

**TO
THE CHAIRPERSON OF THE SCIENTIFIC JURY,
APPOINTED BY ORDER No. 15-03-48#2/23.02.2026
OF THE EXECUTIVE DIRECTOR AND THE PROCURATOR
OF "ACIBADEM CITY CLINIC UMBAL TOKUDA" EAD**

R E V I E W

By Prof. Dimitar Petkov Petkov, MD, PhD
Head of the Clinic of Vascular Surgery
University Hospital Trakia

Regarding: Dissertation thesis for obtaining the educational and scientific degree "Doctor" in the field of higher education 7. Healthcare and Sports, professional direction 7.1. Medicine, doctoral program "Cardiovascular Surgery".

Author: Dr. Nikolay Dimitrov Valchev

Form of doctoral studies: Independent preparation

Scientific unit: Clinic of Vascular Surgery, "Acibadem City Clinic UMBAL Tokuda" EAD

Topic: "The Role of Mechanochemical Ablation in the Modern Algorithm for the Treatment of Patients with Chronic Venous Disease"

Research supervisor: Prof. Dr. Vasil Jordanov Chervenkov, PhD

1. General Presentation of the Procedure and the Doctoral Candidate

The dissertation thesis was discussed and proposed for defense by an expanded Scientific Collegium of the Clinic of Vascular Surgery at "Acibadem City Clinic UMBAL Tokuda" EAD. At a meeting of the Scientific Council of "Acibadem City Clinic UMBAL Tokuda" EAD (Protocol 61/26.11.2025) and by order No. 15-03-48/23.02.2026 of the Executive Director and Procurator of the hospital, I was appointed as an external member of the Scientific Jury in connection with the dissertation thesis of Dr. Nikolay Dimitrov Valchev. I am designated to present this Review.

Dear Members of the Scientific Jury.

2. Relevance of the Topic

Chronic Venous Disease (CVD) is a global health problem, affecting a significant percentage of the population and leading to a deterioration in the quality of life. The evolution in CVD treatment is directed towards minimally invasive methods. Mechanochemical ablation (MOCA) is a relatively new, non-thermal, and non-tumescent method, which eliminates the risks associated with thermal energy and tumescent anesthesia. Despite its advantages, MOCA shows certain limitations in long-term anatomical success.

The dissertation thesis is extremely relevant, as it investigates the role of MOCA in the modern algorithm and proposes an innovative "modified approach" to optimize the method. The goal is to increase the effectiveness and safety of MOCA, which makes it highly significant for vascular surgery.

3. Understanding the Problem

The doctoral candidate demonstrates an excellent understanding of the problem, based on a detailed and critical analysis of the specialized literature (42 pages). The review covers a historical overview, anatomy, pathophysiology, diagnostic methods (CEAP classification), and modern therapeutic strategies for CVD. Dr. Valchev critically analyzes the existing data for MOCA, identifying the need to improve the long-term anatomical success rate of the method, which is also the main motivation for his research.

4. Research Methodology

The chosen research methodology is precise and adequate, allowing for the achievement of the set goal and obtaining an adequate answer to the tasks. A prospective clinical study was conducted, involving 220 patients (220 lower limbs), treated in the period 2019–2022. Patients are divided into two groups of 110 individuals:

- Group 1: Treated with the classical (standard) method using a ClariVein® catheter and liquid sclerosant.
- Group 2: Treated with a modified method by the author – with foam and active aspiration of the foam. Modern assessment methods were applied: color-coded duplex sonography for monitoring anatomical success, standardized quality of life questionnaires (CIVIQ-20), and a disease severity scale (VCSS). The statistical processing (with STATISTICA package) is adequate, including Student's t-test and ANOVA, which guarantees the reliability of the results.

5. Characteristics and Evaluation of the Dissertation Thesis and Contributions

The dissertation thesis is written on 157 pages and is well illustrated with 49 figures and 53 tables. The structure is correct and adheres to academic standards.

In the "Results and Discussion" section, the author presents a detailed comparative analysis, clearly demonstrating the advantages of the modified method:

- **Comparability of Groups:** The groups are comparable in all main characteristics (gender, age, CEAP stages), which ensures the reliability of the comparison.
- **Anatomical Success:** A key contribution is the proof of a statistically significantly higher anatomical success rate at 3 years with the modified approach: 86.36% for Group 2 versus 75.45% for Group 1 ($P=0.0186$). This result brings MOCA closer to the "gold standard" of thermal methods.
- **Clinical Success:** High and comparable in both groups ($>91\%$), with no significant difference.
- **Pain and Comfort:** Intra-procedural pain is minimal. Post-procedural pain in the first 2 weeks is statistically lower in Group 2 ($P=0.037$ and $P=0.041$), explained by the aspiration of the sclerosant.
- **Complications:** The modified method proves a high safety profile. DVT was observed in only 2 cases in Group 1 and 0 in Group 2. Hyperpigmentation is statistically less with the modified method (2.7% versus 6.3%, $P=0.0127$), as is superficial phlebitis (1.81% versus 3.63%).
- **Quality of Life and Satisfaction:** Both groups show significant improvement. The modified method demonstrates statistically better long-term results for CIVIQ-20 ($P=0.002676$) and VCSS ($P=0.0215$).

Main Contributions of the Dissertation:

- **Original Contribution:** A modified method of mechanochemical ablation has been developed and successfully introduced into clinical practice, which significantly increases long-term anatomical success and reduces complications.
- **Scientific-Applied Contribution:** A detailed profile of the "suitable patient" for MOCA has been developed, and clear criteria for optimal selection have been defined (e.g., vein diameter <8 mm, absence of thrombophilia, careful approach to SSV).

- Practical Contribution: A detailed, practically oriented working algorithm for working with the ClariVein® catheter has been created.

6. The abstract accurately reflects the content of the dissertation thesis.

The abstract is prepared in accordance with all academic requirements and reflects the content of the dissertation thesis comprehensively and accurately.

7. Evaluation of Publications and the Doctoral Candidate's Personal Contribution

The doctoral candidate has submitted the required number of publications in national and international journals, as well as participations in scientific forums, through which the results of the dissertation have become known to the scientific community. Dr. Valchev's personal contribution is indisputable – he personally performed all operative interventions, followed up with patients, and analyzed a vast amount of data, demonstrating the qualities of a serious researcher.

8. Critical Remarks and Recommendations

The dissertation thesis is developed at an exceptionally high scientific and practical level. Despite the overall positive impression, I would allow myself to make the following constructive remarks and recommendations, without them diminishing the value of the scientific work:

- In the Methodology section of the study, there is no explicit definition of the type of study (whether it is entirely prospective or prospective-retrospective).
- In the "Results and Discussion" section, there are some repetitive elements, which could be optimized.

CONCLUSION

The dissertation thesis by Dr. Nikolay Dimitrov Valchev is a completed scientific study with undeniable scientific-applied contributions. The dissertation meets all the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria (LDASRB), its Implementing Regulations, and the Regulations of "Acibadem City Clinic UMBAL Tokuda" EAD.

Dr. Nikolay Valchev establishes himself as a well-rounded specialist – a vascular surgeon, who possesses not only profound theoretical knowledge but also demonstrates exceptional qualities and skills for independent scientific work, innovative thinking, and successful implementation of scientific achievements in clinical practice.

In view of the above, I give my positive assessment and confidently recommend that the members of the esteemed Scientific Jury positively evaluate the dissertation thesis "The Role of Mechanochemical Ablation in the Modern Algorithm for the Treatment of Patients with Chronic Venous Disease" and award Dr. Nikolay Dimitrov Valchev the educational and scientific degree "Doctor" in the field of higher education 7. Healthcare and Sports, professional direction 7.1. Medicine, doctoral program "Cardiovascular Surgery", for which I confidently vote "FOR".

Stara Zagora
15.03.2026


Prof. Dimitar Petkov Petkov, MD, PhD