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PHENOMENON OF DEMIKHOV.

At N.V. Sklifosovsky Institute (1960–1986). V.P. Demikhov and his experiments in the field of organ transplantation in 1968–1973

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Abstract

The article analyzes the experimental studies of V.P. Demikhov conducted by him in 1968-1973, by studying the content of his report on the work done during this period of time and presented at the Meeting of the Academic Council of N.V. Sklifosovsky Institute in July 1973 for the re-election for the position of the Head of the Organ Transplantation Laboratory for a new 5-year term. It follows from the analyzed document that the extent of the research made by V.P. Demikhov and his staff significantly exceeded the data that were presented in the Institute's reporting documents for 1973, in the Research Plans for 1974, and the plans for implementing the research results in healthcare practice in 1974. The Table that illustrated the report indicated that in 1968–1973

V.P. Demikhov conducted more than 485 different experiments, including transplantation of vital organs, experiments on perfusion of isolated organs, resuscitation of cadaveric hearts, and heterogeneous blood transfusion. He actively collaborated with surgeons from many clinical institutions in Moscow (Institute of Tuberculosis, S.P. Botkin Hospital, Hospitals of the Moscow Military District) and other cities of the country (Frunze, Tyumen), conducting joint experimental and clinical studies with them. However, attempts to introduce the methods developed by him into clinical practice were futile. Of all his achievements in different years, the method of upper limb reimplantation was successfully applied in clinic in 1971 by Professor B.D. Komarov.

Keywords: history of transplantology, V.P. Demikhov, his scientific and experimental activities in 1968–1973, upper limb reimplantation

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Introduction

Earlier, we reviewed and analyzed the achievements of V.P. Demikhov and the staff of his Laboratory in the period from 1969 to 1972 [1, 2]. The present article proceeds with the previous review. The analysis was based on the Proceedings of the N.V. Sklifosovsky Institute Academic Council Meetings for the year of 1973. We have focused our particular attention to V.P. Demikhov's reporting (Fig. 1) on his research for a 5-year period (from 1968 to 1973) for the occasion of his re-election on the position of the Head of the Organ Transplantation Laboratory. But

first, let us cite from some of the documents preceding V.P. Demikhov's report on his research, which mention the Organ Transplant Laboratory or its employees.

Fig. 1. V.P. Demikhov. 1970s

Research conducted in the Organ Transplantation Laboratory at the N.V. Sklifosovsky Institute in 1973

At the Academic Council Meeting on February 21, 1973, Doctor of Medical Sciences L.L. Gugushvili in his presentation put forward the initiative to establish an independent *Laboratory of Surgical Anatomy*. Back in 1971, L.L. Gugushvili had addressed the Academic Council with an idea to create a Laboratory for Vascular and Circulation Pathology, which, among other things, would have been designated to conduct anatomical research. After that, *a Laboratory of Clinical Physiology* was created at the Institute, which did not perform anatomical studies. Therefore, the speaker asked for the permission to establish a new Unit that, according to L.L. Gugushvili, would have aimed at conducting the research to study the pathogenesis of urgent surgical diseases, and

training surgeons in the topographic anatomy of the affected organs and tissues.

However, the members of the Academic Council did not support the speaker, believing that this scientific issue was not included in the Institute's Research Topics. As a result, they agreed that it would not be advisable to create such a Laboratory in an emergency medical institute, and this research topic should be dealt with by the Institute of Morphology of the USSR Academy of Medical Sciences, the Central Institute for Doctors' Advanced Training, or some specialized departments of operative surgery and topographic anatomy at medical institutes. It is worth to note that the Council members who took the floor at the Meeting rightly criticized L.L. Gugushvili for disengaging himself from research in the Organ Transplantation Laboratory, of which he was an employee and which was headed by V.P. Demikhov.

The main thing that L.L. Gugushvili meant was his conviction of the need to continue studying *the phenomenon of retrograde circulation he had found in liver on the model of portal hypertension*, which phenomenon, in his opinion, existed in other organs both in the norm and in pathology, performing a compensatory or decompensatory function. This phenomenon, as L.L. Gugushvili believed, was confirmed by the segmental structure of organs; and its study would allow reconsidering the anatomical advisability of some organ-removing operations and develop new, functionally sound methods of organ transplantation. Moreover, rather than generally to the study of the liver segmental structure, the results obtained by L.L. Gugushvili, were related to substantiating the methods and extent of liver resections and the replacement of the resected parts of the organ with homologous liver fragments [3, p. 46–77]. However, as we know, the N.V. Sklifosovsky Institute would set to start clinical liver transplants much later.

The Academic Council Meeting on March 14, 1973, discussed the issue “On the results of implementing the scientific research results into healthcare practice” (Fig. 2). The Candidate of Medical Sciences A.S. Kuznetsov, the Scientific Secretary of the Institute spoke at the Meeting. He spoke about the directives of the XXIV Congress of the CPSU, the development and implementation of new methods of diagnosis and treatment in practical healthcare.

Fig. 2. At the Meeting of the Academic Council of the N.V. Sklifosovsky Institute. 1970s. From the archives of Professor B.D. Komarov

Among other things, he said that there is not the slightest doubt that the N.V. Sklifosovsky Institute had completely fulfilled all the socialist obligations assumed for the Congress and really did a lot of useful and necessary work for practical health care. It should be noted that the presentation also covered one of the achievements in the field of organ and tissue transplantation: in 1973, several Institute employees headed by B.A. Petrov received a USSR Author's Certificate for an Invention entitled "Device for preservation of isolated organs" [3, p. 104–118].

On April 4, 1973, the Scientific Council discussed one, but very important issue. Professor V.V. Lebedev, the Head of the Emergency Surgery Department, Head of the Traumatic Brain Injury Department, the

Secretary of the Party Organization of the N.V. Sklifosovsky Institute, (Fig. 3) made the presentation reporting on the state of ideological and educational work in the personnel.

Fig. 3. Professor V.V. Lebedev. 1970s

Completing his presentation, V.V. Lebedev expressed his opinion that not a single new scientific school had been created at the N.V. Sklifosovsky Institute. "*Before*," the speaker said, "*we had the schools of the surgeon S.S. Yudin, physiologist S.S. Bryukhonenko, therapist A.N. Kryukov, surgeon A.A. Rusanov, traumatologist V.V. Gorinevskaya. Now we have surgical schools of B.A. Petrov and D.A. Arapov... So, what is next? Where are new scientific schools? Where are world famous scientists?*" V.V. Lebedev addressed the audience. But the question turned out to be rhetorical [3, p. 139-145].

The Institute Academic Council Meeting on May 24, 1973, among others, discussed the issue of electing E.B. Kanevskaya for the position of the Junior Research Associate of the Organ Transplantation Laboratory. It is curious that V.P. Demikhov opposed her candidacy. He said that in

view of the long break in her work, she would not be able to meet the high requirements that are placed on the Institute's scientific staff. It is unclear why he did that. Before, he used constantly to request on increasing the staff of his Laboratory. But after his speech, E.B. Kanevskaya was voted down [3, p. 253].

On June 13, 1973, Professor A.P. Kuzmichev[1] (Fig. 4), the Deputy Director of the N.V. Sklifosovsky Institute presented the report on the Research Project for 1974. The discussion turned to Research Topic Sheets. There was criticism of some Research Units that had submitted no Research Sheets or planned too general topics. There were no Research Topic Sheets from V.P. Demikhov's Laboratory among the submitted ones. But the reason was clear as day.

Fig. 4. Professor A.P. Kuzmichev. 1970s

When A.P. Kuzmichev turned to transitional topics of national economic importance, among others he named two topics of the Organ Transplantation Laboratory: 1) the Development of new surgical methods

[1]Kuzmichev Alexander Pavlovich (1921–1996), Soviet thoracic surgeon, organizer of science. From 1970 to 1995, he worked as Deputy Director for Research at the N.V. Sklifosovsky Research Institute for Emergency Medicine.

for transplantation, preservation and maintenance of the viability of organs and tissues; and 2) the Development of new methods for long-term maintenance of the viability of donor organs. In other words, V.P. Demikhov had not submitted the Research Topic Sheets because they were not required to be drawn up for transitional topics.

We should note the speech of Professor A.P. Golikov, the Head of the Acute Therapeutic Diseases Department, who said that the Research Plan of his Unit included the topic of blunt heart injuries, and that he needed the help of an experimental laboratory for its implementation. But it is not clear which laboratory he meant [4, p. 17–32].

Following A.P. Kuzmichev, A.V. Rumyantseva, the Head of the Organizational and Methodological Department, took the floor to report "On the plan for implementing the results of research for 1974".

And from A.V. Rumyantseva's report it was also seen that the Institute planned to implement the results of research on 55 topics and 11 problems in total, but not a single topic on organ transplantation was proposed for implementation [4, p. 45–46].

On the achievements of V.P. Demikhov and the Organ Transplantation Laboratory of the N.V. Sklifosovsky Institute as by 1973

On July 4, 1973, at the following Meeting of the Academic Council, Doctor of Biological Sciences V.P. Demikhov was re-elected for the position of the Head of the Organ Transplantation Laboratory for the next term [4, p. 87]. Here is a summary of his "Report on the work of the Organ Transplantation Laboratory for 5 years (1968-1973)".

> “ As an experimenter, I began my scientific activity while still a student of the Physiological Department of the Biology Faculty of Moscow State University. In 1937, I designed and manufactured a heart prosthesis (two adjacent membrane pumps that performed the functions of

the left and right ventricles). This prosthesis was experimentally placed substituting for the removed heart of the dog, thanks to which it lived for 5 and a half hours. One of these experiments was demonstrated to S.S. Bryukhonenko, the pioneer of cardiopulmonary bypass.

Thirty years later, the American scientist Kolff[2] wrote in his report on a heart prosthesis that *the first person to replace the heart with a prosthesis in experiment was the Soviet researcher V.P. Demikhov* (our italics. - *Auth*). Another American surgeon, Dr. Cooley[3], translated the results of the experiment to the clinic 32 years later. By means of prosthesis, he supported the life of an inoperable patient for three days, after which he transplanted a donor heart.

In 1940, we started experiments on heart transplantation in warm-blooded animals (dogs), but mobilization into the army and the outbreak of war interrupted those experiments. During the war, I worked as a pathologist in 1st line hospitals, which allowed me to gain extensive experience in the analysis of the causes of death in the wounded and sick, which I used in the post-war period when analyzing the causes of death of animals with transplanted organs.

In 1946, *for the first time in science* (our italics - *Auth.*), we experimentally proved the possibility of a complete replacement of the heart and lungs in higher warm-blooded (dogs). In 1947, the results of experiments on heart and lung transplantation were reported at the 1st All-Union Conference on Thoracic Surgery. In the same year, a Research Group for transplantation of the heart and other organs was established at the A.V. Vishnevsky Institute of Surgery. In 1953 <...> our Group was reorganized into an Organ Transplantation Laboratory. In 1960 <...> the laboratory, which I headed, in full staff moved to the N.V. Sklifosovsky Institute for implementing the positive results of experimental studies into clinic[4].

In early 1962, the Health Sector of the CPSU Central Committee, together with the doctors of the urological clinic of the Hospital named after S.P. Botkin was allowed to transplant a kidney to a patient who was dying of uremia[5]. Such operations at the N.V. Sklifosovsky Institute <...> were not performed at that time.

The patient's condition improved considerably after the operation. But due to the fact that the patient could not be examined at that time, the transplanted kidney had to be prematurely removed. The patient died a few days later. Now, in case of incompetence of the transplanted kidney, it is removed and replaced with a new one. Today, cases of such a

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[2] Kolff Willem Johan (1911–2009) - a Dutch-born American physician, one of the pioneers of the artificial kidney (1943) and artificial heart (1967); one of the founders of a new trend in medicine - the use of artificial organs for replacement and auxiliary purposes.

[3] Cooley Denton Arthur (1920–2016) - an American Cardiovascular Surgeon; in 1962–1967 along with D. Liotta created an artificial heart. In 1969, he performed the world's first implantation of an artificial heart in a patient who lived for 65 hours. In 1970, he first substantiated the concept of using an artificial heart as a "bridge to transplantation" of a biological heart.

[4] In 1955–1960 V.P. Demikhov headed the Organ Transplantation Laboratory of the USSR Academy of Medical Sciences at the Department of Operative Surgery and Topographic Anatomy of the 1st Moscow Medical Institute named after I.M. Sechenov.

[5] It was the second kidney transplant operation in a USSR clinic. The first one was performed in 1933 by Yu.Yu. Voronoy.

successful replacement are known in the world (if the first kidney turned out to be incompetent, it is removed and a new one is implanted).

We performed the largest number of experiments on heart and lung transplantation in various options (Table 1). These experiments proved for the first time *in science* (italics ours - *Auth.) the possibility of heart transplantation in warm-blooded patients (USSR Author's Certificate No. 85878 dated June 10, 1950; German Encyclopedia <unreadable> p. 705).*

Table 1. Number of experiments performed in the Organ Transplantation Laboratory from 1968 to 1973 [4, p. 138–140]

Type of experiment / year	1968	1969	1970	1971	1972	1973	Total
1. Transplantation of a second heart into the chest and on peripheral vessels	27	11	14	10	5	4	**71**
2. Total heart and lung replacement	4	1	2	3	—	—	**10**
3. Transplantation of the complex of visceral organs	5	—	1	1	—	5	**12**
4. Connecting the front and back halves of the body	—	—	7	10	2	—	**19**
5. Reimplanting the 2nd head	8	1	2	1	—	—	**12**
6. Limb transplantation	—	—	—	6	—	3	**9**
7. Pancreas transplantation	2	—	—	—	—	1	**3**
8. Implantation of the uterus with ovaries	2	3	1	—	—	—	**6**
9. Replacement of blood in dogs with human cadaveric blood	—	3	5	—	10	—	**18**
10. Replacement of blood in monkeys with human cadaveric blood	—	—	—	2	—	—	**2**
11. Implanting the sternum on the neck	4	—	—	—	—	—	**4**
12. Preservation of the isolated cardiopulmonary complex in the thermostat	4	—	—	—	—	—	**4**
13. Improvement of the heart revitalizing method in experiment	4	6	—	—	—	—	**10**
14. Revitalization of the heart in human corpses	—	—	—	11	11	1	**23**
15. Revitalization of the heart from a human corpse by connecting it to pig vessels	—	—	—	2	2	—	**4**
16. Revitalization of the heart from a human corpse by connecting it to dog vessels	—	—	1	1	—	—	**2**
17. Human kidney revitalization	—	—	3	—	—	—	**3**
18. Testing a stapler device of a new design	4	—	1	3	2	2	**12**

19. Implantation of Scribner shunts[6] in dogs and pigs	—	—	—	3	1	—	**4**
20. Testing of a heart-lung machine of a new design	3	—	2	5	—	—	**10**
21. Transection of the spinal cord and suturing its roots	—	—	—	2	1	—	**3**
22. Experiments on the study <...> of the stomach blood circulation (experiments by [L.L.] Gugushvili)	2	5	4	2	—	—	**13**
23. Ligation of the venous sinus in dogs (experiments by [V.S.] Nepomnyashchaya)	—	77	—	—	—	—	**77**
24. Replacement of blood in monkeys with the blood of cattle (jointly with Kyrgyzstan)	—	—	1515	—	—	—	**1515***
25. Inducing acute biliary pancreatitis in dogs (Karelin from the 1st MOLMI [named after I.M. Sechenov])	20	—	—	—	—	—	**20**
26. Lung transplant (Frinovskaya from [N.V.] Sklifosovsky [Institute])	—	—	—	—	—	1	**1**
27. Revitalization of the animal heart by using human cadaveric blood	1	21	—	—	—	—	**22**
28. Anatomical and experimental substantiation of emergency surgical interventions for acute circulatory disorders (studies on human corpses was performed by V.P. Demikhov, L.L. Gugushvili, V.S. Nepomnyashchaya and V.M. Goryainov)	60	40					**100**
TOTAL:	150	168	41	60	44	22	**485****

* 1515 experiments on the replacement of blood in monkeys with the blood of cattle, mostly carried out in the city of Frunze, Kirghiz SSR, were not included in the general statistics. − *Auth.*

** This number of operations (485) was calculated by us. In his report, V.P. Demikhov indicated 418 operations. − *Auth.*

In 1947, at the 1st All-Union Conference on Thoracic Surgery, we reported the results of our experiments on heart transplantation in various options. At that time, many such experiments seemed fantastic. Nowadays, a quarter of a century later, in the *Cardiology* journal, No. 3, 1973, a review article from the Institute of Organ Transplantation (Director: Professor G.M. Solovyov) was published [4, p. 131–133]. As for the number of human heart transplant operations, as of December 1, 1972, 200 heart transplants were performed in 197 patients in 61 medical centers in 21 countries (Table 2).

[6] Scribner Belding Hibbard (1921–2003), American physician, pioneer of hemodialysis; proposed an open access to the circulation system by connecting the arterial and venous cannula using a U-shaped Teflon tube (Scribner's shunt).

Table 2. Chronicle of heart transplants by years and countries [4, p. 134]

Year / Country	USA	Canada	France	South Africa	Other countries	Total (survivors; percentage)
1967	1	—	—	1	—	2 (none)
1968	54(4)*	14(1)	10(1)	2	21	101(6; 5.9%)
1969	34(2)	1	—	4(1)	8	47(3; 6.3%)
1970	16(9)	1	—	—	—	17(4; 23.5%)
1971	13(5)	1	—	3(1)	—	17(6; 35.3%)
1972	13(9)	—	—	2	1	16(9; 56%)
Total	131(24)	17(1)	10(1)	12(2)	30**	200(28; 14%)

* The number of living recipients is indicated in brackets.

** In the USSR, two human heart transplants were performed by Professor A.A. Vishnevsky in 1968 and Professor G.M. Solovyov in 1971

Thus, the number of survivors with a transplanted heart worldwide was 28 people, with the longest lifespan of 4 years. We can say that the problem of heart transplantation has come beyond the scope of the physiological experiment. However, the problem of heart transplantation as a purely clinical one is still far from being resolved, and in this regard, we have a lot of work to do to develop methods that provide transplantation. The assessment of the function of the state of the transplanted heart by electrocardiography is performed by V.M. Goryainov.

Along with this, since 1948, we have experimentally developed methods for the organ revitalization and the preservation of revitalized organs for transplantation. In 1950, an *Author's Certificate* [for an invention] was issued for this method.

The N.V. Sklifosovsky Institute of Emergency Medicine is the most suitable for organizing the bank of revitalized organs. Every day, patients are admitted who need to be saved from the injury of one of the vital organs, and if it is impossible to save them, healthy organs should be removed after death for replanting or transplanting them. From 1969 to 1973, 67 experiments on the revitalization of isolated cadaveric organs had been performed (see Table 1), which made it possible to significantly improve the methods of their preservation.

Together with the Institute of Tuberculosis, a "Device for the biological preservation of a cardiopulmonary preparation" was created (USSR Author's Certificate No. 313542 dated June 11, 1971). In addition, we carried out 20 experiments on blood replacement in animals (dogs and monkeys) with human cadaveric blood, and 32 experiments on reviving the heart and kidneys of human corpses by connecting them to the vessels of animals (dogs, pigs). Analyzing the results of the experiments, we came to the conclusion that these studies can be of great practical importance in creating an organ bank. At present, our Laboratory is theoretically prepared for the organization of such a bank, but its creation will require the up-to-date equipment and a significant increase in staff.

One of the topics of our Laboratory, included in the national economic plan of the institute, is the development of a method for transplanting isolated organs and a complex of organs in experiment.

During the reporting period, 29 experiments were made on this topic, many schemes were developed for transplanting individual organs (isolated heart), as well as organ complexes (liver-kidney-pancreas). The fact is that in case of diseases, not one, but several organs are often involved in the pathological process. Implanting a complex of organs in such cases will be more effective than implanting one.

In the next 5 years, we will continue to improve the developed methods in order to substantiate recommendations for their clinical use.

I should mention the educational and methodological work carried out by the Laboratory. A large number of lectures were read for doctors and the staff of the Central Advanced Training Institute. T. Rozhkova, the Researcher from the Institute of Tuberculosis was trained [in our Laboratory] in 1969. In 1970, two researchers from Cuba mastered the methods of organ transplantation in [our] Laboratory, after which a similar laboratory was established in Cuba [5][7].

Since 1970, we have been collaborating with surgeons of the Moscow Military District (M.N. Anichkov[8], I.V. Vigdorchik, V.G.Kostyushkin, V.I. Zhigalin) to transplant and revive organ complexes. Together with the surgeons of Tyumen (Dubrovin et al.), a technique was developed for temporary implanting and preservation of the liver-kidney complex, *which was then applied in clinic* (italics ours. − *Auth*.). The Laboratory has provided assistance to the employees of NIIEKhAiI and M.M. Razgulov in the creation and experimental study of a new vascular stapling device.

Many investigational experiments carried out in the Laboratory were attended by surgeons from many cities of the Soviet Union and other countries (Fig. 5).

Fig. 5. V.P. Demikhov shows doctors the results of his experiments.

1970s

[7] The first organ transplants in Cuba were performed: kidneys in 1970, hearts in 1985, heart and lungs in 1986, liver in 1986, pancreas and kidney in 1986, lung in 1989

[8] Anichkov Mily Nikolaevich (1920–1991), a Military Surgeon, Doctor of Medical Sciences, Professor; in 1969-1976 Chief Surgeon of the Moscow Military District; in 1976–1983 the Head of the Vascular Surgery Department, in 1983–1988 the Head of the Scientific and Organizational Department of the A.V. Vishnevsky Institute of Surgery of the USSR Academy of Medical Sciences.

For participation in the Exhibition of Achievements of the National Economy (VDNH), a bronze medal was awarded. A large number of lectures were given on the advances in medicine and biology. Much lecturing has been given within the Society for the Advancement of Scientific Knowledge.

In conclusion, I can say the following:

1. The experimental operations performed in our Laboratory have been implemented into the human clinic, in particular, heart transplantation.

2. The problem of transplantation has grown into a problem of national economic importance in the field of medicine and health care. Large experimental study on the up-to-date technique of operations and on defining a rational method of organ preservation was carried out and recommended for implementation in practice.

3. Research on organ transplantation without removing native organs are of great practical importance, which in some cases leads to the bringing a human out from a threatening state. Organ implanting has a great future as a method of selecting a donor organ.

4. Further development of methods for revitalization and preservation of donor organs for transplantation largely depends on the material and technical supply of the Laboratory with equipment and [medicinal] drugs.

5. For more fruitful work of the Laboratory, it is necessary to have closer contacts with all departments of the Institute" [4, p. 134–137].

Let's comment on what has been said. First, the dynamics of the number of performed experiments attracts attention: there were 318 of them in 1968–1969; 101 in 1970-1971; and only 66 in 1972-1973 (taking into account the fact that the report was made in the middle of the year). Moreover, if in 1968-1970, the vast majority of experiments were devoted to transplantations of the heart and other organs, then in 1971-1973, the number of these experiments abruptly decreased, and experiments on the heart revitalization in the corpses of animals and humans came to the forefront, including those on connecting a human organ to the vessels of animals to ensure its perfusion, as well as the replacement transfusion of human cadaveric blood to an animal or the transfusion of blood from one animal to another animal of different species (for example, from a cow to a monkey, etc.). For this, an original

heart-lung machine was designed, and a new vascular stapling device was used to connect the vessels.

Second, V.P. Demikhov conducted numerous and successful experimental studies with surgeons from the Institute of Tuberculosis of the USSR Ministry of Health, from NIIEKhAiI, with military surgeons of the Moscow Military District, with surgeons from Tyumen, Kyrgyzstan and even Cuba; but for some reason not with surgeons from the N.V.Sklifosovsky Institute.

Third, why did V.P. Demikhov begin his narration from speaking about 1937? From the experiments that he conducted after the end of the Great Patriotic War? With the mention that he has extensive experience as a pathologist? We believe he did this so that no one who listened to him could say that he did not know what he was doing. To those who listened to him for the first time, to get imbued with his ideas. To show that these ideas were born many years ago rather than only yesterday or today, and that they were appreciated by both Soviet and foreign scientists.

After the speaker finished his speech, he was asked questions. The first question was asked by Professor B.D. Komarov, the Director of the Institute: "*Have donor organs been transplanted without removing the native ones, what are the prospects for the development of this area?*[9] *Have the contacts been established with the Department for the Treatment of Acute Poisoning?*".

> "Such work is underway and their prospects are positive," answered V.P. Demikhov, - but we have no joint work with other departments. The thing is, *we can't force surgeons to work with us.* (Italics ours - *Auth.*). But if any of the surgeons wish to work with us, then we are always ready to help in this regard. We have no joint work with the Department for the Treatment of Acute Poisoning."

[9] *See* this in Clause 3 of the conclusion V.P. Demikhov's report (p. 404)

Question of Professor A.P. Kuzmichev was the second and ... the last: "*Why is L.L. Gugushvili, the Senior Researcher of your Laboratory does not fulfill the theme of the Laboratory?*" V.P. Demikhov's answer was sincere and simple: "*Why L.L. Gugushvili does not work for our Laboratory and does not work on our subject, it is difficult for me to say. He has his own interests, different from ours. In addition, he is an adult and knows what he is doing*."

There were no more questions. After the answers to them had been given, the discussion of V.P. Demikhov's report was started. The first who took the floor was Professor V.V. Lebedev:

> "Doctor of Biological Sciences Demikhov made a great contribution to the development of theoretical aspects of medicine, especially in such a field as organ transplantation. It is recognized by many scientists of the world. He developed, for example, a mechanism (obviously, an apparatus - *Ed*.) for suturing organs and vessels. This is very important for the development of vascular surgery. I believe that Doctor of Biological Sciences Demikhov should be recommended for the re-election to the position of the Head of the Organ and Tissue Transplantation Laboratory for the next term."

The debate was summed up by Professor B.D. Komarov:

> "The Laboratory headed by Demikhov is small, but it did a very great job. *The Laboratory needs to be well developed in the future.* I believe that *all research conducted in the Laboratory should be carried out in terms of applying the experiment in clinic* (our italics. - *Auth*.). I join the opinion of Professor V.V.Lebedev on the re-election of Doctor of Biological Sciences Demikhov for a new term" [4, p. 95–96].

It should be noted that in October 1971, Professor B.D. Komarov performed a successful limb reimplantation operation after its traumatic amputation, mentioning the name V.P. Demikhov in his inscription to the photo (Fig. 6).

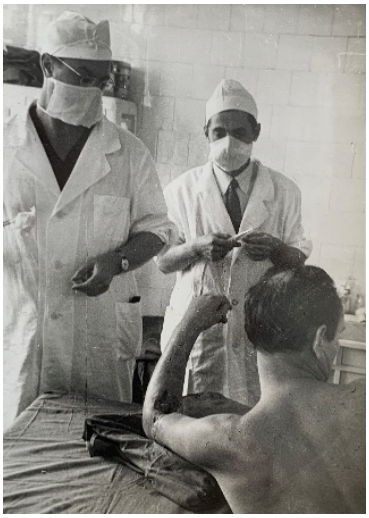

Fig. 6. Professor B.D. Komarov with a patient after reimplantation of the left forearm. Inscription overleaf: "*The forearm on the left side sutured according to Demikhov. Operated by Professor B.D. Komarov. A large wound is visible. Got hit under the saw blade. EMS delivered the arm and the injuried. 1971*". From the archives of Professor B.D. Komarov

But return back to the transcript of the Meeting. After the debate completed, the Meeting was offered a draft decision. In it, in particular, it was said:

> "After listening and discussing the report of Doctor of Biological Sciences V.P. Demikhov, the Head of the Organ Transplantation Laboratory, the Scientific Council notes that during the reporting period, the Laboratory has continued to develop research on transplantation of both isolated organs and their complexes, as well as on the biological preservation of grafts. *The research carried out by the Laboratory is of great importance for the development of the science of organ transplantation* (our italics. - *Auth*.).
>
> However, the Academic Council notes a number of shortcomings:
>
> 1. Laboratory staff has few publications in the press.
>
> 2. For all the time, the Laboratory has prepared only 1 Candidate of Medical Sciences (meaning M.M. Razgulov. - *Auth*.).
>
> 3. The Head of the Laboratory does not make sufficient demands on the research staff. As a result, the only Senior Researcher (meaning L.L. Gugushvili. - *Auth.*) does not pay enough attention to the Research Topics of the Laboratory, but works according to his personal plan.
>
> The Academic Council decided:
>
> 1. Approve the report.

2. Recommend V.P. Demikhov for his re-election.
3. Recommend to increase the number of publications.
4. Strengthen the training of scientific personnel.
5. Raise the requirements for researchers to conduct scientific research only on the research topics of the Laboratory.
6. Report on the fulfilling the resolution in 5–6 months” [4, p. 141].

Note that neither at this Meeting, nor at the previous ones, nor at the subsequent ones L.L. Gugushvili was not present. By secret ballot (27 votes "for" and none "against"), V.P. Demikhov was re-elected for another 5-year term.

Meanwhile, the N.V. Sklifosovsky Institute continued working successfully. Its achievements in other areas of surgery, improving the provision of emergency and urgent care to injuried were impressive. In November 1973, the Institute, whose team was awarded the Order of Lenin, celebrated its 50th anniversary (Fig. 7). On November 21, a Solemn Meeting was held in the Hall of Columns of the House of the Unions, which was attended by 1,500 people. On November 22, the Anniversary Scientific Conference was held.

Fig. 7. N.V. Sklifosovsky Institute for Emergency Medicine. 1970s

From the archives of Professor B.D. Komarov

In the same year, 8 Soviet thoracic surgeons were nominated for the USSR State Prize in the field of technology "for the development of surgical operations on the trachea and bronchi and their introduction into clinical

practice". This award was granted in 1974 to O.M. Avilova, F.F. Amirov, L.K. Bogush, N.S. Koroleva, A.P. Kuzmichev, M.I. Perelman, Yu.V. Semenenkov, and A.A. Travin.

At the Meeting of the Academic Council on December 27, 1973, A.A. Gorokhov was elected a Junior Researcher of the Organ Transplantation Laboratory. The candidate had been recommended by the Competition Committee and Professor A.P. Kuzmichev. V.P. Demikhov's surname was on the list of those present. But he did not speak either in support of the candidate or against him [6, p. 343].

From the report on the implementation of Research by the N.V. Sklifosovsky Institute for 1973:

> "Explanatory letter.
>
> Problems recommended for inclusion in the long-term Plan for the Development of the RSFSR National Economy: <…>
>
> — Development of methods to ensure efficient transplantation of organs and tissues <…>
>
> Continue work on topics to be comleted in 1975: <…>
>
> – Development of new surgical methods for transplantation, preservation and *support of organ and tissue viability* (our italics. - *Auth*.).
>
> — Development of new methods to support the long-term *viability of donor organs* (Italics ours. - *Auth*.)" [6, p. 13].

Note that one of the Immunology Topics that was developed by the staff of the Blood Transfusion Laboratory under the guidance of Professor G.A. Pafomov, sounded like this: “The role of immune mechanisms in the reparative regeneration process and *transplantation immunity* (highlighted by us. - *Auth*.)” [6, p. 110–111].

Conclusion

Thus, the analysis of the type and results of the experimental studies conducted by V.P. Demikhov in 1968–1973 showed that the volume of work done by V.P. Demikhov and his staff, as well as its scientific importance, significantly exceeded the data indicated in the

Institute's reporting documents for 1973, Research Plans for 1974, and plans for implementing its results into healthcare practice in 1974.

In V.P. Demikhov's report presented at the Meeting of the N.V. Sklifosovsky Institute Academic Council in July 1973, it was mentioned that in 1968–1973 V.P. Demikhov conducted more than 485 different experiments, including transplantation of vital organs, experiments on the perfusion of isolated organs, revitalization of cadaveric hearts, as well as on the replacement heterogeneous transfusion of cadaveric blood from humans to animals and from animals of one species to animals of another species.

During that period of time, he actively collaborated with surgeons from many clinical institutions in Moscow (Institute of Tuberculosis, S.P. Botkin Hospital, hospitals of the Moscow Military District) and other cities of the country (Frunze, Tyumen), conducting experimental and clinical studies with them.

Among V.P. Demikhov's achievements of different years, it is worthwhile to mention that at the N.V. Sklifosovsky Institute, the limb reimplantation technique was successfully applied in 1971 in an operation performed by Professor B.D. Komarov.

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