

Thesole Truth: Understanding and Managing Corns on The Sole

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Abstract:

Background: Corns, or *clavi*, are localized areas of thickened skin that form due to repeated friction or pressure, often on the soles of the feet. They are a common dermatological concern and can significantly impact mobility and quality of life. **Prevalence:** General Population: Studies indicate that corns and calluses affect approximately 14–48% of individuals, with variations based on age, occupation, and footwear habits⁽¹⁾. Older Adults: Among individuals aged 65 and above, the prevalence of hyperkeratotic lesions, including corns, ranges from 20% to 65%, with higher rates observed in those with specific foot deformities or chronic conditions⁽²⁾. Athletes and Active Individuals: Corns are prevalent in populations engaged in repetitive physical activities, such as athletes, due to increased mechanical stress on the feet⁽³⁾. Homeless Populations: In homeless individuals, the prevalence of corns and calluses ranges from 7.7% to 57%, often due to inadequate footwear and prolonged periods of standing or walking⁽⁴⁾.

Introduction: Corns are small, hard, thickened patches of skin caused by repeated pressure or friction, usually on the tops or sides of toes and the balls of the feet, and can be painful.

Materials and Methods: Literature search was done from standard authenticated text books, Homeopathic books, research data bases.

Result: summary of the case: A 51-year-old female software employee presented with painful hard corns on the soles for 7 months, associated with pressing, tearing, and pulsating pain, worse from standing, walking, and wearing shoes, disturbing her sleep especially in the evening and night. She had a past history of chronic acidity and flatulence, particularly after onions, beans, and cabbage, along with constipation and unsatisfactory stools. She also reported craving for sweets and disturbed sleep with anxious dreams. On the mental plane, she showed lack of confidence at work, anxiety before tasks, irritability and a domineering attitude at home, and was sensitive to criticism. On local examination, tenderness was noted on pressure over the corns. Considering the totality of symptoms (gastrointestinal, mental, and particular complaints), the remedy **Lycopodium clavatum, 30C** was selected, which is known to cover her characteristic features and is indicated in cases of painful corns with associated digestive and psychological symptoms.

Conclusion: This case illustrates that individualized homeopathic management, including the administration of Lycopodium, in treating corns on the sole.

Keywords: Corns, Soles of the foot, Hyperkeratotic lesions, Risk factors, Pain, Case report, Foot care, Homeopathic management, Lycopodium.

I. Introduction

CORN - A corn—also called a clavus, heloma, or focal intractable plantar hyperkeratosis⁽⁵⁾. Corn is a localized hyperkeratosis of the skin⁽⁶⁾. It is a circumscribed horny thickening, cone-like in shape with its apex pointing inwards and the base at the surface. Being circumscribed it is palpable as a nodule. This occurs at the site of friction and often spontaneously disappears when the causing factor is removed. Histologically it is composed of keratin masses with intact basal layers. It is often caused by ill-fitting and tight shoes chiefly affecting feet and toes. It usually occurs at the sites of pressure, e.g., on the sole and toes⁽⁷⁾. There is usually a horny induration of the cuticle with a hard centre. A corn may be painful, particularly when it is rubbed. A corn has a deep central core which reaches the deeper layers of dermis⁽⁶⁾.

Objectives:

1. To explore the role of homeopathic remedies in the management of corns on the sole, focusing on symptom relief, prevention of recurrence, and improvement in patient comfort.
2. To review existing literature and clinical experiences to highlight the effectiveness, safety, and holistic approach of homeopathy in treating plantar corns.

II. Review of Literature

Embryology of the sole of the foot⁽⁸⁾

Developmental Stages of the Sole of the Foot

Formation of the Lower Limb Bud: The lower limb bud appears in the fourth week of intrauterine life, consisting of a mesenchymal core and surface ectoderm, laying the foundation for foot development.

Foot Plate and Digital Ray Formation: By the fifth week, the limb bud expands into a foot plate with digital rays forming, and apoptosis separates the toes for proper digital architecture.

Rotation of the Lower Limb: By the seventh week, the limb undergoes a 90-degree medial rotation, positioning the extensor surface anteriorly and forming the sole's anatomical position.

Tissue Contributions to the Sole:

- Ectoderm- differentiates into the epidermis, including thickened plantar skin and associated appendages such as sweat glands.
- Mesoderm- gives rise to the dermis, subcutaneous fat, plantar aponeurosis, ligaments, and intrinsic plantar muscles.
- Neural crest cells (neuroectodermal origin) → migrate into the limb bud to form the peripheral nerves, sensory innervation, and autonomic ganglia that provide trophic and functional supply to the sole.

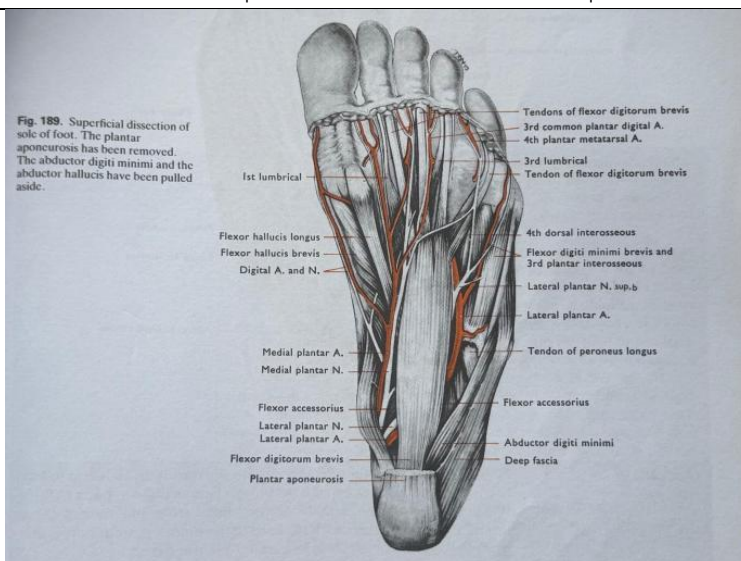
Gross anatomy of the sole of foot

Layers of the sole (superficial to deep)⁽⁹⁾:

1. Skin – Thick, glabrous (hairless) on the plantar surface; contains ridges for grip.
2. Superficial fascia (subcutaneous tissue) – Contains fat pads, especially in the heel and ball of the foot, which cushion impact.
3. Deep fascia (Plantar fascia / aponeurosis) – Dense fibrous layer connecting the heel (calcaneus) to the toes; supports longitudinal arch.
4. Tendons & Ligaments – Tendons of extrinsic muscles (tibialis posterior, flexor digitorum longus) and plantar ligaments.
5. Bones & Joints: Calcaneus, talus, navicular, cuboid, cuneiforms, metatarsals, phalanges.
6. Neurovascular structures: Medial and lateral plantar nerves and arteries, superficial and deep plantar arches.

Muscles – Four intrinsic layers⁽¹⁰⁾

Layer	Muscles	Features
First layer	- Flexor digitorum brevis - Abductor hallucis - Abductor digiti minimi	They cover the whole of the sole
Second layer	- Flexor digitorum accessorius - Four lumbricals - Two tendons (FDL tendon & FHL tendon)	Flexor digitorum accessorius and lumbricals attach to the tendon of flexor digitorum longus
Third layer	- Flexor hallucis brevis - Flexor digiti minimi brevis - Adductor hallucis	- Confined to the metatarsal region of the sole - Two act on big toe, one on little toe
Fourth layer	- Interossei (3 plantar, 4 dorsal) - Tendon of tibialis posterior - Tendon of peroneus longus	They fill up the inter-metatarsal spaces



Applied Anatomy of the Sole:

Weight Bearing & Shock Absorption⁽⁹⁾: The plantar aponeurosis and fat pads absorb shock and distribute forces during movement, preventing micro-trauma.

Maintenance of Foot Arches⁽¹²⁾: Longitudinal and transverse arches are supported by fascia, muscles, and ligaments; arch collapse leads to flatfoot or pes cavus.

Role in Locomotion⁽¹³⁾: Intrinsic foot muscles stabilize toes and aid push-off during gait; weakness causes claw toes and instability.

Neurovascular Considerations⁽¹⁴⁾: The sole is innervated by the tibial nerve, essential for nerve blocks, tarsal tunnel syndrome, and diabetes management.

Surgical & Clinical Importance⁽⁶⁾: Plantar fasciitis, corns, calluses, and sole ulcers in diabetes are common clinical issues with significant morbidity.

Applied Physiology of the Sole⁽¹⁵⁾:

Weight Bearing & Shock Absorption: Plantar fascia and fat pads absorb shock and evenly distribute weight during walking.

Maintenance of Foot Arches: Arches are supported by bones, ligaments, and intrinsic muscles, acting like a spring for efficient locomotion.

Role in Locomotion: The sole provides a rigid lever during push-off; intrinsic muscles stabilize toes for smooth gait.

Sensory & Protective Functions: The sole's sensory receptors help with balance, posture, and protection from harmful stimuli.

Venous Return ("Sole Pump"): The plantar venous plexus acts as a pump, aiding blood return to the heart during standing or walking.

Sole Health Management:

1. Preventive Measures Footwear modification – Properly fitting, cushioned footwear prevents pressure sores, corns, and calluses⁽¹⁶⁾. Weight reduction – Decreases strain on plantar fascia and arches, reducing risk of fasciitis and callosities⁽⁶⁾. Protective padding/orthoses – Silicone pads, insoles, and orthotic supports redistribute pressure in patients with deformities⁽¹⁷⁾.

2. General Care Practices Nail and skin care: Regular trimming and paring of thick calluses prevent trauma⁽¹⁷⁾. Moisturization: Urea-based creams restore skin barrier, preventing cracks⁽¹⁸⁾. Skin protection – Prevention of fissures and secondary infection by keeping skin supple (petroleum jelly, dressings)⁽¹⁶⁾.

3. Lifestyle & Rehabilitation Exercises: Stretching of plantar fascia and intrinsic foot strengthening improve arch support⁽¹⁹⁾.

Different Dermatological Conditions of the Sole :

1. Corns (Clavi): Localized hyperkeratotic lesions with a central hard core, usually painful on pressure. Caused by chronic friction or pressure over bony prominences⁽¹⁷⁾.

2. Calluses : Diffuse hyperkeratotic lesions without a central core. Common in manual laborers and those with ill-fitting shoes⁽¹⁶⁾. 3. Plantar Warts (Verruca Plantaris) : Viral infection (HPV) of sole skin, presenting as painful papules. Distinguished from corns by interruption of skin lines and presence of black dots (thrombosed capillaries)⁽¹⁸⁾.

4. Fissures & Cracks: Due to excessive dryness or keratoderma. Can lead to pain and secondary infection⁽¹⁸⁾.

5. Fungal Infections (Tinea Pedis / Athlete's Foot): Presents with scaling, erythema, itching, and sometimes vesicles. Common in moist environments⁽¹⁸⁾.

CORN: It is a localised hyperkeratosis of the skin. It usually occurs at the sites of pressure e.g. on the sole and toes. There is usually a horny induration of the cuticle with a hard centre. Corn may be painful particularly when it is rubbed. Corn has a tendency to recur after excision. A corn has a deep central core which reaches the deeper layers of dermis⁽⁶⁾.

Types of Corns⁽⁵⁾

There are two main variants of corn: Hard corn ('heloma durum') – This is the most common type of corn, usually located over the lateral and dorsal aspect of the fifth toe as well as on the dorsal aspect of the interphalangeal joints of the lesser toes. "Soft corn or inter digital corn ('heloma molle') – this lesion is a painful hyperkeratotic lesion, primarily seen in the interdigital web spaces, especially the fourth space. This location often leads to maceration of the corn, with sometimes the occurrence of a bacterial or fungal infection or ulceration."

Causes of Corns on the Sole

Mechanical/Pressure-Related Causes: Repeated friction and pressure over bony prominences due to tight shoes, high heels, or prolonged standing cause corns⁽¹⁷⁾.

Anatomical/Structural Abnormalities⁽¹⁶⁾: Deformities like hallux valgus, hammer toes, flatfoot, or pes cavus create abnormal pressure points leading to corn formation.

Dermatological Factors⁽¹⁸⁾: Chronic irritation and trauma cause localized hyperkeratosis and thickening of the skin's outer layer.

Systemic/Contributory Factors⁽⁶⁾: Conditions like obesity, diabetes, peripheral neuropathy, and arthritis alter gait and increase plantar stress.

Occupational and Lifestyle Factors: Jobs or habits involving prolonged standing, walking, or barefoot activity on hard surfaces increase friction and corn risk.

Loss of Plantar Fat Pad (Heel Pad Atrophy): Age-related thinning of the plantar fat pad reduces shock absorption, increasing focal stress and corn formation.

Symptoms of Corns on the Sole : Corns (clavi) usually present as localized, painful, hyperkeratotic lesions on pressure-bearing areas of the sole. The following features characterize their clinical presentation: 1. Pain and Tenderness : Localized pain over the lesion, aggravated by pressure or walking. Relief of pain on removing footwear or pressure⁽¹⁷⁾. 2. Localized Lesion : Well-defined, hard, hyperkeratotic nodule on weight-bearing areas (metatarsal heads, heel, lateral toes). Central hard core may be visible⁽¹⁶⁾. 3. Difficulty in Walking : Altered gait due to pain on pressure points. Patients may limp or avoid weight-bearing on the affected area⁽⁶⁾. 4. Recurrent Nature: Corns often recur unless underlying cause (ill-fitting shoes, deformity, abnormal pressure point) is corrected⁽¹⁷⁾. 5. Absence of Skin Line Disruption: Unlike plantar warts, skin lines (dermatoglyphics) pass through corns, helping clinical differentiation⁽¹⁸⁾.

Investigations for Corns on the Sole

1. **Clinical Examination⁽¹⁷⁾:** Diagnosis is primarily clinical, based on a painful, well-defined hyperkeratotic lesion with a central core, with skin lines passing through.

2. **Radiological Investigations⁽¹⁶⁾:** Foot X-rays help detect underlying bony abnormalities in recurrent or severe cases.

3. **Laboratory Tests⁽⁶⁾:** Blood sugar and other tests are used to rule out diabetes or systemic conditions like neuropathy or arthritis.

4. **Podiatric / Pressure Studies⁽¹⁶⁾:** Pedobarography may be used to identify abnormal pressure points contributing to corn formation.

⁽²⁰⁾ Homoeopathic Approach:

[Murphy] [Feet] CORNS, feet: **Ant-c, Lyc, Ph-ac, phos, Psor, Sep, Sil.**

[Murphy] [Feet] CORNS, feet, Boring: **Nat-m, Ran-s, Sep, Sil**

[Murphy] [Feet] CORNS, feet, Burning: **Ign, Sep**

[Murphy] [Feet] CORNS, feet, Burning, Night: **Nat-m**

[Murphy] [Feet] CORNS, feet, Drawing, Night: **Sep**

[Murphy] [Feet] CORNS, feet, Heels: **Phos,**

[Murphy] [Feet] CORNS, feet, Horny: **Ant-c**

[Murphy] [Feet]CORN, feet, Inflamed: **Sil, Sulph**

[Murphy] [Feet]CORN, feet, Jerks: **Sep**,

[Murphy] [Feet]CORN, feet, Painful: **Sulph**,

[Murphy] [Feet]CORN, feet, Painful: Touched, when: Bry, Cal-c

[Murphy] [Feet]CORN, feet, Pinching: Bar-c,

[Murphy] [Feet]CORN, feet, Pressing: **Lyc, Sulph**,

[Murphy] [Feet]CORN, feet, Pulsating: **Lyc**

[Murphy] [Feet]CORN, feet, Shooting: **Nat-m**

[Murphy] [Feet]CORN, feet, Soles, Horny: **Ant-c**

[Murphy] [Feet]CORN, feet, Sore: **Carb-an, Ign, Lyc, Sil**

[Murphy] [Feet]CORN, feet, Stinging: **Alum, Bry, Calc-c, Calc-s, Nat-c, Nat-m, Rhus-t, Sulph**

[Murphy] [Feet]CORN, feet, Stinging, Rainy weather, Covered in: Bor

[Murphy] [Feet]CORN, feet, Stinging, Walking: Phos

[Murphy] [Feet]CORN, feet, Tearing: **Lyc, Sil, Sulph**

[Murphy] [Feet]CORN, feet, Tearing, Night: Ars

[Murphy] [Feet]CORN, feet, Ulcerated, as if : Am-c, Bor

Case Report:

Preliminary Data:

- Name: Mrs. Xyz
- Age / Sex: 51 years / Female
- Occupation: Software employee
- Marital status: Married
- Date of case taking: 17 March, 2024
- Place: Hyderabad.

Presenting Complaints:

- Painful, hard corns on the soles since 7 months.
- Pain described as pressing, tearing, pulsating.
- Pain worse from standing, walking, and pressure of shoes.
- Pain disturbs sleep in the evening and night.

History of Presenting Complaints:

- Corns appeared gradually over 7 months.
- Initially painless, later developed pain on walking and standing.
- Over time, pain intensity worsened, now severe enough to disturb sleep.
- No discharge, bleeding, or ulceration noted.

Past History:

- Chronic acidity and flatulence after onions, beans, cabbage.
- Constipation, unsatisfactory stools.
- No history of diabetes, hypertension, or major systemic illness reported.

Life Space & Investigations:

- Professionally a software employee, experiences lack of confidence and anxiety before tasks.
- At home, shows irritability and a domineering attitude.
- Sensitive to criticism, gets easily offended.
- Reports disturbed sleep with anxious dreams.
- Craves sweets strongly.

Personal History:

- Diet: Mixed, with craving for sweets.
- Appetite: Good.
- Bowel habits: Constipation, unsatisfactory stools.
- Sleep: Disturbed, anxious dreams.
- Addictions: None reported.

General Physical Examination:

- Build: Moderately nourished.
- Gait: Antalgic due to painful soles.
- Skin: Corns present on soles.
- No pallor, icterus, cyanosis, edema, or lymphadenopathy.

Systemic examination:

- Local: On examination, hard corns noted on soles, tender to pressure.

Vital Signs:

- Pulse: 78/min, regular.
- BP: 124/78 mmHg.
- Temperature: Afebrile.
- Respiration: 18/min.

Differential Diagnosis:

1. Callosity – thickened skin due to friction, usually painless.
2. Corns (Clavus) – localized thickening with central core, painful on pressure.
3. Plantar wart – viral origin, painful, black dots (thrombosed capillaries).

Final Diagnosis:

- Painful corns (Clavi) on soles with characteristic mental, general, and particular symptoms.

Analysis of Symptoms:**Mental Symptoms –**

- Lack of confidence at work.
- Anxiety before tasks.
- Irritability and domineering attitude at home.
- Sensitive to criticism.

Physical Generals –

- Craving for sweets.
- Chronic acidity and flatulence, especially after onions, beans, cabbage.
- Constipation with unsatisfactory stools.
- Disturbed sleep with anxious dreams.

Particulars –

- Painful, hard corns on soles.
- Pain pressing, tearing, pulsating.
- Aggravation: standing, walking, pressure of shoes, evening and night.
- Amelioration: rest.

Evaluation of Symptoms:

- Mental generals (most important): Lack of confidence, anticipatory anxiety, irritability, sensitivity (Grade I).
- Physical generals: Craving sweets, GI complaints, disturbed sleep (Grade II).
- Particulars: Painful corns with modalities (Grade III).

Miasmatic Analysis

- Psora: Anxiety, anticipatory fear, lack of confidence, irritability.
- Sycosis: Chronic corns, digestive disturbances with flatulence and constipation.

Totality of Symptoms:

1. Painful, hard corns on soles with pressing, tearing, pulsating pain; < standing, walking, evening/night.
2. Craving for sweets.
3. Flatulence and acidity, < onions, beans, cabbage.
4. Constipation, unsatisfactory stools.
5. Disturbed sleep with anxious dreams.
6. Lack of confidence, anticipatory anxiety, irritability, sensitive to criticism.

Repertorial Totality

Rubrics selected

- 1).[Kent] [Mind]Confidence, want of self: (52)
- 2).[Kent] [Mind]Anticipation, complaints from: (6)
- 3).[Kent] [Mind]Irritability (see Anger): (245)
- 4).[Kent] [Stomach]Desires:Sweets: (36)
- 5).[Kent] [Rectum]Constipation (see inactivity): inactivity):Insufficient
- 6).[Kent] [Extremities]Corns:Painful: (32)
- 7).[Complete] [Extremities]Corns:Stitching, stinging:Pressure agg.: (1)
- 8).[Kent] [Generalities]Walking:Agg: (150)

Remedy Name	Sulph	Lyc	Bry	Kali-c	Nux-v	Nit-ac	Calc	Nat-m	Calc-s	Sep	Bar-c	Nat-c
Totally	16	14	13	13	12	12	11	11	11	11	10	10
Symptoms Covered	6	7	6	6	6	5	6	6	5	5	6	5
Kinedom												
[Kent] [Mind]Confidence, want of self: (52)	1	2	2	2	1	1	1	1			2	1
[Kent] [Mind]Anticipation, complaints from: (6)		1										
[Kent] [Mind]Irritability (see Anger): (245)	3	3	3	3	3	3	3	3	3	3	2	3
[Kent] [Stomach]Desires:Sweets: (36)	3	3	2	2	1		2	1	2	2	1	2
[Kent] [Rectum]Constipation (see inactivity):Insufficient,incomple...	3	2	2	3	3	3	1	3	1	2	2	3
[Kent] [Extremities]Corns:Painful: (32)	3	2	1	1	1	2	1	1	2	1	2	
[Complete] [Extremities]Corns:Stitching, stinging:Pressure agg.: (1)												
[Kent] [Generalities]Walking:Agg: (150)	3	1	3	2	3	3	3	2	3	3	1	1

Repertorial Result: Lycopodium prominently covered the mental, physical, and particular symptoms.

Remedy Prescription

- **Rx:** Lycopodium clavatum
- **Potency:** 30 c 6doses for 3 days two times in a day
- sac lac - 1 month

Follow-Up	Follow-Up Findings	Prescription
1st Follow-Up (18 apr 2024)	- Pain in corns slightly reduced, but still present.- Sleep quality improved slightly, Flatulence and acidity somewhat better, irritability persists.	Lycopodium clavatum 30C, 6 doses x 3days Sac lac-1 month
2nd Follow-Up (20 may 2024)	- Corn pain significantly reduced, walking easier.- Sleep disturbance much less, Digestion improved, less flatulence, irritability reduced than before.	Lycopodium clavatum 30C, 6 doses x 3days Sac lac-1 month
3rd Follow-Up (20 june 2024)	- Corns softer, pain minimal, tenderness on pressure reduced. bowels satisfactory.- Sleep almost normal.	Lycopodium clavatum 200C, 3 doses x 3 days Sac lac-1 month
4th Follow-Up (18 july 2024)	- Corns greatly improved, pain-free, only mild thickening remains.- Generals good, digestion regular.- Sleep sound, refreshing.	Lycopodium clavatum 200C, 3 doses x 3 days Sac lac-1 month
5th Follow-Up (20 aug 2024)	- Corns almost completely resolved.- No digestive complaints.- Sleep normal.- Mentally much improved.	Sac lac-1 month

6th Follow-Up (20 sept 2024)	- Free from pain and corns. Generals- Good	Sac lac-1 month
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Before treatment

After treatment

Conclusion: Homoeopathy is a holistic system of medicine that aims to treat the individual as a whole. Lycopodium Clavatum is a trimiasmatic polychrest remedy used in treating corns on the soles.

Consent: The authors certify that they have obtained all appropriate patient consent. Orally, the patient has given consent for their clinical information to be reported. The patient understands that their name and initials will not be published, and due efforts will be made to conceal their identity.

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