REPUBLIC OF AZERBAIJAN

On the rights of the manuscript

ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

EVALUATİON OF TREATMENT APPROACHES FOR PEDİATRİC MANDİBULAR FRACTURES

Speciality: 3226.01 – Dentistry

Field of Science: Medicine

Applicant: Elnur Musa Abdullayev

Baku – 2024

The dissertation work was performed at the Department of Oral and Maxillofacial Surgery of Azerbaijan Medical University.

Academic Supervisor: doctor of medical sciences, professor
Chingiz Rahim Rahimov

Official Opponents: doctor of medical sciences, professor
Zohrab Islam Qarayev

doctor of medical sciences
Ziba Vaqif Qasimova

doctor of philosophy in medicine
Tahir Rauf Vazirov

Dissertation Council ED 2.50 of the Supreme Attestation Commission under the President of the Republic of Azerbaijan at the Azerbaijan Medical University

Chairman of the Dissertation Council:
doctor of medical sciences, professor
Vafa Mustafa Panahian

Scientific Secretary of the Dissertation Council:
doctor of medical sciences, professor
Agha Chingiz Pashayev

Chairman of the Scientific Seminar:
doctor of medical sciences, professor
Rana Gurban Aliyeva

İMZANI TƏSDİQ EDİRƏM
Azərbaycan Tibb Universitetinin
ELMİ KATİBİ
Tibb elmləri doktoru, professor
Nazim Adil oğlu Panahov
19.01.24

GENERAL CHARACTERISTICS OF THE STUDY

Actuality of the problem. Maxillofacial fractures in children, although accounting for only 1-15% of all facial skeleton fractures, pose an urgent issue in modern dentistry and maxillofacial surgery. It is important to note that these fractures exhibit distinct clinical characteristics when compared to fractures in adults[1].

Fractures of the jaw in children constitute over 50% of all facial skeletal fractures, with the majority happening at the condyle.[2] The analysis of the research conducted on jaw fractures in Azerbaijan reveals that the fractures primarily occur due to household accidents (58.7%), followed by transport accidents (18.3%), industrial accidents (11.9%), and sports-related injuries (1.8%).[3]

Condylar fractures of the jaw constitute approximately 29-40% of fractures in the facial skeleton and 20-62% of all fractures in the jaw. Fractures in children are classified as a distinct pathology due to their occurrence in bones that are undergoing rapid growth. The child's facial expressions facilitate interaction with the surrounding environment and contribute to the development of their individuality. Consequently, any flaws or distortions in this region adversely impact the mental well-being of the individual who is injured.

Within the literature, two primary methods for treating condyle fractures in children prevail: open reduction (involving surgery or an invasive approach) and closed reduction (utilizing a non-surgical or conservative approach)[4].

---

1. Kazi N. Epidemiology of Maxillofacial Trauma in Pediatric and Adolescent Population: An Institutional Experience of 6 Years / N. Kazi, P. Ranadive, S. Rajurkar [et al.] // Open Journal of Orthopedics, – 2022. 12, – p. 277-287.
2. Cooney M. Non-surgical management of paediatric and adolescent mandibular condyles: A retrospective review of 49 consecutive cases treated at a tertiary referral centre / M. Cooney, J.E. O'Connell, J.A. Vesey [et al.] // Journal of Cranio-Maxillofacial Surgery, – 2020, 48 (7), – p. 666-671.
3. Həsənova G.F. Küt zədələrin təsiri nəticəsində üst və alt çənə sınıqlarının kliniki və biomexaniki olaraq qiymətləndirilməsi: / tibb üzrə fəlsəfə doktoru dis. avtoreferatı. / - Bakı, 2017. – 24 s, s.16.
4. Akbulut N. Çocuklarda kondil kırıklarında konservatif yaklaşım: bir olgu sunumu / N. Akbulut, M. Tümer, S. Ertem // Cumhuriyet Dental Journal, – 2014. 17 (3), – p. 291-295.

Untreated jaw fractures in children, particularly condyle fractures, are known to result in significant complications such as abnormal bite, maxillofacial dysfunction, jaw growth disorder, and maxillofacial ankylosis. [5]. Jaw fractures frequently coincide with skin lacerations in the jaw region, displacement of the dental arch, tissue tears, sprained temporomandibular joint, and fractures of the facial skeleton. Intracranial trauma and spinal fractures are often accompanied by severe injuries resulting from significant trauma. Infants and young children are more susceptible to jaw fractures. [6.] The successful treatment of fractures in this complicated group of people relies directly on accurately evaluating the trauma and promptly starting the chosen therapy, despite the difficulties. While facial fractures are less prevalent in children compared to adults, it is crucial to have a comprehensive understanding of jaw fractures in children and provide prompt treatment to ensure a favorable long-term result [7].

The treatment of jaw fractures, which are occurring with a high frequency due to the rise in traumas, holds significant medical and social significance. Both surgical and conservative treatment methods are utilized in the management of jaw fractures. The procedure involves immobilizing the jaw using intermaxillary fixation, which is achieved by utilizing dental splints and elastic materials. These treatment strategies necessitate an extended period of rehabilitation[8]. The current standard of care for craniofacial trauma is treatment with titanium plates and screws.

5. Yu-ming Zhao. A retrospective study of using removable occlusal splint in the treatment of condylar fracture in children / Yu-ming Zhao, Jie Yang, Rui-chun Bai [et al.] // Journal of Cranio-Maxillofacial Surgery, – 2014. 42 (7), – p. 1078-1082].
6. Lazner M. Jaw fractures and dislocation / M. Lazner, D. Baldwin, N. Maini [et al.] // Paediatric Clinical Practice Guideline, – 2021, – p.1-4.
7. Cole P. Managing the pediatric facial fracture / P. Cole, Y. Kaufman, L.H. Hollier // Craniomaxillofac Trauma Reconstrction, – 2009. 2 (2), – p. 77-83.
8. Чжан Ш., Петрук П.С., Медведев Ю.А. Переломы нижней челюсти в области тела и угла: принципы хирургического лечения. Часть II // Российский стоматологический журнал, –2017. №4, – с.203-207.

The method of biological absorbable fixation does not necessitate its removal and is gradually assimilated, making it highly significant in the management of jaw fractures. The number is [9].

The management of jaw fractures is contingent upon several variables, including the child's age, tooth displacement, occlusion, and the specific type of fracture. The primary objective of treating jaw fractures in children, regardless of the chosen treatment approach, is to restore the bone structure, minimize any remaining aesthetic abnormalities, and resolve functional impairments using minimally invasive techniques[10].

Existing literature sources indicate a lack of research specifically focused on the epidemiological investigation of maxillofacial traumas among children in Azerbaijan.

No comprehensive study has been conducted to compare various treatment methods for traumatic jaw injuries in children. Additionally, specific treatment strategies for fractures in different regions of the jaw in children of different age groups have not been established.

The controversy surrounding the optimal approach (conservative or radical surgical treatment) and the appropriate age groups for managing jaw bone injuries in children remains unresolved. [11]

Hence, the extensive occurrence of mandibular fractures in children underscores the significance of accurately diagnosing and selecting efficacious treatment strategies.

The object of study. The study included 99 children and adolescents, aged 1-16 years, who received treatment for jaw fractures. A total of 29 cases were examined retrospectively, consisting of 20 boys and 9 girls.

9. Jingang An. Application of biodegradable plates for treating pediatric mandibular fractures // Jingang An, Pengcheng Jia, Yi Zhang [et al.] // Journal of Cranio-Maxillofacial Surgery, 2015. 43 (4), – p. 515-520.
10. Bansal A. Comparison of outcome of open reduction and internal fixation versus closed treatment in pediatric mandible fractures-a retrospective study / A. Bansal, P. Yadav, O. Bhutia [et al.] // Journal of Cranio-Maxillofacial Surgery, – 2021, 49 (3), – p.196-205.
11. Monnazzi M.S. Treatment of mandibular condyle fractures. A 20-year review / M.S. Monnazzi, M.A.C. Gabrielli, M.F.R. Gabrielli // Dental Traumatology, – 2017. 33, – p. 175-180.

Additionally, 70 individuals were analyzed prospectively, comprising 50 boys and 20 girls. In the prospective study, patients were categorized into three groups based on their treatment methods: Group I consisted of 20 patients who received conservative treatment, Group II consisted of 12 patients who received combined treatment, and Group III consisted of 38 patients who underwent osteosynthesis.

The aim of study. The aim is to enhance the outcomes of jaw trauma treatment in children by assessing treatment methods and developing a highly efficient clinical algorithm.

The study objectives included:

1. Perform a retrospective analysis of the diagnosis and treatment of jaw fractures in children treated at our clinic.
2. Identify the clinical and radiological characteristics of jaw fractures in children by conducting clinical and instrumental examinations using new criteria for prospective analysis of patients entering our clinic.
3. Develop treatment strategies based on clinical and radiological indicators for jaw fractures in children of different age groups.
4. Validate the effectiveness of the treatment-diagnostic algorithm developed by our team for jaw fractures in children.

Research methods.

Research methods include clinical, radiological, photometric, and mathematical-statistical approaches.

The main provisions of the dissertation for the defense:

- The dissertation defends the main provisions of scientific research focused on finding practical solutions for jawbone fractures in children. The study explores different treatment approaches tailored to each age group.
- The approach to treating jaw bone fractures in children is determined by factors such as the specific location of the fracture, the degree of displacement of the fractured pieces, and the age category of the patient.
- A distinct algorithm is suggested for fractures of the jaw bone in children, tailored to each age group, using clinical and radiological indicators.

- By implementing these algorithms and utilizing the obtained results, we can enhance the treatment process and mitigate the occurrence of post-traumatic deformities in the future.

Scientific novelty of the study :

- This study examined the indications and sequence for using conservative or surgical methods, as well as their combination, in treating jawbone fractures in children. The study analyzed separate clinical and radiological indicators for each age group.
- A comprehensive algorithm for diagnosing and treating traumatic injuries to the jaw bone in children has been formulated.
- Azerbaijan has obtained new findings regarding the epidemiological investigation and treatment of jaw injuries in children.

The practical significance of the study.

- After identifying the challenges of conducting clinical examinations for jaw fractures in children and recognizing the limitations of using 2-projection X-ray examination for articular head fractures, incorporating 3-projection X-ray examination (3D CT) into the diagnostic algorithm enables precise diagnosis.
- Identifying an efficient diagnostic approach for jaw bone fractures in children is crucial for choosing appropriate treatment strategies and has practical significance in ensuring successful treatment outcomes and preventing future facial skeletal deformities.
- Conservative treatment (orthodontics) can be used instead of surgery for jaw fractures in children in certain clinical cases, relying on clinical and radiological indicators. This approach helps prevent surgical complications and lowers hospital expenses.
- For the first time in Azerbaijan, a comprehensive diagnostic and treatment algorithm was developed to address the specific clinical and radiological indicators of jaw bone fractures in children. This advancement has created a valuable opportunity for widespread clinical application.

Approbation of the study results. The research findings were deliberated upon at the subsequent conferences. The 6th International Conference. Management of injuries and illnesses affecting the musculoskeletal system. Contemporary advancements in the fields of

traumatology and orthopedics. Management and mitigation of complications. Baku from September 24th to 26th, 2010; The 20th International TOAMS Congress in conjuction with regional countries Association. Antalya- Turkey19th to May 23rd, 2013; The 8th International Congress. ACBID 2014. Antalya-Turkey from May 28th to June 1st, 2014; 1th International Congress. Azerbaijan Society of Oral and Maxillofacial Surgeons. Baku, March 14th to 16th, 2019; 2nd International Congress of the Azerbaijan Society of Oral and Maxillofacial Surgeons. Baku, October 12-14, 2023.

The findings of the research were presented and discussed at the collaborative meeting between the Department of Oral and Maxillofacial Surgery of AMU and other departments on October 10, 2022 (protocol No. 02). They were also reported and discussed at the scientific seminar of the ED 2.50 Dissertation Council, which operates under AMU, on November 3, 2023 (protocol No. 04).

Implementation into practice.

The findings of the research were implemented in the clinical practice of the maxillofacial surgery departments at Azerbaijan Medical University and Baku Clinical Medical Center. The implemented algorithm was utilized in the department of oral and maxillofacial surgery at Azerbaijan Medical University.

Name of the facility where the research was implemented. The dissertation research was conducted at the Department of Oral and Maxillofacial Surgery at Azerbaijan Medical University and the Maxillofacial Surgery Department at the Clinical Medical Center.

Publications. The dissertation yielded 10 scientific publications, comprising 6 articles and 4 theses. Among these, 3 articles and 2 theses were published internationally.

The volume and structure of the dissertation. The dissertation consists of 179 computer pages (237,716 characters) and includes an introduction (13,719 characters), a literature review (34,997 characters), a description of the materials and methods used in the research (38,827 characters), the results of the personal investigation (120,889 characters), the implementation of algorithms for the treatment of jaw disorders in children (5,888 characters), a summary (21,831 characters), the conclusions (1,029 characters), practical

recommendations (536 characters), and a bibliography (16 pages). The dissertation is illustrated with 29 tables, 30 figures and 4 graphs. The literary bibliography encompasses 153 sources.

MATERİALS AND METHODS OF THE STUDY

The research material encompasses 29 patients treated retrospectively and 70 patients treated prospectively with the diagnosis of jaw fractures in the Craniofacial Surgery Department of Baku City Clinical Medical Center from 2005 to 2018. In total, the study involved 99 pediatric patients with jaw fractures.

The research included patients of both genders up to the age of 16. Initially, a retrospective analysis of treatments conducted with jaw fractures in children from 2005 to 2009 was performed. We will present the retrospective review of treatments carried out by us after presenting the results of the prospective analysis.

On our part, from 2010 to 2018, 20 out of 70 treated patients were girls (28.6%), and 50 were boys (71.4%). Long-term outcomes of the treatment were investigated after the medical interventions.

In pediatric patients treated for jaw fractures of various etiologies, the average age was 8.26. This age indicator indicates that among the children in our country, jaw injuries of such severity occur precisely at this age, which coincides with the incomplete development of the jaw. The average age for boys was 8.26, and for girls, it was 8.9.

The patients were divided into three groups based on the treatment methods applied.

The first group treated with consisted of 20 patients (28.6%). The second group treated with a combined method consisted of 12 patients (17.1%). The third group osteosynthesis was performed included 38 patients (54.3%) (table 1). All three groups received similar contemporary and substantial medical interventions.

Table 1

Dividing patients into groups

Groups	Treatment metods	Prospektive (n=70)	%
I group	Conservative	20	28,6
II group	Combined	12	17,1
III group	Osteosynthesis	38	54,3

This passage discusses the prevalence of jaw injuries in children over the years and emphasizes the importance of implementing treatment algorithms to enhance the treatment process. In 2014, it is indicated that the highest percentage of jaw injuries occurred in children. However, in 2015 and 2016, this rate decreased to 8.6%. The lowest number of cases was observed in 2018 and 2010. During these years, the parameters were 4.3% and 7.1% respectively.

Traditional methods of medical history, clinical instrumental examinations (X-rays, computed tomography, orthopantomography) were employed in the evaluation of patients' traumas. Surgical treatment methods: Intraoral approaches were performed in fractures of the mental, symphysis, parasymphysis, body and angular regions.

Middle and low-type fractures of the articular protrusion: If the deviation is between 1-3 mm, treatment is carried out with a conservative method. If it is more than 4 mm and the fracture fragment is displaced medially to the middle cranial fossa, a retromandibular approach is used.

Fractures of the upper type of the articular protrusion and the articular head: If the deviation is between 1-3 mm, treatment is carried out with a conservative method. If it is more than 4 mm and the fracture fragment is displaced medially to the middle cranial fossa, a preauricular approach is used.

Conservative treatment methods: Fractures of the articular eminence and articular head are treated conservatively when there are enough teeth in each arch for reference in the oral cavity. The role of orthodontic treatment in the treatment of jaw fractures has also been confirmed. According to the experience gained in our clinic, orthodontic devices can be placed immediately after trauma. Here, the

jaw is pulled forward with the help of traction in order to reduce the load on the forming joint head, to keep it in the correct position and to activate endochondral osteogenesis processes in the joint head. The duration of orthodontic treatment depends on the results obtained. In our study, circular Class I 4-oz elastics skeletal braces are used in MMF to obtain orthognathic teeth. After 2 weeks of fixation of the jaws, the circular rubber darts were removed and replaced with Class III 4-oz elastics elliptical rubber darts. This allows limited opening of the mouth and keeping the chin in the center line. During the opening of the jaw, rubber darts are used until the excrement comes on its own on the central line. Rubber bands are stored for up to 4 weeks. During opening of the mouth, the deviation was eliminated, after the distance between the jaws reached 30 mm, the rubber bands were removed. After the removal of the rubber bands, no changes were noted in the orthognathic bite, and the movements of the jaw were free and painless.

When there are not enough teeth in each arch for reference in the oral cavity, it is possible to use the conservative method in the patient. In this case, orthognathic screws are placed in the alveolar bone between teeth 54-55, 64-65, 74-75, 84-85.

Combined treatment methods will include both conservative treatment and osteosynthesis surgery. After the osteosynthesis operation, the treatment was continued conservatively.

Mathematical-statistical analysis. Statistical processing of the data obtained during the study was performed. For each group, the mathematical mean (M) and its standard error (m), the absolute number of qualitative indicators and the frequency (%) of quantitative indicators were calculated. The statistical integrity of the difference between the indicators of the statistical comparison of the quantities by groups and subgroups was determined by Student's test and non-parametric methods - Wilcoxon test (for paired samples), Mann-Whitney's U-test (between independent samples) and Fisher's exact method (on a 2x2 frequency table) evaluation of the difference) is mainly defined. Differences between the indicators in the compared groups were considered statistically significant if $p<0.05$.

Statistical processing of the obtained results was carried out on individual computers using Microsoft Office Excel 2013 spreadsheet editor and the MedCalc 12.7 statistical software package.

THE STUDY RESULTS AND THEIR DISCUSSION

A retrospective analysis was conducted using archival materials from 2005 to 2009. The study examined various factors including the average age of sick children, their age ranges, the average number of bed days, the appropriateness of examinations and research conducted, the consequences of incomplete examinations and research, the latest clinical characterization of the disease in patients, accompanying pathologies, the presence of unilateral, bilateral, or multiple injuries of the jaw, the condition of the temporomandibular joints, the causes of pediatric jaw fractures, the treatment methods employed, including the role of cardiovascular measures in the treatment process, the reasons for long-term hospitalization, and the age groups in which fractures are more common. The findings of the retrospective analysis diverged significantly from those of the prospective analysis. We categorized the children diagnosed with MF, who were part of the prospective study, into four different age groups. Upon analyzing the patients based on age groups, it was found that the majority of patients fell within the 8-12 age bracket. The total patient count was 23, representing 32.9% of the total. Subsequently, a significant number of patients were identified within the age brackets of 4-7 and 13-16. Among the patients aged 4-7, 18 individuals (25.7%) were exposed to child MF, while in the 13-16 age group, 17 patients (24.3%) had similar exposure. The 1-3 age group had the fewest number of patients. This indicator accounted for 17.1% of the children we treated.

The study findings indicated that 55.8% of the parents of the children sought medical evaluation and treatment. 37.1% of patients were referred for intricate medical intervention from different city and district central hospitals in our republic, while only 7.1% of patients were transported for immediate medical attention via emergency medical assistance.

Within the study, out of the group of 12 individuals who utilized CO techniques for treating MF, there were 2 patients whose ages fell between 1 and 3. This accounted for 16.7% of the group. However, there is only one patient whose age falls within the range of 4-7 in the appropriate treatment group, accounting for 8.3% of the group.

According to the study, out of the 38 individuals who used OS for treating MF, there were 7 children between the ages of 1 and 3. This accounts for 18.4% of the sick children in the same treatment group. Within this treatment cohort, there were 8 patients who fell within the age range of 4-7, accounting for 21.1% of the total patients in the same treatment group.

Within the study, out of a group of 20 individuals utilizing CV methods for the treatment of MF, there were 6 children aged 8-12. This accounts for 30% of the treatment group in question. Out of the 12 individuals who underwent CO treatment for jaw fractures, only 2 were children within this age range. This accounts for 16.7% of the patients in the respective treatment group.

Within the study, 15 individuals from a treatment group of 38 patients underwent OS surgery. Among these patients, 39.5% were children aged between 8 and 12 years.

The study found that 2 out of the 20 patients in the MF treatment group were between the ages of 13 and 16, representing 10% of the total treatment group. Out of the 12 patients who utilized CO methods for treating MF, 7 of them were children within the suitable age range. This accounts for 58.3% of the patients in the appropriate treatment group. Among the cohort of 38 patients who underwent surgery performed by OS for the management of MF, 8 individuals, accounting for 21.1% of the total, fell within the age range of 13-16 and were classified as children.

Within the treatment group comprising twelve individuals, in which both OS and CV techniques were employed to restore the jaw, three individuals (representing 25% of the group) sustained fractured jaws due to animal-induced trauma. Within this study group, one individual experienced a jaw fracture due to trauma related to sports activities, representing 8.3% of the patients in the treatment group under consideration.

Within a study group consisting of 20 individuals, the occurrence of MF resulting from traumatic incidents at home was documented in 2 patients, representing 10.0% of the group. However, it is important to note that none of the traumas that led to MF in the 12-member research group, where we employed the CO method for treatment, were related to domestic incidents (table 2).

The research findings indicate that among the 38 children in the treatment group who underwent OS surgery for the treatment of MF, 3 individuals, accounting for 7.9% of the group, had injuries caused by animals as the source of their trauma. The research group observed household origin MF in 4 clinical cases, accounting for 10.5% of the total patients in the group. However, no instances of mandibular fractures resulting from sports-related injuries were observed in the children who underwent this particular treatment.

Among the cohort of 20 individuals who exclusively relied on CV methods for treating PMF, only one patient, constituting 5% of the study group, experienced jaw fractures in children due to trauma resulting from a bicycle fall. In the study group that was compared, there were tenfold more instances of MF caused by falls, accounting for 50% of the total cases in that group.

Table 2

Primary etiological factors of trauma in patients with jaw fractures

Ethiology of Injuries	I Group (n=20)	II Group (n=12)	III Group (n=38)	Total (n=70)
Animal Origin	1 (5,0%)	3 (25,0%)	3 (7,9%)	7 (10,0%)
Sports related	1 (5,0%)	1 (8,3%)	-	2 (2,9%)
Household accidents	2 (10,0%)	-	4 (10,5%)	6 (8,6%0
Bicycle Falls	1 (5,0%)	-	2 (5,3%)	3 (4,3%)
Falls	10 (50,0%)	7 (58,3%)	19 (50,0%)	36 (51,4%)
Traffic accidents	5 (25,0%)	1 (8,3%)	8 (21,1%)	14 (20,0%)
Assault	-	-	2 (5,3%)	2 (2,9%)

Note: There was no statistically significant difference in the indicators among the groups.

Five children experienced domestic trauma due to a fall, while two children experienced it in an elevator.

It was clarified that the majority of the children who were exposed to MF - specifically, 24 of them - had their parents apply for examination and treatment on their behalf. 5 patients, representing 17.2% of the total, were referred for treatment from various district central hospitals. The comparative assessment of the findings from prospective and retrospective analyses has demonstrated the superior effectiveness of our research. Due to a lack of comprehensive retrospective analysis, the medical history of sick children has not been thoroughly examined, and there is a dearth of information regarding the initial medical assistance provided for the clinical condition of soft tissues. The accompanying diseases have not been definitively elucidated. The medical history did not provide information about the extent and orientation of the pediatric fracture. There is a lack of information regarding the clinical-functional conditions associated with opening the mouth, including whether it is painful, painless, unrestricted, restricted, slightly restricted, or abnormal. The comprehensive assessment of injuries to the organs of the oral cavity is insufficient.

The medical history did not indicate whether there was any damage to the brain or skull bones. The specific timeframes for when the mouth can be opened after treatment, which are 4 weeks, 3 months, 6 months, and 1 year, have not been specified. No instances of harm to other body regions have been reported in sick children. Furthermore, it is worth mentioning that the positioning of the tooth rows during the mixed dentition phase is not specified. Deliberate consultations with experts were not carried out. The utilization of contemporary examination techniques remains incomplete. The absence of a treatment regimen adversely impacted the treatment outcomes in these patients. The retrospective analysis was performed using archival materials from 29 patients of both genders who received MF treatment between the ages of 3 and 15 years. In contrast to the prospective analysis, a total of 70 children received treatment over a span of 9 years, with 29 of these children being specifically treated for

MF within a 6-year period. This represents an increase of approximately 2.5-fold compared to the number of children treated in the retrospective analysis. Out of the total of 29 patients, 9 were girls, accounting for 31% of the group, while the remaining 20 patients were boys, making up 69% of the group. The mean age of the treated pediatric patients was 11.7 years. In 2009, the majority of patients (38%) were treated for MF, which accounted for 11 out of the total 29 patients. This data indicates that in 2009, a significant proportion of children experienced jaw injuries. The indicator stood at 27.6% in 2007 and 24.1% in 2008. Interestingly, it is worth mentioning that in 2005, our clinic did not receive any referrals as a result of PMF. Upon conducting the retrospective analysis, it was established that 17 out of the patients treated with MF, accounting for 58.6% of the total, were residents of Baku. Out of the patients who applied, 12 (41.4%) were children residing in various cities and regions of our republic.The retrospective analysis reveals that the haphazard, regular, and inefficient treatment of the majority of patients with pediatric jaw fractures has prompted the need for new treatment approaches.

For the assessment of children with a mandibular fracture, we have employed traditional radiographs, CT scans, and orthopantomograms. In children, the primary radiological indication of jaw fractures is the presence of a fracture line along with the displacement of bone fragments. During the examination, we employed X-ray in both straight and side projection. Orthopantomography, an alternative XR imaging technique, produced a panoramic XR image of the jaw that was larger in size and provided clear visibility of fracture fragments. We utilized CT and 3D CT examinations, along with conventional XR examination and orthopantomogram, for diagnosing pediatric jaw fractures. Our utilization of radiation examination techniques establishes the foundation for accurate diagnosis and effective treatment of pediatric patients. Following the study, it was found that out of the 70 patients who had a fracture in the jaw, 50 individuals, accounting for 71.4% of the total, were male, while 20 individuals, accounting for 28.6% of the total, were female children. The research findings indicate that 66.7% of the patients, specifically 8 out of 12, were male. Additionally, the

average age of these male patients was 10.5±2.13. Out of the 12 sick children we treated, 4 of them, or 33.3% of the total, were female research subjects. The average age of these female subjects was 12.0±1.68. As a result of our research, 30 of the 38 children, or 78.9% of them, were male. Eight patients or 21.1% of the patients in the appropriate treatment group were female children. It should be noted that the average age of the group of male patients who used OS surgery for the treatment of jaw fractures was 7.8±0.77, and 10.5±1.45 in the corresponding treatment group of female patients (t=1 .65; P>0.05) was determined.

In the study, 12 out of 20 patients, or 60% of them, belonged to the male gender, in which we used only the conservative method for the complex treatment of jaw fractures in children. The average age in the group of men who used conservative methods for treatment was 8.0±1.30. Despite this, the average age in the group of women who used osteosynthesis for treatment was 5.8±0.73. It should be noted that 8 out of 20 patients, or 40% of them, were women.

The research findings indicate that among the 12 patients who underwent combined treatment for jaw fracture in children, 8 of them, accounting for 66.7% of the total, were male. The average age of these male patients was 10.5 ± 2.13 years. Out of the 12 sick children being treated for fractures, 4 of them, or 33.3% of the total, were female research subjects. The average age of these female subjects was 12.0±1.68.

Our research findings indicate that out of the total of 38 children, 30 of them, which accounts for 78.9%, were male. Out of the patients in the appropriate treatment group, eight individuals, accounting for 21.1% of the total, were female children. The average age of male patients who underwent osteosynthesis surgery for jaw fractures was 7.8±0.77, while the average age of female patients in the same treatment group was 10.5±1.45. (table 3)

Table 3.
The treatment approach for jaw fractures involves assessing the average age indicators in different groups.

Treatment groups	Man			Woman		
	Relative Frequence	%	Mean age	Relative Frequence	%	Mean age
I group (n=20)	12	60,0	8,0±1,30	8	40,0	5,8±0,73
II group (n=12)	8	66,7	10,5±2,13	4	33,3	12,0±1,68
III group (n=38)	30	78,9	7,8±0,77	8	21,1	10,5±1,45
Total	50	71,4	8,3±0,65	20	28,6	8,9±0,92

Following the research, we observed that out of the 20 children and teenagers in the treatment group, who were exclusively treated with CV methods for MF, there were 3 children aged 1-3. These children constituted the appropriate conventional treatment-age group, accounting for 15% of the total patients. Signifies or indicates. Deviation was observed in all patients of the appropriate treatment-age group upon arrival at the hospital.

Out of the 20 patients we treated for MF using the CV method, 9 of them were between the ages of 4 and 7. These children comprised the suitable treatment-age group. Among the patients in this specific age group who were hospitalized, 8 of them experienced jaw deviation, accounting for 40% of the total patients who received CV treatment.

No abnormalities were observed in any of the patients during the follow-up examinations conducted at the 3rd, 6th, and 12th months after the administration of CV treatment in the corresponding age group.

Following the study, it was observed that out of 6 patients in the conventional treatment-age group (children aged 8-12) who were satisfied with CV treatment for MF, 5 patients exhibited a deviation in

the jaw bone during hospital examinations. Consequently, these patients underwent CV treatment. We applied the treatment to 25% of the patients.

Following the study, one teenager in the treatment-age group of 13-16-year-old adolescents, who were treated with CV methods for MF, exhibited jaw deviation. This accounts for 5% of all patients who received CV treatment across all age groups. shielded The word "the" is a definite article used to indicate a specific noun or noun phrase.

During our study on patients undergoing CO treatment for correcting MF, we examined the presence and size of jaw deviation in different age groups. Two children, aged between 1-3, were admitted to the hospital for treatment. One child had a 3 mm deviation, while the other had a 4 mm deviation. These cases accounted for 16.7% of the total patients (n=12) who received CO treatment.

The research revealed that there were 7 individuals in the age group of 13-16 years who opted for CO treatment measures for MF treatment, making them the specific treatment-age group. Out of the total number of patients, 25% of those who were in the appropriate treatment-age group and received CO treatment had a recorded deviation upon admission to the hospital. Out of the 38 patients who had OS surgery to treat MF, there were 7 children between the ages of 1 and 3. These children were brought to the hospital and examined during the study period, and they belonged to the appropriate age group for treatment.

During the study, the age range of 8 patients who underwent OS surgery for the treatment of MF was between 4 and 7 years. These patients formed the appropriate treatment-age group. Out of the patients who were in the appropriate age group for treatment, 3 patients exhibited deviation upon their arrival at the hospital. This accounted for 7.9% of the total patients who underwent OS treatment. Currently, the magnitude of the deviation measured 4 mm in all patients. In the first month following the OS operation, the patients' condition of deviation persisted, but its dimensions were reduced. Given that the suitable indicator was 3 mm, the average measurement for the group was also determined to be 3 mm. During the initial month following OS operations in the relevant treatment-age group, only one

patient exhibited jawbone deviation, which accounted for a mere 2.6% of the total number of patients who underwent OS operations. The patient's deviation index measured 1 mm. Upon conducting examinations at the 6th and 12th month post-operation, the findings observed in the 3rd month were consistently replicated in the patients. During the study, we included 15 children aged 8 to 12 in the patient group undergoing OS surgery for the treatment of MF. These children formed the suitable age group for treatment. Deviation was observed in 9 patients within the appropriate treatment-age group or in 23.7% of the patients who underwent osteosynthesis surgery across all age groups. Among the patients examined, the smallest recorded deviation size was 2 mm, while the largest recorded deviation size was 5 mm. The average deviation size for the group was calculated to be 3.7±0.37 mm. During the examinations conducted in the first month after implementing treatment measures in the appropriate age group, 6 out of the total osteosynthesis patients, accounting for 15.8%, exhibited ongoing deviation. Throughout the examination period, the minimum deviation index among patients was 1 mm, while the maximum index reached 2 mm. The average deviation for the group decreased to 1.7±0.21 mm. During our examinations in the 3rd month after OS operations, we observed a decrease of 3 patients with jaw deviation in the appropriate treatment-age group. This group accounted for 7.9% of the total patients who underwent osteosynthesis operations across all age groups. Throughout the examination period, the group's average jaw measurement was determined to be 1.7±0.33 mm, with the smallest deviation being 1 mm and the largest deviation being 2 mm. During our examinations conducted in the 6th month after the completion of treatment measures, we observed a decrease in the number of patients with deviation to 2 among suitable patients. One patient had a jaw deviation indicator of 1 mm, while the other had a deviation of 2 mm. On average, the indicator was calculated to be 1.5±0.50 mm in both patients. This scenario was also noted during the examinations conducted in the twelfth month following the OS procedure.In our study, comparing OS and CV methods, it was decided that depending on the clinical situation, the conservative method can be considered as the main method of choice. Currently,

there are many ways to treat jaw fractures in children. However, the number of complications of CV treatment is low. The advantage of CV treatment allows it to be used as a standard in any clinical setting. If the treatment is not carried out correctly and on time, it can cause serious consequences for the developing organism.

The characteristics of all the clinical parameters of this treatment algorithm, the main etiological factors of trauma, the localization of fractures in the jaw and their frequency, the occurrence of fractures in different areas of the jaw and their age intervals, the relationship between bed days, the different forms of teeth during trauma, the central incisor during mouth opening we can say that it will be effective from a scientific and practical point of view, taking into account that the distance between the teeth, including mouth opening, jaw movements and jaw deviation is prepared as a result of a complete and accurate study of all patients. Therefore, for the first time, we proposed and developed an algorithm to improve the treatment process for various nosological forms of jaw fractures in children. In addition, it should be noted that a complete and accurate analysis of clinical parameters during MF in children in different age groups has justified the development of algorithms for the treatment of jaw fractures in children.

1-3 years

a) Mandibular symphysis and mental Fractures.

Displaced - osteosynthesis

Non-displaced - conservative.

When there are teeth (non-edentulous) – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),

Edentulous - solid nutrition

b) Mandibular body Fractures

Displaced - osteosynthesis

Non-displaced - conservative.

When there are teeth (non-edentulous) – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),

Edentulous - solid nutrition

c) Fractures of the angular region of the jaw

Displaced - osteosynthesis

Non-displaced - conservative.
When there are teeth (non-edentulous) – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - orthognathic screws
d) Low and medium type fractures of the articular protrusion of the jaw
Displaced - conservative, combined.
When there are teeth (non-edentulous) – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
When there are no teeth (edentulous) - osteosynthesis
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous- solid nutrition. e) Fractures of the high type of the articular protrusion of the jaw and the articular head
Displaced - conservative, combined.
Auxiliary components of time-fixed appliances with teeth (archwires+orthodontic brackets+rings),
Edentulous - osteosynthesis
Unchanged - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition

4-7 years old

a) Fractures of the mental and symphysis regions of the jaw
Displaced - osteosynthesis
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition
b) Fractures of the body area of the jaw
Displaced - osteosynthesis
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition

c) Fractures of the angular region of the jaw
Displaced - osteosynthesis
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition
d) Low and medium type fractures of the articular protrusion of the jaw
Displaced - conservative, combined.
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - orthognathic screws
e) Fractures of the high type and articular head of the articular eminence of the jaw
Displaced - conservative, combined.
Non-displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - orthognathic screws

8-12 years old

a) Fractures of the mental and symphysis regions of the jaw
Displaced - osteosynthesis
Non-Displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition
b) Fractures of the body area of the jaw
Displaced - osteosynthesis
Non-Displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition
c) Fractures of the angular region of the jaw
Displaced - osteosynthesis
Non-Displaced - conservative.

When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - solid nutrition
d) Low and medium type fractures of the articular protrusion of the jaw
Displaced - osteosynthesis, combined - auxiliary components of fixed technique (arch wires + orthodontic brackets + rings),
Non-Displaced - conservative.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous- orthognathic screws
e) Fractures of the high type and articular head of the articular eminence of the jaw
Displaced - combined.
When there are teeth – auxiliary components of fixed equipment (archwires+orthodontic brackets+rings),
Edentulous - orthognathic screws
Non-displaced - conservative. Auxiliary components of fixed appliances (archwires+orthodontic brackets+rings)

13-16 years old

a) Fractures of the mental and symphysis regions of the jaw
Displaced - osteosynthesis
Non-conservative. Auxiliary components of fixed technique (archwires+orthodontic braces+rings).
b) Fractures of the body area of the jaw
Displaced - osteosynthesis
Non-displaced - conservative. Auxiliary components of fixed equipment (archwires+orthodontic brackets+rings).
c) Fractures of the angular region of the jaw
Displaced - osteosynthesis
Non-Displaced - conservative. Auxiliary components of fixed equipment (archwires+orthodontic brackets+rings).
d) Low and medium type fractures of the articular protrusion of the jaw
Auxiliary components of displaced - osteosynthesis, combined - fixed technique (arch wires + orthodontic brackets + rings),

Non displaced - conservative
e) Fractures of the high type and articular head of the articular eminence of the jaw
Displaced - osteosynthesis, combined - auxiliary components of fixed technique (arch wires + orthodontic brackets + rings),
Non Displaced - conservative. auxiliary components of fixed equipment (archwires+orthodontic brackets+rings.

It is noteworthy that the implementation of treatment algorithms for jaw injuries in children will significantly improve the treatment process.

CONCLUSİONS

1. The primary factor contributing to different jaw fractures in children is domestic trauma, accounting for 55.2% of cases. The majority of these fractures occur in the 13-16 age group, representing 44.8% of cases. An examination of past medical records regarding the treatment of jaw fractures in children has verified that there is no established standard procedure.
2. The treatment method was selected based on the displacement of the fractured fragments, the dental condition, and the patient's age. The prospective study utilized the following treatment approaches: surgical treatment (osteosynthesis) was administered to 38 patients (54.3%), conservative treatment (orthodontics) was given to 20 patients (28.6%), and a combined approach involving both surgical and conservative treatments was applied to 12 patients (17.1%). [5, 6, 9].
3. When determining treatment strategies, osteosynthesis surgery is primarily carried out in the 8-12 age group (21.4%) based on clinical and radiological indicators. Conservative treatment is most commonly employed in the 4-7 age group (45%), while combined treatment is preferred for the 13-16 age group (58.3%). [5, 7, 9, 10].
4. The study conducted after implementing the proposed treatment diagnostic algorithm did not identify any

inflammatory-degenerative complications or jaw deformations in the patients. [3, 8, 11].

PRACTİCAL RECOMMENDATİONS

1. When treating jaw fractures in children who have been injured, doctors should take into account the potential deformities that may arise during the growth and development of the body.
2. To achieve optimal outcomes in treating children with different types of jaw fractures, it is advisable to utilize the suggested diagnostic algorithm for treatment.
3. Orthodontic intervention is advised for children with jaw fractures to enhance the treatment process promptly following the trauma.

LIST OF SCIENTIFIC REFERENCES PUBLİSHED ON THE TOPİC OF THE DISSERTATION:

1. Rəhimov Ç.R., Fərzəliyev İ.M., Abdullayev E.M. Uşaqlarda çənənin oynaq başının sınıqları məsələsinə aid // Dayaq-hərəkət apparatının xəsarətləri və xəstəliklərinin müalicəsi. Travmatologiyada və ortopediyada müasir texnologiyalar. Ağırlaşmaların müalicə və profilaktikası mövzusunda 6-cı beynəlxalq elmi-praktik konfransı materialları. – Bakı, – 4-26 sentyabr, 2010, – s.108-117.

2. Rahimov C.R., Abdullayev E.M. The orthodontic treatment in paediatric patients with unilateral condylar fracture // 20th International Taoms Congress in conjunction with regional countries`associations. – Antalya, –19-23 may 2013, – p.165.

3. Rəhimov Ç.R., Abdullayev E.M. Uşaqlarda çənənin oynaq başının sınıqları məsələsinə aid // – Bakı: Sağlamlıq, – 2014. № 1, –s. 58-64.

4. Abdullayev E.M., Rahimov C.R., Right approach in the treatment of mandible fractures in paediatric patients // ACBID2014-8th International Congress, 28 may-1 June 2014, Mardan Palace-Antalya, – 2014, – p. 30.

5. Абдуллаев Е.М., Юсифов Р.А. Лечение переломов мыщелкового отростка нижней челюсти у детей: консервативный и хирургический подходы // «Хирургия. Восточная Европа», – 2018. Том 7. № 4, – с. 436-441.

6. Rəhimov Ç.R., Abdullayev E.M., Əhmədov E.T. Uşaqlarda çənə sınıqları // Azərbaycan Təbabətinin Müasir Nailiyyətləri, –2018. № 4, – s.124-129.

7. Abdullayev E.M. Uşaqlarda çənə sümüyünün oynaq çıxıntısı sınıqlarının müalicə üsullarının müqayisəsi // – Bakı: Azərbaycan Tibb Jurnalı, – 2019 №2, – s.98-101.

8. Abdullayev E.M. The adequate approach in pediatric mandibulyar body fractures // Azerbaijan Society of oral and Maxillofacial Surgeons, 1st International scientific congress, scientific program. Baku, 14-16 march 2019, – p.96-97.

9. Абдуллаев Е.М. Новый подход к лечению детских переломов нижней челюсти // – Одесса: Вісник стоматології, – 2020. Т 35. № 1(110), – с. 75-79.

10. Abdullayev E.M. Non-surgical treatment of condylar fractures in children // Oral and Maxillofacial Surgery Cases, – 2020. 6 (1), – p. 100-134.

List of Abbreviations

MF – Mandibular Fracture
PMF – Pediatric Mandibular Fracture
CF – Condylar Fracture
CP – Coronoid Process
SCF – Subcondylar Fractures
CT – Computed Tomography
OS – Osteosynthesis
CV – Conservative
CO – Combined
XR – X-ray
MMF – Maxillo-Mandibular Fixation

The defense will take place on "23" February of 2024 at 14 at a meeting of the Dissertation Council ED 2.50, operating on the basis of the Azerbaijan Medical University

Address: AZ 1022, Baku, str. 14 A.Gasimzadeh 14, (Conference hall).

The dissertation can be found in the library of Azerbaijan Medical University.

The electronic version of the dissertation and abstract are posted on the official website of the Azerbaijan Medical University (www.amu.edu.az)

The abstract has been sent to the approprite addresses "19" January 2024 year

Protocol for print: 08.01.2024.

Paper format: 60 x 84 1/16

Volume: 38,684

Number of hard copies: 20