L7 BULLETIN

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No. 9

CLINICAL

The Role of Layering and Rheology in Lower Face Augmentation

ACADEMIC

Unit 4, Question 1.1

JOURNAL CLUB

“The Basics of Filler Rheology”

EVENTS

Upcoming Events from Level 7

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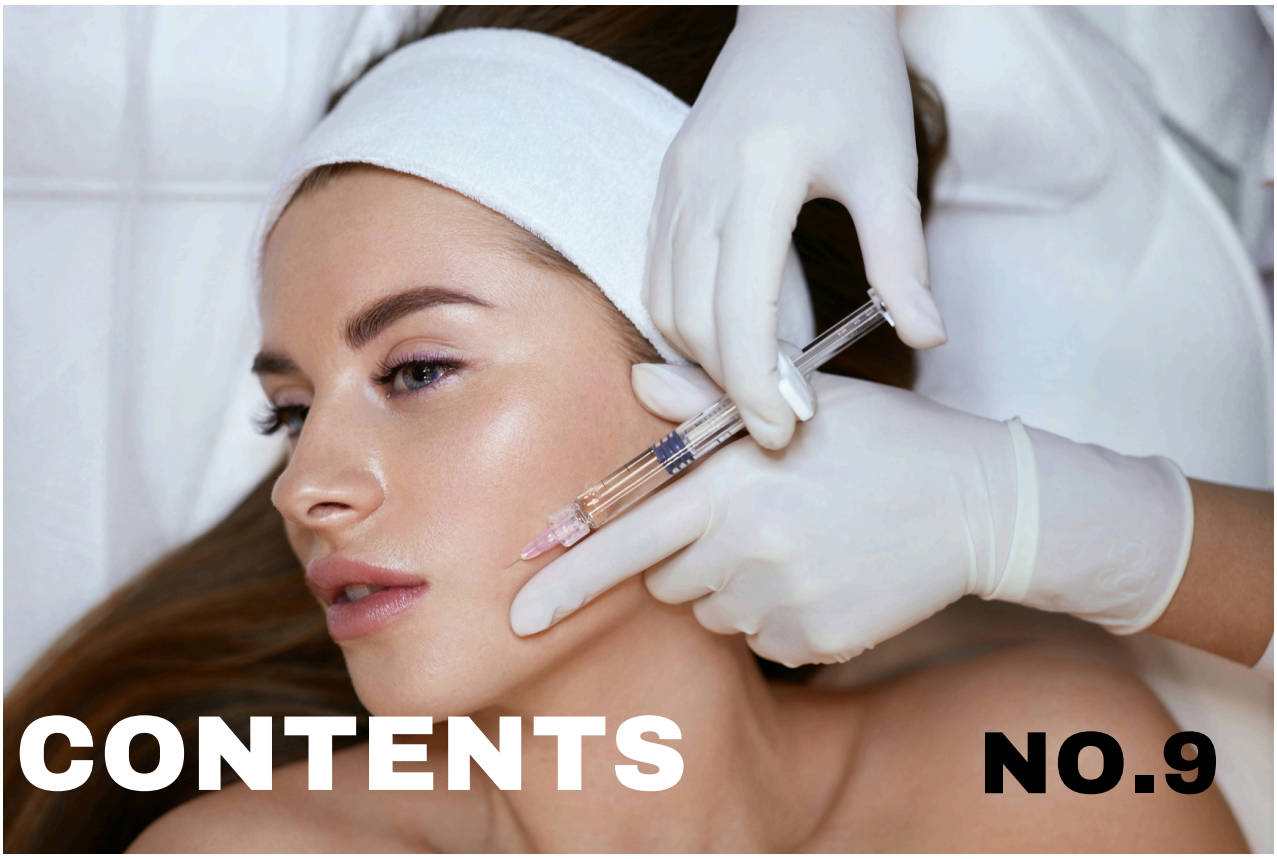

CONTENTS NO.9

CLINICAL

THE ROLE OF LAYERING AND RHEOLOGY IN LOWER FACE AUGMENTATION

Overview

When addressing the lower face, achieving balance, symmetry, and a natural contour requires a deep understanding of both the layering technique and the rheological properties of dermal fillers. The lower face, including the jawline, chin, and perioral region, presents unique challenges that demand precise product selection and injection strategy. Let's explore how different rheologies influence the layering technique in this area to create optimal outcomes.

Understanding Rheology in Dermal Fillers.

Rheology is the study of the flow and deformation of matter, which refers to how the product behaves under various conditions in the context of dermal fillers. Fundamental rheological properties include:

- **Viscosity**: This refers to the thickness of the filler and its resistance to flow. A higher-viscosity filler is thicker and holds its shape better, making it suitable for deeper injections where structural support is needed.
- **Elasticity (G'):** Elasticity measures the filler's ability to return to its original shape after deforming. Fillers with higher elasticity provide better lift and support, making them ideal for areas that require contouring.
- **Cohesivity:** This describes how well the filler particles stick together, which affects the product's ability to stay in place once injected. Higher cohesivity is beneficial in areas where the filler needs to resist spreading out over time.

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Layering Technique in the Lower Face

The lower face requires a strategic approach to layering due to its complex anatomy and the functional importance of maintaining natural movement while achieving aesthetic goals.

Layer	Filler Selection	Rheology	Impact
Deep-Structural Support	A high-viscosity, high-elasticity filler is typically used for deep injections in the lower face. These fillers are placed at the supraperosteal layer eg chin, or along the mandible	High G' High Cohesively High Viscosity	This layer is critical for creating a strong, well-defined jawline and chin, which are essential for a youthful and balanced lower face. The filler's ability to resist deformation ensures that the contours remain sharp and well-defined.
Mid-Layer – Contour and Volume Enhancement	For the mid-layer, a filler with moderate viscosity and elasticity is ideal. This filler is injected into areas like the pre-jowl sulcus, the mental crease, and the superficial layers of the marionette lines.	Moderate G' Moderate Cohesively Moderate Viscosity	The mid-layer filler enhances volume where needed and smooths transitions between the deep foundational layer and the surface. This creates a natural contour and helps to soften deeper lines without adding excess bulk.
Superficial Layer – Surface Refinement:	A low-viscosity, low-elasticity filler is appropriate for the superficial layer. This filler is applied more superficially to address fine lines around the mouth (perioral lines) and to refine the jawline's contour	Low G' Moderate Cohesively Low Viscosity	The superficial layer is key for fine-tuning the overall appearance. It allows for the precise correction of superficial imperfections, ensuring that the lower face looks smooth and natural without compromising movement or expression.

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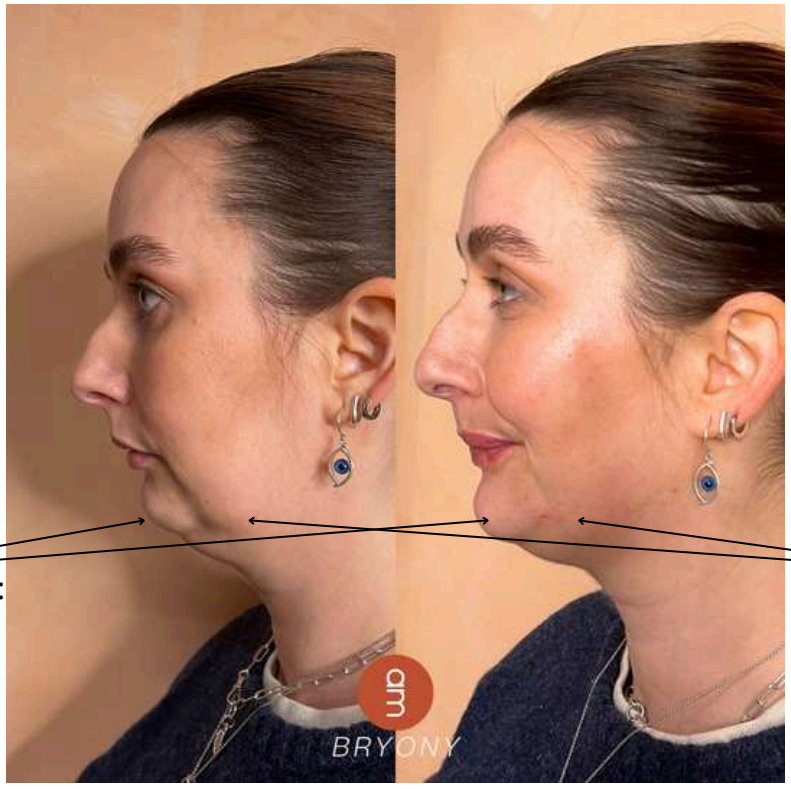
Why Rheology Matters in Lower Face Layering

Each filler's rheological characteristics dictate how it will perform in different layers of the lower face. A high-viscosity, high-elasticity filler used deeply provides essential structural support, which is particularly important for maintaining the shape of the jawline and chin under the dynamic forces of expression and movement. On the other hand, a less cohesive, lower-viscosity filler used superficially ensures a smooth, natural finish without creating lumps or interfering with facial expressions.



Deep Structural Support:
Restylane Lyft

Mid Layer Contour
Restylane Defyne

Conclusion

The lower face is an area where the balance between structural support and subtle surface refinement is crucial. Using the wrong filler in the wrong layer can lead to unnatural results, such as an overly stiff appearance or an unbalanced profile. Mastery of rheology allows clinicians to layer products effectively, achieving both strength and softness where they are needed most.

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SAQ Guide

Unit 4, Question 1.1

Evaluate the safety and effectiveness of pharmacology and rheology of currently available biologics and dermal fillers

Consider the following when answering this question:

- Product history
- Product biochemistry and pharmacology of both biologics and filler
- Storage and shelf life
- Toxicity
- The basics of dermal filler rheology
- Discuss permanent vs temporary fillers

Unit 4, Question 1.2

Discuss the mechanisms of action of currently available commercial biologics and dermal fillers.

Your answer should consider the following:

- Mechanisms of action of permanent, semi-permanent, temporary fillers.
- Neuromuscular junctions, binding sites/receptions etc for toxins.
- Use evidence based medicine.

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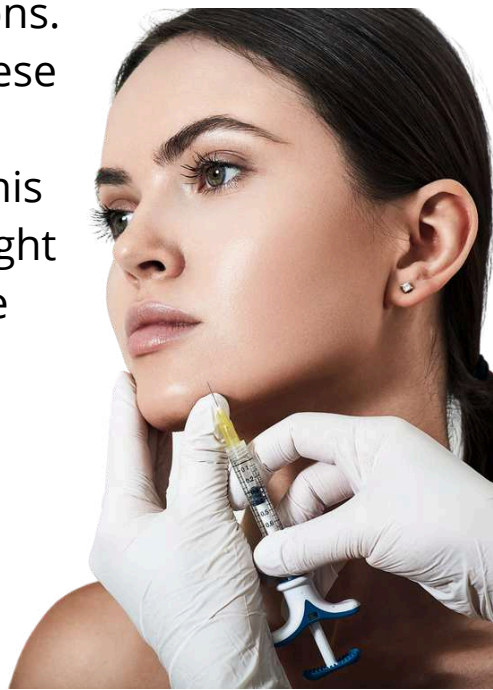
ORIGINAL ARTICLES

Basics of Dermal Filler Rheology

Sébastien Pierre, PhD,* Steven Liew, MD,† and Aude Bernardin, PhD*

Overview

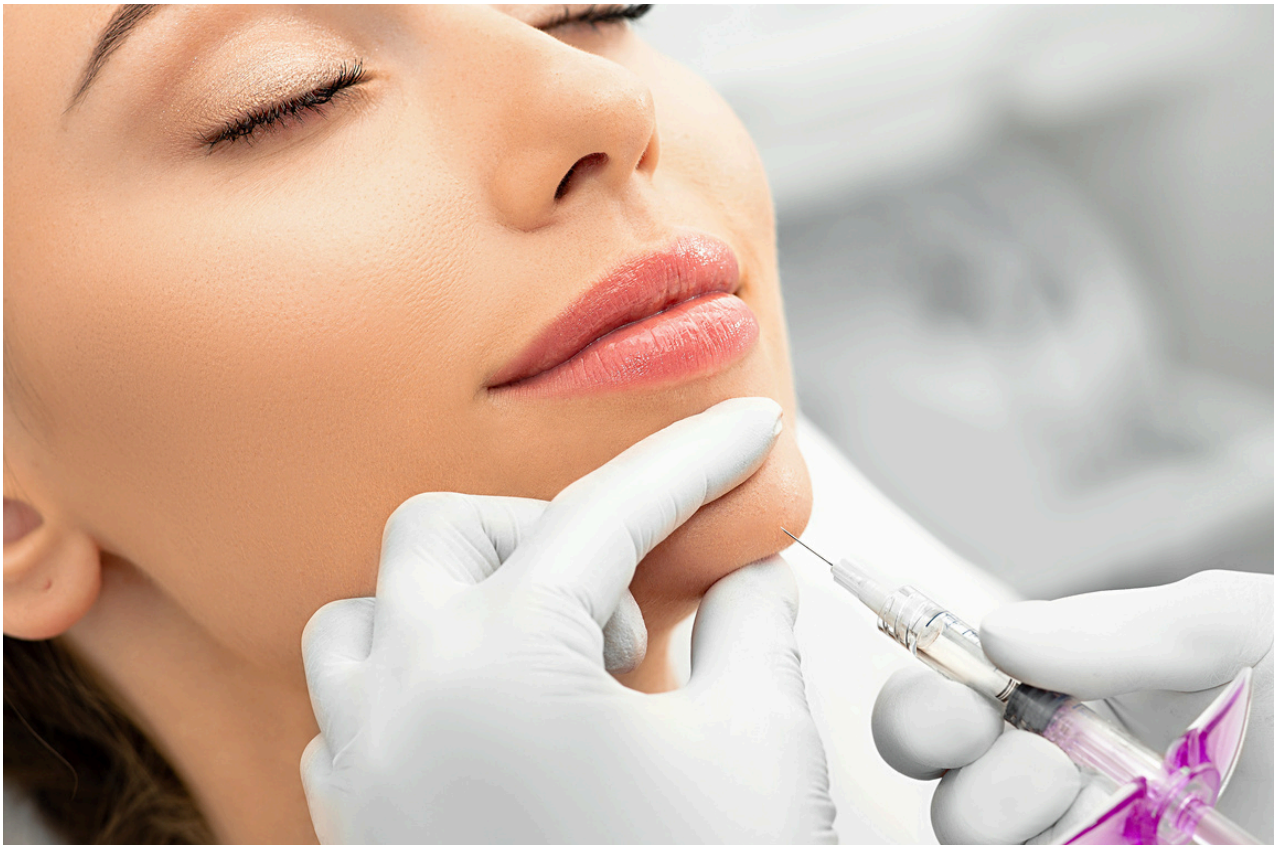
The paper "Basics of Dermal Filler Rheology" by Pierre, Liew, and Bernardin provides an in-depth analysis of how rheological properties influence the performance of hyaluronic acid (HA) dermal fillers, which are extensively used to address facial volume deficits and enhance aesthetics. The study highlights the importance of gel viscoelasticity and cohesivity in determining the filler's resistance to deformation and its integration into facial tissues under mechanical stresses such as shear deformation and compression. The paper outlines the critical parameters, including the complex modulus (G*), elastic modulus (G'), viscous modulus (G''), and cohesivity, explaining their impact on filler selection for various facial regions. It underscores that an appropriate match of these properties to the facial area treated ensures natural-looking, durable aesthetic outcomes. This understanding aids clinicians in choosing the right HA filler to achieve desired effects based on the specific mechanical demands of different facial zones.



Mechanical Stresses and Deformations:

The section describes the types of mechanical stresses that fillers undergo in the facial environment. These include:

- **Shear Deformation:** This occurs when force is applied along the surface of the filler material, causing it to change shape without altering its dimensions. This is particularly relevant during facial movements where lateral shearing forces act on the filler.
- **Compression/Stretching Forces:** These forces are applied perpendicularly to the filler, leading to changes in the filler's dimensions while retaining its shape. This type of deformation is common when external pressures, such as lying on a pillow or skin tension, compress the filler.



Rheological Properties:
There are three primary rheological properties that determine filler performance under mechanical stresses:

1. **Viscoelasticity**: Viscoelasticity is the property of a material that exhibits both viscous and elastic behavior. For HA fillers, this means they can flow under high shear stress (like during injection) and recover their shape when the stress is removed (once implanted in tissue).
    - Parameters:
        - **G (Complex Modulus):*** Represents the overall viscoelastic properties or hardness of the filler, measuring the total energy required to deform the material.
        - **G' (Elastic Modulus):** Reflects the filler's ability to store energy and recover its shape after deformation.
        - **G'' (Viscous Modulus):** Indicates the energy lost due to internal friction during deformation.
        - **Tan δ:** The ratio of viscous to elastic components (G''/G'), determining whether the material behaves more like a viscous liquid or an elastic solid.

2. Cohesivity: Cohesivity refers to the internal adhesion forces holding the HA gel together, which affects how well the filler maintains its shape under compression.

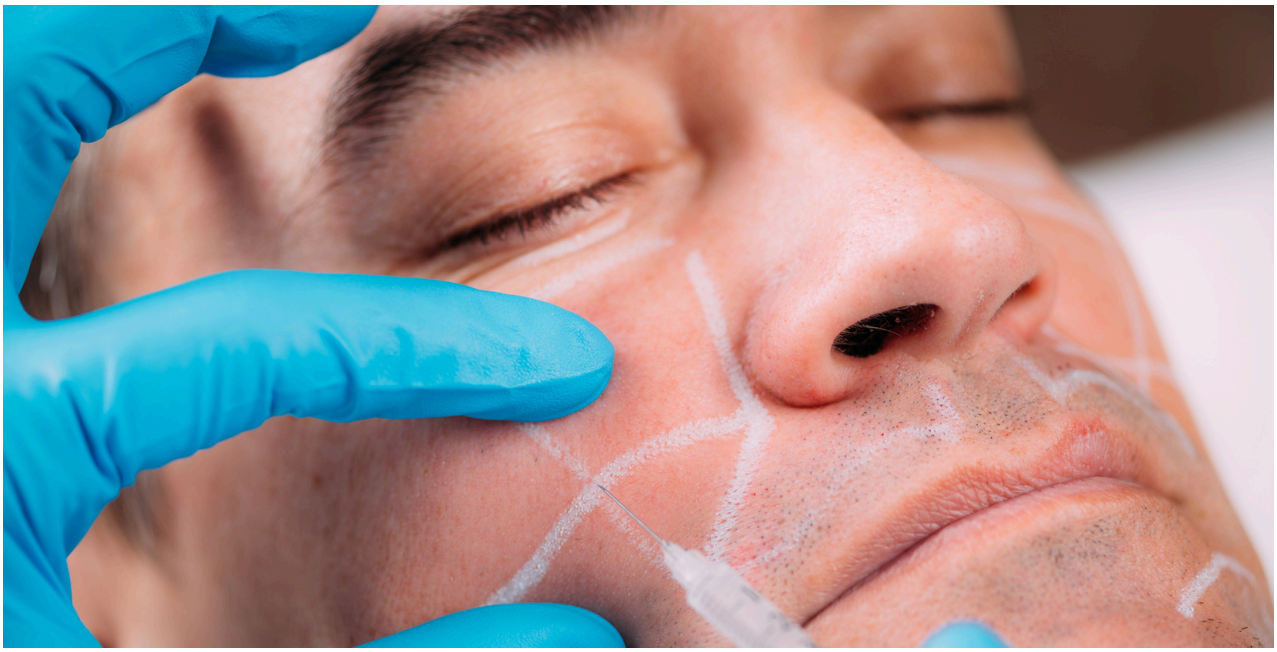
- Measurement: Cohesivity is assessed by resistance to vertical compression/stretching forces, which simulate real-world pressures on the filler after implantation.
- Implications: High cohesivity helps fillers resist compression and maintain their shape and projection, while low cohesivity fillers may spread more easily under pressure.

3. **Viscosity and Extrusion Force:** Viscosity measures the filler's resistance to flow under shear stress. During injection, higher viscosity requires greater force to extrude the filler through a needle.

- Clinical Relevance: Lower viscosity is desirable for ease of injection, reducing physician fatigue and tissue trauma at the injection site. However, once implanted, the filler's viscosity is less relevant as it behaves more elastically.

Application to Facial Areas:

When applying these rheological properties to different facial regions, fillers with specific viscoelastic and cohesive characteristics are better suited for particular areas:



- Midface Volumisation: Requires fillers with high elastic modulus and moderate to high cohesivity for maintaining shape and resisting shear and compression forces.
- Fine Lines and Superficial Corrections: Needs softer fillers with low to medium G* and G', and lower cohesivity for easy molding and minimal projection.
- Lower Face Fillers: Should have moderate G' and low to medium cohesivity to integrate well with facial movements.
- Nose and Chin: Fillers with high cohesivity and high G' are ideal for maintaining sharp vertical projections over bony structures with tight skin and muscle tension.

Conclusion:

The study concludes that understanding and selecting fillers based on their rheological properties can significantly improve the predictability and customization of facial aesthetic treatments. This approach allows clinicians to achieve more natural-looking, durable results by matching the filler's properties to the specific mechanical demands of different facial areas.

Dr Emmaline Ashely: Academic Lead

EVENT RUNDOWN

UPCOMING COURSES

Don't miss our exciting lineup of courses this summer! Enhance your skills and stay ahead in the field with our specialised training sessions. Here's what's coming up:

- Sunday 22nd September 2024 - PRP - London
- Saturday 28th September 2024 - Foundation - London
- Saturday 28th September 2024 - Foundation - Newcastle
- Saturday 28th September 2024 - Mentoring - London - **1 space left!**
- Sunday 29th September 2024 - Advanced - London
- Sunday 29th September 2024 - Advanced - Newcastle
- Saturday 5th October - Foundation - Glasgow
- Sunday 6th October - Advanced - Glasgow
- Saturday 12th October 2024 - Foundation - Manchester
- Sunday 13th October 2024 - Advanced - Manchester

PARTICIPATION IN ACQUISITION AESTHETICS RESEARCH & DEVELOPMENT

Please help us by filling out a short survey about your experience on the diploma. This should take no more than 3-5 minutes.

Answers are confidential and will be anonymised.

Participants will be entered into a draw for a chance to win a £100 Amazon voucher.

How to Participate

Access the Questionnaire: Link - https://forms.gle/GpCr8NqtWrTtbPwo6 click the link to access the online survey.

Thank you for your participation and for contributing to the future of aesthetic medicine. We look forward to your valuable insights!