Alcohol-Based Handrubs: An Additional Option for Surgical Scrubs

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Alcohol-Based Handrubs: An Additional Option for Surgical Scrubs Study Guide #10

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Description of Study Guide Topic

Surgical handscrubs are preformed to reduce the number of microorganisms and decrease the chance of patient infection in the event of glove failure during a surgical procedure. Surgical scrub techniques have been followed for many years using a brush and an antimicrobial soap, but recent research has shown that surgical scrubs can be done in a more effective and accepted way using an alcohol-based handrub. This study guide will review the history and practices of surgical scrubs and discuss implementation tips for newer alternative methods using alcohol-based handrubs.

Overall Purpose of the Study Guide

To describe the new surgical scrubbing techniques using an alcohol handrub solution.

Objectives

Upon completion of this study guide program, the participant should be able to:

1. Describe the traditional method of performing a surgical scrub
2. Review the CDC guidelines to support the alcohol surgical scrub

Intended Audience

This study guide is a self-study program intended for use by perioperative nurses, surgical technologists, perianesthesia nurses and staff members, endoscopy suite nurse and staff members, cardiac cath lab personnel, physician office and clinic personnel and other healthcare professionals interested in this topic.

Trends in Surgical Infection Control

Surgical site infections continue to be one of the leading Healthcare-Acquired Infection (HAI) causes of morbidity and sources of excess medical costs today (Parienti, 2002). Since the skin of the surgery team members is one of the major sources of microbial contamination in the surgical environment, sterile gloves are worn during surgery to prevent the spread of pathogens and prevent surgical wound infections. If the gloves are defective or sustain a puncture or tear during the surgical procedure, infective microorganisms can be transmitted. Standard surgical scrub procedures have been implemented to remove microorganisms from the surgical team's hands and reduce the chance of spreading pathogens. To understand the infection control practices of surgical antisepsis, the anatomy of the skin, transient and resident organisms, the chain of infection must be reviewed.

Skin: The Body's Protection

The skin is an amazing structure within the integumentary system that serves as the first line of defense against pathogenic organisms. It offers protection from the environment and microorganism invasion, provides temperature regulation and fluid control, responds to changes in the external environment and reflects changes in the internal environment. Skin is discreetly composed of three main layers: the epidermis, dermis and the subcutaneous tissues.

The epidermis consists of an outer, dead, cornified portion and a deeper, living, cellular structure and measures approximately 0.5 to 1.1mm in thickness (Mosby, 1994). The inner epidermal cells slowly migrate towards the skin surface until they are sloughed as cornified flakes. Nails are an epidermal structure that consists of specialized hardened keratin protein. Care of the fingernails focuses on the nail bed (the pink background behind the nail), the base of the nail (the junction site of the skin and the exposed fingernail) and the area under the exposed tip of the fingernail (Rodgers, 1998). Underneath the epidermis lies the dermis, which makes up the bulk of the skin. Consisting of tough connective tissue, lymphatics, glands, sensory receptors and related nerves, and blood vessels, the dermis supports and nourishes the epidermis. The subcutaneous layer lying immediately underneath the dermis is responsible for fat storage, which is instrumental in temperature insulation.

Skin is one of the most complex organs of the human body and provides a critical barrier to possible abrasions, chemical irritants, ultraviolet radiation and most importantly, infectious agents. Normal skin is colonized with nonpathogenic bacteria that protects us against invasion by pathogenic bacteria. However, skin can also serve as the vehicle for transmission of pathogenic microorganisms to vulnerable hosts. In particular, damaged skin can also become more heavily colonized with pathogens, which can be transferred to others and be the cause of infections. Studies have shown that medical personnel can have from 3.9×10^4 to 4.6×10^6 total bacterial counts on their hands (CDC, 2002). Preventing transmission of pathogens from medical personnel to patients requires establishing good hand hygiene practices such as handwashing and surgical scrubbing.

Transient vs. Resident Organisms

In addition to bacteria, fungi, yeasts and viruses can be found on most hands at any time. The skin can harbor microorganisms and not even appear to be soiled. There are two types of flora found on human skin: resident flora and transient flora.

Resident flora (also known as colonizing flora) are microorganisms considered as permanent residents of the skin and can not readily be removed with mechanical friction or other scrubbing techniques. These microorganisms can be consistently isolated from the skin of most persons. An example of a microbe that resides without harm on the skin surface and is considered normal is Staphylococcus epidermidis.

Non-native flora that appear suddenly are classified as transient. Transient flora (also contaminating or non-colonizing flora) are microorganisms that may be found consistently on the skin of most individuals and accumulate easily on hands after patient contact and other patient care activities. These microorganisms must be removed by mechanical friction with soap and water, or destroyed by the application of an antiseptic handrub (alcohol, for instance). If proper hand hygiene is not performed, then the chance of pathogenic organism transmission to other persons (i.e. patients or co-workers) increases.

Chain of Infection

The main elements in the chain of infection are the agent, the route of transmission and the host (AAMI, ST-79-2006). Healthcare professionals must understand the chain of infection so that practices (such as handwashing and surgical scrubbing) can be implemented properly to control the transmission of pathogens.The six elements in the chain of infection are:

1) Etiological agent
2) Reservoir
3) Portal of exit
4) Mode of Transmission
5) Portal of Entry
6) Susceptible Host

The agent that causes an infection may be a bacterium, virus, fungus, parasite, or prion. This pathogen must be virulent, invasive, infective and have the appropriate reservoir to survive and transmit disease.

Virulent - The ability of a microorganism to cause disease. Virulence is the degree of pathogenicity. As a microorganism

becomes more virulent, the resulting disease becomes more severe and communicable.

Invasive - The organism must be able to invade by penetrating the host's defensive barriers to cause a disease.

Infective - The number of organisms needed to cause an infection. An infective dose of the pathogen must be present. This number varies with the organism and the host.

Appropriate reservoir - An animate or inanimate environment that allows the organism to metabolize and multiply. Different microorganisms require different reservoirs.

Transmission of microorganisms can occur one of four ways. Direct contact is the most common method of transmission. Direct contact takes place whenever there is skin to skin contact, contact of skin with bodily fluids and sexual contact. Indirect contact occurs when a healthcare worker or patient contacts contaminated surfaces or medical devices such as soiled surgical instruments. Transmission can also occur through vehicles that are contaminated such as medications, tube feedings, or food and water. Vector transmission occurs when insects such as mosquitoes can pass along infectious diseases such as malaria and the West Nile virus. Although healthcare workers and patients come in contact with pathogenic microorganisms on a daily basis, a host has to be susceptible to the infective pathogen before disease can occur.

In summary, the disease is transmitted through a chain of infection. First, a causative agent multiplies in a reservoir and then a portal of exit allows the pathogen to escape and transmit to a susceptible host through a portal of entry.

During a surgical procedure, the use of an accepted surgical scrub technique and preparation can break this chain of infection by minimizing or eliminating pathogenic contamination on the surgical team members' hands. Therefore, compliance with an accepted surgical scrub protocol is mandatory for infection control.

History of Surgical Scrubs

Handwashing for antisepsis originated more than 150 years ago. The timeline of historical events that have steadily enhanced and advanced the practice of surgical scrubs are described below:

1840s – Ignaz Phillip Semmelweis, a Hungarian obstetrician, discovered how antiseptic handwashing can reduce patient deaths from pathogens transmitted by hands. He reduced the maternal mortality rate from puerperal fever about 90% over a three year period from 1846 - 1848. Semmelweis unfortunately died of puerperal fever more than likely contracted during an operation he had performed (Rotter, 1984).

Late 1800s – British surgeon Joseph Lister encouraged the application of carbolic acid to the surgeon's hands before a procedure to decrease infections.

1895 – Hot water and soap combined with the cleaning of the nails with a nailbrush were encouraged. Potash soap gained popularity. Rinsing the hands in alcohol followed by an immersion in bichloride solution was also employed.

Early 1900s – Scrub brushes were used with an antimicrobial soap.

1978 – The effectiveness of a brushless scrub technique that involves plain soap and a foam product (Hexachlorophene or alcohol) was explored.

1990 – Softer brushes and foam antimicrobials were introduced.

2000 – Alcohol-based handrubs for hand hygiene and handscrubs gained popularity. The need to use scrub brushes and sponges was once again explored. This history of hand antisepsis demonstrates the goal to provide an infection control method to manage nosocomial infections, especially during surgical interventions.

Traditional Surgical Scrub Methods

Wound infection has been a primary concern during any surgical intervention. One study provided evidence that bacteria on the hands of surgeons caused wound infections if bacteria was introduced into the sterile field during the procedure (Boyce et al., 1990). Therefore, regimented surgical scrubs must be performed before every surgical procedure.

The purpose of a surgical handscrub is to remove dirt, skin oils and transient microorganisms from the nails, hands and forearms to reduce the resident microbial count and to leave an antimicrobial residue on the skin to prevent growth of microbes for several hours (Rothrock, 2003). Since the skin can never be rendered sterile, to achieve these goals, the surgical handscrub must be approached as a highly disciplined practice.

Persons scrubbing should be in good health and have healthy, intact skin. Cuts, abrasions, hangnails and sores can ooze serum and harbor microorganisms that can be passed on to the surgical patient. Because microorganisms can harbor in jewelry, these items must be removed before scrubbing. Fingernails should be clean, healthy and short. Artificial nails or synthetic nail additives should not be worn as studies have shown the presence of higher numbers of gram negative organisms with these nails (Edel et al., 1998).

The traditional surgical scrub method uses the anatomic, counted, brush-stoke method and usually takes 5 to 10 minutes. The prescribed number of strokes with a brush is usually around 30 strokes to the nails and 20 strokes to each area of the skin (Rothrock, 2003). The following steps of the traditional surgical scrub are described below:

1. Wet the hands and forearms.
2. Use a foot control dispenser with antimicrobial soap or preparation along with a brush or use a disposable pre-packaged scrub brush.
3. Thoroughly clean the subungual areas of the nail with a nail pick.
4. Scrub the hands and forearms in an organized manner with a brush and antiseptic solution starting with the fingertips and moving towards the elbows. A timed method or a stroke-count method can be used.
5. Rinse the hands and forearms with the fingers always higher than the elbows.
6. Optional: Rewet the hands and forearms for a subsequent scrub with or without a brush. Thoroughly rinse the hands and forearms.
7. Thoroughly dry the hands and forearms with a sterile towel.

Prolonged surgical handscrubs have led to frequent complaints of skin damage. Several studies have reported that scrubbing for five minutes has demonstrated a reduction in bacterial counts similar to the 10-minute scrub (CDC, 2002). Other studies have indicated that even 2 or 3-minute scrubs reduced bacterial counts to acceptable levels (CDC, 2002). Today, practitioners are decreasing scrubbing time to minimize problems with skin irritation and damage. An acceptable two-stage surgical handrub involves using an

antimicrobial soap in the first stage followed by the application of an alcohol-based handrub. For example, a 1 to 2-minute surgical scrub with a 4% CHG or a povidine-iodine solution followed by an application of an alcohol-based handrub has been shown to be as effective as a 5-minute scrub with an antimicrobial soap (Deshmukh, 1998).

For years, scrub brushes have been recommended for surgical hand antisepsis. Along with this wide spread use of brushes, reports of skin damage resulting in an increased bacterial shedding from the hands have been documented. When a brush is used during the surgical scrub process, research has shown an 18-fold increase in skin cell shedding (Gruendemann, 2001). One study demonstrated that scrubbing with a disposable sponge or a combination of using a sponge and a brush decreased hand bacterial counts as effectively as scrubbing only with a brush (McBride, 1973). Further studies have shown that neither a brush nor a sponge are necessary to reduce the bacterial counts on hands when scrubbing, especially if alcohol-based handrubs are used (CDC, 2002).

Agents for Surgical Antisepsis

The Food and Drug Administration (FDA) has reviewed a variety of antiseptic agents over the years for safety and efficacy. The criteria for a surgical scrub have been outlined in the FDA's Tentative Final Monograph for Healthcare Antiseptic Drug Products (TFM) published in 1994. A hand hygiene product must be tested in a five-day in vivo clinical study and meet the following FDA criteria to be considered a surgical scrub.

1. An immediate one (1) $\log_{10}$ reduction in microorganisms on day one
2. Microbial counts of resident flora do not exceed baseline counts six (6) hours post-scrub and after wearing surgical gloves for the six-hour period (persistence)
3. An immediate two (2) $\log_{10}$ reduction and an immediate three (3) $\log_{10}$ in microorganisms on days two and five respectively (cumulative activity)

The Association of periOperative Registered Nurses' Recommended Practices for Surgical Hand Antisepsis/Hand Scrubs (AORN 2008) state that the surgical hand antiseptic agent should:

1. Significantly reduce microorganisms on intact skin
2. Contain a non-irritating antimicrobial preparation
3. Be fast-acting
4. Have a persistent effect

Over the years a variety of surgical scrub agents have been introduced and accepted into the surgical environment. Plain soap is not accepted as a surgical scrub agent as it can not bind with the stratum corneum, which in turn results in a persistent chemical activity (AORN, 2007). The following list includes the characteristics of different antiseptic preparations that have been used for surgical scrubs:

Alcohol

- Action – causes protein denaturization and dehydration of cells
- Effective concentrations are between 60-90%
- Excellent bactericidal and virucidal properties against most organisms, not sporicidal
- Can have a drying effect on the skin if no emollients are used

Chlorhexidine Gluconate (CHG)

- Action – causes cell membrane disruption leading to denaturization and precipitation of cellular contents
- Broad spectrum activity (more effective against gram-positive bacteria than gram-negative bacteria, no distinct action against fungi, or spores
- Excellent persistence (ability to stop microbial regrowth with repeated use)

Para-chloro-meta-xylenol (PCMX) or chloroxylenol

- Action – causes cell wall disruption and enzyme inactivation
- Good activity against gram-positive bacteria but has less activity against gram-negative bacteria, fair activity against fungi and viruses
- Percutaneous absorption has been documented

Hexachlorophene (HCP)

- Action – inactivates essential enzyme systems in microorganisms
- Bacteriostatic for gram-positive organisms, not very effective against gram-negative bacteria, fungi or viruses
- Can produce neurotoxicity (therefore, its use in the USA is very limited)

Triclosan

- Action – affects cytoplasmic membrane and synthesis of RNA, fatty acids and proteins
- Fairly broad range of antimicrobial activity, tends to be bacteriostatic, poor fungicidal activity
- Some persistence

Alcohol-Based Handrubs as Surgical Scrubs

Alcohol-based hand rubs that have met the FDA's criteria of a surgical scrub can be used as a surgical scrub preparation. Alcohol-based surgical scrubs are readily available in liquid or foam applications.

The benefits and advantages to using an alcohol-based handrub versus performing a traditional surgical scrub with a brush have gained much recognition and acceptance in the past few years. Some of these benefits include:

- Proven to be effective for surgical scrubbing
- The new CDC guidelines support the new alcohol surgical scrub
- Shortened surgical scrub time
- Increased compliance with alcohol-based handrubs
- Skin integrity can be maintained
- Requires no sink
- Requires no brush or sponge

Guidelines and recommendations for the use of alcohol handrubs for surgical scrubs

The Guideline for Hand Hygiene in Health-Care Settings published in 2002 provides specific recommendations to promote improved hand hygiene practices, including surgical hand antisepsis. The recommendations in the guideline evolved from a concerted effort of professional organizations such as the Healthcare Infection Control Practices Advisory Committee (HICPAC), Society for Healthcare Epidemiology of America (SHEA), Association of Infection Control and Epidemiology (APIC), Centers for Disease and Control and Prevention (CDC) and the Infectious Diseases Society of America (IDSA). The guideline cites multiple studies that demonstrate the efficacy of alcohol-

based handrubs as surgical scrubs. Consult with the manufacturer of any surgical scrub product to obtain information on the scientific evidence proving efficacy and for instructions of use.

Waterless handrubs that contain concentrations of alcohol in the range of 60-90% are considered to be safe and effective by the FDA. The mode of action of alcohols is believed to be that of protein coagulation/denaturation. Alcohol-based handrubs are fast-acting and have broad spectrum activity against bacteria, viruses, yeast and fungi. Alcohol does not leave a remarkable persistent chemical effect on the skin. However, the regrowth of bacteria on the skin occurs slowly after the use of alcohol-based handrubs, presumably because of the sub lethal effect alcohols have on some of the skin bacteria (Boyce 2002).

Shortened surgical scrub time

Less time is needed to perform the alcohol surgical scrub due to alcohol's excellent spreading and evaporation abilities. Traditional scrub techniques using an antimicrobial preparation along with a brush or sponge usually require three to five minutes to perform. An alcohol handscrub method usually requires less than three minutes to perform.

Increased compliance with alcohol-based handrubs

Alcohol-based handrubs with emollients are less drying to the skin and are more widely accepted by surgical team members. Elimination of brushes translates to less irritation of skin. The surgical team also enjoys the time-savings involved with the alcohol surgical handscrubs.

Skin integrity can be maintained

Surgical team members favor alcohol-based handrubs as they are less prone to experience irritant contact dermatitis. The drying effect of alcohols can be reduced or eliminated by adding emollients, such as 1% to 3% glycerol or other skin conditioning agents, to decrease skin dryness and irritation. Studies have shown that alcohols with emollients have caused less skin irritation and dryness than other commonly used solutions (Boyce 2002).

Requires no sink with the waterless preparations

No scrub sink may be needed with some of the alcohol-based handubs, as many of them do not require water for rinsing. An initial hand wash is usually recommended, though.With the new alcohol surgical scrub agent and method, future surgery departments may design handscrub areas with fewer scrub sinks. A provider actually could perform the alcohol surgical scrub technique within any restricted area of the surgical department.

Requires no brush or sponge to be used

The new CDC guideline clearly recommends not only the use of alcohol-based handrubs for surgical handscrubs, but it also promotes refraining from brushes or sponges with these preparations. Scrub brushes are known to be more detrimental to the skin than the simple application of an antimicrobial agent without using a brush (Gruendemann, 2001).

The tide has turned towards less irritating and more time saving surgical scrub options. These benefits, plus numerous others, will continue to capture the attention of healthcare professionals and drive acceptance and implementation of alcohol surgical scrub programs.

Implementation of an Alcohol Surgical Scrub Program

Implementation of a new program always involves the dynamics of behavioral change, which can be very complex. Any implementation process involves a combination of education, motivation and system change to be successful. Implementing a new alcohol surgical scrub program must address this triad of components to be successful.

Education

The educational component of an implementation process requires an acknowledgment of the research promoting the change to a brushless alcohol surgical scrub. Research results must be promoted to the practitioners who are involved with this change since research logically guides practices within the healthcare environment. Research studies can be posted within the surgery lounges and on bulletin boards.

An implementation team may be chosen to assist with the introduction of the new alcohol surgical scrub to the physicians and staff. These team members can be used to inservice the product and promote the new practice involved with the brushless method of surgical scrubbing. Team members also can serve as mentors or resources to ensure appropriate use of the product and answer any questions that may arise.

Education includes the review of recommended practices and guidelines. Promoting expert recommended practices and guidelines is vital to the successful implementation of an alcohol surgical scrub program. AORN recommended practices and the CDC guidelines for hand hygiene are thorough and well-referenced resources for surgical scrub practice and behavior changes.

AORN Recommendations

The AORN "Recommended Practices for Surgical Hand Antisepsis/Handscrubs" (AORN 2008) include the following statements:

Recommended Practice I: All personnel should practice general hand hygiene.

Recommended Practice II: An FDA-compliant, surgical hand antiseptic agent (i.e., surgical hand scrub/rub) approved by the facility's infection control personnel should be used for all surgical hand antisepsis/hand scrubs.

Recommended Practice III: Surgical hand antisepsis/hand scrub should be performed before donning sterile gloves for surgical or other invasive procedures. Use of either a FDA-compliant, antimicrobial surgical scrub agent intended for surgical hand antisepsis, or an FDA-compliant, alcohol-based antiseptic hand rub with documented persistent and cumulative activity that has been approved for surgical hand antisepsis is acceptable.

Recommended Practice IV: Surgical hand antisepsis/hand scrub using a FDA-compliant, traditional antimicrobial scrub agent should include a standardized hand scrub procedure that follows the manufacturer's written directions for use and is approved by the health care facility.

Recommended Practice V: Surgical hand antisepsis/hand rub with an FDA-compliant, alcohol-based surgical hand rub product should follow a standardized application according to the manufacturer's written directions for use.

Recommended Practice VI: Policies and procedures for surgical hand antisepsis should be developed, reviewed periodically and readily available in the practice setting.

This last recommended practice further states that these policies (AORN 2008) should include, but not be limited to:

- Identifying facility-approved, FDA-compliant, surgical hand antisepsis agents
- Defining the duration of surgical hand antisepsis procedures
- Establishing standardized protocols for each hand antisepsis method used

CDC Recommendations

The CDC refers to surgical scrubs in the "Guidelines for Hand Hygiene in Healthcare Settings" (Boyce 2002). The recommendations are categorized into four main areas so that levels of importance are realized:

- Category IA: Strongly recommended for implementation, strongly supported by well-designed experimental, clinical, or epidemiologic studies
- Category IB: Strongly recommended for implementation, supported by some well-designed experimental, clinical, or epidemiologic studies
- Category IC: Required for implementation and supported by suggestive clinical and epidemiologic studies or a theoretical rationale
- Category II: Suggested for implementation and supported by suggestive clinical and epidemiologic studies or a theoretical rationale

The following are the new CDC recommendations for surgical hand antisepsis:

A. Remove rings, watches and bracelets before beginning the surgical handscrub (II)

B. Remove debris from underneath fingernails using a nail cleaner under running water (II)

C. Surgical hand antisepsis, using either an antimicrobial soap or an alcohol-based hand rub with persistent activity, is recommended before donning sterile gloves when performing surgical procedures (IB)

D. When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, usually two–six minutes. Long scrub times (e.g., 10 minutes) are not necessary (IB)

E. When using an alcohol-based surgical handscrub product with persistent activity, follow the manufacturer's instructions. Before applying the alcohol solution, prewash hands and forearms with a non-antimicrobial soap and dry hands and forearms completely. After application of the alcohol-based product as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves (IB)

Both the AORN recommended practices and CDC guidelines have offered statements of support for the new alcohol surgical scrub methods. This information is extremely valuable to help educate providers when trying to implement the change to the alcohol surgical scrub.

The CDC guidelines can be referenced for more information on education and compliance building tools that educators and staff members can use (Boyce 2002). Some of these tools include:

- Routine observation and feedback
- Engineering controls (make alcohol surgical scrub solution available in easy, convenient locations)
- Visual aids to help promote the new alcohol surgical scrub process
- Reminders about the change to the alcohol surgical scrub practice
- Administrative sanctions or rewards

Motivation

Proper implementation of the new alcohol surgical scrub includes a motivational component that addresses the concerns of surgical team members. This requires identifying the need for change and understanding the problems with the existing system. Once surgical team members who have been educated on the overall rationale for the system change, they become motivated change champions. Often, research has shown that effectiveness of the alcohol surgical scrub is enough to motivate healthcare providers, but the focus on other benefits and advantages also helps. Practitioners may be motivated by the non-irritating effects of the alcohol-based handrub, by the new brushless scrub method, or by the time savings of using this new method.

After a period of time when the new alcohol surgical scrub preparation and practices have been accepted and become accepted practice, efficacy monitoring and continued motivation of the surgery team follows. The incidence of surgical site infections along with complaints of skin irritation from surgical employees should be compared to past traditional surgical scrub data. Compliance monitoring will aid attempts to consistently reinforce a surgical scrub implementation program.

System change

System change requires the evaluation of the new alcohol surgical scrub products that are on the market. Some of the desirable characteristics and research results that should be considered in the selection of an effective alcohol surgical scrub preparation include:

- Effectiveness
  - antimicrobial action
  - persistence rating
- Safety
  - non-irritating
  - shows little percutaneous absorption
  - excellent shelf-life stability characteristics
  - safe to the environment
- Personnel acceptance
  - maintains skin integrity
  - rub in time and time to scrub
  - not drying or irritating to the skin
  - no unpleasant odor
  - aesthetics and afterfeel
  - easy to access and apply
  - no staining or discoloration of the skin
- Cost

After products have been chosen, a comprehensive evaluation period follows whereby comparison of various alcohol surgical scrub preparations and accompanying scrub methods is conducted. As many surgical team members as possible should be included in the evaluation, so that motivation to make the change to a new scrub agent and system can be facilitated. The surgical scrub product is chosen at the end of the evaluation period.

An implementation program should address any barriers that could prohibit acceptance or changes in practice. Some of these barriers cited in previous research (Boyce 2002) include:

- Lack of scientific information dissemination to support the alcohol surgical scrub
- Lack of active participation in the implementation process
- Lack of role models promoting the new surgical scrub agent and process
- Lack of institutional priority for the alcohol surgical scrub
- Lack of administrative sanctions for non-compliance or rewards for compliance

Summary

The introduction of the new alcohol surgical scrub has been eagerly welcomed by surgical team members who have complained for years about the length of time required to perform the traditional surgical scrub and the skin irritation from scrub brushes and harsh antiseptic solutions. The CDC guidelines and the AORN Recommended Practices along with many articles, directly address the success of the alcohol surgical scrub. Numerous research studies document the effectiveness of the new alcohol surgical scrub as compared to traditional methods. Thus, the alcohol surgical scrub has become very popular in a very short period of time. Some of the documented advantages of the alcohol surgical scrub that have led professionals to switch to this type of scrub include:

- Fast acting antimicrobial activity
- Broad spectrum antimicrobial activity
- Accepted persistence level
- Cost effective
- No brushes needed (environmental impact, cost savings impact, minimizes skin irritations)
- Water savings
- User friendly for staff compliance
- Special emollients protect hands from dryness

These benefits far outweigh any concerns with problems that may be experienced when adjustments in practice are required. Proper implementation of the new alcohol scrubbing protocols must be logical, organized and well-planned if behavioral changes are expected. Changes in behavior require education to justify the change, motivation to understand why the change is needed and system changes that endorse and facilitate the change. Leaders and mentors who are committed to the success of the implementation program are also vital for success.

The addition of alcohol-based products to the surgical antisepsis arena has far reaching implications for the skin health and work-load of surgical personnel. Strong support for the use of these alternative scrubs is reinforced by the CDC, AORN and thought leaders. To make transition to this new type of surgical scrub, education, worker motivation and measurement of compliance should all be included in the implementation of a surgical scrub program.

Glossary

Alcohol-based products
Preparations that are increasingly being used for hand antisepsis and surgical handscrubbing. Formulations include foam and liquid rinses. These products do not remove soil, so if the hands are visibly dirty, a soap and water hand wash should proceed the application of the alcohol-based products.

Anatomical brush stroke surgical scrub method
A counted stroke method of surgical scrubbing of the fingers, hands and forearms (30 strokes on the nails, 20 strokes on the other surfaces).

Antiseptic
A substance that inhibits the growth of bacteria.

Foam surgical scrub products
A scrub agent that is mixed with air while being dispensed through a specialized nozzle. Some agents are applied to dry skin while others are applied to wet skin.

Nosocomial infection
An infection that was contracted during a patient's hospitalization or treatment in a healthcare facility.

Resident microorganisms
Microorganisms considered as permanent residents of the skin and not readily removed by mechanical friction.

Subungual
Under the nail (for example, under the fingernails).

Surgical handscrub
The process of removing as many microorganisms as possible from the hands and forearms by mechanical washing or chemical antisepsis before participating in a surgical procedure.

Surgical handscrub agent
A broad-spectrum, persistent, fast-acting, non-irritating preparation that reduces the number of microorganisms on the intact skin.

Transient microorganisms
Microorganisms that are not consistently present on the skin, can be readily transmitted on hands unless removed by mechanical friction and soap and water washing.

Stratum corneum
The horny, outermost layer of the skin, composed of dead flat cells converted to keratin that continually flake away.

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Review Questions

1. 1. Which of the following statements is true?
   A. A scrub brush or sponge must be used whenever a surgical scrub is performed before a procedure.
   B. Surgical scrubs of 5 minutes in length reduces the bacterial count as effectively as a 10-minute scrub.
   C. Alcohol is a slow-acting antiseptic solution.
   D. Today practitioners scrub for longer periods of time due to the increase in antimicrobial organisms.

2. Alcohol has been shown in studies to be more effective than traditional CHG scrubs.
   A. True
   B. False

3. Transient bacteria can not be easily removed with handwashing or handscrubbing techniques.
   A. True
   B. False

4. Virulence is the ability of an organism to penetrate the host's defensive barriers to cause a disease.
   A. True
   B. False

5. Brushless scrubbing techniques were first reviewed for effectiveness in the late _____.
   A. 1960s
   B. 1970s
   C. 1980s
   D. 1990s

6. AORN recommended practices state that agents used for surgical scrubs should:
   A. Significantly reduce microorganisms on intact skin
   B. Contain a non-irritating antimicrobial preparation
   C. Be fast-acting and have a residual effect
   D. All of the above

7. Alcohol-based handrubs within what percentage solution are the most effective?
   A. 40-80%
   B. 80-100%
   C. 60-90%
   D. 50-75%

8. The chemical composition of most foam products is the same as their liquid counterparts.
   A. True
   B. False

9. To be successful, implementation of a new product or practice within the OR involves a combination of
   A. a. motivation, system involvement and compliance
   B. b. research, compliance and purchasing
   C. c. education, dedication and cost-efficiency
   D. d. education, motivation and system change

10. The CDC guideline on surgical scrubs notes that "to reduce the number of bacteria that may be released from the hands of surgical personnel, while minimizing skin damage related to surgical hand antisepsis, decontaminate hands without using a brush."
    A. True
    B. False

Answers to Review Questions & Section Sources:

1. B (Traditional surgical scrub methods)
2. A (Surgical Alcohol Handrub)
3. B (Transient vs. Resident Organisms)
4. B (Chain of Infection)
5. B (History of Surgical Scrubs)
6. D (Agents for Surgical Antisepsis)
7. C (Agents for Surgical Antisepsis)
8. A (Surgical Alcohol Handrub)
9. D (Implementation of an Alcohol Surgical Scrub Program)
10. A (Surgical Alcohol Handrub)

Evaluation Form

Study Guide #10: Alcohol-Based Handrubs: An Additional Option for Surgical Scrubs

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First Name/M.I.

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Non-RN: License or Social Security Number

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To what extent did the study guide meet the 2 stated objectives below?

1. Describe the traditional method of performing a surgical scrub. [1] [2] [3] [4] [5]
2. Review the CDC guidelines to support the alcohol surgical scrub. [1] [2] [3] [4] [5]
3. To what extent is this learning method easy-to-use? [1] [2] [3] [4] [5]
4. How much time was required to read the content, take the test, compare your answers and complete the evaluation form? _____ hours _____ minutes
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