THE "TULLE GRAS" TYPE OF DRESSING AND ITS VALUE IN SURGERY.

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The object of this article is to draw attention to a type of dressing, the merits of which—although well recognized in certain specialist branches of surgery—do not appear to be familiar to the general surgeon.

Types of Surgical Dressing in General Use.

Most surgical dressings in general use for application to cutaneous granulating surfaces may be divided into five classes:—

(a) Those having a considerable degree of antiseptic power, which are used in highly infected wounds, with the idea of destroying the organisms present. Such dressings are not employed to any extent at the present time because it is recognized that, in virtue of their destructive properties, they also act as deterrents to the regenerative tendencies of the living tissue itself.

(b) Those of a milder antiseptic nature, most of which act fundamentally by the liberation of nascent oxygen on the surface of the wound, thus assisting the natural reparative process of the body tissue. In this group may also be placed the milder forms of Group A above, which when used in proper strength are capable of dealing with mild degrees of infection, but are not sufficiently powerful to cause much damage to the living body tissue. Also the "dye" antiseptics, such as brilliant green, which seem actually to have a stimulant action on growing cells whilst possessing a destructive power towards micro-organisms.

(c) Those which act by virtue of their hygroscopic power, such as "salt-packs," magnesium sulphate paste, and glycerine. These produce an outpouring of serum with a high antibody content from the wound surface, and cause very little damage to the regenerating tissue-cells.

(d) Those which are used merely as protective dressings on an aseptic, granulating surface.

(e) Those which are used as stimulants either to the formation of granulation tissue, such as lotio rubra, or to the epithelialization of the surface, such as scarlet red.

All these types of dressing have proved valuable in practice when used after careful consideration of the condition of the wound and the results which it is desired to obtain, but in many cases they are far from ideal. Until the introduction of the "Tulle Gras" dressing the difficulty has always been to provide a dressing of a protective nature—when once the
major degree of infection of the wound has been overcome—which will possess the following properties:

(1) Mild antiseptic powers, and thus prevent accidental infection of the healing surface, without causing damage to the living tissue.

(2) Act as a stimulant to the growing epithelium.

(3) Be easily removable without adhering to the granulating surface: since the removal of a "stuck" dressing not only causes unnecessary pain to the patient, but on each occasion on which it is performed invariably means the avulsion of delicate, growing epithelial cells. Such recurrent traumata cause a definite increase of scar tissue growth in the wound, with a corresponding increase of unsightliness in the resultant scar.

(4) Allow the free escape of serous or purulent discharge from the granulating surface, the damming back of which always tends to encourage the growth of any organisms present.

Many forms of dressing have been elaborated in the past in an attempt to find one which will embody all the above points, but without complete success. The usual dressings employed by the general surgeon at the present time for such purposes are mixtures or emulsions of liquid paraffin with a mild antiseptic such as flavine (1:1,000) or eusol; but these are far from fulfilling all the conditions specified. In the form in which they are generally used they often act as a dam, effectively preventing the escape of discharge from the wound. They frequently stick to the granulating surface, their removal causing both pain to the patient and trauma to the growing tissue cells. Moreover, the bleeding which occurs on the removal of such an adherent dressing tends both to increase the tendency of future dressings to adhere to the wound, and to retard the natural regenerative tissue processes. Also it has been definitely proved experimentally that liquid paraffin and such substances, when present in sufficient quantities to prevent adhesion of a gauze dressing to the wound surface, cause a small but decided degree of retardation of tissue growth.

These disadvantages, inherent in such types of dressing, remained unrelieved till the introduction of the "Tulle Gras" dressing a few years ago.

The "Tulle Gras" Dressing.

This dressing was first placed on the market under the name of "Tulle Gras" by a French firm some years ago. It consists essentially of a fairly large-mesh gauze net, impregnated with vaseline containing 1 per cent. of balsam of Peru, supplied in sections about four inches by five inches in size.

The method of application of the dressing is as follows:—From the sections an area of dressing is cut, slightly larger in size than the area of the wound—or several whole pieces may be used together in wounds of large surface area—and this is placed in contact with the actual granulating surface. Over this is then placed a covering dressing, either of dry gauze

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or of the particular mild antiseptic dressing which the surgeon favours, according to the state of the wound surface. Any discharge from the wound obtains free drainage into the covering dressing through the holes in the net and is absorbed. Thus the immediate neighbourhood of the granulating surface is kept clean, and the contaminated covering dressing only comes into contact with a small proportion of the wound surface. Owing to the impregnation of the gauze net with vaseline the dressing is almost entirely non-adhesive, thus enabling it to be changed whenever necessary with the minimum of disturbance to the healing surface and of pain to the patient. Moreover, the presence of the balsam of Peru not only acts as a mild antiseptic, but has a definite stimulant effect on tissue growth.

Thus it will be seen that this type of dressing completely fulfils all the conditions specified. Also, owing to its property of allowing free drainage, the dressing may be left in position for several days at a time, the covering dressing being changed only when considered necessary, thus still further minimizing the results of trauma on the reparative processes occurring in the wound.

Since the type of case to which such dressings are particularly beneficial is that with a large cutaneous granulating surface—e.g., that following the separation of sloughs after severe burns, etc.—it is obvious that they are specially useful in plastic surgery where a minimum of scar tissue is essential for the best results; and they have, in fact, been employed very extensively in such cases by many operators in this field of surgery.

Treatment by this method has been proved quite conclusively to reduce the time taken for epithelialization of large granulating surfaces by some 10 per cent.

**Variations of the Original "Tulle Gras" Dressing.**

The original proprietary preparation is, however, sufficiently expensive to prohibit its extensive use among patients of the hospital class. Also, although the results given by it showed a definite improvement over all types of surgical dressing previously employed, some of the wounds on which it was used progressed less rapidly than others. It is obvious that it is unreasonable to expect a single type of dressing to produce uniformly good results when applied indiscriminately to all of the various conditions which may be present in a cutaneous granulating surface. Some wounds may need a strongly antiseptic application whilst others require a dressing to stimulate the growth of granulation tissue, without which there can be no hope of rapid epithelialization.

Now although such minor alterations may be effected by varying the type of covering dressing, it was considered that better results might be obtained by impregnating the net itself with the particular substances required. In this way the substances would be kept in closer apposition to the healing surface, whilst maintaining all the advantages of the original
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Dressing; and a variety of dressings could be kept on hand to meet the various conditions of the wound which might be encountered. Moreover, such dressings can be made in the hospital dispensary itself, since they call for little technical ability on the part of the staff; they are relatively inexpensive to produce, enabling them to be used more extensively than would be possible with the more costly proprietary preparation.

Consequently a number of impregnating substances were experimented with, and the resulting dressings tested on various cases. The following three types of dressing were found to be the most satisfactory, and have been employed with excellent results in the treatment of a large number of cases at the Metropolitan Hospital, London, and also in the Queen Alexandra Military Hospital, Millbank.

_Type 1._—Owing to the fact that the balsam of Peru, incorporated in the proprietary preparation, did not give very good results in the presence of more than a moderate degree of sepsis, search was made for an alternative antiseptic for impregnation in the dressing. The "dye" antiseptic "brilliant green" has been found to possess a bactericidal power _in vivo_ considerably greater than most other antiseptics of corresponding "phenol strength," and appears to have in addition a definite stimulant action on growing tissue cells. Hence it was thought that it might give superior results to those obtained with the original dressing. This supposition was borne out in practice—the "brilliant green" giving definitely better results than any other antiseptic tried. So that a standard dressing for general use was prepared in which 0.2 per cent. of "brilliant green" was substituted for the balsam of Peru in the proprietary preparation.

_Type 2._—It has frequently been observed clinically that granulating surfaces which show but slow tissue growth with the continued application of a single type of stimulant dressing, will often react more rapidly if treated alternatively with different stimulants. From this point of view a dressing containing 0.5 per cent of scarlet red was prepared, and proved most satisfactory in use. The application of this dressing alternately with the brilliant green dressing has resulted in a marked quickening of tissue growth in such cases. Owing to the lower antiseptic properties of scarlet red, the strength employed is slightly greater than that of the brilliant green in Type 1 dressing, and a small proportion of tricresol and chlorobutal have been added as an additional means of increasing antiseptic action. Moreover, for some unexplained reason, this type of dressing is more satisfactory in the case of surfaces with a fair amount of necrotic tissue than is Type 1 dressing, and seems to aid in the separation of small superficial sloughs.

_Type 3._—For many years, one of the most popular solutions for stimulating the growth of granulation tissue has been _lotio rubra_, containing zinc sulphate as its active element. Difficulties as regards the solubility of this substance made it impossible to prepare a dressing of the "Tulle Gras" type containing it, but other salts of this metal were tried—
the acetate giving the best results. Brilliant green is also incorporated in this dressing, with the idea of providing an additional stimulant action. This type of dressing gives superior results to those obtained from Types 1 and 2 where stimulation of granulation tissue particularly is required.

**Practical Indications for the Use of these Dressings.**

The following are the main points in the condition of the wound which call for the application of one of these three types of dressing:

(a) Where the granulating surface is aseptic, or moderately so, and for general use, Type 1.

(b) Where rather more infection is present, or where there is a fair amount of superficial necrotic tissue, Type 2.

(c) Where tissue reaction is slow with the application of either Type 1 or Type 2 dressing alone they should be used alternately, being changed over every few days.

(d) Where stimulation of granulation tissue is necessary before epithelialization can occur, Type 3. In this type of dressing, care must be taken to cut it to the exact size of the granulating surface, as the zinc salt in the dressing will cause dermatitis and multiple pin-point ulcers if allowed to remain in contact for any length of time with the healthy skin surrounding the wound.

The covering dressing, whichever type of "Tulle Gras" dressing be employed, may be varied in accordance with the tastes of the particular surgeon, but as a general rule a simple dry gauze dressing gives as good results as any. If a temporary increase of antiseptic power be considered necessary, a good covering dressing is gauze soaked in eusol, which has been found to give good results in combination with all three types of "Tulle Gras."

**Preparation of the dressings.**

The prescriptions for the antiseptic portion of the three types of dressing are as follows:

1. **Brilliant green**
   - 1;1> Brilliant green...
   - 0.2 per cent.

2. **Scarlet red**
   - 1;1> Scarlet red...
   - 0.5 per cent.
   - Tricresol...
   - 0.5 per cent.
   - Chlorobutal...
   - 2.0 per cent.

3. **Zinc acetate**
   - 1;1> Zinc acetate...
   - 2.0 per cent.
   - Brilliant green...
   - 0.2 per cent.

The base is the same in all three types:

- 1;1> Liquid paraffin...
- 10 parts
- Paraffin mol. flav...
- 90 parts

The best material to use for the actual dressing is window-curtain net, with holes one-eighth of an inch in diameter. If, however, it is not possible to obtain a supply of this material, ordinary wide-mesh plaster-bandage muslin makes an efficient substitute.

The material must first be washed thoroughly to remove all the
"dressing" in it—at least two washings are necessary to do this properly. It is then cut into sections of a convenient size—about five inches by four inches will be found most suitable for general use. These sections are then sterilized in the autoclave.

The substances with which it is desired to impregnate the dressing are then dissolved in spiritus vini meth. and the sections of net are placed in the solution, where they are left for an hour. They are then removed and allowed to dry off slowly; too high a temperature must not be used in the case of dressings of Types 2 and 3, or chemical decomposition will occur.

The base is then melted, well mixed, and sterilized. A metal container is procured, about an inch larger both ways than the square of net. It must be provided with a well-fitting lid, and should be deep enough to contain a pile of from thirty to forty pieces of the dressing. The sections of net are then placed in a pile in the tin alternately with pieces of thin paper cut to the same size. Interleaving the pieces of dressing with paper is to prevent them sticking together after impregnation with the vaseline base.

The melted and sterilized base is next poured into the tin until it covers the top of the dressings in the container. The container and its contents are then kept at a temperature slightly above the melting point of the base for two hours. At the end of this time the base will have satisfactorily impregnated the dressing, and the surplus may be poured away.

The container is then closed, sealed with adhesive plaster round the lid and autoclaved for twenty minutes. No holes should be present in the container, as exposure to steam in the autoclave will destroy the dressing. The dressing is then ready for use.

If care is taken to remove only a single sheet of dressing at a time, and to do so with a sterile pair of forceps, the tin and its contents will remain completely sterile for some time, owing to the antiseptic incorporated in the dressing. But of course it may easily be resterilized in the autoclave whenever considered necessary.

It will be seen from the above description that these dressings are quite inexpensive to prepare. The only costly ingredients are the dyes, and the solutions of these in methylated spirit can be kept and used again several times, though it must be remembered that each time it is used the solution will become slightly weaker.

**Practical Points in the Use of These Dressings.**

The following are a few practical points about the use of these dressings which may be found of value:

(1) When placing the dressings on the granulating surface, always make sure that they are in close contact with the wound, as otherwise the best results will not be obtained. This may be done by gently smoothing them down with the finger-tip, when they will adhere closely to the contour of the wound.
(2) The usual period to leave such dressings unchanged is three to four days, but this may have to be varied according to the condition of the wound. They should always be changed when the dye has disappeared from the portion of the dressing in contact with the granulating surface.

(3) If correctly prepared, the dressings will be found to stick slightly to the surface of the wound, so that they will be left in correct position when the covering dressings are removed. If, however, they come away with the covering dressing, the epithelializing surface will not be injured in any way, and they may be replaced as before.

(4) If the dressings adhere to the wound and have to be torn off, they are either not being prepared correctly or have been left in position too long.

In conclusion, I wish to thank Mr. F. W. Hooper, Chief Pharmacist to the Metropolitan Hospital, for his invaluable assistance in the evolution of these dressings and for his help with the details of their preparation.