Journal of Applied Cosmetology

ISSN 2974-6140 (online) ISSN 0392-8543 (print)

*Case Report*

# BEFly Vector Lift: A Vector-Guided Multilayer Facial Volumization Technique Using PEGDE-Cross-Linked Hyaluronic Acid Fillers – A Case Report

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**Keywords**: *facial volumization, vector-based technique, PEGDE-cross-linked hyaluronic acid, calcium hydroxyapatite, dermal filler, case report, BEFly Vector Lift*

Received: 24 February 2026
Accepted: 03 April 2026



ISSN 2974-6140 (online) ISSN 0392-8543 (print).


**DISCLOSURE: V.R. is a speaker for Neauvia (Matex Lab Switzerland SA). R.G. is a scientific collaborator with Matex Lab Switzerland SA. I.B. declares no conflicts of interest. The products used in this case were purchased through standard commercial channels.**

## ABSTRACT

**Facial aging involves bone resorption, fat compartment deflation, ligament laxity, and soft-tissue biomechanical changes. Conventional hyaluronic acid (HA) filler techniques may not address these changes comprehensively and can risk overcorrection or impaired facial dynamics. Vector-based injection approaches have therefore gained interest, though standardized protocols remain limited. To describe the BEFly Vector Lift, a vector-guided, multilayer facial volumization technique using two PEGDE-cross-linked HA fillers, and to report short-term clinical outcomes in a single patient. A 47-year-old female patient (Fitzpatrick skin type IV) with mild-to-moderate mid- and lower-face volume loss was treated in a single session. Deep juxta-osseous support was performed using a high-density PEGDE-HA filler (28 mg/mL, 2 mL total), followed by subcutaneous volumization using a CaHA-enriched PEGDE-HA filler (26 mg/mL, 3 mL total). Outcomes were assessed using static and dynamic clinical photography, patient-reported satisfaction, and safety monitoring over 30 days. No validated outcome scales were used. At 30-day follow-up, contour improvement was noted in the malar, mandibular, and mentonian regions on photographic comparison. Facial expressiveness appeared preserved. Treatment was well tolerated; adverse events were limited to mild transient edema. In this single case, the BEFly Vector Lift produced short-term contour improvement with preserved expressiveness and acceptable tolerability. The findings are preliminary and based on qualitative assessment. Studies with validated outcome measures, longer follow-up, and larger cohorts are needed.**

## INTRODUCTION

Facial rejuvenation that appears natural, preserves dynamic expression, and restores structural harmony remains a key clinical goal. Despite advances in hyaluronic acid (HA)–based soft-tissue augmentation, consistent three-dimensional facial support is difficult to achieve with fillers alone (1, 2).

Facial aging is a multifactorial process involving bone resorption, fat compartment deflation, ligamentous attenuation, and changes in soft-tissue biomechanics (3, 4). Conventional linear or point-based filler techniques may yield limited contour correction, overcorrection, or compromised facial dynamics when applied to these complex changes (5, 6). This risk is compounded when large volumes are concentrated in a single tissue plane without accounting for the multilayered nature of facial volume loss (7). These shortcomings have driven interest in anatomically informed, vector-based strategies that combine volumetric restoration with soft-tissue repositioning (8, 9). The facial retaining ligaments play a central role in this process: as skeletal support diminishes and fat compartments deflate, ligamentous attachments become relatively prominent, contributing to visible descent and contour irregularity (2, 10).

Several such approaches have been described, including the MD Codes system and various anatomy-driven protocols (11, 12). While vector-based concepts and deep support–oriented filler strategies have been previously described, variability in execution and limited personalization continue to challenge reproducibility and outcome predictability. There remains a clinical need for structured, adaptable protocols that combine structural restoration with preservation of facial dynamics (5, 13, 14).

Advances in injectable biomaterials have broadened the technical possibilities. HA fillers cross-linked with polyethylene glycol diglycidyl ether (PEGDE) differ from conventional 1,4-butanediol diglycidyl ether (BDDE)-cross-linked gels in their crosslinking architecture, and preclinical data suggest favorable tissue integration and a reduced inflammatory profile (15–17). PEGDE provides a longer and more flexible molecular bridge between HA chains compared with BDDE, resulting in gels with distinct cohesive and elastic

properties (18, 19). These properties may be relevant in protocols requiring precise, layer-specific placement across multiple anatomical planes.

In the present case, two PEGDE-cross-linked HA formulations were used: a calcium hydroxyapatite (CaHA)-enriched filler (26 mg/mL) for subcutaneous volumization and tissue stimulation (20–22), and a high-density PEGDE-HA gel for deep juxta-osseous structural support (17). Published clinical experience with these products reports favorable tolerability and a low incidence of adverse events (23, 24).

The Butterfly Vector Lift (BEFly) was developed as a structured, single-session protocol that pairs individualized vector planning with multilayer filler placement. It uses a predefined bilateral butterfly-shaped mapping system, a central anchoring axis combined with oblique lifting vectors aligned to retaining ligaments, to standardize treatment planning while allowing patient-specific volume allocation. The protocol sequences deep juxta-osseous bolus injections with subcutaneous linear threading in a fixed workflow. While this structured pairing of mapping geometry and product sequencing distinguishes the BEFly Vector Lift from previously described techniques, comparative data are not yet available. As no prior report has described this specific protocol, a detailed single-case description with procedural documentation was considered an appropriate first step before undertaking larger studies. The present report should be regarded as a preliminary feasibility description: it presents the technique and its short-term outcomes in a single patient, with attention to contour change, preservation of facial dynamics, tolerability, and patient-reported satisfaction.

## MATERIALS AND METHODS

### *Technique Overview and Treatment Planning*

The BEFly Vector Lift is a vector-guided, multilayer injection technique based on individualized facial analysis. Treatment planning begins with clinical assessment of the face at rest and during expression to identify projection loss, depth-specific volume deficits, contour irregularities, and asymmetries that may not be apparent in static evaluation alone.

Based on this assessment, injection vectors are arranged in a bilateral butterfly configuration. The pattern consists of a central anchoring axis and oblique lifting vectors aligned to facial retaining ligaments and natural soft-tissue force lines (Figure 1). Deep vectors define supraperiosteal bolus placement points for structural support at the malar eminence, mandibular angle, and chin. Superficial vectors define linear threading paths in the subcutaneous plane for contour refinement along the midface, jawline, and lower face. The mapping is standardized in its geometry but allows the operator to adjust volume allocation per point according to individual patient anatomy.

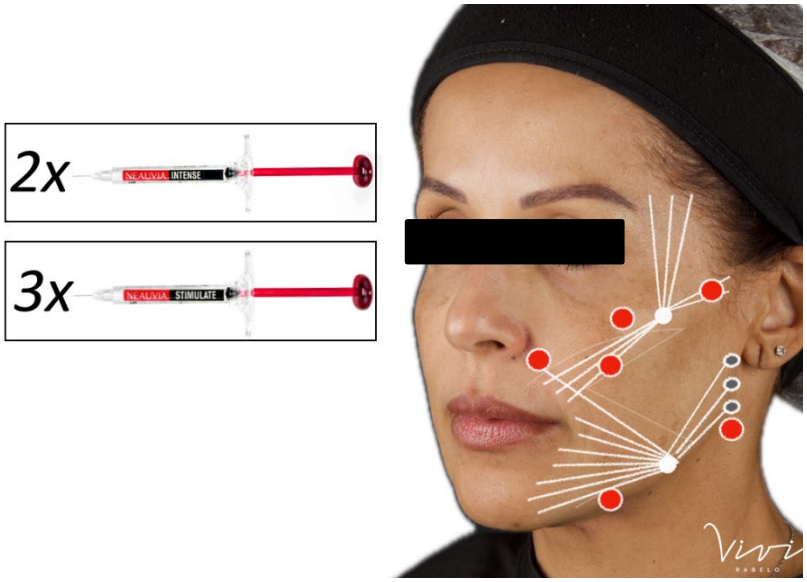


**Figure 1.** *Treatment planning and volumetric distribution for the BEFly Vector Lift: a schematic illustration of the vector-based injection pattern, showing deep structural support points and superficial lifting vectors. The number of syringes used is indicated: two syringes of PEGDE-HA filler (28 mg/mL) for juxta-osseous structural support and three syringes of PEGDE-HA (26 mg/mL with 1% CaHA) for subcutaneous volumization and contour refinement.*

Planning diagrams showing vector orientation and per-point volume distribution are presented in Figures 2 and 3. The injection sequence is fixed: deep bolus placement is performed first, followed by superficial threading, so that subcutaneous vectors are placed over an already-established structural support layer.

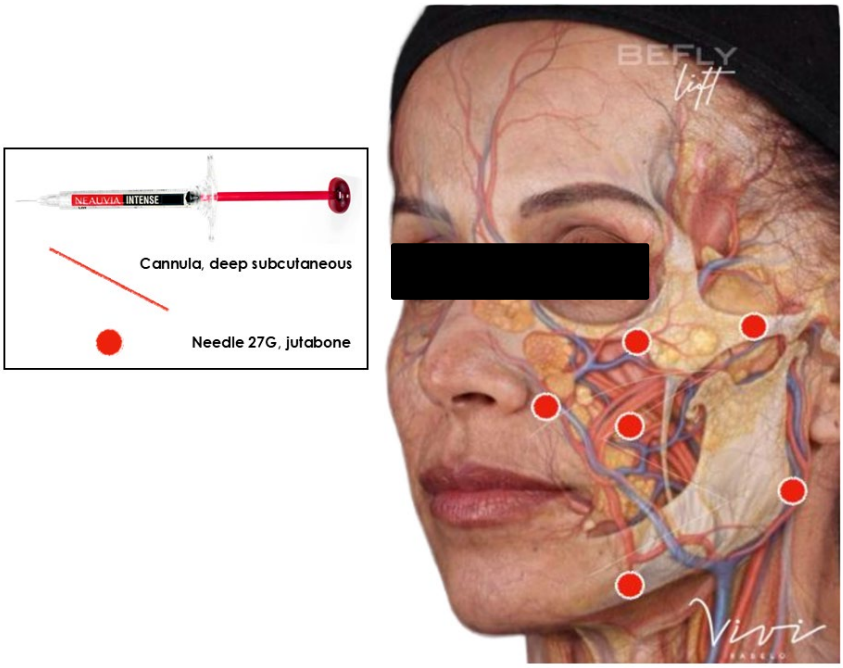


**Figure 2.** *Juxta-osseous injection pattern and volumetric distribution for PEGDE-HA filler (28 mg/mL) in the BEFly Vector Lift. Volumes per injection point (mL) are indicated.*

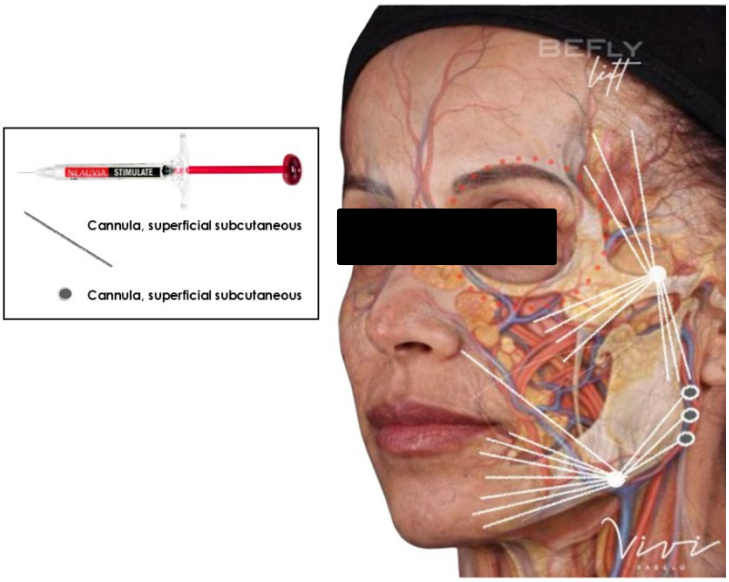


**Figure 3.** *Subcutaneous vector-based injection pattern and volumetric distribution for PEGDE-HA (26 mg/mL with 1% CaHA) in the* BEFly Vector Lift*. Volumes per vector line and region (mL) are indicated.*

***Materials and Injection Technique***

Two PEGDE-cross-linked HA fillers with different rheological profiles were used:

- **PEGDE-HA 28 mg/mL** (Neauvia Intense, Matex Lab, Switzerland), a high-density gel containing glycine and L-proline, used for supraperiosteal bolus placement [1 mL per syringe].
- **PEGDE-HA 26 mg/mL with 1% CaHA** (Neauvia Stimulate, Matex Lab, Switzerland), containing calcium hydroxyapatite microparticles (5–12 μm), glycine, and L-proline, used for subcutaneous linear threading [1 mL per syringe].

Product selection was based on published data reporting favorable rheological properties, biocompatibility, tissue integration, and a reduced inflammatory profile for PEGDE-cross-linked HA formulations (17, 19, 24, 25), as well as collagen neosynthesis, dermal remodeling, and improved skin firmness associated with CaHA-enriched PEGDE-HA fillers in histologic and clinical studies (20, 22, 26). These material properties informed the rationale for the present protocol but were not directly assessed in this patient.

***Injection Protocol***

The procedure was performed in a single session. Total procedure duration was approximately 40 minutes. A topical anesthetic was not used. Infiltrative anesthesia with 2% lidocaine hydrochloride without vasoconstrictor was administered locally at the entry points. Treatment areas were prepared with 0.5% chlorhexidine.

Deep structural support was performed first. PEGDE-HA filler (28 mg/mL) was injected supraperiosteally using a 27G needle at the malar eminence, mandibular angle, and chin projection points. Bolus deposits of 0.05’0.1 mL per point were placed, with aspiration performed before each injection. A total of 2 mL from two syringes was used (Figure 2).

Subcutaneous volumization followed. PEGDE-HA (26 mg/mL with 1% CaHA) was delivered via 22G microcannulas into the superficial-to-mid subcutaneous plane along the predefined lifting vectors. Linear retrograde threads of approximately 0.05 mL per pass were placed, with cumulative volumes of 0.1–0.2 mL per region. A total of 3 mL from three syringes was used (Figure 3).

### *Post-Treatment Care*

Gentle manual molding was applied to selected injection sites. The patient was instructed to avoid strenuous exercise, excessive heat exposure, and direct pressure on treated areas for 48 hours. No prophylactic antibiotics or anti-inflammatory medications were prescribed. Clinical follow-up was scheduled at 30 days for photographic documentation and safety assessment.

### *Photography*

Clinical photographs were obtained at baseline and at 30-day follow-up. A Canon EOS Rebel T5i camera equipped with an EF-S 18–135 mm lens was used. The patient was positioned upright with the Frankfort horizontal plane parallel to the floor at a standardized distance from the camera. Frontal, oblique (approximately 45°), lateral, and dynamic (smiling) views were captured at each visit using consistent flash settings and a neutral background. A formal fixed-mount or stereophotogrammetric imaging system was not used.

## CASE REPORT

A 47-year-old female patient (Fitzpatrick skin type IV) presented with concerns about progressive mid- and lower-face volume loss and reduced contour definition. Her medical history was unremarkable. She reported no prior facial aesthetic procedures, no relevant drug allergies, and no contraindications to dermal filler treatment. She had a history of facial melasma, which was stable at the time of consultation. She reported a history of botulinum toxin treatments performed three times per year over the past six years. Previous aesthetic procedures included lip filler injection approximately three years prior and chin augmentation with dermal filler two years prior. The patient also underwent treatment with poly-L-lactic acid (Sculptra®), initiated four years earlier, with annual maintenance sessions consisting of one vial. She was also undergoing topical treatment for melasma.

On examination, mild-to-moderate soft-tissue deflation was noted in the mid- and lower face, with diminished malar projection, early mandibular contour loss, and reduced chin definition (Figure 4, left). The patient expressed a preference for a subtle correction that preserves expressiveness.

Based on the pattern of volume loss and the patient's goals, the BEFly Vector Lift protocol was selected. The procedure was performed in a single session following the protocol described in the Materials and Methods section (Figure 1).

### *Clinical Outcomes*

Immediately after treatment, facial contour appeared improved on clinical assessment, particularly in the malar, mandibular, and mentonian regions targeted for structural support (Figures 4–6). No signs of overcorrection were apparent (Figures 5, 6).

At the 30-day follow-up, contour improvement was maintained on photographic comparison. Facial expressiveness appeared preserved, with no clinically evident stiffness or overfilled appearance (Figure 7). No worsening of pre-existing melasma was observed (Figures 4-7).

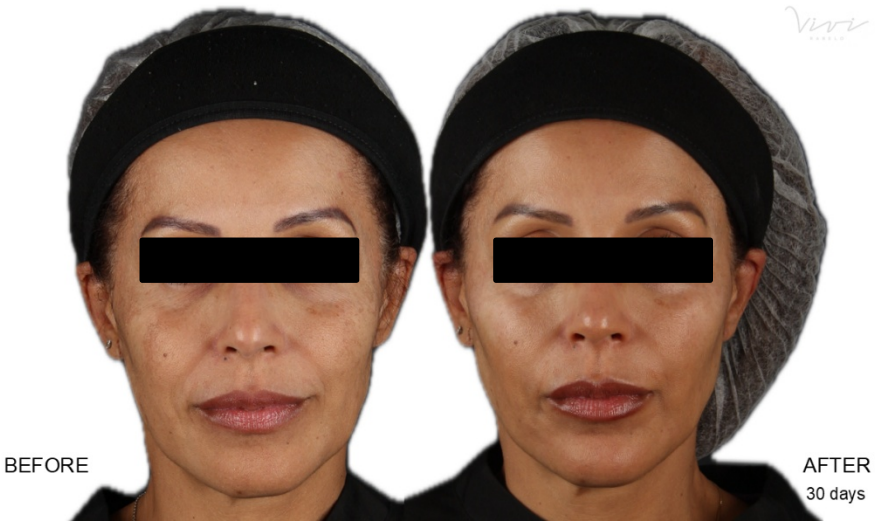


**Figure 4.** *Frontal view at baseline (left) and 30-day follow-up (right).*


**Figure 5.** *Oblique view at baseline (left) and 30-day follow-up (right).*


**Figure 6.** *Lateral view at baseline (left) and 30-day follow-up (right).*


**Figure 7.** *Dynamic smiling view at baseline (left) and 30-day follow-up (right).*

***Patient-Reported Outcomes and Safety***

The patient reported satisfaction with the treatment outcome, noting that the result appeared natural and that she did not feel the intervention was noticeable to others. No formal patient-reported outcome measure (e.g., GAIS, FACE-Q, visual analogue scale) was administered; this assessment is based on informal verbal feedback during the follow-up visit. The post-treatment course was uneventful. Mild localized edema occurred in the early post-procedural period and resolved spontaneously without intervention. No bruising, nodularity, vascular events, pigmentary changes (including melasma exacerbation), or delayed adverse effects were observed at the 30-day follow-up visit. Longer-term safety data beyond this time point are not available.

## DISCUSSION

Facial rejuvenation has shifted from isolated volumetric correction toward protocols that address structural support and facial dynamics together. This reflects the understanding that aging involves bone resorption, fat redistribution, and soft-tissue biomechanical changes, rather than surface volume loss alone (1, 4, 27).

The BEFly Vector Lift applies vector-based planning combined with two fillers placed at different tissue depths. Region-focused filler treatments have been associated with mechanical overload, edema, and overfilling (5, 6, 13). The present approach attempted to reduce these risks by distributing smaller volumes along predefined vectors aligned with retaining ligaments. The retaining ligaments of the face serve as fixed anchoring points that resist gravitational descent; aligning injection vectors with these structures may optimize the mechanical efficiency of filler placement, as proposed in cadaveric and anatomical studies (10, 28).

The distinguishing element of the BEFly Vector Lift is its standardized butterfly mapping system, a central anchoring axis with bilateral oblique vectors, paired with a fixed product sequence across two tissue planes. This structure is intended to provide a reproducible framework that may reduce operator-dependent variability compared with less formalized multilayer approaches. However, this potential advantage was not tested in the present study, and comparative data are needed.

The observed outcome in this patient, contour improvement without apparent overcorrection at 30 days, is consistent with the principle of volumetric restraint emphasized in the overfilling literature (5, 9). Deep juxta-osseous placement addresses projection loss near its anatomical origin and may reduce the need for large superficial volumes. Similar principles have been described in prior work on deep-plane filler support (22,

29). Notably, the total volume used in this case (5 mL across all regions) is lower than volumes reported in comparable full-face rejuvenation protocols, which typically range from 6 to 12 mL (30). However, whether the BEFly Vector Lift offers a measurable advantage over other multilayer techniques needs further validation.

The protocol uses two PEGDE-cross-linked HA fillers with different rheological profiles (25). Published preclinical data suggest that PEGDE-HA may integrate with host tissue with a reduced inflammatory response (23, 24, 31), CaHA microparticles have been reported to stimulate collagen synthesis in histologic studies (20–22). Kubik and Gruszczyński (2024) described early collagen remodeling and attenuated inflammation following combined PEGDE-HA and CaHA injection (32, 33). Published histologic studies thus provide a plausible biological rationale for the material combination used in this protocol. However, the present case did not include histologic, ultrasonographic, or other objective tissue evaluation, and whether these processes contributed to the observed clinical outcome is unknown.

Facial expressiveness was preserved on dynamic photography at 30 days. Excessive or poorly distributed filler has been linked to compromised dynamics, particularly in the mid- and lower face (30). In this case, the combination of small bolus volumes at deep anchor points with low-volume linear threads in the subcutaneous plane may have contributed to preserved movement, though this observation is subjective and unblinded. Future evaluations of expressiveness outcomes may benefit from instruments specifically designed for this purpose, such as the FACE-Q Appraisal of Lines module or standardized video-based dynamic assessment (34).

No vascular events, nodularity, or pigmentary exacerbation were observed. This is relevant given the patient's Fitzpatrick skin type IV and pre-existing melasma, as data on filler safety in higher phototypes remain limited (35, 36). Post-inflammatory hyperpigmentation is a recognized risk following invasive procedures in Fitzpatrick types IV–VI, and the use of atraumatic cannula-based delivery, where possible, as in the subcutaneous phase of this protocol, may reduce this risk (37). While no adverse events were observed in this patient during the 30-day follow-up period, a single case is insufficient to draw conclusions about the technique's overall safety profile. Longer-term monitoring in a larger number of patients will be necessary.

This report has several important limitations. It describes a single patient with a 30-day follow-up; the findings cannot be generalized, and long-term durability is unknown. Outcome assessment relied on unblinded clinical photography and patient self-report. No validated outcome scales (GAIS, FACE-Q), blinded evaluator scoring, or objective measurement tools (3D imaging, ultrasound) were used. The mechanistic discussion regarding collagen remodeling, tissue integration, and biostimulation draws on published literature and was not directly demonstrated in this patient. Finally, the 30-day timepoint captures only early post-treatment appearance; data after edema resolution and product stabilization (typically 4–12 weeks) would be more informative. Future studies should employ validated outcome measures, blinded assessment, standardized imaging, and longer follow-up in larger patient cohorts.

## CONCLUSION

In this single case with a 30-day follow-up, the BEFly Vector Lift produced contour improvement in the malar, mandibular, and mentonian regions with preserved facial expressiveness and no adverse events. The technique illustrates a structured approach to multilayer, vector-guided filler placement using two PEGDE-cross-linked HA products with different rheological properties. These preliminary observations require confirmation through controlled studies with objective outcome measures, longer follow-up, and multiple patients before conclusions about reproducibility, durability, or comparative effectiveness can be drawn.

*Author Contributions*

Conceptualization, V.R. and R.G.; Methodology, V.R. and I.B.; Formal Analysis, V.R. and I.B.; Data Curation, V.R.; Writing and Original Draft, V.R.; Writing, Review and Editing, I.B. and R.G.; Supervision, V.R.

*Availability of Data and Materials*

All data generated or analyzed during this study are included in this published article.

*Financial Support and Sponsorship*

This study received no external funding. No financial support was provided by any manufacturer or commercial entity for the execution of this work.

*Conflicts of Interest*

V.R. is a speaker for Neauvia (Matex Lab Switzerland SA). R.G. is a scientific collaborator with Matex Lab Switzerland SA. I.B. declares no conflicts of interest. The products used in this case were purchased through standard commercial channels.

*Ethical Approval and Consent to Participate*

The study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from the patient for the procedure and for publication of clinical photographs.

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