Surgical Gloves: Puncture Holes and Bacteria (11/10)


The reasons for wearing gloves for surgery are to protect the surgical field from microorganisms on the surgeon's hands and protect the surgeon from microorganisms from patients. This study measured the concentration of bacteria passing through glove punctures during surgical procedures. Double-layered surgical gloves were worn during visceral surgeries over four months. The study included 128 outer gloves and 122 inner gloves from 20 septic laparotomies. To measure bacterial passage through punctures, intraoperative swabs were made, yielding microorganisms that were compared with microorganisms retrieved from the inner glove layer. Depending on the duration of glove wear, the microperforation rate of the outer layer averaged 15%. Approximately 82% of the perforations went unnoticed by the surgical team. Eighty-six percent of perforations occurred in the nondominant hand, with the index finger being the most frequently punctured location (36%). Bacterial passage from the surgical site through punctures was detected in 4.7% of the investigated gloves. Depending on the duration of wear, surgical gloves develop microperforations not immediately recognized by staff. During surgery, such perforations allow passage of bacteria from the surgical site through the punctures. Possible strategies for preventing passage of bacteria include improving the gloves’ barrier function by double gloving, strengthening of glove areas prone to punctures or strict glove changing every 90 minutes.

DECS Comment: Limited studies of the penetrability of different glove materials under conditions of use have been conducted in the dental environment. Consistent with observations in clinical medicine, leakage rates vary by glove material (e.g., latex, vinyl, and nitrile), duration of use, and type of procedure performed, as well as by manufacturer. The frequency of perforations in surgeon’s gloves used during outpatient oral surgical procedures has been previously reported to range from 6% to 16%. The current study supports previous publications which have demonstrated that health-care personnel (HCP) and dental health-care personnel (DHCP) are frequently unaware of minute tears in gloves that occur during use. These studies determined that gloves developed defects in 30 minutes–3 hours, depending on type of glove and procedure, however investigators did not determine an optimal time for changing gloves during procedures.

In the present study, the authors discussed the possibility of wearing double gloves to prevent punctures and passage of bacteria. The Centers for Disease Control and Prevention (CDC) Guidelines for Infection Control in Dental Health-Care Settings—2003 provide information on wearing two pairs of gloves during dental procedures. The CDC considered this an unresolved issue for dentistry because of the lack of evidence in preventing disease transmission. The CDC dental infection control guidelines state: “Although the effectiveness of wearing two pairs of gloves in preventing disease transmission has not been demonstrated, the majority of studies among HCP and DHCP have demonstrated a lower frequency of inner glove perforation and visible blood on the surgeon’s hands when double gloves are worn.” In one study evaluating double gloves during oral surgical and dental hygiene procedures, the perforation of outer latex gloves was greater during longer procedures (i.e., >45 minutes), with the highest rate (10%) of perforation occurring during oral surgery procedures. Based on these studies, double gloving might provide additional protection from occupational blood contact. Double gloving does not appear to substantially reduce either manual dexterity or tactile sensitivity. Additional protection might also be provided by specialty products (e.g., orthopedic surgical gloves and glove liners).
References