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INTERDISCIPLINARY APPROACH TO COMPLEX FULL-MAXILLARY RESTORATIONS: COLLABORATION BETWEEN DENTIST AND TECHNICIAN

МІЖДИСЦИПЛІНАРНИЙ ПІДХІД ДО СКЛАДНИХ ПОВНОЩЕЛЕПНИХ РЕСТАВРАЦІЙ: СПІВПРАЦЯ МІЖ СТОМАТОЛОГОМ ТА ТЕХНІКОМ

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Abstract. *The article highlights the topical issue of an interdisciplinary approach to complex full-maxillary restorations. The main stages and principles of teamwork that contribute to obtaining an optimal result in complex clinical cases are analyzed. The interaction between the dentist and the technician allows to take into account all aspects of treatment and create an individual plan for each patient, which contributes to the achievement of high accuracy, functionality and aesthetics of restoration work. Thanks to this cooperation, the risks of errors are minimized at all stages of treatment and fabrication of structures. Particular attention is paid to digital modeling and preliminary coordination of the result between all participants in the clinical process.*

Key words: *dentistry, restoration, interdisciplinary approach, aesthetic result.*

Statement of the problem.

Nowadays, there is a transition to a highly specialized and interdisciplinary approach in the dental practice of complex clinical conditions. This approach is optimal not only for patients but also for dentists who want to ensure optimal treatment results. An interdisciplinary approach allows to use the knowledge and skills of different specialists to develop a comprehensive therapy that provides optimal patient care.

The visual appeal of teeth and smiles has a significant impact on how others perceive people, as well as on their self-esteem and self-confidence [1]. Meeting the specific aesthetic desires and needs of the patient is a major challenge in dentistry. Digital technologies have become an integral part of solving these problems, allowing for the creation of personalized smile designs regardless of the clinician's or dental technician's own aesthetic judgment [1; 2; 3]. Digital technologies not only optimize treatment planning, smile design, and restoration creation, but also ensure effective

collaboration between dentists and technicians, which improves the outcome of restorations [4; 5].

Analysis of recent research and publications.

The scientific literature Mykhaylyuk N. (2024) emphasizes the important role of coordinated teamwork between dentists and technicians, especially in complex full-maxillary restorations, which provides high-quality and comprehensive dental care. Researchers Cofar (2022), Charavet (2019), Yassmin, F., & Blatz, M. B. (2022), Poggio (2021), Coachman (2021) identify the importance of using digital protocols to improve the work of interdisciplinary teams. In their works, Ali Saleh Mohammed Alkhamsan (2024), Hassan (2024), Alshahrani (2024) emphasize the importance of cooperation between dentists and dental technicians.

Cole & Mehta (2024), Hassan (2024) point out that the integration of interdisciplinary expertise allows dental teams to improve treatment outcomes and increase its stability.

The purpose of the study is to determine the features of an interdisciplinary approach to complex full-maxillary restorations.

Summary of the main material.

Modern technological developments are driving advances in biomaterials, surgical procedures, and digital technologies that are improving the effectiveness of long-term rehabilitation for patients with complex problems. Prosthodontists, orthodontists, oral and maxillofacial surgeons, and technicians collaborate to achieve optimal restoration of function and aesthetics. This includes reconstructing damaged jaw bones, designing prostheses, and correcting occlusal discrepancies. Effective rehabilitation improves physical outcomes and promotes psychological recovery by eliminating disfigurement and restoring patients' self-confidence [4; 5; 6].

The ability of the dental technician and the dentist to work together effectively and communicate is essential to producing high quality, long-lasting dentures. A poorly designed prosthesis has a high chance of causing tissue injury, as inadequate communication of design information results in a prosthesis that is made with minimal consideration of important clinical or biological data. The ideal way of communication

is when the dental technician can communicate face-to-face with both the patient and the dentist. In doing so, the dental technician can gather information about the patient, individual lip movements, and aesthetic needs that cannot be obtained with mounted impressions. However, since the dental laboratory and the dental office are sometimes located in different places, not all doctors and technicians can afford such communication. A qualified technician can correct minor errors made during preparation or hide them and create a satisfactory restoration. The design and specifics of each restoration or component should be described in full and in a language that the technician can understand. It is easier for the technician to create successful restorations that meet the patient's needs and desires by utilizing a variety of communication tools between the dentist and the patient. Therefore, effective communication with the dental technician is considered as a barrier to treatment effectiveness, especially in cases of aesthetic needs [7].

Dentists, in particular oral and maxillofacial surgeons and prosthodontists, have advanced experience in the diagnosis and treatment of complex full-maxillary restorations, reconstructive surgery, and rehabilitation care. They often serve as team leaders, managing the overall treatment strategy. Dental technicians play an important role by fabricating customized prostheses and appliances that facilitate patient recovery and functionality. Meanwhile, dental assistants provide indispensable support in patient preparation, documentation, and chairside assistance, ensuring efficiency and continuity of care [4; 8; 9].

Effective collaboration between dental technicians and dentists is paramount to achieving high-quality results, and clear communication ensures that customized designs meet clinical requirements [8]. Their collaboration in complex full-maxillary restorations will take place through several key stages, each of which is essential to achieving high quality and long-term success of the orthopedic treatment, namely

✓ Diagnosis and planning of restorations.

✓ Determination of materials.

✓ Production of demonstration models.

✓ Clinical checking and correction.

✓ Installation of restorations.

✓ Checking functionality, aesthetics and comfort.

✓ Further monitoring and maintenance.

Dental diagnostics involves a comprehensive assessment of the oral cavity using a visual examination, x-rays, and diagnostic tests. Visual examination is essential for assessing the condition of the oral cavity and is highly effective in detecting dental problems such as tooth decay, gum disease, and early signs of oral cancer. Studies emphasize that the sensitivity of conventional dental examinations increases when they are complemented by additional diagnostic methods, especially for disease detection [10]. Radiographic techniques such as X-rays and cone beam computed tomography (CBCT) are important for diagnosing gum problems, bone structure abnormalities, and complex lesions that are not visible on clinical examination. Innovations such as optical coherence tomography (OCT) are emerging as radiation-free alternatives for high-resolution imaging, although they are currently limited in depth of penetration and field of view compared to radiographic techniques [11]. As noted by Erdelyi et al. (2020), Essat et al. (2022), the use of such technologies achieves a comprehensive diagnostic approach, increases accuracy and early detection of dental pathologies [10; 11].

Dental technicians use advanced methods and technologies, such as CAD/CAM systems, to design and create customized devices that improve comfort, functionality, and aesthetics. In addition to their technical knowledge, dental technicians contribute to innovations in prosthetic manufacturing by integrating digital workflows. These workflows facilitate the production of precise, durable, and cost-effective dental devices, even for complex cases. The use of modern technologies, such as 3D printing, has also made it possible to reduce production time while maintaining high standards of accuracy and customization. These advances emphasize the indispensable role of dental technicians in ensuring the success of dental treatment and increasing patient satisfaction. Dental technicians make a significant contribution to the fabrication of temporary and permanent prostheses necessary for the recovery of patients [12; 13; 14]. They work closely with oral and maxillofacial surgeons and orthopedists to

fabricate permanent restorations such as crowns, bridges, and implant-supported prostheses.

Cofar et al. (2022) [15], Yassmin, F., & Blatz, M. B. (2022) [16] pointed out the possibility of using digital protocols and modern design tools to improve the efficiency of interdisciplinary patient care in complex cases. In addition, this approach contributes to the definition of clearer treatment regimens, which increases accuracy, predictability, and contributes to functional and aesthetic success [15; 16].

New technologies and software have been developed to diagnose, plan, and design an interdisciplinary, aesthetic, and functional final smile. Facial appearance, or more specifically smile aesthetics, plays a predominant role in patient satisfaction in terms of quality of life and self-esteem. The final aesthetic result remains the central part that determines the success of restorations. Therefore, a dynamic dentofacial analysis of the relationship between teeth, lips, and face should be performed to achieve ideal results in complex full-maxillary restorations [17].

Digital smile design (DSD) is a systematic protocol that includes photographs and software analysis. DSD aims to assist the practitioner in creating and planning a course of treatment, especially in an interdisciplinary approach, and provides a virtual simulation of the final result. In addition, it is a tool that allows communication and discussion between the entire dental team, including the dental laboratory, as well as with the patient. The study by Charavet et al. (2019) proved the clinical effectiveness of DSD in planning complex orthodontic treatment as part of an interdisciplinary approach [17].

Digital smile design and restoration planning tools simplify processes by utilizing libraries of natural teeth based on the specific aesthetic and functional needs of each patient. The extensive information gathered in the virtual space and the treatment plan that is integrated in the initial digital design facilitate true interdisciplinary treatment planning and execution, involving all dental specialties, from orthodontics to surgery and prosthodontics [15]. The new 3D digitization technology can help with the overall modeling of treatment before the start of the entire complex interdisciplinary approach [18]. Thus, in the study by Lv et al. (2022), the development and implementation of a

3D digital modeling workflow for complex aesthetic rehabilitation by interdisciplinary teams was carried out [2]. It was found that the 3D treatment plan was significantly higher than the DSD with conventional wax modeling (9.7 ± 0.5) points versus (6.4 ± 1.4) ($P < 0.01$), and the level of patient satisfaction with the 3D treatment plan (9.0 ± 0.6) was higher compared to the DSD with conventional wax modeling (7.1 ± 1.8) ($P < 0.01$) [2].

It should be noted that well-coordinated cooperation of specialists in interdisciplinary teams contributes to more effective results of complex full-maxillary restorations (Table 1).

Table 1 – Main advantages of an interdisciplinary approach to complex full-maxillary restorations

Advantages	Result
Improved quality of restoration of functions and aesthetics	Collaboration between the dentist and the technician allows for a more accurate consideration of anatomical, functional and aesthetic parameters, which leads to a more natural and functionally comfortable prosthesis
Reduced treatment time	Coordinated work allows to go through the stages of planning, manufacturing and installation of prostheses faster
Reduced risk of errors and complications	Good communication between different specialists reduces the likelihood of inaccuracies in the manufacture of prostheses, which is especially important in complex cases
Individual approach	Allows us to take into account the peculiarities of the clinical situation of each patient and select the best solutions for their specific needs
Increasing the predictability of the result	Coordinated actions contribute to a more accurate reproduction of natural anatomy and functioning, which makes the result stable
Improved patient comfort	Due to the high precision and aesthetics, patients receive more comfortable and natural prosthetics, which increases their satisfaction with the treatment result

Source: Compiled by the author based on [2; 5; 7; 8; 12; 19].

Modern scientific research proves the need for an integrated approach to solving both small and large dental problems. Effective solutions regarding function and aesthetics were found by Al- Sunbul (2025) [20] through the use of an interdisciplinary approach that included periodontal therapy, orthodontic, endodontic and restorative therapy using advanced materials and techniques. Such coordinated professional cooperation improves both the physical and emotional well-being of the patient. Initial preventive measures, extractions, temporary fixation, composite restorations, non-surgical root canal treatment, and the use of fiber and zirconia posts all contributed to the successful restoration of the patient's oral health. Other authors Gil et al. (2025) [21] showed the effectiveness of an interdisciplinary approach to define a strategy for complex full mouth rehabilitation that included aesthetics, function, and periodontal health using defect-oriented preparation techniques.

In a study by Gandhi (2016) [19], crown lengthening improved gingival sulcus bleeding, patient satisfaction and aesthetics, and periodontal health and dysfunction in patients who had lost their maxillary anterior teeth. This indicates that careful treatment planning and occlusal adjustments of both final and temporary restorations are important. Occlusal rehabilitation is vital for the long-term achievement of restorations and overall oral health, requiring a multidisciplinary approach in complex cases [19; 20; 22].

Minervini's (2024) research shows the effectiveness of an interdisciplinary approach in diagnostic mockups for crown lengthening, a finite element method for assessing bone stress, and an innovative approach to treating malocclusion and cleft lip and palate [6].

Nowadays, it has been established that one of the tasks of dental technicians is to choose the material for dental prosthetics. This can help to achieve more positive results of prosthetic restoration in terms of functional and aesthetic requirements. Materials should be durable, biocompatible, and aesthetically pleasing. Materials such as porcelain are known for their durability and lower maintenance requirements compared to materials such as acrylic. Composite materials also show promise in terms of strength and maintenance [8; 23]. Innovative developments in biocompatible

materials, such as CAD/CAM polymers, reduce the risk of allergic reactions, which increases patient safety. Such materials are characterized by favorable mechanical properties and less pressure on the tooth structure, which makes them suitable for a wide range of patients. Dental ceramics, especially zirconia-based materials, are preferred for their exceptional aesthetics and biocompatibility. They provide a natural appearance and are often used in anterior restorations [8; 12].

Thus, thanks to the cooperation of dentists and technicians in interdisciplinary teams, complex dental work can be successfully performed. This approach to teamwork allows to take into account all aspects of treatment and create an individualized plan, which is important for achieving predictable results and patient satisfaction.

Conclusions.

An interdisciplinary approach to complex full-maxillary restorations, which involves cooperation between the dentist and the technician, is important for achieving successful treatment. The purpose of such cooperation is to integrate the knowledge and experience of both specialists to achieve the best rehabilitation results. This helps to reduce the risk of complications, achieve predictable results and patient satisfaction. Complex treatment often requires the participation of a team of highly qualified specialists to select and implement the most appropriate treatment plan.

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Анотація. *У статті висвітлюється актуальне питання щодо міждисциплінарного підходу до виконання складних повнощелепних реставрацій. В ході роботи проведено аналіз основних етапів та принципів командної роботи, які сприяють отриманню оптимального результату в складних клінічних випадках. Взаємодія між стоматологом і техніком дозволяє врахувати всі аспекти лікування та створити індивідуальний план для кожного пацієнта, що сприяє досягненню високої точності, функціональності та естетики реставраційних робіт. Завдяки такій співпраці вдається мінімізувати ризики помилок на всіх етапах лікування та виготовлення конструкцій. Особлива увага приділяється цифровому моделюванню та попередньому узгодженню результату між усіма учасниками клінічного процесу.*

Ключові слова: *стоматологія, реставрація, міждисциплінарний підхід, естетичний результат.*

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