

# What is Collagen and Why is It Important?

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### **Basics of collagen, including what it is, it's role in the skin:**

Collagen is a protein, which means it is a molecule (collection) of amino acids including a repeating sequence of glycine, proline and a third variable amino acid. The collagen molecule is shaped like a triple helix (triple spiral) that combines with other collagen molecules in the skin to form a mesh-like network in the dermis, which is the layer of skin beneath the epidermis and above the subcutaneous fat.

### **What collagen is and its role in the body/skin?**

Collagen gives body tissues structure, toughness, rigidity and texture. In the skin, it is akin to a layer of leather. And when it intermingles with elastic fibers, it gives skin strength and resilience.

### **"Different types" of collagen fibers, particularly in relation to skin:**

There are many types of collagen in various parts of the body, including the skin, hair, nails, cartilage, bone and blood vessels. The most abundant type of collagen in fetal skin is type III, which is replaced with type I collagen in youth and beyond.

### **Why do we tend to lose collagen (age, UV, diet, other lifestyle factors)?**

As we mature, we have a reduced ability to produce a well-structured collagen triple helix. Likewise, our ability to repair damaged collagen diminishes, so we are left with poor quality, fragile collagen. The result is poor skin turgor, easy bruising, and increased susceptibility to skin tearing.

Ultraviolet radiation, which the sun emits, and other forms of light for that matter, can damage collagen fibers, breaking them down to the point that they form poorly-structured protein clusters. These clusters can give the skin a pebbly or beaded appearance. Broken-down collagen can also lead to thin (atrophic) skin, which occurs due to sun-damage and the aging process.

A major lifestyle contributor to poor collagen quality is smoking. Research suggests that smoking allows free radicals to attack collagen fibrils, rendering them weak and of poor quality. It is not surprising, therefore, that the skin of a smoker tends to look damaged and wrinkled, particularly around the mouth. The classic perioral "smoker's lines" become prominent as collagen and elastic fibers degrade.

There is controversy as to what role diet plays in collagen synthesis and quality. A diet rich in animal products alone can introduce oxygen free radicals that damage collagen. A plant-based diet rich in anti-oxidants that eat up the oxygen free radicals responsible for damaging collagen is beneficial, as long as the diet contains sufficient amino acids, which are the building blocks of proteins such as collagen. Therefore, a well-balanced diet is ideal.

### **How can you increase collagen production? (From topicals to diet/specific nutrients, procedures, supplements--what modes are legit?)**

Research on dietary supplementation suggests that oral supplementation with collagen hydrolysate leads to a statistically significant increase in synthesis of proteins by chondrocytes, the precursors cells of cartilage. Studies also suggest that collagen hydrolysate may decrease joint pain in athletes, and might be useful in the treatment of osteoarthritis and osteoporosis. Other forms of oral collagen, whether extracted from various sources such as plants and animals, or synthesized in a lab, show promise in improving the appearance of skin. However, the data is sparse, and the topic is deserving of greater attention.

There is significant data to show that a variety of procedures are able to increase collagen production and improve the appearance of skin. Studies prove that a variety of laser procedures, monopolar radiofrequency, ultrasound, microneedling, subcision and fillers increase collagen production.

### **Are there any side effects or risks to the above we need to point out?**

Aesthetic procedures are very safe if performed by qualified and trained professionals on appropriately screened patients. Risks are dependent on individual circumstances and can be mitigated if a patient considering an aesthetic procedure consults with a board-certified dermatologist or plastic surgeon prior to undergoing the procedure.