

***Sheet no. :1***

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First we’ll be talking about cross infection control, which is very important to us as we are working inside the patient’s mouth and are more susceptible to patient’s saliva and blood , which are full of microbes (bacteria, viruses …), so we have to protect ourselves.

we’ll be aided by a clinical manual, from which you should study this course.

**Why do we care about infection control in dentistry?**

Because we and our patients are in risk of contamination, or our instruments might be contaminated, so we have certain armamentarium like the gloves, masks, goggles and lab coats, and certain chemicals that will prevent cross infection.

**What are the modes/routes of transmission?**

Either by **direct** contact: you get contaminated by blood or saliva that come in direct contact to your face, nose , eyes, broken skin…

Or **indirect way**, through the instruments, while we are cleaning them we might get injured or forget to clean our hands and then spread the infection here and there. And sometimes there might be tiny droplets in the air that we might inhale.

**Cycle of infection:**
pathogen in a reservoir (blood or saliva) >> by mode of transmission>>entry route (through your body or inhaled by the patient)>> if you are a susceptible host (maybe immunocompromised, or you are not vaccinated) >> you got infected >> then you’ll become another reservoir.

So our aim is to break this cycle/chain by stopping any of the above levels.

e.g. vaccination, prevent routes of entry by wearing mask, prevent mode of transmission by cleaning and using disinfectants.

In the past, there was something called **universal precaution** which means that you have to protect yourself from BLOOD BORNE pathogens like hepatitis, HIV. Nowadays we have what is called **standard precaution** which said that also all other body fluids or broken skin might also transmit pathogens, so it has integrated universal precaution and added to it other body fluids and broken skin.

 So standard precaution means that you should treat all patients as if they were infectious, because sometimes the patient might be a carrier without knowing that, or he might not tell you.

standard precaution has many **elements**, some will protect you, some will protect your patients and the nurse or assistant.

**1-First element** we’ll be talking about is **vaccination:**
-blood borne pathogens are hepatitis B , C and HIV. These are serious considerations as we don’t have protection or vaccination against HIV or HCV. And also they are quite common to encounter through life, don’t think it’s not that common, it is.
-the most common route of infection is from the patient to you as a dentist.
 from you to other patients, also might happen but not that common.
 from patient to patient is very unlikely to happen.

If you get a needle stick injury in the clinic, how much is the percentage that you’ll get hepatitis B , C or HIV ?
a study was held in JU hospital reveled that 4th year students, from sep. to dec. (the first months in the clinic), the needle stick injury incidence is high then it starts to decrease until the end of the 5th year as it will go high again cause you’ll be working quickly.
-if the patients has **hepatitis B** : it’s 1-60% you’ll get infected :o .

rem. HBsAg indicates immunity. And HBeAg indicates infectivity of the patient.
if the patient was HBsAg+ and HBeAg- it’s 1-30%(from every 3 hepatitis patients, if you get a needle stick injury, one of them will infect you!) And

if the patient was HBsAg+ and HBeAg+ , again it’s 1-60%.

-if the patient has **hepatitis C** , the risk is lower 1.8%.
-if the patient has **HIV** the risk is 0.3%(from each 300 HIV patients, if you get a needle stick injury you’ll get the disease).

These percentages may change depending on how long were you exposed to the blood, how much blood/saliva were there on the needle, and our immunity.

Blood usually contains most of microorganisms >> saliva >> other body fluids.

In the past, dentists were the most susceptible people to diseases, even more than the general population, but after the introduction of these guidelines they become less susceptible.

We All took HBV vaccination, but we should also test Anti-HbsAg level every now and then, it shouldn’t be below 10 microunit/ml.

**What are the things that may injure you in the clinic**? Needle stick , any sharp objects or burs. These injuries usually happen outside the patient’s mouth, while you are cleaning.

There’s few things that can be controlled in order to stop these injuries,
**Engineering controls**: you can buy stuff that are in certain design to protect you, for example the sharp containers

**Work practice control:** you should close the needle after using it for example.
 **2-The second element** of standard precaution (after vaccination) is hand hygiene:

There are certain ways to wash your hands. Hands are the most common route of transmission of microorganisms as we open the door, touch the light and open mouths.

**When should we wash our hands?** Before wearing the gloves and after taking them off ,and if you touch anything that is contaminated

Washing hands with:

-Soap and water

-Antiseptic hand washing (washing with soap that has antimicrobial effect).

-Alcohol based rubs

-Surgical antiseptics (used before surgeries, which is different from other disinfectant by the antimicrobial activity which lasts a little bit longer, to protect the patient for longer time).

Water<<water and soap<<antiseptic soap<<alcohol based disinfectants (THE BEST).

Washing hands here will be different from everyday life washing, as we see many patients.

You might need to use hand creams and lotions, but be careful for these chemicals not to react with gloves, or make it easier to tear.

You should keep your nail fingers short, and not to wear rings while working, in order not tear the gloves easily, without being noticed.
Artificial nails, and rings also may be a source of hidden contamination.

Basically, when washing your hand you need to rub everything.

**3-The third element** is personal protective equipments: Things that you wear to protect you: as we said already lab coat, goggles, mask and gloves.

-The mask should be changed between patients or in the same patients if it’s getting wet.

-Gloves should be changed between patients, DON’T EVER wash your gloves in order to reuse them. Gloves are NOT substitute for hand washing.
gloves might be latex. Or latex-free, gloves for surgery, heavy duty (used in dishes washing, and we’ll be using it in cleaning our instruments).

Always check your gloves before you start working on your patient.

-Latex sensitivity is not very common, it may generate rash. its type one allergy which may cause anaphylactic shock and breathing problems but most common types will result in only irritation and contact dermatitis. Exposure to latex for several times may cause ulcerations or itchy, dry skin.

Sometimes you may have delayed hypersensitivity (type four hypersensitivity), not because of latex but other chemicals in gloves ,so you might need to change the type of the gloves or the company, also you may get nylon underneath the gloves to protect your hands

**4- The forth element** is the environment: surfaces, clinic, chair, nurse, patient (which we can't sterilize) but we can do something about them. Environmental surfaces although not like intraoral instruments or instruments used in surgery, but they may get contaminated (You may get some blood or saliva on the chair for eg. ). So does not really require stringent decontamination procedure, and you have to find other ways to decrease contamination.

**Environmental surfaces** are of 2 types: clinical contact surfaces and housekeeping surfaces.

**-Clinical contact surfaces:** have very high chance of being contaminated, which are the clinic itself, the chair where patient set, door handle which you may hold with your gloves, your chair (you may forget to remove your gloves before holding it, if it happen you have to clean it in between), the light, bracket table, the bench on your right ( you may be doing impression for the patient ,and everything you are holding will be contaminated)

**-Housekeeping surfaces:** are other surfaces, wall, floor, tap, which have very low chance of being contaminated.

**How do we deal with them ?**

1- General recommendation is to have barriers, like nylon or food wrap, which you can put on chair and everything you hold to minimize contamination of clinical contact surfaces, and you remove and change it between patients.

2- Another thing you can do is physical removal of microorganism by putting alcohol or other disinfectant on a towel and wipe the chair before putting the wrap. You don't use hypex all the time; because it may distort the machine, there is certain types of disinfectant that you may use.

**Don't** use high level disinfectant because you may burn or break the machine, you know hypex is very corrosive, you have to think about the level of the contamination and accordingly you choose the disinfectant.

-So, for clinical contact surfaces we use barriers and use low or intermediate level disinfectant.

Low level disinfectant (like Dettol) which is good for hepatitis B. If you see blood or saliva on these surfaces you might need intermediate level disinfectant.

Housekeeping surfaces you just use soap and water, with clean cloth and mops.

**The Dr. showed us a video, and he said some notes on it.**

- When we clean the chair between patients we start usually from the least to the most contaminated area, you have to wear your gloves and mask. First he sprays disinfectant on a paper towel ,then wipe the chair from the least to the most contaminated areas (head is the most contaminated ”saliva”, hands are less).

-Then wipe the panel.

-tubes starting from areas on it that are farther from patient mouth, to the air water syringe and the hand pieces (closer to the mouth ).

-Be careful about the sequence.

After he finishes he should actually change the towel. Don’t forget the light, and the bracket table. Then go to the suction, you have high and low volume suction, here also you start from the bottom going upward.

-The last thing you wipe is the spit tool which is the most contaminated.

So this is what you do between patients but this is not enough, you have to put the barrier, you have 1/4 hour to do this in clinics.

You put the wrap on the hand rests, head rest, bracket table. It’s better to have trays for your instruments, cause this wrap is easy to tear, and not to lose your instrument during disinfection.

Also wrap the tip of the water syringe, hose of the hand pieces ,then wrap area where those handpieces set, and the panel ( you may hold it while working, so you need to put wrap on it)

-**panel**: is the component by which you control the chair up and down, and it opens water.

You don’t have to go to any clinic where there are no barriers on the chair.

Now, you wrap the suction. Suction usually have disposable tubes. You have to redo everything between patients.

The water in the clinics is that from our tanks, it is municipal water which we usually use in our homes, but we don't drink. Ideally you should routinely check the water lines, its quality, the turbidity should be less than 500, it should meet the standards of drinking water.

The problem is, when water become stagnant, biofilm will be formed in the tubes, actually we don't do anything for them (like changing them or putting chemical). Most dental units in Jordan have biofilms.

**Legionella** is most common microorganism found in the tubes, it causes legionellare or legionellosis, which is fatal if happened, but it's not very common.

**So what should you do about them**?

Sometimes when you work with triple air water syringe, or when you are working with the hand piece, when you stop, always there's a little back flow that happens, maybe because of pressure or whatever, here bacteria or saliva will enter into the handpiece ,triple air water syringes or suction (it will enter into the tube).

1-What you do is to flush it (30 sec between patients and few min at the beginning of the day), to prevent water stagnation, and to get any back flow of bacteria out of the tube.

2- Some clinics have independent reservoir, you can put your own water, sterile water, so you have control over the quality of water.

3- You can use purification system or filters in the clinic.

 4- in suction tubes, instead of getting water out by flushing, you put the suction tube in glass containing water, or disinfectant commonly (specific types, to prevent corrosion of the tube).

-Suction tubes have anti retraction valves, which causes unidirectional movement of fluids and prevent back flow.

Sometimes specially during using low volume suction, back flow of the materials that was suctioned (saliva and blood) may happen in patient mouth! It doesn't occur that often.

To prevent that from happening try not to use low and high volume suction together, you will disturb the pressure between them. Also sometimes you will tell your patient to close his mouth on the suction and this will generate negative pressure which aids in back flow (always let the suction come from the machine itself and not from the patient mouth by closing it).

There's a picture to the disinfection method ideally we use for the suction, the shape of the bottle exactly the same as the shape of the shape of the suction, so you put the tube,and aspirate according to what company tell the manufacturer .

-Use disposable suction tips.

Another video after finishing treatment:

- You always change the gloves and mask.

- Put the instrument on the enzyme, to break blood and organic material before sterilize them (if you send it with blood particles on it, it will not sterilize from inside).

- Remove wrap.

- Replace suction tips, put disinfectant on a glass to clean the suction lines, water lines.

-Flushing for 30 seconds.

 -There is a **certain protocol** you need to do to clean instrument. You first put it in the enzyme, then wash it (here you should wear the heavy duty gloves, Also there's brushes with long handle to clean with, to prevent being injured), dry them (don't put them wet on the sterilization bags, because they will tear), put in sterilization bags choosing the proper size to the instrument, then you send it to the autoclave.

The instrument should be clean before sending it to the autoclave in order to sterilize it (e.g. if you are doing temporary filling "TF", you will have some material stuck to the instrument and it should be removed) If you use a mirror or probe rapidly, you can just put it on the sterilization bags.