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# Histological Observation of the Healing Effect of Camwood Ointment on Burnt Skin of Rabbits.

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## ABSTRACT

Burn injury is one of the main causes of death by injury worldwide and healing of burn is still a challenge in modern medicine. Burn can happen in any area and causes dominant changes in the quality of normal tissues. In present studies we investigated the healing effect of camwood ointment on a second degree burn wound in rabbit.7 local rabbits were used in this study. The rabbits were randomly divided into 4 groups. After creating a second degree burn wound on the dorsum of the rabbits, group II, III, IV were treated with tropical application camwood ointment. Visual observation and histopathological examination were performed on days 35 of post-burn induction. At day 15, it showed moderate hyperplastic cells and koilocytosis. At day 25, it showed stratified squamous epithelia cells and proliferation of immature hair follicle and at day 35, it showed normal histology and matured hair follicles. Physically and histologically the rabbit showed gradual and progressive healing.

Key words: Burn, camwood, histopathology, hair, follicles

### **INTRODUCTION**

Burns are one of the most occurring forms of trauma in the world<sup>1</sup>. The causes of burn can be classified as thermal burns caused by dry and wet heat, radiation Burn, electrical burn, contact burn, chemical burn, flash burn and laser burn. Each of this type of burn differs from each other<sup>2</sup>. Burn injury is characterized as a kind of inflammation beneath the stratum corneum of the skin, which can progress either to spontaneous healing or can deteriorate to further necrosis, depending on the approach to treatment<sup>3</sup>. There are three primary types of burns: first degree burns: red, no blistered skin, second degree burns: blisters and some thickening of the skin, third degree burns: widespread thickness with a white, leathery appearance. There is also fourth degree which extends beyond the skin into the tendons and bones<sup>4</sup>.

Camwood is a reddish material that is extracted from *baphia nitida*<sup>5</sup> *Baphia nitida* is a shrubby leguminous tree which is predominantly found in West Africa majorly in Sierra Leone and Cameroon. It is usually red in colour and extremely hard, heavy and durable. Traditionally it is use in making drumsticks, mortars, pestles and knife handles. The core of *baphia nitida* (camwood) tree beneath the bark is said to have diverse effect on the skin<sup>6</sup>. The seed is very nutritious for man consumption, a part from its nutritive contents, the roots of *Baphia nitida* yields a red dye that was used locally until recently, to dye raffia and cotton textiles.

### MATERIAL AND METHODS

Eight (8) healthy rabbit of both sexes weighing between 1071-1681g were purchased from a local market in Abuja, Nigeria. They were kept in a well-ventilated cage in the animal house of Bingham University, Department of Anatomy. Six (6) rabbits were anaesthetized with intramuscular administration of 25mg/kg Ketamine and 5 mg/kg Xylazine. The dorsolateral aspect of the 6 rabbits were clipped and shaved and a superficial second-degree burn was inflicted on the skin using an electric heater. The wound was disinfected with iodine and treatment commenced after 24 hours.

**Treatment Protocol:** Each rabbit was treated once daily, before bandaging. The wound was cleaned and disinfected with normal saline solution and methylated spirit before tropical application of camwood ointment gently against the burn area. A gauze was placed loosely on the wound area then the bandage was rapped loosely around it to allow the animal breath properly.

Animal Sacrifice and Skin Collection and Processing: Photograph were taken to show the process and progress of healing before the sacrifice was done. 24hrs after final application on day 35, the animals were sacrificed under general anaesthesia using (chloroform). The skin of the application site on the treated animal and the control animal were dissected and fix in a specimen bottle containing 10% formalin solution, after which it was prepared for staining protocols and histological analysis.

# RESULTS



**Figure 1:** Picture showing the rabbit after dressing (1); 2A: showing shaved dorsum of rabbit with burnt area, affected surface was hard and soften after application of camwood ointment; 2B: showing shaved dorsum of rabbit during the second week; 2C: showing the wound area starting to fall off slowly and there was no visible contraction during the third week.



**Figure 2:** Picture showing the rabbit after dressing (1); 3A: showing burnt area, affected surface was hard and became softened after application of camwood ointment; 3B: showing soften area with constant application of camwood during the second week; 3C: the hair surrounding the wound area started to fall of slowly and the wound showed little contraction during the third week.



**Figure 3:** Picture showing the rabbit after dressing (1); 4A: showing slight healing of the burnt surface during the first week; 4B: shows progressive healing with hair follicles drastically replaced and reduction in wounded surface area during the second week; 3C: shows 85% healing process and suurounding hair fully replaced with new ones during the third week.



**Figure 4:** Photomicrograph of skin for control group showing normal histology skin layers A-E; **2:** Photomicrograph of rabbit skin after burnt showing sclerosed and shrunken keratinized stratified squamous epithelial cells noticed; **3:** Photomicrograph of rabbit skin burnt and treated for 15 days with camwood showing moderate hyperplastic stratified squamous epithelial cells with intese kiolocytosis; **4:** Photomicrograph of rabbit skin burnt and treated for 25 dyas showing startified squamous epithelial cells and proliferation of immature hair follicles; **5:** Photomicrograph of rabbit skin burnt and treated for 35 days showing normal histology and matured hair follicles.

# DISCUSSION

Group 1 control (positive) showed normal histology of the skin with layers from A-E, sweat gland, and sebaceous glands. Control 2 (negative) showing sclerosed and shrunken keratinised stratified squamous epithelium cells and inflammatory cells. Sclerosis meaning hardness of the skin in which normal tissue is being replace with thick dense connective tissue which is usually caused by an infection, dehydration or any other environmental conditions and when there is an infection, macrophages eat up some of the invading organism and break them down. The macrophage then presents a fragment of the pathogen called the antigen to the naive T cell, the antigen and native T cell binds together and mature into T-Helper cell (CD4+ T-cell). The T-Helper cells releases cytokines which increases the activity of macrophages which also attracts neutrophils. Macrophages also releases cytokines such as TGF-β which tells fibroblast to repair damage tissue after the infection by laying down collagen. Therefore control 2 showed harden and shrunken keratinized stratified epithelium cells and inflammatory cells and no collagen and fibroblast proliferation.

Group 2 were treated for 15 days with camwood ointment showing moderately hyperplastic stratified squamous epithelia cells with intense koilocytosis. Inflammatory cells were found to be present. Epithelial hyperplasia is the most common non-neoplastic lesion of the skin and it is a common respond to dermal application of chemicals and it is described as the thickening of the epidermis. It is also known as acanthosis7. It is classified into flat, proriasiform, papillomatous, pseudocarcinomtous, pseudoepitheliomatous hyperplasia. Pseudoepitheliomatous hyperplasia is a histopathological reaction to various condition such as infection, neoplasia, inflammation and trauma. The function of pseudoepitheliomatous hyperplasia is hypothesized to be physiological response to different types of skin damage. It acts as a defensive mechanism for transepithelial elimination of foreign body material<sup>8</sup>.

Koilocytosis is the abnormal change in squamous epithelial cells which is characterised by perinuclear haloes surrounding the nuclei<sup>9</sup>. Group 2 showed epidermal hardening and change in the structure of the squamous epithelium present in the skin. Inflammatory cells were also present.

Group 3 were treated for 25 days with camwood ointment showing stratified squamous epithelia cells, also showing proliferation of immature hair follicles. The adnexal structures are essentially normal.

Group 4 were treated for 35 days with camwood ointment showing normal histology and mature hair follicles also re-epithelization, healthy granulated tissue, regenerated sebaceous glands and new blood vessels. During the course of the experiment which lasted 35 days, the rabbit showed constant gradual healing at different level from day 15 and 25 and by 35 days it showed complete healing.

# CONCLUSION

In conclusion, the photographic and histopathological analysis gotten from the tropical application of camwood ointment on the burnt skin of rabbit, demonstrated that camwood ointment has the potential to effectively promote wound healing activities at cell and tissue level and they do not produce any adverse effect.

## REFERENCES

- Clayton, K., Vallejo, A., Davies, J., Sirvent, S., Polak, M. Langerhans Cells—Programmed by the Epidermis. Front. Immunol. 2017; 8:1676. Available from: Doi 10.3389/fimmu.2017.01676
- Deirdre, C., Sameer, E., Owen, R., Brent, W., Robert, L. "Burn Wound Infections". Clin. Microbiol. Rev. 2016; [online]. Available from: DOI: 10.1128/CMR.19.2.403-434.2006 [accessed 21th September 2020]
- Costin, G.E., Hearing, V.J. Human skin pigmentation: melanocytes modulate skin colour in response to stress. The FASEB Journal. 2007; 2 1 (4) available from: https://doi.org/10.1096/fj.06-6649rev
- Khan, M.Y., Aliabbas, S., Kumar, V., Rajkumar, S. "Recent advances in medicinal plant biotechnology." Indian J. Biotechnol. 2016; 8(1): 9–22.
- Kah, K.H. Camwood (*pterocarpus tinctorius*) in the political economy of the cross and manyu rivers basin of Cameroon hinterland communities, 1916-1961. Africani Zamani. 2012; 20:149-164
- Boyle, H.M., Hill, G.D. Skin-hyperplasia. National toxicology program- U.S department of health and human services. 2014; Available from: ntp.niehsnih.gov
- Nayak, N.V., Uma, K., Girish, C.H., Murgod, S., Shyamala, K., Naik, B.R. Pseudoepitiomatous hyperplasia in oral lesions: A review. J. Int. Oral Health. 2015; 7 (9):148-152.
- Lawson, J.S., Glenn, W.K., Whitaker, N.J. Koilocytes indicate a role for human papilloma virus in breast cancer. Br. J. Cancer. 2009; 101:1351-1356. Available from: doi.org/10.1038/sj.bjc.6605328.