

A Siddha Management of *Kaalaani* (Corn Foot) using *Uloga Suttigai* (Heated Metal Cauterisation): A Case Report

Case Report

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Abstract

Corn foot is nowadays a common skin problem among people who are subjected to pressure and constant friction from repetitive actions on their feet. It causes psycho-somatic stress on the affected individuals due to the changes in their walking style. On March 16, 2023, the client, a 46-year-old female, came to the Outpatient Department with complaints of thickened skin over the plantar aspect of the right foot, severe pain present while walking for 4 years, and another area of thickened skin appearing over the plantar aspect of the right big toe without pain for 1 year. Through clinical examination, the skin lesions were confirmed to be corn foot. After the diagnosis, the client was advised to do the surgical procedure, heated metal cauterisation (*Uloga suttigai*), as in Siddha. A heated metal robe was strongly held in one hand and applied over the periphery of the lesion site, then towards the center. *Aloe vera* (L.) Burm.f. pulp was placed over the burn site. Using the surgical instruments, the burned tissue was removed until the healthy tissue became visible. Finally, the ulcerated area was cleaned with *padikaara neer* (alum water). Dressing was done with *matthan thylam*. After a regular bandage of the wound for a week, the corn foot completely healed, along with all related symptoms. The recurrence did not happen in the course of a one-year follow-up. To summarize, the case report exhibited that the heated metal cauterisation used in the Siddha is very effective in the management of patients with corn foot, relieving their stress at an affordable cost.

Keywords: *Corn foot*, Dermatology, Heated metal cauterisation, Traditional medicine, *Uloga suttigai*.

Introduction

Corns are one of the popular skin lesions that occur on the plantar surface of the sole and develop in response to excess pressure over a limited area. Corn foot basically refers to a hard center area of localized hyperkeratinization of the skin. The lesion has a broad surface and a narrower, deeper plane, yielding a cone shape. They hurt and are very tender. These are primarily hard corn. There may be soft corn between the toes (1).

Foot corn can arise from many different causes, such as wearing high heels or tight shoes, not using socks, being overweight, bunion formation, hammer toes, and foot deformities like bone spurs. It can also be caused by pressure and constant friction from repeated movements of the foot. The symptoms and signs of foot corn include erythema, heat, a firm, rough region of skin with raised bumps, flaky, dry skin, pain when walking, and restriction of daily activities due to pain(2).

As per the Siddha classical literature, *kaalaani* (corn foot) occurs due to walking over the uneven surface, and small stones and unremoved thorn pricks can induce the keratinization on the outer layer of the skin that affects the sole to change as hard and rough. The hardening is due to the accumulation of *kabham* (a combined form of earth and water), which could be normalized by the application of heat given by the *uloga suttigai* (heated metal probe application)(3).

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Although there are several traditional treatments for corn foot, hot metal cauterisation is the treatment of choice in this case because it has fewer costs and no side effects mentioned in the Siddha classical textbook, *Siddhar Aruvai Maruthuvam*.

Case report

Case Information

On March 6, 2023, the client, a 46-year-old female homemaker, came to the Outpatient Department of Santhigiri Siddha Medical College and Hospital with complaints of thickened skin over the plantar aspect of the right foot and severe pain present while walking for 4 years. Four years ago, she noticed a small area of thickened skin over the lateral aspect of the forefoot of the right sole. Gradually, she started to feel pain in the same area while walking. Then pain got aggravated during walking, and after 2 years, another area of thickened skin appeared over the plantar aspect of the right big toe without pain. She had undergone a thyroidectomy in 2012, and she was taking the medication thyronorm tablet (75 mcg). The client does

not belong to any familial tendency disorders like hemophilia, muscular dystrophy, etc. She often dipped her right foot in salt-poured, lukewarm water after her work was completed. By doing this, she only got mild relief at that time. Sometimes she used to rub herself with diclofenac gel for severe pain.



She noticed there was no permanent pain-relieving method, so she only approached the OPD for the permanent removal of the foot corn through any cost-effective therapeutic interventions in traditional medicine like Siddha. The client did not have a family history of corn foot. She was said to have a normal mixed diet with a normal appetite, normal bowel habits, and a normal sleep pattern.

Clinical Findings

Heart rate - 74 beats/minute, pulse rate- 71 beats/minute, blood pressure - 128/80 mm Hg, respiratory rate - 18 breaths/minute, temperature - 98.9⁰ Fahrenheit, height - 168 cm, weight - 79 kg, Body Mass Index - 28 kg/m² (overweight).

Systemic clinical examination was done and noted in Table 1.

Table 1: Systemic clinical examination

Sl.No	Examination	Findings
1		Local Examination - Skin
A.		Inspection
	i. Site	 
		Figure 1. Lesion site - Right Sole lateral aspect
		Figure 2. Lesion site - Right big toe
	ii. Number	1
	iii. Color	Central translucent core with induration
	iv. Surrounding Area	Pale yellow in color
	v. Deformity	No deformity
B.		Palpation
	i. Tenderness	Present
	ii. Texture	A hard, slight depression in the center which is surrounded by callus
	iii. Measurement	2 cm in diameter
	iv. Pain Scale Score	8
2	Cardiovascular system	No murmurs were heard, S ₁ , S ₂ heard
3	Nervous system	No focal neurological deficit, All cranial nerves were intact.
4	Respiratory system	No added sounds were heard, Normal vesicular breath sounds were heard.
5	Locomotor system	Bones, joints, and vertebrae - Normal, No deformities were found. Gait - antalgic gait due to lesion in sole
6	Genitourinary system	No bowel or bladder disturbance

Investigation reports

In order to avoid blood-borne infection during the surgery, it was advised that the client do routine and protective lab tests concerning heat metal cauterisation. All the investigation reports done on March 16, 2023 (first OPD visit) and on March 22, 2023 (after 1 week of treatment) were documented and tabulated in a table.2.

Table 2 : Results of pathological tests of the client

Sl. No	Parameters with units	First visit to OPD March 16, 2023	After one week March 22, 2023
1	Total WBC count (cells/cu mm of blood)	9589	8150
2	Neutrophils (%)	84.3	76.0
3	Eosinophils (%)	5.3	3.8
4	Lymphocytes (%)	7.1	15.2
5	Monocytes (%)	3.3	5.0
6	RBC count (cells/cu mm of blood)	4.4 million	4.6 million
7	Packed Cell Volume (%)	45	42
8	Hemoglobin (g/dL)	14.0	14.4
9	Platelet count (cells/mcL)	2.7 lakhs	2.6 lakhs
10	Random Blood Sugar (mg/dL)	94	90
11	Serum Cholesterol (mg/dL)	190	152
12	Total Protein (g/dL)	6.4	6.6
13	Serum Albumin (g/dL)	3.2	3.5
14	Serum Globulin (g/dL)	3.2	3.1
15	C-Reactive Protein (mg/dL)	0.8	0.5
16	Bleeding Time (min)	3	3.1
17	Clotting Time (min)	5.2	4.3
18	Prothrombin Time (sec)	11	10
19	Blood Urea (mg/dL)	24	21
20	Serum Creatinine (mg/dL)	0.8	0.5
21	Serum Uric acid (mg/dL)	4.2	2.4
22	Total Bilirubin (mg/dL)	0.9	0.8
23	Direct Bilirubin (mg/dL)	0.12	0.06
24	Indirect Bilirubin (mg/dL)	0.78	0.74
25	SGOT (U/L)	32	27
26	SGPT (U/L)	43	40
27	HIV (NAT)	- ve	Not done
28	RT-PCR - COVID 19	- ve	Not done
29	HBs Ag (mIU/mL)	- ve	Not done
30	VDRL	- ve	Not done




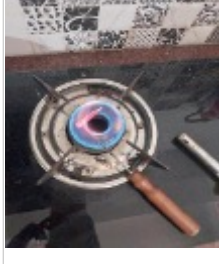
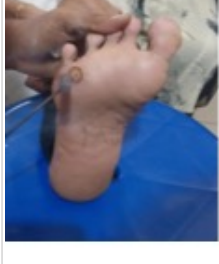


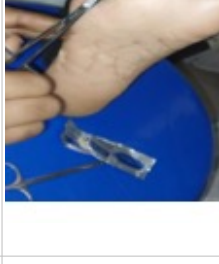

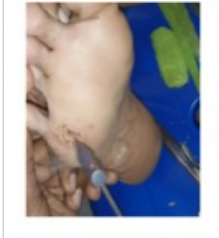


Diagnostic Assessment

From the above detailed clinical examination, the case was diagnosed as that of *kaalaani* (corn foot) (Figure 1, 2).

Therapeutic Intervention

Considering the limited possibilities of medical intervention in treating *kaalaani* (corn foot) in the present case, *uloga suttigai* (heated metal cauterisation), one of the most efficient surgical methods mentioned in Siddha literature, was recommended, planned, and performed successfully. After the cauterisation procedure, the client was advised to clean the wound with *padikkara neer* and dress and bandage the wound with *matthan thylam*.

Figure 3: Standard Operating Procedure of Uloga Suttigai (Heated metal cauterisation)

<p>The client was in a sitting position, exposing the right sole.</p>	<p>The site was sterilized with <i>padikaara neer</i>.</p>	<p>The area to be cauterized was marked with a pen.</p>
		
<p>The metal probe was heated up to red.</p>	<p>A heated metal robe was strongly held in one hand and applied over the periphery of corn, then towards the center.</p>	<p><i>Aloe vera</i> pulp was placed over the burn site.</p>
		
<p>Then again, the previous procedure was repeated.</p>	<p>Using a surgical blade, straight forceps, and surgical scissors, the burnt tissue was removed.</p>	<p>The above-mentioned procedures were repeated until the healthy tissue became visible.</p>
		
<p>The above-mentioned procedures were repeated until the healthy tissue became visible.</p>	<p>Finally, the ulcerated area was cleaned with <i>padikaara neer</i>.</p>	<p>Dressing was done with <i>matthan thylam</i>.</p>
		

SOP followed - *Uloga suttigai* (heated metal cauterisation)

Figure 3 shows every standard operating procedure followed during the heated metal cauterisation therapy. After explaining the procedure, we got a consent form filled out by the client.

Dressing code of the investigator

Head cap, sterile gloves, mask, and apron.

Checklist

Case sheet, consent form, thermometer, BP apparatus, weighing machine, stethoscope, straight forceps, scissors, cotton, gauze roll, surgical spirit, normal saline, water, *padikaara neer* (a medicinal preparation in watery form from alum for washing the affected area), *Mathan thylam* (the oil used as an external application that is made up of the purified copper sulfate, juice of *Datura metel* var. *fastuosa* L. leaves, and coconut oil), examination table, kidney tray, *Aloe vera* (L.) Burm.f. pulp, rubber sheet, torchlight, chair, bed sheet, stool (small and large), and pillow.

Standard Operating Procedure (*Uloga suttigai*)

After getting all the investigation reports and a thorough clinical examination with vital assessments, the client was taken to the therapy room. Prior to the therapy, the client had been advised to have breakfast and was given access to sit on a comfortable examination table. The client was in a sitting position, exposing the right sole. The site was sterilized with *padikaara neer*. The area to be cauterized was marked with a pen. The metal probe was heated up to red. A heated metal robe was strongly held in one hand and applied over the periphery of the site of the lesion, then towards the center. *Aloe vera* (L.) Burm.f. pulp was applied over the burn site. Then again, the previous procedure was repeated. Using a surgical blade, straight forceps, and surgical scissors, the burned tissue was removed. The above-mentioned procedures were

repeated until the healthy tissue became visible. Finally, the ulcerated area was cleaned with *padikaara neer* (alum water). Finally, dressing and bandaging were done with *matthan thylam*.

Advice given to the client after the cauterisation therapy

- For 15 to 20 minutes, soak the feet in warm water mixed with rock salt. This helps to soften the corn and facilitates the removal of the thickened skin.
- Eliminate or decrease the mechanical pressure that is producing the corn.
- Maintain adequate foot hygiene and wear shoes that fit properly.

Do's and don'ts after cauterisation therapy

- The client was instructed to maintain a normal body weight by eating a diet heavy in fiber-rich vegetables and greens.
- She was advised to drink three to five liters of water per day.
- In addition, the client was told to abstain from consuming spicy, bitter, hot, and junk food items, smoking, and drinking.
- The client was also instructed to stop wearing tight or high-heeled shoes.

Outcome and Follow-up

At the end of the cauterisation therapy, the root part of the kaalaani (corn foot) had turned into a bleed, and then it was washed and cleaned with alum water and bandaged with *matthan thylam*. After an hour, the client felt better. There was no severe pain, and she was able to walk without support. Afterward, she came to the outpatient department daily for the dressing of the wound. The dressing was done with *matthan thylam*. In six days, the wound healed well and there was no discharge. The skin turned into normal skin. The pain score of the site of the lesion was found to be zero after one month.

Table 3. Findings of examination of skin before treatment and one year of follow-up

Sl.No	Examination of Skin		Clinical Findings	
A.	Inspection – corn foot		Before treatment	After one year of follow-up
i.	Number of corns - 2		1. Over the lateral aspect of the forefoot of the right sole	Nil
			2. Over the plantar aspect of the right big toe	Nil
	ii.	Color	Central translucent core with induration	Not specific (As normal skin of sole)
iii.	Surrounding Area	Pale yellow	Not specific (As normal skin of sole)	
B.	Palpation – corn foot		Before treatment	After treatment
i.	Tenderness		Present	Nil
ii.	Texture		A hard, slight depression in the center which is surrounded by callus	Soft, no depression in the center
iii.	Measurement		2 cm in diameter	Not applicable
iv.	Pain Scale Score		8	0

Figure 4: Images of the site of corn foot lesion in client before, after treatment and after three months and one year of follow-up



Both the corn foot over the lateral aspect of the forefoot of the right sole and the associated symptoms like pain on walking and severe intolerable pain after walking for a bit longer had disappeared one month after the therapy. The client was contacted for two follow-up sessions, three months and a year after the cauterisation surgery. During these follow-up visits, no recurrence was noticed.

The images of the site of the lesion before, after treatment, and after three months and one year of follow-up are depicted in Figure 4. The examination with its findings before treatment and one year of follow-up are demonstrated in Table 4.

Discussion

Cauterisation is one of the external therapies followed in the Siddha system of medicine. There are five types of *suttigai* therapy (cauterisation) mentioned in *Siddhar Aruvai Marauthuvam*, as follows: *kaanthi suttigai* (sunlight cauterisation), *man suttigai* (heated clay cauterisation), *mara suttigai* (heated wooden cauterisation), *kaal suttigai* (heated air cauterisation), and *uloga suttigai* (heated metal cauterisation)(4).

Because the *uloga suttigai* administers an enormous amount of heat immediately in just a short amount of time, it is the most effective approach among those mentioned above. *Uloga Suttigai* comes in first, followed by *mann* and *mara suttigai*. Because there is little heat exhibited over an extensive area for a long period of time, *kaal* and *kaanthi suttigai* come third(4).

Some of the diseases indicated for *Suttigai* therapy are: *kabha* disease (diseases due to the accumulation of *kabham*), *soolai* (pain due to various etiologies), *gunmam* (abdominal pain), *paandu* (anemia), *vithai veekam* (inguinal hernia and hydrocele), and *parkittum janni* (locked jaw)(3).

The first *dhosam* that is deranged in the present case, *kaalaani* (corn foot), is *kabham* (earth + water), whereas the subsequent one is *vatham* (air + space). These approaches to intervention were used to restore the deranged humors of the body to a state of normalcy.

A heated metal probe is applied in this case, which results in the burning of the hard epidermal and dermal tissue and necrosis of that tissue. The root of the

corn foot is exposed, then it is cauterised by the probe till the normal tissue is visible, which reveals that the hard tissues here are the *kabha* predominance feature that can be neutralised by the *pitha*-characterized therapy as heat given by the red hot metal probe.

One external medication containing both water and alum is called *padikaara neer* (alum water). Common uses include gargling, cleaning wounds, treating eye conditions using eye drops, and using nasal drops to halt bleeding from the nose. Both other ulcers and aphthous ulcers are healed by it. Because it is both anti-microbial and anti-hemorrhagic, alum has the ability to promote the creation of new tissues, stop bleeding from wounds, and stop ulcers from spreading by inhibiting or preventing the growth of bacteria(5).

One of the best medicated external oils for healing wounds, *matthan thylam*, is extensively used by doctors who practice Siddha and contains *oomathai* leaf juice (*Datura metel* var. *fastuosa* L.), coconut oil (*Coccus nucifera* L.), and *thurusu* (purified copper sulfate), which together possess anti-ulcerogenic properties. Due to their analgesic, antimicrobial, anti-fungal, and wound-healing qualities, *thurusu* and *oomathai* help to promote healthy cell growth around the ulcer and eliminate ulcer debridement(6). Because of its bio-active ingredients, coconut oil aids in the healing of wounds(7).

After *uloga suttigai* (heated metal cauterisation therapy), the client showed significant improvements in both objective and subjective measurements; no adverse effects were noticed during this case study, and the corn foot disappeared in addition to other symptoms like pain and difficulty walking.

The additional external therapies for treating *kaalaani* (corn foot) demonstrated a considerable improvement in all related symptoms, including topical application of *matthan thylam* and washing with *padikaara neer* (alum water). The client's corn foot condition and progress were observed and recorded in Figure 4.

On inspection, before treatment, a medium-sized corn was present over the lateral aspect of the forefoot of the right sole and a small-sized corn was present in the plantar aspect of the right big toe without pain. After

treatment, both the corns were completely resolved, as evidenced by the absence of any corn. Before treatment, the corn exhibited a central translucent core with surrounding induration, which was a characteristic of corn. Post-treatment, the skin returned to a normal appearance, lacking specific coloration indicative of corn. Before treatment, the surrounding area of the corn was pale yellow. After treatment, this area was no longer distinct, aligning with normal skin coloration. The complete resolution of the corn, indicated by the absence of any corns and normalisation of skin colour, underscores the effectiveness of the treatment.

On palpation, initially, the corn was tender upon palpation, which resolved completely after treatment, indicating successful removal of the corn. Before treatment, the corn was described as having a hard, slightly depressed centre surrounded by a callus that measured 2 cm in diameter. After treatment, the area became soft with no depression, reflecting the removal of the corn and associated callus, whose measurement was no longer applicable as the corn was resolved.

The resolution of tenderness and the pain scale score dropping from 8 to 0 highlight the significant symptomatic relief provided by the treatment. This improvement aligns with the clinical goal of addressing both the physical and sensory discomfort associated with corns. A paired t-test was performed to compare the mean pain scores before and after treatment. The results indicated a significant reduction in pain scores ($t(1) = -t, p < 0.01$). The low p-value suggests that the observed reduction in pain is statistically significant, providing strong evidence that the treatment was effective in alleviating pain.

The statistical analysis supports the treatment's efficacy in reducing pain, as indicated by the significant drop in pain scores and the low p-value. These findings contribute valuable insights into the management of corn foot conditions in resolving corns, alleviating pain, and restoring normal skin appearance. The improvements observed underscore the importance of appropriate treatment and follow-up in managing corn foot conditions effectively and highlight the importance of effective pain relief in clinical practice.

This case report highlights the potential for effective management of corns with the described treatment method. The one-year follow-up shows sustained results, suggesting that this approach could be a viable option for similar cases. However, further studies with larger sample sizes and diverse populations are recommended to generalise these findings and confirm the treatment's efficacy across different demographics.

Limitations of the study

This case report aims to demonstrate the effect of *uloga suttigai* on the *kaalaani* patient (corn foot). Patients with uncontrolled diabetes and those with immune systems that are compromised cannot be treated with this method due to their delayed wound healing.

Conclusion

Although there are several traditional treatments for corn foot, heated metal cauterisation is the treatment of choice in this case because it has fewer costs and no side effects. The recurrence of corn will be unaccountable in some other therapies. However, the heated metal cauterisation that cauterised the root of the corn foot lesion is helpful in the prevention of recurrence in this case study. Then this case report revealed that the traditional method of *uloga suttigai* (heated metal cauterisation), followed in this case, is a renewable cosmetologically approach to affordability.

From the client's point of view

The Client: I had thickened skin over the plantar aspect of the right foot and severe pain present while walking for 4 years. I visited the outpatient department of Santhigiri Siddha Medical College and Hospital for two weeks because I was in excruciating pain, and the doctor suggested that I undergo *uloga suttigai*, a Siddha external therapy. After the *uloga suttigai* (heated metal cauterisation) treatment, the symptoms were reduced well in 2 days, and I felt better in 4 days. Then I continued my dressing and cleaning of the wound regularly for a week until the wound was healed. I am very thankful to the doctor, who has given me the best relief from my 4-year suffering.

Notes on the client's informed consent

For this study to be published, the client provided written consent. She agreed to the format in which her photos, along with additional clinical data, may be published. Her name and initials would not be revealed, and she knew that every effort would be made to keep her identity disguised, but anonymity could not be guaranteed.

Statement of ethics

This was carried out ethically in accordance with the World Medical Association Declaration of Helisinki and conforms to the regulations for research involving humans.

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Conflicts of interest

There are no conflicts of interest between any of the authors.

References

1. Al About AM, Yarrarapu SNS. Corns. 2023 Jul 24. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. PMID: 29262147.

2. InformedHealth.org [Internet]. Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2006-. Corns: Overview. 2019 Apr 11. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK541153/>
3. Uthamarayan.K.S, Siddhar Aruvai Maruthuvam, Department of Indian Medicine and Homoeopathy, Chennai, 4th Edition, 2004, Page No: 76-78, 33-35.
4. Dinesh B R, Prabakar.K, Mahalakshmi.V, Muthukumar.N.J, Banumathi.V (2018). Suttigai [Cauterization] in Siddha system of Medicine. *Int. J. Curr. Res. Med. Sci.* 4(1): 166-169. DOI: <http://dx.doi.org/10.22192/ijcrms.2018.04.01.020>
5. Vignesh. K, Nivesh. S.J, Saravanasingh, Uma.A.P, Padiakaram (Alum) - A unique drug and its utilization in Siddha Medicine: A Pharmacological Review, *Siddha papers*, September 2019, Volume 14, Issue 2.
6. Kanimozhi. S, Ponmalar. E, Bupesh. G, Mathiyazhagan. M, Vasanth. S, Sahoo. U.K, analgesic effects of Mathan Thylam - A pharmacognestic review, *International Journal of Research in Pharmaceutical Sciences*, 2020, 11(4), 6203-6205).
7. Ibrahim AH, Li H, Al-Rawi SS, Majid ASA, Al-Habib OA, Xia X, Majid AMA, Ji D. Angiogenic and wound healing potency of fermented virgin coconut oil: in vitro and in vivo studies. *Am J Transl Res.* 2017 Nov 15;9(11):4936-4944.
