

# Natural approaches to joint care, omega-3

## Introduction

Did you know there are over 100 types of rheumatic conditions including osteoarthritis\* and rheumatoid arthritis\* which affect the joints and its surrounding muscles and connective tissue?

The joints work extremely hard over a lifetime, therefore it is not surprising that repeated strenuous activity involved in certain jobs and sports, as well as the ageing process, can affect their health and efficiency.

Joint problems affect a large proportion of the population and according to the Arthritis Foundation, 1 in 5 are living with chronic joint symptoms. With lifespan increasing, the pressure on the load bearing joints will inevitably increase.

### What is the difference between Rheumatoid Arthritis\* and Osteoarthritis\*?

Rheumatoid arthritis is a chronic, progressive and disabling auto-immune disease\*. It is a painful condition causing swelling and damage to cartilage and bone around the joints. Any joint can be affected but it is commonly the hands, feet and wrists. In time it can affect a person's ability to carry out everyday tasks.

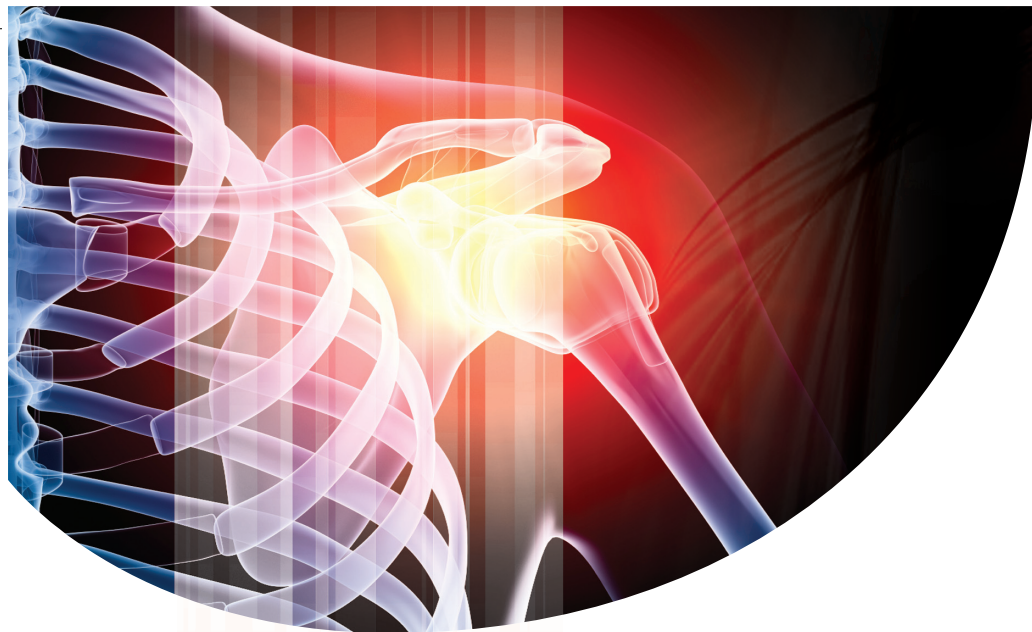
Despite much research, the causes of rheumatoid arthritis are still unknown and there is no cure. Medical treatments include analgesics and non-steroidal anti-inflammatory drugs (NSAIDs\*) to relieve pain and reduce inflammation. As people with

rheumatoid arthritis need to medicate long term and NSAIDs\* can have unwelcome side effects, doctors and patients are keen to find ways of reducing their NSAID\* requirement. Osteoarthritis (OA) is the term used to describe a gradual degeneration of the movable joints, sometimes referred to as 'wear and tear' arthritis. It is primarily caused by the breakdown of cartilage resulting in the bones rubbing against each other. This degradation causes increasing stiffness and pain in the joints that can become severe over time. OA can affect any joint, but the hips, knees and lower spine are the joints most commonly affected.

## Objectives

- To provide a thorough understanding of Joint Health and Care.
- To understand the role Omega-3 can play for Joint Health.
- To be able to offer practical advice to your customers and patients on the benefits of Omega-3 for healthy joints.

*“Joint problems affect a large proportion of the population and according to the Arthritis Foundation, 1 in 5 are living with chronic joint symptoms.”*



*“Omega-3 can slow the progress of cartilage degradation, reduce inflammation and lessen pain.”*

*“Studies have shown that Omega-3 fatty acid supplements may allow arthritis sufferers to reduce their dose of these drugs by over 30%.<sup>2</sup>”*

*“Omega-3 is referred to as “essential” it cannot be made by the body therefore it must be obtained from the diet.”*

## Quick Reference Guide

### Rheumatoid Arthritis

- Chronic, systemic, inflammatory autoimmune disorder
- Usually begins in small joints of the hands and feet
- Spreads to larger joints
- Inflamed joint lining extends and erodes articular cartilage and bone
- Joint deformity
- Progressive physical disability

### Osteoarthritis

- Most common articular disorder
- Accounts for more disability amongst elderly than any other disease
- Affects hands or weightbearing joints (hips, knees, spine)
- Slowly progressing chronic disease
- Loss of articular cartilage
- Joint pain, tenderness, limitation of movement
- Local inflammation

### Symptoms

- Cartilage degradation
- Pain and inflammation
- Muscle weakening
- Bone weakening and fragmentation
- Loss of mobility and quality of life
- Eventual need for joint replacement surgery

### Who is at risk?

Doctors used to think of OA as a disease of old age, but now they believe that this form of arthritis begins as early as our 20's, although the first signs may not be felt until our 40's.

People involved in frequent, intensive sports participation and some occupations requiring repetitive use of certain joints may be at more risk of joint pain and stiffness.

Smoking and being overweight can also increase a person's risk of developing joint problems.

### Anatomy of a joint

Joints are the place where two bones meet. All bones in the body, except for one (the hyoid bone in your neck), form a joint with another bone. Most joints are designed to protect the ends of bones where they meet, they hold your bones together and they allow the rigid skeleton to move.

Movable joints are described as 'synovial' joints – characterised by the presence of a closed space, or cavity between the bones.



### A healthy knee joint

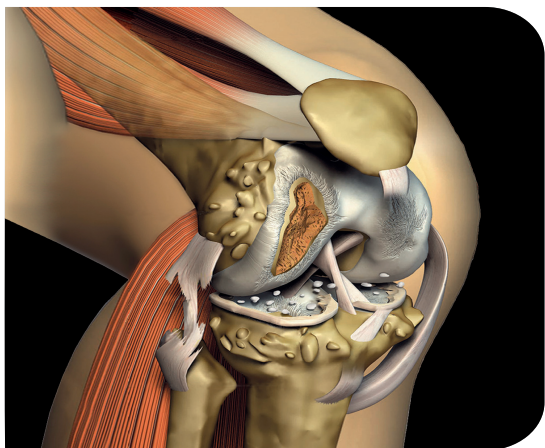
The joint cavity of synovial joints is contained in a capsule made up of a thick, tough outer layer (fibrous capsule) and a more delicate thin layer (synovial membrane). This capsule adheres firmly to the fibrous sheath that covers the articulating bones (bones being joined).

Synovial joints are made up of bone, connective tissues (cartilage, tendons and ligaments) and synovial fluid\*.

The most common synovial joints include:

- **Ball and socket joints** e.g. hip and shoulder joints.
- **Hinge joint** e.g. knee and elbow.
- **Ellipsoidal joints**, such as the joint at the base of your index finger.
- **Gliding joints** that occur between the surfaces of two flat bones held together by ligaments. Some of the bones in your wrists and ankles move by gliding against each other.
- **Pivot joint**, in your neck that allows you to turn your head from side to side.
- **Saddle joints**, found only in your thumbs.

\* See glossary



### A damaged knee joint

**Cartilage:** Made up of water, proteins and sugars, cartilage is the body's shock absorber. The cushion of cartilage around the bones, keeps them from grinding against one another. Factors such as injury and age can cause cartilage to break down.

**Muscles:** These support the joints. The quadriceps, for example, are responsible for holding up the knees and relieving some of the stress of walking and running. Weak quads can put too much strain on the joints, leading to tears in the tendons.

**Bones:** Bones are the rigid structures that form our skeleton. Throughout life, bone tissue undergoes continual breakdown and restoration in response to the body's demands. Eroding cartilage can cause growth of bone spurs and changes in bone structure that effect the shape of a joint which can trigger a breakdown in the cartilage.

**Tendons and Ligaments:** These provide support for the joints by connecting muscles and bones. If they are torn through injury or weakened by a sedentary lifestyle, the cartilage in the knee is forced to bear more weight which can cause collapse.

**Genes:** More than half of arthritis sufferers are born with mutations in their genes that control cartilage formation and destruction. These irregularities can result in cartilage which is weaker to begin with or that degrades at a faster rate.

### Cod Liver Oil for Joint Health

Cod liver oil has been used as a natural health supplement for literally hundreds of years. Among the many claims for its effectiveness for relief of joint pain and stiffness, but it is only in the past fifty years that scientific investigation has identified its active ingredients and explained why

this traditional supplement is so beneficial for health.

Cod liver oil is extracted from the liver of the cod. It is then refined to pharmaceutical standards. Cod liver oil provides vitamin D, which is essential for bone development and maintenance and Omega-3 fatty acids. Omega-3 is referred to as 'essential' it cannot be made by the body therefore must be obtained from the diet.

Omega-3 contains the important nutrients EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). Research has found that these valuable nutrients offer many physical and mental health benefits, among them the ability to control inflammation and halt, even reverse cartilage destruction.

Studies have shown that by switching off the enzymes that break down joint cartilage, omega-3 can slow the progress of cartilage degradation, reduce inflammation and lessen pain.

In a recent study, scientists have revealed that dietary Omega-3 Polyunsaturated Fatty Acids (PUFA\*), such as eicosapentaenoic acid (EPA\*) can reduce inflammation, a symptom associated with arthritis.<sup>1</sup>

The research looked at the effects of these fatty acids on the amount and activity of the enzyme cyclooxygenase-2 in bovine chondrocytes\* and in chondrocytes\* taken from human arthritic joints. The cyclooxygenase (COX) enzyme is responsible for the synthesis of prostaglandins, some of which have an inflammatory action. Two forms of COX exist and it is COX-2 that is produced particularly by inflammatory factors. COX-2 levels and activity are elevated in arthritis, contributing to continued inflammation.

According to the research, bovine and human in vitro systems that mimic arthritis were used. Growing the (healthy) bovine chondrocytes in the presence of EPA, the amount of COX-2 protein produced when the cells were stimulated was reduced significantly. Further, the amount of prostaglandin E2, a measure of COX-2 activity, was also reduced. Even in the human chondrocytes, taken from 'arthritic cartilage', EPA was able to reduce the high COX-2 protein levels and the enzyme's activity.

### Beneficial vitamin D for joint health

Cod liver oil provides vitamin D, sometimes called the 'sunshine vitamin.' Vitamin D is not only essential for healthy bone development and maintenance; it is an all-round health protector. During the winter months, some people in the northern hemisphere have levels considered below healthy because of insufficient sun exposure.

Early in the 1900s it was discovered that cod liver oil was a good natural source of vitamin D and its free distribution in the UK during World War II and the years of rationing that followed was credited with practically eradicating rickets\*.

### Can cod liver oil be taken with other supplements or medicines?

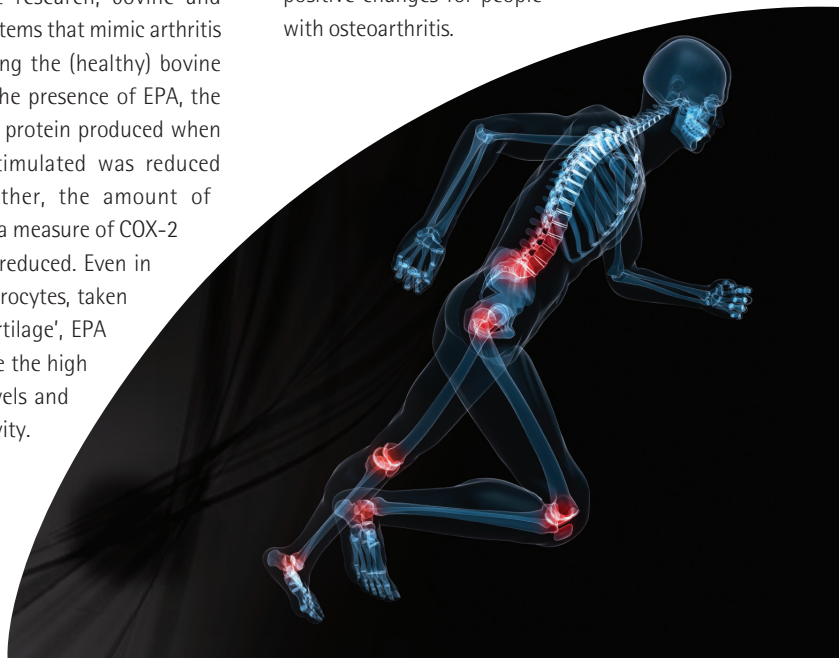
Cod liver oil can be taken for relief of arthritis symptoms alongside over-the-counter or prescribed analgesics and NSAIDs. In fact, studies have shown that Omega-3 fatty acid supplements may allow arthritis sufferers to reduce their dose of these drugs by over 30%.<sup>2</sup>

Cod liver oil has blood thinning properties (one of the reasons they are thought to help maintain heart health) therefore, anyone taking warfarin or other anticoagulant medication should first consult a healthcare professional.

### Questions to ask yourself re your customers?

Remember – any additional advice of diet and lifestyle you can give to your customer is very important. If in doubt, don't hesitate to refer to your pharmacist.

Non-drug, lifestyle changes such as losing weight, using relaxation techniques and taking appropriate exercise can also play an important role in encouraging positive changes for people with osteoarthritis.





## Glossary

Auto-immune disease	Arise from an overactive immune response of the body against substances and tissues normally present in the body.
Chondrocyte	A cartilage cell found embedded in the matrix.
Eicosapentaenoic acid (EPA)	Is an omega-3 fatty acid, found in fish. Beneficial for many autoimmune and inflammatory disorders.
NSAIDs	Non-steroidal anti-inflammatory drugs prescribed to reduce inflammation and pain.
Osteoarthritis	The term used to describe a gradual degeneration of the movable joints, sometimes referred to as 'wear and tear' arthritis.
Synovial fluid	A transparent, sticky fluid secreted by synovial membranes lubricating.
Polyunsaturated fatty acids (PUFAs)	PUFAs are important for maintaining the membranes of all cells, for regulating body cholesterol metabolism and for making prostaglandins which regulate many body processes which include inflammation and blood clotting.
Rheumatoid arthritis	A chronic, progressive and disabling auto-immune disease. It is a painful condition causing swelling and damage to cartilage and bone around the joints.
Rickets	Rickets is a disorder caused by a lack of vitamin D, calcium, or phosphate. It leads to softening and weakening of the bones.

## Self-assessment questions

To help provide support with your ongoing professional development, complete the questions and evaluate your learnings from this module. Why not e-mail your answers to [international@sseas.com](mailto:international@sseas.com) quoting reference: Joint Health. You will receive your Seven Seas Certificate, subject to the submission of 5 correct answers.

- 1 What type of joint is the knee?
  - a. Ball and socket
  - b. Hinge
  - c. Pivot
- 2 Which disease was vitamin D credited for practically eradicating in the 1900's?
  - a. Night-blindness
  - b. Scurvy
  - c. Rickets
- 3 Which symptom is NOT a symptom of osteoarthritis?
  - a. Muscle weakening
  - b. Cartilage degradation
  - c. Joint Deformity
- 4 Who is more at risk of joint problems?
  - a. Older Generation
  - b. Heavy Smokers/Overweight
  - c. Intensive Sports Participation
  - d. All of the above
- 5 Which nutrient found in Omega-3 is particularly beneficial for joint health?
  - a. Eicosapentaenoic Acid (EPA)
  - b. Docosahexaenoic Acid (DHA)
  - c. Vitamin E

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<sup>1</sup> S Hurst, SG Rees, PF Randerson, B Caterson, J Harwood. Contrasting effects of n-3 and n-6 fatty acids on cyclooxygenase-2 in model systems for arthritis. *Lipids*, 2009, 44:889-896.

<sup>2</sup> B Galarraga, M Ho, H M Youssef, et al. Cod liver oil (n-3 fatty acids) as an NSAID-sparing agent in RA. *Rheumatology*. Doi:10.1093/rheumatology/ken024.