Prevention of Cross-Contamination When Using Microdermabrasion Equipment

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This article addresses the concern of cross-contamination with the use of microdermabrasion equipment. After performing microdermabrasion on a patient with acne scarring, the instrument was examined for debris on the plateau of the hand piece. Bloody material was noted, indicating that it is not sufficient to only sterilize the distal cap of the hand piece or to use disposable caps. The hand piece itself must be sterilized to prevent the transmission of infectious particles to the next patient receiving treatment with this equipment.

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Microdermabrasion has become a well-integrated part of many cosmetic procedures to produce smoother skin texture and homogenous coloration.[1-7] Both clinical and histological improvements in patients have been documented as a result of microdermabrasion.[8-10] It is extremely important that a patient receiving an elective procedure is not harmed, which would be particularly upsetting if the injury could have been avoided by implementing a simple additional step such as autoclaving the surgical equipment.

To investigate the possibility of cross-contamination, a Derma Care™ microdermabrasion machine was used on a patient, mostly with a vacuum adjustment of 3/5 and a crystal flow of 3/5. Double passes were conducted over the patient's cosmetic site and multiple passes were conducted over acne scars on the patient's shoulders until pinpoint papillary dermal capillaries began to bleed. The hand piece was then disassembled and inspected for gross bloody material on the platform of the hand piece. Great turbulence was experienced within the head of the hand piece. The crystals bounced off each other during procedures, creating erosions on the skin. As a result, obvious blood was noted on the platform surrounding the apertures of the nozzle.

Use of microdermabrasion equipment involves the particulate materials aluminum oxide crystals[11] or sodium bicarbonate crystals.[12] Fine particles of these materials are propelled by the machine in a focused spray through a small aperture in the nozzle of the hand piece. The crystals strike the skin surface and then become enclosed within the cap, which may be glass or plastic and is shaped like a helmet (Figure 1). The vacuum force of the equipment sucks the particles back into the distal hand piece as well as into the distal cap (Figure 2). Normally, light microdermabrasion is used to desquamate the skin. Theoretically, keratinocytes that may be infected with human papilloma, herpes simplex, or molluscum contagiosum viruses may be brought into the head of the hand piece.

In our sample microdermabrasion, there was visible evidence that blood and particles of skin were deposited on the inner surface of the cap of the hand piece in addition to the receiving plateau surrounding the inflow orifice. As the turbulence propelled the particles in different directions, they bounce off the inner cap and the plateaus, circulating potentially infectious material. These materials may be carried with the new particulate egress and thus may contaminate the next patient to receive microdermabrasion with this unit. It is not necessary to see gross blood on the hand piece to realize that infectious particles could lodge there after patient contact.

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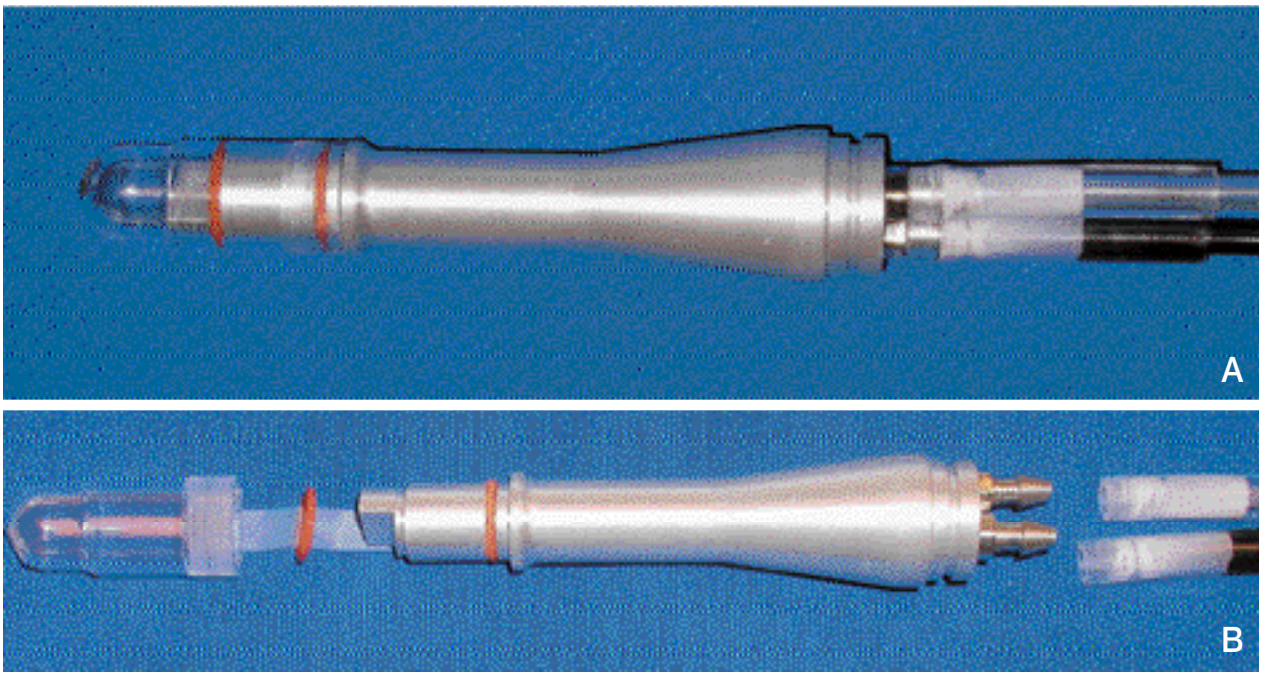

Figure 1. A stainless steel hand piece connected to the ingress and egress tubing (A). The disposable plastic cap (helmet) is attached. The plastic cap has been unscrewed to reveal the rubber O-ring that is removed from the neck of the hand piece prior to placing the unit in the autoclave (B).

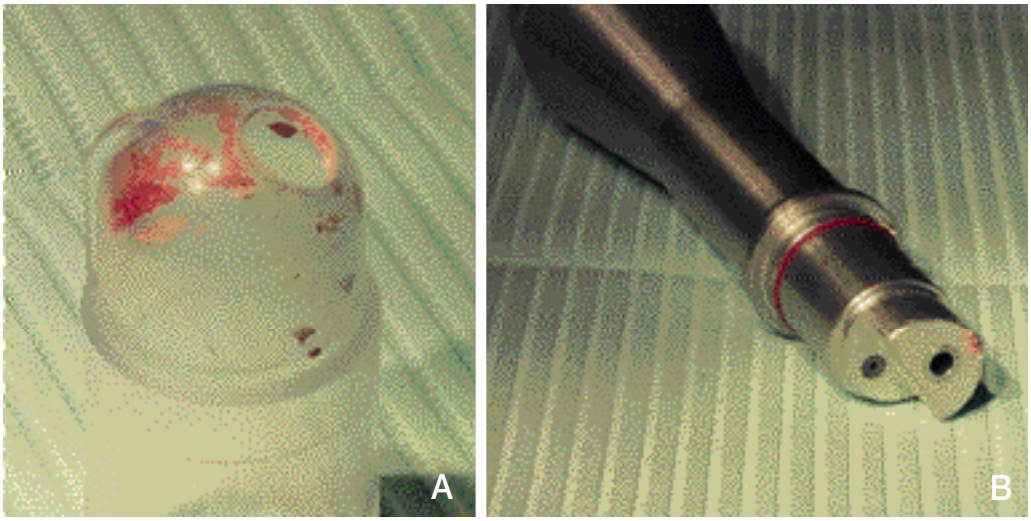

Figure 2. A close-up view of the disposable cap after aggressive microdermabrasion (A). Dried blood and sodium bicarbonate crystals are on the inner surface of the distal cap. The free-flowing debris, including keratinocytes, sodium bicarbonate crystals, and blood, are deposited not only on the cap but also on both the propulsion and receiving platforms of the distal hand piece (B).

In this chamber, ingress of material could seed particles on the tip of the metal nozzle that surrounds the aperture where particles are egressed. If this platform is not sterilized before the equipment is used on the next patient, cross-contamination could occur. This scenario is even more critical when the microdermabrasion is performed more aggressively and the papillary dermis is entered, such as when acne scars are treated. It is my clinical experience that better cosmetic results are obtained with more aggressive microdermabrasion. The superficial papillary plexus of blood vessels is violated, and fresh blood may be drawn into the hand piece and deposited on the platform. Because

particles tend to bounce around the interior surface of the helmet rather than exiting and entering in a linear stream, some of the particles could strike the platform and carry the prior patient's blood or infected keratinocytes to the cutaneous surface of the next patient. Precautions concerning cross-contamination also must be observed with the hand engine of dermabrasion procedures.[13]

Conclusion

Wiping or cleaning the microdermabrasion equipment does not conform to the standards of care in preventing cross-contamination. To minimize the risk of health hazards to staff and patients, the equipment must be sterilized by autoclaving the hand piece. Although the operator's manual does not mention the need to sterilize the hand piece, it was recommended in a subsequent memorandum from the manufacturer that every attempt should be made to autoclave the hand piece between patients.

Microdermabrasion is an elective surgical procedure that is used primarily to enhance a patient's cosmetic appearance. It would be unacceptable for such patients to acquire a nosocomial infection that could have been prevented by sterilizing the equipment between patients. To date, there have been no reports of blood-borne diseases transmitted via microdermabrasion nor have there been cases of cutaneous inoculation of herpes simplex or human papilloma viruses caused by microdermabrasion. It is the responsibility of the physician to prevent disease transmission if it is theoretically plausible, regardless of not having evidence that microdermabrasion actually has caused such cross-contamination.

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