REGENERATIVE AESTHETICS: SKIN AND SCAR THERAPY

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WHY REGENERATIVE AESTHETICS?

Regenerative aesthetics is grounded in the principles of regenerative medicine, which aims to repair, replace, or regenerate damaged tissues or organs.

It leverages the body's innate healing mechanisms, such as stem cells and growth factors, to improve skin quality, elasticity, and appearance.

Two main parts of RA:

- Using special cells: Like stem cells, to help heal and improve skin and looks, mostly without surgery.
- Bio-cues and scaffolds: These are special signals and materials that help the body's cells work better and rebuild skin in a more natural way.

- Goldie, K. (2023). The evolving field of regenerative aesthetics. *Journal of Cosmetic Dermatology*, *22*(S1), 1–7. https://doi.org/10.1111/jocd.15556

OBJECTIVES

Understand Peptide Therapy: Learn about peptide types, mechanisms, and aesthetic applications for skin and hair.

Insights into Ozone Therapy: Understand Ozone Therapy's role, applications in aesthetics, and supporting evidence.

Explore Procaine Benefits: Learn Procaine's history, action, and anti-aging treatment benefits.

Integrate Advanced Modalities: Strategies for incorporating peptide, ozone, and Procaine therapies into practice, including patient management.

Legal and Ethical Considerations: Grasp the legal, ethical, and continuing education importance in advanced aesthetic treatments.

FACTS

2023: Rise of minimally invasive aesthetic treatments.

2024 Trends: Shift towards non-invasive, 'less is more' aesthetic approaches.

Social Media Influence: Platforms like Instagram and celebrity choices promote natural looks, expanding interest among younger demographics.

In 2022, the global dermal filler market size was estimated at around $5.5 billion USD and is expected to have a compound annual growth rate of over 10% in the next decade.

As of 2017, 57% of dermal filler recipients were between the ages of 40 and 59 (Source: Statista).

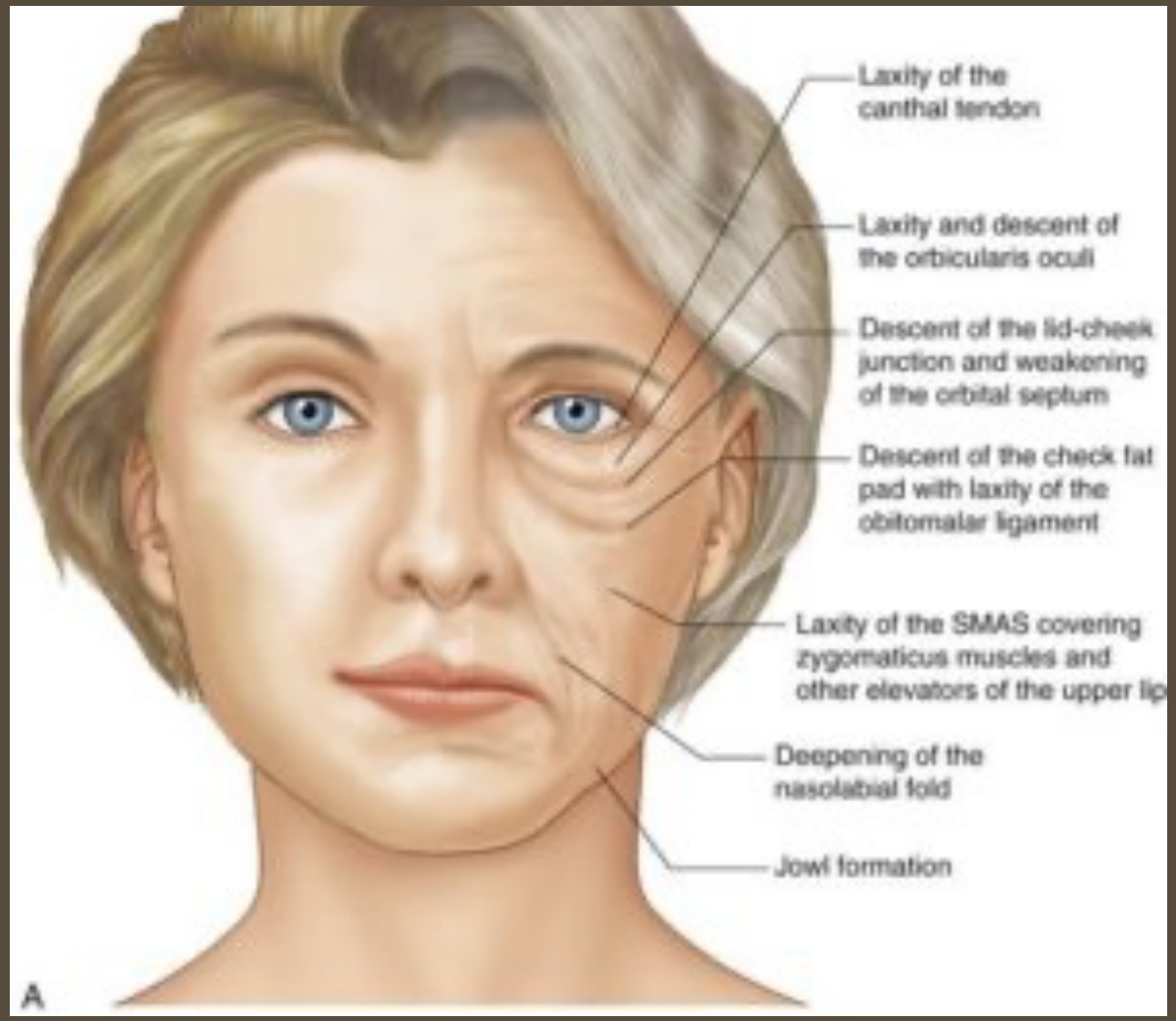
REGENERATIVE TREATMENTS

Regenerative aesthetics include a wide variety of treatments.

Some of the most popular regenerative treatments include:

- RF microneedling
- Traditional microneedling
- Microdermabrasion
- Skin tightening treatments
- Red light therapy
- Protein-rich plasma (PRP) therapy
- Facial and body peels
- Laser skin resurfacing
- Hair restoration treatments
- Exosomes
- **Advanced:**
- Procaine
- Ozone
- Peptide

THE AGING PROGRESSION



- Cheeks sag inferiorly resulting in appearance of jowls
- Corners of mouth move inferiorly resulting in slight frown look
- Tissue around eyes sags inferiorly
- Tissue of forehead drifts inferiorly, creating wrinkles and drooping eyebrows, giving them flatter appearance
- Nose may elongate and move the tip inferiorly
- Nose may develop small to pronounce dorsal hump
- Tip of Nose may enlarge and become bulbous
- Generalized wrinkling of face may occur

BIOSTIMULATORS

- CaHa
- PLLA
- PDO Threads
- Micro needling

WHY BIOSTIMULATORS?

Natural

Nonsurgical

Boost natural collagen production, enhancing skin quality and texture.

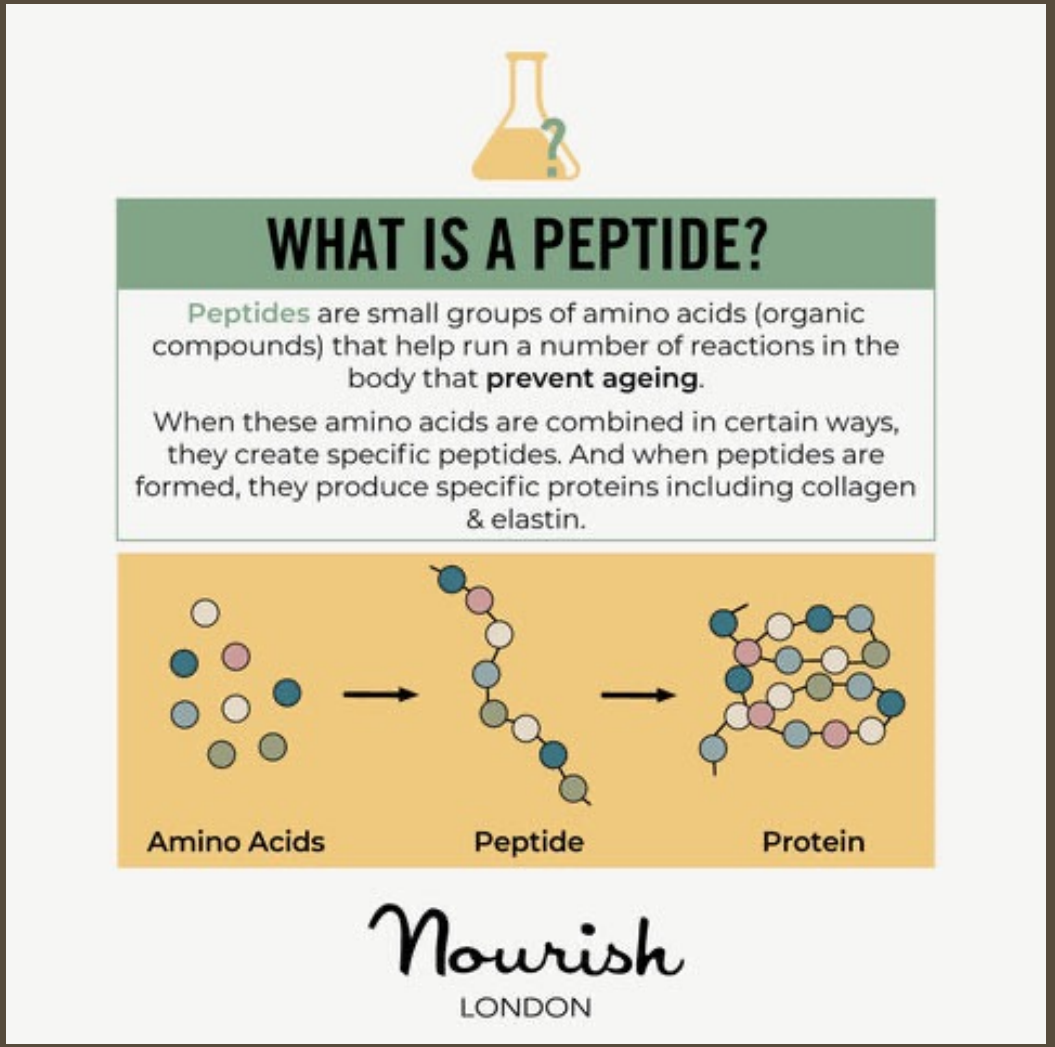
Natural Process: Unlike fillers, they activate the body's own collagen renewal, improving firmness and reducing aging signs.

Safe Composition: Made of biocompatible, biodegradable materials, they support skin's self-repair by promoting new collagen growth

Stats: In 2023, Sculptra sales up 25%; Classic Restylane down 14%

WHAT IS A PEPTIDE?

Peptides are short chains of amino acids, the building blocks of proteins.



FUNCTIONS OF PEPTIDES

- Acting as hormones
- Fighting against effects of aging
- Regeneration
- Regulating appetite, digestion and metabolism
- Reducing inflammation
- Acting as antioxidants to scavenge free radicals

- Delivering messages from tissue to blood
- Providing structure to muscle and bone
- Signaling Molecules
- Antimicrobial
- Critical in many biological functions

PEPTIDES IN AESTHETICS

BPC-157 (CAPSULE)

BPC-157/KPV (CAPSULE)

GHK-CU (TOPICAL)

ARGIRELINE-SNAP 8- LEUPHASEYL (TOPICAL)

THYMOSIN BETA-4 (INJECTABLE)

ARGIRELINE

6 amino acid launched in 2001

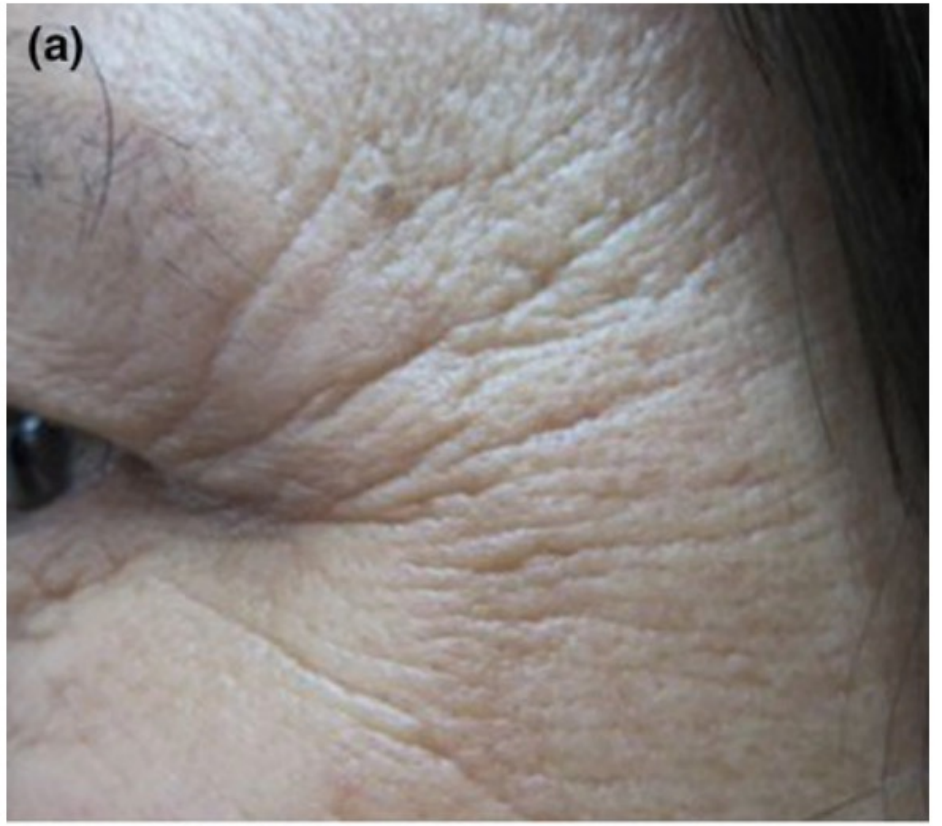
Non-toxic, anti-wrinkle acetyl hexapeptide-8 that imitates the action of currently used botulinum neurotoxins.

Interferes with SNARE complex and there is no release of acetylcholine.

Research:

- Ten women study performed using argireline topical cream BID for 4 weeks. Women saw a 48% improvement of fine lines and wrinkles in the eye area

Wang, Y., Wang, M., Xiao, S. *et al.* The Anti-Wrinkle Efficacy of Argireline, a Synthetic Hexapeptide, in Chinese Subjects. *Am J Clin Dermatol* **14**, 147–153 (2013). https://doi.org/10.1007/s40257-013-0009-9



SNAP-8

SNAP-8™ peptide solution contains an anti-wrinkle octapeptide that is an elongation of the hexapeptide ARGIRELINE® peptide. Therefore, it reduces expression wrinkles through a Botulinum Toxin-like mechanism of action

Reduces neural excitability, and therefore decreases muscle contractions. SNAP-8 can diminish wrinkle depth and muscle contractions by up to 63% over four weeks.

Errante F, Ledwoń P, Latajka R, Rovero P, Papini AM. Cosmeceutical Peptides in the Framework of Sustainable Wellness Economy. Front Chem. 2020 Oct 30;8:572923. doi: 10.3389/fchem.2020.572923. PMID: 33195061; PMCID: PMC7662462.

LEUPHASYL

5-amino acid peptide that reduces the depth of wrinkles by contraction of facial muscles.

An enkephalin modified for enhanced stability that modulates acetylcholine activity in neuron cells and catecholamine release.

Targets the wrinkle-formation mechanism of the expression of wrinkles in a unique way, offering an alternative to other cosmetic peptides like Argireline and SNAP-8.

HOW DOES GHK-CU WORK?

GHK-Cu acts directly on fibroblasts by increasing production of mRNA and protein for collagen, elastin, proteoglycans, glycosaminoglycans, and decorin; all of which are critical components in tissue repair and maintenance.

Further, it acts to stimulate the production of metalloproteases and protease inhibitors which function to remove damaged tissue proteins.

Together these functions increase the function of the cellular machinery and scaffolding to initiate repair and healthier tissue.

AESTHETIC USES OF TOPICAL GHKCU, ARGIRELINE, LEUPHASYL

- Restores replicative vitality to fibroblasts after radiation therapy
- Skin regeneration -Effects in cosmetic products
- Hair Growth
- Improved Elasticity
- Improved skin density and firmness
- Reduce fine lines and wrinkles
- Reduce photo damage and hyperpigmentation

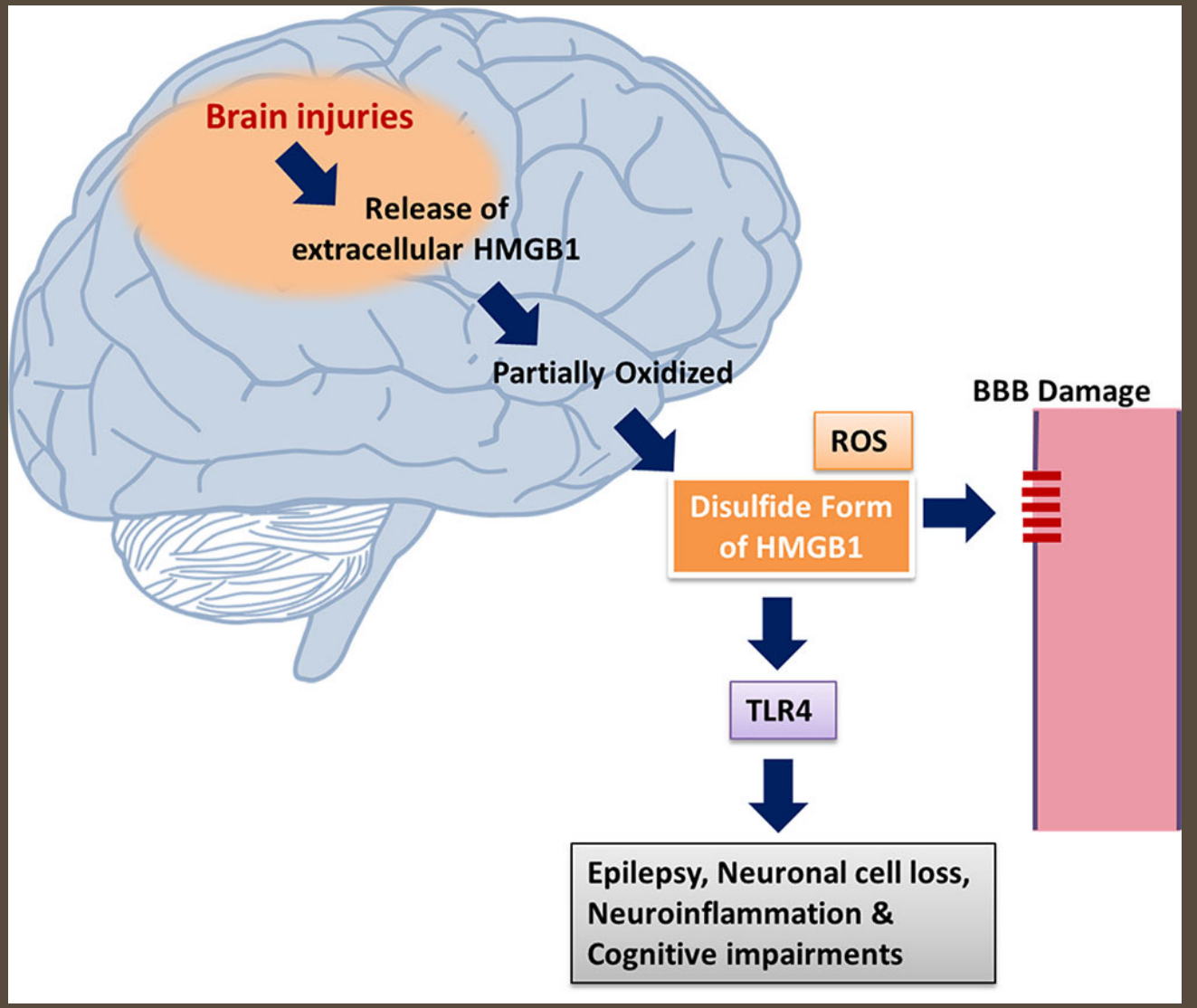
GHK-CU DOSING

750mcg up to 1-gram daily SQ

6 WEEK INTERVALS

Depending on clinical use
Must cycle on and off

Side effects:
Redness, pain, itching at injection site



GHK-CU FORMULATIONS AND DOSING

GHK-Cu 2mg/mL Cream	Apply topically to scalp QD for hair growth
GHK-Cu 5mg/mL Spray	Apply topically to scalp QD for hair growth
GHK-Cu 5mg/mL Dropper	Apply topically to scalp QD for hair growth
GHK-Cu 5mg/mL Foam	Apply topically to scalp QD for hair growth
GHK-Cu 10mg/mL Injection	0.2mL SQ QD 5mL
GHK-Cu/Argireline/Leuphasyl 0.2%/10%/5% Cream or Gel	Apply to wrinkles 1-2 times daily
GHK-Cu/Hyaluronic Acid 2/10mg/mL Cream	Apply topically QD to wound

BPC-157

Found to have significant anti-inflammatory actions

Promotes tissue healing through signaling pathways

Used to treat dyspepsia, gastritis, heartburn, diarrhea, constipation, poor appetite and anemia

MSK injuries: joint, tendon, ligament tor bone

Topical: used to health burns, injuries and scars

BPC-157 MECHANISM OF ACTION

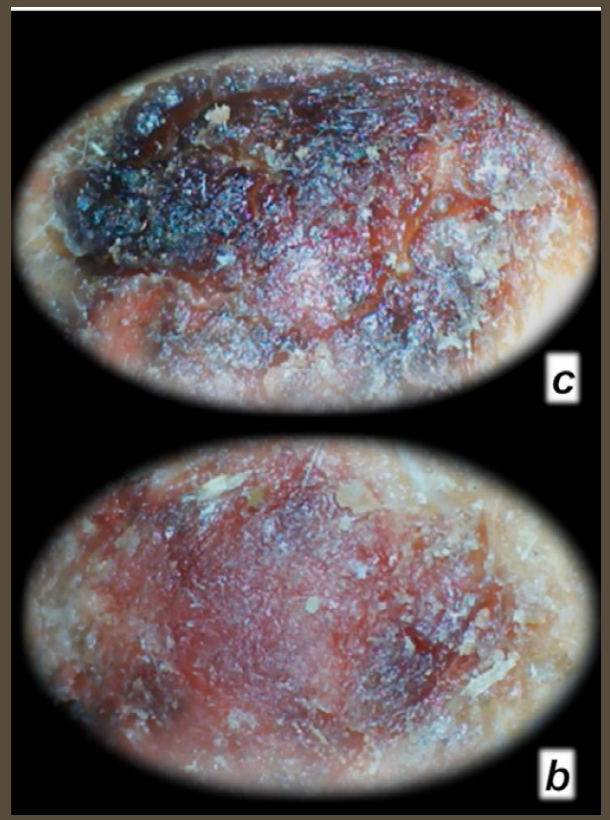
Increase nitric oxide

Accelerates the production of collagen and reticulin

Creates new blood vessels

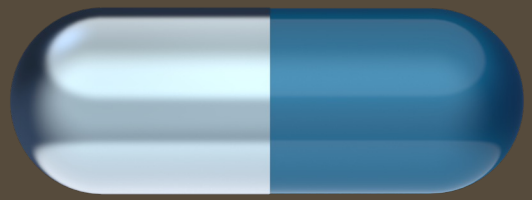
Helps healing tissue become stronger and healthier.

Stimulate expression of early growth response 1 gene – responsible for cytokine and growth factor generation and early extracellular matrix (collagen) formation



Seiwerth, S., Vukojevic, J., Dobric, I., Kokot, A., & Sikiric, P. (2021). Stable Gastric Pentadecapeptide BPC 157 and Wound Healing. *Frontiers in Pharmacology, 12*. https://doi.org/10.3389/fphar.2021.627533

BPC-157 DOSING



Gut Healing

- 500mcg po 1-2 times daily
- 400-600 MCG/DAY SQ
- 1 SPRAY EACH NOSTIRL IN THE MORNING

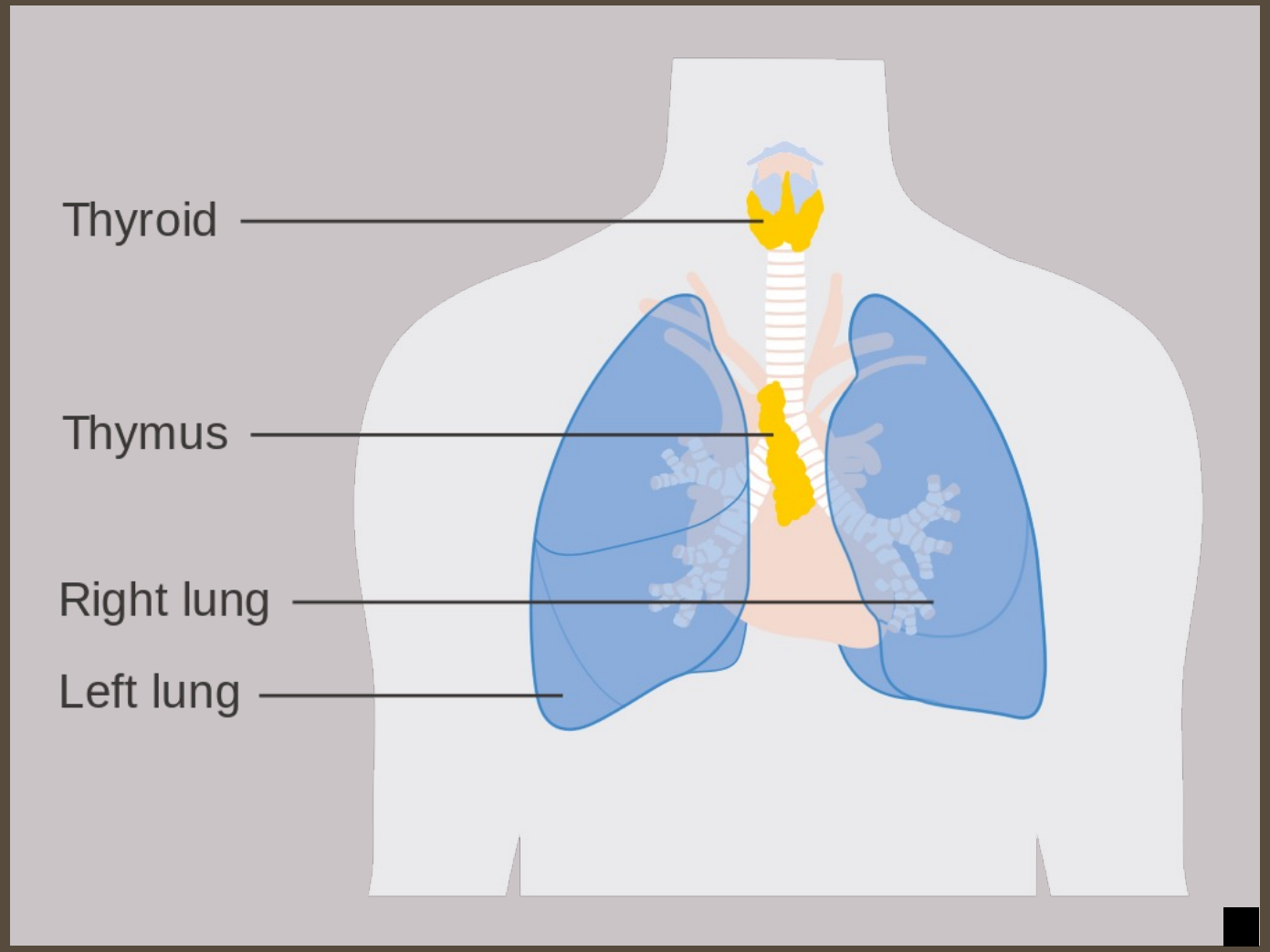
Joint/Tissue Repair

- 2000mcg/mL
  - 0.25mL (500mcg) SQ QD near affected area
  - 0.10mL (200mcg) SQ BID near affected area

BPC-157 SIDE EFFECTS

INJECTION: redness and swelling, but not common

Oral capsule- none



THYMOSIN BETA-4

43 amino acid sequence encoded by gene TMSBX4

Produced in the Thymus gland

Present in all human cells

Naturally found in higher concentrations in tissue damaged areas

Innate peptide that is released in our body in response to injury

THYMOSIN BETA-4: CLINICAL EFFECTS

Promotes rapid wound healing with little to no scarring

Enhances collagen deposition

Works at cellular level supporting tissue stem cells to heal and regenerate injured tissue

Promotes angiogenesis and differentiation of endothelial cells

THYMOSIN BETA-4: THERAPEUTIC USES

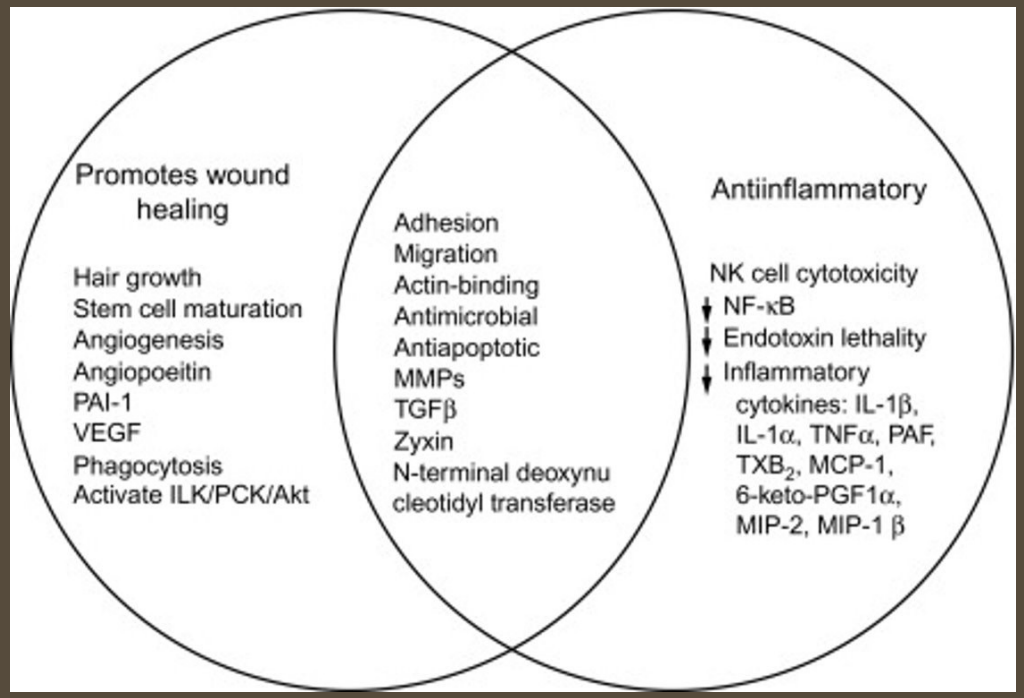
Chronic inflammation

Soft tissue injury

Wound healing

Sarcopenia

Enhance collagen deposition
Reduce acute & chronic pain
Promoting hair growth
Protected restore neurons post traumatic brain injury.



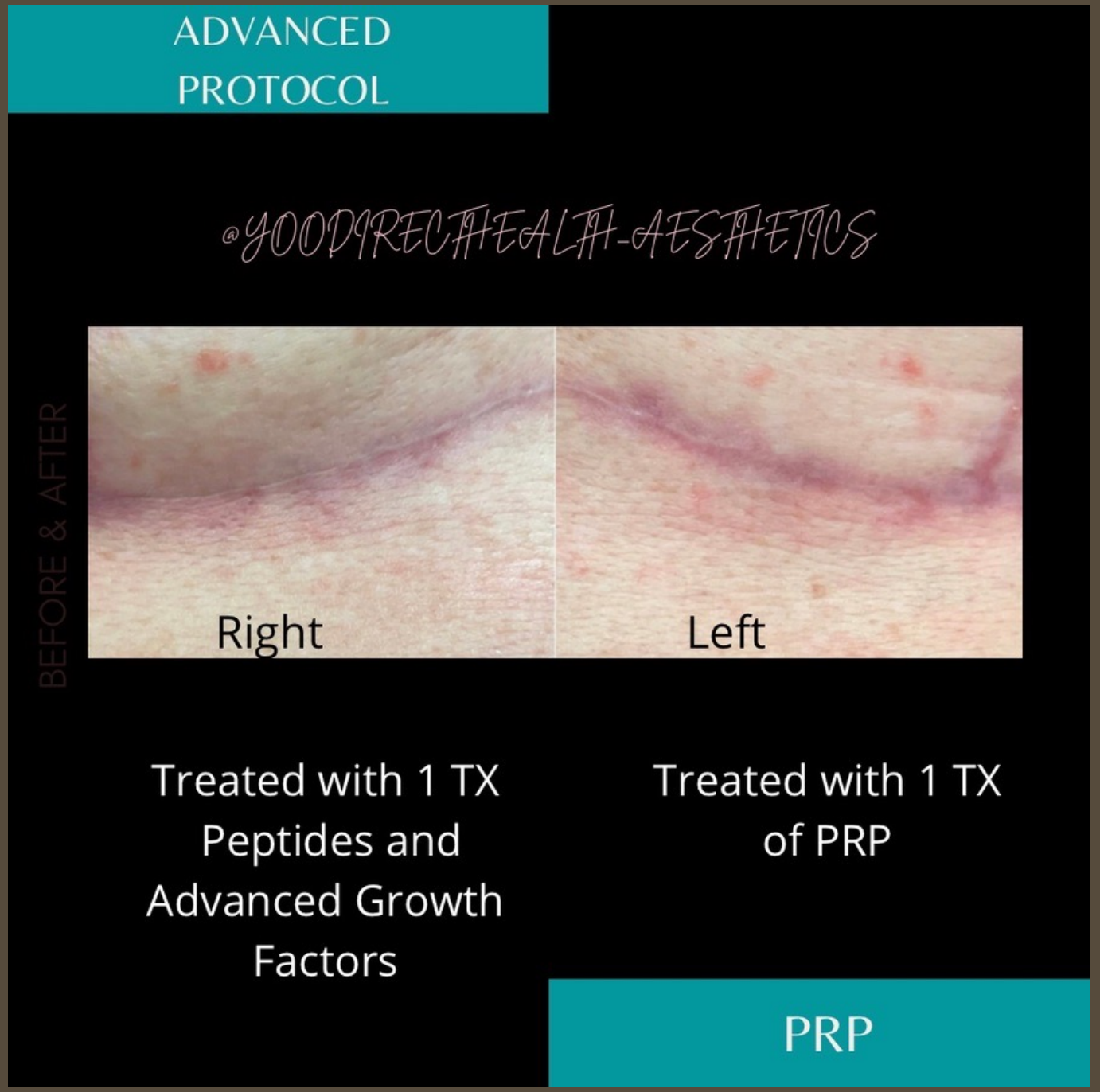
TB4 DOSING

1500MCG TB4 (0.5ML)

Syringe: 1ml

Needle: 30 gauge

WOUND HEALING
GHKCU +
TB4+
BPC-157



PROCAINE HISTORY

1905: Alfred Einhorn synthesizes procaine, introduced as Novocain for local anesthesia.

1950s: Discovery of procaine's diverse non-aesthetic effects, attracting attention across Europe.

- Researchers involved include Vishnevsky and Speransky in Russia; Huneke and Lüth in Germany; Leriche, Dos Ghali, and Hazard in France; Danielopolu and Parhon in Romania.

1946-1956: Ana Aslan in Romania highlights procaine's beneficial actions on cellular functions and metabolism with long-term, low-dose treatment, noting "rejuvenating" effects.

Development of Gerovital H3 (GH3), a procaine-based pharmaceutical formulation.

1960s-1970s: Procaine emerges as a highly debated medical development in "anti-aging" therapy, moving beyond its original use as an anesthetic.

PROCAINE FOR SCAR TREATMENTS (NEURAL THERAPY)

Neural Therapy (NT) involves injections with a local anesthetic, mainly procaine, to address chronic pain and certain diseases. This therapy uses procaine injections in different ways:

1. Local Treatment: Directly injecting procaine into or near the painful area.
2. Segmental Techniques: Injecting procaine into areas served by the same part of the spinal cord as the affected area.
3. Interference Field Techniques: Targeting chronic, low-grade inflammation areas, often in scars or old injuries, with procaine injections.

NT is effective for its nerve-blocking and anti-inflammatory properties, helping with a range of issues from chronic pain to digestive disorders and certain heart conditions.

HOW IT WORKS:

Trauma to the tissue causes an interference in the autonomic nervous system.

This can trigger pain, inflammation and delay in healing.

Neural therapy breaks up that interference by scar tissue disrupts the autonomic nervous system by creating abnormal electrical signals.

Neural therapy treats these issues by injecting local anesthetics into scars, nerves, acupuncture points, etc., to normalize cell charge and improve metabolism.

This treatment aims to restore the body's natural energy flow and reduce pain by improving cellular health.

NEURAL THERAPY: INTERFERENCE FIELD TECHNIQUES

Injecting Procaine in conjunction with:

Microneedling:

- Involves using a device with fine needles to create tiny punctures in the skin.
- Stimulates collagen production to heal and reduce the appearance of scars.
- Minimally invasive, with minimal downtime.
- Suitable for various scar types and skin tones.
- Multiple sessions required for optimal results.
- Improves skin texture and appearance.

Subcision:

- A surgical technique that involves inserting a needle beneath the scar to break fibrous scar tissue.
- Directly targets the scar tissue causing depressions in the skin.
- More invasive, with potential for bruising and swelling.
- Often used for treating deep, depressed scars, especially acne scars.
- Can see significant improvement after one or a few sessions.
- May be combined with other treatments for enhanced results.

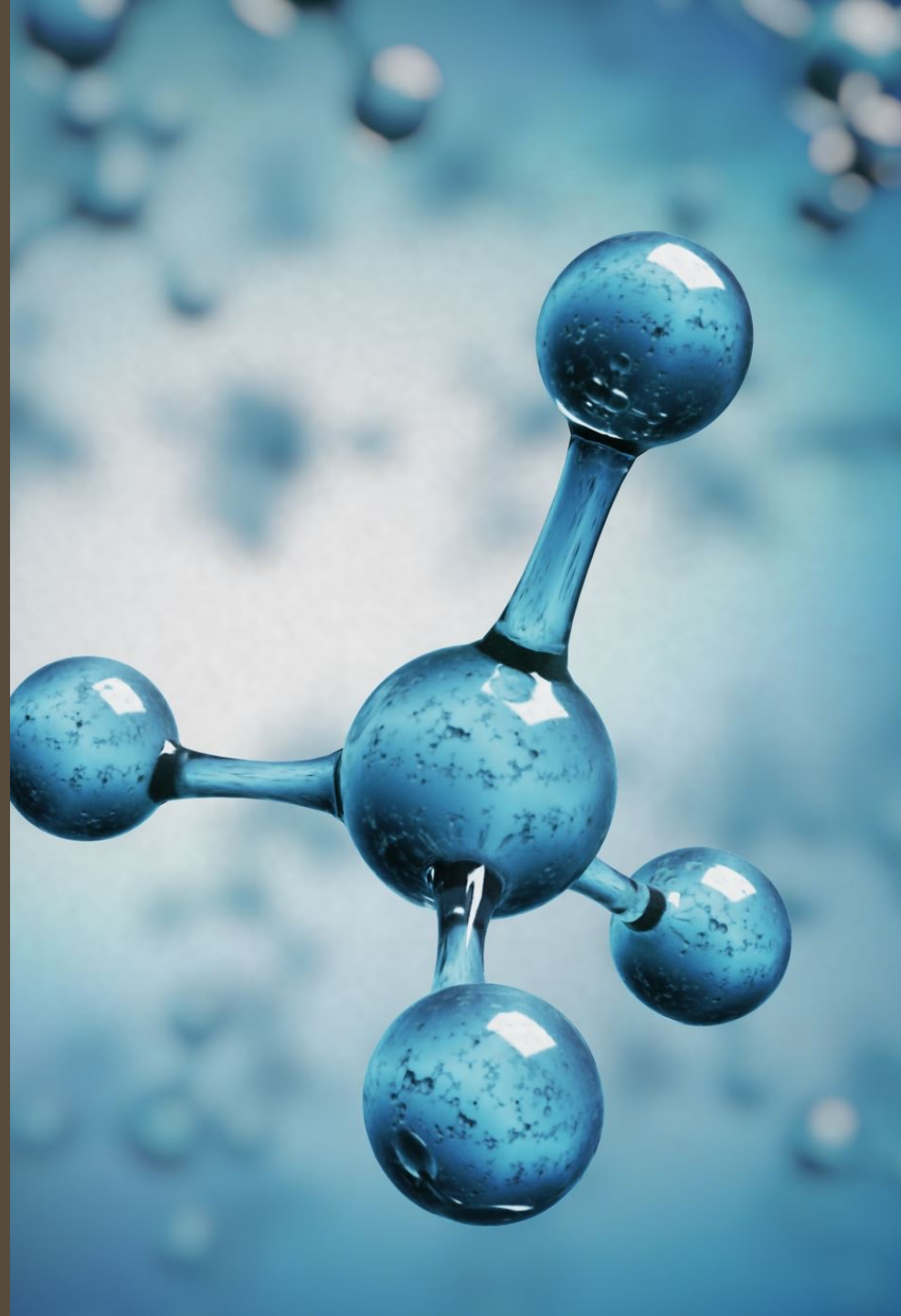
CASE: ACNE

Treatment:
BPC-157 capsule, TB4 inject,
Topical Ghk-Cu

Modalities:
Subcisising and micro needling

OZONE-HOW IT WORKS!

- O3 (ozone) is a gas composed of three oxygen atoms.
- It can break down into oxygen molecules and atoms, influencing gene expression related to hypoxia.
- Ozone activates factors like HIFs, VEGF, and PDGF, improving conditions in hypoxic tissues.
- It has a high oxidation capacity leading to its pharmacological effects.
- Ozone therapy works as ozone dissolves in plasma/serum, reacting rapidly to produce ROS (e.g., H2O2) and LOPs (e.g., 4-HNE, MDA).
- These products regulate Nrf2 and NF-κB pathways, crucial for controlling redox reactions and inflammation.
- The pharmacological effects of ozone are mediated through complex interactions within these pathways across various cell and tissue types.



WHY SHOULD WE CONSIDER IT AESTHETICS?

Ozonated hydrotherapy involves physically dissolving ozone in water (rather than chemically.

- Clinical application: Post laser, post microneedling.
- Limitations: Mixed on the spot, At 20°C, the half-life of O3 in water is only 27 min.

Ozonated oil: When stored at 4°C, ozonated oil can maintain stable properties and pharmacological activities for 2 years.

- Clinical application: Aids in healing wounds and topically treating atopic dermatitis, psoriasis, superficial bacterial, and fungal infections.

OZONE AS AN INJECTABLE

Wrinkles

Wound

Hyperchromia

Stretch marks

Telangiectasias

Modality: Therapeutic ozone boosts nitric oxide (NO) production, enhancing local microcirculation and benefiting chronic degenerative and vascular diseases. Despite NO's brief half-life, its protein-bound form can induce vasodilation at distant ischemic sites, offering significant therapeutic advantages.

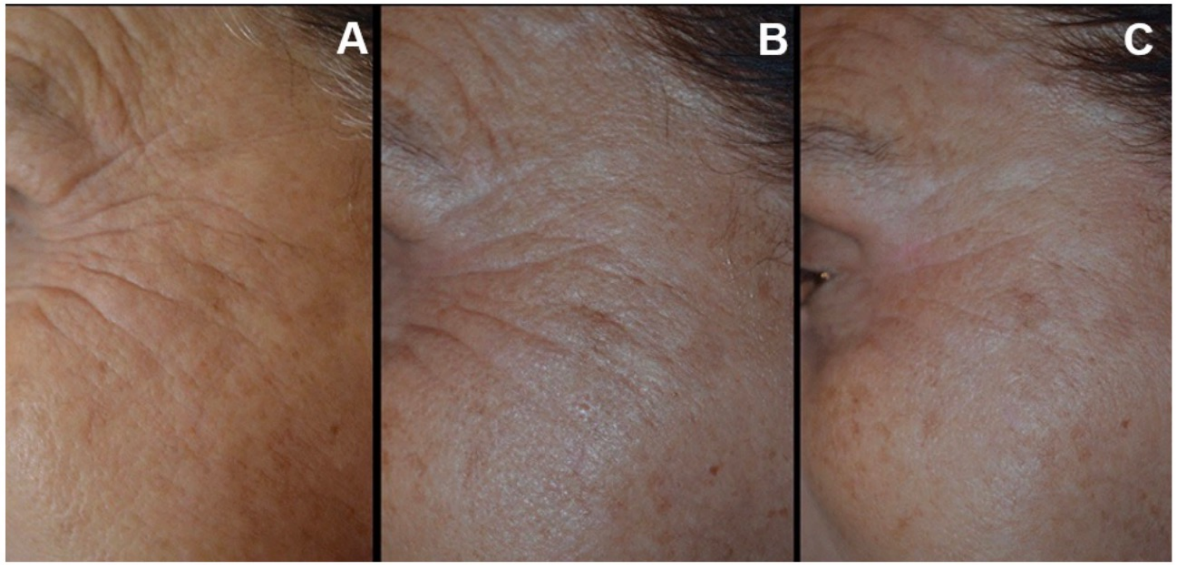
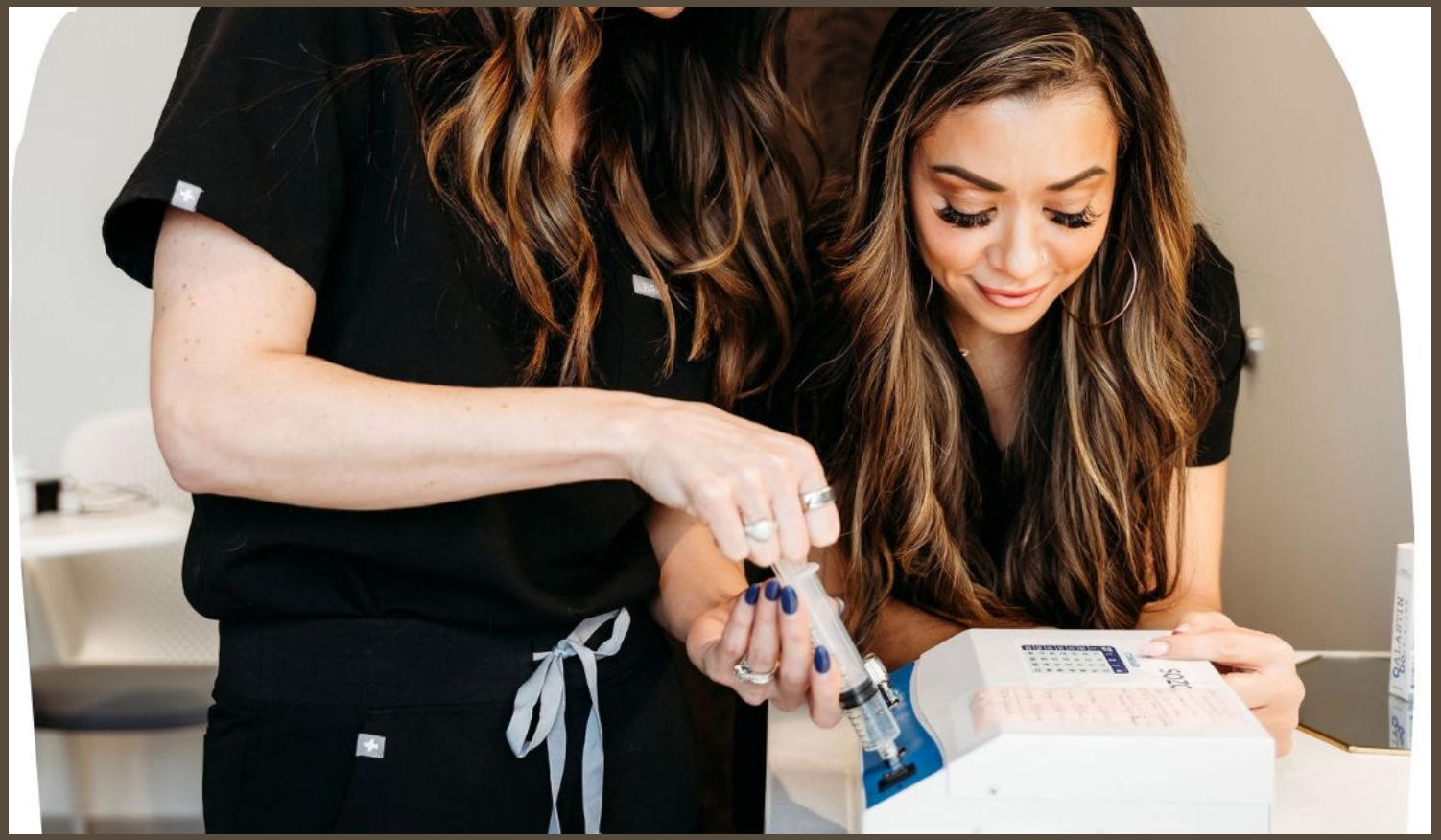


Figure 9. Rejuvenation of the peri orbicular region of the eyes: 8 sessions (1 time every 20 days, 1 ml volume at each injection point; 15 µg concentration; intradermal technique with retro injection). (A) Before treatment; (B) 4 sessions; and (C) After treatment.

Photos: Borges, F. dos S., Meyer, P. F., Jahara, R. S., Carreiro, E. de M., Antonuzzo, P. A., Picariello, F., & Palma, C. D. (2021). Fundamentals of the Use of Ozone Therapy in the Treatment of Aesthetic Disorders: A Review. Journal of Biosciences and Medicines, 9(12), Article 12. https://doi.org/10.4236/jbm.2021.912005



OZONE AS AN INJECTABLE DOSING

Concentration of: 15 gamma (fine lines and wrinkles)- placed intradermal

Concentration of: 20 gamma (scars, scar tissue)- placed sub Q

Volume Dose: 1ml

OZONE IN VASCULAR OCCLUSION

A vascular occlusion is when blood flow through a vessel is halted or reduced, due to either complete or partial blockage, leading to decreased blood supply.

Case: 26 yo female presents 24 hours post lip filler. Product: Restylane Defyne.

Technique: Direct needle

Symptoms: Pain, pallor and delayed capillary refill.

Treatment: Hylenex, warm packs, Ozone

OZONE IN DELAYED ONSET NODULES

Delayed-onset nodules (DONs) describe post-filler treatment nodules, appearing two weeks or later, without practical benefit from distinguishing "delayed" vs. "late."

Prevalence of DONs is up to 0.8%; causes include product redistribution, delayed hypersensitivity, biofilm, granuloma, and systemic issues.

Their variable nature and potential for chronic impact significantly affect quality of life, comparably to psoriasis and atopic dermatitis.

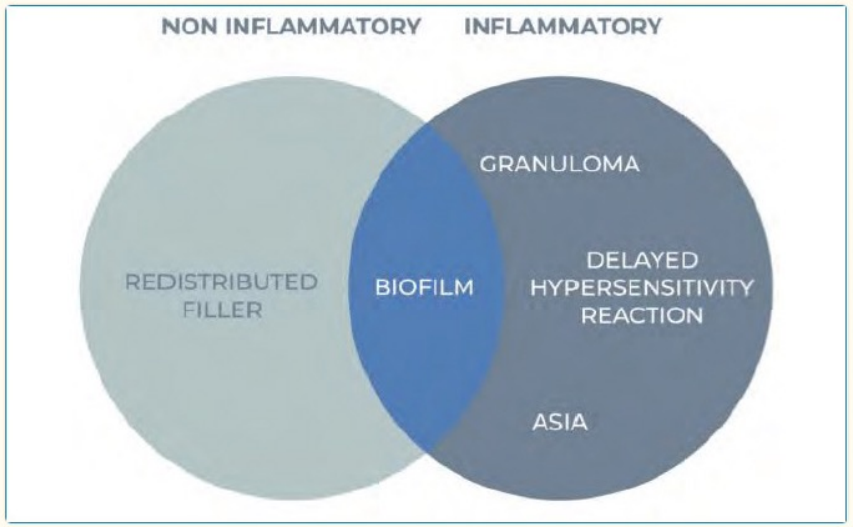


FIGURE 1.

Potential pathologies responsible for a delayed-onset nodule and their presentation with respect to inflammation

Convery C, Davies E, Murray G, Walker L. Delayed-onset Nodules (DONs) and Considering their Treatment following use of Hyaluronic Acid (HA) Fillers. J Clin Aesthet Dermatol. 2021 Jul;14(7):E59-E67. Epub 2021 Jul 1. PMID: 34840652; PMCID: PMC8570356.

CLINICAL CASE

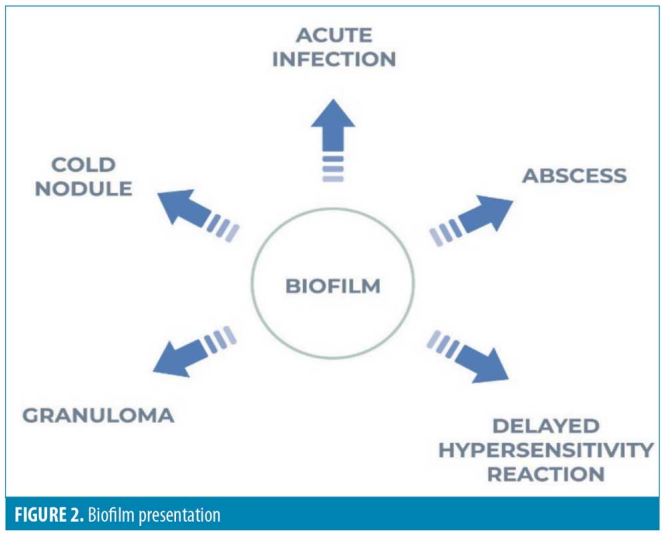


FIGURE 2. Biofilm presentation

36 year female, pmh negative for autoimminity

Hx of injectables w/o issues

Voluma placed bilaterally in midface, Lips with Versa in 03/2022

05/2022- C-shot Booster

07/2022- Lips started to swell and harden, dissolved by outside injector

08/2022-Burning and pain in midface; outside inject tx 3 session of hylenex, steroid pack and doxy x 2 mos

Symptoms improved, however still occasional burning pain and palpable hard mass in lateral part of zygoma

US visualized HA and opacity on imaging

Treatment: hyelnex warm pack, and ozone

Results: Immediate- no longer able to palpate mass, pain improved with in a week