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## BENEFITS OF TOPICAL HYALURONIC ACID FOR SKIN QUALITY AND SIGNS OF SKIN AGING

***Annotation.** This article presents the study of the natural acid produced by the body that is gooey, slippery substance it is produced throughout the body, especially in eyes, joints and skin and is known as Hyaluronic Acid. This article takes a deeper dive to investigate how effective, safe and beneficial hyaluronic acid is for the skin when applied or taken externally, what effects can it create for the skin, what skin types can be treated and how long one needs to use it to see the effects. It has been observed from the literature that Hyaluronic acid is safe to use and has various substitutes as well further it helps in making the skin look hydrated and fresh and reduces the process of skin aging. The research concludes in the pattern that hyaluronic acid helps in many ways and can be used in the form of drug and oral application. There is however, a significant number of people who are not aware of the use and benefits of hyaluronic acid and the study can be used as source of information for anyone looking forward to start using Hyaluronic Acid for their skin problems.*

***Key words:** Hyaluronic acid, Skin, dehydrated, Aging, skin condition, Combination Skin, effects*

***Анотація.** Представлено дослідження природної кислоти, що виробляється організмом, яка є липкою, слизькою речовиною, яка виробляється по всьому тілу,*

особливо в очах, суглобах і шкірі, і відома як гіалуронова кислота. У цій статті детальніше досліджено, наскільки ефективною, безпечною та корисною для шкіри є гіалуронова кислота при застосуванні чи зовнішньому застосуванні, який вплив вона може мати на шкіру, які типи шкіри можна лікувати та як довго її потрібно використовувати, щоб побачити ефекти. У літературі було зазначено, що гіалуронова кислота є безпечною для використання та має різні замінники, а також допомагає зробити шкіру зволоженою та свіжою та сповільнює процес старіння шкіри. Дослідження прийшло до висновку, що гіалуронова кислота допомагає багатьма способами і може використовуватися у вигляді препарату та перорального застосування. Однак існує значна кількість людей, які не знають про використання та переваги гіалуронової кислоти, і це дослідження може бути використано як джерело інформації для тих, хто з нетерпінням чекає почати використовувати гіалуронову кислоту для вирішення проблем шкіри.

**Ключові слова:** гіалуронова кислота, шкіра, зневоднена, старіння, стан шкіри, комбінована шкіра, ефекти.

**Introduction.** Hyaluronic acid is a naturally occurring substance in the human body that acts as a lubricant and shock absorber in joints and as a moisturizer in skin. It is a type of glycosaminoglycan, a long chain of sugars, and is found in high concentrations in connective tissues throughout the body, including skin, joints, and eyes. Hyaluronic acid is also used in various medical and cosmetic applications due to its ability to retain water and improve hydration in tissues. It is often used as a dermal filler in cosmetic procedures to reduce the appearance of wrinkles and fine lines, as well as to add volume to the face. In addition, hyaluronic acid is commonly used in skincare products to hydrate and plump the skin, as well as to improve the appearance of fine lines and wrinkles. It can be found in serums, creams, and other skincare formulations.

Hyaluronic acid is generally considered safe and well-tolerated when used as directed. However, some people may experience mild side effects, especially when used in high concentrations or in large amounts. These side effects may include, Skin irritation, Allergic reactions, Injection-related side effects such as bruising, swelling, or Interactions with other medications.

Hyaluronic acid was first discovered in 1934 by two scientists, Karl Meyer and John Palmer, who isolated the substance from the vitreous humor of cow eyes. However, it wasn't until the 1980s and 1990s that hyaluronic acid began to be used in medical and cosmetic applications. In the medical field, hyaluronic acid was initially used to treat joint disorders such as osteoarthritis. In the 1990s, it was also used as a dermal filler to treat facial wrinkles and volume loss. In the cosmetic industry, hyaluronic acid was first used in skincare products in the early 2000s. Since then, it has become a popular ingredient in moisturizers, serums, and other skincare formulations due to its ability to hydrate and plump the skin. Today, hyaluronic acid is widely used in both the medical and cosmetic industries, and its benefits and applications continue to be studied and researched.

There are different types of hyaluronic acid available in the market, and the «best» type may depend on the intended use and individual preferences. Some commonly used types of hyaluronic acid, Sodium Hyaluronate: This is the most commonly used form of hyaluronic acid in skincare products due to its ability to penetrate the skin effectively and deeply hydrate the skin. the «best» type of hyaluronic acid depends on individual needs and preferences, as well as the intended use of the product.

**The Aim of Research.** The aim of this research is to understand the effects of Hyaluronic Acid on various skin conditions and determine how effective it is for skin problems.

**Research Methodology.** The research involves mixed method approach in the form of qualitative and quantitative data analysis. For the quantitative data survey

questionnaire was distributed to a specific set of group audience. The total number of respondents were 25 from which the workable data for analysis was used. For the qualitative section the author used interview descriptive analysis, 3 respondents with different age groups under the category were approached and were asked the same set of questions, the answers were clubbed and clustered together for narrative analysis for this paper.

**Research Sample.** A number of 25 respondents answered the survey questionnaire and 3 interviewees were approached and interviewed for qualitative analysis.

**Research question:** Does hyaluronic acid have beneficial effects on skin quality and skin aging?

**Research period:** from the year 2017 to current year 2023.

**Research Limitation:** The limitation of this particular research is it studies the effects of Hyaluronic Acid on one particular set of gender and age group, females and age range from 19 to 30 years. The data compiled and analyzed is in this particular sphere and hence restricts the study to a specific age group and gender in this particular case.

**Literature.** Overall, hyaluronic acid is a versatile and effective substance that plays an important role in maintaining the health and function of the skin and joints. Its ability to retain water makes it a valuable ingredient in skincare products, while its lubricating properties make it an effective treatment for joint pain and stiffness. According to (Janine Griesser, 2018) [6] it is highlighted by their research that hyaluronic acid is also known as (hyaluronan or hyaluronate) and is a naturally occurring substance that is found in our skin, eyes, and joints. Further, It is a type of sugar molecule that has the ability to hold onto moisture (it is capable of binding over one thousand times its weight in water!). Its properties help to keep skin looking hydrated and plump. Because of its water-binding properties, hyaluronic acid is often

used in skincare products to help keep skin hydrated and reduce the appearance of wrinkles and fine lines.

As stated by (Arpağ, 2018) [2] Hyaluronic acid is a substance that has many properties and benefits. A few of the benefits of hyaluronic acid according to (Prasad N. Sudha, 2014) [11] are shown below: -

- Hyaluronic acid helps joints work like a well-oiled machine.
- It prevents pain and injury from bones grinding against each other.
- Hyaluronic acid is very good at retaining water. It's also used in moisturizing creams, lotions, ointments, and serums.

- Hyaluronic acid helps skin stretch and flex and reduces skin wrinkles and lines. Hyaluronic acid helps wounds heal faster and can reduce scarring.

Further as per (Prasad N. Sudha, 2014) [11] there are many benefits of Hyaluronic acid and some of them are scientifically-backed benefits such as: -

- Promotes healthier, more supple skin. Hyaluronic acid supplements can help increase skin moisture and reduce the appearance of fine lines and wrinkles. Topical treatments can calm redness and dermatitis, while injections can firm the skin.

- May speed up wound healing. Applying hyaluronic acid directly to an open wound can help speed up the healing process. It isn't known whether supplementing them would have the same effect.

- Get rid of dry eyes and discomfort. Hyaluronic acid occurs naturally in the eyes and is often included in eye drops to relieve dry eye symptoms. More research is needed to confirm whether supplementing them would have the same effect.

- Hyaluronic acid supplements can be safely taken by most people and provide many health benefits. In general, hyaluronic acid is a beneficial supplement for a variety of conditions, especially conditions related to skin and joint health.

However, it is argued by (Edwards, 2022) [3] that apart from benefits the hyaluronic acid can cause adverse effects If you are using Hyaluronic acid incorrectly -

if you are applying hyaluronic acid to a very dry face and without applying a moisturizer - hyaluronic acid has the opposite effect of its intended purpose. Hyaluronic acid can actually end up drawing moisture from the deeper levels of your skin, which in turn will cause more harm than good and leave your complexion feeling tight, dry, uncomfortable and more prone to showing signs of ageing. Hyaluronic acid may produce adverse side effects and allergic reactions in some people (pain, redness, itching, swelling, bruising).

### **Situation with the current literature**

As per (A. Fakhari a, 2013) [1] the most common hyaluronic acid salt on an ingredients list is sodium hyaluronate, which happens to be in trend nowadays. Potassium hyaluronate is also used in beauty formulations; however, it is less common. These hyaluronic acid salts are naturally occurring in the body. They are parts of the larger hyaluronic acid biopolymer. Nowadays it is used by almost all the age groups, as stated by (Natalia M Salwowska, 2016) [9] Hyaluronic acid is suitable for all skin types, however, the people who use it the most are people with dehydrated skin, which is especially prominent in the winter. Because it has water-pulling qualities, hyaluronic acid can hydrate dry areas, resulting in the skin looking plumper and more vibrant instead of dry and rough. Overall, any person who is interested in anti-aging, moisturizing, anti-wrinkle or skin elasticity increasing properties in their cosmetic products, should opt for hyaluronic acid.

As per (Fernanda Zamboni, 2023) [5] there are many reasons why people use hyaluronic acid. Primarily hyaluronic acid is used for hydration. With its amazing job of moisturizing comes along - plump skin, less signs off aging and wrinkles as hydrated skin looks more youthful. And the great news is that hyaluronic acid is suited for anyone at any age and with any skin type or condition. So, if a person is experiencing dry and dehydrated skin or just want to consider wrinkle prevention - hyaluronic acid is definitely a product to try. Further it is stated by (Maio, 2020) [7] that, there are many

ways to use hyaluronic acid. A moisturizer infused with hyaluronic acid at the time when you'd usually moisturize. Ideally, this would be 2 times a day and always after cleansing, exfoliating, or applying serums. A hyaluronic acid serum involves a slightly different routine. After cleansing, and while the skin is still damp, pressing a couple of drops into the face with the palms of the hands. Applying a moisturizer immediately afterwards helps to seal in all the hydration. Hyaluronic acid works well with most common skin care ingredients, including: retinol, vitamin C, alpha hydroxy acids (AHAs), beta hydroxy acids (BHAs).

It is highlighted by (Papakonstantinou, 2012) [10] that With the help of preparations containing hyaluronic acid, you can prolong the youthfulness of the epidermis, they are suitable for all types of skin. However, it is recommended to use them from 25 to 30 years of age. Hyaluronic acid is better absorbed when consumed on an empty stomach in the evening and in combination with vitamin C, collagen. The drug is taken in courses - for 3 months twice a year With the help of preparations containing hyaluronic acid, a person can prolong the youthfulness of the epidermis, they are suitable for all types of skin. However, it is recommended to use them from 25 to 30 years of age. Hyaluronic acid is better absorbed when consumed on an empty stomach in the evening and in combination with vitamin C, collagen. The drug is taken in courses - for 3 months twice a year

It is also to be understood that the same properties of Hyaluronic Acid are found in other substances as well. According to (Miyata, 1997) [8] there are various substitutes for hyaluronic acid, such as:

- Glycerin - Like hyaluronic acid, glycerin is a humectant. The stratum corneum and deeper layers of the skin benefit from its ability to bind to water molecules and hydrate them.

- Polyglutamic acid - Formulations with polyglutamic acid are most similar to a high molecular hyaluronic acid. Although it is a superb hybrid occlusive and humectant substance, it won't penetrate your stratum corneum.
- Alpha glucan and beta glucan - As parts of larger compounds, the two separate sugar molecules perform similarly. They can't carry nearly as much water, though. Because they are tiny, they can penetrate the skin more deeply even if they cannot hold as much water.
- Mucin - Proteoglycan is what it is. Mucin works like an occlusive in skin care products. On top of the stratum corneum, it produces a protective barrier that water cannot cross.
- Alginate - Alginate may permeate the stratum corneum and moisturize all the way to the dermis, making it a great direct substitute for hyaluronic acid. You can use it the same way if you use hyaluronic acid in your skincare routine because they are so similar.
- Honey - Honey is a thick, viscous polysaccharide that functions similarly to hyaluronic acid but with a larger molecular weight. Honey just touches the skin's outer layer. Because it cannot enter the stratum corneum and hydrate the dermis, it cannot be used as a substitute for a lower molecular weight hyaluronic acid.
- Hydrocolloid oat -Because it maintains moisture on the region of skin it was applied to and softens and rehydrates it, hydrocolloid oat is considered as an emollient.
- Aloe vera - Aloe vera's sugar molecules react just like those in other polysaccharides. They serve as a moisture reservoir that lies on top of the skin and maintains it hydrated thanks to their capacity to bind water molecules.
- Cactus water -Although it doesn't use hyaluronic acid's identical hydrating action, it can help hydrate the lower layers of skin similarly to lower molecular weight hyaluronic acids.



- Calendula - The humectant property of polysaccharides allows them to draw and hold onto water molecules. With reduced molecular weight hyaluronic acid, this hyaluronic acid substitute is hence most comparable to the hyaluronic acid salts.

There are also some long-term and short-term effects when using hyaluronic acid, they can be different according to different skin types. As described by (Mustak, 2017) the application of hyaluronic acid to the skin can exacerbate skin ulcers in people with scleroderma. The skin contains about half of the hyaluronic acid in the body. Hyaluronic acid binds to water molecules, which keeps the skin hydrated. Hyaluronic acid levels in the skin decrease significantly with age, which can lead to wrinkles. Taking hyaluronic acid or using cosmetic products that contain it may improve skin hydration and reduce signs of aging. Beauty injections with hyaluronic beauty leave scars and seals under the skin with prolonged use.

**Data Analysis.** Data collection – A Survey questionnaire (with closed & open-ended questions) for quantitative results and for qualitative results interviews. three, structured Interviews of respondents from The International College of Cosmetology (ICC) in Latvia, Riga were done. The Interviewees were students of ICC from the (Research Methods class Group Ek-1/21-1 & Ek-1/21-2) The interviewees were selected according to their long term & short-term experience with the use of Hyaluronic acid on a daily basis. Mixed methods of research were used. For qualitative data analysis, narrative analysis was used and for the quantitative data – descriptive statistics were used!

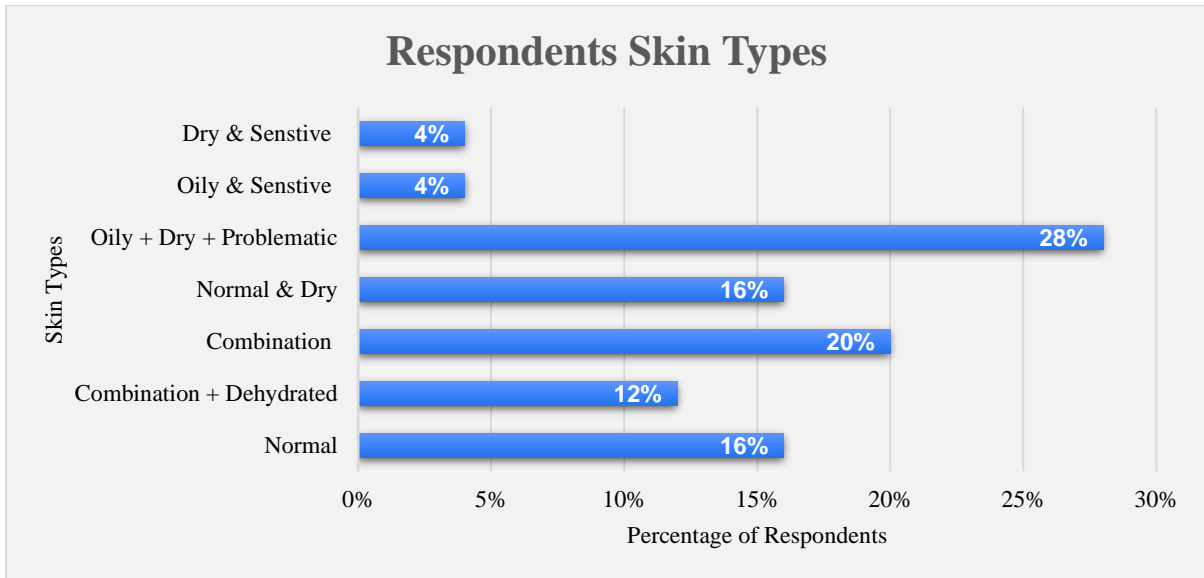
**Research process.** Participants who participated in the survey were randomly targeted according to the research question and aim. Respondents answered questions that highlighted their respective age group, how long they have been using hyaluronic acid, side effects if any during the course, and visible good effects on skin, and if they will continue using it or recommend it to others and why. The structured interviews

helped understating, the participants self-assessment patterns with the use of hyaluronic acid on a continued basis.

**Interview Analysis .** All the three interviewees were young adults from teenage to young adults, and hence it is easier to get more precise and raw information on young skin tone and texture about the effects of hyaluronic acid on skin. The interview is analyzed that all the three-interviewee had three different skin types from normal, dehydrated and combination, this helps in collecting information on the effects of hyaluronic acid on different skin types in real-time. The usage period of the interviewee's was from 6 months minimum to 1 year maximum on a daily basis. All the interviewees stated the reason they use hyaluronic acid is to improve their skin condition, especially reduce their skin dehydration and to moisturize the skin helping make skin moister and softer. Hence, it can be analyzed to make skin moist and soft hyaluronic acid is given higher preference in younger generation. It was further analyzed that during their usage period of hyaluronic acid none of the Three respondent reported any side effects, proving hyaluronic acid to be safe for different skin types and conditions. It is also analyzed from the interview that the respondents, noticed that their skin became smoother, shinier and more hydrated and a considerable reduction in facial blemishes. However, no one reported that is showed effects of anti-aging, it can be analyzed perhaps it should be tried with an older set of respondents with an aged skin. It is analyzed that usually the hyaluronic acid serum is preferred, further analysis reveal respondents are highly satisfied with hyaluronic acid and will highly recommend it to others.

**Survey Analysis** (Fig. 1 – 3).

As it is seen in form fig 1, almost 28% of respondents report they have multiple skin types or conditions, such as oily, dry & problematic. It can be analyzed that majority of people do have not only one but multiple skin types, this further suggest respondents are using hyaluronic acid for different skin conditions.



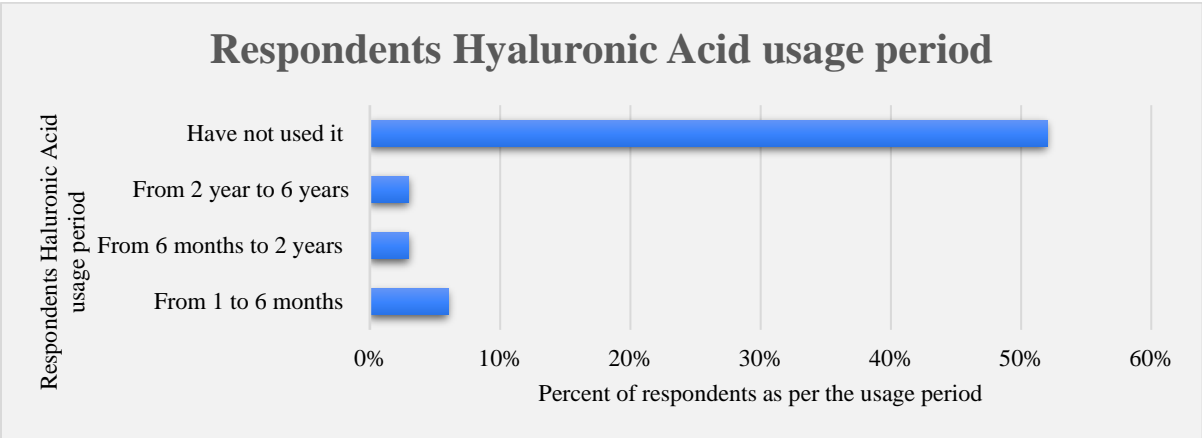
**Fig. 1. Respondents Skin types**

The second skin type that is 20% amongst the respondents is the combination skin type, followed by normal skin type to 16%. These results highlight the facts the various skin type respondents have been actively using hyaluronic acid to treat their skin conditions.

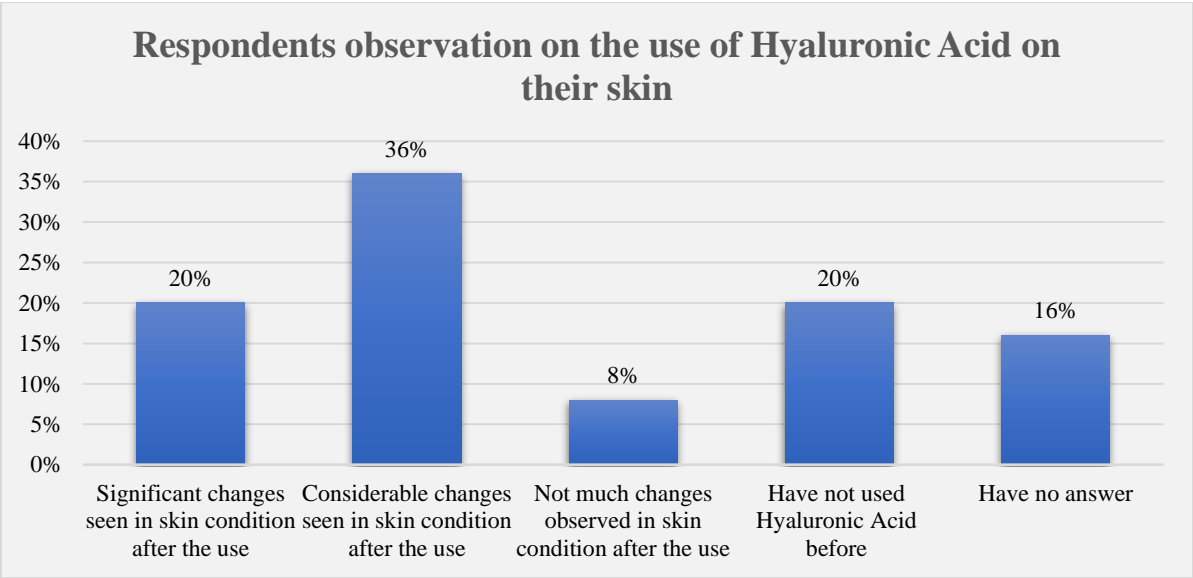
As it is seen in form fig 2 below, almost 52% of respondents report they have never tried Hyaluronic Acid, hence it can be analyzed that these respondents are not sure of the effects or side effects of hyaluronic acid and therefore this research paper can cater a potential information for them to understand the benefits of hyaluronic acid and its limitations. It is analyzed that Majority of the respondents are using it from 1 to 6 months that is 6% and from 6 months to 2 years and from 2 years to 6 years make an equal percentage of respondents to 3%, hence it can be analyzed almost 12% of respondents have been actively using the hyaluronic acid in their daily routine and can identify, comment and provide the right information in real time about hyaluronic acids benefits.

As it is seen in form fig 3, a number of 20% of respondents report they have seen significant changes in their skin condition in a good way after using Hyaluronic Acid,

hence it can be analyzed that these respondents are highly satisfied with the use of hyaluronic acid and its consistent use has helped their skin problems.



**Fig 2. Respondents Hyaluronic Acid usage period**



**Fig. 3. Respondents Observation of their Skin condition after using Hyaluronic Acid**

A number of 36% respondents reveal that they have not seen significant changes in their skin condition but a considerable change, it can further be analyzed that this percentage belongs to respondents who have started using hyaluronic acid recently and not long term but have no side effects to report and will probably continue the use of hyaluronic acid. 8% respondents do not see any changes in their skin type and thus it can be analyzed that either they have just started using it or are probably not constant

with their use, or perhaps they might need to switch to some other products if they have been using it for a long term. 20% & 16% of respondents have no answer as they probably have not used it or have been using it on occasions.

### **Conclusion & Discussions.**

- It can be concluded from the literature that Hyaluronic Acid is in the skin however as we age it loses its strength and we need to give skin these nourishments

- It can further be concluded from the literature that there are various substitutes for hyaluronic acid in the market such as Hydrocolloid oat, cactus water, glycerin etc., which can also be used for treating similar skin problems.

- It can further be concluded from the survey that people using hyaluronic acid in a long-term report better results on their skin conditions than people who have been using it for a shorter period.

- From the interview analysis it can be concluded that hyaluronic acid would not show any signs of antiaging qualities on younger and less aged skin.

- It can also be concluded from the quantitative and qualitative results that on a majority respondents who have bene using hyaluronic acid for skin problems do not report any side effects, thus making it highly recommendable to most of the skin types and also favorable for daily use.

### **Recommendations.**

- From the data collected and the literature studied and analyzed it can be recommended that Hyaluronic acid should be used as it is, in its natural essential form in the type of serums for better results.

- Further it can also be recommended that Hyaluronic acid can be used to treat skin problems for short- and long-term. Hyaluronic acid is better absorbed when consumed on an empty stomach in the evening and in combination with vitamin C, collagen. The drug can be taken in courses - for 3 months twice a year.

▪ It can also be recommended that there is no harm in trying Hyaluronic acid, it can also be mixed with daily moisturizer and applied to the skin, However, it is always recommended to apply it on a small patch of skin on the arm or where the person finds it appropriate to test if it might cause any side effects.

## References

1. A. Fakhari a, C. B. (2013, July ). Applications and emerging trends of hyaluronic acid in tissue engineering, as a dermal filler and in osteoarthritis treatment. *Acta Biomaterialia*, 9(7), 7081-7092. doi:<https://doi.org/10.1016/j.actbio.2013.03.005>
2. Arpağ, O. F. (2018). To what extent does hyaluronic acid affect healing of xenografts? A histomorphometric study in a rabbit model. *Journal of Applied Oral Science*. doi:<https://doi.org/10.1590/1678-7757-2017-0004>
3. Edwards, P. C. (2022, Oct). Review of long-term adverse effects associated with the use of chemically-modified animal and nonanimal source hyaluronic acid dermal fillers. *Clinical Interventions in Aging* , 509-519.
4. FCOphth, H. M. (2017, Nov 11). Filling the periorbital hollows with hyaluronic acid gel: Long-term review of outcomes and complications. *Journal of cosmetic Dermatology*, 17(4), 611-616. doi: <https://doi.org/10.1111/jocd.12452>
5. Fernanda Zamboni, C. K. (2023, January ). Hyaluronic acid association with bacterial, fungal and viral infections: Can hyaluronic acid be used as an antimicrobial polymer for biomedical and pharmaceutical applications? *Bioactive Materials*, 19, 458-473. doi:<https://doi.org/10.1016/j.bioactmat.2022.04.023>
6. Janine Griesser, G. H.-S. (2018, Feb). Thiolated Hyaluronic Acid as Versatile Mucoadhesive Polymer: From the Chemistry Behind to Product Developments—What Are the Capabilities? *Advances in Mucoadhesive Polymers and Formulations for Transmucosal Drug Delivery*), 10(3), 1-6. doi:<https://doi.org/10.3390/polym10030243>

7. Maio, M. d. (2020, May). MD Codes™: A Methodological Approach to Facial Aesthetic Treatment with Injectable Hyaluronic Acid. *Aesthetic Plastic Surgery*, 45, 690–709.
8. Miyata, N. M. (1997). Evaluation of Collagen Gel and Hyaluronic Acid as Vitreous Substitutes. *Ophthalmic Research*, 29(6), 400-420. doi:<https://doi.org/10.1159/000268042>
9. Natalia M Salwowska, M. K. (2016, June 21). Physiochemical properties and application of hyaluronic acid: a systematic review. *Journal of Cosmetic Dermatology*, 15, 520-526. doi: <https://doi.org/10.1111/jocd.12237>
10. Papakonstantinou, E. (2012, July 1). Hyaluronic acid: A key molecule in skin aging. *Dermato-Endocrinology* , 4(3), 253-258. doi:<https://doi.org/10.4161/derm.21923>
11. Prasad N. Sudha, M. H. (2014). Chapter Nine - Beneficial Effects of Hyaluronic Acid. *Advances in Food and Nutrition Research*, 72, 137-176. doi:<https://doi.org/10.1016/B978-0-12-800269-8.00009-9>