Oral and Maxillofacial Surgery Complication Rates at a Major Teaching Hospital: A 9-Year Retrospective Review

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Background: Postoperative complications in oral and maxillofacial surgery (OMS) can prolong recovery, increase health care costs, and negatively impact patient outcomes. Identifying complication trends is crucial for improving patient care and safety, particularly in academic settings where balancing surgical training and patient safety is essential.

Purpose: The study purpose is to measure and identify trends in the prevalence of OMS complications over a 9-year period at a major teaching hospital.

Study Design, Setting, Sample: This retrospective cohort study was conducted at Memorial Hermann Hospital, Texas Medical Center, Houston. The study included 4,466 documented operations performed between July 1, 2014, and June 30, 2023, with no exclusions.

Predictor Variable: The primary predictor variable was date of surgery, measured in years. A secondary predictor variable was procedure type, categorized into 8 groups: trauma, infection, dentoalveolar, reconstruction, pathology, critical care, orthognathic, and temporomandibular joint disorder.

Main Outcome Variable: The primary outcome variable was the occurrence of postoperative complications, defined as any adverse outcome or unintended consequence resulting from medical or surgical treatment and documented as a morbidity or mortality event. A secondary outcome variable was complication type.

Covariates: Age and sex associated with procedures were collected.

Analyses: Demographic variables were computed at the subject level. Descriptive analysis at the procedure level was used to calculate the prevalence of complications. A generalized linear model assessed trends in complication prevalence, procedure volume, and complication type over time, while Fisher's exact test examined the relationship between procedure type and complication type. A P value of <.05 was considered statistically significant.

Results: The sample was composed of 4,466 operations and 4,453 subjects with a mean age of 41.4 (±4.6) and 2,724 (61%) were male. There were 325 (7.28%) complications. There was no statistically significant trend in the prevalence of complications over time (B-coefficient 0.002, 95% CI −3.9 to 0.004, P = .1). There was a significant association between procedure type and complication type (P < .001).

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Orthognathic procedures exhibited the highest proportion of complications at 17.4% (n = 4), while critical care procedures demonstrated the lowest at 2.0% (n = 4).

Conclusion and Relevance: No statistically significant trend in the prevalence of complications was observed, but procedure type was associated with complication type.

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Postoperative complications in oral and maxillofacial surgery (OMS) are a significant concern due to their potential to lead to extended recovery times, increased health care costs, and adverse patient outcomes.[1] Analyzing trends in surgical complications is crucial for improving clinical practices and enhancing patient safety, particularly in academic settings where resident training must be balanced with optimal patient care.[2] The dynamic environment of teaching hospitals introduces unique challenges, including the integration of less-experienced residents into surgical teams, which may impact patient outcomes.[3,4]

The OMS department at Memorial Hermann Hospital, Texas Medical Center (OMS-MHH) conducts a monthly peer review process where adverse outcomes are evaluated to identify system-based improvements. However, this case-by-case review does not provide a comprehensive analysis of long-term trends. Existing studies on OMS complications are often limited in scope, either focusing on specific complication types or short time frames, leaving gaps in understanding how complication rates evolve. A long-term evaluation of postoperative complications is necessary to assess whether complication rates have changed over time.

The purpose of this study is to measure and identify trends in the prevalence of postoperative complications over a 9-year period at OMS-MHH, a leading teaching hospital in the nation. The authors hypothesize that there is no statistically significant trend in the prevalence of postoperative complications over time. The study aims to measure trends in complication prevalence over time, evaluate whether changes in surgical volume correlate with trends in complication frequency, and categorize complications by type to identify associations between procedure types and specific complications. By systematically analyzing surgical complications across a large dataset, this study will provide measurable insights into patterns of postoperative outcomes and potential areas of improvement that warrant further investigation.

Materials and Methods

STUDY DESIGN/SAMPLE

This is a retrospective cohort study with a study sample derived from patients of all ages who presented to the OMS-MHH service between July 1, 2014, and June 30, 2023, and underwent surgical procedures in the operating room. All documented operations and mortality and morbidity events within this time frame were considered for inclusion. Complete documentation was defined as an operative record that contained the following elements: date of procedure, type of procedure performed, primary indication for surgery, and postoperative morbidity and mortality records, as applicable. Patients were excluded if operative documentation was incomplete, missing, or inaccessible in the electronic health record system. The institutional review board at the University of Texas Health Science Center approved the study (HSC-DB-23-0203) on May 26, 2023.

VARIABLES

Predictor Variables

The primary predictor variable is date of operation, measured over time, recorded during the study interval spanning the academic years 2014 to 2023. The secondary predictor variable is type of procedure, categorized into 8 groups: trauma, infection, dentoalveolar, reconstruction, pathology, critical care, orthognathic, and temporomandibular joint disorder (Table 1).

Outcome Variables

The primary outcome variable is the occurrence of a postoperative complication, coded in a binary format, and defined as an adverse outcome or any unintended consequence determined to have occurred as a direct consequence of any medical treatment, diagnostic or surgical procedure performed by any resident or faculty member of OMS-MHH and documented as a morbidity or mortality event in the institutional records. The OMS-MHH service keeps a record of all mortality and morbidity events. When potential adverse outcomes are identified, they undergo review by 2 full-time faculty members and are subsequently incorporated into the OMS-MHH service's existing morbidity and mortality record.

A secondary outcome variable, coded in a categorical format, is the complication type, categorized into 9 groups: infection management, hardware (including dental implants), surgical and technical errors, postoperative healing or wound management, anesthesia and respiratory complications, diagnostic and decision making, patient-related factors or compliance issues,

Table 1. PROCEDURE CATEGORIES AND DESCRIPTIONS

Type of Procedure	Description
Trauma	Procedures to repair injuries to the head and neck region: hard tissue trauma involving fractures of the maxillofacial skeleton including alveolar fractures and dental trauma and soft tissue trauma including facial lacerations, hemorrhages, hematomas, vessel injuries, and orbit or sinus injuries.[5]
Infection	Management of the invasion and multiplication of pathogenic microorganisms in tissues within the head and neck region, leading to tissue inflammation and damage, specifically head and neck infections of bacterial, viral, or fungal origin as well as cases of osteomyelitis, osteoradionecrosis, and medication-related osteonecrosis of the jaw.[5]
Dentoalveolar	Surgical treatment of conditions affecting teeth, dental implants, and supporting structures such as dental extractions, preprosthetic treatment (vestibuloplasty, alveoloplasty, frenulectomy, sinus augmentation, and exostoses removal), dental clearance, and dental implants.[5]
Reconstruction	Surgical intervention to restore the form and function to the facial skeleton, soft tissues, and associated structures and procedures including local and regional flap, free flaps, avascular grafts, nerve repair, and scalp reconstruction.[5]
Pathology	The diagnosis and surgical management of oral diseases and benign and malignant soft tissue and hard tissue lesions, odontogenic cysts and tumors, as well as salivary gland diseases.[6]
Critical care	A potentially life-threatening condition necessitating a surgical airway procedure (ie tracheostomy).[5,6] Tracheostomies performed concurrently as an adjunct to another primary procedure, were assigned their own category.
Orthognathic	Surgical correction of skeletal abnormalities where the underlying abnormality may be congenital or due to extrinsic causes (excluding acute injuries) or secondary to systemic disease and corrective surgeries for obstructive sleep apnea, cleft lip and palate, and craniofacial syndromes fall into this category.[7]
Temporomandibular Joint Disorder	Surgical therapy to treat disease of internal derangement, degenerative joint disease, rheumatoid arthritis, infectious arthritis, mandibular dislocation, neoplasia, ankylosis, condylar hyperplasia or hypoplasia, or condylar osteolysis.[8]

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functional and esthetic sequelae, and medical or systemic complications (Table 2).

COVARIATES

Age and sex associated with each procedure were collected.

DATA COLLECTION

Electronic health records of study subjects were reviewed for demographics and operative data. All data were deidentified and stored in a secure, Health Insurance Portability and Accountability Act -compliant database.

DATA ANALYSIS

Two independent investigators categorized each documented operation into a procedure category (Table 1) and each postoperative complication into a procedure category (Table 1) based on the primary indication for surgical intervention. Every postoperative complication was further categorized by complication type (Table 2). Discrepancies were resolved through discussion with a third independent investigator or senior faculty member.

Demographic variables were computed at the subject level while all other variables were assessed at the procedure level (Table 3). Basic descriptive analysis at the procedure level was used to calculate the prevalence of complications, defined as the number of postoperative complications within each procedure category divided by the total number of operations in the same category for a given academic year. Inferential analysis was conducted by a statistician using R Statistical Software (R Core Team, 2020), with statistical significance set at $P \leq .05$. A generalized linear model assessed trends in the number of operations, complications, and complication types over time; while Fisher's exact test evaluated the association between 2 categorical variables, procedure type, and complication type.

Results

COMPLICATION TRENDS

During the study interval, 4,453 subjects underwent a total of 4,466 procedures across 8 procedure categories. No patients were excluded from the sample.

Table 2. COMPLICATION TYPES AND DESCRIPTIONS

Complication Type	Description
Infection management	Related to infection control, whether local or systemic, affecting the surgical outcome. Examples are surgical site infection, osteomyelitis, abscess formation, antibiotic resistance, and peri-implantitis.[9]
Hardware (including dental implants)	Arising from the incorporation of surgical hardware, such as plate, screw or implant malposition and hardware loosening or exposure.[10]
Surgical/Technical errors	Intraoperative errors due to improper techniques or failure to adhere to protocols. Examples include inaccurate anatomic positioning, procedural errors, instrumental malfunction or misuse, and intraoperative bleeding.[11]
Postoperative healing or wound management	Issues affecting the healing of wounds, hard or soft tissue after surgery, impacting recovery and potentially necessitating further intervention. Examples are wound dehiscence, keloid scarring, soft tissue necrosis, nonunion or malunion, and flap failure.[12]
Anesthesia and respiratory complications	Related to airway management difficulties, adverse reactions to anesthesia, respiratory depression and/or bronchospasm.[6]
Diagnostic and decision-making errors	Resulting from misdiagnosis, improper surgical planning, or failure to interpret imaging or test results accurately.[13]
Patient-related factors	Associated with patient noncompliance to postoperative care, poor health habits, missed follow-up appointments, or medical conditions impairing healing or increasing surgical risk.[14]
Functional/esthetic sequelae	Unfavorable functional or esthetic outcomes of surgery such as malocclusion, temporomandibular joint dysfunction, nerve or vascular injury, and speech or mastication difficulties.[15]
Medical/systemic complications	Adverse events that affect multiple organ systems beyond the local site of surgery and may arise due to the body's response to surgical trauma or the suboptimal administration of medications.[6]

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The mean age of the sample was 41.4 years (SD ± 4.6) and 2,724 (61%) were male. There was a total of 325 (7.3%) postoperative complications. There was no statistically significant trend in the prevalence of complications over time (B-coefficient 0.002, 95% CI −3.9 to 0.004, $P = .1$). The annual proportion of complications ranged from 5.7% (n = 32) to 8.3% (n = 36) over the 9-year study period (Table 4). Orthognathic procedures exhibited the highest proportion of complications at 17.4% (n = 4) and critical care procedures demonstrated the lowest at 2.0% (n = 4). No individual procedure category demonstrated a statistically significant trend in complications over time (Table 5).

PROCEDURE VOLUME TRENDS

Trauma accounted for the largest proportion of operations (38.3%, n = 1,708) followed by infection (34.6%, n = 1,545), while orthognathic procedures accounted for the fewest (0.5%, n = 23) number of operations (Table 6). The annual number of dentoalveolar procedures demonstrated a statistically significant increase over time (B-coefficient 7.9, 95% CI 3.8 to 12, $P < .001$), while critical care procedures exhibited a statistically significant decrease over time (B-coefficient −5.4, 95% CI −7.8 to −2.1, $P < .05$). Notably, the prevalence of complications in both dentoalveolar and critical care operations remained stable over time, with no statistically significant increase or decrease.

COMPLICATION TYPES

The most common complication type was infection management (26%, n = 85) followed by functional/esthetic outcomes (16%, n = 52), while patient-related issues (2%, n = 6) was the least common complication type (Table 7). There was no statistically significant trend in complication types over time. A statistically significant relationship was identified between procedure category and complication type, as revealed by Fisher's exact test ($P = .0005$). One notable event of mortality occurred in March of 2018 following an infection procedure that led to the postoperative complication from a medical/systemic cause.

Discussion

KEY FINDINGS

This study examined postoperative complications following OMS operations at a leading teaching hospital over a 9-year period to uncover underlying trends that may emerge over time. Analyses of 4,466 surgical

Table 3. DESCRIPTIVE SUMMARY OF THE STUDY SAMPLE

Study Variable	Descriptive Statistics
Sample size (k)	4,466 procedures
Sex: male (binary); n (%)	2,724 (61%)
Age (yr); mean ± SD	41.4 ± 4.6
Academic year (categorical); k (%)	
2014-2015	384 (8.6%)
2015-2016	483 (10.8%)
2016-2017	563 (12.6%)
2017-2018	435 (9.7%)
2018-2019	605 (13.5%)
2019-2020	498 (11.2%)
2020-2021	522 (11.7%)
2021-2022	443 (9.9%)
2022-2023	533 (11.9%)
Procedure Type (categorical); k (%)	
Trauma	1,708 (38.2%)
Infection	1,545 (34.6%)
Dentoalveolar	504 (11.3%)
Reconstruction	315 (7.1%)
Pathology	111 (2.5%)
Critical care	205 (4.6%)
Orthognathic	23 (0.5%)
Temporomandibular joint disorder	55 (1.2%)

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interventions performed between July 1, 2014, and June 30, 2023, revealed no statistically significant increase or decrease in the prevalence of complications. The frequency of complications within individual procedure categories also demonstrated no statistically significant trends over time. This finding aligns with results of Dencker et al[16] who observed stable complication rates across multiple surgical specialties over a 7-year period, as well as the findings of Ou et al[17] who reported stable complication and 30-day mortality rates over a 7-year period across 82 Australian hospitals despite various patient safety initiatives.

PROCEDURE-SPECIFIC TRENDS

Dentoalveolar procedures showed a statistically significant increase in volume over the 9-year period, while maintaining stable frequencies in complications. Ricciardo et al[18] highlight that dentoalveolar surgery comprises the greatest proportion of practice among oral and maxillofacial surgeons, with the growth in dental implantology likely contributing to this finding. A study conducted in 2007[19] emphasized that although almost all OMS residents in the United States believe implant dentistry will be an important part of their practice, many residents felt inadequately prepared by their residency training. In 2021, Tannyhill et al[20] assessed the confidence of graduating OMS residents and found that training proficiency in dentoalveolar surgery, including dental implantology, was perceived to be at a higher level than any other area, suggesting improved training may be contributing to the consistent clinical outcomes despite the increase in volume of procedures.

Conversely, critical care procedures demonstrated a statistically significant decrease in volume over time while maintaining a stable complication prevalence. This finding suggests that although fewer interventions are being performed, the underlying risk of complications remains high. Singh et al[21] discovered that in patients undergoing free flap reconstruction, primary tracheostomy was associated with a longer hospital stay and a higher rate of serious complications compared to delayed extubation. Goetz et al[22] reported that 20% of patients undergoing temporary tracheostomy for oral cancer surgery with microvascular flap reconstruction developed tracheostomy-associated complications, most commonly pneumonia (50%). Ben-Ishay et al[23] noted a significant increase in complication rates in tracheostomies performed in the later era (2016 to 2020) compared to the earlier era (2006 to 2009), with a higher prevalence of comorbidities such as diabetes and coagulation disorders in the patient population. These studies emphasize that while tracheostomy is an essential tool for airway management, its use should be carefully weighed against potential complications, and that the complexity and risk profile have evolved over time.

COMPLICATION TYPES

Fisher's exact test revealed a statistically significant relationship between procedure type and complication type ($P < .001$), indicating that the observed association is unlikely to be random and specific procedures are more likely to result in certain types of complications. Further investigation into this relationship may support the development of targeted complication prevention strategies.

Infection management challenges represent the most common complication type (26%, n = 85), consistent with previous studies that identified high infection rates in head and neck surgeries. Wang et al[24] determined the incidence rate of surgical site infections in head and neck cancer surgeries to range from 19 to 29%, with an overall infection rate of 24%. Gallant et al[25] found that most complications following oral cancer surgery were locally infectious in nature, with surgical site infections and orocutaneous fistulas being the most common. After the gastrointestinal tract, the oral cavity hosts the second most diverse microbial community in the body, consisting of over 700 species

Table 4. TOTAL COMPLICATIONS PER YEAR

Year	Complications (Y/N)	Complication Rate (%)	B-Coefficient	95% CI	*P* Value
2014-2015	27/357	7.0	0.002	−3.9 to 0.004	.1
2015-2016	28/483	5.8			
2016-2017	32/563	5.7			
2017-2018	36/399	8.3			
2018-2019	48/557	7.9			
2019-2020	39/459	7.8			
2020-2021	39/483	7.5			
2021-2022	33/410	7.5			
2022-2023	43/490	8.1			
Total	325/4,141	7.3			

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that colonize the hard and soft tissues.[26] Despite advances in surgical techniques and antibiotic use, the oral microbiome remains a key mediator in complication rates and postoperative outcomes in OMS, due to the anatomical disadvantage of direct exposure of surgical wounds to saliva and a complex microbial environment.[25]

TEMPORAL DISTRIBUTION OF COMPLICATIONS

The highest proportion of complications (27%, n = 88) was observed during the first quarter of the academic year, coinciding with the integration of new residents and exceeding the rates in other quarters by 2 to 4%. While concerns about the "July effect" have been raised and studied, evidence remains mixed. A comprehensive review of 113 studies over 30 years found no significant evidence of increased mortality, major morbidity or readmission rates associated with the arrival of new residents and fellows in July.[27] Another study comparing outcomes between the first and last academic quarters in a neurosurgical program found no statistically significant differences in mortality, morbidity or efficiency.[28] On the contrary, a study of 14,063 cases in a general surgery program found a 52% increase in the rate of complications in the first academic semester when compared to the second semester, and that the first 3 months of the year seem to have the highest complication rates of the entire academic year.[29]

ROLE OF TECHNOLOGY AND ADVANCED SURGICAL TOOLS

During the study period, OMS-MHH implemented advanced surgical technologies, specifically intraoperative computed tomography imaging in 2016, virtual surgical planning (VSP) in 2017, intraoperative navigation and patient-specific implants (PSIs) in 2019. Intraoperative computed tomography has been found to reduce intrasurgical and postsurgical adverse events in neurosurgery, orthopedic surgery, and spinal surgery by offering real-time data extraction and computer-assisted processing.[30] VSP has shown to play an instrumental role in reducing surgical complications, specifically in head and neck oncologic surgery, through its precision in determining tumor-free resection margins.[31] Integration of PSI, especially those engineered with antimicrobial properties have potential to reduce postoperative infections and thus minimize postoperative complications.[32] The role of VSP and PSI at OMS-MHH has been notably more significant in elective surgeries such as reconstructive and orthognathic cases. The inherent delays and extensive preparatory time required for these technologies have limited their application in the management of acute trauma cases. These technologies have shown to reduce complications in other surgical fields and may have contributed to the stability of postoperative complications at OMS-MHH. Thematic analysis[33] of complication types reveals an overall stable proportion of surgical and technical errors with a notable decrease in the 2022 to 2023 academic year; however, further investigation is required to explore the impact of advanced technology on complications and patient outcomes.

LIMITATIONS

A limitation of this study is the retrospective design, which relies on existing records and data that may be prone to inaccuracies, incomplete information, or reporting biases. However, by analyzing data over a 9-year period and including a total of 4,466 procedures, the large dataset can mitigate the impact of inconsistencies or missing records, enabling reliable identification of trends. Another limitation is the lack of focus on external factors such as technological advancements, hospital policy changes, or improved postoperative care. Potential confounders like patient comorbidities, surgeon experience, and case severity are also

Table 5. BIVARIATE ANALYSES OF COMPLICATIONS PER PROCEDURE TYPE OVER TIME

Year	Trauma	Infection	Dentoalveolar	Reconstruction	Pathology	Critical Care	Orthognathic	TMJ	Total
2014-2015	13 (6.5%)	10 (10.9%)	0 (0.0%)	1 (4.8%)	1 (20.0%)	2 (5.4%)	0 (0.0%)	0 (0.0%)	27 (7.0%)
2015-2016	15 (6.9%)	9 (6.3%)	1 (3.2%)	1 (2.9%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	1 (7.6%)	28 (5.8%)
2016-2017	14 (7.1%)	13 (6.5%)	1 (3.5%)	2 (4.7%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	1 (11.1%)	32 (5.7%)
2017-2018	25 (15.2%)	7 (4.5%)	0 (0.0%)	4 (13.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	36 (8.3%)
2018-2019	21 (10.7%)	23 (8.6%)	2 (2.5%)	2 (5.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	48 (7.9%)
2019-2020	17 (8.9%)	11 (6.8%)	6 (8.3%)	5 (12.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	39 (7.8%)
2020-2021	16 (9.3%)	16 (8.7%)	0 (0.0%)	2 (5.6%)	3 (25.0%)	1 (7.1%)	1 (33.3%)	0 (0.0%)	39 (7.5%)
2021-2022	16 (9.8%)	10 (6.7%)	1 (1.5%)	3 (8.3%)	1 (8.3%)	0 (0.0%)	1 (50.0%)	1 (33.3%)	33 (7.5%)
2022-2023	19 (9.4%)	16 (8.3%)	2 (2.8%)	4 (9.8%)	1 (9.1%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	43 (8.1%)
Total	156 (9.1%)	115 (7.4%)	13 (2.6%)	24 (7.6%)	6 (5.4%)	4 (2.0%)	4 (17.4%)	3 (5.5%)	325 (7.3%)
B-coefficient (95% CI)	0.003 (−004 to 0.01)	−0.0005 (−0.006 to 0.005)	0.001 (−0.006 to 0.008)	0.006 (−0.003 to 0.01)	0.005 (−0.02 to 0.03)	−0.002 (−0.01 to 0.006)	0.03 (−0.01 to 0.08)	0.01 (−0.02 to 0.04)	0.002 (−3.9 to 0.004)
P value	.4	.9	.7	.2	.7	.6	.2	.5	.1

Abbreviations: TMJ, temporomandibular joint.

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Table 6. OPERATIVE VOLUME BY PROCEDURE TYPE OVER TIME

Year	Trauma	Infection	Dentoalveolar	Reconstruction	Pathology	Critical Care	Orthognathic	TMJ	Total
2014-2015	200 (52.1%)	91 (23.7%)	24 (6.3%)	21 (5.5%)	5 (1.3%)	37 (9.6%)	1 (0.3%)	5 (1.3%)	384 (8.6%)
2015-2016	219 (45.3%)	142 (29.4%)	31 (6.4%)	34 (7.0%)	5 (1.0%)	36 (7.5%)	3 (0.6%)	13 (2.7%)	483 (10.8%)
2016-2017	198 (35.2%)	201 (35.7%)	29 (5.2%)	43 (7.6%)	18 (3.2%)	63 (11.2%)	2 (0.4%)	9 (1.6%)	563 (12.6%)
2017-2018	165 (37.9%)	157 (36.1%)	34 (7.8%)	30 (6.9%)	15 (3.5%)	23 (5.3%)	6 (1.4%)	5 (1.2%)	435 (9.7%)
2018-2019	196 (32.4%)	267 (44.1%)	79 (13.1%)	34 (5.6%)	16 (2.6%)	10 (1.7%)	0 (0.0%)	3 (0.5%)	605 (13.6%)
2019-2020	191 (38.4%)	161 (32.3%)	72 (14.5%)	40 (8.0%)	17 (3.4%)	9 (1.8%)	1 (0.2%)	7 (1.4%)	498 (11.2%)
2020-2021	172 (33.0%)	184 (35.3%)	95 (18.2%)	36 (6.9%)	12 (2.3%)	14 (2.7%)	3 (0.6%)	6 (1.2%)	522 (11.7%)
2021-2022	164 (37.0%)	150 (33.9%)	68 (15.4%)	36 (8.1%)	12 (2.7%)	8 (1.8%)	2 (0.5%)	3 (0.7%)	443 (9.9%)
2022-2023	203 (38.1%)	192 (36.0%)	72 (13.5%)	41 (7.7%)	11 (2.1%)	5 (0.9%)	5 (0.9%)	4 (0.8%)	533 (11.9%)
Total	1,708 (38.2%)	1,545 (34.6%)	504 (11.3%)	315 (7.1%)	111 (2.5%)	205 (4.6%)	23 (0.5%)	55 (1.2%)	4466
B-coefficient (95% CI)	−3.0 (−7.6 to 1.6)	6.6 (−5.5 to 18.8)	7.9 (3.8 to 11.9)	1.4 (−0.1 to 2.8)	0.6 (−0.6 to 1.8)	−5.4 (−7.8 to −2.1)	1.2 (−0.3 to 0.7)	−0.6 (−1.4 to 0.1)	7.6 (−10.1 to 25.3)
P value	.2	.3	.0002	.1	.4	.001	.5	.1	.4

Abbreviations: TMJ, temporomandibular joint.

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Table 7. COMPLICATION TYPES OVER TIME

Year	Infection Management	Hardware	Surgical and Technical	Postoperative Healing	Anesthesia and Respiratory	Diagnostic	Patient-Related	Functional and Esthetic	Medicine
2014-2015	6 (22.2%)	1 (3.7%)	6 (22.2%)	4 (14.8%)	1 (3.7%)	4 (14.8%)	1 (3.7%)	3 (11.1%)	1 (3.7%)
2015-2016	3 (10.7%)	4 (14.3%)	5 (17.9%)	3 (10.7%)	1 (3.6%)	5 (17.9%)	0 (0.0%)	5 (17.9%)	2 (7.1%)
2016-2017	12 (37.5%)	4 (12.5%)	3 (9.4%)	5 (15.6%)	2 (6.3%)	3 (9.4%)	0 (0.0%)	3 (9.4%)	0 (0.0%)
2017-2018	6 (16.7%)	4 (11.1%)	8 (22.2%)	4 (11.1%)	0 (0.0%)	4 (11.1%)	3 (8.3%)	5 (13.9%)	2 (5.6%)
2018-2019	17 (35.4%)	9 (18.8%)	5 (10.4%)	3 (6.3%)	1 (2.1%)	3 (6.3%)	0 (0.0%)	9 (18.8%)	1 (2.1%)
2019-2020	11 (28.2%)	5 (12.8%)	7 (18.0%)	5 (12.8%)	0 (0.0%)	2 (5.1%)	0 (0.0%)	8 (20.5%)	1 (2.6%)
2020-2021	12 (30.8%)	7 (18.0%)	6 (15.4%)	2 (5.1%)	2 (5.1%)	2 (5.1%)	0 (0.0%)	7 (18.0%)	1 (2.6%)
2021-2022	8 (24.2%)	4 (12.1%)	7 (21.2%)	3 (9.1%)	1 (3.0%)	6 (18.2%)	0 (0.0%)	3 (9.1%)	1 (3.0%)
2022-2023	10 (23.3%)	5 (11.6%)	3 (7.0%)	5 (11.6%)	3 (7.0%)	6 (14.0%)	2 (4.7%)	9 (20.9%)	0 (0.0%)
Total	85 (26.2%)	43 (13.2%)	50 (15.4%)	34 (10.5%)	11 (3.4%)	35 (10.8%)	6 (1.9%)	52 (16.0%)	9 (2.8%)
B-coefficient (95% CI)	0.6 (−0.4 to 1.6)	0.4 (−0.2 to 0.9)	−0.02 (−0.5 to 0.5)	−0.02 (−0.3 to 0.3)	0.1 (−0.1 to 0.4)	0.1 (−0.3 to 0.5)	0.02 (−0.3 to 0.3)	0.5 (−0.1 to 1.1)	−0.1 (−0.3 to 0.1)
P value	.3	.2	.9	.9	.3	.6	.9	.1	.3

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unaccounted for. While the purpose of this study is to identify overarching trends, it is important to acknowledge that these factors can influence complication rates. The third limitation is potential misclassification bias, as subjective judgment may influence the classification of each procedure, complication, and complication type. Although 2 investigators were involved in the classification process to resolve disagreements, the risk of bias remains, potentially affecting categorization consistency. Lastly, this study is limited to 1 institution. Results from a single teaching hospital may not be applicable to other hospitals or clinics with different surgical practices, patient populations, or resources.

FINAL THOUGHTS AND FUTURE RESEARCH

Among 4,466 operations performed between July 1, 2014, and June 30, 2023 at OMS-MHH, no statistically significant trends in the prevalence of complications were observed over time. There was a statistically significant increase and a statistically significant decrease in the number of dentoalveolar operations and critical care operations performed, respectively, over the study period.

Infection management emerged as the most common complication type. Although advanced technologies were introduced during the study period and a reduction was seen in surgical and technical error–related complications in the most recent academic year examined, their impact on complications remains unclear. Future studies should explore the influence of technological advancements by comparing complication rates between procedures that utilize specific technologies and those that do not.

Furthermore, the significant association between procedure type and complication type underscores the importance of identifying specific risk factors linked to different procedure categories. Future research should examine these relationships to aid in the development of targeted prevention strategies. External factors and confounding variables affecting complications should be investigated to better understand their potential impact on complications in OMS.

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