

ORTHODONTIC OFFICE DESIGN

Computer Technology and HIPAA

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Office design has always been affected by advances in technology. Computers are now part of the orthodontic landscape throughout the office, not just at the reception desk. In addition, provisions of the recently enacted Health Information Privacy and Accountability Act (HIPAA) have influenced the way we gather and maintain patient data on computers and thus have had an impact on the office environment.

“Building-Block” Computer Systems

A costly mistake in office planning is to skimp on square footage when signing a long-term lease. A cramped facility will have difficulty accommodating the necessary improvements as the practice grows. A similar mistake is the false economy of purchasing computer software and hardware based on cost alone. Buy equipment that allows you to incorporate the building blocks of the inevitable new technology, which

will seamlessly blend with your initial system with minor incremental expense.

A good practice management system should start with three to five computer work stations and a Redundant Array of Independent Disks (RAID) file server (Fig. 1). The standard software package includes accounts receivable, basic appointment scheduling, patient and professional communications, practice management reporting, and basic imaging integration with VistaDent, QuickCeph, and Dolphin systems.¹

Even doctors who have achieved an “all-digital” system (Fig. 2) continue to maintain their paper charts for security and archival purposes. The paper files are not used for treatment, but serve as redundant records in addition to the usual daily and monthly computer backups.

HIPAA and the Reception Desk

The basic premise of HIPAA is that orthodontists may “use” and “disclose” a patient’s “protected health information” only as the patient permits or as is allowed under the privacy rules.² Fortunately, orthodontists are required only to follow the “minimum” regulations. Still, orthodontic office designs must now incorporate physical and technical barriers, as well as administrative safeguards, to protect the security of patients’ personal health information.

The U.S. Department of Health and Human Services, which is responsible for HIPAA enforcement, recognizes that all risk of disclosure cannot be eliminated and that overheard conversations are unavoidable. Restructuring or soundproofing an entire office, or retrofitting private rooms to accommodate all sensitive conversations, is not required. Simply providing priva-



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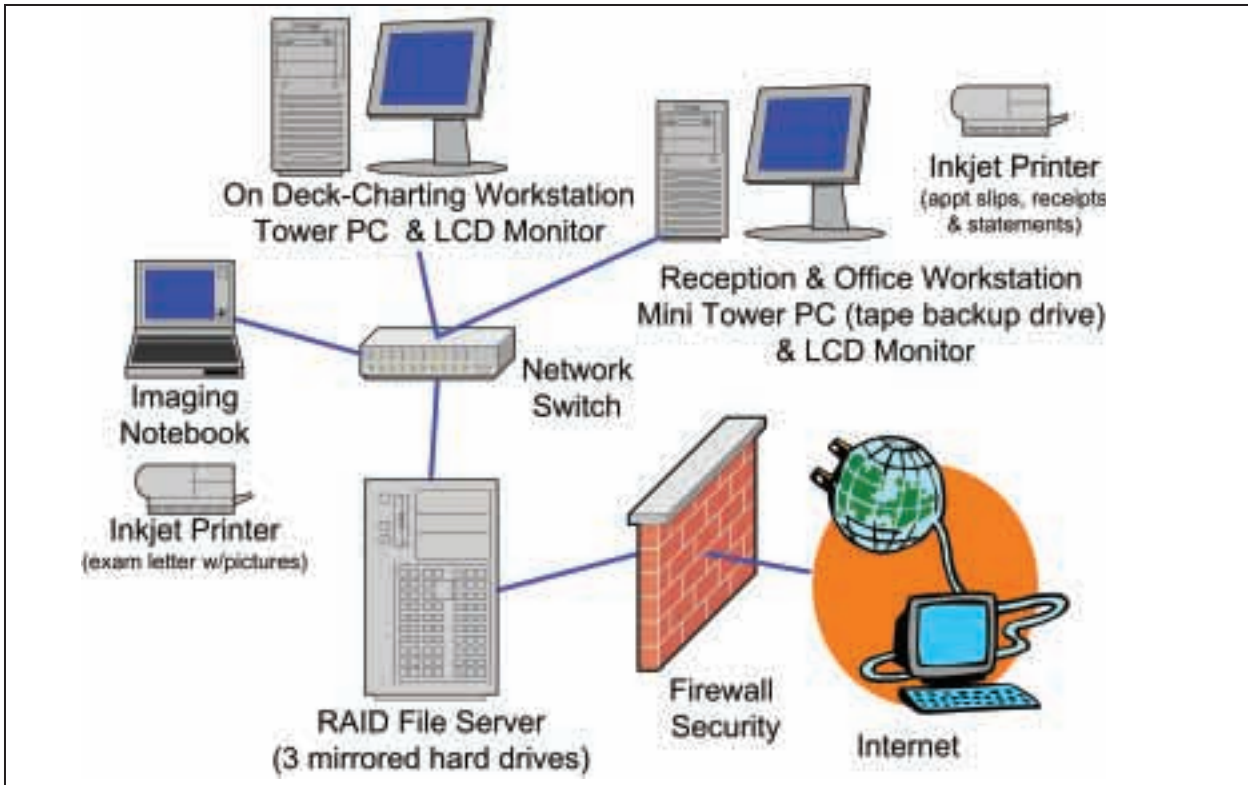


Fig. 1 Typical starter office computer diagram.

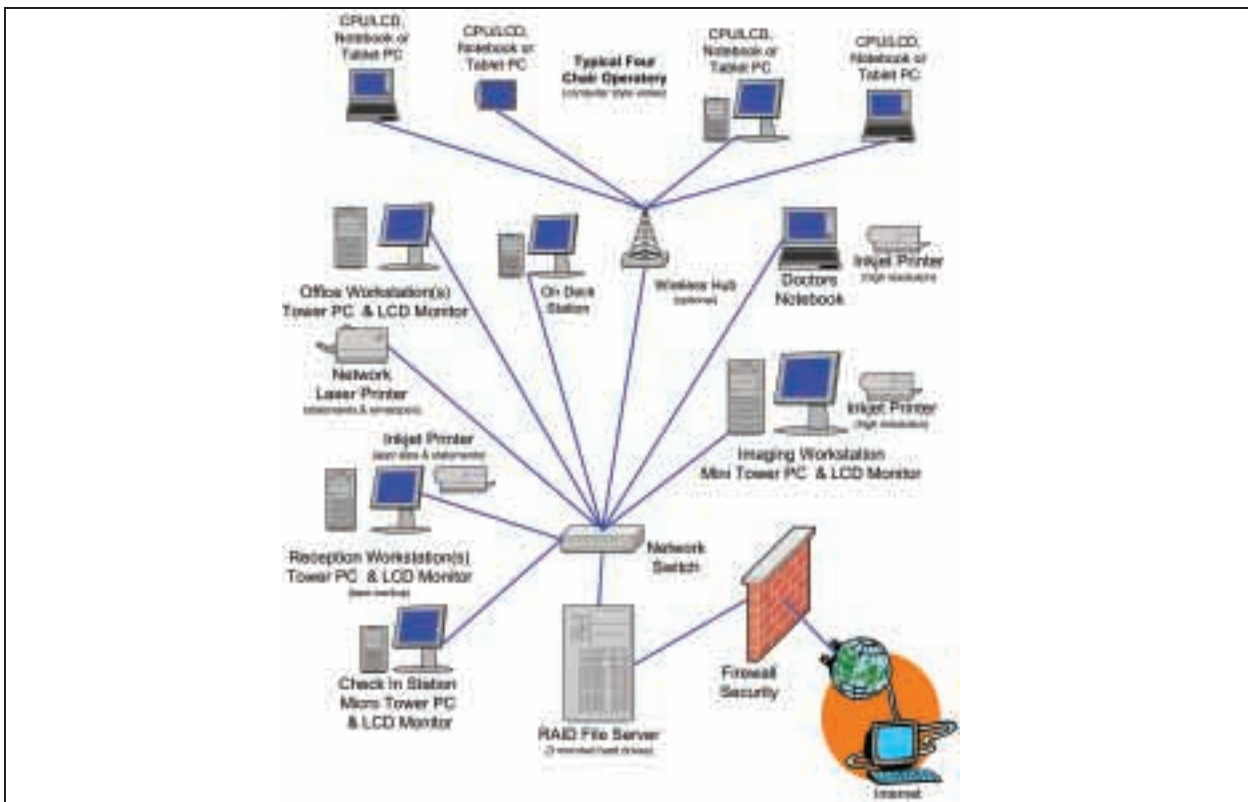


Fig. 2 Building blocks for "all-digital" orthodontic office.

cy panels and sound treatment around areas where treatment is discussed, such as stand-up consultation areas, would demonstrate the intent to comply with HIPAA's regulation that doctors show "reasonable effort" toward privacy safeguards. "Likewise, lowering voices and asking patients to stand a few feet away from a counter used for patient consulting or scheduling would be considered a reasonable effort."²

The contemporary style of a reception desk that is completely open to the reception room has become popular among orthodontists. This open concept helps create a friendly office atmosphere, and it also has the advantage, in medium-to-large practices, of allowing two or more scheduling stations to operate simultaneously during peak hours. Even before HIPAA, doctors with open reception desks often needed to incorporate principles of sound control at the front desk. Figure 3 shows an open desk with prefabricated fiberglass Victratex sound panels on the walls behind it to mute conversations between patients and the secretary. Note also that the ceiling and the underside of the soffit are treated with blown-on acoustical plaster, which creates an esthetic stucco-like surface. Additional sound panels are strategically placed opposite the end of the counter, which is the main appointment station. People seated in the reception room have difficulty overhearing conversations at the desk because of an alcove with acoustical treatment.

Check-In Station

The first step toward smooth patient flow in the office is the computerized check-in station, which should be easily observable by the front-desk staff. Decorative check-in areas independent from the front desk are common, but when ample counter space is available, the station can be located at one end of the front desk leading to the operatory. A keyboard is not needed, because the patient's name is already in the system. Only a small counter area, approximately 6" x 6", is needed for a secured mouse of standard size, and several companies are now making miniature



Fig. 3 Front desk with acoustical soffit and panel treatment in office of Dr. David Hamula, Colorado Springs, CO.



Fig. 4 Check-in station with mouse activation in office of Dr. David Way, Fort Collins, CO.

versions. A wireless mouse is not recommended here, since a patient may intentionally or accidentally remove it from the check-in station. Note that HIPAA allows only patient names, appointment times, and photographs to be publicly displayed.

A flat-screen (LCD) monitor will occupy as little of the secretary's work area as possible, with less glare and heat than a conventional CRT monitor (Fig. 4). It can be wall-mounted to save even more space. The cost of LCDs has declined



Fig. 5 Dedicated server closet in Dr. Way's office.

rapidly in just the last year, making them affordable in all sizes. A 15" LCD is recommended at the check-in station, and 17" LCDs at all other business stations.

Dedicated Server Room

In cramped quarters, this expensive and critical nerve center is often found in a dusty corner, under an open counter, or in an enclosed, non-ventilated cabinet. Even though servers are equipped with fault-tolerant components to prevent permanent loss of data, when a server crashes, the entire computer system is prevented from accessing vital patient records. A separate, ventilated closet as small as 15 square feet is a wise allocation of space to ensure the protection, security, and trouble-free operation of the server (Fig. 5). This is the most important component of the hardware network—definitely *not* a place to cut costs.

The server should be placed above floor level (ideally 4-6") and should never have a sprinkler head above it. Water damage and accidental flooding are not uncommon in dental office buildings. The router box should be stored in the same closet as the server, in a secure location, but readily accessible; the server key should be kept in a different secure location. An uninterruptible power supply (at least 650 VA) is a must. A keyboard, mouse, and inexpensive 15" CRT



Fig. 6 Stand-up consultation room in Dr. David Hamula's office, with custom-fitted Victratex acoustical panels, covered by cloth surface with small holes that allow sound to penetrate.

monitor should be kept on hand for server maintenance.

Business Office

This room is a potential location for the server, if a dedicated location or closet is not available elsewhere. Consider mounting a keyboard/mouse tray under the counter to preserve important work-surface area. The computer monitor can be a valuable aid in discussing business with parents. Because space is usually limited, LCD screens are preferable over CRT monitors. An all-in-one printer-fax-scanner will also save space in the business area.

Patient Education/Stand-Up Consultation Station

This area is used for education as well as to motivate patients in a semiprivate environment. It can double as a good-bye mirror for patients. The station should be at least 10' from any on-deck area to maintain "reasonable" confidentiality under HIPAA; a location halfway between the reception room and the operatory will save steps for parents and staff.³ For space conservation, the stand-up consultation station is often placed in a wide hallway or an alcove leading to the operatory.

The counter should be at least 4' long (4 1/2-



Fig. 7 Dr. Way's exam/consultation room, with large flat-screen plasma display for digital images.

5' is ideal) to accommodate patient, parent, and instructor and to achieve an esthetic look. A generous-size counter allows the use of x-ray view box and an LCD screen with a mouse or small keyboard for making appointments. A view box is not necessary if a computer is present and you have digital x-rays stored in your system.

A notebook (laptop) computer can alleviate the need for a long counter. If a separate CPU is required, it can be stored in a shallow cabinet beneath the counter, along with visual aids. Audio privacy can be maintained by a sound-proofing design (Fig. 6), and privacy panels can help create a semiprivate atmosphere.

Exam/Consultation Room

This room should be designed with enough flexibility that it can be used as an exam room, a treatment coordinator work area, and a consultation room with seating for parents. A room in the 150-square-foot range can also accommodate a dental chair and a working cabinet/sink, so it can double as a treatment overflow room.⁴ An imaging corner with a slave flash box for digital photography may also be incorporated.

Experience has proven that an exceptional imaging system can greatly enhance patient acceptance of treatment. Traditional visual aids are being replaced by multimedia technology, including flat-screen plasma displays (Fig. 7). To

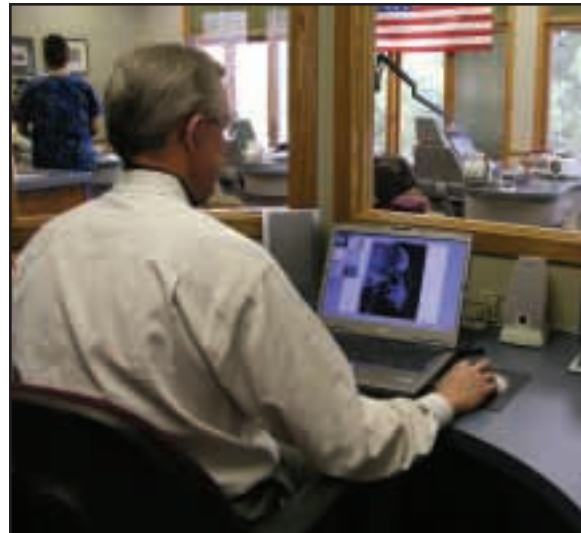


Fig. 8 Dr. David Way reviewing cases at computer in his private office, with full view of operator.

take advantage of this high-quality imaging, however, the exam/consultation room will need the most expensive and powerful computer in the office. Consider installing a fast Pentium processor and a high-end graphics accelerator card for the best graphics and presentations.

Another recent development is the possibility of eliminating plaster casts and their storage requirements. Advocates of this new software maintain that the accuracy of arch-length analysis is greatly improved and that tooth-size discrepancies are easier to identify. Images can be accessed easily from chairside computers during treatment, as well as in the consultation room. Bracket-placement hardware is also available to improve direct bonding.

Digital radiography allows immediate access to tomographic, panoramic, and cephalometric x-rays, which is especially useful in offices with one-step exam/consultation systems. Cephalometric tracings are made easily and quickly with current software, allowing the doctor to review records and devise a treatment plan before meeting patients and parents in the consultation. Space and expense are saved by eliminating the darkroom and processing chemicals.

Doctor's Private Office

Figure 8 shows an orthodontist's office with a full view of the operator—a perfect setting for



Fig. 9 Three-quarter panel divides semiprivate adult bay from main operator in office of Dr. Peter Worth, Roseville, CA.



Fig. 10 Centrally located on-deck screen in back of Dr. Way's operator.

the doctor to review records of a difficult case on the computer before the patient's visit. With computer access to patient histories and treatment notes, the staff will not have to pull charts, and the doctor's office will not be cluttered with paper charts and records that have to be re-filed later.

The office station can be used to access the Internet for collaboration with colleagues, e-mail correspondence, or research. This area also allows the doctor to conduct a confidential huddle with the staff about sensitive information during treatment (HIPAA factor), or to meet with the treatment coordinator about a difficult case before the consultation.

HIPAA and Operator Design

The traditional open-bay operator, with chairs placed approximately 6' apart on center, is not in jeopardy. Although some orthodontists like to have privacy panels between chairs, these provide only "visual privacy", which is not a HIPAA requirement. A privacy panel between the main treatment bay and adult chairs, when space permits, has always been advisable because it creates a semiprivate atmosphere for adult treatment (Fig. 9). However, acoustical 5'-high panels between chairs have a limited effect on audio privacy and require considerably more space. The Americans with Disabilities Act expects a 32"

aisle between each side of a panel and the adjacent chair. Therefore, if a narrow panel is placed between two chairs, the chairs must be at least 7'6" apart on center. A four-chair open bay without panels would be 25' wide, whereas the same operator with panels would have to be 29' wide. This is significant additional square footage, and many open bays have as many as six chairs.

The type of delivery and chairside cabinet system may have an impact on privacy under HIPAA. A rear-delivery cabinet with a mounted computer screen is best because the screen will not be within direct sight of operator traffic, on-deck seating, or patients in adjacent chairs. Side-delivery cabinetry, although popular among orthodontists, places the computer screen with potentially sensitive information facing the patient, traffic flow, and, in some cases, people seated in the on-deck area. Pulling up information about the patient's health, treatment, or payment schedule will require caution and good judgment. If the operator staff needs sensitive information, it may have to be accessed on a computer elsewhere in the office, which is inefficient from a time-and-motion standpoint.

On-Deck Area

There appears to be a trend toward less seating in the on-deck area. The old formula of one and a half seats per operator treatment chair



Fig. 11 Space-saving notebook computers used at chairside in Dr. Way's office.

is less applicable because of the increasing number of treatment chairs in many operatories and the availability of computers. Computer scheduling has brought more order to the office, especially at peak times, and fewer people are backed up in the on-deck area. On-deck seating can therefore be placed farther from the dental chairs than in past operatory floor plans, which promotes HIPAA privacy and also allows a valuable secondary support area in the middle of the operatory to be converted to a convenient sterilization center.

Some doctors employ a large central on-deck screen only to monitor traffic flow, without using it for treatment records or other sensitive information. Large on-deck screens are not necessary if computers are present at chairside, since patient-flow information is available at each chairside computer. However, an on-deck computer station centrally located in the back of the operatory, with reasonable conversation privacy, is useful for the doctor and staff to retrieve and discuss private information (Fig. 10), especially if the office has side-delivery cabinets with mounted computer screens facing the patients.

Operatory Computers

There are three basic types of computers that can be used for chairside treatment charting and records: CPU/LCD monitor combinations,



Fig. 12 Wireless tablet PC in office of Dr. Randy Kunik, Austin, TX.

notebooks (laptops), and tablet PCs. Chairside delivery cabinets are limited in size and need all the drawers and internal storage possible. The conventional CPU becomes a burden to place on or within them, and can generate a significant amount of heat, especially inside a cabinet without proper ventilation. The CPU/monitor combination may therefore require mounting of the computer, keyboard, and mouse. Common solutions include:

- Central island installations
- Adjacent secondary support cabinets
- Wall mounting
- Pole mounting on the chairs or on independent poles*
- Ceiling pole mounts
- Wireless mouse and keyboard connections

Notebook computers are now supplied with larger, glare-free, wide-angle screens, and with costs coming down, they are gradually replacing the original CPU/monitors in the operatory (Fig. 11). In addition, notebooks and tablet PCs can operate wirelessly and thus do not require trenching or conduit for direct wiring.

The tablet PC features a touch-screen display that can be carried from chair to chair (Fig. 12). A stylus takes the place of a mouse, and soft-

*Ergotron, Inc., 1181 Trapp Road, St. Paul, MN 55121, www.ergotron.com; or Workrite Ergonomics, 1450 Technology Lane, Petaluma, CA 94954, www.wrea.com.

ware allows for handwriting recognition, so that you can digitally store notes in your own handwriting or convert them later to conventional type. The latest model weighs only about two pounds. Time will tell how this new technology will be applied and what effect it will have on operator routines, but if you plan to try out a tablet PC, make sure your practice management software is compatible with the tablet's operating system.

Wireless Technology

During the construction of new orthodontic buildings, hard wiring in conduits can be strategically placed where computer stations are planned in the operator. Lines are directed to the back of the operator, central islands, and chair-side cabinet locations before the concrete is poured. If you are renting the first floor of a building with a concrete floor, however, the only option for direct wiring may be trenching to the planned computer stations. In that case, a wireless installation may be advisable.

The cost of a good wireless installation is relatively low, but the highest-quality equipment must be purchased for consistent results. One wireless hub—essentially an antenna placed in the operator ceiling space—is usually sufficient for the average-size open-bay operator. Hubs work best in the acoustical-tile dropped ceilings typically found in orthodontic offices. Drywall or plaster ceilings are more difficult for radio waves to penetrate, and they can measurably affect the performance of the wireless network.

Several disadvantages of a wireless system should be considered. One is information security (the HIPAA factor). Any wireless transmission can be accessed by other wireless devices; although the chances are slim, a computer-savvy person in the parking lot could conceivably obtain sensitive information stored in your computers. Firewall hardware to reduce the threat is available, but it can be costly to purchase and maintain, and requires expert technical support. Additionally, even with the best wireless equipment, data reception is not as fast as on a hard

line, and the quality of multimedia programs, especially video, is not as sharp. A wireless card must be added for each existing computer not equipped to receive a signal. Additional hubs may be required for computers physically separated by walls or dividers to connect to the wireless network.

Conclusion

Computers and HIPAA privacy issues are influencing the design and location of work stations throughout the orthodontic office. Even if most orthodontists have not yet implemented “all-digital” paperless offices, clinicians are increasingly taking advantage of the many outstanding programs that can save time in patient education and greatly enhance case presentations. Digital cameras, study models, and x-rays offer patient records instantaneously at our fingertips.

How far a doctor wishes to enter into this digital world is an individual decision, but the most important consideration is to purchase the correct software at the outset of office computerization. Choosing an experienced, responsible company focused on customer service is paramount to success. Today's entry-level computers are less expensive, more powerful and reliable, and easier to network than their predecessors. They are more than adequate to operate a digital orthodontic office that meets any present needs or future goals.

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