

## ORTHODONTIC OFFICE DESIGN The Paperless Practice

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When orthodontists discuss the practice of the future, the conversation usually turns to the problem of eliminating paper from daily operations. In a busy practice, trying to keep track of patient files and treatment records is both cumbersome and difficult. Many of today's practices use computers in selected areas, but are far from "paperless". Several progressive orthodontists, however, have discovered that a paperless operation can be a reality, and that it does increase practice efficiency. This article will examine the factors involved in making such a transition.

### Technological Considerations

The first requirement for paperless operation is that you must be willing to change your practice into a high-tech operation. All paper records and manual systems must be replaced by a central, computerized practice management program. Thus, all patient records will be available at every work station, to everyone with access to the computer system.<sup>1</sup> These records include:

- Demographic (patient information forms)
- Diagnostic (health histories, photographs, models, x-rays)
- Treatment (charts, plans, notes)
- Scheduling (appointment book)
- Financial (ledger cards)

Ancillary tools may include imaging, cephalometrics, insurance-benefits data bases, credit reporting, scanning, inventory and electronic ordering, and CD-ROM systems for patient education, case presentations, and staff training. All operations, including treatment delivery, are centralized around the primary computer program. Even if you do not want to go completely paperless, your efficiency will be enhanced by integrating all the practice tools into one system.

The computer company entrusted to provide such a system must have:

- Considerable experience with paperless operations.
- A record of providing software that keeps up with the changing needs of orthodontic practices.
- A program that does not limit choices to the products of any one company, which may be popular today, but fail to keep up with new technology.
- A program allowing selection of ancillary practice tools, such as imaging systems, that are compatible with present or anticipated equipment.
- An efficient method of electronically converting existing patient data to the new format.
- Systems designed to minimize hardware failures and downtime.
- Systems designed to accommodate growth of the practice and staff.

At least one company, IMS, meets all these requirements, and was selected by the orthodontists we canvassed who are operating paperless practices. IMS has been fully integrated with the major imaging systems for more than four years, and it saves weeks of staff time with a fully integrated scanning system for entering current patient records, including photographs and x-rays, into the computer.

## **Financial Considerations**

The initial investment in hardware and software is the first cost factor to be considered in developing a paperless office. Ongoing expenses will depend on the system selected and the size of the practice. Operating a paperless practice should cost 2-5% of gross income,<sup>1</sup> but at today's interest rates, larger practices will find the costs closer to 2%. Since this is about 10% of the average staff payroll, many orthodontists can justify the investment based on increased efficiency alone.

## **Physical Considerations**

An axiom in office design is that "work patterns determine the floor plan".<sup>2</sup> Therefore, the first step in designing a perfect floor plan—whether the practice is paperless or not—is for the doctor and staff to step back and analyze the way they work. It is important to recognize and build on efficient work patterns, but to be willing to substitute new methods in areas of weakness.

Many offices that are now using computers are actually in an intermediate stage toward becoming a paperless office. The same basic floor plan (Fig. 1) can be converted to a paperless office (Fig. 2) without much structural change. Switching to a paperless mode can be gradual, or with the right system and proper preparation, can be done immediately. When establishing a new facility, it is usually advisable to make a complete change before moving into the new office.

Many specific needs of the practice must be determined when making a transition within an existing facility (Table 1):

- Number and location of work stations
- Location of the file server
- Operating system requirements (Table 2)
- Present and future software requirements<sup>1</sup> (Table 3)

The number and location of work stations becomes important in the determination of the computer hardware and the capacity required. Automated records should be available for access at the following locations:

- Front desk
- Financial/business areas
- Key areas throughout the operatory
- Chairside units
- Satellite offices
- Doctor's home

When practical, the main server should be located near the center of the office, thus reducing the distance to the work stations (Fig. 2). If the server is placed in a closet, as is often done, the closet must be well ventilated. A vent in the door is acceptable, because a server does not make enough noise to interfere with clinical operations. If the server is located in a mechanical room, it should be mounted on a wall rather than placed on the floor, to avoid water contamination from the suction, compressor, or other equipment.

A myriad of practice management software programs are available, including everything from electronic scheduling to computerized time clocks and payroll systems. The management system should have the ability to link branch offices if necessary.<sup>3</sup> In addition, if the doctor has access to

patient information at home, it will eliminate the need to take patient charts out of the office, with the potential of lost or misplaced records. Office work can then be done at home on a laptop computer.

### **Installation and Wiring**

If the building is under construction, the cable or conduit should be installed during framing, before the walls are finished or concrete is poured. Some states have codes that specify the type of wire or cable to be used; a few, such as Nevada, require conduit-only installation. A wire with the brand name Plenum is used by many installers and approved by most inspectors, because it is nontoxic if it burns in a fire.

Wiring from the server can pass upward into the ceiling space and be threaded down between walls to the various work-station sites. It is often efficient and economical to route the wiring through concrete or wooden floors, but if you have a concrete floor and are on the ground level, trenching will be required to gain access to chairside units or to central islands in an open-bay operatory. The computer-wire conduit can be placed in the same trench used to supply operatory units with air, water, and electricity. The design should allow ready access to conduits or wires, since future technological advances may require changing the wiring.

### **Patient Flow**

The floor plan should indicate the primary location and territory of each staff member (Figs. 1, 2). Good traffic flow promotes efficiency while allowing staff to interact as necessary. In addition, since many practices see 75-100 patients per day, the flow of patients within the office and operatory—from the beginning to the end of appointments—is critical. Problems that can interrupt patient flow include inability to locate patients, questions about treatment status, and lost records or charts.

An effective paperless practice carefully controls patient flow and keeps doctors and staff fully informed of each patient's location and treatment status. Upon arrival, the patient checks in at a station in the reception area (Fig. 3). This information is instantly relayed to the on-deck screen, which displays patients in the order they are normally taken—first by appointment time, and second by check-in time. The patient may be seated in the reception room, as is often done with adults, or may proceed to an on-deck area in view of the assistants in the operatory. Any screen can be checked to determine whether a patient is early or late, or to find out who is seated in which chair (Fig. 4). Thus, the doctor always knows which chairs require his or her presence, and in what order (Fig. 5).

### **Records Storage**

Traditional office designs allot considerable space to paper product storage and filing cabinets, increasing the practice's rental costs. As storage space fills up, many large practices have to purge their files two to three years into retention. With more practices prescribing long-term retention, however, records must legally be kept longer than in the past. State laws may also require keeping patient records indefinitely.

In a paperless office, the scanning system stores all patient records in the computer. The storage problem is eliminated, and long-term retention information can be instantly retrieved. Scanned records can be transferred to off-site storage on a regular schedule, or whenever computer disk capacity is reached.

The doctor or a designated staff member can leave the office each day with a backup copy of all the

patient records in the practice—an important security advantage. In case of a disaster such as fire or flood, the complete practice records can be available for use within hours.

Orthodontists using paperless systems report backing up their patient records every month and storing them off-site at archiving services.<sup>1</sup> While alteration of traditional paper records can be a legal issue, this electronic system prevents any entries on treatment charts from being altered after storage.

## **Reducing Stress**

As with any major change, a few problems will arise during the transition to a paperless operation, and a learning curve will be experienced. Nevertheless, those who have made this transition report that any initial apprehension is quickly overcome by the reduced stress of treating patients.

When doctors or staff are tense or irritable due to breakdowns in routine, their attitude is picked up by patients and parents. This is not the kind of atmosphere we want to create. In the paperless office, there is no such thing as a lost chart—once a constant cause of frustration and lost time. Instant access to patient data by any staff member, at work stations throughout the office, will be a welcome improvement over past routines.

Dr. David Way of Fort Collins, Colorado, reports that after his office became a paperless operation, there was an automatic redefinition and expansion of staff roles. In the past, patients' questions may have been glossed over because of the inconvenience of digging out information from charts at the front desk. Now, pictures of pretreatment casts or changes in facial profiles could be instantly flashed on the chairside screens. Increased interaction and communication with patients and parents naturally occurred, especially in explaining treatment progress. CD-ROM educational materials on brushing techniques and the like could be used routinely, without having to take patients to an audiovisual room and then return them to the operatory.

The ease of gaining information to use in communicating with patients improves staff morale and self-esteem. Who better to enter information than the assistant who worked with the patient? Who better to discuss treatment provided that day and to schedule the next appointment?

Chairside scheduling is optional, but can be an advantage in an office whose front-desk area is so small that only one staff person can comfortably work there. Backed-up patient traffic, which can be stressful to both the receptionist and the patients, is common in such practices. Chairside scheduling can free the front-desk staff to focus on other important aspects of the practice—making new-patient phone calls, rescheduling appointments, working on collections, or answering questions (which is easier because all the information is instantly accessible).

Paperless records also offer advantages outside the office. Some of the doctors have found it convenient to update patient records at home, at night and on weekends. They feel this gives them an unhurried time in which to review treatment plans or enter notes regarding treatment and progress. One way to do this is to connect a home computer to the office system via modem. Another method is to take the entire office data base home on a laptop computer (Fig. 4). After changes are made, the revised data is simply loaded back into the office system.

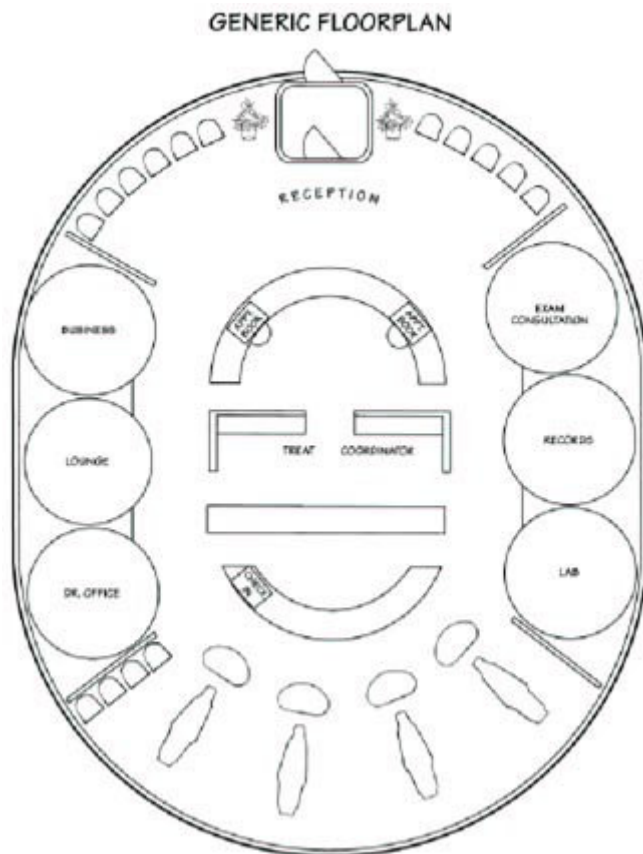
## **Conclusion**

Without question, a conversion to a paperless office is a significant change. Doctors and staff

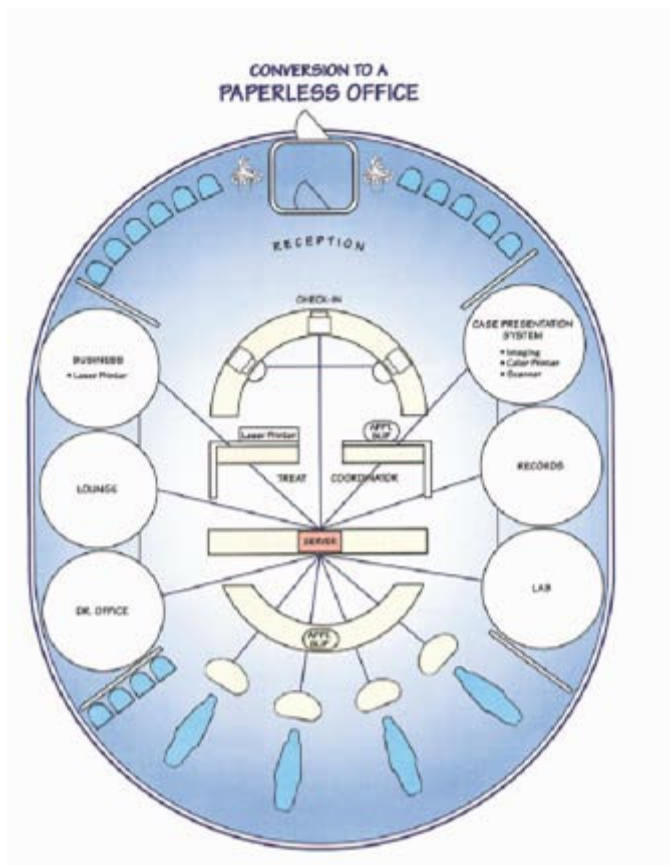
members who have made the change, however, believe it increases practice efficiency, enhances patient communication, and reduces stress in the practice. The computer system actually elevates the level of personal contact with patients, instead of reducing it.

Before choosing a company or system, you should be certain that it can be integrated with all your other electronic tools, such as imaging. Only the proper hardware and software will make it possible to achieve the ultimate goal of the paperless practice. □

## FIGURES



**Fig. 1** Typical orthodontic floor plan.



**Fig. 2** Same building as in Figure 1, converted to paperless office. Lines from server to various areas of office may represent either complete work stations or simple terminals.



**Fig. 3** Patient check-in monitor built into wall in office of Dr. Mark C. McDade, Camarillo, CA.



**Fig. 4** Notebook computer used as work station in office of Dr. Timothy F. Buckley, Palmdale, CA.



**Fig. 5** Laptop computer used as chairside in office of Dr. David Way, Fort Collins, CO.

**TABLES**

**TABLE 1  
SYSTEM NEEDS ANALYSIS FORM\***

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**Practice Information**

Number of office locations in which a computer will be needed: \_\_\_\_\_

If more than one office is involved, are doctors at more than one location on a given day?  Yes  No

Will the staff be working, or will patients be seen, at more than one location on a given day?  Yes  No

Are patients seen at more than one location during treatment?  Yes  No

Are any satellite offices shared with another dental specialist?  Yes  No

Specialty: \_\_\_\_\_

Will telephone calls between offices incur toll or long-distance charges?  Yes  No

Will the practice be operated in "paperless" mode immediately, or in the future?  Yes  No

If yes, is the plan to operate in "paperless" mode in more than one location?  Yes  No

Will the main computer system be integrated with any ancillary systems?  Yes  No

If yes, list the ancillary systems (video imaging, etc.): \_\_\_\_\_

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**Determining File Server and Work Station Locations**

File server (tower case) location: \_\_\_\_\_  
(Dedicated server can go in a closet with reasonable ventilation.)

Number of work stations (mid-tower or desktop cases) at front desk: \_\_\_\_\_

Location dimensions for each: \_\_\_\_\_

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Check-in station location: _____	Dimensions: _____
On-deck station location: _____	Dimensions: _____
Consult room station location: _____	Dimensions: _____
Doctor's office station location: _____	Dimensions: _____
Exam room station location: _____	Dimensions: _____

Number of work stations in operatory: \_\_\_\_\_ Location dimensions for each: \_\_\_\_\_

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Lab station location: \_\_\_\_\_ Dimensions: \_\_\_\_\_



Table. 1

**TABLE 2  
DETERMINING OPERATING SYSTEM REQUIREMENTS\***

Does the practice have existing computers to be used in the new system?	__Yes __No
If yes, list the number of computers, types of processors (486, Pentium, etc.), amount of RAM (8, 16, 32MB), and sizes of hard drives (250, 540MB, etc.):	
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Are any of the existing computers Macintoshes?	__Yes __No
If yes, list the number of computers, types (Proforma, PowerMac, etc.), amount of RAM (16, 24, 32MB), and sizes of hard drives (250, 540MB, etc.):	
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Do any of the existing computers have network cards (Ethernet, etc.)?	__Yes __No
Does the practice currently have any version of Novell NetWare?	__Yes __No
If yes, list the version (3.12, 4.1, etc.) and the number of work stations licensed:	
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Do any of the existing computers have MS-DOS, Windows 3.1, or Windows 95 installed?	__Yes __No
Will the new system include Macintosh-based Quick Ceph video imaging?	__Yes __No
Will interactive CD-ROM programs be used for patient information or case presentations?	__Yes __No
Does the practice plan to use Windows-based software?	__Yes __No __Open to suggestions
Does the practice plan to use Macintosh-based software?	__Yes __No __Open to suggestions
Does the practice plan to use DOS-based software?	__Yes __No __Open to suggestions

Table. 2

**TABLE 3  
DETERMINING SOFTWARE NEEDS\***

<b>Practice Software Requirements</b>	
Electronic scheduling?	__Yes __No
If yes, how sophisticated a scheduler is needed (basic, intermediate, or advanced)? _____	
Insurance processing?	__Yes __No
If yes, will multiple forms be used and printed? _____	
Electronic claims submission?	__Yes __No
Automatic deposit of insurance proceeds?	__Yes __No
Communications/letters system?	__Yes __No
If yes, basic automated letters or extensive graphics and/or font capabilities? _____	
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Daily accounting (patients allowed to select own payment dates)?	__Yes __No
Video imaging?	__Yes __No
If yes, is it important that the imaging be fully integrated with the practice management system? _____	
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Computerized patient check-in system?	__Yes __No
Computerized patient on-deck system?	__Yes __No
Electronic patient charting and notes?	__Yes __No
Electronic treatment planning?	__Yes __No
Electronic time clock and payroll system?	__Yes __No
Integrated accounts-payable system?	__Yes __No
Automated patient-calling system integration (e.g., HouseCalls)?	__Yes __No
Automated inventory system?	__Yes __No
Automated order entry system?	__Yes __No
Management reports?	__Yes __No
Reports available graphically?	__Yes __No
Integration of interactive CD-ROM programs for patient information or case presentations?	__Yes __No
Electronic, automated credit reports on prospective patients?	__Yes __No
Multiple-specialty doctors involved in the practice?	__Yes __No
Specialties: _____	
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<b>Supplemental Information</b>	
Does the practice plan to substantially increase the number of work stations in the next 1-3 years?	__Yes __No
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Is the practice upgrading and converting from another management software?	__Yes __No
Is it important for existing computer data to be electronically converted to the new system?	__Yes __No
If the practice uses a manual system, is it important to have help in patient data entry?	__Yes __No
If a "paperless" mode will be used, is scanning of existing charts and records important?	__Yes __No
Total budget for new system: \$ _____	

\*Tables courtesy of IBM Technologies and Services, Inc., 2010 W. Avenue K #015, Lancaster, CA 93534.

Table. 3

**REFERENCES**

1 Lewis, C.A. and Moorish, J.A. Jr.: The "paperless" orthodontic practice, Orthod. Prod.2:44-47, 1996.



**2** Hamula, W.: Orthodontic Office Design: Developing a floor plan, J. Clin. Orthod. 18:719-725, 1984.

**3** Lewis, C.A.: System needs analysis: Part II–Evaluating orthodontic software, Orthod. Prod. 3:38-44, 1997.

**FOOTNOTES**

**1** IMS Technologies and Services, Inc., 2010 W. Avenue K #815, Lancaster, CA 93534.