ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

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Improper Treatments in the Field of Oral and Maxillofacial Surgery: A Clinical Cohort Study of 55 Cases

Ağız, Diş ve Çene Cerrahisi Alanında Hatalı Tedaviler: 55 Olgunun Klinik Kohort Araştırması

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ABSTRACT Objective: To underscore the significance of dentistry-based education in oral and maxillofacial surgery (OMFS), fostering interdisciplinary communication and collaboration for effective treatments. **Material and Methods:** Fifty five improper OMFS treatment cases directed to us from different centers were investigated. Cases were categorized into dentoalveolar and maxillofacial interventions. Clinical records and patient files were analyzed for age, gender, etiology, improper treatment classification, treating clinician, previous interventions, complications, and orofacial outcomes. **Results:** During the 25-year survey (1990-2015), 55 out of 12,452 cases were studied. Case ages range from 3 to 70 years (Average: 33.4), with 33 (60%) males and 22 (40%) females. Dentoalveolar interventions accounted for 22 cases, while maxillofacial cases accounted for 33. Private practices performed 32 interventions, whereas state or university hospitals performed 23. Dentists carried out 22 procedures, plastic surgeons 22, and ear nose throat specialists 11. The most common improper treatments were tooth extraction-related (21 cases), followed by jaw fracture treatment (15 cases), and misdiagnosed odontogenic tumor as infection (8 cases). The top 3 reasons for patient referrals were facial asymmetry and malocclusion (21 cases), root migration to anatomical spaces (11 cases), and nerve injury (9 cases). The most common sequelae after the first intervention were facial asymmetry and malocclusion (24 cases), infection in the area (22 cases), and nerve injury (12 cases). **Conclusion:** Improper treatments are common in OMFS, necessitating awareness among all surgeons. Reducing such cases requires physicians to take responsibility throughout the preoperative, intraoperative, and postoperative phases, being fully aware of their authority and skills. Additionally, addressing authority conflicts, improving dentistry-based secondary education, and promoting specialization in the field are vital factors.

Keywords: Malpractice; oral surgery; oral pathology; oral surgical procedures; dentistry education

ÖZET Amaç: Bu çalışmanın amacı, ağız, diş ve çene cerrahisinde (ADÇC), diş hekimliği temelli yeterli ve kapsamlı eğitimin, disiplinler arası iletişimin ve uygun tedaviler için interdisipliner iş birliğinin önemini vurgulamaktır. **Gereç ve Yöntemler:** ADÇC alanında hatalı tedavi edilen 55 vaka incelenmiştir. Vakalar dentoalveolar ve maksillofasiyal girişimler olmak üzere 2 alt gruba ayrılmıştır. Veriler (klinik kayıtlar ve hasta dosyaları) yaş, cinsiyet, etiyoloji, hatalı tedavi sınıflandırması, ilgili klinisyen, önceki tedavi, komplikasyonlar ve orofasiyal sekellere olarak analiz edilmiştir. **Bulgular:** Yirmi beş yıllık (1990-2015) araştırma döneminde, 12.452 vakadan 55'i bu çalışmaya dâhil edildi. Vakalarda yaş aralığı 3-70 arasında (ortalama 33,4) değişmektedir. Elli beş hastanın 33'ü (%60) erkek, 22'si (%40) kadındır. Yirmi ikisi dentoalveolar, 33'ü çene-yüz müdahalelerinden kaynaklanmıştır. Ayrıca 32 adedi serbest muayenehanede, 23'ü devlet veya üniversite hastanesinde uygulanmıştır. Yirmi ikisi diş hekimi, 22'si plastik cerrah ve 11'i kulak-burun-boğaz tarafından yapılmıştır. İlk üçe giren hatalı tedavilerden 21'i diş çekimi sırasında, 15'i çene kırığı tedavisinde ve 8'i odontojenik tümörün yanlış teşhisi nedeniyledir. Hastaların yönlendirilmesine neden olan ilk 3 sorun; fasiyal asimetri ve maloklüzyon (21), kök migrasyonu (11) ve sinir yaralanmasıdır (9). En sık saptanan ilk 3 sekel fasiyal asimetri ve maloklüzyon (24), enfeksiyon varlığı (22) ve sinir yaralanmasıdır (12). **Sonuç:** Uygun olmayan tedaviler, günlük klinik pratiğin bir parçasıdır ve tüm çene cerrahlarının farkında olması gereken bir konudur. Hekimlerin ameliyat öncesi, sırası ve sonrasında hastaların sorumluluğunu üstlenmesi, yetki ve becerilerinin tam olarak farkında olması, yanlış tedavi vakalarını azaltabilir. Ayrıca çene cerrahisi alanında yetki çatışmasına çözüm bulunması, eğitimin uygun düzeyde ve kalitede olması, alanda uzmanlaşma ve branşlar arası iletişim ve hasta yönlendirilmesi katkı sağlayabilecek diğer faktörlerdir.

Anahtar Kelimeler: Malpraktis; oral cerrahi; ağız patolojisi; oral cerrahi işlemleri; diş hekimliği eğitimi

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Contrary to societal expectations, global health systems are not entirely safe. Recent studies have focused on identifying causes and developing solutions to reduce improper treatments in health systems.[1-4] Oral and maxillofacial surgery (OMFS) is a specialized branch of surgery with diverse interventions, ranging from routine tooth extractions to complex cancer treatments involving head and neck dissection. OMFS presents unique challenges and requirements. Jaw fractures, for instance, require special knowledge due to their involvement in a dynamic joint, aiming not only for interosseous integrity but also to preserve dental relationships between the jaws.[3,5,6] Similarly, temporomandibular joint (TMJ) treatments demand distinct expertise due to its biaxial mobility.[7] Orthognathic surgery, which emphasizes occlusion and tooth relations between the jaws, requires collaboration across different specialties and consideration of multiple factors during the intervention.[8,9] Even seemingly simple tooth extractions, commonly performed by dental trainees in their third year of education, hold potential complications for patients.[10-12] Moreover, improper interventions in the oral and maxillofacial region can lead to rapid and evident consequences, impacting functions such as chewing, speaking, and facial aesthetics (e.g., after jaw fracture treatment or orthognathic surgery), making the results of improper treatments more apparent.[2,3,5,13]

Improper medical treatment, considered professional negligence, can lead to additional patient injuries. Terms used interchangeably for problems arising from medical and dental treatments include "complication", "side effect", "sequelae", "adverse reaction", and "misapplication". It is essential to distinguish improper treatments from complications, side effects, and sequelae. Complications are unexpected events that can occur despite adequate treatment. However, they can often be resolved with early detection and proper care. Side effects refer to unintended outcomes accompanying the intended results. Sequelae are symptoms that persist after an illness or adverse event. All events related to patient treatment are labeled as "medical accidents", regardless of health personnel's fault. In contrast, conflicts between patients and healthcare providers or institutions are known as "medicolegal issues". Improper treatment involves medical negligence or errors, such as inadequate treatment and misdiagnosis resulting from a doctor's lack of education, knowledge, ability, and experience. Legal and criminal disputes may arise when patients suffer significant harm due to improper treatment.[4,5,14,15]

Healthcare professionals must fulfill their duty of care, provide prior explanations, maintain close relationships between healthcare personnel and patients, and promptly address problems. Unexpected complications and side effects are common in OMFS. Hence, all oral and maxillofacial surgeons should actively investigate and manage such issues. Two competencies are required to evaluate improper OMFS treatment: a thorough case history, careful clinical observation, and proper radiographic documentation to demonstrate its correctness or inadequacy and evolution. Different specialists perform clinical and surgical procedures in OMFS, making improper treatments in this field more prevalent.[2,3,5,6,13]

Building on this perspective, this study analyzes improper treatment cases in OMFS, considering age, gender, treatment classification, previous interventions, referral reasons, reasons for secondary interventions, and the intended second intervention. The study aims to highlight the significance of dentistry-based education in achieving successful maxillofacial surgery outcomes by implementing appropriate procedures.

MATERIAL AND METHODS

In this study, patients who required a secondary intervention or revision surgery due to a previous procedure were selected among those who applied to the dentistry faculty hospitals of two universities between 1990 and 2015.

The archives of the council meetings for evaluating all the patients who applied held in the relevant universities' OMFS departments, were used. The problems experienced by the patients regarding the previous treatments and the necessity of a second surgical procedure or revision surgery were accepted by the unanimous/majority of the faculty members of the relevant departments during in-patient evaluation councils. Additional treatments or revision surgeries required by the relevant patients were performed by

the same oral and maxillofacial surgeon and his team if the patient had accepted the revision treatment.

All preoperative, intraoperative, and postoperative improper treatments related to dental implantology were excluded from the study due to the broad scope of this subject, the fact that treatment complications do not constantly occur in the short term, and the difficulty of objective evaluation. Therefore, no dental implant cases were included in the study, including grafting cases that were made for dental implant applications or had the potential to be related.

This study analyzed 55 recorded improper treatment cases among 12,452 patients. Data (clinical records, patients' files) were reviewed and analyzed regarding age, gender, etiology, misdiagnosis, classification of improper treatment, related clinician, treatment methods and complications, and orofacial sequels. Patients were divided into 2 subgroups: dentoalveolar treatments and maxillofacial treatments. Percentages and means were calculated.

To avoid duplication, all data researchers use anonymous information generated solely from genealogical data, the date the adverse event occurred, and the source or origin of the information. All case data were analyzed by 2 researchers working independently of each other. These 2 researchers used the same evaluation criteria to standardize and remain homogeneous when interpreting the data in the cases.

In this study, researchers employed specific terms to differentiate between improper treatment and complications as follows: Improper treatment referred to failures in diagnosis, planning, execution, or patient follow-up resulting from a lack of skill or proper attitude among healthcare professionals, while complications denoted abnormal outcomes arising after treatment had been adequately performed. The researchers meticulously selected cases that fulfilled specific criteria to gather pertinent data. These requirements encompassed instances involving improper treatment related to dentoalveolar surgery or maxillofacial surgery. The compiled data encompassed comprehensive information about the previous procedure, the date when the improper treatment occurred, the definition of the improper treatment, its potential causes and consequences, and the specific area of surgical intervention responsible for the adverse event. Factors associated with improper treatment were also considered. Additionally, the study investigated the type of healthcare treatment required by the patients. It documented the outcomes they experienced as a result of the improper treatment.

This study was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent forms were obtained from all patients before examination, treatment and, if any, revision surgeries. Ethical considerations were followed as data were anonymized, except for gender and age. Thus formal approval from an ethics committee was not sought. All relevant information on the patients analyzed within the study is provided in Table 1.

RESULTS

AGE AND GENDER DISTRIBUTION

Patient ages ranged from 3 to 70, with a mean age of 33.4. Of the 55 patients, 33 (60%) were male, and 22 (40%) were female (Table 1).

IMPROPER TREATMENT CLASSIFICATION

It classified improper treatment cases into two subgroups according to the characteristics of the cases. These are dentoalveolar interventions and maxillofacial interventions. While 22 were related to dentoalveolar interventions, 33 were caused by maxillofacial interventions (Table 1).

In addition, 32 were applied in private practice, and 23 were applied in a state hospital or university hospital. Twenty-two were performed by a dentist, 22 by a plastic surgeon, and 11 by an ear, nose, and throat specialist (Table 1). Of the previous interventions, 21 (38.2%) were tooth extraction, 15 (27.2%) were jaw fracture treatment, 8 (14.6%) were unfair treatment of cyst or tumor as an infection because of misdiagnosis, 5 (9.1%) after orthognathic surgery, 4 (7.3%) after TMJ surgery, 1 (1.8%) after tumor operation, and 1 (1.8%) after cyst operation (Table 2).

REFERRAL REASONS OF THE PATIENTS

Unsolved or newly occurring problems in patients as a result of primary interventions applied to patients listed below: 21 (25.7%) were facial asymmetry and

TABLE 1: Detailed information on the cases included in the study.

Date	Medical staff	G	A	Health institution	Category	Previous intervention	Referral reasons	Reason for needing secondary operation	Secondary intervention
1990	Dentist	F	23	Private practice	Dentoalveolar surgery	Tooth extraction	Root in the mandibular canal (migrated tooth and nerve injury)	Nerve injury and infection in the area	Surgical removal of tooth piece
1992	Dentist	F	43	Private practice	Dentoalveolar surgery	Tooth extraction	Root in the mandibular canal (migrated tooth and nerve injury)	Nerve injury and infection in the area	Surgical removal of tooth piece
1995	Dentist	F	50	Private practice	Dentoalveolar surgery	Tooth extraction	Fragmented bone and tooth pieces in the maxillary sinus (migrated tooth and oroantral communication)	Oroantral fistula formation and infection in the area	Caldwell-Luc surgery and closure of oroantral communication
1995	ENT specialist	F	67	Public hospital	Maxillofacial surgery	Infection treatment	Submandibular mass (misdiagnosed cyst/tumor/cancer)	Worsening of the condition	Tumor operation
1996	Plastic surgeon	F	31	Public hospital	Maxillofacial surgery	Infection treatment	Infraorbital swelling (misdiagnosed cyst/tumor/cancer "Burkitt lymphoma")	Worsening of the condition	Tumor operation
1998	Dentist	M	25	Private practice	Dentoalveolar surgery	Tooth extraction	Migrated third molar in the mandibular spaces (migrated tooth)	Infection in the area	Surgical removal of tooth piece
1998	Plastic surgeon	F	39	Private practice	Maxillofacial surgery	Infection treatment	Submandibular mass (misdiagnosed cyst/tumor/cancer)	Worsening of the condition	Tumor operation
1999	ENT specialist	F	41	Public hospital	Maxillofacial surgery	Infection treatment	Infraorbital swelling and gingival hyperplasia (misdiagnosed cyst/tumor/cancer)	Worsening of the condition	Cyst operation
2000	Dentist	M	28	Private practice	Dentoalveolar surgery	Tooth extraction	Third molar in the parapharyngeal space (migrated tooth)	Infection in the area	Surgical removal of tooth piece
2000	Plastic surgeon	M	26	Private practice	Maxillofacial surgery	Infection treatment	Submandibular swelling (misdiagnosed cyst/tumor/cancer "non-Hodgkin lymphoma")	Worsening of the condition	Tumor operation
2001	Dentist	M	24	Private practice	Dentoalveolar surgery	Tooth extraction	Migrated third molar into submandibular space (Migrated Tooth)	Infection in the area	Surgical removal of tooth piece
2001	Plastic surgeon	M	27	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2001	Plastic surgeon	M	28	Private practice	Maxillofacial surgery	Orthognathic surgery	Facial asymmetry and malocclusion, and mobile maxilla	Facial asymmetry and malocclusion	Revision surgery (orthognathic surgery)
2002	Plastic surgeon	M	33	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2003	Plastic surgeon	M	32	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2004	Plastic surgeon	M	47	Public hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2004	ENT specialist	M	25	University hospital	Maxillofacial surgery	Fracture treatment and soft tissue (tongue) injury	Facial asymmetry and malocclusion, partial necrosis of the tongue	Facial asymmetry and malocclusion, soft tissue loss (tongue)	Revision surgery (fracture treatment) and partial glossectomy
2004	Plastic surgeon	M	18	University hospital	Maxillofacial surgery	TMJ surgery	Re-ankylosis of TMJ and facial asymmetry and malocclusion, limited mouth opening	Facial asymmetry and malocclusion, limited mouth opening	Revision surgery (TMJ surgery)
2005	ENT specialist	M	29	Private practice	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2005	ENT specialist	M	43	University hospital	Maxillofacial surgery	Infection treatment	Ulcer on the lower lip (misdiagnosed cyst/tumor/cancer "lower lip carcinoma")	Worsening of the condition	Tumor operation
2005	ENT specialist	M	65	Public hospital	Maxillofacial surgery	Infection treatment	Mandibular mass, infection in the area (misdiagnosed cyst/tumor/cancer)	Worsening of the condition	Cyst operation
2006	Plastic surgeon	F	12	Private practice	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2007	Plastic surgeon	M	37	Private practice	Maxillofacial surgery	Fracture treatment	Nerve injury and infection in the area	Facial asymmetry and malocclusion, nerve injury, infection in the area	Revision surgery (fracture treatment)
2007	Dentist	F	32	Private practice	Dentoalveolar surgery	Tooth extraction	Migration of premolar root to the maxillary sinus (migrated tooth and oroantral communication)	Infection in the area and oroantral fistula	Caldwell-Luc surgery and closure of oroantral communication
2007	Dentist	M	19	Private practice	Dentoalveolar surgery	Tooth extraction	Broken extraction instrument fragment in the mandible (foreign body)	Infection in the area	Removal of foreign body
2007	Dentist	F	43	Private practice	Dentoalveolar surgery	Tooth extraction	Root migration behind the mental nerve (migrated tooth and nerve injury)	Nerve injury and infection in the area	Surgical removal of tooth piece
2007	Dentist	F	37	Private practice	Dentoalveolar surgery	Tooth extraction	Broken extraction instrument fragment in the mandible (foreign body)	Infection in the area and nerve injury	Removal of foreign body
2008	Plastic surgeon	F	27	Private practice	Maxillofacial surgery	TMJ surgery	TMJ ankylosis and limited mouth opening	TMJ ankylosis and limited mouth opening	Revision surgery (TMJ surgery)
2008	Plastic surgeon	M	35	Public hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2008	Plastic surgeon	F	24	University hospital	Maxillofacial surgery	Tumor operation	Facial asymmetry and deformity (scar formation)	Worsening of the condition	Revision surgery (tumor operation)
2008	Plastic surgeon	F	23	University hospital	Maxillofacial surgery	TMJ surgery	Facial asymmetry (bird face) and malocclusion	Facial asymmetry and malocclusion	Revision surgery (TMJ surgery)
2008	Plastic surgeon	M	19	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion, facial palsy (nerve injury), limited mouth opening	Facial asymmetry and malocclusion, nerve injury, limited mouth opening	Revision surgery (fracture treatment)

TABLE 1: Detailed information on the cases included in the study *(contunie)*.

Date	Medical staff	G	A	Health institution	Category	Previous intervention	Referral reasons	Reason for needing secondary operation	Secondary intervention
2008	ENT specialist	M	29	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and deformity (scar formation)	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2008	Dentist	F	47	Private practice	Dentoalveolar surgery	Tooth extraction	Osteonecrosis and pathological fracture	Osteonecrosis, infection in the area, facial asymmetry, and malocclusion	Fracture surgery and treatment of osteonecrosis
2009	ENT specialist	M	3	Public hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2009	Plastic surgeon	M	22	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion, screws were loose and slid (foreign body), mini plates have perforated the mucosa and had to be replaced with a recon plate	Facial asymmetry and malocclusion, foreign body	Revision surgery (fracture treatment)
2009	Plastic surgeon	M	27	University hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion (maxillary collapse)	Facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2009	ENT specialist	M	45	University hospital	Maxillofacial surgery	Infection treatment	Misdiagnosed lower lip carcinoma (misdiagnosed cyst/tumor/cancer)	Worsening of the condition	Tumor operation
2009	Plastic surgeon	F	39	Private practice	Maxillofacial surgery	Orthognathic surgery	Facial asymmetry and malocclusion	Facial asymmetry and malocclusion	Revision surgery (Orthognathic surgery)
2010	Dentist	F	37	Private practice	Dentoalveolar surgery	Tooth extraction	Dental burr part remaining in the bone (foreign body)	Infection and foreign body in the area	Removal of foreign body
2010	Dentist	M	46	Private practice	Dentoalveolar surgery	Tooth extraction	Mandibular fracture and nerve injury	Infection in the area and nerve injury	Fracture surgery
2010	Dentist	M	54	Private practice	Dentoalveolar surgery	Tooth extraction	Migrated tooth root to sublingual space, (migrated tooth) Lingual nerve injury during extraction of an impacted tooth	Nerve injury, infection in the area	Surgical removal of tooth piece
2010	Dentist	M	23	Private practice	Dentoalveolar surgery	Tooth extraction	Mandibular fracture and nerve injury	Facial asymmetry and malocclusion, nerve injury	Fracture surgery
2010	ENT specialist	F	59	Private practice	Maxillofacial surgery	TMJ surgery	Facial asymmetry and malocclusion, TMJ ankylosis	TMJ ankylosis, and facial asymmetry and malocclusion	Revision surgery (fracture treatment)
2011	Plastic surgeon	M	43	Public hospital	Maxillofacial surgery	Fracture treatment	Facial asymmetry and malocclusion, mini fixation screw migration (foreign body)	Facial asymmetry and malocclusion, nerve injury	Revision surgery (fracture treatment), removal of foreign body
2011	Plastic surgeon	M	24	Private practice	Maxillofacial surgery	Orthognathic surgery	Displacement of the mini fixation screw into the maxillary sinus (foreign body)	Infection and foreign body in the area	Caldwell-Luc surgery
2011	Dentist	F	22	Private practice	Dentoalveolar surgery	Orthognathic surgery	Grinding at the gum level of all posterior teeth of the patient without crowning to treat an anterior open bite (incorrect intervention to the teeth).	Facial asymmetry and malocclusion, multiple tooth loss	Orthognathic surgery and dental implant placement
2011	Dentist	M	38	Private practice	Dentoalveolar surgery	Tooth extraction	Extraction of all anterior mandible teeth with the diagnosis of an extraoral fistula by misdiagnosing the pilonidal sinus of the beard (incorrect intervention to the teeth).	Facial asymmetry and malocclusion, multiple tooth loss	Removal of foreign body, dental implant placement
2012	Dentist	M	44	Private practice	Dentoalveolar surgery	Tooth extraction	Displacement of the second premolar into the maxillary sinus (migrated tooth and oroantral communication)	Infection in the area and oroantral fistula formation	Caldwell-Luc surgery and closure of oroantral communication
2012	Dentist	F	19	Private practice	Dentoalveolar surgery	Tooth extraction	Migration of impacted canine root between nasal mucosa and palatine bone (migrated tooth)	Infection in the area	Surgical removal of tooth piece
2013	Plastic surgeon	M	43	Public hospital	Maxillofacial surgery	Orthognathic surgery	Facial asymmetry and malocclusion, and mobile maxilla still not adequately fixed four months after LeFort 1 surgery	Facial asymmetry and malocclusion	Revision surgery (orthognathic surgery)
2013	Dentist	M	29	Private practice	Dentoalveolar surgery	Tooth extraction	Mandibular fracture during extraction of an impacted tooth and nerve injury	Infection in the area and nerve injury	Fracture surgery
2014	Dentist	F	43	Private practice	Dentoalveolar surgery	Tooth extraction	Necrosis of palatine mucosa and oronasal fistula formation after extraction of a maxillary wisdom tooth	Infection in the area, oroantral fistula	Closure of oroantral communication
2015	ENT specialist	M	43	Public hospital	Maxillofacial surgery	Cyst operation	Chronic infection of the grafted region (infection in the area) and paresthesia (nerve injury)	Infection in the area, nerve injury	Revision surgery (cyst operation) and removal of infected bone graft
2015	Dentist	F	37	Private practice	Dentoalveolar surgery	Tooth extraction	Broken dental drill piece in the bone (foreign body)	Foreign body and infection in the area	Removal of foreign body

ENT: Ear, Nose, Throat; TMJ: Temporomandibular joint.

malocclusion, 11 (13.5%) were root migration to the anatomical spaces, 9 (10.9%) were nerve injury, 8 (9.8%) were misdiagnosed cyst/tumor/cancer, 7 (8.6%) were foreign bodies in the anatomical spaces, 5 (6.1%) were oroantral communication, 4 (4.9%) were pathological jaw fracture, 4 (4.9%) were infection in the area, 3 (3.6%) were limited mouth opening, 3 (3.6%) were TMJ ankylosis, 2 (2.4%) were mobile jaw, 2 (2.4%) were soft tissue necrosis, 2 (2.4%) were incorrect intervention to the teeth 2 (2.4%), and 1 (1.2%) was osteonecrosis (Table 3).

OROFACIAL SEQUELS EXPERIENCED BY THE PATIENTS DUE TO IMPROPER TREATMENTS

Problems, orofacial sequels, and damage experienced by patients because of primary interventions listed below: 24 (29%) facial asymmetry and malocclusion, 22 (26.5%) infection in the area, and 12 (14.5%) nerve injuries were in the top 3 ranks. Worsening of the condition in 9 (10.8%) cases, oroantral fistula formation in 4 (4.8%) cases, presence of the foreign body in 4 (4.8%) cases, limited mouth opening in 3 (3.6%) cases, multiple tooth loss was seen in 2 (2.4%) cases. In addition, in each case, soft tissue loss, TMJ ankylosis, and jaw osteonecrosis were seen in one case (Table 4).

TABLE 2: Interventions that require revision surgery or secondary intervention.

Previous intervention	n	p value
Tooth extraction	21	38.2%
Fracture treatment	15	27.2%
Infection treatment	8	14.6%
Orthognathic surgery	5	9.1%
TMJ surgery	4	7.3%
Tumor operation	1	1.8%
Cyst operation	1	1.8%
Total	**55**	**100%**

TMJ: Temporomandibular joint.

TABLE 3: Reasons for referral of patients to our department.

Referral reasons	n	p value
Facial asymmetry and malocclusion	21	25.7%
Root migration to the anatomical spaces	11	13.5%
Nerve injury	9	10.9%
Misdiagnosed cyst/tumor/cancer	8	9.8%
Foreign bodies in the anatomical spaces	7	8.6%
Oroantral communication	5	6.1%
Pathological jaw fracture	4	4.9%
Infection in the area	4	4.9%
Limited mouth opening	3	3.6%
TMJ ankylosis	3	3.6%
Mobile jaw	2	2.4%
Soft tissue necrosis	2	2.4%
Incorrect intervention to the teeth	2	2.4%
Osteonecrosis	1	1.2%
Total	**82**	**100%**

TMJ: Temporomandibular joint.

TABLE 4: Damage or sequelae caused by the first intervention.

Orofacial sequels	n	p value
Facial asymmetry and malocclusion	24	29%
Infection in the area	22	26.5%
Nerve injury	12	14.5%
Worsening of the condition	9	10.8%
Oroantral fistula formation	4	4.8%
Presence of the foreign body	4	4.8%
Limited mouth opening	3	3.6%
Multiple tooth loss	2	2.4%
Soft tissue loss	1	1.2%
TMJ ankylosis	1	1.2%
Osteonecrosis of the jaw	1	1.2%
Total	**83**	**100%**

TMJ: Temporomandibular joint.

SECONDARY INTERVENTIONS PERFORMED

Secondary interventions performed for the treatment of the problems experienced by the patients due to the previous interventions were listed below: Fracture treatment (including repositioning) in 20 (31.2%) cases, surgical removal of tooth piece in 8 (12.5%) cases, tumor operation in 7 (11%) cases, surgical removal of foreign body in 6 (9.4%) cases. Caldwell-Luc surgery, orthognathic surgery (revision), and closure of oroantral communication were applied in 4 (6.3%) cases. In addition, TMJ surgery was applied in 3 (4.7%) cases, cyst operation in 3 (4.7%) cases, and dental implant placement in 2 (3.1%) cases. Partial glossectomy, osteonecrosis treatment (sequestrectomy), and removal of infected bone graft were applied in one case. Two separate interventions were required in 9 of the cases (Table 5).

TABLE 5: Secondary interventions were applied to the patients in our department.

Secondary intervention performed	n	p value
Fracture treatment	20	31.2%
Surgical removal of tooth piece	8	12.5%
Tumor operation	7	11%
Surgical removal of foreign body	6	9.4%
Caldwell-luc surgery	4	6.3%
Orthognathic surgery	4	6.3%
Closure of oroantral communication	4	6.3%
TMJ surgery	3	4.7%
Cyst operation	3	4.7%
Dental implant placement	2	3.1%
Partial glossectomy	1	1.5%
Osteonecrosis treatment (sequestrectomy)	1	1.5%
Removal of infected bone graft	1	1.5%
Total	**64**	**100%**

TMJ: Temporomandibular joint.

DISCUSSION

The 44th General Assembly of the World Medical Association (Spain, 1992) accepted a declaration defining medical malpractice as a physician's failure to meet the standard of care for treating a patient's condition, lack of skill, or negligence, resulting in direct patient injury. This declaration was rescinded at the 55th World Medical Association General Assembly (Santiago, 2005). In contrast, an unforeseeable injury occurring during medical treatment, not due to lack of skill or knowledge of the treating physician, is considered an untoward result for which the physician is not liable.[16] Additionally, the 13th article of the Turkish Medical Association's Code of Professional Ethics of Medicine defines "malpractice of medicine" as harming a patient due to improper treatment, ignorance, inexperience, or indifference.[17]

Hortoğlu defines improper treatment as bodily and moral damages resulting from misdiagnosis, lack of due care during or after treatment and surgery, wrong injection, faulty analysis, lack of equipment and personnel, and failure to uphold patient rights.[18,19] On the other hand, situations arising from unpredictable knowledge or skill deficiencies during medical practice, which cannot be prevented despite precautions, are considered complications, and the physician is not held responsible. However, suppose a situation is foreseeable, or the physician fails to meet medical standards and does not request the outcome. In that case, it becomes a liability and not within an acceptable risk. To comply with the law, authorized individuals must perform medical interventions, have appropriate indications, obtain informed patient consent, and adhere to medical standards. In teaching and practice, different views exist on the nature of the contract between the physician and the patient. While experiencing a complication does not hold the physician responsible, failure to manage it successfully can transform it into malpractice, leading to the physician's legal responsibility.[2-5,14,20]

Improper medical treatments encompass mistakes in diagnosing, treating, or managing diseases, leading to patient trauma and permanent injury that could be prevented. The main cause is often the physician's inability to meet the standard of skill, learning, care, and treatment common among colleagues in the community. Complaints arising from these improper treatments contribute to patient lawsuits. Such treatments pose significant problems in the health system and jeopardize patient safety, with potential social, economic, and human costs. The possible causes of improper treatments can be categorized into several stages, including errors during diagnosis, treatment, and complications management, as well as failure to fulfill post-treatment and postoperative obligations. Moreover, another factor to consider is the physician's failure to inform the patient about treatment errors.[1,4,6,15]

Not all diagnostic errors necessarily indicate treatment defects, as symptoms may not always be apparent and may point to different causes. While physicians are not obligated to achieve a successful diagnosis, they are expected to intervene, conduct examinations and tests, and reach a proper diagnosis within their medical expertise. However, fundamental mistakes leading to failure in recognizing disease symptoms or misdiagnoses due to the lack of essential control examinations can be considered a duty of care violation. Physicians must provide necessary findings about the patient and utilize all diagnostic possibilities required for the encountered or suspected cases.[1,2,20,21] In the current study, diagnostic problems

resulted in cysts, tumors, and cancers being misjudged as infections, leading to incorrect interventions and delayed proper diagnosis and treatment. Frequent encounters included physicians treating patients solely with antibiotics without confirming the diagnosis, which can cause harm due to side effects and delay effective treatment. Not all swellings, wounds, or redness in the oral and maxillofacial region are related to bacterial infections and may require different treatments not involving antibiotics.

Treatment errors encompass all medical interventions that do not align with medical science data, deviate from the standard treatment of a specialist physician, or involve incorrect decisions made by the physician during or after the intervention. The nature of the physician's action, whether executive or negligent, does not impact the occurrence of a treatment error. Errors can arise from the physician's failure to perform medically necessary actions or from performing unnecessary ones. Additionally, errors may result from choosing the wrong treatment method or implementing the chosen method incorrectly. If the physician fails to meet the conditions for proper treatment, such as providing the right intervention by the appropriate professional at the correct time and place, they are considered at fault. Skill defects in the physician/dentist may lead to their liability, requiring an immediate referral to a specialist when the physician cannot perform the necessary medical intervention. Suppose the patient is referred, but the necessary intervention cannot be carried out. In that case, the physician becomes responsible for any damages resulting from the delay. Late or incorrect patient referrals, failure to consult a specialist, or delays in consultation all indicate treatment errors.[1-6,14,15,20]

The most problematic procedure in this study is tooth extraction, both simple and impacted. Careless and uncontrolled forces and inadequate visibility contribute to potential complications. Although dental students begin tooth extraction practices in the third year of dental education, this study demonstrates that tooth extractions require significant training, experience, attention, and skill to avoid severe complications. Dentists have the legal right to perform extractions, but they should be mindful of their patient responsibilities. If dentists anticipate complications or lack expertise, they should consider referring the patient to a specialist physician to avoid harm.[10-12,22,23] The study's results highlight nerve injuries, oroantral fistulas, tooth or root migrations, foreign bodies in bones and anatomical spaces, and jaw fractures as common occurrences during or after tooth extractions.

The physician may not be responsible for a complication. However, the physician's legal responsibility may be questioned if the complication is not managed well. This can happen if the physician fails to notice the complication in time, does not take necessary precautions despite recognizing it on time, or if the medical intervention remains below the current medical standard despite timely recognition and precautions. Patients in this study sought help due to complications caused by improper treatments and their previous issues not improving or worsening.[4,8,10,20,24,25] Referral reasons included malocclusions, orofacial deformities, nerve injuries, facial palsy, limited mouth opening, TMJ dislocations, implant-related issues, postoperative infections, facial abscess, facial emphysema, graft sequestration, orofacial fistulas, mandibular osteonecrosis, pathological fractures, tongue necrosis, and oronasal defects.

In medical interventions, the duty of care extends beyond the treatment phase to the post-treatment period. Physicians must continue warning and informing patients even after the intervention is completed if any potential danger is detected. Counter-interventions or revision surgeries are considered independent therapeutic interventions, subject to the same rules as other procedures. Therefore, all secondary interventions in this study are governed by these rules. Any new mistakes or wrong treatments made during the treatments are solely the responsibility of the physician who performed the second surgery, not the previous surgeon. The initial mistake in the first attempt cannot justify subsequent mistakes in subsequent interventions.[2,5,6,13,26,27]

In cases involving abandonment and lack of care, malpractice may occur when the physician terminates the patient-physician relationship without proper notification or fails to refer the patient to another physician when necessary. Physicians must as-

sess whether they have the knowledge, equipment, and experience to meet medical standards during treatment. They should consult colleagues or refer the patient to a specialist or hospital if they cannot meet these standards. Failure to make reliable diagnoses, not referring the patient to another physician or hospital during disease diagnosis, or undertaking interventions beyond the physician's abilities are considered application errors and violate the duty of care. When physicians lack the required skills or expertise, they should seek expert help and limit their activities to their expertise. If the physician reaches their limits, they should refer the patient to an expert or a more knowledgeable and experienced colleague and consult when necessary.[4,20,24,25] Some patients in this study were referred by their previous physicians due to unresolved problems. In contrast, others sought help directly due to the previous physicians' lack of responsibility, failure to solve the problems, or even the worsening of the situation.

In cases where additional measures are necessary for the patient's health condition but the physician suspects or is certain of a mistake in the application, there is an obligation to inform the patient. Failure to notify the patient in such situations is considered a practice error. While some patients in the study were referred by their previous physicians, most were uninformed about their current disease status or the sequelae caused by the previous operation. This suggests that some physicians did not fulfill their responsibilities properly and left the patients without proper care.

Risk management in OMFS aims to reduce the risk of patient care. Communication and documentation are vital elements in this process. Ensuring patients are well-informed about procedures and documenting all aspects of care can significantly decrease claims risk. OMFS practitioners should regularly employ these principles rather than waiting for claims to arise. The evaluation of possible reasons revealed three main factors: authority conflicts, dentistry-based education, and the importance of dental occlusion in OMFS.[1,2,4,20] Dental education is essential in ensuring proper treatment, as overlooking dental occlusion during fracture or orthognathic surgery can lead to significant problems. Improper OMFS treatments can be prevented through proper training, education, and experience of dental and medical professionals, as well as appropriate diagnosis, treatment planning, and surgical techniques. Patients also play a crucial role by selecting qualified professionals and asking about their qualifications and experience. Dental and medical professionals must be aware of the risks and strive to provide the highest quality of care.[2,4,6,15,26]

CONCLUSION

Among the improper treatments in this study, the top 3 were 21 cases during tooth extraction, 15 after jaw fracture treatment, and 8 due to misdiagnosing an odontogenic tumor as an infection. The primary reasons for patient referral were facial asymmetry and malocclusion (21), root migration to anatomical spaces (11), and nerve injury (9). The most common sequelae after the first intervention were facial asymmetry and malocclusion (24), infection in the area (22), and nerve injury (12).

Improper treatment is an unfortunate reality in clinical practice, and awareness of this issue is essential for all oral and maxillofacial surgeons. By emphasizing proper education, planning, and risk-reduction strategies, improper treatments can be minimized. The management goal is to reduce such cases by physicians assuming responsibility throughout treatment and resolving authority conflicts. Proper education, quality secondary training, and specialization are vital.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Behçet Erol;* ***Design:*** *Behçet Erol, Sercan Küçükkurt;* ***Control/Supervision:*** *Behçet Erol;* ***Data Collection***

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