avoids an additional operative procedure, anesthetic risk, and recovery period for the

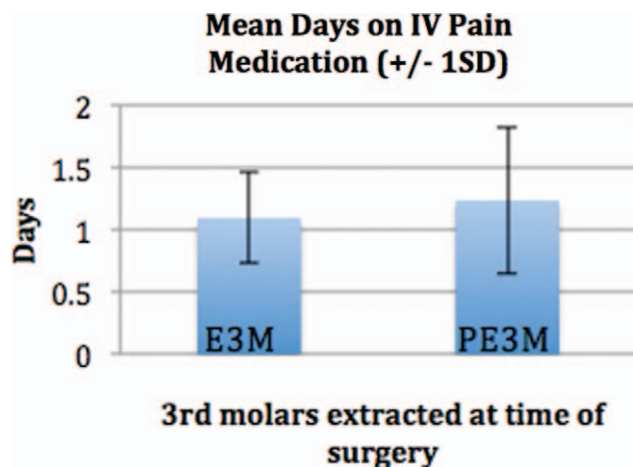


FIGURE 1. Mean days on IV pain medication.

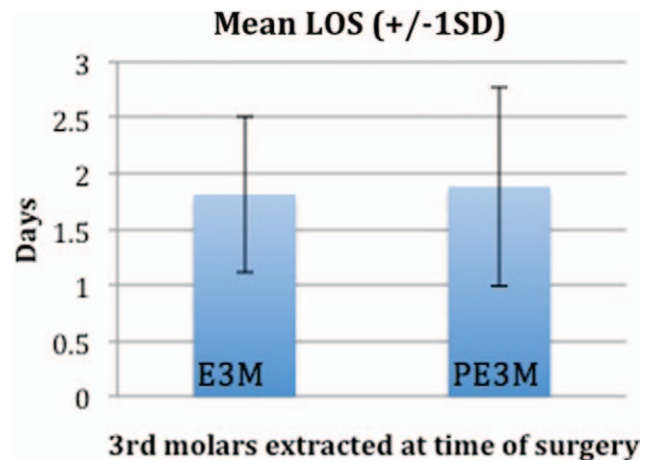


FIGURE 2. Mean length of stay in hospital.

patient. Simultaneous extractions can be facilitated by osteotomies and access to the surgical site during orthognathic surgery. As shown in this study, operative time, postoperative pain, and length of stay are not influenced by this additional step in the procedure.

The limitations of this study are principally due to the information bias inherent to retrospective research. Due to this, we were not able to take the degree of impaction of third molars into account. We were also not able to consistently differentiate extractions that were performed through the osteotomy sites versus through a separate incision. As this study has demonstrated, the incidence of complications is low. Future prospective studies would require greater sample size to correlate degree of impaction with complications.

In this retrospective cohort study, there was no significant difference in incidence of intraoperative or postoperative complications when third molars were extracted at the time of orthognathic surgery. Despite the additional steps required to remove third molars, procedure time was not shown to increase significantly. Patients did not require more IV pain medication and did not have significantly longer lengths of stay in the hospital. This study suggests that extraction of third molars at the time of orthognathic surgery does not result in increased complications, does not significantly influence hospital course, and is well tolerated by patients. Future studies are planned to investigate the effect of extracting third molars at the time of orthognathic surgery on total orthodontic and surgical treatment time.

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