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Safe Facial Rejuvenation with PEGylated Fillers in a Complex Oncology Case

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Abstract

Cancer survivors are experiencing improved overall survival due to earlier diagnosis and advances in targeted therapies, transplantation, and immunotherapies. However, survival often comes with a heavy burden of physical and emotional scars that profoundly affect quality of life. Aesthetic medicine is increasingly recognized as an important adjunct in survivorship care, particularly using dermal fillers to restore volume, correct tissue loss, and improve self-image. In this case report, we describe the treatment of a 48-year-old patient with a history of Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ ALL) managed with allogeneic bone marrow transplantation, complicated by epileptic seizures with subdural hematoma.

The patient presented with facial volume, which negatively affected their self-esteem. We applied PEGylated and hybrid hyaluronic acid (HA)-based fillers, which demonstrated excellent integration, safety, and favorable aesthetic outcomes without complications. This case highlights the potential of PEGylated HA fillers as safe and effective tools for cancer survivors, even in immunocompromised or fragile patients, provided appropriate precautions and multidisciplinary oversight are maintained.

Keywords:Aesthetic medicine; Dermal fillers; PEGylated hyaluronic acid; Leukemia survivors; Cancer patients; Regenerative medicine; Hybrid injection techniques

Abbreviations: ALL: Acute Lymphoblastic Leukemia; Ph+ ALL: Philadelphia Chromosome-Positive Acute Lymphoblastic Leukemia; HSCT: Hematopoietic Stem Cell Transplantation; HA: Hyaluronic Acid; PEG: Polyethylene Glycol; PEGDE: Polyethylene Glycol Diglycidyl Ether; PEGDE-HA: Polyethylene Glycol Diglycidyl Ether–Crosslinked Hyaluronic Acid; Caha: Calcium Hydroxyapatite; DAO: Depressor Anguli Oris; ASCO: American Society Of Clinical Oncology; ESMO: European Society for Medical Oncology

Introduction

Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ ALL) is a recently recognized high-risk subtype of B-cell ALL, associated with poorer outcomes compared to other subtypes [1]. Advances in targeted therapies, hematopoietic stem cell transplantation (HSCT), and supportive care have significantly improved survival; however, long-term sequelae remain a major challenge for survivors [2]. These include complications from intensive treatments, immune dysfunction, therapy-induced toxicities, and profound psychological distress [3]. For many patients, the visible consequences of illness-such as facial lipoatrophy, volume loss, scarring, and premature signs of aging-serve as constant reminders of their disease, adversely affecting self-image and hindering social reintegration [4]. These concerns are particularly pronounced in individuals whose professional or public roles place a strong emphasis on appearance, where physical changes directly influence identity and self-confidence.

International survivorship guidelines from ASCO and ESMO stress the importance of addressing psychosocial and aesthetic needs as part of holistic care [5,6]. Within this context, aesthetic medicine has emerged as an adjunctive therapy for cancer survivors. Dermal fillers, especially HA-based products, are widely used due to their biocompatibility and reversibility. Recent technological innovations, such as PEGylated cross-linking, have improved the safety profile of HA fillers by reducing inflammatory responses, enhancing tissue integration, and allowing for more predictable clinical outcomes [7]. This case report describes the successful use of PEGylated and hybrid HA fillers in a patient with a complex oncologic and neurological history. Beyond the medical procedure, it emphasizes how aesthetic interventions can significantly influence emotional recovery, identity reconstruction, and overall quality of life in cancer survivors.

Patient Description

The patient is a 48-year-old female who presented to our clinic for evaluation and treatment in aesthetic medicine. Her past medical history is remarkable for a high-risk hematologic malignancy: she was diagnosed with Philadelphia chromosome–positive acute lymphoblastic leukemia (Ph+ ALL) in 2013 and subsequently underwent an unrelated allogeneic bone marrow transplant in 2014. Her post-transplant course has been complex. She developed severe graft-versus-host disease requiring prolonged immunosuppressive therapy, recurrent septic shocks necessitating intensive care, and nutritional complications including periods of parenteral nutrition due to severe gastrointestinal involvement. Neurologically, she experienced an epileptic seizure complicated by a subdural hematoma and subarachnoid hemorrhage following a fall in 2014; she remains on chronic levetiracetam therapy for focal epilepsy.

Additional comorbidities include chronic kidney disease, Factor V Leiden mutation, premature menopause with osteoporosis, and ocular surface disease. She remains on maintenance immunosuppression with tacrolimus. At present, she is clinically stable, with preserved daily activity and good functional status. Despite her medical history, she previously received botulinum toxin and dermal filler treatments two years prior, with no adverse reactions or delayed-onset complications. She presented facial lipoatrophy and volume loss, particularly affecting the midface and preauricular regions, consistent with sequelae of intensive therapy and prolonged immunosuppression. Prior to the initial session, patients provided written informed consent, including permission for the use of photographic images for analysis.

Materials and Methods

Treatment focused on volume restoration and tissue support using PEGylated hyaluronic acid (HA) fillers, chosen for their high biocompatibility, immunomodulatory properties, and low risk of immune-mediated adverse effects, particularly relevant in immunocompromised patients with autoimmune conditions.

Products Used:

Neauvia Intense LV

A cross-linked hyaluronic acid (PEGDE-HA) filler (26 mg/mL) combined with glycine and L-proline (Neauvia Intense LV, Matex Lab, Switzerland).

- Total volume: 1 mL (0.5 mL per side)
- Injection technique: Hybrid, multilayer approach targeting the midface. Injections were performed in the lateral fat compartments using a retrotracing technique (0.05 mL per vector, 3 vectors in total; subcutaneous), and in the medial midface (3 vectors of 0.05 mL each; deep fat).
- Bolus injections: 0.1 mL (2 points per side) in the prezygomatic space.

Neauvia Stimulate

A cross-linked PEGDE-HA filler (26 mg/mL) containing 1% CaHA, glycine, and L-proline (Neauvia Stimulate, Matex Lab, Switzerland).

Total Volume: 1 mL (0.5 mL per side)

- Injection sites:
- **Preauricular Area:** 4 lines of subdermal retrotracing (0.025 mL each; total 0.1 mL)
- **Jawline:** 4 retrotracing vectors (0.025 mL each; total 0.1 mL)
- **Zygomatic Region:** 4 lines of subdermal retrotracing (0.025 mL each; total 0.1 mL)
- Midface fat compartments and nasolabial fold: corrected using fanning technique (4 vectors; total 0.1 mL)

Pre-mandibular and marionette lines, extending toward the DAO to provide support and improve lower face contour (4 lines of 0.025 mL each; total 0.1 mL)

- **Technique:** Subdermal retrotracing, 0.01–0.025 mL per line (20 lines in total per side; 0.5 mL per side).

All injections were performed under strict aseptic conditions, with careful attention to anatomical landmarks, tissue planes, and previous treatment areas [8]. The procedures aimed to restore facial volume, improve tissue hydration, and enhance structural support while minimizing the risk of immunological or inflammatory complications.

Results

Quantitative 3D analysis revealed several measurable yet subtle changes in facial angular parameters following treatment. The facial convexity angle increased slightly, from 157° to 158.14° (Figure 1). This change of approximately 1.1° reflects a minor improvement in the alignment of the midface and lower face, suggesting a subtle enhancement of overall facial profile harmony. The mentolabial angle decreased from 142.34° to 137.95°, reflecting a more acute mentolabial fold configuration (Figure 2). This adjustment is often associated with improved chin–lip harmony and a more youthful appearance in the lower third of the face. Quantitative 3D analysis showed also a slight increase in the nasal tip angle, from 144.34° at baseline to 145.40° post-treatment (Figure 2).

This modest change reflects a subtle elevation and refinement of the nasal tip, contributing to improved nasal contour and overall facial harmony. Further, the mandibular angle widened from 147.81° pre-treatment to 153.97° post-treatment, indicating a modest but perceptible improvement in jawline definition (Figure 3). In parallel, the full facial convexity angle increased slightly from 124.39° to 125.12°, consistent with a subtle straightening of the global facial profile (Figure 3). Taking together, these modifications suggest a trend toward enhanced contour refinement and greater harmony of facial proportions.

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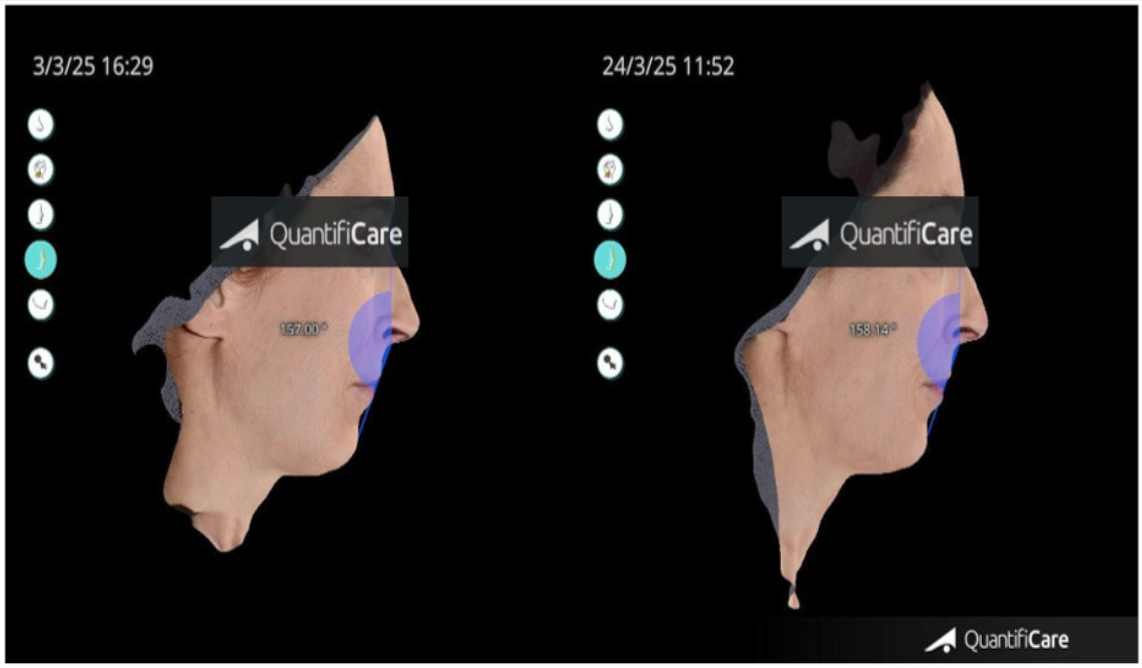

Figure 1: Assessment of the facial convexity angle (Glabella–Subnasale–Pogonion) measured with the QuantifiCare 3D analysis system before and after treatment. At baseline, the facial convexity angle measured 157°, while after treatment it increased to 158.14°. This change corresponds to a subtle straightening of the facial profile.

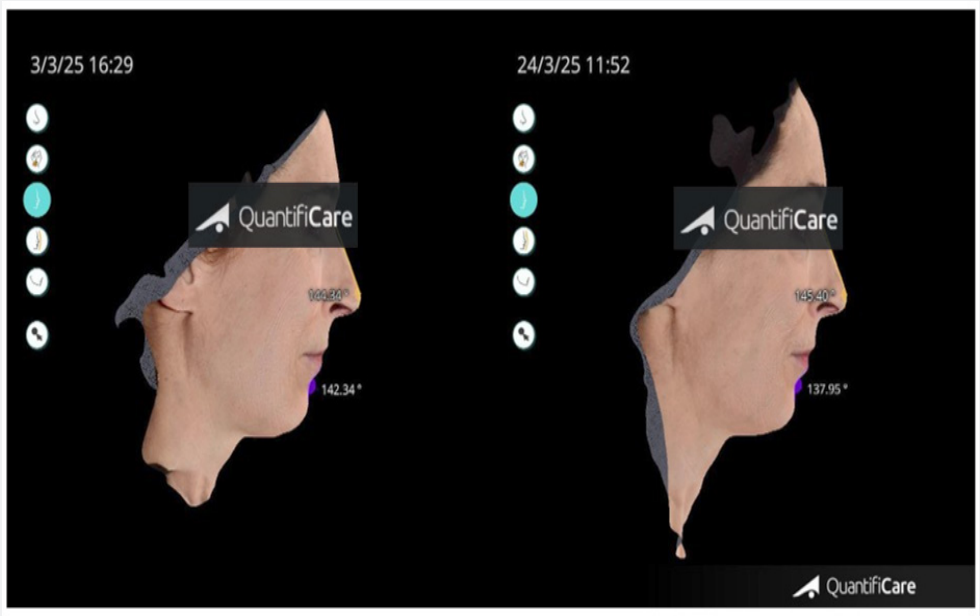

Figure 2: Assessment of the mentolabial angle (formed between the lower lip and the soft tissue chin) and nasal tip angle using the QuantifiCare 3D analysis system before and after treatment. At baseline, the mentolabial angle measured 142.34°, while after treatment it decreased to 137.95°. This represents a reduction of approximately 4.4°. The nasal tip angle increased slightly from 144.34° at baseline to 145.40° post-treatment.

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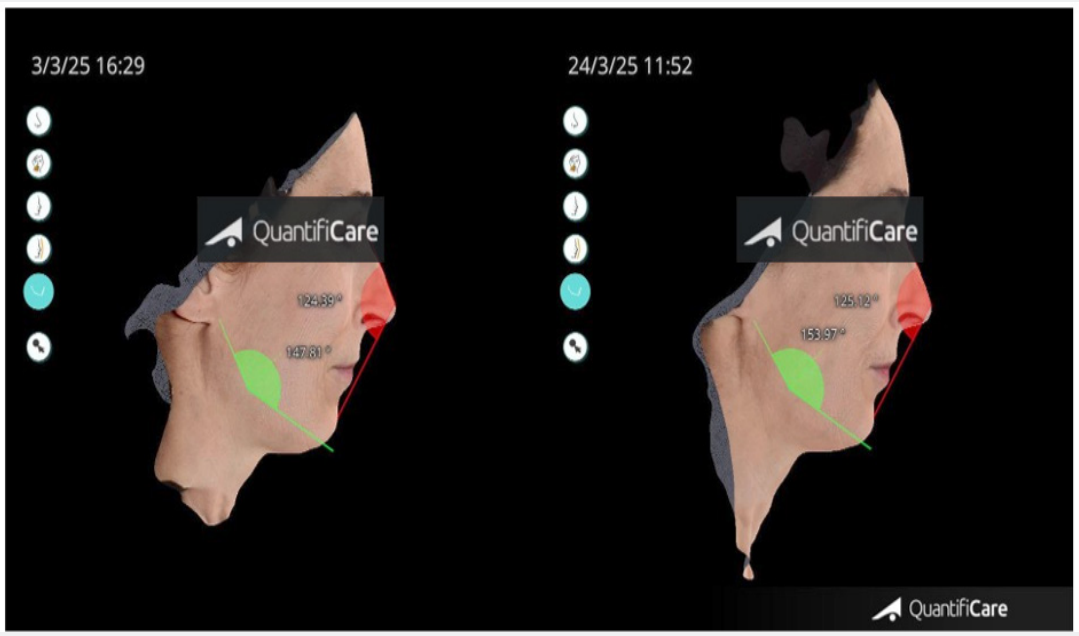

Figure 3: QuantifiCare 3D analysis of the mandibular angle and the full facial convexity angle before and after treatment. The mandibular angle increased from 147.81° at baseline to 153.97° post-treatment, representing a widening of approximately 6.2° and indicating an improvement in the definition of the lower face and jawline. The full facial convexity angle showed a minor increase from 124.39° to 125.12°, corresponding to a subtle straightening of the overall facial profile.

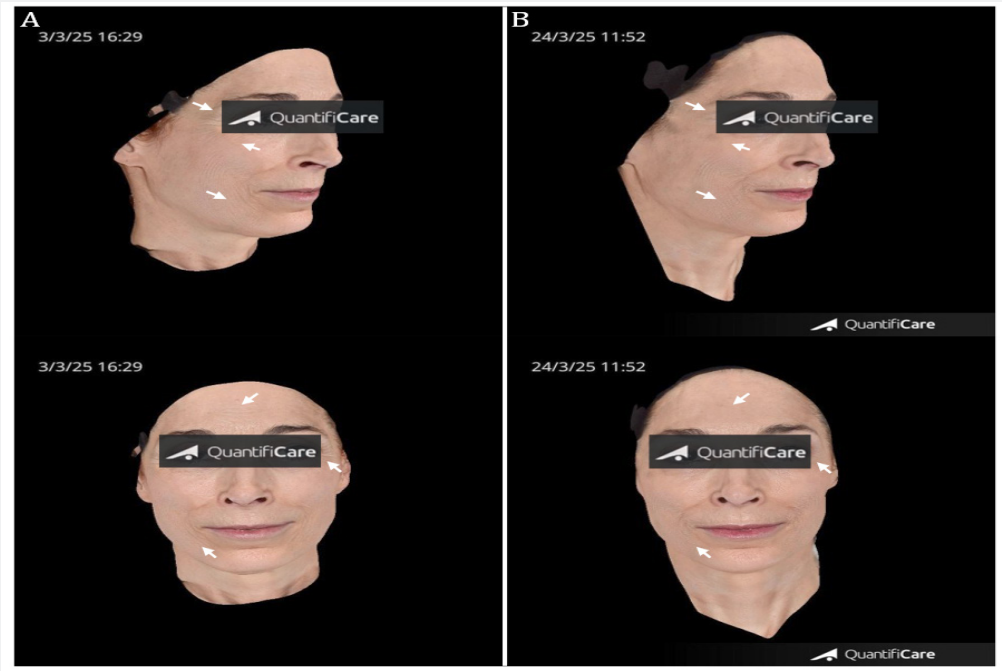

Figure 4: Skin quality improvement before and after treatment. Patient before (A) and after (B) treatment. White arrows indicate reduced wrinkles in the forehead, tear troughs, marionette lines, and crow's feet, reflecting improved skin elasticity and overall rejuvenation.

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In addition to angular changes, a general improvement in skin quality was observed. Elasticity of the skin improved, and there was a visible reduction in dynamic and static wrinkles, most notably in the forehead lines, tear troughs, marionette lines, and crow's feet (Figure 4). These findings complement the angular measurements, highlighting both structural and surface-level rejuvenation effects achieved with treatment. The patient did not experience any serious adverse effects. All treatments were well tolerated, and no complications or delayed-onset reactions were observed.

Discussion

The management of cancer survivors increasingly emphasizes quality of life and long-term safety alongside disease remission [6]. Our patient history illustrates the complexity of survivorship in high-risk hematological malignancies. Following a diagnosis of Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ ALL), the patient underwent an unrelated allogeneic hematopoietic stem cell transplant (HSCT), a procedure associated with a high risk of complications yet often considered the best curative option for high-risk adult patients [9,10]. Her clinical course included multiple episodes of septic shock and an epileptic crisis with subdural hematoma, highlighting the significant medical challenges.

Post-treatment, the patient presented with facial volume loss and lipoatrophy, changes often seen after intensive therapy and prolonged immunosuppression [4,11]. These aesthetic sequelae, while not life-threatening, can affect patient satisfaction, self-perception, and social interactions. Addressing them is consistent with current survivorship guidelines emphasizing comprehensive care [4-6,12]. Dermal fillers represent an important tool to address these concerns; however, their application in oncology patients requires careful consideration [13-15]. All injectable materials demand strict asepsis, especially in patients with immune suppression, persistent skin complications, or ongoing therapies [13].

While autologous fat remains the gold standard due to its inherent biocompatibility, hyaluronic acid (HA)-based fillers have been demonstrated to be safe in certain populations, including cancer patients, as supported by Phase 4 studies in women with breast cancer where no adverse events were observed [4,16]. PEGylated HA fillers offer distinct advantages over conventional HA fillers. The cross-linking of HA with polyethylene glycol (PEG) creates a three-dimensional scaffold, promoting uniform integration into connective tissue without segregation or encapsulation. This structure allows high hydration of the extracellular matrix, enhances nutrient diffusion, and supports tissue homeostasis [17,18]. Importantly, PEGylated HA has a very low risk of immune-mediated adverse effects, which is particularly relevant in patients with autoimmune conditions such as hyperthyroidism [7,19].

Histological and in vitro studies, along with retrospective clinical data, have confirmed the safety and biocompatibility of PEGylated HA in patients with autoimmune thyroid disease [20]. In our patients, the use of PEGylated HA fillers was associated with excellent tolerability and no adverse events. Beyond measurable clinical safety, the emotional impact was remarkable. Quantitative 3D analysis after PEGylated HA filler treatment showed subtle yet measurable improvements in facial harmony. Mentolabial, mandibular, and full facial angles indicate enhanced profile balance and jawline definition.

Skin elasticity improved, and dynamic and static wrinkles, particularly in the forehead, tear troughs, marionette lines, and crow's feet, were reduced. Overall, the treatment restored volume and refined both facial proportions and surface-level aesthetics. The patient reported feeling "like herself again," noting that the treatment helped her move beyond the constant reminder of illness etched into her facial features. This underscores a broader concept: aesthetic medicine is not superficial in oncology; it can be profoundly therapeutic by restoring dignity, reducing stigma, and enhancing resilience [2,4,11].

Nevertheless, clinicians must remain cautious. Patients with active disease, ongoing immunosuppression, or concurrent immunotherapies (e.g., checkpoint inhibitors) may have higher risks of granulomatous or inflammatory reactions [15,21]. Multidisciplinary collaboration with oncologists remains essential, both to ensure safety and to avoid interference with ongoing therapies. In addition, awareness of potential radiological misinterpretations of fillers (e.g., calcium hydroxyapatite (CHA) mimicking malignant lesions) is crucial in follow-up imaging [4,22]. Overall, this case underscores the value of PEGylated and hybrid HA fillers as safe and effective tools to improve both aesthetic and psychological outcomes in cancer survivors with complex medical histories.

When applied within a multidisciplinary framework and under oncological supervision, such treatments can address physical and emotional sequelae, supporting long-term survivorship. Given their biocompatibility and favorable safety profile, PEGylated fillers may be a preferred option for fragile, immunocompromised, or autoimmune-prone individuals. Further clinical studies are needed to establish standardized guidelines and confirm long-term safety; however, this report supports the integration of aesthetic interventions into survivorship care as a meaningful strategy to improve holistic patient outcomes.

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