NEEDLE STICK INJURIES IN DENTAL CLINICS: A REVIEW
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ABSTRACT: Sharps related injuries, including needle stick injuries expose health professionals to blood borne pathogens like Hepatitis B virus (HBV), Hepatitis C virus (HCV) and human immunodeficiency virus (HIV). This article focuses on needle stick injuries in dentistry, to determine which of these injuries are most common, assembled precautions and tips from other dentists to prevent needle stick injuries based on previous published literature.

KEY WORDS: Blood, Exposure, Needle, Sharps.

INTRODUCTION: Healthcare workers (HCW), including dental staff, may be exposed to viruses carried in blood, oral fluids and tissues. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are the principal blood borne pathogens of concern to dental staff. The estimated transmission rates for HBV, HCV and HIV, after a needle stick injury from a dental needle are 6-30%, 2.7-10% and 0.1-0.3% respectively1.

Since needles and sharp instruments are an essential part of today’s health care, injuries from these items are a major concern for everyone, who works in a health care setting. Injuries from sharps remain a concern in contemporary dental practice because of the underlying possibility of transmission of blood-borne viruses.

Devices with which needle Stick Injury takes Often (Fig. 1):2-13
Any sharp medical or dental instruments or needle, including Small bore hallow syringe, Burs, Suture needles, Scalpel, Periodontal Scaler, Elevators, Explorer, Wire, Retractors, Endodontic file, etc.

Circumstances associated with needle stick injuries (Table 2):1-13
Needle stick Injuries is associated with various dental procedures, like
1) Recapping of the needle, bending or removing an uncapped needle.
2) Unexpected movement or jerk by the patient or a work colleague and a momentary lack of concentration can result in an injury.
3) Picking up sharp instrument during clean up procedures either by hands or from sterilization bags, from which contaminated sharp instruments may have protruded.
4) Handling or disposal of used needles i.e. needle disassembly.
5) Accidental injury by a colleague.
6) During suturing with suture needles.
7) During treatment of fractures by wires.
8) While giving local anaesthesia with syringe, injury to the hand which is retracting the tissues.
9) Patient grabbing dentist's hand during procedure.
10) During changing of the burs.
11) During scaling, when scaler slips off the teeth.
12) Injuries by the orthodontic wires.
13) During examination of teeth with an explorer.
14) While reaching out for one instrument, inadvertently touching another instrument.
15) Leaving a sharp in an unusual location.
16) Wiping the instrument during Procedure.

Few observations from previous Studies:

- The most common procedures associated with sharp injuries were oral surgical procedures, followed by restorative procedures (Cleveland J et al). ²
- Pediatric and prosthodontic dentists were having the highest chances of injury. (Cleveland J et al) ², (Siew C et.al) ³
- The most common site of exposure was the non-dominant index finger, followed by the non-dominant thumb. (Cleveland J et al) ² (Siew et al) ³
- Recapping can account for most of all needle stick injuries in dental setup. Often, it is the single most common cause. It is extremely dangerous to hold a needle in one hand and attempt to cover it with a small cap held in the other hand ¹⁴.
- In intraoral procedures, the majority of the injuries were due to syringes (Fig. 2) and sharp instruments. In extra oral procedures, the injuries were due to burs and utility knife, while trimming the impression compound. (Cleveland J et al) ², (Siew et al) ³
- Burs left in hand piece by the operator, which sometimes causes a puncture injury to the operator or the assistant. ³ The position in the operatory of the dental cart, that has hand pieces on the side and the dental tray containing dental burs and sharp instruments on top, can contribute to injuries. (Harte J et.al) ⁷
- The use of wire which involves fracture reduction may be associated with an increased risk of injury. Protecting hands and fingers by double gloving may be used to decrease the risk of percutaneous injury. (Carlton J et al) ⁶
- Needle stick injuries were commonly seen in “four handed dentistry practice” While passing the instrument from one person to another person. ³ ⁴

Prevention:(NSW infection control resource center.) ⁸
The person who uses the needle or sharp instrument is responsible for its management and disposal.

- Make sure sharps container is nearby every time a needle is used.
- If a needle or sharp instrument has to be carried some distance to a sharps container, use a puncture resistant dish or tray; do not carry it in your hand.
- Never pass needles or sharp instruments to another worker by hand – use a puncture resistant tray.
- Never bend needles contaminated with blood or body substance
- Never force needles into a sharps container i.e. never overfill a sharps Container.
- Let falling needles or sharp objects fall. Don’t try and catch them or break their fall.
- Develop a slow, safe handling technique when using sharp instruments.
- Seek assistance for confused or uncooperative patients.
- Store sharp instruments safely and dispose the needles correctly.
- NEVER reach into garbage or sharps containers.
- Wear general purpose household gloves when cleaning non-disposable instrument.
- Don’t rush or take short-cuts when performing procedures.
- Wear a mask and eye protection or a face shield during procedures or activities that are likely to generate splashes or sprays of blood or other body substances.
- Always make sure your hepatitis B and tetanus vaccinations are up-to-date.

Suggestions from previous Studies: During injecting inferior alveolar nerve block, the dentist usually palpates the retromolar area with the index finger and then administers the injection, while palpatiting finger is still in place. Dentists are now advised to palpate the area, withdraw the finger and use a mirror handle to pull aside the cheek at the time of injecting, this can reduce the injury to the finger.  

Similarly, burs in hand pieces, which rest on dental carts in the upright position, contributed to many of the reported injuries to legs and feet. To reduce the risk of such injuries, the hand pieces be placed in downward position with the bur facing the cart.

Dental health care workers are encouraged to wear two layers of gloves when cleaning instruments: examination gloves next to the skin, covered by heavy-duty, or utility, outer rubber gloves.

Use a one-handed procedure to recap needles: either the fishing technique, in which the syringe is held in one hand and the cap is scooped up and over the needle without being held; or the cotton plier holder technique, in which the cap is placed in the handle of cotton pliers and the needle is inserted into it.

One can use a technique to avoid needle stick injuries, like not to put the used needle back in its original cover and should be put in a specially designed, rigid, puncture-proof needle container.

Post exposure measures for accidental sharps injury:
- All procedures should be stopped.
- The wound should be washed immediately and thoroughly with soap or disinfectant and water, but do not scrub the affected area.
- In case of mucosal contact, like in eyes, it should be washed thoroughly with sterile water.
- Check whether the device is contaminated with blood and assess the depth of injury.
- Assess the patients risk factors and check the immune status of the dentist for HBV.
- In case of possibility of exposure to any infection like HIV, HBV, HCV etc.; urgent opinion should be taken for the post-exposure prophylaxis.

CONCLUSION: Dentists are considered as high risk for the needle stick injuries, but many of the dentists do not follow the universal precautions. As sharps injuries can cause the serious and fatal diseases, efforts should be taken to spread the importance of avoiding the accidental exposures among dentists.

REFERENCES:
8. Needlestick injuries and other occupational exposures: information sheet; NSW infection control resource centre.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percutaneous injuries caused (%)</th>
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<tbody>
<tr>
<td>Manipulating needle in patient</td>
<td>27</td>
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<tr>
<td>Disposal related causes</td>
<td>12</td>
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<tr>
<td>Clean up</td>
<td>11</td>
</tr>
<tr>
<td>Handling/ passing device during or after use</td>
<td>10</td>
</tr>
<tr>
<td>Improper waste disposal</td>
<td>10</td>
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<tr>
<td>I.V. line related causes</td>
<td>08</td>
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<tr>
<td>Others</td>
<td>04</td>
</tr>
</tbody>
</table>

Table 1: Activity associated percutaneous injuries
Adapted from Kukreja BJ et al (2013)\textsuperscript{15}.
Fig. 1: Percutaneous injuries in dental health care workers. (Adapted from Luthra et al (2005)\textsuperscript{17})

Fig. 2: Needle stick injury during handling of syringe.

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