Systemic fluorides

DR. SHANKAR
<table>
<thead>
<tr>
<th>Score</th>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>The enamel represents the usual translucent semivitriform type of structure. The surface is smooth, glossy, and usually of a pale creamy white color.</td>
</tr>
<tr>
<td>0.5</td>
<td>Questionable</td>
<td>The enamel discloses slight aberrations from the translucency of normal enamel, ranging from a few flecks to occasional white spots.</td>
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<tr>
<td>1</td>
<td>Very mild</td>
<td>Small, opaque, paper white areas scattered irregularly over the tooth but not involving as much as approximately 25% of tooth surface.</td>
</tr>
<tr>
<td>2</td>
<td>Mild</td>
<td>The white opaque areas in the enamel of the teeth are more extensive but do not involve as much as 50% of the tooth.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>All enamel surfaces of the teeth are affected, and surfaces subject to attrition show marked wear. Brown stain is frequently a disfiguring feature.</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
<td>All enamel surfaces are affected, and hypoplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is the discrete or confluent pitting. Brown stains are widespread, and teeth often present a corroded like appearance.</td>
</tr>
</tbody>
</table>
Total daily intake of fluoride

- Fluoride intake from air
  0.038mg/day

- Fluoride intake from water
  Water cont. 1ppm fluoride was therefore estimated at 0.39 to 0.56 mg daily for children aged 1 to 3 yrs, rising to 0.810 to 1.165mg in 10-12 yrs

- Fluoride intake from food
  0.6mg/day
Optimal fluoride concentrations and climatic conditions

- Galagan and Vermillion formula
- ppm F = 0.34/E
- Where E = -0.038 + 0.0062 t
- t is the mean maximum daily temperature in fahrenheit
Administration of fluoride

- Systemic
- Water fluoridation - School, community
- Milk fluoridation
- Salt fluoridation
- Fluoride drops
- Fluoride tablets
- Fluoride lozenges
- Fluoridation of flour
- Topical
- Sodium fluoride
- Stannous fluoride
- Acidulated phosphate fluoride
- Fluoride varnish
- Fluoride dentrice
- Fluoride mouth washes
Water fluoridation

- O.7-1.2 ppm
- Types of equipment- saturator system, dry feeder, solution feeder, venturi fluoridator system, saturation- suspension cone
- NaF- saturated system, granular form, 45kg bags, expensive
- Sodium silico fluoride- 45kg bags, cheapest
- Hydroflurosilicic acid- tanker lorry, 19,000L, more expensive
- In school- 4.5ppm
Salt fluoridation

• 5mg potassium iodine and 90mg of sodium fluoride per Kg
• Type 1- fluoride is added to salt by spraying concentrated solution of sodium fluoride and potassium fluoride on salt on conveyer belt
• Type 2- NaF and calcium fluoride are mixed with slightly moist salt or mixed with a flow conditioner such as tricalcium phosphate and these premixed granules are added to dry salt
Milk fluoridation

- Reduction in fluoride absorption from milk during the first hour, but there after absorption continues at higher levels for longer periods of time
Fluoride tablets

• 2.2mg, 1.1mg, 0.55mg yielding 1mg, 0.5mg, 0.25mg fluoride
Fluoride drops

- 10 drops = 1 mg
- Resultant is 1 ppm
Fluoride metabolism and bioavailability

• Mechanism and site of absorption

Water soluble fluoride- sodium fluoride, hydrogen fluoride, H2SiF6, Na2PO3F, and stannous fluoride

Less soluble fluoride- CaF2, Ca10(PO4)6F2, and Na3AlF6

Absorption is passive in nature
• Direct inhibitory effect on enzymatic functions of the ameloblasts
• More fluorotic the enamel the greater the enamel porosity
Physiologic distribution of fluoride

- Fluoride in blood and soft tissues
  Three fourth in plasma
  Plasma concentration- 0.01-0.025ppm
- Phases
- Fluorides in hard tissues
  95%, 2.6g
  Replaces hydroxyl ion or groups such as carbonate and bicarbonate
  Not an irreversible process
  Dentin contain 4 times more fluoride than enamel
  Speed of penetration- 38µm/hour or 186µm/day
Excretion of fluoride

- Kidney
  40-60%
  Tubular reabsorption of F mainly occur as hydrofluoric acid
  Greater in acid urine-5.6pH
- Gut
- Sweat
- Ingested 0.4-0.5mg, 29.5c, 50% humidity, 10-20% excreted
- Saliva
- Breast milk
- Placental transfer of fluoride
Safety and toxicity of fluoride

• Acute toxicity
CLD of sodium fluoride for a man weighing 70kg to be 5-10g
10kg child- 1.07g

• Chronic toxicity
Osteofluorosis- crippling fluorosis
Dental fluorosis