

# AN INTRODUCTION TO THE MEDICINE FOR MUSICIANS

STELA DRAGULIN<sup>1</sup>

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**Abstract.** *Over the last three decades, the medicine specialized in the musicians' treatment has been acquiring increasingly clear outlines. These professionals' special requirements have long been overlooked, but the rising requirements as regards the quality of musical performance have led to reconsidering them. Abroad, this branch of medicine has undergone a remarkable development, which is set forth in the material herein. In Romania, the musicians' specialized medicine has only known its outset.*

**Keywords:** *musicians' stress, professional diseases, specialty publications, organizing the musicians' medicine*

## 1. INTRODUCTION

Ever since Antiquity, until very recently, creating music was deemed to be some slight activity, which called for little physical effort from the performer, and the pains or deficiencies arising in the musician's organism could allegedly be eliminated through the same methods used in the treatment of other patients or sportsmen. Recent measurements effectuated with technique's state-of-art means – on one hand – have unveiled the immense complexity of musical activity, starting with processing the neurological signals in the brain, to the very differentiated action upon the musical instrument.

The produced sound is received by the performer, is compared to the notations in the score and the subsequent movements are instantaneously modified so as the perceived sonorous result should correspond both to the musical notes and to the previously set interpretative intention, during the rehearsals. Such an activity may well be compared to the one played out by a very sophisticate computer, which regulates the operation of an extremely complicated machine.

On the other hand, the audience's exigency has been immensely rising over the last decades, so this one is nowadays capable of perceiving minor differences in the quality of the produced sound or imperfections during the performance caused by a slight delay in a finger's movement or by shoulder pains.

The currently required exceptional quality of musical performance may be only yielded by a musician whose body irreproachably functions in all details: therefore the requirements from the recovery medicine for musicians much exceed those for a clerk who must further press on the computer keyboards, despite back pains, or for a sportsman who will be able to run 100 m in 10 seconds, despite a mild wrist pain.

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<sup>1</sup> Transilvania University of Brasov, 500036, Brasov, Romania. E-mail: [steladragulin@yahoo.com](mailto:steladragulin@yahoo.com).

Medicine for musicians is about to grow into a new medicine's branch, at the border between the two activities: general medicine – which comprises the treatment of all changes for the worse within human body – and that part of musical activity that comprises the participation – perfect from all standpoints – of the human body in creating music.

## 2. DAWN OF MUSICIANS' MEDICINE

During the year 1713, the physician Bernardino Ramazzini publishes *Diseases of a Tradesman* [1] wherein he also describes some of his contemporary musicians' diseases: temple throb, brain pulsation, eye inflammation, lung fatigue etc. The interest in the musicians' specific diseases was much reduced at that time and therefore all specialty publications were scarce. The discussions were kept up and subsequently more than 100 studies were published, which led to knowledge deepening. Only in the last decades some illness causes could be scientifically proven, such as the connection between the pulmonary pressure and various forms of lung illness, whereof the pulmonary emphysema [2, 3].

Towards the end of the 19th century, medicine turned its attention towards healing the musicians' cramps, especially the piano players', although similar cramps affected violin players and other musicians. Many studies had as initial impulse Robert Schumann's suffering, who had been during childhood and youth an exceptional piano player, but who was no longer able to perform in adulthood. George Vivian Poore, a British physician, opined that the piano players' discomfort sensation, fatigue and even loss of finger control – this was Schumann's case – might be due to overstress or to a muscular accident. Poore could only use the treatment means available at his time (arsenic and massage) but he came in time to the conclusion that a long pause from piano playing might bring the most substantial improvement [4].

Many piano players complained that the ring finger was not as strong and independent as the other fingers. The surgeon William S. Forbes developed a surgical technique named "ring finger release", which consisted in cutting a connection tendon. This surgery was in vogue between 1857 and 1885 and it seems that – in isolated cases – is still practiced of our days.

## 3. PIANO EVOLUTION AND ITS INFLUENCE UPON PERFORMANCE

The evolution of piano towards the currently known instrument took place between 1825 and 1900, leading to the extreme change of music, performing technique and performers' suffering, compelled to comply with ever increasing and variegated strains.

The hapsicord is the instrument preceding the piano: it had frail construction and the piano players' efforts were at a level corresponding to the construction of the instrument, much lower than the one required from the piano player of our days.

Once with the apparition of piano – a much more solidly built instrument and with immensely greater sonorous possibilities – composers have begun to intensely use new sound combinations, brought forth not only from the order of the musical notes, but also from the intensity of piano key pressing, achieving melodies which varied from the standpoint of the sonorous intensity, of the musical notes' speed and of the sound's brilliance. The new compositions demanded the musicians to reach the performance limits of their superior

musculoskeletal system, which led to relinquishing the previously used technique and to creating a new technique, adapted to the new instrument.

At the beginning of the 20th century, piano professors developed new study methods for their apprentices and begun paying attention to both human anatomy and psychology [5]. The first who managed to create a scientific basis was Otto Ortmann, at that time director of the Conservatory from Baltimore: he created a research department and published the obtained results during the year 1925, under the title *The Physical Basis of Piano Touch and Tone* and during the year 1929, *The Physiological Mechanism of Piano Technique*, even nowadays regarded as the most important publication of this field [6]. Ortmann analyzed the differences existing in the various performers' body, arm and finger dimensions and their impact upon the used technique. He laid the stress on studying the movement coordination and used to this purpose the most advanced measuring and recording instruments at his time. Acting differently than other professionals, Ortmann focused on analyzing the individual anatomical differences of the hands and forearms and their influence on one's individual technique. He emphasized the importance of movement coordination, resorting to scientific methods and laboratory experiences.

#### 4. EVOLUTIONS DURING THE 20<sup>TH</sup> CENTURY

The German physician Kurt Singer – who also benefited from extensive musical education – analyzed both the physical and psychic aspects of the musicians' diseases, intuiting that many of the occurring symptoms had in fact psychic origin. Singer analyzed in detail cramps, emphysema, laryngitis, dental problems, vision problems and others. Between 1930 and 1934, The International Labor Office of USA published two encyclopaedias entitled *Occupation and Health: Encyclopaedia of Hygiene, Pathology and Social Health* wherein more other musician-specific illnesses are dealt with, such as myopia, neuritis, tenosynovitis etc. In order to cure the nervousness before performance, he had recommended, even at his time, the drastic reduction in the number of study hours. He focused his attention on the musicians' neurological and psychological deficiencies, intuiting that their physical troubles were in fact provoked by their psychic states. In a special chapter, he deals with the issue of the wind instrument players' lung expansion (emphysema), which may lead to the interruption of the musical career. He also analyzed the problems connected to the wind instrument players' dentition, the issues connected to calking the embouchure with lip seal and the deficiencies that might arise, the problems related to visual acuity and more. On this basis, the German musicians negotiated with their employers, in 1925, the pension and sickness benefit granting; the musicians from Netherlands and the Soviet Union managed to settle through contract that the loss of the vocal soloists' voice was a socially insured disease [7].

After 1945, the musician-treatment publications multiplied, but it was apparent that the authors worked independently of each other and that their works were not correlated. Since 1946, in the magazine *Music Index*, the issue of the treatment has been intensely discussed, the problems related to the buccal apparatus and to the vocal chords being placed in the spotlight.

The researches effectuated since 1960 upon the causes leading to the musicians' illness have been achieved with sophisticated equipment analyzing and recording the performer's movements, whereof rapid cameras. The researches pointed out to new correlations between the music performance and the musician's suffering, ascertaining that the previous (intuitive) beliefs upon the movements of the body and upon the caused suffering

were not objectively confirmed by the modern recording means. Almost the entire data and knowledge base had to be restored and corrected. With this, new problems were considered, such as those related to the musicians' hearing impairment. Measurements of the sonorous intensity have displayed values beyond 110 dB in the jazz bands and beyond 100 dB in the symphonic orchestras. This sound intensity – to the threshold of pain – leads, after a relatively short time, to the impairment of the musicians' most important sense. A first measure was to provide the musicians with especially adapted hearing protections, placed in the ear, so that the musician might be able to coordinate with his colleagues, but the perceived sonorous intensity might be significantly lowered. Particularly damaging has proved to be the piccolo flute, which, of all the instruments of an orchestra, makes the highest-frequency and considerable-energy sound. This one alone may completely impair the hearing of the performing musician and of his colleagues nearby.

In 1967, M. M. Porter published a series of articles in *British Dental Journal* [8] wherein he detailed the problems faced by wind instruments players whilst practicing their profession. Their suffering has received the generic name of temporomandibular joint disorder (TMJ). For wind instrument players, losing their teeth means the cessation of practicing their profession. Music professors and dentists participated in discussing the arising problems, which start with teeth loosening and end with their loss. The pains that occur while opening and shutting the jaw were correlated as resulting from pressing the wind instrument on one's lips. Lip protections made of various materials were experimented – starting with paper, plastic foil etc. – however a unique solution, acceptable for all wind instrument players, could not be reached.

Also in 1967, Dr. Friederick Polnauer, a well-known English violin professor, published, together with Dr. Morton Marks, *Senso-Motor Study and its Application in Violin Playing* [9]. In SUA, Maurice Faulkner, a trumpet professor, published the results of his researches with respect to the respiratory function and intrathoracic pressure. He suggested professional musicians, doctors and those physicists who can develop specialized measuring equipment to collaborate in order to elucidate all aspects of the wind instrument performers' activity and suffering.

The entire publishing activity and the increasingly intense questions asked by musicians have not remained unnoticed by the physicians dealing with their treatment. After 1970, various medical publications – such as *British Medical Journal* – have published comments that suggest recognizing a subspecialty of internal medicine, bearing the name of musicians' medicine. As first success, the Neurology Symposium from 1972, held at Vienna, was dedicated to the new subspecialty. In 1977, MacDonald Critchley and R. A. Henderson – two participants in the symposium – published a book which marked the beginning of the new branch of the medical sciences [10].

A study carried out by the National Institute of Occupational Safety and Health from USA, in 1978, classified musical activity as the fifth more stressful (amidst 130 analyzed activities), more stressful than the activity played out by policemen, doctors or lawyers [11]. This stood for a very important signal to both musicians, physicians and to public opinion to the purpose of re-assessing the musicians' health problems.

General public had still remained however little acquainted with the dimensions of this problem until, in 1981, *New York Times* published a report about the difficulties encountered by two renowned musicians, Garry Graffman and Leon Fleischer, in healing the problems appeared at their hands. Both referred to Massachusetts General Hospital from Boston, where they were relatively successfully healed. In the following years, almost all musicians having faced medical problems – which they had approached more “empirically” before (with acupuncture, with relaxation techniques) – took to Boston, creating this way the first institution specialized in curing musicians. *Piano Quarterly*, a magazine dedicated to piano

professors, published a series of interviews with the healed musicians, but the consecration of the treatment methods only occurred in 1983, when the acquired experience was submitted in a detailed article, published in *Journal of The American Medical Association* [12].

In line with the development of the knowledge upon the musicians' medicine, a series of specialized clinics were inaugurated in several cities from USA. They would provide adequate treatment not only to musicians, but also to dancers, vocal soloists, and to other categories of employees – such as sportsmen – who suffered from similar problems. Some of them have specialized in curing specific diseases, but others provide the entire palette of treatments, necessary for each patient. These clinics collaborate with physicians of variegated specialties, with analysis laboratories, which may conduct expensive researches; they resort to specialized equipment, which is only economically justified in the case of a sufficiently great number of patients. These clinics' main problem is of financial nature as, on one hand, musicians need long treatments, very carefully conducted, and, on the other hand, they are inadequately insured to bear the costs of such a treatment.

In parallel with curing these physical problems, the treatment of the musicians' psychic problems began. The fright of going onstage, the fear to perform has accompanied musicians ever since the dawn of music. Starting with 1970, the anxiety has been treated with psycho-pharmaceuticals or betablockers, such as propranolol. The abuses inherently led to undesired complications. With the passage of time, the musicians' natural apprehension, confronted to a situation which might have destroyed their career, gave way to the collaboration with the physicians, to the purpose of obtaining maximal healing efficiency.

## 5. ORGANIZATION OF MUSICIANS' MUSIC IN USA

The avalanche of publications led to the necessity of directly consulting the various participants in the musician-healing process. This has been achieved through organizing specialized conferences. The first was initiated by *National Flute Association*, in 1982. Within this association's newsletter, a brief report upon two of the flute players' basic problems was published: the fear of concert, stage fright, and specific health problems. In 1983, there was organized at Chicago – in collaboration with the *Musical Festival of Aspen / Colorado* – the first conference, under the name of *Medical Problems of Musicians*. In the following years, the conference has been regularly held at Aspen and, within its programme, materials upon the professional dancers' medical problems have also been included. Since 1984, the violin players have likewise been organizing – through their association *American String Teacher Association* – meetings with specialized physicians, in order to discuss specific issues. In Denver, also during 1984, the conference *Biology of Music Making* was organized, wherein neuro-musicology-related themes were submitted.

During the following years, manifold seminaries began being provided, wherein specialized doctors made public the results of their researches. Making use of the impulse from physicians, the musicians reconsidered their existing training methods, developed new methods, verified their efficacy in healing specific diseases and informed their colleagues upon the obtained results.

As physicians have been obtaining increasingly good results in healing musicians, and the problems signaled by the latter have been recognized as professional diseases, musicians began to trustfully refer to hospitals for adequate treatment. In big cities, with a great number of musicians and Faculty of Music students, ultra-specialized clinics appeared, which joined in organizations capable of offering the entire range of treatments required by musicians. Most doctors practicing within these clinics are, they themselves, musicians. Summarizing the

acquired experience, Dr. Richard Noris published, in 1994, *The Musician Survival Manual: Guide to prevent and Treating Injuries of Instrumentalists* [13]. *American Federation of Musicians* has been publishing, since 1995, in *International Musician*, a federation-edited magazine, informative notes upon injuries, illnesses and the offered cures. They enjoyed a great deal of attention from musicians, as the materials briefly and clearly explained both their colleagues' health problems and the successful treatments. The analysis upon the musicians' stress has been also extended upon those performing within jazz bands: contrary to all expectations, they undergo significant stress levels.

In 1986, the magazine *Medical Problems of Performing Artists* was founded, under Dr. Alice Brandfonbrener's management. Its goal was promoting the interest for the artists' medical problems, disseminating the acquired knowledge and achieving good contribution to the musicians' welfare. Since 1993, the magazine has been the official publication of *Performing Arts Medicine Association*. As time went on, the magazine has evolved into a well-known forum, which facilitated the communication between the medical world personalities and the musical world ones, and also with other social groups dealing with the musicians' health problems.

The research results in the musicians' medicine have been regularly published. One of the most important publications included a statistic outlook upon the health situation, resulted from a call during 1985, which invited musicians to honestly report all problems they underwent. Out of the data published in 1988, there may be seen that 82% among the musicians suffered from medical problems along their career, and 76 % had problems that seriously affected their working ability. Women are more predisposed than men to medical complications; and betablockers are used by 40% among the musicians, for mastering their emotions, before going onstage. Interestingly to note, the left hand undergoes more suffering than the right hand. Similar studies were conducted upon the Faculty of Music students, and the result indicates that 8.5% among them have health problems every year.

In 1985, the issue of extending certain aspects of the musicians' treatment upon other categories of artists was raised for the first time. After a short space, *International Arts Medicine Association* was founded, which proposed a very broad spectrum of goals, starting with collecting information, disseminating them, preventing dysfunctions, educating to the purpose of maintaining the artists' health and others. This association's official publication is *International Journal of Artist Medicine*, which also serves as specialized magazine for *International Society for Music in Medicine*. In 1989, *Performing Arts Medicine Association* was set up at Aspen, so as to ensure specialized treatment to sick musicians

In 1987, American Occupational Medicine Association recognized the importance held by the medicine for musicians and created a special section for studying these specific problems. In 1988, The Library of the Medical and Chirurgical Faculty in Baltimore organized a collection of specialized books and magazines, which are now available to all interested persons. An analysis effectuated in 1989 shows that more than 100 specialized articles are being published every year in the American press, most of them within *Medical Problems of Performing Artists*. Likewise, many other newspapers participate in this publishing effort, which denotes that the issue of the music for musicians has already reached public consciousness.

The Universities with Faculties of Music began organizing specialized courses, especially to the purpose of contributing to the artists' health. Some of them have stepped forward and offer University degree diplomas in the "Artists' Medicine" field.

Applying the acquired experience and some ergonomics knowledge, the musical instruments started being optimized for every musician. Especially in wind instruments, the position of the keys and holes was modified, so as to adapt them to every musician's body particularities. For violin players, various violin supports were created, so that the instrument

might be comfortably secured under one's chin. A genuine forward shift was the computer-assisted study upon the geometry of the instrument: the method allowed overlaying the image of the musician's body and the image of the instrument; the positions and the causes of the performers' pains could be thereby identified. Through modifying the geometry of the instrument, the musicians' chronic problems disappeared. An especially created software for following the movement of the fingers on the keyboard allowed studying the piano players' hand injuries and subsequently their recovery process. The Internet's ever increasing availability led to the proliferation of the information upon the musicians' medical treatment. Many hospitals and research institutes now have specialized web pages, displaying the latest achievements in this field.

## 6. CONCLUSIONS

Despite the progress attained by medicine, the future of the musicians' medicine is mostly influenced by the insurers' financial situation. Many musicians are not insured, others are not sufficiently insured; consequently, the insurances do not cover some of the strictly necessary treatments. In these circumstances, the financial situation of some specialty clinics is precarious.

Within great orchestras, the issue of the musicians' medical insurance was solved, considering three independent components: traditional health insurance, accessible to all employees, private insurance for musicians and their appropriate remuneration. This is the ideal solution; however, not all orchestras and musical bands are capable of providing these conditions. Despite these difficulties, musicians remain committed to their profession and the physicians specialized in the musicians' medicine endeavor to provide the best treatment and to maintain the progress of medical knowledge.

The musicians' unions – as many as they are – have taken over this issue and attempt to solve as many members' wishes and grievances as possible. They are nevertheless confronted, on one hand, to the ever increasing costs of the medical insurance and, on the other hand, to the necessity, incumbent on the managers of the hospitals and clinics, to optimize the offer and to maximize the profit obtained from medical activity.

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