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CASE REPORT

A Case Study on the Therapeutic Efficacy of *Suttigai* (Thermal Cauterization) in the Management of *Kaalani* (Corn Foot)

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Abstract

A 45-year-old, moderately built female presented with complaints of a thickened layer of skin in the foot with severe pain for over three years. She was diagnosed to be affected by Corn foot which is equated to *Kaalani* in the *Siddha* system of medicine. Corn is a well-defined focal region of hyperkeratosis. As a result of repetitive mechanical stress from friction or pressure forces, corns are formed as thickened skin lesions. *Suttigai* is one of the treatment modalities indicated for *Kaalani* in *Siddha*. *Uloga suttigai* is superior among all *suttigai* procedures and an effective treatment for *Kaalani* which prevents recurrence was chosen to treat corn foot. A Visual Analogue Scale(VAS) was used for the criteria of assessment of pain. The patient was treated successfully by *uloga suttigai* with the total repair of corn without any unsightly scar or discoloration. No other complications and remissions were found.

Keywords: Cornfoot, External Therapy, *Kaalani,* Para Surgical Procedure, *Siddha*, *Ulogasuttigai*

1. Introduction

Corn, which is also referred to as a "*clavus*", a "*heloma*," or a "focal intractable plantar hyperkeratosis," is a kind of callosity. As a result of repetitive mechanical stress from friction or pressure forces, corns are formed as thickened skin lesions. The literature frequently employs ambiguous language to describe various hyperkeratotic skin lesions. Although a callus is a more dispersed kind of callosity, physicians must differentiate between a corn and a callus. Corn is a well-defined focal region of hyperkeratosis. This illness is frequently observed in athletes and in patients having gait abnormalities, elderly folks, people with diabetes, and amputees who are subject to uneven friction forces from their footwear. It ought to be viewed as a symptom rather than a serious disease[1-3]. Corn usually has recurrence even after surgical removal. Its lowest stratum of the dermis is reached by its considerable central core[4]. It usually appears in females and is colored white, grey, or yellow[5].

The incidence of corn on the feet has been reported to range anywhere from 14% to 48%[6]. As a result of wearing narrow shoes, they have been observed to primarily affect older age groups with a little female predominance. Fat pad atrophy affects older people resulting in the loss of their protective fat pad cushioning, and may result in more painful corns[7]. In contemporary medicine, the goal of treatment is to lessen corn-related discomfort and pain. Several skin-softening products, topical keratolytic agents, lactic acid or colloid, localized use of salicylic acid, and ablative laser treatment are used as their treatment[8,9]. In *Siddha* system of medical treatment for corn

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includes internal medicines, surgical removal (*Aruvai*), Fumigation (*Pugai*), chemical cauterization (*Karam*), and thermal cauterization (*Suttigai*)[10]. *Suttigai* is a para-surgical procedure in which heat will be applied to the site of corn[11]. There is less chance of recurrence of the disease, which is treated with *suttigai. Suttigai* often works better at giving apparent, noticeable relief from pain that is observed instantly[12] and removing corn completely. Hence considering the above facts, this study attempted to assess the effectiveness of cauterization, or *suttigai*, in the treatment of corn foot (*kaalani*).

2. Case Report

A 45-year-old female reported to *Pura Maruthuvam.* Department OPD of NIS-APH with complaints of a hardened thick layer of skin in the foot with severe pain for more than three years. She belongs to a middle-class family and has a history of wearing hard-sole footwear. She had no history of any systemic illness. There is no surgical history in the past. In obstetric history, she had two children with normal delivery, G1-Male-10 years, and G2-Female-8 years. On local examination, the location was 5 cm below the third inter digital gap on the plantar surface of the left foot, in the mid-metatarsal area. A small, painful nodule is formed by the bounded, pale-colored, deep lesion. Palpation revealed that the center was hard. The region was sensitive when deeply palpated. Thus, *Kalaani*, or corn foot, was the diagnosis made in this case. To rule out any systemic pathology, routine tests such as complete blood counts, blood sugar levels during fasting and postprandial periods, bleeding times, clotting times, LFT, RFT, VDRL, and HbsAg were performed. All of the results were within normal ranges. Subsequently, the patient enrolled in the *Suttigai* therapy unit of the National Institute of Siddha.

3. The Standard Operative Procedure of *Suttigai*

3.1 Pre-operative Procedure

The materials required for the procedure like the copper *Suttigai* probe, Aloe vera leaf pulp, gas stove, *Padikara neer*, and sterile gauze piece were taken. The copper probe was used for the procedure. The patient was educated about the treatment and obtained informed consent from the patient and their attender. The patient was asked to satisfy natural urges before the procedure. Vitals were checked to ensure the patient's health condition. Then the patient was allowed to adopt a comfortable position over the operating table as per the site of lesion. At last, *Padikara neer* was used to sterilize the area, and a dry, sterile cotton gauge was used to wipe it down to attain asepsis.

3.2 Operative Procedure

The copper probe was placed on a gas stove burner and heated till it became red hot. The red hot probe was placed over the *kaalani* to burn the lesion. The probe was reheated and again applied to the lesion after assessment until the whole of the hyperkeratosis tissue was burnt. Soon after every *Suttigai,* the spot was covered with aloe vera pulp to soothe the burning feeling. Proper precautions were taken to evade the production of burned lesions.

3.3 Post-operative Procedure

The metal probe is kept in a specified place after the procedure. The *suttigai* spot was covered with aloe vera pulp, and it was then dressed. The patient was monitored for one hour after the procedure. The patient was advised to avoid water contact at the *suttigai* site for a full day. Later on, follow-up of the patient was done after 3 days which showed complete healing.

4. Assessment Criteria

The assessment was carried out with a Visual Analogue Scale (VAS) (Table 1, Figure 1)[13,14]. The assessment was carried out before treatment, one hour after *suttigai*, 3rd day, 7th day, 14th day after *suttigai* therapy, and after a month.

Table 1. Visual Analogue Scale (VAS)

VAS Score	Description
0	No pain
1-3	Mild pain (nagging, annoying, interfering little with ADLs)
4-6	Moderate pain (interferes significantly with ADLs)
7-10	Severe pain (disabling; unable to perform

5. Observation

The *suttigai* procedure was uneventful and the patient well endured the pain. After an hour of observation, the patient was discharged from the *suttigai* unit. To track the efficacy of treatment, the VAS for pain evaluation was collected over time (Table 2). The treatment prognosis is depicted in Figures 2, 3 and 4. *Suttigai* provided complete relief from pain in one sitting. The patient came back to routine activities within a week without any pain or discomfort. Before treatment, patient has a VAS score of 9 *i.e.* she can't tolerate pain and demands painkillers.

6. Results and Discussion

Suttigai is a para-surgical OPD procedure of the *Siddha* system of medicine indicated for *kabham* and *vatham* related diseases due to its action of heat[11]. Additionally, it can eliminate pathology in deeper structural layers and aids in calming vitiated *vatham* and *kapham*. The *suttigai* probe is heated to a red-hot temperature and laid over the site of corn. The root of the corn is removed. To encourage wound healing in the *suttigai* site, aloe vera pulp is applied and dressed.

Compared to standard treatment approaches, such as the use of antibiotics and painkillers together with post-excision dressings, *suttigai* is a quick and cost-effective technique[15]. Significant antibacterial, antifungal, and antiviral activities are present in aloe vera[16,17]. Aloe vera has been shown to have analgesic, anti-inflammatory, and wound-healing properties [18,19]. Even after local medication application or excision, which is also unpleasant and time-consuming, there is a possibility of corn recurrence in modern medicine. After receiving *suttigai* therapy for one sitting, the patient recovered.

Recent research suggests that *suttigai's* mode of action decreases pain and accelerates wound healing. According to Dr. Van't Hoff, when heat is applied, the local tissue metabolism improves, increasing the tissue's need for oxygen and nutrients. This further results in improved nutrition delivery and more effective waste removal, hastening the natural healing process[20]. The estimated minimum temperature for a skin burn is 40.55° C[21]. Low-threshold myelinated nerve fibers are preferentially activated by the painful peripheral stimulation that the heat above 43°C produced by red-hot *suttigai* on the skin. The propagation of nociception through unmyelinated fibers is inhibited by the afferent input from these fibers. This causes the descending inhibitory pathway, which modifies pain perception by releasing certain hormones or chemicals including

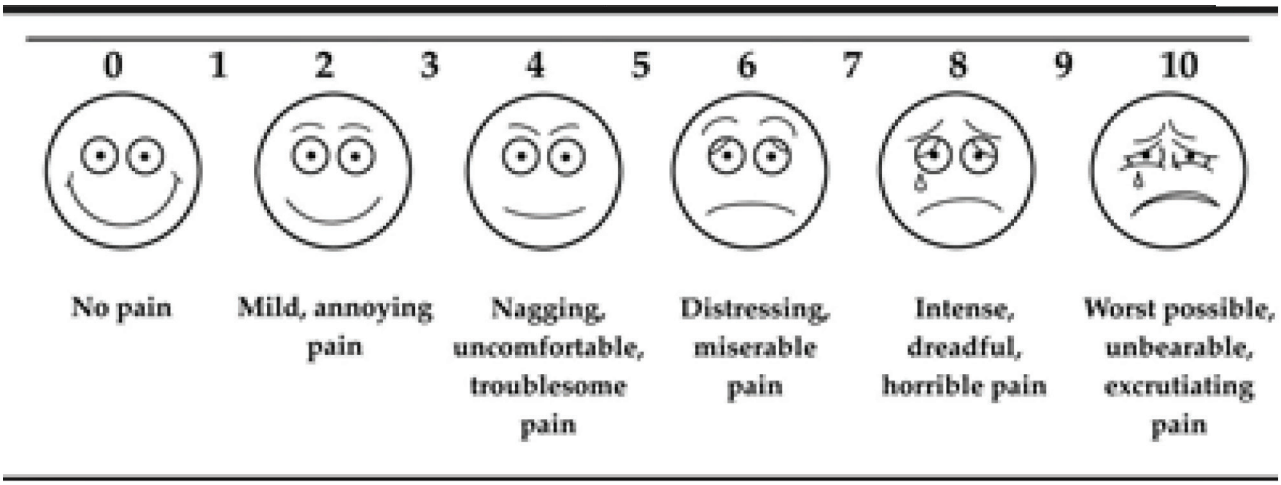

Figure 1. VAS scale.

Table 2. Result of study: Visual analog scale of pain in various timelines

No	Before Treatment	One Hour After Treatment	3rd Day	7th Day	14th Day	30th Day
Visual analog scale	9	4	2	1	1	0

Figure 2. Corn foot before treatment.

Figure 3. Corn foot after 1 sitting of *Suttigai*.

met-encephalin and beta-endorphin, which have analgesic properties and can lessen or suppress pain perception. The hypothalamus is the region of the brain responsible for inducing the release of various hormones[22].

Increasing blood flow to the injured area helps to drain out the inflammatory chemical, which reduces

Figure 4. After 1 month.

swelling when therapeutic heat is used[20]. Through increased blood flow and accelerated muscle fiber contraction and relaxation, a temperature rise induces muscles to relax and increases the efficiency of their action, which enables efficient use of the extremities for performing tasks[23].

According to the findings of this study, *suttigai* treatment drastically decreased the VAS pain score from severe pain to mild pain in 14 days and to zero pain within 30 days. There were no undesirable scars or discolorations after the recuperation process was completed. *Suttigai* aids in easing the patient's agony and pain to a certain extent. *Suttigai* exhibits positive outcomes in the case study mentioned above.

7. Conclusion

This study found that the *suttigai* is quite effective in the treatment of *Kaalani*(corn). Burning and eliminating the hyperkeratosis tissue, it produced positive effects in patients who had corn. The present case showed complete recovery, the creation of normal skin free from problems, and remission when it was managed by *Siddha* principles.

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9. References

1. Takehara K, Oe M, Ohashi Y, Tsunemi Y, Kadowaki T, Sanada H. Differences between patient-reported versus clinician-observed nonulcerative signs and symptoms of the foot in patients with diabetes mellitus. J Wound Ostomy Continence Nurs. 2019; 46(2):113-116. https://doi.org/10.1097/won.0000000000000504
2. Garcia CA, Soler FC. Effect of debridement of plantar hyperkeratoses on gait in older people - An exploratory trial. Arch Gerontol Geriatr. 2018; 78:7-13. https://doi.org/10.1016/j.archger.2018.05.017
3. Leikin JB. Foot disorders in the elderly: A mini-review. Dis Mon. 2018; 64(3):63. https://doi.org/10.1016/j.disamonth.2017.08.002
4. Das S. A concise textbook of surgery. 2006; p.122.
5. Bhat S. SRB's Manual of surgery. CBS Publishers and Distributors Pvt Ltd. 2014; 4:pp.167.
6. Farndon L, Barnes A, Littlewood K, Harle J, Beecroft C, Burnside J, Wheeler T, Morris S, Walters SJ. Clinical audit of core podiatry treatment in the NHS. J Foot Ankle Res. 2009; 2(1):7. https://doi.org/10.1186/1757-1146-2-7
7. Elwell R. The management and treatment of hyperkeratosis. Br J Nurs. 2017; 15(10). https://doi.org/10.12968/npre.2017.15.sup10.4
8. AlAboud AM, Yarrarapu SNS. Corns. Stat Pearls Publishing. 2022. https://www.ncbi.nlm.nih.gov/books/NBK470374/
9. Bhat S. SRB's Manual of 14 surgery, skin tumors. CBS Publishers and Distributors Pvt Ltd. 2014; 4:p.171.
10. Thiyagarajan R. *Siddha Maruthuvam Sirappu*. Directorate of Indian Medicine and Homoeopathy. Chennai-106. 2013; 4.
11. Uthayamarayan CS. *Siddhar Aruvai Maruthuvam*. Directorate of Indian Medicine and Homeopathy. Chennai-106. 2005; 4.
12. Ponnayapillai T. Pararasasegaram-Part 5. Virus Printers. 2016; p.152.
13. Bodian CA, Freedman G, Hossain S, Eisenkraft JB, Beilin Y. The visual analog scale for pain. Anesthesiology. 2001; 95:1356-1361. https://doi.org/10.1097/00000542-200112000-00013
14. Delgado DA, Lambert BS, Boutris N, McCulloch PC, Robbins AB, Moreno MR, Harris JD. Validation of digital visual analog scale pain scoring with a traditional paper-based visual analog scale in adults. J Am Acad Orthop Surg. Global research and reviews. 2018; 2(3):e088. https://doi.org/10.5435/jaaosglobal-d-17-00088
15. Phillips S, Seiverling E, Silvis M. Pressure and friction injuries in primary care. Prim Care. 2015; 42(4):631-644. https://doi.org/10.1016/j.pop.2015.07.002
16. Ramasubramanian TS, Sivakumar VT, Thirumalai AV. Antimicrobial activity of *Aloe vera* (L.) Burm. f. against pathogenic microorganisms. J Bio Sci Res. 2010; 4:251-258.
17. Arunkumar S, Muthuselvam M. Analysis of phytochemical constituents and antimicrobial activities of *Aloe vera* L. against clinical pathogens. World J Agric Sci. 2009; 5(5):572-576.
18. Hajhashemi V, Ghannadi A, Heidari AH. Anti-inflammatory and wound healing activities of *Aloe littoralis* in rats. Res Pharm Sci. 2012; 7(2):73-78. PMID: 23181083
19. Sanchez M, Gonzalez-Burgos E, Iglesias I, Gomez-Serranillos MP. Pharmacological update properties of Aloe vera and its major active constituents. Molecules. 2020; 25(6):1324. https://doi.org/10.3390/molecules25061324
20. Kumar M, Singh L. Application of *Agnikarma* in the surgical practice book. pp.81.
21. Sharma AV, Dudhamal TS, Gupta SK, Mahanta V. Clinical study of *Agnikarma* and *Panchatikta Guggulu* in the management of *Sandhivata* (osteoarthritis of knee joint). Ayu. 2016; 37(1):38. https://doi.org/10.4103/ayu.ayu_103_14
22. Fein A. Nociceptors and the perception of pain. 2014
23. Dwivedi AP. An Overview on agnikarma - A minimal invasive procedure. *Ayurveda* Today Magazine. 2011. p. 15.