Medical university -Varna
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ANESTHESIA IN ORAL AND MAXILLOFACIAL SURGERY

ABSTRACT

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Note: In the abstract, the numbers of the tables and figures correspond to the numbers in the dissertation.

CONTENTS

I. INTRODUCTION

Pain is an unpleasant sensory and psychological experience resulting from actual or potential tissue damage and is commonly associated with dental treatment. [Sruthi & Ramakrishnan, 2021] Local anesthesia is a safe and effective way to manage pain.

Local anesthesia is essential for pain management in dentistry. Dental treatment can involve mechanical, thermal, or chemical stimuli that trigger a painful response. In this regard, local anesthesia is used to provide temporary loss of sensation to allow dental treatment to be performed. [Lee & Yang, 2019] Local anesthetics are divided into two classes: amides and esters. Our study examined the use of lidocaine and mepivacaine, which are amide compounds. On the other hand, articaine, the third type of anesthetic studied in the study, is an amide anesthetic with an ester bond.

The gold standard and most widely used local anesthetic in dentistry is lidocaine due to its safety and efficacy. Adrenaline is added to lidocaine to counteract its vasodilator properties and delay drug absorption, which prolongs the duration of anesthesia and reduces the risk of toxicity. [Wang YH, et al., 2021]

Articaine with adrenaline is widely used because of its superior solubility. Articaine has high lipid solubility due to its thiophene ring and can diffuse through the maxillary and mandibular bone more readily than other anesthetics. Buccal infiltrations with articaine are particularly useful in the posterior mandible because, unlike other agents, articaine can penetrate the dense cortical bone to anesthetize the IAN. It should be noted that articaine is not recommended for IANB due to the greater risk of nerve damage. [Wang YH, et al., 2021]

Mepivacaine has weak vasodilator properties and can be used without adrenaline. It is a short-acting anesthetic and is a good option for dental treatment in children, the elderly, and patients with contraindications to adrenaline. [Wang YH, et al., 2021] Mepivacaine is the anesthetic of choice in patients with cardiovascular disease.

Infiltration anesthesia is usually reserved for the maxilla, as the porous structure of the maxilla allows the anesthetic solution to easily penetrate the bone. [Wang YH, et al., 2021] However, the introduction of articaine has facilitated mandibular buccal infiltrations. Articaine has high lipid solubility and can be used for buccal infiltrations in the posterior mandible as an alternative or adjunct to IANB. Success rates of 84 to 94% have been reported for the ability of buccal infiltrations with articaine to anesthetize the lower molars. [Lee & Yang, 2019; Dougall A, et al., 2019] In addition, studies suggest that palatal anesthesia can be achieved after maxillary buccal infiltration with articaine, negating the need for a separate palatal infiltration. [Chandrasekaran D, et al., 2021]

Allergy to amide local anesthetics is very rare, with a reported incidence of 0.1 to 1%. Some patients may have an allergic reaction to the preservative sodium metabisulfite, which is found in many local anesthetics. [Decloux & Ouanounou, 2020]

The choice of local anesthetics and delivery techniques can affect the efficacy of anesthesia. [Wang YH, et al., 2021] Consequently, dental practitioners should have a solid knowledge of local anesthetics and techniques used in dentistry, including their indications and contraindications. Although local anesthesia is rarely associated with serious adverse effects, clinicians should further understand the potential complications to ensure patient safety. This should extend to understanding how best to manage or prevent these complications.

Because block anesthesia cannot guarantee success in every operation, researchers have tried different methods of injecting lidocaine for LA. In Jamil's study, when patients received an infiltration injection of lidocaine, the average duration of numbness of the lower lip was 2.3 hours, [Jamil F.A., et al., 2020] while the same data from Kammer's study were 3.8 hours. [Kämmerer P.W., et al., 2012] It has been suggested that lidocaine infiltration injection may be an alternative way to anesthetize the mandible. However, Robertson et al. reported that only 45–67% of patients were successfully anesthetized by the buccal infiltration (BI) technique when lidocaine was used as a local anesthetic. [Robertson D., et al., 2007] The possible reason for this may be the lack of tissue permeability for lidocaine to fully penetrate the thickened bony plate on the buccal side of the mandible.

Unlike lidocaine, articaine is metabolized not only in the liver, but also in the blood. [Hassan S., et al., 2011] In the presence of carboxylic ester groups in the molecular structure, articaine can be broken down in the liver, but only 10–15% of the drug undergoes this process. [Oertel R., et al., 1999] In the blood, the remaining 85–90% of articaine is inactivated to articainic acid, which is non-toxic and inactive as an anesthetic, with the formation of additional ester bonds in the chemical structure of articaine. [Gazal G., 2018; Hassan S., et al., 2011] Due to its high tissue permeability, articaine is commonly used in infiltration injection for jawbone anesthesia, especially in the area of the posterior teeth of the maxilla. [Kanaa M.D., et al., 2006; Bataineh & Alwarafi, 2016]

Currently, the controversy over the use of articaine in infiltration of the mandible has attracted the attention of scientists. Kanaa and Robertson et al. believe that BI of articaine on mandibular molars shows obvious advantages in terms of anesthetic effect and speed. [Robertson D., et al., 2007;138 Kanaa M.D., et al., 2006] Betaineh even believes that articaine has the potential to completely anesthetize mandibular molars via BI, instead of IANB. [Bataineh & Alwarafi, 2016] Maruthingal et al. have proven that 87.5% of patients obtained a perfect anesthetic effect after receiving a BI injection of articaine in the mandible and had a

mean onset time of 6.92 minutes. [Maruthingal S., et al., 2015] However, some scientists hold the opposite view. [Marjanovic U., et al., 2017] For example, in the study by Nydegger, articaine was unable to effectively anesthetize mandibular canines and second molars. [Nydegger B., et al., 2014] The reason may be that the buccal bone plate thickens and the mandibular canal deviates to the lingual side in these areas. In addition, he also pointed out that only 55% of patients who received BI with articaine experienced a painless treatment process, which illustrates that this method of anesthesia is not sufficient for clinical promotion. Haas and colleagues even considered articaine to be unsuitable as an LA agent with BI in the mandible. [Haas D.A., et al., 1990] Several factors, such as the thickness of the buccal cortex, the position of the mental foramen, and the direction of the mandibular canal, influence the success rate of BI with articaine. [Meechan J.G., 2011] However, there is a general consensus that after IANB, additional BI with articaine may prolong the duration of anesthesia. [Haase A., et al., 2008]

II. AIM, TASKS, HYPOTHESIS, MATERIAL AND METHODS

2.1. Aim

To determine the prevalence and characteristics of different methods of local and general anesthesia in day dental surgery and maxillofacial surgery.

2.2. Tasks

1) Study of the application of local anesthesia in oral surgery
2) Study of the application of sedation and general anesthesia in oral surgery
3) Study of the application of local anesthesia in maxillofacial surgery
4) Study of the application of sedation and general anesthesia in maxillofacial surgery

2.3. Hypothesis

Anesthesia in the field of oral and maxillofacial surgery has undergone significant development in recent years, which is accompanied by a reduction in complications during procedures and the treatment of patients with a number of concomitant diseases.

2.4. Material and methods

For the period from 2019 to 2021, a total of 1,794 patients were examined and analyzed, of which 1,024 patients passed through the Clinic of Maxillofacial Surgery of the University Hospital "St. Marina" Varna and 770 patients passed through the UMDC at the Medical University - Varna.

2.4.1. Material and methods for task 1

2.4.1.1. Research object

- 500 patients treated with oral surgery methods

Criteria for inclusion in the study:

1) Persons who have completed an informed consent to participate in the study
2) Persons in need of treatment with oral surgery methods using local anesthesia
3) Persons without systemic diseases requiring treatment in a hospital setting

Exclusion criteria:

1) Persons who have not completed an informed consent

2) Persons with temporary contraindications to performing surgical interventions

2.4.1.2. Research location

- The surgical rooms of the UMDC at the Medical University of Varna

2.4.1.3. Methods

2.4.1.3.1. Clinical methods: Each patient underwent a clinical examination and an outpatient card was completed and a medical history with an epicrisis was issued, from which the data for the present study were used..

2.4.1.3.2. Imaging methods - for all patients with orthopantomography performed with a Planmeca device:

- for adults with an average exposure time of 10 sec, 66 Kv, 9mA
- for children exposure time 13.2 sec, 66Kv, 9mA.

2.4.1.3.3. Pain relief methods – local anesthesia

- Local anesthesia is a reversible blocking of sensation in a specific area of the body (for example, the oral cavity). It works by blocking the nerves in that area and preventing the transmission of pain signals to the brain. The process of administering local anesthesia usually involves injecting an anesthetic around the tooth that is to be treated. The effect is almost immediate, with the numbing sensation usually occurring within a few minutes. The duration of the anesthesia can vary depending on the type of anesthetic used and the procedure being performed, but it usually lasts long enough to cover the duration of a standard dental procedure.

- Depending on the site of application of the anesthetic, local anesthesia is terminal (terminal nerve endings) and conductive (peripheral nerve trunks). In terminal anesthesia, the nerve endings are anesthetized, and in conductive anesthesia, the nerve trunks are anesthetized.
- Depending on the method of implementation, terminal anesthesia is non-injection (contact) and injection (infiltrative). Infiltrative terminal anesthesia, depending on the method of implementation, is direct (the anesthetic is infiltrated into the site of the surgical incision) and indirect (the anesthetic solution is infiltrated around the pathologically altered tissue, outside the surgical incision). Additionally, an anesthetic solution can be infiltrated into the sulcus gingivalis and periodontal ligament, with the anesthesia being referred to as intraligamentary.

- **The anesthetics used at UMDC are:**
- **Mepivacaine -** a local anesthetic from the amide group. Mepivacaine has a fairly rapid onset of action and a medium duration of action
- **Articaine -** a short-acting local anesthetic used in dental procedures. It belongs to the amide group and has an additional ester group that is rapidly hydrolyzed by plasma esterases, therefore it has less toxicity than other ester drugs. Articaine is used for pain control. Like other local anesthetics, articaine causes a transient and fully reversible state of anesthesia (loss of sensation) during (dental) procedures. In dentistry, articaine is mainly used for infiltration injections. The indications for use of articaine are as follows:
    - Local anesthesia (through infiltration and nerve block)
    - For minor procedures: articaine hydrochloride 4%/epinephrine 1:50,000
    - For complex procedures: articaine hydrochloride 4%/epinephrine 1:1000003
    - Single or multiple tooth extractions, with apical periodontitis or broken teeth
    - Interventions in infected tissues
    - Maxillofacial surgery
    - Mucocutaneous surgical interventions that require more pronounced ischemia and longer duration
- **Lidocaine -** a local anesthetic from the amide group. Its action is due to blocking the perception of irritation by receptors and reducing or interrupting the conductivity of nerve fibers, stabilizing the plasma membrane and thus counteracting the processes of depolarization. Lidocaine DS 20 mg/ml injection solution is used for various types of local anesthesia – infiltration anesthesia, conduction anesthesia and nerve blockade.

2.4.2. Material and methods for task 2

2.4.2.1. Research object

- 270 patients who underwent treatment with oral surgery methods

Criteria for inclusion in the study:

1) Persons who have completed an informed consent to participate in the study
2) Persons in need of treatment with oral surgery methods using sedation and general anesthesia
3) Persons without systemic diseases requiring treatment in a hospital setting

Exclusion criteria:

1) Persons who have not completed an informed consent
2) Persons with temporary contraindications to performing surgical interventions

2.4.2.2. Research location

- The surgical rooms of the UMDC at the Medical University of Varna

2.4.2.3. Methods

2.4.2.3.1. Clinical methods: Each patient underwent a clinical examination and an outpatient card was completed and a medical history with an epicrisis was issued, from which the data for the present study were used.

2.4.2.3.2. Imaging methods - for all patients with orthopantomography performed with a Planmeca device:

- for adults with an average exposure time of 10 sec, 66 Kv, 9mA
- for children exposure time 13.2 sec, 66Kv, 9mA.

2.4.2.3.3. Methods of anesthesia:

2.4.2.3.3.1. Sedation

- Minimal sedation (anxiolysis) – this is the lightest level of sedation, where the patient remains awake but relaxed. It is usually used for patients who experience mild anxiety, or for shorter and less invasive procedures.
- Moderate sedation – often called conscious sedation, this level involves a deeper state of relaxation. Patients under moderate sedation respond to verbal commands, although they may not remember much of the procedure afterward.
- Deep sedation – patients are difficult to awaken but respond after repeated stimulation. This level is usually reserved for more extensive dental procedures.
- **The local anesthetics used at UMDC are:**
  • Articaine
  • Lidocaine
  • Mepivacaine

2.4.2.3.3.2. General anesthesia

- General anesthesia is a drug-induced, reversible state of unconsciousness, accompanied by the exclusion of consciousness, relaxation of skeletal muscles, and suppression of reflex activity. It is achieved by the application of anesthetic agents that affect the entire body, not just a specific area. Under general anesthesia, patients do not feel pain, are not aware of, or remember the procedure being performed. The process involves several stages:
- Pre-anesthesia consultation – the patient's medical history is thoroughly checked, a clinical examination is performed, and all necessary laboratory tests are performed to assess the risk and prepare the patient for anesthesia.
- Induction (introduction) – the patient is most often given intravenous medications, during which he gradually becomes unconscious, breathing becomes rhythmic, muscles relax, heart rate normalizes, and the patient is considered to be completely anesthetized.
- Maintenance of anesthesia – the depth of anesthesia is carefully maintained at a level appropriate for the procedure, using a combination of medications.
- Recovery – the introduction of anesthetic agents is stopped and the patient gradually regains consciousness.
- Post-anesthesia care – the patient is monitored during recovery from anesthesia to manage any possible side effects and ensure their safety.

- **Използваните в УМДЦ анестетици за седация и обща упойка са:**
- Midazolam - belongs to a group of medicines known as 'benzodiazepines'. It is a short-acting anaesthetic - it works quickly to induce a state of calm, drowsiness or sleep (sedation) and relieve anxiety and muscle tension. It has an anticonvulsant effect and causes anterograde amnesia.
- Propofol
- Fentanyl

2.4.3. Material and methods for task 3

2.4.3.1. Research object

- 240 patients who underwent treatment with oral and maxillofacial surgery methods

Criteria for inclusion in the study:

1) Persons who have completed an informed consent to participate in the study

2) Persons in need of treatment with oral and maxillofacial surgery methods using local anesthesia

Exclusion criteria:

1) Persons who have not completed an informed consent

2) Persons with temporary contraindications to performing surgical interventions

2.4.3.2. Research location

- The surgical rooms of the University Hospital "St. Marina" - Varna

2.4.3.3. Methods

2.4.3.3.1. Clinical methods: Each patient underwent a clinical examination and an outpatient card was completed and a medical history with an epicrisis was issued, from which the data for the present study were used.

2.4.3.3.2. Imaging methods - for all patients with orthopantomography performed with a Planmeca device

2.4.3.3.3. Methods of anesthesia – local anesthesia. The anesthetics used at St. Marina University Hospital - Varna are:

- Articaine
- Lidocaine

2.4.4. Material and methods for task 4

2.4.4.1. Research object

- 784 patients who underwent treatment with oral and maxillofacial surgery methods

Criteria for inclusion in the study:

1) Persons who have completed an informed consent to participate in the study

2) Persons in need of treatment with oral and maxillofacial surgery methods using sedation and general anesthesia

Exclusion criteria:

1) Persons who have not completed an informed consent

2) Persons with temporary contraindications to performing surgical interventions

2.4.4.2. Research location

- The surgical rooms of the University Hospital "St. Marina" - Varna

2.4.4.3. Methods

2.4.4.3.1. Clinical methods: Each patient underwent a clinical examination and an outpatient card was completed and a medical history with an epicrisis was issued, from which the data for the present study were used.

2.4.4.3.2. Imaging methods - for all patients with orthopantomography performed with a Planmeca device.

2.4.4.3.3. Methods of anesthesia:

2.4.4.3.3.1. Sedation. The anesthetics used at St. Marina University Hospital: - Varna are:

• Articaine

• Lidocaine

2.4.4.3.3.2. General anesthesia. The anesthetics used at UHAT are:

- Midazolam
- Propofol
- Fentanyl

2.5. Statistical methods

The statistical software package IBM SPSS for Windows, v.20.0 was used for data processing.

In all analyses, an acceptable level of significance of $p<0.05$ with a confidence interval of 95% is assumed.

- Analysis of variance (ANOVA) to assess whether the influence of a given factor is statistically significant or not.
- Analysis of variation to study the quantitative characteristics of the indicators.
- Correlation analysis to assess the dependence between the studied indicators. The assessment of the strength of the dependence between the variables is based on the results of the Pearson (r) and Spearman (p) coefficients, with Spearman's coefficient calculating the correlation based on monotonic relationships, and Pearson's based on linear relationships.

The degree of association between variables is defined as:

- $0<r(p)<0.3$ – poor correlation
- $0.3<r(p)<0.5$ – moderate correlation
- $0.5<r(p)<0.7$ – significant correlation
- $0.7<r(p)<0.9$ – high correlation
- $0.9<r(p)<1$ – very high correlation

- Regression analysis to assess possible functional dependencies between the studied indicators. Investigation of cause-and-effect relationships.
- Comparative analysis (hypothesis evaluation) – $\chi 2$, Student's t-test for comparing quantitative and qualitative indicators and examining the difference between them.
- Graphical and tabular method of displaying the obtained results.

III. RESULTS

3.1. Results of task 1. Research on the application of local anesthesia in oral surgery

The study examined 500 patients who underwent treatment with local anesthesia at the UMDC with a mean age of 42.45 years ± 17.67 years (5 years – 89 years) (Fig. 1).

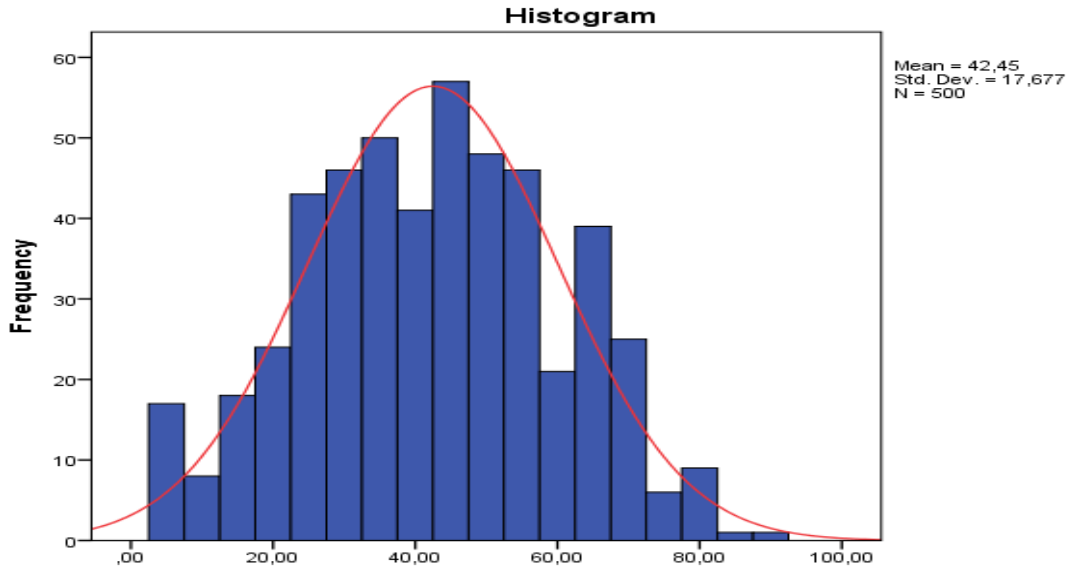

Fig. 1. Distribution according to patient age

The distribution by gender shows that women predominate - 54.4% (272) compared to men (45.6% - 228), with no significant difference in terms of average age.

Of the patients studied, 31.2% (156) reported smoking.

10.0% (50) of the subjects studied had comorbidities, with an average age of 63.5 years, with an even distribution by gender – 50% women and 50% men. A significant difference was found between the average age of patients with and without comorbidities ($p<0.001$), with the average age of patients without comorbidities being 40.4 years.

Of the patients with concomitant diseases who underwent treatment with local anesthesia at the UMDC at the Medical University of Varna, 40 had hypertension (80.0%) and 10 had diabetes mellitus (20.0%).

Table 1 presents the distribution of patients according to the procedure performed. The data shows that the largest relative share is odontectomy (39.8%), followed by tooth extraction (24.62%) and preprosthetic surgery (13.6%).

Table 1. Distribution of patients according to the procedure performed

Procedure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tooth extraction	121	24,2	24,2	24,2
	Odontectomy	199	39,8	39,8	64,0
	Extraction of supernumerary teeth	13	2,6	2,6	66,6
	Removal of odontomas	10	2,0	2,0	68,6
	Pre-prosthetic surgery	68	13,6	13,6	82,2
	Extraction of impacted teeth	23	4,6	4,6	86,8
	Exposure of teeth for orthodontic reason	10	2,0	2,0	88,8
	Implant placement	12	2,4	2,4	91,2
	Removal of exostoses	5	1,0	1,0	92,2
	Sinus lift	11	2,2	2,2	94,4
	GTR - guided tissue regeneration	12	2,4	2,4	96,8
	GBR - guided bone regeneration	16	3,2	3,2	100,0
	Total	500	100,0	100,0	

Table 2. Average age of patients according to the type of procedure performed

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Tooth extraction	121	52,4711	12,12509	1,10228	25,00	81,00
Odontectomy	199	37,0955	14,10516	,99989	7,00	73,00
Extraction of supernumerary teeth	13	5,9231	,86232	,23916	5,00	7,00
Removal of odontomas	10	17,4000	4,52647	1,43139	8,00	24,00
Pre-prosthetic surgery	68	58,0588	15,92040	1,93063	22,00	89,00
Extraction of impacted teeth	23	31,7391	6,26837	1,30705	21,00	42,00
Exposure of teeth for orthodontic reason	10	10,1000	2,51440	,79512	7,00	13,00
Implant placement	12	50,1667	8,06602	2,32846	32,00	65,00
Removal of exostoses	5	32,8000	5,71839	2,55734	26,00	40,00
Sinus lift	11	40,1818	12,48854	3,76544	24,00	58,00
GTR - guided tissue regeneration	12	42,5833	14,28577	4,12395	23,00	65,00
GBR - guided bone regeneration	16	46,5625	15,24891	3,81223	26,00	76,00
Total	500	42,4500	17,67700	,79054	5,00	89,00

A significant difference was found in the mean age of patients treated with local anesthesia according to the type of procedure ($p<0.001$), the oldest being the patients who underwent preprosthetic surgery (58.05 years), and the youngest being the patients who underwent extraction of supernumerary teeth (5.92 years) (Table 2).

When examining the procedures performed according to gender, no significant difference was found, despite the variation in the relative proportions (Table 3).

Table 3. Distribution of procedures performed by gender

		Gender		Total
		Male	Female	
Procedures	Tooth extraction	49	72	121
		21,5%	26,5%	24,2%
	Odontectomy	87	112	199
		38,2%	41,2%	39,8%
	Extraction of supernumerary teeth	9	4	13
		3,9%	1,5%	2,6%
	Removal of odontomas	7	3	10
		3,1%	1,1%	2,0%
	Pre-prosthetic surgery	31	37	68
		13,6%	13,6%	13,6%
	Extraction of impacted teeth	13	10	23
		5,7%	3,7%	4,6%
	Exposure of teeth for orthodontic reasons	7	3	10
		3,1%	1,1%	2,0%
	Implant placement	7	5	12
		3,1%	1,8%	2,4%
	Removal of exostoses	2	3	5
		0,9%	1,1%	1,0%
	Sinus lift	6	5	11
		2,6%	1,8%	2,2%
	GTR - guided tissue regeneration	4	8	12
		1,8%	2,9%	2,4%
	GBR - guided bone regeneration	6	10	16
		2,6%	3,7%	3,2%
Total		228	272	500
		100,0%	100,0%	100,0%

In the treatment with local anesthesia, two main types are applied - terminal and conduction, with no significant difference in the relative shares (50.6% - conduction local anesthesia and 49.4% - terminal).

On the other hand, a significant difference was observed in terms of the age of the patients ($p<0.001$). In conduction anesthesia, the average age was 39.9 years, and in terminal anesthesia it was 45.5 years (Fig. 2).

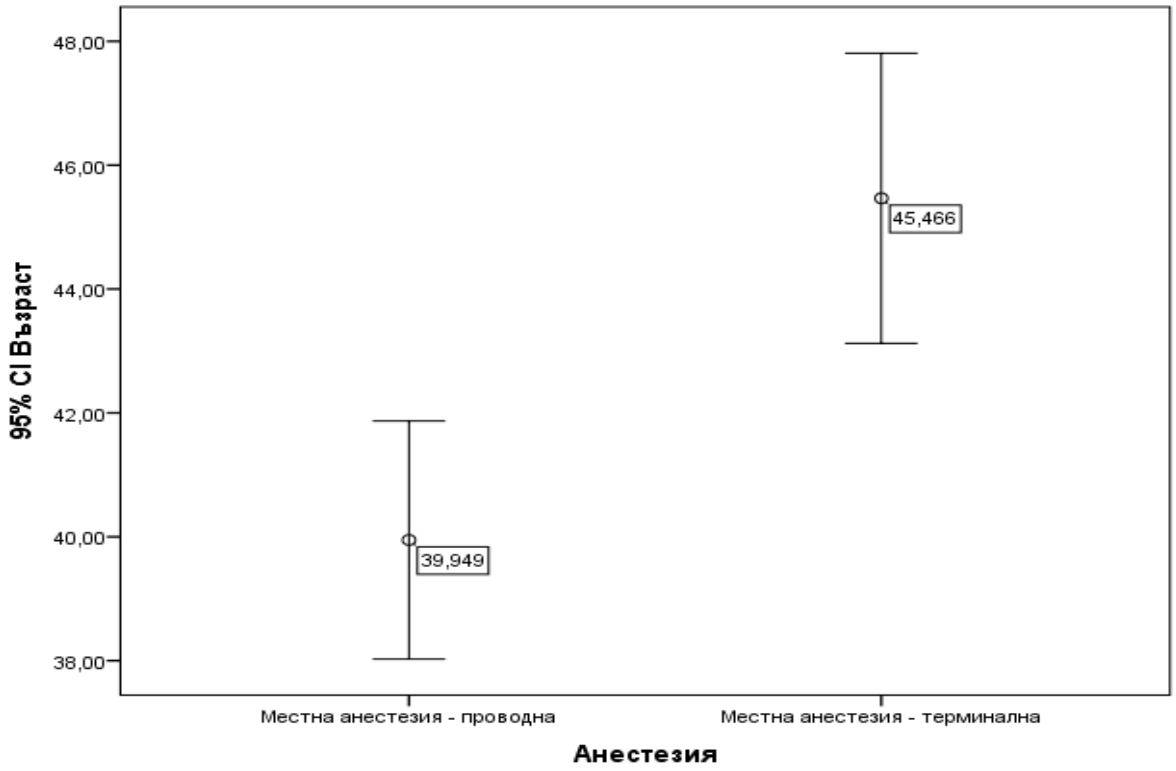

Fig. 2. Average age by type of anesthesia

A significant difference was found in the type of anesthesia used and the type of procedure ($p<0.001$), local conduction anesthesia was used in the highest percentage in odontectomy (63.3%) and tooth extraction (52.9%) (Table 4). The extraction of supernumerary teeth was mainly performed with local terminal anesthesia. Local conduction anesthesia prevailed in the removal of odontomas (80%), the extraction of impacted teeth (52.2%) and the removal of exostoses (60.0%). Local thermal anesthesia is used in the highest percentage in preprosthetic surgery (72.1%), orthodontic tooth exposure (80.0%), implant placement (75%), sinus lift (72.7%), and GBR (56.2%). In GTR, both types of local anesthesia are used equally.

Table 4. Types of anesthesia according to the type of procedure

			Anesthesia		Total
			Local anesthesia - conductive	Local anesthesia - terminal	
Procedures	Tooth extraction	Count	64	57	121
		% within Procedures	52,9%	47,1%	100,0%
	Odontectomy	Count	126	73	199
		% within Procedures	63,3%	36,7%	100,0%

	Extraction of supernumerary teeth	Count	0	13	13
		% within Procedures	0,0%	100,0%	100,0%
	Removal of odontomas	Count	8	2	10
		% within Procedures	80,0%	20,0%	100,0%
	Pre-prosthetic surgery	Count	19	49	68
		% within Procedures	27,9%	72,1%	100,0%
	Extraction of impacted teeth	Count	12	11	23
		% within Procedures	52,2%	47,8%	100,0%
	Exposure of teeth for orthodontic reasons	Count	2	8	10
		% within Procedures	20,0%	80,0%	100,0%
	Implant placement	Count	3	9	12
		% within Procedures	25,0%	75,0%	100,0%
	Removal of exostoses	Count	3	2	5
		% within Procedures	60,0%	40,0%	100,0%
	Sinus lift	Count	3	8	11
		% within Procedures	27,3%	72,7%	100,0%
	GTR - guided tissue regeneration	Count	6	6	12
		% within Procedures	50,0%	50,0%	100,0%
	GBR - guided bone regeneration	Count	7	9	16
		% within Procedures	43,8%	56,2%	100,0%
Total		Count	253	247	500
		% within Procedures	50,6%	49,4%	100,0%

A significant difference was found in the type of anesthesia used and the patients' concomitant diseases ($p<0.001$), and a weak correlation was also found between the presence of a concomitant disease and the choice of type of anesthesia ($r=0.111$; $p=0.013$) (Table 5).

Table 5. Type of anesthesia used and presence of concomitant disease

			Anesthesia		Total
			Local anesthesia - conductive	Local anesthesia - terminal	
Comorbidities	None	Count	236	214	450
		% within Anesthesia	93,3%	86,6%	90,0%
	Yes	Count	17	33	50
		% within Anesthesia	6,7%	13,4%	10,0%
Total		Count	253	247	500
		% within Anesthesia	100,0%	100,0%	100,0%

The main drug used as an anesthetic in local anesthesia treatment at the UMDC is Articaine (89.4%) (Table 6).

Table 6. Main anesthetics used in local anesthesia at the UMDC

Medication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Articaine	447	89,4	89,4	89,4
	Lidocain	7	1,4	1,4	90,8
	Mepivacaine	46	9,2	9,2	100,0
	Total	500	100,0	100,0	

When examining the relationship between the choice of anesthetic and the age of the patients, it was found that there was a significant difference (p=0.009), indicating that Lidocaine was used in older patients (61.28 years) (Table 7).

Table 7. Average age of patients according to anesthetics used

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Articaine	447	42,4676	18,00481	,85160	5,00	89,00
Lidocain	7	61,2857	12,12043	4,58109	34,00	69,00
Mepivacaine	46	39,4130	12,95732	1,91045	19,00	70,00
Total	500	42,4500	17,67700	,79054	5,00	89,00

It does not establish a difference in the anesthetics used according to the type of procedure (Table 8), with Articaine being the most commonly used medication, and in the extraction of supernumerary teeth and the exposure of teeth for orthodontic reasons, it is the only choice.

Table 8. Anesthetics used by type of procedure

		Medication			Total
		Articaine	Lidocain	Mepivacaine	
Procedure	Tooth extraction	114	4	3	121
		94,2%	3,3%	2,5%	100,0%
	Odontectomy	179	2	18	199
		89,9%	1,0%	9,0%	100,0%
	Extraction of supernumerary teeth	13	0	0	13
		100,0%	0,0%	0,0%	100,0%
	Removal of odontomas	8	0	2	10
		80,0%	0,0%	20,0%	100,0%
	Pre-prosthetic surgery	64	0	4	68
		94,1%	0,0%	5,9%	100,0%
	Extraction of impacted teeth	21	0	2	23
		91,3%	0,0%	8,7%	100,0%
	Exposure of teeth for orthodontic reasons	10	0	0	10

	100,0%	0,0%	0,0%	100,0%
Implant placement	10	0	2	12
	83,3%	0,0%	16,7%	100,0%
Removal of exostoses	3	0	2	5
	60,0%	0,0%	40,0%	100,0%
Sinus lift	9	0	2	11
	81,8%	0,0%	18,2%	100,0%
GTR - guided tissue regeneration	7	0	5	12
	58,3%	0,0%	41,7%	100,0%
GBR - guided bone regeneration	9	1	6	16
	56,2%	6,2%	37,5%	100,0%
Total	447	7	46	500
	89,4%	1,4%	9,2%	100,0%

A significant difference in the average duration of anesthesia was found according to the type of procedure ($p<0.001$), with the procedures with the longest duration being odontectomy (65.50 min), followed by implant placement (60 min) and NCR (59.68 min). The shortest duration was the extraction of supernumerary teeth (26.15 min) (Table 9). A moderate correlation was also found between the type of procedure and the duration of anesthesia ($r=0.434$; $p<0.001$).

A significant difference in the duration of analgesia was also found with respect to the medication used ($p<0.001$), with the use of Mepivacaine being associated with longer analgesia (Table 10). A strong correlation was also found between the anesthetic used and the duration of the procedure ($r=0.533$; $p<0.001$).

Table 9. Average duration of anesthesia by type of procedure in minutes

	N	Mean	Std. Deviation	Std. Error	Min.	Max.
Tooth extraction	121	29,2975	10,43443	,94858	15,00	60,00
Odontectomy	199	33,2764	13,72305	,97280	10,00	90,00
Extraction of supernumerary teeth	13	26,1538	14,59935	4,04913	10,00	70,00
Removal of odontomas	10	65,5000	18,32576	5,79511	40,00	90,00
Pre-prosthetic surgery	68	36,1765	17,87431	2,16758	15,00	90,00
Extraction of impacted teeth	23	36,0870	12,69901	2,64793	25,00	75,00
Exposure of teeth for orthodontic reason	10	31,5000	13,95429	4,41273	15,00	60,00
Implant placement	12	60,0000	16,92228	4,88504	30,00	90,00
Removal of exostoses	5	54,0000	23,82226	10,65364	25,00	90,00
Sinus lift	11	53,6364	22,48232	6,77867	30,00	90,00
GTR - guided tissue regeneration	12	55,0000	21,53222	6,21582	30,00	90,00
GBR - guided bone regeneration	16	59,6875	18,75000	4,68750	25,00	90,00
Total	500	35,9240	17,09499	,76451	10,00	90,00

Table 10. Average duration of anesthesia according to the type of anesthetic used in minutes

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Articaine	447	32,9463	14,48818	,68527	10,00	90,00
Lidocain	7	35,7143	14,26785	5,39274	15,00	60,00
Mepivacaine	46	64,8913	13,68248	2,01737	45,00	90,00
Total	500	35,9240	17,09499	,76451	10,00	90,00

Table 11 presents an analysis of the duration of analgesia according to the type of procedure, type of anesthesia, anesthetic used, and age of the patients. A significant difference was found between the studied indicators ($p<0.001$).

Table 11. Duration of analgesia according to the type of procedure, type of anesthesia, anesthetic used and age of patients

Procedure	Anesthesia	Medication		Duration	Age	Dose in mg.
Tooth extraction	Local anesthesia - conductive	Articaine	Mean	29,21	49,89	90,95
			N	57	57	57
			SD	10,12	12,08	34,76
		Lidocain	Mean	30,00	65,00	86,00
			N	4	4	4
			SD	12,24	,00	43,02
		Mepivacaine	Mean	60,00	56,33	54,00
			N	3	3	3
			SD	,00	13,05	,00
	Local anesthesia - terminal	Articaine	Mean	27,72	53,96	94,74
			N	57	57	57
			SD	8,35	11,91	33,76
Odontectomy	Local anesthesia - conductive	Articaine	Mean	32,12	36,25	112,86
			N	111	111	111
			SD	12,31	15,43	35,83
		Lidocain	Mean	40,00	34,00	72,00
			N	1	1	1
			SD	.	.	.
		Mepivacaine	Mean	58,21	40,57	63,00
			N	14	14	14
			SD	4,64	8,22	19,65
	Local anesthesia - terminal	Articaine	Mean	28,41	37,45	108,00
			N	68	68	68
			SD	9,85	12,69	36,26
		Lidocain	Mean	30,00	66,00	80,00
			N	1	1	1
			SD	.	.	.
		Mepivacaine	Mean	60,00	35,75	67,50
			N	4	4	4
			SD	12,24	11,70	27,00
			SD	6,59	8,95	20,68
Extraction of supernumerary teeth	Local anesthesia - terminal	Articaine	Mean	26,15	13,30	88,61
			N	13	13	13
			SD	14,59	12,16	31,57
Removal of odontomas	Local anesthesia - conductive	Articaine	Mean	55,00	17,85	144,00
			N	7	7	7

			SD	8,66	3,43	,00
		Mepivacaine	Mean	90,00	22,00	108,00
			N	1	1	1
			SD	.	.	.
	Local anesthesia - terminal	Articaine	Mean	90,00	8,00	144,00
			N	1	1	1
			SD	.	.	.
		Mepivacaine	Mean	90,00	19,00	162,00
			N	1	1	1
			SD	.	.	.
Pre-prosthetic surgery	Local anesthesia - conductive	Articaine	Mean	35,55	45,72	100,00
			N	18	18	18
			SD	18,46	15,94	36,11
		Mepivacaine	Mean	50,00	38,00	54,00
			N	1	1	1
			SD	.	.	.
	Local anesthesia - terminal	Articaine	Mean	34,23	63,76	103,30
			N	46	46	46
			SD	16,73	12,18	39,14
		Mepivacaine	Mean	65,00	51,33	54,00
			N	3	3	3
			SD	8,66	24,54	,00
Extraction of impacted teeth	Local anesthesia - conductive	Articaine	Mean	33,63	31,45	111,27
			N	11	11	11
			SD	6,36	6,56	37,60
		Mepivacaine	Mean	75,00	32,00	54,00
			N	1	1	1
			SD	.	.	.
	Local anesthesia - terminal	Articaine	Mean	32,50	32,30	115,20
			N	10	10	10
			SD	9,78	6,84	37,18
		Mepivacaine	Mean	60,00	29,00	54,00
			N	1	1	1
			SD	.	.	.
Exposure of teeth for orthodontic reasons	Local anesthesia - conductive	Articaine	Mean	45,00	14,00	72,00
			N	2	2	2
			SD	21,21	2,82	,00
	Local anesthesia - terminal	Articaine	Mean	28,12	11,12	99,00
			N	8	8	8
			SD	10,99	4,73	37,26
Implant placement	Local anesthesia - conductive	Articaine	Mean	50,00	49,66	120,00
			N	3	3	3
			SD	17,32	5,68	41,56
	Local anesthesia - terminal	Articaine	Mean	60,0000	48,8571	113,1429
			N	7	7	7
			SD	17,32	8,17	56,64
		Mepivacaine	Mean	75,00	55,50	54,00
			N	2	2	2
			SD	,00	13,43	,00
Removal of exostoses	Local anesthesia - conductive	Articaine	Mean	45,00	29,00	144,00
			N	1	1	1
			SD	.	.	.
		Mepivacaine	Mean	70,00	31,50	90,00
			N	2	2	2
			SD	28,28	7,77	25,45
	Local anesthesia - terminal	Articaine	Mean	42,50	36,00	108,00
			N	2	2	2
			SD	24,74	5,65	50,91
Sinus lift	Local anesthesia - conductive	Articaine	Mean	40,00	26,00	108,00
			N	2	2	2
			SD	14,14	1,41	50,91
		Mepivacaine	Mean	90,00	24,00	162,00
			N	1	1	1
			SD	.	.	.

	Local anesthesia - terminal	Articaine	Mean	51,42	48,14	144,00
			N	7	7	7
			SD	22,67	7,35	58,78
		Mepivacaine	Mean	60,00	29,00	54,00
			N	1	1	1
			SD	.	.	.
GTR - guided tissue regeneration	Local anesthesia - conductive	Articaine	Mean	40,00	37,33	168,00
			N	3	3	3
			SD	17,32	16,25	41,56
		Mepivacaine	Mean	80,00	38,66	78,00
			N	3	3	3
			SD	17,32	16,16	27,49
	Local anesthesia - terminal	Articaine	Mean	45,00	50,50	144,00
			N	4	4	4
			SD	17,32	16,38	,00
		Mepivacaine	Mean	60,00	40,50	54,00
			N	2	2	2
			SD	,00	,70	,00
GBR - guided bone regeneration	Local anesthesia - conductive	Articaine	Mean	50,00	36,66	144,00
			N	3	3	3
			SD	17,32	7,76	,00
		Mepivacaine	Mean	71,25	34,75	67,50
			N	4	4	4
			SD	22,50	14,26	27,00
	Local anesthesia - terminal	Articaine	Mean	59,16	58,50	156,00
			N	6	6	6
			SD	20,59	8,73	54,19
		Lidocain	Mean	60,00	69,00	40,00
			N	1	1	1
			SD	.	.	.
		Mepivacaine	Mean	52,50	38,00	63,00
			N	2	2	2
			SD	10,60	4,24	12,72

Comorbidities did not affect the duration of the procedure in the present study.

Complications were observed in 8.2% of cases or 41 patients, most often related to tooth extraction or odontectomy (36.6% and 39.0%, respectively) (Table 12).

Table 12. The presence of complications according to the procedure performed

			Complications		Total
			None	Yes	
Procedures	Tooth extraction	Count	106	15	121
		% within Complications	23,1%	36,6%	24,2%
	Odontectomy	Count	183	16	199
		% within Complications	39,9%	39,0%	39,8%
	Extraction of supernumerary teeth	Count	13	0	13
		% within Complications	2,8%	0,0%	2,6%
	Removal of odontomas	Count	10	0	10
		% within Complications	2,2%	0,0%	2,0%
	Pre-prosthetic surgery	Count	63	5	68
		% within Complications	13,7%	12,2%	13,6%
	Extraction of impacted teeth	Count	22	1	23
		% within Complications	4,8%	2,4%	4,6%
	Exposure of teeth for orthodontic reasons	Count	10	0	10
		% within Complications	2,2%	0,0%	2,0%
	Implant placement	Count	11	1	12

	Removal of exostoses	% within Complications	2,4%	2,4%	2,4%
	Sinus lift	Count	5	0	5
		% within Complications	1,1%	0,0%	1,0%
	GTR - guided tissue regeneration	Count	10	1	11
		% within Complications	2,2%	2,4%	2,2%
	GBR - guided bone regeneration	Count	12	0	12
		% within Complications	2,6%	0,0%	2,4%
		Count	14	2	16
		% within Complications	3,1%	4,9%	3,2%
Total		Count	459	41	500
		% within Complications	100,0%	100,0%	100,0%

The most common complication of local anesthesia treatment in oral surgery is hematoma (46.3%) followed by trigeminal neuritis (34.1%) (Fig. 3).

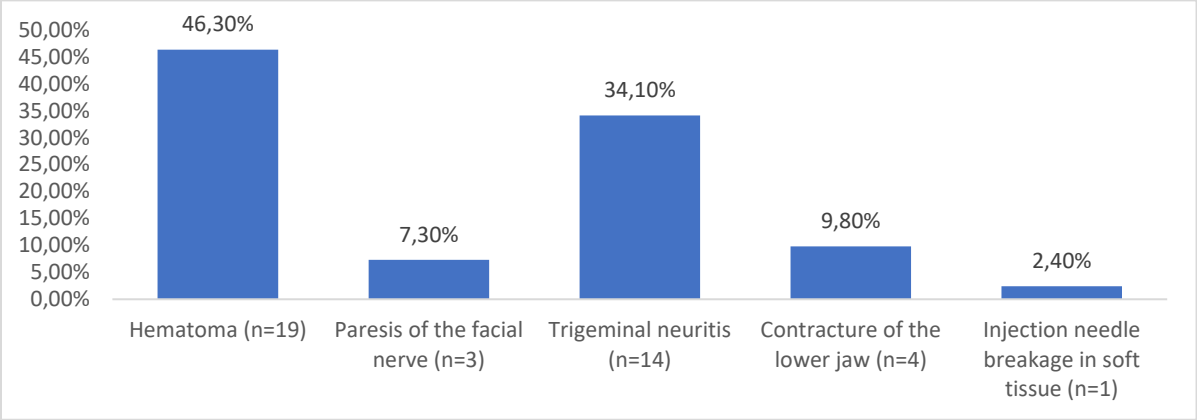

Fig. 3. Distribution of the type of complications

No correlation was found between the presence of complications and the anesthetic used, indicating that complications may be due to other factors.

No correlation was found between the type of complications and the type of procedure (Table 13).

Table 13. Type of complications according to the type of procedure

		Types of complications					Total
		Hematoma	Paresis of the facial nerve	Trigeminal neuritis	Contracture of the lower jaw	Injection needle breakage in soft tissue	
Procedures	Tooth extraction	5	0	8	2	0	15
		26,3%	0,0%	57,1%	50,0%	0,0%	36,6%
	Odontectomy	10	2	2	1	1	16
		52,6%	66,7%	14,3%	25,0%	100,0%	39,0%
	Pre-prosthetic surgery	3	0	2	0	0	5

		15,8%	0,0%	14,3%	0,0%	0,0%	12,2%
	Extraction of impacted teeth	1	0	0	0	0	1
		5,3%	0,0%	0,0%	0,0%	0,0%	2,4%
	Implant placement	0	0	1	0	0	1
		0,0%	0,0%	7,1%	0,0%	0,0%	2,4%
	Sinus lift	0	0	1	0	0	1
		0,0%	0,0%	7,1%	0,0%	0,0%	2,4%
	GBR - guided bone regeneration	0	1	0	1	0	2
		0,0%	33,3%	0,0%	25,0%	0,0%	4,9%
Total		19	3	14	4	1	41
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

3.2. Results of task 2. Study of the application of sedation and general anesthesia in oral surgery

The study examined 270 patients who underwent treatment under general anesthesia at the UMDC with a mean age of 47.88 ± 21.1 years (6 years – 91 years) (Fig. 4).

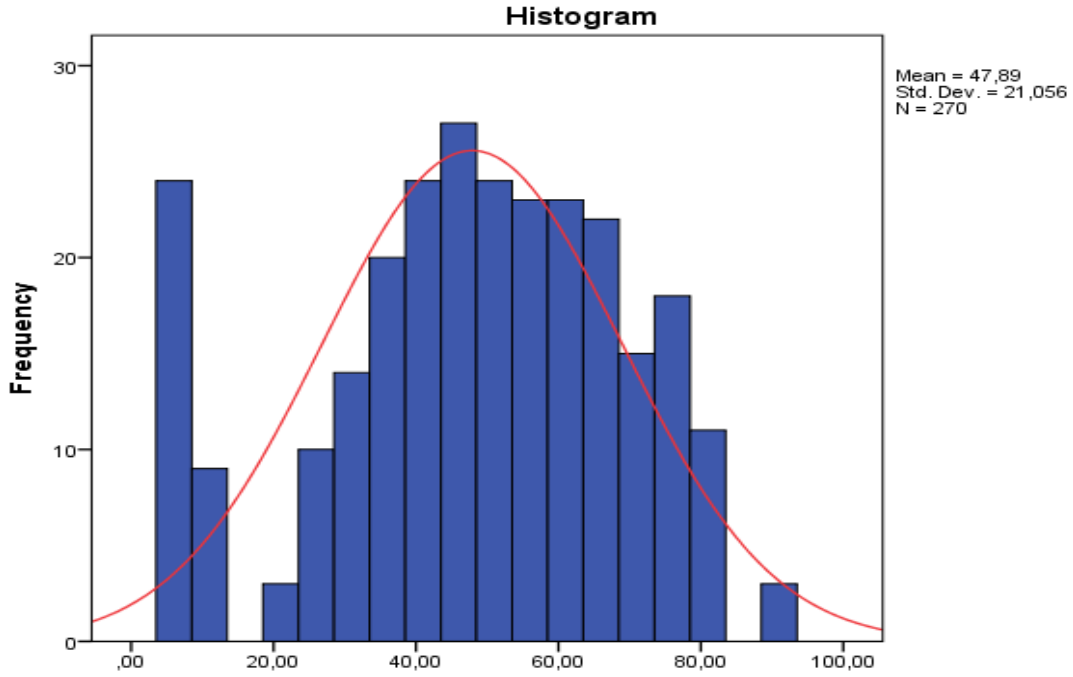

Fig. 4. Distribution according to patient age

The gender distribution shows that men predominate – 53% (143) compared to women (47% - 127), with no significant difference in terms of mean age.

Of the patients studied, 28.1% (76) reported that they smoke.

With concomitant diseases are 41.9% (113) of the examined persons, who have a mean age of 59.8 years and are predominantly men – 53.1% (60). A significant difference is

established between the mean age of patients with and without concomitant diseases (p<0.001), as the mean age of patients without concomitant diseases is 39.3 years. Of the concomitant diseases, patients with hypertension predominate (51.3%), as the distribution is presented in Fig. 5.

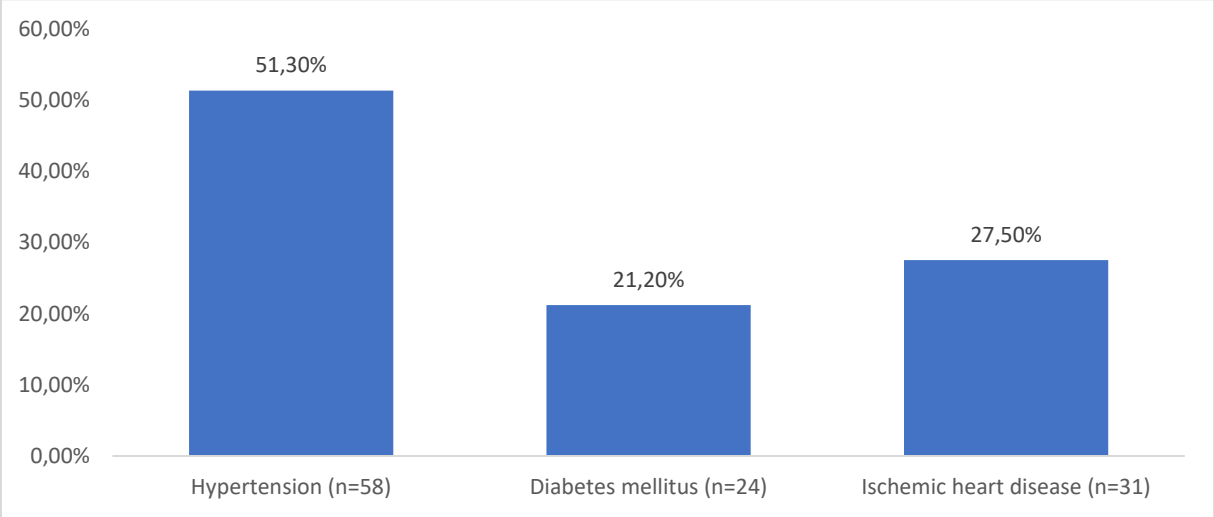

Fig. 5. Distribution of patients according to concomitant diseases

Table 14 presents the distribution of patients according to the procedure performed. The data shows that the largest relative share is the placement of implants (15.6%), followed by GTR (13.7%) and removal of odontomas (13.7%).

Table 14. Distribution of patients according to the procedure performed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tooth extraction	19	7,0	7,0	7,0
	Odontectomy	30	11,1	11,1	18,1
	Extraction of supernumerary teeth	20	7,4	7,4	25,6
	Removal of odontomas	37	13,7	13,7	39,3
	Pre-prosthetic surgery	7	2,6	2,6	41,9
	Extraction of impacted teeth	7	2,6	2,6	44,4
	Exposure of teeth for orthodontic reason	8	3,0	3,0	47,4
	Implant placement	42	15,6	15,6	63,0
	Removal of exostoses	28	10,4	10,4	73,3
	Sinus lift	20	7,4	7,4	80,7
	GTR - guided tissue regeneration	37	13,7	13,7	94,4
	GBR - guided bone regeneration	15	5,6	5,6	100,0
	Total	270	100,0	100,0	

A significant difference was found in the mean age of patients treated under general anesthesia according to the type of procedure ($p<0.001$), the oldest were the patients who underwent tooth/teeth extraction (64.47 years), followed by preprosthetic surgery (62.85 years), and the youngest were the patients who underwent supernumerary tooth extraction (6.6 years) (Table 15).

Table 15. Average age of patients according to the type of procedure performed

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Tooth extraction	19	64,4737	17,70866	4,06264	8,00	89,00
Odontectomy	30	48,6000	12,69971	2,31864	27,00	83,00
Extraction of supernumerary teeth	20	6,6000	,75394	,16859	6,00	8,00
Removal of odontomas	37	54,4865	16,06864	2,64167	9,00	80,00
Pre-prosthetic surgery	7	62,8571	9,92352	3,75074	47,00	75,00
Extraction of impacted teeth	7	33,0000	13,90444	5,25538	13,00	49,00
Exposure of teeth for orthodontic reason	8	11,1250	1,80772	,63913	8,00	13,00
Implant placement	42	55,6905	16,70766	2,57805	25,00	91,00
Removal of exostoses	28	56,8929	15,46882	2,92333	32,00	89,00
Sinus lift	20	37,9000	10,58748	2,36743	23,00	55,00
GTR - guided tissue regeneration	37	48,3784	17,84400	2,93354	6,00	79,00
GBR - guided bone regeneration	15	57,2000	15,46517	3,99309	32,00	79,00
Total	270	47,8852	21,05573	1,28141	6,00	91,00

General anesthesia was most commonly performed (71.1%) – 192, followed by sedation with local terminal anesthesia – 21.5% (58) and sedation with local conduction anesthesia – 7.4% (20). (Table 16).

Table 16. Types of general anesthesia used in oral surgery

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sedation + Local anesthesia - conductive	20	7,4	7,4	7,4
	Sedation + Local anesthesia - terminal	58	21,5	21,5	28,9
	General anesthesia	192	71,1	71,1	100,0
	Total	270	100,0	100,0	

A significant difference in the mean age of patients was found according to the type of anesthesia (p=0.025), with the oldest patients undergoing general anesthesia (49.87 years). On the other hand, patients with sedation and local terminal anesthesia were the youngest (41.31 years) (Table 17). A weak to moderate correlation was found between the age of patients and the choice of anesthesia type (r=0.247; p<0.000).

Table 17. Average age of patients according to type of anesthesia

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Sedation + Local anesthesia - conductive	20	47,8500	15,54713	3,47644	8,00	73,00
Sedation + Local anesthesia - terminal	58	41,3103	26,12669	3,43060	6,00	83,00
General anesthesia	192	49,8750	19,48163	1,40597	6,00	91,00
Total	270	47,8852	21,05573	1,28141	6,00	91,00

A significant difference was found in the type of anesthesia used and the patients' concomitant diseases (p<0.001), and a weak to moderate correlation was also found between the presence of concomitant disease and the choice of type of anesthesia (r=0.288; p<0.001) (Table 18).

Table 18. Type of anesthesia used and presence of concomitant disease

			Comorbidities		Total
			None	Yes	
Anesthesia	Sedation + Local anesthesia - conductive	Count	19	1	20
		% within Anesthesia	95,0%	5,0%	100,0%
	Sedation + Local anesthesia - terminal	Count	43	15	58
		% within Anesthesia	74,1%	25,9%	100,0%
	General anesthesia	Count	95	97	192
		% within Anesthesia	49,5%	50,5%	100,0%
Total		Count	157	113	270
		% within Anesthesia	58,1%	41,9%	100,0%

The study of the relationship between the type of anesthesia and the procedure performed showed a significant difference (p<0.001), with sedation being preferred for tooth/teeth extraction, while more complex procedures are performed primarily under general anesthesia (Table 19). A moderate correlation was found between the choice of anesthesia type and the procedure performed (r=0.357; p<0.001).

Table 19. Type of anesthesia according to the procedure performed

		Anesthesia			Total
		Sedation + Local anesthesia - conductive	Sedation + Local anesthesia - terminal	General anesthesia	
Procedure	Tooth extraction	1	10	8	19
		5,3%	52,6%	42,1%	100,0%
	Odontectomy	10	4	16	30
		33,3%	13,3%	53,3%	100,0%
	Extraction of supernumerary teeth	1	14	5	20
		5,0%	70,0%	25,0%	100,0%
	Removal of odontomas	0	4	33	37
		0,0%	10,8%	89,2%	100,0%
	Pre-prosthetic surgery	2	4	1	7
		28,6%	57,1%	14,3%	100,0%
	Extraction of impacted teeth	0	2	5	7
		0,0%	28,6%	71,4%	100,0%
	Exposure of teeth for orthodontic reason	0	2	6	8
		0,0%	25,0%	75,0%	100,0%
	Implant placement	2	6	34	42
		4,8%	14,3%	81,0%	100,0%
	Removal of exostoses	1	3	24	28
		3,6%	10,7%	85,7%	100,0%
	Sinus lift	0	1	19	20
		0,0%	5,0%	95,0%	100,0%
	GTR - guided tissue regeneration	3	5	29	37
		8,1%	13,5%	78,4%	100,0%
	GBR - guided bone regeneration	0	3	12	15
		0,0%	20,0%	80,0%	100,0%
Total		20	58	192	270
		7,4%	21,5%	71,1%	100,0%

The medications and combinations used are presented in Table 20. The results show that the most frequently used combination is Articaine with Propofol (55.2%).

Table 20. Types of medications and combinations used in general anesthesia at UMDC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Articaine + Midazolam	82	30,4	30,4	30,4
	Articaine + Propofol	149	55,2	55,2	85,6
	Midazolam	16	5,9	5,9	91,5
	Propofol	1	,4	,4	91,9
	Lidocain 2% + Propofol	4	1,5	1,5	93,3
	Articaine + Fentanyl	18	6,7	6,7	100,0
	Total	270	100,0	100,0	

The study of the relationship between the anesthetic and combination used and the procedure performed showed a significant difference ($p<0.001$) (Table 21.) A weak correlation was found between the choice of anesthetic and combination for anesthesia and the procedure performed ($r=0.249$; $p<0.001$).

Table 21. Type of anesthetic and combination for anesthesia according to the procedure performed

Процедура * Медикамент Crosstabulation

			Медикамент						
			Articaine + Midazolam	Articaine + Propofol	Midazolam	Propofol	Lidocain 2% + Propofol	Articaine + Fentanyl	Total
Процедура	Екстракция на зъб/зъби	Count	9	5	5	0	0	0	19
		% within Процедура	47,4%	26,3%	26,3%	0,0%	0,0%	0,0%	100,0%
	Одонтектомия	Count	21	7	2	0	0	0	30
		% within Процедура	70,0%	23,3%	6,7%	0,0%	0,0%	0,0%	100,0%
	Екстракция на свръхбройни зъби	Count	15	4	1	0	0	0	20
		% within Процедура	75,0%	20,0%	5,0%	0,0%	0,0%	0,0%	100,0%
	Премахване на одонтоми	Count	1	31	1	0	0	4	37
		% within Процедура	2,7%	83,8%	2,7%	0,0%	0,0%	10,8%	100,0%
	Предпротетична хирургия	Count	5	2	0	0	0	0	7
		% within Процедура	71,4%	28,6%	0,0%	0,0%	0,0%	0,0%	100,0%
	Екстракция на ретинирани зъби	Count	0	5	1	0	0	1	7
		% within Процедура	0,0%	71,4%	14,3%	0,0%	0,0%	14,3%	100,0%
	Разкриване на зъби по ортодонтски причини	Count	3	4	0	0	1	0	8
		% within Процедура	37,5%	50,0%	0,0%	0,0%	12,5%	0,0%	100,0%
	Поставяне на импланти	Count	9	27	1	0	2	3	42
		% within Процедура	21,4%	64,3%	2,4%	0,0%	4,8%	7,1%	100,0%
	Премахване на екзостози	Count	3	21	1	0	1	2	28
		% within Процедура	10,7%	75,0%	3,6%	0,0%	3,6%	7,1%	100,0%
	Синус лифт	Count	5	11	0	0	0	4	20
		% within Процедура	25,0%	55,0%	0,0%	0,0%	0,0%	20,0%	100,0%
	НТР - направлявана тъканна регенерация	Count	8	22	3	0	0	4	37
		% within Процедура	21,6%	59,5%	8,1%	0,0%	0,0%	10,8%	100,0%
	НКР - направлявана костна регенерация	Count	3	10	1	1	0	0	15
		% within Процедура	20,0%	66,7%	6,7%	6,7%	0,0%	0,0%	100,0%
Total		Count	82	149	16	1	4	18	270
		% within Процедура	30,4%	55,2%	5,9%	0,4%	1,5%	6,7%	100,0%

Table 22. Type of anesthetic and combination for analgesia according to type of anesthesia

			Anesthesia			Total
			Sedation + Local anesthesia - conductive	Sedation + Local anesthesia - terminal	General anesthesia	
Medication	Articaine + Midazolam	Count	17	28	37	82
		% within Anesthesia	85,0%	48,3%	19,3%	30,4%
	Articaine + Propofol	Count	3	26	120	149
		% within Anesthesia	15,0%	44,8%	62,5%	55,2%
	Midazolam	Count	0	0	16	16
		% within Anesthesia	0,0%	0,0%	8,3%	5,9%
	Propofol	Count	0	0	1	1
		% within Anesthesia	0,0%	0,0%	0,5%	0,4%
	Lidocain 2% + Propofol	Count	0	1	3	4
		% within Anesthesia	0,0%	1,7%	1,6%	1,5%
	Articaine + Fentanyl	Count	0	3	15	18
		% within Anesthesia	0,0%	5,2%	7,8%	6,7%
Total		Count	20	58	192	270
		% within Anesthesia	100,0%	100,0%	100,0%	100,0%

Similar results were observed in the study of the relationship between the type of anesthesia and the medications used, where it was found that the combination of Articaine with Midazolam was mainly used for sedation, while Propofol was mainly used alone or in combination for general anesthesia ($p<0.001$) (Table 22). A moderate correlation was found between the choice of anesthetic and combination for anesthesia and the type of anesthesia ($r=0.385$; $p<0.001$).

A significant difference ($p=0.005$) and weak dependence ($r=0.227$; $p< 0.001$) was also found in relation to the anesthetic or combination of pain medications used according to the presence of a concomitant disease (Table 23). The most used combination was Articaine with Propofol (63.7%).

Table 23. Medications used for anesthesia according to the presence of concomitant disease

		Comorbidities		Total
		None	Yes	
Medication	Articaine + Midazolam	62	20	82
		39,5%	17,7%	30,4%
	Articaine + Propofol	77	72	149
		49,0%	63,7%	55,2%
	Midazolam	8	8	16
		5,1%	7,1%	5,9%
	Propofol	1	0	1
		0,6%	0,0%	0,4%
	Lidocain 2% + Propofol	2	2	4
		1,3%	1,8%	1,5%
	Articaine + Fentanyl	7	11	18
		4,5%	9,7%	6,7%
Total		157	113	270
		100,0%	100,0%	100,0%

A significant difference was found in the duration of the procedures performed in the treatment with sedation and under general anesthesia ($p=0.026$) (Table 24). The shortest procedure was the extraction of impacted teeth (28.57 min.), and the longest was the preprosthetic surgery (77.14 min.). The exposure of teeth for orthodontic reasons, odontectomy and GBR lasted about one hour.

Table 24. Average duration of procedures performed

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Tooth extraction	19	40,0000	15,98611	3,66746	20,00	60,00
Odontectomy	30	59,3333	21,32399	3,89321	20,00	90,00
Extraction of supernumerary teeth	20	47,0000	34,65621	7,74936	20,00	120,00
Removal of odontomas	37	46,4865	25,18997	4,14121	20,00	100,00
Pre-prosthetic surgery	7	77,1429	38,60669	14,59196	20,00	120,00
Extraction of impacted teeth	7	28,5714	14,63850	5,53283	20,00	60,00
Exposure of teeth for orthodontic reason	8	60,0000	33,80617	11,95229	20,00	120,00
Implant placement	42	49,5238	29,04600	4,48190	20,00	150,00
Removal of exostoses	28	46,7857	39,53934	7,47223	20,00	210,00
Sinus lift	20	49,5000	31,36794	7,01408	20,00	150,00
GTR - guided tissue regeneration	37	43,5135	23,12000	3,80091	20,00	90,00
GBR - guided bone regeneration	15	63,3333	38,71446	9,99603	20,00	150,00
Total	270	49,4815	29,63078	1,80327	20,00	210,00

On the other hand, a significant difference was found between the duration of analgesia according to the type of anesthesia (p=0.035), with the shortest duration being sedation with local terminal anesthesia (41.03 min.) (Table 25). A weak to moderate correlation was also found between the two studied indicators (r=0.271; p<0.001).

Table 25. Average duration of individual types of anesthesia in minutes

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Sedation + Local anesthesia - conductive	20	57,0000	16,57519	3,70632	30,00	90,00
Sedation + Local anesthesia - terminal	58	41,0345	30,06949	3,94832	20,00	150,00
General anesthesia	192	51,2500	30,14364	2,17543	20,00	210,00
Total	270	49,4815	29,63078	1,80327	20,00	210,00

A significant difference was found between the duration of analgesia according to the type of anesthetic used (p<0.001), with the shortest duration being the administration of Articaine with Propofol (43.95 min.), and the longest duration being analgesia with Lidocaine 2% with Propofol (127.50 min.) (Table 26).

Table 26. Average duration of anesthesia according to the medications used in minutes

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Articaine + Midazolam	82	55,6707	28,90771	3,19232	20,00	150,00
Articaine + Propofol	149	127,5000	75,00000	37,50000	30,00	210,00
Midazolam	16	44,3750	24,21260	6,05315	20,00	90,00
Propofol	1	115,0000	.	.	115,00	115,00
Lidocain 2% + Propofol	4	43,9597	25,64884	2,10124	20,00	150,00
Articaine + Fentanyl	18	50,5556	22,61499	5,33040	30,00	90,00
Total	270	49,4815	29,63078	1,80327	20,00	210,00

Table 27 presents the average duration of analgesia according to the type of procedure, type of anesthesia, medication used, and age of the patients.

Table 27. Average duration of analgesia according to the type of procedure, type of anesthesia, medication used and age of patients

Procedure	Anesthesia	Medication		Duration	Age	Dose
Tooth extraction	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	60,00	48,00	146,50
			N	1	1	1
			SD	.	.	.
	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	35,00	70,00	122,50
			N	6	6	6
			SD	12,24	10,54	37,18
		Articaine + Propofol	Mean	27,50	64,00	128,50
			N	4	4	4
			SD	5,00	7,39	36,00
	General anesthesia	Articaine + Midazolam	Mean	60,00	85,00	3,75
			N	2	2	2
			SD	,00	5,65	1,76
		Articaine + Propofol	Mean	30,00	55,00	466,00
			N	1	1	1
			SD	.	.	.
		Midazolam	Mean	46,00	55,20	145,70
			N	5	5	5
			SD	19,49	27,72	195,46
Odontectomy	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	54,00	52,00	103,30
			N	10	10	10
			SD	12,64	12,90	37,18
			Mean	45,00	46,50	146,50

	Sedation + Local anesthesia - terminal	Articaine + Midazolam	N	2	2	2
			SD	21,21	14,84	,00
		Articaine + Propofol	Mean	30,00	44,00	146,50
			N	2	2	2
			SD	14,14	5,65	,00
	General anesthesia	Articaine + Midazolam	Mean	74,44	49,11	236,27
			N	9	9	9
			SD	19,43	15,17	174,83
		Articaine + Propofol	Mean	72,00	43,00	306,70
			N	5	5	5
			SD	16,43	13,24	172,31
		Midazolam	Mean	30,00	50,00	2,50
			N	2	2	2
			SD	,00	7,07	,00
Extraction of supernumerary teeth	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	30,00	8,00	74,50
			N	1	1	1
			SD	.	.	.
	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	29,09	6,36	107,22
			N	11	11	11
			SD	12,21	,67	37,60
		Articaine + Propofol	Mean	26,66	6,66	122,50
			N	3	3	3
			SD	5,77	,57	41,56
	General anesthesia	Articaine + Midazolam	Mean	110,00	6,66	360,66
			N	3	3	3
			SD	17,32	,57	125,36
		Articaine + Propofol	Mean	90,00	8,00	394,00
			N	1	1	1
			SD	.	.	.
		Midazolam	Mean	90,00	6,00	222,00
			N	1	1	1
			SD	.	.	.
Removal of odontomas	Sedation + Local anesthesia - terminal	Articaine + Propofol	Mean	30,00	62,75	146,50
			N	4	4	4
			SD	,00	20,00	,00
	General anesthesia	Articaine + Midazolam	Mean	30,00	74,00	394,00
			N	1	1	1
			SD	.	.	.
		Articaine + Propofol	Mean	49,25	52,66	342,57
			N	27	27	27
			SD	27,86	15,99	131,80
		Midazolam	Mean	60,00	33,00	344,00

			N	1	1	1
			SD	.	.	.
		Articaine + Fentanyl	Mean	45,00	59,00	319,62
			N	4	4	4
			SD	17,32	7,30	117,79
Pre-prosthetic surgery	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	75,00	55,50	146,50
			N	2	2	2
			SD	21,21	12,02	,00
	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	93,33	71,00	122,55
			N	3	3	3
			SD	46,18	4,58	41,61
		Articaine + Propofol	Mean	20,00	53,0000	74,5000
			N	1	1	1
			SD	.	.	.
	General anesthesia	Articaine + Propofol	Mean	90,0000	63,00	394,00
			N	1	1	1
			SD	.	.	.
Extraction of impacted teeth	Sedation + Local anesthesia - terminal	Articaine + Propofol	Mean	20,00	26,00	110,50
			N	2	2	2
			SD	,00	1,41	50,91
	General anesthesia	Articaine + Propofol	Mean	26,66	35,00	353,33
			N	3	3	3
			SD	5,77	19,07	70,43
		Midazolam	Mean	20,00	25,00	416,00
			N	1	1	1
			SD	.	.	.
		Articaine + Fentanyl	Mean	60,00	49,00	344,00
			N	1	1	1
			SD	.	.	.
Exposure of teeth for orthodontic reason	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	60,00	13,0000	74,5000
			N	1	1	1
			SD	.	.	.
		Articaine + Propofol	Mean	20,0000	13,00	74,50
			N	1	1	1
			SD	.	.	.
	General anesthesia	Articaine + Midazolam	Mean	50,00	10,50	137,25
			N	2	2	2
			SD	28,28	2,12	190,56
		Articaine + Propofol	Mean	60,00	10,00	360,66
			N	3	3	3
			SD	30,00	1,73	28,86
			Mean	120,00	12,00	115,00

		Lidocain 2% + Propofol	N	1	1	1
			SD	.	.	.
Implant placement	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	60,00	56,00	74,50
			N	1	1	1
			SD	.	.	.
		Articaine + Propofol	Mean	90,00	49,00	2,50
			N	1	1	1
			SD	.	.	.
	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	60,00	59,50	128,50
			N	4	4	4
			SD	24,49	9,74	36,00
		Articaine + Propofol	Mean	60,00	74,00	146,50
			N	1	1	1
			SD	.	.	.
		Lidocain 2% + Propofol	Mean	30,00	40,00	146,50
			N	1	1	1
			SD	.	.	.
	General anesthesia	Articaine + Midazolam	Mean	57,50	43,25	337,62
			N	4	4	4
			SD	37,74	12,28	136,90
		Articaine + Propofol	Mean	42,00	56,16	324,58
			N	25	25	25
			SD	21,21	18,47	119,13
		Midazolam	Mean	20,00	67,00	394,00
			N	1	1	1
			SD	.	.	.
		Lidocain 2% + Propofol	Mean	150,00	82,00	100,00
			N	1	1	1
			SD	.	.	.
		Articaine + Fentanyl	Mean	50,00	52,00	329,33
			N	3	3	3
			SD	34,64	13,07	112,00
Removal of exostoses	Sedation + Local anesthesia - conductive	Articaine + Propofol	Mean	30,00	51,00	2,50
			N	1	1	1
			SD	.	.	.
	Sedation + Local anesthesia - terminal	Articaine + Propofol	Mean	40,00	41,00	110,50
			N	2	2	2
			SD	28,28	1,41	50,91
		Articaine + Fentanyl	Mean	30,00	49,00	146,50
			N	1	1	1
			SD	.	.	.
	General anesthesia		Mean	40,00	45,33	270,83

		Articaine + Midazolam	N	3	3	3
			SD	17,32	6,11	123,75
		Articaine + Propofol	Mean	43,88	60,11	315,75
			N	18	18	18
			SD	26,81	17,16	95,72
		Midazolam	Mean	20,00	62,00	394,00
			N	1	1	1
			SD	.	.	.
		Lidocain 2% + Propofol	Mean	210,00	68,00	470,00
			N	1	1	1
			SD	.	.	.
		Articaine + Fentanyl	Mean	30,00	63,00	394,00
			N	1	1	1
			SD	.	.	.
Sinus lift	Sedation + Local anesthesia - terminal	Articaine + Midazolam	Mean	150,00	27,00	146,50
			N	1	1	1
			SD	.	.	.
	General anesthesia	Articaine + Midazolam	Mean	42,50	31,25	312,62
			N	4	4	4
			SD	20,61	9,94	115,83
		Articaine + Propofol	Mean	41,81	39,54	353,54
			N	11	11	11
			SD	19,90	10,87	121,03
		Articaine + Fentanyl	Mean	52,50	42,75	394,00
			N	4	4	4
			SD	28,72	8,77	,00
GTR - guided tissue regeneration	Sedation + Local anesthesia - conductive	Articaine + Midazolam	Mean	60,00	45,50	146,50
			N	2	2	2
			SD	,00	19,09	,00
		Articaine + Propofol	Mean	60,00	23,00	146,50
			N	1	1	1
			SD	.	.	.
	Sedation + Local anesthesia - terminal	Articaine + Propofol	Mean	26,66	51,00	122,50
			N	3	3	3
			SD	5,77	11,26	41,56
		Articaine + Fentanyl	Mean	50,00	39,50	110,50
			N	2	2	2
			SD	14,14	47,37	50,91
	General anesthesia	Articaine + Midazolam	Mean	43,33	52,33	326,33
			N	6	6	6
			SD	26,58	15,43	94,51
			Mean	36,66	51,11	299,30

		Articaine + Propofol	N	18	18	18
			SD	21,42	15,04	127,49
		Midazolam	Mean	60,00	34,66	320,00
			N	3	3	3
			SD	30,00	29,67	88,47
		Articaine + Fentanyl	Mean	75,00	53,00	394,00
			N	2	2	2
			SD	21,21	11,31	,00
GBR - guided bone regeneration	Sedation + Local anesthesia - terminal	Articaine + Propofol	Mean	66,66	37,33	122,50
			N	3	3	3
			SD	72,34	7,57	41,56
	General anesthesia	Articaine + Midazolam	Mean	75,00	70,66	230,16
			N	3	3	3
			SD	25,98	5,03	88,03
		Articaine + Propofol	Mean	54,28	57,14	310,21
			N	7	7	7
			SD	26,99	13,93	137,48
		Midazolam	Mean	30,00	74,00	344,00
			N	1	1	1
			SD	.	.	.
		Propofol	Mean	115,00	60,00	200,00
			N	1	1	1
			SD	.	.	.

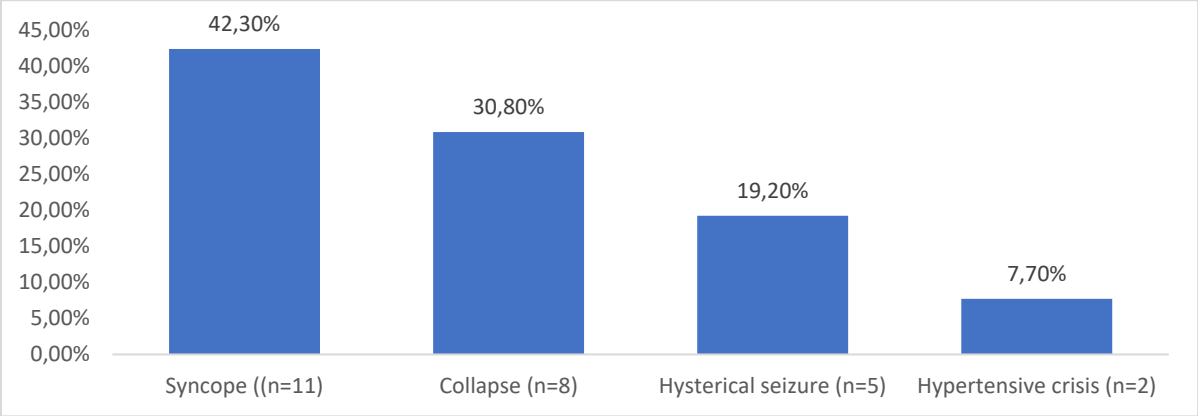

Fig. 6. Complications of treatment with sedation or general anesthesia

Complications were observed in 26 patients (9.6%), the distribution of which is presented in Fig. 6. The results presented show that patients with syncope predominated (42.3%), followed by patients with collapse (30.8%).

No relationship was found between the age of the patients and the types of complications (Table 28). The results show that the youngest patients with collapse and syncope (27 years and 28.5 years, respectively) were the patients with hypertensive crisis (69.5 years) and the oldest patients.

Table 28. Average age of patients according to types of complications

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Syncope	11	28,5455	23,49623	7,08438	7,00	83,00
Collapse	8	27,0000	28,68051	10,14009	9,00	89,00
Hysterical seizure	5	44,8000	8,49706	3,80000	33,00	55,00
Hypertensive crisis	2	69,5000	9,19239	6,50000	63,00	76,00
Total	26	56,2692	22,55758	4,42391	7,00	89,00

3.3. Results of task 3. Research on the application of local anesthesia in maxillofacial surgery

The study examined 240 patients who underwent treatment with local anesthesia at the Clinic of Maxillofacial Surgery with a mean age of 54.38 years ± 19.20 years (13 years – 90 years) (Fig. 7).

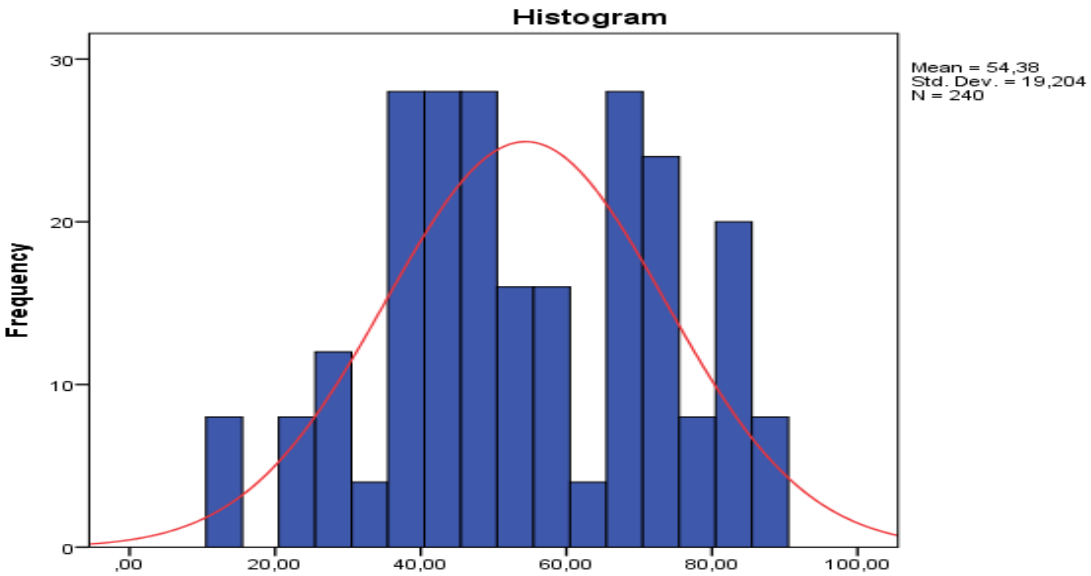

Fig. 7. Distribution according to patient age

The distribution by gender shows that men predominate – 68.3% (164) compared to women (31.7% - 76), with a significant difference in terms of average age ($p<0.001$) being established – women are older than men (Fig. 8).

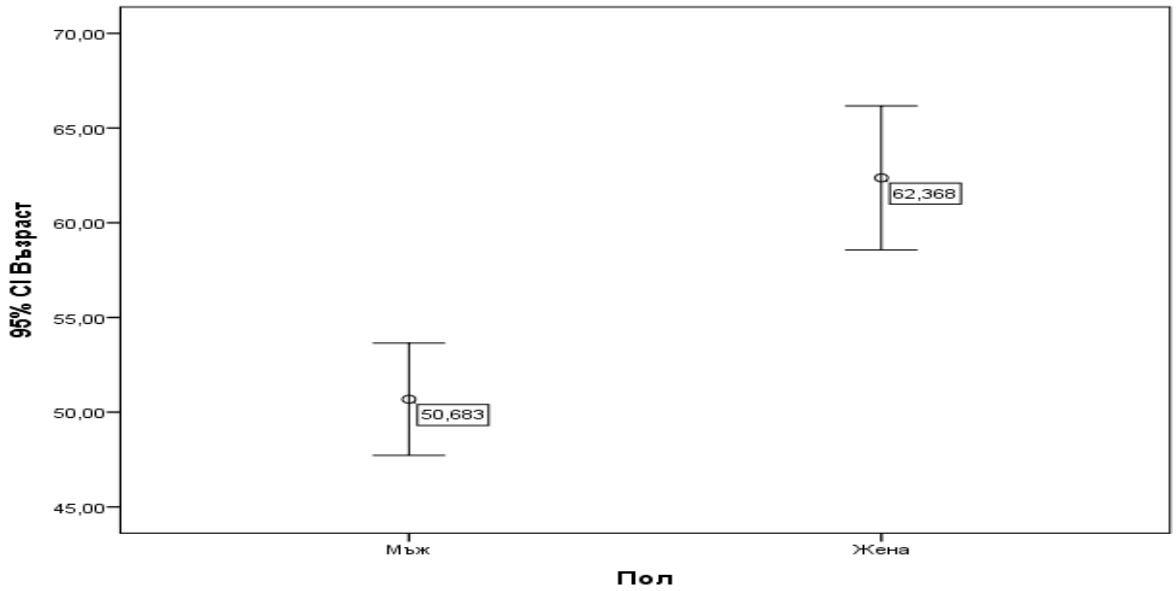

Fig. 8. Average age by gender of patients

None of the patients studied reported smoking. 60.0% (144) of the studied individuals (Fig. 9), with a mean age of 64.9 years, had comorbidities, with a significant difference in terms of gender ($p<0.001$) – men predominated with 61.1% (88). A significant difference was found between the mean age of patients with and without comorbidities ($p<0.001$), with the mean age of patients without comorbidities being 38.6 years. From the results obtained, it can be said that male gender is a risk factor for the presence of a comorbidity (mainly hypertension) – OR=2.02 (1.142-3.557); p=0.015.

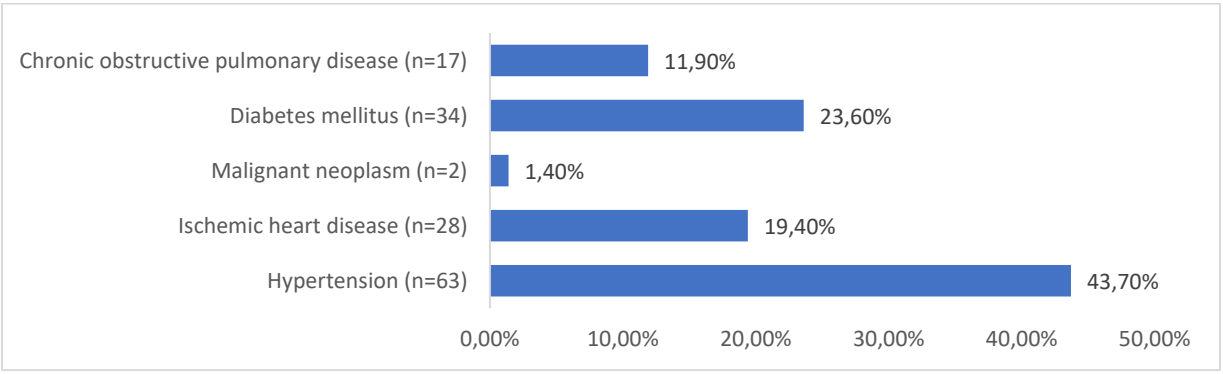

Fig. 9. Distribution of patients according to concomitant diseases

Table 29 presents the distribution of patients according to the procedure performed. The data shows that the largest relative share is the incision of a submucosal abscess (27.9%), followed by the incision of a skin abscess (19.2%) and the excision of a dermoid cyst (11.7%).

Table 29. Distribution of patients according to the procedure performed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nevus excision	7	2,9	2,9	2,9
	Excision of dermoid cyst	28	11,7	11,7	14,6
	PSO on a lip wound	8	3,3	3,3	17,9
	Incision of a skin abscess	46	19,2	19,2	37,1
	Incision of a submucosal abscess	67	27,9	27,9	65,0
	Extraction of mucous formations	21	8,8	8,8	73,8
	Biopsy of intraoral lesions	24	10,0	10,0	83,8
	Sequestrectomy	4	1,7	1,7	85,4
	Lymph node excision	12	5,0	5,0	90,4
	Excision of tongue lesions	23	9,6	9,6	100,0
	Total	240	100,0	100,0	

A significant difference was found in the mean age of patients treated with local anesthesia according to the type of procedure ($p<0.001$), the oldest were the patients who underwent sequestrectomy (72 years), and the youngest were the patients who underwent lip wound PSO (18 years) (Table 30).

Table 30. Average age of patients according to the type of procedure performed

	N	Mean	Std. Deviation	Std. Error	Min.	Max.
Nevus excision	7	44,0000	7,48331	2,82843	36,00	50,00
Excision of dermoid cyst	28	62,4286	19,01934	3,59432	38,00	88,00
PSO on a lip wound	8	18,0000	6,21059	2,19578	13,00	28,00
Incision of a skin abscess	46	61,2609	18,74440	2,76371	24,00	90,00
Incision of a submucosal abscess	67	48,5672	17,40622	2,12651	13,00	83,00
Extraction of mucous formations	21	60,0000	20,62038	4,49974	26,00	82,00
Biopsy of intraoral lesions	24	62,0000	10,74608	2,19353	50,00	81,00
Sequestrectomy	4	72,0000	,00000	,00000	72,00	72,00
Lymph node excision	12	53,3333	16,14330	4,66017	40,00	75,00
Excision of tongue lesions	23	48,0000	16,64059	3,46980	28,00	69,00
Total	240	54,3833	19,20433	1,23963	13,00	90,00

When examining the procedures performed according to gender, a significant difference was found ($p<0.001$), with men not having nevus excision or sequestrectomy performed, while women not having lip wound excision or intraoral lesion biopsy performed (Table 31).

The main drug used as an anesthetic in local anesthesia treatment at the Maxillofacial Surgery Clinic is Articaine (89.2%) (Table 32).

Table 31. Distribution of procedures performed by gender

			Gender		Total
			Male	Female	
Procedure	Nevus excision	Count	0	7	7
		% within Gender	0,0%	9,2%	2,9%
	Excision of dermoid cyst	Count	16	12	28
		% within Gender	9,8%	15,8%	11,7%
	PSO on a lip wound	Count	8	0	8
		% within Gender	4,9%	0,0%	3,3%
	Incision of a skin abscess	Count	30	16	46
		% within Gender	18,3%	21,1%	19,2%
	Incision of a submucosal abscess	Count	51	16	67
		% within Gender	31,1%	21,1%	27,9%
	Extraction of mucous formations	Count	12	9	21
		% within Gender	7,3%	11,8%	8,8%
	Biopsy of intraoral lesions	Count	24	0	24
		% within Gender	14,6%	0,0%	10,0%
	Sequestrectomy	Count	0	4	4
		% within Gender	0,0%	5,3%	1,7%
	Lymph node excision	Count	8	4	12
		% within Gender	4,9%	5,3%	5,0%
	Excision of tongue lesions	Count	15	8	23
		% within Gender	9,1%	10,5%	9,6%
Total		Count	164	76	240
		% within Gender	100,0%	100,0%	100,0%

Table 32. Main anesthetics used in local anesthesia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lidocaine	26	10,8	10,8	10,8
	Articaine	214	89,2	89,2	100,0
	Total	240	100,0	100,0	

A significant difference was found in the average duration of anesthesia according to the type of procedure (p=0.009), with the procedure with the shortest duration being the biopsy of an intraoral lesion (52.5 min), with most procedures lasting about 60 min (Table 33).

Table 33. Average duration of anesthesia by type of procedure in minutes

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Nevus excision	7	60,0000	,00000	,00000	60,00	60,00
Excision of dermoid cyst	28	57,8571	5,34522	1,01015	45,00	60,00
PSO on a lip wound	8	60,0000	,00000	,00000	60,00	60,00
Incision of a skin abscess	46	57,3913	8,54655	1,26012	30,00	60,00
Incision of a submucosal abscess	67	56,4179	8,29412	1,01329	30,00	60,00
Extraction of mucous formations	21	60,0000	,00000	,00000	60,00	60,00
Biopsy of intraoral lesions	24	52,5000	11,70284	2,38883	30,00	60,00
Sequestrectomy	4	60,0000	,00000	,00000	60,00	60,00
Lymph node excision	12	60,0000	,00000	,00000	60,00	60,00
Excision of tongue lesions	23	60,0000	,00000	,00000	60,00	60,00
Total	240	57,5000	7,34676	,47423	30,00	60,00

A significant difference in the duration of anesthesia was also found with respect to the medication used ($p<0.001$), with the use of Lidocaine being associated with shorter anesthesia (Fig. 10). A strong correlation was also found between the anesthetic used and the duration of the procedure ($r=0.786$; $p<0.001$).

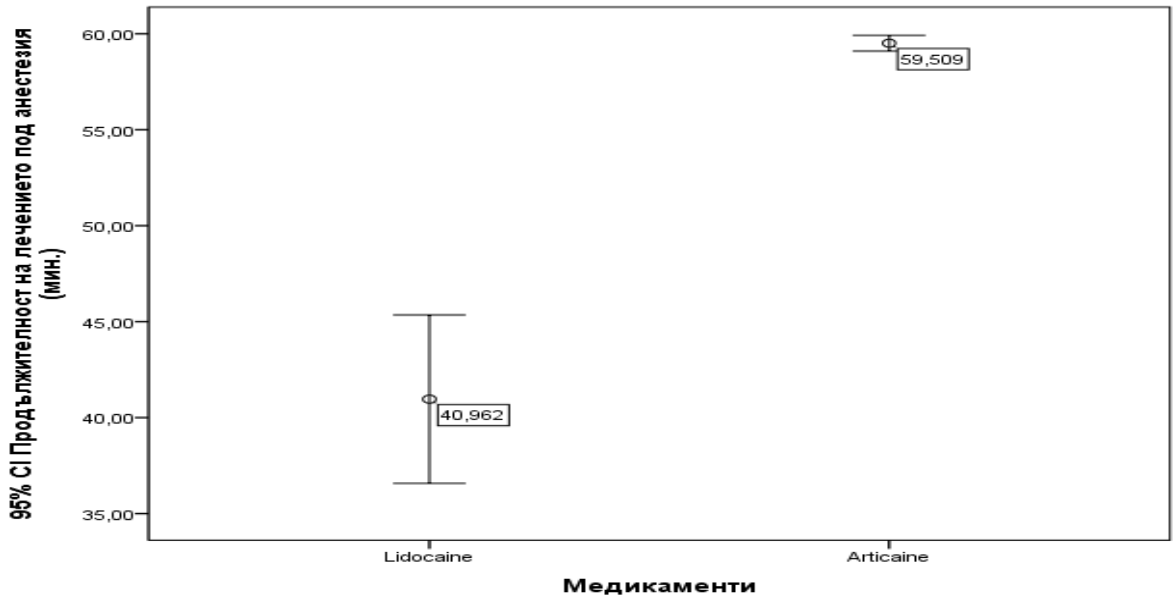

Fig. 10. Average duration of the procedure according to the anesthetic used

Table 34 presents an analysis of the duration of anesthesia according to the type of procedure, the anesthetic used, and the age of the patients. A significant difference was found between the studied indicators ($p=0.014$).

Table 34. Duration of anesthesia according to the type of procedure, the anesthetic used and the age of the patients

Procedure	Medications		Duration of treatment under anesthesia (min.)	Age
Nevus excision	Articaine	Mean	60,0000	44,0000
		N	7	7
		Std. Deviation	,00000	7,48331
Excision of dermoid cyst	Lidocaine	Mean	45,0000	72,0000
		N	2	2
		Std. Deviation	,00000	,00000
	Articaine	Mean	58,8462	61,6923
		N	26	26
		Std. Deviation	4,07620	19,56480
PSO on a lip wound	Lidocaine	Mean	60,0000	18,5000
		N	2	2
		Std. Deviation	,00000	7,77817
	Articaine	Mean	60,0000	17,8333
		N	6	6
		Std. Deviation	,00000	6,46271
Incision of a skin abscess	Lidocaine	Mean	36,0000	46,8000
		N	5	5
		Std. Deviation	13,41641	10,73313
	Articaine	Mean	60,0000	63,0244
		N	41	41
		Std. Deviation	,00000	18,82616
		N	10	10
		Std. Deviation	9,48683	19,76782
Extraction of mucous formations	Articaine	Mean	60,0000	60,0000
		N	21	21
		Std. Deviation	,00000	20,62038
Biopsy of intraoral lesions	Lidocaine	Mean	36,4286	56,5714
		N	7	7
		Std. Deviation	8,01784	6,94879
	Articaine	Mean	59,1176	64,2353
		N	17	17
		Std. Deviation	3,63803	11,38820
Sequestrectomy	Articaine	Mean	60,0000	72,0000
		N	4	4
		Std. Deviation	,00000	,00000

Lymph node excision	Articaine	Mean	60,0000	53,3333
		N	12	12
		Std. Deviation	,00000	16,14330
Excision of tongue lesions	Articaine	Mean	60,0000	48,0000
		N	23	23
		Std. Deviation	,00000	16,64059

Articaine was mainly used in nevus excision, with the procedure lasting an average of 60 minutes and performed in patients with an average age of 44 years. Lidocaine was used in dermoid cyst excision in shorter procedures lasting an average of 45 minutes in older patients and Articaine in longer procedures lasting an average of 58.84 minutes in younger patients. In the lip wound PSO, Lidocaine and Articaine were again used, with no difference in the duration of the procedure and the age of the patients. In the skin abscess incision, Lidocaine was used for shorter procedures in younger patients and Articaine for longer procedures in older patients. In the incision of a submucosal abscess, Lidocaine was used for the shorter procedure (about 42 min.) and Articaine for the longer procedure (about 58.9 min.). In the extraction of mucosal masses, sequestrectomy, lymph node extraction, and extraction of tongue lesions, Articaine was primarily used. In the biopsy of intraoral lesions, Lidocaine was used for shorter procedures in younger patients and Articaine for longer procedures in older patients.

67 patients (27.9%) had complications from the procedures performed, and the distribution of the types of complications is presented in Table 35.

Table 35. Types of complications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hematoma	15	6,3	22,4	22,4
	Ischemic zone	7	2,9	10,4	32,8
	Paresis of the facial nerve	10	4,2	14,9	47,8
	Contracture of the lower jaw	8	3,3	11,9	59,7
	Infection	11	4,6	16,4	76,1
	Post-ejection pain	16	6,7	23,9	100,0
	Total	67	27,9	100,0	
Missing	System	173	72,1		
Total		240	100,0		

The highest relative share is post-injection pain (23.9%) and hematomas (22.4%).

Results of task 4. Study of the application of sedation and general anesthesia in maxillofacial surgery

The study examined 784 patients who underwent treatment with sedation and general anesthesia at St. Marina University Hospital - Varna, with a mean age of 50.5 ± 18.1 years (10 years - 91 years) (Fig. 11).

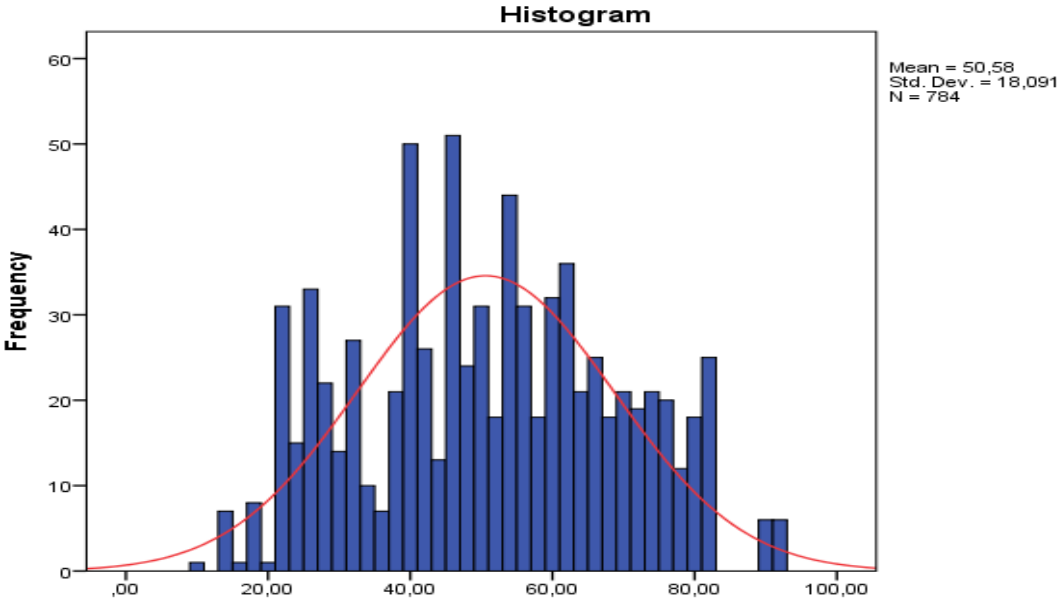

Fig. 11. Distribution according to patient age

The distribution by gender shows that men predominate - 56.9% (446) compared to women (43.1% - 338), with no significant difference in terms of average age.

Of the patients studied, 5.6% (44) reported smoking.

55.5% (435) of the examined individuals had comorbidities, with a mean age of 60.5 years and a predominance of men – 52.6% (229). A significant difference was found between the mean age of patients with and without comorbidities ($p<0.001$), with the mean age of patients without comorbidities being 38.3 years.

Fig. 12 presents the distribution of patients according to concomitant diseases, with the results showing a predominance of patients with diseases of the cardiovascular system.

Table 36 presents the distribution of patients according to the procedure performed. The data shows that the largest relative share is incision/drainage (17.2%), followed by complete sialoadenectomy (13.0%) and tooth/teeth extraction (11.6%).

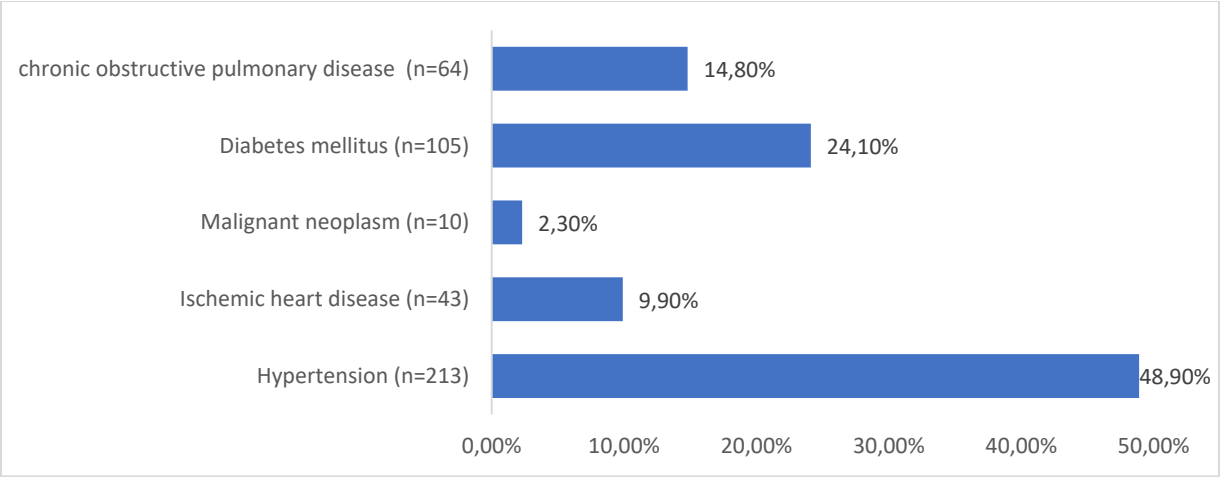

Fig. 12. Distribution of patients according to concomitant diseases

Table 36. Distribution of patients according to the procedure performed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tooth extraction	91	11,6	11,6	11,6
	Plastic surgery	36	4,6	4,6	16,2
	Foot or flap transplant	38	4,8	4,8	21,0
	Incision, drainage	135	17,2	17,2	38,3
	Complete sialoadenectomy	102	13,0	13,0	51,3
	Radical excision of a skin lesion	14	1,8	1,8	53,1
	Lymph node excision	20	2,6	2,6	55,6
	Excision of lesions	30	3,8	3,8	59,4
	Partial ostectomy of another facial bone	24	3,1	3,1	62,5
	Other incision of skin and subcutaneous tissue	21	2,7	2,7	65,2
	Excision and plastic surgery	73	9,3	9,3	74,5
	Stitching a torn lip	24	3,1	3,1	77,6
	Facial bone sequestrectomy	18	2,3	2,3	79,8
	Biopsy of the hard palate	7	,9	,9	80,7
	Partial glossectomy (tongue resection)	7	,9	,9	81,6
	Splinting	36	4,6	4,6	86,2
	Radical maxillary antrotomy	30	3,8	3,8	90,1
	Partial mandibulectomy	78	9,9	9,9	100,0
	Total	784	100,0	100,0	

A significant difference was found in the mean age of patients treated under general anesthesia according to the type of procedure ($p<0.001$), the oldest were the patients who underwent foot or flap transplantation (71.36 years), followed by the incision of skin and subcutaneous tissue (64.09 years), and the youngest were the patients who underwent partial glossectomy (37 years) (Table 37).

Table 37. Average age of patients according to the type of procedure performed

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Tooth extraction	91	47,0440	24,89708	2,60992	10,00	89,00
Plastic surgery	36	45,5000	21,15858	3,52643	21,00	75,00
Foot or flap transplant	38	71,3684	13,66673	2,21704	40,00	91,00
Incision, drainage	135	48,9185	15,32389	1,31887	23,00	82,00
Complete sialoadenectomy	102	58,5294	11,66929	1,15543	32,00	77,00
Radical excision of a skin lesion	14	59,7143	12,31277	3,29073	42,00	74,00
Lymph node excision	20	49,8500	7,47117	1,67060	40,00	69,00
Excision of lesions	30	41,6000	18,91469	3,45333	22,00	74,00
Partial ostectomy of another facial bone	24	55,5000	6,87149	1,40264	50,00	67,00
Other incision of skin and subcutaneous tissue	21	64,0952	12,13221	2,64746	45,00	81,00
Excision and plastic surgery	73	42,4521	14,82682	1,73535	21,00	66,00
Stitching a torn lip	24	36,0000	17,67828	3,60856	14,00	61,00
Facial bone sequestrectomy	18	61,0000	23,29857	5,49153	29,00	78,00
Biopsy of the hard palate	7	51,5714	1,13389	,42857	49,00	52,00
Partial glossectomy (tongue resection)	7	34,8571	12,85079	4,85714	30,00	64,00
Splinting	36	37,0000	10,12493	1,68749	21,00	50,00
Radical maxillary antrotomy	30	59,2000	12,67743	2,31457	45,00	79,00
Partial mandibulectomy	78	50,2308	15,25959	1,72781	24,00	70,00
Total	784	50,5816	18,09090	,64610	10,00	91,00

The most common type of anesthesia was general anesthesia (92.6%) – 726, followed by sedation with local terminal anesthesia – 5.2% (41) and sedation with local conduction anesthesia – 2.2% (17). (Table 38).

Table 38. Types of general anesthesia used in oral surgery

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sedation + Local anesthesia - conductive	17	2,2	2,2	2,2
	Sedation + Local anesthesia - terminal	41	5,2	5,2	7,4
	General anesthesia	726	92,6	92,6	100,0
	Total	784	100,0	100,0	

A significant difference in the mean age of patients was found according to the type of anesthesia ($p<0.001$), with the oldest patients undergoing general anesthesia (51.22 years). On the other hand, patients with sedation and local conduction anesthesia were the youngest (31.71 years) (Table 39). A weak to moderate correlation was found between the age of patients and the choice of anesthesia type ($r=0.154$; $p<0.000$).

Table 39. Average age of patients by type of anesthesia

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Sedation + Local anesthesia - conductive	17	31,7059	10,02974	2,43257	17,00	59,00
Sedation + Local anesthesia - terminal	41	47,0488	20,52432	3,20536	10,00	81,00
General anesthesia	726	51,2231	17,84739	,66238	14,00	91,00
Total	784	50,5816	18,09090	,64610	10,00	91,00

A significant difference was found in the type of anesthesia used and the patients' concomitant diseases ($p<0.001$), and a weak to moderate correlation was also found between the presence of concomitant disease and the choice of type of anesthesia ($r=0.190$; $p<0.001$) (Table 40).

Table 40. Type of anesthesia used and presence of concomitant disease

			Comorbidities		Total
			No	Yes	
Anesthesia	Sedation + Local anesthesia - conductive	Count	17	0	17
		% within Anesthesia	100,0%	0,0%	100,0%
	Sedation + Local anesthesia - terminal	Count	26	15	41
		% within Anesthesia	63,4%	36,6%	100,0%
	General anesthesia	Count	306	420	726
		% within Anesthesia	42,1%	57,9%	100,0%
Total		Count	349	435	784
		% within Anesthesia	44,5%	55,5%	100,0%

The study of the relationship between the type of anesthesia and the procedure performed showed a significant difference ($p<0.001$), with sedation being preferred for tooth/teeth extraction, while more complex procedures are performed primarily under general anesthesia (Table 41). A moderate correlation was found between the choice of anesthesia type and the procedure performed ($r=0.323$; $p<0.001$).

Table 41. Type of anesthesia according to the procedure performed

		Anesthesia			Total
		Sedation + Local anesthesia - conductive	Sedation + Local anesthesia - terminal	General anesthesia	
Procedure	Tooth extraction	16	27	48	91
		17,6%	29,7%	52,7%	100,0%
	Plastic surgery	0	0	36	36
		0,0%	0,0%	100,0%	100,0%
	Foot or flap transplant	0	2	36	38
		0,0%	5,3%	94,7%	100,0%
	Incision, drainage	1	2	132	135
		0,7%	1,5%	97,8%	100,0%
	Complete sialoadenectomy	0	0	102	102
		0,0%	0,0%	100,0%	100,0%
	Radical excision of a skin lesion	0	2	12	14
		0,0%	14,3%	85,7%	100,0%
	Lymph node excision	0	2	18	20
		0,0%	10,0%	90,0%	100,0%
	Excision of lesions	0	0	30	30
		0,0%	0,0%	100,0%	100,0%
	Partial ostectomy of another facial bone	0	0	24	24
		0,0%	0,0%	100,0%	100,0%
	Other incision of skin and subcutaneous tissue	0	3	18	21
		0,0%	14,3%	85,7%	100,0%
	Excision and plastic surgery	0	1	72	73
		0,0%	1,4%	98,6%	100,0%
	Stitching a torn lip	0	0	24	24
		0,0%	0,0%	100,0%	100,0%
	Facial bone sequestrectomy	0	0	18	18
		0,0%	0,0%	100,0%	100,0%
	Biopsy of the hard palate	0	1	6	7
		0,0%	14,3%	85,7%	100,0%
	Partial glossectomy (tongue resection)	0	1	6	7
		0,0%	14,3%	85,7%	100,0%
	Splinting	0	0	36	36
		0,0%	0,0%	100,0%	100,0%
	Radical maxillary antrotomy	0	0	30	30
		0,0%	0,0%	100,0%	100,0%
	Partial mandibulectomy	0	0	78	78
		0,0%	0,0%	100,0%	100,0%
Total		17	41	726	784
		2,2%	5,2%	92,6%	100,0%

The medications and combinations used are presented in Table 42. The results show that the most frequently used combination is Lidocaine with Propofol (28.3%).

The study of the relationship between the anesthetic and combination used and the procedure performed showed a significant difference ($p<0.001$) (Table 42.) A weak to moderate correlation was found between the choice of anesthetic and combination for anesthesia and the procedure performed ($r=0.277$; $p<0.001$).

Table 42. Types of medications and combinations used for sedation and general anesthesia at St. Marina University Hospital - Varna

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Articaine+Midazolam	68	8,7	8,7	8,7
	Articaine+Propofol	77	9,8	9,8	18,5
	Articaine+Fentanyl	9	1,1	1,1	19,6
	Propofol	66	8,4	8,4	28,1
	Fentanyl+Propofol	126	16,1	16,1	44,1
	Fentanyl+Midazolam	48	6,1	6,1	50,3
	Lidocaine+Propofol	222	28,3	28,3	78,6
	Propofol+Midazolam+Fentanyl	90	11,5	11,5	90,1
	Midazolam+Propofol	78	9,9	9,9	100,0
	Total	784	100,0	100,0	

Table 42. Type of anesthetic and combination for anesthesia according to the procedure performed

Процедура * Медикаменти Crosstabulation

			Медикаменти									
			Articaine+Midazolam	Articaine+Propofol	Articaine+Fentanyl	Propofol	Fentanyl+Propofol	Fentanyl+Midazolam	Lidocaine+Propofol	Propofol+Midazolam+Fentanyl	Midazolam+Propofol	Total
Процедура	Екстракция на зъб/зъби	Count	68	23	0	0	0	0	0	0	0	91
		% within Процедура	74,7%	25,3%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%
	Пластика	Count	0	0	0	0	12	0	24	0	0	36
		% within Процедура	0,0%	0,0%	0,0%	0,0%	33,3%	0,0%	66,7%	0,0%	0,0%	100,0%
	Трансплантация на крače или ламбо	Count	0	1	1	0	12	6	12	0	6	38
		% within Процедура	0,0%	2,6%	2,6%	0,0%	31,6%	15,8%	31,6%	0,0%	15,8%	100,0%
	Инцизия, дренаж	Count	0	15	0	6	12	0	54	18	30	135
		% within Процедура	0,0%	11,1%	0,0%	4,4%	8,9%	0,0%	40,0%	13,3%	22,2%	100,0%
	Пълна сиалоаденектомия	Count	0	6	0	18	24	0	18	24	12	102
		% within Процедура	0,0%	5,9%	0,0%	17,6%	23,5%	0,0%	17,6%	23,5%	11,8%	100,0%
	Радикална ексцизия на кожна лезия	Count	0	8	0	0	6	0	0	0	0	14
		% within Процедура	0,0%	57,1%	0,0%	0,0%	42,9%	0,0%	0,0%	0,0%	0,0%	100,0%
	Ексцизия на лимфен възел	Count	0	2	0	0	6	0	6	0	6	20
		% within Процедура	0,0%	10,0%	0,0%	0,0%	30,0%	0,0%	30,0%	0,0%	30,0%	100,0%
	Ексцизия на лезии	Count	0	12	0	6	6	0	6	0	0	30
		% within Процедура	0,0%	40,0%	0,0%	20,0%	20,0%	0,0%	20,0%	0,0%	0,0%	100,0%
	Частична остектомия на друга лицева кост	Count	0	6	0	6	6	0	0	0	6	24
		% within Процедура	0,0%	25,0%	0,0%	25,0%	25,0%	0,0%	0,0%	0,0%	25,0%	100,0%
	Друга инцизия на кожа и подкожна тъкан	Count	0	2	1	0	0	0	12	0	6	21
		% within Процедура	0,0%	9,5%	4,8%	0,0%	0,0%	0,0%	57,1%	0,0%	28,6%	100,0%
	Ексцизия и пластика	Count	0	1	0	6	12	12	30	6	6	73
		% within Процедура	0,0%	1,4%	0,0%	8,2%	16,4%	16,4%	41,1%	8,2%	8,2%	100,0%
	Шев на разкъсана устна	Count	0	0	0	0	0	6	12	6	0	24
		% within Процедура	0,0%	0,0%	0,0%	0,0%	0,0%	25,0%	50,0%	25,0%	0,0%	100,0%
	Секвестректомия на лицева кост	Count	0	0	0	6	0	0	6	6	0	18
		% within Процедура	0,0%	0,0%	0,0%	33,3%	0,0%	0,0%	33,3%	33,3%	0,0%	100,0%
	Биопсия на твърдото небце	Count	0	0	1	0	0	0	6	0	0	7
		% within Процедура	0,0%	0,0%	14,3%	0,0%	0,0%	0,0%	85,7%	0,0%	0,0%	100,0%
	Частична глосектомия (резекция на езика)	Count	0	1	0	6	0	0	0	0	0	7
		% within Процедура	0,0%	14,3%	0,0%	85,7%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%
	Прилагане на шина	Count	0	0	6	6	18	0	0	6	0	36
		% within Процедура	0,0%	0,0%	16,7%	16,7%	50,0%	0,0%	0,0%	16,7%	0,0%	100,0%
	Радикална максиларна антротомия	Count	0	0	0	6	0	0	12	12	0	30
		% within Процедура	0,0%	0,0%	0,0%	20,0%	0,0%	0,0%	40,0%	40,0%	0,0%	100,0%
	Частична мандибулектомия	Count	0	0	0	0	12	24	24	12	6	78
		% within Процедура	0,0%	0,0%	0,0%	0,0%	15,4%	30,8%	30,8%	15,4%	7,7%	100,0%
Total		Count	68	77	9	66	126	48	222	90	78	784
		% within Процедура	8,7%	9,8%	1,1%	8,4%	16,1%	6,1%	28,3%	11,5%	9,9%	100,0%

Similar results were observed in the study of the relationship between the type of anesthesia and the medications used, where it was found that in sedation with local conduction anesthesia, the combination of Articaine with Midazolam was mainly used (94.1%), in sedation with local terminal anesthesia, the combination of Articaine with Propofol was used, while in general anesthesia, Propofol was mainly used alone or in combination ($p<0.001$) (Table 43). A moderate correlation was found between the choice of anesthetic and combination for anesthesia and the type of anesthesia ($r=0.411$; $p<0.001$).

Table 43. Type of anesthetic and combination for analgesia according to the type of anesthesia

		Anesthesia			Total
		Sedation + Local anesthesia - conductive	Sedation + Local anesthesia - terminal	General anesthesia	
Medications	Articaine+Midazolam	16	16	36	68
		94,1%	39,0%	5,0%	8,7%
	Articaine+Propofol	1	22	54	77
		5,9%	53,7%	7,4%	9,8%
	Articaine+Fentanyl	0	3	6	9
		0,0%	7,3%	0,8%	1,1%
	Propofol	0	0	66	66
		0,0%	0,0%	9,1%	8,4%
	Fentanyl+Propofol	0	0	126	126
		0,0%	0,0%	17,4%	16,1%
	Fentanyl+Midazolam	0	0	48	48
		0,0%	0,0%	6,6%	6,1%
	Lidocaine+Propofol	0	0	222	222
		0,0%	0,0%	30,6%	28,3%
	Propofol+Midazolam+Fentanyl	0	0	90	90
		0,0%	0,0%	12,4%	11,5%
	Midazolam+Propofol	0	0	78	78
		0,0%	0,0%	10,7%	9,9%
Total		17	41	726	784
		100,0%	100,0%	100,0%	100,0%

A significant difference ($p<0.001$) and weak dependence ($r=0.173$; $p<0.001$) was also found in relation to the anesthetic or combination of pain medications used according to the presence of a concomitant disease (Table 44). The most used combination was Lidocaine with Propofol (31.7%).

A significant difference was found in the duration of the procedures performed in the treatment with sedation and under general anesthesia ($p<0.001$) (Table 45). The shortest was partial glossectomy (42.85 min.), and the longest was complete sialoadenectomy (140.29 min.).

Table 44. Medications used for anesthesia according to the presence of concomitant disease

		Comorbidities		Total
		No	Yes	
Medications	Articaine+Midazolam	44	24	68
		12,6%	5,5%	8,7%
	Articaine+Propofol	33	44	77
		9,5%	10,1%	9,8%
	Articaine+Fentanyl	8	1	9
		2,3%	0,2%	1,1%
	Propofol	24	42	66
		6,9%	9,7%	8,4%
	Fentanyl+Propofol	78	48	126
		22,3%	11,0%	16,1%
	Fentanyl+Midazolam	24	24	48
		6,9%	5,5%	6,1%
	Lidocaine+Propofol	84	138	222
		24,1%	31,7%	28,3%
	Propofol+Midazolam+Fentanyl	30	60	90
		8,6%	13,8%	11,5%
	Midazolam+Propofol	24	54	78
		6,9%	12,4%	9,9%
Total		349	435	784
		100,0%	100,0%	100,0%

Table 45. Average duration of procedures performed

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Tooth extraction	91	51,9780	21,92005	2,29785	20,00	150,00
Plastic surgery	36	95,0000	27,30777	4,55129	60,00	120,00
Foot or flap transplant	38	75,7895	36,23359	5,87787	30,00	130,00
Incision, drainage	129	65,1163	31,62565	2,78448	25,00	150,00
Complete sialoadenectomy	102	140,2941	51,77457	5,12645	60,00	240,00
Radical excision of a skin lesion	14	79,2857	37,09951	9,91526	30,00	120,00
Lymph node excision	20	110,5000	55,95816	12,51263	20,00	180,00
Excision of lesions	30	68,0000	27,59310	5,03779	40,00	120,00
Partial ostectomy of another facial bone	24	107,5000	30,10850	6,14587	60,00	140,00
Other incision of skin and subcutaneous tissue	21	61,4286	41,26569	9,00491	20,00	120,00
Excision and plastic surgery	73	82,1918	34,31863	4,01669	30,00	120,00
Stitching a torn lip	24	57,5000	33,39487	6,81670	30,00	110,00
Facial bone sequestrectomy	18	53,3333	9,70143	2,28665	40,00	60,00
Biopsy of the hard palate	7	107,1429	34,01680	12,85714	30,00	120,00
Partial glossectomy (tongue resection)	7	42,8571	5,66947	2,14286	30,00	45,00
Splinting	36	107,5000	39,68627	6,61438	60,00	180,00
Radical maxillary antrotomy	30	102,0000	22,65179	4,13563	70,00	120,00
Partial mandibulectomy	78	104,6154	43,22074	4,89378	45,00	180,00
Total	778	86,6967	45,74931	1,64019	20,00	240,00

On the other hand, a significant difference was found between the duration of analgesia according to the type of anesthesia ($p<0.001$), with the shortest duration being sedation with local terminal anesthesia (45.61 min.) (Table 46). A weak correlation was also found between the two studied indicators ($r=0.206$; $p<0.001$).

Table 46. Average duration of individual types of anesthesia in minutes.

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Sedation + Local anesthesia - conductive	17	58,2353	12,86239	3,11959	30,00	90,00
Sedation + Local anesthesia - terminal	41	45,6098	33,91525	5,29667	20,00	150,00
General anesthesia	720	89,7083	45,49357	1,69545	20,00	240,00
Total	778	86,6967	45,74931	1,64019	20,00	240,00

A significant difference was found between the duration of analgesia according to the type of anesthetic used ($p<0.001$), with the shortest duration being the administration of Articaine with Midazolam (54.85 min.), and the longest duration being the analgesia with Fentanyl with Propofol (122.14 min.) (Table 47).

Table 47. Average duration of anesthesia according to the medications used in minutes.

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Articaine+Midazolam	68	54,8529	22,42684	2,71965	30,00	150,00
Articaine+Propofol	77	56,7532	26,07891	2,97197	20,00	150,00
Articaine+Fentanyl	9	71,1111	28,48001	9,49334	30,00	90,00
Propofol	66	80,9091	40,58144	4,99523	40,00	170,00
Fentanyl+Propofol	126	122,1429	46,59368	4,15090	60,00	200,00
Fentanyl+Midazolam	48	77,5000	32,35442	4,66996	35,00	120,00
Lidocaine+Propofol	222	89,5946	41,05032	2,75512	30,00	240,00
Propofol+Midazolam+Fentanyl	90	96,3333	52,42866	5,52647	30,00	190,00
Midazolam+Propofol	72	79,1667	49,02572	5,77774	20,00	170,00
Total	778	86,6967	45,74931	1,64019	20,00	240,00

Table 48 presents the average duration of analgesia according to the type of procedure, the type of anesthesia, the medication used, and the age of the patients.

Table 48. Average duration of analgesia according to the type of procedure, type of anesthesia, medication used and age of patients

Procedure	Anesthesia	Medications		Duration of treatment under anesthesia (min.)	Age
Tooth extraction	Sedation + Local anesthesia - conductive	Articaine+Midazolam	Mean	58,1250	32,2500
			N	16	16
			Std. Deviation	13,27592	10,09620
	Sedation + Local anesthesia - terminal	Articaine+Midazolam	Mean	62,5000	49,3750
			N	16	16
			Std. Deviation	38,20995	23,44888
		Articaine+Propofol	Mean	25,4545	34,8182

			N	11	11
			Std. Deviation	6,87552	16,23464
	General anesthesia	Articaine+Midazolam	Mean	50,0000	56,8333
			N	36	36
			Std. Deviation	14,34274	26,68172
		Articaine+Propofol	Mean	60,0000	45,5000
			N	12	12
			Std. Deviation	,00000	29,76728
Plastic surgery	General anesthesia	Fentanyl+Propofol	Mean	60,0000	23,0000
			N	12	12
			Std. Deviation	,00000	2,08893
		Lidocaine+Propofol	Mean	112,5000	56,7500
			N	24	24
			Std. Deviation	13,26978	16,82196
Foot or flap transplant	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	60,0000	74,0000
			N	1	1
			Std. Deviation	.	.
		Articaine+Fentanyl	Mean	30,0000	40,0000
			N	1	1
			Std. Deviation	.	.
	General anesthesia	Fentanyl+Propofol	Mean	125,0000	63,5000
			N	12	12
			Std. Deviation	5,22233	1,56670
		Fentanyl+Midazolam	Mean	70,0000	82,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	57,5000	72,5000
			N	12	12
			Std. Deviation	2,61116	19,32262
		Midazolam+Propofol	Mean	30,0000	79,0000
			N	6	6
			Std. Deviation	,00000	,00000
Incision, drainage	Sedation + Local anesthesia - conductive	Articaine+Propofol	Mean	60,0000	23,0000
			N	1	1
			Std. Deviation	.	.
	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	90,0000	53,5000
			N	2	2
			Std. Deviation	84,85281	30,40559
	General anesthesia	Articaine+Propofol	Mean	60,0000	75,5000
			N	12	12
			Std. Deviation	,00000	3,65563
		Propofol	Mean	60,0000	40,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	120,0000	43,0000
			N	12	12
			Std. Deviation	,00000	2,08893
		Lidocaine+Propofol	Mean	63,8889	50,8889
			N	54	54
			Std. Deviation	32,25293	16,42440
		Propofol+Midazolam +Fentanyl	Mean	53,3333	36,0000
			N	18	18
			Std. Deviation	6,41689	2,22288
		Midazolam+Propofol	Mean	51,2500	47,2000
			N	24	30
			Std. Deviation	29,42381	9,41898
			Std. Deviation	31,62565	15,32389
Complete sialoadenectomy	General anesthesia	Articaine+Propofol	Mean	120,0000	47,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Propofol	Mean	116,6667	56,6667
			N	18	18
			Std. Deviation	46,27285	14,80064
		Fentanyl+Propofol	Mean	165,0000	48,5000

			N	24	24
			Std. Deviation	39,23175	9,75794
		Lidocaine+Propofol	Mean	140,0000	65,6667
			N	18	18
			Std. Deviation	77,00267	3,18082
		Propofol+Midazolam +Fentanyl	Mean	136,2500	63,0000
			N	24	24
			Std. Deviation	52,25876	8,14008
		Midazolam+Propofol	Mean	145,0000	67,5000
			N	12	12
			Std. Deviation	26,11165	6,78903
Radical excision of a skin lesion	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	45,0000	58,0000
			N	2	2
			Std. Deviation	21,21320	22,62742
	General anesthesia	Articaine+Propofol	Mean	50,0000	49,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	120,0000	71,0000
			N	6	6
			Std. Deviation	,00000	,00000
Lymph node excision	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	25,0000	54,5000
			N	2	2
			Std. Deviation	7,07107	20,50610
	General anesthesia	Fentanyl+Propofol	Mean	180,0000	42,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	60,0000	50,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Midazolam+Propofol	Mean	120,0000	56,0000
			N	6	6
			Std. Deviation	,00000	,00000
Excision of lesions	General anesthesia	Articaine+Propofol	Mean	60,0000	34,0000
			N	12	12
			Std. Deviation	,00000	12,53359
		Propofol	Mean	40,0000	74,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	60,0000	25,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	120,0000	41,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	60,0000	25,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	120,0000	41,0000
			N	6	6
			Std. Deviation	,00000	,00000
Partial ostectomy of another facial bone	General anesthesia	Articaine+Propofol	Mean	60,0000	67,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Propofol	Mean	110,0000	53,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	140,0000	52,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Midazolam+Propofol	Mean	120,0000	50,0000
			N	6	6
			Std. Deviation	,00000	,00000
Other incision of skin and		Articaine+Propofol	Mean	25,0000	45,5000
			N	2	2

subcutaneous tissue	Sedation + Local anesthesia - terminal		Std. Deviation	7,07107	,70711
		Articaine+Fentanyl	Mean	40,0000	73,0000
			N	1	1
			Std. Deviation	.	.
	General anesthesia	Lidocaine+Propofol	Mean	90,0000	69,0000
			N	12	12
			Std. Deviation	31,33398	12,53359
		Midazolam+Propofol	Mean	20,0000	59,0000
			N	6	6
			Std. Deviation	,00000	,00000
Excision and plastic surgery	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	30,0000	33,0000
			N	1	1
			Std. Deviation	.	.
	General anesthesia	Propofol	Mean	45,0000	56,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	60,0000	26,5000
			N	12	12
			Std. Deviation	,00000	4,70010
		Fentanyl+Midazolam	Mean	77,5000	43,5000
			N	12	12
			Std. Deviation	44,38980	23,50048
		Lidocaine+Propofol	Mean	114,0000	42,8000
			N	30	30
			Std. Deviation	12,20514	9,97376
		Propofol+Midazolam +Fentanyl	Mean	60,0000	39,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Midazolam+Propofol	Mean	45,0000	62,0000
			N	6	6
			Std. Deviation	,00000	,00000
Stitching a torn lip	General anesthesia	Fentanyl+Midazolam	Mean	110,0000	61,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	45,0000	21,0000
			N	12	12
			Std. Deviation	15,66699	7,31126
		Propofol+Midazolam +Fentanyl	Mean	30,0000	41,0000
			N	6	6
			Std. Deviation	,00000	,00000
Facial bone sequestrectomy	General anesthesia	Propofol	Mean	60,0000	78,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	60,0000	29,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Propofol+Midazolam +Fentanyl	Mean	40,0000	76,0000
			N	6	6
			Std. Deviation	,00000	,00000
Biopsy of the hard palate	Sedation + Local anesthesia - terminal	Articaine+Fentanyl	Mean	30,0000	49,0000
			N	1	1
			Std. Deviation	.	.
	General anesthesia	Lidocaine+Propofol	Mean	120,0000	52,0000
			N	6	6
			Std. Deviation	,00000	,00000
Partial glossectomy (tongue resection)	Sedation + Local anesthesia - terminal	Articaine+Propofol	Mean	30,0000	64,0000
			N	1	1
			Std. Deviation	.	.
	General anesthesia	Propofol	Mean	45,0000	30,0000
			N	6	6
			Std. Deviation	,00000	,00000
Splinting	General anesthesia	Articaine+Fentanyl	Mean	90,0000	21,0000
			N	6	6
			Std. Deviation	,00000	,00000

		Propofol	Mean	60,0000	43,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Fentanyl+Propofol	Mean	125,0000	43,6667
			N	18	18
			Std. Deviation	44,25860	5,06429
		Propofol+Midazolam +Fentanyl	Mean	120,0000	27,0000
			N	6	6
			Std. Deviation	,00000	,00000
Radical maxillary antrotomy	General anesthesia	Propofol	Mean	120,0000	47,0000
			N	6	6
			Std. Deviation	,00000	,00000
		Lidocaine+Propofol	Mean	100,0000	52,5000
			N	12	12
			Std. Deviation	20,88932	7,83349
		Propofol+Midazolam +Fentanyl	Mean	95,0000	72,0000
			N	12	12
			Std. Deviation	26,11165	7,31126
Partial mandibulectomy	General anesthesia	Fentanyl+Propofol	Mean	150,0000	57,0000
			N	12	12
			Std. Deviation	31,33398	10,44466
		Fentanyl+Midazolam	Mean	71,2500	43,5000
			N	24	24
			Std. Deviation	29,42381	16,99360
		Lidocaine+Propofol	Mean	88,7500	62,0000
			N	24	24
			Std. Deviation	28,52345	3,75326
		Propofol+Midazolam +Fentanyl	Mean	150,0000	32,0000
			N	12	12
			Std. Deviation	31,33398	8,35573
		Midazolam+Propofol	Mean	120,0000	53,0000
			N	6	6
			Std. Deviation	,00000	,00000
			Std. Deviation	26,07891	21,02133
		Articaine+Fentanyl	Mean	71,1111	32,0000
			N	9	9
			Std. Deviation	28,48001	18,57418
		Propofol	Mean	80,9091	53,7273
			N	66	66
			Std. Deviation	40,58144	15,38485
		Fentanyl+Propofol	Mean	122,1429	44,8095
			N	126	126
			Std. Deviation	46,59368	14,72832
		Fentanyl+Midazolam	Mean	77,5000	50,5000
			N	48	48
			Std. Deviation	32,35442	21,18611
		Lidocaine+Propofol	Mean	89,5946	52,5946
			N	222	222
			Std. Deviation	41,05032	17,02879
		Propofol+Midazolam +Fentanyl	Mean	96,3333	50,0667
			N	90	90
			Std. Deviation	52,42866	17,95300
		Midazolam+Propofol	Mean	79,1667	56,1538
			N	72	78
			Std. Deviation	49,02572	11,78936
		Total	Mean	86,6967	50,5816
			N	778	784
			Std. Deviation	45,74931	18,09090

There were 18 patients (2.3%) with complications from the sample under consideration, and the types of complications are presented in Table 49. The most common complication was hypertensive crisis (38.9%), followed by syncope (22.2%).

Table 49. Types of complications during treatment under general anesthesia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quincke's edema	2	,3	11,1	11,1
	Syncope	4	,5	22,2	33,3
	Collapse	3	,4	16,7	50,0
	Hypertensive crisis	7	,9	38,9	88,9
	Vomiting	2	,3	11,1	100,0
	Total	18	2,3	100,0	
Missing	System	766	97,7		
Total		784	100,0		

A significant difference was found in the mean age of patients according to the types of complications ($p<0.001$), with the youngest being patients with syncope (22.25 years) and collapse (25.33 years), and the oldest being patients with hypertensive crisis (68.0 years) (Table 50).

Table 50. Average age of patients according to types of complications

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Quincke's edema	2	43,5000	3,53553	2,50000	41,00	46,00
Syncope	4	22,2500	1,89297	,94648	21,00	25,00
Collapse	3	25,3333	1,52753	,88192	24,00	27,00
Hypertensive crisis	7	68,0000	11,97219	4,52506	55,00	82,00
Vomiting	2	40,5000	21,92031	15,50000	25,00	56,00
Total	18	44,9444	22,15845	5,22280	21,00	82,00

IV. DISCUSSION

In our study, 500 patients treated with local anesthesia using oral surgery methods were examined. In a study by Daniel et al. [Daniel & Haas, 2002], the age range of patients treated with local anesthesia was between 5 and 88 years, with a mean age of 37 years for men and 31 years for women. The results in our study in terms of age range do not differ significantly, with the age ranging from 5 to 89 years, but the average age of men is 41.7 years and that of women is 43 years.

Another study by Syed et al. [Syed & Zaheer, 2013] found that in both men and women, the mandibular third molars were most affected (about 49.5%). In our study, odontectomy accounted for 39.8% of procedures performed with local anesthesia, with over 80% being on the third molars in the mandible. According to Syed et al., the age group 20–25 years showed the highest prevalence of third molar extraction (64.5%) and the incidence decreased with increasing age. While in our study, the average age of this procedure was 37.1 years, with the highest prevalence in the age range of 20-50 years.

In oral surgery, the most common procedure is the extraction of the third molar. In a literature review by Pérez-García et al., the lower third molars were the most frequently affected teeth [Pérez-García S, et al., 2005]. These results are also confirmed in our study.

In our study, more women than men underwent surgery, consistent with previous findings (54.4% for women and 45.6% for men, respectively). This may be related to women's increased interest in aesthetics and health care. A study in North India also found that women had more dental surgeries than men [Jena AK, et al., 2010].

Various articles have reported damage to the trigeminal nerve from the administration of dental local anesthesia, ranging from mild and temporary to severe and permanent. Hillerup et al. [Hillerup & Jensen, 2006] described 54 patients with trigeminal nerve injury after IANB administration. The lingual nerve was affected in 77.8% of cases and the inferior alveolar nerve in 22.2% of cases. Symptoms of nerve injury included paresthesia, dysesthesia, and allodynia. Garisto et al. [Garisto GA, et al., 2010] reported involvement of the lingual nerve in 89% and involvement of the inferior alveolar nerve in 11% of cases. Kingon et al. [Kingon A, et al., 2011] described five cases of dysesthesia and paresthesia after IANB or mental nerve block with anesthetic solutions. One case of permanent nerve damage with facial numbness, hearing loss, facial paralysis, and ataxia on the ipsilateral side of the injection has been reported [Shenkman Z, et al., 1996]. The overall reported incidence of permanent nerve damage from mandibular local anesthesia is 0.000007%–0.003% [Garisto GA, et al., 2010; Krafft & Hickel,

1994; Pogrel & Thamby, 2000; Sambrook & Goss, 2011; Pogrel MA, et al., 1995]. Moorthy et al. [Moorthy & Stassen, 2015] reported a case of paresthesia in the maxillary region after infiltration anesthesia. The patient experienced numbness of the upper lip and gingiva in the anterior left maxillary region. One case of inflammatory trigeminal lesions has been described. The symptoms were paresthesia and numbness of the tongue, lips, face, hand, and forearm on the ipsilateral side, all of which were transient [Blair NF, et al., 2013].

Facial and sympathetic nerve palsy have been reported in several studies. Hemifacial paralysis after IANB has been reported by Tiwari et al. [Tiwari & Keane T., 1970]. Hearing is impaired, the corner of the mouth is drooping, and the hemifacial muscles are immobile. Tzermpos et al. [Tzermpos FH, et al., 2012] also reported a temporary facial nerve palsy after IANB, in which the patient was unable to raise the left eyebrow and showed generalized weakness on the left side and drooping of the corner of the mouth. One article reported hemifacial paralysis after infiltration anesthesia [Cakarer S, et al. 2010]. Bell's sign and lower motor neuron weakness of the facial nerve were observed. Baart et al. [Baart JA, et al., 2006] described two cases of transient paresis after IANB. The first patient could not purse his lips at the injection site and the facial nerve was paralyzed. The symptoms resolved after treatment. The second patient developed vagus nerve paralysis and experienced tightness and difficulty swallowing. A case of numbness in the neck, difficulty swallowing, and chest pressure following diffusion of anesthetic fluid into the parapharyngeal space has been reported [Dormer & Barker, 1976]. Another article reports Harlequin syndrome after IANB [Huang RY, et al., 2013].

Bajkin et al. [Bajkin & Todorovic, 2012] conducted a study to evaluate the safety of dental local anesthesia in patients taking anticoagulants. The study group (n = 279) consisted of patients with INR 2–4, and the control group (n = 73) consisted of patients with subtherapeutic INR (<2). Only two minor hematomas were found in the study group and no prolonged bleeding was observed. Dougall et al. [Dougall A, et al., 2019] determined the safety of buccal infiltration anesthesia in patients with hemophilia based on the severity of hemophilia (mild, moderate, or severe). The clinical experience of the practitioners was categorized as less than or more than 3 years of experience. No hematomas larger than 2 mm were reported after the application of buccal infiltrationFurthermore, no differences in superficial bleeding time based on hemophilia severity or practitioner experience have been reported. Brodsky et al. [Brodsky CD, et al., 2001] reported a patient with ear problems after a Gow-Gates injection during a dental school practice. The patient developed increased pressure in the ear and had hearing problems. The efficacy and side effects of articaine, lidocaine, and mepivacaine were

compared in a randomized clinical trial conducted by Srisurang et al. [Srisurang S, et al., 2011]. No serious adverse effects were reported and only two ecchymoses were found at the injection site 1 hour after local anesthesia was administered.

Hematomas from local anesthetic injections have been reported in four articles [Bajkin & Todorovic, 2012; Dougall A, et al., 2019; Brodsky CD, et al., 2001; Srisurang S, et al., 2011]. Several large blood vessels and soft tissues are present in the pterygomandibular space, and hematomas can occur when an anesthetic needle punctures these tissues during IANB. Bajkin et al. [Bajkin & Todorovic, 2012] found no signs of hematomas after IANB in patients with INR 2–4 on anticoagulants. A possible explanation is that hematomas may be prevented by vasoconstrictors in the anesthetic solutions when the vessel is punctured. In another article describing patients with hemophilia, infiltration anesthesia appears to be a safe technique [Dougall A, et al., 2019]. These observations indicate that the use of dental local anesthesia is safe in patients with hemophilia. If a hematoma occurs after dental local injection, the affected area should be treated with a cold compress. In addition, the authors of one study suggest that antibiotics should be prescribed to prevent hematoma infection [Biočić J, et al., 2018]. In our study, hematomas during the application of local anesthesia were observed in 19 patients (46.3%) of the patients who underwent UMDC and in 15 patients (22.4%) of the patients treated at the Clinic of Maxillofacial Surgery at the University Hospital "St. Marina" - Varna. The results of our study show a higher incidence of hematoma as a complication of treatment with local anesthesia compared to the results reported in other studies.

Local anesthetic needle breakage may occur during administration. Pogrel [Pogrel MA., 2009] describes 16 cases of needle breakage that were reported over a 25-year period. Twelve of these cases were excluded from this review due to the criterion that patients must be ≥18 years of age. The four included cases were between 21 and 28 years of age. Needle breakage after IANB was described in three of these four cases and after infiltration in the fourth. Pogrel [Pogrel MA., 2009] estimated the incidence of needle breakage at 0.000007%. Zijderveld et al. [Zijderveld & Dubois 2018] reported a case of needle breakage after IANB, and Rahman et al. [Rahman N, et al., 2013] reported a case of a 65-year-old man in whom the needle broke during IANB administration. In our study, needle breakage was found in one patient treated with local anesthesia at the UMDC.

Another reported adverse effect is breakage of dental anesthesia needles during the administration of dental local anesthesia. Modern disposable anesthetic needles are flexible and needle breakage rarely occurs. However, some factors can influence the occurrence of needle breakage. Bending the needle before insertion or short and thin needles are factors associated

with needle breakage. Bending the needles activates a breaking point and can cause breakage [Augello M, et al., 2011]. When the needle is broken, fragments of the needle can migrate and damage deeper tissues [Casey JT, et al., 2015]. Patients may also develop trismus, pain, infection, or life-threatening hematomas [Zijderveld & Dubois, 2018]. Therefore, removal of fragments by needle is highly recommended. If simple removal of these fragments is not possible, patients should be referred to an oral and maxillofacial surgeon for localization of the fragments with radiography and surgical removal of the fragments [Pogrel MA., 2009].

Several observational studies have reported various adverse effects and their incidence following dental local anesthesia. A variety of physical reactions have been observed during and after the administration of local anesthesia, including clenching the fist; pressing the hand against the dental unit, assistant, or partner; and moaning, crying, sweating, pallor, dizziness, agitation, nausea, tremor, syncope, and headache [Brand HS, et al., 2009 Daubländer M, et al., 1997; Kaufman E, et al., 2000; Brand HS, et al., 2009]. Self-injury to the lip, cheek, or tongue has also been observed following the administration of dental local anesthesia [Boynes S, et al., 2014]. Multiple studies have reported adverse cardiovascular effects, including tachycardia, positive blood aspiration, hypertension, and palpitations [Daubländer M, et al, 1997; Kaufman E, et al., 2000; Brand HS, et al., 2009; Boynes S, et al., 2014; Lustig & Zusman, 1999]. Inadequate anesthesia, pain during administration, and postoperative pain have been described [Kaufman E, et al., 2000; Brand HS, et al., 2009 Boynes S, et al., 2014; Lustig & Zusman, 1999; Alamanos C, et al., 2016]. Other reported adverse reactions include confusion and bronchospasm. [Daubländer M, et al., 1997; Kaufman E, et al., 2000; Brand HS, et al., 2009]. The overall rate of adverse effects after dental local anesthesia is between 4.5% and 26.2% [Daubländer M, et al, 1997; Kaufman E, et al., 2000; Brand HS, et al., 2009]. In our study, the relative proportion of most favorable effects or complications was 8.2%.

Long surgical procedures are among the indications for treatment with sedation or general anesthesia in dentistry [Kapur, A., Kapur, V. 2018; McCrea, S. J. J., 2015]. However, the existing literature does not provide a clear and meaningful idea of what can be considered a “long” or “short” oral surgical treatment. Further clarification of the duration of “long” treatments is needed to better understand and interpret research results in this regard. A systematic review by Jamali et al (2018) investigated the effect of dental procedure duration on patient behavior and reviewed the difference between long and short dental treatments. [Jamali, Z., et al., 2018] The result of this study showed that the range of “short” treatments varied from 15 to 30 minutes, but a “long” procedure could vary between 30 minutes and exceed 45 minutes. [LENCHNER, V, 1966; DAVIDOVICH, Esti, et al. 2013] All of these studies have focused

on pediatric patients, and a clearer definition is needed, taking into account patient factors, the extent and complexity of the procedure, and the skill and experience of the clinician regarding the definition of long versus short dental treatment in adults.

Given that some dental and oral surgical procedures may require longer periods of conscious sedation due to their complexity, it would be difficult to perform them in a few short sessions. [HOLTZCLAW, Dan J., et al., 2014; ALMEIDA, et al., 2017; SANDHU, Gurkirat, et al., 2017] The existing literature primarily focuses on the application of conscious sedation in oral surgery for populations including anxious, pediatric, or special needs patients. There is little research on the use of sedation to improve patient comfort while mitigating potential psychological distress during long and extensive dental extraction and implant procedures.

A study of treatment with midazolam sedation found that patients aged 55 and over were much less likely to be offered sedation, even though it has been established that midazolam sedation is effective and safe in older ages [Rignell L, et al., 2017]. Това може да се обясни с факта, че разпространението на денталната тревожност може да намалява с напредване на възрастта [Hägglin C, et al., 1999]. The results in the present study confirm those from the literature, with the mean age of the patients being under 50 years (respectively 47.85 years for treatment with sedation and local conduction anesthesia and 41.31 for treatment with sedation and local terminal anesthesia. The mean age of treatment with Midazolam sedation is between 40 and 50 years.

Two-thirds of sedated patients were female, which is appropriate as dental anxiety has been reported to be more common among women [Svensson L, et al., 2016].

The incidence of adverse reactions described by patients is reported to be 50–56% of cases, but adverse events are described as drowsiness, dizziness, muscle relaxation and amnesia, that is, effects that should be desired and expected from Midazolam [Araújo JO, et al., 2021]. However, the side effects reported in the studies were not life-threatening and did not require specific treatment [Li X, et al., 2023]. Rignell et al. [Rignell L, et al., 2017] considered midazolam sedation to be safe, with only two of 61 patients suffering from milder side effects: one becoming hyperactive and one more sleepy than expected. In a study of a pediatric population that compared four sedation techniques, no side effects were found [Heard C, et al, 2010].

In our study, patients treated with local anesthesia in oral surgery were few in number and no correlations between side effects and age, indication for sedation, or type of treatment could be noted in the analysis, but they still cannot be ruled out, as patients with complications were too few to draw conclusions.

If we compare the use of local anesthesia in outpatient oral surgery and inpatient, the following conclusions can be drawn. Patients treated with local anesthesia in outpatient settings are significantly younger compared to patients treated with local anesthesia in the medical facility (42.45 years for UMDC and 54.38 years for the medical facility, respectively).

Patients treated with local anesthesia at the UMDC have fewer comorbidities compared to those treated at the medical facility (10% for the UMDC and 60% for the medical facility, respectively).

The main procedures performed at the dental center under local anesthesia are mainly tooth extractions and other procedures, with a maximum duration of about 60 minutes, while more complex procedures are performed in the hospital.

No difference was found in the anesthetic used in oral and maxillofacial surgery with regard to local anesthesia, with Articaine being primarily used in both the dental center and the medical facility.

A higher incidence of complications was observed in patients treated with local anesthesia in inpatient settings, which is related to the complexity of the procedures performed.

The use of sedation and general anesthesia in oral and maxillofacial surgery follows the same trend as treatment with local anesthesia. Patients treated with sedation and general anesthesia in the dental center are younger, have fewer concomitant diseases and complications after treatment. The procedures at the dental center are characterized by low complexity and duration compared to those at the medical facility. It can be said that treatment with sedation is more frequent in patients treated at the UMDC (respectively 28.9% for the UMDC and 7.4% for the medical facility).

CONCLUSIONS

1. The most commonly used local anesthetic in practice is articaine.
2. The most commonly used local anesthesia in outpatient oral surgery is terminal anesthesia.
3. Terminal local anesthesia is mainly used on the upper jaw. Only 4 patients from the UMDC and 3 from the UHAT "St. Marina" were treated with conduction anesthesia, which was due to the presence of an abscess in the respective surgical area.
4. Local conduction anesthesia is mainly used on the lower jaw.
5. Terminal anesthesia is always used when placing dental implants.
6. The most commonly used conduction anesthesia is the Weissbrem method.
7. Local anesthesia is primarily used in all patients who are physically healthy, regardless of the type of procedure.
8. The most used medications for sedation are Articaine with Midazolam for both the UMDC and the medical facility (respectively 57.7% for the UMDC and 55.2% for the UHAT)
9. The most used medications for general anesthesia are Articaine with Propofol for the UMDC and Lidocaine with Propofol for the medical facility.
10. Sedation is most often used for short and quick procedures in patients with concomitant diseases (mainly cardiovascular diseases - hypertension and coronary artery disease).
11. General anesthesia is used in long surgeries, and when several activities or surgical interventions need to be performed at once (extraction of 4 impacted wisdom teeth at once - for UMDC, and for St. Marina incision or drainage, as well as complete sialoadenectomy).
12. As patients age, the percentage of general anesthesia used increases.
13. Older patients tend to have more and more severe comorbidities.
14. The percentage of operations under local anesthesia in maxillofacial surgery is relatively small.
15. The duration of interventions in maxillofacial surgery is significantly longer, and for this reason general anesthesia is more often used.
16. The most common complication of local anesthesia is hematoma.
17. The most common complication of general anesthesia is syncope.

CONTRIBUTIONS

Original contributions to the country

1. For the first time in Bulgaria, such an in-depth study of the types of anesthesia used, both in outpatient and inpatient settings, has been conducted.
2. We demonstrate that treatment with sedation and general anesthesia in modern oral surgery is increasingly used in anxious and uncooperative patients.

Confirmatory contributions

1. Terminal local anesthesia is mainly used on the upper jaw.
2. On the lower jaw, conductive apodactyl anesthesia according to the Weissbrem method is most often used.
3. When placing dental implants in practice, only terminal local anesthesia is used.
4. Articaine is the most commonly used local anesthetic used in oral and maxillofacial surgery.
5. Sedation in oral surgery is used for short and rapid procedures in patients with comorbidities (mainly cardiovascular diseases).

PUBLICATIONS RELATED TO THE DISSERTATION

1. Zafiroski S. Vestibuloplasty with grafts – a review article. Varna Medical Forum – in print
2. Zafiroski S. Follicular cysts – review article. Varna Medical Forum – in print
3. Kumanov I., Zafiroski S. Georgieva S. Food supplements. Health risks in the use of plant-based food supplements. Management and Education. Volume XII (5)2016, 83-92
4. Kumanov I., Zafiroski S. Georgieva S. Food supplements. European and national regulatory framework. Management and education. Volume XII (5)2016, 72-82