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ADMIXTURE OF ALUMINUM METAL POWDER
AND POWDERED VEGETABLE GUM FOR
TREATMENT OF OPEN WOUNDS

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The present invention relates to a medicinal preparation and, more particularly, a medicinal preparation for the treatment of skin wounds, especially such wounds that are moist by reason of the exudation or discharge of body fluids, such as wounds resulting from burns, or abrasions, or bed sores. The present invention is particularly directed to the provision of a medicinal preparation or composition of matter that is especially adapted for use on skin wounds that cover large body areas and have heretofore been most difficult to treat.

Generally stated, the object of the present invention is to provide a medicinal preparation of the character described which, in its effects, simulates natural healing conditions but improves greatly upon natural healing in a number of ways.

Wet, open wounds, such as result from burns, abrasions or bed sores, especially wounds covering large surface areas from which the outer skin has been burned off or abraded, are very painful by reason of exposed nerve endings which are numerous and highly sensitive. Natural healing of such wounds begins with the formation of a scab over the wound. This process of a scab formation is relatively slow and depends on the amount of serum discharged by the wound; the larger the serum discharge, the longer it takes to form a scab. During this scab formation, the exposed nerve ends are still open to irritation and remain very painful.

The prolonged period such as heretofore required for natural scab formation may prove fatal, in cases of extensive burns, due to excessive loss of body fluids during that time.

Another source of pain in the wound area is the inevitable movement of the affected body portion which may be due either to shifting or to muscular contraction. This is especially true in the case of open wounds that affect a skin area which encompasses or is closely adjacent to a body joint. Heretofore, such wounds involving areas over and adjacent to a joint were particularly hard to treat. Such wounds required the application of dressings and immobilization of the joint, and frequently resulted in the contraction of the newly grown skin over the affected area, which often resulted in a limitation of movement of the joint, requiring surgical procedure to correct it.

It is the object of the present invention to provide a medicinal preparation of the character described which, when applied over an open, wet wound, will combine with the body serum or fluids to form a film over the wound that is closely akin to a natural scab.

It is also an object of the present invention to provide a medicinal preparation of the character described which combines with the body fluids to form a protective film therewith, substantially instantaneously, to thereby provide immediate protection to the underlying area against further discharge and evaporation of the body fluids there-through.

It is another object of the present invention to produce a medicinal preparation of the character described which, when applied to an open wound, combines with the body fluids discharged therefrom to form a protective film and, because of such combination, the film formed thereby insinuates itself into the surface irregularities in the same manner as a natural scab, to protect the exposed nerves and thereby alleviate pain and, since such film is formed

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substantially immediately after application of the preparation, alleviates pain substantially immediately after the application.

It is still another object of the present invention to provide a medicinal preparation of the character described which forms a film that closely hugs the wound surface in the manner of a natural scab, but is much thinner and, therefore, far more flexible and elastic than a natural scab and permits movement of the affected area without undue pain and without disruption, whereby the need for the application of dressings to an immobilization of joints which or whose adjacent skin areas are affected by the wound is dispensed with, and healing will, therefore, take place without any contraction, and is also substantially accelerated and is of minimum painfulness.

It is a further object of the present invention to provide a medicinal preparation of the character described which forms a protective film that dissipates excessive body heat generally present in wounds for the treatment of which the preparation is intended; and otherwise promotes normal chemical and physical conditions under the film to thereby further promote and hasten healing.

It is a still further object of the present invention to provide a medicinal preparation of the character described which, because it combines with the body fluids discharged by the wound, absorbs the same and produces a film which is adhesive to the wound surface and seals it against further discharge of serum; unlike the dressings and ointments heretofore used which did not seal the wounds against fluid exudation and were dissolved and washed away thereby.

It is yet a further object of the present invention to provide a medicinal preparation for forming a film over open wounds, of the character described, which may be easily, quickly and painlessly applied, and as easily, quickly and painlessly removed.

It is another object of the present invention to provide a medicinal preparation of the character described which is of relatively low cost, simple and easy to produce, may be conveniently stored and carried, and may be quickly, simply and easily applied.

The foregoing and other objects and advantages of the medicinal preparation of the present invention will become clearer and more readily apparent to those skilled in the art from the following more or less detailed description thereof.

Generally stated, the medicinal preparation of the present invention consists of a mixture of a finely comminuted, atmospherically inert metal powder and of a gum powder which is absorbent of the fluids exuded by the tissues of a wet body wound. More specifically stated, the metal component of the preparation of the invention comprises a metallic dusting powder formed, preferably, of a metal that is atmospherically inert and has high heat transference characteristics and is ground to an impalpable, dust-like fineness. A highly suitable metal for the purpose of the present invention has been found to be aluminum, which is available, commercially, in the finely ground form most suitable for the purpose. The aluminum dust is thoroughly mixed with a powdered vegetable gum which will readily absorb and be dissolved by the body fluids exuded by an open wound. A preferred vegetable gum for the purpose of the preparation of the present invention is tragacanth.

The tragacanth, in powdered form, is preferably present in the mixture in an amount of between about 10 and about 15 percent, by weight, of the metal powder. A preferred mixture comprises approximately 8.5 parts, by weight, of the metal powder to about 1.0 part, by weight, of the tragacanth powder.

I have found that when a mixture such as the foregoing is applied, as by dusting or spraying, in a thin layer,

over an open wound, it quickly converts, by the absorption of the body fluids present in the open wound into the tragacanth present in the mixture, into a pasty film which immediately protects the wound surface against excessive evaporation of the body fluid and covers the open nerve ends and protects them against irritation, and immediately commences to cool the wound surface by the convection of heat through the metal present in the paste.

The absorption of the body fluid by the tragacanth in the mixture brings about an intimate and close contact between the paste and the wound surface, with the viscous fluid insinuating itself closely against the body surface and around exposed nerve ends, to give them maximum protection.

The viscous paste layer formed gradually sets into a relatively strong but thin and flexible film which is sufficiently close grained and conforms closely to the wound surface to protect it, and closes the wound to stop further excretion of fluids. The thin, flexible layer thus formed also protects the wound underneath it from external irritants and infections and maintains normal body conditions that are conducive to and hasten healing underneath.

Because of the flexibility of the protective film formed by the body fluids with the powder of the present invention, and its close adhesion to the wound surface, the film permits the wounded area underneath, even where a joint area is affected, to be moved with a minimum of pain and without material disruption of the film, thereby completely eliminating the need for dressings and the immobilization of the wound-affected areas and avoiding the possible resulting contraction and limitation of motion of the affected area.

The efficacy of the medicinal preparation of the present invention was tested in the laboratory on a group of twelve mice. Each of the mice in the group, after being anaesthetized, had a half inch square burn produced on its body, between its shoulder blades. Four of the mice in the group were left completely untreated. Another four of the mice in the group were treated by dusting aluminum powder over their wounds. The remaining four mice of the group were treated with a powder mixture according to the present invention. After three weeks, the following results were observed.

The wounds on the wholly untreated mice were healed, but the healing eschar still remained over their wounds.

The four mice treated with powdered aluminum metal only had their wounds healed, with the eschar gone.

The wounds on the mice treated with the powdered preparation of the present invention had their wounds completely healed and had, in all four instances, the beginning of a regrowth of hair over the wounded areas.

In each of the three groups of mice, the pH of the body fluids in the burn wounds was tested during the healing. In the untreated and in the aluminum powder treated groups of mice, the pH was definitely on the alkaline side; being respectively, 7.9 and 7.7. The pH of the wounds of the group treated with the powder mixture of the invention was slightly on the acid side; being about 6.5.

The foregoing controlled tests indicate that the preparation of the present invention maintains a wound condition that is different than exists in an open wound or in one protected only by a metallic powder. These tests also clearly indicate that the preparation of the present invention promotes more rapid and more complete healing of a wound and brings about a quicker return to normal skin condition.

It may here be stated that the preparation of the present invention may be modified to confer on it additional medicinal and therapeutic properties, such as sterilizing and bactericidal properties, by the addition thereto, in powdered form, preferably, of an antiseptic substance, or an antibiotic. Such additives may preferably be

in the proportion of approximately five percent, by weight, of the mixture of metal dust and tragacanth.

It may here be stated also that the protective film formed over the wound by the preparation of the present invention may easily and quickly be removed from a wound with a minimum of irritation, either during or after healing, by washing it away, as with soap and water.

The preparation of the present invention may also be used in the same manner, as by dusting or spraying, even on dry skin wounds, such as produced by first degree burns. For such use, the preparation of the present invention need not be mixed with fluid before application, but such fluid may be supplied by wetting the affected surface with a fluid, such as water, and by applying the dry powder to the wetted surface.

It may here be pointed out that in addition to the advantages of the powder of the present invention for the treatment of open skin wounds pointed out above, certain additional advantages inherent in its use, over the two general methods heretofore practiced for the treatment of burns and the like, will become readily apparent to those familiar with the subject.

The two methods heretofore practiced for the treatment of open skin wounds, particularly those affecting large areas, are as follows:

(1) *The open method.*—Under this procedure, no dressings whatever are used. The patient lies constantly on a wet sheet. This sheet has to be frequently changed. This procedure, besides being painful, therefore requires a great quantity of material in the form of a large supply of sheets and the frequent laundering thereof, and a great deal of care and attention involving time and personnel.

(2) *The pressure method.*—This procedure requires the application of great quantities of dressing material applied in thick, bulky layers, and bandages, which have to be frequently changed. This procedure occupies a great deal of time of attending personnel, in application and changing of the dressings. It also requires the maintenance and storing of large amounts of varied materials and supplies, including ointments, varied bandages, dressings, and pain alleviating drugs.

In contrast to the foregoing, the preparation of the present invention may be quickly and easily applied. It completely eliminates the need for frequent change of sheets, wet or dry, dressings, bandages, and most, if not all, other drugs. Not only is the powder of the invention quickly and easily applied, but the patient requires very little care thereafter, because he may move freely about, with a minimum of pain, substantially immediately after the application of the preparation, and may, therefore, mostly take care of himself.

The last described advantages of the preparation of the present invention are particularly important in connection with mass injuries, as in disastrous fires, especially aboard ships, and particularly in connection with arrangements now current against mass injuries by reason of atomic or similar disasters which may cause extensive skin burns to great masses of people that will require prompt and immediate treatment. Under the procedures as heretofore practiced, civil defense authorities and public health agencies, such as hospitals, have been amassing great volumes of materials, in readiness for such emergencies, for the treatment of burns, at tremendous cost, and requiring capacious storage facilities. In spite of all these preparations, it is generally recognized that the treatment of mass casualties resulting from such catastrophes may be substantially impossible because of the time and personnel elements involved under the old procedures.

It will be obvious that the powder of the present invention is the practical answer for preparedness for such catastrophic emergencies. Great volumes of the powder may be prepared at little cost and stored in little space. It requires no additional applications by way

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either of medicine or dressings or bed sheets, and such need not be stored. It requires no equipment for its application and consumes a minimum of time of a minimum of personnel, both in the application and in after-care. Because it relieves pain, allows freedom of movement and accelerates healing, the use of the powder of the invention eliminates hospitalization in many instances and in the other instances reduces hospitalization time, and thereby enables hospitals to extend the use of their facilities.

This completes the description of the powered medicinal preparation of the present invention. It will be readily apparent that such preparation may be readily modified and varied, by any one skilled in the art, within limited range, especially with respect to the proportions of metal and gum and also with respect to any additives that may be admixed with them, in accordance with the principles of the invention set forth above and without the exercise of any inventive ingenuity. I desire, therefore, to be protected for any and all such modifications and variations that may be made within the spirit of the present invention and the scope of the claims hereto appended.

What I claim is:

1. A preparation for the treatment of open wounds, comprising a dry admixture of aluminum metal powder of palpable fineness and a highly comminuted, powdered vegetable gum capable of absorbing moisture.

2. A preparation for the treatment of open wounds, comprising a dry admixture of finely comminuted alu-

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minum metal powder and finely comminuted tragacanth gum.

3. A preparation for the treatment of open wounds, comprising a dry admixture of finely comminuted aluminum metal powder and finely comminuted tragacanth gum, said tragacanth gum being present in the proportion of about one part, by weight, of the tragacanth gum powder to about eight and one-half parts, by weight, of the aluminum metal powder.

References Cited in the file of this patent

UNITED STATES PATENTS

2,338,416 Fales ----- Jan. 4, 1944
2,639,268 Heiss ----- May 19, 1953

FOREIGN PATENTS

503,781 Canada ----- June 22, 1954

OTHER REFERENCES

Farmer: *Plast. and Reconst. Surgery*, vol 14, September 1954, pp. 171-177.

Farmer: *J.A.M.A.*, vol. 57, No. 9, February 26, 1955, p. 763.

Valance: *Manufacturing Chemist*, October 1940, pp. 258-261.

Remington's *Practice of Pharmacy*, 9th Ed., Mack Publ. Co., Easton, Pa. (1948), p. 754.

De Ment: *Abstract from Official Gazette*, vol. 663, p. 1221, October 28, 1952.