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UNITED STATES PATENT OFFICE

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SURGICAL MATERIAL

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This invention relates to material for making surgical dressings, and consists in material for such use prepared in a manner and having characteristics which render it peculiarly serviceable.

In making surgical dressings and in rendering first aid to injured persons, surgical gauze is commonly used; and it is desirable that for such use the gauze be bacteriologically sterile, and additionally that it be a carrier of an antiseptic agent; and it has become common practice to impregnate surgical gauze with active antiseptic agents, so that when the gauze is applied to a wound, it will serve not only as a protective covering, but also, by virtue of the substance with which it has been impregnated, it will serve to destroy bacteria present upon the wound surface. Free elemental iodine, an excellent antiseptic agent, may not readily be applied to surgical gauze for the purpose indicated—at least, not with satisfactory results—for a number of reasons: It gives tc the gauze an unsightly appearance; if gauze to which free iodine has been applied be allowed to stand for a time unused, some of the iodine will react with the material of the gauze, and in so doing will lose to a degree its antiseptic power and will weaken the gauze; and, since it will volatilize rapidly from the gauze, practically all of the iodine not spent in reaction will by volatilization be lost.

This invention consists in surgical gauze or like material, not subject to deterioration, which, upon application to a moist wound or upon being moistened with water after application, will release free iodine, to serve its antiseptic purpose.

To accomplish this result, a web of surgical gauze, or other suitable porous sheeted material, is impregnated in a part of its extent with iodine-containing material and in another part with material capable of releasing iodine from such iodine-containing material, when the two materials are brought to contact in the presence of water. The iodine-containing material may be an iodide or an iodate or a periodate. The iodine-releasing material will, in the case of an iodide, be an oxidizing agent; and it is also necessary to the accomplishment of the reaction that an acid be present to complete the reaction. The iodide employed may be any of the iodides of sodium, potassium, calcium, barium, or other metal, or a mixture of two or more of these. As oxidizing agents, metallic iodates or periodates, such as calcium or potassium iodate or periodate, may be used. Other oxidizing agents, such as potassium permanganate or ferric chloride may be used, the choice being governed by the effect which they or their reaction products may have in practice, other than the primary effect of releasing iodine. As for the acid, solid, soluble, non-hygroscopic acids which do not react readily with free iodine may be used. Suitable acids are citric and tartaric acids. Instead of an acid directly introduced, salts of strong acids and weak bases, such as aluminum sulfate, which with water hydrolyzes to give an excess of hydrogen ions, may be used. The oxidizing agent and the acid may be afforded together, in a single compound, such as iodic or periodic acid or ferric chloride. Any of these in the presence of water will react with an iodide to release iodine. If, however, an oxidizing agent and an acid be provided as distinct materials, they may be brought together in one and the same solution for impregnation of the gauze.

In case an iodate or a periodate be employed as the iodine-containing material, the iodine-releasing material will be a reducing agent. The iodine-containing material may, for example, be the iodate or the periodate of barium, calcium, or potassium, or other metal, or a mixture of two or more of these. In this case also it is necessary additionally to provide an acid such as those already named. Among the reducing agents available and useful to the ends indicated are iodide salts, such as sodium, potassium, or calcium iodide, and also thiosulfates, such as sodium, or potassium, thiosulfate, and indeed reducing agents generally.

To prepare the gauze for use a web of gauze of suitable width, which is intended to be folded so that several folds will overlie the wound to which it is to be applied, is impregnated over separate areas with solutions

of the several materials indicated. After making the applications the gauze is dried before folding. The impregnated and dried gauze is so folded that after folding there are present in superposed layers those materials which in the presence of moisture will react to release free iodine. The impregnated layers may be brought by folding into immediate contact, or they may be separated by an unimpregnated layer of gauze or by a layer of other water-penetrable material.

I claim as my invention:

1. A surgical material consisting of superposed webs of water-penetrable material, one web being impregnated with an iodine-containing salt capable of releasing free iodine, and another web being impregnated with a material capable of reacting in the presence of moisture with such iodine containing salt with the release of iodine.

2. A surgical material consisting of superposed webs of water-penetrable material, one web being impregnated with a material of a class which includes metallic iodates or periodates and another web being impregnated with a reducing agent which in the presence of moisture is capable of reacting with the first-named material with the release of iodine.

3. A surgical material consisting of superposed webs of water-penetrable material, one web being impregnated with an iodine salt and another web being impregnated with an oxidizing substance which in the presence of moisture and in association with an acid reacts with such iodine salt and releases iodine.

In testimony whereof I have hereunto set my hand.

GEORGE M. KARNS.