

### Using Vick's VapoRub® to treat Onychomycosis

BACKGROUND	
Title of Article	Novel treatment of onychomycosis using over-the-counter mentholated ointment: a clinical case series
Authors	Derby R, Rohal P, Jackson C, et al.
Journal / Citation	<i>Journal of the American Board of Family Medicine</i> 2011; 24: 69-74.
Background / Justification of the research	<p>The treatment of toenail onychomycosis is difficult. Many of the treatment options are expensive, require extensive durations of therapy, are associated with adverse effects, have many drug-drug interactions, and are associated with incomplete cure rates.</p> <p>Alternatives that are inexpensive and relatively benign have been desired for quite some time.</p> <p>A common "folk remedy" has been the use of Vick's medicated chest rub available over the counter. Up until the publication of this article, no studies had investigated the potential effectiveness of this remedy.</p> <p>One study in 2003 examined the fungicidal properties of Vick's VapoRub ingredients in vivo and found that they did indeed inhibit growth of the common types of fungi that cause onychomycosis. Camphor, thymol, and oil of Eucalyptus citriodora were all shown to be efficacious in vivo, and provided a springboard for the current study.<sup>8</sup></p>
Purpose / Objective	Test the efficacy of Vicks VapoRub as a safe, cost-effective alternative for treating toenail onychomycosis in an outpatient clinical setting (p. 70).
Funding	TRUE Research Foundation, San Antonio TX
METHODS	
Trial Design	Pilot Study, single center (US Air Force Medical Center)
Study Dates	Not Specified
Interventions	Vicks VapoRub – apply small amount with a cotton swab or finger
Inclusion Criteria	18 yo Clinical onychomycosis evident on at least 1 great toenail <ul style="list-style-type: none"> <li>• Positive fungal culture</li> </ul>
Exclusion Criteria	Allergy or sensitivity to any ingredient of Vicks VapoRub (thymol, camphor, menthol, oil of Eucalyptus) Use of oral antifungal agent within the past year Deformity of the affected nail that would prevent sampling for KOH or culture Deformity of the affected nail that would prevent photographic assessment Negative fungal culture
Primary Endpoint	Mycological cure at 48 weeks <ul style="list-style-type: none"> <li>• KOH test negative</li> <li>• Fungal culture negative</li> </ul> Clinical Cure (clearance of dystrophic nail) at 48 weeks <ul style="list-style-type: none"> <li>• Gross appearance of the nail analyzed</li> <li>• Quantified though PhotoShop software (counted the pixels to calculate total nail area and affected nail area)</li> </ul>
Secondary Endpoint	Patient satisfaction with appearance of affected nail <ul style="list-style-type: none"> <li>• Likert Scale (1=very satisfied; 5=very dissatisfied)</li> </ul>
Statistical Analyses	Paired t-test (parametric data) Fisher's exact test (non-parametric data; when N=20-40)

RESULTS																													
Enrollment / Assignment	40 enrolled initially 20 met inclusion criteria (other 20 had negative fungal culture from their initial visit)																												
Withdrawal or lost to f/u	2 18 = # of total participants after exclusions and withdrawals																												
Baseline Characteristics	<table border="1"> <thead> <tr> <th>Male</th> <th>Female</th> <th>Mean Age</th> <th>Initial degree of nail involvement</th> <th>Causative Organism</th> </tr> </thead> <tbody> <tr> <td>56%</td> <td>44%</td> <td>Mean: 46 Median: 50.5 Modal: (Bimodal) 37, 52 Range: 30-85</td> <td>Mean: 62.7% Median: 62% Mode: (Bimodal) 89%, 100% Range: 16-100%</td> <td>Trichophyton rubrum (33%) Trichophyton mentagrophytes (17%) Candida parapsilosis (17%)</td> </tr> </tbody> </table> <p>Fairly equal balance of men / women Ages slightly younger than would expect (expect to see more in their 60-70's) Most participants had &gt;50% nail involvement at outset Most common organisms in the participant sample are ones most commonly seen in the general population</p>	Male	Female	Mean Age	Initial degree of nail involvement	Causative Organism	56%	44%	Mean: 46 Median: 50.5 Modal: (Bimodal) 37, 52 Range: 30-85	Mean: 62.7% Median: 62% Mode: (Bimodal) 89%, 100% Range: 16-100%	Trichophyton rubrum (33%) Trichophyton mentagrophytes (17%) Candida parapsilosis (17%)																		
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Monitoring	Photographs taken at 4, 8, 12, 24, 36, and 48 weeks 5/18 seen at every f/u visit 13/18 missed about 2 visits on average # of patients that applied Vick's daily as instructed = 15/18 (majority) # of patients that applied Vick's 3-5 times per week = 3/18																												
Results: Primary Endpoints	<p>Mycological Cure at 48 weeks:</p> <table border="1"> <tr> <td>Yes</td> <td>5</td> </tr> <tr> <td>No</td> <td>15</td> </tr> </table> <ul style="list-style-type: none"> <li>5/15 (=27.8%) had mycologic cure</li> </ul> <p>Clinical Cure at 48 weeks:</p> <table border="1"> <thead> <tr> <th></th> <th>Total</th> <th>Trichophyton metagrophytes</th> <th>Candida parapsilosis</th> <th>Trichophyton rubrum</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Complete</td> <td>5</td> <td>3</td> <td>2</td> <td>0</td> <td>0</td> </tr> <tr> <td>Partial</td> <td>10</td> <td>0</td> <td>1</td> <td>5</td> <td>4</td> </tr> <tr> <td>No Change</td> <td>3</td> <td>0</td> <td>0</td> <td>1</td> <td>2</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>13/15 (=83%) had a positive response to treatment</li> <li>Decrease in avg ratio of affected to total nail area 63% (start) → 41% (end); p&lt;0.001, Paired t-test</li> </ul>	Yes	5	No	15		Total	Trichophyton metagrophytes	Candida parapsilosis	Trichophyton rubrum	Other	Complete	5	3	2	0	0	Partial	10	0	1	5	4	No Change	3	0	0	1	2
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Results: Subgroup Analysis	<p>Subgroup analysis (not pre-specified, which author did point out)</p> <ul style="list-style-type: none"> <li>Ended up doing a composite with Trichophyton metagrophytes and Candida parapsilosis (the 2 organisms that had the most success with the type of treatment) VS all other organisms</li> </ul> <p># showing clinical cure: Trichophyton metagrophytes or Candida parapsilosis vs all other organisms</p> <ul style="list-style-type: none"> <li>5/5 vs 0/13; p&lt;0.001, Fisher's Exact test</li> </ul>																												

	<p># showing mycologic cure: Trichophyton mentagrophytes or Candida parapsilosis vs all other organisms</p> <ul style="list-style-type: none"> <li>• 4/5 vs 1/13; p=0.008, Fisher's Exact test</li> </ul> <p># highly satisfied: Trichophyton mentagrophytes or Candida parapsilosis vs all other organisms</p> <ul style="list-style-type: none"> <li>• 5/5 vs 4/13; p=0.029, Fisher's Exact test</li> </ul>
<b>AUTHORS' CONCLUSIONS</b>	
<p>"Vicks VapoRub provides a positive effect in the treatment of onychomycosis" (p. 71), but additional studies are needed to verify these findings.</p> <p>Strong association between organism and success of treatment (Trichophyton mentagrophytes and Candida parapsilosis, vs all other organisms) but statistical significance not concretely established because this was based on subgroup analysis not pre-specified or controlled for with alpha spending functions</p>	
<b>STRENGTHS / LIMITATIONS</b>	
<p>Strengths:</p> <ul style="list-style-type: none"> <li>• Studied an agent that is over-the-counter, inexpensive, and relatively benign in terms of SE</li> <li>• Has potential to set the stage for more robust studies in how to best treat onychomycosis</li> <li>• Very applicable to the geriatric population due to higher prevalence</li> </ul> <p>Author reported strengths:</p> <ul style="list-style-type: none"> <li>• Simple design</li> <li>• Inexpensive agent</li> </ul> <p>Limitations / Weaknesses:</p> <ul style="list-style-type: none"> <li>• Extrapolation of results obviously limited by study design (not a RCT, no placebo, open label, small number of patients)</li> <li>• How much is a "small amount" (which study participants were instructed to apply? Since this amount is subjective, it could have affected which persons were cured and which were not.</li> <li>• Positive fungal culture required for remaining in the study could have eliminated several potential candidates (poor sensitivity of test) → perhaps should have allowed the option to remain in the study if clinical presentation was convincing enough</li> <li>• Test of cure based on a test that has low sensitivity</li> </ul> <p>Author reported limitations:</p> <ul style="list-style-type: none"> <li>• Small sample size</li> <li>• Lack of control group</li> <li>• Variability of pathogens</li> <li>• Initial degree of nail involvement between participants</li> </ul>	
<b>DISCUSSION / CLINICAL UTILITY</b>	
<p>Is it actually the Vaseline base that is providing moisture to the nails that makes them less friable and contributed to study participants feeling satisfied with the treatment? Would like to see Vaseline (white petrolatum) used as a placebo / control.</p> <p>Findings of the study suggest that Trichophyton mentagrophytes easier to treat compared to Trichophyton rubrum. Unfortunately, T. rubrum is the most common.</p>	

Amber Schilling, PharmD  
August 28, 20XX

**References:**

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2. Newton GD, Popovich NG. Fungal skin infections. In Krinsky DL, et al. *Handbook of Nonprescription Drugs: An Interactive Approach to Self Care*, 17<sup>th</sup> Ed. American Pharmacists Association: Washington, D.C.: 2012.
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9. Derby R, Rohal P, Jackson C, Beutier A, Olsen C. Novel treatment of onychomycosis using over-the-counter mentholated ointment: a clinical case series. *J Am Board Fam Med*. 2011; 24(1): 69.