CONDITION

Trisodium phosphate poisoning

Trisodium phosphate poisoning is harmful exposure to a strongly alkaline chemical that can burn tissues and disrupt body salts.

WHAT IT IS
Caustic injury from harmful trisodium phosphate exposure

BODY SYSTEM
Digestive tract, lungs, eyes, skin, heart, and kidneys

MAIN SYMPTOMS
Mouth burns, vomiting, abdominal pain, breathing difficulty

WHAT CAUSES IT
Swallowing, inhaling, or contacting concentrated trisodium phosphate

HOW IT IS DIAGNOSED
Exposure history, examination, blood tests, sometimes endoscopy

MAIN TREATMENT
Decontamination, supportive care, electrolyte correction, and burn management

CAN IT BE CURED?
Sometimes - severe burns may leave scarring

IS IT AN EMERGENCY?
Yes - swallowed concentrate or breathing problems need immediate help

LONG-TERM OUTLOOK
Most mild exposures recover; deep burns can scar

Overview

Trisodium phosphate is a strongly alkaline chemical. It may be found in some heavy-duty cleaners, degreasers, industrial products, and older cleaning powders. Small, regulated amounts of phosphate compounds may also be used in food processing, but normal exposure from food is not the same as poisoning.

Poisoning usually happens when a concentrated product is swallowed. Harm can also follow eye or skin contact or breathing in dust or spray. Products sold as "TSP substitutes" may contain different chemicals, so the product label matters.

Because trisodium phosphate is caustic, meaning it can chemically burn tissue, concentrated exposure may injure the mouth, throat, food pipe, stomach, eyes, skin, or lungs. Swallowing a significant amount may also disturb calcium, phosphate, sodium, and other body salts. This can

affect the heart, nerves, muscles, and kidneys.

The seriousness depends on the product's concentration, the amount involved, how the exposure happened, and how quickly it was removed or treated. A person can have internal injury even when burns around the mouth are not obvious.

Symptoms

Symptoms may begin immediately, but some problems can become clearer over several hours.

After swallowing trisodium phosphate, symptoms can include:

A person may also become weak, confused, unusually sleepy, or restless. Severe exposure can cause low blood pressure, collapse, seizures, or an abnormal heartbeat. These effects may result from deep chemical burns, fluid loss, or changes in calcium and other body salts.

Eye exposure may cause intense pain, watering, redness, blurred vision, and damage to the eye's surface. Skin contact can cause irritation, redness, pain, or a chemical burn. Damp skin and prolonged contact may increase the injury.

Breathing in dust or mist may irritate the nose, throat, and lungs. Possible symptoms include coughing, chest tightness, shortness of breath, and throat swelling.

The absence of early symptoms does not always rule out injury after swallowing a concentrated product.

- Burning or pain in the mouth, throat, chest, or abdomen
- Drooling, painful swallowing, or inability to swallow
- Nausea, vomiting, or vomiting blood
- Coughing, hoarseness, wheezing, or breathing difficulty

Causes and risk factors

Trisodium phosphate poisoning is caused by exposure to enough of the chemical to damage tissue or disrupt normal body chemistry. It is not infectious or inherited.

Accidental swallowing can happen when cleaning chemicals are stored in cups, water bottles, or unlabelled containers. Children are at particular risk when products are within reach. Adults may be exposed while mixing cleaners, using industrial products without suitable protection, or mistaking a chemical for food or drink.

Other situations that may increase risk include poor ventilation, splashing while pouring or

mixing, handling powder that becomes airborne, and leaving contaminated clothing against the skin.

Intentional swallowing can cause severe injury and also signals a need for urgent emotional and mental health support.

The product name alone does not show how dangerous an exposure is. Concentration and other ingredients matter. Some cleaners contain several chemicals, while products described as TSP substitutes may not contain trisodium phosphate at all.

Diagnosis

There is no single test that confirms every case. Diagnosis begins with identifying the product and understanding how the exposure happened. If it is safe to do so, bring the container or a photograph of the label to the hospital. Do not delay emergency care to search for it.

The medical team will assess breathing, circulation, alertness, swallowing, pain, and visible burns. A normal-looking mouth does not prove that the food pipe and stomach are unharmed.

Blood tests may measure calcium, phosphate, sodium, potassium, kidney function, and acid-base balance. An electrocardiogram, or ECG, records the heart's electrical activity and can detect rhythm changes related to severe poisoning or abnormal body salts.

A chest or abdominal X-ray or CT scan may be used if there is concern about a hole in the food pipe or stomach, lung injury, or damage around nearby organs.

Endoscopy may be considered after significant ingestion. During this procedure, a flexible camera is passed through the mouth to examine the food pipe and stomach. It helps determine the depth of a chemical burn. It is not appropriate in every situation, particularly if the person is unstable or there are signs of a perforation.

Treatment and management

There is no specific antidote for trisodium phosphate poisoning. Treatment focuses on stopping further exposure, protecting breathing and circulation, correcting body-salt changes, and managing chemical burns.

For a recent exposure:

A poison specialist may sometimes advise a small amount of water after swallowing, but this should be based on the product and the person's condition. Vomiting can expose the throat and mouth to the chemical again. Attempting to neutralise an alkali can produce heat and

worsen the burn.

For eye exposure, remove contact lenses if they come out easily and rinse the eye continuously with clean, lukewarm water. For skin exposure, remove contaminated clothing and rinse the affected area thoroughly. Avoid spreading dry powder to other areas. Fresh air may help after inhaling dust or mist, but no one should enter a contaminated space without appropriate protection.

Hospital treatment may include oxygen, close airway monitoring, intravenous fluids, pain relief, and medicines for nausea. A breathing tube may be needed if swelling threatens the airway.

Abnormal calcium, phosphate, sodium, or other body salts are corrected carefully while the heart and kidneys are monitored. Activated charcoal usually does not absorb caustic chemicals well and can interfere with assessment. Procedures that empty or wash out the stomach can cause further injury and are generally avoided after caustic ingestion.

Deep burns, dead tissue, or a perforation may require surgery. People with swallowing injuries may later need nutritional support or procedures to treat scarring.

- Do not make the person vomit
- Do not try to neutralise the chemical with an acid or another cleaner
- Rinse the mouth gently and spit out the water
- Contact a poison centre or emergency service promptly
- Do not give food or drink to someone who is drowsy, vomiting, having a seizure, or unable to swallow safely

Complications

A deep burn can damage the full thickness of the food pipe or stomach. A hole, called a perforation, may allow contents to leak into the chest or abdomen and cause serious inflammation or infection.

Throat swelling, inhaled vomit, or direct chemical injury can interfere with breathing. Severe vomiting and tissue damage may cause dehydration, bleeding, low blood pressure, and shock.

High phosphate or sodium levels and low calcium can affect nerves, muscles, and the heart. Possible effects include tingling, muscle spasms, weakness, seizures, or an abnormal heartbeat. Kidney injury can make these chemical changes harder to correct.

As a burn heals, scar tissue may narrow the food pipe. This narrowing is called an oesophageal stricture. It can cause food to stick, painful swallowing, regurgitation, or weight loss. Strictures often develop over weeks or months rather than immediately.

Eye exposure can damage the cornea, the clear front surface of the eye, and may affect vision if treatment is delayed.

Prevention

Most accidental trisodium phosphate exposures can be prevented.

Keep cleaning and industrial chemicals in their original, labelled containers. Never store them in food jars, cups, or drink bottles. Lock products away from children and from adults who may confuse one container with another.

Read the label before use. Follow its instructions for ventilation, protective gloves, and eye protection. Avoid creating airborne dust, and do not mix the product with other cleaners unless the manufacturer specifically directs this.

Wash your hands after handling the chemical. Change contaminated clothing promptly and clean spills using the product's safety instructions.

In workplaces, training, suitable protective equipment, accessible eyewash facilities, and the product's safety data sheet can reduce the chance and severity of exposure.

Living with it and what to expect

Many people with brief, mild skin or eye irritation recover after thorough rinsing and appropriate assessment. A minor digestive exposure may also settle without lasting effects, but the outcome cannot be judged safely from symptoms alone.

After a more significant ingestion, hospital observation may last long enough to watch for airway swelling, internal burns, bleeding, or changes in body salts. Recovery from superficial burns may take days to weeks.

Deep injury can affect eating and swallowing for much longer. Scar-related narrowing may appear several weeks or months later, including after the initial pain has improved. Treatment can involve repeated endoscopic stretching of the narrowed area. Some people need temporary tube feeding or surgery.

Follow-up is especially important after a documented burn of the food pipe or stomach. Seek routine review if swallowing gradually becomes painful or difficult, food seems to stick, vomiting continues, or weight is falling. These are not always emergencies, but they should not be ignored.

Severe poisoning can have lasting physical and emotional effects. Rehabilitation, nutrition

support, and mental health care may be part of recovery. If the exposure was intentional, follow-up should include support for the circumstances that led to it.

When to get medical help

Contact a poison centre immediately after trisodium phosphate is swallowed, even if there are no symptoms yet. In the United States, Poison Control is available at 1-800-222-1222. Elsewhere, use your local poison information service or emergency number.

Call emergency services now if the person has:

Do not wait for a routine appointment in these situations.

Prompt medical advice is also needed for ongoing eye pain after rinsing, a worsening skin burn, cough or breathlessness after inhalation, or any exposure involving a young child.

After the immediate recovery period, arrange routine follow-up for new or worsening difficulty swallowing, repeated regurgitation, food sticking, poor intake, or unexplained weight loss. These can be signs of scar-related narrowing.

- Trouble breathing, noisy breathing, or increasing throat swelling
- Collapse, severe drowsiness, confusion, or a seizure
- Inability to swallow, heavy drooling, or persistent vomiting
- Severe chest or abdominal pain
- Blood in vomit or black, tar-like stool
- A large or concentrated ingestion
- Severe eye pain or sudden loss of vision

Common questions

What should I do if I swallowed trisodium phosphate?

Rinse your mouth and spit out the water. Do not make yourself vomit or try to neutralise the chemical. Contact a poison centre immediately and follow its instructions. Call emergency services for breathing difficulty, severe pain, repeated vomiting, drowsiness, collapse, or inability to swallow.

Is trisodium phosphate in food poisonous?

Phosphate compounds may be used in regulated amounts during food processing. This is

different from swallowing a concentrated cleaning or industrial product. Risk is determined by the exact substance, concentration, and amount. If a non-food product was swallowed, contact a poison centre.

Can trisodium phosphate burn my throat?

Yes. Concentrated trisodium phosphate is alkaline and can chemically burn the mouth, throat, food pipe, and stomach. The mouth may look normal even when deeper tissue is injured, so significant ingestion needs prompt assessment.

Should I drink milk or water after swallowing it?

Do not give anything to someone who cannot swallow normally, is vomiting, is drowsy, or is having a seizure. In other cases, a poison specialist may advise a small amount of water, depending on the product. Call first rather than forcing fluids.

Will I recover completely?

Many mild exposures heal completely. Deep burns can lead to lasting swallowing problems, scarring, or organ complications. The likely course becomes clearer after examination, blood testing, and, when needed, imaging or endoscopy.

Can symptoms start later?

Yes. Pain and irritation often begin quickly, but swelling, internal tissue damage, abnormal body salts, or scar-related narrowing may become apparent later. New swallowing trouble can develop weeks or months after a serious caustic injury.

Sources

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