

FLUOROSIS IN RAJASTHAN – TREATMENT AND PREVENTION

Fluorosis is an endemic problem in most developing countries. In Rajasthan alone all 32 districts have been identified as fluorosis prone areas. While the WHO standards permit only 1.5 mg/l as a safe limit for human consumption people in several districts in Rajasthan are consuming water with fluoride concentrations of up to 44 mg/l. This has resulted in permanent deformities, severe joint pains, general debility and misery. (Annexure 1&2)

There is a crying need to over come the problem of fluorosis. Three approaches are indicated:

1. Treatment of the children,
2. Use of safe domestic defluoridation technique at household level.
3. Health education

1. Treatment of the disease

Literature reviewed indicated that the fluorosis is irreversible. Recent studies conducted in Rajasthan by Dr. Sunil Kr. Gupta and his team (under Rajasthan DST sponsored studies) indicated that fluorosis could be reversed, at least in children, by a therapeutic regimen (Calcium, Vitamin C and Vitamin D) which is cheap and easily available. The scientific papers have been published in International and National reputed journals. (Annexure 3,4)

Recently a newly developed **Tooth powder** developed by Dr. Sunil Kr. Gupta is very useful in removing the dental stains of fluorosis, so as to overcome the psychological problems girls due to dental stains.

2. Use of safe domestic defluoridation technique at household level.

To avoid water containing > 1.5 mg/l of fluoride by using domestic defluoridation. Various methods of domestic defluoridation have been recommended so far, are aimed at bringing the fluoride levels to the WHO standards but they are cumbersome and difficult to use by our villagers.

Defluoridation on larger scale is costly and requires continuous skilled supervision. The commonly advisable Nalgonda process is not successful on field implementation (enclosure 5).

Newly developed KRASS defluoridation technology, Jaipur developed by Dr. Sunil Kr. Gupta appears to be most suitable for use in our rural areas. The **KRASS defluoridation technology** have been tested and approved by CSIR, New Delhi and Chief Chemist, Department of PHED, Government of Rajasthan (enclosure 6,7).

Health education

The further prevention of fluorosis can be done by simple health education. This requires minor changes in the diet by: (a) avoiding use of fluoride rich water, (b) use of diet rich in Calcium and Vitamin C., (c) Changing dietary habits (e.g. cooking practices which destroys Vitamin C during cooking) of the population within their social system and available resources.

The proposed strategy will be useful to overcome the problem of fluorosis and will make this program as community oriented rather than government dependant and:

“FOR THE PEOPLE AND BY THE PEOPLE”

Principal SMS Medical College, Jaipur to start a Fluoride Research Center at SMS Medical College, Jaipur in 1995, has already submitted a proposal (Annexure 8). Facilities at this center will be provided in totality to overcome the problem of fluorosis. No such center is available in our country, where the facility of treatment of, patient as well as of water is available.

This center may prove to be a blessing for the population especially the younger generation living in fluoride prone areas having no choice except to drink the fluoride rich water and getting permanently deformed.

b. *Fluorosis*

Three aspects have been covered:

- Reversal of fluorosis
- Development of new defluoridation process (KRASS process)- Under patent
- Development of new tooth powder, useful to remove the dental stains- Under the process of patent

Scientific papers have been published in national and international journals, and, presented in national and international conferences.

The work on following aspects of the problem is going on:

- Pathophysiology of fluorosis – Detailing the details the
- Synergistic effects of Aluminum and fluoride resulting into aggravation of skeletal symptoms and poor scholastic performance

RECENT PUBLICATIONS

INTERNATIONAL REFEREED JOURNALS

- Transplacental passage of Fluorides in Cord Blood
Gupta S, Seth AK, Gupta A and Gavane AG
THE JOURNAL OF PEDIATRICS, USA, 1993(July):137-141
- Increased incidence of Spina bifida occulta in fluorosis prone areas
Gupta SK, Gupta RC, Seth AK and Chaturvedi CS
ACTA PEDIATRICA JAPONICA, 37(4):1995
- Reversal of fluorosis in children
Gupta SK, Gupta RC, Seth AK and Gupta A
ACTA PEDIATRICA JAPONICA, 38, 513-519:1996

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- Development of New Low Cost Defluoridation Technology (Krass)

Agrawal KC, Gupta SK and Gupta AB
WATER SCIENCE AND TECHNOLOGY, UK
40 (2), Sept 1999 : 167-173

INDIAN JOURNALS

- Reversal of Clinical and Dental fluorosis

Gupta SK, Gupta RC and Seth AK
INDIAN PEDIATRICS,31:439-443,1994

- Normophosphatemic Hypocalcemia with increased Serum alkaline phosphatase in children consuming high fluoride in drinking water

Gupta SK, Gupta RC, Seth AK and Sapra M
RAJASTHAN MEDICAL JOURNAL,(IN PRESS)

- Low Serum and Leucocyte Ascorbic acid in children consuming high fluoride in drinking water

Gupta SK, Gupta RC, Seth AK and Sapra M
RAJASTHAN MEDICAL JOURNAL,(IN PRESS)

- A Process for defluoridation of water by a filter bed using indigenous material

Gupta SK
INDIAN JOURNAL OF ENVIRONMENTAL SCIENCES 1 (2):
149 - 156,1997

- Performance of a Domestic filter based on KRASS defluoridation process

Gupta SK, Gupta AB, Dhindsa SS, Seth AK, Agrawal KC and
Gupta RC
Journal of IWWA 3(XXXI), 193 – 200, 1999

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Brief report

- Increased incidence of Spina bifida occulta in fluorosis prone areas

Gupta SK, Gupta RC, Seth AK
INDIAN PEDIATRICS,31:1431-1432,1994

Letters to editor

- Reversal of Manifestations of Fluorosis- An unusual finding

Gupta SK, Gupta RC, Seth AK
SDMH Jour. Vol. 16, No. 3, March 1993

CONFERENCES

Papers Presented In International Conferences

ASIAN CONFERENCE OF PEDIATRICS, NEW DELHI 1994

Two articles selected and presented in scientific session

1. Histopathological Study on Toxicological Effects of Nitrate Ingestion on Rabbits: A Possible Simulation of Nitrate Toxicity in Infants.
2. Reversal Fluorosis in Children.

FIRST INTERNATIONAL SPECIALIZED CONFERENCE ON "WATER QUALITY AND ITS MANAGEMENT" 2-6 March 1998, NEW DELHI, INDIA

One article selected and presented in scientific session

Development of New Low Cost Defluoridation Technology (KRASS)

V INTERNATIONAL CONGRESS OF TROPICAL PEDIATRICS, 1999, JAIPUR, INDIA

Three articles were selected and presented in scientific session

1. Improved Cerebral Perfusion Following Use Of "SR Compounds" In Mentally Retarded Children: A 99 Tc- Labeled HMPAO SPECT Studies Of Brain
2. Drinking Water Nitrate : A Cause Of Recurrent Diarrhea and Respiratory Infection in Children
3. Hyperparathyroidism Secondary To High Fluoride Ingestion: A Possible Pathophysiology Of Fluoride Toxicity

Papers Presented In National Conferences

Attended many national conferences and presented scientific free papers, Guest invited lectures