Kavo Dental Unit | University of Toronto Faculty of Dentistry Information and Instructional Technology Services

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Introduction

The Kavo Environment Unit which includes the patient dental chair, the operator's stool, the dentist's unit, the assistant's unit, the cuspidor and Kavolux light head has many features and benefits that make it ideal for performing clinical dentistry efficiently and safely. It is also designed to offer optimal comfort for both the patient and the operator during treatment. Some of the components on the unit can be removed for disinfection and sterilization purposes, therefore, it is imperative that when you report to your dental unit you do a quick inventory of the pieces of equipment to make sure everything is in place. If you notice that the dental unit or any of its components are damaged please report it to a faculty member immediately.

Features and Adjustments on the Kavo Operator's Stool

One of the many challenges that a company is faced with when designing operatory equipment is designing an operator's stool that will accommodate all different sizes of operators and give proper support and function to each of them. The operator's stool achieves this through the use of four adjustments. The first adjustment is the backrest. The backrest is on a ratchet mechanism and can be stopped at any height in the up and down position. If you wish to adjust the backrest to its lowest position, bring it all the way to the top and then it will drop right back down to its lowest position. The second adjustment is the overall height adjustment of the stool. This adjustment is activated by pulling the lever which

is located on the right-hand side of the stool to the front, in the upward direction. If there is weight on the stool, it will go down. If you relieve the weight from the stool, the piston will now drive the stool upward. This must be adjusted so that there is no tension on the back of the operator's legs, which would affect his or her circulation while seated. The third adjustment is the seat and backrest tilt. When the operator is in the seated position for extended periods of time this can provide good lumbar support as well as support in the back of the legs without cutting off circulation. This adjustment is activated by pulling the lever on the right-hand side of the stool at the back, in the upward direction. This places the lever in the release position which permits a back and forth adjustment of the backrest as well as a tilt adjustment of the seat. Once the desired position is achieved push down the lever to lock both the backrest and seat position.

The fourth adjustment is the traverse which permits the seat to move forward and back providing proper orientation between the seat cushion and the back cushion to give maximum support to the small of the back. This adjustment is activated by pulling the lever on the left-hand side of the stool in an upward direction. Now the seat can traverse forward and backward to achieve the proper orientation. Once the correct position is achieved simply push the lever in the downward direction to lock it into place.

The Patient Chair

The Kavo Dental Unit is designed for easy transition between a left and a right-handed operator. The cuspidor and assistant's unit will rotate around the back of the chair and the dentist's unit will pivot around the toe of the chair as will the Kavolux light head. This delivers the instrumentation in the exact position you wish, whether you are a right or left-handed operator.

When seating a patient in the patient chair the armrest can be moved out of the way to allow easier access and will be especially important for patients in wheelchairs. To drop the armrest into a downward position pull the arm outward away from the arm base and it will drop forward. Once the patient is comfortably seated draw the armrest back up towards its normal position and it will lock back into place.

Once the patient is seated in the chair it is important that he or she sits right up against the backrest to take advantage of the built in lumbar support. When adjusting the headrest for each patient, first, adjust the height which is accomplished by pulling the headrest up or pushing it down. Next, adjust the headrest cushion itself so that it supports the nape of the neck. To do this turn the knob on the back of the headrest counter clockwise to loosen it and provide full adjustment of the headrest. It most cases, the headrest will be adjusted approximately to the position seen here. Once the correct position is achieved, lock the headrest in this position by turning the knob clockwise to tighten it. It's much easier to accomplish this in the upright seated position, therefore this adjustment needs to be made before the patient is placed in the supine position for treatment.

Another useful feature on the dental chair is its ability to swivel. The swivel allows the operator to move the chair left or right, therefore providing the right amount of space on either side of the chair depending on whether you are a left or right handed operator. It also further aids in accessibility for patients with wheelchairs. The swivel function is activated by depressing the semicircular button at the base of the chair. This unlocks the chair permitting it to swivel in one direction or the other. Once the ideal position is achieved release the button and the chair locks in that position.

In keeping with the left and right-handed functionality there are two additional foot controls at the base of the chair on both the right and left sides. The operator can adjust the base of the chair up and down, adjust the backrest in a backward or upright direction or activate the preset positions with either foot control. To make the base go down, draw either foot control away from the chair. To make the base go up push either foot control towards the toe of the chair. To make the backrest recline into a supine position push either foot control to the left. To make the backrest rise to the upright position push either foot control to the right. There are four auto positions available to the operator, three of which can be programmed. To activate the presets using the foot control is very simple. To bring the chair into the Entry-Exit position, tap the foot control backwards, away from the chair. To make the chair go to position one, tap the foot control to the right. To make the chair go to position two, tap the foot control to the left. The fourth is called the Last Position. This is not a programmable position, however, it does go to the last position the chair was in. To make the chair go to this position just tap the foot control forward.

The Dentist’s Unit

The main controls for the environment unit are located on the left side underneath the control head of the dentist’s unit. To turn the environment unit on, locate the first toggle switch located to the back of the dentist’s unit. The unit is on when this switch is toggled inward and is off when the switch is toggled outward. The dental unit will not operate if this switch is in the off position.

The next toggle switch is located slightly behind and to the right and controls the fibre optics. The fibre optics can be activated in two ways. If this switch is toggled inward then the fibre optics can be activated by pressing the handpiece foot control. If the switch is toggled outward then the fibre optics are activated automatically when the handpiece is picked up from the dentist’s unit.

The next control located further to the right is the Chip Air Control Knob. The Chip Air Knob controls the amount of mist in the water spray or water coolant. When the Chip Air Knob is completely closed there is just a stream of water coming from the handpiece. By opening the Chip Air Knob mist is introduced to the stream which cleans the working area and provides

good coolant to the entire cutting surface. To increase the amount of mist, turn the knob in the clockwise direction and to reduce the amount of mist, turn it in the counter clockwise direction.

The last control on the underside of the control head is the Flush Button which is located directly beside the main on/off toggle switch. This button is used to flush the tubings on the dental unit. To use the flush feature remove the tubings from the dental unit, hold them over the cuspidor and depress the Flush Button, holding it for several seconds. This will flush out the water lines.

In addition, to these four controls there is an oil collection filter which is located directly behind the controls just discussed. The exhaust from the handpieces is directed towards the oil collection filter which acts to eliminate much of the exhaust noise created by the handpieces and also collects any excess oil coming through the exhaust line. The container housing the Collection Filter can easily be dismantled and cleaned. Just turn the container clockwise and pull it down. Inside there is a felt filter around the edge which can be removed, cleaned and placed back into the container. The third component that makes up the Collection Filter Unit is the actual sponge collection filter which is inside the dental unit. Once the container has been removed the filter will be exposed and can be pulled out, washed and then placed back up into the unit. The container holding the clean felt ring can also be placed back into the unit and locked into place by turning it clockwise.

The last controls that can be found under the control head are the water controls. There is a separate water control located adjacent to each handpiece position allowing each one to be adjusted independently. If you wish to increase the water flow to your handpiece you would turn the knob clockwise. If you wish to decrease the water flow you would turn the knob counter clockwise. This adjustment works exactly the same for each handpiece.

Now that all of the controls on the underside of the control head have been covered the configuration and functionality of the instrumentation on the front of the control head will be described. All units are equipped with an air-water syringe, two fibre optic tubings and a traditional or standard tubing. The high speed handpieces can be located in either one of the fibre optic positions. The standard or traditional tubing is where you will mount your slow speed handpiece. Just above the handpieces is an air gauge which monitors the air pressure on the slow speed position as well as either one of the high speed positions. This pressure will be preset for you here at the university, however, please take note of the air pressure when you depress the rheostat completely. The air pressure should stay consistent. If you notice any changes in the air pressure, please bring it to the attention of a faculty member so that the appropriate adjustments can be made.

As with the dental chair itself the control head touch pads have also been designed to accommodate both left and right-handed operators. The touch pad provides the operator with easy access to the independent chair controls, the preset and customizable chair

positions and the air break button. The first control at the top of the touch pad is the air brake which is used to secure the control head at the appropriate height. To move the control head depress the brake button, move the control head to the desired position and then release the button. This will secure the control head and prevent it from moving up and down during the procedure. The Entry-Exit position button and Last Position buttons are located directly below the brake button, followed by the independent chair control buttons and finally two customizable auto position buttons. The chair control buttons are self explicit and indicate with arrows the direction of the adjustment for the chair seat and backrest.

Programming a custom auto position button is achieved very easily. Adjust the chair to the desired custom position and press custom auto position button one 2 times quickly. A double beep will be heard indicating that button one has been programmed. Repeat this procedure for custom auto position button two and the Exit position. The Last Position button is not customizable as it is set automatically to the chair's last configured position whether that position was a pre-programmed position or an adjusted position. It is recommended that custom auto position one be dedicated to the maxillary position and custom auto position two be dedicated to the mandibular position.

Another feature on the KaVo Environment Dental unit is a clean or bottled water system. Here at the Faculty the bottled water system is used for running disinfectant through the water lines and will be maintained by a clinical staff member. The activation of this system is controlled by a toggle switch located on the termination box by the base of the chair. This toggle switches between the bottled water system and the city water line. If you find there is no water being supplied when you are cutting with a handpiece check the toggle position on the termination box to ensure the toggle is set to the correct position for delivery of city water.

Handpieces are controlled through a foot control, sometimes referred to as Rheostat. To operate, remove the handpiece from the handpiece hanger on the control head and when you depress the foot control the handpiece motor will activate. The more pressure you place on the foot control the faster the handpiece will rotate and the more you ease off on the foot control the slower the handpiece will rotate. When you remove your foot from the foot control all together the handpiece will stop. The water can also be turned on or off through the foot control, which permits you to use the handpiece for wet or dry cutting. To cut with water move the toggle switch towards the blue dot. To shut the water off move the toggle switch away from the blue dot.

On the assistants side there is a hanger arm that contains the high volume suction, saliva ejector and the air-water syringe. The arm rotates left or right for good accessibility to instrumentation. It can also be adjusted so the instruments hang either towards or away from the assistant's chair. This is easily achieved by removing the instruments and rotating the hanger arm 180 degrees to accommodate the inverse configuration.

Directly behind the assistant's instrumentation is the cuspidor and cup filler. The cuspidor can be rinsed by depressing the back of the faucet which will release a preset amount of water into the bowl. Behind the faucet for the bowl rinse is the cup filler. To activate the cup filler, simply press the top of the cup filler faucet head and it will dispense a pre-adjusted amount of water. Directly below the cuspidor is the solids collector which can be removed for emptying. Typically a clinical staff member will be responsible for emptying the solids collector. If you are responsible for cleaning the solids collector, shut off the vacuum and remove it from its holder. The container top can be opened by squeezing the sides together permitting it to be emptied and cleaned after which it can be reassembled and placed back in to its holder below the cuspidor. After extensive use the solids container will have to be replaced with a new one. There will be instances when other auxiliary pieces of equipment need to be attached to the dental unit. If the auxiliary equipment requires air or water there is both an auxiliary air and auxiliary water supply located above the solids filter. The air and water connections are different sizes to ensure that the correct connection is made without confusion.

The overhead light has a master on -off switch which is located at the base of the stem of the light head. Once the light has been turned on the intensity can be controlled with the intensity knob located below the on-off switch. The setting indicator ranges from 1 to 10 with 10 producing the most intense light at 5500 degrees Calvin. This is generally too intense, especially for light sensitive materials, so you may find a setting of between 5 and 7 to be more preferable. This gives you more time to work with these materials and achieve appropriate results.

When the light is in the on position the fan continuously runs, pulling heat away from the bulb and out through vents located at the sides thereby increasing bulb life and usability. In addition, it has the added benefit of redirecting the heat away from the operator and patient throughout a long procedure.

The light head handles are removable and autoclavable, however, at the Faculty, infection control barriers will be used to maintain antisepsis. If it is necessary to remove them for sterilization, rotate the nut at the top of the handle clockwise to release the handle and slide it off. To place it back in position slide it up over the handle support and rotate the handle nut counter clockwise to tighten it. The handle on the other side works in exactly the same way.

The Kavo Environment Equipment incorporates four safety switches which are put in place for the protection of the operator, the patient and the equipment itself. The first safety feature is located in the cantilever base. If an obstruction comes in contact with the cantilever base while the chair is being repositioned the chair will automatically stop all motion. Once the obstruction has been moved, repositioning of the chair can continue. The second safety switch is incorporated into the backrest of the chair. As with the cantilever base the back rest will stop moving during repositioning if it comes into contact with an obstruction. Once the obstruction has been removed it will be possible to continue repositioning the backrest. The

third safety switch is incorporated into the cuspidor and the assistant's instrumentation. If these items come into contact with an obstruction as the chair is being moved in a downward direction the chair will automatically stop. Once the obstruction is removed it will be possible to continue moving the chair in a downward direction. The final safety switch is the handpiece override switch which is incorporated in both the chair and in the foot control unit. If the foot control is depressed and a handpiece is in use all chair positioning controls will be inoperable. This prevents accidental adjustment of the chair while work is being performed with the handpiece. Once the operator releases the foot control and stops using the handpiece it will be possible to adjust the chair position again.

Cuspidor Cleaning and Maintenance for Clinical Staff

The cuspidor is made up of 3 main components, the cup fill activator spout, the bowl rinse activator spout and the bowl strainer. The bowl rinse activator is on a timer which releases a set amount of water into the bowl. To initiate a rinse simply push the bowl rinse activator forward and release.

The cup filler is also on a timer to provide a ¾ cup full of water. To operate place a cup under the filler, push the cup filler activator down and release. This will deliver the set amount of water into the cup.

There will be occasions when the cuspidor will need to be removed in order to provide a more thorough cleaning of hard to reach areas. The first step is to shut off the main water valve underneath. Now press the bowl rinse activator and the cup filler activator to expel any remaining water in the line. Both activator spouts can now be removed by lifting them upward. The spouts will not be autoclaved; however, they can be wiped down with an approved disinfecting agent. The bowl strainer which is comprised of a plastic strainer covered by a ceramic cap can be removed next. The ceramic cuspidor can now be removed. Lift the cuspidor straight up with both hands. You may find you have better leverage if you push down on the cup filler activator initially while pulling up on the cuspidor bowl. The cuspidor bowl can now be taken to a sink for cleaning. Once it has been cleaned all the parts can be reassembled and the main water supply can be turned back on. The final step is to verify that both the bowl rinse activator spout and cup filler activator spout are fully functioning after reassembly.