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The Saratov Tuberculosis Institute as a local orthopaedic research cluster in the first half of the 20th century*

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Abstract

This article examines institutional factors in the development of local orthopaedics in 1920–1945. The study was carried out using unpublished documents from the State Archive of the Russian Federation, the State Archive of Saratov Oblast, the archive of the Research Institute of Traumatology, Orthopaedics and Neurosurgery of the Razumovsky Saratov State Medical University, and personal documents. Most of these documents are being introduced into scientific literature for the first time. The authors attempted to provide an insight into the role of the Saratov Tuberculosis Institute, created in 1924, as a local cluster for the formation of an orthopaedic research school, which influenced the development of orthopaedics in the Soviet Union. The development of local orthopaedics is usually viewed in the context of the work carried out by established institutional structures – specialised research institutes and departments. The authors' attempt to go beyond the existing tradition uncovered a new cluster for the establishment of orthopaedic science and practice based on the principle of interdisciplinarity.

Keywords

history of medicine, history of orthopaedics, Saratov Tuberculosis Institute, A.G. Eletsky, A.Y. Demidov, G.P. Voskresensky

The past decade has seen growing interest in the history of orthopaedics, not studied as much as it should, but having not only informative but also educational value (Hernigou and Pecina 2013). The study of the history of orthopaedics demonstrates just how peculiar this area of medicine is and the brilliance of the inventions made in it, which remain relevant to this day. Furthermore, it enables to determine the chronology of orthopaedic science, referring to the facts, events and figures, without which modern-day orthopaedic science is unimaginable (Marcacci et al. 2013). Numerous studies present materials relating to both the establishment of orthopaedic science in specific regions and countries (Becker 1976; Bumbasirević, Lesić, Sudjić 2005; Rauschmann and Thomann 2000; Taylor and Barry 1994; Pillay 2002; Fischer, Fischer-Athiel, Fischer 1998; Bashurov 2006; Glazyrin 2006; Korzh et al. 2012; Linnik, Romashov, Saldun 2012; Battaloglu and Bose 2013), and revealing the contribution of

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individual scientists to its development (Grishin 2017; Jackson 2011; Bovine, Silver, Weiner 2012; Hughes 2015; Sebastin and Chung 2010).

The actual picture of the development of orthopaedics as a science consists of regional stories about its formation and evolution. The history of orthopaedics is traditionally viewed through the lens of research institutes of traumatology and orthopaedics or the work of staff in respective departments. Using the example of Saratov as a new centre for the establishment of medical science and practice in the first quarter of the 20th century, this article attempts to assess the contribution of tuberculosis institutes to the development of orthopaedics.

Besides published sources, the source base for this study consists of unpublished documents from the State Archives of the Russian Federation, The State Archive of Saratov Oblast, the archive of the Research Institute of Traumatology, Orthopaedics and Neurosurgery of Razumovsky Saratov State Medical University, as well as personal documents.[1] This is the first time most of the archive materials have been published.

The Saratov State Tuberculosis Institute of the RSFSR People's Commissariat of Public Health opened at the former tuberculosis hospital on 20 November 1924.[2] The Saratov provincial health department issued an order to convert the hospital into a tuberculosis institute. And in 1931, it was turned into a research institute.[3] The tuberculosis institute occupied two buildings in the historic town centre – the former governor's house at the intersection of Michurin and Volskaya. There was an outpatient clinic, a laboratory, offices and three departments – an adult pulmonary department with an isolation unit, a children's orthopaedic department, and a social pathology and tuberculosis prevention department.

Professor Alexander Grigorievich Eletsky was appointed head of the orthopaedic department, the largest department at the institute. It had 60 beds and 40 staff.[4] Three hundred and forty-one patients were treated in the department in 1925.[5] A total of 5,530 people[6] visited the institute's orthopaedic outpatient clinic, and 15,825 orthopaedic procedures (plaster beds, spinal braces, bandages, traction, etc.) were performed.[7]

Following Eletsky's arrival at the Saratov Tuberculosis Institute, in ten years, the orthopaedic department became a cluster of orthopaedic research and innovations that influenced the development of orthopaedic science in the Soviet Union. The Saratov Workers' and Peasants' Inspectorate inspected all medical institutions in Saratov in 1925. All institutions were reprimanded except the orthopaedic department of the Tuberculosis Institute. The inspection report stated that the orthopaedic department was treating bone tuberculosis, and its staff was attending to patients from various provinces. The report particularly noted that "thanks to the special energy, skill, love for work of Professor Eletsky <...> patients are receiving effective assistance". The document also speaks of the need "to raise the question of making the Saratov orthopaedic department the central medical institution for the entire Lower Volga region".[8] In 1923–1925, while working at the Saratov Tuberculosis Institute, Eletsky was the first in the Soviet Union to perform hip and knee arthroplasty in patients with joint damage due to tuberculosis (Demidov 1958, p. 106).

By 1927, Eletsky was regarded as one of the leading Soviet orthopaedists and was given a seat on the editorial board of the Soviet Union's first specialised scientific journal, *Orthopaedics and Traumatology*, first published in Kharkov. At the Congress of Surgeons held in Leningrad in 1928, Professor Eletsky presented a paper on the significance and potential of arthroplasty. In 1932, the Ukrainian People's Commissariat of Public Health offered him to take charge of the traumatology and orthopaedics department at the Kiev Medical Institute.

During his time in Saratov, Eletsky, one of the founders of the orthopaedic department in

[1] Correspondence between Professor A.G. Eletsky and Professor S.R. Mirotvortsev.

[2] State Archive of Saratov Oblast (GASO). F. R-411. Op. 1. D. 61. L. 32.

[3] State Archives of the Russian Federation (GA RF). F. A 482. Op. 28. D. 217. L. 1 ob.

[4] GASO. F. R-461. Op. 2. D. 50. L. 144.

[5] GASO. F. R-461. Op. 2. D. 50. L. 144 ob.

[6] GASO. F. R-461. Op. 2. D. 50. L. 145.

[7] GASO. F. R-461. Op. 2. D. 50. L. 145 ob.

[8] GASO. F. R-338. Op. 1. D. 333. L. 9 ob.

Ukraine, was focused on the development of the following areas:

– the problem of spastic paralysis: Eletsky wrote his first work on this topic at the Saratov Institute of Traumatology (Eletsky 1923a; Eletsky 1923b) and continued it in his doctoral thesis, and it was the basis of his monograph and articles (Eletsky 1924); all these works dealt with orthopaedic issues poorly explored at that time;

– the study of bone and joint innervation[9]: based on studies carried out in Saratov, Eletsky was the first to establish the presence of sympathetic ganglia in the popliteal fossa, paving the way for the further study of the issue;

– mobilisation of ankylosed joints via arthroplasty: his work in this area in Saratov earned him a place in the Great Medical Encyclopaedia as a leading expert alongside R.R. Vreden.[10] Eletsky developed and successfully put into practice original techniques for arthroplasty of major joints based on suppressing bone tissue regeneration. He used thermocautery and chemocautery to suppress bone tissue regeneration. His work titled *On the Question of Arthroplasty* (Eletsky 1926) is the first publication in the Soviet Union based on a vast amount of material from personal clinical observations;

– treatment of nonunions: Eletsky established a definite relationship between the location of bone fragments and the direction of muscle-force action on these fragments, which consists in intensifying or suppressing reparative regeneration of bone tissue. He was the first to prove that, under favourable conditions, the sclerosed ends of bones at the level of the nonunion can grow together and, therefore, should not be resected. The development of osteoplasty in the Soviet Union was based on advancing Eletsky's ideas.

The first thesis work on orthopaedics in Saratov was written in 1935 by Alexey Yakovlevich Demidov, a student of Eletsky. It was titled *The impact of economical knee joint resection on the growth of the lower limb*.[11] While a student at Saratov University in 1918–1920, Demidov worked as an assistant anatomist in the department of general anatomy. In his third year, he went on to become an anatomist in the department of operative surgery (Arhangelsky 1935, p. 54), where, under the guidance of N.V. Kopylov and A.G. Eletsky, he was introduced to orthopaedics. At the same time, Demidov was actively involved in the students' scientific circle. (Saratovskiy meditsinskiy institute... 1980, p. 53). The lure of surgical work led the young doctor to the hospital surgery clinic, headed by Professor S.I. Spasokukotsky. Due to the lack of a full-time position, Demidov was sent to the city of Guryev (Kazakhstan), where he headed the city hospital and the surgical department. In 1925 he returned to Saratov after being elected senior research fellow at the department of orthopaedics at the Saratov State Institute of Tuberculosis. There, he set out to conduct orthopaedic research under the guidance of the head of the department, Eletsky. In 1927–1928, Demidov published eight papers containing the results of his research carried out under the guidance of Eletsky. Six of the articles appeared in leading scientific journals on traumatology and orthopaedics. He addressed issues relating to hip fractures at an early age (Demidov 1928b), a congenital defect of the rectus abdominis muscle (Demidov 1928a), reactions in bone and joint diseases (Demidov 1927a), a case of congenital anterior dislocation of the knee joint (Demidov 1927b), and other issues (Eletsky and Demidov 1928). Describing a congenital defect of the rectus abdominis muscle in an 18-year-old patient, Demidov catalogued anecdotal reports from foreign literature, covering up to ten observations of the described congenital abnormality, adding his own case reported at Professor Eletsky's orthopaedic department at the Saratov Tuberculosis Institute. In his paper, Demidov gave a general description of patients with congenital defects of the rectus abdominis muscle, pointing out

[9] Eletsky first published a paper on this issue in 1925. In an extended version, he presented his views on this issue in 1927 at the 19th Congress of Russian Surgeons. His paper was published in the materials of the Congress. These views were further elaborated four years later.

[10] Arthroplasty, in Great Medical Encyclopaedia. 2nd ed. Moscow, 1957, p. 834. (In Russ.)

[11] A.Y. Demidov was born on August 9, 1898, in Saratov to the family of a public servant (See Archive of Saratov Research Institute of Traumatology and Orthopaedics (SarNIITO). Op. 1. D. 796. L. 1). From 1917 to 1922, he studied at the faculty of medicine Saratov University.

that along with the latter, these patients have a sagging abdomen, pain below the navel when pressure is exerted, and constipation. Demidov brilliantly and vividly describes a typical patient with a congenital defect of the rectus abdominis muscle: "The wall of their abdomen has the thickness of parchment paper – you can clearly distinguish the loops of the intestines, their peristalsis; palpation of the diaphragm, bladder, spine and other organs is possible; there is no m. rectus abdominis from the first transverse line; the external and internal abdominal obliques are underdeveloped; funnel deformation of the thorax; no testicles in the scrotum; high position of the bladder and its attachment to the navel" (Demidov 1928a, p. 22). In the paper, the author presents information supporting the possibility of conservative management of this congenital abnormality, including the use of electrotherapy and massaging of abdominal muscles, as well as surgical treatment – muscle transplant (m. adductor longus, m. rectus femoris, m. sartorius, m. tensor fasciae latae). However, based on his observation, Demidov noted that surgical treatment was not possible owing to the generally weak state of the patient.

In 1935, Demidov was elected an assistant in the orthopaedic department of the surgical clinic of the Saratov Medical Institute. Following Eletsky's move to Kiev, Demidov completed his thesis work officially under Professor Sergey Romanovich Mirotvortsev, who was in charge of the surgical clinic at that time. From 1935 to 1941, he taught an assistant professor course on orthopaedics and traumatology at the hospital surgical clinic of the Saratov Medical Institute.

Apart from teaching, Demidov was actively involved in clinical work. From 1935 to 1939, he headed Saratov's only remaining orthopaedic department of the clinic of departmental surgery of the 3rd Soviet Hospital. Then, after the orthopaedic department was brought under the 1st Soviet Hospital, he headed the orthopaedic department of this hospital from 1939 to 1941.[12] In the ensuing years, Demidov advanced the scientific ideas articulated by Professor Eletsky, which was reflected in his doctoral thesis titled *Hip Arthroplasty in the Aftermath of Tuberculous Coxitis* (1967) (SarNIITO... 2015, p. 89).

The fate of Grigory Pavlovich Voskresensky, another student of Professor Eletsky, was somewhat different. He was born in 1899 in the village of Ovsyanka in the Kirsanovsky District of Tambov Oblast. He enrolled in the faculty of medicine of Saratov State University in 1918 and graduated in 1925.[13] In his student years, Voskresensky was keenly interested in science. On 30 December 1924, he presented a patient who had undergone a Foerster and Stoffel operation to members of the Saratov Surgical Society.[14] In 1920–1921, he put his studies on hold while serving in the Red Army.[15] From June 1925 to July 1931, Voskresensky worked as an intern in the orthopaedic department of the Saratov Tuberculosis Institute under Professor Eletsky, receiving a positive performance review from the professor in the first two years of his internship: "In two years of working in the orthopaedic department, Voskresensky gained experience in orthopaedic techniques <...>, showed great interest in orthopaedics and proved to be a good worker. All this gives me the reason to consider Voskresensky a very valuable and desirable assistant in the orthopaedic department".[16]

From July 1931 to 1937, Voskresensky headed the children's department of bone tuberculosis at the Saratov Tuberculosis Institute. From late 1932 to early 1933, he took a three-month refresher course under Professor Fridlyand at the orthopaedics and traumatology clinic of the Institute of Advanced Medical Studies in Kazan. In 1933–1937, he was enlisted as an assistant to teach a tuberculosis course at the Saratov Medical Institute.

Voskresensky's research interest during his time at the orthopaedic department of the Saratov Tuberculosis Institute was focused on the study of cervical coxitis and the prevention of disability-related osteoarticular tuberculosis.[17] In 1937, he successfully defended his thesis for

[12] SarNIITO archive. Op. 1. D. 796. L. 17.

[13] SarNIITO archive. Op. 1 l/d. D. 685. L. 1–43.

[14] GASO. F. R-3737. Op. 1. D. 37. L. 1 ob.

[15] He worked as a pharmacist in a military pharmacy store, first on the Eastern front and then the Caucasus front.

[16] SarNIITO archive. Op. 1 l/d. D. 685. L. 10 ob.

[17] GASO. F. R-2217. Op. 1. D. 74. L. 6.

a Candidate of Sciences degree, titled *Osteoarticular Tuberculosis in Children*, summarising all cases of tuberculosis reported in Saratov over 16 years (beginning 1919). The reviewers – Professor S.R. Mirotvortsev, Professor N.I. Krauze and Docent L.I. Korobkov – noted the following positive aspects of the thesis: the author's consistent comparison of his own material with literature data, which improves the author's objectivity and depth of opinions and conclusions; the author's nearly exhaustive answers to all the issues raised. According to the reviewers, the author was a very knowledgeable, vastly experienced, thoughtful, and critical-thinking clinician. The reviewers concluded that this was a doctoral thesis rather than a thesis for a Candidate of Sciences degree.[18] Its results were presented in academic papers published in 1936–1937 (Voskresensky 1936; Voskresensky 1937a; Voskresensky 1937b) dealing with the organisation of specialised care, early diagnosis and treatment of patients with osteoarticular tuberculosis.

Voskresensky pointed out the importance of prevention and early detection in combating osteoarticular tuberculosis: "When it comes to osteoarticular tuberculosis, preventive aspects consist in the prevention of the 'fact', that is, reduction of morbidity and prevention of 'consequences', i.e., deformities" (Voskresensky 1936, p. 1328). The first aspect relates to all sanitary measures generally aimed against tuberculosis, and specific measures, for example, the veterinary inspection of tuberculosis-infected cattle. As for the second aspect, i.e., the prevention of consequences, all children in contact with persons with tuberculosis or with a positive Pirquet or Mantoux test should be placed under constant monitoring by an orthopaedist. Bearing in mind the vast medical community of the periphery and the scarcity of guidelines on bone tuberculosis at that time, the author summarises the early symptoms of the initial forms of joint and spinal tuberculosis and the technique for examining patients.

In his other work, Voskresensky noted: "During the early detection of osteoarticular tuberculosis, we must shift the emphasis towards assistance from the general medical community. We must teach doctors how to navigate the symptoms during the early diagnosis of osteoarticular tuberculosis so that they refer all suspected cases to specialists for consultation" (Voskresensky 1937b, p. 129). He argued that familiarisation with the early diagnosis of osteoarticular tuberculosis should occur as early as the medical institute: students and graduates are not sufficiently familiar with early diagnosis because very few hours are allocated for teaching bone tuberculosis. This shortcoming could be significantly remedied if more attention was paid to differential diagnosis when teaching such disciplines as internal, nervous system and childhood diseases. He also argued that familiarisation of doctors with the early diagnosis of osteoarticular tuberculosis required frequent lectures, courses on pulmonary and bone tuberculosis, and demonstrations of cases of early osteoarticular tuberculosis. Voskresensky also believed it was necessary to organise popular lectures, speak with the general public, and promote popular literature. He also called for special attention to contact with patients since the so-called bacillary environment accounts for most patients with bone tuberculosis.

In 1937–1946, Voskresensky headed the bone tuberculosis departments in various republics across Central Asia. From 1937 to 1939, he headed the bone tuberculosis department of the Kazakhstan Tuberculosis Institute, and from 1939 to 1942, he headed the bone tuberculosis department of the Institute of Orthopaedics and Traumatology in Tashkent. Simultaneously, he was an assistant in the traumatology department at the Tashkent Institute of Advanced Medical Studies. During World War II, Voskresensky was head of the 2nd division of the District Military Commissariat of the Central Asian Military District.

Therefore, Professor Eletsky's first students at the Saratov Tuberculosis Institute – Alexey Demidov and Grigory Voskresensky – went on to become the first orthopaedic specialists at the Saratov Research Institute of Reconstructive Surgery and Orthopaedics (now the Research Institute of Traumatology, Orthopaedics and Neurosurgery of the Razumovsky Saratov State Medical University of the Russian Ministry of Health), established by the RSFSR People's Commissariat of Public Health in November

[18] SarNIITO archive. Op. 1 l/d. D. 685. L. 9 ob.

1945.[19] The development of local orthopaedics is usually viewed in the context of the work carried out by established institutional structures — specialised research institutes and departments. The method proposed by the authors, which goes beyond the existing tradition, uncovered a new cluster for the establishment of orthopaedic science and practice, operating as an interdisciplinary structure.

In conclusion, it should be noted that it is typical to investigate problems in the history of medicine as a change of schools of thought from the perspective of a linearly perceived temporal approach with reference to specific dates considered significant. In this study, the authors relied on an institutional approach involving comprehensive analysis of the origins and development of new models of organising medical research practices.

Therefore, the model of the formation of medical science and practice trialled in the first half of the 20th century proved to be socially effective. That model was based on organisational forms that ensure a consistent rather than sporadic increase in knowledge, and it went on to develop rapidly in the form of traumatology and orthopaedic institutes, operating as specialised local research clusters.

[19] Order of the People's Commissariat of Public Health of the RSFSR No. 472-O, of 19.11.1945, "On the organisation of the Saratov Research Institute of Orthopaedics and Reconstructive Surgery of the People's Commissariat of Public Health of the RSFSR".

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