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DESIGNING AN OFFICE LAYOUT

Input by Dr. Larry Emmott

John Naisbitt the author of the best selling books "Megatrends" and "Megatrends 2000" coined the phrase "High Tech ... High Touch". Naisbitt is a futurist. In the megatrends books he examined the major or "mega" trends he saw developing in the US and the world and then predicted what we would see happening in society in the eighties, nineties and on into the next century. His predictions have proven to be remarkably accurate.

Naisbitt noted that people really do like High Tech. That is, they like the excitement of it, they like the change, they like the novelty, they like the speed and rapid access to information, they like new and innovative ways of doing things. But they don't like being depersonalized. They don't like being turned in to a number or digitized. If they perceive that technology is taking over their humanity high tech backlash results.

The challenge, according to Naisbitt, will be to provide the high tech innovation people want and businesses need to stay ahead and at the same time to provide the personal high touch relationships people demand.

Dentistry is a perfect example of a High Tech ... High Touch profession. Dental patients really do want their dentist to be up to date, using the latest and best methods. They are impressed with high tech gadgets like light curing and intra oral cameras. They want and even expect their dentist to be state of the art, cutting edge, techno perfect. And yet at the same time what most of them really want even more is a personal one on one relationship with their dentist. They want to be recognized and appreciated as an individual human being. They crave high touch.

With that in mind it is appropriate to begin a discussion of computers in dentistry not with computer systems but with human systems.

Putting Dentistry and People First

Computer enthusiasts or sales people often make the mistake of jumping into dentist's lives with wonderful stories and demonstrations of what computers can do. They are so focused on the computer they miss what is really important to the dentist, which is the daily grind of dental practice. It is hard for a dentist who is worried about crown margins and insurance hassles to become excited about computers unless the dentist can see a real high touch relationship to daily practice.

So, what happens in daily practice? Dentists diagnose and treat dental disease. Once a dentist diagnoses a dental condition and proposes a treatment a series of steps is begun to properly document and communicate the procedure. These same steps are required whether or not the dental office is using a computer. Following are the communication and documentation steps most dental offices would commonly follow on paper to complete a simple single procedure. This procedure is done thousands of times every day in dental offices around the world. A crown on tooth number three.

The process almost always happens this way. The dentist, dental patient and dental assistant are all sitting in the treatment room. The dentist peers into the patient's mouth and says something like "Tooth number three needs a crown". The assistant then makes a mark on the patients tooth chart usually in red outlining or highlighting tooth number three in some way. That is the first documentation step. Then a treatment plan of some sort is made. There are virtually dozens of ways this can be done but in all of them someone writes down "tooth number three crown".

The patient is then sent to the front to schedule. Before they make an appointment they almost always ask, "How much will this cost and what will my insurance pay?" At this time the dental staff member will give the patient an estimate, prepare an insurance pre determination form, make an appointment in the book, and give the patient an appointment card. At a minimum the staff member will write, "tooth number three crown" on all four pieces of paper. They will also write the patients name, the fee, insurance codes, and a lot more in some cases.

When the patient returns for treatment another whole series of documentation and communication steps begins. These include the daily schedule, chart notes, lab slip, chart update, ledger, receipt, day sheet, and insurance claim. Once again the dentist and staff must write "tooth number three crown" and usually a lot more on all of these forms.

The final step is payment. This could include payment entries to the ledger and monthly billing statements. Again there are half a dozen ways to do this but most of them require the dental staff to again write, "tooth number three crown".

If you go back and add up all the entries there are up to sixteen times the dentist or dental staff must write "tooth number three crown" usually along with a lot more general information such as the patient's name, social security number, insurance codes, fees and

on and on. And these sixteen entries represent one procedure on one patient. If you start adding up all the patients and every procedure the paper work burden is staggering. If that isn't frightening enough keep in mind that every time an entry is made there is a chance to make an error.

Single Entry

There are some things computers are good at and there are some things they don't do well at all. One thing computers do very well is they do the same thing over and over again. They do it very accurately, very quickly and they never get bored with it. That means that with a good computer system the dentist only has to enter "tooth number three crown" one time. The computer will then transfer that information to all the other places it is needed. It will attach the other information such as fees and insurance codes automatically. It will do it instantly and accurately. This feature is called **single entry**.

The single entry feature of a computer system has a profound effect on the human system of a dental office. Single entry frees the staff to do other things, such as care directly for the patient. It speeds up the communication process, saves time and reduces errors. It reduces stress and makes dental staff jobs more meaningful and human directed. The single entry concept is very important because it answers the fundamental question, "What the heck does a dentist need a computer for anyway?" and it leads to most of the advanced features and uses of computer systems in dentistry.

For example, **the two most critical entries from the list above are diagnosis and completion of treatment. Both of these events take place in the treatment rooms**. If you do not have treatment room based computers then you can not do true single entry and must rely on notes or other person to person communication, which slows down the process and introduces more chance for error. In other words using the power of the computer for single entry to speed production and reduce error is the goal. Treatment room based computers are a logical extension of the goal.

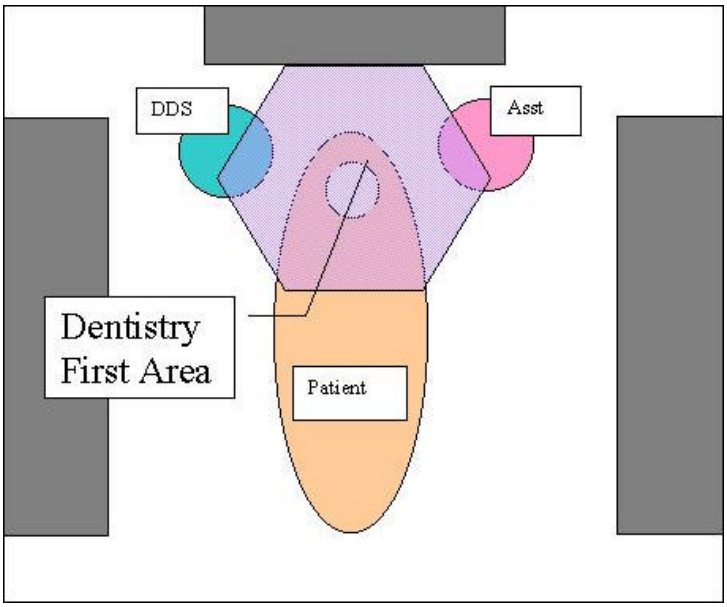
Once the dentist makes the shift and puts the computer in the treatment room then other possibilities follow. If you can access the schedule in the treatment room via the computer then why not schedule the patient. The only reason we sent them up front to schedule before was because that's where the paper book was. If you can access patient information such as medical notes and progress notes on the computer then why make a paper record. Electronic notes are easier to access, more complete, easier to store and transmit and contrary to popular conceptions are actually safer than paper records provided the office follows proper back up procedures. Also now that all the treatment and patient data is stored in the computer why print or write up an insurance form. Just send the data electronically with electronic claims. When the dentist reaches this point then POT "point of treatment" stations or computers in the treatment rooms makes more sense. "Frontdesklessness" or scheduling from the back seems logical. And the "paperless" office becomes possible.

More possibilities. If the computer is already in the treatment room then it is easier and less expensive to add on extras such as digital x-ray, digital intra oral camera images,

cosmetic imaging, patient education programs, drug and prescription programs, and to present complete treatment plans with accurate estimates and insurance information chairside.

To restate all of this in another way. Advanced totally integrated, multiple application, chairside, computer systems are the ultimate dental version of "High Tech". But the successful high tech dental office rarely starts with this in mind. Instead the first concern is human "High Touch". How can I do a better job faster and with less errors? How can I serve my patients better, faster and cater to their needs? How can I make my staffs jobs easier and more rewarding? And finally How can I use the things computers do well to help me? The answer to all these questions is single entry computer use. From that everything else flows. If you start with the ultimate high tech office as the goal in itself with out the human high touch benefits in mind it doesn't make much sense. Dentists then rarely see the value or benefit in the high tech dental office.

Now That I Have All These Computers…Where the Heck do I Put Them??



One of he big trends in dental high tech use in the next five years will be the movement of computers into the treatment rooms. At this time four out of five US dentists have computers but only one out of five have treatment room based computers. However I predict that this will change, and we will soon be seeing most dental offices with back office computers. There are lots of reasons for this change; the most significant is that it is the most effective way to use computers in the dental office.

As a consultant, one of the things I am asked to help with most often is to design treatment rooms and position computers for effective use. If it is going to be used effectively (or at all) the technology must be placed well, convenient to use and it must enhance the dental process. If it doesn't meet these criteria it doesn't get used. Also many dentists don't think they have room to put computers in the treatment area. However you can easily fit multiple technology units in the standard ten by ten treatment room with a

little creative thinking. When deciding where to put computers in the dental treatment rooms there are five factors to consider.

Dentistry First: What that means is that no matter how much we use technology the prime focus of the dentist and assistant must be delivering fine dental treatment. When setting up a room all of the ergonomic factors important to four handed dentistry, the delivery of care, patient comfort and safety must be met before it is appropriate to introduce computers.

There is a zone around the head of the chair, the dentistry first area, which should be reserved for dental treatment only, no computers. This is also the zone of potential contamination from aerosol.
It is not possible to sterilize a computer. You can't dip the mouse in the cold sterile tub or spray and wipe the keyboard. At least you can't do it more than once. There are ways to cover and decontaminate the computer components but one of the best techniques is to simply keep them out harms way.

Break the Desktop: Desktop computers are designed to be used at a desk by a single user. At a desk in an office it is logical to have a single monitor placed over the inputs (mouse and keyboard) with a CPU (Central Processing Unit, the box) on the floor below. In the dental treatment room we use computers much differently.

When we first started to move computers into the back we tried to recreate a mini desktop in the treatment room. We put them on carts and some offices even built in little desks on the assistant's side of the room.

However we found we don't use computers that way in the back office. There are multiple users, dentist and assistant. Multiple people need to view the monitor, dentist patient and assistant, often at the same time. And the CPU has various inputs such as cameras, x-ray sensors, computer probes, and more which will come in and out of the box many times during the day.

Don't try to create a mini desk in the treatment room for the computer with a cart or built in. Break up the components and put them where they need to be for efficiency in the dental treatment room.

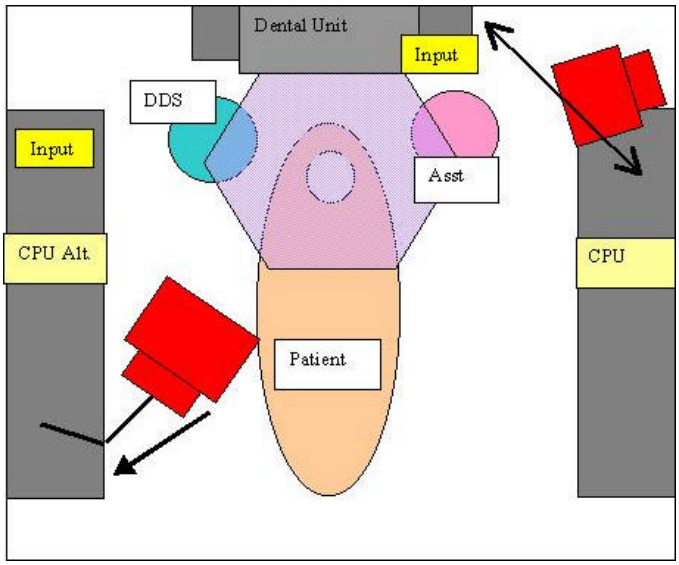
CPU Access: Treatment room computers are used for many things besides data entry. This includes digital x-rays, patient education, image collection, blood pressure monitoring, computerized perio probing and more. Some of these peripherals attach to the face of the computer and others attach to the back. This means the CPU must be easily accessible to the dentist and assistant and needs to be fairly close to the dental chair.

There are in fact too many accessories. Most computers have a limited number of motherboard slots and IRQs and don't have the capacity to handle all the options. However how we attach accessories to the computer is changing. There are two new systems being developed to connect computers to various peripherals, USB (Universal Serial Bus) and IEEE 1394 also called Fire Wire.

USB in particular is designed to allow many attachments, up to 127 (in theory). However at this time only a few of the peripherals such as cameras or digital radiology sensors are USB ready. As this option is developed we will eventually see a USB hub placed in a convenient place to attach all the peripherals and the CPU can be hidden away.

In the mean time place the CPU where you can access it. There are three logical choices, on either side of the room under the counter or behind the patient in a rear delivery cabinet. Some attachments, such as video input and radiology sensors, can be placed on a remote connection plate and routed to the CPU with hidden wires. However don't spend too much on this type of set up, as USB will soon displace the current systems with a more refined solution.

Public and Private: Some things seen on the computer monitor are public. Those are things we want the patient to see, their own chart, x-rays, photos or patient education. Other information should not be seen. That would include another patient's chart or even the daily schedule. That is private.



Michael Unthank, a dental office designer refers to these as the patient monitor and the practice management monitor. Computer monitors in the treatment rooms need to be placed so that they can be seen or not as needed. That means either movable or multiple monitors.

Dual Entry: The final element to effective use of technology in the treatment room is multiple inputs. Input refers to any device, which allows the user to access the computer. The most common input devices are a keyboard and mouse. However there are other options as well such as light pens, touch pads, track balls, pen tablets, mini keyboards, voice and even bar code scanners.

When we first moved computers to the back we used the desktop model and had a single data entry point with a keyboard and mouse on the assistant's side. As we developed the electronic chart and started using digital radiology, computerized notes, digital imaging and patient education we soon discovered we needed more input access.

For example, if the doctor wanted to view or manipulate a certain x-ray he would have to ask the assistant to bring it up on the screen and then manipulate it. As you can imagine this was a problem and ended up taking two people to do the job of one in a pretty ineffective manner. The same problem occurred with chart information. If the dentist wanted to read the previous appointment notes or review the treatment plan he had to ask the assistant, in front of the patient, to do it for him. Or worse yet he had to get up and move to the other side of the room, break asepsis, and do it, again in an ineffective

manner.

The solution was a second input device on the doctor's side of the room. This can be any type of input; we used a pen and tablet, a touch pad and even a wireless infrared keyboard. However we found what really worked well was a simple mouse.

Planning: If you keep these five ideas in mind when planning where to put computers in the treatment rooms they will be effective, easy to use, and out of the way.

1. **Dentistry First**
2. **Break the Desktop**
3. **CPU Access**
4. **Public and Private**
5. **Multiple Inputs**

Treatment Room Monitors

Where to put the treatment room computer monitors is a dilemma for many offices. They are big, heavy and in the way. However if they aren't positioned well it is difficult to use computers effectively in the treatment rooms.

Monitors need to be positioned so that the assistant can access it easily to input data, such as chairside charting, while maintaining contact with the dentist and patient and touching the screen if light pens are used. They also need to be close enough for the dentist to view radiographs or photos for diagnosis, or to read the chart. And finally they need to be in a position that the patient can view them to see their own photos, slide shows or patient education programs.

In addition there is the public/private issue. Some times you just don't want the patient seeing what is displayed.

One solution to this problem is a movable monitor on a bracket or arm. The problem with this solution is that like all movable equipment it is never where you want it and moving it to the proper position takes time, breaks asepsis and tends not to get done. Also the brackets needed to support the equipment often cost more than the computer. For example Adec has a very elegant monitor bracket called the Radius. It sells for $1,100. You could buy three monitors or a whole new computer for the cost of the bracket.

The second solution is multiple monitors. One, the private monitor, placed at the 12 to 2 o'clock position for the assistant and two, the public monitor, placed at 5 or 9 o'clock for the patient and dentist. The private monitor can be small 14" or 15". The public monitor will be used for patient display and should be large and impressive, 17" or bigger.

Three Options: There are three ways to set up dual monitors. They all have some drawbacks and there is no perfect solution at this time.

The simplest set up is to split the monitor output. This results in two monitors showing the same thing. The problem is the public/private issue. There is no way to prevent the patient from seeing the display unless you turn off the public monitor.

The second solution is to split the monitor output with an A-B switch. This allows you to turn on one or the other monitor but not both. It addresses the public/private issue but is inconvenient much like the movable monitor bracket. It takes time, breaks asepsis, and never seems to be showing the monitor you want to be on.

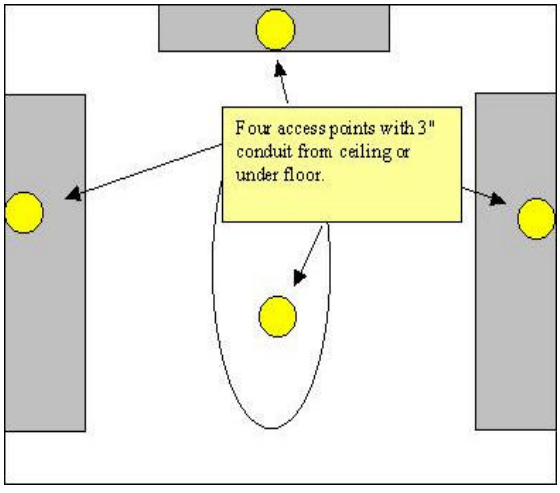
The third solution is to use dual video cards. This only works with Windows 98. It allows the user to display two different things on the different monitors. It is perfect for the public/private issue and allows the assistant to be inputting data while the public monitor displays a photo or x-ray.

The problem with this solution is the extra complexity in setting it up and using it plus some software functions are a problem. For example some Dentrix pop up menus will appear only on one screen and it may not be the one you want. Also the Vipersoft capture screen will only appear on one screen. However as the software developers begin to design for multiple monitors this solution will be ideal.

At this time the only version of Windows, which supports the dual monitor, set up is 98. NT 4.0 does not, however the coming upgrade Windows 2000 is supposed to support this feature.

Flat Screen Monitors: Another developing technology that will be ideal for treatment room use is a flat screen monitor. Flat screens are light and compact. They can be hung from a wall or light pole with ease. However until recently they had significant limitations in image quality and were very expensive.

Flat screens have arrived (almost). The newest models are easy to view from a wide angle, are bright and display good color graphics. In addition the cost has dropped dramatically. Fifteen-inch models with speakers and USB connections are now available for under $500. The price goes up quickly with size. Seventeen inch flat screens are under $1,500. That compares to less than $500 for a seventeen inch CRT. Also light pens will not work with a flat screen monitor.



Prices will go down and quality increase again in the next year. If you are willing to pay the price they can be used immediately. For most offices general use of flat screens is about a year away.

Planning for the Future

If you are planning or building a new office even if you aren't using computers in the treatment rooms yet there are several things you can do to accommodate the use of technology in the future.

One primary truth about technology is that it is changing at a remarkable rate and whatever we do now is likely to change over time. For that reason build in flexibility. Don't hard wire everything with built in cabinets but think in terms of modules and access points, which can be changed.

To accommodate wiring plan for four access points. That would be each side wall, the rear wall and the floor under the chair. Place large conduits with 2-3" internal dimensions from the ceiling to each point and under the floor. Another good idea is to have finished channels or spaces in the walls and ceiling to run wires. In this way the technology components can be easily moved or changed.

Following are five dental office, cabinet and design companies which understand the high tech office and can help you plan, design and build the office of the future.