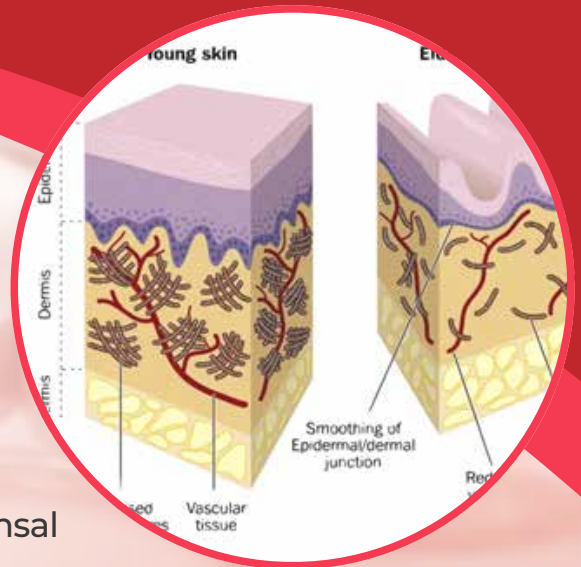




IADVL

SIG AESTHETICS

NEWSLETTER 2022



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MESSAGE FROM SIG AESTHETICS CO-ORDINATOR

Dr. Gulhima Arora

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Mehektagul Dermaclinic

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Knowledge has power. It controls access to opportunity and advancement – Peter Drucker

As Co-ordinator SIG aesthetics 2022-23, it is indeed an honour and pleasure for me to pen this address for this newsletter. With Aesthetic Dermatology now having created a niche as an integral part of Dermatology, it is also time for us to imbibe the knowledge and advancements in this field.

Having evolved in stature over nine-long-years, the Special Interest Group (SIG) on Aesthetics has indeed come a long way since its inception under the umbrella of SIG LASERS and Aesthetics in 2013. It was given an independent status as a separate SIG in 2020, the black year in human history which heralded the start of the COVID-19 pandemic. It was under the able leadership of Air Commodore Dr. (Professor) Sandeep Arora, as the first Co-ordinator of SIG Aesthetics, that despite all adversities, that the SIG was able to conduct several academic webinars with video presentations over this period, which were well-received by our colleagues all over the country.

Being associated in various capacities as a member, convener and now co-ordinator of this SIG, I have seen it grow with the various activities we have conducted over these nine years. From conducting physical hands-on workshops in not just tier 1 but also tier 2 and 3 cities across the country, formulating consent forms for all aesthetic procedures, updating and adding to them, disseminating patient education leaflets, releasing newsletters and publishing scientific literature, we have done it all.

This year, we have rolled out the Presidential initiative of conducting CMEs and Hands-On Workshops on Injectables in various cities. On behalf of the SIG aesthetics team, I am delighted to release this Newsletter from SIG Aesthetics which is a focussed read on “Collagen”. The newsletter is a myriad of academics and fun-reading with a crossword and a quiz.

I take this opportunity to thank the SIG Aesthetics team, the President IADVL, Dr. Rashmi Sarkar, Honorary. Secretary General IADVL, Dr. Dinesh Kumar Devaraj, the Academy Chairperson and Convener, Dr. Lalit Gupta and Dr. Rashmi Jindal respectively, for their continuous support in helping us release this issue.

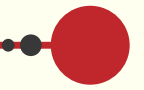
Hope you enjoy reading the first issue of the newsletter as much as we enjoyed compiling it for you. I wish the SIG the very best for its future endeavours.

You can reach out to me at gulhima@gmail.com

Long Live IADVL!

Best Wishes

Dr. Gulhima Arora



MESSAGE FROM SIG AESTHETICS CONVENOR

Dr Rajat Kandhari

Dear respected seniors and my dear colleagues

It is indeed a privilege to be addressing one and all in capacity of the IADVL SIG Aesthetics Convenor for the year 2022. It is said that “only education empowers the society to grow in the REAL sense”, and in the current scenario where dermatology has in fact, undergone a paradigm shift in the past few years and is constantly evolving, it is only pertinent that we evolve with it.

It has been an endeavor of SIG Aesthetics to impart knowledge in the field of Aesthetics to dermatologists across India to enhance their cosmetic practice and take it to the next level. This year we hope to evolve with some newer nuances in the field of aesthetics and hope to do justice to the great work done by the previous teams through the last decade, who seem to have set the platform for a bright future ahead.

This newsletter is a small attempt in highlighting some key areas on “collagen” and “collagen remodeling” as this protein appears to be at the forefront when we talk of aging, where it depletes with age and forms the cornerstone for most of our anti-aging modalities where we try to replenish it.

Hope you enjoy it as much as we did it putting it together for you. Moreover, your inputs and suggestions would only make us improve so please feel free to contact me on rkandhari@gmail.com

Long live IADVL!

Regards

Dr Rajat Kandhari

COLLAGEN AND SKIN - THE YOUTH ELIXIR - Dr Akshi Bansal

MD, DNB, FRGUHS, EBDVD, MRCP-SCE

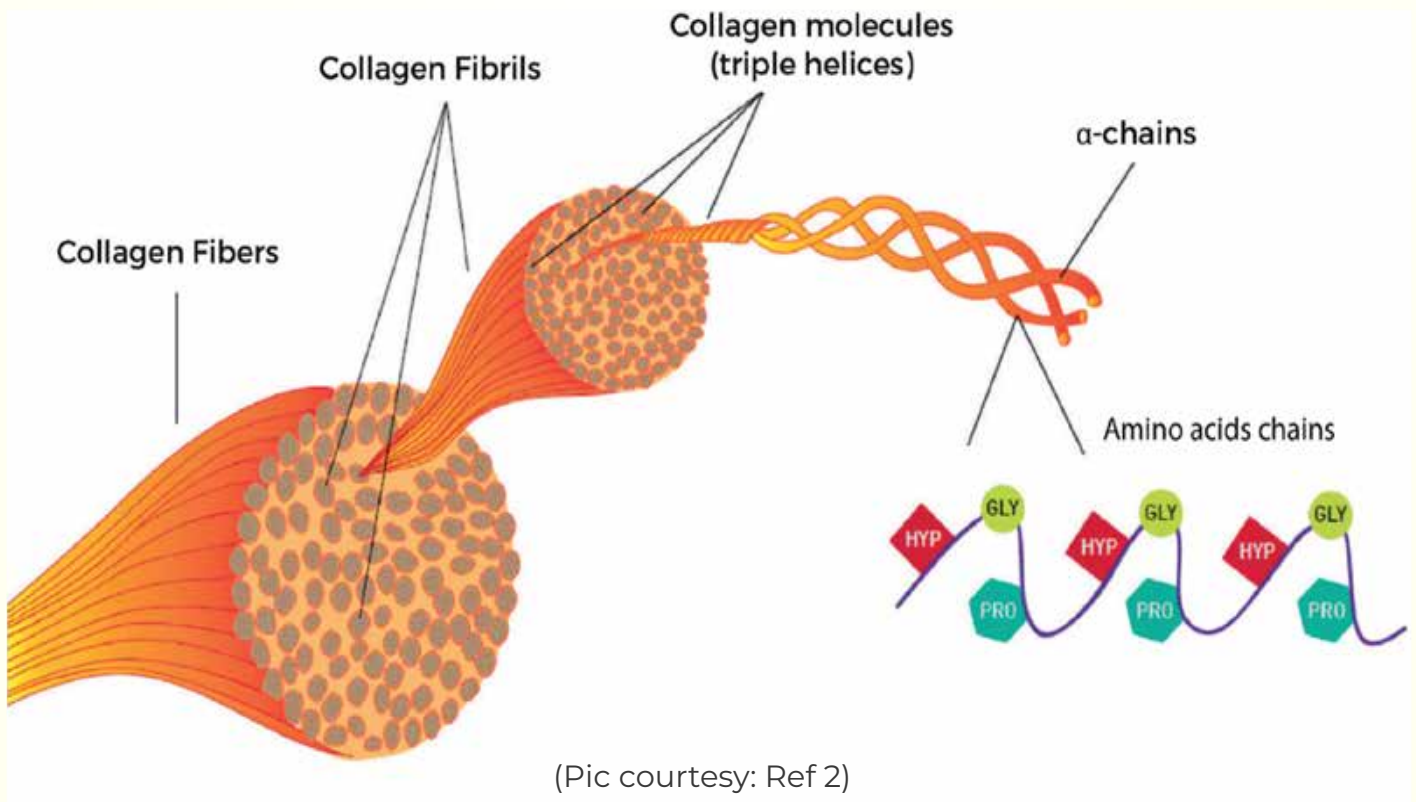
Consultant Dermatologist, Manipal Hospital, Bengaluru

What would you do stay youthful?

Would you use animal poop in your mud baths for its alleged restorative and anti-ageing properties? This is not out of a fable but a well-documented fact. Apparently in ancient times, Greeks and Romans used a special ingredient in their facials to create a mask that would keep them looking youthful. The ingredient? Crocodile dung!!

For centuries, man has sought the elixir of life, the mythical potion that would grant its drinker eternal life or youth. Our obsession with looking youthful has transcended time and we would try anything to cling on to the vestiges of our youth for as long as we can. It is said that Cleopatra bathed in donkey milk every day; Mary Queen of Scots preferred white wine! Aesthetics today has become a multibillion-dollar industry with a variety of options and alternatives for slowing skin ageing, so thankfully one need not go looking for livestock milk anymore to retain their skin vigor. Collagen is the recent hot-off the press molecule that is inching into our anti-ageing skincare regime

WHAT IS COLLAGEN?



Collagen often called the 'body's scaffold protein', is the most abundant component of the extracellular matrix (ECM). It accounts for approximately 75% of the dry weight of a young and healthy skin. There are 28 different types of collagen expressed in body, of which type-I is the main skin collagen making up around 80-90% of total collagen in skin. It is produced by mesenchymal cells called fibroblasts, found predominantly in the dermis.

The structure of collagen is reminiscent of a rope. There are four structural levels of a collagen protein which include a primary structure (amino acid triplet), secondary structure (the α -helix), tertiary structure (triple helix), and quaternary structure (fibrils). The three α chains are distorted around each other to form the right-handed triple helix of collagen³. This structural complex of collagen and its ideal organization into functional fibers is what gives the skin its characteristic strength, firmness and resilience resulting in a plumper and fuller skin. Collagen alongwith the other components of ECM like elastin and glycosaminoglycans also promote skin elasticity, boost moisture and improve skin tightness which are critical to maintain a youthful, bouncy skin.

CHANGES IN COLLAGEN WITH AGEING

Skin ageing results from a series of divergent processes which effect the many constituents of skin and hence it's appearance. There are distinct structural and functional changes in all the major components of ECM including fibrillary collagen. From early adulthood itself, fibroblasts become less active and collagen production starts to decline by about 1.0%-1.5% every year¹. There is also a shift in the proportion of fibrillary type-I and type-III collagen in skin with age. There is not just a decrease in collagen synthesis but also an increase in production of matrix metalloproteinases (MMP), especially MMP-1 which bring about disorganization and fragmentation of collagen into collagen fragments. These high molecular collagen fragments not only inhibit new collagen synthesis, by a possible negative feedback loop but have also been found to increase the gross total intracellular oxidative stress, further contributing to the ageing process of the skin³. The overall effect of decreased collagen in the skin is loss of strength and resilience, manifested clinically as appearance of fine lines, deep wrinkles and sagging of skin.

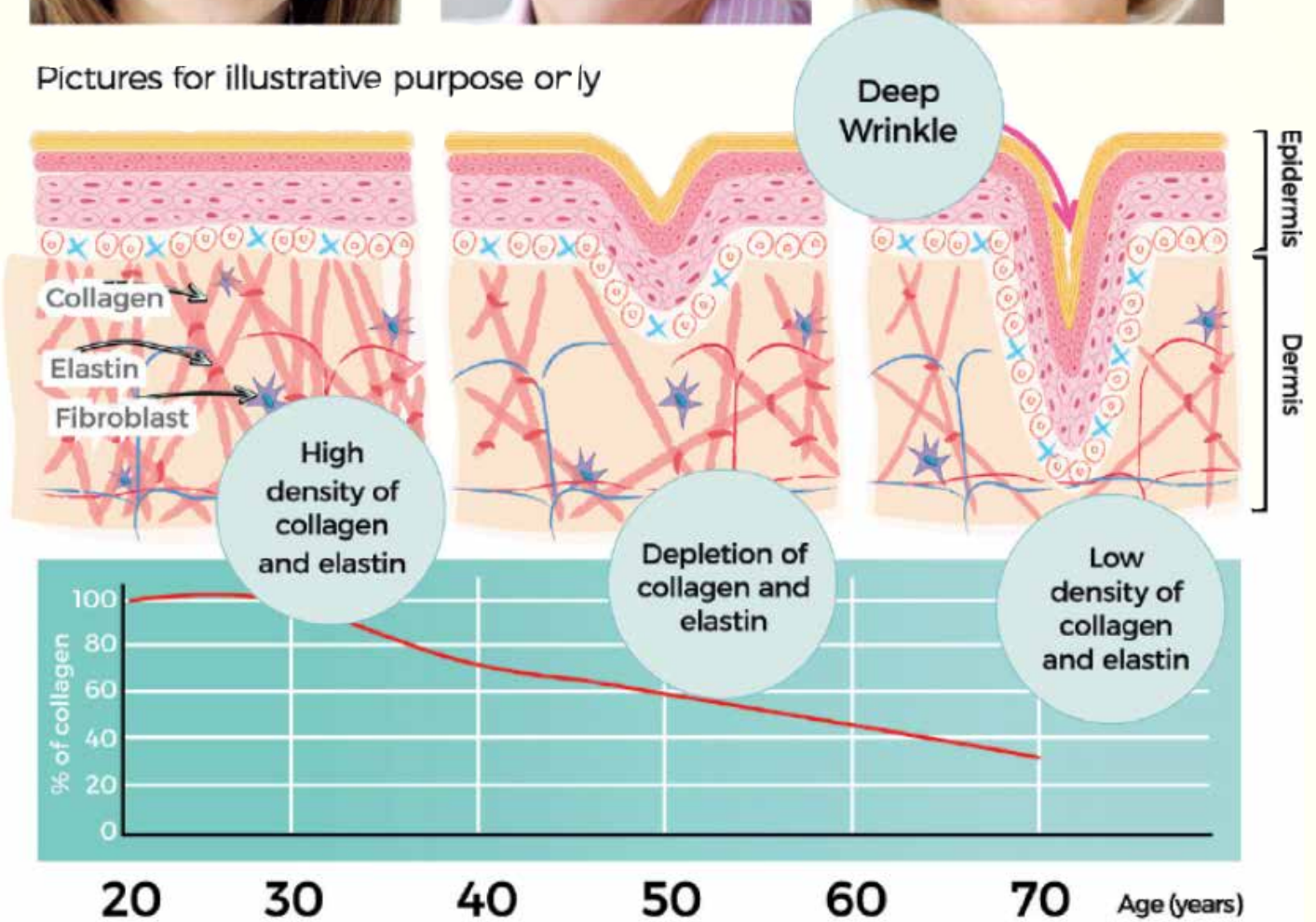
USE OF COLLAGEN IN ANTI-AGEING

Collagen is the new buzzword that has wriggled its way into our skin care regimes and beauty diets. We have collagen inducing smoothies available even at juice counters now, such is the conviction of the populace in this molecule. Stimulation of collagen production or inhibition of collagen degradation can be achieved in several ways, including

Natural ageing process



Pictures for illustrative purpose only



(Pic courtesy: Ref 1)

the use of topical treatments, surgical aesthetic procedures, or use of oral supplements. In topical formulations, vitamin A (retinol) and its derivatives (retinaldehyde and tretinoin) continue to remain one of the most favoured treatment options for restoring collagen in ageing skin³. Recently collagen peptide based creams have been introduced and are picking up, although their efficacy in actually making a difference in ECM architecture is still a matter of debate. In office based aesthetic procedures, there is percutaneous collagen induction

with microneedles which is very commonly indicated for a broad spectrum of skin alterations where the goal is to stimulate collagen. There is also evidence now of the hyaluronic acid based dermal fillers triggering a 'bio-remodelling' response in skin, which stimulates production of natural collagen and elastin in extra cellular matrix, thereby resulting in smoothing and tightening of skin over time⁴. Use of oral collagen supplements in the form of pills, powders and capsules has offered some intriguing results^{5,6}. Schagen et al. reviewed the link between skin and nutrition in detail and they found 7 out of the 11 intervention strategies mentioned in the review, to be directly related to collagen content in skin⁷. Now supplemental collagen in combination with vitamins, minerals and antioxidants are increasingly being used in nutricosmeceutical products to improve the skin elasticity, hydration and visible signs of fine lines and wrinkles⁵.

CONCLUSION

When Margaret Wolfe Hungerford famously wrote in 1878 that “beauty is in the eye of the beholder” (suggesting that it is subjective and perceptual), she mayhap did not expect science to controvert that beauty in actuality is a construct of various visible and measurable physical features and attributes. And the sum total of all these attributes, inevitably starts to decline with ageing. Despite the mirth and laughter of wrinkles, what goes on under the wrinkled skin surface is no laughing matter!

With the understanding of the role that collagen plays in maintaining a bouncy, youthful skin all eyes are now set on it for the hope that our centuries old quest for that 'fountain of youth' would end here.

So, what would you do to stay youthful?

Suggested Reading :

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COLLAGENCREAMS- FAD OR FUTURE

Dr Bhavesh Swarnkar, DVD, DNB, Consultant Dermatologist, Swarnkar Super Speciality Center, Indore, MP

Collagen is a fibrillar protein that conforms the conjunctive and connective tissues in the human body, essentially skin, joints, and bones. This molecule is one of the most abundant in many of the living organisms due to its connective role in biological structures. Due to its abundance, strength and its directly proportional relation with skin aging, collagen has gained great interest in the cosmetic industry. It has been established that the collagen fibers are damaged with time, losing thickness and strength which has been strongly related with skin aging phenomena¹.

Nowadays, the biomolecule can be obtained by extraction from natural sources such as plants and animals or by recombinant protein production systems including yeast, bacteria, mammalian cells, insects or plants, or artificial fibrils that mimic collagen characteristics like the artificial polymer commercially named as KOD. Its market size is valued over USD 6.63 billion by 2025 [Collagen Market By Source(Bovine, Porcine, Poultry, Marine), Product (Gelatin, Hydrolyzed Collagen), Application(Food & Beverages, Healthcare, Cosmetics), By Region, And Segment Forecasts, 2014 –2025. Grand View research. 2 The cosmetic industry has made great efforts on incorporating this biomolecule on several available products. It has been proven that the collagen hydrolysate has shown bioactivities such as antioxidant properties, antihypertensive activity, lipid-lowering activity, as well as reparative properties in damaged skin. Also, it has been observed that this particular presentation of collagen has a double action in the skin that in first instance provides the building block for elastin and collagen formation, and in second to act as ligands or binding receptors in fibroblasts to stimulate the prior-mentioned components and hyaluronic acid.

26 Different types of collagens are grouped in to 8 different families depending on its structure, chain bonding and position in the human body. Other classification is based on its forms like – Fibrillar forming (basement membrane and microfibrillar), Anchoring fibrils (hexagonal network forming) and fibrillar associated collagen with interrupted triple helix (FACIT) (transmembrane, and multiplexin) In the cosmetic industry, the use of collagen is increasing because of its availability, biocompatibility, and biodegradability. 4 Type I collagen (fibrillar forming) is the most used in several cosmetic applications as it is considered to be the gold standard due to its high biocompatibility with the human body. It has been reported that in tissue engineering, biomaterials are based on fibril-forming collagen mainly (type I, II, III, V, XI) Also, collagen type I is used as an ingredient in cosmetics dental composites, skin

regeneration templates biodegradable matrices, and collagenshields in the field of ophthalmology.

Sources of collagen:

- A.) Poultry and Live stocks 1. Porcine skin ,2. Bone tendon ,3. Chicken bone
- B.) Aquatic animals 1. Fish scales, 2. Fish skin and 3. Fish bone
- C.) Synthetic poly peptides.

Both Bovine and marine collagen is used as a temporary cover to external oral wounds and burns of the body. Its larger use is due to its effectiveness and biocompatibility. Porcinecollagen are used for grafting of soft tissues. It provides a biocompatible surgical material as an alternative to an autologous transplant. Animal sources are cheap and easy to acquire but on prolonged use may lead to allergic tendencies and misfolded,provoking severe diseases such as osteogenesis imperfecta. Marine sources are considered to be no risk of transmitting diseases. So considered as GRAS (Generally recognized as safe) by FDA.

Synthetic Poly peptides have some characteristics; when applied topically, such as instability on the skin and low skin permeability which made challenges in the application of polypeptides for dermalapplication, particularly delivery in the dermis. The polypeptide can be modified by acetylation, glycosylation, and amidation at the N-terminal and the C-terminal. And after modification, the polypeptides have various advantages, such as increase the penetration of the polypeptide on the skin.

Kim et al 2019; foundthat carnosine can decrease the circulating levels of corticosterone andincrease PI3K/Akt phosphorylation by establishing in vivo mouse agingmodel and injecting carnosine daily for 8 weeks, which indicating thatcarnosine had the potential to promote wound healing in aging skin. 3 Trookman,2009 studied female subjects who applied SYNAKEcontinuously for 12 weeks and found that SYN-AKE can increase thesynthesis of collagen and significantly improve skin fine lines andwrinkles.1Liang et al;2019. investigated the UVB-inducedphotoaging in human dermal fibroblasts and a 3D reconstitutedhuman full skin model and found that tetrapeptide (Pro-Lys-Glu-Lys)could suppress the formation of matrix metalloproteinase-1 (MMP-1)and increase the expression level of collagen-1 and fibronectin-1.1X Zhmak et al.,2015 researched the placebo-controlled clinicalstudy and found that the pentapeptide -3(Gly-Pro-Arg-Pro-Ala) couldincrease the skin elasticity by enhancing the chances of acetylcholine tobind with acetylcholine receptors on the surface of muscle cells .With the active peptide have been increasingly used in skin antiagingsince 2000, it has been found that a variety of sequence of bioactive peptides can

be used in products. These bioactive peptides have extremely strong compatibility. They can not only be used in combination with a variety of antioxidants, such as ascorbic acid and its derivatives, catechins, curcumin, and ferulic acid derivatives, they can directly add into cosmeceuticals skin products, such as milky lotions, facial essences, facial packs. On the other hand, they can be embedded by using a physiologically acceptable carrier to produce the pharmaceutical products (Nakagami et al., 2018) 5. Lintner et al (2003); randomly investigated 15 female subjects who treated with milky lotions contained tripeptide derivative (X-Thr-Thr-Lys-Y), compare with placebo, tripeptide derivative (X-Thr-Thr-Lys-Y) can induce the formation of partial collagen and glycosaminoglycan, protect and repair skin damage caused by ultraviolet radiation, and reduce skin surface wrinkles. 6 Goldstein et al. studied a subject with an age spot on the back of hand that used gel formulation containing Leu-Lys-Lys-Thr-Glu-Thr for consecutive 28 days and found that the age spots significantly fades within 7 days and noticeably decrease in size after 28 days. The results showed that the polypeptide with sequence Leu-Lys-Lys-Thr-Glu-Thr could reduce or reverse skin aging and enhance skin elasticity by inducing terminal deoxynucleotidyl transferase (a nontemplate-oriented DNA polymerase) (Goldstein et al., 2004) 7. Lersch et al. selected 10 volunteers to conduct Placebo-controlled clinical study who should use the O/W cream containing oligopeptides (Val-Glu-Ile-Pro-Glu) or placebo twice a day with 10 days to the left volar forearm, respectively. The results showed that the synthetic peptide with thesequence of Val-Glu-Ile-Pro-Glu could be used as a neurotransmitter inhibitor to increase the neuronal perception of the skin and skin sensitivity and repair skin damaged cells timely (Lersch et al., 2010). 8 Dal Farra et al. studied the human fibroblasts and keratinocytes incubated with synthetic peptide (Lys-Leu-Asp-Ala-Pro-Thr) and found that synthetic peptide (Lys-Leu-Asp-Ala-Pro-Thr) could increase adhesion between skin cells, provide curative and preventive treatment for ageing skin symptoms (of physiological or solar origin) and enhance skin appearance (Dal Farra and Domoge, 2007).

Conclusions :

Bioactive peptides have several advantages, including high activity, abundant sources, good absorption, and utilization in vivo. They are thus recognized by consumers due to their safety, high efficiency, and other characteristics. After topical application and oral administration, the natural and synthetic bioactive peptides can regenerate skin stromal cells, thereby reducing UVB-induced skin pigmentation, decreasing the fine lines and wrinkles, increasing skin elasticity, and promoting the skin to look smoother and firmer. In recent years, anti-aging peptides applied to skin local or integral has been extensively studied. Previous studies demonstrated that bioactive peptides have great potential in the cosmeceutical

field. However, some of them are only in vitro and cell studies that have no clinical trials as guidance, and the protective mechanism has not been fully clarified.

Suggested Reading :

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Mirna Lorena Sanchez PhD2; Collagen: A review on its sources and potential cosmetic applications; J Cosmet Dermatol. 2018;17:20–26.
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CROSSWORD PUZZLE

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Dermazeal Clinic, Bengaluru*

ACROSS

2. predominant type of collagen in granulation tissue.
5. an atypical glycosaminoglycan, unique for being non-sulfated with large molecular size
6. structural unit of collagen fibre
7. objective assessment of skin elasticity
9. the most abundant type of collagen in the body
11. mutation in fibrillin 1 leads to _____ syndrome.
13. another name for photoaging
14. a retinoid that increases the density of anchoring fibrils and upregulated type VII gene expression
15. a tetrahydroxy flavone, plays a role as an antioxidant, anti-inflammatory and for anti-aging

DOWN

1. the main proteoglycan that binds collagen fibrils into stable collagen fibres
3. type VII collagen is the major structural component of
4. biological markers of skin hydration are glycosaminoglycans and _____.
8. a topical drug that inhibits mTOR pathway having promising antiaging effects
10. biological markers of skin elasticity are collagen, elastin and _____.
12. fine wrinkles that occur due to mid-dermal elastolysis.

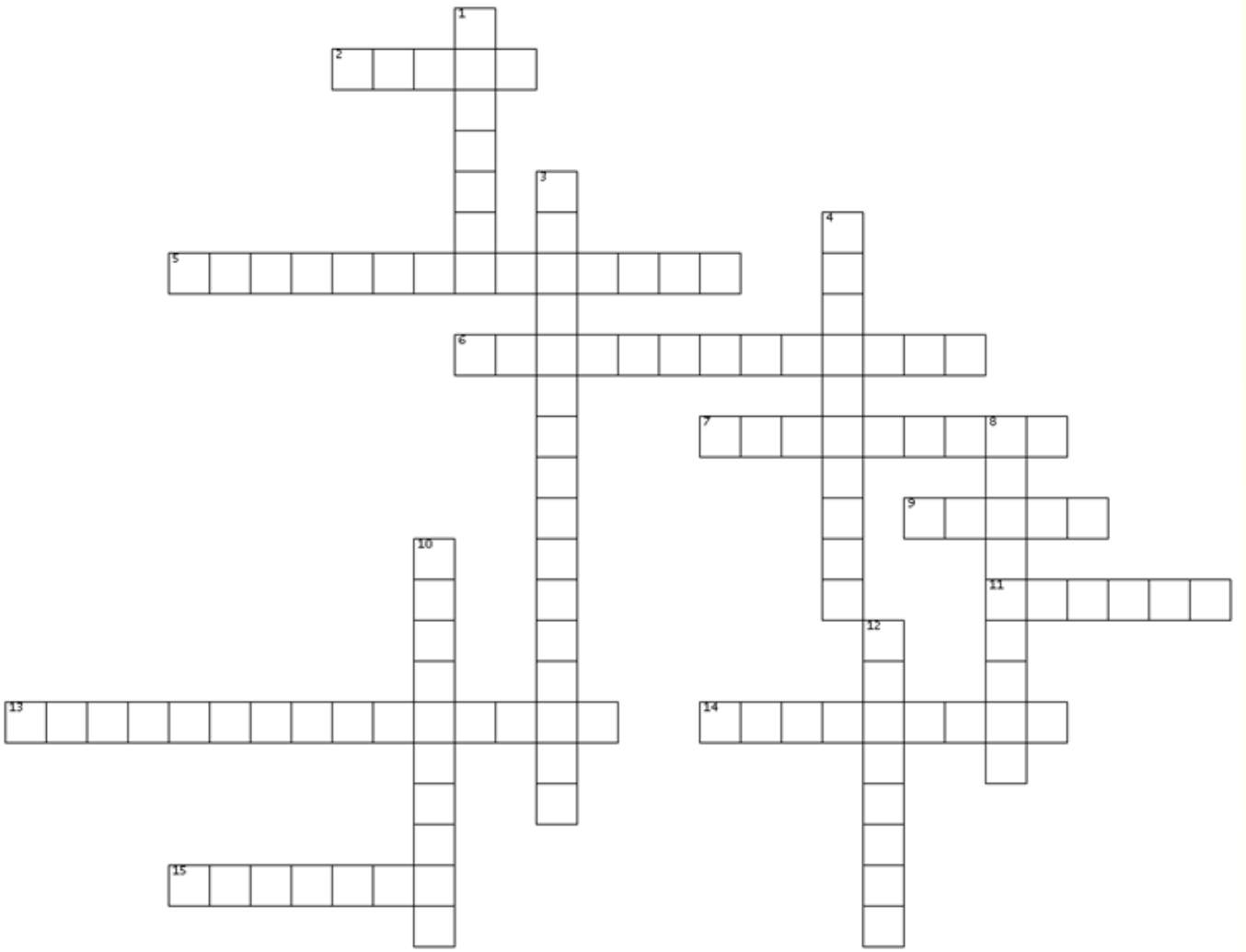
ANSWERS

Across

2. Typeiii
5. Hyaluronicacid
6. Tropocollagen
7. Cutometry
9. Typei
11. Marfan
13. Dermatoheliosis
14. Tretinoin
15. Fisetin

Down

1. Decorin
3. Anchoringfibrils
4. Aquaporin3
8. Rapamycin
10. Fibrillin1
12. Crinkles



DISTORTED PERCEPTIONS OF YOUTHFULNESS BY INFLUENCERS ON SOCIAL MEDIA

Authors

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Abstract

As influence of social media and presence of influencers imparting knowledge regarding skin care increases, it becomes of utmost importance and urgency that dermatologists tighten their reins against this new form of cosmetologic quackery. From basic home remedy skin care to serious dermatologic advice, everyone has an opinion. While social media has spread awareness, it has also spread an unreasonable desire to bottle youthfulness among the followers of these influencers. We cannot control what is on the internet, but as dermatologists it is our duty to impart proper and realistic knowledge to our patients regarding such influence.

Introduction

A generation ago, the concept of skin care in the 30s or younger was almost non-existent. In today's time, every individual irrespective of age, gender or status has some form of basic skin care regimen. Men have become as aware as women and teenagers have become as conscious as elders of how they look. A huge role in the spread of this awareness has been played by the internet, where a sea of information lies at hand at all times. Any individual with a cosmetic query would first turn to the internet and try a thing or two, then to a friend and probably eventually to a qualified medical professional. As platforms such as Facebook and Instagram are used more frequently by patients seeking health advice and support on dermatologic conditions, literacy in online dermatologic trends becomes more important to improve communication, combat misinformation, and improve patient health outcomes [1].

Social media is a faster, easier and cheaper way to advertise as compared to the older methods of advertisement like television, newspaper, magazines or radio. The internet boom gave rise to two sets of individuals: anybody with a smartphone and a ring light became an influencer, and anybody with access to the internet became an influencee. The influencers

who promote skin care and skin health have without a doubt spread an awareness that we need to take care of our skin from an early age. They have made a huge contribution to how important sun protection is and use of sunscreens is the first step to anti-ageing.

While we can give some credit to the social media influencing bandwagon, the negatives seem to be emerging rapidly. One wellknown and commonly seen example is use of facial oils. Under the garb of promoting supple and youthful skin, face oils have also increased acne, comedones and milia formation. Once PCOD and stress is ruled out, the reason behind acute adult-onset acne can most likely be massage with a facial oil. Another product that came holding hands with facial oils is face massagers or gua sha. While face massage has its benefits of promoting circulation and reducing puffiness, it does not need overpriced jade or rose quartz face massagers, and it certainly doesn't lead to facial contouring as promoted by certain influencers. A small place is also held by sheet masks: a product that nobody needs but everybody wants. All this, because a social media influencer has been raving about the benefits of these products with their flawless skin as a proof, hiding behind multiple filters.

Social media influencers have helped a lot with promoting cosmetic skin care brands. These products are liked by many as a part of their skin care regimen and pose relatively less side effects due to lower than permissible concentration of the active molecule than that of a pharmaceutical product. The price range of a product by a decent brand is most likely to be on a higher side. The influencers are all ready to spend the coin for a cosmetic brand, but will most likely crib while paying for products written in a prescription by a dermatologist, calling it "too expensive". A dermatologist has always been stereotyped with writing expensive prescriptions, but it is of importance to realise that those products have FDA approved concentrations, and are not just products with a smidgen of active molecule in a fancy package, like niacinamide serums, vitamin C serums or AHA and BHA serums.

Effects and side effects

Most of the social media influencing is almost harmless till a certain extent. One could give it a try and move on if not satisfied. But, social media influencing particularly related to skin care, gave birth to a new form of quackery that dermatologists have to face nowadays. Be it peer pressure or media influence, everyone is a target audience. Everyone wants to delay ageing or not age at all. It is appalling to see the influencers recommending use of a tretinoin cream as "retinol" to reduce fine lines and improve texture. There are no disclaimers, no methods of application, no precautions; just rub it over your face like a moisturising cream and viola! For obvious reasons the emergence of side effects was just around the corner. Some influencers make the audience believe that unless one starts using a seven-step regimen as early as their

teenage years, they will age prematurely and all hell will break loose. So, we encounter a lot of patients aged 14 to 17 years of age who are using retinols, niacinamide, vitamin C serums, hyaluronic acid serums, AHAs, toners, exfoliators and scrubs. This has led to an increase in the number of patients presenting to us with facial sensitivity, contact dermatitis and 'red face syndrome'. When people started to notice side effects like burning, redness, irritation, dry and flaky skin, there emerged a new product of influence: Bakuchiol. It is a plant-based product which promises to be as effective as retinol without the side effects. This is a tall claim that has no scientific basis, but also a classic example of fear-based marketing. An influencer who was recommending retinol from an early age is now imparting knowledge on how harmful it is. Some influencers encourage the use of home-use devices like low grade radio frequency and ultrasonic devices. They make the viewers believe in the unrealistic and almost magical properties of these devices which is obviously not true and is only a way to promote a product. Some advocate the inappropriate and frequent use of microneedling devices and dermarollers followed by application of serums that has increased the chances of contact sensitivity with these products, let alone the fact that none of them seem to mention how to maintain sterility of the roller. Sometimes half-baked scientific information without much consensus is peddled as bona fide knowledge, especially the use of collagen shots, IV glutathione and other IV infusions of multivitamins for anti-ageing. The medical community does not claim to have all the answers but the use of medications and devices is evidence based through thorough trials and studies, which is far from true for social media influencers. Product advertisement is based on word of mouth and brand promotion on the social media.

Unrealistic expectations

Another new trend is, advertisement of a dermatologist by an influencer on an online platform. The before and after comparison pictures are outstanding for obvious reasons. The problem is not the advertisement, the problem is unrealistic expectations the viewer forms for these procedures, and demands for the exact same procedure with the exact same results. Sometimes the viewers are so adamant that it becomes tough to counsel them against or for something better. It needs to be kept in mind that as a viewer, they are not wrong in such demands because the results are put in front of their eyes by such influencers. What is important as a dermatologist is to influence them better than a social media influencer.

Everyone's skin is unique and requires a bespoke plan – There is no magic wand!

It is a basic rule of skin care, that every skin is not the same. While a particular product might have worked wonders for some, it might do more harm than good to another. The want of increasing the number of views and followers has led to increase in consumerism in such a way that people have become dependent on such products. People are ready to make any

false and unverified statements just to garner views and make money out of it, may it be a useless product or a harmful one.

Awareness and insecurities

The distorted image of youthfulness presented on social media has probably increased the awareness, but more than that, somewhere it has increased the insecurities among many people. Selling a product is one thing, but making someone think that using it will make them “look” better or younger is another. As dermatologists, it is our duty to impart knowledge with proper facts. Communication between a dermatologist and a patient is crucial for effective diagnosis and treatment[2]. We should educate the patients that gathering correct information is more important than harbouring irrelevant and incorrect facts. As members of online forums frequently consult social media for dermatologic information, advice posts may become more influential in the decision-making patterns of dermatologic patients [1].

The presence of social media has increased awareness regarding self-image and how to maintain our body and looks. It has educated people to start maintaining themselves at an early stage, rather than desperately looking for means to reverse ageing in the later part of life. At the same time, social media has increased peer pressure and want of using unnecessary products to reach unreasonable beauty standards. It has created unreasonable expectations out of products and procedures which has no scientific basis. Half baked information is provided without any disclaimers and precautions, which makes the life of consumers and dermatologists tough.

While we cannot control what is on the internet, but we can teach the difference between right and wrong. As a consumer, the patients should understand that it is their face and skin that is at stake. They should be as aware of the products that go on their face as they are about maintaining their body image. And most of all, there is grace in ageing in a healthy being desperate to not age at all and deforming ones face and mental peace.

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QUIZ :

Dr Sanjana AS, MD, FRGUHS. Professor, Department of Dermatology, BGS Global Institute of Medical Sciences, Bengaluru

Fill in the blanks :

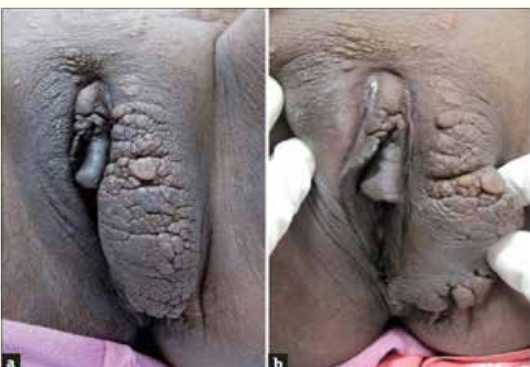
- Collagen chains have helical domain consisting of gly-x-y
Where x is _____
Where y is _____
- collagen constitutes- ___ % of dry weight of skin
- _____collagen is abundant throughout the dermis
- type 1 collagen fibers constitute ___ % in dermis
- the collagen located in papillary dermis and around adnexa is type - & -
- _____collagen forms the anchoring fibrils in DEJ;dermo-epidermal junction
- _____ type of collagen filler approved by the USFDA to treat scars
- _____collagen is confined to basal lamina
- electron microscopy demonstrates _____molecules of collagen fibres
- _____is used to stain collagen

Key answers :

- 1.** proline, hydroxyproline | **2.** 75% | **3.** type 6 | **4.** 80-90% | **5.** type 3 & type 5 | **6.** type 7 | **7.** bellafill; bovine collagen and PMMA(polymethyl methacrylate) | **8.** type 4 | **9.** triple helical molecule | **10.** masons trichrome

PICTURE QUIZ :

- Identify The Naevi



A Collagenomas are connective tissue nevi that represent hamartomatous proliferation of collagen and have been defined based on their pattern of distribution (localized or generalized) and mode of inheritance (acquired or inherited).[2]



Question: patients with which comorbid status cautioned to use thermogenic collagen?

Ans- pre hypertensives and risk for hypertension
 Ref: the effect of a single dose thermogenic supplement on resting metabolic rate and hemodynamic variables in healthy females, a randomized, double-blind, placebo controlled cross over trial. billicampbell; journal of international society of sports nutrition



Question: source of marine collagen

ans: wild-caught cod



Question: name any three use of oral collagen supplementation in dermatology?

Ans: pressure ulcers, xerosis, skin aging and cellulite

Ref: oral collagen supplementation: francesca. d. choi et al. J Drug Dermatol. 2019



COLLAGEN SUPPLEMENTS- THE TRENDING

Dr. Sonali Langar, Consultant Dermatologist, Skin Remedies, Noida

The use of collagen for skin care has been rising steadily over the last few years. Collagen supplements, originating from various sources (porcine, bovine, marine, plant derived) are available in various formulations (as protein, gelatin, hydrolysate, peptides) all around the world and are marketed as agents helping in improving skin hydration and modulating skin aging¹. The use of collagen supplementation in dermatology remains controversial due to the lack of regulation on the quality and quantity of ingredients in over-the-counter available collagen supplements, as well as minimal availability of peer-reviewed literature on the subject. However due to the increasing trend in its popularity and positive feedback regarding patients, its mention worthwhile.

Collagen is the most abundant component of the extracellular matrix constituting 75% of skin's dry weight.² Qualitative and quantitative decline in collagen is seen with cutaneous aging. Collagen protein is a right-handed triple helix of parallel polypeptides where every third amino acid residue is glycine (Gly) resulting in X-Y-Gly triplets, where X and Y are frequently proline (Pro) and 4-hydroxyproline (Hyp), respectively, making Pro-Hyp-Gly the most common amino acid triplet unit found in collagen.³ Native, animal collagen can be extracted from connective tissue and variously processed to give the formulations suitable for human consumption. Collagen, when denatured by heat, forms Gelatin, which has been commonly used as a food source and in traditional Chinese medicine for centuries. Gelatin on further enzymatic hydrolysis produces collagen hydrolysates (CH). CH has a lower molecular weight, higher water-solubility, and no gelation properties, allowing CH to be easily formulated into drinks and jelly sticks for oral consumption.⁴ CH on further degradation leads to formation of collagen bioactive peptides including dipeptides and tripeptides that are resistant to intracellular hydrolysis by peptidases and systemic hydrolytic enzymes.⁵ Upon human consumption, collagen bioavailability studies demonstrate that dipeptides and tripeptides can be detected in the bloodstream. Mouse models employing radioactively-labelled CH show dipeptides, reaching the skin rapidly after CH ingestion, and are retained in the tissue for up to two weeks. ⁶ Among the various clinical trials conducted to evaluate the effectiveness of collagen supplementation in human skin, CH is most commonly used, followed by collagen tripeptide (CTP) and collagen dipeptide (CDP).

Effect of Collagen Hydrolysate (CH) on skin

CH is widely studied as far as its effect on skin is concerned. A 12-week study with 106

Caucasian females (age range, 40 to 65 years) demonstrated that oral intake of 10gm/day fish CH led to a significant 8.83% increase in collagen density (vs 0% with placebo; $P<0.01$), and a 31.2% reduction of collagen fragmentation (vs increased fragmentation with placebo; $P<0.05$).⁷ Another study demonstrated the effect of CH supplementation on skin hydration. Forearm dry skin was tested in 69 healthy female patients (age range, 33 to 55 years). Over a period of 8 weeks, patients received either 5.0g/d or 2.5g/d of CH, or placebo. Both CH groups had significant improvement in skin elasticity and hydration, as assessed by cutometer, at both week 4 and week 8 of treatment compared with placebo ($P<0.05$).⁸ CH has also been evaluated for its beneficial effects in the treatment of photodamage. An 8-week study on 114 healthy female patients (age range, 45 to 65 years) demonstrated that consumption of 2.5g/d CH resulted in a significant reduction in eye wrinkles compared with placebo ($P<0.05$), and an increase in procollagen type I (65%) and elastin (18%) content. ⁹

Effect of Collagen Tripeptide (CTP) on skin

Not much data is available on the effects of CTP on skin. Literature shows its use in very few RCTs. One RCT showed a total of 40 patients (32 female, 8 male) on dosages of 3 g/d for 4 weeks or 12 weeks. Eight healthy Korean volunteers (age range, 33 to 44 years) who underwent treatment with non-ablative, fractional 1550 nm photothermolysis were supplemented with 3 g/d CTP post-treatment and showed significant improvement in skin hydration at day 3 ($P<0.05$) and skin elasticity at day 14 ($P<0.05$).¹⁰ Although the studies using CTP supplementation are limited, preliminary results demonstrate improved skin hydration and elasticity, as well as improvement in post-laser erythema and hydration recovery.

Effect of Collagen Dipeptides (CDP) on skin

Very limited studies are available in literature, notably a single RCT using CDP supplementation in 85 Chinese females (age range, 25 to 57 years) for 8 weeks. It showed that consumption of supplements with a higher content of CDP significantly improved facial skin moisture and elasticity.¹¹

As already stated, the use of collagen supplements in dermatology has been controversial due to the lack of large-scale RCTs. There are various shortcomings of these studies. The outcomes reported in the studies are highly dependent on the measuring tools. Objective measures such as improvement in skin elasticity, hydration, and collagen density, rely on qualitative, and subjective measures such as visual scales and patient satisfaction and product appreciation. Secondly these do not incorporate a single dosage regimen of collagen ingestion. The collagen supplements used in these studies are not comparable, which can lead to inconsistencies when aggregating the data Thirdly optimal duration of collagen

treatment has not been defined in these studies. It is worth noting that not all collagen supplements are created equal. The concentration and composition of bioactive collagen peptides (dipeptides such as Pro-Hyp and Hyp-Gly, and tripeptides such as Pro-Hyp-Gly) should be considered when comparing collagen supplements. Available over-the-counter supplements often also include hyaluronic acid, vitamins, and minerals, thus adding confusion to the real beneficial effect of collagen alone. Lastly many of the studies are also limited by only involving patients of particular geographic regions, sex, and age groups. While there were many different types of objective measurements, it is unclear how each translates into clinical appearance. It has been argued that the amino acids required for collagen synthesis can be consumed from a normal protein diet, which negates the need for additional collagen supplementation.

Based on the limited number of studies available, patients should be appropriately counselled on the use of collagen supplements, especially regarding the purity of active ingredients and possibility of unlisted components. Further studies will need to be conducted to further elucidate a role for collagen supplementation and determining the optimal dosing regimens, and also in defining the ideal patient based on age, gender, skin type, and ethnicity to be benefitted by collagen intake. As this trend continues to gain in popularity, especially with its widespread availability for consumers, there is a need for more rigorous research to validate its effects. Until then, clinicians should be aware of the current evidence in the literature in order to guide patients properly.

MANUFACTURER	SOURCE	COLLAGEN TYPE	SERVING SIZE	COLLAGEN DOSING
NUTROVA	MARINE COLLAGEN	COLLAGEN PEPTIDE	12gm sachet	5.5gm collagen/serving
TRUEBASICS	BOVINE COLLAGEN	COLLAGEN HYDROLYSATE	5gm sachet	2.5gm collagen/serving
HEALTHKART	MARINE COLLAGEN	COLLAGEN PEPTIDE	5gm scoop	5gm collagen/serving
HEALTHY HEY	BOVINE COLLAGEN	COLLAGEN HYDROLYSATE	6gm scoop	5gm collagen/serving
KAYOS	BOVINE COLLAGEN	COLLAGEN PEPTIDE	12gm scoop	10gm collagen/serving
CUREVEDA	PLANT COLLAGEN	PROTEIN BLEND	20gm scoop	12gm collagen/serving

Table 1. Common Collagen supplements available in India

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BIO REMODELLING OF COLLAGEN WITH INJECTABLE SUBSTANCES

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Ageing Skin

The visible signs of ageing on the face can have a major impact on the mental well-being and confidence of an individual. Skin sagging, volume loss and changes in the texture or quality of the skin, all play a role in diminishing the youthfulness of a face.

Various non-surgical interventions like Lasers, Energy based devices, Botulinum toxin, Threads, Dermal Fillers and PRP injections are used to re-establish youthful features in an ageing face.

Changes in Dermal Matrix in Ageing Skin

The dermal matrix comprises collagen and elastin fibres, enmeshed in a ground substance made of polysaccharides. Each of these components is manufactured by fibroblasts. 1

Ageing of the skin is a complex process determined by both intrinsic and extrinsic factors. Ageing skin shows an overall degradation of the dermis due to fragmentation of collagen bundles. A reduction in the fibroblast collagen production and increase in matrix metalloproteinases (MMPs) leads to a reduction in the amount of collagen types I and III. Elastin microfibrils become disorganised, alongside a decrease in hyaluronic acid, proteoglycans and glycosaminoglycans.2

Neocollagenesis and Injectables

The loss of collagen, elastin and ECM in general, leads to the primary complaints of ageing skin such as fine and deep wrinkles, laxity, loss of elasticity, dryness and thinning. Dermal Fillers are agents used to correct such ageing features. They can be classified as temporary, semi-permanent and permanent.

However, there is another classification of dermal fillers -

- a). Replacement Fillers- they occupy space and directly fill the deficient areas thereby volumizing, augmenting and improving wrinkles.
- b). Stimulatory Fillers - they stimulate collagen, elastin, and ECM production, thereby increasing dermal thickness and improving skin texture.

The distinction is not absolute, as replacement fillers also induce neocollagenesis and stimulatory fillers also have slight filling effect. 3

Substances used for bio remodelling may be placed superficially in tiny quantities at multiple

spots over a large area of the skin, or in the deeper planes. They are used to confer elasticity, smoothness, hydration and tautness in areas such as mid- and lower face, neck, décolletage, upper arms, abdomen, legs, and buttocks.⁴

Mechanism of Bio Remodelling

Among all the substances used for soft tissue filling, the role of neocollagenesis is definitely known for a few (Table 1) ⁵

1. Silicone - Silicone induces collagen production by launching an inflammatory reaction.
2. Calcium hydroxylapatite (CaHA) microspheres induce histiocytic and fibroblastic response, acting as a scaffold for neocollagenesis. ⁶
3. Poly-L-lactic acid (PLLA) crystals incite an inflammatory reaction and lead to fibroplasia and formation of fresh collagen. ⁷
4. PolyCaproLactone (PCL) microspheres launch a minor inflammatory cascade resulting in wound healing by formation of new collagen. The microspheres resist phagocytosis and act as a unique scaffold for the newly formed collagen type-I fibres. ⁸
5. Hyaluronic Acid (HA) Several clinical and histological studies have now revealed that HA filler induces dermal remodelling and neocollagenesis, even after the filler itself is degraded. ^{9,10}The mechanism seems to be elongation of fibroblasts due to mechanical stretching by the HA gel, with subsequent increase in procollagen I and collagens I and III production. ¹¹

Substance	Mechanism of Neocollagenesis
Silicone	Launches inflammatory reaction
Calcium Hydroxylapatite (CaHA)	Acts as a scaffold for new collagen growth
Poly L lactic acid (PLLA)	Launches inflammatory reaction
Polycaprolactone (PCL)	Launches inflammatory reaction and acts as scaffold
Hyaluronic Acid (HA)	Causes elongation of fibroblasts to stimulate them to produce new collagen

Injectable Substances Used for Bio Remodelling of Collagen

Calcium Hydroxylapatite (CaHA) microspheres

Calcium hydroxylapatite microspheres (CaHA, Radiesse; Merz Pharmaceuticals GmbH, Frankfurt, Germany) comprise biodegradable particles suspended in an aqueous carboxymethyl cellulose gel carrier. Undiluted CaHA is highly viscoelastic, and more suitable for deep implantation for volumizing tissue. For neocollagenesis however, we require a product that is more easily spreadable in the superficial tissues such as deep dermis or subdermis. Dilution with lidocaine or saline makes it amenable to such use. Diluted CaHA (CaHA diluted 1:1 with saline/lidocaine) provides both volume and dermal remodelling, whereas hyper dilution (CaHA diluted more than or equal to 1:2 with saline/lidocaine) is better suited for neocollagenesis. 12

To optimise results, a thin, uniform deposition of diluted or hyperdiluted CaHA is needed. This is done by fanning or parallel, serial retrograde linear threads in the deep dermal or subdermal plane. Post injection massaging is recommended to evenly distribute the product. Response is assessed after 3 months and reinjection recommended if needed. Maintenance is needed at 12-18 months. Adverse events may be pain, bruising, swelling and induration. 13

Poly L Lactic Acid (PLLA)

PLLA is a synthetic, biocompatible, and biodegradable polymer of lactic acid. It is available as a lyophilized powder in a sterile glass vial comprising PLLA microparticles (40–60 µm) (Sculptra®, Berwyn, PA, USA). After injection, an effect of filling is observed transiently, but this reduces as the product gets resorbed. The actual effect due to neocollagenesis is observed over 3-4 weeks as a diffuse, subtle increase in volume leading to a very natural-looking restoration of youthful appearance. Prior to injection, the product must be reconstituted with sterile water in a dilution of 5 - 9 ml. After dilution, the product should be left to hydrate for upto 24 hours before injecting. Injection is done by subcutaneous fanning or crosshatch technique in a dose of 0.1 to 0.3 mL per square cm. Undercorrection is always the key. Vigorous massage is carried out to evenly distribute the filler. Treatment may be repeated after 4 weeks if more restoration is needed. Studies have shown that the effect lasts for up to 25 months. 14 Care should be taken to avoid superficial placement as it may lead to appearance of nodules or fibroplasia. Deep placement must also be avoided so as to prevent formation of nodules due to product trapped in muscle fibres. 15

Polycaprolactone (PCL)

A novel biodegradable collagen stimulator, Ellansé® (Sinclair Pharmaceuticals, London, UK), composed of polycaprolactone (PCL) microspheres in an aqueous carboxymethylcellulose gel carriers, is available as a bioremodelling or stimulatory filler. While the gel carrier is gradually resorbed by macrophages in 6–8 weeks, the PCL microspheres stimulate neocollagenesis. Subcutaneous injections by linear threading, fanning or cross-hatching techniques are recommended. Post injection massage should be performed for even distribution.

Undercorrection is advised. Complications include nodule formation resulting from too superficial placement or large boluses.¹⁶

Hyaluronic Acid

It has been established that small particle, cross linked HA fillers can indeed improve skin texture and quality due to neocollagenesis.^{17, 18, 19} This technique of injecting HA in multiple tiny droplets in the intra or subdermal plane on large skin areas is known as the SKIN-BOOSTING CONCEPT.²⁰ Such placement of the small particle HA filler causes a more diffuse and homogeneous neocollagenesis than direct placement into wrinkles and folds. Restylane Vital (Galderma, Uppsala, Sweden) was the first product designed specifically for skin-boosting. Other comparable formulations are Belotero Balance (Merz Pharmaceuticals, Greenboro, N.C.) and JuvedermVolbella (Allergan, Irvine, Calif.)

Injection Technique - Intradermal/subdermal injections in doses of 0.01 - 0.02 ml at points placed 1 cm apart. Marking a grid of 1 cm² assures even distribution of the product. A total of 1 ml per side of the face is usually recommended. Various protocols of treatment are advised by different manufacturers ranging from one session every month for three months, to one session followed by half of the dose after another month and a final session three months later. Results last for 6-9 months.¹¹

Mesotherapy / Biorevitalization with HA and biological actives

The stabilized, cross linked HA fillers are able to resist degradation by the skin hyaluronidase and hence have greater longevity in the skin. However, various formulations containing non- cross linked HA in combination with vitamins, minerals, amino acids, nucleotides, coenzymes, and antioxidants are being used for rejuvenation and hydration of skin. The principle for recommending their use is a multipronged approach to promote fibroblast and collagen growth, antioxidant effects as well as regeneration of ECM.²¹ While some studies have shown their benefit in improving skin quality, there is a lack of controlled studies and trials that convincingly prove their use.^{22, 23} Moreover, there is a lack of standardisation of contents and method of use.

They may be either administered using delivery devices, mesotherapy or intradermal injections. The usual side effects after such treatments are erythema, swelling, pain and bruising. Lumps may form if HA is injected too superficially. Rarely, granulomas have been reported.⁴

Profilo® (IBSA Farmaceutici Italia Srl, Lodi, Italy) is a preparation containing a blend of high- and low-molecular-weight HA (H-HA and L-HA) - based on stable hybrid cooperative complexes (HyCoCos) using a patented technology, that creates a highly purified sodium salt of HA without

any crosslinking agents. It is available in a 2 ml prefilled syringe containing an HA concentration of 3.2%, with 32 mg of H-HA and 32 mg of L-HA, in 2 mL of buffered sodium chloride physiologic solution. ²⁴This specific concentration of the stabilised HA hybrid complex integrates with the endogenous HA. L-HA stimulates fibroblasts and keratinocyte proliferation, and H-HA provides a dermal scaffold action and the combination itself is claimed to increase Type I and III Collagen and elastin.²⁵

Five injection points on each side of the face - zygomatic protuberance, nostril angle, inferior margin of the tragus, lip marionette lines, and mandibular angle - are chosen. 0.2 ml bolus is deposited at each point. Treatment is repeated after 4 weeks. Bruising, edema and minor pain may be experienced. A volumetric as well as tightening effect, contributing to overall facial attractiveness has been reported.²⁶

Conclusion

Bio remodelling of collagen with injectable substances is a relatively new concept that provides a diffuse regeneration of extracellular matrix to provide an overall rejuvenation of ageing skin. Various substances are used for this purpose with differing levels of success. Innovative mixtures and cocktail solutions, promising to be the elixir of youth have yet to be proven to be of definite positive impact.

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PERCUTANEOUS COLLAGEN INDUCTION- RESTORING YOUTHFULNESS

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Skin aging is a complex biological process that arises from : intrinsic aging (influenced by genetics factors, cellular metabolism, hormone and metabolic processes) and extrinsic aging caused by chronic light exposure, pollution, ionizing radiation, chemicals and toxins.

Maintaining skin health and reducing the signs of skin aging are an important part of patients life and wellbeing

Wrinkling and aging changes of skin occurs almost entirely as a result of changes in the dermal collagen. The dermis diminishes in bulk and the collagen per unit area decreases with age along with a steady decrease in number and size of fibroblasts and decrease in their synthetic ability.(1)

The ideal treatment would be to preserve the epidermis and promote normal collagen and elastin formation in the dermis. Percutaneous collagen induction takes us closer to this ideal

Percutaneous Collagen Induction

Microneedling or percutaneous collagen induction was started in 1997 and has proved to be a simple, safe and fast method for safely treating wrinkles and scars

It is a minimally invasive technology that involves repetitive skin punctures with sterile microneedles to disrupt dermal collagen. The underlying mechanisms of action rest on producing a pattern of non-ablative and non-confluent puncture wound pattern to the dermis with a resulting regenerative effect to the skin. Epidermis is not removed and hence heals rapidly with negligible downtime.



Schematic Diagram Of Woundhealing After Tissue Injury.

Illustration : dr Anushree Baishya

Microneedling leads to a cascade of wound healing effects ultimately leading to matrix remodelling and laying of healthy collagen fibres

In contrast to normal wound healing where there is scar tissue formation, the controlled trauma of microneedling minimizes environmental stresses (eg, infection, ultraviolet radiation, mechanical tension) to maximize tissue regeneration. The ultimate result of treatment is tightening of skin laxity, smoothing of scars, and improvement of wrinkles(2)

Beneficial Effects Of Microneedling On Aging Skin Include:

Increase in epidermal thickness by 112% over eight weeks; histological findings include denser and more compact epidermis with more cellular layers and fewer gaps in the stratum corneum

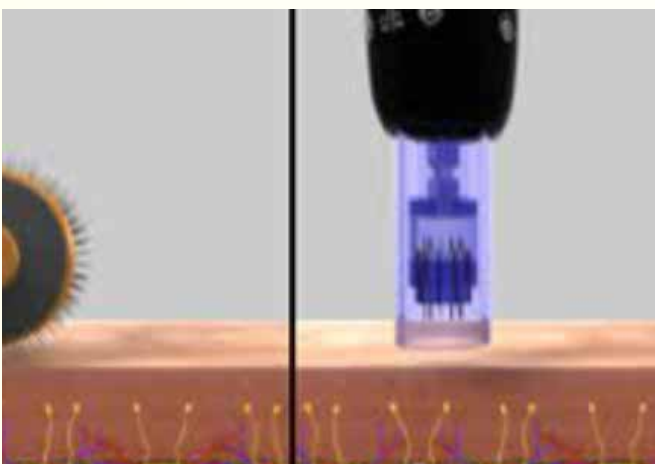
- a) Upregulation of type 1 collagen expression resulting in a denser network of thicker collagen fibre strands
- b) Increased expression of stromal glycosaminoglycans within the dermis.
- c) Increased fibronectin expression, a marker of fibroblast differentiation.

Devices Available For Microneedling

Microneedling can be delivered using a range of devices, which can be divided into: manual, motorised as well as radiofrequency coupled devices Manual devices include rotary drums as well as static needling devices; the latter allow treating smaller more localised scars. Motorised devices consist of a powered handpiece and a disposable needle cartridge unit with treatments being delivered by moving the motorised device over the skin in multiple directions. Radiofrequency needling equipment works by creating radiofrequency thermal zones, hence imparting combined mechanical and thermal stimuli to the dermis.

Manual devices

- a) Dermaroller is a simple handheld drum shaped roller consisting of handle with a cylinder



Dermaroller and Dermapen

Picture courtesy: internet (pinterest image)

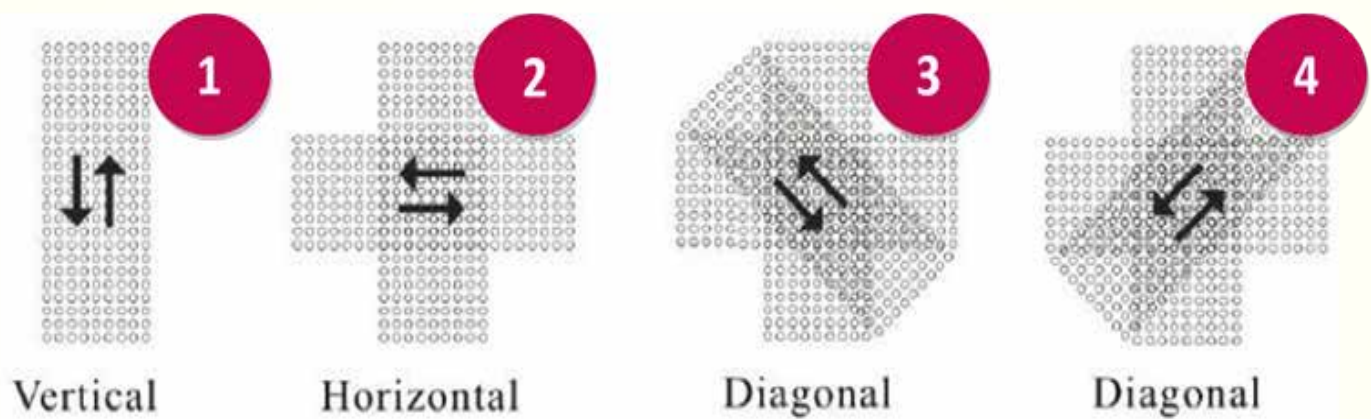
studded with 192 microneedles all around in eight rows 0.5–1.5 mm in length and 0.1 mm in diameter. High ratio of tip length versus diameter, quality, hardness, and sharpness of needles are important properties of good needles. Neocollagenesis occurs with a 1.5-mm length needle at a depth of 5–600 μm . Site-specific consideration for the type of dermaroller

1. Periorbital area: 0.5-mm diameter microneedle
2. Nose: 1-mm diameter
3. Perioral area: 1–1.5-mm length and narrow barrel

Dermastamp –having needle heights of 200 μm in a 5-mm diameter circular arrangement, used for small areas such as upper lips and eye.

Procedure of dermaroller

- a) The area to be treated is stretched with one hand and the instrument is rolled over in a direction perpendicular to that of stretching force with other hand. Roller is rolled in horizontal, vertical, and both oblique directions for at least 15–20 times.



Direction of dermaroller movement;

image source: pinterest: Directions to roll the derma roller x 4/6 times

Rolling with a standard dermaroller will result in approximately 250 holes per square cm up to the papillary dermis. While rolling, the handle should form an angle of 30° – 40° with the barrel for smooth to-and-fro movement of the barrel over the stretched skin.

Pinpoint bleeding is considered as clinical end point. Erythematous flushing is the clinical end point where shorter needles are used such as periorbital Motorised or battery operated.

- a) Dermapen – Operated by battery and have disposable heads which can be used in more than one patient. The needle tip has 9–12 needles arranged in rows with the high-speed mode (700 cycles/min) and the low-speed mode (412 cycles/min)
- b) Dermafrac: combines microneedling with microdermabrasion

Microneedling Coupled With Radiofrequency

RadioFrequency uses the emission of a high-frequency oscillating current that flows from an electrode tip to the target tissue. RadioFrequency devices can use microneedling to bypass the epidermis and deliver electrical current directly to the dermis.

It uses extra sharp microneedles to heat the depths of the dermis, Open pores, fine lines, wrinkles, and scarring can be treated and leads to overall skin tightening

Radiofrequency coupled devices also differ in the needle tips, which can be insulated or non-insulated. Insulation consists of a non-conductive coating that lasts the length of the epidermis. non-insulated microneedling RF devices improve skin texture without causing dyspigmentation or epidermal burns. Microneedling RF with non-insulated needles has even been shown to be safe in skin types III to V after multiple treatments for acne scars. Another advantage of non-insulated needles is that they allow for more effective heating and coagulation of vessels in the dermis.(3)

Counselling And Ruling Out Contraindications

- Counselling – Explanation of steps of procedure, its outcome, side effects, and complications to the patients
- Contraindications to microneedling include collagen vascular disease, the presence of verruca (microneedles in theory could spread viral-infected or neoplastic cells), active skin infection, and a predisposition to keloid formation.
- Informed written consent and photographs
- Priming with topical retinoids. Vitamin A and C increases the production of collagen

Procedure

Under all aseptic and antiseptic measures, area to be treated should be cleaned with spirit and povidone-iodine Topical anesthesia, i.e., EMLA, is applied over the area to be treated before 45 min which is cleaned with normal saline before starting the procedure.



Thick layer of topical anesthetic agent



Bleeding and oozing immediate post procedure



Erythematous flushing immediately after procedure

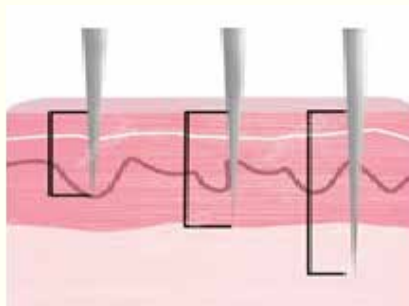
Postprocedure care

Treated area is covered with damp swabs to absorb the any serous discharge. Antibiotic, analgesics and anti-inflammatory agents may be given.

Strict avoidance of sun exposure post procedure

Actives in the form of tretinoin / HQ and other bleaching agents maybe avoided for 10-14 days till the erythema and crusting settles completely.

Interval Between Sessions



Upto 1mm:
epidermis

1mm to 1.5mm
upto papillary dermis

1.5mm to 3mm Upto
reticular dermis and subcutis

Microneedle depth schematic.

Illustration : dr anushree

The gap between two sessions depends on the length of needle and tissue injury

Time interval between two sittings varies from 4 to 8 weeks. In different studies, total numbers of treatment session performed varied from 2 to 6. It is not established yet if more number sittings could result in still higher efficacy.

Common adverse effects and drawbacks

- 1) Excessive downwards pressure specially over bony prominences may lead to linear scarring (facial papules in a horizontal and vertical linear pattern similar to a tram track) called tram-track scarring.(4)



Pic courtesy: dr anushree baishya

Milia pruritus, pustules and crusting , contact allergies recurrence or flares of acne are possible, may occur.

As with any procedure that penetrates the skin barrier, infection is a risk that can be seen with MN as well.

Postprocedure erythema is an expected and frequently encountered side effect. Transient erythema may last for a day and, if prolonged, often self-resolves within three to seven days.

Other common adverse effects of include mild

pain, edema, and variable postinflammatory dyspigmentation (5)

Poor quality needles can cause tissue damages, lacerations, hemorrhage, linear hypertrophic scars, or postinflammatory hyperpigmentation

Conclusion

Microneedling has proven to be safe and minimally invasive, non surgical modality for skin rejuvenation and skin tightening. (6) Various devices and needle parameters help in achieving optimum results. Microneedling can be done along with with other treatments for skin rejuvenation such as platelet rich plasma chemical peels. (7) Compared to the ablative treatment modalities for skin resurfacing, microneedling is less expensive and requires less recovery time, but does require more treatments for notable results. Multiple treatments combined in a rational way can give more satisfactory outcome

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RESTORING COLLAGEN IN THE AGED SKIN WITH RETINOIDS

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Aging results in thin, dry, pale, and wrinkled skin. Although the normal epidermal differentiation is preserved, there is epidermal thinning, with reduced of keratinocytes. Dermal thinning with age results in reduction and disorganization of connective tissue. Fibrillar collagen bundles, elastic fibers, proteoglycans and other extracellular matrix molecules form a matrix with imbedded fibroblasts impartingskin its strength and resiliency.Their degeneration with age results in increased fragility and a generally less youthful appearance (Figure 1).

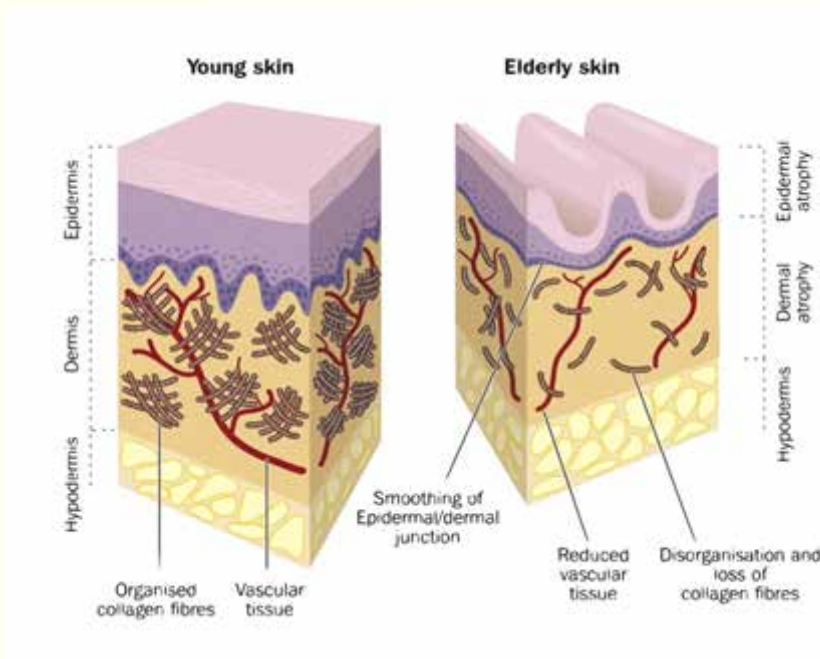


Figure 1. Structural changes in skin with aging

Dr. Sandeep Arora

Collagen forms 90% of the wet weight of the dermal connective tissue. Extrinsic aging by UV light results from a complex molecular dysregulation effective downregulation of protective protein tyrosine phosphates and induction of mitogen-activated-protein-kinases causing upregulation of transcription factor AP-1 and its target genes, matrix metalloproteinases (MMP1& 9) which in turn cause collagen degradation as well as reduced posttranslational processing of procollagen peptides for formation of new collagen.^{1,2} These MMPs consist of collagenases (responsible for initial cleaving of collagen) gelatinases and stromelysin (degrade the denatured collagen).

Photodamage also results in an environment inefficient in maintaining mechanical stressors and fibroblast fibre interaction required for efficient collagen production. Similar induction of MMP is induced by cigarette smoking, air pollution stress and excess caffeine.³⁻⁵ The gradual decline of new collagen production and degradation of existing fibres results in the aging of skin.⁶ Similarly, in

intrinsic skin aging, reduced collagen synthesis occurs due to age-related reduction in collagen-synthetic activity in the resident fibroblast population. The end result in both intrinsic and extrinsic aging is a decrease in the number of interstitial fibroblasts, reduced connective tissue (collagen) fiber bundles, an increase in space between connective tissue fiber bundles, and an increase in histologically observable connective tissue disorganization (Figure 2).

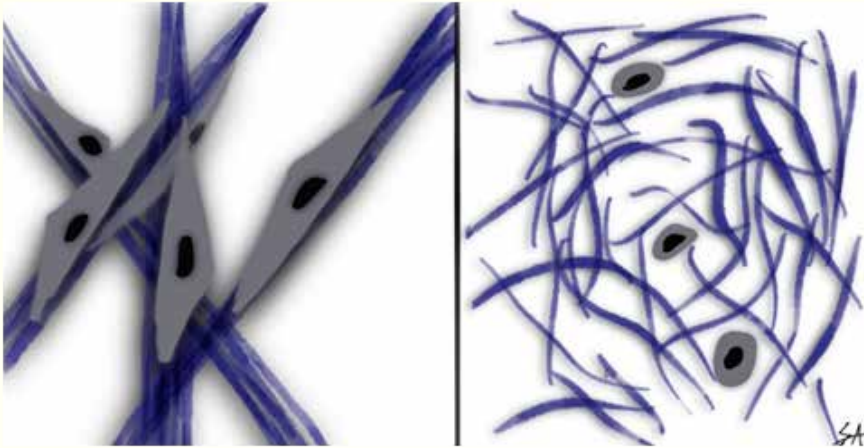


Figure 2. Representational diagram of younger skin with well organised collagen architecture and associated cells (left) and disorganized and broken down collagen with increased space and ineffective fibroblastic activity in aged skin (right).

Retinoids

'Retinoid' refers to analogues of vitamin A, synthetic or natural. These molecules bind to and activate the appropriate nuclear receptors and to induce transcription of relevant genes either directly or after metabolic transformation. The retinoid family comprises vitamin A (retinol) and its natural derivatives such as retinaldehyde, retinoic acid, and retinyl esters, and their synthetic derivatives (tretinoin, isotretinoin, tazarotene).

The lipophilic retinoid molecule penetrates the superficial epidermis and mediates its effects via the cytosolic retinoic acid-binding protein type-II, the nuclear receptors and retinoid X receptors (RXR- α , β and γ). Retinoic acid, RXRs and their heterodimers mediate the actions of topical retinoids.⁷

Role of retinoids in collagenization

Kligman et al initially demonstrated the therapeutic effect of retinoids on photoaged skin where they described deposition of reticulin fibers and new dermal collagen formation (type I and III) with angiogenesis in the papillary dermis following application of 0.5% tretinoin for 3-12 months. All-trans retinoic acid, formed from retinol in human skin, inhibits AP-1 activation as well as MMP-1 and MMP-9 gene expression, hence preserving procollagen longer. Topical Vitamin A (all-trans-retinol) 1% application increases fibroblast activity and collagen induction within a week. Fibroblast activation further results in collagen formation. An initial increase in Glycose Amino Glycans (hyaluronic acid) within a month of application results in increased water content in the superficial skin layers and is not related to collagen change.⁸ For appreciable change in

collagen content at least 6 months of regular use is needed.

Retinoid use in collagen synthesis of aged skin

Retinol has been a consistent ingredient of OTC cosmeceutical products for skin aging. Although demonstrated to inhibit UV induced production of MMPs and stimulation of collagen synthesis in photoaged skin, it is 20 times less potent than tretinoin and requires further conversion to retinoic acid to be effective. Retinol by itself is extremely unstable and gets easily degraded to biologically inactive forms on exposure to light and air. Hence vehicle used for retinol delivery plays a crucial role in its stability and efficacy.

Retinol derivatives like retinyl acetate, retinyl propionate, and retinyl palmitate are hence now being increasingly used. However prescription topical retinoids are either in retinoic acid formulation or need conversion to this form.

They are available as gel (0.01%, 0.25%), cream (0.025%, 0.05%, 0.1%), microspheres (0.04%, 0.1%), solution (0.05%), and emollients (0.05%). Retinol concentrations in cosmeceuticals is between 0.0015% and 0.3%. Tretinoin has FDA approval for treatment of fine wrinkles.⁹

Combinations with retinol such as vitamin C and hydroquinone have shown better response than retinol use alone.² Seletinoid G, a 4th generation retinoid has shown increased expressions of type I procollagen, tropoelastin, and fibrillin-1, and reduced MMP-1 similar to that of tretinoin demonstrating its potential in the treatment of intrinsic aging with no skin irritation even under occlusion. Its wider use needs larger blinded studies.¹⁰

Conclusion

Retinoids are unique molecules which have been demonstrated reversal of collagen breakdown in the skin and formation of new collagen molecules. Their early effects on skin are more on account of increased GAGs and hence increased water content, while persistent neo-collagen effects are seen after at least 6 months with best results at after 24-36 weeks of use at therapeutic concentrations.

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