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COMPLEX REHABILITATION OF ATHLETES ENGAGED IN WRESTLING AT A PROFESSIONAL LEVEL: THE EXPERIENCE OF FOREIGN COUNTRIES. LITERATURE REVIEW

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Abstract

Background: The rehabilitation of professional wrestlers is particularly important due to the traumatic nature of the sport and the need for a rapid recovery in order to return to competitive activity. Combat sports involve intensive physical exertion and frequent musculoskeletal injuries, necessitating a comprehensive, evidence-based approach to rehabilitation. Improving rehabilitation programs by taking into account the individual characteristics of athletes and introducing innovative technologies and interdisciplinary methods helps to accelerate recovery and reduce the risk of repeated injuries, which directly affects the duration and success of a professional career.

Aim. To analyze modern approaches to complex rehabilitation of professional athletes-wrestlers according to the data of international studies.

Search strategy. A systematic search strategy was used to conduct a qualitative and substantiated literature review on the topic of improving the rehabilitation of athletes involved in wrestling at the professional level. The main sources of information were the leading international and national scientific databases: PubMed, Scopus, Web of Science, and Google Scholar. Search queries were formed using combinations of key words and terms, both in English and Russian. The English-language databases used the following terms: ‘combat sports’, ‘wrestling’, ‘professional athletes’, ‘sports rehabilitation’, ‘injury recovery’, ‘physiotherapy’, ‘neuromuscular rehabilitation’, ‘psychological recovery’, ‘injury prevention’, ‘personalized rehabilitation’, ‘technology in rehabilitation’. Publications from the last 10 years (2014-2024) containing original research, meta-analyses and systematic reviews on rehabilitation of professional athletes, especially in the field of wrestling, were considered as *inclusion criteria*. Priority was given to papers describing innovative, evidence-based and interdisciplinary approaches. *Exclusion criteria* included non-peer-reviewed articles, non-athletic trauma publications, and studies conducted on amateur or junior samples.

Results and conclusions. A critical analysis of current scientific literature indicates that the multidisciplinary model of rehabilitation represents the most effective and scientifically grounded approach in restoring the functional capacity of athletes engaged in professional wrestling. This model conventionally integrates physiotherapy, kinesiotherapy, psychological support, and nutritional correction, thereby addressing the complex interplay of physical, metabolic, and mental recovery factors.

It has been consistently reported that the predominant injuries observed among wrestling athletes include trauma to joints and muscles, as well as cranio-cerebral injuries, all of which require a comprehensive and systemically coordinated rehabilitation strategy. Given the high biomechanical demands of wrestling and its inherent injury risks, rehabilitation cannot rely on generalized protocols but must instead adopt sport-specific and individualized regimens.

Keywords: *rehabilitation, wrestling, sports rehabilitation, injury recovery.*

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Резюме

КОМПЛЕКСНАЯ РЕАБИЛИТАЦИЯ СПОРТСМЕНОВ, ЗАНИМАЮЩИХСЯ БОРЬБОЙ НА ПРОФЕССИОНАЛЬНОМ УРОВНЕ: ОПЫТ ЗАРУБЕЖНЫХ СТРАН. ОБЗОР ЛИТЕРАТУРЫ

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Введение: Реабилитация профессиональных борцов особенно важна в связи с травматичностью этого вида спорта и необходимостью быстрого восстановления для возвращения к соревновательной деятельности. Боевые виды спорта связаны с интенсивными физическими нагрузками и частыми травмами опорно-двигательного аппарата, что требует комплексного, научно обоснованного подхода к реабилитации. Совершенствование реабилитационных программ с учетом индивидуальных особенностей спортсменов, внедрение инновационных технологий и междисциплинарных методов позволяет ускорить восстановление и снизить риск повторных травм, что напрямую влияет на продолжительность и успешность профессиональной карьеры.

Цель. Провести анализ современных подходов к комплексной реабилитации профессиональных спортсменов-борцов по данным международных исследований.

Стратегия поиска. Для проведения качественного и обоснованного обзора литературы по теме совершенствования реабилитации спортсменов, занимающихся единоборствами на профессиональном уровне, была использована стратегия систематического поиска. Основными источниками информации стали ведущие международные и национальные научные базы данных: PubMed, Scopus, Web of Science и Google Scholar. Поисковые запросы формировались с использованием комбинаций ключевых слов и терминов, как на английском, так и на русском языках. В англоязычных базах данных использовались следующие термины: „боевые виды спорта“, „борьба“, „профессиональные спортсмены“, „спортивная реабилитация“, „восстановление после травм“, „физиотерапия“, „нейромышечная реабилитация“, „психологическое восстановление“, „профилактика травм“, „персонализированная реабилитация“, „технологии в реабилитации“. В качестве *критериев включения* рассматривались публикации за последние 10 лет (2014-2024 гг.), содержащие оригинальные исследования, мета-анализы и систематические обзоры, посвященные реабилитации профессиональных спортсменов, особенно в области боевых искусств. Приоритет отдавался работам, описывающим инновационные, научно обоснованные и междисциплинарные подходы. *Критерии исключения* включали не рецензируемые статьи, публикации, не посвященные спортивной травме, а также исследования, проведенные на любительских или юниорских выборках.

Результаты и выводы. Критический анализ современной научной литературы показывает, что мультидисциплинарная модель реабилитации представляет собой наиболее эффективный и научно обоснованный подход к восстановлению функциональных возможностей спортсменов, занимающихся профессиональной борьбой. Эта модель традиционно объединяет физиотерапию, кинезиотерапию, психологическую поддержку и коррекцию питания, тем самым устраняя сложное взаимодействие физических, метаболических и психических факторов восстановления.

Неоднократно сообщалось, что преобладающие травмы, наблюдаемые у спортсменов-борцов, включают травмы суставов и мышц, а также черепно-мозговые травмы, все из которых требуют комплексной и системно скоординированной стратегии реабилитации. Учитывая высокие биомеханические требования к спортивной борьбе и присущий ей риск травм, реабилитация не может основываться на общепринятых протоколах, а должна проводиться по индивидуальным схемам, специфичным для данного вида спорта.

Ключевые слова: реабилитация, борьба, спортивная реабилитация, восстановление после травм

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Түйіндеме

**КӘСІБИ ДЕҢГЕЙДЕ КҮРЕСПЕН АЙНАЛЫСАТЫН СПОРТШЫЛАРДЫҢ
КЕШЕНДІ ОҢАЛТУЫ: ШЕТ ЕЛДЕРДІҢ ТӘЖІРИБЕСІ.
ӘДЕБИЕТТІК ШОЛУ.****Гаухар А. Корганбаева¹**, <https://orcid.org/0000-0001-5257-1495>**Гульнар М. Шалгумбаева¹**, <http://orcid.org/0000-0003-3310-4490>**Икра Шахзади²**,**Гүлбаршын Д. Мукашева¹**, <https://orcid.org/0000-0003-3490-5628>**Динара Е. Туржанова¹**, <https://orcid.org/0000-0003-0409-0210>**Дастан Н. Сайдуалиев¹**, <https://orcid.org/0000-0002-8920-3730>**Ляззат Н. Бекбоссынова¹**, <https://orcid.org/0009-0000-7261-5467>¹ КеАҚ «Семей медицина университеті», Семей қ., Қазақстан Республикасы;² Хабиб қаласының азаматтық ауруханасы, Камоке Гуджранвала, Пенджаб қ., Пәкістан.

Кіріспе: Кәсіби деңгейде спортпен айналысатын спортшыларды оңалту спорттың жарақаттануына және бәсекеге қабілетті әрекетке қайта оралу үшін жылдам қалпына келтіру қажеттілігіне байланысты өте маңызды. Жекпе-жек спорты қарқынды физикалық белсенділікпен және тірек-қимыл аппаратының жиі жарақаттарымен байланысты, бұл оңалтуға кешенді, ғылыми негізделген тәсілді қажет етеді. Спортшылардың жеке ерекшеліктерін ескере отырып, оңалту бағдарламаларын жетілдіру, инновациялық технологиялар мен пәнаралық әдістерді енгізу қалпына келтіруді жеделдетуге және қайта жарақат алу қаупін азайтуға мүмкіндік береді, бұл кәсіби мансаптың ұзақтығы мен табыстылығына тікелей әсер етеді.

Мақсаты. Халықаралық зерттеу деректері негізінде кәсіпт-спортшы-балуандарды кешенді оңалтудың заманауи тәсілдеріне талдау жүргізу.

Іздеу стратегиясы. Кәсіби деңгейде жекпе-жекпен айналысатын спортшыларды оңалтуды жетілдіру тақырыбы бойынша әдебиеттерге сапалы және негізделген шолу жүргізу үшін жүйелі іздеу стратегиясы қолданылды. Негізгі ақпарат көздері жетекші халықаралық және ұлттық ғылыми мәліметтер базасы болды: PubMed, Scopus, Web of Science және Google Scholar. Іздеу сұраулары ағылшын және орыс тілдерінде кілт сөздер мен терминдердің тіркесімін қолдану арқылы қалыптасты. Ағылшын тіліндегі мәліметтер базасында келесі терминдер қолданылды: "жекпе-жек", "күрес", "кәсіби спортшылар", "спорттық оңалту", "жарақаттан кейін қалпына келтіру", "физиотерапия", "нейробұлшықеттік оңалту", "психологиялық қалпына келтіру", "жарақаттанудың алдын алу", "жекелендірілген оңалту", "технологиялар оңалтуда". Соңғы 10 жылдағы (2014-2024) басылымдар кәсіби спортшыларды, әсіресе жекпе-жек өнерін оңалтуға арналған түпнұсқа зерттеулерді, мета-талдауларды және жүйелі шолуларды қамтитын басылымдарды қосу критерийлері ретінде қарастырылды. Инновациялық, ғылыми негізделген және пәнаралық тәсілдерді сипаттайтын жұмыстарға басымдық берілді. *Ерекшелік критерийлеріне* рецензияланбаған мақалалар, спорттық жарақатқа арналмаған басылымдар, сондай-ақ әуесқойлық немесе жасөспірімдер үлгілерінде жүргізілген зерттеулер кірді.

Нәтижелер мен қорытындылар. Қазіргі ғылыми әдебиеттерге сыни талдау көрсеткендей, оңалтудың көпсалалы моделі кәсіби күреспен айналысатын спортшылардың функционалдық қабілетін қалпына келтірудегі ең тиімді және ғылыми негізделген тәсіл болып табылады. Бұл модель физиотерапияны, кинезиотерапияны, психологиялық қолдауды және тамақтануды түзетуді шартты түрде біріктіреді, осылайша физикалық, метаболикалық және психикалық қалпына келтіру факторларының күрделі өзара әрекеттесуін қарастырады.

Күрес спортшылары арасында жиі кездесетін жарақаттарға буындар мен бұлшықеттердің жарақаттары, сондай-ақ бас миының жарақаттары жатады, олардың барлығы кешенді және жүйелі түрде үйлестірілген оңалту стратегиясын қажет етеді. Күрестің жоғары биомеханикалық талаптарын және онымен байланысты жарақат алу қаупін ескере отырып, оңалту жалпыланған хаттамаларға сүйене алмайды, оның орнына спортқа тән және жеке режимдерді қабылдауы керек.

Түйінді сөздер: оңалту, күрес, спорттық оңалту, жарақаттан кейін қалпына келтіру.

Дөйексөз үшін:

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Introduction

Wrestling, as one of the most physically demanding and strategically complex combat sports, imposes intense physiological and psychological stress on athletes, particularly at the professional level. Due to its high-contact nature and repetitive exposure to high-force maneuvers, professional wrestling is associated with a significant risk of acute and chronic musculoskeletal injuries, including ligament sprains, joint dislocations, and spinal compressions. These injuries not only affect athletic performance but can also compromise long-term health and career longevity.

Furthermore, psychological readiness, motivation, and fear of reinjury - factors that significantly influence rehabilitation outcomes - remain insufficiently addressed within many existing clinical models.

Therefore, the development of comprehensive, context-specific rehabilitation strategies remains a scientific and practical imperative. Future directions should focus on the systematic validation of sport-specific protocols, the integration of mental health frameworks, and the longitudinal assessment of return-to-play outcomes. Only through such a multifaceted and evolving approach can the goals of injury prevention, functional restoration, and career sustainability be effectively achieved in the demanding context of professional wrestling.

Objective. Analyze modern approaches to the complex rehabilitation of professional wrestler athletes based on international researches.

Search strategy. A systematic search strategy was used to conduct a qualitative and substantiated literature review on the topic of improving the rehabilitation of athletes involved in wrestling at the professional level. The main sources of information were the leading international and national scientific databases: PubMed, Scopus, Web of Science, and Google Scholar.

Search queries were formed using combinations of key words and terms, both in English and Russian. The English-language databases used the following terms: 'combat sports', 'wrestling', 'professional athletes', 'sports rehabilitation', 'injury recovery', "physiotherapy", 'neuromuscular rehabilitation', 'psychological recovery', 'injury prevention', 'personalized rehabilitation', 'technology in rehabilitation'.

Publications from the last 10 years (2014-2024) containing original research, meta-analyses and systematic reviews on rehabilitation of professional athletes, especially in the field of wrestling, were considered as inclusion criteria. Priority was given to papers describing innovative, evidence-based and interdisciplinary approaches.

Exclusion criteria included non-peer-reviewed articles, non-athletic trauma publications, and studies conducted on amateur or junior samples.

Search results and their discussion.

Professional martial arts encompass a variety of disciplines, each with unique injury patterns due to differences in techniques, rules, and contact levels. This section provides an overview of the common types of injuries, including concussions, fractures, and soft tissue injuries, drawing from research on various martial arts such as mixed martial arts (MMA), karate, taekwondo, and Muay Thai.

Types of Injuries in Professional Martial Arts

Empirical studies show that the prevalence and severity of concussions vary significantly between different types of martial arts. It depends on the level of contact, the rules of competition, and the biomechanics of the punches.

In professional MMA, concussions are among the most frequently reported injuries. A significant portion of these injuries are related to knockouts (KO) and technical knockouts (TKO), both of which involve rapid deceleration acting on the brain. According to recent epidemiological data, approximately 14.7% of all injuries in professional MMA competitions are classified as concussions, with significant regional differences in incidence rates. In particular, competitions held in African regions show higher rates of concussions compared to competitions in North America, indicating potential differences in regulatory frameworks, standards of protective equipment, or athlete training practices [17].

These findings collectively underscore the importance of sport-specific concussion surveillance, injury prevention programs, and evidence-based return-to-play protocols, particularly in high-risk disciplines within the broader spectrum of martial arts.

Taekwondo, known for its emphasis on kicking techniques, also sees a notable number of concussions. The fast-paced nature of the sport and the use of headgear in competitions contribute to the risk of head injuries [20],[3].

The long-term effects of repeated concussions, such as chronic traumatic encephalopathy (CTE), are a growing concern in martial arts. As such, concussion prevention and proper management are critical to ensuring athlete safety [5].

Fractures in Martial Arts

Fractures are another common type of injury in martial arts, often resulting from high-impact strikes, falls, or awkward landings. The distribution of fractures varies by discipline:

Fractures in MMA frequently occur in the hands, fingers, and facial bones due to the nature of strikes and grappling maneuvers. Upper limb fractures are particularly prevalent, with metacarpal injuries being common [39].

In karate, fractures are less common than soft tissue injuries but can occur, particularly in the face and head regions. Nasal fractures and orbital injuries are not uncommon due to direct strikes [22].

Within the discipline of Muay Thai, a traditional full-contact combat sport originating from Thailand, fractures of the lower and upper extremities represent a prevalent category of traumatic injury. This is largely attributable to the technical emphasis on powerful kicks and upper-limb strikes, which subjects specific anatomical regions to repetitive high-impact forces [33].

Clinical observations and injury monitoring data show that fractures of the shin and metatarsal bones are particularly common in Muay Thai practitioners. This is due to the frequent use of shin kicks and foot blocks during sparring and competition. At the same time, the intensive use of elbows and fists in offensive and defensive actions contributes to a high incidence of fractures of the hands, forearms and elbow-radial complex [14].

In severe cases, such injuries may require surgical intervention, including internal fixation or reconstructive procedures, which is associated with long periods of rehabilitation and temporary cessation of sports activities. Functional results and the time to return to sports depend on the severity of the fracture, early treatment, and compliance with individual rehabilitation protocols [13].

Given the frequency and potential severity of fractures in Muay Thai, preventive strategies are of paramount importance. These include advanced technical training, the use of protective equipment (such as shin guards, hand bandages), and strict adherence to safety and competition rules. In addition, coach training and athlete awareness programs play a vital role in shaping a culture of injury prevention in the sport [55], [60].

Overall, the high-intensity nature of Muay Thai requires a dual focus on optimizing performance and mitigating orthopedic injuries, emphasizing the importance of integrated efforts between athletes, coaches, medical professionals, and sports governing bodies [49].

Soft Tissue Injuries in Martial Arts

Soft tissue injuries in MMA are prevalent, with contusions and lacerations being the most frequent. The head, face, and neck regions are particularly susceptible to these injuries due to the full-contact nature of the sport [25].

In karate, soft tissue injuries such as contusions and bruises are common, particularly in the face and head areas. The high-impact nature of kicks and punches contributes to the prevalence of these injuries [9].

Taekwondo practitioners often experience soft tissue injuries in the lower extremities, particularly in the legs and knees, due to the emphasis on kicking techniques. Contusions and muscle strains are frequent occurrences [20].

Soft tissue injuries, while often less severe than fractures or concussions, can still lead to significant downtime for athletes. Proper warm-up routines, stretching, and conditioning can help reduce the risk of these injuries [52].

Modern approaches to rehabilitation in sports medicine

In recent years, modern approaches to rehabilitation in sports medicine have undergone significant changes that have emphasized an interdisciplinary and integrative framework that synergistically combines traditional therapeutic methods with innovative practices. This paradigm shift reflects a growing understanding of the complex interplay between the physical, psychological, and functional aspects of an athlete's recovery process. Comprehensive care models that take into account all aspects of an athlete's health status are currently considered necessary to achieve optimal rehabilitation outcomes [37],[4].

The collaborative work of a multidisciplinary team plays a key role in developing modern rehabilitation strategies. Such teams include sports physiotherapists, orthopedic sports doctors, psychological surgeons, and sometimes nutritionists and biomechanics specialists [68]. The scientific literature consistently highlights that effective communication and coordination among team members are critical determinants of the rehabilitation trajectory and directly influence the athlete's timeline for returning to sport. A multidisciplinary approach ensures that the athlete's

physical recovery, psychological resilience, and social reintegration are managed concurrently and systematically [23],[6].

In alignment with current evidence-based practices, the individualization of rehabilitation protocols has emerged as a cornerstone of successful recovery programs. Rehabilitation plans are meticulously tailored to the athlete's specific injury profile, physiological characteristics, competitive demands, and psychological needs. As emphasized by Wodiyar, injury-specific and sport-specific rehabilitation not only facilitates more effective recovery but also plays a pivotal role in reducing the risk of recurrent injuries. Personalized protocols allow for a dynamic adjustment of interventions in response to real-time assessments of progress, thereby maximizing rehabilitation efficiency [62].

The holistic philosophy of yoga, which promotes simultaneous physical recovery and mental health maintenance, makes a significant contribution to creating a favorable rehabilitation environment. This helps to increase the resilience of athletes and achieve long-term results of returning to training and competition [69].

Despite the progress made, serious challenges remain, especially in resource-limited settings where access to multidisciplinary care and psychological services remains difficult. This global gap in the provision of rehabilitation resources highlights the urgent need for international efforts to improve the availability and quality of rehabilitation care, particularly for athletes in underdeveloped regions [40], [10].

In parallel with advances in clinical practice, the emergence of innovative technologies is fundamentally changing the face of sports rehabilitation. Recent advances in rehabilitation science have contributed to the increasingly active integration of advanced technologies into athletes' recovery protocols. Emerging techniques such as immersive virtual reality (VR) systems, wearable sensor technologies, artificial intelligence (AI)-based analytics, and robotic therapeutic platforms are increasingly being used in sports medicine to improve traditional approaches to rehabilitation [18].

Innovative technologies in sports rehabilitation

In the context of modern sports rehabilitation, the integration of immersive and interactive technologies represents a significant breakthrough in enhancing motor and cognitive recovery. Notably, virtual reality (VR) and augmented reality (AR) have been increasingly applied to create engaging and dynamic rehabilitative environments. According to *Considine S. et al.*, the utilization of VR and AR platforms notably improves upper limb mobility as well as cognitive functions such as attention span and spatial awareness. These technologies, when employed as adjuncts to conventional rehabilitation methods, contribute to accelerated improvements in motor skills and support cognitive rehabilitation, providing athletes with a more holistic recovery experience [16],[43].

Another pivotal advancement is the widespread adoption of wearable technologies and AI-based applications. As highlighted by *Karadeniz et al.*, wearable sensors enable the continuous collection of real-time data on patient performance parameters, such as movement dynamics, muscle activation, and cardiovascular responses [26]. This information facilitates the development of highly

personalized rehabilitation programs that adapt dynamically to the individual's rate of progress. Furthermore, AI-driven platforms can autonomously suggest modifications to exercise regimens, offer corrective feedback, and predict recovery trajectories, thereby optimizing the rehabilitation process and ensuring interventions remain aligned with the athlete's evolving capabilities [67], [47].

According to *Mainwaring et al.*, robotic technologies significantly support the restoration of mobility and physical functions, particularly benefiting individuals with severe neuromuscular disabilities. In addition, motion analysis technologies integrated into robotic systems are being employed to assist athletes in refining technical skills, enhancing biomechanical efficiency, and minimizing the risk of reinjury through precise movement pattern corrections [34].

To mitigate this risk, it is necessary to conduct reliable multicenter clinical trials, include medical and economic analyses, and develop scalable implementation frameworks adapted to different health care settings [30].

In conclusion, while the technological transformation of rehabilitation offers an enticing future direction, its implementation must be accompanied by critical research, strategic planning, and inclusive policies to ensure that innovation translates into accessible, safe, and evidence-based practices for all patient groups [12].

The psychological aspects of athlete rehabilitation

In the context of sports rehabilitation in professional sports, the psychological aspects of recovery are increasingly considered as key factors determining overall results. Injuries not only disrupt the physical integrity of athletes, but also cause serious emotional and cognitive problems that can negatively affect compliance with the rehabilitation regime and performance after returning to competition. Therefore, dealing with psychological factors through targeted interventions is of paramount importance to optimize the rehabilitation process and facilitate successful reintegration into sports [41], [48].

Following injury, athletes commonly exhibit a range of emotional reactions. As reported by *Chaabane et al.*, acute psychological responses often include shock, anger, sadness, and in many cases, anxiety and depression. These negative emotional states can disrupt motivation and diminish adherence to rehabilitation protocols [11], [32].

Another critical psychological barrier is the fear of reinjury, which, as highlighted by *Gema Torres-Luque et al.*, may generate persistent self-doubt, leading to overly cautious behavior and impaired performance during both training and competition phases. This fear not only slows functional recovery but also increases the risk of maladaptive movement patterns [57].

Injuries often lead to a perceived loss of athletic identity, especially among professional athletes, whose self-esteem is closely linked to their athletic role. *Bridge et al.* emphasized that such identity violations contribute to feelings of isolation, decreased self-esteem and motivation, which further complicates the athlete's recovery process [8].

Integration of psychological services is necessary for the effective operation of rehabilitation programs. *Karatranta et al.* note the promotion of adaptive coping strategies, such as positive self-talk, goal setting, and the use of social support, plays a crucial role in maintaining

athletes' engagement and perseverance throughout the rehabilitation process [27].

Furthermore, psychological techniques including cognitive restructuring, which aims to reframe negative thoughts, and mindfulness practices, which enhance present-moment awareness and emotional regulation, have demonstrated efficacy in reducing stress and improving rehabilitation outcomes [51], [53].

Critically, the application of a biopsychosocial model - which integrates physical, psychological, and social dimensions of health - is increasingly advocated as a best practice in athlete rehabilitation. This holistic approach ensures that interventions address the full spectrum of an athlete's recovery needs, rather than narrowly focusing on physical healing alone [50].

While some may argue that the primary emphasis in rehabilitation should remain on physical restoration, growing empirical evidence underscores that neglecting psychological health prolongs recovery times and elevates the risk of reinjury. Therefore, a balanced, interdisciplinary approach that gives due consideration to both physical and mental rehabilitation is critical for achieving sustainable return-to-sport outcomes [19], [44].

A personalized approach to rehabilitation

Personalization of rehabilitation strategies is a concept that is fundamentally changing modern healthcare. It is based on the understanding that the construction of treatment plans for the unique clinical, genetic and lifestyle characteristics of each patient can significantly improve the results of therapy. By moving from standard protocols to individual regimens, personalized rehabilitation seeks to optimize recovery trajectories for a wide range of medical conditions. The following sections will provide various examples of the application of personalized rehabilitation in specific clinical situations [15], [59].

Based on these detailed profiles, individualized treatment plans may incorporate the use of hearing aids, cochlear implants, and targeted auditory training exercises adapted to the patient's functional needs and daily life demands. Moreover, the integration of technological tools such as mobile applications and online platforms facilitates continuous adjustment and fine-tuning of hearing devices, further enhancing rehabilitation outcomes [65].

In the domain of cardio-surgical rehabilitation, personalization plays a pivotal role in mitigating post-operative complications, particularly respiratory insufficiency. As reported by *Argunova et al.*, the implementation of intensive individualized rehabilitation protocols in the ICU setting can significantly shorten recovery periods, promote autonomous respiratory function, and expand motor activity capabilities, thereby accelerating the overall recuperation process [61], [24].

Recognizing the growing prevalence of burnout among medical professionals, personalized rehabilitation programs have been developed to address the specific psychological and physiological stressors faced by this group. According to *Lepekhova*, these interventions encompass individualized psychotherapeutic and physiotherapeutic modalities, tailored based on comprehensive psychological assessments. The principal aims are to reduce burnout symptoms, enhance professional resilience, and foster a healthier work environment [64], [36].

For individuals suffering from neurogenic dysphagia, personalization is essential for ensuring safe and effective recovery of swallowing function. *Ozidal et al.* emphasize that personalized rehabilitation protocols must consider the severity of dysphagia, speech deficits, and coexisting cognitive impairments. Key interventions include sensory stimulation of the oral cavity and the customized selection of food consistencies, thereby minimizing the risk of aspiration and promoting functional feeding [45].

In the rehabilitation of psychostimulant addiction, the incorporation of genetic profiling represents a novel frontier [66]. As described by *Arend et al.*, individual variations in genes regulating the serotonin system and neuroplasticity are increasingly utilized to guide motivational psychotherapy and to individualize therapeutic strategies, thereby enhancing the prospects for achieving sustained remission [2], [63].

While personalized rehabilitation offers profound clinical advantages, several challenges must be addressed. These include the requirement for comprehensive diagnostic assessments, the complexity of integrating multidisciplinary expertise, and variations in resource availability, which may affect the feasibility of personalized programs across different healthcare settings. Nevertheless, the promising potential for improved patient-centered outcomes positions personalized rehabilitation as a critical and evolving priority within modern healthcare systems [58], [46].

Problems and limitations of existing rehabilitation programs

Despite significant progress in rehabilitation sciences, existing rehabilitation programs still face a number of critical challenges and systemic limitations that reduce their overall effectiveness and accessibility. These challenges range from organizational deficiencies to gaps in service delivery, collectively impairing patient outcomes and highlighting the need for comprehensive systemic reforms. The following sections summarize the main problems identified in the modern literature.

One of the most persistent problems is the low rates of referrals and attendance, especially noticeable in cardiac rehabilitation (CR) programs. As noted by *Marques et al.*, despite the well-documented benefits of CR in improving cardiovascular health and reducing mortality, many eligible patients are either not referred or do not attend rehabilitation classes. This shortfall is exacerbated by insufficient awareness among healthcare providers regarding the importance of timely rehabilitation referrals, as well as limited patient education about the potential benefits of participating in structured rehabilitation programs [38].

These organizational shortcomings underscore the need for integrated care models and the development of evidence-based, standardized rehabilitation pathways [54], [42].

The problems related to the allocation of resources and their availability remain particularly acute in various global realities. In China, for example, there is a chronic shortage of resources in the rehabilitation system. This system is characterized by weak hospital-to-hospital connections and insufficient financial support mechanisms. Similar challenges arise in specialized sectors such as military rehabilitation. These include the shortage of rehabilitation

doctors and the lack of well-defined packages of services tailored to the special needs of veterans. Such shortcomings not only limit the availability of services, but also worsen the quality and continuity of medical care [31],[21].

Despite these significant limitations, it must be recognized that some rehabilitation programs have demonstrated significant effectiveness under optimal conditions. However, the urgent need for systemic improvements remains paramount, encompassing investments in human resource development, increased interdisciplinary coordination, patient education initiatives, and standardization of rehabilitation services. Removing these barriers is crucial to ensure equitable access to high-quality rehabilitation and maximize recovery outcomes for different patient groups [28].

The prospects for further research

Such injury profiles, often cumulative in nature, differ significantly from those observed in other athletic domains, thus demanding rehabilitation protocols specifically calibrated to wrestling's biomechanical profile.

By advancing these research priorities, the field of sports rehabilitation will be better positioned to deliver precision-oriented, contextually relevant, and athlete-centered care that meets the evolving demands of professional wrestling [29].

Another promising direction involves the application of emerging technologies - such as motion capture systems, neuromuscular electrical stimulation, and AI-assisted rehabilitation platforms - to improve both assessment precision and intervention outcomes. Future research should examine the comparative effectiveness of such tools when applied in wrestling-specific settings, taking into account their cost-efficiency, scalability, and athlete satisfaction [56].

In addition, cross-cultural and international comparative studies are essential to evaluate the variability in rehabilitation practices across countries. These studies can inform the development of globally adaptable guidelines and contribute to evidence-based policy recommendations for sports medicine institutions and regulatory bodies [1].

Finally, the long-term consequences of repeated injuries and intensive rehabilitation on career longevity and post-retirement quality of life remain underexplored in the wrestling population. Longitudinal studies are needed to understand how early rehabilitation decisions affect health trajectories beyond the competitive phase [7], [35].

In summary, the future of rehabilitation science in the context of professional wrestling lies in personalized, data-informed, and integrative approaches that align with the physiological demands and psychological complexities of this combat sport. Advancing such research agendas will be instrumental in optimizing recovery protocols, ensuring athlete well-being, and preserving high-performance capacity over the course of athletic careers [70].

Conclusion

A comprehensive review of modern rehabilitation approaches confirms the need to adopt a multidisciplinary, integrated, and personalized care model to achieve the best recovery outcomes for professional athletes, especially those involved in high-injury sports such as wrestling and martial arts. In recent years, advances in rehabilitation

science, including the integration of new technologies such as virtual reality platforms, wearable sensor systems, artificial intelligence-based analytics, and robotic therapies, have significantly expanded opportunities for improving neuromotor recovery, cognitive function, and psychological adaptation during rehabilitation.

At the same time, growing empirical evidence highlights the key role of psychological support in determining the success and sustainability of rehabilitation outcomes. Structured interventions aimed at regulating emotional disorders, fear of repeated injury, and identity disorders are increasingly recognized as important for improving athletes' resilience, adherence to therapeutic regimens, and confident return to competitive activities.

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References:

1. Alas H. et al. Sports-related Cervical Spine Fracture and Spinal Cord Injury: A Review of Nationwide Pediatric Trends // *Spine*. 2021. № 1 (46). P. 22–28.
2. Arend M. et al. Effect of inspiratory muscle warm-up on submaximal rowing performance // *Journal of Strength and Conditioning Research*. 2015. № 1 (29). P. 213–218.
3. Asker M. et al. Risk factors for, and prevention of, shoulder injuries in overhead sports: a systematic review with best-evidence synthesis // *British Journal of Sports Medicine*. 2018. № 20 (52). P. 1312–1319.
4. Bahr R. Why screening tests to predict injury do not work-and probably never will...: a critical review // *British Journal of Sports Medicine*. 2016. № 13 (50). P. 776–780.
5. Bakirtzis D. et al. A Narrative Review of Combat Sports Injuries With a Particular Focus on Cervical Spine Injuries // *Cureus*. 2024. № 12 (16). P. e74980.
6. Bittencourt N. et al. Complex systems approach for sports injuries: moving from risk factor identification to injury pattern recognition-narrative review and new concept // *British Journal of Sports Medicine*. 2016. № 21 (50). P. 1309–1314.
7. Brelvi A. M., Rue J.-P. H. Return to Play Following Meniscus Surgery // *Clinics in Sports Medicine*. 2016. № 4 (35). P. 669–678.
8. Bridge C. A. et al. Physical and physiological profiles of taekwondo athletes // *Sports Medicine (Auckland, N.Z.)*. 2014. № 6 (44). P. 713–733.
9. Brinkman J. C. et al. Epidemiology of Spine Injuries in National Collegiate Athletic Association Men's Wrestling Athletes // *Orthopaedic Journal of Sports Medicine*. 2021. № 9 (9). P. 23259671211032007.
10. Brown D. A. et al. The association of concussion history and symptom presentation in combat sport athletes // *Physical Therapy in Sport: Official Journal of the Association of Chartered Physiotherapists in Sports Medicine*. 2021. (48). P. 101–108.
11. Chaabène H. et al. Amateur boxing: physical and physiological attributes // *Sports Medicine (Auckland, N.Z.)*. 2015. № 3 (45). P. 337–352.
12. Chaabene H. et al. Physical and Physiological Attributes of Wrestlers: An Update // *Journal of Strength and Conditioning Research*. 2017. № 5 (31). P. 1411–1442.
13. Čierna D. et al. Epidemiology of injuries in juniors participating in top-level karate competition: a prospective cohort study // *British Journal of Sports Medicine*. 2018. № 11 (52). P. 730–734.
14. Čierna D., Lystad R.P. Epidemiology of competition injuries in youth karate athletes: a prospective cohort study // *British Journal of Sports Medicine*. 2017. № 17 (51). P. 1285–1288.
15. Cirino C. et al. Effects of Inspiratory Muscle Warm-Up on Physical Exercise: A Systematic Review // *Biology*. 2023. № 2 (12). P. 333.
16. Considine S., Hirpara K.M., Hynes D.E. Fracture of the scapular neck sustained in an arm wrestling match // *Irish Medical Journal*. 2014. № 9 (107). P. 298–299.
17. Curran-Sills G., Abedin T. Risk factors associated with injury and concussion in sanctioned amateur and professional mixed martial arts bouts in Calgary, Alberta // *BMJ open sport & exercise medicine*. 2018. № 1 (4). P. e000348.
18. Davis G.A. et al. Definition of sport-related concussion: the 6th International Conference on Concussion in Sport // *British Journal of Sports Medicine*. 2023. № 11 (57). P. 617–618.
19. Franchini E. et al. Influence of linear and undulating strength periodization on physical fitness, physiological, and performance responses to simulated judo matches // *Journal of Strength and Conditioning Research*. 2015. № 2 (29). P. 358–367.
20. Geßlein M. et al. Injury Incidence Rates and Profiles in Elite Taekwondo during Competition and Training // *International Journal of Sports Medicine*. 2020. № 1 (41). P. 54–58.
21. Granacher U., Borde R. Effects of Sport-Specific Training during the Early Stages of Long-Term Athlete Development on Physical Fitness, Body Composition, Cognitive, and Academic Performances // *Frontiers in Physiology*. 2017. (8). P. 810.
22. Harris D. M. et al. Absolute and Relative Strength, Power and Physiological Characteristics of Indian Junior National-Level Judokas // *Sports (Basel, Switzerland)*. 2020. № 2 (8). P. 14.
23. Hoge C. et al. Rising Trends in Wrestling-associated Injuries in Females Presenting to US Emergency Departments // *The Western Journal of Emergency Medicine*. 2020. № 2 (22). P. 410–416.
24. Hyden A., Tennison M. Evaluation and Management of Sports-Related Lacerations of the Head and Neck // *Current Sports Medicine Reports*. 2020. № 1 (19). P. 24–28.
25. Ji M. Analysis of injury types for mixed martial arts athletes // *Journal of Physical Therapy Science*. 2016. № 5 (28). P. 1544–1546.
26. Karadeniz E. et al. Humeral fractures sustained during arm wrestling // *European Journal of Trauma and Emergency Surgery: Official Publication of the European Trauma Society*. 2022. № 4 (48). P. 3109–3114.

27. Karatrantou K. et al. Strength Training Induces Greater Increase in Handgrip Strength than Wrestling Training per se // *International Journal of Sports Medicine*. 2020. № 8 (41). P. 533–538.
28. Kiningham R., Monseau A. Caring for Wrestlers // *Current Sports Medicine Reports*. 2015. № 5 (14). P. 404–412.
29. Kroshus E. et al. The First Decade of Web-Based Sports Injury Surveillance: Descriptive Epidemiology of Injuries in US High School Boys' Wrestling (2005-2006 Through 2013-2014) and National Collegiate Athletic Association Men's Wrestling (2004-2005 Through 2013-2014) // *Journal of Athletic Training*. 2018. № 12 (53). P. 1143–1155.
30. Lockhart R. et al. A Systematic Review on the Biomechanics of Breakfall Technique (Ukemi) in Relation to Injury in Judo within the Adult Judoka Population // *International Journal of Environmental Research and Public Health*. 2022. № 7 (19). P. 4259.
31. Lode I. et al. Operative versus nonoperative treatment of humeral shaft fractures: a systematic review and meta-analysis // *Journal of Shoulder and Elbow Surgery*. 2020. № 12 (29). P. 2495–2504.
32. Lomax M., Tasker L., Bostanci O. An electromyographic evaluation of dual role breathing and upper body muscles in response to front crawl swimming // *Scandinavian Journal of Medicine & Science in Sports*. 2015. № 5 (25). P. e472-478.
33. Loturco I. et al. Transference Effect of Short-Term Optimum Power Load Training on the Punching Impact of Elite Boxers // *Journal of Strength and Conditioning Research*. 2021. № 9 (35). P. 2373–2378.
34. Mainwaring L. et al. Subconcussive head impacts in sport: A systematic review of the evidence // *International Journal of Psychophysiology: Official Journal of the International Organization of Psychophysiology*. 2018. № Pt A (132). P. 39–54.
35. Manchado-Gobatto F.B. et al. Complex Network Model Reveals the Impact of Inspiratory Muscle Pre-Activation on Interactions among Physiological Responses and Muscle Oxygenation during Running and Passive Recovery // *Biology*. 2022. № 7 (11). P. 963.
36. Manley G. et al. A systematic review of potential long-term effects of sport-related concussion // *British Journal of Sports Medicine*. 2017. № 12 (51). P. 969–977.
37. Marostegan A.B. et al. Effects of different inspiratory muscle warm-up loads on mechanical, physiological and muscle oxygenation responses during high-intensity running and recovery // *Scientific Reports*. 2022. № 1 (12). P. 11223.
38. Marques L. et al. Physiological and performance changes in national and international judo athletes during block periodization training // *Biology of Sport*. 2017. № 4 (34). P. 371–378.
39. McClain R. et al. Injury profile of mixed martial arts competitors // *Clinical Journal of Sport Medicine: Official Journal of the Canadian Academy of Sport Medicine*. 2014. № 6 (24). P. 497–501.
40. Moloney D.P. et al. Injuries associated with arm wrestling: A narrative review // *Journal of Clinical Orthopaedics and Trauma*. 2021. (18). P. 30–37.
41. Morales J. et al. Use of heart rate variability in monitoring stress and recovery in judo athletes // *Journal of Strength and Conditioning Research*. 2014. № 7 (28). P. 1896–1905.
42. Moreland G., Barkley L.C. Concussion in Sport // *Current Sports Medicine Reports*. 2021. № 4 (20). P. 181–182.
43. Ohya T., Hagiwara M., Suzuki Y. Inspiratory muscle warm-up has no impact on performance or locomotor muscle oxygenation during high-intensity intermittent sprint cycling exercise // *SpringerPlus*. 2015. (4). P. 556.
44. Oshlag B., Ray T., Boswell B. Neck Injuries // *Primary Care*. 2020. № 1 (47). P. 165–176.
45. Özidal M. et al. Effect of respiratory warm-up on anaerobic power // *Journal of Physical Therapy Science*. 2016. № 7 (28). P. 2097–2098.
46. Pierpoint L.A., Collins C. Epidemiology of Sport-Related Concussion // *Clinics in Sports Medicine*. 2021. № 1 (40). P. 1–18.
47. Putukian M. et al. Clinical recovery from concussion-return to school and sport: a systematic review and meta-analysis // *British Journal of Sports Medicine*. 2023. № 12 (57). P. 798–809.
48. Rabinstein A.A. Traumatic Spinal Cord Injury // *Continuum (Minneapolis, Minn.)*. 2018. № 2, Spinal Cord Disorders (24). P. 551–566.
49. Raines B.T., Naclerio E., Sherman S.L. Management of Anterior Cruciate Ligament Injury: What's In and What's Out? // *Indian Journal of Orthopaedics*. 2017. № 5 (51). P. 563–575.
50. Rowson S. et al. Correlation of Concussion Symptom Profile with Head Impact Biomechanics: A Case for Individual-Specific Injury Tolerance // *Journal of Neurotrauma*. 2018. № 4 (35). P. 681–690.
51. Saraiva A.R. et al. Chronic effects of different resistance training exercise orders on flexibility in elite judo athletes // *Journal of Human Kinetics*. 2014. (40). P. 129–137.
52. Stanbouly D. et al. Craniomaxillofacial injuries from the sport of wrestling: a query of the National Electronic Injury Surveillance System (NEISS) // *Oral and Maxillofacial Surgery*. 2022. № 3 (26). P. 393–400.
53. Stavrou V.T. et al. Respiratory Muscle Strength: New Technology for Easy Assessment // *Cureus*. 2021. № 5 (13). P. e14803.
54. Suchomel T.J., Nimphius S., Stone M.H. The Importance of Muscular Strength in Athletic Performance // *Sports Medicine (Auckland, N.Z.)*. 2016. № 10 (46). P. 1419–1449.
55. Thomas R.E., Thomas B.C., Vaska M.M. Injuries in taekwondo: systematic review // *The Physician and Sportsmedicine*. 2017. № 4 (45). P. 372–390.
56. Thomas R.E., Zamanpour K. Injuries in wrestling: systematic review // *The Physician and Sportsmedicine*. 2018. № 2 (46). P. 168–196.
57. Torres-Luque G. et al. Physical and Physiological Characteristics of Judo Athletes: An Update // *Sports (Basel, Switzerland)*. 2016. № 1 (4). P. 20.
58. Updegrove G.F., Mourad W., Abboud J.A. Humeral shaft fractures // *Journal of Shoulder and Elbow Surgery*. 2018. № 4 (27). P. e87–e97.
59. Wilson E.E. et al. Respiratory muscle specific warm-up and elite swimming performance // *British Journal of Sports Medicine*. 2014. № 9 (48). P. 789–791.

60. Wolff C.S., Cantu R.C., Kucera K.L. Catastrophic neurologic injuries in sport // Handbook of Clinical Neurology. 2018. (158). P. 25–37.

61. The personalized approach to the rehabilitation of a severely ill patient presenting with a cardio-surgical problem // Voprosy kurortologii fizioterapii i lechebnoĭ fizicheskoi kultury. 2019. № 1 (96). P. 50–54.

62. Sports injuries and rehabilitation programmes – An Overview // SciSpace - Paper. URL: <https://scispace.com/papers/sports-injuries-and-rehabilitation-programmes-an-overview-3emmqom1t9> (дата обращения: 29.04.2025).

63. Personalized rehabilitation of patients with psychostimulant addiction, taking into account the polymorphism of genes controlling the serotonin system and neuroplastic brain processes // 2023. № 3. P. 200–212.

64. Study protocol: a personalized approach to the rehabilitation of outpatient medical workers with burnout syndrome. // Medicine. 2023. № 5 (10). P. 423–429.

65. Personalized Approach to Auditory Rehabilitation // Imsang ĭbi inhu'gwa. 2023. № 4 (34). P. 103–110.

66. Personalized approach to the logopedic rehabilitation of neurogenic dysphagia patients // Medical Journal. 2024, P.21-28.

67. Neue Technologien in Rehabilitation und Prävention von Sportverletzungen // Sports Orthopaedics and Traumatology. 2024, P.23-29.

68. Current Concepts in Sports Injury Rehabilitation - PubMed. URL: <https://pubmed.ncbi.nlm.nih.gov/28966376/> (дата обращения: 29.04.2025).

69. Yoga as Part of Sports Medicine and Rehabilitation. URL: <https://pubmed.ncbi.nlm.nih.gov/38204776/> (дата обращения: 29.04.2025).

70. Comparison of Physical and Physiological Profiles in Elite and Amateur Young Wrestlers - PubMed. URL: <https://pubmed.ncbi.nlm.nih.gov/25559900/> (дата обращения: 29.04.2025).

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