

## Benefit from Vitamin Therapy in Smoker's Hair

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### Introduction

Smokers are known to be prone to hair loss [1,2]. Even passive smoke is a suspected cause for hair loss [3]. Despite the significant number of smokers presenting with hair loss there has been no standard protocol to induce regrowth of the lost hair in smokers. We have noted some common clinical findings in smokers (Table 1). Due to the oxidative stress created by smoking, the hair loss can mimic androgenic alopecia or accelerate the progress of androgenic alopecia [2]. In this case we describe the clinical evaluation, trichoscopy, improved hair counts, calibre of the hair and report regrowth over the areas of hair loss in a smoker, with the use of minoxidil 2%, use of antioxidants and nutritional support using lower than recommended, once in three days, divided dose of Vitamins as a cyclical therapy.

### Case Presentation

A 37 year male presented with complaints of hair loss, dryness of scalp, hair thinning, commencement of greying of hair, surprisingly not having excessive hair fall, hair loss was 25-30 strands a day during washing and combing, for more than past 5-6 years. Patient had used minoxidil application 1 ml twice a day for over two years and then discontinued as he found no improvement. At present he had no hair shedding on the pillow, clothes etc. He complained of slow growth and poor hair quality. Patient had dragging sensation and pain in the roots while combing the hair. Patient also complained of dry scalp and fine dandruff but no flaking of the scalp. He smoked 8-12 cigarettes per day. He started smoking at the age of 21 years, earlier it was 2-3 cigarettes per day and has now gradually increased to 8-12 cigarettes in the past 5 years. Patient was willing to reduce smoking and make an effort to quit if it would convincingly translate into benefit for hair growth. He also occasionally mixed smoking and alcohol 2-3 times a week. Enquiry into patient's health history showed he had no major disease, no sick leaves from work, he goes jogging three to four times a week, has mixed vegetarian and non-vegetarian diet. He admitted to stress at work which leads him to smoking breaks and alcohol only with friends, 2-3 times a week. He does not stock alcohol at home, though he stocked cigarettes. Lab investigations showed Vitamins, minerals and hormone levels within normal limits (Table 2). The free testosterone and DHT levels were not raised, thyroid levels were normal. Since no other cause could be directly determined, smoking was suspected as a probable cause due to the elimination or non-confirmation of any other cause.

### Trichoscopy

Mid scalp hair density count was 77 hairs per square centimetre,

1	Diffuse thinning
2	Rapid progressive hair loss over 6-8 months
3	Slow hair growth
4	Temporal thinning or receding
5	Predominant villus hair and single hair on trichoscopy
6	Very few two or three hair follicle units
7	Complaint of trichodynia
8	Commencement of greying
9	Mimic or accelerate androgenic alopecia

Table 1: Clinical Presentation of Smoker's Hair loss.

Sr. no.	Parameter Tested	Test Value	Normal Range
1	Haemoglobin	14 g/dl	13- 17 g/dl
2	Ferritin	72 ng/ml	30-200 ng/ml
3	Iron	60 µg/dl	33-193 µg/dl
4	Transferrin	283 mg/dl	200-360 mg/dl
5	Calcium	9.2 mg/dl	8.6-10 mg/dl
6	Zinc	70 µg/dl	70-120 µg/dl
7	Vitamin B12	294 pg/dl	211-946 pg/dl
8	Vitamin. D	30 ng/dl	30-100 ng/dl
9	Total Testosterone	300 ng/dl	240-950 ng/dl
10	Free Testosterone	0.7 pg/ml	0.3-2 pg/ml
11	DHT Dihydrotestosterone	41 ng/dl	29-90 ng/dl
12	T3 Triiodothyronine	139.40 ng/dl	78-195 ng/dl
13	T4 Thyroxine	9.72 µg/dl	5.52-13.6 µg/dl
14	TSH Thyroid Stimulating Hormone	2.05 µIU/ml	0.27-4.2 µIU/ml
	Total Protein	7.4 g/dl	6.4-8.3 g/dl

Table 2: Laboratory investigation reports of the patient.

normal range 120-300 hair per square centimetre. Patient had 18 villus hair (24%) whereas normal is 2-6%, he had 46 single hair follicles (60%) whereas normal is 30-40%, he had 7 two hair follicles (9%) whereas normally there should be 60-70% 2 hair follicular units, and only 5 (7%) three hair follicular units, which normally should be 12-20%. The hair distribution pattern appeared to be reversed with more single and villus hair follicles than robust two and three hair follicles. The average hair calibre was 28 microns, normal being 40-70 microns for Asian hair. It was noticeable that as a smoker the patient had thinner slow growing hair with poor conversion of villus to terminal hair.

### Standard therapies for hair loss due to smoking

The patient had use minoxidil application for over two years without seeing any improvement. Though smoking is known as a cause for hair loss and hair loss due to smoking is known to mimic clinical presentation of androgenic alopecia and accelerate the progress of androgenic alopecia, there are no standard therapies reported for hair loss due to smoking and this case report would be the first attempt to such a focused approach. All mechanisms of hair loss are not medicated through DHT (dihydrotestosterone) alone. Associated cofactors can precipitate and accelerate hair loss. Smoking can make the hair roots weak and sensitive making them more vulnerable to damage and slower to respond with regrowth. The treatment is planned to provide stimulation and support the required cell division with adequate nutrition without the risk of excess or overdose.

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## Reviews of other Therapies and the Basis of Planning Vitamin Therapy

Use of L-cysteine and Vitamin B6, to correct hair damage and slow growth due to apoptosis from cigarette smoke was recommended by D'Agostini et al. [4]. This study showed hair loss in mice exposed cigarette smoke [4] resulting in areas of alopecia, grey hair, apoptosis of the hair bulbs, atrophy of the epidermis, reduced thickness of the subcutaneous tissue, and scarcity of hair follicles at the end of 3 months. They not only showed that genotoxic components in the smoke alter the hair cycle but also recorded improvement with N-acetylcysteine and Vitamin B6 supplements [4]. Traber et al. advocated nutritional supplements for all diseases conditions resulting through tobacco [5]. Low antioxidant levels in smokers and passive smokers were recorded by Alberg, [3,6] and Bloomer [7], paving the way for use of antioxidants. Similarly the use of beta-carotene, Vitamin C, Vitamin E, zinc and selenium in smokers is supported by low levels recorded by Galan et al. [8]. the study also indicates poor absorption of nutrients from alcohol [8], thus combining smoking with alcohol would be considered more harmful to a person's nutritional status [8]. Previous work by the author [9-11] shows that hair regrowth can be achieved from the use of low dose amino acids, biotin, antioxidants, omega 3, calcium, Vitamin D3, iron, folic acid, Vitamin C, and Vitamin B6, B12. The peculiarity of this program is that different nutrients and minerals that are synergistic with each other are administered in combinations on different days over a three day cycle. The aim is to avoid interaction, prevent overdose and also reduces cost of the therapy. This comprehensive therapy was followed for treatment of hair loss in the present 37 year, smoker patient. Along with the nutritional correction, patient used minoxidil 2% 1 ml twice a day to stimulate hair growth.

## Treatment Progress and Results

The smoker's response to the hair loss therapy was recorded every 2 months with standard photography. Hair growth and hair quality had improved and new hair growth could be seen commencing within 2 months. (Figures 1a and 1b). Though there was not much relief from grey hair. After 4 months, (approximately one telogen cycle), trichoscopy showed 28% improvement in hair counts, from 77 to 100 per square centimetre, 8% improvement in average hair calibre from 28 to 31 microns, with 50% reduction in villus hair counts from 18 to only 9 villus hair, indicating conversion of villus hair to terminal hair. The improvement was recorded in 2 months whereas the earliest



**Figure 1b:** Improved density and calibre after 4 months of vitamins and 2% minoxidil.

benefits seen with standard use of minoxidil are only after 6 months of application [12]. The benefit would definitely continue further, as nutritional support and care followed for subsequent hair cycles.

Patient unexpectedly reported other benefits from the cyclical Vitamin therapy. The skin was no more dull and dry, it looked better, small aches and pains in the joints and muscles had disappeared, patient had better stamina and did not feel fatigue easily at the end of the day. By the end of the 9<sup>th</sup> month the patient had quit smoking, which was another social advantage, considering a general quit rate of only 20% in smokers [13]. Regrowth of the lost hair was regarded as the motivation to quit smoking. We conclude that there is scientific basis for hair loss in smokers and significant benefit from nutritional correction in addition to the use of minoxidil 2% alone for stimulating new hair growth.

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**Figure 1a:** Hair loss in a smoker.

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