



A Simple and Affordable Technique for Treating Fungal Nail Infection: Case Report

Corresponding Author:

Mr. Mohammad S Walid,
PGY1, Kingsbrook Jewish Medical Center, 31201 - United States of America

Submitting Author:

Mr. Mohammad S Walid,
PGY1, Kingsbrook Jewish Medical Center, 31201 - United States of America

Article ID: WMC003594

Article Type: Case Report

Submitted on: 22-Jul-2012, 09:25:13 AM GMT **Published on:** 23-Jul-2012, 01:44:45 PM GMT

Article URL: http://www.webmedcentral.com/article_view/3594

Subject Categories: DERMATOLOGY

Keywords: Fungus, nail, heat, blowdryer

How to cite the article: Walid MS. A Simple and Affordable Technique for Treating Fungal Nail Infection: Case Report . WebmedCentral DERMATOLOGY 2012;3(7):WMC003594

Copyright: This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC-BY\)](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Source(s) of Funding:

None

Competing Interests:

None

A Simple and Affordable Technique for Treating Fungal Nail Infection: Case Report

Author(s): Walid MS

Abstract

Fungal nail infections are common and notoriously difficult to treat. In this paper I present two cases of fungal nail infection treated conservatively with dry heat using a regular electromechanical blowdryer (hair dryer).

Introduction

Fungal nail infections (onychomycosis or tinea unguium) are common (2-3% of the population [1]) and notoriously difficult to treat. The fungal organism responsible for most fungal nail infections is *Trichophyton rubrum*. *Trichophyton mentagrophytes* is the second most common source of fungal nail infections. These dermatophytes cause infections of the skin, hair and nails due to their ability to obtain nutrients from keratinized material. Less than 10% of fungal nail infections are caused by nondermatophytes, yeasts or mold [1].

The treatment of fungal nail infections is expensive and long-term. It requires a commitment on the part of the patient to take medicine for several months. Unfortunately, topical preparations do not effectively treat fungal nail infections.

In this paper I present two cases of fungal nail infection treated conservatively with dry heat using a regular electromechanical blowdryer (hair dryer).

Case Description

My 71 year old father, a retired professor of plant diseases, living in Syria had fungal nail infection in his two big toes from which he suffered for more than a year. He had typical nail changes: brittleness, thickening of the nail and white or yellow streaks on the side of the nail. The patient tried several topical fungicides without effect. Based on his knowledge in fungal pathology, he decided to try treating his infected nails using heat. He trimmed the edge and surface of the affected nails by rubbing them against the abrasive surface of a nail file from an average nail care kit. He then applied dry heat from a regular blowdryer on the

affected nails in a pinpoint fashion using a pierced cardboard sheet. The hole in the cardboard was fitted to the size of the nail. Treatment was applied after shower and after each instance of feet washing to keep the nails dry. Sessions were repeated daily for periods gauged by the level of tolerable pain. In about six weeks the toenails regained their normal color and thickness (see picture). This technique was repeated by my 30 year old sister who applied it on both infected big toe nails and obtained the same results.

Discussion

Fungi can be divided into two basic morphological forms, yeasts and hyphae. Yeasts are unicellular fungi which reproduce asexually by budding or fission. Hyphae are multicellular fungi which reproduce asexually and/or sexually. Most fungi occur in the hyphae form as branching, threadlike tubular filaments called mycelium.

The methodology reported in this paper has its origin in the management of some fungal plant diseases [2-4]. In agriculture, loose smut of wheat and barley is a disease that can destroy a large proportion of a barley crop and is caused by *Ustilago* species. The disease cycle of loose smut begins when teliospores are blown to open flowers and infect the plant giving rise to basidiospore which germinate into hyphae, the vegetative part of a fungus, consisting of a mass of branching. The grains remain apparently intact with the fungus inside in latent stage.

The most widely used method of control for loose smut is treating the seeds with systemic fungicide. Another option is heat-treating the seeds to kill the fungus inside without affecting its germinability capability [3, 4]. This is a delicate process because too much heat will kill the plant embryo and not enough heat will allow the fungus to survive. Experimentally, the minimum effective heat dose is 42-45° C. for 2-5 minutes [4-6]; however, longer heating periods can be more effective for control of *Ustilago* species but with the risk of compromising germinability [4]. Temperatures up to 80° C. may be needed for saprophytic fungi that live in the soil and feed on dead and decaying material. [7]. Heating through sun exposure (solarization) is habitually used for sterilization of soil from fungi and other pathogens especially in green houses and by

organic growers [8].

The fungus affecting human nails (of the genus *Trichophyton*) form hyphae that produce asexual reproduction propagules termed conidia (synonymous with spores). Conidia are borne on specialized stalks called conidiophores. The morphology of these specialized conidiophores is often distinctive of a specific species and can therefore be used in identification of the species.

The similarity in the nature of these two pathogens is the basis for our assumption that using dry heat to treat fungal infection of the toe might be effective. This was indeed the case with satisfactory results in both patients. The nail, denervated tissue made of keratin, can withstand higher temperatures than surrounding soft tissue. Therefore, temperature levels can reach significantly higher degrees in the nail before pain receptors in the nail bed become stimulated. Pain lag depends on the temperature of the air current, personal pain perception threshold, thinness of the tiled nail and intactness of nerve conduction.

We caution that thermotherapy is contraindicated in diabetic long-term patients with peripheral neuropathy and microvascular fragility, due to the risk of gangrene. Medical device manufacturers are encouraged to design a clinically-usable blowdryer with pinpoint orifice and rising degrees of heating. Moreover, a randomized controlled trial with cost-benefit analysis comparing the effectiveness of different dosages of dry thermotherapy versus systemic fungicide treatment in the treatment of this common ailment is worth contemplating about.

Acknowledgement

I thank Dr. Abdullatif Walid for his new idea and the effort he made in applying this innovative technique for treating nail fungal infection on himself.

References

1. Gupta AK and Shear NH. Onychomycosis. Going for cure. *Can Fam Physician*. 1997;43:299–305.
2. Forsberg G. Control of Cereal Seed-borne Diseases by Hot Humid Air Seed Treatment. Doctoral thesis. Swedish University of Agricultural Sciences. Uppsala 2004. ISBN 91-576-6496-X.
3. Forsberg G, Johnsson L, Lagerholm J. Effects of aerated steam seed treatment on cereal seed-borne diseases and crop yield. *Zeitschrift für Pflanzenkrankheiten und Pflanzenschutz* 2005;112(3),

247–256. ISSN 0340-8159.

4. Tapke, V. F.: Single-bath hot-water and steam treatments of seed wheat for the control of loose smut. *USDA Bulletin* 1926;1383:1–29.
5. Forsberg, G., S. Andersson, L. Johnsson: Evaluation of hot, humid air seed treatment in thin layers and fluidized beds for seed pathogen sanitation. *Z. Pflanzenkrankh. Pflanzensch* 2002;109: 357–370..
6. Forsberg, G., L. Kristensen, P. Eibel, P. Titone, W. Hartl: Sensitivity of cereal seeds to short duration treatment with hot, humid air. *Z. Pflanzenkrankh. Pflanzensch* 2003;110:1–16.
7. RM Clear, SK Patrick, TK Turkington, R Wallis. Effect of dry heat treatment on seed-borne *Fusarium graminearum* and other cereal pathogens. *Canadian Journal of Plant Pathology* 2002; 24(4): 489–498. DOI:10.1080/07060660209507038.
8. Conway KE and Pickett LS. Solar Heating (Solarization) of Soil in Garden Plots for Control of Soilborne Plant Diseases. Oklahoma Cooperative Extension Service EPP-7640.

Illustrations

Illustration 1

Picture of the nails of a 71 year old man treated with dry thermotherapy using a blowdryer. A localized, aging-related, discoloration remains in the left big toe nail. Pretreatment picture unavailable.



Disclaimer

This article has been downloaded from WebmedCentral. With our unique author driven post publication peer review, contents posted on this web portal do not undergo any prepublication peer or editorial review. It is completely the responsibility of the authors to ensure not only scientific and ethical standards of the manuscript but also its grammatical accuracy. Authors must ensure that they obtain all the necessary permissions before submitting any information that requires obtaining a consent or approval from a third party. Authors should also ensure not to submit any information which they do not have the copyright of or of which they have transferred the copyrights to a third party.

Contents on WebmedCentral are purely for biomedical researchers and scientists. They are not meant to cater to the needs of an individual patient. The web portal or any content(s) therein is neither designed to support, nor replace, the relationship that exists between a patient/site visitor and his/her physician. Your use of the WebmedCentral site and its contents is entirely at your own risk. We do not take any responsibility for any harm that you may suffer or inflict on a third person by following the contents of this website.