Fluoridated varnishes
These are slow release or semi-slow release agents. Prolonged exposure time and high fluoride concentrations result in the formation of a large calcium fluoride reservoir. Fluoride release continues for a long time, as for at least 8 hours or even for several weeks according to the type used. Studies showed that the use of fluoridated varnishes resulted in the most significant caries reduction among topical fluoride agents (30-70% caries reduction).

Types
1- Duraphate:
   It contains 5% NaF (2.26% F). It is viscous, resinous varnish. In contact with saliva, Duraphate hardens into a yellowish brown coating.
2- Fluor protector:
   It is a polyurthan-based varnish contains 0.9% silane fluoride (0.1% F). The varnish is acidic and hardness in air in to a colorless, transparent film within 2-3 minutes. The silane fluoride, is insoluble in water but reacts on contact with saliva, releasing small amounts of hydrogen fluoride that penetrates enamel more rapidly than other types of fluoride.
3- Bifluoride 12:
   Is a clear varnish containing 6% NaF and 6% CaF2, The varnish base consists of collodion and organic solvents.

Indication of use:
- high risk group.
- Initial caries even for children under 6 years of age as can be applied on the affected surface only.
- Highly indicated for sensitive teeth
- Root caries.

Varnishes should not be applied in presence of sever gingival bleeding to prevent the development contact energy with the components of the varnishes.

Fluoride containing prophylactic paste
Before applications of fluoride agents, it recommends to clean teeth by polishing with a rubber cup using pumice. Different types are available as Zirconium silicate contains stannous fluoride; Silicon dioxide contains acidulated phosphate fluoride. This paste is not a substitute for the topical agents; they are used in order to increase the accessibility for fluoride ions by tooth surface. Thorough prophylaxis will remove a thin layer of enamel (1 – 4 µm), thus it is always recommend using F pumice.
Fluoride Toxicity

There are two types of toxicity related to fluoride:
1- Acute fluoride toxicity due to single ingestion of a large dose of fluoride at one time.
2- Chronic fluoride toxicity due to long term ingestion of small amount of fluoride for a long time.

Acute fluoride toxicity;
It is the rapid excessive ingestion of fluoride at one time, the speed and severity of ingestion depend on amount of fluoride ingested and the weight and age of the victim.
The certainly lethal dose (CLD) for adults, 70 Kg weight is 5 – 10 gm F/ Kg body weight.
For children the CLD is not well known but the probable toxic dose is 5 mg / kg body weight.

It is always recommended not to dispense more than 264 mg of F at any time.
Note: the PTD is the threshold dose that trigger immediate emergency.

Signs and symptoms of acute toxicity:
GIT; nausea, vomiting, diarrhea, abdominal pain, and cramps.
CNS, paresthesia, tetany, CNS depression and coma.
CVS; weak pulse, hypotension, pallor, shock, cardiac irregularities and ultimately failure.
Blood chemistry; acidosis, hypocalcaemia, hypomagnesaeemia.

Emergency treatment depends on the dose ingested:
1- Less than 5 mg/kg body wt.,
   - give calcium orally or milk to relive gastro intestinal symptoms.
   - Induce vomiting if necessary
   - Keep child under observations.

2- More than 5 mg F/ kg body wt;
   - Empty stomach by induction of vomiting using emetic materials.
   - If vomiting is not possible as for infant or young child or retarded patient then endotrachal intubation is performed before gastric lavage.
   - Give solution as milk or Ca- gluconate 5% or Ca – lactate solution.
   - Admit to hospital.

3- More than 15 mg / kg.
   - Admit to hospital immediately.
   - Cardiac monitoring
   - IV administration of 10 ml of 10% Ca gluconate solutions.
   - Monitoring of electrolyte especially Ca and K.
   - Adequate urine out put by diuretic.
   - Supportive measures for shock.
Recommendations to avoid toxicity
1- use small amount of topical fluoride agents in the clinic (not more than 4 ml).
2- Self applied fluoride for children need to be observed by parents.
3- Keep F supplements out of the reach of children.

Chronic fluoride toxicity

It is long term ingestion of small amount of F for years, in teeth is dental fluorosis and in bone is skeletal fluorosis.

Skeletal fluorosis
A term used to describe any changes in bone because of ingestion of at least 8 ppm of fluoride for years.
Signs:
- More dense bone.
- Diffuse bone.
- Thickening of cortical bone.
- Numerous exostoses. Through out the skeleton.
- Calcification of ligaments and tendon
- Crippling fluorosis in sever cases.
The severity of these signs depends on the duration and concentration of F ingested and age of the individual. This condition is seen in polluted area due to industrial factories or volcanic actions.