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Complications in patients with facial bone fractures before and after conservative and surgical treatment, their comparison and correlation with different factors

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Abstract. – OBJECTIVE: This study aims to determine the occurrence of complications before and after the treatment of facial fractures, as well as the impact of the factors on the treatment results and evaluation of their relationships.

PATIENTS AND METHODS: This is a prospective case-control study comprising 90 patients aged between 18 and 65 with facial fractures. Depending on the treatment method, patients were divided into three groups: those treated surgically using a transcutaneous approach, those treated surgically using a transmucosal approach, and those treated conservatively (control group). Following complications before and after treatment were compared: malocclusions, paresthesias, facial asymmetry, diplopia, and limited mouth opening. The follow-up period after the treatment of choice was six months.

RESULTS: There was a significant reduction in complications after treatment: malocclusion, paresthesia, facial asymmetry, and limited mouth opening. Regarding the transcutaneous approach, there is a substantial reduction in the number of complications after treatment, such as malocclusions (p=0.008), paresthesias (p=0.004), and facial asymmetries (p<0.001). Similar results were obtained for the transmucosal approach. Pain intensity positively correlated with preoperative complications: malocclusion, paresthesias, and facial asymmetry. The range of mouth opening had a negative interdependence with malocclusion before and after treatment with infection, *fractura male sanata*, malocclusion, paresthesias, postoperative level of mouth opening, and damage to the facial nerve.

CONCLUSIONS: There is no difference in the reduction of preoperative and postoperative complications related to surgery when an incision is made through the skin or mucosa. Malocclusions, paresthesias, and facial asymmetry are reduced through surgical methods.

Key Words:
Malocclusions, Paresthesias, Facial asymmetry, Diplopia, Limited mouth opening.

Introduction

Traumatism of the facial area can lead to various facial deformities, consequently leading to facial disproportions and disorders of physiological functions. There are quite a few studies[1-3] regarding their occurrence and frequency. However, scarce studies were conducted to analyze the choice of a surgical approach followed by a consequent occurrence of complications, as well as the treatment of choice for facial fractures and its effect on the general state of health and integrity of the injured. To our knowledge, no studies have been conducted regarding the correlation between the type of injury, the type of surgical treatment, the occurrence of complications, and long-term consequences.

Most of the studies[4] that monitored complications were retrospective, and certain shortcomings of those being retrospective studies came through, such as the absence of clearly defined evaluation criteria and weak cooperation between different surgeons.

One of the advantages of conservative treatment of fractures of the facial and jaw bones is the avoidance of damage to one of the branches

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of the facial nerve or the formation of scars. However, this type of treatment can lead to complications in terms of bone growth disorders, functional disorders, or poor healing[5-6]. Complications of facial bone fracture treatment can occur before, during, and after treatment, and consequences can be aesthetic or functional, and sometimes both. Many factors influence the occurrence of complications, such as age, type, and location of the fracture, the patient's condition, medications, the condition before the injury, the choice of treatment, the degree of correction and fixation of the fragments, but also the competence of the surgeon and the cooperation of the patient, emphasizing the importance of studying certain factors in treating facial bone fractures. For example, complications after treatment of facial bone fractures occur in the mandible more often than during treatment of other facial fractures[7], partially due to unfavorable muscle contraction, as well as the action of significant forces on the fragments of the mandible.

The location of the fracture, the degree of dislocation, and the functional disturbances directly correlate with the need for surgical intervention, the results, and the degree of complications[8,9].

Bilateral fractures and associated fractures correlate with treatment results and degree of complications. This research aims to determine the occurrence of complications before and after treatment of facial fractures, as well as the influence of these factors on treatment results, evaluation of its relationships, and finding the optimal way of timely treatment of patients with facial bone fractures.

Patients and Methods

We conducted a prospective case-control study in which 90 patients with fractures of the mandible, zygomatic bone, or maxilla, were examined. These patients were treated at the Clinic for Otorhinolaryngology and Maxillofacial Surgery of the Clinical Center of Montenegro in Podgorica, starting in 2017 until the necessary sample was obtained. Ethical permission to perform this study was obtained from the Ethics Committee of the Clinic for Otorhinolaryngology and Maxillofacial Surgery of the Clinical Center of Montenegro in Podgorica. The examined patients were aged from 18 to 65 years old, both sexes. The patients were monitored for six months after the commencing of the treatment.

Based on the method of treatment, they were divided into three groups of 30 patients each:

- The first examined group included patients surgically treated with a transcutaneous approach.
- The second examined group included patients surgically treated with a transmucosal approach.
- The third group (control group) included patients treated conservatively.

The criteria for dividing patients into groups and choosing a treatment method depended on the fracture type, determined after a clinical examination followed by imaging diagnostics (computed tomography, orthopantomography). Further, indications for surgical treatment were based on clinical and radiological criteria and supplemented by potentially associated degrees of dislocation, diplopia, deformity, the impossibility of repositioning and occlusion with a closed approach, absence of teeth, and communicability.

We monitored and divided complications into the following groups: complications before treatment (facial asymmetry, paresthesia of certain parts of the face, limited mouth opening, occlusion disorder, diplopia) and complications after treatment (facial asymmetry, infections, a non-union or poor union of fractured bones, paresthesia of certain parts of the face, limited mouth opening, occlusion disorder, pronounced scars or keloids, diplopia).

Computed tomography was used to compare the condition of the facial bones before the injury and three months after the injury. The degree of bone healing, dislocation expressed in mm, infection, non-union, and scar tissue were monitored.

The assessment of the state of vision and the state of the eye socket was based on monitoring visual acuity, the presence of diplopia, ectropion, enophthalmos, chemosis, symmetry of the lateral canthus, limited eye mobility, asymmetry of the orbital-zygomatic-maxillary complex, paresthesia, infection, and scars.

The length of hospitalization was recorded, as well as the day after the injury when the treatment was carried out. A correlation was made between the length of hospitalization and days of treatment with the occurrence of complications.

We divided the limited opening of the mouth into groups of <5 mm, 6-10 mm, 11-15 mm, 16-20 mm, and 21-25 mm.

Pain intensity ranges from 0-2.5, 2.6-5.0, 5.1-7.5, 7.6-10.0.

Statistical Analysis

Statistical calculations were performed with SPSS version 22 (IBM Corp., Armonk, NY, USA). The McNemar test was used to determine the association between the dichotomous characteristics of two dependent samples. Spearman's rank correlation examined the association between variables. The statistical hypothesis was tested at the significance level for the risk of α=0.05; the difference between the samples is significant if p<0.05.

Results

Table I shows the distribution of complications before and after the treatment of patients, divided into four sections: in total (independent of the injured bone and the type of intervention), patients treated with the transcutaneous approach, patients treated with the transmucosal approach, and patients treated conservatively. Results were obtained by the McNemar test. A significant decrease in the number of patients with complications was recorded in all complications except diplopia: malocclusion (p<0.001), paresthesia (p<0.001), facial asymmetry (p<0.001), and limited mouth opening (p<0.001).

The results of comparing complications before and after the treatment of patients operated on through the transcutaneous approach show a significant reduction in the number of complications after treatment in malocclusion (p=0.008), paresthesia (p=0.004), and facial asymmetry (p<0.001). Regarding the comparison of complications before and after treatment of patients operated on by the transmucosal approach, a significant reduction in the number of complications after treatment was found in the presence of malocclusions (p<0.001), paresthesias (p<0.001), and facial asymmetry (p<0.001). The results of comparisons of complications before and after treatment of patients on conservative treatment (control group) obtained by the McNemar test showed that facial asymmetry and diplopia were not registered in patients who underwent conservative paresthesia treatment. At the same time, malocclusions (p=1.000) and limited mouth opening (p=1.000) did not show a significant difference before and after treatment.

Table II shows the correlation results of days from injury to treatment and complications before treatment and after treatment, as well as the correlation of length of hospitalization and complications before treatment and postoperative complications. Results were obtained by Spear-

Table I. Real time PCR primers.

		Maloclusion		Paresthesia		Facial assymetry		Diplopia		Limited mouth opening	
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
In total	BT†	60	30	60	30	42	87	87	3	75	15
	AT‡	84	6	82	8	48	3	89	1	83	7
	p*	< 0.001		< 0.001		< 0.001		0.500		< 0.001	
Transcutaneous approach	BT	18	12	16	14	3	27	29	1	22	8
	AT	26	4	25	5	28	2	30	0	27	3
	p	0.008		0.004		< 0.001		0.500		0.063	
Transmucosal approach	BT	14	16	14	16	3	27	28	2	28	2
	AT	29	1	27	3	28	2	29	1	25	5
	p	< 0.001		< 0.001		<0.001		1.000		0.250	
Treated conservately	BT	28	2	30	0	30	0	30	0	29	2
	AT	29	1	30	0	30	0	30	0	28	2
	p	1.000		/		/		/		1.000	

BT† - before treatment; AT‡ - after treatment; p* - p-value.

Table II. Correlation of days until treatment with pre- and post-treatment complications and correlation of length of hospitalization and pre- and post-treatment complications.

Correlation of days until treatment with complications before treatment			Correlation of length of hospitalization and complications before tretment	
	σ	p	σ	p
Maloclusion	0.099	0.351	0.301	0.004
Paresthesia	0.455	< 0.001	0.586	< 0.001
Facial assymetry	0.488	< 0.001	0.704	< 0.001
Diplopia	0.182	0.085	0.167	0.117
Limited mouth opening	0.257	0.014	0.292	0.014
Correlation of length of days until treatment with postoperative complications			**Correlation of length of hospitalization with postoperative complications**	
	σ	p	σ	p
Mouth opening	-0.146	0.170	-0.158	0.138
Pain	0.456	< 0.001	0.482	< 0.001
Infection	0.143	0.178	0.314	0.003
Fractura male sanata	-0.024	0.822	0.274	0.009
Malocclusion	-0.030	0.777	0.152	0152
Paresthesia	0.222	0.036	0.294	0.005
Facial asymmetry	0.096	0.369	0.081	0.445
Scar/keloid	0.054	0.614	0.143	0.180
Ectropion	0.090	0.401	0.112	0.291
Diplopia	0.187	0.078	-0.002	0.984
Limited mouth opening	0.084	0.429	0.012	0.909
Facial nerve damage	0.090	0.401	0.055	0.608

σ – Spearman's rank correlation coefficient.

man's rank correlation. Significant positive correlations of days from injury to treatment existed with the presence of paresthesia before treatment (σ=0.455; p<0.001), the existence of facial asymmetry (σ=0.488; p<0.001) as well as with the limited opening of the mouth (σ=0.257; p=0.014).

Regarding the correlation of days from injury to treatment with postoperative complications, a high statistically significant positive interdependence existed with the presence of pain in the patient (σ=0.456; p<0.001) as well as with the appearance of paresthesias (σ=0.222; p=0.036).

Significant positive correlations of the length of hospital treatment were observed in relation to the presence of malocclusion prior to treatment (σ=0.301; p=0.004), paresthesia before treatment (σ=0.586; p<0.001), the existence of facial asymmetry (σ=0.704; p<0.001), as well as limited mouth opening (σ=0.292; p=0.014).

The correlation of length of hospitalization with postoperative complications showed a high statistically significant positive interdependence of hospitalization with the presence of pain in the patient (σ=0.456; p<0.001), the presence of infection (σ=0.314; p=0.003), *fractura male sanata* (σ=0.274; p=0.009), as well as with the appearance of paresthesias (σ=0.222; p=0.036).

Table III shows the correlation between preoperative pain and complications before treatment, as well as the correlation between preoperative pain and postoperative complications. The results were obtained by Spearman's rank correlation. Pain intensity was significantly positively correlated with malocclusion before treatment (σ=0.349; p=0.001), paresthesias before treatment (σ=0.256; p=0.015), and facial asymmetry (σ=0.438; p<0.001). Regarding the correlation be-

Table III. Correlation of preoperative pain with complications before treatment and with postoperative complications.

Correlation of preoperative pain and complications before treatment		
	σ	*p*
Maloclusion	0.099	0.351
Paresthesia	0.455	< 0.001
Facial assymetry	0.488	< 0.001
Diplopia	0.182	0.085
Limited mouth opening	0.257	0.014
Correlation of preoperative pain and postoperative complications		
	σ	*p*
Mouth opening	-0.267	0.011
Infection	0.288	0.006
Fractura male sanata	0.136	0.201
Malocclusion	0.064	0.548
Paresthesia	0.238	0.024
Facial asymmetry	0.093	0.383
Scar/keloid	0.111	0.299
Ectropion	0.154	0.147
Diplopia	0.053	0.619
Limited mouth opening	0.080	0.451
Facial nerve damage	0.154	0.147

tween preoperative pain and complications after treatment, the preoperative level of pain had a statistically significant negative association with the level of mouth opening (σ=-0.267; p=0.011), while there was a positive association with infection (σ=0.288; p=0.006) and paresthesias (σ=0.238; p=0.024).

Table IV shows the correlation between the level of mouth opening and complications before treatment, as well as a correlation between mouth opening level and postoperative complications. Results were obtained through Spearman's rank. The mouth opening range negatively correlated with malocclusion before treatment (σ=-0.231; p=0.029). Other complications did not correlate significantly. Regarding correlation between the extent of mouth opening and complications after treatment, preoperative level of mouth opening had a statistically significant negative association with the occurrence of infection (σ=-0.229; p=0.030), *fractura male sanata* (σ=-0.349; p=0.001), malocclusion (σ=-0.240; p=0.023), paresthesias (σ=-0.214; p=0.0243), postoperative mouth opening level (σ=-0.222; p=0.036), as well as facial nerve damage (σ=-0.244; p=0.021).

Discussion

Our study compared complications before and after treatment, including malocclusions, paresthesias, facial asymmetry, diplopia, and limited mouth opening.

There was a significant reduction in the number of patients with complications of malocclusion, paresthesia, facial asymmetry, and limited mouth opening. Due to the repositioning of the bone fragments, the nerve is freed from the pressure that exists during the dislocation of the fragments. The swelling contributes to nerve function recovery and paresthesia reduction as complications after treatment. Also, the malocclusion and limited mouth opening before the treatment were significantly corrected after repositioning the broken bone fragments. The existence of facial asymmetry before the treatment is due to the

Table IV. Correlation of mouth opening level with complications before treatment and postoperative complications.

Correlation of mouth opening level and complications before treatment		
	σ	*p*
Maloclusion	-0.231	0.029
Paresthesia	-0.152	0.152
Facial assymetry	-0.107	0.315
Diplopia	0.054	0.614
Correlation of mouth opening level and postoperative complications		
	σ	*p*
Infection	-0.229	0.030
Fractura male sanata	-0.349	0.001
Malocclusion	-0.240	0.023
Paresthesia	-0.214	0.043
Facial asymmetry	0.054	0.614
Scar/keloid	0.078	0.468
Ectropion	0.044	0.682
Diplopia	0.031	0.774
Limited mouth opening	-0.222	0.036
Facial nerve damage	-0.244	0.021

dislocation of bone fragments and the presence of swelling and hematoma. After the treatment, the existence of this complication was significantly reduced.

On the other hand, regarding diplopia, no significant reduction of this complication after treatment was documented. This can be explained by the complication occurring with zygomatic bone and maxilla fractures. As it existed in only three patients before the operation and only in one after the operation, it is a small number of patients. Therefore, this reduction did not prove to be statistically significant. Research in the literature deals with these complications[7-17].

Complications before treatment, such as malocclusion, paresthesia, and facial asymmetry, were significantly more present in operated patients (transcutaneous and transmucosal approach) than those treated conservatively.

For patients who were treated surgically, without difference in approach (transcutaneous or transmucosal), there was a significant reduction in the number of complications after treatment in malocclusion, paresthesia, and facial asymmetry.

To our knowledge, no studies were conducted to compare different methods of treatment (conservative or surgical), as well as different surgical approaches (approach through an incision through the skin or mucosa). Patients treated surgically had complete and complicated fractures, so they were expected to have a more significant number of malocclusions and the appearance of paresthesia due to nerve damage in varying degrees. The presence of malocclusions after the occurrence of the fracture and before treatment was significantly more prevalent in mandibular fractures compared to maxillary fractures. A fracture of both the maxilla and the mandible can cause occlusion disorders. However, a mandible fracture is undoubtedly more common because it is also a mobile bone of the face where muscle traction plays a dominant role. The appearance of facial asymmetry was more prevalent in fractures of the bones of the middle third of the face and more often in operated patients due to the dislocation of bone fragments and the need for surgical treatment with a transcutaneous or transmucosal approach.

Complications that occurred after fracture treatment were: infections, *fractura male sanata* (poorly treated fracture), malocclusion (altered or bad bite), paresthesia, facial asymmetry, formation of a pronounced scar/keloid, ectropion, diplopia, limited opening of the mouth and damage functions of some of the branches of the facial nerve. Anyanechi and Saheeb[18], in their 2017 paper on complications in the treatment of mandibular body fractures, tracked most of these complications. In our study, no infections were found after the treatment of fractures of the middle third of the face, in contrast to the study by Lee et al[19], where this complication was described. *Fractura male sanata* did not exist as a complication in conservatively treated patients. In contrast, it did exist in operated patients. Malocclusion occurs in all treatment methods with a complete bone fracture. Complications were described after the operative treatment of mandibular fracture in the work of Benjamin et al[9] from 2014, where malocclusion and *fractura male sanata* (poorly managed fracture) were singled out as postoperative complications[15,18]. The appearance of this complication is also possible after a fracture of the bones of the middle third of the face[10,13,14]. Thus, in the work of Reiter et al[14] from 2017, this complication is described mainly in complicated fractures due to poor reconstruction and repositioning of fragments of broken bones in the middle third of the face.

Paresthesia was also described in other works[10,12,13,15,16], where paresthesia was investigated after treatment of a fracture of the zygomaticomaxillary complex. It is stated that is one of the most common complications in the surgical treatment of this fracture paresthesia along the infraorbital nerve distribution. These cases are generally caused by nerve compression, but the degree of compression can vary widely. Neurapraxia and nerve injuries that occur during surgical treatment during repositioning and osteosynthesis of facial bone fractures are also often the result of unnecessary traction in the area of the nerve when assisting during surgery. Nerves should be protected during surgical exposure and manipulation to avoid iatrogenic nerve injuries. However, the benefit of surgery to improve these disorders is variable[20-26].

A study by Pedemonte and Basili[27] A showed that in half of the patients, paresthesia did not improve or worsen after operative treatment.

Infraorbital nerve injury is a frequently reported complication after zygomatic bone fracture[14]. Many other previous studies[11,14,19,20,21] have reported infraorbital nerve deficits after fractures of the zygomatic bone or zygomaticomaxillary complex. Dislocation of broken fragments of the zygomatic bone usually compresses the infraorbital nerve, causing nerve injury. Due to nerve injury, symptoms typically vary from transient paresthe-

sia to prolonged or even permanent numbness in the area of distribution of the infraorbital nerve. The infraorbital nerve innervates the same side of the nose, the lower eyelid, the cheek, the upper lip, parts of the gingiva, and some teeth, thus influencing the numbness of this area when the nerve is damaged.

Significant positive correlations of days from injury to treatment existed with the presence of paresthesias before treatment, the existence of facial asymmetry, as well as with the limited opening of the mouth. The greater the number of days when operative treatment was carried out, the greater the likelihood of facial asymmetry or limited mouth opening, mostly with more complicated fractures. Soft tissue swelling and hematomas occur after a fracture, so it is often necessary to wait 2 or 3 days for them to subside. However, the operation should not be delayed for more than seven days. Sometimes, patients have other injuries, so it is necessary to stabilize their general condition due to more extended preoperative preparation. Indeed, it is preferable to do the treatment in the first two or three days. This also applies to orbital floor fractures and mandibular fractures. However, it is impossible to say the ideal treatment time precisely. However, the recommendations are certainly in the first two or three days. Other authors[21,22] have also engaged in such research and have a similar opinion. It is also important to highlight that undesired events such as diplopia are sometimes rather a direct result of trauma and not complications, which cannot always be healed[26].

Patients with facial bone fractures were hospitalized for up to 10 days. Significant positive correlations of hospital treatment were recorded concerning the presence of malocclusion before treatment, paresthesias before treatment, facial asymmetry, and limited opening of the mouth. Patients with some of these complications before treatment had more days of hospital treatment because they were more complicated fractures, which required longer preoperative preparation and longer postoperative follow-up. A high statistically significant positive interdependence of hospitalization existed with the presence of pain in patients with complications after treatment: the existence of infection, *fractura male sanata*, and paresthesia.

A more significant number of days of hospitalization in patients with the appearance of infection postoperatively requires treatment of the infection by parenteral administration of antibiotics in hospital conditions. The occurrence of increased postoperative pain, poorly managed fractures, or paresthesia is seen in more demanding fractures requiring surgical treatment, which suggests that due to the complexity of the fractures, such patients require greater postoperative attention and inpatient monitoring.

Pain intensity positively correlated with preoperative complications: malocclusion, paresthesias, and facial asymmetry. These cases are complete fractures with dislocated bone fragments; such patients were treated surgically. The pain is more intense within the first days after the injury, with the appearance of pain and edema of the face, which are clinically manifested by varying degrees of limited mouth opening (trismus) and altered nerve capacity[21].

Regarding postoperative complications, the preoperative pain level had a statistically significant negative association with the level of mouth opening. At the same time, there was a positive association between infection and paresthesias. The greater the pain intensity before treatment, the more likely there will be limited mouth opening. Higher pain intensity preoperatively is associated with a higher probability of infection and paresthesia postoperatively.

The range of mouth opening had a negative interdependence with malocclusion before treatment and complications after treatment with infection, *fractura male sanata*, malocclusion, paresthesias, postoperative level of mouth opening, and damage to the facial nerve.

The smaller the pre-treatment mouth opening range, the higher the probability of postoperative infection, as it was primarily associated with complex mandibular fractures requiring surgical management through extraoral (transcutaneous) or intraoral (transmucosal) approaches. Consequently, there was an increased likelihood of infection or injury to the facial nerve (predominantly through a transcutaneous incision), the occurrence of paresthesia (due to damage to the mental nerve during surgical management), improper fracture management leading to malocclusion, or persistently limited mouth opening postoperatively.

This study showed that the greater the degree of limited mouth opening and facial pain, the greater the complications, significantly affecting the treatment outcome. This may be due to factors that influence it, and the outcome of mandibular fracture treatment is multifactorial and complex. This finding is similar to previous observations[5,6,7,8,9 24].

Biller et al[25] showed that treatment of mandibular fracture after three days of injury leads to increased complications, such as weakness of the marginal mandibular nerve, malocclusion, and persistent pain, while those treated earlier did not show a higher incidence of complications. Brucoli et al[26] showed that possible complications could sometimes be inexplicably related to uncommon factors, as complications in isolated mandible angle fractures are related to the absence of third molars in the angle fracture line.

A high statistically significant positive interdependence existed between the presence of pain and the appearance of paresthesias.

Impairment of the function of one of the branches of the facial nerve is a postoperative complication registered only in 2 patients operated on through a transcutaneous approach, usually after operations on the articular process of the mandible treated surgically with a transcutaneous approach. This is why care must be taken to make an incision through the skin in precisely defined places to access the bony structures and perform osteosynthesis. Even when making an incision in a precisely defined area, it can happen that due to difficult access to the fragment (e.g., the mandibular column or generally the condylar process of the mandible) or during rougher manipulation when assisting with instruments, paresis of the facial nerve branch may occur. As it is a nerve that is sensitive to pressure, paresis of its branch may occur. However, after a particular time, it resolves spontaneously (up to 2 months). Sometimes, it takes more time, including physical therapy (after two months of the injury). With a mandible fracture, there is a limited opening of the mouth, so it is precise with a mandibular fracture that this complication occurs more often postoperatively[24].

Conclusions

Before treatment in patients with a fracture of one of the facial bones, the appearance of complications, such as malocclusion, paresthesia, and facial asymmetry, are significantly more present in operated patients (transcutaneous and transmucosal approach) compared to patients treated conservatively.

In patients who were treated surgically, there was a significant reduction in the number of complications after treatment in malocclusions, paresthesias, and facial asymmetry, regardless of the type of surgical approach (transmucosal or transcutaneous).

The preoperative level of mouth opening has a statistically significant negative association with the occurrence of infection, *fractura male sanata*, malocclusion, paresthesias, postoperative level of mouth opening, and damage to the facial nerve.

Pain intensity positively correlates with malocclusion before treatment, paresthesias before treatment, and facial asymmetry.

Preoperative pain level has a statistically significant negative association with the range of mouth opening after treatment, while there is a positive association with infection and paresthesias.

There is a high statistically significant positive interdependence between the presence of pain and the appearance of paresthesias postoperatively.

There is a significant positive correlation between the number of hospital days and days from injury to treatment with the presence of paresthesias before treatment, facial asymmetry, and limited opening of the mouth.

There is a high statistically significant positive interdependence of the number of days of hospitalization with the presence of pain in the patient, the existence of infection, *fractura male sanata*, and the appearance of paresthesias.

Comparison of pre-and post-operative complications of patients undergoing transcutaneous and transmucosal approaches shows a significant reduction in postoperative complications for malocclusions, paresthesias, and facial asymmetry.

Conflict of Interest

The authors declare that they have no conflict of interests.

Data Availability

All data generated or analyzed during this study are included in this published article.

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Ethics Approval

The Ethics Committee of the Clinic for Otorhinolaryngology and Maxillofacial Surgery of the Clinical Center of Montenegro in Podgorica, gave the approval. Number of acceptance 03/01-22513/1.

Informed Consent
All patients gave written informed consent.

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