Intact skin (i.e. with no cuts or abrasions) is our first and most important natural barrier against infection. Gloves are an imperfect layer above this, yet it is common for staff to consider their disposable gloves are the most important barrier - they are not. The natural rubber latex in gloves breaks down when exposed to soaps and detergents (such as sodium lauryl sulphate), as well as a range of other materials including ethanol and acetone (solvents for bonding agents), eugenol, eucalyptol and other essential oils, orthophosphoric acid and epoxy resins (such as AH26).

Knowing that gloves are an imperfect barrier provides the rationale for dental staff having an obsession with hand care, since any breaks in the skin (from trauma or various lesions such as weeping dermatitis) will be potential locations for entry for pathogens. Improper hand care can damage the protective systems of the normal skin (such as its lipid fatty acid layer and commensal bacterial flora), particularly when detergents or solvents are used excessively on the hands. Cuts and abrasions (Figure 1) should be covered by water-resistant occlusive dressings (such as Liquid Band-Aid™ ) that can be changed as required. Staff who have skin problems such as exudative lesions or weeping dermatitis must seek medical advice and must be removed from direct patient care until the condition resolves.

Unnecessary trauma to the hands should be avoided. Zealous use of scrubbing brushes can easily abrade the skin, as can forceful use of poor quality paper toweling for drying the hands. To minimize chapping of hands, the 2004 Infection Control Guidelines recommend that for handwashing, warm water be used and the hands dried by patting them to blot away the moisture (leaving the lipid layer intact), rather than by rubbing them, which will abrade the skin surface.

Irritant contact dermatitis in response to wearing disposable gloves is a very common problem in dental staff and surveys conducted by this author have identified prevalence rates of greater than 70% in dentists and dental assistants.¹ The problem has a clear occupational cause and to elucidate this more clearly, a 5-year longitudinal study is being conducted with dental student cohorts at the University of Queensland to track the emergence of the problem as the students gain greater exposure to the clinics in successive years. A parallel track of the study being conducted at James Cook University is following nursing students, for whom this problem is equally important.

Irritant contact dermatitis is a non-allergic response, caused primarily by detergents (such as sodium lauryl sulphate) and disinfectants. It occurs with all types of gloves and thus is not specific to latex gloves or even to health care. Contact with these types of agents is a particular problem when excessive amounts of handwash are used. Residues are left on the skin and they are then held in contact with the outermost layers of the skin because of the occlusive action of the glove material, which acts like a dressing in this regard.

It is interesting to note that water in itself can be a mild irritant if the skin is exposed to it frequently for prolonged periods of time.² Water combined with antiseptics and detergents removes the protective lipid layer on stratum corneum of the skin and as a consequence, liquids can spread onto and penetrate into the skin itself. The loss of lipid also increases the rate of trans-epidermal water loss and makes the skin more susceptible to subsequent irritants. This is why the condition
becomes self-perpetuating. Dental staff typically notice an improvement during vacations, however the problem re-appears when they return to work. The history may reveal that non-occupational factors are contributing, for example, exposure to detergents and solvents domestically can exacerbate the condition. This is the reason why gloves should also be worn when washing dishes by hand after meals.

The appearance of irritant contact dermatitis is typically dry fissured skin, which may then become itchy. The outer layers of the skin can break down and begin to peel into layers (Figures 2 and 3). If this develops, the staff member should check their hand care protocol and reduce the use of irritant handwash whilst improving rinsing and drying of the hands before gloving (to remove traces of detergent). Use of a water-based emollient hand cream (not a barrier cream) three or more times daily is also recommended to provide some additional protection. The product chosen should be low in fragrances, emulsifiers and other additives which can in themselves cause irritation. As an aside, oil-based hand preparations should be avoided as traces of these on the skin may cause latex gloves to deteriorate, and may leave oily residues on handled items such as clean instruments. If these measures do provide resolution, changing the brand/type of handwash should be considered. Medical assessment is warranted in more severe cases, however irritant contact dermatitis can resemble allergic contact dermatitis (and other skin diseases) and in fact both the irritant and allergic forms can co-exist (Figure 4) which can further complicate diagnosis.

While it is both harmless yet annoying, irritant contact dermatitis should not be ignored since its effects on the skin, namely reduced skin integrity, can enhance direct absorption of glove materials, which could accelerate the onset of a true immunological reaction to polymerizing agents or to latex itself. This can occur because these components are water soluble and thus when in contact with the skin under occlusive conditions, will dissolve in perspiration and traces of moisture and penetrate into the skin evoking an immune response.

Finally, let us briefly consider some of the finer points of hand washing. Care should be taken that the liquid handwash used does not become contaminated with water-borne opportunistic pathogens (such as Pseudomonas aeruginosa). This can occur when refillable containers are topped up repeatedly. Instead, when empty, they should be washed thoroughly and left to dry overnight before filling with new solution. Alternatively, systems with a fully disposable reservoir and nozzle can be used.

Hot and cold water taps should be operated in a “no-touch” fashion, for example using sensor controls (Figure 5) or elbow, knee or foot controls. A neutral pH liquid handwash solution applied for 10-15 seconds onto wet hands is sufficient. The important thing to remember is to rinse off all traces of detergent under running water. The hands are then dried gently. Do not rub, to avoid chapping, however be sure to remove traces of water - particularly between the fingers, otherwise powder-free gloves will not slide on.

Lastly, spend a second or two to check the quality of the gloves that have been donned. Any batch of gloves that has a defect rate (holes, macroporosities and other visible defects) of greater than 4 percent (1 glove in 25) is unacceptable, since this is the internationally accepted rate for disposable gloves used in patient care.

Further reading:

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