

IFSO 2026 :INTEGRATED HEALTH SESSION:

GUARDING THE MICRONUTRIENT GAP: OBESITY MANAGEMENT MEDICATIONS AND

MBS BEYOND THE LAB:

RAPID RECOGNITION AND TREATMENT OF MICRONUTRIENT DEFICIENCIES

***Quality Improvement – How to improve recognition and
Interventional Treatment of Micronutrient deficiencies in
specific countries / regions***

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Interventional Treatment of Micronutrient deficiencies in specific countries / regions***

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★ International Centre Of Excellence (IEF)

Co-Chair IFSO Integrated Health- Education & Training Committee 2025

• IFSO IH Committee Member 2012-2016

• AIAARO- ECM , Joint Secretary 2012- 2021

• Life Member –API, ASI, RSSDI, DiabetesIndia

Done in our protocol and common post MBS

Rarely done



MICRONUTRIENT & VITAMIN TESTS – Why??

NOT EASILY AVAILABLE

REPORTS TAKE TIME

EXPENSIVE

NOT COVERED BY INSURANCE (?)

Case Study

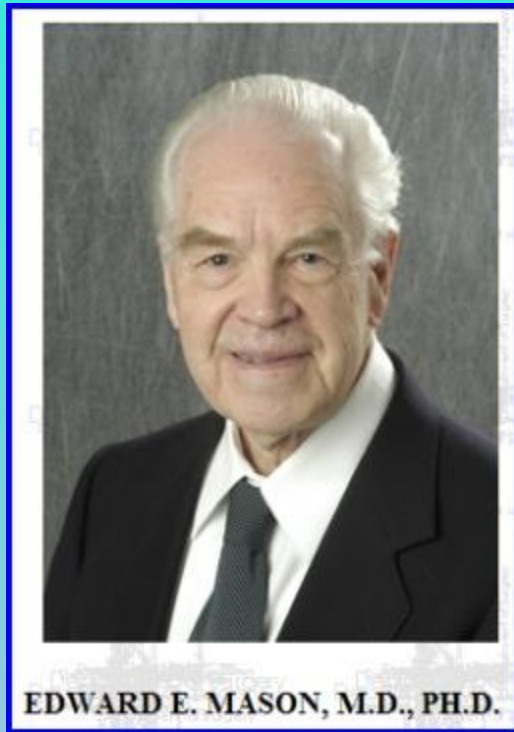
Low Serum Chromium levels correlate with
post operative sugar craving in patient
undergoing bariatric surgery

DR. POONAM S. SHAH

Laparo-Obeso Centre

Gastric Bypass can induce Cr Deficiency

Dr. Edward Mason



Dr. Mal Fobi



CASE STUDY 2011

YOUNG MALE –AGE 27 yrs, HT-5.5, WT- 99 kg BMI = 36 kgs/m²

POST GASTRIC BYPASS 2009,. 99-> 58 -> 62 ->64 kgs

NO PAST HISTORY OF DIABETES. FH- of DM II +

PURE VEGETARIAN,

NO ALCOHOL INTAKE / NO ANTI ANXIETY OR ANY ANTI-PSYCHOTIC HISTORY OR MEDICATIONS.

C/O EXCESSIVE SWEET CRAVING, VERY DISTRESSED, WEIGHT LOSS PLATEAU

DISCUSSED & INVESTIGATED – FOR S. CHROMIUM DEFICIENCY

REPORTS:

S. INSULIN F & PP – WNL

CHROMIUM- 0.33 (0.7-28u)

S. IRON , FERRITIN- 68, 15

VIT B12- 204.

VIT D – 15.80, PTH – N, S. CU- N

MANAGEMENT-

*DIET COUNCELLING – MORE PROTEIN, IRON, CHROMIUM CONTAINING FOOD STUFF ETC

*INJ. B COMPLEX INCLUDING B12 – 1V INFUSION, THEN ORAL

*INJ. VIT. D 6 LAC UNITS I.M-1

**TAB. CHROMIUM 200 mcg- one a day (?)

THE SWEET CRAVING DECREASED AFTER FEW WEEKS.

STUDY

11 patients undergoing bariatric surgery with complaints of onset of sugar craving few months after surgery and 11 normal persons without sugar craving were included.

Chromium assay was performed in all using Atomic Absorption Spectrometry .

The samples drawn after surgery were between 6 months to 1 & 1/2 year.

The prospectively collected results were compared and analysed.

FEMALES: MALES : 6:5

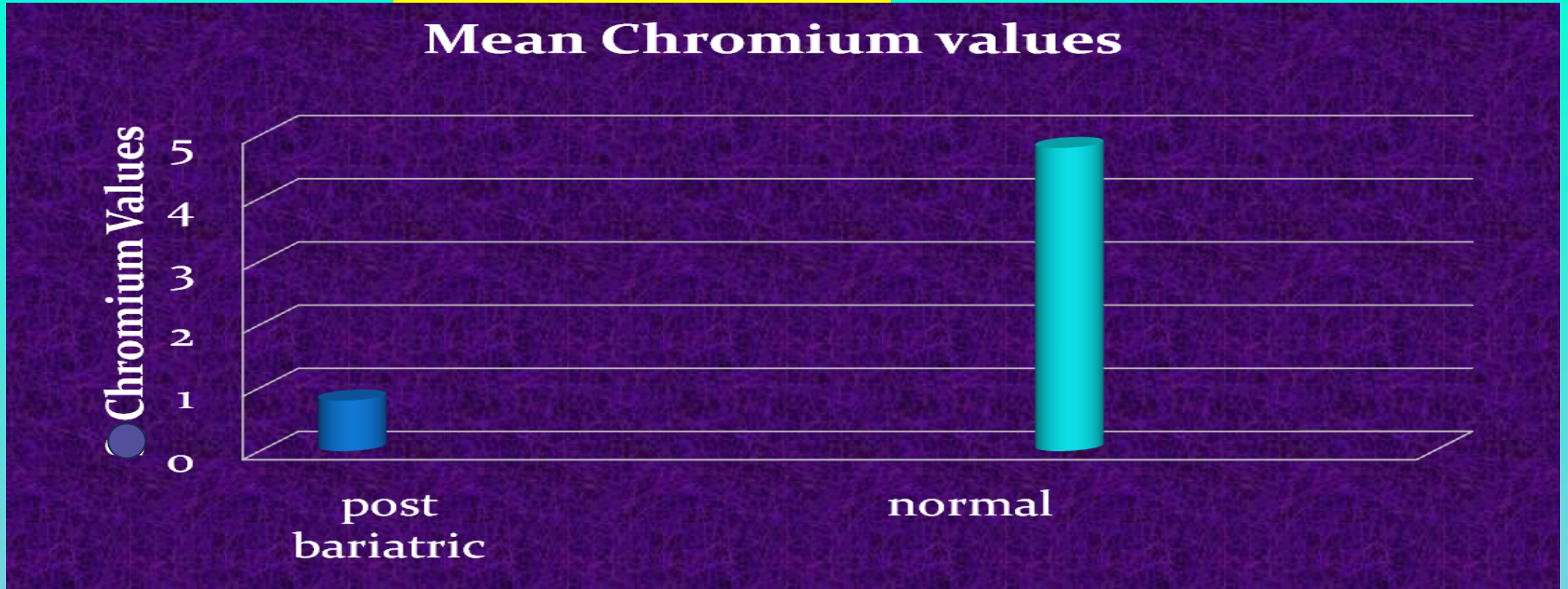
AGE: 39+/- 9

BMI: 45 +/- 8 kgs/m²

H/O DM/ Pre-DM - all

PROCEDURE: LGBP

Results



The mean Chromium in the post bariatric patients was $0.89\mu\text{g/dl}$ as against $4.89\mu\text{g/dl}$ in normal persons.

The difference was statistically significant.

Study limitations

- Small sample size.
- Lack of literature.
- Lack of scientific definition of “sweet craving”
- No guidelines for treatment
- Drug – Nutrient interaction not evaluated.

Chromium preparation

- *Chromium Piconate (commonly used) contains*
- *200/ 400 /600 μg /tab*
&
- *Plant based – 50 mcg- more expensive than above !*

Forms of Chromium

1. Cr^0 (metallic)
2. (Chromium 3+), which is biologically active and found in food
3. (Chromium 6+), a toxic form that results from industrial pollution

Effects of Deficiency

Increase in

- Insulin Resistance
- Sensitivity to stress
- Fat formation -> weight gain
- Atherosclerosis
- Sweet craving
- *Eyes?

Decrease in

- Immunity
- Muscle mass

Available Dietary Sources

Some food sources of Cr³⁺ (Trivalent):
Organ meats, broccoli, mushrooms,
egg yolks, brewer's yeast, cheese,
wheat germ etc.

(provides 3 – 11 µg/100gm)

RDA = 50 – 200 µg/day.

Escorted by ***Transferrin***
Acts through ***Chromodulin***

Absorption

In intestinal mucosa-part of small intestine, jejunum & ileum
Mechanism of absorption – unknown
Rate of absorption –very slow, depends on blood levels. < 0.5% after consumption of 50 µg of Cr.
(Self-Regulatory?)

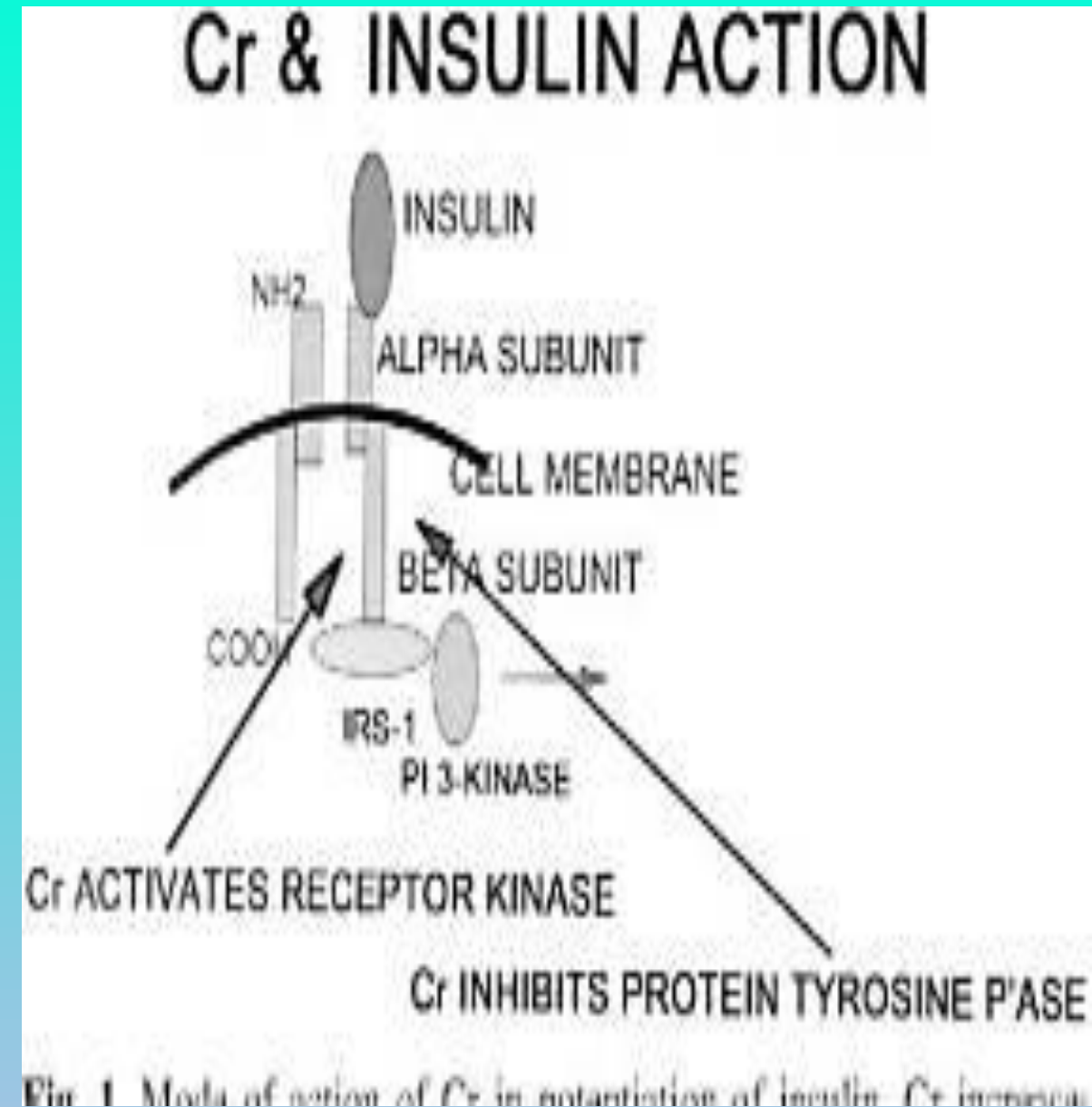
Excretion-

Mainly kidneys.
Also Sweat, Milk

Diet high in (CHO) sugar and flour -increased excretion of chromium by kidneys

Chromium loss increases with age.

The oligopeptide chromodulin binds **chromic ions** in response to an insulin-mediated chromic ion flux, and the metal-saturated oligopeptide can bind to an insulin-stimulated insulin receptor, activating the receptor's tyrosine kinase activity. Thus, chromodulin appears to play a role in an autoamplification mechanism in insulin signaling.



Proposed Mechanisms

1. Potentiation of Insulin Signaling (The Chromodulin Hypothesis)

- Trivalent chromium (Cr^{3+}) is an essential component of **chromodulin** (Low-Molecular-Weight Chromium-Binding Substance or LMWCr).
- When blood glucose rises, insulin binds to its cell surface receptor. Chromodulin binds Cr^{3+} ions and interacts with the intracellular β -subunit of the insulin receptor, stimulating tyrosine kinase activity up to 8-fold.
- **The Deficiency Link: *Without adequate chromium, insulin receptor autophosphorylation and GLUT4 translocation are impaired, leading to peripheral insulin resistance.***

2. Reactive Hypoglycemia and the "Energy Crisis" Drive

- Impaired cellular glucose uptake leaves cells energy-deprived despite high circulatory glucose.
- The resulting compensatory hyperinsulinemia can lead to rapid precipitous drops in blood glucose (reactive hypoglycemia).
- ***The central nervous system perceives this rapid decline in available substrate as an urgent energy shortage, driving targeted behavioral cravings for high-glycemic, simple carbohydrates (sweets) to rapidly restore blood sugar.***

3. Direct Central Nervous System (CNS) Neuromodulation

- Research suggests chromium ***acts directly on central brain regions regulating appetite and reward (hypo-thalamic circuits).***
- Central administration of chromium modulates neurotransmitters involved in satiety and carbohydrate preference (e.g., serotonin, dopamine, and hypothalamic neuropeptides), independent of peripheral insulin action

Study / Evidence Type	Key Findings	Clinical Relevance
Human Clinical Trial (Anton et al., 2008)	1000 μ g/day, chromium picolinate over 8 weeks significantly reduced food intake (25%), hunger, and specifically <u>carbohydrate/sweet cravings</u> compared to placebo (8%).	Demonstrates a direct, quantifiable reduction in sweet cravings in individuals with high baseline cravings.
Translational / Animal Models	Central (intracerebroventricular) administration of chromium yielded a significant, dose-dependent decrease in food intake compared to peripheral administration.	Points to a direct central nervous system effect on appetite control rather than purely peripheral metabolic changes.
Systematic Reviews & Meta-Analyses	Chromium supplementation consistently improves glycemic control (HbA1c reduction of 0.55%--0.71%) and reduces fasting glucose in insulin-resistant populations.	Stabilization of blood glucose fluctuations reduces the physiological triggers for sweet craving episodes.

ADDITION TO PROTOCOL:

IV NUTRITIONAL THERAPY AFTER BARIATRIC PROCEDURES-

Supplement B-complex intravenously,
Injectable Vitamin D,
Trace elements including Chromium –(containing 5 Trace elements)
given as Intravenous injection yearly
Especially- those who cannot afford Tests / oral supplements/ rural areas/ illeterate

Oral Supplements having Trace elements in minor quantities .

Patients cautioned against continuing these medications without followup advice –
to prevent toxicity situation.

ADDITION TO PROTOCOL:

3 ml Injection

Composition:

Chromium Chloride (0.4mg) +

Copper Sulphate (0.4mg) +

Manganese Sulphate (1mg) +

Selenious acid (0.02mg)

3 ml Injection

Composition:

Chromium Chloride (4mcg) +

Copper Sulphate (0.4mg) +

Manganese Sulphate (0.1mg) +

Selenium (20mcg) +

Zinc Sulfate (5.8mg)

ORAL- Avoid taking **ANTACIDS** 2 hours before or after taking any trace element medications as they may make it harder for the body to absorb the medicine.

TEAM TRAINING & PATIENT COUNSELLING

Alone or Multiple together depending on the presentation:

- * Case study-

But Testing not easily available, Results take time, Expensive.

Excess –Toxicity *SO NO SELF- MEDICATIONS*

Oral may not be enough , IV indicated sometimes.

Counselling- *to emphasize role of protein-*

‘PROTEIN ESCORTS ALL THESE MINUTE SUBSTANCES TO TARGET ORGANS- for them to do their beneficial action !
(High CHO, LOW Protein population !)

Prevention is easier than to Cure

THANK YOU

Laparo-Obeso Centre

Laparo-Obeso Centre Team



XXX IFSO WORLD CONGRESS

"Advancing Multimodal Obesity Care"

24-27 August 2027

ifso2027.org



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PARIS 2027

See you in
PARIS

