How to treat fungal nail infections successfully

Mr John Miller  BHSc (Podiatry) MBA
About Foot Mechanics

Foot Mechanics Podiatry was established in the 1999

We have 9 clinics across the North Island

Over 65,000 patients

This is the third time I have present at the GPCME conference in Rotorua.

How to treat fungal nail infections successfully
How to treat fungal nail infections successfully
Overview of today's workshop:

- Background
- Patterns of Infection
- Differential Diagnosis
- Establishing a Diagnosis
- Treatment Options
- Preventing Reinfection

How to treat fungal nail infections successfully
Background

Definition

Fungal infection of the toe nails that may involve any component of the nail unit; matrix, bed or plate.

Onycho-mycosis = fungal infection of nails
Background

Prevalence

Eleven population-based and 21 hospital-based studies were identified. The mean prevalence in Europe and North America was 4.3% in the population-based studies, but it was 8.9% for the hospital-based studies. Both population-based and hospital-based studies showed that onychomycosis is more common in toenails and is seen more frequently in males. The main causative agent was a dermatophyte in 65.0% of the cases. Moulds were found on average in 13.3% and yeasts in 21.1%.
Background

Structure of the nail

How to treat fungal nail infections successfully
Background

Keratin

How to treat fungal nail infections successfully
Background

Keratin

How to treat fungal nail infections successfully
Background

Keratin

Crystalline & Non crystalline

How to treat fungal nail infections successfully
Background

Fungal infections leads to change in structure of proteins e.g. less stable disulphide bonds → brittleness
Background

Causative Organisms:

1. Dermatophyte (68%) - Trichophyton rubrum

2. Yeast (11%) – Candida albicans

3. Non dermatophytes moulds (NDM) (11%)

4. Mixed
Background

Who gets it?

- Prevalence 5%
- 50% of all nail disorders
- All races Males > Females
- Elderly > Adults > Children
- Closed footwear
- High activity - Soldiers / Athletes
- Immunosuppressed / Poor circulation
- Poor foot care
Background

Impact of Onychomycosis

Pain

Discomfort - standing, walking, exercising, footwear

Disfigurement - cosmetic, medical

Occupational limitations – pain, spread

Quality of Life - interferes with lifestyle

Onychomycosis, Medscape Feb 2013. A. Tosti
Background

Onychomycosis is more than just a cosmetic problem

- For diabetic and immunocompromised patients, onychomycosis can lead to serious complications
- Even for healthy patients, onychomycosis impacts quality of life

Impact

Patterns

Five Patterns of Onychomycosis:

1. Distal-lateral Onychomycosis (DLSO)
2. White Superficial Onychomycosis (WSO/SWO)
3. Proximal Subungual Onychomycosis (PSO)
4. Endonyx Onychomycosis (EO)
5. Total Dystrophic Onychomycosis (TDO)
Patterns

Five Patterns of Onychomycosis:
1. Disto-lateral Onychomycosis (DLSO) – most common

How to treat fungal nail infections successfully
Patterns

Five Patterns of Onychomycosis:
2. White Superficial Onychomycosis (WSO/SWO)
Patterns

Five Patterns of Onychomycosis:
3. Proximal Subungual Onychomycosis (PSO)
Patterns

Five Patterns of Onychomycosis:
4. Endonyx Onychomycosis (EO)

How to treat fungal nail infections successfully
Patterns

Five Patterns of Onychomycosis:
5. Total Dystrophic Onychomycosis (TDO)

How to treat fungal nail infections successfully
Differential Diagnosis

• Psoriasis
• Lichen Planus
• Eczema
• Trauma
• Yellow nail Syndrome
• Idiopathic onycholysis
• Neoplasms – Benign/malignant
• COEXIST!

How to treat fungal nail infections successfully
Establishing a Diagnosis

Choosing the right specimen

<table>
<thead>
<tr>
<th>Table 1: Sites for sample collection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DLSO</strong></td>
</tr>
<tr>
<td><strong>PSO</strong></td>
</tr>
<tr>
<td><strong>SWO</strong></td>
</tr>
<tr>
<td><strong>CO</strong></td>
</tr>
<tr>
<td><strong>Endonyx/TDO</strong></td>
</tr>
</tbody>
</table>

DLSO: Distal and lateral subungual onychomycosis, PSO: Proximal subungual onychomycosis, SWO: Superficial white onychomycosis, CO: Candida onychomycosis (CO), TDO: Total dystrophic onychomycosis

How to treat fungal nail infections successfully
Establishing a Diagnosis

Choosing the right specimen

How to treat fungal nail infections successfully
Establishing a Diagnosis

Specimen Analysis

• Direct Microscope
• Lab Culture

Both are necessary to definitively identify the etiological agent.

False negative up to 15% - try again!
Treatment

Overview

How to treat fungal nail infections successfully

~35 Million Onychomycosis Patients in U.S.

% of Patients

- 47% Untreated
- 36% Debridement
- 6% Oral
- 11% Topical

Topical Therapy
- Penlac Nail Lacquer (ciclopinox)
  - 5.5% - 8.5% labeled efficacy
  - ~375K NRx in 2010
  - $300M peak WW sales
  - Limitation: Poor efficacy due to insufficient penetration to reach nail bed

Oral Therapy
- Lamisil (terbinafine)
  - 38% labeled efficacy
  - 1.4M NRx in 2010
  - $1.2B peak WW sales
  - Limitation: Safety concerns due to rare but severe liver toxicity

Debridement
- Cut, clip, scrape, remove nail
- ~10M patients per year
- Limitation: Treats symptoms but rarely cures disease
Treatment

Mechanical

• Reduce and shorten nails
• Removes bulk infected tissue
• Immediate improvement in appearance
• Immediate improvement in comfort
• Preparation for other treatments
• Treatment of symptom only
Treatment

Mechanical

How to treat fungal nail infections successfully
Treatment

Mechanical

How to treat fungal nail infections successfully
Treatment

Oral

Terbinafine (Lamisil)

Is especially effective against dermatophytes

Appears to diffuse into the nail plate via the nail bed and nail matrix

Administered for 12 months – cure rates as high as 80%

Relapse rate 20%.
Treatment

Topical
Most common topicals used:
- Morpholine, amorolfine (Loceryl®, Nail lacquer)
- Ciclopirox (Batrafen®, Nail lacquer)

- Penetration into the nail is a problem for lacquers
- Ease of use can create a barrier for patient compliance
- New oil based topicals may overcome the lacquer issue

- Effectiveness can be enhanced if combined with mechanical treatment.

How to treat fungal nail infections successfully
Treatment

Laser

• Non-drug treatment
• Direct lethal effect- Photothermolysis of the fungal cell wall
• Instantly obliterates all varieties of fungus
• No damage to other tissues
• Quick
• No side effects

How to treat fungal nail infections successfully
Treatment

Combinations

Topical + Mechanical

Laser + Topical

Oral + Topical
Preventing Reinfection

If you’re going to treat nail fungus then you must commit to:

Shoes
- The most overlooked site for reinfection!!!
- Pharmacy products often do not kill fungal spores

Socks / Linin
- Must wash at 60 °C

Shower
- Bleach
- In public showers wear jandals

Skin
- Treat Tinea Pedis asap
How to treat fungal nail infections successfully

• There are five different fungal nail patterns. Knowing them will help you gain better specimens for diagnosis and select a treatment type.

• Mechanical treatment will enhance Topical treatment

• Shoes are the main source of reinfection and are usually left untreated

• Laser is available
How to treat fungal nail infections successfully