

The Concept of Cyclical Nutritional Therapy for Hair Growth which can be Applied for Wellness

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Abstract

Hair growth can be achieved by fighting hair loss with medications or by strengthening the hair roots with nutrients. Caution as excess vitamin A, vitamin E, omega 3 cause hair loss instead of hair growth. Supplements are considered harmless and consumed without thinking of interactions or overdose. Therapeutic doses of vitamins to treat disease are high, however preventive or prophylactic dose for wellness are low. Antioxidants improve health by neutralizing Reactive oxygen species, but ROS have important role in infection control and phagocytosis. Overuse of antioxidants interferes with protective mechanisms. High doses of one nutrient affect the absorption and efficiency of others. Administered together, vitamin C can destroy vitamin B12. Iron and calcium reduce the absorption of one another. High vitamin C, increases sodium & reduces potassium levels. Nutrients are also synergistic. Vitamin E regenerates Beta carotene. Vitamin C regenerates vitamin E. Toxic effects of Beta carotene break down products are reduced by alpha tocopherol, N acetyl cysteine and vitamin C. Single deficiency causes multiple inefficiencies. Inappropriate combinations and nutrient overdose are easily possible with rising use of multivitamins and fortified foods. Nutrient deficiencies are compensated by autophagy and also prevail as subclinical deficiencies making them difficult to detect on laboratory tests. To utilize nutrients without interaction and overdose we have proposed the use of different synergistic nutrients on different days of the week, repeating in a three day cycle. The concept was initiated for achieving consistent hair growth as published earlier. It can be applied to a set of nutrients identified for various other indications like geriatrics, pediatrics, growing teens, athletes, body builders, women's health, cardiac patients, diabetics, athletes, bariatric surgery etc. ensuring low dose, low cost, and optimum benefit nutrient program allowing the body to assimilate and utilize each nutrient, without wastage or overdose.

Keywords: Hair growth; Hair loss; Cyclical nutritional therapy

Introduction

Hair growth can be achieved by fighting hair loss with anti-androgens, enzyme blockers and medications with potential side effects. Or by strengthening the hair roots with the right choice of antioxidants, minerals, vitamins, and amino acids and promoting hair growth. However, excess use of antioxidants, vitamin A, vitamin E, omega 3 can cause hair loss instead of hair growth [1-4]. Hair growth achieved through a combination of nutrients delivers wellness, good health and hair growth without the possibility of side effects from the use of hair loss medications. In this article we are attempting to share the approach for selective use of nutrient combinations and avoiding nutrient interactions to achieve hair growth. A similar approach of selective synergistic combinations can be applied for general wellness. Loss of hair, deterioration of health and creating a breeding ground for diseases, have common risk factors like smoking, pollution, stress, lack of sleep, sedentary lifestyle, poor nutrition, obesity, exposure to chemicals, insecticides, fertilizers, artificial preservatives, taste makers in processed foods etc. People find it easy to create a false protection through self-perceived benefits from unrestricted use of vitamins and supplements rather than changing their habits or lifestyle. The general perception that vitamins and supplements promote health has encouraged people to feel that more multivitamins and more supplements of all kinds is equivalent to more health [5]. Today we are in an era of abuse and overuse of vitamins which are being consumed as a celebration of your own free will. People consume supplements

randomly without inquiring in to the rationale or true benefits of such practice [5]. As a general assumption it is perceived that use of supplements will prevent illness, give more energy, improve health and make people feel better [5,6]. Such thinking is driven by advertising and promotion [5]. Rising trend of vitamin and supplement consumption has been noted in several studies and national surveys [5-9].

Commonly people consume antioxidants, iron, calcium, zinc, selenium, omega 3, omega 6, amino acids, B-complex, Beta carotene, vitamin C, vitamin D, vitamin E and health promoting herbal preparations. These nutrients have interactions which may reduce the absorption, bioavailability and efficiency of one another. On the other hand, synergistic combinations of the nutrients can also be used to improve the efficiency and benefit from the nutrients.

Supplement manufacturers do not need to study interactions with other nutrients or drugs as is mandatory for the more regulated pharmaceutical industry [5,6]. It is our responsibility to guide the end users about adequate dosage, optimum efficacy, prevention of overdose, interactions, avoid unnecessary wastage and overuse of vitamins and nutrients. There was a time when vitamin supplements were recommended to patients in convalescence to aid in recovery from sickness or disease. But today supplements are required for a regular, day to day healthy living and we must provide the best understanding for the rationale and the basis for these various recommendations.

Food Cannot Provide Complete Nutrition

There are many studies to conclude that routine diets are short of meeting the complete nutritional requirement of an individual. The study by Misner [10] compared diets of men and women, athletes and sedentary workers with computer analysis by Harris Benedict formula comparing energy expense against micronutrient requirement, age and BMI. Seven minerals and ten vitamins were evaluated. All these minerals and vitamins through the food were short of meeting the nutritional requirement in all individuals in the study. Therefore supplements are necessary. The same paper mentions a statement by experts in the 1936 Nutritional Congress. It was then said in 1936 that 'food was no more nutritious as it was in their prior generations, when our forefathers enjoyed good health just by selecting the right foods to eat' [10]. What was said eight decades ago remains true even today.

American Dietetic Association [10,11] does not follow RDA which is recommended daily allowance but mentions much lower RDI which is recommended daily intake for prevention of any disease being caused due to nutritional deficiency. RDI aims at preventing overdose. However, all these standards are decided by group of experts after review of benefits reported in the scientific literature and not by any laboratory studies or experiments or investigations. The benefits and side effects from use of supplements are scarcely reported, not providing the required basis to derive the best advice [12,13]. As is the prevalent, permitted practice, using multivitamins with 30-100% added overages (to compensate for losses), along with self-selected individual nutrients and routine consumption of fortified foods and easily lead to unaccounted overuse and overdose [14-16].

Loss of nutritive value of foods

The problem of deriving nutrition from food is compounded by the fact that the nutritive value of the agricultural produce from the farms itself is falling down due to changes in the soil, use of pesticides, fertilizers and fast growing crops which do not assimilate enough nutrients or develop resistance to natural variations in soil and climate as when growing in the wild [17-20]. Studies have been done on vegetables, fruits [17], milk meat and cheese [18]. Reporting Loss of 49% sodium, 16% of their potassium, 24% magnesium, 46% calcium, 27% Iron and 76% copper content. In contrast the use of NPK fertilizers has led to 9% rise in Phosphorous [19]. Over 80-90% of the content in farm products and grains being carbohydrate, the high yield concentrates on more carbohydrate content and loses on phytochemicals, vitamins, and minerals contents as a tradeoff [19]. These Researchers have expressed concern that replenishment of nutrient depleted soils and wind, water erosion are harming agriculture. Nutrient mining and leaching is exacerbated by use of fertilizers [21]. Nutrient exhaustion, over cultivation, lack of return of organic matter to the soil and deforestation are leading to this global phenomenon [21]. Loss of nutrients in the soil estimated in the year 2000 was reported to be 75% in developing countries, 14% in developed countries, and 11% in least developed countries [21]. Artificially grown foods do not gain the properties of the wild and do not deliver the desired benefits for wellness.

Nutrients and supplement are not always beneficial to health

By the end of the 19th century, researchers established the role of oxidative stress is pathogenesis of various diseases, synthetic vitamin A, vitamin C, vitamin E and Beta carotene were manufactured and widely promoted for wellness and as adjunct therapy. These were

recommended with random round off figures, in high doses, as every day, regular intake for healthy living. Recent studies on various supplements of all kinds, have found limited benefits in prevention of disease and made it clear that the aim of healthy living with use of supplements is not always achieved [22-26].

Excess use of antioxidants compromises important body functions

You cannot achieve more health by using more antioxidants and neutralizing all the free radicals and metabolic toxins in the body. Study by Salganik points out that free radicals, the ROS (Reactive Oxygen Species) are required for their important role in body defence mechanisms, infection control, phagocytosis and apoptosis of cancer cells [27]. Bacteria and cancer cells are killed in the body by creating a sudden flood of ROS [28,29]. ROS oxidizes hydrophobic toxins, steroids, drugs to hydrophilic compounds which then can be easily transferred out of the cells, achieving detoxification [30,31]. ROS are a part of metabolic processes for prostaglandin synthesis, hydroxylation of proline, lysine and oxidation of xanthine [27,30]. Overuse of antioxidants and neutralizing functions of the ROS and can interfere with the well-being of a person [31,32].

Excess iron and minerals reverse the conversion of super oxides

Superoxides in the body are converted to less reactive hydrogen peroxide, by Superoxide Dismutase (SOD). A person having regular iron and multimineral supplements triggers Fenton reaction between metallic iron or copper ions with the reduced form, hydrogen peroxide, generating more reactive hydroxyl ions and reversing the benefit from conversion of super oxides and peroxides [27,32-34]. Therefore high doses of iron and mineral supplements should be avoided to ensure the benefit of antioxidants.

Excess use of vitamins leads to interactions and reverses the benefits

Rutkowski and Grzegorzczuk reviewed adverse effects of vitamins [5]. Labelling under the category of dietary supplements creates a delightful and harmless meaning to the use of vitamins, minerals unknowingly leading to easy abuse and overuse. Vitamin A, E and C, are commonly promoted as co therapy with various treatments and as general source of beauty and wellness [5].

Excess vitamin A can lead to aplastic anemia, hair loss, dry skin, rashes, raised Erythrocyte Sedimentation Rate (ESR), and interfere with blood coagulation [5]. Synthetic retinoids can impair liver functions [5]. Vitamin A has been found to damage bone and increase incidence of hip fractures at just marginally higher doses without signs of hypervitaminosis [35-37]. Excess β -carotene which is an effective antioxidant at low partial pressure of oxygen (pO_2) as in peripheral tissues becomes pro oxidant at high pO_2 as in lungs even leading to DNA (Deoxyribonucleic acid) damage [38-41]. Regular supplements of β -carotene could not protect patients with lung cancer by 18% and caused increased the incidence of lung cancer in smokers by 18% and caused intra cerebral hemorrhage in alcoholics [38,42,43]. Vitamin A stores are depleted with high intake of vitamin E [41].

High intake of vitamin C causes electrolyte imbalance increasing sodium levels and reducing potassium in the blood [43]. When administered together vitamin C can destroy vitamin B12 [44,45].

High doses of vitamin C inhibit enzymes ceruloplasmin and superoxide dismutase (Cu, Zn-SOD) due to interference of vitamin C with copper absorption [46]. High doses of vitamin C in glucose-6-phosphate dehydrogenase (G-6-PD) and vitamin B12 deficiency can cause haemolysis of the erythrocytes [43,18] and damage pancreatic β -cells, similar to that known with drug alloxan [47-49]. Vitamin C taken at night can lead to difficulty in falling asleep due to its stimulant effect [50]. High doses of vitamin C lead to tolerance and dependency, sudden withdrawal causes scurvy like state of deficiency, gradual tapering is advised [18,51,52].

Excess vitamin E antagonizes vitamin K, reduces platelet aggregation, promoting anti-coagulant activity [41], it also interferes with generation of beneficial ROS used for killing of the infective phagocytosis agents engulfed by granulocytes [53-55]. Vitamin E in high doses becomes pro oxidant [56,57]. With high doses of minerals and easy availability of iron and copper ions vitamin E encourages generation of ROS [47,58,59]. Meta-analysis of 135,000 people taking vitamin E 400 IU or higher per day for over one year showed increased risk, instead of health benefit [43].

Favorable or synergistic nutrient interactions

Vitamin E regenerates the Beta carotene utilized for antioxidant activity and also preserves the activity of vitamin A [50,57,60,61]. Vitamin C regenerates vitamin E consumed for reduction of peroxide and peroxy radicals [62-65]. Vitamin C neutralizes the xenobiotics leading to formation of ROS helping in detoxification [66]. Vitamin A and Beta carotene in the diet make the non heme iron soluble at pH 6 neutralizing inhibition due to chelation by phytates, polyphenols and iron inhibitors in food to improve iron absorption more than three times [67].

Under oxidative stress, Beta carotene cleavage products generate aldehydes and epoxides which impair the function of the mitochondrial respiratory chain, creating a genotoxic effect and promoting inflammation, especially on prolonged use. These toxic effects are known to be reduced with concomitant use of other antioxidants, alpha tocopherol, N acetyl cysteine and vitamin C [68-71]. Vitamin C is known to improve iron absorption by preventing the formation of insoluble iron complexes with tannins and phytates. Vitamin C also converts ferric iron to ferrous form which is the required form for absorption by the intestinal mucosal cells [72].

Higher doses do not lead to higher benefits

The preceding information so far has tried to present the view that overdose of vitamins or supplements should be avoided and synergistic combinations can enhance efficiency with prevention of toxicity and undesired side effects. Especially because people tend to use supplements for a long time. We should now see if the rationale is applicable to the commonly used iron and calcium, minerals as well. The amount of iron absorbed depends on the gradient across the gut lumen and the blood. Iron is absorbed better in a relatively low iron states rather than in presence of good circulating levels [73,74]. Higher iron content in the meal or recurrent high doses of iron supplements lead to low absorption [75-77]. Iron absorption is regulated at the mucosal level depending on the deficiency status and the iron load in the food [77,78]. The intestinal mucosal cells or enterocytes are equipped to down regulate iron absorption in response to daily exposure to high intake of iron [78,79]. Since iron and calcium are the oldest and most popular mineral supplements, there are studies done

as early as 1958 to show that iron supplements administered once in three days (or twice a week) are more efficient for absorption and utilization, than providing iron every day [80]. The mucosal cells need to renew and regain their ability for iron transport with a three day gap [80,81]. High iron levels are not always desirable. High iron leads to formation of pro oxidative, harmful, hydroxyl ions, through Fenton reaction [82]. Thus excess iron should be avoided and there is a rationale for a once in three days low dose recommendation [80].

Presence of Iron and calcium together reduce the absorption of one another [83]. Calcium absorption also depends on the calcium load and the relative deficiency in an individual [84,85]. High concentration of extracellular iron leads to a concomitant buildup of calcium ions, leading to premature apoptosis and cell death [86]. Higher bioavailability of nutrients is not necessarily better. When there is a combination of all minerals together, administered in multivitamin, multimineral formulations, the individual minerals compete with each other for absorption. Levels of zinc, magnesium, calcium, selenium, iron, affect the absorption of each other [87].

Even after absorption of the nutrients the metabolic systems have a rate limiting capability of utilizing the nutrients. High doses of Folic acid cannot be utilized well due to limited metabolic capacity of the cells for reduction and methylation of folic acid to its active form [88]. High doses of vitamin C not only reduce further absorption of vitamin C, but also become pro oxidant in behavior [5,89]. We decided to follow the thought of providing low but effective dosage in preference over high doses of nutrients, leading to poor absorption, incomplete utilization or the risk of reversing the benefits due to continuous, repeated, daily doses or uncontrolled high doses. The thought has led to a low dose once in three days Cyclical Nutrition Therapy.

The concept of Low dose once in three days Cyclical Nutritional Therapy

The conclusion derived from the studies, nutritional and our experience of similar approach in achieving wellness along with hair growth has lead us to believe in some new concepts of administering nutritional supplements as enlisted below:

- Nutritional supplements are required for healthy living as food alone cannot meet all the requirements.
- One single nutrient cannot function effectively. A balance of micronutrients, vitamins, minerals is required for optimum function, without an excess of any single nutrient.
- We should not encourage multivitamin, multimineral supplements as these would compete for uptake, exceed the metabolic capability for activation, reduce the absorption of nutrients, limit the bio availability, efficiency and utilization of each other, resulting in compromised outcome, reversal of benefits, no benefits or harmful conversion of behaviour to pro oxidation.
- Nutrients administered in intermittent doses can have better absorption than being repeated every day. Such approach will maintain a low gradient in circulation which favours more efficient absorption and complete utilization. The intermittent gap of three days allows time for the cells and systems to regenerate. It prevents wastage, avoids overuse, making the therapy efficient and cost effective.
- Nutrients can be administered in synergistic combinations that favour one another and do not adversely interfere with the metabolism of one another.

- Large amount of money is spent by clients in an attempt to derive health benefits from seemingly harmless use of supplements. It is our responsibility to make them aware of the best options preventing overuse and abuse of nutrients.
- RDA and RDI are guidelines decided by a review committee with the best intention of delivering wellness. These are not concurred by scientific or metabolic experiments or studies. The guidelines are updated and revised as per new reports, changing lifestyles and regular feedbacks.

In order to reduce the dosage, improve the efficiency, have broad spectrum coverage to include required vitamins, minerals, amino acids, fatty acids, coenzymes and supportive nutrients we have created a comprehensive approach of using different nutrient combinations on different days of the week. Six nutrient combinations are utilized as two per day over a three day cycle. Monday-Antioxidant and Calcium with Vitamin D. Tuesday-Iron, Folic acid, Vitamin C and Omega 3. Wednesday-Essential Amino acids, B-complex and Biotin. The same cycle repeats on Thursday, Friday, and Saturday. Sunday is break for detoxification. There is also an option where additional supplements can be added on Sunday if required (Table 1). Our program was created for hair regrowth. However, the hair regrowth has been achieved by improving general wellness of the patients and creating a nutrition balanced, toxin free environment for all the cells in the body to divide and grow. In our clinic we have been delivering wellness and good health leading to hair growth for past 19 years. The clinical benefit, compliance, efficacy of this program would comprise an elaborate report. These have been published clinical observations and benefits under various indications [1-4,90-92]. The clinical observations are reported here. Detail experimental and laboratory studies to document the benefits from low dose nutritional combinations would be required to corroborate the benefits and study other relevant aspects of the new approach. The program has received safety clearance and approval from regulatory health authorities from Australia, USA and Canada.

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|---|--|
| Monday & Thursday | Antioxidant, Calcium, Vitamin D3 |
| Tuesday & Friday | Iron, Folic Acid, Vitamin C, Omega 3 |
| Wednesday & Saturday | Essential Amino acids, B-Complex, Biotin |
| Sunday—no medicines | Detox on Sunday OR add extra a dose of another nutrient as per individual status if required |
| Provides ten different nutrient combinations that are synergistic with each other over three days preventing overdose and inter nutrient interaction. | |

Table 1: Cyclical Nutrient Therapy two supplement per day in a 3–days cycles.

Patients who are on this program have reported general health benefits like raise in iron and calcium levels, better energy levels, no fatigue, mental alertness, correction of thyroid function, no more nagging aches and pains in the body, waking up feeling fresh in the morning, good sleep, some rare patients also had weight gain.

A similar set of vitamins, minerals and essential nutritional supplements can be identified for geriatrics, pediatrics, growing teens, women's health, cardiac patients, diabetics, athletes, bariatric surgery and patients with special gastric or intestinal needs. We can make synergistic combination for individual conditions. Make sure the

combinations do not counter the efficiency of one another and spread these nutritional supplements over a similar three day cycle for optimum coverage of all essential nutrients and consistent benefit.

We would like to address the concern of whether an evidence of clinical deficiency detected by laboratory tests is required to be established before recommending nutritional supplements?

Why existing nutrient deficiencies cannot be detected on routine laboratory tests?

The Nobel Prize for Medicine in year 2016 was awarded to the Yoshinori Oshumi from Japan for his work on Autophagy. When the cells in our body experience lack of nutrients the process of autophagy triggers programmed breakdown of intracellular organelles in order to retrieve required nutrients, amino acids, minerals from the cells [93,94]. Autophagy is one step before apoptosis. Nutritional deficiencies are masked and compensated back to normal levels by retrieving nutrients and preserving circulating levels, through autophagy. Deficiencies are thus compensated and cannot be detected in the laboratory tests. You do not have to wait for clinically detectable nutritional deficiencies to develop before administering the low dose supplements. Therefore, though high dose supplements are not indicated, the low dose once in three days nutritional supplements can be advised, for patients having hair loss or clinical signs of fatigue, continuous stress, low immunity, borderline lower margins of nutrients on tests results, these patients shall benefit before they suffer or display frank nutritional deficiencies. This approach can be safely advised to patients who intend to have supplements only to maintain good health. We can prevent such fitness conscious users from overuse and known or unknown long term effects from indiscriminate use, self-determined or unguided use of supplements. In our experience the moment you provide these minimal corrections the patients show dramatic benefits in all aspects of good health. Correction of severe nutritional deficiencies is often difficult but prevention with low dose once in three days cycle is safe, easy and effective. Nutrients have two kinds of dosage. The dose given to a person suffering from deficiency disorder like scurvy or rickets is very high. This is a therapeutic dose or a treatment dose but the dose required for prevention of deficiency is a prophylactic dose which can be as low as possible [95], for promoting wellness.

Subclinical deficiencies

Researchers around the world have expressed concern over subclinical deficiencies [96] which are another type of nutritionally compromised states that are not clinically detectable. Covert malnutrition or subclinical deficiencies are a state where the metabolism and biological system of an individual has adjusted, reset and adapted to continue functioning under sub optimal lower levels of nutrients without clinical signs of failure. Certain ethnic communities are known to have reduced height, low body mass and stunted growth due to endemic deficiencies.

We regard the subclinical deficiencies as a status of compensated failure, where the failure is masked, until there is a demand or need for complete functional capacity. Vitamin C 10 mg per day is enough to prevent scurvy [95]. The deficiency will manifest only when there is requirement for wound healing [95]. The prevalence of such covert deficiencies is more than our perception of this rising problem [95,96]. In a surprising report, healthy donors certified to be fit and selected for blood donation after due screening with laboratory tests were been

found to have subclinical iron deficiencies [97]. All the body systems are interrelated; covert deficiencies that become apparent in one element affect other body systems as well and are associated with multiple undetected deficiencies. Hypothyroidism known to result from iodine deficiency has been reported to be associated with subclinical deficiencies of vitamin A, vitamin D, iron and selenium [98-101]. Subclinical deficiencies have been reported to affect the thyroid pituitary axis [102]. Therefore we require a low dose but long term, comprehensive nutritional supplement program rather than a selective, short term, immediate, single nutrient correction approach. In one of the studies, covert deficiencies due to inadequate diet in athletes did not manifest as these were adequately compensated by their use of nutritional supplements.

Conclusion

Nutritional deficiencies are on the rise becoming more common than we can realize. The deficiencies are multi nutrient, multi vitamin and multi mineral in nature and not limited to single individual nutrients. Administering too many nutrients together leads to reduced absorption and reduced efficiency from inter nutrient interactions. Nutritional supplements also need to be continued for a long time. Excess use of any single nutrient turns out to be ineffective as a balance of all micro nutrients in the body is essential to ensure wellness. High dose nutritional supplements can become ineffective and also reverse the benefits. A low dose once in three day nutritional cycle has been suggested with synergistic combinations which reduces dosage, improves efficiency, brings down total cost of the therapy, provides comprehensive coverage of all required supplements and is safe for long term use. We have used this approach successfully for hair loss management and achieving new hair growth. We suggest similar approach can be planned for geriatrics, paediatrics, growing teens, athletes, body builders, women's health, cardiac patients, diabetics, athletes, bariatric surgery and patients with special gastric or intestinal needs. Cyclical nutritional therapy is a new way to look at safe, comprehensive nutritional supplementation avoiding nutrient interactions and improving efficiency without overdose. The unique approach can be applied to more clinical conditions and tailored to meet the demand for promotion of wellness at various levels.

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