

Effective Chronic Wound Healing

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ABSTRACT

The adverse impact of chronic wounds is felt worldwide. The concerns for advanced wound care product are progressively increasing due to factors such as value for money spent in wound care products.

Acute and Chronic wounds are managed in most health facilities in Ghana with sodium chloride (0.9%) infusion solution and povidone iodine fortified with metronidazole solution. The procedure is usually done by the nurse cleaning the wound with the saline solution wet gauze or cotton and then covered with the povidone iodine wet gauze for acute and chronic wounds. For chronic infected wounds, the wound is usually cleaned with saline solution and covered with wet gauze saline or currently with neomycin wound care spray or powdered antibiotics applied on the wounds. But it is popular as many wounds are covered with povidone iodine after wound cleaning in wound care practices in Ghana. Despite all these efforts, many wounds, especially chronic type wounds take a very long time to heal or sometimes fails to heal which reduce the quality of life of the people suffering from the menace. When it happens in this way, many resort to the use of local remedies to cause the wounds to heal but no avail, especially in Ghana where advanced treatment is scare. It is against this background that focal research in wound care was done in Ghana to come out with an innovative pharmaceutical wound care product effective for chronic and acute wounds healing to improve the quality of life of people as global burden of wounds escalates.

In a Blind Observational Study for a period of five years in Ghana to observe the wound care products efficacy to heal wounds especially chronic types, the objective of the study was to examine **a new product efficacy in chronic wound healing in the targeted population of patients with wounds**. A product that has dual purpose of wound care as a cleaning and application agent, also has unique product pharmaceutical characteristics. A scalable, easy- to- use, multi-purpose, multi-use and cost-effective product, able to address the barriers or problems of wounds healing. The areas of consideration as far as wound care are concerned included: The study also sought to observe the product ability to **control wound pains, control wound bleeding, control and prevent wound infection, remove wound debris, remove wound exudates** effecting wounds healing at **reduced healing time** and with minimal scar in varied targeted patients' population. Again, to observe the product with outcome of which to mitigate the long-term effect of chronic wounds like recurrent hospitalizations, financial burden, amputations, deformity, and frequent visit to hospital for wound care. One product, 9G Wound Solution (a cleaning and application product) manufactured by Pat J Health Company Limited, Ghana, was effective in wounds healing, especially, effective chronic wounds healing. The product was used to subject varied patients' population with wounds on randomized basis, for wound care, and through observation the direct short, intermedial and long-term outcomes recorded of product effectiveness recorded. The outcome reported included control of wound pains, control of wound odor, control of bleeding, control of wound infection, removal of wounds exudates, removal of wound debris and ultimately reduced wound healing time to prevent wounds complications like amputations.

The study was progressively extended across 10 regions in Ghana to cover 500 patient population with varied wounds. Patients' population included those with Diabetic ulcers, Burns, pressure ulcers, venous ulcers, herpes zoster skin ulcers, Perineum wounds, Surgical abdomen-pelvic wounds, Traumatic wounds, Buruli Ulcers, gas gangrene wounds, and Mouth ulcers. The outcome of using the new wound care product were directly observed for the study period. By this observational study, the new product was observed to be superior to the controls as this product was able to heal 99% patients who had wounds, especially chronic wounds for many

years, including 20years-old wound at reduced healing rate with no reoccurrence within the study period. The product scientifically readily released to the wound environment modulators capable to address the problems or barriers of wounds and simultaneously promoting modulators effective for wound healing. The product was not only effective in chronic wound healing at reduced time but also controlled wound pains shortly, controlled wound odor shortly, stopped wound bleeding, fought and controlled wound infection. However, using the product needed change of wound dressing every two days. The long-term effect of the product on target population not conclusively observed within the period of the research. We need to continuously observe the reported long-term effect of the product efficacy.

BEFORE

AFTER

Fig1



6yrs old chronic wound

Fig2: 10th month



Dressing with a new wound care product, 9G Wound Solution

Fig3: 11th Month



INTRODUCTION

Epidemiology of Chronic Wounds

Chronic Wounds starts with varied causes and progressively becomes difficult to heal which pose suffering on people with these health problems ranging from pains, deformity on individuals in sufferings and putting socioeconomic burdens. The adverse impact of chronic wounds is felt worldwide. According to the American Diabetes Association, over 9-12 million Americans suffer from chronic ulcers/wounds. In the US, chronic wounds affect around 6.5million people at any one time. In the US, foot ulcers and other complications are responsible for 20% of the nearly 3million hospitalizations every year related to diabetes. Approximately 2.2 million people have chronic wounds in the UK. In Africa, the news is not different as increase in adult population with high risk of development of diabetes and injuries from vehicle accidents pose risk of chronic wounds.

Progress of Acute Wounds to Chronic Wounds

During Covid-19 pandemic there were some neglected essential primary health care activities as advocated by health authorities, which included patients who needed wound care services. This led to many wounds progressed to complicated wounds to chronic wounds. A simple wound can progress to complicated chronic wound when it is neglected.

A wound is considered to be chronic if it hasn't started to heal after 4 to 12 weeks despite treatment. These kinds of wounds usually arise as a result of poor blood circulation, diabetes or a weak immune system.

Problems of Wounds or barriers of wounds healing

Wound Pains

Painful chronic wounds can be a burden in daily life and prevent and also prevent sufferers from getting a good night sleep. Constant pains can really wear you down making a patient with chronic wound feels quite low or depressed. It often hurts when the dressing is changed too, particularly if the dressing is stuck to the wound. But this pain can be reduced in various ways-for instance, by using dressings that are less likely to stick to the

wound. The wound can also be rinsed with saline solution first so the dressing comes off more easily. However, there chronic wounds with constant pains not as a result of aforementioned factors but due to poor healing mechanism and chronic wound infections. Drugs like acetaminophen or ibuprofen, or other pain medications are often prescribed to control pains. Some patients as a result of constant pains become addicted to pain relieving medications.

Combating and prevention of Wound Infections

Wounds are less likely to heal well if they are infected with bacteria. Depending on how severe the infection is, antibiotics may be considered. They are usually taken as tablets or capsules, but sometimes applied to the wound in an ointment, spray, powder or placed on the wound using a dressing. Antibiotics resistance as a result of chronic wounds care is high due to constant wound infection.

Wound bleeding

Mild, Moderate, and Severe Bleeding

With **severe bleeding**, any of these may be true:

- Blood is pumping from the wound.
- The bleeding does not stop or slow down with pressure.
- Blood is quickly soaking through bandage after bandage.

With **moderate bleeding**, any of these may be true:

- The bleeding slows or stops with pressure but starts again if you remove the pressure.
- The blood may soak through a few bandages, but it is not fast or out of control.

With **mild bleeding**, any of these may be true:

- The bleeding stops on its own or with pressure.
- The bleeding stops or slows to an ooze or trickle after 15 minutes of pressure. It may ooze or trickle for up to 45 minutes.

Wound debris

Debridement is a natural process that occurs in all wounds and is crucial to healing: damaged and dead tissue, debris and bacteria are removed from the wound, minimizing infection risk and encouraging healthy granulation tissue to form, which aids healing (Strohal et al, 2013).

Dead tissue, slough and debris in a wound can:

- Prevent or delay a wound's normal healing process (Weir et al, 2007);
- Mimic or hide infection;
- Attract bacteria to the wound, increasing the risk of infection (O'Brien, 2002);
- Prevent practitioners from assessing the extent and size of the wound, which is particularly problematic when staging pressure ulcer damage (Weir et al, 2007);
- Increase odor and exudate (Vowden and Vowden, 2011).

Wound Exudates

Exudate production by open wounds is essential for moist wound healing. However, when wounds produce insufficient or too much exudate, and/or the composition of the exudate is harmful, a wide range of problems can occur that ultimately delay healing, distress patients and consume considerable healthcare resources.

Wound Odor

Wound odor, also referred to as malodor, is typically the result of necrotic tissue or bacterial colonization in the wound bed. Certain dressings like Hydrocolloids, also tend to produce a characteristic odor as a result of the chemical reaction that takes place between the dressing and wound exudate, causing odor. While not directly harmful to the patient, wound odor is often indicative of bioburden or other barriers to wound healing. In addition, the psychological effects of malodorous wounds on the patient, relatives, or caregiver can be significant.

Assessment of Wound Odor

Though there is no universally recognized scale for measuring wound odor, the following can be used to qualitatively assess wound odor for documentation purposes:

Very strong: Odor is evident on entering the room (6–10 feet or 2–3 meters from the patient) with the dressing intact.

Strong: Odor is evident on entering the room (6–10 feet or 2–3 meters from the patient) with the dressing removed.

Moderate: Odor is evident at close proximity to the patient when the dressing is intact.

Slight: Odor is evident at close proximity to the patient when the dressing is removed.

No odor: No odor is evident, even at the patient's bedside with the dressing removed.

Etiology

Most wound odors are thought to arise from the metabolic processes of anaerobic bacteria. In chronic Wounds; such as pressure ulcers, leg ulcers, and diabetic foot ulcers, the odor may also be due to tissue degradation. The aptly named, foul-smelling compounds called cadaverine and putrescine, are released by anaerobic bacteria as part of the putrefaction of tissue.

Wound Treatment Modalities

Cleaning the wound

The wound is often cleaned when the dressing is changed, normally using a saline (salt) solution. Overall, though, not enough is known about the pros and cons of the various solutions that are used to clean wounds, and how they affect the healing process. It is also not yet clear whether tap water could be used for the medical cleaning of wounds.

Wound dressings

Once the healthcare professional has cleaned the wound, they cover it with a new dressing. Most wounds are kept moist, for instance with moist compresses. Various kinds of dressings can be used instead, which include: films, hydrogel dressings, hydrocolloid dressings, dressings containing iodine or alginates and foam dressings. The dressings are used to remove excess fluid from the wound and protect it from infection. They are usually left on the wound for several days. Dressings are changed if it is clear that they can't soak up any more wound secretions, if they slip out of place, or fluid leaks out of the bandage.

In addition, substances called growth factors can be put on the wound to help the wound cells grow better. One approach involves putting some of the patients own blood into a machine to increase the concentration of blood plasma (platelet rich plasma, PRP). The blood that is prepared in this way is often applied to the wound

as a gel. Growth factors can also be made chemically. Several studies suggest that they can help chronic wounds to heal better.

Debridement

When treating chronic wounds, doctors or nurses often remove dead or infected tissue. This is known as debridement. The tissue is removed using instruments such as tweezers, a sharp spoon-like instrument called a curette, or a scalpel. An enzyme-based gel is sometimes applied too, to help clean the wound.

The wound can also be cleaned using a high-pressure water jet. Another form of debridement involves the use of a certain species of maggots (fly larvae) that are specially bred for medical purposes. The maggots are placed on the wound, either as they are or in a pouch. They remove dead tissue and fluid from the wound.

Because debridement is often painful, a local anesthetic is used to numb the wound beforehand, for instance using an ointment. If more severe pain is expected painkiller can be taken before treatment. Larger wounds are sometimes cleaned under general anesthetic.

Compression stockings and compression bandages

If venous insufficiency is what caused the chronic wound, then compression stockings or compression bandages can help it to heal faster. The pressure from the stockings and bandages helps the veins to carry blood back to the heart. This also relieves the pain caused by venous leg ulcers.

Antibiotics

Wounds are even less likely to heal well if they are infected with bacteria. Depending on how severe the infection is, antibiotics may be considered. They are usually taken as tablets, but are sometimes applied to the wound in an ointment or placed on the wound using a dressing.

Hyperbaric oxygen therapy

In hyperbaric oxygen therapy, you go into a special chamber to breathe in oxygen under high pressure. This is meant to increase the oxygen concentration in your blood and improve the blood supply to the wound area.

Research suggests that hyperbaric oxygen therapy can improve the healing of wounds in people with diabetic foot problems

Negative pressure wound therapy

In negative pressure wound therapy (also called vacuum-assisted closure or VAC therapy), the wound is covered with an airtight dressing that is connected to a pump by a thin tube. The pump continuously sucks fluid out of the wound, creating negative pressure across the surface of the wound. The aim is to increase the flow of blood to the wound. It helps keep the wound moist too, which is also meant to improve the healing process. Research suggests that negative pressure wound therapy helps chronic wounds to heal better and can also reduce the length of the hospital stay.

The pump that is attached to the wound limits your mobility somewhat and makes noise. Some people find this annoying. Changing the dressing and tube can also be painful and cause a small amount of bleeding.

Skin grafts

Skin grafts are considered as a treatment option if a wound is so large that it can't close on its own. In this procedure, skin is taken from another part of your body – usually your upper leg – and transplanted to the wound. There are also grafts that are made from human cell products and synthetic materials.

Skin grafts increase the chances of poorly healing venous leg ulcers closing faster. Chronic foot wounds (ulcers) in people with diabetes also heal faster after a skin graft.

Ultrasound and electromagnetic therapy

Ultrasound therapy involves treating chronic wounds using sound waves. The sound waves make the tissue warmer. But ultrasound therapy hasn't been scientifically proven to help the wound heal faster.

The same is true of electromagnetic therapy, where weak electromagnetic waves are applied to the wound using pillows or mats that have magnets in them.

Treatment of Wound Odor

Implementing one or more of the following precautions can help minimize the risk of developing malodorous wounds in at-risk patients and minimize complications in patients already exhibiting symptoms:

- Cleanse the wound as often as advisable to reduce bioburden
- Ensure the patient is practicing good hygiene
- If not contraindicated, increase the frequency of dressing changes
- Change bed linen as soon as it becomes soiled
- Use products designed to decrease or mask odor (i.e., calcium alginate)
- Use cleansers designed to break through biofilm or bioburden
- Use wound cleansing products that are biocides designed to kill odor causing bacteria

Treatment of malodorous wounds is typically aimed at treating the underlying infection or debridement of the devitalized tissue responsible for the odor. While topical or systemic antibiotics may be effective, it is difficult to reach the necessary concentration of antibiotics at the infection site. One formulation that has found wide use in the wound care community is metronidazole gel or powder, which even though it is most effective against anaerobic bacteria may have some effect on a range of aerobic organisms at the concentrations typically used.

If it is not feasible to eradicate the cause of the wound odor, odor-controlling dressings can help mitigate the psychological effects of excessive wound odor. Activated charcoal is widely used as a deodorizing agent in dressings for these purposes. Cleansing and/or debridement of the wound may be necessary before applying the dressing to achieve the desired effect. If these measures are not enough by themselves to mitigate odor from the wound in question, external deodorizers (air fresheners, scented candles, essential oils, coffee grounds, etc) can be used to mask the odor.

Economics of Wounds Care

The concerns for advanced wound care product are progressively increasing due to factors such as:

- value for money spent in wound care products
- cost reduction in wound care
- scalability of wound care products/service
- additive benefits of wound care products

Scope of the study

Geographically, the study covered all patient's population with varied wounds across 10 regions in Ghana. In all 500 patients population with wounds were involved. In context, the study assessed the efficacy of the wound care products in healing chronic wounds at reduced rate whilst observing the following: The control of

wound pains, control of wound odor, control of bleeding, control of wound infection, removal of wounds exudates, removal of wound debris and ultimately reduced wound healing time. Again, the outcome of which to mitigate the long-term effect of chronic wounds like recurrent hospitalizations, financial burden, amputations, deformity, and frequent visit to hospital for wound care were observed. The study was limited in scope as it could not capture all the patient population with wounds in all the 16 regions in Ghana.

Objective

The main objective of the study was to examine a new product efficacy in chronic wound healing in the targeted population of patients with wounds. The specific objectives of the study included:

The product ability to control wound pains, control wound bleeding, control and prevent wound infection, remove wound debris, remove wound exudates effecting wounds healing at reduced healing time in varied targeted population with wounds.

The research involved finding an alternative wound care product with a unique product pharmaceutical characteristic in such a way that using this product can control wound pain, wound bleeding, prevent and fight wound infection, remove wound dead tissues to promote fast wound healing and save the user from financial burden related to wound care. A scalable wound care product that is multi-use, multipurpose, simple to use, and cost effective for home based wound care and clinical setting should be the choice and practice in wound care.

RESULTS OF THE STUDY

Impact of the new product for wound care in the targeted patient’s population of wounds.

In the blind studies of impact of the new product for wound care among the targeted population of 500 patients with wounds progressively across 10 regions in Ghana for a five years trend, with more than 1000pcs of samples product piloted, there were exceeding results of benefits of the new product to the targeted population though initial difficulty of acceptance of the new brand was encountered.

This initial acceptance challenge of the new product is consistent with some Ghanaians as they would always like to stick to the status quo-thus the randomized controls of wound care products in wound care practices in Ghana. This challenge was overcome as the efficacy of the new product gained popularity through recommendations of the product to others by patients themselves and relatives.

The data collected and analyzed based on the main and the specific objectives of the study. This data was classified into type of wound treated in varied age patients’ group and gender with the new product and the direct benefits of the new product in wound care in the following areas stated in the tables below compared to the controls.

Table 1: Criteria for data collection

Healing rate	Debris Removal	Pain control	Infection control/prevention	Bleeding Control	Odor control	Exudates Removal
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Table 2: Type of Wounds treated with the new product and percentage in the studies population

Type of Wounds	% population treated
Chronic Venous Ulcer	16%
Chronic Diabetic Wound	30%

Chronic Mouth Ulcer	1%
Surgical Infected Wounds	15%
Acute Herpes Zoster Sores	1%
Acute Multiple Wounds	7%
Acute Injuries	7%
Surgical Non-infected Wounds	8%
Mouth Ulcers	1%
Burns	6%
Perineal Ulcers	3%
Cancerous Wounds	5%

Wound Biometrics

Table3: A five-year trend of sample in varied population of patients' wounds and characteristics in the Blind Studies

Type of Wounds	Age of patient	Sex	Existing condition	Location of wound	Duration of wound
Chronic Venous Ulcer	40	M	Sickle cells	Leg	20 years
Chronic Diabetic Wound	48	F	Diabetes	Leg	4 months
Chronic Mouth Ulcer	5	F	Unknown	Mouth	>3 years
Acute Leg Sore	4	F	Groin Lymph nodes(infection)	Leg	< 7 days
Chronic Foot Venous Ulcer	66	M	Unknown	Foot	6 years
Acute Herpes Zoster Sores	32	F	HIV	Torso	10days
Acute Multiple Wounds	40	M	Nil	Different parts	< 24 hours
Acute Deep Wound(injury)	28	M	Nil	Chin	< 24 hours

Surgical incisional wound-C s	45	F	Nil	Lower abdomen	2 weeks
Cancerous Perineum Wound	58	F	Perineal Cancer	Perineum	2years
Chronic Celluptic Wound	68	F	Cellulitis	Hand	4months
Acute Celluptic Wound	72	F	Gas gangrene ? Buruli Ulcer	Leg	2 weeks
Surgical Wound	6	M	Injury	Forehead	< 24 hours
Surgical Excisional Wound	35	F	Keloids	Pubis	< 24 hours
Pressure Sore	52	M	Chronic Illness	Buttocks	2 weeks
Superficial Burns	9	M	Nil	Abdomen	< 24hours
Traumatic Injury	6	M	Nil	Leg	< 24 hours
Vulva ulcers	19	F	Candidiasis	Vulva	2 years
Bilateral Venous Leg Ulcers	45	M	Nil	Both Legs	1 year

Table 4: A five-year trend of sample in varied population of patients' wounds and specific Wound problems

Type of Wound	Location of wound	Duration of wound	Specific problem/ Concerns	Wound
Chronic Venous Ulcer	Leg	20 years	Prolonged wound healing	
Chronic diabetic wound	Leg	4 months	Prolonged wound healing	
Chronic Mouth Ulcer	Mouth	>3 years	Prolonged wound healing	
Acute Leg Sore	Leg	< 7days	Wound pains and infection	
Chronic Foot Venous Ulcer	Foot	6 years	Prolonged wound healing	

Acute Herpes Zoster Sores	Torso	2 weeks	Severe pains, Effective wound healing
Acute Multiple Wounds	Different parts	< 24hours	Bleeding and pains
Acute Deep Wound(non-sutured)	Chin	< 24hours	Bleeding, pains, effective healing and infection prevention
Surgical Infected incisional wound-C/s	Lower abdomen	2 weeks	Wound Infection, Pain, Exudates, prolonged healing
Cancerous Perineum Wound	Perineum	2 years	Wound odor, Wound infection, prolonged healing
Chronic Celluptic Wound	Hand	4 months	Wound debris, Wound exudate, Prolonged healing
Acute Celluptic Wound	Leg	2 weeks	Spread of wounds, wound odor, Wound infection, Wound healing
Surgical Wound (sutured)	Forehead	< 24hours	Wound infection prevention, pain, bleeding, Intact sutures, effective wound healing
Surgical Excisional Wound (sutured)	Pubis	< 24hours	Wound infection prevention, effective wound healing
Pressure Sore	Buttocks	2 weeks	Prevention of infection, effective wound healing
Superficial Burns	Abdomen	< 24hours	Wound pains, prevention of wound infection, bleeding, effective wound healing
Traumatic Injury	Leg	< 24hours	Wound bleeding, healing, Wound pains
Vulva ulcer	Vulva	2 years	Ulcer healing, control of odor, pains, infection
Bilateral Leg Venous Ulcer	Both Legs	1 year	Prolonged healing, Pains

Table 5: A five-year trend of sample in varied population of patients' wounds, specific Wound problems/concerns and outcome of intervention using the new product for wound care.

Type of Wound	Specific Wound problem	Outcome of Intervention						
		Healing	Debris Removal	Pain control	Infection control/prevention	Bleeding Control	Odor control	Exudates Removal
Chronic Venous Ulcer	Prolonged wound healing	< 3months	-	-	-	-	-	-
Chronic diabetic wound	Prolonged wound healing	< 7 days	-	+	-	-	-	+
Chronic Mouth Ulcer	Prolonged wound healing	1 week	-	+	-	-	-	-
Acute Leg Sore	Wound pains, immobility and infection	< 7 days	-	< 24hours Mobility restored	+	+	-	-
Chronic Foot Venous Ulcer	Prolonged wound healing	11months	-	-	+	-	-	-
Acute Herpes Zoster Sores	Severe pains, Effective wound healing	7 days	-	+	+	-	-	-
Acute Multiple Wounds	Bleeding and pains, infection prevention	2 weeks	-	+	+	+	-	-
Acute Deep Wound(non-sutured)	Bleeding, infection prevention, effective healing and pains	2 weeks	-	+	+	+	-	-
Surgical infected incisional	Wound Infection, Exudates,	7 days	-	+	+	-	-	+

wound-C s	Pain, prolonged healing							
Cancerous Perineum Wound	Wound odor, Wound infection, prolonged healing	*	-	-	-	-	-	+
Chronic Celluptic Wound	Wound debris, Pain, Wound exudate, Prolonged healing	4 weeks	+	+	+	-	-	+
Acute Celluptic Wound	Spread of wounds, wound odor, Wound infection, Wound healing	*	+	+	+	-	+	+
Surgical Wound (sutured)	Wound infection prevention , Intact sutures, pain, bleeding, effective wound healing	< 7days	-	+	+	+	+	-
Surgical Excisional Wound (sutured)	Wound infection prevention , pain, bleeding effective wound healing	< 2weeks	-	+	+	+	-	-
Pressure Sore	Prevention of infection, pains, exudates, bleeding,	*	+		+	+	-	+

	effective wound healing							
Superficial Burns	Wound pains, prevention of wound infection, bleeding, effective wound healing	< 7days	-	+	+	+	-	-
Traumatic Injury	Wound bleeding, healing, Wound pains	< 7 days	-	+	+	+	-	-
Vulva ulcer	Ulcer healing, control of odor, pains, infection	< 2weeks	-	+	+	-	+	-
Bilateral Leg Venous Ulcer	Prolonged healing, pains	6 months	-	+	-	-	-	-

Keys: * (cased missed), +(affirmative), - (Not Applicable)

Table 6: A five-year trend of sample in varied population of patients’ wounds, showing Duration of wounds in the controls against the Healing Duration using the new product for wound care.

Type of Wound	Wound Duration	Healing Duration using the New Product
Chronic Venous Ulcer	20years	< 3months
Chronic diabetic wound	4months	< 7days
Chronic Mouth Ulcer	>3 years	1 week
Chronic Foot Venous Ulcer	6 years	11 months
Bilateral Leg Venous Ulcer	1 year	6 months

CONCLUSION

The new product 9 G Wound Solution was superior to the controls as it was effective to heal wounds, especially chronic type of wounds at reduced rate, and also proved to have additive benefits in wound care by

addressing most of the wound problems and barriers to wound healing. This offered much economic advantage to patients and their relatives not spending much money in buying wound care additive treatments, such as pain control medications and excessive use of antibiotics in wound care.

Throughout the period of studies there were observed or reported problems of patients' recurrent hospitalization or amputation of limbs whilst patients on the new product for their wound care against in the case as observed in patients' population in the control group. However, the product efficacy to heal patients' population with cancerous wounds needs further studies as most of the patients with cancerous wounds died along the studies.

Scientific Evidence Based of using our innovative wound care Product for wound dressing.

BEFORE

AFTER



A chronic wound with suspicion of cancer, almost healed with 9 G Wound Solution

Below are graphics of the stages of wound healing progress for a 66-year-old man farmer with chronic wound, Right Foot Venous Ulcer for 6years in Ghana.

Graphics Of The Stages Of The Wound Healing

Nov 8, 2023

January 20, 2024

February 23, 2024

April 6, 2024



May 8, 2024

July 3, 2024

August 14, 2024

August 30, 2024



September 2024



Some Images of Various Cases of Chronic Wounds Managed With the 9g Wound Solution





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