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AST Guidelines for Best Practices for Wearing Jewelry

Introduction

The following Guidelines for Best Practices were researched and authored by the AST Education and Professional Standards Committee, and are AST approved.

AST developed the Guidelines to support healthcare delivery organization's (HDO) reinforce best practices in wearing jewelry as related to the role and duties of the Certified Surgical Technologist (CST®), the credential conferred by the National Board of Surgical Technology and Surgical Assisting. The purpose of the Guidelines is to provide information OR supervisors, risk management, and surgical team members can use in the development and implementation of policies and procedures for wearing jewelry in the surgery department. The Guidelines are presented with the understanding that it is the responsibility of the HDO to develop, approve, and establish policies and procedures (P&P) for the surgery department regarding wearing jewelry per HDO protocols.

Rationale

Wearing jewelry has become a controversial subject, particularly wearing rings under the sterile gloves. Before further discussion Table 1 is a summary of the literature review.

Table 1

Study	Description of Study	Results	Conclusion
Quasi-experimental; Hoffman, et al, 1985[1]	Skin under the ring of 20 nurses was sampled & cultures grown on various agar over a five-month period. Up to six samples were taken from each nurse.	16 of the 20 nurses had Gram negative bacilli at the ring site & in most cases, the strains were present in each of the samples.	The pattern of Gram negative bacilli suggest that the organisms are colonizers of the hands & not transient microbes. The possibility that the bacteria can permanently colonize the hands should be taken into consideration by HCP who work in high risk departments.

Quasi-experimental; Salisbury, et al, 1997[2]	Cultures were obtained from 50 HCP with rings & 50 without rings who performed a timed hand washing procedure.	Compared to the colony counts before the hand wash was performed, there was a significant difference in the count after hand washing between the two groups.	A standardized, timed hand washing procedure was effective in decreasing the bioload on the hands of both groups, but the effect of rings produced a significantly higher bioload as compared to the non-ring wearers.
Randomized controlled trial; Trick, et al, 2003[3]	66 nurses who work in a 27-bed surgical ICU participated in the study November 21, 2000 to March 5, 2001; 564 hands were sampled. Samples of nurses' hands were obtained during their routine work hours, always after performance of patient care during the day shift. The hands of each nurse were sampled & cultured only once per day. A sealed envelope was opened that randomly assigned the first hand to be sampled & the hand hygiene technique. The first hand was sampled by means of the glove juice technique, rinsed, & dried. Then the nurse performed one of the three hand hygiene techniques: 1) hands were washed for 30 seconds with unmedicated soap,	Ring wearing was associated with 10-fold higher median skin organism counts & a step-wise increased risk of contamination with any transient organism as the number of rings worn increased.	Ring removal during work & use of an alcohol-based hand rub should reduce the degree of hand carriage of potential pathogens.

	rinsed, & dried with paper towels; 2) 62% ethyl alcohol-based gel was applied & hands were rubbed until dry; 3) medicated hand wipe was rubbed on the hands for 30 seconds. The medicated hand wipe contained an antibacterial solution. After completion of hand hygiene, a sample from the second hand was obtained by the glove juice method & cultured.		
Comparison study; Waterman, et al, 2006[4]	19 veterinary medical students participated in the study. 11 wore a smooth ring band & 8 were non-ring wearers. All participants performed a 5-minute surgical scrub with chlorhexidine gluconate & scrub brush, & a donned sterile gown & gloves that were worn for 3 hours while performing tissue dissection on dog cadavers. Cultures were obtained after the 3 hours.	There was no difference in the bacterial counts of all ring hands & non-ring hands or between the ring and non-ring hands for ringed participants both before and after dissection in the lab.	The authors stated that the information obtained from this study was used to demonstrate there is no significant difference in the change of bacterial counts between ringed & non-ringed hands. However, the authors concluded that given the limited size of the study, further clinical studies are needed to determine if surgeons who wear rings under the sterile gloves increase bacterial loads in wounds or increase the risk for surgical site infections (SSI).
Laboratory study; Fagernes; 2007[5]	The sample size was 152 *finger rings* worn by 118 nurses in 15	The findings showed a significantly lower bacterial count on	The author concluded that even though the count on

	units at a 400-bed hospital. Using sterile technique, 100 plain rings & 52 non-plain rings were shaken in 5-mL sterile water, the solution transferred to agar & incubated for 48 hours.	plain rings as compared to non-plain rings.	plain rings was lower, the plain rings still represent a danger of infection.
Prospective comparative study; Yildirim, et al, 2008[6]	84 nurses participated in the study; 30 from surgical ICUs & 54 from medical ICUs. All nurses throughout the study used the same type of alcohol-based hand-antiseptic solution for routine daily hand hygiene. 28 nurses wore plain *wedding ring*; 28 wore a ring with stones; 28 wore no ring, starting 15 days before the start of the study & throughout the study.	The nurses wearing rings had more Gram-positive, Gram-negative & total bacterial colonization on their hands than the nurses without rings. When comparing the two ring-wearing groups there was no difference in bacterial counts between those wearing plain wedding rings & rings with stones.	Rings worn by nurses working in ICUs cause higher colonization of potential pathogenic bacteria on the hands despite the use of an alcohol-based hand-antiseptic solution. However, the authors stated that the number of existing studies is limited & majority of the study groups are small thus continuing the controversy if HCP should remove rings at work.
Quasi-experimental; Al-Allak, et al, 2008[7]	19 surgeons & anesthesiologists who wore a ring participated in the study. Everyone performed a surgical scrub, removed the ring, and the internal circumference of the rings were swabbed, and the swab placed in culture medium.	There was no statistically significant difference in colonization between the right non-ring hand & left ring-wearing hand of both groups.	Authors state that more evidence is required regarding wearing wedding rings during surgical procedures, but this study provides evidence that the wedding ring is not a significant source of microbes, providing that a surgical scrub is performed.
Level III retrospective	From January 1998 through June 2002	22 postop infections were recorded in	Author concluded that there is no

cohort study; Stein, et al, 2009[8]	Stein performed 2,127 surgeries, the first two years without a *wedding band* & the next 2 years with a plain wedding ring under the sterile glove. When performing the surgical scrub the ring was slid proximal & distal on the finger to allow the surgical scrub solution to cleanse the skin under the ring.	2,127 surgeries. The "no ring" group totaled 987 cases with an infection rate of 1.6%; the "ring" group had an infection rate of 0.53% in 1,140 cases.	correlation between wearing a plain wedding ring under the surgical glove & an increase in postop infections.
Pre-experimental; Fagernes, et al, 2009[9]	100 HCP who wore finger ring(s) on 1 hand & 100 HCP who did not wear any rings performed a standardized hand shake with an investigator wearing sterile gloves. Samples from the gloved hands of the investigators & bare hands of the HCP were obtained by the glove juice technique.	A significantly higher bacterial load & number of bacteria transmitted were confirmed with ringed hands as compared to the control hands. The percentage of nonfermentative Gram-negative bacteria & Enterobacteriaceae was also significantly higher on ring wearers versus non-ring wearers.	Wearing rings increases the number of bacteria on the hands of HCP. However, there was no statistically significant difference detected in the transmission of bacteria between ring wearers and non-ring wearers.
Experimental; Khodavaisy, et al, 2011[10]	Total of 40 participants that consisted of physicians, nurses, nurse assistants, & patient transporter who worked in the ICU with 11 beds. Study was conducted May 1 to July 15, 2010. 126 specimens were cultured from the dominant hand & rings of participants during routine work hours	The microbial flora was found to be higher in ring-wearing HCP. Some of the flora are known to cause HAIs including *staphylococci*, *Klebsiella* spp., & *Escherichia coli*.	A high rate of contamination with potential pathogens was reported. 73% of the HCPs hands and rings samples were found to be contaminated with at least one pathogen during routine clinical work. The authors concluded that HCPs must perform

	before & after performance of patient care during the day shift.		meticulous hand washing techniques & should remove rings, watches, & bracelets before washing their hands & entering the ICU.

The transfer of microorganisms from the skin is a potential source of cross-contamination in the perioperative environment. Hand hygiene is the least expensive, most effective factor in preventing infections and should be diligently practiced by all healthcare personnel (HCP).[11] This includes awareness of the consequences of wearing jewelry in the HDO. Jewelry can be a source of microbial colonization on the skin under rings that could possibly be transmitted to the patient causing a HAI.[12-16] Additionally, jewelry presents the possibility of causing glove perforations when wearing non-sterile or sterile gloves.[4]

Evidence-based Research and Key Terms

The research of articles, letters, nonrandomized trials, and randomized prospective studies is conducted using the Cochrane Database of Systematic Reviews and MEDLINE®, the U.S. National Library of Medicine® database of indexed citations and abstracts to medical and healthcare journal articles.

The key terms used for the research of the Guidelines include: finger rings; hand hygiene; hand washing; healthcare-associated infection; jewelry; microbial colonization; rings; smooth band rings; surgical scrub; wedding band; wedding ring. Key terms used in the Guidelines are italicized and included in the glossary.

Guideline I

It is the responsibility of surgical team members to follow CDC standards for recommended OR attire.[17]

1. CDC standards and surgery department P&Ps aid in environmental control of the restricted and semi-restricted areas of the surgery department. Surgery department personnel should implement the CDC standards and surgery department P&Ps to protect patients from SSIs.

Guideline II

***Hand hygiene*, including *hand washing* and performing the *surgical scrub* are important towards the prevention of the transmission of microorganisms.[17]**

1. The surgical scrub renders the skin surgically clean by reducing pathogenic colonization, decreasing the density of transient flora and providing a continuous antimicrobial action.[18-21]

Guideline III

Non-sterile and sterile surgical team members should remove all *jewelry*, including facial and oral jewelry prior to entering the OR.

1. Because the possibility exists that *microbial colonization* of the skin under *rings* can occur and possible transmission of the microbes places the surgical patient at-risk for acquiring a SSI, it is recommended that the non-sterile and sterile surgical team members remove all bracelets, earrings, necklaces, rings, and watches prior to entering the OR.[1-3,5,6,10,12-16,18,20-23] Chains, earrings, and necklaces are also removed to avoid skin desquamation and shedding at the sterile field.[23] Lastly, jewelry that is exposed and not contained within the scrub attire can become contaminated during a surgical procedure with aerosolized particles, blood, or other potentially infectious materials (OPIM), and become a source of cross-contamination.
    A. Wearing bracelets, rings, watches, and similar hand and forearm jewelry reduces the efficacy of hand washing, and disinfecting the hands and forearms when performing the surgical scrub.[1-3,5,6,10,17,18,20-23] Removal of all jewelry from the hands and forearms allows the CST and other surgical team members who must perform the surgical scrub to contact the entire surface of the skin with the antimicrobial scrubbing agent.[17,18,20,21]
    B. Rings and forearm jewelry present challenges in properly donning gloves and as well as possibly cause glove perforations.[4] Therefore, jewelry should not be worn to avoid interference with the ability to wear the correct size of gloves, and possibly affect their integrity.[4,20]
        1) Waterman, et al tested the gloves of 19 veterinary medical students after performing three hours of mock surgery using a water pressure test. Eight of the participants perforated at least one glove and some of the gloves had multiple perforations. Majority of the perforations occurred in the glove on the nondominant ring-wearing hand.

            Two additional factors related to the frequency of glove perforations during surgery are the type and length of procedures.[4] Higher perforation rates are also seen in non-soft tissue surgeries, e.g., neurosurgery, orthopedic and thoracic surgery, due to the length of the surgery time and handling of bone, plates, screws, and wires.[1,4,5] The combination of wearing a ring, and type and length of procedures places the glove wearer at a higher risk for glove perforations and exposure to blood, body fluids, and OPIM during surgery.
2. Surgery personnel should remove facial and oral jewelry before entering the OR. Wearing eyebrow, lip, nose, and tongue piercings present the potential of dislodging and falling onto a sterile field, and possibly enter the surgical wound.[19,21]

Guideline IV

The surgery department should review the P&Ps regarding sterile attire and wearing jewelry on an annual basis.

1. The surgery department should include members of the surgical team and administration when reviewing the P&Ps, including CSTs, surgeons, RNs, risk management, and infection control officer.
    A. The surgery department should document when the P&Ps were reviewed, revision completed (if necessary), and who participated in the review process.
2. CSTs should be familiar with the P&Ps for hand hygiene, sterile attire and wearing jewelry. The orientation of new employees should include reviewing the P&Ps.

Guideline V

CSTs should complete continuing education to remain current in their knowledge of hand hygiene practices including the surgical scrub, sterile attire and wearing jewelry.[24]

1. The continuing education should be based upon the concepts of adult learning, referred to as andragogy. Adults learn best when the information is relevant to their work experience; the information is practical, rather than academic; and the learner is actively involved in the learning process.[25]
2. It is recommended surgery departments use various methods of instruction to facilitate the learning process of CSTs.
    A. If the education is primarily lecture, methods to engage learners include presentation of case studies for discussion, and audience discussion providing suggestions for reinforcing sterile attire and wearing jewelry.
    B. Other proven educational methods include interactive training videos, and computerized training modules and teleconferences.
    C. The continuing education should be delivered over short periods of time such as in modules, and not in a one-time lengthy educational session.
3. Continuing education programs should be periodically evaluated for effectiveness including receiving feedback from surgery department personnel.
4. The surgery department should maintain education records for a minimum of three years that include dates of education; names and job titles of employees that completed the continuing education; synopsis of each continuing education session provided; names, credentials, and experience of instructors.

Competency Statements

Competency Statements	Measurable Criteria
1. CSTs are knowledgeable of the methods for implementing infection control practices to prevent cross-contamination.	1. Educational standards as established by the *Core Curriculum for Surgical Technology*.[26]
2. CSTs have the knowledge and skills to perform the hand wash and surgical scrub per guidelines published by professional organizations.[17,18,21]	2. The didactic subjects of the principles of asepsis and proper donning of sterile attire is included in a CAAHEP accredited surgical technology program.
3. CSTs are knowledgeable of recommended CDC regulations and HDO policy and procedures for wearing jewelry in the OR.	3. Students demonstrate knowledge of the principles of asepsis and proper donning of sterile attire in the lab/mock OR and during clinical rotation.
	4. CSTs complete continuing education to remain current in their knowledge of the principles of asepsis and proper sterile attire.[24]

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Glossary

Finger rings: See *ring*.

Hand hygiene: Any method that removes or destroys microorganisms on hands.

Hand washing: Method of hand hygiene that involves the action or process of washing one's hands with a soap or solution.

Healthcare-associated infection: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare delivery organization.

Jewelry: Personal ornaments, such as bracelets, necklaces and rings, that are made from precious or imitation jewels and metals.

Microbial colonization: Formation of a group of the same type of microorganism such as a colony of a specific species of bacteria.

Rings: A circular band that can be smooth or consist of precious or imitation metals, gemstones, and etchings worn on a finger as an ornament.

Smooth band rings: See *rings*.

Surgical scrub: Specific method for cleaning the hands and forearms using a disinfecting solution.

Wedding band: See *rings*.

Wedding ring: See *rings*.

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