

**REVIEW ARTICLE - RATIONAL USE OF SWARNA PRASHANA IN CHILDREN IN CURRENT TIMES OF COVID 19 CRISIS****Mayank Srivastava**

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**ABSTRACT**

In this unfortunate period of COVID 19 pandemic when saving lives has become priority above all issues, the interests of our future, the children, are being hurt the most. Deprivation of psycho-social and environmental elements during the childhood period of human life can seriously jeopardize the physical, mental, social and immunological development of children. Consequentially in post-COVID period many of our children are likely not to grow up to their inherent genetic potential and thus manifest as laggards in their respective fields. This crucial childhood specific health issue arising out of COVID 19 conditions can however be effectively managed by a simple and time tested *Ayurvedic* therapeutic measure of 'Swarna Prashana'. Its principal ingredient is gold. In pre COVID 19 times, the major trend of administering *Swarna Prashana* in our country was of giving it monthly as a pulse therapy (on *Pushya Nakshatra*). But in view of the present 24X7 threat of n-CoV 2019, the most reasonable approach of would be of daily administration in the initial few months, thereafter, followed by a strategic shift to pulse therapy. 0.25 mg/kg/day appear to be a rational daily dose of *Swarna (bhasma)* for *Swarna Prashana* in children. Thus, considering its potential of ensuring a maximum possible overall growth and development of a child and in turn the nation too, *Swarna Prashana* should be urgently launched as a national program in the present time of crisis.

Keywords: *Ayurveda*, Children, COVID 19, Gold, Growth and Development, Immunity, *Swarna Prashana*

INTRODUCTION

“Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity,” (WHO). But in this unfortunate period of COVID 19 pandemic, saving lives has become the priority above all issues. However as a result if this approach, the interests of our future, the children, is being hurt the most because unlike adults they are incessantly undergoing a unique process of physical, mental, social and immunological development most of which are genetically programmed and fixed, i.e., it will not wait for the COVID 19 to resolve and lockdown to be removed and hence the developmental damage done during this period is unlikely to be recovered later on.

Ensuring an achievement of maximum possible overall growth and development within the inherent genetic potential of a child is the most cost-effective measure to ensure the growth and development of the nation too. Hence there is an urgent need for addressing this crucial issue emerging up in community pediatrics.

Classical *Ayurvedic* recommendations on *Swarna Prashana* suggest that it has a potential to work as a multidimensional therapeutic agent for enhancing and ensuring all the favorable factors required needed to ensure maximum possible physical, mental and immunological development of a child. More and more scientific studies are now also coming up to support many of these actions of gold, the principal constituent of *Swarna Bhasma*. Hence, *Swarna Prashana* looks to be the best candidate to tackle this complex childhood specific issue arising out of the COVID 19 conditions.

Aim of this study

1. To throw light on the seriousness of the need for an urgent addressal of silent challenge of ensuring physical, mental, social and immunological development of children in the current times of COVID 19 crisis.
2. Identify the superiority of *Swarna Prashana* in meeting this challenge and

3. Propose a standard method of promoting rational use of *Swarna Prashana* in children in view of the present crisis.

Materials and methods

Classical *Ayurvedic* texts, research thesis, modern textbooks, journals and research papers from PUB-MED, MEDLINE database were searched extensively for the relevant matters. Thereafter, it was tried to build a excogitate the method of rational use of *Swarna Prashana* in the novel community pediatric health concerns arising in the present COVID 19 times.

DISCUSSION

The dire need of saving lives in this unfortunate period of COVID 19 pandemic has left every other issue on standby. However, failure to recognize the importance of ensuring timely achievement of physical, mental, social and immunological development can deeply hurt the future of the children growing and developing during the present period of COVID 19 crisis.

For urgently coming up with an effective solution, a bit closer look of the two major pediatric issues of developmental and immunological maturation and the appropriate solution is needed and so is being brought to light as follows-

The Developmental Issues

Deprivation of psycho-social elements (e.g., watching various faces, playing, schooling, outings, etc.) during the early years of human life can seriously bonsai the growth and development of the child and in turn the future of the nation too. Consequentially, in post-COVID period many of our children are likely not to grow up to their inherent genetic potential and later on manifest as laggards in their respective fields. Hence overlooking this issue can prove to be disastrous with respect to the future prospects of the nation too. During present COVID 19 times, an upsurge in developmental issues such as bedwetting, thumb sucking, temper tantrums, obesity, etc. is pointing towards a silent buildup of stress in children, akin to rising suicidal tendencies in the grown-ups. Also, other ill ef-

fects of prolonged home stay such as enhanced screen exposure induced ocular issues as refraction disorders, obesity, etc. are on rise in children.

The Immunological Issues

Children are naturally more vulnerable to infections because of their immature immune system. Increasing dropouts from the routine vaccination and reduced exposure to external environment (antigens) in present COVID 19 times has thus furthered the risk of infectious diseases in children. All this has laid the path to delay the development of general immunity of the children in today's crucial period where good non-specific immunity is the only answer to ward off the risk of COVID 19. It is also a well-established fact that the infection-malnutrition cycle can readily come into play during childhood and jeopardize their growth and development.

Ignorant overlooking of these two crucial issues is the present challenging times is in fact silently pushing our future citizens from the track of road to health to the track of road to compromised physical and mental endurance.

Swarna Prashana

Swarna Prashana is a unique, safe and effective ancient Ayurvedic therapeutic technique of oral administration of gold in a special way so as to ensure best physical, mental and immunological health in children. Also known as Swarna Bindu Prashana, Swarna Amruta Prashana or Suvarnaprashana has a long history of recommendation right from Vedic literatures as Grha Sutras, Manusmriti,^[1,2] Rigveda and up to authentic Ayurvedic classics as Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, Kashyapa Samhita,^[3] etc.

As said above, the children during this COVID 19 period are bearing the dual brunt of deprivation of developmental stimuli and inadequate immunity. This complex childhood specific lacuna arising out of COVID 19 conditions can however be effectively and urgently managed by a simple ancient Ayurvedic multi-faceted therapeutic measure of oral administration of gold in a specific manner, the "Swarna Prashana".

1. The benefits of Swarna Prashana as per Ayurvedic texts

Kashyapa Samhita, the ancient textbook of Ayurvedic Pediatrics has nicely summarized the benefits of Swarna Prashana as an enhancer of^[3]

It says that the use of Swarna Prashana in children promotes-

- Medha (intelligence),
- Agni (digestive/metabolic power),
- Bala (strength),
- Ayushya (longevity)
- Mangalakara (increases auspicious circumstances),
- Punyam (virtue),
- Vrushya (virility/fertility),
- Varnya (clarity of complexion) and
- Graha Baadha Nashaka (elimination of the effects of malefic planets). Grahapaham (protection from evil spirits and microorganisms).
- If Swarna Prashana is done for one month then the child will be Parama medhavi (very intelligent) and remains unaffected by Vyadhi (immune to diseases).
- If done for six months, then the child will be Shruta dhara (remembers whatever heard- increases grasping capacity).

In toto, Swarna Prashana seems to be an ideal prototype for ensuring the best interplay of all the favorable factors needed to ensure maximum possible overall growth and development of a child.

Ancient Ayurvedic texts have also recommended administration of Swarna soon after the birth, under the process of Jatakarma, indirectly suggests that gold (properly prepared as per standard methods) can be safely administered even to a newly born baby.^[4,5,6] A glimpse of administration of Swarna in newborn is also found in the text of Rasaratna Samucchaya.^[7]

2. Scientific studies on pharmacological effects of gold in present context

Increasing number of studies are now surfacing up to indicate that Swarna bhasma, the principal ingredient of Swarna Prashana, is capable of altering various biological functions in a favorable manner. Many of them support the aforesaid claims directly or indirectly, e.g.-

On growth and development

In a clinical study on 80 children aged one to two years, *Swarnamrita Prashana* has been demonstrated to accentuate the process of growth and development.^[8] A study on colloidal gold has showed improvement in cognitive functioning, which was measured by IQ scores.^[9]

On Immunity

A pharmaco-clinical study of a *Madhu-Ghrita-Swarna-Vacha* combination on neonates demonstrated a significant immunological response in the form of humoral antibody formation and actions on immunological system, as evident by triggering of the responses of immunological system by a rise in the total proteins and serum IgG levels.^[10]

An experimental study has evaluated the efficacy of *Swarna Bhasma* on non-specific immunity in mice. Male mice were administered incremental doses of *Swarna Bhasma* orally for 10 days. It was observed that *Swarna Bhasma* significantly ($p < 0.001$) increased the counts of peritoneal macrophages and stimulated phagocytic index of macrophages. This demonstrates the immunostimulant activity of the traditional *Ayurvedic* formulation '*Swarna Bhasma*' on macrophage functions.^[11]

Another experimental study on animal model evaluated the free-radical scavenging activity of *Swarna Bhasma*. It was observed that chronic *Swarna Bhasma* treated animals showed a significant increase in the activity of two free radical reducing enzymes, superoxide dismutase and catalase.^[12]

A *Unani-Tibb* gold formulation, *Kustha Tila Kalan* was evaluated for immunomodulatory activity in male mice and parameters were used to evaluate the effect on cell mediated as well as humoral immunity. *Kustha Tila Kalan* was orally administered to animals at dosage of 6.25, 12.5, 25 and 50 mg/kg body weight for 10 days. Cell mediated immunity was assessed by measuring delayed type of hypersensitivity response, while humoral immunity was evaluated using plaque forming cell assay. Both the types of immune responses were augmented at dose level of 6.25, 12.5 and 25 mg/kg. However, optimum activities were recorded at a dose of 25 mg/kg.^[13]

Pharmacological studies have showed that specific and nonspecific immune responses were modified in a positive manner in *Swarna Bhasma* treated mice. It also had a stimulatory effect on peritoneal macrophages, which may be helpful to fight against infections.^[14]

Antistress effect

Another experimental study on rat model investigated the therapeutic potential of *Swarna Bhasma* in restraint induced stress at different time points of 01 hour, 02 hours and 04 hours using. Rats were pretreated with *Swarna Bhasma* in a dose of 25 mg/kg orally for 10 days prior to restraint stress. Brain catecholamine, serotonin and plasma corticosterone levels were determined following 01, 02- and 04-hours restraint stress, using HPLC and also plasma corticosterone using luminescence spectrophotometry. It was observed that *Swarna bhasma* restored restraint stress induced elevation in levels of brain catecholamines (norepinephrine, epinephrine and dopamine), 5 HT and plasma corticosterone to near normal levels.^[15]

Toxicity and safety studies

Any form of gold having better bioavailability should be the first choice for internal administration. It can be given internally either in the form of rubbed gold, incinerated gold or *Swarna Bhasma*, *Swarna lavana* (as described in *Rasatarangini*) or *Swarna varka* (mostly used in *Unani* system of medicine). However, only appropriately processed form should be used because it is only such particles of *Swarna Bhasma* that have been reported to be noncytotoxic.^[16]

In a study of chronic toxicity of *Swarnabindu Prashana* no cytotoxicity was observed.^[17] In an experimental model, it was observed that acute oral administration of *Swarna Bhasma* showed no mortality in mice (upto 1 ml/20 g body weight of *Swarna Bhasma* suspension containing 01 mg of drug). Also, chronic administration of *Swarna Bhasma* showed no toxicity as adjudged by SGOT, SGPT, serum creatinine, serum urea levels and histological studies.^[18]

Marked analgesic (elicited through opioidergic mechanisms) and immunostimulant effects of *Swarna Bhasma* and the *Unani* preparation *Kushta Til Kalan* with a wide margin of safety has been reported.^[19, 13]

In a blood compatibility study, it was found that *Swarna Bhasma* contained gold nanoparticles with crystallite size 28–35 nm and was 90% pure gold.^[16]

Ideal Methodology Of *Swarna Prashana* In View Of Present Times Of Covid 19 Crisis

In current scenario, there is an urgent need to implement *Swarna Prashana* as a national program. It should be administered free of cost or at minimal cost throughout the country through the presently existing public healthcare system. On every *Pushya Nakshatra* day, first dose should be given by these authorized centers/health workers and the rest 27 doses until next *Pushya Nakshatra* date should be handed over to the mother along with clearly written instructions. This should be continued until an effective vaccine is available or COVID 19 gets checked by herd immunity or measures as *Swarna Prashana* itself.

Applicability

Sushruta Samhita recommends administering it from birth till twelve years of age.^[4] However during this COVID 19 pandemic period, it is worth considering offering it to the whole pediatric age group.

Posology

As regards the form of gold and day and time of administration, the standard *Ayurvedic* texts do not recommend anything specify. Verbally, *Swarna Prashana* should mean a sole administration of (pure) gold, but in fact, it is the administration of properly prepared gold (*bhasma*) alone or along with various herbs.

Frequency of administration

There is no reference of any specific day or time for *Swarna prashana* in children. *Swarna Prashana* can be done daily (usually in the morning) or at least on every *Pushya Nakshatra* (considering the nourishing effect of the star) - an auspicious day which comes every 28th day. In pre COVID 19 times, the major trend of administering *Swarna Prashana* in our country was of giving it monthly as a pulse therapy (on *Pushya Nakshatra*). But because presently there is a 24X7 threat of n-CoV2019, so the most reasonable approach of administering *Swarna Prashana* in present times would be of daily administration.

Dose and Duration

Authentic *Ayurvedic* texts do not specifically mention the dosage (of *Swarna bhasma*) for *Swarna Prashana*. However, as per the dose of *Swarna bhasma* for adults, the dose of *Swarna bhasma* in children can be calculated and in turn the dose of *Swarna Prashana* may be found out.

Safe dosage of *Swarna* for *Swarna Prashana* in children to cope up the present times of crisis may be determined on the basis of following guiding principles -

- in minimum recommended single daily dosage.
- once daily administration.
- up till COVID-19 gets controlled or up to a maximum of 6 months. However, after a few initial months of daily administration, gradual switching to pulse therapy may be considered.

Recommended adult dose of *Swarna Bhasma* as per some standard *Ayurvedic* texts are -

- 1/4 – 1/8 *Ratti* (15–30 mg)^[20]
- 15.5–62.5 mg^[21]

By taking these adult dosages as reference standards, dosage in children can be calculated. E.g., as per above reference, 1/4 *ratti* which approximates to 15 mg, equates to 0.25 mg/kg dose if adult weight is taken to be 60 kg. Thus, 0.25 mg/kg/day of *Swarna (bhasma)* may be used daily for *Swarna Prashana* in children.

Sushruta Samhita suggests administration of *Swarna* along with other herbs like *Shankhapushpi (Convolvulus pluricaulis Choisy)*, *Kushtha (Saussurea lapa Clarke)*, *Vacha (Acorus calamus L.)*, etc., with honey and ghee up to one year.^[22]

However, for purpose of ease, different dose slabs may be fixed for a particular age group. Also as many of the benefits of *Swarna* are attributed to its *Prabhava* (inherent nature), which is not much dose dependent and secondly because *Swarna bhasma* has a wide dose range, so for convenience, even a single dose may be fixed for the whole pediatric age group.

Contents/co-administration

The standard method of *Swarna Prashana* will be to administer the selected form of *Swarna* with honey and cow's ghee (in unequal amount) in a minimum possible lickable amount. However, it may also be given in the form of drops. Its dimensions may be fur-

ther be extended to suit the needs of the child by judiciously adding other *Ayurvedic* drugs such as *Vacha* (*Acorus calamus* Linn.), *Padma Kinjalka* (stamen of *Nelumbo nucifera* Gaertn.), *Amrita*, etc. Authentic *Ayurvedic* texts have also been recommending adding such drugs to the primary ingredient *Swarna* in *Swarna Prashana*.

However, if the goal is to carry on nationwide *Swarna prashana* as a mass drive, then for sake of convenience *Swarna prashana* with pure gold (*Swarna bhasma*) only. It is also justified because the benefits of *Swarna prashana* stated by *Kashyapa Samhita* are stated by him it to be the benefits of the pure gold (*Swarna*) itself.

Contraindications

No specific contraindications present. However, it should be avoided in children with renal failure.

Assessment of response

Considering the aim with which this program is intended to be carried on, there is practically no need to enter into this part. However, at some selected institutes carrying out this *Swarna Prashana* Program, assessment of the response may be done as per a standard protocol and in a format prepared on following lines-

- Assessment of growth and development as per the age group of the child.
- Laboratory investigations to assess immunological effects: e.g., TNF α , complement system C3 and C4, total IgG and IgM, liver function tests, etc.

CONCLUSION

In the present period of COVID 19 pandemic, the physical, mental, social and immunological development of children is adversely and, in many ways, irreversibly being affected. This complex issue emerging in community pediatrics can however be effectively managed by a simple and time tested ancient *Ayurvedic* multi-faceted therapeutic measure, "*Swarna Prashana*". Classical *Ayurvedic* recommendations suggest its potential as a multidimensional therapeutic agent to enhance and ensure all the favorable factors required to ensure maximum possible physical, mental and immunological development of a child. Increasing

number of modern scientific studies are now also available to support many of these claims.

Considering all the above facts, it can be viewed as the most simple and cost-effective measure to ensure the growth and development of the child and in turn the nation too. Hence by urgently launching *Swarna Prashana* as a national program, we can give our country an advantage over other nations who are still helpless in looking after the wholesome health of their future citizens. However, all necessary precautions and scientific protocols also need to be followed concomitantly.

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