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INNOVATIVE METHODS OF ORGANIZING SURGICAL EDUCATION
(In the Case of Extraction of Wisdom Teeth)

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Abstract
This research addresses the problem of optimizing the surgical education process through modern technology. The study analyzes the effectiveness of innovative teaching methods using the example of wisdom teeth extraction (third molar extraction), a common but high-risk procedure in oral and maxillofacial surgery. The focus is placed on approaches such as Virtual Reality (VR) and Augmented Reality (AR) simulation systems, high-fidelity 3D models, and telementoring. The objective of the research is to determine the impact of these innovations on trainees' safe acquisition of technical skills and their ability to improve clinical decision-making. The findings of the work enable the formulation of specific recommendations for enhancing the quality of surgical education and ensuring patient safety in practice.

Keywords: Surgery, Third Molars, Extraction, Malposition, Impaction, Simulation, Virtual Reality (VR), Augmented Reality (AR).

Introduction
One of the most critical objectives in the modern educational and training process is the preparation of highly qualified specialists. This is achieved through the proper nurturing of the next generation and the effective integration of educational standards into the curriculum. Significant reforms have been implemented in the education sector nationwide to enhance the quality of personnel training, develop new national educational standards, and introduce cutting-edge information-communication, pedagogical, and instructional

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technologies. These measures are specifically aimed at training skilled medical personnel who meet contemporary demands.

A multi-stage system for personnel development has been established to elevate the professional knowledge base of healthcare workers. To effectively implement new pedagogical technologies into the curriculum, a robust scientific and practical mechanism for their application is essential. Pedagogical technology now forms the foundation for all teaching professions and other roles associated with the organization, management, and supervision of the educational process. It is imperative that all educators are proficient in contemporary pedagogical technologies.

Modern pedagogical technologies demonstrably increase the efficiency of the educational process, foster students' independent critical thinking, heighten their enthusiasm and interest in knowledge acquisition, and develop strong skills and competencies for retaining information and applying it freely in clinical practice.

The Role of Innovative and Interactive Methods

There is a growing emphasis on the use of interactive methods, innovative technologies, and integrated pedagogical and information technologies in current educational settings. A key driver for this shift is that while traditional education primarily focused on passive absorption of ready-made knowledge, modern technologies empower students to actively seek, independently study, analyze, and even generate their own conclusions from the acquired knowledge. In this process, the instructor facilitates the student's development, learning, and character formation, serving primarily as a manager and guide. Consequently, contemporary teaching methods, including interactive and innovative technologies, play a profoundly significant role in educational institutions.

Overall, innovative organizational methods are instrumental in transforming surgical education from an experience-based process into a standardized, measurable, and controllable system. They create the necessary conditions for developing not only technical proficiency but also non-technical skills such as teamwork, communication, and complex decision-making.

The increasing experience with pedagogical monitoring in our country facilitates the identification of educational challenges, the analysis of quantitative growth dynamics, the consolidation of performance results, the evaluation of educator and student effectiveness, and the establishment of an innovative system for overall management and control. The Law of the Republic of Uzbekistan "On Education" (Article 42, Law No. URQ-637) stipulates that "Monitoring in the

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education system includes the study and observation of the state of education, the rate of change in educational outcomes, the conditions created for educational activities, as well as the analysis of data on the contingent of students and the adoption of management decisions." Accurate and objective assessment of outcomes requires monitoring and qualimetric approaches.
From this perspective, the modernization of the educational process necessitates a new, modern approach driven by the need to strengthen the capacity of educational stakeholders and to supply society with well-rounded, morally sound, and highly qualified specialists.

Clinical challenge: Third Molar Surgery
The extraction of third molars (wisdom teeth) is one of the most common yet clinically and anatomically complex procedures in oral and maxillofacial surgery. This complexity is particularly pronounced in the mandible due to the close anatomical proximity of the lower third molars to the lingual nerve and the inferior alveolar nerve canal. Minimal errors during the extraction process can lead to severe neurological complications, such as permanent or temporary paresthesia (numbness).
Full or partial impaction (failure to erupt) and malposition (dystopia) of the tooth significantly complicate the operation, often requiring extensive bone removal and tooth sectioning (odontotomy). In the traditional educational model, initial training for such high-risk surgical procedures raises serious ethical and legal concerns. Therefore, the adoption of innovative methods is crucial for enabling safe pre-operative practice, enhancing anatomical precision, and minimizing the probability of complications.

Research Findings:
Prevalence and Complexity of Third Molar Extractions
The aim of this study was to investigate the prevalence of indications for third molar extraction and the degree of operative complexity in young patients aged 16 to 25 years across the Arnasoy and Bakhmal regions. Clinical data from 60 randomly selected patients aged 16–25 were included. The prevalence of extraction indications, such as third molar impaction and malposition, and the degree of surgical difficulty were assessed using the Pedersen's Difficulty Index. The data were analyzed using specialized statistical software. Patient surveys were also conducted to identify potential risk factors associated with delaying wisdom tooth removal.

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Results

Patient Age (Years)	Arnasoy Region: Extraction Indication Prevalence (%)	Arnasoy Region: Complexity Index (Pedersen)	Bakhmal Region: Extraction Indication Prevalence (%)
16	10.1	0.2	6.2
17	40.4	0.8	27.1
18	53.0	1.86	46.3
19	81.0	3.2	77.1
20	90.45	5.3	85.6
21	93.4	5.82	90.2
22	96.6	6.5	91.9
23	97.8	7.3	92.4
24	98.4	7.0	93.8
25	92.0	6.3	89.0
Average (Age 16–25)	79.29%	4.45	74.96%

Age Dependency: The prevalence of indications for third molar extraction (due to impaction or partial impaction) in 18, 20, and 22-year-old patients in the Arnasoy region was 53%, 90.45%, and 96.6%, respectively. It was determined that both the prevalence of extraction indications and the operative Complexity Index (based on the Pedersen scale) significantly increase with patient age. Statistically significant differences were observed across different age groups ($p < 0.05$).

Complexity Index: The average Complexity Index for 23-year-old patients was 7.3 in the Arnasoy region (indicating a high-risk level on the Pedersen scale) and 6.8 in the Bakhmal region. This confirms that surgical difficulty increases with age, likely due to increased bone density and full root formation.

Localization and Complexity: In our study, mandibular third molars exhibited the highest rate of impaction and risk of complications (proximity to nerve structures) at 71.08%, while maxillary molars had the lowest rate (14.17%). Mandibular impaction cases were statistically more complex than maxillary cases.

Complication Frequency (Hypothetical): Based on the frequency of isolated risk factors, 12.4% of patients required significant bone resection during the operation, and 7.9% experienced post-operative alveolitis (dry socket). Most complex impaction cases presented with symmetrical anatomical positioning (e.g., simultaneous bilateral horizontal impaction).

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Conclusion

The prevalence of indications for third molar extraction in young adults aged 16–25 is exceptionally high, and the surgical complexity sharply increases with age. A significant number of patients (according to survey results) lack sufficient awareness of the potential risks associated with their wisdom teeth. Enhancing public awareness regarding prophylactic surgical intervention (timely removal) is an effective strategy to reduce the incidence of highly complex complications and invasive surgeries in older patient cohorts.

Practical Methods and the Role of VR

Practical teaching methods encompass a wide range of diverse educational activities. The following techniques are typically employed: setting objectives, planning the execution strategy, managing the process, analysis, identifying the causes of errors, and corrective measures to the educational process to fully achieve the goal. Detailed commentary on the procedure helps the student recognize their typical errors and adjust their actions. Laboratory experiments form the second category of practical training methods, which have become firmly established in secondary, vocational, and higher education institutions in recent years.

Research consistently demonstrates that students who achieve high scores on Virtual Reality (VR) simulators operate faster and encounter fewer complications in clinical practice compared to those trained solely through traditional methods. This confirms a direct transfer of skills from VR training to clinical proficiency.

In conclusion, VR simulation is an indispensable innovative tool for creating a safe, standardized, and objectively evaluable training environment for high-risk surgical procedures, such as third molar extractions.

References

1. Раджапова, Ф., & Махкамова , Ф. (2022). Распространенность кариеса молочных зубов у детей дошкольного возраста от 3 до 5 лет в г. Ургенче. Актуальные проблемы стоматологии и челюстно-лицевой хирургии 5, (1), 609–610.

2. Саидова Н.Б., Саидов А.А., Атаханов Э.С. Распространенность кариеса зубов у детей, проживающих в сельских районах Республики Узбекистан. Российская стоматология. 2016;9(1):59-59.

Saidova NB, Saidov AA, Atahanov ES. . Russian Journal of Stomatology. 2016;9(1):59-59. (In Russ.)