Huff? You May Fracture. 
An Unusual Case of Skeletal Fluorosis

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Skeletal fluorosis is a rare metabolic bone disease caused by massive bone fixation of fluoride. It is prevalent in areas with fluoride water contamination, fluoride air pollution in industrial areas, and in areas with increased tea consumption. In the United States, skeletal fluorosis is not a public health issue, however, it has been reported in individuals who inhale and “huff” fluoride containing aerosols recreationally. Patient reported huffing up to 10 containers a day and only stopped two months prior after completing a stay in a rehabilitation facility for inhalation abuse. It is important to note that air duster contains chemicals such as hydrofluoric acid and carbonyl fluoride. Given his presentation of a fragility fracture with worsening diffuse osteosclerosis along with his history of inhalant abuse, serum fluoride levels were obtained. The patient’s serum fluoride levels were significantly elevated at 23.0 (Reference value <4.1 mcmlol/L). Furthermore, it became clear that the presence of diffuse osteosclerosis in conjugation with elevated serum fluoride levels, fragility fractures and a history of compressed air dust inhalant abuse strongly supported the diagnosis of skeletal fluorosis. These changes had progressed since his prior studies from about one year prior when he had been admitted with a contralateral femur fragility fracture. His labs this admission were significant for an elevated serum alkaline phosphatase level to 342 (46 - 116 U/L), PTH level of 112.6 (18.4 - 80.1 pg/mL) and Vitamin D, 25-Hydroxy level of 20 (30 - 100 ng/mL).

Skeletal fluorosis is a rare disease in the United States and can present with nonspecific findings (e.g., fragility fractures, nonspecific bone pains etc.), as seen in our case. Fragility fractures and diffuse sclerosis on imaging in patients, particularly without significant risk factors for osteoporosis, should prompt clinicians to include skeletal fluorosis in their differential diagnosis. This case further highlights the importance of thorough history taking.

Introduction
- Skeletal fluorosis is a rare metabolic bone disease caused by massive bone fixation of fluoride
- It is prevalent in areas with fluoride water contamination, fluoride air pollution in industrial areas, and in areas with increased tea consumption
- In the United States, skeletal fluorosis is not a public health issue, however, it has been reported in individuals who inhale and “huff” fluoride containing aerosols recreationally

Clinical Case
- A 40-year-old male with past medical history of substance use disorder on Suboxone and bipolar disorder was hospitalized with a right midshaft femur fracture after a ground-level fall
- He reported all his teeth were extracted and he had dental implants
- Upon his hospital admission, imaging revealed diffuse sclerotic changes involving all cervical and upper thoracic vertebral bodies, hip, femur and ribs
- Patient endorsed “huffing” compressed air duster for the past 3 years

Discussion
- Skeletal fluorosis is a rare disease in the United States and can present with nonspecific findings (e.g., fragility fractures, nonspecific bone pains etc.), as seen in our case
- Fragility fractures and diffuse sclerosis on imaging in patients, particularly without significant risk factors for osteoporosis, should prompt clinicians to include skeletal fluorosis in their differential diagnosis
- This case further highlights the importance of thorough history taking