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## A Comprehensive Review on Tinea Infections: Pathogenesis, Diagnosis, Treatment, and Homoeopathic Management

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### **Abstract:**

Tinea infections, caused by dermatophytes, affect the skin, hair, and nails, leading to various clinical manifestations like itching, scaling, and inflammation. This review explores the pathogenesis, clinical features, diagnostic methods, and treatment options for tinea infections, with a focus on Tinea corporis, the most common form. The pathogenesis involves the invasion of the epidermis by dermatophytes, triggering an inflammatory immune response, with factors such as host immunity and environmental conditions influencing disease progression. The review also highlights the different types of tinea infections, their clinical presentation, and the factors increasing their prevalence, particularly in tropical regions. Diagnosis is mainly clinical, supported by dermoscopy, microscopic examination, and fungal culture. Standard treatments include topical and systemic antifungal therapies, though resistance and treatment failures remain challenges. Additionally, the review examines the potential role of homoeopathic remedies in managing tinea infections, offering individualized treatment options based on patient symptoms and constitutional characteristics. This comprehensive analysis provides insights into both conventional and alternative approaches to managing dermatophyte infections effectively.

**Keywords:** Tinea infection, Dermatophytes, Homoeopathic management

### **Introduction**

Dermatophytes are a group of fungi that infect and multiply in keratinized tissues, such as the skin, hair, and nails, leading to various skin infections.<sup>(1)</sup> These infections are commonly referred to as tinea or dermatophytosis.<sup>(8)</sup> Tinea infections are superficial, affecting the outer layer of the skin, and are caused by fungi from the *Trichophyton*, *Microsporum*, or *Epidermophyton* genera.<sup>(1)(2)</sup> These dermatophytes invade the keratinized epithelial layer, causing inflammation, itching, and other symptoms characteristic of dermatophytosis.<sup>(1)(2)</sup>

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- **PATHOGENESIS<sup>(8)</sup>**

When a dermatophyte infects the skin, it triggers the up regulation of specific genes in the pathogen that are essential for infection, leading to the release of mycotic virulence factors. This, in turn, activates the host's inflammatory defense mechanisms. Dermatophytes typically penetrate the skin through hair follicles, reaching the dermis and upper subcutis, but they rarely invade deeper tissues or internal organs. The host's response to the infection depends on both the dermatophyte species (or even strain) and the host's immune defenses. Zoophilic and geophilic dermatophytes often provoke stronger inflammatory reactions compared to anthropophilic species. Additionally, factors such as the patient's age, sex, immune status, and possibly genetic predisposition influence the nature of the host's defense response. The body's defense against the infection involves keratinocytes, defense cells, antimicrobial factors, and both unspecific and specific immune responses, all working together to combat the pathogen.

- **FACTORS INCREASING THE PREVALENCE<sup>(9)</sup>**

Dermatophytes thrive in hot and humid environments, leading to a rise in infections in many tropical and developing countries. India, in particular, has seen a significant increase in chronic and recurrent dermatophyte infections, largely due to the country's tropical and subtropical climate, which provides an ideal environment for these fungi. Additionally, factors such as overcrowding, shared living spaces, and rapid urbanization have further contributed to the growing prevalence of dermatophytosis.

FACTORS INCREASING PREVALENCE <sup>(9)</sup>	Hot and humid climate
	Tropical and subtropical climate
	Overcrowding
	Shared living space
	Rapid urbanization

Fig 1: Factors increasing prevalence

- CLASSIFICATION OF TINEA <sup>(9)</sup>

**1. Tinea capititis:** There are three varieties which includes scaly variety (commonest) , kerion variety and black- dot variety. Scaly variety has salient features are circular patch or patches of partial alopecia with greyish scaling, broken lustreless stumps of hairs. Kerion variety are small boil-like lesions at beginning with little oozing and no pus. This later is red, painless, boggy swellings are present. The lesion of kerion variety are irregularly distributed on the scalp along with the areas of partial alopecia. Black-dot variety, in which mycelia of the fungus grow inside the hair: the hair breaks off flush with the surface of the skin, thereby producing the appearance of black dot. In this variety, alopecia may be complete but black dots can be seen at peripheral of the lesion.

**2. Tinea barbae:** This is characterized by scaling or vesiculo-pustules present in patch or patches with peripheral inflammation and accompanied by itching. Commonly seen among farm workers.

**3. Tinea corporis:** Commonest and typical variety of fungus affection of skin which is characterised by marked itching, one or more circular, sharply demarcated from the surrounding skin. Affected shows vesicles, pustules or scaling with inflammation at peripheral area of lesion and centre area with tendency of clearing.

**4. Tinea cruris:** This type is mostly prevalent in summer season commonly affecting toes or nails. This starts as small circinate lesions with marked itching which grows and becomes well-defined patch or patches of scaling, vesicles and pustules with inflammation marked at lesion's periphery.

**5. Tinea unguium:** Also called as onychomycosis affecting one or more nails characterized by opaque, brittle and deformed nail or nails and hyperkeratotic debris under the free edges. Here, no pain and no itching present.

**6. Favus:** This occurs in overcrowding and unhygienic environment, particularly when these conditions are accompanied by rat infestation. Favus has features such as yellowish cup-shaped crusts embedded in the depressions on the skin, mousy odour, and secondary cicatrical alopecia. Affecting mostly scalp and rarely skin of the trunk, neck and nails.

- **DIAGNOSIS<sup>(8)</sup>**

- **Clinical Diagnosis:** Tinea corporis is typically diagnosed clinically, characterized by a well-demarcated, erythematous, annular (ring-shaped), scaly plaque with a raised leading edge and central clearing.
  - **Dermoscopy and Reflectance Confocal Microscopy:** Dermoscopy can reveal characteristic findings such as white scales, dotted vessels, and "moth-eaten" scale. Reflectance confocal microscopy can show branching fungal hyphae over the erythematous, annular patch.
  - **Microscopic Examination (KOH Test):** Potassium hydroxide (KOH) wet mount preparations of skin scrapings can confirm the diagnosis by visualizing septate hyphae and arthroconidia under a microscope.
  - **Fungal Culture:** If needed, fungal culture is the gold standard for diagnosing dermatophytosis, especially in uncertain cases or when the infection is widespread or unresponsive to treatment. It helps differentiate fungal species but can take 7– 14 days for results.
- **TREATMENT<sup>(10)</sup>**

1. **Topical Antifungal Therapy:** The first-line treatment for localized tinea corporis is the use of topical antifungals (e.g., terbinafine, naftifine, clotrimazole, miconazole), applied once or twice daily for 2–4 weeks. These are generally well- tolerated with rare

side effects such as contact dermatitis.

2. **Systemic Antifungal Therapy:** For extensive, deep, recurrent, or chronic cases, or in immunocompromised patients, oral antifungal medications (e.g., terbinafine, itraconazole, fluconazole) are used. The treatment duration typically ranges from 2–4 weeks, depending on the response.
3. **Combination Therapy:** Combining topical and oral antifungal treatments may be more effective, especially for severe or recalcitrant cases, potentially improving cure rates.
4. **Treatment Failures and Resistance:** Factors like poor compliance, reinfection, and drug resistance (e.g., terbinafine resistance) can lead to treatment failure. Terbinafine resistance is often linked to mutations in the fungal gene responsible for ergosterol synthesis.

#### • COMPLICATION<sup>(10)</sup>

1. **Secondary Bacterial Superinfection:** Scratching and skin abrasion caused by itching can lead to secondary bacterial infections, further complicating the condition.
2. **Post-inflammatory Pigmentation:** Tinea corporis can lead to changes in skin pigmentation, resulting in hypopigmentation (lighter skin) or hyperpigmentation (darker skin) after the infection resolves.
3. **Dermatophytid (Id) Reaction:** This is a secondary dermatitic eruption that may occur during or after systemic antifungal treatment, characterized by widespread, pruritic, erythematous, scaly papules or pustules, likely due to a hypersensitivity reaction to the fungal antigens.

#### • HOMOEOPATHIC MANAGEMENT<sup>(3)</sup>

Homoeopathic treatment is based on a thorough investigation of the patient's physical and mental status to form the totality of symptoms for individualization. By applying the principle of similia, the most effective and indicated medicine is selected to treat dermatophyte infections. Homoeopathic remedies have been proven to improve person, leading to a successful cure.

There are some homoeopathic remedies mentioned below which the study has done previously.

- **Sulphur:** It is a great antipsoric homoeopathic remedy used frequently for treating dermatophyte infections, patients complaining of dry, dirty, scaly unhealthy skin with itching, scratching caused burning sensation, pimply eruptions, pustules, hang-nails, excoriation especially folds areas, scalp dry with falling of hairs, aggravation from washing, from the heat of bed, sometimes relapsing of skin complaints, many time observed skin affections that have been treated for long period by medicated soaps and wash, with other associated constitutional symptoms have been cured.
- **Rhus toxicodendron:** It is also a great useful remedy for treating dermatophyte infection, patients with complaints of red circular swollen, intense itching, and burning eczematous eruptions with a tendency to scale formation. Also sometimes recurrent bacterial infection characterized by a large red patch on the skin of the body, vascular lesion, cellulitis, herpes-like eruption mostly worsen during rainy weather, at rest, at night, in rest condition and ameliorated in dry weather, rubbing, warm application applied with associated constitutional symptoms will be useful.
- **Sepia:** This remedy is selected when patients having complaints of circular patches, itching, and swelling of skin at various parts of the body, which is not

ameliorated by scratching, apt to cause burning. Soreness of skin and itching in bends of joints, with itching on other area. The eruptions prominently behind the ears and on the eyelids are herpes-like eruptions. It can also be useful in itching of the hands and feet, ring-shaped lesions in various parts of the body having an offensive odor, and complaints that worsen with friction, touching, cold weather, rest, and at night.

- **Thuja occidentalis:** This remedy is recommended for treating dermatophyte infections and patients with unhealthy dirty brownish colour of the skin, mottled spots on the skin, scaly, dry eruptions on the skin. Eruptions burn violently after scratching. Eruptions are present on covered parts only. Pustular eruptions face skin waxy and greasy, and genital folded areas lesions which aggravates from cold damp air, from the heat of the bed, and motion, relieved from drawing up limbs, left side.
  
- **Graphites:** It is an effective remedy for various skin conditions. Its symptoms are quite evident, including moist scabby eruptions on the scalp, face, bends of joints, between fingers, and behind the ears. It also causes cracking, bleeding, and oozing of a thick, and tenacious discharge from the corners of the mouth and eyes. It is useful for dry and scaly skin, hair loss, and skin eruptions with a tendency to malignancy for instance pimples, keloids, fibromas, eczema, acne, cancer of the breast, and hard and old, painful cicatrices. Skin complaints tend to aggravated during bed warmth at night, during weather changes, and before and during menstruation. However, they are better in the dark, from wrapping up, and by exposure to open air.
  
- **Psorinum:** Psorinum is a highly effective remedy for chronic skin conditions when prescribed with its other constitutional symptoms. It has a dull, dark, and unpleasant appearance of skin , as if it is covered in dirt, and cannot be cleaned

thoroughly. The skin

- is dirty, unhealthy, rough, lumpy, and easily cracked, sometimes causing bleeding. It also becomes scaly and itchy, particularly when the patient is warm or in contact with woollen fabric. After scratching the affected area, it becomes raw and scabby. It is useful of various eruptions such as papules, pimples, crusts, boils, and vesicles that ooze watery moisture. Over time, the crusts and vesicles blend together, leading to thick and hardened skin. Patient is worsen with bathing and when warm in bed.
  
- **Arsenicum iodatum:** This medicine has good role in treating various skin conditions. Some of the common skin conditions that can be treated with this medication are dry and scaly itching skin, as well as marked exfoliation of skin in large scales, which can leave a raw exuding surface beneath. Other conditions such as some herpes circinate on isolated spots on upper parts of the body, with deformity of nails, all complaints are worsen on dampness, sweat, washing, and better by warmth, pressure, from cold bath, sitting cross-legged with associated constitutional symptoms have been a cured.
  
- **Tellurium:** This remedy is of great helpful for tinea infections. This medicine is useful for patients who experience slight inflammation, red spots on the scalp and include ichthyosis, venereal bubo, debilitating night sweats, eczema of the beard with watery oozing, and itchy - and gets aggravated on washing.
  
- **Mascanella:** This medicine is helpful for various skin diseases. Skin complaints include dermatitis with excessive vesiculation, oozing of sticky serum and crust formation, erythema, vesicles, blisters, as from scalds, heavy brown crusts and

scabs, erysipelas.

- **Rhus venenata:** It is indicated in skin diseases where patient complaints itching, vascular inflammation red patches of skin, many rashes on the skin, skin is dark red, erythema nodosum, itching relieved by applied on hot water.
- **Tuberculinum:** This medicine is also indicated for ringworm infection, patients having symptoms of patches of skin which is rough and inflamed with blisters that causes intense itching and sometimes bleeding, bran like scales, infolds of skin with rawness and soreness sensation, fiery redskin. This complaints are better by cool wind, open air, motion. worse at night when undressing, from bathing.
- **Bacillinum:** Bacillinum is an useful indicated remedy for fungal infections such as ringworms of the scalp, groin, and other areas of the body. It produces ringworm and pityriasis vesicularis all over the skin on the body. Patient is aggravated at night, while lying down in bed, in the early morning, or in cold air. Symptoms may relieved with warmth.
- **Antimoinum crudum:** In skin complaints, patient complains about skin becoming very thick and dirties at various places. In Antim crud, there is a tendency for abnormal growth of skin. Nails of the fingers crack, grow in and can split and also have warts and horny spots. Eczema associated with gastric derangements. Skin complaints include pimples, vesicles and pustules, urticaria, measles-like eruptions. Itching aggravated by warmth of bed. Pustular eruptions with burning and itching and dry skin, worsen at night. Effective for the cracked and fissured corners of the mouth. The skin is very dirty and unhealthy.

- **Anagallis:** This homoeopathic remedy is marked effective on the skin. It is often used to treat skin disease with itching and dryness, as well as bran-like eruptions. Anagallis is useful where the vesicles and swellings that occur on folded joints, especially on the hands and fingers.

- **HOMOEOPATHIC REMEDIES FROM HOMEOPATHIC MATERIA MEDIA BY W. BOERICKE.** <sup>(13)</sup>

1. **SULPHUR:** Dry, scaly, unhealthy; every little injury suppurates. Itching, burning: worse scratching and washing. Pruritus, especially from warmth, in evening, often recurs in spring-time, in damp weather.
2. **BACILLINUM:** Ringworm: pityriasis. Glands of neck enlarged and tender. Worse at night and early morning, cold air.
3. **SEPIA:** Itching not relieved by scratching; worse in bend of elbows and knees. Ringworm like eruptions in spring.
4. **TELLURIUM:** Itching of hands and feet. Herpetic spots; Ringworm. Ring shape lesions, offensive odors from affected parts. Barber's itch.

- **HOMOEOPATHIC REPERTORY** <sup>(16)</sup>

**Synthesis repertory:**

1. **SKIN-Eruptions-herpetic- circinate**
2. **SKIN-Eruptions-ringworm**
3. **SKIN-**  
**Eruptions\_dermatomycosis**

**Boericke repertory:**

1. SKIN-Tinea favosa,favus
2. SKIN-Trichophytosis-ringworm
3. SKIN-Tinea versicolor(chromophytosis)

**Phatak repertory:**

1. R-Ringworm all over body

**CONCLUSION:**

Tinea infections, prevalent in tropical regions like India due to favorable climates and urbanization, present significant treatment challenges, including drug resistance. Homoeopathic remedies, tailored to individual symptoms, offer promising alternatives or complements to conventional antifungal therapies.

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