



# Automatic Sclerosant Injection Technique of Mechanochemical Ablation with ClariVein Using a Syringe Pump for the Treatment of Varicose Veins

Insoo Park and Daehwan Kim

Charm Vascular Clinic, Seoul, Korea

Mechanochemical ablation (MOCA) is a non-thermal, non-tumescent technique for the treatment of incompetent saphenous vein. It is sometimes difficult to maintain consistency when simultaneously implementing wire rotation, sclerosant injection, and wire pullback. Here, we report a simple technique for achieving constant injection during MOCA with the help of a syringe pump; thus, the operator can focus on wire pullback only with convenience and consistency.

**Key Words:** Varicose veins, Venous insufficiency, Sclerosant

Received August 4, 2020

Revised September 4, 2020

Accepted September 11, 2020

**Corresponding author:** Insoo Park

Charm Vascular Clinic, 1814

Nambusunhwan-ro, Gwanak-gu, Seoul

08738, Korea

Tel: 82-2-6959-1550

Fax: 82-2-6959-1551

E-mail: insoo.park.md@gmail.com

<https://orcid.org/0000-0003-0563-9105>

This study was presented at the Charing Cross International Symposium 2019, London, UK, Apr 15-18, 2019.

Copyright © 2020, The Korean Society for Vascular Surgery

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Vasc Specialist Int 2020;36(3):198-200 • <https://doi.org/10.5758/vsi.200053>

## INTRODUCTION

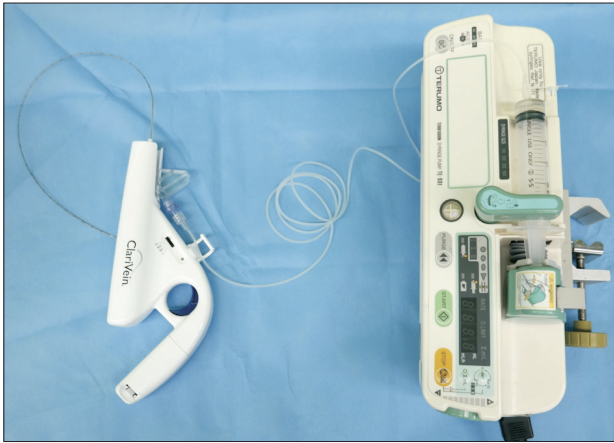
Mechanochemical ablation (MOCA) is a non-thermal, non-tumescent technique that is associated with lesser pain than conventional thermal ablation [1]. Technically, MOCA involves simultaneous implementation of three types of techniques: mechanical wire rotation, chemical sclerosant injection, and wire pullback [2]. However, it is sometimes challenging for a single operator to simultaneously perform these three techniques with a high level of consistency or reproducibility. The operator needs to inject the sclerosant at a constant speed with the thumb while keeping the motor on with the index finger. At the same time, the other hand must pull back the wire at a constant speed. As a result, it is difficult to maintain a high level of consistency while conducting these three techniques together.

We would like to introduce a simple technical tip for achieving high consistency and reproducibility when performing MOCA, ClariVein® (Vascular Insights, Quincy, MA, USA), with the help of a syringe pump.

## TECHNIQUE

The key point of our technique is that constant injection can be achieved with the help of a syringe pump while performing MOCA; thus, the operator can focus on wire pullback only while employing this technique.

A 20-mL syringe is filled with the sclerosant, installed in the syringe pump, and connected directly to the catheter through the syringe pump line (Fig. 1). In previous literature, the recommended injection dose and pullback speed are 0.2 mL/cm and 1 cm per 7 seconds, respectively [1,2].



**Fig. 1.** From the right: syringe pump with 20 mL syringe, syringe pump line, motor, and catheter device (ClariVein®). These can be connected and used during the procedure.

Accordingly, we set the syringe pump's injection speed at 102 mL/h, which is equal to 0.2 mL every 7 seconds. During treatment, the syringe pump is turned on at the start of chemical ablation, and the assistant can simply hold the handle unit while keeping the motor on. The operator can achieve the exact wire pullback speed because they only have to focus on this task. Additionally, the operator can hold the ultrasound probe or investigate the treatment area with the other hand (Fig. 2). The advantage of using a syringe pump is that the precise injection dose of the sclerosant (accuracy can be achieved below the decimal point) can be determined correctly by the syringe pump.

## DISCUSSION

The mechanism of MOCA is, as its name implies, the simultaneous application of mechanical and chemical ablation of varicose veins. Technically, the operator needs to inject the sclerosant at a constant speed with the thumb while keeping the motor on with the index finger. At the same time, the other hand must pull back the wire at a constant speed [2].

However, during the authors' early experience, we realized that it was technically demanding to perform the three actions at the same time with a high level of consistency or reproducibility. This would be especially true if the wire tip were to become stuck in tissue or a vein valve during treatment as it would then become more challenging to proceed with the treatment as intended [3]. In addition to the advantage of convenience for the operator, our technique holds the advantages described below.

First, we can measure the precise volume injected into the patient's body. Sclerosant should be injected under



**Fig. 2.** While the assistant keeps the motor on with one hand, the operator pulls the wire back with one hand and holds the ultrasound probe with the other hand to check the treatment process in real time. Sclerosant is injected at an exact and constant speed.

quantitative control, and side effects might arise with higher volumes of sclerosants [4,5]. Our technique, which uses a syringe pump, is able to measure and control the volume accurately, even achieving accuracy below the decimal point.

Second, since the syringe included in the ClariVein kit is a 5-mL syringe, if more than 5 mL of sclerosant is needed, the treatment must be stopped and the 5-mL syringe must be refilled with additional sclerosant. Due to the convenience of our technique, there is no need to stop until the end of the treatment if a larger syringe containing sufficient sclerosant is set in the syringe pump at the beginning.

Finally, the most important advantage is that injection of sclerosant can be accurately implemented by the syringe pump instead of the thumb. Therefore, we can perform the treatment with a high level of consistency and reproducibility.

New modalities become more familiar as practitioners build their experience and get used to them. However, in the case of MOCA, the aforementioned challenges can cause initial difficulties. We believe that our technical tips will offer operators a high level of convenience and reproducibility when performing MOCA with ClariVein.

## CONCLUSION

The automatic sclerosant injection technique for MOCA, ClariVein, using a syringe pump improves the convenience and helps the operator achieve a very high level of consistency and reproducibility.

## CONFLICTS OF INTEREST

The authors have nothing to disclose.

## ORCID

Insoo Park

<https://orcid.org/0000-0003-0563-9105>

Daehwan Kim

<https://orcid.org/0000-0002-7273-9969>

## AUTHOR CONTRIBUTIONS

Concept and design: IP. Analysis and interpretation: IP, DK. Data collection: IP. Writing the article: IP. Critical revision of the article: IP, DK. Final approval of the article: IP, DK. Statistical analysis: none. Obtained funding: none. Overall responsibility: IP, DK.

---

## REFERENCES

---

- 1) Lane T, Bootun R, Dharmarajah B, Lim CS, Najem M, Renton S, et al. A multi-centre randomised controlled trial comparing radiofrequency and mechanical occlusion chemically assisted ablation of varicose veins - final results of the Venefit versus ClariVein for varicose veins trial. *Phlebology* 2017;32:89-98.
- 2) Mueller RL, Raines JK. ClariVein mechanochemical ablation: background and procedural details. *Vasc Endovascular Surg* 2013;47:195-206.
- 3) Lane TR, Moore HM, Franklin IJ, Davies AH. Retrograde inversion stripping as a complication of the ClariVein mechanochemical venous ablation procedure. *Ann R Coll Surg Engl* 2015;97:e18-e20.
- 4) Breu FX, Guggenbichler S, Wollmann JC. 2nd European Consensus Meeting on Foam Sclerotherapy 2006, Tegernsee, Germany. *Vasa* 2008;37 Suppl 71:1-29.
- 5) Rabe E, Breu FX, Cavezzi A, Coleridge Smith P, Frullini A, Gillet JL, et al. European guidelines for sclerotherapy in chronic venous disorders. *Phlebology* 2014;29:338-354.