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DOUBLE GLOVING IN DENTISTRY: A REVIEW

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Abstract

There is high risk for transfer of pathogens in minor dental surgeries, because of its invasive nature and an increased exposure to blood. Pathogens can be transferred through contact between surgical patients and the surgical team, resulting in post-operative or blood borne infections. Both patients and the surgical team need to be protected from this risk.

The risk of cross-infection / contamination can be reduced by implementing protective barriers such as wearing surgical gloves. Wearing two pairs of surgical gloves, as opposed to one pair can provide an additional barrier and further reduce the risk of contamination.

Keywords: Double gloving - glove perforation - minor surgery –cross-infection.

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LE PORT DE GANTS DOUBLES EN DENTISTERIE

Résumé

Il existe un risque élevé de transfert d'agents pathogènes dans les chirurgies mineures en dentisterie, en raison de leur nature invasive et suite à l'exposition accrue au sang. Les agents pathogènes peuvent être transférés par contact entre les patients et l'équipe médicale, ce qui entraîne des infections post-opératoires.

Les patients et l'équipe médicale doivent être protégés contre ce risque.

Le risque d'infection croisée / contamination peut être réduit en mettant en œuvre des barrières de protection telles que le port de gants chirurgicaux. Porter deux paires de gants chirurgicaux, par opposition à une paire peut fournir une barrière supplémentaire et permet de réduire davantage le risque de contamination.

Mots-clés: infection croisée – contamination – port de gants.

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Introduction

Needle stick injuries are caused by surgical blades, knives during surgical operations and splashes of bloods and body fluids. They usually cause bleeding, minor surface scratches and minor visible skin injuries. However, the risk of transmission of viral infections is relatively high [1].

According to the World Health Organization (WHO), among 35 million healthcare workers worldwide, about three million receive percutaneous exposures to blood borne pathogens each year. Out of these, two millions are exposed to HBV, 0.9 millions to HCV and 170,000 to HIV [2].

Hepatitis B is one of the most common and serious diseases in the world. It is 100 times more infectious than HIV. According to the WHO, more than 2 000 million people alive today have been infected with HBV at some time in their lives. There are approximately 350 million chronic carriers of hepatitis B virus (HBV) worldwide [3].

Surgical gloves were introduced in the early years of the 20th in order to protect the hands of medical staff from the strong antiseptic chemicals used during surgery. Nowadays, gloves' wearing has become essential for an effective cross-infection control [4].

Risk of infection transmission

Injuries from sharps remain a concern in contemporary dental practice because of the underlying possibility of transmission of blood-borne viruses. Hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) can be transmitted to non-vaccinated recipients, after a needle stick injury from a dental needle; the estimated rates of transmission are 6-30%, 2.7-10% and 0.1- 0.3% respectively [5].

Dentist's gloves perforation

Since the 1980's, wearing gloves has become mandatory in order to protect both patient and surgeon from the risk of cross-infection during oral surgical procedures [5, 6]. The highest

risk is incurred by dental surgeons, because of the restricted area of surgery, their extensive use of needles, sharp instruments and perforating instruments in various oral surgical procedures [7, 8].

Glove perforation have been reported during routine operative dentistry and are higher during minor oral surgical procedures; their rates vary between 4–7.5%. [9-12]. The incidence varies with the duration of the procedure and the quality of the glove [9-11].

Also, the experience of the surgeon plays an important role in preventing glove perforation and reducing the incidence of sharp injuries during practice. A study performed by Padhye [13] has shown that the rate of glove perforation was higher (50%) when minor oral surgical procedures were carried out by the residents; the rate was 36% for glove perforation during major oral surgical procedures when carried out by the staff.

They recommended the double gloving when minor oral surgical procedures are carried out by the relatively inexperienced residents [13].

The duration of the procedure is another factor that might increase the risk of glove perforation. When the duration of major oral surgical procedures exceeded 150 minutes, and when minor oral surgical procedures took over 60 minutes to complete, the number of perforations was 2 times and 2.4 times, respectively, than procedures which took a shorter duration of time to complete [13]. The authors suggest changing the gloves at shorter intervals (90 minutes for major surgery) irrespective of their status, especially while carrying out high-risk procedures.

Glove barrier breakdown

In many cases, the breaching of the glove barrier is not discovered until the gloves are removed and blood is noted on the hand [14, 15]. Studies by Dodds et al. [14, 15] have demonstrated that this occurs as much as 12% to 17% of the time. These studies recommended

that surgeons should change their gloves at least once an hour to avoid contamination with patient's bodily fluids.

Gloves perforation can be detected visually. Various studies have concluded that visual detection had errors in detecting the barrier breakdowns of gloves. A study on the electronic evaluation of the value of double gloving have shown that; without the use of electronic detection system, a large majority of barrier breakdowns would remain undetected by the surgical team [17].

Incidence of glove perforation has been reported for various surgeries. Their rate is high in major general surgery, orthopedic and trauma surgery, including maxillofacial trauma. Double gloving has been shown to reduce the incidence of inner glove perforation [18-23]. Perforations can be sometimes unnoticed. The 'Reveal' glove perforation indication system has shown the increased intra-operative detection rates [23, 24].

Double gloving and its importance

Many glove perforations pass unnoticed at the time of treatment. Double gloving during minor oral surgery and dental hygiene procedures reduces the incidence of inner glove perforation and therefore potential exposure to cross-infection [10, 11].

Double gloving has been shown to be an effective method to reduce the surgeons' potential for contact with bodily fluids. In 1992, Quebemann et al. [18] reported that surgeons who used only single gloved had a 51% hand contamination rate versus a 7% contamination rate for surgeons who are double gloved.

Double gloving significantly reduces the perforation rate of the inner glove by at least 70% compared to single gloving [25-27].

Double gloving of either both hands or just the non-dominant hand, has been suggested for procedures; these include exposure prone or when treating patients who are 'high-risk' for

the transmission of blood borne viral diseases, such as HIV and hepatitis [9-11].

However, the effectiveness of wearing two pairs of gloves during oral surgical procedures to prevent disease transmission is not yet clear.

Although double gloving will not prevent a penetrating injury, it may reduce the risk of disease transmission because of the wiping effect of two layers [27]. This is probably most important when a significant volume of blood with a high viral titre is involved. However, all patients should be assumed to be an infection risk and universal barrier precautions applied equally.

Conclusions

Double gloving is a very effective method to reduce exposure to blood-borne pathogens (HBV, HCV and HIV), as it decreases the potential exposure risk.

Routine glove changing, especially after intensive works on bones or deep procedures, which carry a high risk of perforating the outermost glove, is the best way to rebuild a high level of protection provided by two gloves.

Visual detection is not a safe method to detect or limit perforation of glove barrier performance. Double gloving is easy to implement, as the latest generation of surgeons gloves are designed to support double gloving.

To balance the security of double gloving with individual needs, such as comfort and sensitivity, it is recommended to test different options of double gloving to avoid hand-fatigue or other discomforts.

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