

1. Urea 45% Ointment

- Uses: nail removal (non-surgical), softening of nail and skin
 - > Keratolytic agent
 - > Degrades protein, including keratin a major component of the nail plate
 - > Softens the nail plate, making it porous and penetrable to topical antifungal meds¹
- Warnings/Precautions: known hypersensitivity
- Adverse Reactions: transient stinging, burning, itching or irritation may occur
- Usual Dosage: Apply 1 to 3 times daily (most common twice daily)
- Discontinue if redness or severe irritation occurs.² Can combine with Fluconazole if needed.

2. Fluconazole 1 - 5% in DMSO Topical Nail Solution (alcohol base also available)

- Use: onychomycosis (toenail fungus)
 - > Fluconazole is a triazole antifungal that inhibits fungi cell membrane formation
- Warnings/Precautions: known hypersensitivity (cross-reaction with other azole antifungals may occur)
- Adverse Reactions: rash²
- Usual Dosage: Apply to affected nails once or twice daily until nail grows out clear
- Use until nail grows out. Apply soon after bathing and drying for best penetration. No concerns about liver like with oral antifungal treatment. Treatment can take months to complete. Can be dispensed in a nail brush bottle or dropper bottle.

3. Fluconazole 1%/Terbinafine 1.67% in DMSO Nail Suspension (alcohol base also available)

- Use: onychomycosis (toenail fungus)
 - > Fluconazole is a triazole antifungal that inhibits fungi cell membrane formation
 - > Terbinafine is an allylamine antifungal that weakens fungi cell membranes
- Warnings/Precautions: known hypersensitivity to either component
- Adverse Reactions: rash, pruritus, urticaria²
- Usual Dosage: Apply to affected nails up to twice daily until nail grows out clear
- Use until nail grows out. Apply soon after bathing and drying for best penetration. No concerns about liver as with oral antifungal drugs and reduces potential for drug interactions. Treatment can take months to complete. Can be dispensed in a nail brush bottle or dropper bottle.

4. Itraconazole 1%/Ibuprofen 2% in DMSO Nail Suspension (alcohol base also available)

- Use: onychomycosis (toenail fungus)
 - > Itraconazole is a triazole antifungal that inhibits fungi cell membrane formation²
 - > Ibuprofen has antifungal activity as well as anti-inflammatory^{3,4}

- Warnings/Precautions: known hypersensitivity to either component; pregnancy or intended pregnancy
- Adverse Reactions: Rash, pruritus, skin irritation²
- Usual Dosage: Apply to affected nails up to twice daily until nail grows out clear
- No concerns about liver as with oral antifungal treatment and reduces potential for serious drug interactions. Can be dispensed in a nail brush bottle or dropper bottle.

5. Ketoconazole 2% in DMSO Nail Solution (alcohol base also available)

- Use: onychomycosis (toenail fungus)
 - > Ketoconazole is an imidazole antifungal that inhibits permeability of fungi cell walls, increases hydrogen peroxide concentrations in fungi by inhibiting multiple enzymes, and inhibits androgen synthesis, broad spectrum activity
- Warnings/Precautions: known hypersensitivity (cross-reaction with other azole antifungals may occur), coadministration with ergot derivatives and triazolam (potential for fatal arrhythmias)
- Adverse Reactions: pruritus²
- Usual Dosage: Apply to affected nails once to twice daily until nail grows out clear
- No concerns about liver as with oral antifungal treatment and reduces potential for serious drug interactions. Can be dispensed in a nail brush bottle or dropper bottle.

6. Thymol 2 - 5% in ethyl alcohol Topical Solution

- Use: chronic paronychia (inflammatory infection around the nails)
 - > Thymol is a phenol extracted from thyme oil and has antifungal and antibacterial activity⁵
 - > Alcohol reduces moisture in the cuticles
- Warnings/Precautions: known hypersensitivity to thymol or thyme, pregnancy or intended pregnancy
- Adverse Reactions: burning sensation, pruritus, erythema⁵
- Usual Dosage: Apply to affected nail/area twice daily, one to four drops each dose
- Dispensed in a dropper bottle. Protect from sunlight. Keep treated area as dry as possible during treatment.

7. Thymol 2 - 4%/Clobetasol 0.05% in ethyl alcohol/water (clobetasol can be substituted)

- Use: chronic paronychia (inflammatory infection around the nails)
- Warnings/Precautions: known hypersensitivity to either component or thyme, pregnancy or intended pregnancy
- Adverse Reactions: burning sensation, pruritus, erythema⁵
- Usual Dosage: Apply to affected nail/area twice daily, one to four drops each dose
- Dispensed in a dropper bottle.

8. SSA 17%/5FU2%/CIM2%/DDG0.2% (Salicylic Acid, Fluorouracil, Cimetidine, Deoxy-D-Glucose)

- Use: wart removal
 - > Deoxy-D-Glucose exhibits antiviral properties and is an inhibitor of protein glycosylation. It is hypothesized that this mechanism leads to a defective replication function of the virus.⁶
 - > Cimetidine is reported to exhibit immunomodulatory activity^{7,8}
- Warnings/Precautions: Broken or inflamed skin, pregnancy, dihydropyrimidine dehydrogenase (DPD) enzyme deficiency, hypersensitivity to any of the ingredients
- Usual Dosage: Apply to affected area twice daily and cover with tape as directed⁹
- Comments: Wash hands thoroughly after each use. Clean application site well and dry, wait ten minutes before applying. Treated areas may be unsightly during therapy and, usually, for several weeks following end of therapy. Dispensed in a syringe.

9. CIM 10%/DDG 0.2%/IBU 2% (Cimetidine, Deoxy-D-Glucose, Ibuprofen in Lipoderm)

- Use: wart removal (plantar warts)
 - > Deoxy-D-Glucose exhibits antiviral properties and is an inhibitor of protein glycosylation. It is hypothesized that this mechanism leads to a defective replication function of the virus.⁶
 - > Cimetidine is reported to exhibit immunomodulatory activity^{7,8}
- Warnings/Precautions: Broken or inflamed skin, known hypersensitivity to any component, pregnancy or breastfeeding
- Adverse Reactions: pruritus, skin irritation, rash
- Usual Dosage: Apply to affected area twice daily and cover with tape as directed⁹
- Comments: Wash hands thoroughly after each use. Clean application site well and dry, wait ten minutes before applying. Dispensed in a syringe.

10. Pyruvic Acid 70% in Flexible Collodion

- Use: wart removal
 - > Pyruvic acid (PA) is an alpha-hydroxy acid with potent keratolytic properties¹⁰
 - > Flexible collodion forms a protective coating over the treated area and helps keep pyruvic acid in contact with the wart
- Warnings/Precautions: warts with hair growing from them or warts on mucous membranes
- Adverse Reactions: desquamation, crusting, stinging or burning sensation, inflammation, blistering, scarring (see comments)
- Usual Dosage: Apply to wart(s) nightly and cover with a bandage or tape as directed
- Comments: Apply with a cotton swab or toothpick. Caution in patient selection when prescribing. Overuse or improper application of Flexible Collodion can cause scarring, especially in younger skin.¹¹

11. SSA 30%/Lactic acid 10% in Flexible Collodion

- Use: wart removal
 - >Salicylic acid and lactic acid are keratolytic agents that causes the wart to gradually peel off

> Flexible collodion forms a protective coating over the treated area and helps keep pyruvic acid in contact with the wart

- Warnings/Precautions: hypersensitivity to salicylates, broken or inflamed skin, signs of infection
- Adverse Reactions: slight burning, skin redness, peeling
- Usual Dosage: Apply to affected area(s) twice daily
- Comments: Apply with a cotton swab or toothpick. Caution in patient selection when prescribing. Overuse or improper application of Flexible Collodion can cause scarring, especially in younger skin.¹¹

12. SSA 30%/Lactic acid 10%/Trichloroacetic acid 5% in Flexible Collodion

- Use: wart removal
> Trichloroacetic acid (TCA) added as an additional keratolytic agent.
- Adverse Reactions: slight burning, skin redness, peeling, hyperpigmentation
- Usual Dosage: Apply to affected area(s) once to twice daily
- Comments: TCA may cause a slight white frosted look to appear at the application site. TCA at the 5% concentration results in a light peel with no penetration below the stratum granulosum.¹² Apply with a cotton swab or toothpick. Caution in patient selection when prescribing. Overuse or improper application of Flexible Collodion can cause scarring, especially in younger skin.¹¹

13. Methenamine 5% Topical Lotion or Gel

- Use: hyperhidrosis/foot odor
>Methenamine releases formaldehyde in the presence of acid, in the case of hyperhidrosis it is acidic eccrine sweat. The released formaldehyde causes eccrine duct blockage in the stratum corneum.^{13, 14}
- Adverse Reactions: pigmentation, scaling, dermatitis
- Usual Dosage: Apply to affected area(s) each evening and let it dry or Apply once daily to plantar surface as directed
- Comments: Methenamine is safe and effective with little chance of side effects.

14. Methenamine 5%/Benzalkonium Chloride 2% Topical Solution

- Use: hyperhidrosis/foot odor
> Benzalkonium Chloride added to methenamine as a topical antiseptic when infectious disease believed to be present.

15. Ibuprofen 20% Topical Lipoderm

- Uses: inflammation/pain, plantar fasciitis
- Usual Dosage: Apply to affected area(s) every 6 to 8 hours as needed

16. Piroxicam 5% Topical Lipoderm

- Uses: inflammation/pain, plantar fasciitis
- Usual Dosage: Apply to affected area(s) once to twice daily as needed

17. IBU 20%/Pirox 1%/Cyclo 1% (Ibuprofen, Piroxicam, Cyclobenzaprine in Lipoderm)

- Uses: inflammation/pain, plantar fasciitis
- Usual Dosage: Apply to affected area(s) twice to three times daily as needed

References

1. http://www.medscape.com/viewarticle/452687_8 (accessed Oct. 28, 2014)
2. Lexi-Comp, Inc. (Lexi-Drugs®). Lexi-Comp, Inc.; October 28, 2014.
3. Pina-Vaz C, Sansonetty F, Rodrigues AG, Martinez-De-Oliveira J, Fonseca AF, Mardh PA. Antifungal activity of ibuprofen alone and in combination with fluconazole against *Candida* species. *J Med Microbiol*. 2000 Sept;49(9):831-40.
4. Pina-Vaz C, Goncalves Rodrigues A, Costa-de-Oliveira S, Ricardo E, Mardh PA. Potent synergic effect between ibuprofen and azoles on *Candida* resulting from blockade of efflux pumps as determined by FUN-1 staining and flow cytometry. *J of Antimicrob Chemother*. 2005;56:678-85.
5. Olaizola C, Pérez C, Mata-Essayag S, et al. Experience with thymol in chloroform solution for the treatment of paronychia. *Mycopathologia*. 2005 Feb;159(2):209-11.
6. Leung HJ, Duran EM, Kurtoglu M, Andreansky S, Lampidis TJ, Mesri EA. Activation of the unfolded protein response by 2-deoxy-D-glucose inhibits Kaposi's sarcoma-associated herpesvirus replication and gene expression. *Antimicrob Agents Chemother*. 2012 Nov;56(11):5794-803.
7. Mullen B, Guiliana J, Nesheiwat F. Cimetidine as a first-line therapy for pedicel verruca. *J Am Podiatr Med Assoc*. 2005;95(3):229-34.
8. Mitsubishi T, Iida K, Kawana S. Cimetidine treatment for viral warts enhances IL-2 and IFN-gamma expression but not IL-18 expression in lesional skin. *Eur J Dermatol*. 2003 Sep-Oct;13(5):445-8.
9. Focht DR 3rd, Spicer C, Fairchok MP. The efficacy of duct tape vs cryotherapy in the treatment of verruca vulgaris (the common wart). *Arch Pediatr Adolesc Med*. 2002 Oct;156(10):971-4.
10. Halasz CL. Treatment of warts with topical pyruvic acid: with and without added 5-fluorouracil. *Cutis*. 1998 Dec;62(6):283-5.
11. Donaldson MR, Stetson CL. Hypertrophic scarring after treatment with fluorouracil, 2%, in pyruvic acid, 98%, for verruca vulgaris. *Arch Dermatol*. 2010 Feb;146(2):213-4.
12. Slavin JW. Trichloroacetic acid peels. *Aesthetic Surgery Journal*. 2004;24(5):469-70.
13. Bergstresser PR, Quero R. Treatment of hyperhidrosis with topical methenamine. *Int J Dermatol*. 1976 Jul-Aug;15(6):452-5.
14. <http://www.sweathelp.org/en/treatments-hcp/topical-treatments/astringent-agents.html> (accessed Nov. 25, 2014)