OBJECTIVES
After completing this chapter, you should be able to do the following:

• Spell and define key terms
• Identify the different types of computers found in the dental office
• List various types of peripherals used with computers
• Describe common administrative applications used in the dental office
• Describe the clinical applications of a computerized practice management program
• Explain how to use the Internet effectively in the dental office
• Discuss the ethical considerations involved in computer use
• Demonstrate the use of proper ergonomics when working at a computer
• Identify other pieces of equipment commonly found in the dental office and demonstrate how to use them

KEY TERMS
• laptop
• tablet PC
• desktop
• central processing unit
• computer system
• peripheral
• monitor
• Internet security system
• cookies
• viruses
• search engine

Technology in the Dental Office

The role of computers in the workforce today has become central to daily operations. The dental office is no exception. In both administrative and clinical areas of the dental office, the computer plays a central role. For dental office administrators, the computer acts as the daily schedule, accounts receivable and payable center, and the patient financial file. The computer aids the dentists in taking and interpreting radiographs, taking

OUTLINE
The Computer
Hardware
Core Components: Processor and Internal Drives
Essential Peripherals
Monitor
Keyboard
Mouse
Optional Peripherals
Network Card and Modem
Printer
Scanner
Speakers
External Hard Drive and Backup Devices
Digital and X-Ray Cameras
Applications
Administrative Applications
Word Processing
Spreadsheets
E-mail
Backup Management
Performing Basic Computer Tasks
Clinical Applications
Charting
Digital Imaging
Peripheral Integration
Patient Education
Internet Basics
Security
Internet Searches
Computer Ethics
Ergonomics
Other Office Equipment
Fax Machine
Copier
Postage Machine
Shredder
Calculators
Point of Sale Terminals
Chapter Summary

295
intraoral photographs, and providing patient education. As a dental office administrator, you must be confident in using dental practice management software as well as other computer software.

The purpose of this chapter is to develop your skills and knowledge of computers and both administrative and clinical applications in the dental office. Note that the coverage of administrative applications here is merely an overview, with more detailed coverage of individual applications—such as communication, patient record management, recall and recare systems, appointment management, electronic filing, inventory, insurance claims filing, and financial transactions—being integrated throughout the book in the chapters corresponding to these topics. Moreover, this chapter presents Internet basics, ergonomics, and guidelines on performing basic computer tasks. Finally, you will learn about the use of other common equipment in the dental office.

THE COMPUTER

Computers come in many shapes and sizes (Figs. 14-1 and 14-2) to accommodate the many preferences and uses for computers in the dental office. For example, a laptop or Tablet PC may be preferred by the dentist for use in the operatory, whereas the front desk may be best suited for a desktop computer. Regardless of the style of computer, there are certain elements that they all have in common.

Hardware

Computer hardware includes all of the physical core and peripheral components that make up the computer or that may be linked to and used with the computer. These include core components, such as the processor and internal drives, essential peripherals, and optional peripherals.

Core Components: Processor and Internal Drives

Probably the most important part of the computer is the central processing unit (CPU). A CPU, housed within the computer’s case, is the minute circuitry imprinted on silicon chips that processes computer language data and instructs the operation
of the computer. The speed at which these silicon chips can analyze data and run the computer varies. Computer CPUs are rated with a number that refers to their clock speed, or the basic number of commands or “cycles” that they can perform per second (hertz). With modern processors, these speeds are so fast that they must be measured in billions of cycles per second or gigahertz (GHz). Furthermore, a single CPU can have multiple cores or processors within their architecture that all run at gigahertz speed. These CPUs are termed dual core or quad core chips, depending on the number of cores included. The computer can use each one of these cores either together for one program or separately when running more than one program at a time. Effectively this is like having many computers running within one case to help speed up the multitasking that is so necessary when using a computer in today’s dental environment.
The speed of the CPU is an important factor governing the speed of a computer, but the amount of memory that is included is equally important in determining the applicability of the usefulness of the machine. Memory is used in a computer for storage of data that needs to be constantly changed, such as pictures on the screen, Web pages, or mathematical calculation results. The smallest memory part is called a bit. You can think of a bit as a light switch. It can be either on or off, so, if for instance, a particular bit in memory is set to on, that may mean one small dot on the computer screen is white, when it is off, that dot may be black. The place that bit is located, or its address, determines what it does. The CPU keeps track of all of these addresses. Eight bits equals one byte, 1024 bytes equals one kilobyte (kB) and a million kilobytes is a gigabyte (GB). Computers can run quite well with one gigabyte of memory, but many modern computers have up to 16 GB of memory. As memory has become much less expensive in recent years, the amount seen in modern computers has been increasing dramatically. Less important than size, memory also has a speed just like a CPU, but it is usually rated much slower and is rated in megahertz (MHz) or millions of instructions per second. This number determines how fast the memory can change what is being held in its addresses.

The information that is contained in the computer’s memory is not permanent, and therefore a method to permanently record and recall the information is required. If the information is to be read-only, and not changed, it can be stored as a permanent record on a compact disk (CD) or digital video disk (DVD) using a CD/DVD recorder. DVDs make excellent archival storage media. Most manufacturers give at least a 50-year predicted life for the data on a DVD, they are inexpensive, they are easily stored, and they can carry a lot of data. One DVD can easily carry all the financial and appointment data for 10 years of the daily activities of an average dental office. But data can be written only once to most DVDs and then not changed. To store data permanently, but still have the ability to change it, computers use devices referred to as hard drives. Hard drives can be internal, or within a desktop or laptop computer, or they can be external, which adds to their portability. The data that are typed into a computer first are stored in memory, and then if the user decides to keep the data, it is written to metallic plates within the hard drive. Hard drives are rated on their size. Common sizes for hard drives range from 250 to 1000 MB or one terabyte (TB). Internal hard drives are usually used for the day-to-day data storage operations of the dental office, whereas portable hard drives are used for backup at the end of the day. Monthly backups can be burnt to a DVD and stored off-site for security and fire protection. Some older computers may use either floppy drives or zip drives. These storage devices are good for archival storage of records but tend to be slower and more cumbersome to use, and so they are being phased out quite rapidly.

The combination of the essential peripherals and optional peripherals along with the CPU is what makes up the entire computer system.

**Essential Peripherals**

A peripheral is a type of computer hardware that is added to a computer in order for the intended use of the computer to be fulfilled. Peripheral devices are normally viewed as optional items that are connected to a computer. Peripheral devices are connected to a computer through a port, or bus, such as a Universal Serial Bus (USB) port. Items such as monitors or keyboards are not usually considered peripheral items since they are not truly optional; that is, it is impossible to use the computer without them. They are referred to here as essential peripherals. Box 14-1 lists some guidelines for properly caring for peripherals.

Essential peripherals consist of the following:

- monitor
- keyboard
- mouse
**CHAPTER 14  Technology in the Dental Office**

**BOX 14-1  Care of Peripherals**

Use the following guidelines regarding the care of peripherals in the dental office to maintain their use:

- Place a dust cover over the peripheral at the end of the day or when it is not to be used again for some time. Dust can be damaging to the insides of the peripheral if allowed to accumulate.
- Wipe the peripheral on a weekly basis using an antistatic cloth and solution designed for computers and peripherals. Always spray the cloth with the solution and then wipe; never spray the peripheral directly.
- Never touch a computer monitor with your fingers, especially if the monitor is a liquid crystal display (LCD) monitor. The oils secreted from human skin can be damaging to the screen and may shorten the life of the monitor.
- Keep backup drives or disks stored in a protective case. Maintaining the proper care of these items will prolong their use and ensure that they are effective when needed. Backup drives and external hard drives should be stored in a safe place, where they will not be exposed to harsh temperatures.
- Do not eat or drink around computer peripherals. Food and beverages accidentally spilled on them can cause permanent damage.

**Monitor**  A **monitor** is the visual display screen used with the computer. The various sizes and shapes available in monitors are designed to address the different needs for monitors. A CRT monitor (cathode-ray tube) is a bulkier style monitor, which uses the same technology as used in most televisions to display the information on the computer screen. An LCD monitor, or liquid crystal display, also known as a flat-panel monitor, is a thin, modern-looking computer monitor that takes up much less space at the computer area. Graphic professionals still use CRT monitors as they are said to have truer colors and less glare and cause less distortion of images. These graphic series monitors can be very expensive, are found only in sizes up to 27 inches, and are not often seen in a dental office. The benefits of size and price have all but caused the replacement of the CRT monitor in most office situations with LCDs. LCD monitors can be found in sizes from 14 inches to more than 60 inches (measured diagonally) although practical sizes range from 20 to 24 inches. They are much less expensive than comparably sized CRT monitors. These monitors create a small “footprint” or amount of space used on the desk, and so allow for more room for other items. It should be noted that smaller, older CRT monitors may be found in some dental offices, and when due for replacement, they should be disposed of at the proper facilities, as they contain recyclable materials.

**Keyboard**  To enter information into the computer such as patient information, a **keyboard** is required. There are several different keyboards that may be considered for the dental office. The standard keyboard has a cord that attaches it to the keyboard input on the outside of the computer’s case. This keyboard usually has alphabetic and numeric keys, function keys, editing and navigation keys, and a numeric keypad. Manufacturers may also add multimedia keys to control playback of music or movies. The keys on the keyboard may be in straight rows or may be in a more ergonomic, curved pattern that may help some people with problems like repetitive stress injuries. Some keyboards are wireless and do not require a physical connection to the computer. This can be very handy if the keyboard is some distance from the computer case. Washable and sterilizable keyboards should be strongly considered for the dental office where the possibility of cross-contamination of surfaces is possible. These keyboards can be wiped down or cleaned with antibacterial sprays without worry of ruining the mechanical aspects of the keyboard.
**Mouse** The mouse started to become a standard input device for computers in the 1980s. Early mouse devices had a mechanical mechanism based on a rolling ball that allowed the user to move an arrow or other pointing device on the screen and select and move different items. Very soon after the introduction of the mouse, the mechanical parts, which tended to be prone to failure, were replaced with optical parts that could detect the movement of the mouse over a surface with great accuracy. The optical mouse and its components, either a light-emitting diode or a laser, proved to be much more accurate and much more reliable and required less cleaning than the mechanical mouse and so has largely replaced it. The mouse may be attached to a USB port or a mouse port on the computer case or more conveniently may be wireless. Wireless mice will require battery replacement or battery recharging from time to time. Typically a mouse has a left and right button and a scroll wheel. After moving the pointer, or focus of attention on the screen, by moving the mouse, the new area under the pointer can be selected by pressing the left mouse button. This is termed “point and click.” The right mouse button generally is used to perform an action on this area of focus. The scroll wheel quite commonly allows movement through lists or through pages in a rapid fashion by rolling the wheel with the finger. Clicking twice in quick succession on the left mouse button can access different functions. This action, termed “double clicking,” usually will select an item and allows the user to perform an action on the selected item. As you can see, the term usually is used quite often here as every program that is used may have different mouse responses and requirements. Programmers have made an attempt at standardization of responses to mouse gestures, but the software manual should be consulted with regard to what mouse actions will provide the proper required response for the user.

**Optional Peripherals**

Optional peripherals are those that, while not necessary, extend the capabilities of the computer. Peripherals make day-to-day necessary procedures easier to accomplish, such as printing statements for patients, sending dental claims electronically, and obtaining information for patient charts. Optional peripherals include network cards and modems, printers, scanners, speakers, external hard drives and backup devices, and digital cameras.

**Network Card and Modem** Most dental offices have access to the Internet and the ability to communicate with other computers in the office, which is made possible through the use of a modem. A modem is a device that encodes and decodes the digital signal of a computer to send it as electrical information. Modems are available in various speeds, which means that the faster the speed the modem can provide, the faster the transmission of information. The type of connection to the Internet, which the modem provides, can vary between telephone (dial-up) or a cable system (high-speed Internet). Because some dental programs and dental insurance providers insist on communicating with dental offices by way of older dial-up modems that use regular telephone lines, it is sometimes necessary to have a computer that has this capacity. Newer computers have forsaken this type of modem, and so a telephone modem quite often has to be purchased as an add-on to the system. This modem can be purchased in an external or internal configuration. The external modem will plug into a modem port on the back of the computer, while an internal modem will fit into a card slot inside the computer. A telephone line is then plugged into the modem. Because the speed of dial-up modems is limited to not much more than 56 thousand pieces of data per second, or 56 Kbps, newer broadband modems have taken their place. These newer modems can be as fast as 1 billion bits per second. DSL modems, cable modems, and satellite modems allow the user to send larger files such as radiographs or pictures to other computers in a reasonable amount of time. This is not possible or is at least not practical with dial-up modems. The concept is the same, however, in that the computer must encode and decode data to send it to

**checkPoint**

2. What are essential peripherals? List three examples.
other computers. Even computers that are networked within the same office must have a network card that operates as a modem to “talk” to other computers. These network cards can be wired to each other with a cable that looks like a thick telephone line (RS232) or they can be wireless. A wireless modem can be attached externally or internally to a computer to provide wireless access for several computers in one office. Wireless cards and access must be configured with security measures to prevent unwanted access to computers or to data on those computers.

PRINTER  The printer is a commonly used peripheral and is used in the dental office for such tasks as printing out patient statements, claim forms and submission results, daily and monthly reports, and daily schedules. The printer is especially important for offices that maintain hard copy files of important documents that are created or received electronically.

The two primary types of printer used in the dental office are the ink-jet and laser printers. The ink jet printer uses liquid ink that is sprayed on the paper in the form of very small dots to form an image. The laser printer uses a powder called toner that is heated on to the paper to form its image.

The ink jet printer is very versatile. It can print very good text documents and can also print photographs that will rival the output of professional photography labs. Printing radiographs or images of teeth is easily accomplished. The pages can be printed fairly quickly, and ink jet printers print color very well. The initial cost of an inkjet printer tends to be quite low, but the cost of replacement inks can be very expensive and the cost per page of most ink jets is quite high.

Laser printers print excellent text documents, in most cases exceeding the quality of ink jets. In general, laser printers print single and especially multiple pages faster than ink jet printers. Color laser printers are available, but they do not print color or black and white photographs very well. It is not practical to use a laser printer to print patient photographs or radiographs. The cost per page of laser printed output is less than with an ink jet, and toner cartridges tend to last longer than ink cartridges.

The solution for many offices is to have at least one ink jet printer and at least one laser printer. In this way, the laser printer can be used to print day-to-day and important documents at a fast speed. When color or graphic output is required, the ink jet can be used. Printers can be attached to the office network so that they are accessible from any computer on the network. Some printers will even attach to the network wirelessly, so they require no physical connection to the system.

Some practice management programs may require a specific type of printer to be used for printing.

SCANNER  The scanner is a peripheral device that is used to make digital copies of documents for storage on and output from the computer. Paper forms can be scanned with the scanner, and the resultant scanned document can be sent by e-mail, reprinted as many times as necessary, or stored for future reference. If a document is scanned, a program called an OCR or optical character recognition program can be used to make the document editable in a word processing program. Many scanners can perform the functions of a copier, and this is one of their more common uses. Many ink jet printers have scanners built into them, making the copying process very easy. These so-called “three in one” ink jet printers can also fax documents, making it an easy job to scan a document, save a copy, print a duplicate, and fax it to someone, all with one peripheral.

SPEAKERS  Speakers allow a user to interact with a computer by playing audible sounds. At first it may seem like speakers have no practical application in a dental office, but they can be quite useful. Speakers for most computers can be very inexpensive and require very little desk space and so they should not be ruled out as superfluous. For many applications used on the computer, there is an audio cue when
the user has made an error, or when a message arrives. This audio cue can be very helpful to the operator. If a computer is used for patient education or entertainment, speakers are a necessity, especially if the educational materials are in the form of a video presentation. Speakers can enhance the usefulness of a computer and make it more pleasant to use.

**EXTERNAL HARD DRIVE AND Backup Devices**  Using a backup device to save computer system information is a necessary procedure in the dental office. Computers are machines, and they can break down, sometimes losing all of their data. The loss of data that can occur will be a very serious problem. It is also important to have a copy of all vital data in case of fire, flood, or theft. It can be easily imagined what will happen if all medical, financial, and appointment data are lost. It will bring most modern dental offices to a standstill. Several types of backup devices are available. An external hard drive is a stand-alone drive that may be easily connected, disconnected, and moved from computer to computer. External drives come with varying storage capacities from a few gigabytes to many terabytes. Larger drives can easily contain all the information that is stored on the hard drive of a computer. Typically, the external hard drive is connected to the computer with either a USB cable or a firewire cable. The most common method is USB as it is found on most computers. Firewire is not as commonly found, although it transfers data more quickly. Patient and financial files kept on the computer are typically saved to a backup hard drive at the end of each day and should be taken home with a staff member.

Other methods of backing up the information include recordable compact disks (CD-ROMs), zip drives, or recordable DVDs. Smaller amounts of data can be stored on flash drives. A USB flash drive is a small device, sometimes called a thumb drive because of its small size. It is plugged directly into a USB port, and the computer recognizes it as a disk drive. They are handy for moving photos or documents from one location to another. They have no moving parts and so are very durable, and the capacity of these drives is getting bigger every year. Some flash drives have capacities over 64 GB. Keeping saved information off-site is necessary, should there be a fire or flood and the information is required for insurance purposes.

**Digital and X-ray Cameras**  Technologically progressive dental offices may use peripheral equipment such as digital cameras and digital x-ray or intraoral cameras. These peripherals are usually found in the clinical areas. However, a camera used to take patient pictures is usually the responsibility of the dental office administrator. The digital x-ray is used by the dentist and clinical staff to diagnose disease, establish the health of the oral and perioral structures, and provide patient education. They must be available to the office administrator in order that they can be forwarded to insurance companies or a specialist’s office. For this reason, the office administrator should be aware of what x-rays are available, and what their limitations are, how to access them, how to e-mail them, and how they are stored and recovered. Likewise, the intraoral camera is used for many of the same purposes, taking pictures of oral and perioral structures for diagnosis and education. Again, the office administrator should be aware of the benefits and limitations of intraoral photographs and how the camera works.

**Applications**  In addition to understanding the computer hardware used in most dental offices, it is also important that you understand the most common programs or software applications that are used in the dental office. The applications used in the dental office may be divided into two categories: administrative applications and clinical applications.
Administrative Applications

As noted earlier, detailed discussion of the various components of dental practice management software is integrated throughout this book, where appropriate. Provided below is a brief overview of these programs. Also provided is an overview of other, more general administrative applications, such as word processing applications, spreadsheet applications, e-mail, and backup management.

Word Processing

Several different word processing programs are available for use in the dental office. Some practice management programs have simple text processing programs integrated into their structure, but for more advanced uses, it is important to be familiar with a more full featured program. To write formal letters to other doctors, lawyers, or patients, it is often necessary to have the features of these products. The manuals that come with these programs should be consulted to provide familiarity with the program.

Spreadsheets

Spreadsheets are useful programs for the office administrator to learn to use. Modern spreadsheets allow the user to display and perform calculations on numerical data in several different ways. They can be used to make a list of accounts receivable, petty cash purchases, inventories, or any other purpose where a chart or form is required. The spreadsheet has become a very versatile program as it can also display data graphically in the form of charts and graphs. A smart office administrator will become familiar with spreadsheets, as they are a useful addition to their armamentarium.

E-mail

For the modern dental office, it is essential that an e-mail program be adapted and learned by the office administrator. E-mail can be used to communicate with patients, other dentists, and insurance companies. Many patients prefer to get appointment reminders, make appointments, or get notified of the result of pre determinations all by e-mail. It is easy to send digital x-rays to other dentists for referral, and insurance company correspondence is quite often accomplished by e-mail. Composing a good letter and learning how to retrieve and send e-mail have become essential skills. All operating systems on computers today have an e-mail program that comes with the system.

Backup Management

The practice management program usually includes in its software a method of keeping an up-to-date copy of the software program and its contents. The backup system can be done through the use of an external hard drive as discussed earlier in the chapter. In some cases, a dental management program will have automatic backup that can be directed to an external drive. In other cases, the backup must be performed manually. Usually this can be set in the program preferences, but it is best to refer to your software manual or software professional for advice on this topic. It is also sometimes possible to back up only certain data components in order to save space. Decisions should also be made as to how many backups are kept. For the most part, the most recent backup is the most important, but keeping a few other copies, but certainly no more than five, may be prudent in case of errors, or data corruption. The backups should be done on a schedule, either automatically by the program itself or manually by the operator. In busy offices, daily backups should be the rule, but weekly backups may be enough for a smaller office. The general rule of thumb is that you should back up frequently enough so that if the data are lost before the next backup, retrieval and reentry will not be a problem.

Performing Basic Computer Tasks

There are several basic computer tasks that should become second nature to the effective office administrator. It will be assumed that the reader has a basic understanding of turning a computer on and off, using a mouse, opening a program or document, and typing on a keyboard. If this
is not the case, then a beginning book on the operating system you are using would be an intelligent purchase. It is important to learn as well how to create a folder, how to create a text document, how to cut and paste between documents, and how files can be deleted or retrieved. These skills should be part of the basic armamentarium. There are, however, some tasks that should be performed on a daily or monthly basis to keep the computer running smoothly and cleanly, and having a neat appearance.

Every day, after the computer is turned on, the following tasks should be performed. If it does not happen automatically, any antivirus programs should have their definitions updated. An e-mail program should be opened to check for incoming e-mails. Any urgent e-mails should be answered and any documents that require typing should be finished. Any seldom used or frivolous icons on the desktop should be removed. At the end of the day, a backup should be performed if one does not occur automatically. There may be other tasks that you like to perform daily, and it may be prudent to keep a written list so that they are not forgotten.

On a monthly basis, the disk drive should be defragmented. This is a process by which the hard drive optimizes itself for the best performance. This process may take as long as a few hours but can be left at the end of the day to happen over night. Unused or unneeded files should be removed, but care should be taken to avoid removing critical files. It may also be necessary to check on a monthly basis for program updates. Many programmers will issue updates to their programs that may contain important improvements to the program. It is a good idea to check for these updates for the programs you use most often by visiting the Web site of the program manufacturer on a monthly basis.

Clinical Applications

The clinical application of the dental software program is designed to assist the dentist, hygienist, and dental assistant in providing the patient with detailed, effective dental health care. The components most commonly used by the clinical staff in a dental software program are charting, digital imaging, and the use of other peripherals.

Charting

The main use of the computerized system in the clinical areas is for charting purposes for the dentist and the hygienist. Figure 14-3 is an example of a computerized dental chart for a patient. Each tooth in the dentition of the patient can be clearly seen and any of the surfaces requiring restoration easily viewed. An anatomical view of each tooth is used in order that an accurate charting of the dentition is displayed. Electronic charting varies depending on the software used, but generally, work that is required is indicated in red, work that exists is indicated in blue. Extracted teeth have an X through them, and teeth with root canal therapy have a line in each root. Beyond this, there are specific differences from program to program, and these differences should be learned by consulting the user’s manual or learning from other staff members. It is important that an office administrator learn to read a dental chart, as there is little time in the day for the dental assistant or dentist to explain the meaning of each item on the chart. Charts of the patient dentition are important medical records, are private, and will be stored within the patient’s file on the computer. These charts can be viewed by any member of the dental team on his or her computer but should be considered a private part of patient records.

Digital Imaging

Most digital imaging software that is part of the practice management program is compatible with most or all digital cameras. This is an important aspect to consider before purchasing the software program, since the incompatibility of software digital imaging devices will limit the software or digital devices that can be used. Digital imaging devices used in the dental office consist of digital
cameras, digital x-ray sensors, intraoral cameras scanners, and Web cams. A good dental imaging software component of the program will allow the following:

- Link images to the patient’s chart and manage them by allowing categorization of images
- Make notes directly on the image as well as adding or subtracting colors to the image for educational purposes
- Use patient images to explain and describe treatment and provide a rendition of the image of what it would look after treatment
- Protect images automatically, which prevents irreversible altering of the image

**Peripheral Integration**  Some dental practice management programs support the integration of peripherals commonly used in dental offices. A popular peripheral used by dentists is the Tablet PC, which is a handheld notebook computer that recognizes handwriting and speech or voice commands and is optimized for wireless network connections. The Tablet PC is particularly useful in the dental office because of its great portability, wireless connection to the network, and ease of use while examining a patient. Using a stylus directly on the screen to enter charting information is a simple, fast, and effective method of getting data into the computer without using paper forms or a keyboard. The surfaces of most tablets can be disinfected, making them ideal for use in the operatory. Some offices use Tablet PCs for

---

**FIGURE 14-3**  Tooth charting. DENTRIX image courtesy of Henry Schein Practice Solutions, American Fork, UT.
patients to enter their identification data. The Tablet PC can help create a truly paperless office.

**Patient Education**  Patient education can be a very effective aspect of treatment acceptance. Dental software programs can provide patients with a 3D animation of their own teeth to explain and have them understand the treatment they require. Dental software programs also include a stock of images and educational shorts on procedures and recommendations for treatment. Educational leaflets, or pamphlets that provide patients with information regarding procedures they may be curious about or require, are helpful in preparing patients for the procedure and answering questions that they may have. Patient images can also be included with treatment plan letters to patients or as a marketing device in encouraging patients to accept treatment.

**Internet Basics**

The Internet, or the World Wide Web, is a household term in today's society. In the dental office, the Internet is used by both administrative staff and clinical staff. The administrative staff may need to access the Internet for various reasons, such as locating addresses of insurance companies and patients, ordering supplies online from office and dental supply companies, and contacting the help desk of the dental software provider currently used in the dental office.

The Web browser used by the office you are in will be identified as an icon on the computer screen that you can click on with the mouse to connect to the Internet. Web browsers can vary, but the most the common ones are Internet Explorer and Netscape Navigator.

**Security**

A firewall or Internet security system should be available on the computer you use and enabled at all times. The **Internet security system** provides the computer with protection from harmful viruses and intruders who may be able to sabotage the files on the computer. Companies like Symantec and Trend Micro provide some of the more commonly used security systems. AVG and Zone Labs provide very good free programs for security, but they may not be as fully featured as the pay programs. It should be remembered that these programs should have their software and virus definitions updated on a daily basis, in order that they may keep up with the constantly changing world of computer security.

Additional security measures include using sites that are approved by the dental regulating bodies and following Health Insurance Portability and Accountability Act (HIPAA) guidelines on transferring patient information. These sites often have what is called a secure sockets layer. This means that as the information is transferred from the dental office computer, it becomes scrambled so that it is incomprehensible for anyone who intercepts it. When it arrives at the correct site, the information is unscrambled and easily legible.

Keeping the Internet security system on at all times may deny the acceptance of cookies on your computer. A cookie is a small file that is placed on the hard drive of your computer by a remote site and that contains information that can identify or control your computer in certain ways. Not accepting cookies may make certain Web pages fail to appear or prevent them from operating correctly.

HIPAA requires that passwords be used to access computerized patient information. From time to time, the passwords should be changed to ensure that information is protected. **Viruses** can be very destructive to a computer system. A virus is a small file that may be transferred to your computer system with the intent to sabotage or annoy. The effects of a virus can be as annoying as shutting your computer down periodically or as destructive as erasing your entire hard drive. Viruses can enter your computer system in different ways, such as when downloading information from the Internet or opening an attachment in an e-mail. A worm is a
specific type of virus that enters through an e-mail. Opening e-mail attachments at work should be avoided, particularly if they are sent via personal e-mails! Use the following guidelines when using the Internet at work:

- Do not open e-mails from unknown addresses or suspicious Web site addresses.
- Keep the Internet security system enabled at all times while the computer is on and ensure that the virus protection software is updated as notified.
- When downloading information from the Internet, download only information that pertains to work. Do not download information for personal use.
- Change all passwords on a regular basis.

Internet Searches

Finding the information you need on the Internet is done through the use of a search engine. A search engine allows you to enter a search term and then collects all the sites that match your search terms. Examples of common search engines are Google, Yahoo, and Excite.

Limiting the number of responses you receive on your search is important (Box 14-2). Being specific in the terms that you enter to begin your search is important to avoid wasting time. The Internet can provide hundreds of thousands of Web sites containing information you need if the terms you enter are too general. For example, if you are looking for information on tooth-whitening toothpastes and you enter the search term “toothpaste,” you would find innumerable Web sites containing information about toothpaste, from definitions of toothpaste to discussion of ingredients. Entering the terms “whitening toothpaste” will provide a comprehensive list of sources to gather information on whitening toothpastes. When searching for information regarding dental products or procedures, it is a good time saver to begin with searching dental association Web sites for information on the product or topic or going to manufacturer Web sites.

If you are surfing for information that will be used in the dental office for patient information, make sure to print out a copy of the information that will have the name of the Web site on it. Also, make every effort to find information provided by credible Web sites, or Web sites that represent reliable sources of information on the dental industry. Credible Web sites include your local dental association Web site or a well-known dental product supplier, such as Oral-B or Colgate.

Computer Ethics

As a dental administrator, you should use the computer professionally as a tool for proficient and efficient work at all times. HIPAA provides comprehensive guidelines for the uses of computers for storing, viewing, and transferring patient information;
adherence to these guidelines ensures the privacy of the patients in the practice. Use the following guidelines in the dental office regarding the use of computers:

- Never leave patient information displayed on the computer when you are not present in the area.
- Always close the screen when you are not in front of the computer.
- Assign separate passwords and log in names for each employee.
- Not all employees should have access to all administrative functions allowed on the computer, such as writing off charges or changing billing or payment information.
- Never use a computer when another employee is logged in under his or her own name on that same computer. Ask the employee to log off or sign off and then use the computer.
- Never access your personal e-mail or download personal information while you are at work.
- Always enter information into the computer with extreme care, making sure that you are entering the information into the correct patient account and using the correct codes. Never stop entering information half way through a transaction.
- Keep the information you read and send by e-mail in the dental office confidential by respecting patient confidentiality and not discussing the information outside of the dental office.

**Ergonomics**

Because you will be spending a lot of time sitting in front of a computer, it is important that you practice proper body positioning and proper typing style and that a rest period is obtained at regular intervals.

While sitting in front of the computer, you should adjust your chair so that your back is straight, and your neck and back muscles are relaxed. Arm supports should be adjusted so that your arms form no less than a 90 degree angle at the elbow. If the back of your chair is adjustable, it should be adjusted to create gentle support for your pelvis and neck. Feet should be flat on the floor, and the height of the chair should be adjusted so that your thighs are approximately level with the floor.

While typing, your elbows should be above the level of the keyboard. This will prevent fatigue and numbing of arms that can occur from prolonged posturing of your arms at an angle to the work surface. You should sit close to the desk in order that your elbows can be close to your body. Wrist should not rest on the table or keyboard when typing, as this will cause stress on your wrists. Use your whole arm to support your hands and fingers.

Make sure, during the day that you take time away from your desk, and take time away from the computer. While entering data or typing for a long period of time, make sure you look away from the screen every so often and let your eyes focus on a more distant object. During breaks or lunch periods, make sure you get up from your desk and walk around. Gently stretch and rotate your neck if you have been sitting in the same position for a long time.

If you start to exhibit any symptoms of back pain, neck pain, or repetitive stress injury, check your posture and your rest periods, and make sure you are doing the right thing. It may be prudent to request an ergonomically correct chair for your workstation if you cannot work with the chair you have now.

**OTHER OFFICE EQUIPMENT**

Many offices that you may work in may have several other office machines that you will have to gain familiarity with in order that you can efficiently use them when the need arises. The manuals for these machines should be made available and should
be consulted to gain expertise with each type of equipment. If the manuals are not available, most companies have online manuals in the form of pdf documents that can be downloaded and printed.

Fax Machine

Although many computers can provide the services of a fax machine, the ease of sending a paper document over telephone lines that a fax machine provides cannot be denied (Fig. 14-4). When sending a fax, always take care that fax numbers are entered carefully. Sending medical or dental records to the wrong phone number can have embarrassing or serious consequences. A cover letter should always be included before each fax in order that the receiver of the fax knows its source, the length of the fax in pages, who else received the fax, the phone number of the sender, and the date that the fax was sent.

Copier

It is quite often easier to use a dedicated copier rather than a scanner or a fax machine when making a large number of copies of a document, although in recent years, office supply stores and copying companies provide very cost efficient copying services for larger numbers of copies. For single copies, most fax machines or computers with scanners can copy documents quickly and easily.

Postage Machine

A postage machine is a very convenient method for providing postage for the large quantities of mail that goes out of a dental office. A postage machine prints a metered amount of postage directly on an envelope after postage is purchased for the machine over the phone line or Internet. Generally they are very easy to operate, and the manufacturers are normally more than happy to provide online or phone support for their use.

Shredder

A shredder is an important part of keeping patient records private (Fig. 14-5). Quite often, confidential information will appear on items that need to be recycled or thrown away. A heavy-duty shredder is of paramount importance in protecting the confidentiality of these records by rendering them unreadable. Remember, even phone notes that you have taken while conferring with a patient should be shredded. The shredded material can be recycled when necessary.
Calculators

A printing calculator is a useful part of the office equipment on the front desk. Quick additions on patient estimates, verification of deposits, or quick confirmation of order totals can be done without resorting to paper and pencil.

Point of Sale Terminals

Many dental offices have adopted terminals that allow the patient to easily and quickly use credit cards or debit cards to make payments on their accounts. These machines are quite specific to the financial institution that supplies them, and so the instruction manuals should be consulted for their use. Training courses and advice are usually provided free of charge from the company that supplies the terminals. Great care should be taken to provide accuracy when using the terminals, and privacy should be available while patients are entering private codes or pin numbers into the terminals.

Chapter Summary

There are many different types of computers used in the dental office. Desktop computers are more commonly used in the administrative areas, whereas laptops and Tablet PCs may be found in the clinical areas. Although the type and use of a computer may vary, the core components and peripherals needed for the computer are
common among them. Peripherals include essential items such as monitors, keyboards, and mice and optional items such as network cards and modems, printers, scanners, speakers, external hard drives and backup devices, and digital x-ray and camera equipment.

The use of a computerized practice management program, along with other common administrative programs, will assist in the maintenance of patient flow in the dental office. Becoming proficient in both the clinical and administrative components of the computer program will assist the dental office administrator in ensuring complete and accurate patient records and maintenance of patient dental care. Competency using computers and confidence with computer programs is essential.

Moreover, dental office administrators should be familiar with using the Internet effectively, understand the ethical considerations of computer use in an employment setting as well as the HIPAA applications regarding computerized patient records, and practice proper ergonomics. Finally, dental administrators should be familiar with the use of other common office equipment, such as copiers and fax machines.
Review Questions

Multiple Choice

1. A spreadsheet is primarily used to
   a. arrange text in a format suitable for printing and to create letters.
   b. format numbers in a layout suitable for calculations and analysis.
   c. create presentations to show to the patients for their education.

2. A USB flash drive
   a. can hold any kind of data and plugs in to a port called a USB port.
   b. can hold digital images only and plugs in to a port called a firewire port.
   c. can hold only numerical or text data and plugs in to a port called a flash port.

3. Which of the following is true about computer modems?
   a. An external modem is always slower in speed than an internal modem.
   b. A modem always requires an attachment to a phone line.
   c. A computer must have a modem to get e-mail from the Internet.

4. A good dental imaging software component of the program will allow the clinician to
   a. link images to the patients’ chart and manage them by allowing categorization of images.
   b. allow for notes to be made directly on the image.
   c. use patient images to explain and describe treatment.
   d. all of the above.

5. The Internet security system provides the computer with
   a. cookies that appear when you want.
   b. a history of Web sites visited in the past.
   c. protection from harmful viruses and intruders.
   d. none of the above.

6. Which of the following is not a guideline for proper computer use?
   a. Assign separate passwords.
   b. Never use the computer when another employee is logged in.
   c. Always treat all patient information entered into the computer with extreme care.
   d. Using screen savers is at the discretion of the dentist.

7. Which of the following is considered a clinical application of dental software
   a. word processing
   b. spreadsheets
   c. charting
   d. internet searches

8. Administrative applications in dental software include all but which one of the following
   a. back up management
   b. digital imaging
   c. email
   d. spreadsheet applications

9. The Tablet PC in the dental office is an example of
   a. computer peripheral
   b. patient education
   c. administrative application
   d. back up management

10. Ergonomics in the dental office refers to
    a. proper hand and back positioning
    b. correct posture
    c. proper posture while typing
    d. all of the above

Critical Thinking

1. Is there a difference between the handling of a digital x-ray and a physical x-ray as far as patient privacy is concerned. What special considerations might have to be thought of with regard to the privacy of digital x-rays?

2. If a fax has been sent to a specialist’s office, what should be done with the original cover sheet that was sent with it? Is it important to keep it or to shred it?

3. If an e-mail is sent to a patient, should a hard copy always be printed out for the patient chart? Compare and contrast how the answer may be different in offices with different philosophies on the use of paper.

Hands-On Activity

1. Locate the Web site of the state dental association in your area. Navigate throughout the Web site as if you were a patient wanting to locate a dentist close to your home.

2. Search for three different Web sites for dental offices in your state. What components of the Web sites do you find useful? What components would you like to change?