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Overuse injuries in musicians as an interdisciplinary problem: yesterday, today and tomorrow. Part II

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Abstract. The overuse injury afflicting the instrumentalist musicians is a complex interdisciplinary problem with a very long history. The problem is still relevant today: the overuse syndrome is found in 60–85 % of musicians. By the late 20th century, leading music teachers and physician-researchers were trying to find a solution each on their own and acted in a disjointed manner. Since late 20th century, the study of a repetitive strain injury has been conducted on an interdisciplinary basis. The goal of the research was to study the patterns of currently developing interdisciplinary interaction. In order to achieve the goal, the reference sources containing information on etiopathogenesis, clinical manifestations, and methods of treatment and prevention of the overuse injury in musicians were analyzed. The search for reference sources was conducted in the electronic archives, repositories, and journals indexed in the Scopus, WoS, Medline, and Pubmed databases (1980–2020). The analysis of the modern period showed the active development of interdisciplinary cooperation, whose result was the creation of research centers for interdisciplinary cooperation and specialized rehabilitation communities for musicians with occupational diseases in the developed countries. The significance of these organizations' findings has gone far beyond the relatively narrow problem of overuse injury among the instrumentalist musicians: elaborate methods of prevention and treatment have demonstrated their universality and have found application in many fields of medicine. The cooperation of musicians and physicians has brought a great mutual benefit: the experience of music teachers has proved to be applicable for the prevention and treatment of variously generated traumas, and the experience of medicine has made it possible to improve the system of musical instruction. The study and popularization of foreign experience involved in the interdisciplinary cooperation may contribute to the effective problem solving arising at the junction of various spheres of human activity.
Keywords: playing-related musculoskeletal disorders; overuse injuries in musicians; a repetitive strain injury; ergonomic performing technique.

Introduction

The term *"overplayed hand"* is used by the instrumental musicians in order to describe pain in the upper limb muscles provoked by the *"overuse"*, a prolonged muscle strain arising from the performing practicing. In the English scientific reference sources, the *"overplayed hand"* corresponds most fittingly to the following terms: «*overused syndromes*», «*a repetitive strain injury*», «*overuse injuries*» or «*cumulative trauma disorders*». The umbrella concept of *"overplayed hand"* attributes to various disorders: myositides and tendovaginitides, various tunnel syndromes, arthritis and periarthritis, bursitis etc. To describe the performing-generated conditions, the Russian authors use the term "occupational musician hand conditions" (OMHC), while the English-language scientific literature commonly denotes this pathology as «*playing-related musculoskeletal disorders*». All OMHCs result in a long-lasting temporary or durable disability, and OMHC's prevalence is significantly wide, it varies from 65 to 85%, according to 2020 data [1].

Until the second half of 20th century, the history of OMHC studies amounts to a disparate series of music

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teachers and various physicians (mostly surgeons and neuropathologists) attempting to solve the problem on their own. The systematization and analysis of those attempts prove that their failure was conditioned by the lack of knowledge and experience in the "related field": musicians did not have enough knowledge in the field of anatomy and physiology, while physicians were lacking understanding of the performing specifics. The vital need to solve the problem urged those physicians to criticize the non-physiological (and thus pathogenic) performing techniques suggested by the music teachers [2], while the musicians criticized the physicians for the ineffective treatment methods [3, p. 12]. The first steps made by the specialists towards one another brought significant benefit. Since early 20th century, the teachers started to teach the future musicians how to use the physiological performing techniques, to a great extent reducing the frequency of *"overplaying"*. The achievements incited the music teachers "delving into the foreign territory": in the mid-20th century they turned their attention from the prevention to treatment and started creating the treatment techniques applicable not only to the *"overplayed hand"* but the overstrain syndromes of any possible genesis (sport- or industry-generated ones) [3, p. 90; 4]. However, these achievements belonged to the individual talented teachers whose experience did not have a wide circulation. Most musicians still did not have any exposure to ergonomic performing training or lacked knowledge essential for the health-maintenance purpose in a given professional field. There was no specialized healthcare provided at that time. Only in the second half of the 20th century, the situation started changing. There were large-scale medical studies performed on the interdisciplinary basis.

The aim of this study was to analyze the interdisciplinary cooperation of various specialists (researchers and practitioners) in order to solve the problem of OMHC prevention and treatment at the present stage. To achieve this aim, we performed a search of reference sources devoted to OMHC and indexed by the Scopus, WoS, MedLine and PubMed science-metric databases as well as electronic repositories (from 1980 through to 2000). In our search, we used the following combinations of keywords: *overused syndromes, musicians; a repetitive strain injury, musicians; overuse injuries, musicians; cumulative trauma disorders, musicians; playing-related musculoskeletal disorders, musicians; playing-related musculoskeletal problems, musicians;* and their Russian and Ukrainian equivalents.

Results

The beginning of the modern period is attributed to the publication «Overuse syndrome in musicians – 100 years ago: An historical review» by Hunter John Hall Fry, Australian trauma surgeon, who summarized the previous achievements of OMHC treatments in 1986 [5]. H. Fry initiated dozens of studies, quickly gaining an interdisciplinary character, reviewed extant approaches to the overstrain syndromes in the instrumental musicians (based on the analysis of 658 clinical cases), which helped determine the extent of musicians and physicians cooperating in the field of OMHC prevention and treatment, as well as in the field of scientific research. In the area of OMHC prevention, the system of music education associated with a sanitary awareness-raising (inculcation of health lifestyle in all the spheres of daily being), while in the area of OMHC treatment, the interdisciplinary medicine involving differentiated use of surgery and physical rehabilitation, including rehabilitation techniques of music teachers. The field of scientific research of the OMHC was forever assigned to the equal interdisciplinary interaction of music and medicine [6, 7]. The systematization of diagnostic achievements helped to eradicate the terminological distinction and single out the simple (and thus convenient for the practical medicine) diagnostic criteria based on the questionnaire findings, examination and palpation of the injured limb [5]. It should be noted that the diagnostic criteria described by H. Fry in 1986 has no significant distinctions from the parameters used by the pianist V.A. Guterman since 1943 (this fact does not diminish their value, on the contrary, it emphasizes their practical importance) [8, 9]. Most coincidences of empirical achievements by the music teachers and findings by H. Fry and his modern followers leave no doubt as to the interdisciplinary approach letting musicians and physicians to find common ground. While the musician's overstrain injury symptoms (tendovaginitides, tunnel syndromes etc.) do not differ to a great extent from the ones demonstrated by athletes and workmen, H. Fry adapted the overall clinical signs of overstrain syndromes for the musicians in 1986 and graded into five categories. 1. pain at one site only, and only while playing; 2. pain at multiple sites; 3. pain that persists well beyond the time when the musician stops playing, along with some loss of coordination; 4. all of the above; in addition, many activities of daily living (ADLs) begin to cause pain; 5. all of the above, but all daily activities that engage the affected body part cause pain. [6]. Thanks to its ease and applicability, the classification trickled down for the clinical practice to the musical field and was described in the monograph specifically intended for the instrumental musicians («The Musician's Survival Manual: A Guide to Preventing and Treating Injuries In Instrumentalists» by the rehabilitation physician Richard Norris) [10].

Furthermore, H. Fry made a great contribution into the systematization of differentiated OMHC and combined the findings of a previous medicine-practicing generation and results of treating 175 patients in his analysis. The differentiation of treatment tactics in terms of OMHC's degree of severity proved its validity. With the

light OMHC, a series of conservative treatment means supervised by an interdisciplinary team of specialists is considered quite successful: restricting the performing practice to short classes (15-25 minutes long) followed by the breaks of similar duration; review of performing technique by the teacher (in terms of physiology and ergonomics); avoidance of those musical pieces which are generating pain and overstrain; eradication of posture and articular motion defects thanks to physical exercises (the Alexander Technique and yoga practice); correction of emotional state with the help psychologist. With the severe OMHC forms, it is essential to rule out all the pain-generating factors (including the performing practice), with aggravation cut short one may turn to a careful complex system of rehabilitation, gradual recovery of the previous intensity of studies and motion extent under the tutelage of the interdisciplinary expert team [11].

In the mid-1980s, H. Fry's principle of interdisciplinary cooperation between representatives of music pedagogy and medicine proved its viability and effectiveness in all three directions (prevention, treatment, research). For instance, in 1988 H. Fry suggested a strategy of OMHC differentiated treatment and secondary prophylaxis which does not radically differ from the one used nowadays by the specialized rehabilitation centers for the musicians. In 2020, a famous guitar player Lorenzo Fugazza defended his thesis «Methods to support guitarists to recover from injuries and/or maintain health» describing 8 thoroughly elaborated principles of rehabilitation strategy by the Institut de l Art: Medicine & Fisiologia in Barcelona, Spain [12]. The first principle concerns time limits of the practice (*time restricted practice)*: 5 minute breaks after every 25 minutes for recreation and stretching exercises. The second principle concerns differentiation of performing practice *(targeted practice)*: intermittent playing of pieces requiring straining various muscle-articular groups. This principle mostly refers to the music students practicing various playing techniques (various finger-playing). The third principle concerns the "quality-over-quantity" of practice. The fourth principle concerns a strict adherence to an ergonomically-based structure of classes (regulated by the conservatoire's syllabus and recommended by the Institut de l Art: Medicine & Fisiologia) involving a gradual increase of strain exerted on the playing-involved muscles and tendons (ensuring their gradual warm-up). The fifth principle concerns a step-by-step progressive daily strain increase *(daily progressiveness)*. The experts by the Institut de l Art: Medicine & Fisiologia elaborated a consistent series of recorded tracks fixed as to the speed (tempo) of rendition regulated by the metronome. With each passing day, the tempo grew by 1 metronome beat per minute, barely noticeable for the rehabilitating musician, the strategy ensuring the safe and reliable recovery of the previous professional level of performing. The sixth principle concerns a series of intermittent active and passive recovery: every class is preceded by 5 minutes of stretching exercises focusing on the flexor and extensor finger muscles. Each moment of active practice should be followed by 1 minute of passive or active rest. The active rest implies a physical loading of other muscles (independent from instrument playing). The seventh principle concerns an introductory and ongoing control of classes by the rehabilitologists (*first session, and check-up and follow up)*. The physiotherapist holds an introductory class during the first 2-3 days of affliction (or admittance), giving careful recommendations and reference materials for the independent exercising. The ongoing control implies requesting daily video reports of exercises (three detailed video reports twice a week) and a written report of existing symptoms. Every two weeks, the physiotherapist performs a "live" session in order to evaluate the progress and make corrections in their exercises. The eighth principle concerns an obligatory physiotherapy (*Physiotherapeutic support)*. The Institut de l Art elaborated its own statistics proving the fact that with no physiotherapeutic support only 60 % pre-injury skills and abilities are recovered, while with the physiotherapist involved this index grows by 85-90 %, signaling a complete recovery. Within the frameworks of physiotherapy, the Institut de l Art recommends to perform daily sessions of stretching exercises, while the electric or other physiotherapeutic manipulations are rarely used (as well as massage).

H. Fry's papers partially confirmed and expanded the empirical concepts of music teachers on the OMHC correlation and interdependence with performing technique. H. Fry performed a number of organized and controlled interdisciplinary studies, which show that OMHC results in the damaged limb's coordination disorder closing a vicious circle: non-ergonomic playing technique turns into OMHC while the pain and sensitivity disorder produces the loss of coordination and, in its turn, determines a progressive reduction of professional skill (and respective growth of ergonomic risk) [13, 14]. Further studies confirm the demonstrated regularities. In 2019-2020, several interdisciplinary studies reported that the degree of ergonomic risk (inadequate performing technique generating OMHC) is in a strong reverse correlation with the extent of professional performing skill. In other words, the more elaborate performing skill (both ergonomic and professional/artistic), the better sound of music and the safer it is for the musician's health [15-17]. Thus, modern interdisciplinary studies extending and elaborating H. Fry's research supports the empirical basis of music training systems by Louis Spohr, Friedrich Adolf Steinhausen, Otto Ortmann, Peter Ramul, Anna Shmidt-Shklovskaya, Valentina Guterman, Vladimir Mazel, Dorothy Taubman, Karen Tuttle.

No wonder that following H. Fry's studies of 1980s the tendency of ergonomic performing technique formation coinciding with music training started to be associ-

ated with a key component of OMHC prevention. The instruction techniques of almost 100-year-old standing (and corresponding applicability) continue being used and developed. One of the most effective concepts of practical application belongs to Tomas Cotik, a famous violinist of the Ukrainian origin, who presented the Alexander Technique for the musicians in 2019 [18]. In 2019-2020, there was a paper published on the results of successful application of the Alexander Technique at the Sydney conservatoire in Australia [19] and several US conservatoires (Boston conservatoire of Berkley, Curtis Institute of Music, McGill University, Royal College of Music and University of Toronto) [20].

The logical modern continuation of the Alexander Technique is 'the Body Mapping approach', developed by a cello player and teacher the Alexander Technique, William Conable. Its underlying principle is the use of *"control list"* in *«Coordination»* by Karen Tuttle. The method was successfully used at the musical college by the Bloemfontein University (SAR) [21]. The Body Mapping approach was adapted for the wind instrument players at the School of Music by the University of Nevada (USA) [22], for the piano players at the School of Music by the University of Ottawa (Canada) [23], for the flute players at the School of Music by the Appalachian State University [24]. Anna Shmidt-Shklovskaya's method found its further development in the modern piano pedagogic: nowadays it is successfully applied at the University of Kansas (USA) [25] and at the York University of Toronto (Canada) [26]. The results of applying all the above-mentioned OMHC prevention methods reflect themselves not only through the decreased frequency of musicians' overuse syndromes but also through the improvement of their life quality, decrease of anxiety level, reduced number of classes missed due to the medical condition and elevated academic performing (for students and mostly in terms of specialized disciplines), as well as improved performing skills.

Summing up the experience of 100-year-old practical and research medicine in his review of 1986 «Overuse syndrome in musicians — 100 years ago: An historical review», Hunter Fry singled out one of the key questions of therapeutic practice: "to play or not to play?" He wrote: "a complete rest from the mechanical use of hand has been a single registered effective treatment for one hundred years" [5]. In most countries, this grammatical form "has been" may be replaced with "is": the modern trauma surgeons are still practicing cessation of performing practice for the entire period of rehabilitation, while the injured limb is fixed by a plaster bandage or brace. H. Fry developed and corroborated his differentiated approach to the key issue of applicability based on his studies of 1986-1988. In 2020, the faculty of School of Biological Sciences by the University of Adelaide (Australia) and professional pathology by the University of South Carolina (USA) confirmed the viability of performing practice cessation only in the most severe OMHC cases [27, 28].

The low awareness of musicians in the field of occupational disease prevention was named as a key OMHC risk factor by George Vivian Poore in 1887, and by H. Fry in 1986; it is still a topical issue. If by the second half of 20th century the popularization of instrumentalists' health issues was within the realm of music teachers, then with the beginning of H. Fry's activities the sanitary education of musicians turned into an area of tight interdisciplinary cooperation. All the foreign widely popular (though almost unknown in Ukraine) monographs intended to popularize the knowledge of instrumental musicians' health were co-authored by physicians and musicians (many authors, such as Kurt Singer, had expert knowledge and experience in both fields). Julie Lyonn Lieberman, the US medically educated professional violinist, composer, teacher and popularizer of the ergonomic performing techniques, clinical consultant in the field of ergonomics for the major US producer of string instruments "D'Addario", wrote the book entitled «You are Your Instrument: The Definitive Musician's Guide to Practice and Performance». The book encompasses all psychophysiological aspects of instrumental performance affecting musicians' health and offers a method of ergonomic performing technique, as well as an overall system of occupational disease prevention. «The Musician's Survival Manual: A Guide to Preventing and Treating Injuries in Instrumentalists» written by the rehabilitation physician Richard Norris gained the widest circulation among the instrumental musicians and was reprinted many times in the USA. R. Norris, a physician who dedicated all of his life to the treatment and prevention of occupational diseases among instrumental musicians, became one of the co-founders of the Performing Arts Medicine Association who taught sanitary education at the New England Conservatory of Music. His book is written in a simple, accessible manner, understandable by the musicians [10]. «The biology of musical performance and performance-related injury» is written by Alan H. D. Watson, Assistant Professor of the Anatomy and Neurobiology department by the School of the Biological Sciences at Cardiff University (UK). Alan H. D. Watson received education as an anatomist and neurobiologist; he is now teaching "Biology of music" at the Royal Welsh College of Music and Drama. The authors of «The Musician's Body: a Maintenance Manual for Peak Performance» - Doctor Jaume Rosset Llobet, medical expert in the treatment of musicians' occupational injuries and clinical director of the Center of Medicine and Arts Physiology in Terrassa, Catalonia; George Odam, a famous music teacher, professor

of the Guildhall School of Music & Drama (London). The book is devoted to the problem of physical and psychological overload prophylaxis, as those conditions are typical of instrumental musicians in various fields. The manual «Muscle management for musicians» was written by Elizabeth Andrews, violinist of 25 years, educated both in music and medicine, expert-chiropractic of 15 years. The book includes a detailed description of 70 muscles involved in the musical instrument playing, as well as the facts on prevention of those muscles' overstrain. «The Athletic Musician. A Guide to Playing Without Pain» was written by Barbara Paull, clinical physician, expert in the orthopedic physiotherapy, and Christine Harrison, violinist of the Hamilton Philharmonic Orchestra. The Preface says that "the book is aimed at filling the gap which exists between musicians and therapists treating them, and also may be useful for the touring musicians when they do not have a chance of specialized healthcare". «The Alexander technique for musicians» was written by Judith Kleinman, double bass teacher at the Guildhall School of Music & Drama, and Peter Buckoke, professor of the Royal College of Music, double bass teacher, certified specialist in the Alexander technique. The teachers adapted the Alexander technique not only for elaboration of the ergonomic motion stereotype among the musicians but for the practical recommendations on the individual safe performing style formation among the instrumental musicians in various fields. The popular US guitar player Ethan Kind, who used to suffer from the tunnel syndrome, turned into an expert specializing in the Alexander technique, wrote the book «An Alexander Technique Approach to Piano Technique» where he describes his experience of ergonomic performing style formation.

It seems that the number of books written specifically for musicians should have filled the information gap. However, at the present moment, it is evident that this tool of sanitary education turned almost ineffective. In 2019, the interdisciplinary team of researchers made this conclusion after evaluating the extent of OMHC awareness among the student-musicians at the Australian conservatoria. The results were dire, and the authors published them under the title «Educating Australian musicians: are we playing it safe?» [29]. In 2019, another interdisciplinary team of the Australian researchers gave a clear answer to their colleagues: they found that the OMHC prevalence among the Australian professional musicians amounts to 68% while among the student-musicians 86% [30]. The interdisciplinary team of the German researchers in a similar study of 2020 received similar indices as to the OMHC prevalence, and while analyzing the risk factors they revealed "a low sanitary literacy of the musicians in the field of occupational health" [31]. In order to solve this problem, the international body, Worldwide Universities Network, unveiled the project "Health education literacy and accessibility for musicians: a global approach" to raise the medical literacy among the musicians during their career. They made a joint multicultural, international and interdisciplinary research group, Worldwide Universities Network, aimed at the elaboration of the multi-step research program to create the flexible and understandable approaches to the musicians' sanitary education. The initial obtained findings demonstrated the necessity of organizational changes in the field of musical instruction, as well as raising the level of medical literacy among the musicians across the world [32].

Among the logical consequences of the complex interdisciplinary approach being applied by H. Fry to the solution of OMHC problem suggested in 1986-1988, there were comprehensive programs of prevention, namely reorganization of music training system and healthcare services provision for the OMHC-afflicted musicians. Such programs based on the interaction of music teachers and physicians representing various fields (rehabilitologists, trauma surgeons, occupational pathologists, psychologists) were successfully implemented in 2018-2020 at various conservatoires: at the University of Toronto (Canada) [33], at the School of Music by the University of Washington (USA) [34] and several UK conservatoires at the same time [35]. Their positive outcomes confirm the fact that there is a correct way of solving the problem of musicians' occupational disorders has been found.

Conclusions

To conclude the analysis of contemporary stage of the interdisciplinary cooperation of experts involved in the solution of OMHC problem, one should draw a distinction between the theoretical (scientific) and practical (healthcare and music training) achievements. At present, the creating theoretical foundations of OMHC prevention and treatment can be considered complete: key elements of the prevention strategy (forming ergonomic performing technique and healthy lifestyle while the future musicians are still learning their trade) have been tried out by many studies. The following variables of the prevention strategy were ascertained: reorganization of the music training system and healthcare provided to the musicians. The scientific and theoretical directions of the interdisciplinary cooperation demonstrate the initial signs of a new stage of development, including the recruitment of non-musical and non-medical experts (IT personnel) at the research projects. In the 2019-2020 studies, the IT tools are used to develop the new methods of musicians' control and training in the field of the ergonomic performing style [36-39], as well as to elaborate the ergonomic design of musical instruments [40].

In the field of practical solution of OMHC prevention problem, the achievements are much more moderate. But for some countries (the UK, the USA, the Netherlands, Germany, Australia) which started their careful (experimental) reorganization of medical education in 2018-2020, other European and Asian nations are relegating the problem of *"overplayed hand"* to the hands of music teachers. The field of healthcare provision for the professional musicians develops in a similar way: but for some countries (the UK, Germany, Spain), there are few rehabilitation centers employing physicians with relevant theoretical training and experience. In all the other countries (Ukraine included), the OMHC-afflicted musicians are missing out on the specialized healthcare being provided. Under those conditions, studying and popularization of the foreign experience may become the foundation for the development of a national system of occupational disorder prevention.

In place of an afterword. Solving any interdisciplinary problem may be impeded by many subjective and objective difficulties. Most of them are caused by the interdisciplinary cooperation *per se*: both at the stage of scientific research (problem statement, development of theoretical foundations, search and analysis of the sources, study planning, protocol realization, analysis and processing of data, publication of findings) and at the stage of findings' implementation. The key objective obstacle for interdisciplinary studies is a lack of "interpreters" – experts with knowledge in both fields of cooperation. For many decades, this role of "interpreters" was played by the people who due to the happy chance obtained both medical and musical education. At the moment, the problems arising at the crossroads of various fields of human activities are most often solved by the organized combination of efforts in various fields, bringing forth the continuously-running centers of interdisciplinary studies. For instance, at the University of Oslo (Norway) there is RITMO (Centre for Interdisciplinary Studies in Rhythm, Time and Motion), the center of interdisciplinary studies of rhythm, timing and movement, combining the tools of musical science, psychology and IT technologies in order to study the rhythm as a fundamental feature of human understanding, behavior and culture. A number of 2019-2020 RITMO studies were dealing with the development of new methods of musicians' training in the ergonomic style of performing [41].

Another obstacle of interdisciplinary cooperation is the subjective factor: there is a hardened conservative streak within every profession keeping the expert from listening and hearing other suggestions coming from other fields of knowledge. This approach locks the expert down in "his/her own" pocket and restricts his/her perspective, preventing the interdisciplinary dialogue. No wonder that the most significant achievements in the area of OMHC prevention and treatment were made in those countries where physicians and music teachers are actively cooperating both in the scientific and practical problem-solving. One of the factors confirming this cooperation is the number of publications dealing with this problem. In the UK and USA, the journals started to publish such papers in the late 19th century and their content reflects the cooperation developing both in scope and depth. For instance, a very conservative US «Journal of hand surgery» published a purely music-related paper «Evolution of one-handed piano compositions» next to other interdisciplinary articles. Based on the musical history of how the piano pieces were first written for one hand only, the authors were analyzing numerous interdisciplinary aspects associated with the adaptation of musicians lacking one hand due to an amputation (or hand-related pathology) to their profession. It is not surprising that the article was published in the part entitled «Clinical perspective», and it promoted the dialogue among experts willing to help the musicians with disabilities and bridging the gap of interdisciplinary cooperation [42]. Discussion of the problem of professional diseases of musicians' hands on the pages of Ukrainian medical journals demonstrates the presence of interdisciplinary interaction and demonstrates existing interdisciplinary cooperation, while studying and popularizing the foreign experience allows us to save time and financial resources in the years to come.

Conflicts of interests. Authors declare the absence of any conflicts of interests and their own financial interest that might be construed to influence the results or interpretation of their manuscript.

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«Переграна рука» як міждисциплінарна проблема: вчора, сьогодні, завтра Частина II

Резюме. Травми перенапруження у музикантів-інструменталістів — складна міждисциплінарна проблема з дуже давньою історією. Проблема актуальна і сьогодні: синдроми перевантаження зустрічаються у 60–85 % музикантів і проявляються в тендовагінітах, бурситах і тунельних синдромах, що призводять до тривалої втрати працездатності. До кінця XX століття провідні музичні педагоги і передові представники медичної науки намагалися знайти рішення самостійно і діяли роз'єднано. З кінця XX століття вивчення травм перенапруження проводиться на міждисциплінарній основі. Метою цього дослідження було вивчення закономірностей розвитку міждисциплінарної взаємодії на сучасному етапі. Для досягнення мети було проведено аналіз джерел, що містять відомості про етіопатогенез, клінічні прояви, методи лікування і профілактики травм перенапруження в музикантів. Пошук джерел проводився в електронних архівах, репозитаріях і журналах, що індексуються в наукометричних базах Scopus, WoS, MedLine і PubMed за період 1980–2020 рр. Аналіз сучасного періоду показав активний розвиток міждисциплінарної взаємодії, підсумком якого стало створення в передових країнах науково-дослідних центрів міждисциплінарної співпраці та спеціалізованих реабілітаційних центрів для музикантів з професійними захворюваннями. Значення результатів роботи цих організацій вийшло далеко за межі вузької проблеми травми перевантаження у музикантів-інструменталістів: розроблені методи профілактики і лікування показали свою універсальність і знайшли застосування в багатьох галузях медицини. Співпраця музикантів і лікарів принесла велику взаємну користь: досвід музичних педагогів застосовується в профілактиці і лікуванні травм перевантаження будь-якого генезу, а досвід медицини допоміг удосконалити систему музичної освіти. Вивчення та популяризація зарубіжного досвіду міждисциплінарного співробітництва може сприяти ефективному вирішенню проблем, що виникають на стику різних сфер людської діяльності.

Ключові слова: професійні хвороби музикантів; травми перенапруження; «переграна рука»; ергономічна виконавська техніка; огляд

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«Переигранная рука» как междисциплинарная проблема: вчера, сегодня, завтра Часть II

Резюме. Травмы перенапряжения у музыкантов-инструменталистов — сложная междисциплинарная проблема с очень давней историей. Проблема актуальна и в наши дни: синдромы перегрузки встречаются у 60–85 % музыкантов и проявляются в тендовагинитах, бурситах и туннельных синдромах, приводящих к длительной утрате трудоспособности. До конца XX века ведущие музыкальные педагоги и передовые представители медицинской науки пытались найти решение самостоятельно и действовали разобщенно. С конца XX века изучение травмы перегрузки проводится на междисциплинарной основе. Целью настоящего исследования было изучение закономерностей развития междисциплинарного взаимодействия на современном этапе. Для достижения цели был проведен анализ источников, содержащих сведения об этиопатогенезе, клинических проявлениях, методах лечения и профилактики травм перенапряжения у музыкантов. Поиск источников проводился в электронных архивах, репозитариях и журналах, индексирующихся в наукометрических базах Scopus, WoS, MedLine и PubMed за период 1980–2020 гг. Анализ современного периода показал активное развитие междисциплинарного взаимодействия, итогом которого стало создание в передовых странах научно-исследовательских центров междисциплинарного сотрудничества и специализированных реабилитационных центров для музыкантов с профессиональными заболеваниями. Значение результатов работы этих организаций вышло далеко за рамки относительно узкой проблемы травмы перегрузки у музыкантов-инструменталистов: разработанные методы профилактики и лечения показали свою универсальность и нашли применение во многих областях медицины. Сотрудничество музыкантов и врачей принесло большую взаимовыгоду: опыт музыкальных педагогов оказался применим в профилактике и лечении травмы перегрузки любого генеза, а опыт медицины позволил усовершенствовать систему музыкального образования. Изучение и популяризация зарубежного опыта междисциплинарного сотрудничества могут способствовать эффективному решению проблем, возникающих на стыке различных сфер человеческой деятельности.

Ключевые слова: профессиональные болезни музыкантов; травмы перенапряжения; «переигранная рука»; эргономичная исполнительская техника; обзор