



AN HERBAL APPROACH TO TRICHORRHEXIS NODOSA: BAMBOO HAIR

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ABSTRACT

Trichorrhexis nodosa also popularly called as bamboo hair is a condition where thick or weak points across the shafts cause hair to break off easily. This is generally a genetic condition. It can also be caused by excessive use of chemicals, perming, over-brushing or too much blow drying. Other possible triggers of this condition include ectodermal dysplasia, trichothiodystrophy, Menkes syndrome, iron deficiency, hypothyroidism and even argininosuccinic aciduria. This present review article focuses on use of some herbs consist of important phytoconstituents such as glyceric acid, ginsenosides, eciliptine, nardin and jatamansinic acid etc. which are found to be useful in promoting, strengths and improving hair conditions caused by TN when it is happened by external manipulation of hairs only.

KEYWORDS: Trichorrhexis nodosa, treatment, natural herbs.

INTRODUCTION

Trichorrhexis nodosa is a focal defect in the hair fiber (Fig.1). It is also known as trichonodosis. Trichorrhexis Nodosa (TN) is a hair condition which leads to breakage of hair due to nodes or clumps formed on the shafts owing to varied reasons. The condition was first described by Samuel Wilks in 1856 and it was named by M. Kaposi in 1876.^[1] It may be congenital or acquired. The acquired form results most commonly from repeated trauma, combing habits and use of heat or weathering in the hair. But it can also be associated with some disorders like hypothyroidism, argininosuccinic aciduria and iron deficiency.^[2]

Acquired TN has been classified into 3 clinical forms:

Proximal TN: The involved hairs develop the characteristic nodes that break within a few centimeters from the scalp, especially in areas subject to friction from combing or sleeping. TN is common in black individuals who use caustic chemicals for styling the hair.

Distal TN: In this disorder, nodes and breakage occur near the ends of the hairs that appear dull, dry, and uneven. Breakage commonly is associated with trichoptilosis, or longitudinal splitting, commonly referred to as split ends. This breakage may reflect frequent use of shampoo or heat treatments. The distal acquired form may simulate dandruff or pediculosis and the detection of this hair defect often is casual. Primarily occurs in white or Asian individuals.

Localized TN: Described by Raymond Sabouraud in 1921, is a rare disorder. It occurs in a patch that is usually a few centimeters long. It generally is accompanied by a pruritic dermatosis, such as circumscribed neurodermatitis, contact dermatitis, or atopic dermatitis. Scratching and rubbing most likely are the ultimate causes.^[3]

The congenital form usually appears in the first year of life and can be associated with metabolic disorders or ectodermal defects.



Fig. 1: Showing presence of several Whitish nodes at hair shaft.

Causes

The cuticle encases the hair cortex in a strong almost impenetrable layer. It provides physical support and helps protect the cortex of a hair shaft from environmental factors such as ultra violet light, chemicals such as detergents and physical action such as hair brushing. If the cuticle is absent then the cortex underneath is directly exposed. The cortex is less resistant to the physical and chemical factors in the environment compared to the cuticle. Where the cortex is exposed its integrity is broken down. The chemical bonds that maintain the hair structure can break down and the hair becomes more flexible and weaker. The hair may split and fray into minute strands at the point of cuticle break down. This focal disruption of the hair fiber is a prime area for hair shaft breakage.^[4] In some cases, Trichorrhexis nodosa is caused by an underlying disorder, including very rare ones, such as:^[5]

- Thyroid not making enough thyroid hormone (Hypothyroidism)
- Buildup of ammonia in the body (Argininosuccinic aciduria)
- Iron deficiency
- Menkes syndrome (Menkes kinky hair syndrome)
- Group of conditions in which there is abnormal development of the skin, hair, nails, teeth, or sweat glands (Ectodermal dysplasia)
- Trichothiodystrophy (inherited disorder that causes brittle hair, skin problems, and intellectual disability)
- Biotin deficiency (inherited disorder in which the body is not able to use biotin, a substance needed for hair growth)

Symptoms

Symptoms may include:^[6]

- Lack of apparent hair growth.
- Hair appears patchy.
- Hair breaks easily close to scalp.
- Hair may have thickenings or nodes in the shaft.
- Ends of hair thinned or split.
- Whitish discoloration of hair tips.
- Hair breaks easily at tips.

Pathophysiology

Macroscopically, hair shafts affected by Trichorrhexis nodosa contain small white nodes at irregular intervals throughout the length of the shaft. The number of nodes may vary from one to several, depending on the length of the hair. These nodes represent areas of cuticular cell disruption, which allows the underlying cortical fibers to separate and fray. The cortical fibers display outwards and fracture, giving the node the microscopic appearance of 2 brooms or paintbrushes thrust together end to end by their bristles. Complete breakage often occurs at these nodes.^[7]

Physical traumas that may cause sufficient damage to the hair shaft include excessive brushing, back combing, stressed hairstyles, the application of heat, and prolonged exposure to ultraviolet light. Head rolling and banging; habit tics; trichotillomania; and the scratching and pulling associated with pruritic dermatoses, such as seborrheic dermatitis and pediculosis capitis, can also result in sufficient damage. Chemical traumas include excessive exposure to salt water, shampooing, setting, perming, bleaching, and dyeing of hair. Seasonal recurrence of Trichorrhexis nodosa has been reported as the result of the cumulative effect of diverse insults to the hair.^[8]

Epidemiology

Frequency

Trichorrhexis nodosa is an uncommon disorder. A retrospective review of 129 hair-mount samples from 119 patients over a 10-year span found 25 cases of loose anagen hair syndrome, 6 cases of uncombable hair syndrome, and Trichorrhexis nodosa in 13 patients.^[9]

Race

Acquired proximal Trichorrhexis nodosa is common in blacks, and appears to occur in individuals who are genetically predisposed. Some consider it an ethnic hair disorder. Acquired distal Trichorrhexis nodosa primarily occurs in Asian or white persons.^[10]

Sex

Acquired proximal Trichorrhexis nodosa is more common in females than in males.

Age

Congenital Trichorrhexis nodosa may be present at birth, or it may appear within the first couple months of life. It can present in patients with the late form of argininosuccinic aciduria at age 2 years or older. Acquired Trichorrhexis nodosa usually presents in early to middle life.

Trichorrhexis Nodosa Treatment & Management

Trichorrhexis nodosa develops in association with a range of other hair diseases. Any hair condition that weakens the hair shaft and/or results in abnormal cuticle formation can result in Trichorrhexis nodosa like hair breakage. Hair loss through breakage can be seen in conditions such as alopecia areata as a secondary phenomenon.

Treatment depends on the considered cause of the focal defects. If the hair production is believed to be abnormal then treatment will focus on the hair follicle and improving the strength of hair fiber. Where the defect is the result of excessive grooming the obvious action is to reduce the amount of hair manipulation. Once the integrity of the hair fiber is broken down there is little that can be done to repair it. It may take some time for hair to recover from trichorrhexis nodosa. New, healthy hair has to grow to replace the defective fibers. It may take several months or even years before scalp hair completely recover.^[11]

- Discontinue use of severe chemicals such as relaxers, texturizers, coloring, etc.
- Avoid direct heat from tools and appliances including blowdryers.
- Gentle brushing and combing especially when detangling.
- Harsh Shampoos which are chemically based should be used sparingly or avoided and replaced with an herbal one.
- Use of herbal/organic hair preparation and all natural oils and butters.
- A nutritional diet.

However, some of the herbs are also found to be magical in promoting, strengthens and improving hair conditions affected by Trichorrhexis nodosa. Various phytoconstituents obtained from nature have wide biological activities in severe diseases and have wide therapeutic efficacy. The main advantage of using phytoconstituents obtained from plant is it provides free from adverse effects treatment where none of the medication can do.^[12]

Some of the most widely researched plants for hair growth promoting activity are defined here after:

Glycyrrhiza glabra

Licorice, *Glycyrrhiza glabra* L. belongs to the Family – Fabaceae; the name Glycyrrhiza is of Greek origin which means “sweet wood”^[13], Licorice has been used in

Ayurveda and Chinese medicine for its anti-hair loss effect and its ability to restore dry hair.

Its main components, glyceric acid and its derivatives, are suspected to produce an anti-hair loss effect by inhibiting the production of dihydrotestosterone (DHT) through the suppression of 5-alpha-reductase enzyme activity, which subsequently increases hair growth.^[14]



Fig. 2: Glycyrrhiza glabra bark.

Ginseng radix

Ginseng radix is the steamed and dried root of *Panax ginseng* C.A. Mayer. It mainly contains ginsenosides, essential oil, sesquiterpenes, polyacetylenes, polysaccharides, peptidoglycans, steroid, choline, vitamin- B, C, E, fatty acid, carbohydrates, and amino acids. Experimental studies reported that the 70% methanolic extract from red ginseng has superior activity to that of white ginseng in a hair growth-promoting assay using mouse vibrissal follicles in organ culture. Studies revealed that ginseng act as a 5 α reductase inhibitor. Ginsenosides Ro enhances in vivo hair re-growth based on their inhibitory activity against 5 α reductase in the androgenetic alopecia model.^[15]



Fig. 3: Ginseng radix roots.

EcliptaAlba

The generic name *Eclipta* has been derived from a Greek word meaning “deficient” in reference to absence of bristles and awns on the fruits. The specific epithet *alba* means “white” that refers to the colour of the flowers. The herb, called “The King of Hair”, is a small branched annual herb with white flower heads inhabiting tropical and subtropical regions of the world. It traditionally used to check hair loss and stimulate hair growth. The principal constituents of *Eclipta Alba* are coumestan derivatives like wedololactone (1.6%), demethyl wedelolactone, desmethyl-wedelolactone-7-glucoside and ecliptalluteolin-7-O-glucoside, hentriacontanol, heptacosanol, stigmasterol. Experimental studies have shown that Methanolic extract and petroleum ether extract of *E.alba* promote follicular enlargement and prolongation of anagen phase.^[15]



Fig. 4: *Eclipta Alba* leaves.

Bacopa monneri

Bacopa monneri Linn. Family, Scrophulariaceae, a small, creeping herb and bitter in taste; it has been used in the traditional system of medicine for centuries. Compounds responsible for the pharmacological effects include alkaloids, saponins, and sterols.

Brahmi contains alkaloids that enhance protein kinase activity that may be responsible for hair growth activity.^[15]

Emblca officinalis

E. officinalis Linn. (Syn. *Phyllanthus emblica* Linn.), the Indian gooseberry, or aamla', is a deciduous tree. Emblica is used to promote the growth of hair in traditional medicine. Embelica is reported to improve the iron metabolism; Iron is involved in the oxygenation of body's red blood cells. It is essential for normal hair growth and for the maintenance of healthy hair. Embelica extracts stimulate proliferation of dermal papilla cell in a concentration dependent manner, suggesting their role in hair growth promotion.^[16]



Fig. 5: *Emblca officinalis* fruit.

Capsicum annum

Capsicum annum Linn. Family Solanaceae is a crop that is widely cultivated because of its spicy nature and nutritional value. The crop accounts for a large portion of vitamins A and C in many Nigerian diets. It mainly contains capsaicin and isoflavone.

Experimental studies showed that combined administration of capsaicin and isoflavone has increased IGF-I production in hair follicles in the skin, thereby promoting hair growth. Such effects of capsaicin and isoflavone were mediated by sensory neuron activation in the skin. Insulin-like growth factor-I (IGF-I) plays an important role in hair growth. Capsaicin activates vanilloid receptor-1, thereby increasing the release of calcitonin gene related peptide (CGRP) from sensory neurons, and CGRP has been shown to increase IGF-I production.^[17]



Fig. 6: *Capsicum annum* fruit.

Nordostachys jatamansi

Nordostachys jatamansi, Caprifoliaceae commonly called Jatamansi or spikenard in English and it is a small shrub. The rhizomes of the plant are used since antiquity in the indigenous systems of medicine. It mainly contains bornyl acetate, valeranone, jnonon, menthylthymyl-ether and 1, 8-cineol. It is reported that.^[18] *Nordostachys jatamansi* is having hair growth activity. Experimental studies showed that ethanolic and hexane extract of Jatamansi has prominent hair growth effect in chemotherapy induced alopecia by an enlargement of follicular size and a prolongation of the anagen phase due to presence of two main compound nardin and jatamansic acid.^[19]



Fig. 7: *Nordostachys jatamansi* rhizome.

CONCLUSION

In the present article, an attempt has been made to articulate on herbal option for treatment of hair loss

caused by *Trichorrhexis nodosa*. As *Trichorrhexis nodosa* is a focal defect in the hair fiber which is more likely to be acquired through excessive manipulation of hair such as too much brushing, hairstyles that put constant stress on the hair, excessive washing, dying, and perming may disrupt the cuticle in focal areas along a hair shaft. It also develops in association with a range of other hair diseases and its treatment depends on the considered cause of the focal defects. If hair production is found to be normal in such cases the use of herbs such as *Glycyrrhiza glabra*, Ginseng, *Bhringraj*, *Brahmi*, *Amalaki*, *Capsicum annum* and *Nordostachys jatamansi* are found to be magical in promoting hair growth, strengthens and improving hair conditions affected by such disease.

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