

ARTIFICIAL NAILS... VERY REAL RISKS

ABSTRACT

The current social trend towards personal esthetics has come into conflict with safe perioperative care practices. While artificial nails have become very popular they pose a significant risk to patients. Surgical personnel who scrub while wearing artificial nails are putting their patients at higher risk for post-surgical wound infection. Artificial nails harbour microbes and cannot be cleaned as effectively as short, natural nails. We cannot rely on surgical gloves to always contain these hand organisms. There are reported cases where artificial nails have been the cause of post-surgical infections and even death. OR personnel who scrub should not wear artificial nails.

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INTRODUCTION

Should OR personnel scrub while wearing artificial nails? This question is currently being discussed in many operating room departments.

This article will discuss the types of artificial nails available, and how they are applied.

Effects of hand cleaning on artificial nails and barrier properties of surgical gloves will also be investigated. Documented transmissions of infection related to artificial nails will also be discussed.

TYPES OF ARTIFICIAL NAILS:

Nail extensions or tips enhance the nail's appearance and cover misshapen or bitten nails. Many are made of fiberglass or acrylic. Nail tips are glued into place on the nail plate. Gel or acrylic overlays are then brushed on top of the fingernail and the tip. Gels are thought to be stronger than acrylics and easier to apply because of they do not emit the strong fumes associated with the liquid acrylic coating. Both types of overlay require maintenance every 2 to 3 weeks.

Acrylic nails are applied using a sable brush to apply a mixture of powder and liquid to the natural or tipped nail. Acrylic nails require maintenance approximately every 2 to 3 weeks. There are two main types of acrylic nails; sculptured or tipped. Sculptured nails are formed

with acrylic liquid and powder that is layered to achieve desired nail form. A nail tip is a solid plastic tip that is applied with a resin and then sealed with an acrylic overlay for strength and bonding. Gel and acrylic nails can become chipped or lift from the nail plate if moisture seeps under the overlay. Moisture can seep under the nails if the overlay has been applied on top of the cuticle instead of just on top of the nail. The risk for chips or lifting varies according to the tasks each wearer performs with her hands. It is recommended that wearers wear gloves for tasks that may damage the artificial nails (*Hollywood Nails*, 2002).

Natural nails can also be strengthened with a fiberglass mesh that is bonded with a resin. This process, also known as a fiberglass wrap, is used to repair broken nail tips or split nails. Fiberglass can also be applied over an artificial nail tip in order to form a nail extension. The nail is then buffed to achieve a natural appearance. Maintenance is usually required after 2 to 3 weeks (*Artificial Nails*, 2002).

False nails are sometimes also referred to as artificial fingernails. False nails are shaped like a complete nail and are applied over the natural nails with special glue or a double-sided adhesive. They can be cut, filed, or varnished in the same manner as real fingernails and can be removed relatively easily when desired (*False Nails*, 2002).

Artificial nails can be applied by licensed estheticians or individuals can purchase equipment and attempt to apply their own.

ARTIFICIAL NAILS AND MICROORGANISMS:

It is a well-known fact that bacteria adhere more easily to artificial surfaces than to natural ones (*McNeil, Foster, Hedderwick and Kauffman*, 2001). In addition, artificial nails are almost always longer than natural nails which makes them harder to keep clean. Artificial nails are also known to promote the growth of *Staphylococcus aureus*, gram-negative bacilli and yeast (*McNeil, Foster, Hedderwick and Kauffman*, 2001). Fungal



Artificial Nails Can't Be Cleaned As Well

growth occurs frequently under artificial nails as a result of moisture becoming trapped between the natural nail and the artificial nail (*AORN*, 2001).

Dermatologists report secondary infections associated with *Pseudomonas* and *Candida* when reactions to nail lacquers and hardeners cause onycholysis (*Scher*, 1990).

EFFECTS OF HAND CLEANING ON ARTIFICIAL NAILS:

The subungual regions harbour a greater number of microbes than any other area of the hand. *McNeil et al* (2001) reports that their study concurs with others by determining that health care workers (HCW) wearing artificial nails had more pathogens isolated from their nails, after hand washing, than those with natural nails. *Parry, Grant, Yukna, Adler-Klein, McLeod, Taddonio & Rosenstein* (2001) state that artificial nails are known to promote the growth of gram-negative bacilli and yeast.

A 1998 study by *Edel, Houston and Kennedy* found OR personnel with artificial nails harboured more gram-negative rods before and after a five-minute scrub and had higher bacterial loads compared with natural or polished nails.

Larson (1995) reports that in two instances

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Artificial Nails Harbour Organisms

when prosthetic nails were broken or had separated from the natural nails, high colony counts were found despite a 30-second wash with povidone iodine.

Artificial nails may also interfere with hand cleaning because of a desire to protect the nail gloss.

BARRIER PROPERTIES OF SURGICAL GLOVES:

Are scrubbed personnel relying too heavily on the barrier properties of their surgical gloves to isolate organisms on their hands and nails?

According to one study involving surgeons and first assistants, the overall glove failure rate was 51% when a single pair of gloves was worn. The longer the gloves were worn, the greater the failure rate. In this study, glove failure was defined as blood contamination to the fingers (AORN, 2000).

Alrawi (2001) reports on their study to detect unrecognized perforations involving 206 pairs of surgical gloves from 3 different manufacturers. Fourteen percent of the gloves demonstrated perforations after surgery. The authors conclude that surgical gloves are inefficient at resisting punctures.

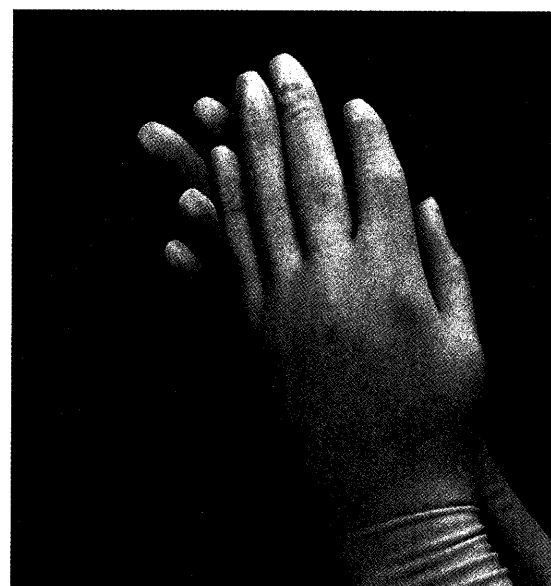
This is only a small selection. There are other publications available that demonstrate less than optimal barrier properties of surgical gloves. It is for this reason that double gloving is recommended in specific situations. There is also an increased risk for glove perforations with long artificial and natural nails.

NOSOCOMIAL INFECTIONS RELATED TO ARTIFICIAL NAILS:

The literature reports a significant number of hospital-acquired infections related to artificial nails. A February report from the *Center for Disease Control* (CDC) linked nurses' long and artificial nails to the deaths of 16 infants in a neonatal intensive care unit in Oklahoma City, following an outbreak of *Pseudomonas aeruginosa* (Moolenaar, Crutcher & San Joaquin, 2000).

Parry, et al (2001) reported 3 patients who were confirmed to have post-laminectomy deep wound infections due to identical *Candida albicans* isolates. These infections were linked to an operating room technician with artificial nails who had *C. albicans* isolated from her throat. The authors stated that "hospitals should enforce policies to prevent operating room personnel from wearing artificial nails" (p. 352).

Winslow (2001) reports on an incident that occurred in 1994 where seven patients at a California hospital acquired postoperative *Serratia marcescens* infections during a one-month period. One of them died. Infection control experts identified a scrub nurse with artificial nails as the likely source of the outbreak.



Gloves Cannot Always Contain Organisms

RECOMMENDATIONS AGAINST ARTIFICIAL NAILS:

AORN (2001) states "Artificial nails shall not be worn" (p.177). ORNAC (1989) states "Acrylic or artificial nails shall not be worn" (p.72). The CDC (1999) states "Keep nails short and do not wear artificial nails" (p. 267). Phippen & Wells, (2000) and Berry & Kohn (2000), both recommend against artificial nails.

CONCLUSION:

Should OR personnel scrub while wearing artificial nails?

The answer to the question seems simple. Scrubbed personnel should not wear artificial nails. Indeed by doing so, they are putting their patients at a significant and unnecessary risk. The current social trend towards personal esthetics has come into conflict with safe health care. Scrubbed personnel are legally and ethically accountable for their actions. In this extremely vulnerable time in their life, our surgical patients are depending on us to act in their best interest and protect them from harm.

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