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STERILIZING METHODS

John J. Perkins, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa., a corporation of Pennsylvania

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Some surgical and dental instruments e. g. dental drill heads require both sterilization and lubrication. If the instruments are lubricated before sterilization, steam does not completely destroy the organisms under the film of oil or grease. Lubrication after sterilization is objectionable because it introduces an opportunity for contamination. Hot oil bath sterilization requires temperatures much higher than steam sterilizing temperatures and introduces a number of problems. Excessive amounts of oil are trapped in and do not drain from the instruments. The oil in the bath tends to decompose and to become rancid. There is also a fire hazard since the oil bath temperatures approach the flash point.

This invention is intended to overcome these problems by a steam sterilizing method which provides a residual film of lubricant at the end of the sterilizing operation.

The instruments to be sterilized and lubricated are first cleaned and washed by the usual method. This customarily involves the flushing of the instruments in a fat solvent such as acetone or Stoddard solvent. At the end of the washing and cleaning operation, the instruments are cleaned but not sterile and the previous film of lubricant, if any, has been removed. The cleaning and washing technique above described is conventional and other techniques are available.

As an initial step in the sterilizing and lubricating, the cleaned instruments are precoated, for example by dipping, with a homogeneous or uniform dispersion or mixture of lubricant and water. After draining, if the precoating is by dipping, the precoating mixture will uniformly coat all surfaces of the instruments including the depressions, serrations, crevices, locks, joints, bearings, etc. and the surfaces will be in intimate contact or at least contiguous with the water so the organisms on the surfaces are not protected by the lubricant.

The precoating mixture of lubricant and water can be selected from a large class of known materials. The mixture should be non-toxic and non-corrosive. The lubricant should not break down at the sterilizing temperatures e. g. 270° F. The wetting properties of the mixture may be improved by the addition of a wetting agent and by the addition of a small amount of detergent. The relative amounts of oil and water are not critical. Practical mixtures may contain as little as 10% water or as much as 90% water. Satisfactory mixtures are available commercially as cutting oils which are usually oil-water emulsions with wetting agent and detergent additions. Mixtures of half cutting oil and half water or one-third cutting oil and two-thirds water are satisfactory.

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The instruments which have been precoated with the mixture are placed in a steam sterilizer and sterilized for a short time by pressure steam sterilization. At 270° F. (27 lbs. per square inch steam pressure) five minutes sterilizing time is adequate. In the steam atmosphere, the water in the mixture is converted to steam thereby effecting moist heat sterilization of organisms on the surfaces of the instruments. This moist heat sterilization is effective despite the presence of lubricant in the mixture. If there were no water in the mixture, the steam would not be effective at the steam sterilizing temperature as the oil coating would protect organisms under the coating. The presence of moisture in the film with which the instruments are precoated is essential for the steam sterilization. While the moisture in the precoating film is evaporated during the steam sterilization, the non-volatile lubricant remains on the instruments and at the end of the time necessary to convert the moisture to steam, there remains only a film of lubricant which is essentially unaffected by the steam sterilizing atmosphere. At the end of the sterilizing time, the steam is exhausted from the sterilizer and any moisture remaining in the film on the instruments is evaporated as the pressure is reduced due to the heat remaining in the instruments. Since the sterilizing time is ordinarily only that required to convert the moisture in the precoating film into steam, the sterilizing takes place quickly and longer sterilizing times are not useful.

The simultaneous sterilization and lubrication of the instruments above described achieves the effectiveness of steam sterilization and eliminates the problems of after lubrication and of oil bath sterilization. Except for the precoating with the lubricant water mixture, the standard steam sterilizing techniques are used so that there is no need to train the operators in new techniques. The coating with the water-lubricant mixture can conveniently be a rinsing step at the end of the usual washing and cleaning operations. The instruments can be loaded into racks, dipped in a precoating bath, and, after draining, loaded directly into the steam sterilizer and thereafter sterilized and simultaneously lubricated by the steam pressure sterilizing technique.

The lubrication obtained by the combined sterilizing and lubricating method is in the form

of a uniform film without objectionable excess lubricant. The amount of lubricant can be controlled by varying the percentage of water in the mixture. Ordinarily a uniform thin film of lubricant is sufficient so that the percentage of water in the mixture is not critical.

In the case of dental instruments, a suitable flavoring may be added so that if the instruments contact the patient's mouth, the flavoring will counteract the taste of the lubricant. The flavoring, of course, has no effect upon the lubrication but has a more pleasing reaction to the patient.

While the sterilizing and lubricating methods is essentially unaffected by the quality of the lubricant, the lubricating properties of the residual film after sterilizing are entirely dependent upon the quality of the lubricant and the selection of the lubricant is a matter of engineering opinion and judgment with the resultant diversity of opinions common in such matters. There are available natural and synthetic lubricants of varying qualities. The most commonly used natural lubricants are petroleum base. The most common synthetic lubricants are synthesized or polymerized from hydrocarbons of which the unsaturated open chain hydrocarbons and alcohols are representative. The synthetic lubricants for the most part duplicate fractions obtained in petroleum refining. Both the natural and synthetic lubricants are oil-type lubricants.

What is claimed as new is:

1. The method of sterilizing and lubricating surgical instruments and the like which comprises precoating the instruments with a wet film of non-toxic, non-corrosive homogeneous oil-type lubricant and water mixture and then subjecting the precoated instruments with the wet film thereon to a steam pressure atmosphere to convert the water phase of the mixture to steam and leave the instruments coated with a film of lubricant.

2. The method of claim 1 in which the water in the mixture ranges from a major to a minor percentage sufficient to subject the instrument surfaces to moist heat sterilization as the water phase is converted to steam.

3. The method of sterilizing and lubricating surgical instruments and the like which comprises precoating the instruments with a wet film of an oil-type lubricant and water mixture selected from the class of cutting oil emulsions having non-corrosive and non-toxic properties including oil which is stable against breakdown when subjected to sterilizing steam pressures, and then subjecting the precoated instruments with the wet film thereon to a steam pressure atmosphere to convert the water phase of the mixture to steam and leave the instruments coated with a film of lubricant.

4. The method of sterilizing and lubricating surgical instruments and the like which comprises precoating the instruments with a wet film of non-toxic, non-corrosive homogeneous oil-type lubricant and water mixture containing a minor amount of a wetting agent, and then subjecting the precoated instruments with the wet film thereon to a steam pressure atmosphere to convert the water phase of the mixture to steam and leave the instruments coated with a film of lubricant.

5. The method of sterilizing and lubricating surgical instruments and the like which comprises cleaning the instruments with a fat solvent, precoating the instruments with a homogeneous wet film of non-toxic, non-corrosive oil-type lubricant and water mixture, and then subjecting the precoated instruments with the wet film thereon to a steam pressure atmosphere to convert the water phase of the mixture to steam and leave the instruments coated with a film of lubricant.

JOHN J. PERKINS.

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