Collagen & Supporting Nutrients for Joint Health and Tissue Regeneration

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Overview

1. Collagen in the Body
2. Collagen Supplementation
3. Collagen Benefits
4. Supporting Nutrients – Hyaluronic Acid and Turmeric
5. Protocol Suggestions
6. FAQs
Collagen Facts

Foundation of your tissues

- 2nd most abundant substance behind water
- 25-35% of total body protein is collagen
- Found everywhere except nervous system
Collagen as Structure

Structural Protein

- Mechanical function of tissues
- “kolla” means “glue” in Greek
- You’re a puddle without collagen
Collagen in Tissues

COLLAGEN FACTS

BEAUTY
- 75% of the skin is made of Collagen Type 1 & 3
- Collagen aids in the transport of nutrients to the hair shaft
- Collagen supports hair and nail thickness and strength

JOINTS
- 100% of tendons are made of Collagen Type 1 & 3
- 86% of ligaments are made of Collagen Type 1 & 3
- 60% of cartilage is made of Collagen Type 2

BONES
- Over one third of healthy bone is composed of Collagen
Collagen’s Influence

How collagen is “woven” determines tissue

- Gym rope a tendon; wool sweater the skin
- Pound for pound collagen is stronger than steel wire!
After age of 25 collagen production naturally declines
- Average of 1.5% per year (15% per decade)
- Can be accelerated by lifestyle choices

Aging symptoms caused by degeneration of collagen
Injuries are predominantly collagen destruction
Gaining Perspective

Skin Cut
75% of skin is collagen. Cells aren’t “cut” apart, it is the collagen fibers being damaged. To heal the cut collagen fibers are linked back together.

Twisted Ankle
Over 86% of connective tissue like ligaments and tendons are collagen. A joint injury is primarily destroyed collagen tissues. To heal a twisted ankle collagen must be repairs – pain and inflammation naturally go away.

Broken Bone
An important 36% of healthy bone is made of collagen, it holds the minerals like calcium together. Breaking a bone is not “breaking calcium” – that is impossible.
The Special Collagen Protein

- Contains a unique amino acid profile with rare amino acids like proline & hydroxyproline
- Acts differently than other proteins
- NOT only a building block!

Collagen specific amino profile:

- Glycine: 20%
- Proline/Hydroxyproline: 25%
- Glutamic acid: 11%
- Arginine: 8%
- Alanine: 8%
- Others (Aspartic acid, Serine...): 12%
- Essential amino-acids: 16%
- Others: 12%
How Collagen Supplements Work

Need both bricks & workers to build a wall

1. Nutritional building blocks for new structures
2. Stimulus to collagen production system
Collagen supplements mimic natural Collagen fragments, replenishing lost fragments, and maintaining the stimulation needed for the body to create new Collagen.
CELLULAR STIMULATION OF COLLAGEN PRODUCTION

Collagen breaks down into amino acid fragments that float in the extracellular fluid.

Groups of amino acids bind to receptor sites on the cell membrane.

After enough receptor sites are filled, the cell is stimulated to produce new collagen.
Collagen Formation

1. Collagen mRNA
2. Amino Acids (Glycine, Proline, Lysine, etc.)
3. Collagen Molecule
   - prolyl hydroxylases
   - glycosylation

Procollagen
- secretion from cell
- enzymatic cleavage
- assembly of triple helix

Mature collagen
- polymerization of triple helices
- lysyl oxidase

Collagen Fibril
- arrangement of fibrils

Collagen Fibers
Vitamin C – Dual Purpose

- Antioxidant protection
- Helps preserve existing collagen
- Collagen Formation
- “Elbow” of collagen triple helix
- Holds collagen together
Who Needs It?

Nobody can escape the collagen decline!

- **EVERY PERSON** on Earth can benefit from collagen supplements!
Unable to obtain key supplements ingredients from diet

- **Dietary/Lifestyle:** Omega-3, Vitamin D, some Vitamins & Antioxidants
- **Supplement Only:** Collagen, Hyaluronic Acid, Turmeric
Measurement of molecular weight; the *size* of the collagen peptide.

- In essence it’s “pre-digesting”
- Important to *mimic the size of naturally existing collagen peptides* in extracellular fluid *to provide a stimulatory effect*
- 3000 Dalton Weight or less is typical of collagen supplements
Effective Dosage

- Must be high enough to stimulate enough cells to make an impact.
- Research generally falls between 1000mg - 10,000mg per day.
Types of Collagen

29 (or more) types of collagen in the body

Types 1&3 Collagen (~90%)
- Skin, Hair, Nails
- Ligaments, Tendons, Bones
  - Tendonitis
  - ACL
  - Sprained Ankle
  - Bone Fractures
- Tennis Elbow
- Exercise recovery
- General pain & stiffness
- Osteoporosis

Type 2 Collagen (~9%)
- Cartilage only
  - Meniscus, clicking knee
  - Back disc or back pain
- TMJ or popping jaw
- Arthritis
Joints & Collagen

The *first* nutrient for joint supplementation should be collagen, then consider other substances.

**Types 1&3 Collagen**
- Tendons are about 99% Collagen
- Ligaments are about 86% Collagen
  
  *A twisted ankle is literally damaged collagen!*

**Types 2 Collagen (Cartilage ONLY)**
- Cartilage is about 60% collagen
- 15% Glucosamine
- 15% Chondroitin
- 10% Hyaluronic Acid
  
  *Also main component of joint fluid*
**Joint Benefits**

**Injury Recovery**
- Repairs connective tissue

**Injury Prevention**
- Exercise recovery

**Joint & Bone Support**
- General mobility
COLLAGEN

JOINT & BONE HEALTH.

**Cartilage**
- **Function:** Bone "caps" that prevents bone on bone friction; shock absorption.
- **Composition:** 60% Type 2 Collagen, 15% Glucosamine, 15% Chondroitin, 10% Hyaluronic Acid.
- **Common Issues:** Arthritis, Meniscus tear (runners knee), TMJ or jaw popping, slipped or bulging disc in back.*

**Synovial Fluid**
- **Function:** Lubricates joint to reduce friction between cartilage and connective tissue.
- **Composition:** 100% Hyaluronic Acid & water.
- **Common Issues:** Aching or creaky joints.*

**Bone**
- **Function:** Provides structural framework of the body.
- **Composition:** 36% Types 1&3 Collagen (primarily Type1) calcium & minerals.
- **Common Issues:** Breaks & fractures, Osteoporosis, bone spurs.*

**Ligament**
- **Function:** Connects bones with bones.
- **Composition:** 86% Types 1&3 Collagen.
- **Common Issues:** ACL/MCL tear, sprains, twisted ankle, joint pain.*

**Tendon**
- **Function:** Connects muscles to bones.
- **Composition:** 99% types 1&3 Collagen.
- **Common Issues:** Tendonitis, arthritis, sprains, twisted ankle, joint pain.*
Bones & Collagen

- 36% of bones are collagen
- Minerals attach to collagen fibers
  - Acts like the “rebar” of the bone
- Structure & flexibility to absorb shock
Hyaluronic Acid (HA)

- Nature’s “moisture magnet”
- 1 HA molecule holds 1000 water molecules!
- Collagen and HA are “best friends”
  - “Grapes on a grapevine”
Hyaluronic Acid Benefits

It’s what Dorothy gave the Tin Man.

- Lubricates joints
- “Feels like an oil change”
- Cushions joint to absorb impact
- Combines with glucosamine to form gel
- HIGH molecular weight for joint benefits
Turmeric & Curcumin

- Reduces pain and inflammation in joints
  - Affects several pathways, most notably NF-kB
- Safe, alternative treatment for arthritis and osteoporosis
- Must be standardized for curcuminoids
  - Powdered root is a food spice
Joint Protocol Guidelines

1. Cartilage?
   a. Type 2 for structure; at least 2000mg
   b. Consider hyaluronic acid, glucosamine, chondroitin, MSM for structure & hydration
   c. Consider extracts like turmeric for pain & inflammation
      Note: slow to heal, at least 4-6 month

2. Everything else besides cartilage (ligament, tendon, fascia, etc.)
   a. Type 1&3 for structure; at least 4000mg with high dose Vitamin C
   b. Highly consider extracts like turmeric for pain & inflammation
   c. Consider hyaluronic acid for hydration

3. Bone
   a. Type 1&3 for structure; at least 6000mg
   b. Nutrients like calcium, D3, K2, many other minerals
   c. Consider hormonal regulation with herbal extracts
What type of collagen is best for joint support? Do I take different collagen for different joints?
That answer can get a little tricky. All joints are made of 4 main structures – bones, ligaments, tendons, and cartilage. The first 3 – bones, ligaments, tendons – are made of Types 1&3 collagen, while cartilage made of Type 2 collagen. Any joint could have a cartilage issue, a ligament/tendon issue, or both at once. Ideally, you would want to take correct type of collagen to support the specific tissue in need.

What if I’m not sure which tissue in my joint needs support? Are there any guidelines to help me determine which NeoCell product to use?
In general, if the joint clicks, pops, or sounds “crunchy” inside you may consider Type 2 collagen for a cartilage issue. For painful and swollen joints - especially from twisting, overextending or repetitive movements – consider Types 1&3 collagen.

Can someone take Types 1&3 and Type 2 at the same time? What if I want tendon and cartilage support?
Type 2 should not be taken with Types 1&3 because each type is produced by a different cell in the body. Type 2 is produced by chondrocytes and Types 1&3 are produced by fibroblasts and osteoblasts. Each specialized cell is stimulated by the unique amino acid profile found in the found in the type of collagen it produces. While it is not dangerous to mix all three types, the supplement would have diminished effectiveness if combined. Think of it like diluting or changing the special amino acids in the supplement. However, taking Types 1&3 and Type 2 supplements during the same day with several hours in between (e.g., one in the morning and one at night) is perfectly fine, and even encouraged for complete joint tissue support.

Does collagen relieve joint pain and inflammation? Will collagen help with injury or surgery recovery?
Collagen does not directly act as a pain reliever or reduce inflammation. However, when an injury occurs in the body the natural physical response is for the body to send a pain signal the brain that damage and protect the area with inflammation and swelling. When the body repairs the damage swelling goes away and the pain signal stops. Since connective tissue in the joints is made of collagen we can see that the regeneration of collagen tissues may alleviate the need for pain and swelling in the joint to be present. In other words, if there’s no damage to joint collagen, the pain and inflammation response may not be needed.

What role do antioxidant play in joint health? Do they help relieve pain and inflammation?
An antioxidant can neutralize free radical damage in the joints that can destroy tissues and cause inflammation. Many antioxidants have been studied to relieve aches and pain in the joints and promote a healthy inflammation response.

Is HA safe to take with collagen?
Yes, the two nutrients are perfect compliments for each other. Collagen gives the body structure, hyaluronic gives the body hydration.

How long until I feel results from HA?
Hyaluronic acid works quickly, often within 1-3 days. The benefits may decline after a few weeks of discontinuing use.
General FAQs

Is collagen safe? Are there any side effects or dangerous interactions with other supplements?
Collagen is very safe for most populations, ages, etc. The only known intolerance or contraindication is a person with a sulfite allergy. Always check with your doctor if you have any concerns.

Is there a vegetarian source of collagen?
No. Cellulose gives plants structure, collagen gives animals structure. Collagen does not naturally exist in plants.

Can I get collagen from my diet?
Collagen in its natural form is very difficult for the body to digest and absorb. Collagen supplements are hydrolyzed and are therefore easily absorbed and used by the body. Hydrolyzed collagen also stimulates the cells producing new collagen - fibroblasts in the skin, osteoblasts in the bones, chondrocytes in the cartilage.

What is the source of collagen?
Types 1&3 collagen usually comes from bovine hides, but also may be a porcine or marine source. Type 2 is mostly derived from chicken cartilage, although some bovine sources are available.

How long does it take to see results? How long do results last?
Collagen supplements begin working immediately in the body, but collagen in our tissues takes time to rebuild and strengthen, so results can vary. Some people report feeling better within days or weeks, others report results in 1-2 months based on their desired benefit. Because collagen is a matrix that is woven into the body, the results will last for months or years even after discontinuing use.

Do I have to take the products forever?
A consistent daily routine can nourishment for the body over the long term. For the average person, supplements may be helpful for as long as they can take them, but a minimum of several months use is recommended. After an initial period of higher dosage supplementation, a lower maintenance dose may be appropriate. However, if the body is under stress or recovering from injury, a full dose may be best until the benefits desired are achieved.

Can I take more than the recommended dosage?
There is no known upper limit toxicity level of collagen supplements.

What is the best way to take collagen?
For maximum benefit a collagen supplement should be taken without other complex proteins. Fruits and vegetables are ok, as well as other non-protein supplements. First thing in the morning or last thing at night may be easiest, or any time a person feels hungry throughout the day. Wait at least 30 minutes after taking collagen before eating protein.