بسم الله الرحمن الرحيم

Sudan University of Science and Technology

College of Graduate Studies

A Comparative Study on three Wound Managements in Donkeys, Gobiesh Locality- Sudan

دراسة مقارنة لثلاث معالجات للجروح في الحمير في محلية غبيش– السودان

A thesis Submitted in Fulfillment of the Requirements for degree of Master in Veterinary Medicine (Veterinary Surgery)

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قال تعالي :

والخَيْلَ والبِغَالَ وَالْحَمِيرَ لِتَركَبُوهَا وَزِينَةً وَيَخْلُقُ مَا لاَ تَعْلَمُون(8)

سورة النحل

Declaration

The work and activity which are exist in this thesis is my own work carried out at the teaching veterinary hospital, university of West Kurdufan, College of Veterinary Medicine, it has not been submitted to any University of any other degree, and extended from 2017 to 2020.

Mohammed Ahmed Gamaa Musa Gamaa

Dedication

To my Father’s soul, my Mother, my wife

sisters and brothers

and to the lovely eyes Sadan

Thank you for support and understanding

LIST OF CONTENTS

CHAPTER ONE LITERATURE REVIEW

content **page**

CHAPTER TOW: MATERIAL AND METHODS

CHAPTER THREE: RESULTS

CHAPTER FOUR:

NO LIST OF TABLE page

LIST OF FIGUER

LIST OF ABBREVATIONS

MRSA	Methicillin resistant, *Staphylococcus* aureus
TCM	Traditional Chinese Medicine
EVMs,	ethno-veterinary medicines
WBCs	White blood Cells count in donkey**s**
VSMS	Vesicular smooth muscle cell
SPSS	Statistical Package for Social Science
^{o}C	centigrade degree
SD	stander deviation
0	base line values
NS	none significant
Sig	significance
H	Days after complete healing
No	number of animals
a	No statistics are computed

LIST Of APPENDIXES

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ABSTRACT

This study was conducted to compare and evaluate the efficacy of different three treatments that used in donkey's wounds, such as coffee powder and spider web as traditional wound treatments, with Oxytetracyclin powder is a common medical treatment as control group in area of Gobiesh locality, West Kurdufan State, Sudan. The study was carried out in faculty of Veterinary Medicine West Kurdufan University. A total number of clinically sound thirty-six local breed donkeys of both sexes10 female and 26 mail were used in this study with mean ± stander deviation age and body weight 7±4.1 years and 93± 7.8 kg respectively. Animals were kept for adaptation period of 7 days prior to experiment and all groups receivedivermectine best 500 mg as well as anti-tetanus injection, animals were fed on green fodder and hay with free access to water allowed. Animals were divided into three equal groups, each of 12 donkeys. Ten Centimeters length and three centimeters depth of Gullotus area were incised under local anesthesia. Wound left opened and untreated two days' post incision, the first group treated with coffee powder, second group covered with spider web while the third group (control) dressed using oxytetracyclin powder. General observation of inflammatory sings was studied such as wound bleeding, oedema, congestion, odor, and pus formation two weeks post treatment, clinical parameters such as respiratory rate, heart rate and rectal temperature were recorded as well as hematological parameters (White Blood Cells count) were screened at intervals 0, 2, 4 and day 6. On the other hand, wound healing processes were observed during wound healing such as wound contraction, Scab formation, Scab cracking and detachment of scab formation at the site of wounds. Histopathological evaluation was done in all groups to determine the grade of wound healing., no significant differences were found in

clinical and hematological indices among all treated group, however, significant difference (*p value* ≤ 0.05) in bleeding were observed at day 2 post wounding in spider web treated group (25%), wound oedema revealed no significant changes in all treated group. On the observation of the congestion at the wound site showed a significant change in all treated group at interval 2,4, 6 and 8 days after treatment, although spider web group showed the higher incidence of congestion compare with the other two groups, wound contraction was significantly observed on day 2, 8, 10 post treatment, however coffee powder and spider web treated groups showed the higher percentage of wound contraction occurrence at day 6 (100%). Scab formation was clearly observed excellent at day 4,6, 8, 10days12 showed excellent in group A C bad in group Band post treatment specially in coffee powder group and less in noticed Spider web and tetracycline groups, scab cracking percentage study were significantly noticed on days 4, 6, 8 and 10 following treatment in all donkeys, especially control group that treated using tetracycline powder (day 4 and day 6). Wound scab detachment was observed during two weeks after treatment, the percentage of wound scab detachment were more observed on day 4 and day6 post treatment, however, spider web treated groups showed no wound scab detachment occurrence till the day 10 following wounds management, Histopathological examination that carried out to determine the wound healing grades revealed that in coffee powder 10%, 30% and 60% were in grade 1,2 and grade3 respectively, spider web managed group showed 60%(grade 2) 40% (grade3) and the control group (tetracycline treatment group) 80% and 20% were detected in grade 2 and grade 3 respectively. Finally, it could be concluded that the treatments were found to be safe and reliable in treating superficial wound in donkeys. However; coffee powder was found to be superior to other treatments

that clearly observed in terms of short healing time, ascent removal andbleeding suppressed.

Key word: **Wounds, Donkeys, Coffee powder, Spider web, oxytetracycline.**

خلاصة الاطروحة

أُجريت هذه الدراسة لمقارنة وتقييم مدي فعالية ثلاثة أدويه مختلفه أستخدمت لعلاج الجروح في الحمير مثل بدرة البن وخيط العنكبوت و علاج بدرة الاوكسي تيتراسيكلين ذو الإستخدام الطبي الشائع كمجموعة تحكم. حيث أجرت هذه الدراسه بجامعة غرب كردفان، كلية الطب البيطري بمحلية غبيش التابعه لولاية غرب كردفان– السودان.العدد الكلي المستخدم في هذه الدراسه 36 من الحمر السليمه سريريا ومن كلا الجنسين10 إناث و 26 ذكر بمتوسطعمر(4,1+7) ومتوسط وزن (7+93) علي التوالي، تم الاحتفاظ بالحيوانات للتكيف لمدة اسبوع قبل التجربة وتلقت جميع الحيوانات العلاج المضاد للدبدان كما حقنت بمضاد الكزاز، كما تمت تغذيتها علي الاعشاب الخضراء والتبن كما تم توفير مياه الشرب لها. قسمت الحيوانات إلي ثلاثه مجموعات متساويه 12 حمارا لكل مجموعه، وباستعمال التخدير الموضعي تم عمل قطع جراحي بطول 10 سنتمترات وعمق 3سنتمترات في المنطقة الاليويه،تركت الجروح بدون علاج لمدة يومين بعد الجراحة. المجموعه الأولي عولجت ببدرة البن ، المجموعه الثانيه تم علاجها بخيط العنكبوت أما المجموعه الثالثه وهي المجموعة الضابطة، عولجت ببدرة أوكسي تيتراسيكلين. تمت دراسة العلامات الالتهابية العامه مثل النزيف، التوزم، الاحتقان، رائحة القيح وتكون القيح لمدة أسبوعين من العلاج ، كما تم رصد العلامات السريريه مثل معدل التنفس ومعدل ضربات القلب ودرجة حرارة المستقيم،فحصتمع خلايا الدم البيضاء في فترات 0، 2، 4 و 6 من جانب آخر لوحظت علامات شفاء الجرح خلال فترة الالتئام والتي تمثلت في تقلص الجرح وظهور قشرة الجرح والتي ظهرت في الايام و10,8,6,412بصورة ممتازه في اليوم الرابع في المجموعه الاولي والثالثه وسيئه في المجموعه الثانيه مدي تشقق قشرة الجرح وإنفصالها

كما تم تقييم النسيج المرضي للجرح في كل المجموعات لتحديد مدي درجة إلتئام الجرح. استنتج أنه لا توجد فروقات معنويه عند فحص العلامات السريره وفحص خلايا الدم البيضاء وسط كل المجموعات المعالجه لكن; بالنسبه للنزيف هنالك فروقات معنويه شوهدت في اليوم الثاني من الجرح بنسبة (25%) في المجموعة التي طببت باستعمال خيط العنكبوت . لم يظهر الجرح اي تغيرات معنويه من ناحية حدوث التوزم في كل الايام في المجموعات التي تمت معالجتها مسبقا . كما تم ملاحظة وجود فروقات معنوية تمثلت في حدوث احتقان في منطقة الجرح في الفترات من 2،4، 6 و8 يوم بعد المعالجه باستعمال خيوطالعنكبوت.أظهر الفحص النسيجي المرضي والذي تم إجراءه لتحديد درجة الالتئام في المجموعات المختلفةوان الجروح التي استعمل فيها بدرة البن كان الالتئام فيها بنسب 10% و 30% و 60% من الالتئام بالدرجة الاولى والثانية والثالثة علي التوالي. مجموعة خيوط العنكبوت فقد اظهرت 60% من الالتئام بالدرجةالثانيه 40% بالدرجة ثالثه أما المجموعه الضابطة (مجموعة الاوكسي تيتراسيكلين) فكانت 80% و 20% من درجة الثانية والثالثة للالتئام علي التوالي. أخيرا يمكن إستنتاج أن العلاج كان آمنا وموثقا به في علاج الجروح في الحمير الا أنه وجد أن مسحوق البن قد تفوق علي نظيريه من العلاجات الاخرى والتي لوحظت بوضوح في فترة العلاج القصيره ، إزالة الرائحه وكبت النزيف.

كلمات مفتاحيه: الجروح، الحمير، بدرة البن، خيط العنكبوت و بدرة اوكسيتيتراسيكلين.

Introduction

Donkeys play a vital role in rural economies through the provision of drought power and transport. Donkeys contributed the major proportion of readily available transport needs for poor women and men living in hostile environments enabling them to integrate into social and economic processes (Swai and Bwanga, 2008).

Donkeys are being used by humans more than 5,000 years ago, to help them survive the harshSahara terrain in northern Africa. They provide greater mobility with which to face erratic rainfalls and are of value in carrying firewood, loads, including water, household structures, goods and children (Starkey, 2004).

Donkeys are considered as animals of the poor men and women; therefore, were highly stigmatized, marginalized and were not a focus of research (Kefena*et al.*, 2011). According to (Hamid, 2004), in Sudan donkeys are divided into two breeds: Makady which are droughtdonkeys and Reefawi, which are riding donkeys.

Donkeys are often inexpensive and have little or no disposal value, even though they have sometimes been considered as animal of ridicule or low status. They have excellent reputations as easily trainable and very dependable work animals. Children can easily manage donkeys (Oudman, 2004).

Farmers use alternative means like drought animals especially donkeys and mules to transport crops, fuel woods, water, building materials and people by carts or on their back from farms and markets to home (Mohammed,1991). The donkeys (*Equusasinus)* are domesticated race of African wild ass. The term ass is normally used for animal found in the wild whereas the term donkey is used for domesticated animals. The donkeys perform hard work under variable agro climate condition and withstand

scarcity of feed and hardiness. Little maintenance and low purchase price have made the donkey the cheapest and suitable means of transport over the centuries (Singh et *al.*, 2005).

Some methods of hobbling to restrain equine causes discomfort and inflict wounds (Mohammed, 1991).

The World Health Organization (WHO, 2002) defines traditional medicine as the health practices, approaches, knowledge and believes incorporating plant, animals and mineral-based medicines, spiritual therapies, manual techniques and exercise, applied singularly or in combination to treatment, diagnose and prevent illness or maintain well-being traditional medicine (also known as indigenous or folk medicine) comprises the knowledge that has been developed over generations within various societies before the era of modern medicine'. Alternative medicine is any healing practicethat does not fall within the field of conventional medicine. It may be based on historical or cultural traditional, rather than on scientific evidence. The terms complementary medicine or alternative medicine is used inter-changeably with traditional medicine in some country. Owners treat animal with traditional medications before taking them to veterinary clinics. They used animal's feces, battery tar in attempt for remedy to combat injuries which is remarkably embarrassing scientifically. Also owners used salt water, ash, plant root, and cleaned the wounds with plenty of water to remove dirt and dusts. Alsothey were recommended that the best way to do was run water from a house pipe over the wounds for 5 minute; use high amount of water. The owners treated their animals with cold water to reduce the swelling (Fentie*et al.*, 2014). Not all wounds will require veterinary treatment, deciding whether the wounds superficial or deep will determine the press appropriate treatment for the wounds, superficial wound can be cleaned with dilute antiseptic. But veterinary care should be sought for deep wounds. The severity of the

injuries will determine the most appropriate course of action. Types of wounds can include abrasion, open wounds, penetrating wounds, and closed wounds with bleeding below the surface of the skin. Abrasion, cut wounds, laceration wounds, puncture wounds, tear, and Embedded object (Vanessa, 2009).

Spider web is a devise built by spider out of proteinaceous silk extruded from spinneret gland, it is rubbed directly on the skin to promote healing also it was used in India and other countries, and was mad to systematically study the wound healing effect of Spider web using excision and linear incision models (Kumari *et al*., 2013).The treatment for wound using freshly homemade coffee powder has long been recognized as a traditional medicine and a local wisdom considering its effectiveness in the healing of wounds. Many local health providers from the area of coffee plantations reported coffee Powder sprinkled on various acute or chronic wounds (Perry *et al*., 1980). the use of topical tetracycline could be a helper way to healing process in diabetics without inconvenient of adverse side effects when used in a systemic way (Nakao*et al*., 2009). Topical tetracycline rendered the healing in diabetic animals near to that observed in control, it was very interesting to observe that in spite of tetracycline reestablishing the velocity of healing in diabetic animals, probably tetracycline effects are exactly the one necessary for diabetic healing deficiency (Nakao*et al*., 2009).

Objectives of the study:

General objectives:

To compare and evaluate between three different treatments; coffee powder, spider web as traditional wound treatmentswithoxytetracyclin powder the medical treatmentascontrolin Veterinary clinics of donkeys at the area of Gebeish locality.

Specific objectives to:

1. Evaluate clinical parameter such as heart rate, respiratory rate, rectal temperature and hematological indices (white blood cells count) as indicator for inflammation at wound sites in different treatments using coffee powder, spider web and oxytetracyclin.
2. Assess the inflammatory signs at the wounds sites such as (bleeding, edema, congestion, odor and pus formation).and to evaluate wound healing progression in term of wound scab formation, wound contraction, wound scab cracking and wound scab detachment.
3. Determine the time that will be required for healing in each group.
4. Compare and contrast between wound healing grades (grade 1, grade 2, grade 3, and grade 4) in different treated groups.

CHAPTER ONE

LITERATURE REVIEW

1.1. Definition of wounds:

Wound is defined as damage or disruption to the normal anatomical structure and function (Velnar *et al*., 2009). Wound is also defined as the loss of cellular and functional continuity of the living tissues (Kumar*et al.,* 2013). Wounds are physical injuries that outcome in an opening or break of skin. They ought to be recuperated legitimately fundamental for the rebuilding have upset anatomical congruity and aggravated useful status of the skin **(**Allen, 2016).

1.2. Types of wounds:

Wounds are classified as open wounds (with disruption of skin or mucous membrane continuity) or closed wounds (no disruption of the continuity though underlying tissues will be damaged, e.g., bruises or hematomas). More over wounds could be classified as either open or closed and clean or contaminated, open wounds are classified by the type of trauma: abrasions, avulsions, incisions and lacerations partial or full thickness(Jonathan, 2016). Also (Gulzar*et al.,* 2011) classified wounds as acute and chronic wounds on the basis of physiology of wound healing

Most wounds, especially open wounds, are often associated with wide ranging bacterial, fungal, and viral floras. Although most of the bacterial infections can be managed using conventional antibiotics, there are several reports of multi-drug resistant bacteria (Nolff*et al*., 2016).

According to (Krishnan, 2006) wounds can be either traumatic or surgical in origin. Both types can fail to heal and become chronic, although traumatic wounds are morecommonly affected by healing difficulties. The incidence and prevalence of traumatic wounds in horses are considered to be high, and a high percentage becomes chronic, adding more complexity to wound healing management strategies (Samantha*et al*., 2010). Chronic wounds in horses have a similar pathophysiology to human chronic wounds. Management practices utilized for human chronic wounds are also being employed successfully in the management of equine traumatic and chronic wounds (Samantha*et al*., 2010).

1.2.1. Open wounds:

Open wounds are injuries to the body that range from very minor like a scratch that bleeds very little to sever such as complete removal of the body part (Rizani, 2012).

1.2.2. Chronic wound:

Chronic wound an insult or injury that has failed to proceed through an orderly and timely repair process to produce anatomic and functional integrity (Jodie and Harper 2017) typically they have a duration of more than 4 weeks and are characterized by the failure to progress through the normal stages of wound healing(Menke,2007).however, in some cases wound become chronic and fail to heal within a reasonable time frame (mounth to Year)

and often remain in an inflammatory state.(James *et al*, 2008).

1.3. Wound contamination:

Wound contaminants are likely to originate from three main sources. First one the environment microorganism in the air or those introduced by traumatic injury the surrounding skin (involving members of the normal skin microflora such as *Staphylococcus*

epidermidis, micrococci, endogenous source involving mucous membranes (Duerden, 1994).

All open wound is colonized with bacteriological culture is indicated only if clinical signs of infection, or if control issue such as Methicillin resistant, *Staphylococcus aureus* (MRSA) need to be considered, the classic sings of infection or heat, redness, swelling and pain. Also sings of wound infection include increase of exudate, delayed healing, contact bleeding, odor and abnormal granulation tissue (Joseph*et al*.,2006).

1.4. Wound management:

The correct approach to treating wounds should effectively assist the healing process and it can have an important impact on the final clinical outcome. Physiological, endocrine and nutritional support at a clinical level significantly influence repair and, without them, wound healing often fails completely (Bischoff*et al*., 1999).

1.4.1.Principals of wounds treatment:

The first stage of wound management should be a thorough assessment of the wound and the patient. The process begins with a diagnosis of the wound's etiology and continues with optimizing the patient's medical condition, particularly blood flow to the wound area (Hunt*et al*., 2000).

1.4.1.1. Debridement:

An acute wound in a stable patient with normal blood flow should heal successfully if appropriate care is given. Guidelines of the medical procedures to use during wound management have been extensively described elsewhere. (Bischoff*et al.*, 1999) The wound will need to be debrided and dressed correctly. (Hunt*et al*., 2000,. And Ennis, 2000) Sufficient debridement, defined as the removal of non-viable, infected and hyperkeratotic tissue, forms the basis of non-delayed as well as delayed

wound healing. Debridement is essential as it accelerates wound healing and different techniques exist (Hunt*et al*., 2000). In chronic wounds, the measures used to reverse medical abnormalities are complex and the etiology of the wound is not easy to identify. Correct debridement helps to convert a chronic wound into an acute one, which can then progress through the normal stages of healing (Greenhalgh, 1998). Dead muscle fibres do not contract on stimulation and are poorly perfused. Special tissues, such as tendons and fascia, are not removed despite not being vital because they promote the healing process in the wound; a surgeon does so only in case of severe contamination (Fildes*et al.*,1999). The next important step is the lavage of micro-organisms, dead tissue and foreign bodies, which can further decrease tissue bacterial counts. Commonly, a bacitracin solution is used. In contrast (Patzakis, 1975) recommends irrigation with large quantities of saline. Low pressure irrigation only removes contamination on the surface. Although high pressure irrigation reduces bacterial colonization of the wound and the frequency of infections, a high pressure jet can damage fine tissues and push dirt particles deeper into the wound or even into the bone. High pressure irrigation also causes the soaking of wound margins with liquid, reducing the ability of the wound to resist infection. High pressure irrigation must be employed cautiously and is only recommended for very contaminated wounds (Braund*et al.,2009*).

1.4.1.2. Wound dressings:

Wound dressings should be chosen according to the nature of the wound. Among the major features of the wound cover; heat and humidity control, removal of odor, to ensure the wound debridement, micro-organisms and a physical barrier against external factors, include the prevention of hypertrophic scar formation and pain reduction (Paul and Sharma, 2004). Basically the purpose of all these features is to prepare a

suitable environment for wound healing. Wound dressings that are used in material, physical form and active ingredient content are classified according to the material used for cover; hydrocolloids, alginate dressings, hydrogels according to the shapes and physical cover; foam and transparent films, based on the content of active ingredient, antibacterial, growth factors and vitamins-minerals containing wound cover (Seaman., 2002 andZahedi *et al*.,2002).

1.4.1.3. Vacuum assisted closure therapy:

The aim of this treatment to the sore area for five minutes and apply a negative pressure of 125 mmHg for eliminating this pressure for a period of 2 minutes to be cleaned from the area of edema fluid, improvement of local perfusion, and stimulation of cellular proliferation and coagulation of the bacterial colonization of the control provision (Ben-Amotz *et al.*, 2007andMendez-Eastman,2001).

1.5. Factors delaying wounds healing:

Several factors can impair the whole process of wound healing; in general these factors are classified as local and systemic. Local factors that affect wound healing are desiccation, infection, maceration, necrosis, oxygenation, pressure, trauma, and edema, but systemic factors such as aging, hormones, trees, and systemic diseases (Dhivya, *et al*., 2015; Guo,2010 and Hess,2011).

1.6. Wounds treatments:

Bacterial proliferation within a wound bed results in alterations of each phase of the wound healing process, thus prolonging healing and contributing to chronic wounds, in addition, the bacteria interfere with the host cells and the cascade of chemical reactions that should lead to wound closure. These foreign bacterial cells produce their own chemicals that are usually tissue destructive as well as stimulate host cells to produce more and more inflammatory mediators and

affect the formation of granulation tissue (Sibbald*et al*., 2014). Local wound infection and foreign bodies affect healing by prolonging the inflammatory phase. If the bacterial count in the wound exceeds105 organisms per gram of tissue, or if any beta hemolytic *Streptococcus* is present, the wound will not heal by any means, including flap closure, skin graft placement, or primary sutures (Robson, 1997). The bacteria prolong the inflammatory phase and interfere with epithelialization, contraction, and collagen deposition. The end toxins themselves stimulate phagocytosis and the release of collagenase, which contributes in collagen degradation and destruction of surrounding, previously normal tissue. Wound contamination in association with tissue hypoxia potentially suppresses macrophage-regulated fibroblast proliferation (Bankey*et al.,* 1989).

1.7. Equine wounds:

Some methods of hobbling to restrain equines cause discomfort and inflict wounds **(**Mohammed, 1991.**)**wounds are amongst one of the commonest health concerns to afflict working donkeys in many countries (Sells*et al*., 2009)**.** The potential cause of equine wounds, wound are almost endless: punctures from sharp object like metal and glass; shear wounds from barbed wire sticks; collusion injuries from falling or running in to the object and entrapment, such as getting a leg hung up in a rope or in cattle are major cause of injury wounds in working donkeys are seen on the leg, girth, tail, saddle and wither regions. These wounds are often caused by a combination of poorly fitting and designed tack or harnesses, beating with sticks and improper management practices. One approach to decrease the prevalence of wounds is through educations of donkey users.

Ethiopian farmers have themselves identified a need for greater knowledge through training (Fentie*et al.*, 2014).

1.8. History of traditional treatments:

The science of wound healing has had an existing journey over the ages. Since the caveman, man has been tending to his wounds. Wound care evolved from magical incantations, potions, and ointments, to a systematic text of wound care and surgery from Sushruta, Hippocrates and Celsius (Bhattacharya, 2012).

Right from the days of Sushruta (one of the founding fathers of surgery, lived in india)in Ancient India, due to frequent battles and wars, healing of wounds was a matter of concern for all including ancient Chinese, Korean, Egyptian and African healers. Sushruta Samhita has two separate chapters dealing with healing of these wounds, and describes more than 100 plants for treatment of wounds both singly and in combination (Bhattacharya,2012).

Ancient Indian Surgery was a highly skilled branch of Ayurveda medicine and known as ShaylaTantra. Eight types of surgical procedures described as "AshtavidhaShastra karma" were means and methods to treat the surgical diseases at that time. He clarified that blood clots, foreign materials like stones, hair, nails, fragment of fractured bone, etc., should be removed and wound should be thoroughly cleaned before applying sutures (Biswas and Mukherjee, 2003). Several drugs of plant, mineral, and animal origin are described in the Ayurveda for their wound-healing properties under the term *Vranaropaka*. Some of these plants have been screened scientifically for the evaluation of their wound-healing activity in different pharmacological models and patients, but the potential of most remains unexplored. In a few cases, active chemical constituents were identified. Some Ayurvedic medicinal plants, namely, *FicusBengalensis*, were found

to be effective in experimental models and have long been incorporated in modern medicine (Biswas and Mukherjee, 2003).

Traditional Chinese Medicine (TCM) has been practiced for thousands of years and has deeply emphasized an artistic and holistic approach to healing. (Bhattacharya,2012),The Chinese philosophy of the five elements, which is the basis of the universe according to Chinese Taoism, are viewed as being essential in promoting wound healing in a complementary way. The traditional remedies such as animal fur, saliva, soil and local herbs are often preferred over the western medicines because of both easy availability and inexpensive nature. The etiology of wounds and practices, such as female genital mutilation, traditional circumcision and scarification, often still remain a direct cause of these wounds (Ojok*et al*., 2012).

The ancient Egyptians used honey as a wound treatment. These same properties are still considered essential in contemporary daily wound management, yet another very early account of wound healing dating back to about 2000 B.C. suggests that the Sumerians employed two modes of treatment: a spiritual method consisting of incantations and a physical method of applying poultice-like materials to the wound. Hippocrates, a Greek physician and surgeon, 460-377 BC, known as the father of medicine, used vinegar to irrigate open wounds and wrapped dressings around wounds to prevent further injury. He washed ulcers with wine and after having softened them by oil, he dressed them with fig leaves. Galen, a notable Roman surgeon, was first to recognize that pus from wounds inflicted by the gladiators preceded wound healing. Plinio used mineral remedies as lead and silver, Galen used spice ointments. These advances achieved in wound care and surgery for healing wounds by Hippocrates and Celsus were lost after the fall of the Roman Empire (Phillips, 1998).

The scale of wound infections was most evident in times of war. During the American civil war infected wounds accounted for some 17,000 deaths. World War I brought new types of wounds from advanced weaponry and contamination from the trenches. A Belgian military surgeon, Depage, introduced wound debridement and delayed wound closure and would use microbiological assessment to determine if wound was safe for closure (Phillips, 1998). The use of antibiotics ushered in a new era in wound care. Penicillin was first used clinically in 1940. However, the use of antibiotics did not end wound infections as resistant bacteria and new surgical interventions has risen. The primary method for wound management is prevention. The use of systemic antibiotics and surgical drainage and excision of damaged tissue are primary methods of wound management in present day (Phillips, 1998). Use of growth factors produced by recombinant DNA technology increase the wounds healing capacity by causing the cells to grow and attract new cells to the wound. Targeting individual phases of wound healing, growth factors can assist in all stages thus VEGF stimulates angiogenesis in granulating tissue and promote collaterals, PDGF is mitogen for smooth muscle cells, endothelial cells and fibroblast and acts as a chemoattractant for neutrophils and fibroblasts, TGF a stimulates epithelial cells and fibroblast proliferation and TGF-β stimulates angiogenesis and collagen metabolism (Barrientos*et al*., 2008).

Gene therapy is another new avenue which is being explored to treat no healing wounds. Genes can be delivered into the wound by different methods - biological (viral vectors), physical (micro-injections) and chemical (cationic liposomes). Genes once incorporated in the healing cells affect the cells and their environment by their products of expression. Gene-activated matrix therapy involves embedding gene into a matrix

which stays longer in a wound thus increasing the duration of exposure of target cells to the gene (Wai *et al*., 2010). Developments in the realm of stem cell, growth factors and gene therapy have given us a whole new horizon to explore for modulating no healing wounds and the caveman's wound healing journey still continues.

1.9. Traditional treatment:

In recent years, the cost of conventional medicines that use in animals has escalated and they have thus become unaffordable to most livestock raisers. Traditional remedies and practices, the ethno-veterinary medicines (EVMs), are now sometimes the only available alternative to expensive or unavailable modern forms of health care (WHO 2002, cited by Kiringe2006). Traditional medicine products are playing greater roles in the lives of the people across the world in the face of the global upsurge of drug resistance, toxicity, adverse effects and increasing costs of synthetic products (Abubakar *et al.*, 2017).

Nature is the main source of traditional medicine, which is based on the knowledge gained over generations. The development of novel drugs through the scientific investigation of biological activities and phytochemical features of traditional medicines is fundamental for the treatment of human ailments. Indeed, ethnobotanical knowledge has been recorded in folklore medicines in certain parts of the world. Ethnobotanical data are the starting point of such ethnopharmacognostic research endeavors, proceeding with an experimental part at the later stage for the verification of this information using appropriate scientific approaches (Ipek*et al.*, 2020**).**As various natural remedies, especially from medicinal plants, are affordable and easily available, they are widely used for wound healing and to treat other skin diseases.Although the popularity of

traditional and complementary medicine has increased in recent years, an awareness regarding their quality, efficacy, and safety needs to be raised through scientific standardization and safety evaluation before their clinical use(Ipek*et al.*,2020).

In the Sudan, as in many developing countries, medicinal plants have played an important role in the treatment of diseases especially in rural areas. Trade in medicinal and aromatic plants products that caters for the local market is carried by informal trading sector. Collectors of wild medicinal plants may be either those who collect many assorted items in small quantities for the local market or those who collect certain species in large quantities for export purpose (Hala, 2009). Most people in the developing countries, especially Africa, depend on herbal remedies for effective treatment of wounds. Various in vitro and in vivo parameters are used for the evaluation of the functional activity of medicinal plants by using extracts, fractions and isolated compounds (Agyare *et al*., 2015).

1.9.1. Coffee powder:

The treatment of wounds using Coffee Powder has started since hundred- years ago as a folk remedy for its effectiveness in healing wounds. Many health providers at coffee-plantation areas reported that the use of Coffee Powder on wounds, either acute or chronic (diabetes mellitus, sharp cuts burns) are effective without complication (Yuwono, 2014).The use of Coffee Powder as a wound dressing has a strong influence on the emergence of a new paradigm of thinking in the management of wounds, particularly longer dressing-change duration, maintenance of a moistened wound, many antioxidants, antimicrobial, absorbing and deodorizing properties, autolytic debridement, reduction of scarring, minimized pain by less frequent dressing change, cost-effective and no adverse reactions, this

study gives confidence based on scientific investigation to use safely the Coffee Powder in assisting wound healing as a wound dressing(Hendro, 2014).It found that wound healing occurs within four weeks without replacing gauze bandage and coffee. This circumstances indicate necrotic tissue can be digested by macrophage, proteinase or collagenase, Cysteine proteinase contained in coffee is capable of carrying out the remodeling phase of wound healing (Lepelley*et al*.,2012).

1.9.2. Spider web:

Spider web (Synonym: Cobweb) is a device built by spider out of proteinaceous silk extruded from its pinnerets gland. The Spider web is rubbed directly on to the skin wound to promote healing (Preeti*et al*., 2013). Spider web are rich in Vitamin K, which can be effective in clotting the blood. Webs were used several hundred Years ago as gauze pad to stop bleeding (Jackson, 1974). In spite of its wide use over a long period of time no systematic approach has been made to study the wound healing activity of Spider web (Kumari*et al*., 2013).

1.9.3. Other traditional treatment:

Herbal medicines include herbs, herbal materials, herbal preparations, and finished herbal products that contain as active ingredients, parts of plants, other plant materials, or combinations. Herbal materials include herbs and other substances such as juices, gums, and oils. Herbal medicines may contain plant materials other than the active ingredients and may also contain non plant organic and inorganic substance as a component of the active ingredients (Kumari*et al*.,2016).

1.10. Synthetic therapy in wound managements:

Tetracycline, by beingliberated in oral fluids and by its anticollagenolytic effects, is important for periodontal tissue repair. Studies showed improvement in repairing conditions of periodontal tissues, some collateral effects, due to systemic administration such as some gastrointestinal discomfort, diarrhea, increased skin and tooth pigmentation and uremia. It is possible to observe that tetracycline, and insulin, present benefic effects in collagen formation in healing area. Comparing the wound healing in diabetic and control animals, it observed that topical tetracycline resulted in faster healing in diabetic animals and this was most evident during the initial phases of the healing process - day 3 after surgery (Pierce *et al.*, 1992). Topical tetracycline rendered the healing in diabetic animals near to that observed in controls. in spite of tetracycline re-establishing the velocity of healing in diabetic animals there not significant effects of topical tetracycline in non-diabetic. Probably tetracycline effects are exactly the one necessary for diabetic healing deficiency (Nakao*et al.*, 2009)healing periods observed in time of topical oxy tetracycline used in wound, were 3 and 7 days after surgery (Chalkley, 1943.). the use of topical tetracycline could be a helper way to healing process in diabetics without inconvenient of adverse side effects when used in a systemic way (Nakao*et al*., 2009)

1.11. Monitoring of clinical parameters:

1.11.1. Rectal temperature:

It is important to measurement to monitor the core temperature in severely injured patient (O Uleberg*et al*, 2015) body temperature of all dogs was slightly increased, for the first days post- operatively; the afterwards, the temperature returned to normal on the third to fourth post-operative day (Shahzad*et al.*,2016) statistically significant higher rectal

temperature was seen in non- survivors when compare with survivors in the study of respective study on clinical findings in horse with peritonitis (Jansson, 2016).

1.11.2. Heat rate:

Minor change of heart rate during surgery are considered normal, animals perceiring surgical stimulation may show an increase in heart rate, the dose not necessarily indicate that the anesthesia depth is inadequate unless increase the heart rate is considerable and or respiratory rate in response to stimulating indicate light plant of anesthesia (DewonganandTiwori 2017).

1.11.3. Respiratory rate:

There is a large variation with incidence of critical respiratory events pacu with several postoperative observation studies reporting in incidence between 8 and 6,9.Multeble factors including surgical, anaesthesia and paitenvariabls to the etology of postoperative respiratory compelication (Karcz,2013).

1.11.4. White blood cells count in donkeys (WBCs):

The normal white blood cells perform some important physiological functions. The chief function of it is imparting immunity to the body. Therefore, the decrease or increase in circulating White blood cells indicates physiological condition i.e., increase in White blood cellsindicates inflammation (Kemal, 2014). In donkeys white blood cellsregarded at 5700-14100 cell/mm3 (10990±860 cell/mm3), 5400-15300 cell/mm3 (10821±800 cell/mm3); **(**Hadithy*et al*., 2016). On day 1 leukocyte counts were decreased with a marked left shift in the differential counts, whereas study days 2 to 6, leukocyte count were increased (Holmer*et al*.,2014) white blood cells is increased in blood following abdominal injury (Salehi*et al*., 2016).

1.12. Manifestation associated with healing:

1.12.1. Bleeding:

Coffee Powder is able to stop the bleeding from the subcutaneous layer that was previously difficult to stop only with tight stitching (Yuwono,2014); German pharmasecit, 2008). Because Caffeine in Coffee is considered a mild and transitory vasoconstrictor effect exists, which depend mainly on caffeine concentration in the Vesicular smooth muscle cell (VSMS) also its block the adenosine receptors present in the vesicular tissue to produced vasoconstriction (Echeverri*et al.*, 2010).

Cobweb is used on wound and cuts, and seem to help healing and reduced bleeding. Also (Jackson, 1974), reported that. Webs were used several hundred years ago as gauzes pads, to stop an injured persons bleeding. Stop bleeding characterization may have attributed to presence too much of Vitamin K, as reported in (Jackson, 1974).

1.12.2. Edema:

Edema is normal response to injury. Even the smallest injury is associated with some inflammation, and Initial edema is part of the normal inflammatory process. However, edema becomes a concern when it persists beyond the inflammatory phase to fibroblastic phase of healing, edema will delay healing and contribute to complications such as pain and stiffness. Early prevention and management to prevent this progression are therefore critical, to express the edema and its relationship with stages of healing (June*et al.*,2012)). Oedema is the swelling of tissue due to excess extracellular fluid in the in the body, usually caused by a disturbance in lymphatic circulation.it is the role of lymphatic circulation to absorb and circulate fluid(Williams,2007). Edema it is a medical term for swelling.it is a part of a general response of the body to injury or the inflammation. It can also be a general term for the accumulation of excess fluid in any body tissue; this is often misunderstood as the inflammation which is an immune

response to injury in body tissue in which an affected area becomes inflamed, painful and congested with blood or body fluid. Major causes of edema include heart or kidney failure, low blood serum protein after starvation or liver failure, shock, and impaired returns of blood from extremities to the heart disease and conditions that may cause edema include: congestive heart failure, kidney diseases, medications, infections, pregnancy and many medical conditions can also cause edema. It can also occur when tiny blood vessels in the body leak fluid and the fluid builds up in surrounding tissues, leading to swelling (Lgile,2014).

1.12.3. Congestion:

Initially, wounds well appear red due to the natural inflammatory process of healing, but that redness should gradually decrease Redness around the wound that continues to expand and worsen is a sign of wounds infection (Kramer*et al*, 2018). Also it is important to remember that not all red wounds are healthy (Dowsett*et al*., 2004). Healthy granulation tissue is pink in color and is an indicator of healing, un healthy granulation tissue is dark red in color, often bleeds on contact, and may indicate the presence of infection (Joseph*et al.,* 2006).Red wound may be a superficial wound, second- degree burn, acute fresh wound, surgical wound, or wound left open to heal by secondary intention, which is the process by which an open wound heal with granulation and new blood vessel formation (Linda, 2014).

1.12.4. Wound contraction:

Contraction and epithelialization are the most important factors in second intention wound healing. Wound contraction is defined as the centripetal movement of the original wound margins. This process occurs because of the contraction of my fibroblasts in the granulation tissue. The proportion of a wound that heals by contraction varies depending on the properties of the surrounding skin (Sardari*et al*., 2007). Wound contraction

is a major component of second intention wound healing and the center for contraction is granulation tissue (Swaim*et al.*,2007). The movement of wound edges towards each other in a centripetal fashion. Measurement of wound contraction is an important tool to confirm the progress of wound healing. (Bilal *et al*.,2014) Wound contraction was recorded on day 2, 4, 6, 8, 10, 12 and 14 after creation of wound **(**Bilal*et al*.,2014). Contraction has been shown to begin in an acute skin wound about 4–5 days after wounding, peaking at 14 days (Lawrence, 1998).

1.12.5. Scab formation:

Scars form when the dermal or lower layer of the skin has been damaged, as in case of a burn. The body forms a protein called collagen to help heal the damaged skin**(**Hall*etal*., 2016). The initial stages comprise the formation of a blood clot and acute inflammatory response (1–3 days after wound infliction), following by chronic inflammation (lymphocytes), proliferation and migration of dermal and epidermal cells, and collagen synthesis scab formation at days 4–7, (Gercek *et al.*, 2007). Finally, tissue remodeling and differentiation occurs, leading to full recovery of the skin tissue (12–30 days). This reparation process is modulated by the interaction of molecular signals, primarily cytokines, which elicit and coordinate the different cellular activities which contribute to inflammation and healing (Catalina*et al.*, 2013).

1.12.5.1.Crack of scab:

When scab is formed, the scraped area usually remains dry and dose not oozes fluid. A scab that forms over an area that moves, such as a joint, may crack and a few drops of clear yellowish to pinkish fluid may be uncomfortable, and an infection can develop under this cracked scab (William, 2018).

1.12.5.2. Detachment of scab formation:

During healing a scab may accidently get rubbed off, which causes the wound to be start bleeding again. Treating the wound and protect the area make the healing process can begin again (William, 2018). Detachment of scab formation was occurred at days 8–12 and formation of new epidermis that becomes differentiated by day 12 (Gercek *et al.*, 2007). Finally, tissue remodeling and differentiation occurs, leading to full recovery of the skin tissue (12–30 days).

1.13. Pus in wound healing:

Pus may be so great at the inflammatory phase that the wound remains at that phase. So it's important that nurse recognize when pus is a major factor in an unhealed wound and initiate local care to asset in cleaning the wound bed. is also important to recognize a clean wound and initiate appropriate local care that facilitates wound healing (Gilmore,1991). The link between pus formation and healing was emphasized so strongly that foreign material was introduced into wounds to promote pus formation and suppuration (Weinstein*et al.*, 2000).

1.14. Odor formation:

Odor is a major problem with some pressure ulcers and other wounds(Poteete,1993).A wound odor is an important, yet often underestimated, according to (Fisk, 2012 and Scalbert, 2005), a very useful nature to eliminate wound odor immediately when the Coffee Powder is sprinkled on a foul smelling wound. Also (Holloway, 2009 and Akhmetova*et al*, 2016), they considered the development of malodor may produce as associations between level of bacterial contamination, and other factor, like a wound type, duration of treatment.

1.15. Wound healing:

Wound healing is a fundamental response to tissue injury and several integrated cellular and biochemical events are set in motion immediately after injury leading to re-establishment of structural and functional integrity with regains of strength of injured tissue(Bilal*et al.,* 2014)**.** Wound healing is a complicated process occurring in injured tissue to restore its construction and return the damaged tissue to its normal situation as soon as possible (Ghosh*et al.*, 2012). Wound healing is the process of repair that follows injury to the skin and other soft tissues. Following injury, an inflammatory response occurs and the cells below the dermis begin to increase collagen (connective tissue) production (Awari, 2017). The process of repair that follows injury to the skin and other soft tissues, started with an inflammatory response occurs and the cells below to the dermis begin to increase collagen (connective tissue) production. Later, the epithelial tissue is regenerated. There are three stages to the process of wound healing: inflammation, proliferation, and remodeling (Awari, 2017)**.** Wound healing is a complex and dynamic process which is not fully understood (Georgeseu*et al.*, 2016**),**wound healing may be divided into three phases,

An initial lag phase which is the inflammatory response to injury where capillary permeability increases and protein-rich exudates (fibrin) forms in wound, while inflammatory cells migrate into the area. There is a delay in 2-3 days before fibroblasts begin to manufacture collagen from the protein-rich exudates (lag phase). Thatfollowed with the incremental phase in which cell proliferation, progressive collagen synthesis (matrix formation) and gain in tensile strength occurs. The third phase is the plateau phase of matrix remodeling (Weledji, 2017). The inflammatory phase is naturally intended to remove devitalized tissue and prevent invasive infection. The proliferative phase is characterized by the formation

of granulation tissue within the wound bed, composed of new capillary network, fibroblast, and macrophages in a loose arrangement of supporting structure. This second phase lasts from day 8 to 21 after the injury occurred. The natural period of proliferative phase is a reflection for us in treating wound to reach the goal which ultimately defines as closed wound. The final maturation phase is also characterized by the balancing between deposition of collagen and its degradation. There are prerequisites that should be considered to evaluate the normal wound healing process such as: all tissue involved. on surrounding the wound should be vital, the second prerequisite is that the freedom of the wound from any fibroblasts and the third is that wound should be free from excessive contamination/infection (Prasetyono, 2009).

1.15.1. Healing by secondary intention:

A wound is left open to heal by granulation tissue contraction and epithelization, the history of the healing mode of such wounds without surgical intervention follows the secondary intention which usually results in a delay of closedwound. The timing for the healing by secondary intention is apparently limited to 3 weeks in a normal healing process regarding the proliferation phase which is included with epithelialization. Often these wounds would not heal by themselves fulfilling the process in 3 weeks to become closed wounds without dressings and treatments. Special care to unique wounds would be needed unless they will easily become chronic (Prasetyono,2009). In this type a wound left open to heal by scar formation (Perry *et al.*, 2014).

CHAPTER TOW

MATERIALS AND METHODS

2.1. Study area:

The study was carried out in the Faculty of Veterinary Medicine, West Kordufan University, Gebeish Town, West Kordufan State, the area lies between latitude 11°.15 - 16°.45 N, and longitude 27°. 50- 32°.15, E(Gad Al-Kareem *et al.*,2012)

2.2. Experimental animals:

The study was performed using thirty-six 10 female and 26 male donkeys of age 7±4.1 years old, and body weight 93±7, 8 kg, apparently and clinically healthy. Indigenousbreed donkeys(Makadi)were obtained from livestock market in Gebeish locality. They were in good body conformation and had body condition score three. Before start of this study, donkeys were under went acclimatization for 7 days and received anti parasitic treatment(Ivermectine bests) to ensure that they were free from endoparasites and ectoparasites. Also they were injected withanti-tetanus 1 ml /animal using subcutaneous administration.

The animals were fed on green fodder and hay without concentrate supplementation with free access to water.

Animals were divided into three equal groups each of 12 individuals. They were grouped as: group A, B and Crespectively**.**

To avoid restlessness and new tick infestation animal pens were sanitized with Cypermethrin spry three times during the experiment period.

2.3. Experimental skinwound:

The sacral region was prepared aseptically. Sub cutaneous injection of local anesthesia (lidocaine 2% 1ml /m were performed, external artificial wounds of 10 centimeter length and 3 centimeters depth was done using

scalpel blade, the incision include skin, fascia, and muscular layer (Fig.1), the wound left untreated for the first two days to accelerate the second wound healing.

2.4. Preparation ofwound treatments:

2.4.1. Coffee powder (Group A):

Coffee Powder was obtained from a local market (Gubaiesh shop) derived from coffee plantations in Ethiopia. The coffee beans were roasted and milled to be in a form of Coffee Powder (Soft beans).

2.4.2.: Spider web (Group B):

A fresh Spider web was collected from the inside roofing of and was grinded to be ready for use as topical traditional treatments.

2. 4.3. Oxytetracyclinpowder (Group C):

Oxytetracyclin powder 10% was brought from veterinary pharmacy, AvecoCompany limited products.

2.5. Wound treatment:

Wound treatments were used after two days' post-Inscission was applied as follow: The first group (group **A)**wound were covered using the prepared Coffee powder, enough amount of preparation(60 gm) was used to cover the wound after washing the wound with tab water.

Second group (group B) wound were treated using (100 gm) of Spider web and replaced every two days was firstly cleaned using tab water.

Control group(group C) the skin wounds were dusted using (60 gm)of tetracycline powder after wound washed with Povidin iodine of 10%.

2.6. The studied clinical and hematological parameters:

2.6.1. Rectal temperature:

Rectal temperature was recorded by using clinical thermometer from rectum wall, according to (Kelly, 1974).

2.6.2. Heart rate:

Heart rate was monitored using slandered methods described by (Kelly, 1974).

2.6.3. Respiratory rate:

Respiratory rate was recorded using standard method described by(Kelly, 1974).

2.6.4. Total count of white blood cells (WBC)

Total White Blood Cells Count was carried out using slandered method described by (Joshua*et al.*, 1994).

2.7. The inflammatory signs of wounds:

2.7.1. Bleeding:

In all wound treatments bleeding were observed on the wound Surfaces.

2.7.2. Edema:

Was studied by observing swelling appears in the wound area and accumulation of fluid as described by (William *et al*., 2018).

2.7.3. Congestion:

Congestion was observed in all groups and considerable congestion was revealed when the wound area become dark in color with presence of infection (Joseph*et al*, 2006).

2.7.4. Pus formation

Pus formation measured by bad smelling fluid when seeped from the wound (Pearl and Joseph, 2018).

2.7.5. Odors:

Odor was determined subjectively by direct smelling.

2.8. Progression signs of wound healing:

2.8.1. Wound contraction:

Wound contraction was assessed by observing when centripetal movement of wound margins was occurred(Sardari*et al*., 2007).

2.8.2. Wound scab formation:

Scab formation was measured by appearance of a rusty brown crust, which cover the underling healing tissue like a cap (Carver,2016).

2.8.3. Wound scab crack:

Cracking Scab was identified subjectively occurrence when the skin became dry and cracked with presence of pus and tissue depries underneath.

2.8.4. Detachment of wound scab formation:

Detachment of scab formation was monitored by noting accidently rubbing off of the scab formed, during the healing (William, 2018).

2.9. Wound healing:

Wound healing was monitored according to the criteria described by (Joanne, 2019), who stated that the wound was considered to reach healing

stage when it became red, stretched and shiny as the scab's falloff, scar formed smaller than the original lesion and he skin was weaker and flexible.

2.10. Histopathologicaltechnique:

2.10.1. Samples collection:

For histopathological studies samples were collected and preserved using slandered methods described by (Shafer*et al.,* 1983).

2.10.2. Wound healing grades:

Histopathological procedures from tissue sample to microscopic evaluations were carried out according to method described by (Paget and Thompson, 1979). Wound healing process was graded histologically as the criteria described by (Shafer *et al.,* 1983) and it is summarized as follows:

Grade 1: very light healing low collagen content, low number of capillaries, absence of granulation tissue, abscess formation, necrotic epithelium.

Grade 2: moderate healing moderate collagen content, number of capillaries, onset of granulation tissue formation, epithelial proliferation.

Grade 3: advanced healing abundant collagen content, abundance of capillaries, presence of a well-organized granulation tissue, continuity of epithelization.

Grade 4:well organizedfibrous connective tissue normal amount of capillaries absence of granulation tissue, complete epithelization(Shafer*et al.,* 1983).

2.11. Statistical analysis:

The collected data were submitting to descriptive analysis done by Statistical Package for Social Science (SPSS) software program version 21 IBM using crosstab under Chi square test. The results have shown as

percentage,Bomferroni method adjusted for association and set as (P< 0.05), Differences between the mean Stander deviation of some groups were analyzed by use of the ANOVA one way

CHAPTER THREE

RESULTS

3.1. The effects of different treatments on rectal temperature:

As illustrated in table (3.1) body temperature (C) was recorded at day zero as base line values then day 2, day 4 and day 6, body temperature showed no significant differences between three treated groups.

3.2. The effects of different treatments on heart rate:

As depicted in table (3.2) heart rate (beat/min) was recorded prior to operation as base line value and then day2, day4 and day 6 following treatment, no significant differences were found between all treated groups.

3.3. The effects of different treatments on respiratory rate:

As showed in Table (3.3) respiratory rate values (breath /min) were recorded as mean standard deviation. No significant changes were observed between three treatments in injured donkeys.

3.4. The effects of different treatments on white blood cells count:

White Blood Cells (WBC) count revealed that no significant changes were recorded in all treated groups, although slight increased were observed in WBCs in all groups on day 2 and on day 4 (Table 3.4).

3.5. The effects of different treatments on wound bleeding:

Bleeding was obviously observed in spider web treated groups on day 2 and 4 at percentages of 25.0 and 8.3% respectively, however, coffee powder group and control group (oxytetracyclin group) were found free of bleeding since the days following treatment, figure (3.5).

Table (3.1): Mean of rectal temperature (Cº)M±SD in different treated donkey's wound using coffee powder, spider web and oxytetracyclin at intervals 0(base line values), 2, 4 and 6 days.

Treatments	Time in Days			
	0	2	4	6
Group (A)	37.5±.57	37.3±.54	37.6±.30	37.6±.29
Group (B)	37.5±.57	37.3±.54	37.6±.30	37.6±.29
Group (C) control	38.5±3.3	37.2±.62	37.6±.44	37.5±.55
Sig	NS	NS	NS	NS

Table (3.2): Mean of heart rates (beat min^{-1}) M±SDin different treated donkey's wound using coffee powder, spider web and oxytetracyclin at intervals 0(base line values), 2, 4 and 6days.

Treatments	Time in Days			
	0	2	4	6
Group (A)	34.7±3.6	35.9±2.8	34.5±4.3	34.6±3.3
Group (B)	34.7±3.1	36.4±1.7	34.6±3.9	34.7±3.3
Group (C) control	33.9±3.8	37.1±1.6	34.3±3.9	35.4±3.5
Sig	NS	NS	NS	NS

Table (3.3): Mean of respiratory rates (breath mint-^{1})M±SD in different treated donkey's wound using coffee powder, spider web and oxytetracyclin at intervals 0(base line values), 2, 4 and 6 days.

Treatments	**Time in Days**			
	0	2	4	6
Group (A)	12.3±1.2	12.6±1.0	12.8±1.1	12.4±1.1
Group (B)	12.3±1.0	12.6±1.0	12.5±1.3	12.00±1.1
Group (C) control	12.1±1.3	12.1±1.1	13.00±.95	12.3±1.0
Sig	NS	NS	NS	NS

Table (3.4): Mean of White Blood Cells (WBCs) count in different treated donkey's wound using coffee powder, spider web and oxytetracyclin(10^{9}/1) M±SD at intervals 0(base line values), 2, 4 and 6 days.

Treatments	**Time in Days**			
	0	**2**	**4**	**6**
Group (A)	3.79±0.66	4.10±.025	4.00±.040	3.89±.109
Group (B)	3.78±0.59	4.09±.095	4.00±.035	3.89±.309
Group (C) control	3.78±0.61	4.13±.100	4.00±.034	3.91±.090
Sig	**NS**	**NS**	**NS**	**NS**

0= base line values **H**= Days after complete healing

Group (A) = coffee powder treated group **group (B)** = spider web treated group

Group (C)control= oxytetracyclin treated group **NS**: none significant

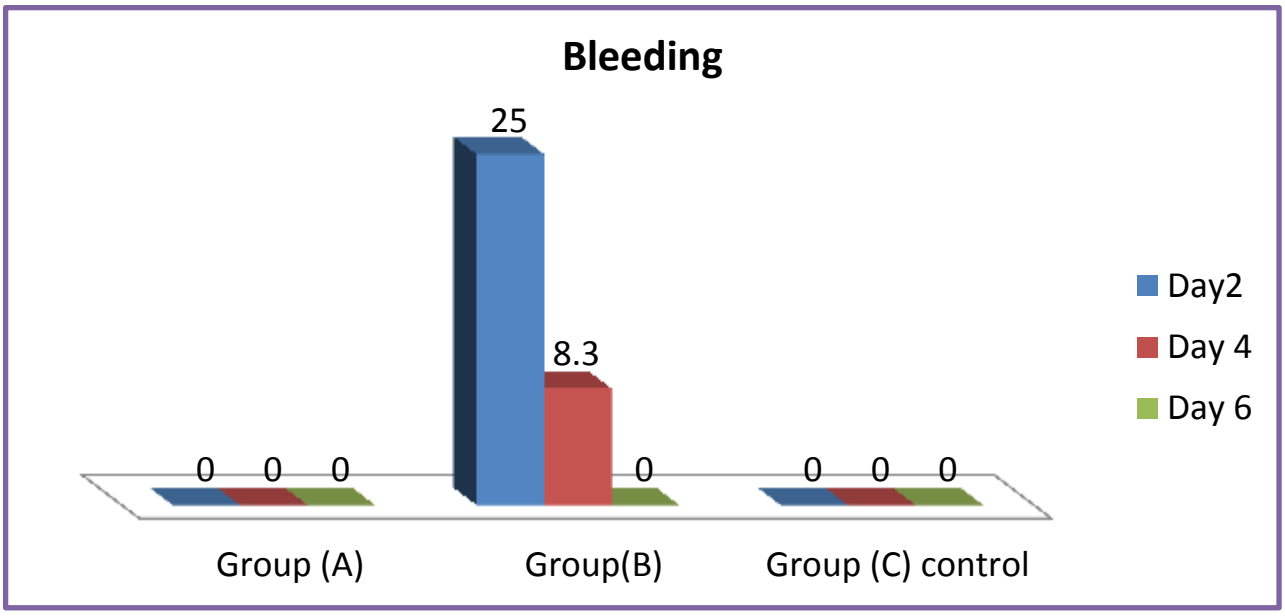


Figure (3.1): percentages (%) of wound bleeding incidence in different treated wounds using coffee powder, spider web and control at intervals 2, 4, days in donkey's wound.

3.6. The effects of the different treatments on wound Oedema:

The occurrence of oedema was studied during this study in all treated animals, no significant differences were observed, however, spider web showed the higher percentages of oedema during the first two days (figure 3.6).

3.7. The effects of different treatments on wound congestion:

Wound congestion was clearly observed in all treated donkeys on intervals 2, 4,6 and day 8 post wound treatment, the higher percentages (%) of congestion were recorded in group (c) the web spider treated group, it noticed that congestion was disappeared in all mentioned treated groups on day 8 (figure 3.7).

3.8. The effects of different treatments on pus formation:

The appearance of pus formation at the incision site was clearly obvious (100%) in both treated donkeys using coffee powder and spider web on days 2, day 4 and day 6 following the treatment, although pus formation at the incision site was not observed in the control group using tetracycline powder (Table 3.8).

3.9. The effects of different treatments on wound odor:

As described in table (3.9) the percentages of smelled foul odor at the wound incision sites after dressing using spider web were found to be higher (100 and 91%) on day 2 and 4 respectively following treatment than other sites that dusted using coffee and tetracycline powders.

3.10. The effects of different treatments on wound contraction:

Healing progression was measured by manifestation of some criteria such as wound contraction; it is found that the contraction of wound at the incision sites is more significantly observed in control group (oxytetracyclin) on day 2, 4, 6, 8, and day 10 at percentages of 83.3, 75.0, 83.3, 75 and 100% respectively (table.3.10.)

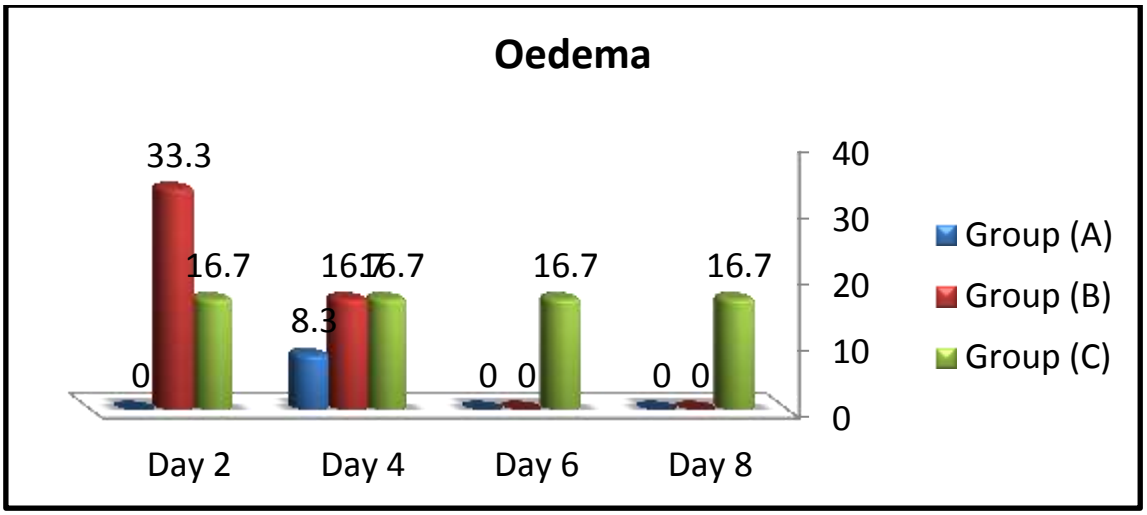


Figure (3.2): percentages (%) of wound oedema incidence in differenttreated wounds using coffee powder, spider web and control (oxytetracyclin) at intervals 2, 4, 6, and day 8, in donkeys

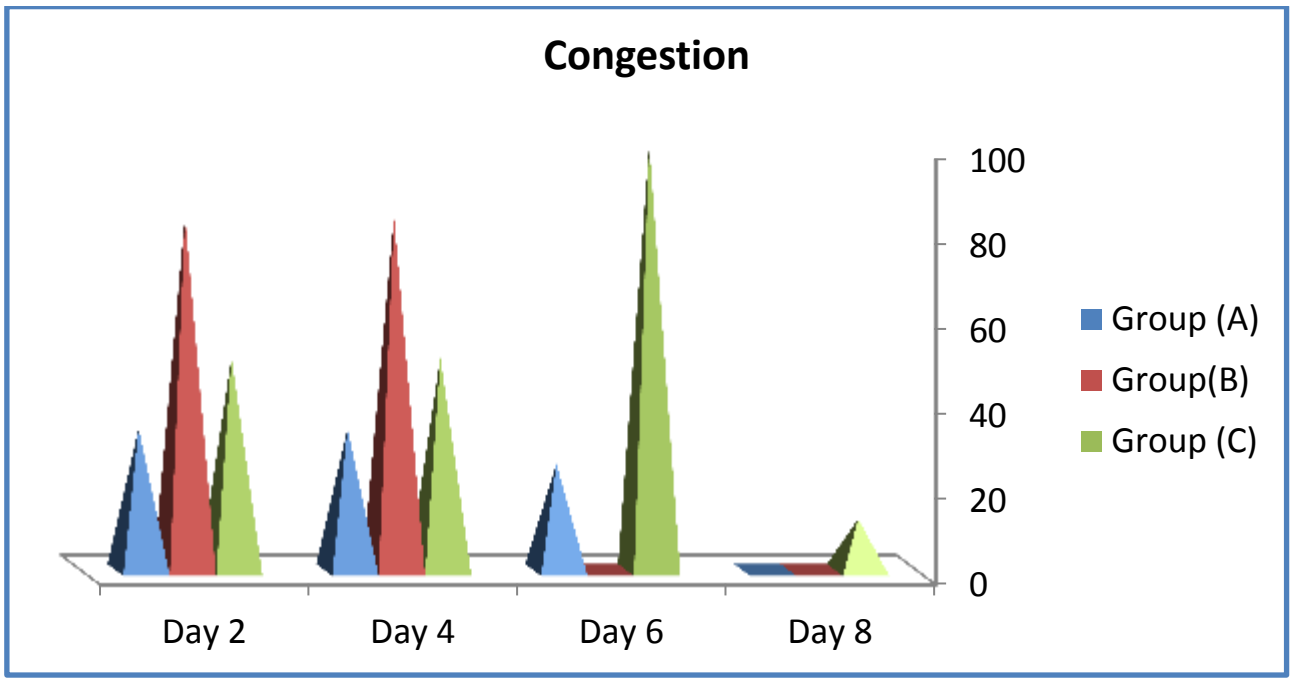


Figure (3.3): percentages (%) of wound congestion incidence in different treated wounds using coffee powder, spider web and control (oxytetracyclin) at intervals 2, 4, 6, and day 8, in donkeys.

Table (3.5): percentages (%) of the incidence of pus formation in different wound treatment using coffee powder, spider web and oxy tetracycline at intervals 2, 4, 6,8, 10, days in donkeys.

Treatment	Time in Days									
	2		4		6		8		10	
	No	%	**No**	%	**No**	%	**No**	%	**No**	%
Group (A)	12	100	12	100	12	100.	4	33.3	0	0.0
Group (B)	12	100	11	91.7	7	58.3	5	41.7	3	25.0
Group (C) contol	0	0.0	0	0.0	0	0.0	6	50.0	6	50.0
Sig	*		*		*		NS		*	

Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (C) = control (oxytetracyclin) treated group **No**= number of animals

a= No statistics are computed. **-** = no Valid Cases

NS= not significant ***:** Significant difference between groups ($p \leq 0.05$)

Table (3.6): percentages (%) of the incidence of wounds odor

in different treated donkeys' wounds using coffee powder, spider web and oxy tetracycline at intervals 2, 4, 6,8, 10, days.

Treatment	Time in Days									
	2		4		6		8		10	
	No	%	**No**	%	**No**	%	**No**	%	**No**	%
Group (A)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Group (A)	12	100.	11	91.7	1	8.3	4	33.3	2	16.7
Group (A)	0	0.0	0	0.0	0	0.0	2	16.7	1	8.3
Sig	*		*		NS		NS		NS	

Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (C) = control (oxytetracyclin) treated group **No**= number of animals

a= No statistics are computed. **-** = no Valid Cases

NS= not significant ***:** Significant difference between groups ($p \leq 0.05$)

Table (3.7): percentages (%) of wound contraction incidence in different wound treatment using coffee powder, spider web and oxy tetracycline at intervals 2, 4, 6, 8, 10, 12,14and 16 days in donkeys.

Treatment	Time in Days															
	2		4		6		8		10		12		14		16	
	N0	%	N0	%	N0	%	N0	%	N0	%	N0	%	N0	%	N0	%
Group (A)	2	16.7	7	58.3	12	100.	2	16.7	0	0.0	-	-	-	-	-	-
Group (B)	3	25.0	10	83.3	12	100.	2	16.7	2	16.7	2	16,7	3	25.0	12	100
Group (C)	10	83.3	9	75.0	10	83.3	10	83.3	12	100.	0	0.0	0	0.0	-	-
Sig	*		NS		NS		*		*		NS		NS		**a**	

Group (A) = coffee powder treated group
Group (B) = spider web treated group
Group (C) = control (oxytetracyclin) treated group
No= number of animals
a= No statistics are computed.
- = no Valid Cases

NS= not significant
***:** Significant difference between groups ($p \leq 0.05$)

3.11. The effects of different treatments on wound scab formation:

As showed in Table (3.11). Scab formation at the incision site started on day four in both coffee powder and control group; however, the higher percentages were clearly seen in coffee powder groups. Spider web treated groups showed the lesser incidence percentages of scab formation at incision lines.

3.12. The effects of different treatments on cracking of scab formation:

As elaborated in table (3.12) scab tissue formation began to crack on day 4 following the usage of coffee powder and tetracycline powder and continued on day 6 and day 8, on the other hands, spider web treated group showed scab cracking only on day 6 at percentage of 33.3%.

3.13. The effects of \different treatments on scab detachment:

The cracked scar tissues at the incision sites started to detach on day 4 in coffee powder and control(oxytetracyclin power) treated groups at percentages of 83.3 and 33.3% respectively. Completer scar tissue detachment was occurred in group(A) that treated using coffee powderon day 6, although spider web treated group (group B) showed no scar tissue detachment till the 10^{th} days following skin incision treatment (table 3.13).

3.14. The effects of different treatments on wound healing time:

The time that required for complete wound healing was studied in different treatment that used to dress the donkey's wounds. Coffee powder and spider web groups were found the shorter the time (days) in healing

compare with control group. Complete healing (100%) were occurred in group A (coffee powder group), control group (oxytetracyclin powder group) and group B (spider web group) on day 10, day 14 and day 18 respectively (table 3.14)

3.15. Histopathological examination and healing grades:

The results obtained from the histopathological examinations are shown in table (3.15). It revealed that 30, 10, 60 and 0% were in grades 1, 2, 3 and 4 in coffee powder treated groups (Figure.1.2 and 3). Spider web groups showed grades 2 and 4 of percentages 60 and 40% respectively (Figure.4 and 5), while oxytetracyclin powder treated groups were showed 80% of grade (2) and 20% of grade (3) (Figure6 and 7).

Table (3.8): percentages (%) of wound scab formation in different wound treatment using coffee powder,spider web and oxytetracyclin at intervals 4, 6,8, 10 ,12,14, 16 and 18days in donkeys.

Treatments	Time in Days															
	4		6		8		10		12		14		16		18	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**Nu**	**%**	**Nu**	**%**
Group (A)	12	100	12	100	5	41.7	0	0.0	-	-	-	-	-	-	-	-
Group (B)	1	8.3	6	50.0	12	100.	1	8.3	1	8.30	1	8.3	3	25.0	3	25.0
Group (C)	11	91.7	10	83.3	6	50.0	12	100	12	100	0	0.0	-	-	-	-
Sig	*****		*****		**NS**		*****		*****		**NS**		**a**		**a**	

Group (A) = coffee powder treated group **Group (B)** = spider web treated group
Group (C) = control (oxytetracyclin) treated group **No**= number of animals
a= No statistics are computed. **-** = no Valid Cases

NS= not significant ***:** Significant difference between groups ($p \leq 0.05$)

Table (3.9): percentages (%) of the incidence of wound scab crack in different treated donkeys' wounds using coffee powder, spider web and oxytetracycline at intervals4, 6,8, and 10 days.

Treatment	Time in Days							
	4		6		8		10	
	No	%	**No**	%	**No**	%	**No**	%
Group (A)	11	91.7	3	25.0	2	16.7	0	0.0
Group (B)	0	0.0	4	33.3	0	0.0	0	0.0
Group (C) control	11	91.7	12	100	7	58.3	6	50.0
Sig	*		*		*		*	

Group (A) = coffee powder treated group

Group (B) = spider web treated group

Group (C) = control (oxytetracyclin) treated group **No**= number of animals

a= No statistics are computed.

- = no Valid Cases

NS= not significant

***:** Significant difference between groups ($p \leq 0.05$)

Table (3.10): percentages (%) of the incidence of wound scab detachment in different wound treatment using coffee powder, spider web andoxy tetracycline at intervals,8, 10 and 12 days in donkeys.

Treatment	Time in Days					
	8		10		12	
	No	%	**No**	%	**No**	%
Group (A)	10	83.3	2	16.7	0	0.0
Group (B)	0	0.00	0	0.0	0	0.0
Group (C) control	4	33.3	3	25.0	0	0.0
Sig	*		NS		NS	

Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (C) = control (oxytetracyclin) treated group **No**= number of animals

a= No statistics are computed. **-** = no Valid Cases

NS= not significant ***:** Significant difference between groups ($p \leq 0.05$)

Table (3.11): percentages (%) of wound healing time in different treated wound using coffee powder, spider web and oxytetracyclin as control at intervals, 6,8, 10,12, 14, 16 and18 days in donkeys.

Treatment	Time in Days									
	6		8		10		14		18	
	No	%	**No**	%	**No**	%	**No**	%	**No**	%
Group (A)	0	0.0	7	58.3	5	41.6	**-**	**-**	**-**	**-**
Group (B)	1	8.3	7	58.3	0	.0	0	0.0	4	33.3
Group (C) control	0	0.0	0	0.0	0	0.0	12	100	**-**	**-**
Sig	**NS**		*****		*****		*****		a	

Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (C) = control (oxytetracyclin) treated group **No**= number of animals

a= No statistics are computed. **-** = no Valid Cases

NS= not significant ***:** Significant difference between groups ($p \leq 0.05$)

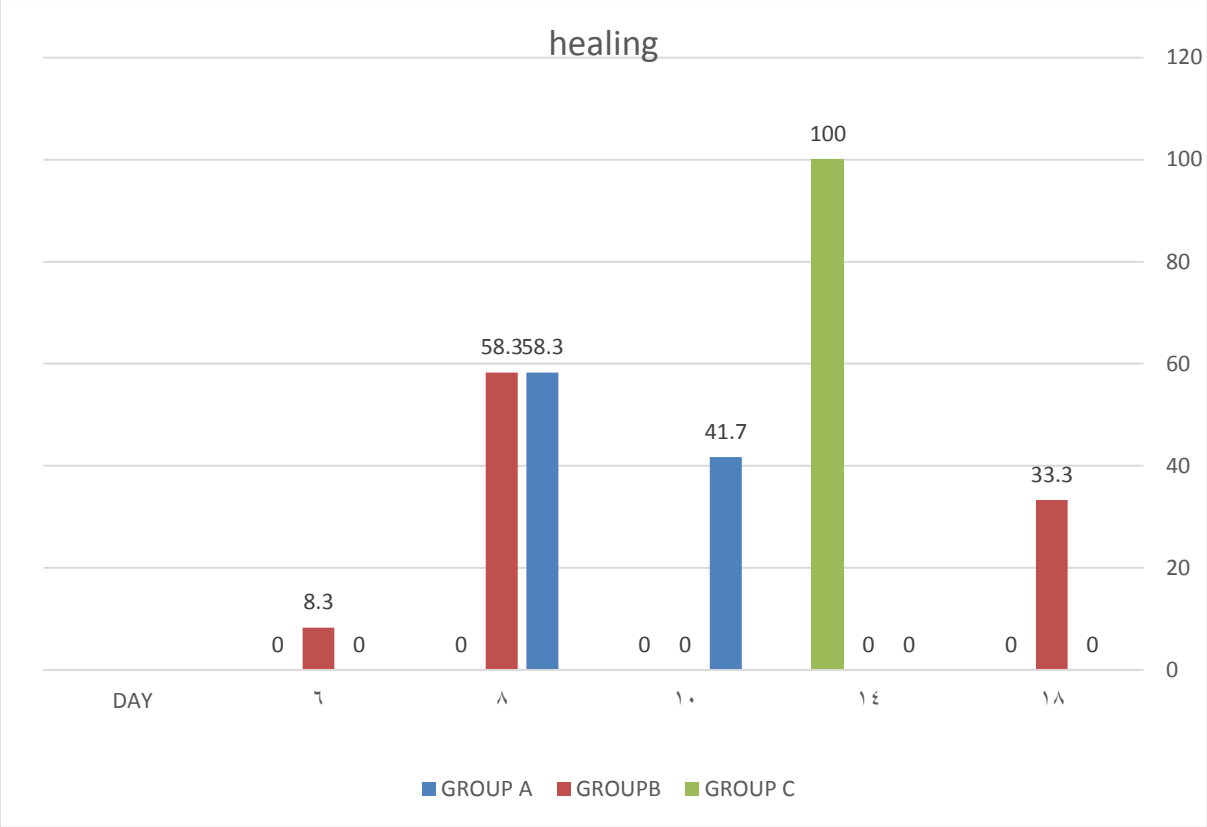


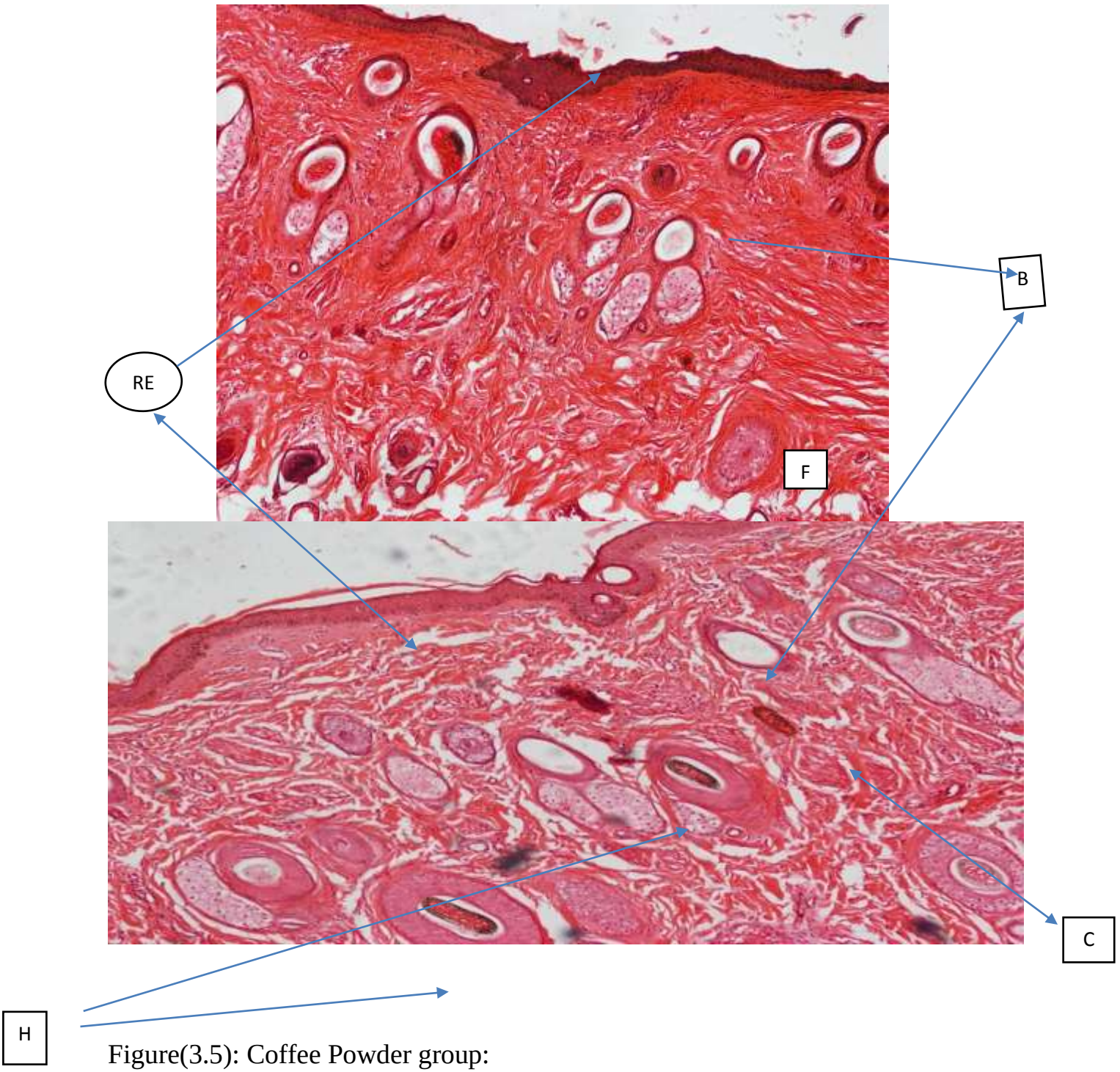
Figure (3.4): Percentages (%) of wound healing at time of incedace in different treated wound using coffee powder, spider web and oxytetracyclin as control at intervals, 6,8, 10,12, 14, 16 and18 days in donkeys.

Table (3.12):Percentages of wound healing grades in different treated donkeys

Group/Grade	Grade 1	Grade 2	Grade 3	Grade 4	Total
Group (A)	10%	30%	60%	0%	100%
Group B	0%	60%	40%	0%	100%
Group C	0%	80%	20%	0%	100%

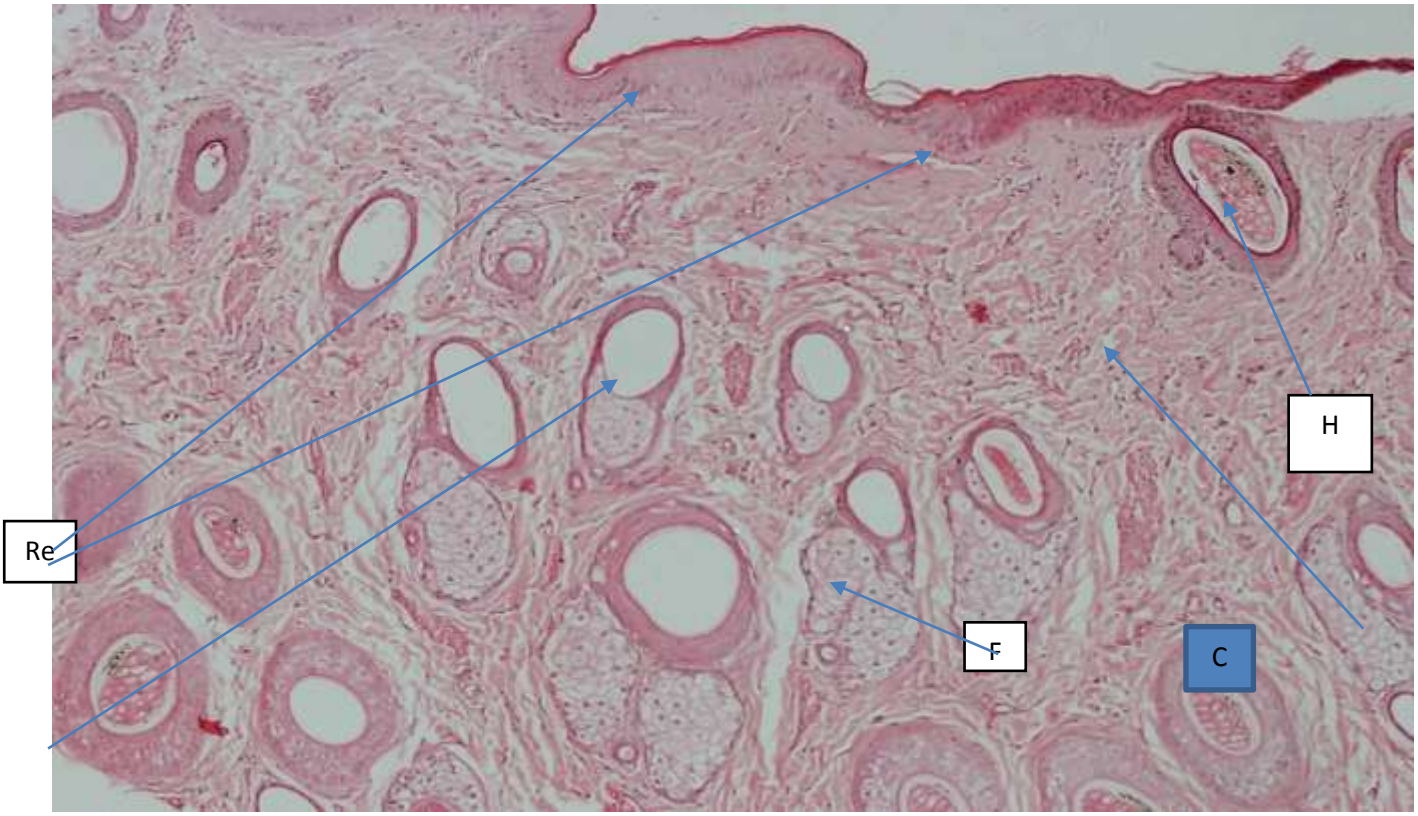
Group (A) = coffee powder treated group **Group (B)** = spider web treated group

Group (C) = oxytetracycline treated group

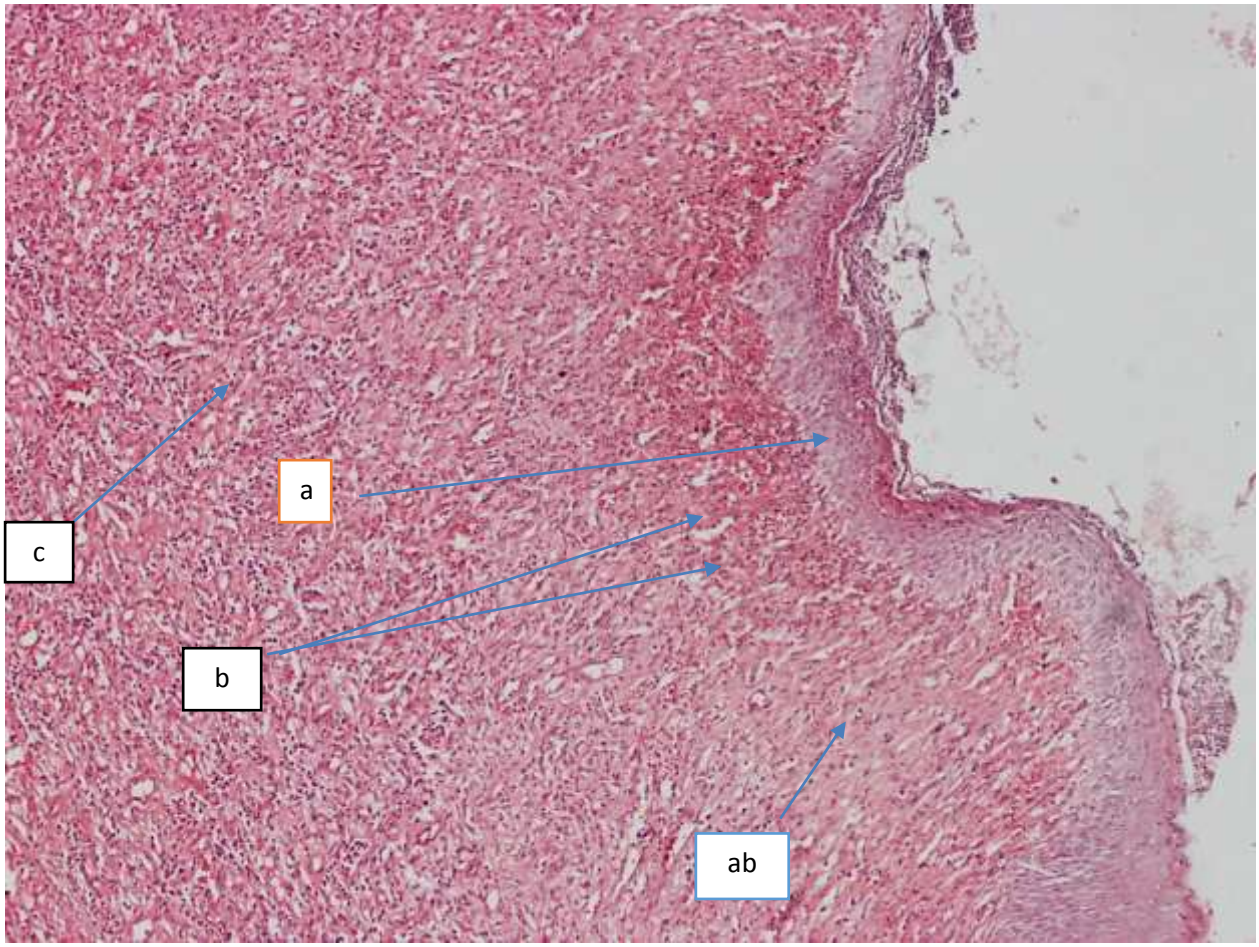


Figure(3.5): Coffee Powder group:

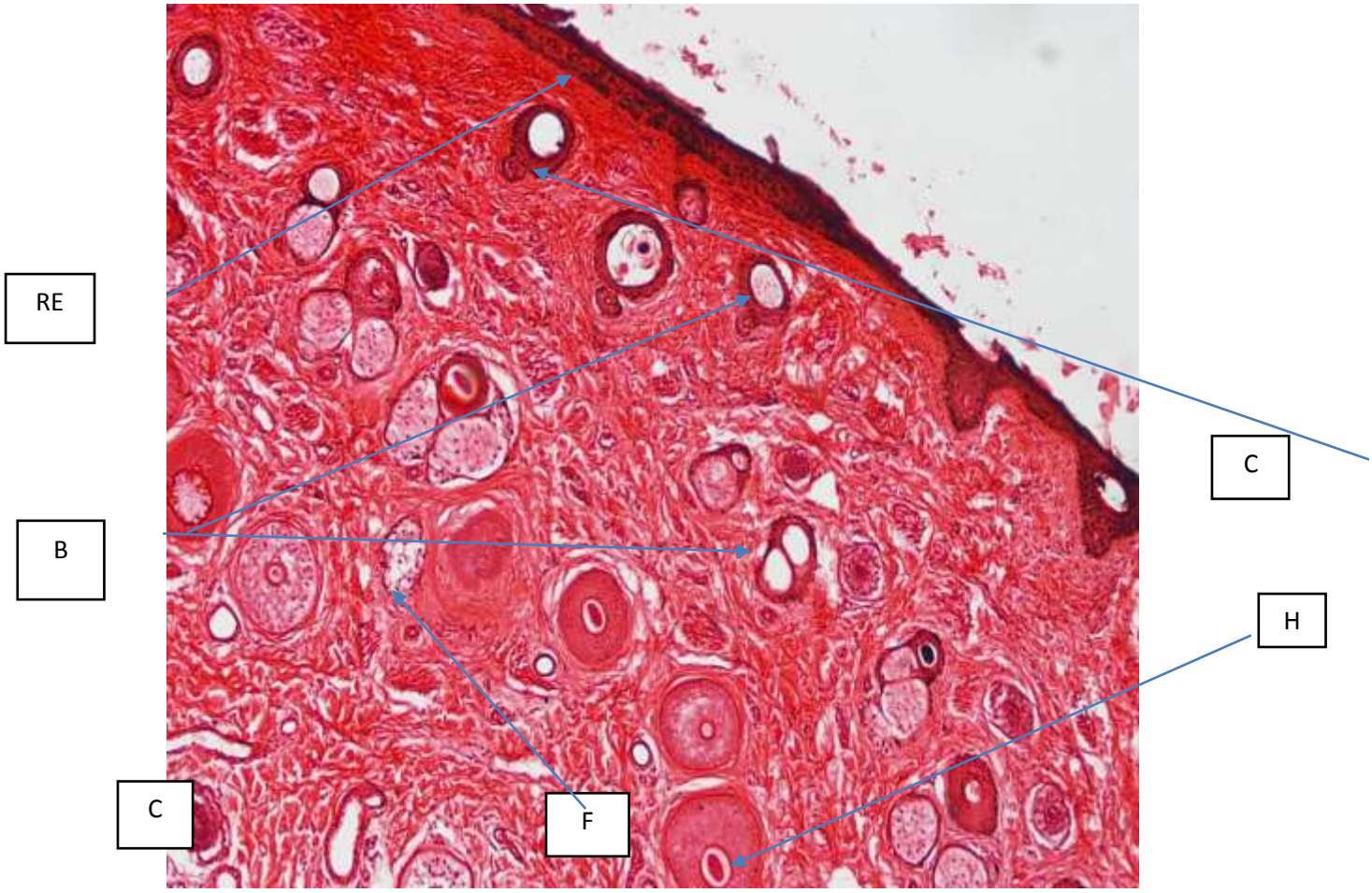
Healing Grade 3: Histological view of wound healingskin biopsy at day 10 showed the hematoxylin and eosin (HE) stained the magnification10X (Re) continuity ofepithelization with (stratum corneum, nucleated epidermis, dermis) (C) abundant content Collagen Fibers H) hair follicles, (B) blood vessels (F) Fibroblast. Presence of a well-organized granulation tissue



Figure(3.6): Coffee Powder grade (2) grouphistological view of wound healingskin biopsy at day 10 showed the hematoxylin and eosin (HE) stained the magnification10X (Re) epithelization with (separated stratum corneum, nucleated epidermis, dermis(C) Collagen moderate content Fibers H) hair follicles, (B) blood vessels (F) Fibroblast. Onset of granulation tissue formation,



Figure(3.7): Coffee Powder grade (1) histopathological finding of wound healing, at day8 skin biopsy showed the hematoxylin and eosin (HE) Stained, Magnification was 100X, arrows pointing events at the healing (a) small amount of epithelization, dermis, no stratum corneum was formed, (b) keratinocyte's moved upwards to build the upper keratin layer, (C) mixed inflammatory infiltration. No blood vessels.(small caliber's) no hair follicles. (Ab)Abcece formation, absence of granulation tissue



Figure(3.8): Spider web groub, grade 3 histological view of wound healingskin biopsy at day 10 showed the hematoxylin and eosin (HE) stained the magnification10X (Re) epithelization with (separated stratum corneum, nucleated epidermis, dermis) (C) abundant of Collagen contain. M Fibers H) hair follicles, (B) blood vessels (F) Fibroblast, presence of a well-organized granulation tissue,

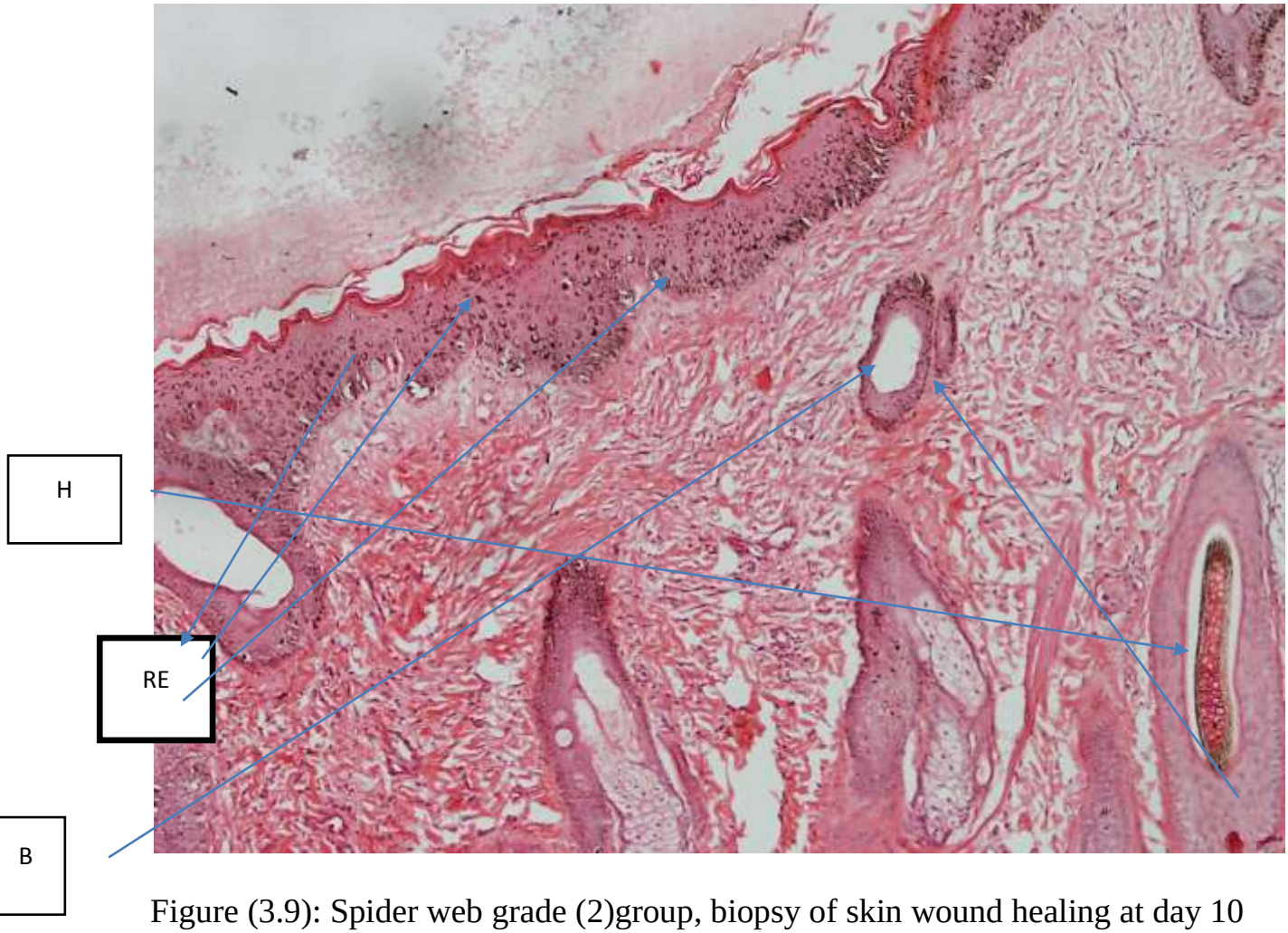
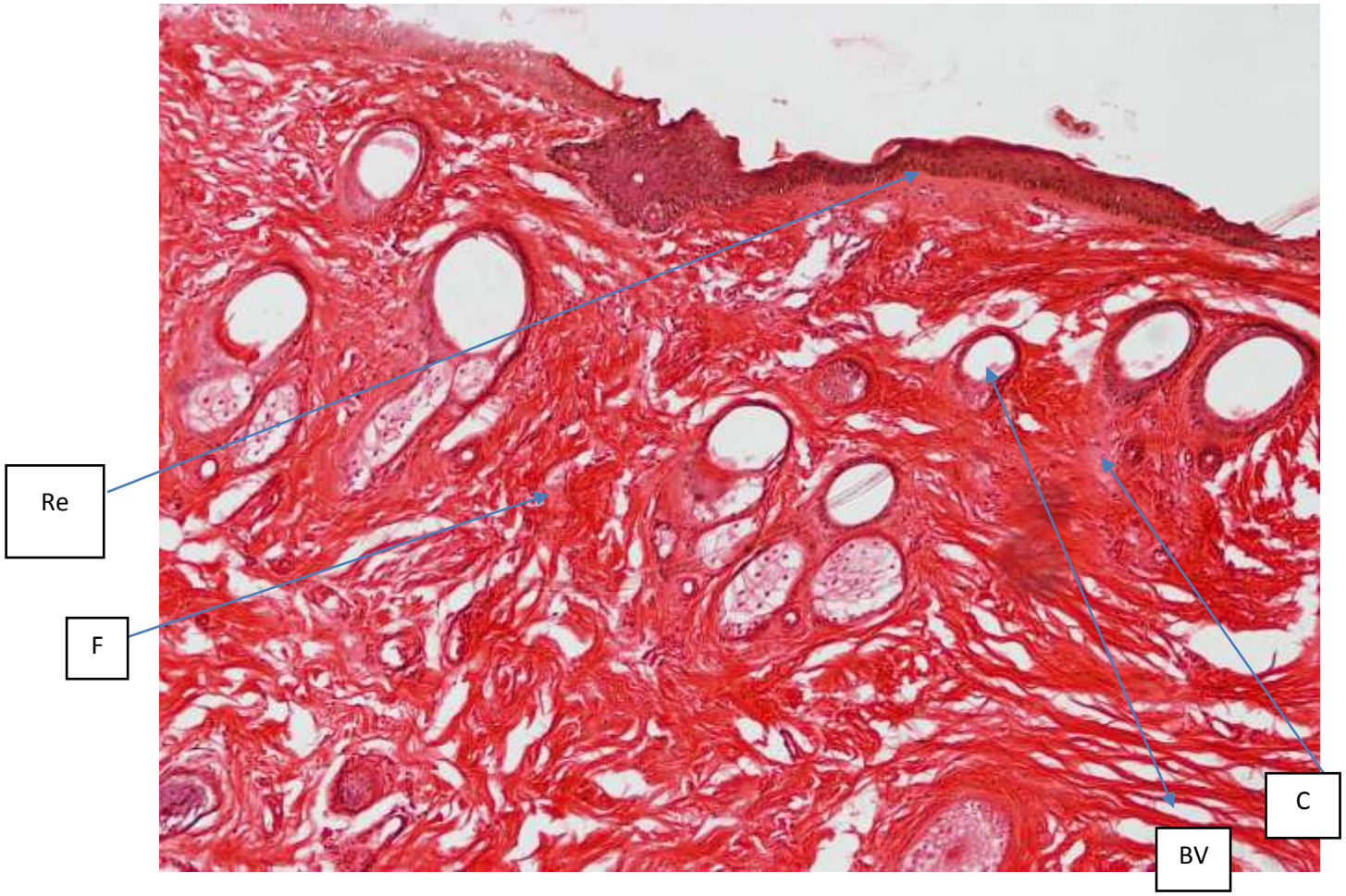


Figure (3.9): Spider web grade (2)group, biopsy of skin wound healing at day 10 post wounding showed:(Re) slight re epithelization with formation of the stratum corneum. Density nucleated epidermis, (C) moderate collagen content Collagen Fibers in the dermis, (H) hair follicles, sebaceous glands, (B) blood vessels.in term of proliferation phase. Onset of granulation tissue formation showed moderate healing.



Figure(3.10): Oxytetracyclin grade (3)at day 10 post wounding, histological view of wound healing and skin intact with epidermal /dermal skin section showed hematoxylin and eosin(H&E) stained, the magnification was 10X. Arrows pointing events during wounds healing, (Re) continuity of epithelization (F) Fibroblast, (C) abundant Collagen content, (BV) blood vessels, similar of Control.

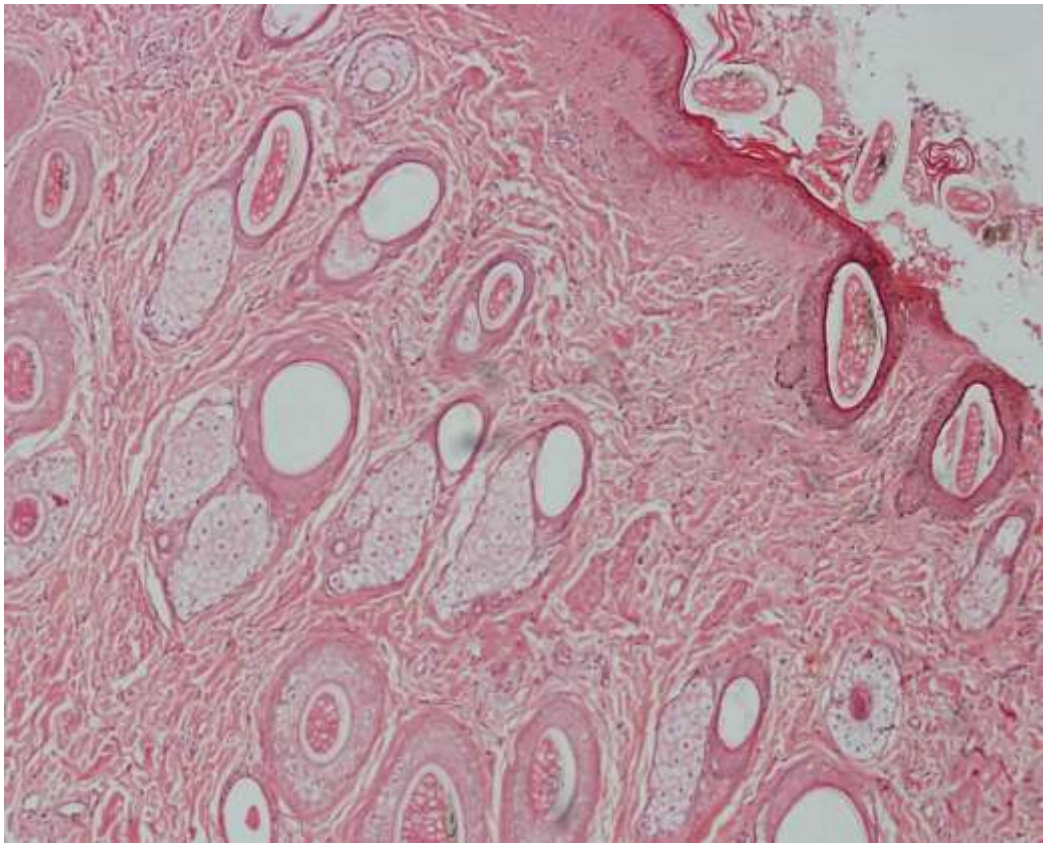


Figure (3.11): Oxy tetracycline group, grade 2 biopsy of skin wound healing at day 10 post wounding showed: formation of the stratum corneum. Density nucleated epidermis, dense Collagen Fibers in the dermis, hair follicles, sebaceous glands, blood vessels. Onset of granulation tissue formation in term of proliferation phase,showed moderate healing**.**

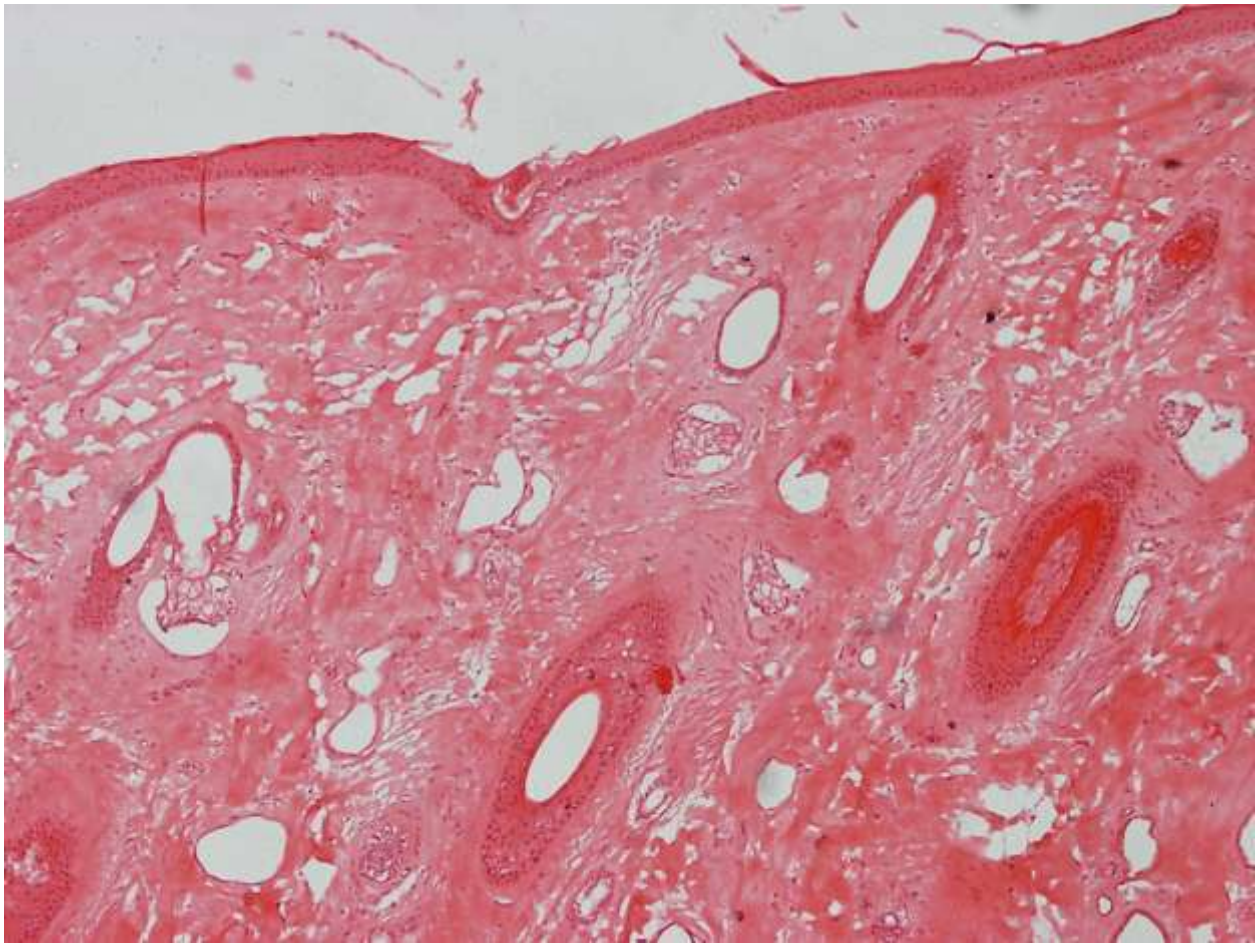


Figure (3.12): histological view in Normal tissue, control, normal skin section showed the hematoxylin and eosin (H&E) stained, normal skin intact normal Collagen, mature blood vessels, hair follicles,

CHAPTER FOUR

DISCUSSION

Skin is a multilayer organ that acts as an interface between the internal organs and the external environment, forming a barrier that prevents the body dehydration and the penetration of external microorganism. As the skin permanently exposed to the external atmosphere, it is extremely vulnerable to the appearance of different types of lesions, such as burns, ulcers and wounds (Pereira*et al*, 2013), wound healing is a complicated process, with different strategies in treating different types of wounds. According to trauma area, infectious situation and medical treatment, wound healing can be divided into different categories including primary healing, secondary healing and subeschar healing (Young *etal*, and Regan 2018).

Successful cutaneous wound repair occurs in a series of tightly coordinated and overlapping phases; inflammatory phase, proliferative phase, and maturation phase (Velnar*et al*, 2009).The search for efficient therapeutic approaches seems to be essential in order to avoid the aggravation of cutaneous wounds. Natural biomaterials of both plant and animal origin own good medicinal characteristics for situations where synthetic materials have not met clinical expectations (Yooest*et al*., 2011). These therapies comprise practices, products, and knowledge from different countries, involving the use of living organisms and natural compounds obtained from a wide range of sources (e.g., animals, plants, fungi, and minerals (World Health Organization, 2012).

The treatment of wounds using Coffee Powder has started since hundred-years ago as a folk remedy for its effectiveness in healing wounds. Many health providers at coffee-plantation areas reported that the use of Coffee Powder on wounds, either acute or chronic (diabetes mellitus, sharp cuts burns) are effective without complications (Yuwono, 2014).

Spider web was being used in India and other countries in incision and excision wound to promote the wound healing (Kumari, 2013) the use of topical tetracycline could be a helper way to healing process in diabetics without inconvenient of adverse side effects when used in a systemic way (Nakao*et al*., 2009).

The usage of different wound treatments in donkey (coffee powder, spider web and oxytetracyclin) showed that body temperatureobserved no significant differences,present study was not match with (Shahzad*et al.*,2016) who reported that body temperature of all dogs was slightly increased, for the first days post- operatively; the afterwards, the temperature returned to normal on the third to fourth post-operative day, also disagree with (Jansson., 2016), reported that statistically significant higher rectal temperature was seen in non- survivors when compare with survivors in the study of respective study on clinical findings in horse with peritonitis. On the other hand, (Tavakoli*et al.*,2007) reported no significant differences between body temperature, heart rate, respiratory rate in animals underwent bowel anastomosis. Also Ghazy*et al* (2016) reported that mean of rectal temperature within normal range before and after surgery of correction of left abomasal displacement on filed condition, however, rectal temperature showed slight increase at the three days following bowel surgery in dogs.

During thisstudy Heart rate value showed no change between groups. This result was notagree with finding of (Rukmani,2017). who reported that Animals perceiving surgical stimulation may show an increase in heart rate also disagree with (Arras *et al*.,2007).Who saidheart rate variability was indicating of mild to moderate post laparotomy pain and could define its duration in our mouse model. Most animals that undergo trauma are in shock. Heart rate and respiratory rate are often high also disagree with (Shahzad*et al.*,2016)who reported that pulse rate was increased for the first two days' post-surgery.

The respiratory value which conducted in this study showed no significant different between tow traditional treatments and control that used in donkeys wound as topical treatment, this result was in line with (Tavakoli*et al.*,2007),who reported that there were no significant different in respiratory rate, put disagree with (Shahab*et al.*,2016),who reported that the respiratory rate in doges was started to increase a few days following surgery.

White blood cells (WBCs) were counted during this study at 0 day (baseline values), 2, 4 and 6, no significant differences were found in all treated group, however, slight elevation were observed on day 2 and day 4 following wound managements, this rises was agree with (Salehi*et al*.,2016), how observed the increase of white blood cells count in blood after the abdominal trauma. and stronglySalcicciasupported by findings of Dilawer*et al*., (2009) who reported increasing in white blood cells count after intra-abdominal surgery, although *et al*., (2013), reported that kinetics of blood leukocytes in survivors is higher than in non-survivors horses after colic surgery, however, Holmer*et al*. (2014), who reported that leukocyte counts were decreased with a marked left shift in the differential counts following surgery in rats. On the other hands, Selman *et al* (2017), reported that white blood cells count significantly decrease in treated wound in male mice, also (Jung, *et al*.,2019) reported that leukocytosis may be sings developing infection in the early postoperative period it's also be part of a normal surgical response.

Bleeding after a minor cut, a postoperative procedure, or after an accident is a common incident, because of the commonality of this complication, homeostasis is an important concept to address when considering wound healing, coffee powder treated group showed the less bleeding among other treated groups it usually halts the bleeding immediately, because coffee powder on the wound helps to clot the blood, others results showed that coffee Powder is able to stop the bleeding from the subcutaneous layer that was previously difficult to stop only with tight stitching (Yuwono,2014). This result also was in

line with (Echeverri*et al*., 2010), who said that, caffeine in coffee has considered a mild and transitory vasoconstrictor effect, which depend mainly on caffeine concentration in the vesicular smooth muscle cell also its block the adenosine receptors present in the vesicular tissue to produced vasoconstriction. On the other hands, the bleeding in spider web treated group, showed less percentages on day 2 and day 4 post treatments, these results were supported by (German pharmasecit, 2008) who reported that cobweb is used on wound and cuts, and seem to help healing and reduced bleeding, the discontinuation of bleeding on wound treated with spider web in this study was in agreement with (Jackson, 1974) who reported that webs were used several hundred years ago as gauzes pads, to stop an injured persons bleeding. Stop bleeding characterization may have attributed to presence too much of Vitamin K (Jackson, 1974). Oxytetracyclin in treated animal groups showed no bleeding and these findings may have attributed to blood coagulate by Oxytetracyclin.

The incidence of oedema at the incision sites were not significantly observed and less occurred in coffee powder treated group, these may have attributed to the role of coffee powder treatment in absorbable of wound fluid, and in line with some results obtained, that coffee Powder absorbs water very fast (hygroscopic), therefore it also plays a role in continuously absorb wound fluids (Yuwono, 2014) and oedema is the swelling of tissue due to excess extracellular fluid in the body, usually caused by a disturbance in lymphatic circulation (Williams, 2007), in spider web group, edema was reported in day 2 and lasted on day 4 that may have attributed to absorbable of extracellular fluid wound by the spider web and in line with the findings that spider web "called Cobweb is able to absorbed the body exudate (Thomas and Fram,2001). Oxy-tetracycline in spite of edema was appeared in few member of animals put it was persisting for several days and its prolonged the inflammatory phase that may due to drug effect, this justification were agree with that edema can cause by medications, infections and many medical condition can cause edema (Lgile,

2014), although edema was prolonged the inflammatory phase in oxy-tetracycline treated group but it was not impaired the healing, this results were in contrast with (June*et al*.,2012) who reported that edema will delay healing and contribute to complications such as pain and stiffness.

The congestions at wound sites takes place in both treated groups using coffee powder and spider web and disappeared by day 6, this is similar with the finding of Miranda (2018) who reported that initially, wounds well appear red due to the natural inflammatory process of healing, but that redness should gradually decrease in approximately 5 – 7 days, and disagree with control group that disappeared at day 8. other workers reported thatred wound may be a superficial wound, second- degree burn, acute fresh wound, surgical wound, or wound left open to heal by secondary intention, which is the process by which an open wound heal with granulation and new blood vessel formation, it is important to remember that not all red wounds are healthy (Dowsett*et al*., 2004).

During this study contraction was observed at day 2, 4, 6, 8, 10, 12, and day 14, in spider web group. This result was in line with the result of (Bilal*et al*., 2014). who reported that wound contraction was observed at day 2, 4, 6, 8, 10, 12 and day 14, but there is a difference in whole case of coffee powder, and Oxytetracyclin groups, because the wound contraction was appeared at day 2 but disappeared on day 6 day 8 in coffee powder and in day 10 in Oxytetracyclin, Lawrence (1998) reported that, contraction has been shown to begin in an acute skin wound about 4–5 days after wounding, peaking at 14 days, that may duo to species, and the type of wound.

Scab tissue formation was reported in all treated wounds on day4 post-treatment, in Coffee Powder treated group, scab was formed on day 4 and day 6, while in spider web was occurred on day 4 and 8, in oxytetracyclin treated group scab was formed on day 4 and day 10 these findings were in contrast with Gercek *et al* (2007), who reported that scab formed at days 4 and 7 from the injured time.

present study showed the occurrence of Cracking skin in Coffee Powder group and oxytetracyclin group which lead to infection and pus formation, this was agree with Nall(2019) who reported that if a scab cracks dislodges or otherwise fails to keep bacteria out they can enter the wound and cause a skin infection.

Percent study revealed that detachment of scab formation appeared at day 8 and day 10 in coffee powder group and control group respectively, this results were agree with Gercek *et al (*2007) who reported that detachment of scab occurred at days 8and day 12, and formation of new epidermis that becomes differentiated. Wiksman*et al* (2007) reported that detachment occurred at day 8 to day 12 post-wounding. Others reported that detachment of scab formation observed at day 14 (Aslam*et al*,2020), wound healing time is the interval from the scab formation to when the scab completely detached (Xue*et al*,2018).

Pus was being expanded after the inflammatory phase in all animals, in coffee powder and spider web treated groups, pus were started to form at day 2 but lasts at day 8 in coffee, and day 10 in Spider web group, while pus was observed at day 8 to day 10 in oxy tetracycline group, pus is a major factor in an unhealed wound so it's important that nurse recognize also above study was agrees with (Robson, 1997), who considered the local wound infection and foreign bodies affect healing by prolonging the inflammatory phase.

odor was not smelled in coffee powder group in spite was showed copious pus production during the time of healing this observation were in agree with (Yuwono, 2014) who said that if wounds covered with coffee powder it will had a nice coffee aroma and immediately eliminated wound-odors. Fisk (2012) and Scalbert (2005) reported that a very useful nature to eliminate wound odor immediately when the coffee powder is sprinkled on a foul smelling wound, oxy tetracycline group, odor was reported just in 2 member of animals that may have attributed to killing bacteria by oxy tetracycline, in spider web group odor was observed in all wounds at day 4 and then it was decreased during the time of

healing this may have attributed to bacterial contamination. Holloway (2009) and Akhmetova(2016) confirm that development of malodor may produce as associations between level of bacterial contamination, and other factor, like a wound type, and duration of treatment, also that may have attributed to that spider web are dirty and dusty, and the wound treated with spider web in this study was cleaned only with water.

The time required for healing was found to be shorter in coffee powder treated group,it observed that all animals treated using coffee powder were totally heeled by the 10^{th} days following treatment,however, Lepelley (2012), reported that wound healing occurs within four weeks without replacing gauze bandage and coffee, short time of healing in present study may have attributed to replacing the coffee treatment each two days and its sprinkles over the wound without gauze.Prasetyono(2009), considered that wounds would not heal by themselves, and fulfilling the process in three weeks to become "closed" wounds without dressings and treatments.

Coffee powder and spider web showed the nearly same rate of healing, in oxytetracyclin treated group, healing occurred once on the 14^{th} post wounding. There was in contrast to Chalkley (1943) who reported that the healing periods observed in time of topical oxytetracyclin used in wound, were 3 and 7 days after surgery.

Histopathological examination findings on wounds healing at day 8, and day 10 post wounding in coffee powder treated group, revealed that a proliferation phase observed on day 3 and day day10 which characterized by epithelization with epidermis, thin stratum corneum, density enucleated epidermis, dermis, Collagen, fibers, keratinocytes, hair follicles, blood vessels and sweets glands these results were agree with Robson (2001) who reported that the formation of granulation tissue, and restoring the vesicular network, occurred next to the immigration of local fibroblast alone the fibrin network, and the beginning of re-epithelization from the wounds edges,

neovascularization blood vessels.(Martin,1997) reported that, the re-epithelization process is insured by local keratinocytes at the wound edges and by epithelium stem cells, from hair follicles or sweet glands.

Examine Sides of spider web groups showed formation of epithelization with formation of stratum corneum, density nucleated epidermis, Collagen, Fibers, Blood vessels, on days 8, and day10, this finding were in same with Robson (2001) and Martin (1997) reported that the same features of skin biopsy at day 8 and day 10 post wounding, put advanced healing with abundant collagen content, abundance of blood vessels, presence of a well-organized granulation tissue, continuity of epithelization.

The peak of the proliferative phase in donkeys in our study was observed between the eighth to tenth day in coffee powder and in spider web by day14, however, oxy tetracycline the peak of proliferation was occurrence in shortest period it should be considered that the proliferative phase in rat was observed in fifth and sixth day, in comparison with human this process is faster but comparable (Barbul and Regan 1993; KumarandCotranz 2003). (Barbuland Regan 1993) and KumarandCotranz (2003) found that maturation phase and remodeling phase in rats started at day sixth, in human started in started on seventh day of wound healing.

Histopathological slides of Oxytetracycline group showed, epithelization with dermis epidermis hyper keratinization, blood vessels collagen fibers and fibroblast and collagen on day 14 post wounding, these results were agree with Horne*et al* (1992) who reported that on 14 days post wounding a thick layer of newly formed epidermis devoid of wool follicles completely covered the wound, the new tissue is fibroblast and dens bands of collagen fibers, Negrini*et al* (2016) considered that re-epithelization was complete by day 14 in many animals.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

The study was carried out to compare the efficacy of Coffee Powder and Spider web with Oxy tetracycline, for the Wound management in donkeys. It was being concluded that:

1-Short time of healing in Coffee powder, and Spider web

2- Dos not showed any complication during healing time.

3- The percent study concluded that, both treatments are efficacy and safety, but Coffee Powder can be most reliable as treatments for all wounds in donkey.

Recommendations:

1-The tow traditional treatment assessed in this study, are strongly recommended to be used in donkeys wound.

2-The two traditional treatments, (Coffee Powder and Spider web) for the management of donkeys wound assessed in this study, must be used in other species of animals.

3- Further studies must be carried out to investigate the effect of tow traditional treatment on sexes and ages in donkeys wound and other species.

4-Fuether studies to identify the active ingredient of Coffee Powder and Spider web to elucidate their mode of action, dosage and rot of administration.

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Appendices

A

B

C

D

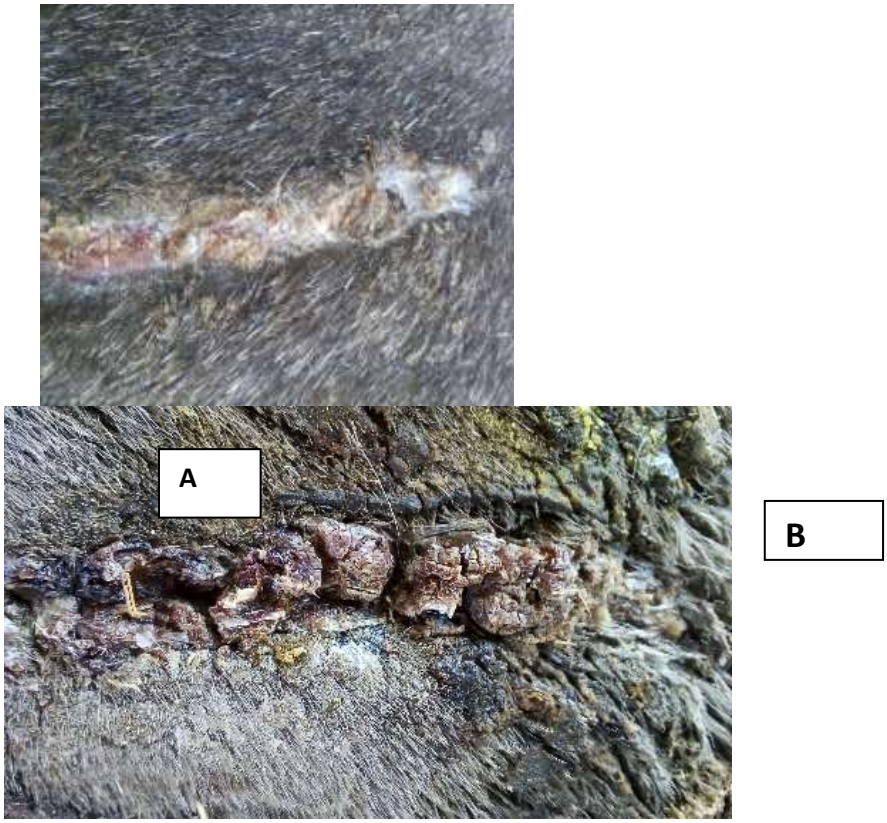
Appendex.1:Steps of the skin preparation and wound incidence on20/10 2018 at 11 Am in experimental donkeys and experimental skin wounds.

A B

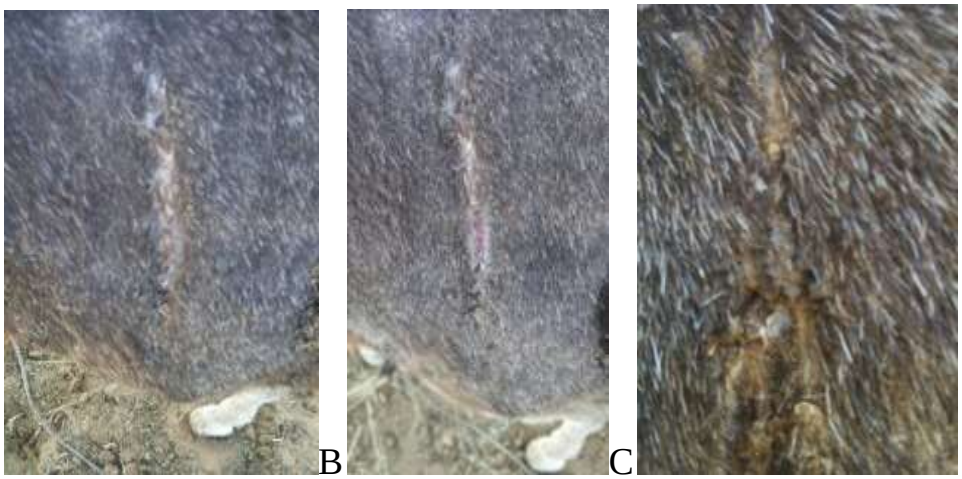
Appendixes 2: Representative picture of incision wounds at 10.20 am on 6\11\2018 Showed congestion and growth of granulation tissue, on the wound basset.

A  B 

Appendixes 3: appearance of Pus formation at the Wound Surface with a clear area around the Wound, at 26/10/2018/10.40 pm



Appendixes 4: wound scab formation and scab crack,formation 24/10/2018/11 pm.



Appendixes 5: Wound healing at 26 and 30 /10/2018 at 11.00 pm