

The organization and provision of medical care and assistance to Russian soldiers on the battlefield during the Battle of Borodino

Ivan M. Chizh¹, Jury E. Vyazovichenko¹, Igor A. Grishin¹, Alexander A. Baranov²

¹ Sechenov First Moscow State Medical University

8 Trubetskaya St., building 2, Moscow 119991, Russia

² Military unit № 93998

Based on the memoirs of eyewitnesses and participants of the Battle of Borodino, the organizational principles of providing medical assistance to the Russian and French armies and the principles of medical care on the battlefield are reviewed. Accounts of eyewitnesses who received medical help or watched as it was provided, in comparison with data on the “standards of care” established during the period, allows us to compile the complete picture of the level of medical support during the battles of the 1812 campaign. The new scales of combat due to the use of more destructive weapons, and demanded an improvement in the organization of military medicine. The military administration of the Russian state had taken into account the experience of previous military campaigns. Sir J. Wylie made the first attempts to establish military hospitals to which patients would be sent according to the nature of their illness or injury. Particular attention was paid to sanitary and hygienic measures. Daily medical examinations of staff were introduced in order to identify the ill during epidemic outbreaks among the military. The vaccination of troops against smallpox was introduced, which ensured fewer medical casualties among Russian Army personnel, compared with the French. The development and improvement of organizational and preventive work of the Russian Army’s military medical service at the beginning of the 19th century is demonstrated and the measures taken to address the challenges it faced to ensure the provision of skilled care under combat conditions are described.

Keywords: *The Battle of Borodino, military medicine, organization of medical care on the battlefield, Sir J. Wylie, evacuation of the wounded, gunshot wounds, military hospital, field dressing station*

For quotation: *Chizh I.M., Vyazovichenko J.E., Grishin I.A., Baranov A.A. The organization and provision of medical care and assistance to Russian soldiers on the battlefield during the Battle of Borodino. History of Medicine. 2016. Vol. 3. № 4. P. 361–371.*

About the authors

Ivan Mikhailovich Chizh – Corresponding member of the Russian Academy of Sciences, Doctor of Medical Sciences, Vice-rector for public relations and educational work, Chairman at the Department of the Health Safety and Disaster Medicine, Sechenov First MSMU (Moscow). E-mail: xrib@mail.ru

Yuriy Evgenyevich Vyazovichenko – Doctor of Medical Sciences, Professor, Department of Epidemiology and Evidence-Based Medicine, Sechenov First MSMU (Moscow). E-mail: vyazovichenko55@gmail.com

Igor Aleksandrovich Grishin – Candidate of Medical Sciences, Associate Professor at the Department of Epidemiology and Evidence-Based Medicine, Sechenov First MSMU (Moscow). E-mail: grishin.goscha2011@yandex.ru

Alexander Aleksandrovich Baranov – Deputy Chairman, doctor at the Military unit 93998 (Moscow). E-mail: sanepid33@mail.ru

Over two hundred years have passed since the Battle of Borodino, one of the key events in the French Invasion of Russia during the Napoleonic Wars. Numerous publications devoted to the description of the Battle of Borodino contain the evidences of the state of the battlefield medicine

of the time. The memoirs of those who received or witnessed the care at the battlefield and the comparison of these accounts to the accepted treatment standards of the time allow us to understand better the darker side of the French Invasion of Russia and the Battle of Borodino in particular, when surviving the battle did not equal escaping death.

Seventeen-year-old prince Nikolay Golitsyn described his experiences thus: “While

Received: 05.12.16

© I.M. Chizh, J.E. Vyazovichenko, I.A. Grishin, A.A. Baranov

approaching the battlefield the first sight that I have witnessed was that of the wounded forced to leave the battle to seek doctor's help. Fractured skulls, hands and legs cut off, cries of the afflicted, death hanging over these unlucky ones who were healthy a minute before and were not expecting such a fate" [1, p. 143]. Not all those who found their way off the battlefield survived the wait for medical assistance.

Napoleonic wars were deadlier and bloodier than any preceding conflict. The unprecedented colossal armies, furnished with firearms that included an enormous number of artillery guns, changed both the scale and the mode of military actions. The number of military deaths due to wounds spiked. Cold steel gave place to firearms as the leading cause of battlefield casualties. According to the "form lists"¹ of the Russian army officers, ballistic wounds and blast injuries accounted for 83.4% of the total number of battle injuries, while cold steel caused only 6.3% of the wounds; in 10,3% of the cases there was no evidence on the type of injury sustained [2, p. 36]. These numbers can be extrapolated to all the ground forces of the Imperial Russian Army of the period that is, to all the soldiers in general.

The main tactical innovation was Napoleon's introduction of Grand Batteries (Grande Batteries), which were used in large battles and amassed hundreds of guns. They created an unprecedented volume of fire, inflicting serious damages and severe wounds on the adversary. The commanders of the Russian army arranged comparable counter-batteries, with the advantage of more large-caliber artillery, including 12-pound guns. The Surgeon-In-Chief of the Napoleonic armies Dominique Jean Larrey remembered the Battle by the Moskva River (La bataille de la Moskova, the French name for the Battle of Borodino), thus: "The wounds received in this battle were generally of a serious nature, in consequence of nearly all of them being caused by artillery, and by musketry, inflicted at the very extremity of the guns, or at least very nearly so. The balls of the Russians, moreover, as we have frequently remarked, are larger than those used by our

soldiers. A large number of wounds caused by artillery required amputation of one or two limbs"[3, p. 34].

The new scale of the battles and an increased number of casualties required a new level of army medical services. Long before the invasion of the Napoleonic armies, the governors of the Russian Empire had taken into account the experiences of the previous military campaigns and, owing to the efforts of Sir James Wylie, Baronet, known in Russia as Yakov Vasilievich Villiye, "Provisions on a marching corps's hospital" were approved in 1805. According to the provisions, each corps was to be followed by "a hospital train formed of the wagons taken from the regiments" trailing 2–3 hours behind the main forces, and with a marching hospital in 50–100 versts (a Russian unit of distance equal to 1.067 km). A regimental physician (*polkovoij lekar'*) helped the sick and wounded and then sent them to a hospital train, from which they were transferred to a hospital. In 1805, corps and armies had marching hospitals that were staffed by medical and apothecary personnel of the specially defined ranks. So-called base hospitals were created along the borders and in the areas of the main army camps. Evacuation of the diseased, including those suffering from infectious diseases, followed a uniform route: regiment → hospital train → marching hospital → base hospital. The evacuation procedures, promulgated in 1805, largely remained in place during the campaign of 1812, and were extended with the specific order of transferring the wounded and sick to the rear from one hospital line to another. The first attempts were undertaken to create hospitals in which cases would be segregated according to ailment. Disinfection using bleaching lime was introduced, and the overall attention to sanitary and hygiene measures increased. As a proactive measure, all military personnel underwent daily medical inspections when in the epidemic foci. Counter-epidemic measures were promulgated as army-level orders. For the first time in the history of the Russian army, the smallpox vaccination was introduced.

In France in 1801, Napoleon dissolved the vast majority of the medical staff, having decided that the wars were largely over. However, in 1804, the campaigns "in retaliation for the aggression of the feudal states" – Russia and Austria – began,

¹ Form lists were the predecessors of personnel records in the Russian army.

and military doctors again became necessary. Experienced civilian physicians were earning good money and were not willing to switch to military careers. Medical personnel were hired from the lay people and hastily trained. Contemporaries called the military doctors, who were assembled by 1806, “the doctors from the garbage dumps” [4, p. 503]. By the beginning of the Russian campaign, many had not reached the necessary proficiency, as one of the high-ranked military medical officials indicated: “French physicians are so bad, that they cannot be compared with some of our Russian medical attendants, who are much more ingenious in their skills” [5, p. 117].

In early 19th-century Russia, the government was reformed after the fashion of the Western European countries, and different ministries were created as a result, though no country had a Ministry of Health at the time. In 1803, the Medical Department was created within the Ministry of Police, which was later joined with the Ministry of the Internal Affairs, and organizational and methodological efforts related to the supply of medical services to the army were undertaken.

Some of the eminent Russian scientists of the first half of the 19th century exhibited significant interest in the provision of health care support to the army. These scientists included Matvey Yakovlevich Mudrov, who had written “Some words on the utility and tools of the military hygiene or the science of maintaining the health of the military personnel”; Ilya Ivanovich Enelgolm, who had authored “A pocketbook on military hygiene or some notes on preserving the health of the Russian soldiers”; and Yakov Ivanovich Govorov, who had published “The universal history of the medical arts and an experience in the brief medical overview of the campaigns of the years 1812–1815”. In Russia the would-be military physicians were trained in the Imperial Medical and Surgical Academy, now known as the S.M. Kirov Military Medical Academy, and in the Moscow Medical Surgical Academy, which was merged with the Faculty of Medicine of the Moscow University in 1842. The assistants were trained at the hospitals.

According to the “Russian Medical List”, by 1812, there were 2677 medical doctors in the Russian Empire. These numbers included

818 physicians,² 1,446 headquarters’ physicians,³ and 413 doctors.⁴ Precise data on the actual numbers of the medical personnel of the Russian army as of the beginning of the Campaign of 1812 are unavailable. Most probably, there were 800–850 physicians, including both senior and junior physicians of the first and second class, and from 1,000 to 1,200 surgeon’s mates⁵ of the first and second classes, bonesetters⁶, and barbers.⁷ [6]

The actual numbers of the army medical personnel were far below the staffing plan, and many of the positions remained vacant. The insufficiency of the medical staff clearly affected the quality of combat medical care in the course of the large battles. Headquarters had expected no more than 15,000 wounded, including 4,000–5,000 severely wounded, in the

² Physician – a noncombatant senior medical rank. In 1812, the physicians’ ranks included physicians of the 1st and 2nd classes, which corresponded to the 11th and 12th classes of the Table of Ranks. Physicians were the heads of the medical services within the regiments, battalions, and batteries.

³ Headquarters’ physician – a noncombatant senior medical rank. In 1812, the headquarters’ physicians comprised the senior physicians of the 1st and 2nd classes, which corresponded to the 8th and 9th classes of the Table of Ranks. They headed the medical services of the divisions and corps and worked in the hospitals. Promotion to this rank required His Majesty’s approval. In 1812, Sir James Wylie had His Majesty’s approval to promote physicians to headquarters’ physicians.

⁴ Until 1816, doctors were the ones holding the degree of “medical doctor (surgeon)” as well as those occupying a position of the Chief Doctor of a hospital, which corresponded to the 6th class of the Table of Ranks.

⁵ Surgeon’s mate – noncombatant middle medical rank. In 1812, there were senior and junior surgeon’s mates, which corresponded to senior and junior second lieutenants. According to the staffing table, each battalion (battery) had to have one, and cavalry regiments two or three, surgeon’s mates. As they belonged to the noncombatant ranks, for excellent service they were usually given monetary remuneration. Starting in 1815, the most able of the senior surgeon’s mates were promoted to the 14th class – the lowest class within the Table of Ranks.

⁶ Bonesetter – lower noncombatant medical rank in the regiment, corresponding to a private. According to the staffing table, there had to be one bonesetter in each regular cavalry regiment.

⁷ Barber – lower noncombatant medical rank in the regiment, corresponding to a private. According to the staffing table, there had to be one barber in each company or squadron.

course of the Battle of Borodino; in fact, there were almost 40,000 wounded.

According to the “Provisions on the governance of a large army in action”, evacuation of the wounded from a battlefield was the responsibility of the military police. The military police were also ordered to supervise the dressing of the wounds, and “should the battle be widely spread, the dressing was to be conducted in different places”. It was the task of the police to ensure that sufficient physicians and regimental priests were present. During the battles of 1812, the wounded were mostly evacuated from the battlefield by militia fighters rather than the military police. The duty was extremely dangerous and complicated, as one of the participants of the Battle of Borodino a militia fighter Yu.N. Bartenev wrote in a letter: “We were assigned the most unpleasant duty which I would have traded for losing the life itself. The duty consisted of taking the severely wounded from the battlefield and sending them further” [7, p. 83].

During the course of the battle, Moscow militia fighters, “dodging the cannon-balls, were picking and carrying away” the wounded. Artillery officer N.Ye. Mitarevskiy, who took part in the Battle of Borodino, wrote, “Having taken Borodino the adversary moved its batteries closer and started shooting balls and grenades. In front a severe rifle firefight was going on and the balls were flying to us in numbers. A crowd of militia fighters carrying the stretchers to pick up the wounded was passing by towards Borodino. As the cannonballs were flying over the fighters were shaking their heads to the left and right, bowing, crossing themselves, and some were kneeling. This was a big source of amusement for the soldiers and the jokes were plenty” [8, p. 246].

In spite of all the militia’s efforts, many of the severely wounded remained on the battlefield. Captain Bukharev, commander of a provisional grenadier battalion, was fortunate: he was wounded twice and remained on the battlefield amidst the dead, but was later retrieved by his father, a militia Warrant Officer.⁸

To transport the wounded, each regiment was to have no fewer than four stretchers, but they were often replaced with overcoats and other

materials at hand, including gun carriages. Owing to insufficient numbers of the carriers, not all the wounded were transported to the “dressing place” of a regiment or division: it is probable that many of the severely wounded could have been saved but were deemed dead. Marin gives the following account of Warrant Officer Krekshin of the Finland Guard’s Regiment, who “without any signs of life was considered a loss for everybody. Only the devoted servant of this officer, his own man, who was upset more than the others, did not want to believe that. He mounted the Warrant Officer Krekshin on a packhorse and with tears in his eyes left for a dressing-station... He pleaded with the medics to pay attention to his master, saying that the latter suffered no wound and that he considered him alive. The good man’s tears persuaded one of the medics who found the signs of life in the deceased and offered him some help. Krekshin regained consciousness and his first question was: “Why am I here?” The man sprang up to hug his master: “You were dead my lord”. “Nonsense, bring me my horse”, answered the young valiant and returned to his position to the pleasure of all of his mates who loved him” [9, p. 25–26].

“It’s easier to spend six hours in a battle than six minutes at a dressing station”,⁹ wrote civil servant of the headquarters of the 2nd Western army Aleksandr Dmitrievich Olsufiev, who was accompanying the wounded Prince Bagration [10, p. 111]. According to the “Provisions”, by the day of a battle, Senior Provost General (general gevaldiger) governing the military police was to assemble behind the army lines a chain made of the convoy party which would be used to deliver the wounded to marching hospitals for further transportation. Within the “Provisions”, the №7 of the “Code for the temporary military hospitals of a large army in action” of January 27th, 1812, described mobile hospitals as a “primary branch” of the Russian army medical service, a main “dressing station” where the wounded were to receive first aid. As mobile hospitals had no staffing plans, servicemen of the medical ranks were recruited in sufficient numbers from the regiments led by the Doctor in Chief or the Chief Doctors of the division or the corps level.

⁸ Russian State Military Archive, stock 29, list 153, 1, part 1, page 43.

⁹ In the 18th century, marching hospitals were called dressing stations.

According to the requirements of the “Provisions”, in times of battle, the majority of medical personnel – about two-thirds of the regimental medical servicemen of varying ranks and classes – were to be recalled from their respective regiments following a command of the army’s Doctor in Chief and concentrated at the locations where mobile hospitals were to be deployed. The hospitals were to include tents designated for the operations, dressing material supplies, instrument boxes at the regimental hospital wagons, convoy parties to convoy the evacuees to the marching hospitals, and wagons, which were usually requisitioned locally by the military police. From his experience in combat medical care, Enehlm recommended identifying the hospital location “with a flag or some other kind of sign so the wounded in their wanderings stood a chance to find it” [quoted in 11].

During combat, the presence of a Field Doctor in Chief was required with mobile hospitals. Mobile hospitals had a special place in combat casualty care, as it was their responsibility to serve the wounded evacuees from a battlefield, the number of whom it was difficult to predict. They had to be highly maneuverable units capable of evacuating the wounded and following the troops.

According to doctors’ memoirs, the “first aid” offered at the mobile hospitals included “a light dressing and necessary operations”, the latter covering amputations and bullet extractions. Of course neither aseptic nor antiseptic was employed, nor was any effective anesthesia used during surgery. The most effective anti-shock treatment of the time was vodka.

From a modern perspective, all the wounds, including those inflicted by surgical instruments, were contaminated. Most of the combat wounds contained debris such as bullets, canister-shells, fragments of cannonballs and grenades, and pieces of clothing, and coincided with blood vessel damage and bone fractures. The most common cause of death at the battlefield was concealed and/or external hemorrhage as a result of vessel damage, pain shock from extensive injuries, penetrating wounds and broken limbs, head injuries, and pneumothorax. Those who survived the initial trauma could die of aerobic and anaerobic infections, secondary hemorrhages following ruptures of traumatic aneurisms, and wound dystrophy.

One witness described mobile hospitals thus: “Finally we reached our destination by a barn. The lawn in front was all occupied by the wounded sitting and standing, waiting patiently for their turn. Doctors with their sleeves rolled up were running from one patient to another. Cut off limbs piled up in different places. I was laid down in front of Kamenetski,¹⁰ who was amputating a hand of a grenadier, who was seated on a stone.... Kamenetski was sharpening his instrument to get down to me. Divov asked me if he could somehow help me... I asked him... to find some ice and put it in my mouth, dry from the fever... Even here the cannonballs disturbed the intensive work of our medics” [12, pp. 360–361].¹¹

Artilleryman Sukhanin recalled, “The torture of thirst was intolerable and in spite of my exhaustion I sprang to the wells where the dressing of the wounded was under way, but reaching them was impossible for a mass of people lying there” [13, p. 258]. A poet and writer, one of the ideologists of the Decembrist revolt F.N. Glinka, wrote, “So many streams of blood! So many thousands of bodies!.. At the place where the wounds were dressed the bloody puddles did not dry out. Never have I seen wounds that horrible: fractured heads, severed legs, hands crushed up to the shoulders. Those who were carrying the wounded were all covered with the blood of their comrades” [14, p. 73].

How surgeries were conducted in the mobile hospitals can be determined by the following evidence left by the participants of the Campaign of 1812: “The cutters washed the wound, where one could see shreds of flesh hanging down and a sharp piece of bone protruding. The surgeon in a powdered wig took a curved knife out of the box, rolled up his sleeves to the elbow, quietly approached the shattered arm, suddenly grabbed it and turned the knife so swiftly and deftly that the hanging flesh fell down at once. Tutolmin screamed and began to moan but the surgeons began to talk loudly so as to drown out his moans with their noise. They used hooks to pull and hold fresh flesh and muscles while the surgeon cut off the bone. It clearly caused insufferable pain to

¹⁰ Kamenetski S.V. – headquarters’ physician of the Izmaylovsky Regiment of the Imperial Russian Guard.

¹¹ From the memoirs of A.S. Norov, a scientist, writer, and statesman.

Tutulmin who shuddered, groaned, endured agony and occasionally fainted; he was often sprinkled with cold water and allowed to sniff some alcohol. Once the bone was cut, the surgeons pulled the muscles into a lump and covered the wound with skin that was purposefully preserved and turned out; the wounded was then sewn up with silk, covered in a compressed bandage and wrapped in dressings – and so ended the operation. Tutulmin was laid to bed, half-dead” [15, p.45]. In this case, so-called blood stitch was applied, which was usually reserved for the mobile body parts and deep or hair-covered wounds; the needles and waxed threads used for the stitch were of varying sizes. The physician’s or dry stitch, with bandages that connected the sides of the soft tissues, was employed mostly for shallow wounds. For large wounds, “a lint bond [was] to be applied above the bandage” [16, p. 345].

Russian doctors understood that the first dressing plays a pivotal role: “...on the speedy dressing depend on the ease, speed, and safety of the treatment” of the wounded. In “A pocketbook on military hygiene or some notes on preserving the health of the Russian soldiers” (allowed for printing on August 1st, 1812) Eneholm wrote, “I advise that every soldier is given some lint and a bandage so that in case of need he could dress his own wounds. I found this to be established in the French army” [17]. Unfortunately, during the campaign of 1812–1814, this measure was not adopted in the Russian army, though in the corps of Louis-Nicolas Davout, every soldier was taught to apply a dressing [18, p. 109].

A small number of medical personnel remained at the dressing stations of regiments and divisions to selflessly aid the wounded. Headquarters’ physician of the 2nd grenadier division of the 8th Infantry Corps A.D. Protopopov, who was called an “illustrious doctor” by his contemporaries, worked at the dressing station of the Semenov Fleche under a barrage of balls and canister-shells. Paying no attention to his own wound, he continued to dress the wounds of others. The Doctor in Chief of the 2nd Western Army Court Councillor Ivan Ivanovich Gangart was wounded in the line of duty in the chest and knee. In his letter to A.A. Arakcheyev of September 12, 1812, Chief Medical Inspector James Wylie wrote, “Following the order of general-field marshal His Grace prince Golenishchev-Kutuzov and

cavalry general baron Bennigsen I found myself in the center of our positions...besides having inspected many wounded I performed from 60 to 80 important surgeries” [19, p. 131]. During the combat, J. Wylie led the Russian army combat casualty care service and appeared in different areas of the front.

Some physicians demonstrated a different attitude. At Raevsky battery, recalls N.N. Muravyov, his 16-year-old brother Mikhail was wounded by a 12-pound cannonball. “[The ball] hit his horse in the chest, went through and hit my brother’s left thigh so that all the flesh was ripped off, muscles damaged and left the bone bare... Bennigsen had ordered to evacuate the wounded and this was carried out by four privates who laid him on their overcoats... Mikhail asked a physician passing by to dress his wound, but at first the physician was paying no attention to him and when my brother said that he was an adjutant to Bennigsen the physician took a rag and tied his leg with a simple knot” [20, p. 175].

Surgical help at the field was given by the physicians. First the “state of the wound” was evaluated – a physician looked at the direction, depth, and cleanliness of the wound. Then foreign bodies such as balls, remnants of cloth, and bone pieces were removed from the wound, and the bleeding was stopped. After the wound was carefully debrided, the “coaptation was made with a dry or a bloody stitch”, which was either covered with dry lint¹² or “anointed with a simple ointment”. If there was damage to a bone, splints were attached to aid the dressing.¹³ By 1809, splints made of “bast plaques, sewn in between linen coverings” and narrow bags filled with sand had replaced straw bags in the Russian army; in 1811, splint production began at the Saint Petersburg Factory for Medical Instruments. One of the most striking examples of how the cases of the wounded were managed is the case of first aid given to an Infantry General P.I. Bagration. Chief Physician of the Lithuanian Imperial Guard regiment Govorof gave the following account of the events: “The first dressing was easy; however during the

¹² Lint – wound closure material that was used in place of cotton wool. It was made by raveling thin, clean, soft rags.

¹³ Splint – hard dressing that was used to immobilize broken limbs. It was made of a large piece of bark from broad-leaved trees such as linden or elm, extracted with the fibrous internal part.

second one the Chief Medical Inspector Wylie somewhat expanded the wound and extracted from it a small bone splinter” [21]. Nothing is said in Bagration’s “Short ailment description” about fitting his wounded leg with splints, and it was the absence of the latter that resulted in a complete fracture at the middle of the thigh bone. Shortly before the beginning of the war, a Russian doctor, K.I. Gibental, had suggested plaster casts for the treatment of bone fractures. This idea, however, was not supported by renowned Saint Petersburg surgeon I.F. Busch,¹⁴ and casts were not accepted in clinical practice.

It was recommended to “bathe all the wounds there are at the first dressing in warm wine or a weak aromatic solution”; such were the only antiseptics used by physicians in the combat field at the time. Swabbing wounds and inserting lint tampons or tubes inside them was already considered unnecessary. The wounded were administered some anti-inflammatory drugs and tranquilizers. In special cases, it was recommended to use camphor, which has no such traits according to contemporary views; mercury, which is a toxic heavy metal; and “sleep potion”, a plant-based preparation whose recipe was lost. Treatment in the army followed the guidelines of “Russian field pharmacopoeia” (“Pharmacopoea castrensis Ruthenica”), which by 1812 had gone through two editions – the first in 1806 and the second in 1811.

By the beginning of the 19th century, the Russian surgical school had accepted the principle of conservational treatment, unlike the French surgical school, which employed early amputation even in the case of simple fractures. The goal of preserving a limb, albeit with limited functionality, instead of amputating it guided the treatment choices of the Russian surgeons treating gunshot wounds. Surgical indications for amputation included “large-scale wounds of calf and thigh where the soft tissues are completely destroyed and disarranged, bones crushed, tendons and nerves affected”, and the putrid smell resulting from bone damage. Additionally, should the attempts to extract foreign bodies like bullets from a joint capsule fail, the limb was to be severed.

¹⁴ Busch I.F. (1771–1843) – a Russian surgeon, one of the founders of Russian traumatology. In 1812 he was a member of the Imperial Medical and Surgical Academy in Saint Petersburg, where he led a department and the surgical clinics.

During this period, Busch conducted the first ligation of internal iliac artery in Russia, and Ye. Muhin for the first time widely applied the strip technique¹⁵ when amputating limbs.

A great variety of bandages, ointments, and poultices of quite complex composition was used in treating wounds; however, only the so-called Gomberg ointment was legally allowed in the army. Abdominal surgery was unheard of; treatment of gunshot, punctured, sword cut, and chopped wounds of the limbs, thoracic cavity, and skull was extensive [22].

In order to stop hemorrhages, including those that occurred during surgery, a tourniquet¹⁶ was used, the most simple of which can be considered a prototype of modern-day tourniquets. In 1803, Yakov Sapolovich co-authored with Ossip Kamenetski “Easy Instructions. Treatment of sick people by simple means.” He stopped bleeding by applying birch tinder and covering it with lint, shreds, and a towel. To stop the bleeding, ligatures¹⁷ were used to tie up the blood vessels. Waxed threads and English tweezers were used to ligate smaller vessels, and Bromfield’s artery hook coupled with waxed threads were used for the large ones.

In the early 19th century, wound dressing required lint, applications, adhesive and non-adhesive bandages, and other supplies. All the materials were to be kept in the regimental medical chest, with half a pound of “good and well-washed lint” for every serviceman. Bandages used in the Russian army were 10 arsheen¹⁸ long and 4 inch¹⁹ wide. “Applications” were one arsheen long and one arsheen wide.

Wounds were examined with button-tip surgical probes of varying lengths and widths. The probes could be modular to allow for extension. They were made of steel, silver, baleen, tortoiseshell, or any other similar material. In his

¹⁵ Strip technique – a method of amputation in which the soft tissues are dissected in strips that covered the wound. It was used to accelerate the healing process.

¹⁶ Tourniquet or physicians’ constrictor “*lekarskij zhom*” – a tool to constrict the blood vessels and stop hemorrhages resulting from wounds and surgical operations.

¹⁷ Here ligature means a thread tied around a blood vessel.

¹⁸ Cubit “*arshin*” is a Russian measure of length equal to 71.12 cm.

¹⁹ Inch “*dyuim*” is a measure of length equal in Russia to 2.54 cm.

“Short manual on the most important surgical operations”, James Wylie indicated that the best probe of all was a surgeon’s finger, for it did not inflict additional traumatization. In the surgical guidelines of the time, the contemporaries indicated that “feeling with a finger is rarely possible; a steel probe is often surpassed with a medical candle anointed with oil”. Nevertheless, a Russian doctor’s pocket set of surgical instruments included three types of silver probes. The wound inspection was described by A. Antonovsky, who served as an officer in the Wittgenstein corps: “To the physicians’ question about the location of my wound, I pointed to it and his fellows, the surgeon mates, having placed me sitting on a plank, cut my pantaloons and boot with a knife, so as not to bother the wounded leg, and started to feel the wound saying that it was peculiar, for there was one hole but the ball was nowhere to be found. I asked the doctor himself to study the wound closer and honestly tell me whether there was a chance for me to keep the leg or if I had to part with it. He applied a probe and said, ‘It touches something’ and asked my permission to investigate further; he inserted his finger in the wound; the pain was insufferable, but I gathered up my courage and did not show any weakness. Having completed his search the physician, judging by the bone, said that the bullet was squeezed within the bone and that taking it out would be difficult and it would be difficult to tolerate the surgery as well. ‘However’, demurred the doctor, ‘I’m assuring you with my good word that the wound is not dangerous as the bone is not fractured; let me dress your wound and you can go wherever you please’. In less than a minute the wound was dressed and the doctor told me not to touch neither the wound nor the dressing”. [23, p. 159–160].

According to the views accepted at the time, any gunshot wound but for the smallest ones had to be left to fester. When the bullet hit the bone and remained squeezed, it had to be bored out with a trephine.²⁰

Surgical instruments used by the Russian doctors were kept in the so-called medical chests. By 1812, there were five types of medical chests used by the army. Two of them were of an old

“collegial” form, developed when the medical service was led by the State Medical Collegium from 1763 to 1803. Three other types of medical chests were introduced by James Wylie in 1806, the same year that his “Short manual on the most important surgical operations”, listing all the medical instruments and accessories to be used in the new army medical chests, came off the press.

The instrument lists and instrument manufacturing processes followed foreign examples, which were mostly executed by individual craftsmen. In 1807, British surgical instruments were used as samples.

One particular type of combat injury was traumatic amputation. Several descriptions record limbs being torn off by passing cannonballs. Although these wounds were very severe, the wounded sometimes survived. The dull blow resulting in crushed tissues and clotted blood vessels probably prevented hemorrhage, and the wound shock induced anesthesia. The wounded could get to the surgeon in time to receive professional help. During the Battle of Borodino, twenty-year-old D.G. Bibikov, who was an Adjutant to Infantry General Mikhail Andreevich Miloradovich and a lieutenant of the Dragoon regiment of the Imperial Guard, was saved in such a fashion. He was ordered to find the Major General Prince Evgeniy Württemberg who was in charge of the 4th infantry division and tell him to go to Miloradovich. Bibikov found him, but as he had no opportunity to approach, he raised his left arm to point to the location of Miloradovich; a cannonball hit his arm and tore it off. In falling from his horse, Bibikov raised his right hand, which was hit by an enemy bullet that took away two of his fingers. The lieutenant survived, returned to the army, and after many years retired as an Infantry General and a Minister of Internal Affairs of the Russian Empire [24, p. 59–60].

To transport the ill and wounded, each regiment had one or two hospital carriages for officers and one regular wagon per company for privates and subaltern officers. The hospital carriage of 1797 was based on a dray-cart with wheels of different diameters, wooden axels, and shock absorbers. In the front of the carriage was a seat for a wagon boy and in the back a seat for a physician’s assistant. The cart was pulled by two

²⁰ Trephine “*trepan*” is a surgical instrument used to bore a bone to create an opening in an underlying cavity.

horses. For the patients, two stretchers made of wooden frames with lace mesh were put in the middle of the cart with a mattress and pillow on top of the mesh [25]. Guard Artillery Lieutenant Avraam Sergeevich Norov wrote in his memoirs that getting a place in a hospital carriage was a privilege even for officers. Norov was sent from a marching hospital in Mozhaysk to Moscow in a two-seater carriage. "I recognized a friend of mine, Taube (colonel R.M. Taube was in charge of battery company №2 of the Imperial Guard artillery brigade of the Count Arakcheyev) ...His leg was amputated above the knee ...Thanks to Taube I was put together with him into a hospital carriage, otherwise they would have put me according to my rank onto a wagon" [12, p. 336–377].

Between six and ten thousand wounded are believed to have remained in Mozhaysk after a retreat of the Russian army, though this number is now being disputed [26, p. 51]. That the available transport was insufficient to transport all the injured was reported by M.I. Golenishchev-Kutuzov [27, p. 106].

The Surgeon in Chief of the Grande Armée D.J. Larrey recalled, "The principal houses were filled with the wounded Russians, who were incapable of following the army, and were left without any kind of succor. Nearly all of these unfortunate individuals had their limbs mutilated, and were consequently unable to procure sustenance by their own exertions... bodies were permitted to lie for a time in the midst of the living... I provided, in the first place, for the most urgent necessities of these unfortunate persons. Water and biscuit, which I discovered in a store-house, were distributed to them by my direction... The churches and public houses were placed in a proper condition for the reception of the wounded French. The Russians were located in the houses of merchants" [3, p. 35–36].

Captain T.-J. Aubry, who was wounded at the field of Borodino, arrived in Mozhaysk and later recalled, "All the houses were filled with the wounded and dying. I found an accommodation by one of the churches that was filled with the Russians. During the night the magnificent doctor Larrey with his surgeons has conducted so many amputations, that the pile of legs and hands could not fit into a large room" [29, p. 164].

One of the French eyewitnesses, Mercier, noted that in Mozhaysk "over 10 thousand wounded, whom the Russians had no time to evacuate, flooded the houses, churches, and even piled on a square in the city center for lack of a better place. The horror of this sight was multiplied for us by the necessity to expel these Russian wounded out of the houses and churches to clear the space for our wounded compatriots." Alexander Bellot de Kergorre wrote, "Six hundred Russian wounded were scattered in the gardens, where they were surviving on cabbage and human meat, both abounding!" [30, p. 62].

First physician Loder, who was in charge of temporary military hospitals in Kasimov, Elatma, and Melenky, recorded the state of the wounded who were saved after the Battles of Smolensk and Borodino: "Many thousands arrived at the hospital with horrible wounds of chest and abdomen, with shattered bones. Many were transported in such a state via Moscow from Vyazma and Smolensk and spent 10, 12, 14, or even more days without having their dressing changed.

"Many wounds developed maggots and St. Anthony's fire [gangrene]; many were wasted by fever, suffered from nervous fits and were worn out by starvation, in spite of the harsh autumn weather they were transported on carts without a wisp of straw to put underneath, oftentimes almost naked and covered only in rags; even many of the officers were in torn peasant's dress, without a shirt, in holey hoses, for they were robbed when lying unconscious on a battlefield. And in spite all of that I never heard any grumbling or anyone who lost hope in saving the Motherland!" [31, p. 226].

That personal hygiene was necessary for the soldiers was noted also by Mikhail Illarionovich Golenishchev-Kutuzov. After the Battle of Borodino and during the War of the Sixth Coalition (known in Russia as the Liberating March of the Russian Army in Europe), special attention was paid to the infectious cases, which were sent from the regiments not to the marching or mobile hospitals, but to the temporary base hospitals or to the special hospitals for "catching patients". Their belongings were either burned or disinfected. Moving Russian troops through inhabited localities where large numbers of prisoners were kept was forbidden. As a result, per 100 troops killed in action the Russian army

lost 170 to disease, where as the French army lost 235 [6].

Academician Vasilii Vladimirovich Petrov suggested burning human and animal corpses to remove the source of disease and to prevent epidemics from spreading. The conference of the Moscow Medical Surgical Academy petitioned twice for such a measure, and on November 14th, a corresponding order was promulgated in the army. By March 13, 1813, the clean-up was almost over. In Moscow, 11,958 human corpses and 12,500 horse corpses were burned, while in

the Mozhaysky district, 56,811 human and 31,666 horse corpses were removed [32].

We can conclude that during the period we have considered, the insufficiency of material and human resources was at least partially offset by soldiers' heroism and the devoted work of medical personnel that helped them regain their health and return to military service. The experience gained by the Russian military doctors in the Battle of Borodino and further military actions had a significant influence on the development of the national military medical service.

REFERENCES

1. *Ofiterskie zapiski, ili vospominaniya o pokhodakh 1812, 1813 i 1814 godov knyazya N.B. Golitsyna*. V kn.: *Otechestvennaya voyna 1812 goda v vospominaniyakh sovremennikov (An officer's notes, or Prince N.B. Golitsyn's memories of the 1812, 1813 and 1814 campaigns*. In: *The Patriotic War of 1812 in the memoirs of contemporaries*. Moscow: State Public Historical Library of Russia, 2008. P. 139–194. [in Russian]
2. Tselorungo D.G. *Istoriko-statisticheskoe issledovanie dannykh o raneniyakh ofitserov russkoy armii, uchastnikov Otechestvennoy voyny 1812 goda (po formulyarnym spiskam)*. V kn.: *Ot Moskvy do Parizha (1812–1814 gg.): 185 let Maloyaroslavetskomu srazheniyu [Historical and statistical research data on the Russian army's wounded officers participants of the Patriotic War of 1812 (according to formulary lists)*. In: *From Moscow to Paris (1812–1814): 185th anniversary of the Maloyaroslavets battle*. Maloyaroslavets, 1998. [in Russian]
3. *Frantsuzy v Rossii. 1812 g. (The French in Russia. 1812)*. Moscow, 1912. Vol. I. P. 163–164. [in Russian]
4. Sokolov O.V. *Armiya Napoleona (Napoleon's army)*. Saint Petersburg, 1999. 592 p. [in Russian]
5. *Stoletie voennogo ministerstva. 1802–1902 gg.* Glavnoe voenno-meditsinskoe upravlenie. *Istoricheskiy ocherk (Centennial of the Defense Ministry. 1802–1902. The Main Military Medical Directorate. A historical review)*. Saint Petersburg, 1902. Vol. VIII, ch. 1. 306 p. [in Russian]
6. Zaglukhinsky V.V., Koposov V.P., Fomin I.V. *Organizatsiya i rabota voenno-meditsinskoy sluzhby russkoy armii v kampaniyu 1812 g. (The organization and work of the military medical service of the Russian army during the campaign of 1812)*. Moscow, 1912. 210 p. [in Russian]
7. *Bumagi, odnosyashchiesya do Otechestvennoy voyny 1812 goda, sobrannyye i izdannyye P.I. Shchukinym (Papers relating to the Patriotic War of 1812, collected and published by P.I. Shchukins)*. Moscow, 1897. Ch. I. [in Russian]
8. *Rasskazy ob Otechestvennoy voyne 1812 goda Nikolaya Evstafeyevicha Mitarevskogo*. V kn.: *Otechestvennaya voyna 1812 goda v vospominaniyakh sovremennikov (Nikolai Yevstafeyevich Mitarevsky's accounts of the the Patriotic War of 1812*. In: *The Patriotic War of 1812 in the memoirs of contemporaries*. Moscow: State Public Historical Library of Russia, 2008. P. 195–339. [in Russian]
9. Marin A.N. *Iz zapisok generala A.N. Marina*. V kn.: *Voronezhskoe dvoryanstvo v Otechestvennoy voyne (From the notes of General A.N. Marin*. In: *Voronezh nobility in the Patriotic War*. Moscow, 1912. P. 25–26. [in Russian]
10. *Vospominaniya A.P. Buteneva o 1812 gode, izdannyye ego synom*. V kn.: *Otechestvennaya voyna 1812 goda v vospominaniyakh sovremennikov (A.P. Butenev's memories of 1812, published by his son*. In: *The Patriotic War of 1812 in the memoirs of contemporaries*. Moscow: State Public Historical Library of Russia, 2008. P. 99–138. [in Russian]
11. *Entsiklopedicheskiy slovar' voennoy meditsiny (Encyclopedic Dictionary of Military Medicine)*. Moscow: Medgiz, 1948. Vol. 4. Col. 162. [in Russian]
12. Norov A.S. *Vospominaniya*. V kn.: *Rossii dvinulis' syny. Zapiski ob Otechestvennoy voyne 1812 goda ee uchastnikov i ochevidtsev (Recollections*. In: *Russia moved its sons. Participants' and witnesses' notes on the Patriotic War of 1812*. Moscow: Sovremennik, 1988. P. 336–377. [in Russian]
13. Sukhanin P.M. *Iz zhurnala uchastnika voyny 1812 goda*. V kn.: *Vospominaniya sovremennikov epokhi 1812 goda na stranitsakh zhurnala «Russkaya starina» (From the journal of a participant of the war of 1812*. In: *Memoirs of 1812 contemporaries in the journal Russian Antiquity*. Moscow: State Public Historical Library of Russia 2011. P. 245–270. [in Russian]

14. Glinka F.N. *Pis'ma russkogo ofitsera (Letters of a Russian officer)*. Moscow: Pravda, 1990. 448 p. [in Russian]
15. Radozhitsky I.T. *Pokhodnye zapiski artillerista s 1812 po 1816 god*. Chast' 1. 1812 god. Voyna v Rossii (*Field notes of an artilleryman from 1812 to 1816*. Part 1. War in Russia). Moscow, 1835. P. 89–90. [in Russian]
16. Bush I.F. *Rukovodstvo k prepodavaniiu khirurgii, sochinennoe Akademikom I. Bushem (A guide to teaching surgery, composed by academic I. Bush)*. 3d ed. Saint Petersburg, 1814. [in Russian]
17. Eneholm I.I. *Karmannaya kniga po voennoy gigiene, ili zamechaniya o sokhraneniі zdorov'ya russkikh soldat (Pocket book on military hygiene, or concerns about maintaining Russian soldiers' health)*. Saint Petersburg, 1813. P. 178–179. [in Russian]
18. Zemtsov V.N. *Velikaya armiya Napoleona v Borodinskom srazhenii (Napoleon's great army in the Battle of Borodino)*. Moscow, 2008. 260 p. [in Russian]
19. *Pis'mo Ya.V. Villie – grafu Arakcheevu*. V kn.: Dubrovin N. Otechestvennaya voyna v pis'makh sovremennikov (1812–1815) [*Y.V. Villie's letter to Count Arakcheev*]. In: Dubrovin N. *The Patriotic War in the letters of contemporaries (1812–1815)*. Moscow: State Public Historical Library of Russia, 2006. P. 129–133. [in Russian]
20. Muravyov-Karsky N.N. *Sobstvennye zapiski. 1811–1816 (Personal notes. 1811–1816)*. Moscow, 2015. 544 p. [in Russian]
21. Govorov Y.I. *Poslednie dni zhizni knyazya Petra Ivanovicha Bagrationa (The last days of Prince Pyotr Bagration's life)*. Saint Petersburg, 1815. [in Russian]
22. Bush I.F. *Rukovodstvo k prepodavaniiu khirurgii (A guide to teaching surgery)*. Saint Petersburg, 1811. [in Russian]
23. Harkevich V.I. *1812 g. v dnevnikh, zapiskakh i vospominaniyakh sovremennikov (1812 in the diaries, notes, and memoirs of contemporaries)*. Vilna, 1904. Is. III. P. 159–160. [in Russian]
24. Smirnov A.A. *1812 g. God stradanii i slavy (1812. A year of suffering and glory)*. Moscow: The State Historical Museum, 2012. P. 59–60. 111 p. [in Russian]
25. Danilevsky P.A. *Kratkiy istoricheskiy ocherk razvitiya sanitarnykh povozok (A brief historical outline of the development of field ambulances)*. Intendantskiy zhurnal (Quartermaster journal). 1907; 1: 77–78. [in Russian]
26. Tselorungo D.G. *O poteryakh russkoy i napoleonovskoy armii v Borodinskom srazhenii 24–26 avgusta 1812 g*. V. kn.: Borodinskoe pole. Muzey i pamyatnik. K 165-letiyu osnovaniya Borodinskogo muzeya-zapovednika (*On the losses of Russian and Napoleonic armies in the Battle of Borodino from August 24–26, 1812*). In: Borodino field. The museum and monument. On the 165th anniversary of the Borodino Museum). Moscow: Poligraf Servis, 2005. [in Russian]
27. *Borodino: Dokumenty, pis'ma, vospominaniya (Borodino: Documents, letters, memoirs)*. Moscow: Soviet Russia, 1962. 416 p. [in Russian]
28. *Frantsuzy v Rossii. 1812 g. (The French in Russia. 1812)*. Moscow, 1912. Vol. I. P. 167–168. [in Russian]
29. Aubry J.T. *Souvenirs du 12-e chasseurs. 1799–1815*. Paris, 1889.
30. Belliot de Kergorre A. *Journal*. Paris, 1899.
31. Tikhonov I.S. «*Nashi russkie imeyut naturu, pocti nerazrushimo krepkuyu (pis'mo leyb-medika Kh.I. Loder o lechenii ranenikh soldat i ofitserov v srazheniyakh 1812 goda)*». V kn.: Moskovskiy voennyi gospi-tal' i meditsina Rossii v Otechestvennoy voyne 1812 goda [*“Our Russians possess a nature that is almost indestructibly strong” (letter to the physician-in-ordinary J.I. Loder about the treatment of wounded soldiers and officers in the battle of 1812)*]. In: Moscow military hospital and Russian medicine in the Patriotic War of 1812]. Moscow: Eko-Press, 2012. [in Russian]
32. Zaglukhinsky V.V. *Osnovy sanitarnoy taktiki (The basics of sanitary tactics)*. Moscow, 1914. 403 p. [in Russian]

About the authors

Ivan Mikhailovich Chizh – Corresponding member of the Russian Academy of Sciences, Doctor of Medical Sciences, Vice-rector for public relations and educational work, Chairman at the Department of the Health Safety and Disaster Medicine, Sechenov First MSMU (Moscow).

Yuriy Evgenyevich Vyazovichenko – Doctor of Medical Sciences, Professor, Department of Epidemiology and Evidence-Based Medicine, Sechenov First MSMU (Moscow).

Igor Aleksandrovich Grishin – Candidate of Medical Sciences, Associate Professor at the Department of Epidemiology and Evidence-Based Medicine, Sechenov First MSMU (Moscow).

Alexander Aleksandrovich Baranov – Deputy Chairman, doctor at the Military unit 93998 (Moscow).