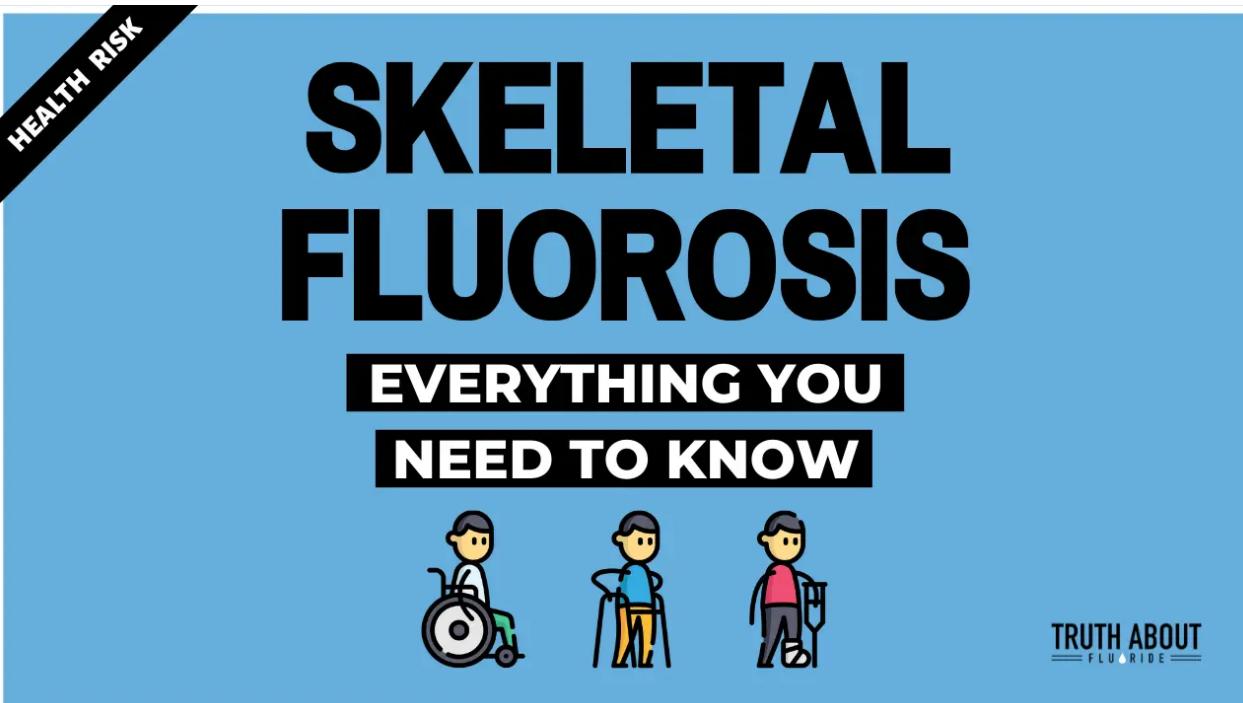


Evidence Based



Skeletal Fluorosis: Symptoms, Causes & Prevention

by Casey J Krol

What Is Skeletal Fluorosis?

Skeletal Fluorosis is a chronic bone and joint disease caused by long term consumption of fluoride.

As fluoride accumulates in the bones it begins to negatively alter processes of bone formation and resorption- affecting the entire skeleton.¹

Gradually bones become weaker and more brittle, while joints increase in pain and stiffness due to skeletal changes.

On-going fluoride exposure can lead to “**crippling skeletal fluorosis**” the most severe case of the disease. A result of calcification of ligaments, immobility, muscle wasting, and neurological problems related to spinal cord compression.²



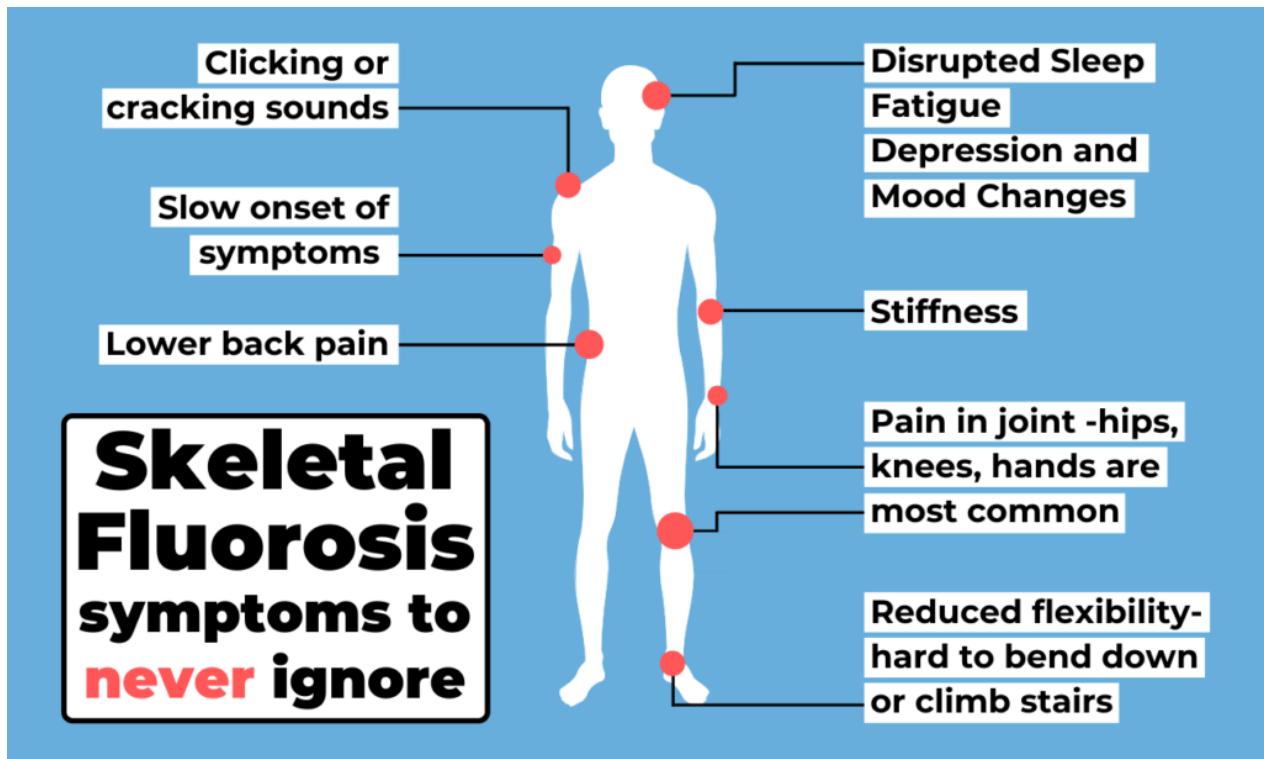
Thankfully, skeletal fluorosis is a **preventable** crippling disease.

However, as it stands, there are no treatments capable of curing skeletal fluorosis.

What makes things more complicated is through its gradual development it can be difficult to distinguish from a number of other bone and joint diseases.

Making it hard to detect without knowing what to look for.

What Are The Symptoms Of Skeletal Fluorosis?



Generally, the larger and greater the exposure to fluoride- the **more** severe the symptoms.²

While the earlier fluoride exposure is stopped, the better chance of reversing the effects, or even better- avoiding them entirely.

The most common early symptoms of skeletal fluorosis are:

- Lower back pain³
- Stiffness and pain in joints⁴
- Weaker bones⁴
- Growth lines on bone⁵

These early symptoms act as red flags.

When skeletal fluorosis progresses, much more serious health effects kick in.

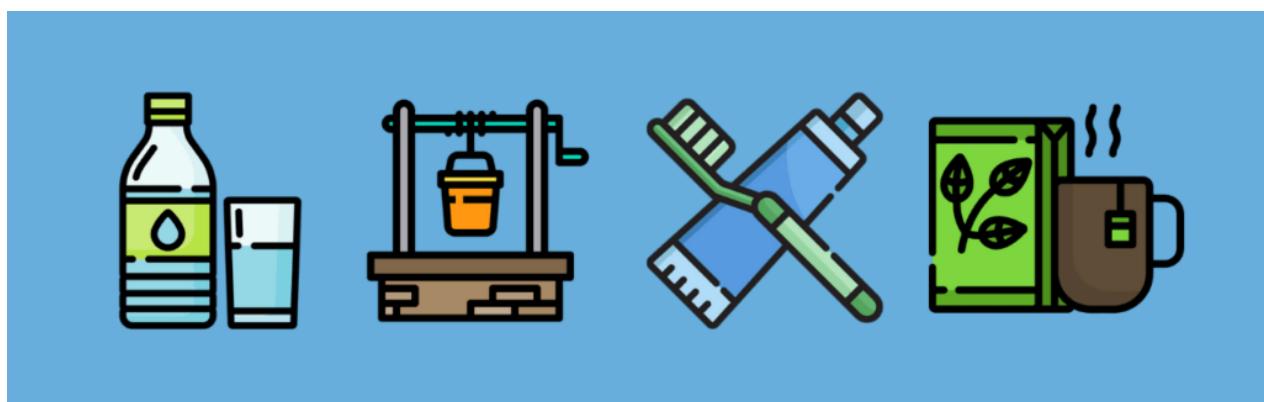
Other Signs Of Skeletal Fluorosis?

Now since fluoride causes dental, skeletal and non-skeletal effects throughout the body, a person can use this to their advantage.^{6,7}

Individuals that don't experience the above symptoms, can spot the development of skeletal fluorosis by observing earlier health effects caused by fluoride:

- [Pineal Gland Calcification](#): poor sleep and lowered melatonin
- [Fluoride's Brain Effects](#): reduced intelligence and functioning
- [Fluoride Allergy](#): eczema, hives, epigastric distress, weakness
- [Dental Fluorosis](#): discoloration and damage to enamel of teeth

Causes Of Skeletal Fluorosis?



The **total amount of ingested fluoride** is the leading factor which determines the development and progression of skeletal fluorosis.⁸

With fluoride being a cumulative toxin, the more you ingest, the more accumulates in your body.

In addition, fluoride exposure from any source or the combination of- can lead to skeletal fluorosis. With the largest and most consistent source of fluoride in most societies being

fluoridated water, dental products, and [fluoride in tea](#).⁹

Nonetheless, other sources of fluoride that will contribute to the risk of developing skeletal fluorosis:

- [Drugs That Contain Fluoride](#) (Search 325+ Drugs)
- [Fluoride In Food](#) (Search 503+ Foods)
- [Fluoride In Coffee](#) (238+ Coffees Tested)

Not to mention, other rare but equally detrimental sources like [fluoride in well water](#), industrial fluoride exposure and indoor coal burning.¹⁰⁻¹²

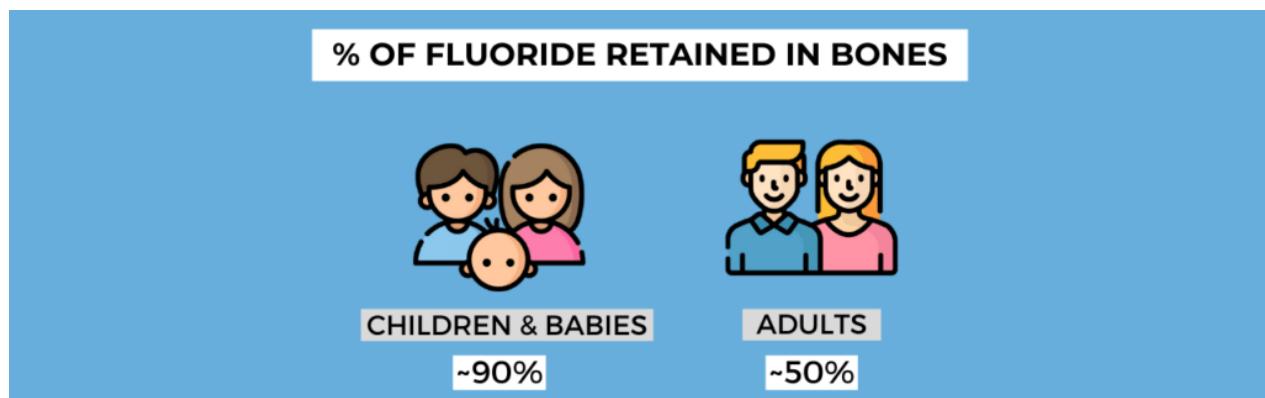
What Does Fluoride Do In The Body?

When fluoride is ingested, it is absorbed into the blood through the digestive tract.

With approximately **50%** of fluoride being removed through urinary excretion, the rest is free to roam and accumulate in the body.⁴

Now when fluoride gets into the blood, uptake by bone removes it from circulation.¹³

This is due to fluoride's negatively charged nature that allows it to react with positively charged ions like calcium. Thus collecting in high calcium areas, such as the bones and teeth.



When fluoride reacts with calcium in your bones, it forms calcium fluoride (CaF₂).

Through this process, fluoride takes the place of naturally occurring calcium hydroxyapatite in the bone- altering normal bone formation and resorption.¹

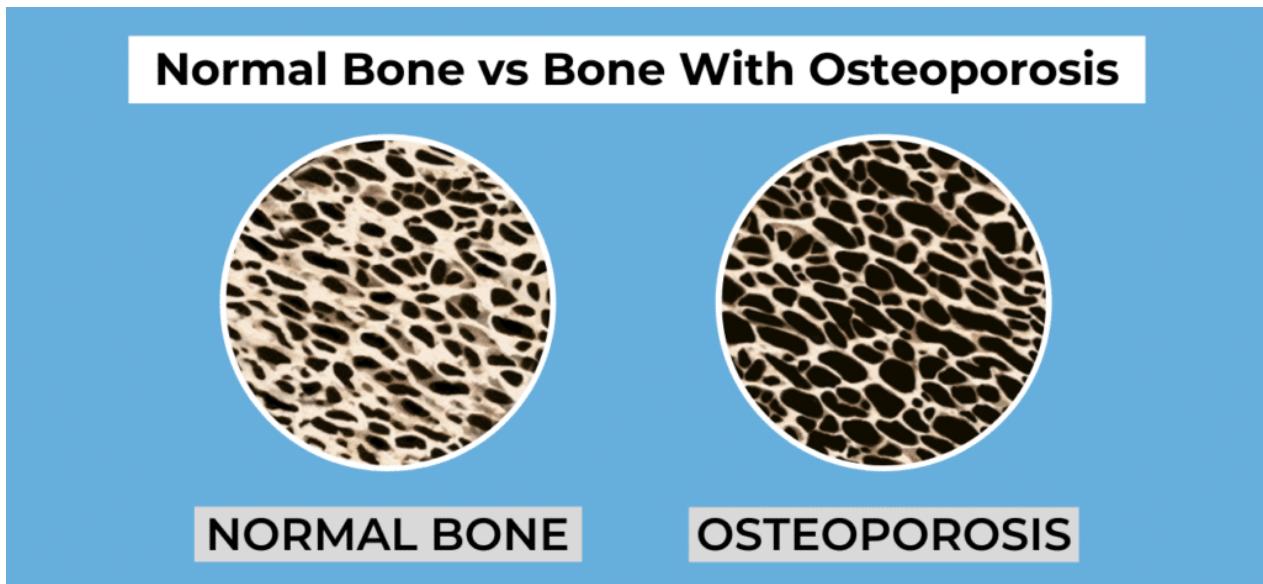
Leading to weaker and more brittle bones.

When the body can not participate in naturally occurring bone formation and resorption, it leads to several different bone turnover disorders:

- **Osteomalacia** (softening of the bone through inadequate bone mineralization)
- **Osteoporosis** (body makes too little bone and/or loses too much bone, leaving bones

weak and easy to break)

- **Osteoarthritis** (most common form of arthritis, commonly affecting hands, knees, hips and spine)



Interestingly enough, radiologic findings suggest that fluoride's primary effect is to stimulate bone formation.¹⁴

However, bone made during the development of skeletal fluorosis is not of good quality compared to bone made in healthy conditions. Mainly due to the abnormal bone formation that results in **increased density** but **decreased strength**.¹⁵

Leaving those with skeletal fluorosis at an increased risk of fracture.¹⁶

What Are The Stages Of Skeletal Fluorosis?

Due to skeletal fluorosis's complexity, an individual's progression through its stages may vary.

As fluoride bone concentrations do not always represent the symptoms an individual experiences.

For example, in the "pre-skeletal" stage, increased bone mass may not be observed but an individual may experience symptoms typically associated with stage 3, such as stiffness, backache or arthritis (spine, hands and fingers).

While someone else in the pre-skeletal phase may be symptom-free.

With that being said, the chart below provides a general guideline on how skeletal fluorosis develops in regard to bone fluoride concentrations.

Skeletal Fluorosis Stages	Fluoride Concentration (mgF/kg)	Symptoms and Signs
Pre-Skeletal	<3500	Symptoms can start at this phase, without an increase in bone mass (arthritis of spine, hands and fingers)
Pre-Clinical Stage	3,500 to 5000	Increase in bone mass, generally no symptoms but stages 1 and 2 symptoms may start to emerge.
Stage 1	6,000 to 7000	Infrequent pain, stiffness of joints, osteosclerosis of pelvis and vertebral column.
Stage 2	7,500 to 9,000	Chronic joint pain, arthritis symptoms, sight calcification of ligaments, and osteosclerosis of cancellous bones.
Stage 3	8,400	Crippling skeletal fluorosis; mobility is significantly affected due to excessive calcification in joints, ligaments and vertebral bodies.

How Is Skeletal Fluorosis Diagnosed?

Diagnosis of skeletal fluorosis is tricky.

As many doctors **fail** to detect it due to the symptoms of skeletal fluorosis appearing similar to other more well known, bone and joint diseases.

For example, when bone change occurs during skeletal fluorosis, it closely imitates other diseases like osteoarthritis, renal osteodystrophy, spondylosis, DISH, Paget's Disease and osteopetrosis.¹¹

Unfortunately this leaves many individuals undiagnosed until the advanced stage of crippling fluorosis.

Where it becomes impossible to cure.

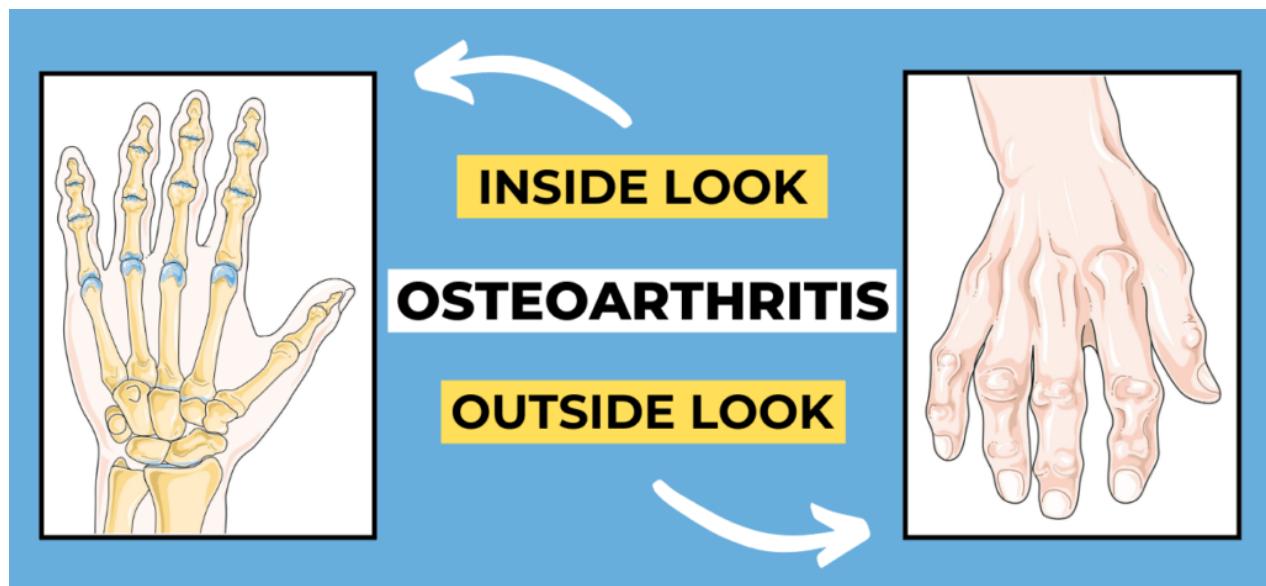
For instance, in 2011 a group of U.S scientists reported a women with crippling skeletal fluorosis, as evident by her severe hunchback ("kyphosis"), had to wait up to 18 years before doctors were able to diagnose her condition as being caused by fluoride.¹¹



To further complicate matters, within the initial stages, a patient may suffer symptoms of skeletal fluorosis (joint pain, joint stiffness and gastric distress) **without** any detectable bone changes.¹⁷

As illustrated below, fluoride can be deposited underneath the skin and around the joints or the hand (left).

Going generally unnoticed until it progresses to obvious visual signs (right).



With diagnosis hard to pinpoint, the most likely diagnosis will be of conditions such as arthritis.

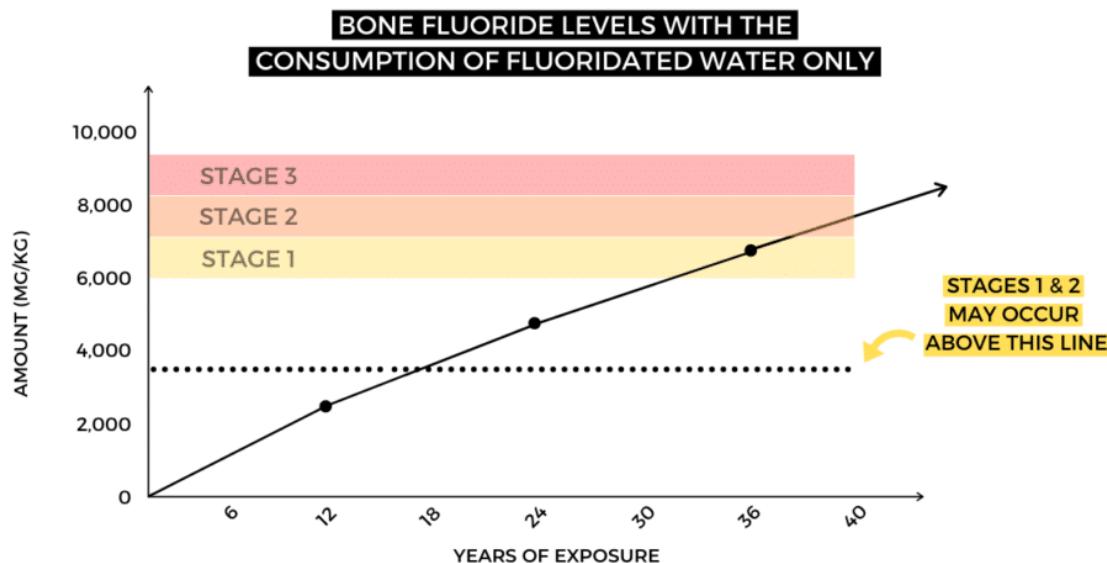
Followed by the prescription of drugs- leaving the patient without a real solution to what caused their symptoms (fluoride).

With the issue unattended to, more serious stages of skeletal fluorosis are likely to develop.

A situation that could be **easily** avoided if more doctors and individuals took into account an individual's lifetime exposure to fluoride.

Now, here is a general guideline to gauging how much fluoride has accumulated in one's bodies.

According to the NRC, in the absence of other sources of fluoride, the consumption of drinking water with a fluoride level of 1 ppm, fluoride bone concentration can reach 2500 mg/kg in twelve years and to 3000 to 4000 mg/kg over longer periods.²



Now considering the US Environmental Protection Agency (EPA) has set a maximum amount of fluoride allowable in drinking water at 4.0 ppm.¹⁸

It's clear that one who would like to avoid skeletal fluorosis should steer clear of public tap water.

Those At Higher Risk?

As mentioned in, [what is fluoride](#), the seriousness of health effects caused by fluoride toxicity depend on the following several factors: age, calcium intake, kidney function, sex, dose and duration of fluoride intake.¹⁹

For example, if a male and female with all other factors equal were exposed to the same amount of fluoride, the female would experience more severe symptoms.

As on average, females have less bone mass, leaving the same amount of fluoride less bone to damage.

This is in part why, more females suffer from osteoporosis in their later years of life than males.

In fact, of the millions of Americans with osteoporosis, **80% are female**.²⁰

Warning: Young and developing children are of greatest risk to fluoride's toxicity, making a

fluoride-free environment critical to healthy development in early years.

On top of personal risk factors, the following lifestyle factors also play a role:

- Heavy tea drinkers.
- Those with kidney impairments.
- Fluoridated water drinkers.
- Jobs exposing individuals to fluoride gas.

How Much Fluoride Is Safe?



The problem with current knowledge across North America is the belief that skeletal fluorosis does not occur at water fluoride levels below 4 ppm.

However, through extensive studies performed in India and China, it has been documented that **skeletal fluorosis can occur at levels as low as 0.7 to 1.5 ppm of fluoride.**^{21,22,23}

This in part builds upon the previous section, as one amount of fluoride can have different effects in different people.

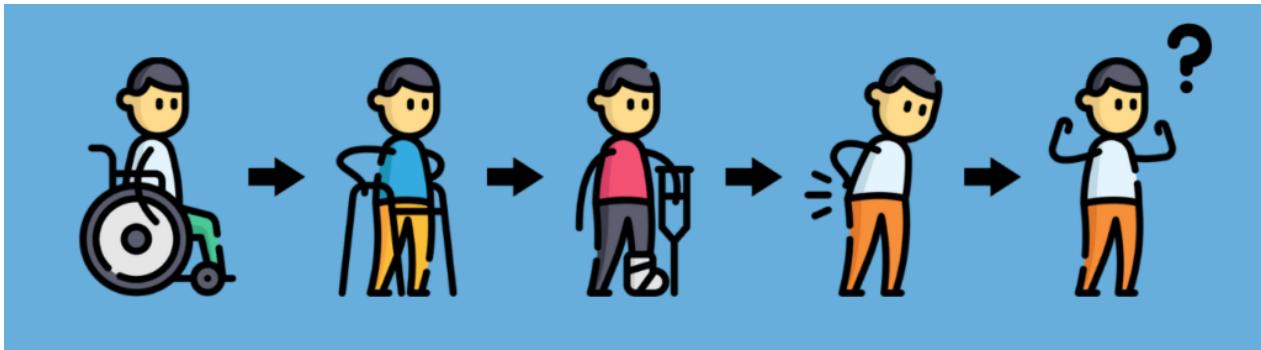
All of which points to individual susceptibility to fluoride:

- Individuals who receive the same dose of fluoride can experience completely different health effect²⁴
- Individuals with pre-skeletal fluorosis can experience painful symptoms, while others with advanced skeletal fluorosis can remain symptom free²⁵
- It's not always a gradual development to the point of fluorosis, it can happen in as little as 6 months in young children and be as fast as 2 to 7 years in adults^{26,27,28}

Considering fluoride serves no essential function in human growth or development, along with being a toxin that accumulates throughout the body.

It's safe to state, 0 fluoride is a safe amount of fluoride.

How Do You Treat Skeletal Fluorosis?



Current available treatments are unable to cure skeletal fluorosis.

The longer an individual is exposed to fluoride, the more it accumulates in their body and the harder it is to reverse the effects.

However, recent studies have shed some hope on skeletal fluorosis treatment:

- **Vitamin E and Methionine:** can reduce the effects of fluoride on soft tissues and prevent excessive accumulation of fluoride in the bone.²⁹
- **Choline:** reduces damage to the chondrocyte matrix and degradation enzymes in mice treated with fluoride.³⁰
- **Taurine:** enhances thyroid gland function and renal antioxidant status in rats, reusing in restoration of fluoride-induced renal toxicity.³¹
- **Acupuncture:** helps improve range of motion, relieve pain and stimulate urinary fluoride.³²

Now as mentioned current therapies only act to control the health effects of skeletal fluorosis but can not cure it.

It can be reversible in some cases but this is purely dependent on how much the disease has progressed.

With the process of reversing skeletal fluorosis is also the same way to prevent it.

How To Prevent Skeletal Fluorosis?



An ounce of prevention is worth a pound of cure.

Now there are two general steps to prevent skeletal fluorosis.

The first and most important step is to **eliminate** the substance that causes skeletal fluorosis, fluoride.

Since fluoride in drinking water is the largest source of fluoride, using a [fluoride filter](#) for your drinking water or drinking [bottled water without fluoride](#) should be of most importance.

Second, you'll have to **remove** all the fluoride that has accumulated in your body.

When fluoride intake is stopped, the amount of fluoride in bone will decrease and be excreted via urine- however, this tends to be a very slow process.

To speed up this process, our [fluoride detox guide](#) outlines the most up-to-date methods to detox your body of fluoride. Along with every fluoride source you're currently exposed to and how to get rid of it.

Final Words

What we put into our bodies should help us avoid illness, not bring us closer to it.

Considering how easy it is to avoid the health effects of fluoride, it's quite unfortunate that millions of people have to suffer from its toxic nature.

But you have to be like the yellow fish in the photo above and swim in the opposite direction.

Lastly, fluoride and all its health effects, is essentially a war between good and bad guys.

With each glass of water with fluoride, use of fluoride-containing toothpaste or cup of coffee made with fluoridated water – “ammunition” is sent to the bad guys, while stripping away resources from the good guys.

The same way fluoride strips the body of calcium, leading to skeletal fluorosis.

Leading us to the most logical solution:

- **Stop** sending ammunition to the bad guys (eliminate fluoride exposure)
- **Strip** bad guys of the current ammunition they have (fluoride detox)
- **Send** resources to the good guys (drink better water)

Again, all steps are outlined in the [fluoride detox guide](#).

A guide made after going through the entire process myself. Helping you do the same but avoiding all the mistakes, time wasted and money spent on poor products that did not help me live a healthier life.

Anyways, there you have it, the [truth about fluoride](#) in regards to *skeletal fluorosis*.

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