

# Foreign scientists on the contribution of Serbian physician and scientist Dr. Lazar K. Lazarević to medical science

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## SUMMARY

Dr. Lazar K. Lazarević (1851–1890, Julian calendar / 1891, Gregorian calendar) was an exceptional Serbian physician, scientist, writer and translator. During his short life and his close to 11-year-long professional career (1879–1890), Dr. Lazarević authored 78 scientific papers and presentations in various branches of medicine. His greatest contribution to the field of neurology and to medical science in general is his description of the straight leg raising test. The article titled “Ischiac postica Cotunnii – One contribution to its differential diagnosis” was published in the Serbian language (in Cyrillic alphabet) in the Serbian Archives of Medicine in 1880. The article was translated to German and republished in Vienna in 1884 in *Allgemeine Wiener medizinische Zeitung*. The straight leg raising test is usually called Lasègue’s test/sign, after the French clinician Charles Lasègue, although he never described it. However, there are numerous authors who admit that Lasègue never published the description of the straight leg raising test, and instead give full credits for its discovery to Dr. Lazarević. Our objective in this article is to highlight the major literature written by foreign scientists who give credit to Dr. Lazarević for his contribution to medical science.

**Keywords:** straight leg raising test; neurology; history

## INTRODUCTION

Dr. Lazar K. Lazarević (1851–1891) was one of the leading and most outstanding physicians in Serbia of his time (Figure 1). He was also an enthusiastic scientist, writer and translator. His professional career was tragically short (1879–1890), but in those 11 years he authored 78 scientific papers and observations [1].

Our objective in this article is to focus on numerous articles and book chapters written by foreign scientists who give credit to Dr. Lazarević for his contribution to medical science.

## THE INAUGURAL DISSERTATION OF DR. LAZAREVIĆ

In 1879 Dr. Lazarević finished his medical studies at the Friedrich Wilhelm University of Berlin and earned the title of Medical Doctor of all fields of medicine. He was attending the lectures of outstanding teachers such as Bardeleben, du Bois-Reymond, Braun, Dove, Fasbender, Frantzel, Frerichs, Hartmann, von Helmholtz, Hensch, Hirsch, Hofmann, v. Langenback, Lewin, Liebreich, Martin, Mendel, Meyer, Munk, Oppenheim, Pinner, Reichert, Remak, Schweigger, Simon, Traube, Virchow, Waldenburg, and Westphal.

On March 8th 1879 he completed his inaugural doctoral thesis about the toxic effects of mercury in experimental animals [2]. Today, *Bibliothèque historique Faculté de Médecine Université de Strasbourg*, the Bodleian Librar-

ies at the University of Oxford, and Center for Research Libraries in Chicago hold the dissertation of Dr. Lazarević. Importantly, the findings gathered in the inaugural dissertation of Lazarević were quoted in the article published in the Archives of Dermatology and Syphilology in 1923 [3]. In this article, the author Bessesen pointed to some important findings from Lazarević’s thesis: “Glycosuria is a constant finding in mercury poisoning (Saikowsky, Rosenheim, Schroder, Graf); is never present (Balogh, Prevost, JoUes); seldom present (*Lazarevic*)... *Lazarevic* investigated hemorrhage in the floor of the fourth ventricle as the cause of this; such was never found... The next following experimenters discussed chiefly the calcium deposit: Rosenbach, 1868; Balogh, 1875; Heilborn, 1878, *Lazarevic*, 1879... The vessels are more penetrable, as indicated by dropsy conditions as found by Heilborn, Leutert, *Lazarevic* and Karvonen.”

## THE DESCRIPTION OF THE STRAIGHT LEG RAISING TEST BY DR. LAZAREVIĆ

After his return to Serbia in 1879, Dr. Lazarević wrote on diverse topics in various branches of medicine, but the most important are his papers devoted to the field of neurology. He published the article titled “Ischiac postica Cotunnii – One contribution to its differential diagnosis” in the Serbian language (in Cyrillic alphabet) in the Serbian Archives of Medicine in 1880 [4]. In this article Lazarević described the straight leg raising test based on original

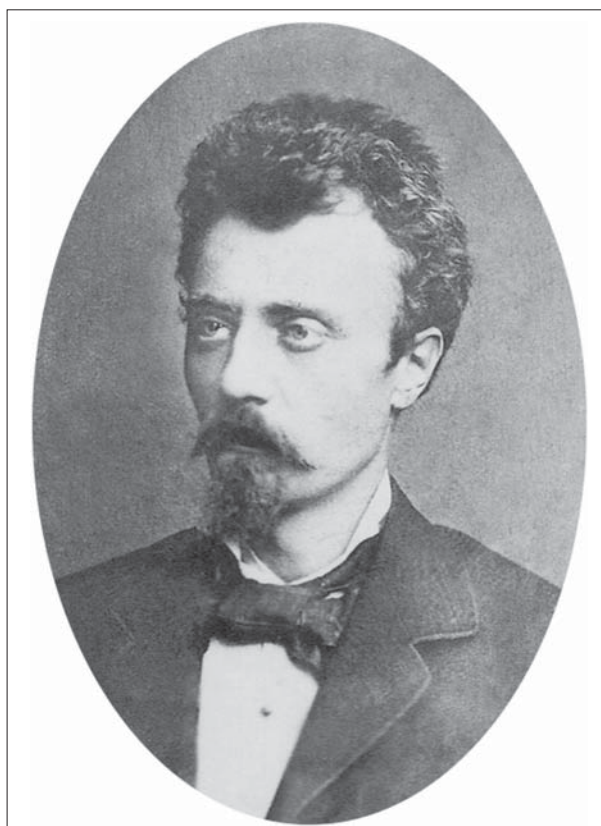
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observations of six patients from his medical practice. After four years, in 1884, the paper was translated to German and republished in Vienna [5]. Although Dr. Lazarević was the first to describe the straight leg raising test, he has never received credit for it. The maneuvers presented by Lazarević are known by other names as Lasègue sign/test/maneuver, Thomayer's test or Kernig's sign. The straight leg raising test is usually called Lasègue's test/sign after the French clinician Charles Lasègue (1816–1883), although he never published the description of this test. Lasègue's reference volume, "Consideration on Sciatica," published in 1864 [6], is frequently quoted as the first description of the test/sign of Lasègue, but its description is not mentioned in this paper. In 1881, one year after the full and clear description of the test given by Lazarević, the straight leg raising test was described by Lasègue's student J. J. Forst [7]. Vladimir Kernig, a Russian physician, published the description of his sign in 1882 in a Russian journal, and he did it again in German in 1884 [8].

Nevertheless, on the basis of historical evidence, numerous foreign scientists admit that Lasègue never published the description of the straight leg raising test, and instead credit its discovery to Dr. Lazarević [9-24]. Our article offers a review of their attitudes.

Seven decades ago, Swedish neurosurgeon Olof Sjöquist stated, "The clinical sign which bears the name of Ch. Lasègue was never described by this great French clinician" [9]. In the 1950s, Robert Wartenberg bolstered the role of Lazarević [10, 11]. In his well-known article "On neurologic Terminology, Eponyms and the Lasègue Sign" R. Wartenberg stated, "However, it is an indisputable fact that this famous article of Lasègue of 1864 contains nothing, absolutely nothing about this sign, not even a hint. It is highly embarrassing to state the plain fact that all those authors mentioned who quote Lasègue's article of 1864 as a source of Lasègue's sign did not read the article. And this applies to such men as Oppenheim and Wilson... Forst's thesis appeared in 1881." At the same time, Dimitrije Dimitrijević in his article published in 1952 actually brought to light unnoticed work of Lazarević to international audience [12]. In the abovementioned paper R. Wartenberg quoted the observations of Dimitrije Dimitrijević, "As D. T. Dimitrijevic has shown, there appeared one year earlier in a Serbian journal an article of the Belgrade physician and story teller, Lazar K. Lazarevic, entitled: *Ischias postica Cotunii*. Here a complete description of the straight-leg-raising test is given. Later, in 1884, Lazarevic gave a more complete description of the straight-leg-raising sign in German" [10]. In the 1970s, Allan Clain, the author of the famous book "Hamilton Bailey's Demonstration of Physical Signs in Clinical Surgery," wrote about Lasègue's sign, "Laza K. Lazarevic, a Yugoslav physician, first described this sign in 1880" [13]. In the 1980s, John MS Pearce emphasized, "J. J. Forst's doctoral thesis of 1881 described the sign that his teacher Lasègue had observed but never published. *There is, however, a contemporary description by a Serbian physician, Laza Lazarevic, in 1880 of 'ischias postica cotunnii' with restricted straight leg raising*" [14].



**Figure 1.** Dr. Lazar K. Lazarević, as the head of the Internal Medicine Department of the General State Hospital in Belgrade

**Original source:** Stanojević V. Laza K. Lazarević's place in the history of Serbian Medicine. *Srp Arh Celok Lek.* 1951; 49(5):340-52 (with permission of the journal *Serbian Archives of Medicine and the Serbian Medical Society*)

In recent years, the same statements can be found in modern textbooks. Steven McGee in the textbook "Evidence-Based Physical Diagnosis" stated, "A positive straight leg raising test is sometimes called Lasègue's sign, after the French clinician Charles Lasègue (1816 to 1883), although Lasègue never published a description of the sign. His student Forst described a maneuver in his 1881 doctoral thesis, crediting Lasègue. *An earlier description of the sign was published by Yugoslavian physician Lazarevic in 1880*" [15]. Peter P. Urban in his textbook "Klinisch-neurologische Untersuchungstechniken" wrote, "Historically, it is very important that Lasègue did not describe this sign. *The sign was first described and correctly interpreted by Lazarevic*" [16]. Kalayan B. Bhattacharyya in the book "Eminent neuroscientists" gave more detailed explanation of Lasègue's "Consideration on Sciatica," "Interestingly, Lasègue did not write about this sign anywhere, not even in his reference volume 'Considerations on Sciatica' published in 1864, which dealt with his analysis of the then prevailing theories on sciatica and his own clinical observations. Oscar Sugar wrote in the article 'Charles Lasègue and His Considerations on Sciatica,' published in the *Journal of the Medical Association* in 1985, that it was his pupil, JJ Forst, who in his thesis in 1881 brought the phenomenon to light and ascribed it to his teacher. *However, medical historians attribute the sign to Laza K Lazarevic, a physician from Belgrade, who described it one year ago*" [17].

At the same time, it must be emphasized that Dr. Lazarević was the first to describe the mechanism of pain occurrence during the test performance. Although Lazarević correctly explained that stretching of the sciatic nerve and its component nerve roots produces the pain, it is usually claimed that author of this theory is Lucien de Beurmann, who just bolstered a theory of Lazarević with cadaveric studies in 1884 [25]. In contrast to Lazarević and de Beurmann, Lasègue was wrong in some of his fundamental ideas on the features of sciatic pain. He wrongly stated in his paper of 1864 that passive flexion or extension of the affected painful leg is possible without increase of pain. This incorrect observation of Lasègue is quite opposite to the mechanism of pain occurrence in the straight leg raising test, since the increase in sciatic pain is caused specifically by flexing of the extended leg on the abdomen. Furthermore, both Lasègue and Forst wrongly concluded in Forst's thesis of 1881 that pain produced by passive elevation of the knee-extended leg originates from pressure of the posterior thigh muscles upon the sciatic nerve [7]. Interestingly, in his article of 1884, Lucien de Beurmann criticized the incorrect views of Forst and emphasized that Lasègue never published a description of the straight leg raising test. He wrote, "Lasègue, until his very death in 1883, never published a word about this sign..." [25].

We note that similar conclusions about theories given by Lazarević, Lasègue or Forst can be found in the literature of the 20th century. In the aforementioned article, Robert Wartenberg stated, "Lazarevic not only described the straight-leg-raising sign before Forst, he was also the first to give the correct explanation for this sign, that is, that the pain elicited is due to stretching of the nerve. Forst explained the pain evoked as due to pressure of the posterior muscles of the thigh on the trunk of the sciatic nerve. Forst said that this was the opinion of Lasègue... Lasègue approved the thesis and did not criticize the views expressed therein" [10]. Robert H. Wilkins and Irwin A. Brody in their article of 1969 pointed out, "Forst and Lasègue concluded that the pain produced by raising the involved lower extremity with the knee extended was due to muscular compression of the sciatic nerve. The current view, implicating stretch of the sciatic nerve and its component nerve roots, is attributed to De Beurmann, who wrote on the subject in 1884. However, Laza Lazarević, a Yugoslavian physician writing in the *Archivum serbicum pro universa scientia et arte medica recipienda* in 1880, was actually the first to describe the straight leg raising test in sciatica and to identify the stretching of the sciatic nerve as the cause of the pain" [18]. In the 1980s, Oscar Sugar also wrote about Lasègue's incorrect observations, "The sign was never put into writing by Lasègue... The steps are unknown by which Lasègue came to modify his 1864 views that any sort of flexion or extension of the lower extremity did not exacerbate the pain..." [19]. Joseph V. McDonald and William C. Welch in the textbook "Operative spine surgery" particularly emphasized that Lazarević correctly explained not just the mechanism of the straight leg raising test, but also the mechanism of the control test: "Straight leg raise is usually called Lasègue's sign. Lasègue did not describe the sign.

His pupil, J. Forst, did describe and illustrate it as well as the relief of sciatic pain with flexion of knee while the hip is flexed in a thesis published in Paris in 1881. *One year earlier, the straight leg raise test was clearly described by Lazar Lazarevic. Unfortunately, his paper was in Serbian, his native tongue. Even though he republished his findings 4 years later in German, he still has not won an eponym crown. He did show that the straight leg raise stretched the sciatic nerve and flexing the knee reduced it*" [20]. Hans J. G. H. Oosterhuis in the textbook "Neurological Eponyms" wrote the following about Lasègue and Lazarević: "It is a strange irony that the test to which his name is attached was in fact not described by him but by one of his pupils... In 1864, in his paper on sciatica, Lasègue distinguished a benign and a grave form with muscle atrophy. This paper is frequently quoted as the first description of the test and the sign of Lasègue, although its description does not occur in this paper... Remarkably, Lasègue stated in his paper of 1864 that passive flexion or extension of the painful leg is possible without increase of pain... *Independent from Forst, Lasègue, and de Beurmann, the test of the stretched leg was described in 1884 by Lazarevic, a Serbian physician in Belgrade, who also emphasized that the leg should be flexed in the knee as the control test. He explained the pain as produced by stretching of the nerve. Lazarevic claimed that he had described this test as early as 1880 in the Serbian Medical Journal, thus preceding the description of Forst*" [21]. More recently, Jennifer Solomon, Scott Nadler and Joel Press in the textbook "Musculoskeletal Physical Examination: An Evidence-based Approach" also pointed to differences in Forst's and Lazarević's views: "Forst suspected that the activation of pain during this maneuver was the result of pressure from the hamstring on the nerve... *Lazarevic described this test in 1880, one year earlier than Forst, after he observed six patients to have increased pain during stretching of the sciatic nerve. Lazarevic described a three-step approach to the test... All three maneuvers were noted to reproduce discomfort in the sciatic nerve distribution...*" [22]. In our recent article, we also intended to highlight the contribution of Dr. Lazarević to the field of neurology. We particularly emphasized that analysis of historical events and documentation indicates that Lazarević described the straight leg raising test in sciatica before Lasègue [23].

Regarding a striking confusion around eponyms, we point to some authors who criticized an incorrect selection of a name for an eponym. At the end of his story about Lasègue's sign, Robert Wartenberg concluded, "Although Lazarevic in 1880 not only gave the first description of the straight-leg-raising sign but offered the correct explanation, his work went completely unnoticed. I have never met any reference to this article of Lazarevic. In the largest existing biographic medical encyclopedia, there are five lines about Lazarevic, but neither of these two articles of his on sciatica is mentioned... It is best to call [it] the straight-leg-raising sign, and if eponym is applied at all, it should be Lazarevic or Lazarevic-Lasègue" [10]. More recently, Jane Orient in the book "Sapira's Art and Science of Bedside Diagnosis" wrote the following about Dr. Lazarević: "The Kernig-Lasègue sign was first described in 1880 by a Yugoslav phy-

sician Lazarević (Clain, 1973). *He has never received credit for it. His sign is known by two other names to two different groups of specialists who use it for different purposes.* Having encouraged the students to describe something original in the hope of eponymous immortality, it must now be recalled how many times the original innovator's name is lost to posterity. As Shaw noted, virtue is its own punishment" [24].

## CONCLUSION

As summary, although Dr. Lazar K. Lazarević was the first to describe the straight leg raising test, he has never received credit for it. The great thing about Lazarević's article, like any good science, is that after a number of years, the test described by Lazarević continues to be the

most recognized maneuver used for decades to evaluate patients with suspected compression of the sciatic nerve or nerve roots. It may, therefore, be concluded that this point undoubtedly proves the validity of Lazarević's legacy.

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## Страни научници о доприносу српског лекара и научника др Лазара К. Лазаревића медицинској науци

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### КРАТАК САДРЖАЈ

Др Лазар К. Лазаревић (1851–1890/1891. према јулијанском, односно грегоријанском календару) био је истакнути српски лекар, научник, писац и преводилац. Током свог кратког живота, за непуних 11 година професионалног рада (од 1879. до 1890. године), др Лазаревић је објавио сам или у сарадњи са другим ауторима 78 радова и саопштења из различитих медицинских области. Његов најзначајнији допринос области неурологије, као и медицинској науци уопште, јесте опис теста подизања испружене ноге, публикован 1880. године под насловом „*Ischias postica Cotunni* – један прилог за њену диференцијалну дијагнозу“ у часопису „Српски архив за целокупно лекарство“ на српском језику и ћири-

личком писму. Исти рад је објављен 1884. године на немачком језику у познатом бечком часопису *Allgemeine Wiener medizinische Zeitung*. Нажалост, овај знак се данас најчешће означава епонимом Ласегов (*Lasègue*) знак или тест, иако француски лекар Шарл Ласег (*Charles Lasègue*) никада није писао о овоме знаку. Ипак, бројни аутори признају да Ласег никада није публиковао опис теста подизања испружене ноге и за опис овога теста дају пуно признање српском лекару Лазару К. Лазаревићу. Наш циљ у овом раду био је да истакнемо публикације страних научника који одају признање др Лазаревићу на његовом доприносу медицинској науци. **Кључне речи:** тест подизања испружене ноге; неурологија; историја

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