Fluoride Treatment and Risk of Fracture In Osteoporosis Patients

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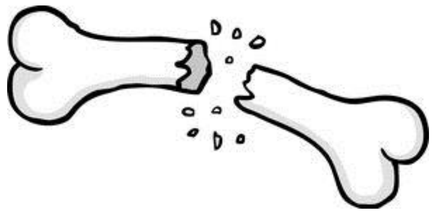
INTRODUCTION

- Osteoporosis is common systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk"
- More common in postmenopausal
- Over 50% of women due to Decreased estrogen levels result in increased secretion of IL-1, IL-6, and TNF-alpha by blood monocytes and bone marrow cells.
- These cytokines are potent stimulators of osteoclastic activity.
- 30-45% of men over age 50 have osteoporosis
- The ideal therapy for osteoporosis should increase bone mass to a level sufficient to decrease the occurrence of new fractures. However, the treatments commonly used, such as calcium, estrogen, and calcitonin, act by decreasing bone resorption
- Also Sodium fluoride stimulates bone formation and increases cancellous-bone mas



- Sodium fluoride (NaF) was currently the only pharmacological agent capable of stimulating bone formation through a direct effect on the osteoblast . This is the basis of its use as a therapy for established osteoporosis. However, although this treatment has existed for 20 years, its ability to prevent fracture remains controversial.
- Due to its ability to increase bone mass,
- The results, however, have generally been disastrous. Rather than prevent bone fractures in osteoporosis patients
- The primary goals of the poster were to assess the effect of fluoride therapy on the occurrence of vertebral fractures and related side effects, including the occurrence of nonvertebral fractures [1,2,3,4,5,6]

METHODS

- This method is based on **three** studies ,a study is performed in March **2016** and another one performed in october **2016** and last one in November **1990**

RESULTS

✓ Average results for the three reports was :

✓ Non vertebral Fractures during the Study in the Women with Osteoporosis in the Fluoride and Placebo Groups.

Number of patient (number of fracture)

Site	Incomplete fracture		Complete fracture		Total fracture	
Group	Fluoride	placebo	Fluoride	placebo	Fluoride	placebo
All site	26 (32)	2 (2)	35 (40)	22 (22)	(72)	24(24) 61

✓ Vertebral Fractures during the Study Period in the Women with Osteoporosis in the Fluoride and Placebo Groups

Year	Fluoride	Placebo
1	87 (56)	89 (39)
2	81 (22)	82 (36)
3	67 (26)	71 (54)
4	66 (32)	69(34)

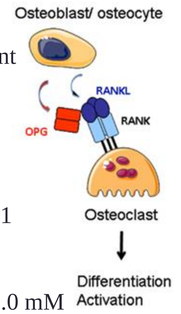
✓ Entire period in floride grobe was 301 (136) and in placebo groub was 311 (163)

✓ The result of bone fructure in these women debend in bone type [1,3,5]

Axial Skeleton	Appendicular Skeleton
☐ Spine, Pelvis, Ribs, Skull	☐ Legs, arms, femoral neck (hip)
☐ Primarily Trabecular	☐ Primarily Cortical
☐ No effect or Increased Density	☐ No effect or Reduced Density

DISCUSSION

- **1st study** assure the fact that fluoride's effect on bone density depends on the type of bone so fluoride tends to increase the density of trabecular bone and decrease the density of cortical bone
- Fluoride-induced reductions in cortical bone density would be expected to reduce bone strength. By contrast, fluoride-induced increases in bone density are generally not accompanied by increases in the bone's strength due to the defective quality of the new bone
- **2ndstudy** assure IFNγ is inhibited by estrogen treatment and increased by fluoride Estrogen suppresses IFNγ, which is elevated by fluoride, playing a pivotal role in triggering bone loss in estrogen-deficient conditions



- **3rd study** assure The expression of BMP-2 and SMAD1 and their roles in osteoblast differentiation
- The expression of BMP-2 and SMAD1 in the 0.5 and 1.0 mM fluoride groups showed a tendency to increase at 24 hr and to reduce at 72hr.
- In the group with exposure to 2.5 mM NaF, the formation of osteoblasts and the gene expression were significantly inhibited and the protein levels of BMP-2 and SMAD1 decreased ($p < 0.01$).
- Therefore, low (0.01 and 0.1 mM) and intermediate (0.5 and 1 mM) concentrations of fluoride initially stimulated the expression of BMP-2 and SMAD1 for a short time (24 hr) but inhibited them after a longer period (72 hr). [1,2,3,4]

CONCLUSIONS

- Fluoride has an ability to increase body mass index (BMD) at lumbar spine, it does not result in a reduction of vertebral fractures.
- In increasing the dose of fluoride, one increases the risk of non-vertebral fracture and gastrointestinal side effects without any effect on the vertebral fracture rate.

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