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Overuse injuries in musicians as an interdisciplinary problem: yesterday, today, tomorrow Part I

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Abstract. The problem of overuse injury among instrumentalist musicians has a very long history, but it is very relevant today. The purpose of this article was to study the patterns of interdisciplinary interaction during the history of studying problem. The sources containing information on etiopathogenesis, clinical manifestations, methods of treatment and prevention of overuse in musicians were analysed. The original search was conducted without time limitations in the electronic archives, repositories, and journals indexed in Scopus, WoS, MedLine, and PubMed. The analysis made it possible to distinguish three periods in the history of interdisciplinary cooperation of medicine and music instruction representatives. The first part of our article presents an analysis of the first two periods. The first period (by the late XIX century) is characterized by a lack of medical interest in the problem. However, the experience gained by the instructors of leading piano and violin schools has made it possible to identify the main causal factors and to develop the general principles of prevention. The second period, from late XIX to early XX century, was associated with the formation of interdisciplinary interaction foundations. At this time, music teachers are actively using the basic medical sciences to improve performance ergonomics as the basis for prevention of the professional musicians' pathology. The researchers and internists are actively studying pathogenesis and symptoms of stress injuries in musicians, as well as accumulating their experience of the available therapeutic means. The third period (from late XX century to the present day), described in the second part of this article, has been characterized by the active development of interdisciplinary interaction, resulting in the creation of a scientific interdisciplinary research centres and specialized rehabilitation centres for musicians with occupational diseases.

Keywords: playing-related musculoskeletal disorders; overuse injuries in musicians; a repetitive strain injury; ergonomic performing technique

"Overplayed hand" (overuse injury) is a non-medical term used by the instrumental musicians when they are referring to the painful sensations in their fingers, hands, forearm or shoulder, triggered by a continuous muscle strain associated with performing and practicing. The umbrella term of "overplayed hand" commonly encompasses the myositides and tendovaginitides (often attended by the gangliae or ganglion cysts), various tunnel syndromes, arthritis and peri-arthritis, bursitis etc. In the Russian-language scientific literature, this disease is referred to as "the occupational musician hand conditions" (PPMC), while the English-language scientific literature commonly denotes this pathology as «overused syndromes», «a repetitive strain injury», «overuse injuries» or «cumulative trauma disorders». However, the English

term, which describes the PPMC's concept most fittingly, is the «playing-related musculoskeletal disorders». Even the lightest possible PPMC 's cases result in a long-lasting temporary performer's disability, undermining their professional progress. The severe cases of "overplayed hand" leads to an occupational disability; and the musician aspiring to the performing career or having achieved certain heights in their professional activities has to retrain themselves completely, and content themselves with instruction only. Such career debacles often provoke a protracted depression. V.A. Guterman V.A., pianist and author of "Return to creative life. Occupational diseases of the hands", once wrote: "The concerns attributed to the occupational diseases may be extremely grievous, requiring neuropsychologist's consultations and even ending in suicides"

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[1, p. 22]. The “overplayed hand” is an interdisciplinary problem, recruiting specialists of various fields (from musicians and rehabilitologists to specialist physicians) in those countries with the most developed healthcare systems. The problem is yet unsolved, and this fact is confirmed by the PPMC’s 2020 prevalence data, quite elevated and varying from 65 to 85 % [2]. The problem is quite topical in Ukraine, as no one out of many national musical educational institutions provides instruction on the prevention of occupational diseases, and no postgraduate medical establishment teaches specific methods of treating PMHC (unlike those of Germany and Spain, for instance). This is why the international experience of PPMC prevention and treatment is so crucial in Ukraine. Taking into account only partial solution of this problem, the evolution of approaches is what interests us a lot, as it consists in a history of interdisciplinary cooperation of practitioners, theorists, musical scholars and medical researchers. Analysis of regularities will help choose the most effective multi-field specialist coordination pattern required to forge the national system of PPMC prevention.

The present study is aimed at analysis and systematization of musicians and physicians’ opinions on etiopathogenesis, PPMC prevention and treatment methods, as well as a history of interdisciplinary cooperation among the multi-field specialists recruited at various stages of this history. In order to carry out this aim, we’ve made a search of scientific literature on PPMC. The search was not restricted in terms of time, and involved the publications indexes by the Scopus, WebOfScience, MedLine and PubMed scimetric bases, as well as the electronic repositories. In our search, we’ve used the following key word combinations: *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*; as well as their Russian- and Ukrainian-language correspondences.

The systematization and analysis of sources enabled us to subdivide the history of interdisciplinary multi-field specialist coordination into three stages. The **first stage** involves the time from the occurrence of the first professional musical performances to the late 19th century. The PPMC problem existed even before the Common Era (CE): the string instruments of the Greek musicians were fairly heavy, while the musical and dramatic performances lasted several hours. For instance, the cithara of V century BC had a massive wooden body and 7 strings. The musical historians, while analyzing the numerous images of cithara player presented on the ancient Greek amphorae, described the uncomfortable poses and strained neck muscles of the musicians [3, p. 188]. There is no doubt that tendovaginitides and left hand tunnel syndromes were quite common for the cithara players, as during the entire performance the musicians had to hold the heavy instrument (whose weight was several kilos) in one left hand. Our analysis of several existing musical training books for organ, harp, flute, lute and violin players revealed only a few passing mentions of PPMC [4, 5].

The detailed descriptions of PPMC mechanisms of occurrence and their prophylaxis appeared only in the early 19th century in the “playing school” of violinists and pianists [6]. One of the typical treatises is «Violinschule» (German for «Grand Violin School») of 1832, written by Ludwig (Louis) Spohr (1784-1859), a famous German violinist, composer, conductor and instructor, and printed in English in 1843 [7]. For many coming decades, Louis Spohr determined the violinist technique development as well as the musicians’ opinions on the PPMC causes, mechanisms of development and preventive methods. He attributed the upper limb muscle pains of the violin players to the long-lasting overstrain during the performance. Among the aggravating factors, he named the weak constitution and incompetent muscle relaxation. Louis Spohr recommended a series of breaks, during which the musician should turn to “other tasks” for a more effective recovery. He considered a correct performance technique to be the foundation of prevention, and devoted a separate chapter of his book to its principles. Another chapter was devoted to the choice of an instrument in accordance with the musician’s physical characteristics (age, height, weight, body composition, and physical development) [7, p.14, p.143, p.183]. In other words, Louis Spohr associated PPMC with a non-ergonomic performance technique, non-ergonomic musical instrument and violated professional hygiene. He insisted on the necessity of training and controlling the process of training (inalienable from the PPMC prevention) by the musical instructor. The first musical instrument makers, namely Amati, Stradivari, Guarneri, the Italian string masters, and Broadwood and Sons, Pleyel and Son, the piano and pianoforte (upright piano) makers, emphasized the ergonomics of their design. For instance, Thomas Lamb Phipson (1833-1908), a famous violinist, in his book «Famous Violinists and Fine Violins. Historical Notes, Anecdotes, and Reminiscences» of 1896 recounts an incident when Henri François Joseph Vieuxtemps (1820-1881), his teacher, the Belgian virtuoso violinist and composer, and one of the founding fathers of the national violinist playing school, diagnosed (using the modern terminology) the craniomandibular dysfunction associated with a non-ergonomic violin construction [8, p. 243]. The numerous instruction books by the famous musicians devoted to the violin and pianoforte (upright piano) playing of the late 19th century followed the lines of «Violinschule», as they considered the PPMC prevention a part of training process [9, 10]. The topicality of PPMC problem in the late 19th century is indirectly confirmed by a series of patents for the inventions of the musicians’ upper limb fatigue prevention tools. For instance, patent No. 247,796 by William H. Brady from Hackensack, New Jersey, registered by the United States Patent Service on October 4, 1881, was named «ARM-REST FOR VIOLINISTS». As the patent description states: “this invention is to serve a double purpose: to create a hand support, preventing fatigue, as well as to maintain the correct position of the violinist’s hand with no strain or effort”, i.e. to form a correct (ergonomic) performing technique.

Having performed our analysis of the first stage, we may conclude that it is epitomized by the saying “If you’re drowning, you’re on your own”. Due to a complete absence of the physicians’ interest in PPMC, the musicians were left one-on-one with their condition and tried solving it “at their discretion”.

The **second stage** lasted from the late 19th century to the early 20th century. In 1887, George Vivian Poore (1843-1904), pioneer diagnostician and physician in charge of treating musicians’ strain injuries, professor of the Royal Medical College by the University of London made the «Clinical lecture on certain conditions of the hand and arm which interfere with the performance of professional acts, especially piano-playing» at the Royal College of Surgeons. In his lecture, George Vivian Poore presented his analysis of etiopathogenesis, clinical manifestations and experience of treating 21 professional musicians. Among the key etiopathogenic factors, Professor Poore named the long-lasting practicing of music with no breaks and performance techniques contravening rules of physiology. For the latter, he mentioned the so-called “*Stuttgart piano method*”, popular in Europe at that time: “in which the extension of the wrist is most rigidly maintained during the whole performance, and, except during the instant when the finger is depressed on the key, the extension of the near phalanges of the fingers is also maintained. In this method of holding the hand there is considerable strain thrown upon the extensors of the wrist and the extensors of the near phalanges (extensor communis digitorum, extensor indicis, extensor minimi digiti)” [11]. Among the aggravating factors, promoting PPMC, Professor Poore mentioned comorbidities and weak constitution. George Vivian Poore claimed that “the most important point in treatment is rest”. He wrote: “The excessive use of the hand must be discontinued, and it is often necessary to insist upon this rather forcibly. Piano-playing, if not prohibited altogether, must only be practised to a degree short of that which causes pain or annoyance. It is often difficult to restrain the ardour of these patients in the matter of playing. Directly they feel in a small degree better, they fly to the piano; and I have known the progress of more than one case very seriously retarded by the undoing, as it were, of the good effect of rest by an hour’s injudicious and prohibited “practising” [11]. In order to ensure the “overplayed hand” resting, George Vivian Poore recommended to fix it “with application of strips of capsicum plaster” or braces. George Vivian Poore was very cautious in prescribing massages – “neither too long nor too vigorous”. In addition, George Vivian Poore emphasized the importance of treating comorbidities (“gout”, “rheumatism”, “anemia”, “dyspepsia” etc.) as well as physical exercises.

Adolphe Wahltuch (1803-1897), the British physician and Professor Poore’s follower, used electrotherapy to treat PPMC in the young female violinist with a certain degree of success: local application of a series of “galvanization” procedures for the left upper limb muscles (continuous current of low intensity and force) 3 times a week for 10 minutes by means of 10 Leclanch cells (battery of 1.4 volts, patented in 1866 by the French scientist

Georges Leclanché, 1839-1882). The right patient’s hand was treated by ‘faradaic current’, alternating current of low frequency, also 3 times a week. The complete cessation of symptoms was achieved after 9 sessions [13]. This trailblazing clinical case paved the way for the electric treatment becoming an essential part of comprehensive PPMC therapy. George Vivian Poore’s methods and principles laid out in his seminal lecture of 1887 determined the system of PPMC patient management for the next 100 years. This conclusion was made by Hunter John Hall Fry, Australian trauma surgeon and founder of the modern interdisciplinary approach to the PPMC treatment, in his paper «Overuse syndrome in musicians — 100 years ago: An historical review» of 1987. Before that, he meticulously analyzed all the scientific literature on PPMC, dating back to 1830 [6].

The long and flexible fingers have always been considered a privilege while mastering the performance technique of pianists and string musicians alike. In the early 19th century, the pianists started to take the brunt due to the popularity of exercises involving the capture of the entire octave. The stretching exercises for the fingers and hand became a must for all the piano players, while the persistent training often resulted in the strain injuries. It is well-known that Robert Schumann (1810 – 1856), a German composer, was stretching his hand by means of a mechanical tool, and this tragic exercise ended in an injury ruling out his career of a virtuoso pianist [14, p. 70]. In their book of 1903, «The Pianist’s Hand», the famous Polish pianoforte (upright piano) instructor Theodor Leschetizky (1830-1915) and his student, pianist and instructor of the Czech origin, Marie Unschuld von Melasfeld (1871-1965) stress the vital importance of technique for the pianists with small hands, thus helping to prevent the overstrain and master their skills [15, c. 53]. The similar methods of developing their performance techniques were used by the violinists. The violin playing has always required a nice finger reach; however, as soon as the legendary Niccolò Paganini (1782-1840) wrote his pieces, the professional demands skyrocketed. Due to his Marfan syndrome (MFS), Niccolò Paganini had extremely long and flexible fingers, and he wrote a number of pieces, specifically intended for the performers with a similar hand composition. In his book «Selected violin solos and how to play them» of 1905, Basil Althaus (1865-1928), a well-known British violinist and instructor, recommended to learn those pieces by Paganini in order to stretch the violinist’s hand [16, p. 140]. Seeking for an extra stretch, the musicians went as far as subjecting themselves to surgeries. Back in 1857, William S. Forbes (1831-1905), a Philadelphia surgeon, invented a surgical procedure he called «*liberating of the ring finger*», targeting the pianists “wishing to pay their octaves easily”. This commercial offer was well-received; its descriptions, printed in the musical newsletters, resembling commercial advertisements. It says, for instance, that the procedure enables “a perfect independence of fingers, necessary for the bravura style of performance”. Because the musician’s ring finger needs to be especially agile, it became the focus of William S.

Forbes' surgeries, practiced for a long time and depicted in numerous publications [17]. With time, other surgeons started practicing their own versions of "ring finger liberating" procedure. In the US, this procedure stayed on the lists of the surgeons' offers «*well into the XX century*» [18]. Late in the 19th century, William S. Forbes' publications gained immense popularity among the British physicians and musicians alike; however, due to the condemnations by the neurologist George Vivian Poore and surgeon John Howard, it gradually "went out of fashion" [11, 12]. Nowadays, the issue of a safe performance technique is still topical for the small-handed pianists, which is confirmed by the modern studies [19].

According to George Poore, the main reasons for the non-ergonomic piano techniques are the lack of anatomy and movement physiology knowledge among the musical instructors, it's no wonder they jumped to respond. The German piano instructor Friedrich Adolf Steinhausen (1859-1910) was the first to lay grounds for the physiology of piano forte playing in his 1903 book «*Die Physiologie der Bogenführung auf den Streich-Instrumenten*» ("Physiological mistakes of piano playing technique") [20]. Friedrich Adolf Steinhausen's disciple and promoter of ergonomic style in the piano forte instruction, the well-known US musical theorist and piano forte instructor, Otto Ortmann (1889-1979), published a book «*The Physiological Mechanics of Piano Technique*. An experimental study of the nature of muscular action as used in piano playing, and of the effects there of upon the piano key and the piano tone» in 1929. The book was based on the piano forte bone-muscular physiology findings of the laboratory by the Peabody Conservatory in Baltimore. A lot of attention is drawn to the tendovaginitides developing out of excessively long exercising or unphysiological performing [21, p. 381-382]. Otto Ortmann makes a detailed description of the pianists' back hand tendon cysts, which he considered the complication of tendovaginitis: "Cysts are made by the effluence of synovial fluid through the tendon sheath within which the tendon is sliding. If, for any reason, the sheath is broken, the fluid leaks into the adjacent tissues, and often hardens into the spongy mass of a cyst" [21, p. 381-306]. Otto Ortmann was writing as follows: "the specific hand placement is of utmost importance: if the cyst presses down on the nerve, then the play is attended by the painful sensations, aggravated by the octave exercises" (requiring a great strain and finger and wrist stretch) [21, p. 306].

Another supporter of the ergonomics concept in the field of pianoforte (upright piano) instruction was a famous Estonian pianist, professor of the Tallinn Conservatoire Peter Ramul (1881-1931), who devoted most of his 1931 book «*The Psycho-Physical Foundations of Modern Piano-Technique*» to the physiological foundations of pianoforte technique [22, p. 42-124]. A special place in the history of interdisciplinary development of the field was occupied by the brilliant German composer, musician, musical theorist and neuropathologist Kurt Singer (1885-1944), who wrote and published a 1931 treatise «*Diseases of the musical profession: a systematic presentation of*

their causes, symptoms and methods of treatment», whose many claims are still topical [23]. Thanks to the fact that Kurt Singer had knowledge and experience in both fields (medicine and music), his multifaceted activities (organizational, clinical, publishing, instructive, performance etc.) constitute an epitome of interdisciplinary cooperation in the field of PPMC prevention and treatment.

The musical instructors of early 20th century (who didn't adhere to the principles of ergonomics and physiology of musical performance) gave practical recommendations on the PPMC prevention in their manuals. For instance, the British pianist, composer, writer James Francis Cooke (1870-1960) wrote in his 1913 book «*Great pianists on piano playing*. Study talks with foremost virtuosos»: "There is no more stupid way to study than to practice continuously (the piano playing), without making any breaks for the general physical and breathing exercises. The student who spends a lot of time at the keyboard inevitably finds himself in the hands of a physician or a masseur. He loses his money spent at the music lessons without getting anything back" [24, p. 389]. The latter quotation implies that massage was a standard method of the "overplayed hand" treatment. A famous violinist Leopold Auer (1845-1930), instructor, conductor and composer, founder of the Russian violinist school published a 1921 book «*Violin playing as I teach it*», where he explained his principles of violin playing technique. He also makes specific recommendations on PPMC prevention as an inalienable part of his methodology: "never to spend more than 40-40 minutes practicing and no less than 15-20 minutes resting, before resuming his activities. If this plan is put into effect, the student is to arrange 6-7 hours for the daily exercises lasting 4-5 hours" [25, p. 14]. Leopold Auer suggested that his students stop "as soon as they feel tired. Muscles and tendons of hand and wrist require some rest after a lengthy, though small effort" [25, c. 16].

A tremendous contribution into laying physiological foundation of musical performance was made by the physician and musician Ivan Ivanovich Kryzhanovskiy (1867-1924), violinist, composer, musical theorist, physiologist, author of "Physiological foundations of pianoforte technique" [26]. For a long time, I.I. Kryzhanovskiy had been treating occupational injuries of the musicians. As the Professor of Pertograd Conservatoire teaching the course of pianoforte technique, he was giving lectures on the human anatomy and physiology. His knowledge and experience became the cornerstone of the Soviet pianist Anna Schmidt-Shklovskaya (1901-1961)'s instruction system. It was the problem of "overplayed hand" which led Anna Schmidt-Shklovskaya to attend I.I. Kryzhanovskiy's lecture in 1922. Anna Schmidt-Shklovskaya created and developed her own method under the guidance and in cooperation with I.I. Kryzhanovskiy, whose book she was using for her instruction of students. This method implies the necessity of pianist developing freedom and ease while performing and is based on the knowledge of movement physiology. A. Schmidt-Shklovskaya's book "On piano skills training" lists her system of exercises, intended for the development of key pianist's skills: lightness of fingers,

good stretch. It was primarily thanks to those exercises that A. Schmidt-Shklovskaya had been treating the “overplayed hand” of not only pianists, but instrumentalists of various fields. Those exercises had a special value, as they may be used while “learning pieces”: “flying movements (free opening of the palm and fingers) develop a feeling of lightness, separateness of fingers. The stretching exercises help finding the degree of immersion into the keyboard and the extent of effort to elicit a sound of every intensity and colouring” [27]. A. Schmidt-Shklovskaya’s description of pianist’s hand’s “flying movements” is dramatically different from the *“Stuttgart piano method”*, criticized and thoroughly described by George Vivian Poore in his treatise of 1887 [11].

A major contribution into the PPMC study was made by another Soviet pianist Valentina Aleksandrovna Guterman (1913–1993), who defended her candidate’s thesis “Tactile-movement method of instructing pianists with occupational conditions” in 1943. For her entire life, V.A. Guterman had been involved in the practical treatment of musicians’ occupational conditions using her own method. Her experience of over 50 years was described by V.A. Guterman in her book “Returning to the creative life. Occupational hand conditions”, published posthumously in 1994. The book’s blurb says: “The book is exploring the original method of treatment and prevention of occupational hand conditions in the performing musicians. Thanks to V.A. Guterman, hundreds of people returned to their creative activities. Her method may also be used by knitters, machinists and people of other professions associated with a delicate and precise manual work” [1, p. 90]. V.A. Guterman’s book received positive reviews not only from the well-known pianoforte instructors G. M. Kogan, G.G. Neugaus, N.I. Golubovsky, B.S. Marans, but also by the academician-physiologist L.O. Orbeli and professor-surgeon F.R. Bogdanov. V.A. Guterman reminisced that “their [medical researchers] opinion of my work as a serious scientific opus initiated the cooperation between physicians and musicians in the field of treating occupational conditions” [1, p. 15]. This contribution did not result in any joint interdisciplinary studies, though the fact of approval by the medical scientists is vitally important. The physicians and musicians did not “see eye to eye”. During the first meeting of the academician L.O. Orbeli (famous Soviet physiologist, scientist and Professor I.P. Pavlov’s student) and V.A. Guterman, the scientists did not understand one another: trying to describe the sensations of a pianist with an “overplayed hand”, V.A. Guterman used an invented term of “isolated hand”, which the physician found misleading: “What does it mean? Was it amputated?” V.A. Guterman recalled: “For some time, we were talking as if we used different languages. While considering the problem of miscommunications existing between people of different professions, I noticed his right shoulder: listen, you have a contracture! Professor Orbeli admitted that he definitely had something wrong with his shoulder: it was so painful that sometimes he couldn’t hold his scalpel. Suddenly the unapproachable academician turned into an unhappy patient” [1, p. 13].

As most musicians and physicians, V.A. Guterman considered PPMC a result of imperfect performance technique. Her method of instructing pianist as to the safe performance technique in order to prevent or treat the “overplayed hand” was built on the training of musculoskeletal unity in motion; which is why she called her method “tactile-movement” one. In his review of V.A. Guterman’s dissertation, Professor Orbeli interpreted this method using some medical terminology: “as a result of using this method, based on training the control by the instructor and passing his own kinesthetic and tactile sensations to the student, while comparing them to the kinesthetic sensations of the student. The latter learns a delicate analysis of his sensations, correct evaluation and skill of muscle management, creating various necessary coordinations” [1, p. 14]. The positive effect of physiological performance technique was well-known to the musicians even earlier than V.A. Guterman published her book. A famous Soviet pianist and instructor G.G. Neugaus (1888–1964) “was treating pathological defects by playing” (the pianoforte), he considered “the correct playing to be a tool of treatment for a musician” [1, p. 16]. Though having no medical education, V.A. Guterman was making her diagnoses according to all the propaedeutic principles: she relied on complaints and anamnesis, data of examination (general and local, evaluation of performance techniques) and data of the injured limb’s palpation (not restricted to the tender site) in order to determine the hypertone (contractures), gangliae or ganglion cysts. Among the people treated by V.A. Guterman, there were not only musicians, but workers (knitters, cobblers), surgeons. The existence of “piano” methods of treating strain syndromes was the extreme means at that time: “If you’re drowning, you’re on your own”, as the saying goes, because the representatives of practical medicine and medical science, who were not familiar with the specifics of PPMC pathogenesis, could not offer any effective solution. In her book, V.A. Guterman made a fairly precise description of a musician’s suffering from an “overplayed hand” addressing the physician for the assistance: “While consulting a doctor (often during the acute flares), the doctors often recommend plastering and a complete rest. The diagnoses being made vary from tendovaginitides to bursitis. In order to relieve the pain, they offer warming procedures: electrophoresis, paraffin, muds, warming applications, ablutions etc. They may be effective or not. However, even after the pain being relieved, while playing the instrument they usually recover. It may be attributed to the fact that the performer, when starting to play, reverts to the wrong sensations, causing the conditions. Thus, consulting the doctors may not prove to be a solution, only a temporary relief” [1, p. 12]. It should be noted that the medical tactics of the 1987 Soviet physicians did not differ much from the methods used by George Vivian Poore in 1887 (their efficacy too) [11], and, to tell the truth, from those adhered to nowadays by the Ukrainian physicians.

The ergonomic style of performance was also supported by the renowned Soviet violinist and instructor Vladimir Mazel. His rich experience of music instruction was in-

corporated in a series of books: “Musician and his hands. Physiological nature and motion system formation. Prevention and rehabilitation of occupational disorders”, “Musician and his hands. Part 2. Perfect posture formation”, “Motion is my life. A book for everyone. Theory and practice of motion”. The instructor managed to develop a universal method of ergonomic performance style formation, based on specific exercises for training the “system of zonal point experiences at various muscle groups”, “experiencing the shoulder part as the leading one for every hand motion”, “stable experiencing of hand in a hanging position”, stable experiencing of hand weight, “experiencing one’s hand as a constituent part of body”, “experiencing one’s fulcrum as the body is bent down” etc [28, p. 104-159].

One of the figureheads of musical instruction, also known for her achievements in the PPMC treatment, was the US pianist Dorothy Taubman (1917–2013), who created and popularized her original approach to the piano playing instruction, the so-called «Taubman Approach», also known as «*coordinate motion*». It was founded as the “kinesthetic teaching”, intended to train the musician’s “feeling of motion unity”. To the same extent as V.A. Guterman’s method, the Taubman Approach turned out a universal method of treating pathogenically-similar conditions: it was successfully applied in prevention and treatment of carpal tunnel syndrome (CTS) in PC users as well [29]. The method was deemed universal for the musical instruction. D. Taubman’s follower and pianoforte instructor, Edna Golandsky adapted her 30-year experience of using the Taubman Approach to train the violin players in cooperation with the violin instructor Sophie Till [30]. Even earlier, the Taubman Approach was adapted for the marimba players [31].

Her knowledge of motion physiology and instruction experience led the US violinist Karen Tuttle to create a similar teaching method, named «*Coordination*» and based on the training of musician’s body awareness (Karen Tuttle referred to it as a “particular kinesthetic intellect”), ruling out the strain of muscles not involved in the practice [32]. We cannot but mention the similarities of “kinesthetic intellect” in «*Coordination technique*» by Karen Tuttle, “tactile-movement” or “kinesthetic-tactile” method by V.A. Guterman, “kinesthetic teaching” in «*coordinate motion technique*» by D. Taubman and the “system of zonal point experiences at various muscle groups” by V. Mazel. These methods are brought together by the intention to coordinate the ergonomic distribution of effort among all the muscles involved in one motion. The communion of knowledge, experience and purposes for various researchers led to the communion of thought and choice of methods at their disposal. Every above-mentioned method presupposes customization and concern about the individual anatomic-physiological and psychological features of the performing artist. The means of customization, though, are individual in every instructor’s system.

Numerous instructors-instrumentalists train the ergonomic style of performance by the Alexander Technique. This method is over 50 years old, and is named after its

inventor – the Australian performer and performing arts instructor Frederick Matthias Alexander (1869–1955). At its origin, the Alexander Technique was intended “to train the spatial awareness” and “to improve the mental and physical wellbeing by abandoning the bad habits” (primarily of motion stereotypes and wrong poses). However, the instrumentalists were quick to adapt this technique to their own purposes, including the exercises for relaxation of muscles strained by the “professional poses” during rehearsals [33]. F. M. Alexander considered the primary control of specific relation between “head-neck-spine” axis and separate body parts for the optimal sensory-motor control. The control of such relation is achieved by training the ability of discerning the damaging nerve-muscular patterns and their conscious suppression. F. M. Alexander emphasized the necessity of stress reaction suppression and developing constructive thinking and motion models, he was certain that these strategies are potentially altering the method of music reproduction and promoting the improvement of performance skills [34].

Conclusions

Having analyzed the second stage of this issue development, we should conclude that this is a history of initial, disparate attempts of the PPMC problem solution, which were based on the unilateral opinion by the musicians or physicians and resembled an ancient Indian fable of an elephant and blind wise men. Having palpated different elephant’s body parts, every wise man made his individual conclusion as to what his hands were touching, and this was the only conclusion he believed. As a result, every wise man thought that only he was cognizant of the elephant’s appearance. No one listened to other suggestions, and thus they never found out what the elephant was like. This stage has the doubtless signs of the imminent interdisciplinary cooperation: both physicians and musical instructors experience an obvious lack of knowledge and experience in the “alien” part of interdisciplinary problem, as a result they were obliged to enter the “alien territory”. From the early 20th century to this time, the musical instructors, using their experience and basic medical science (human anatomy and physiology), invented and improved their methods of the PPMC prevention, intended at forming the musician’s ergonomic performance technique. The development of instruction in the PPMC prevention attended by the lack of effective medical assistance led the musician deep inside the “alien territory”: A. Schmidt-Shklovskaya and V. Guterman, D. Taubman used their methods of treating PPMC (V. Guterman and D. Taubman were practicing the treatment of similar pathological conditions in representatives of other professions). The essence of this situation is quite strange: **musicians are treating** tendovaginitides and tunnel syndromes. In their turn, the physicians, while recognizing the specific PPMC pathogenesis, had to delve into the niceties of pianist and violinist performance technique: we should mention, for instance, Professor Poore’s criticism of “*Stuttgart piano method*”. In this case, the situation was no less strange: **physicians were criticizing the musical instruction**. However, this sit-

uation was temporary and circumstance-induced; it was an intermediate stage of interdisciplinary cooperation. V. Guterman wrote: "I always remember that I am not a physician, but an instructor; if unsure about the professional nature of the condition, I'm sending them [musicians] to the physicians. However, I'm mostly seeing those people who have long been treated [by the professional physicians]. In my activities, I'm avoiding the medical terminology, such as, for instance, "patient", "prophylaxis" etc., as my method has nothing medical in it. I'm always acting as the musician-instructor, setting myself a goal of not only eradicating a pathology, but revealing the prospects of future creative progress, performance progress" [1, p. 16]. The studies of physicians criticizing imperfect musical instruction, as well as the studies of musical instructors criticizing inconsistencies of medicine paved the way for the interdisciplinary approach to solving the strain problem. At the present stage, this cooperation does not restrict itself to PPMC only: the "musical" therapeutic techniques are widely used in the sports medicine and occupational disorder treatment, while the experience and knowledge of medicine promotes the progress of medical instruction.

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«Перегрена рука» як міждисциплінарна проблема: вчора, сьогодні, завтра Частина I

Резюме. Травми перенапруження у музикантів-інструменталістів — проблема з дуже давньою історією, що актуальна і сьогодні. Синдроми перевантаження зустрічаються у 50–85 % музикантів і проявляються в тендовагінітах, бурситах і тунельних синдромах, що призводять до тривалої втрати працездатності. Метою цього дослідження було вивчення закономірностей розвитку міждисциплінарної взаємодії протягом усієї історії існування проблеми. 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 без обмеження часу в електронних архівах, репозитаріях і журналах, що індексуються в наукометричних базах Scopus, WoS, MedLine і PubMed. Аналіз дозволив виділити в історії міждисциплінарної співпраці представників медицини та музичної педагогіки три періоди. У першій частині статті подано аналіз двох перших періодів. Перший період (до кінця XIX століття) характеризується відсутністю інтересу до проблеми з боку медицини. Однак досвід, накопичений педагогами провідних фортепіанних і скрипкових шкіл, дозволив виділити основні причинні фактори і розробити загальні

принципи профілактики. Другий період, з кінця XIX до кінця XX ст., — формування основ міждисциплінарної взаємодії. В цей час музичні педагоги активно використовують базові медичні науки (анатомію та фізіологію) в удосконаленні ергономіки виконавства як основи профілактики професійної патології музикантів. Представники наукової та практичної медицини активно вивчають патогенез і симптоматику травм перенапруження у музикантів, а також накопичують досвід застосування наявних терапевтичних засобів. Третій період (з кінця XX століття до сьогодні), що висвітлений у другій частині даної статті, характеризується активним розвитком міждисциплінарної взаємодії, підсумком якої стало створення центрів міждисциплінарних наукових досліджень і спеціалізованих реабілітаційних центрів для музикантів з професійними захворюваннями. Вивчення і популяризація зарубіжного досвіду міждисциплінарного співробітництва сприятиме ефективному вирішенню проблем, що виникають на стику різних сфер людської діяльності.

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

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

Резюме. Травмы перенапряжения у музыкантов-инструменталистов — проблема с очень давней историей, актуальная и в наши дни. Симптомы перегрузки встречаются у 50–

85 % музыкантов и проявляются в тендовагинитах, бурситах и туннельных синдромах, приводящих к длительной утрате трудоспособности. Целью настоящего исследования бы-

ло изучение закономерностей развития междисциплинарного взаимодействия в течение всей истории существования проблемы. Для достижения цели был проведен анализ источников, содержащих сведения об этиопатогенезе, клинических проявлениях, методах лечения и профилактики травм перенапряжения у музыкантов. Поиск источников проводился без ограничения времени в электронных архивах, репозиториях и журналах, индексирующихся в наукометрических базах Scopus, WoS, MedLine и PubMed. Анализ позволил выделить в истории междисциплинарного сотрудничества представителей медицины и музыкальной педагогики три периода. В первой части статьи представлен анализ двух первых периодов. Первый период (до конца XIX в.) характеризуется отсутствием интереса к проблеме со стороны медицины. Однако опыт, накопленный педагогами ведущих фортепианных и скрипичных школ, позволил выделить основные причинные факторы (неэргономичная исполнительская техника) и разработать общие принципы профилактики. Второй период, с конца XIX до конца XX в., — формирование основ междисциплинарного взаимодействия. В это время музыкальные педагоги актив-

но используют базовые медицинские науки (анатомию и физиологию) в совершенствовании эргономики исполнительства как основы профилактики профессиональной патологии музыкантов. Представители научной и практической медицины активно изучают патогенез и симптоматику травм перенапряжения у музыкантов, а также накапливают опыт применения имеющихся в распоряжении терапевтических средств. Третий период (с конца XX в. по наши дни), освещенный во второй части данной статьи, характеризуется активным развитием междисциплинарного взаимодействия, итогом которого стало создание научно-исследовательских центров междисциплинарного взаимодействия и специализированных реабилитационных центров для музыкантов с профессиональными заболеваниями. Изучение и популяризация зарубежного опыта междисциплинарного сотрудничества будет способствовать эффективному решению проблем, возникающих на стыке различных сфер человеческой деятельности.

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