

FDA-APPROVED HYALURONIC ACID (HA) FILLERS COMPARISON (by M. Lum, D.O., Lumier Medical, Inc., Revised 4-27-2023)

Product**	HA [] mg/ml	Proprietary Stabilization	Boxed Needle	Injection Depth	Characteristics, Molecular Weight (LMW vs HMW) ¹	Worth Mentioning	Lips? (FDA)	Dynamic Strength Score (Pa ²) ¹⁴	Stretch Score ¹⁴	G' ¹⁴ (Pa)	(%) Degree of Modification (MoD)*
Restylane-L	20	NASHA Biphasic, BDDE	29G	Mid-to-deep dermis	Uniform Particle Size HMW HA.	Medium-sized Particle 350-450 μm	YES	32700	15.4	792	1.1%
Restylane LYFT	20	NASHA Biphasic, BDDE	29G	Subcutaneous and/or supraperiosteal	Uniform Particle Size HMW HA. [Robust]	Large-sized Particle 750-1000 μm. NLF, midface, hands		35000	8.5	807	1.2%
Restylane SILK	20	NASHA Biphasic, BDDE	30G	Mid-to-deep dermis	Uniform Particle Size HMW HA. (lots of swelling)	Small sized Particle 50-200 μm	YES				1%
Restylane REFYNE	20	xPresHAn	30G	Mid-to-deep dermis	Very elastic HMW HA.	Among xPresHAn, most flexible and least supportive		4140	186.7	73.5	5.7%
Restylane KYSSE	20	xPresHAn	30G	Lip mucosa	Very elastic, more supportive than Refyne HMW HA.	FDA approved for lips only	YES				
Restylane DEFYNE	20	xPresHAn	27G	Mid-to-deep dermis	Less elastic, but more supportive than Kysse HMW HA.			40800	25.9	220.7	8.4%
Restylane CONTOUR	20	xPresHAn	27G	Subcutaneous and/or supraperiosteal	Very Supportive HMW HA. [Robust]	For midface			72		
Juvederm ULTRA XC	24	Hylacross Monophasic Monodensified BDDE	30G	Mid-to-deep dermis	HMW HA.	Slightly thinner and less hydrophilic than Ultra Plus	YES	11100	134.4	102.1	5.9%
Juvederm ULTRA PLUS XC	24	Hylacross Monophasic Monodensified BDDE	27G	Mid-to-deep dermis	HMW HA.	Slightly thicker and more hydrophilic than Ultra		24300	91.8	136.6	6.9%
Juvederm VOLBELLA XC	15	Vycross Monophasic Monodensified BDDE	32G	Lip mucosa	Mostly LMH HA.	Among Vycross, least supportive	YES	8780	43.1	219.5	5.3%
Juvederm VOLURE XC	17.5	Vycross Monophasic Monodensified BDDE	30G	Mid-to-deep dermis	Mostly LMW HA.	Among Vycross, Medium to low support		18300	33.4	274.6	5.6%

Juvederm VOLUMA XC	20	Vycross Monophasic Monodensified BDDE	27G	Deep subcutaneous and/or supraperiosteal	Mostly LMW. [Robust]	Among Vycross, Very Supportive For midface and chin		33400	20.1	305.4	5.9%
Juvederm VOLUX XC	25	Vycross Monophasic Monodensified BDDE	27G	Subcutaneous and/or supraperiosteal	Mostly LMW. [Very Robust]	Among Vycross, Most lifting For jawline				665 ²¹	
Belotero BALANCE+	22.5	CPM Monophasic Polydensified BDDE	30G	Mid-to-deep dermis	HMW HA. Integrates into skin easily. Very low Dynamic Strength Score (Pa ²). Most "squishable." ²²	Very forgiving for superficial creases. Does not last long.				128 ²¹	
Revanese VERSA+	25	Thixofix Monophasic BDDE	27G	Mid-to-deep dermis	Spherical Particles, less hydrophilic HMW HA.						
Revanesse LIPS+	25	Thixofix Monophasic BDDE	30G	Lip mucosa	Spherical Particles, less hydrophilic. HMW HA.	Same product as Versa. Different packaging, smaller needle.	YES				
RHA REDENSITY (Teoxane)	15	Preserved Network Low degree of BDDE	30G	Superficial-to-mid dermis	HMW HA.	Most stretchable of all the HA products		4390	792	133 ²¹	1.9%
RHA 2 (Teoxane)	23	Preserved Network Low degree of BDDE	30G	Mid-to-deep dermis May use for radial cheek lines.	HMW HA.	RHA stands for Resilient Hyaluronic Acid		22000	227	138.9	3.1%
RHA 3 (Teoxane)	23	Preserved Network Low degree of BDDE	27G	Mid-to-deep dermis	HMW HA.			31900	85.3	145.8	3.6%
RHA 4 (Teoxane)	23	Preserved Network Low degree of BDDE	27G	Deep dermis and/or superficial subcutaneous	HMW HA. [Most Robust of RHA line]			81900	55	263.3	4%

** Restylane products (Galderma), Juvederm Products (Abbvie(Allergan)), Belotero Balance (Merz Aesthetics), Revanese Products (Prolenium Medical Technologies), RHA (Revanse Aesthetics).

RHA PRESERVED NETWORK Technology that uses a lower degree of modification/crosslinking. Designed to preserve long HA chains from fragmentation in the manufacturing process.

LEGEND

Hyaluronic Acid (HA)	A water soluble sugar polymer that belongs to a class of compounds known as glycosaminoglycans. It is made up of long chains of repeating disaccharide units of N-acetylglucosamine and glucuronic acid. ¹⁸
HA Chain Length \propto Molecular Weight	HA chain length is associated with (proportional to) the molecular weight of the HA chain. ¹⁸ Short HA Chains = Low Molecular Weight (LMW), Long HA Chains = High Molecular Weight (HMW).
Monophasic	Cross-links formed between hyaluronic acid chains make a uniform gel-like structure.
Biphasic	Biphasic material consists of 2 or more substances in a blend. In the case of hyaluronic acid, it can exist in two different physical states: cross-linked HA and non-cross-linked HA. Biphasic material is not homogenous (not uniform in character or content).
(%) Degree of Modification (MoD)	Degree of Modification (MoD) is the ratio of chemical crosslinkers that form cross-links to the total number of HA disaccharide units.
Dynamic Strength Score (Pa²)	The Dynamic Strength Score characterizes the ability of a gel to maintain its physical integrity and gel characteristics over a wide range of stress or deformation values ¹⁵
Stretch Score (%/s)	Stretch is the ability of the gel to deform (e.g., extend) and adapt to dynamic facial movement. The Stretch Score describes the ability of an HA gel to deform without disruption when subjected to continuous pressure.
G' (Pa)	Elastic modulus or storage module (G') describes the ability of a gel to rebound to its original shape when a force is applied. High G' usually correlates with a firmer gel. ¹⁶

1 Micheels P et al. J Drug Dermatol. 2016;15(5):600-606.

14 Data on File. RDRE 2016. Newark, CA: Revance Therapeutics, Inc, 2020.

15 Faivre J et al. Poster presented at: 2020 IMCAS; January, 2020; Paris, France.

16 Fagien S et al. Plast Reconstr Surg. 2019;143:707e-720e.

18 Monslow J et al. Front Immunol. 2015;6:231.

21 Rheologic and Physicochemical Characteristics of Hyaluronic Acid Fillers: Overview and Relationship to Product Performance, Facial Plast Surg 2022;38:116–123. It is notable that published G' values differ depending on the study and information source.

22 "Squishable" as an anecdotal observation by Dr. Lum and other injectors when product is injected superficially.