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Short Review

Hair greying & its palliative management

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ABSTRACT

Going grey has a perception of person getting old and not attractive. Therefore, lot of remedies are tried to colour the affected part of scalp. Use of measures to colour hair or use of medications to change the grey hair to black is only a temporary phenomenon which may not last long as the melanin a pigment which imparts colour to hair is gradually decreased. Men have greying much faster than women. Thyroid hormones [triiodothyronine (T3) and tetraiodothyronine (T4)] and the central neuroendocrine regulator of the hypothalamic–pituitary–thyroid (HPT) axis, thyrotropin-releasing hormone (TRH), which is produced within human scalp stimulate melanin production. Thus, both in hypo and hyperthyroid state greying can occur. This is also altered in Postmenopausal changes include decreased anagen hairs in the frontal scalp, lower growth rates. The preferred action is to have balanced diet, adequate vitamins, avoiding excessive exposure to sun and lubrication of hair regularly with any oil.

1. Introduction

Greying of hairs (white hairs) is considered to be the most evident sign of aging. Premature hair greying, or canities, has a multiple etiologies with negative effects on affected individuals. Greying results in anxiety and a sense of low mood. The temporal area is significantly more involved in men than in women whereas the frontal and parietal areas are affected more in women. White hair has no melanocytes or pigmentation, while Grey hair has some persisting color with aberrantly distributed melanosomes. Beard and body hair are affected later. chest, pubic, and axillary hair may remain pigmented even in old age the development of gray hair is ultimately due to a decrease in the number of melanocytes and production of hydrogen peroxide by hair follicles. This can be either due to a defect in the melanocytic stem cells or destruction of the follicular stem cell population. Receptors for bone morphogenic protein and activins that are Bmpr2 and Acvr2a (Transforming Growth Factor (TGF)-β family receptor) are known to influence hair pigmentation. The reduced activity of Bmpr2 and Acvr2 can cause early greying. A significant downregulation of melanogenesis associated genes [tyrosinase (TYR), tyrosine related protein 1 (TYRP1), melanocyte inducing transcription factor, paired box gene 3 (PAX3) and proopiomelanocortin has been reported in subjects who grey earlier. Smoking, and stress have positive correlation with hair aging. The palliative therapy for aging has many intercepts which do not have a long lasting effect.

2. Pathology of Greying

Greying is caused due to oxidative and oxidative stress, Greying is caused the by depletion of hair follicle bulbar melanocytes. Overproduction of copper-zinc superoxidase induces excessive H2O2 formation and triggers oxidative damage. Melanocyte stem cell depletion in the hair bulge

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is an important feature. *B* (TGF-β) and collagen XVII (Col17A1) are involved the in regulation of Melanocyte stem cell maintenance.[1]

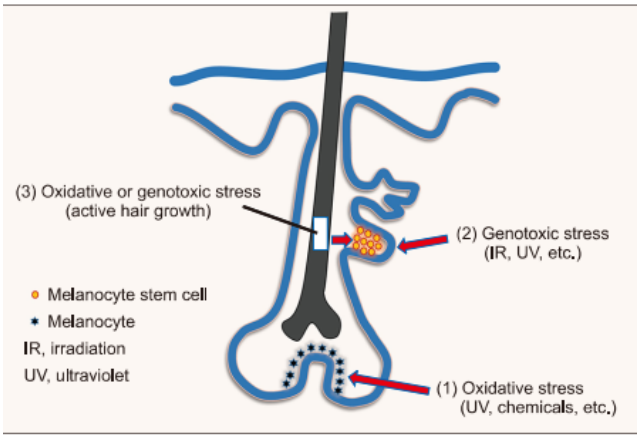

Fig. 1: Target factors for hair greying

2.1. *Etiology of greying of hair*

1. Grey hair is considered premature when it happens at around the age of 25, on average. Caucasians before age of 20, Asians before age of 25 and Africans before age of 30. The ongoing normal aging process. Dermatologists coin this as the 50-50-50 rule. "Fifty percent of the population has about 50% grey hair by the age 50,"
2. Ethnicity makes a difference. Caucasians tend to go grey earlier than Western Asians followed by African-Americans. Mongols tend to grey much later.
3. Thyroid disorders like hyperthyroidism or hypothyroidism can cause hormonal imbalances in the body, which may result in premature greying of hair.[2]
4. Stress can accelerate the greying process. It can be due to sleep disorders, or anxiety. Stress depletes the reserve of stem cells present in hair follicles that can be transformed into pigment cells when new hairs are formed. A positive association between severity of hair graying and coronary artery disease (CAD) has been reported.
5. Vitamins: Low vitamin B12 levels are notorious for causing loss of hair pigment. The pigmentation of his hair returned to normal after treatment with intramuscular cyanocobalamin. Vitamin B6 will help restore hair to its original color following an illness or deficiency, and vitamin B 5, known as pantothenic acid, helps combat premature greying of hair. Its postulated that micronutrients are major factors in the normal hair follicle cycle, playing a role in the cellular turnover of the matrix cells in the follicle bulb that are rapidly dividing.
6. Low serum copper and zinc concentration may play a role in the premature greying of hair.[3]
7. Use of Chloroquine are associated with greying hair. These drugs are thought to inhibit the receptor tyrosine kinase c-kit found in melanocytes reducing melanogenesis. The hair lightening starts 3–4 months after the beginning of treatment and typically affects the hair scalp, whereas eyelashes, eyebrows, and body hair are less frequently affected. Hypopigmentation was indeed more common in patients with light brown hair. Other drugs include mephenesin, phenylthiourea, triparanol, fluorobutyrophenone, dixyrazine, etc. Calcium pantothenate, anthralin, chinoform, mephenesin, minoxidil, propofol, valproic acid, and verapamil await confirmatory data. Paradoxical hyperpigmentation has been documented with Imatinib. EGFR inhibitors cause trichomegaly and coloration of hair. Tyrosine kinase inhibitors (Quinazolinamines), such as Geftinib also sometimes cause darkening of hair. Anti-inflammatory medications known to proinflammatory cytokine activity (including thalidomide, lenalidomide, adalimumab, cyclosporin, and prednisone) have also been linked to hair repigmentation.[4,5]
8. Premature greying of hair may occur alone as an autosomal dominant condition or associated with various autoimmune or premature aging syndromes. Down syndrome (trisomy 21) is has features of accelerated aging, including premature greying of hair and deficient DNA repair.
9. Prooxidant effect of smoking on the body leading to increased ROS (Reactive oxygen species (ROS) which are highly reactive chemicals formed from O_2. Examples of ROS include peroxides, superoxide, hydroxyl radical, singlet oxygen, and alpha-oxygen. The damage to hair follicle melanocytes with subsequent premature aging is a demonstrable feature.[6]
10. Silvery hair is a common presentation of rare group of autosomal recessive disorders called Silvery hair syndromes including Griscelli syndrome (GS), Chediak-Higashi syndrome, and Elejalde syndrome.[7]
11. Disease process accelerating greying of hair include neurofibromatosis, tuberous sclerosis and thyroid disorders vitiligo and alopecia areata. (immunological diseases).[8]
12. The role of water consumption in prevention of greying of hair was not found to be positive and the hypothesis that good hydration is good for hairs could not be established.
13. Premature greying has also been reported in patients with HIV infection, Cystic fibrosis, and Hodgkin′s lymphoma.[9]

2.2. Clinical investigation

Serum Vitamin B12, folic acid, and thyroid profile need to be performed. Though greying is evaluated through clinical examination. Into consideration, type of lubricant used for hair and duration of sun exposure should also be assessed. [10]

2.3. Preventive measures for greying of hair

1. Provision of food rich in iron, vitamin B12, and protein like fresh green leafy vegetables, fresh fruits, juices, white meat, seafood, eggs, and dairy products.
2. Certain food products such as. Amla and methi seeds, Almond oil and lemon juice and onion can retard to some extent hair greying.
3. Fish oil is dietary supplement rich in omega-3 fatty acids, it imparts strength to hair and reduces triglycerides levels, retards hair greying.
4. Avoidance of excessive intake of aerated drinks, cakes, candies, chocolates, and other foods that include refined sugar.
5. Avoidance of processed, high-fat meats like bacon, sausage and salami
6. Avoid soaps and shampoos that are have strong aromas.
7. Arbitrarily prescription of nutritional supplements containing various combinations of vitamins and minerals like biotin, calcium pantothenate, zinc, copper, and selenium is often recommended. [10,11]

2.4. Quasi management greying of hair

There are many options, but are not specific and do not always provide conclusive results. The effects are observed as long these options are used.

Para-aminobenzoic acid, as part of the coenzyme tetrahydrofolic acid, aids in the metabolism and utilization of amino acids PABA supports folic acid production by the intestinal bacteria. Para-aminobenzoic acid (PABA) interacts with Antibiotics (Sulfonamide antibiotics) and can decrease their effectiveness. darkening gray hair, prevention of hair loss, to make skin look younger, and also for the prevention of sunburn. Most PABA supplements on the market recommend 500 mg per day but range from 100 mg to over 1,000 mg.

200mg of Calcium panthonate orally for long term. it provides essential nutrients and reduces hair fall, strengthens hair from roots, nourishes follicles from within, stimulates the growth of existing and new hair and improves melanin content of hair.

Melitane is a biomimetic peptide, agonist of alpha-MSH. It acts through binding melanocortin 1 receptor and thus stimulating the process of melanogenesis in hair. Palmitoyl tetrapeptide-20 is also another alpha-MSH biomimetic peptide. [11]

Latanoprost, a selective FP prostanoid receptor agonist used in the treatment of glaucoma, has a hypertrichotic side effect. Latanoprost at 500 microg/ml induced moderate to marked hair regrowth with 5-10% conversion of vellus hairs to intermediary or terminal hairs. In some individuals caused darkening of hair. [12]

2.5. Topical liposomal delivery of melanin into hair follicles has also shown encouraing results

Premature greying of hairs is linked to pernicious anemia. Binding of copper ions is essential for the activity of tyrosinase and thus the process of melanogenesis. Vitamin B12 restores the same. Premature hair graying has been shown to be less frequent in racial groups with higher bone density.

Green tea, polyphenols, selenium, copper, phytoestrogens, melatonin are under study for their potential use in the premature graying of hair.

In Ayurveda, Pitta dosha governs colour and complexion of skin and hair. Therefore, Pitta aggravation provokes premature greying Pitta dosha is aggravated by eating sour, salty and spicy food or infrequent oiling of skin Frequent oiling of scalp and hair is advised. Coconut oil with aloe vera gel is frequently used.

The Leaves of medicinal plants such as Lawsonia inermis, Eclipta prostrata, Murraya koenigi, Ocimum sanctum, Tridax procumbens, Moringa oleifera, Psidium guajava, and Carica papaya are used in Hairfall and prevent premature greying of Hair. The fruit of Medicinal plants such as Phyllanthus emblica, Aegle marmelos, Citrus Lemon, Citrullus colocynthis used in Hair loss and prevent premature greying of Hair. Rubbing of olive oil to scalp, is said to reduce greying of hair. [13]

Pumpkin seeds, Pine seeds (rich in amino acids including arginine, tryptophan, lysine, and glumatic acid, which can improve the quality of your hair are also known to change colour of grey hair and improve hair growth.

Hair dying systems can be divided into two main categories, oxidative or non-oxidative, and also according to the color durability after the application on hair strands: temporary, and permanent.

p-Phenylenediamine (PPD) is an important hair dye component. Patch test results with hair dye allergens is often made before the dye is used. Dyes are easy to use and the results of dye acts are obvious in 10 minutes. The darkening of the hair strands occurs gradually. There is limited evidence in humans for carcinogenicity, more evident with unnatural colors. [14]

Henna is Lawsonia inermis which is the only species of the genus Lawsonia. Henna balances the pH of the scalp preventing premature hair fall and graying of hair. The limitations of currently marketed natural hair colorants used as a paste includes a lengthy soaking time, messy application and difficultly to rinse it off. [15]

Table 1: Methods adopted for treating grey hair

Topical Applications	Oral Drugs	Alternative Medicine	Other Methods
Hair colors	Para aminobenzoic acid	Green tea extract, phytoestrogens	Usage of Dyes
Prostaglandins- latanoprost	Calcium pantothenate	Brahmi Bringaraj Oil (Bacopa monnieri)	Hair Epilation
Plastoquinone	Minerals- Iron, Copper, Calcium, Zinc	Hair Oil (Veronica Cineria/)	Phosphoric acid, Argentum nit, Lycopodium, Thuja,, Silicea. Described in Homeopathy Medicines
Melitane	Vitamins – Vit B12, folic acid, biotin, Vit E	Dasapushpam Oil (prepared from 10 herbs)	Protect hair from the harsh rays of the sun and chlorinated swimming pools by wearing a cap.
Palmitoyl tetrapeptide-20		Amla Oil (Phyllanthus emblica)	Unani Medicine : use of following herbs Terminalia chebula, Zinjiber officinale, Rosa damascana, Cassia angustifolia Vahl, Ipomoea turpethum and Glycyrrhiza glabra

>30% aqueous extract of Cymphomandra betaceae, aqueous extract of Tagetes erecta and Aloe vera gel, exhibited fast dying property.

Frequent use of any hair colourant leads to thinning of hair, increased fragility, roughness of hair follicle and reduced hair strength.

3. Conclusion

Hair greying (or canities) is considered to be a age-related feature. Reversible hypopigmentation of hair is observed in association with nutritional deficiencies like chronic protein loss, celiac disease and copper deficiency. Premature greying may be reversed with vitamin B12 supplementation. Intake of foods rich in vitamin B12 like meat, eggs, milk, and fish can help in gray hair reversal. A daily dosage of 2.4 mcg is recommended for most adults. Effective greying of hair is reversed in many cases given oral calcium panthonate. 100 mg PABA 3 times daily produced visible improvement in the form of hair darkening which relapsed quickly within 2–4 weeks of stopping treatment. The advantage of natural hair dyes is that they are hypoallergenic and nontoxic. Permanent hair dyes are most popular in the commercial market. There is a risk of damage to the hair shaft due to oxidation with permanent hair dyes. Contact dermatitis is often encountered side effect of hair dye. Shuttling genes into hair follicles can alter hair colour, such experimentation has been done in mice. Greying is age related process, this can be cosmetically improved for some period only.

4. Source of Funding

None.

5. Conflict of Interest

None.

References

1. Kyeong JS, Lee JY, Lee Y, Kim CD, Lee JH, Lee YH. Three Streams for the Mechanism of Hair Graying. *Ann Dermatol*. 2018;30(4):397–401.
2. Kumar HAB, Shamim U, Nagaraju. Premature Greying of Hair: Review with updates. *International Journal of Trichology*. 2018;10(5):198–202.
3. Eva MJ, Imfeld D, Graub R. Graying of the human hair follicle. *J Cosmet Sci*. 2011;62(2):121–5.
4. Ricci F, DeSimone C, Regno LD, Peris K. Drug-induced hair colour changes. *Eur J Dermatol*. 2016;26(6):531–6.
5. Zheng S, Pan YL, Wang J, Huang K, Liu J, Wang J, et al. Gefitinib-induced hair alterations. *BMJ Case Rep*. 2009;2009. doi:10.1136/bcr.09.2008.0878.
6. Reddy RR, Babu BM, Venkateshwaramma B, Hymavathi CH. Silvery Hair Syndrome in Two Cousins: Chediak-Higashi Syndrome vs Griscelli Syndrome, with Rare Associations. *Int J Trichol*. 2011;3(2):107–11.
7. O'Sullivan JDB, Nicu C, Picard M, JC, Bedogni B, Tobin DJ. Ralf Paus The biology of human hair greying. *Biol Rev*. 2021;96:107–28.
8. Sonthalia S, Priya A, Tobin DJ. Demographic Characteristics and Association of Serum Vitamin B12, Ferritin and Thyroid Function with Premature Canities in Indian Patients from an Urban Skin Clinic of North India: A Retrospective Analysis of 71 Cases. *Indian J Dermatol*. 2017;62(3):304–8.
9. Montero-Vilchez T, Remon-Love A, Tercedor-Sánchez J. Hair Shaft Examination: A Practical Tool to Diagnose Griscelli Syndrome. *Dermatopathology (Basel)*. 2021;8(1):49–53.
10. Pandhi D, Khanna D. Premature graying of hair. *Indian J Dermatol Venereol Leprol*. 2013;79(5):641–53.
11. Singh R, Madke B, Bansod S, Yadav N. Premature graying of hair: A concise review. *Cosmoderma*. 2021;1:65.
12. Sundaram S, Suresh K. Prevention of hair fall and whitening of hair by valuable medicinal plants in selected areas of Madurai district. *J Med Plants Stud*. 2019;7(3):74–7.
13. DaFrança SA, Dario MF, Esteves VB, Baby AR, Velasco MVR. Types of Hair Dye and Their Mechanisms of Action. *Cosmetics*. 2015;2:110–26.
14. Packianathan N, Karumbayaram S. Formulation and Evaluation of Herbal Hair Dye: An Ecofriendly Process. *J Pharm Sci Res*. 2010;2(10):648–56.
15. Jamagondi LN, Katte AS, Rumane MB, Mirza NN, Sontakke SS, Kale A, et al. Development and evaluation of herbal hair dye formulation. *J Pharmacogn Phytochem*. 2019;8(2):1363–5.

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