Chapter 6:

Dental Office Design

Design Trends

According to design professionals, healthcare design has evolved dramatically in the past two decades. Dental office design has changed as well.

Discoveries and trends such as: new advances in dentistry; the increased innovations in new ceramic materials and high tech dental equipment; Generation X-ers and Baby Boomers wishing to perfect their smiles; and the acceptance of cosmetic surgery by both men and women, are all having an effect on dentists' workspaces.

Patients are demanding more pleasing environments and dentists are becoming more willing to deliver. Also, many dentists are beginning to realize that superior office design can be used to market their services. According to dental office design experts, dental office environments are now being designed with an increased awareness and sensitivity to the patient and they project a more spa-like atmosphere to promote a sense of well-being.

In addition, technology is bringing a new sophistication into the dental office — both in the clinical and administrative areas. Currently, the most popular technologies are ones that produce dental imagery, such as intraoral video cameras, digital still cameras, and digital radiography. However, other high-tech equipment such as patient education/entertainment systems, curing lights, telescopic loupes, air abrasion, electric handpieces, and other equipment, are integrating quite well into treatment areas. Increasingly, electronic dental records, e-mails, advances in digitized imaging, and teledentistry are becoming commonplace.

The dentist needs to anticipate the future technology avancements in office designs, anticipate future growth and plan accordingly.

Overall, the design of your own dental office needs your personal attention. No one knows more about your desires, philosophies, and goals than you do.

For additional information on office design, see the ADA publication *Dental Office Design: A Guide to Building, Remodeling and Relocating.* You can place an order for the publication by calling ADA Catalog Sales at 1.800.947.4746, or by visiting the Web site **www.adacatalog.org.**

Design Considerations

The overall function of the dental office should dictate the form of its design and layout rather than adapting function to a prearranged design. Dental offices are most effectively designed from within.

A new office, built from scratch, should have the interior functional layout designed first, before overall outside dimensions and walls are drawn. Unfortunately, not all offices have the luxury of total size and shape determination since remodeling an existing facility is the norm.

This presents another design challenge: modifications to existing space to best enhance functional office efficiency. It will help if you begin to look

Checklist C

_____ number of dentists in the facility

_____ number of hygienists

_____ number of assistants

_____ number of other staff members

_____ delivery system design

_____ ancillary equipment needs

_____ specialty material needs

_____ number of patients/day

_____ radiographic requirements

_____ darkroom processing needs

_____ number of reception room seats

_____ business area machines

_____ filing system

_____ storage needs

_____ mechanical room
(compressors, vacuum pumps, tanks, etc.)

at your plans and traffic flow from eye level by walking yourself through as a patient would. Again, depending upon the patient services provided, your overall form and layout can be determined.

One of the ways for you to start is through a process of goal setting and preliminary evaluations. Ask yourself a number of questions about how you will practice dentistry now and how you see your practice in the future. How many staff will you have? How many treatment rooms will you need? What growth is projected for you and your community? Will you need more reception room space due to the nature of your patient load? What type of ancillary dental equipment will you use to support your treatment?

Checklist C contains several of the issues that you should consider. The checklist is only a start — you need to begin thinking about how you will use the space and how you plan to run the office.

Through the use of block diagrams, you can plan for your needs and wants. The block diagrams can then be converted into actual plans. An example of such a block diagram is shown below.

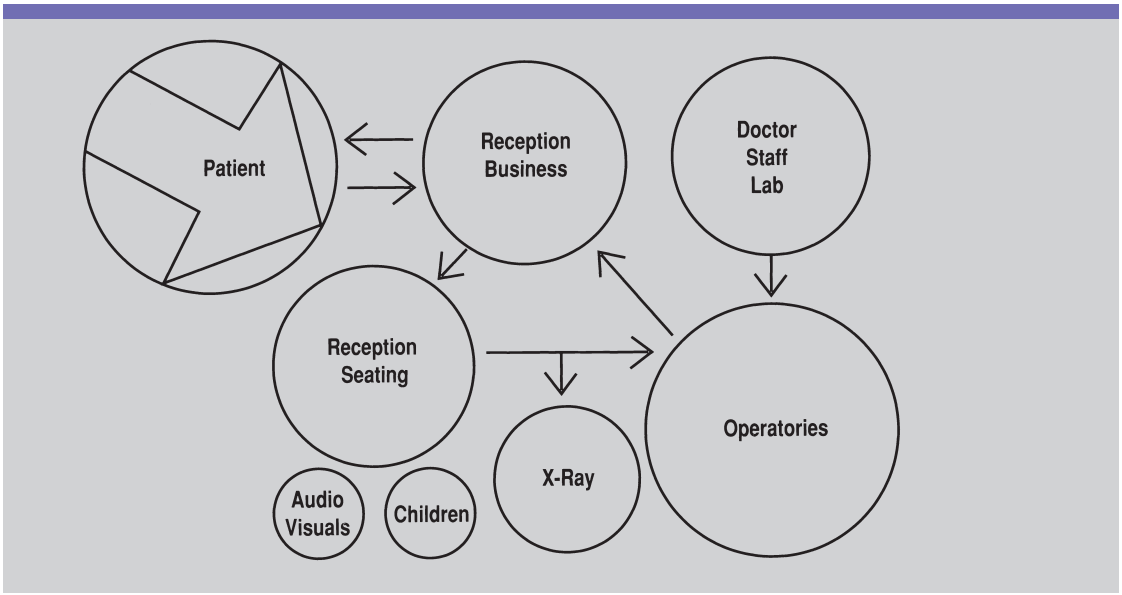
It is important to know your design goals before details can be implemented in an effective office layout by an architect. Similar to the design of a manufacturing facility, a dental office should look at the production area first, then the support areas for the treatment rooms, and finish with the administrative and patient reception areas. For example, location and design considerations could be planned in the following order:

- Treatment rooms;
- X-rays and digital imaging facilities;
- Tray and sterilization areas;
- Reception areas;
- Business office;
- Reception room; and
- Other administrative areas.

It is prudent for a dentist involved in developing a new or remodeled office to obtain professional advice from an attorney, architect, and/or contractor.

Legal Issues

A variety of laws will come into play when designing and building a dental office. It is important that your dental office comply with all applicable laws. That said, this introductory chapter cannot, nor does it purport to, fully address every relevant legal requirement. That is among the many good reasons why it is prudent for a dentist involved in developing a new or remodeled office to obtain professional advice from an attorney, architect, and/or contractor.



Relying on experts "in the know" about legal requirements, and shaping your contracts with them to protect you and assure compliance, is your best way for you to proactively address this important aspect of dental office design.

In designing your office, there will be a number of legal matters to consider. At the federal level, you will want to comply with the Americans with Disabilities Act. Patients with disabilities will have rights under the Americans with Disabilities Act and perhaps also state or local law. For example, the Americans with Disabilities Act provides for service animals to stay by the patient's side in the dental office and requires that your office offer an interpreter in some cases. The Americans with Disabilities Act also imposes minimum design requirements (such as restrooms/toilets, curbs and ramps, door widths for wheelchair accessibility, and handicapped parking, etc.) regarding accessibility for people with disabilities. Similar state and local laws may also impose even more stringent requirements. If you have any questions about the Americans with Disabilities Act, the American Dental Association has information at **http://www.ada.org/members/law/lawb.asp.** The federal standards you will need to meet will vary depending on whether you are planning to build a new office, renovate an existing one, or move into an office that does not need renovation. Again, in addition to these federal law requirements, you will need to comply with applicable state and/or local accessibility laws and building codes.

The U.S. Department of Justice (DOJ) has responsibility for enforcing provisions of the Americans with Disabilities Act related to public accommodations. The U.S. Department of Justice Technical Assistance Program provides publications and free information about the Americans with Disabilities Act through a toll-free ADA Information Line 800.514.0301 and 800.514.0383 (TDD).

Covered entities under the Health Insurance Portability and Accountability Act (call HIPAA Hotline at ADA 800 member number, extension 2899) must have in place appropriate safeguards to protect the privacy and security of protected health information. This standard requires that covered entities make reasonable efforts to prevent uses and disclosures not permitted by the rule. The DOJ does not consider facility restructuring to be a requirement under this standard. Visit **www.ada. org/goto/hipaa** or email **HIPAA@ada.org** for answers to specific HIPAA questions.

A number of other issues affecting dental practice have the potential to significantly impact dental office design, such as ergonomics and waste management. Have your professional advisors take these, and all regulatory requirements, into account.

Because the interplay of these federal, state and local laws varies from city to city, the information in this chapter about office design should be taken only as suggestions until they are approved by local authorities and become part of the plan.

The Division of Legal Affairs of the American Dental Association can also answer general questions about these issues via the 800 member number, at extension 2874. Also, *Frequently Asked Legal Questions* is available by contacting 1.800.947.4746. It has a chapter on dental office design.

Infection Control

Infection control is another important factor in today's office design considerations. Designers are planning larger and more efficient sterilization areas, tray preparation concepts, and central storage facilities. It is also important to have adequate ventilation in this area to minimize the buildup of chemical vapor that is associated with disinfecting solutions, ultrasonic cleaning solutions, and chemical vapor sterilant, if an alcohol-formaldehyde water sterilizer is used.

Furthermore, floor and environmental surfaces (walls and floors do not need cleaning after each patient) in the treatment rooms should be evaluated for their cleanability. Surfaces that may be contaminated, including floors, should be easy to clean and if necessary, disinfect.

Because the interplay of these federal, state and local laws varies from city to city, the information in this chapter about office design should be taken only as suggestions until they are approved by local authorities and become part of the plan.

The ADA has many products available regarding infection control issues. You can place an order for the publication by calling ADA *Catalog Sales* at 1.800.947.4746, or by visiting the Web site **www.adacatalog.org.**

Planning Considerations

Construction and Remodeling Time

Dental office buildings or remodeling projects take time for design, financing, and construction. Dentists who are anticipating office design changes or construction should adequately prepare and plan accordingly.

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Generally, it is estimated that 15 to 16 months or longer will often be needed in a new office construction project.

For a remodeling project, allow yourself at least 9 months.

Site Location

Determining the physical location of your practice is ultimately a personal, yet important — and never easy — decision. It's vital that the location you ultimately choose has a local culture and infrastructure that will support your practice.

Some suggestions to help you make a wise choice for the location of your dental office include: 1) to explore your wish list for your "dream practice"; 2) review your business plan and image; and 3) conduct a need analysis of your community and patients.

Size

The overall size of the office will be determined by a number of factors, such as:

- Office volume in terms of both productivity and patient traffic
- Amount of time that the office is in use and the number of providers in the facility
- Your practice mission
- Number of staff in your office.

A dentist, practicing in an office with four treatment rooms, employing one dental hygienist, and additional support areas necessary for the effective functioning of the patient flow, will need 1100 to 1500 square feet of office space.

Smaller offices can be highly functional if their design is thoroughly planned. Obviously, the type of practice, its volume of patient flow and the number of staff will dictate the overall size of the office.

Parking

Parking facilities are very important for both staff and patients. Convenient parking can have a favorable influence on your patients' perceptions of your office.

City codes often regulate the number of parking spaces based on the square footage of the office. Be sure to check these regulations, but remember that they are minimum requirements and that dental offices usually need additional parking spaces. A rule of thumb for determining the number of parking spaces needed is to multiply the number of treatment rooms by 1.5 and add in the number of staff parking spaces needed. Thus, for a four person staff in a three treatment room office, approximately 9 to 10 parking spaces will likely be needed.

The Americans with Disabilities Act has many requirements regarding accessible parking spaces. Work with a contractor who is familiar with the regulations. In addition, check with your state and local laws regarding this issue.

Interior Design Considerations

The methods that can be used to enhance the interiors of your dental office are endless! This introductory section can only offer a few basics to consider when designing your office.

A good piece of advice is to work closely with your designer. They will have the creativity, experience, and knowledge to help you choose from the countless materials that are available in today's design marketplace.

A designer who specializes in dental offices can help you become familiar with trends in the

dental environment regarding air quality, noise, ventilation, cabinetry, dental equipment — even aromatherapy!

Lighting

Indirect lighting to produce softer, more subtle environments and the use of increased indoor lighting have been the revolutionary changes in terms of lighting in the dental office, say design experts.

Designers are also becoming more creative with lighting to produce relaxing, stress-free atmospheres by using intricate illumination designs.

Windows allowing natural light to provide a psychological boost and a connection to nature is another way of reducing stress. Natural light can also be a source for cheap, high quality light if controlled properly. Today, it's easier than ever to get creative with natural light. Decorative windows, available in colored contemporary and natural outdoors scenes, are just as efficient as conventional windows.

Generally, for the treatment room, ambient lighting should be evenly distributed, shadow free, have good color rendering and be concentrated at the patient's head. The dentist should use lamps with a high Color Rendering Index (CRI) (a CRI number of 100 shows the "truer" colors) to perform tasks such as tissue inspections, shade readings for tooth colored restorations, and aesthetic evaluations.

Dentists can reduce the amount of eyestrain during the day if the ambient lighting of the treatment room is high enough to prevent a large difference when moving the eye from intraoral task lighting to regular room lighting. The dentist may also need to reduce the task lighting when using a fiberoptic light source. Generally, overhead treatment room lighting from two banks of 2' x 4' four tube fixtures will be adequate room illumination.

Color

The healthcare industry is beginning to use more color, and dental offices are following this trend.

Interior designers can develop color themes throughout the office to attract the eye of the patient and assist movement through the office. Color themes for the floors, fixtures, equipment, walls, and ceilings should be coordinated, if possible. Using innovative ideas can assist in developing room atmospheres that are conducive to patient management. For example, use of color in corridors and stairways can provide stimulation and variety for patients who are passing between spaces.

There is evidence that suggests that certain colors are more relaxing than others. It is important that the color schemes contribute to the overall relaxation of the patients in a dental office.

Flooring

There are a myriad of flooring choices for the dental office. Keep in mind that flooring choices are subject to applicable laws.

Floors are available in wood, carpet, vinyl composition tile (VCT), sheet vinyl, ceramic tile, slate, a combination of all of these, or others. With the variety of hard surface flooring and carpet available today, they can be incorporated as wayfinding techniques and patterns to reinforce larger themes.

Today, wood flooring, such as Pergo, is an option for treatment rooms since it is more durable, worry free, and easily cleaned. It adds warmth to the dental office setting and can be an attractive, inviting choice of flooring for lobbies and corridors.

However, wood flooring is being used more in nontraditional areas such as bathrooms. Wooden floors with a "worn in" look are gaining popularity. These distressed floors are less expensive and easier to install than traditional wood flooring.

The use of carpet as a floor covering choice is becoming more popular in healthcare settings. With new fiber technology, there are now a larger variety of colors and designs in commercial grade carpet that can be suitable for the dental office.

Using innovative ideas can assist in developing room atmospheres that are conducive to patient management.

Carpet is not recommended for use in treatment rooms or laboratories because of the difficulties with clean-up, particularly with mercury spills. Otherwise, infection control isn't necessarily a concern with the use of carpet — the main point being that it should be able to be maintained in a clean and sanitary condition.

Walls

Interior designers can assist you in planning your wall preparations.

Painted walls are usually inexpensive and easy to clean. New technologies are producing wall-coverings or wallpaper with sharper and more sophisticated designs. Wallpaper is available in a wide variety of color combinations, designs, and textures — including natural grass cloths. In addition, these new products are meeting fire code requirements.

It cannot be stated strongly enough that your office makes a statement about you and an impression on the patient.

One trend that is evolving with wallpaper is that more commercial spaces are using "residential" colors and patterns. Dental offices use the residential theme to help patients relax and feel more comfortable. Wallpaper also is a great way to "cover" imperfections in walls, which can be common in older buildings.

Also, faux painting is becoming extremely popular.

Consider a combination of paint and wallpaper in certain areas to enhance the office look.

Ceilings

Ceilings can create special effects on the visual perception of the observer. For example, using alternating ceiling heights or placing a border along the ceiling can give an impression of more space or enhance the design. Soffits along the ceiling can be a good way to trap sound and reduce the noise level in the office.

In addition, ceiling art such as painted murals, mobiles, even artifacts embedded in the ceiling, can provide positive distractions for patients.

Design Throughout the Dental Office

Reception Area

Your reception area and the entrance to your office will affect the overall "feel" that patients have about your office and about you.

Subconsciously, patients are making value judgments about the office based on hundreds of little items they notice. It cannot be stated strongly enough that your office makes a statement about you and an impression on the patient.

Generally, the reception area should be "inviting" with an open design. These days dentists are handling the "checking in" of their patients in a variety of ways. For example, some dental offices have "greeters" who provide concierge types of services, such as offering beverages, or "treatment coordinators" who may offer office tours on the first visit and handle all transactions for the patient for the entire time they are with that practice.

Today, many dentists are offering amenities such as juice bars, plug ins for computer laptops, and entertainment systems designed to relax and preoccupy the patient before the appointment. Some dentists are even offering foot massage machines or other spa like amenities. Display cabinets showcasing dental products used in the office are becoming more popular.

Reception room design features such as ceiling height, doors, woodwork, lighting, and colors can all be used to set the tone for the patient visit. Interior designers can be extremely helpful in assisting the dentist to portray the "office image" desired.

Perimeter reception room seating is preferred so that the receptionist can see patients when viewing the area. Some dentists have designed children's areas into their reception rooms, depending on the nature of their patient pool and their business strategies.

For patient comfort, a solo general practitioner will probably need seating for six to nine persons in the reception room.

Business Area

Dentists often make the mistake of having a business area that is too small. Increasing clinical complexity, special business needs, prepaid dental programs, and insurance copayments are just some of the reasons why the space for the business office has become more important.

A general guideline is that one person needs a two feet wide space to walk comfortably between objects such as a filling cabinet and a desk; allow at least five feet for two people to work around each other without interference. In addition, each employee in the business area should have two to three feet of working space, plus room for equipment such as computer, telephone, etc.

It is important your staff have enough room to do their job comfortably. A good rule is to use 100 square feet for one full-time person in the business office. For each additional person, use 75 square feet.

Be sure you also have a private area for discussions with patients regarding billing and insurance filing.

Corridors

Use wide, spacious corridors and hallways – a minimum of five feet for two people to pass each other comfortably. This will also help your supplier with any equipment installation and servicing. Frequently, dentists subtract space in the hallways to acquire space for another treatment room. This is usually a bad idea. Cramped quarters will increase the stress levels in your office.

In regards to accessibility, corridors should be free of clutter and loose doormats and area rugs. Doorways should be at least 32 inches wide, with thresholds no more than one half inch high. Ramps should be equipped with handrails that extend beyond the end of the incline. Elevators should be large enough for wheelchairs and the buttons should be accessible from a seated height.

Consultation Room

Some dentists and architects plan the dental offices with a separate consultation and treatment presentation room. Often this room can double as a patient education and audiovisual center for the office. An excellent room design would allow for ease of case presentation, adequate display aids, and the privacy necessary to discuss the patient's treatment and financial needs. Many dentists believe that case presentation done in such a setting will result in increased case acceptance.

Public Restroom

Many dentists are paying extra attention to the restroom used by patients, designing them to be more "residential" in look and feel. This is a room where you can be more dramatic with your design as well.

Cleanliness is of utmost importance at all times. With the increased use of restorations, many patients feel the need for privacy to look at their smiles and adjust their makeup. Keep this in mind when designing the lighting system.

Cleanliness is of utmost importance at all times.

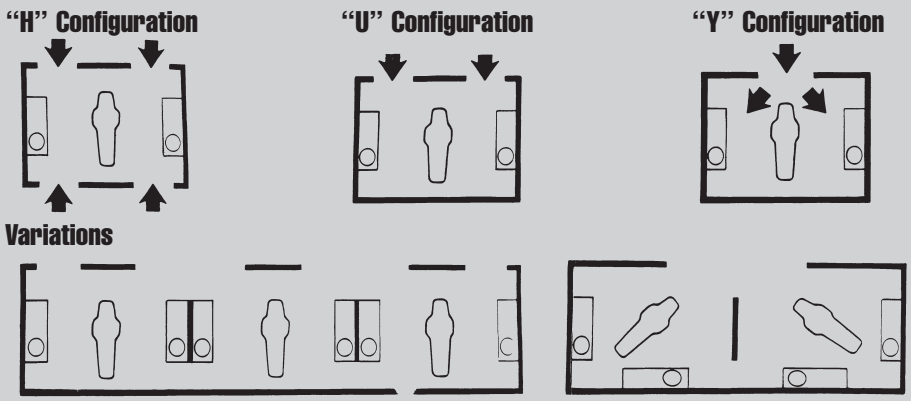
Most restrooms have to be designed larger to comply with the guidelines of the Americans with Disabilities Act and codes for working with sedated patients. In addition, check with local building codes regarding designing and building public restrooms.

Treatment Rooms

Trends in the design of the treatment rooms include integrating high tech dental equipment and moving from a clinical environment to a more warm, inviting space. Designs are becoming more sophisticated in all materials; upholstery, cabinetry, flooring, wallcoverings and flooring and window treatments are becoming more decorative than ever.

The basic question dentists and designers start with is how many dental treatment rooms are needed. It has been estimated that a well run, busy professional office, with one dentist and one dental hygienist, will utilize at least four treatment rooms. This is broken down as follows: two for the dentist, one for the dental hygienist and one for emergency or overflow patients. Offices with a higher number of shorter appointments, such as a pediatric dentistry or orthodontic office, will likely need additional treatment rooms.

Sample Room Configuration



For maximum efficiency, all treatment rooms should be the same in size, equipment and layout.

Practitioners who are building a clientele will likely need only two functional treatment rooms, until patient demand indicates a need for additional space. For maximum efficiency, all treatment rooms should be the same in size, equipment and layout. This will allow the dentist to perform any regular service in any treatment room. It will also prevent bunching of the appointment schedule around certain "preferred" treatment rooms or a delay in seating patients while a room is occupied or being prepared.

It is also important to place the treatment rooms close to one another to reduce the time necessary to move between rooms and to enhance productivity. Great care in planning the treatment room layout should be taken if more than four treatment rooms are designed to ensure a smooth traffic pattern.

Types of Treatment Rooms

There are three basic room designs for dental treatment rooms. These include:

- "H" configuration
- "U" configuration
- "Y" configuration.

Many designers prefer the "H" configuration. In this design, four doors exist for each treatment room, two from behind the patient and two at the foot of the chair. Dentist, patients and staff can easily enter and exit with this type of arrangement. Drawbacks to this design include the necessity for two separate hallways and the inability to place the chair in a position that allows the patient much of a view while waiting. Costs are often increased in this design due to extra hallway requirement.

The "U" concept is an adaptation of the "H" configuration that eliminates the doorways at the foot of the chair. Patients and dentist come in through one entry and staff enters through another, both behind the chair. Advantages include the ability to place the chair facing a window while the head of the chair is left in a non traffic area, allowing for carts, tubing, and other mechanical requirements to be placed there. Both the "H" and "U" concepts are popular and allow ease of motion to and from the dental chair, which is an important aspect in any treatment room design.

A "Y" design plans for one doorway into the treatment room, from either the side or the foot of the chair. All traffic enters through this doorway and then moves to the appropriate areas of the treatment room. The design is popular but often results in slightly more distance for both the dentist and staff when moving from the treatment room to another.

There are variations of the basic "H," "U," and "Y" layout. One example could involve two entries at the head of the chair to allow separate access by the dentist and patient through one side, and on the opposite side of the head of the chair, another entrance for staff. Another example might utilize a single entry located at the head of the chair, which allows a staff member to quickly move between adjacent treatment rooms.

In regards to accessibility, be sure the treatment room is large enough to position a wheelchair next to the dental chair — enough room for transferring a patient to the dental chair.

Regardless of the treatment room design, the support equipment should be within reach of the dentist or the assistant. Dental assistants will need to sit slightly higher than the dentist to allow for adequate vision. Since the average reach radius of an assistant is approximately 26", consider designs that bring in all work surfaces, materials, and instruments within this distance. A rule of thumb in dental office design is to use a 28 inch "space" on each side of the patient chair to the nearest walls or countertops.

Treatment Room Design Elements

Regardless of the treatment room design, a basic principle of good design places the assistant and as much of the support equipment as possible along the long axis of the dental chair and within reach of the dentist or the assistant.

Dental assistants will need to sit slightly higher than the dentist to allow for adequate vision. Furthermore, since the average reach radius of an assistant is approximately 26", all work surfaces, materials, and instruments should be within this distance when performing treatment to prevent unnecessary motions, which can be stressful and time consuming.

All types of delivery systems, such as behind the patient, one or two carts, or over-the-patient, can function well in a properly designed treatment room and the final choice is usually up to personal preference of the dentist.

Because of heat generating equipment and people, treatment rooms do not have to bear additional heat from the sun. Design treatment rooms so they are oriented to the North, since the sun does not shine on that side of the building. Treatment rooms facing East are sufficient, since the sun from that direction is in the early, cool part of the day.

Remember to consider infection control needs when reviewing delivery systems, X-ray equipment, and treatment room lights. One consideration of a delivery system should include the ease of decontamination and minimization of contact areas that eventually will need to be decontaminated. Also, keep in mind the compatibility of disinfectants with the materials used for the fabrication of the delivery system. Many designers believe that a system of prearranged instruments, pre measured materials, and centralized sterilization will facilitate treatment room clean-up and decrease inventory levels; all factors that need to be considered in your design. Consideration for plumbing requirements should be given to ventilating the exhaust of the pump and the suction system so that it will not reenter the building. This is especially important if nitrous oxide scavenging units are used (as recommended by the ADA if nitrous oxide is used in the treatment room). The design should also allow for ease of servicing the plumbing system such as installation of traps and emptying and replacement of traps.

Special plumbing requirements will be dictated by the manufacturers' installation suggestions and the type of equipment you place in the office. Building codes may also regulate the plumbing installation.

Dentist's Private Office

The private office is becoming increasingly important in design with the belief that it is important for the dentist to have "private" areas to go to during the day for mental breaks.

Dentists used to work in small offices, but this is changing. They are being designed larger. Large windows always offer a peaceful, psychological

The private office is becoming increasingly important in design with the belief that it is important for the dentist to have "private" areas to go to during the day for mental breaks.

break. Remember to design for a positive, relaxing atmosphere.

Consider a private closet and bathroom to accompany the office. Keep in mind the accessibility requirements when designing the private office.

Staff Break Room

Dentists are becoming more accommodating to staff, again to offer private areas for mental breaks. Patients cannot judge your clinical care, but they definitely make "mental notes" about the attitude of your staff. If your staff is happy, and their needs are being met, it will show to your patients.

A trend in office design is that some business owners are becoming creative with the design of the break room; building it to be flexible for conversion into conference, meeting, and employee education areas. Custom designed cabinetry can hide kitchen appliances and audiovisual equipment.

Another trend is themed conference and break rooms. For example, break rooms can be designed to feel like a bistro café; or a conference room may have an "ocean" theme.

Separate special function areas like an x-ray room, are usually not recommended for the average solo practice as they are not cost effective.

X-ray Facilities/Darkroom

Regardless on which wall the x-ray machines are placed, make sure that the equipment and chair are positioned to allow ease of access to both left and right sides of the mouth. It is important to check with dental suppliers to determine the inner wall support necessary for intraoral radiographic machine mounting. During full extension of the arms of the machine, the weight of the tube head can put significant torque onto the mounting plate and wall supports. Many offices plan for a panographic radiographic machine even if they do not currently have one. The designer or architect needs to know about anticipated expansion plans in order to allow for appropriate wiring.

Architects will begin to consider a central x-ray area if the office has approximately six or more treatment rooms. Separate special function areas like an x-ray room, are usually not recommended for the average solo practice as they are not cost effective. However, panographic equipment located near the reception area could be accommodated in a space as small as 5' x 5'.

If a central radiographic area is indicated, it is important to place enough distance between the machines for both ease of operation and for compliance with radiation safety requirements. Check these requirements carefully with the manufacturer and/or local building authorities. Be sure to also check state or city radiation laws to determine if special construction is required. If there are no specific requirements, it may still be advisable to use 5/8 inch sheetrock in the walls rather than 1/2 inch thick material.

Darkroom facilities are often designed to be near the central radiographic area. Generally, a room of 4'x 5' is considered adequate for a darkroom. The architect will need to make modifications in this area based on the dentist's preference for processing equipment.

If an automatic processor is planned, it is important to have a sink nearby that is 10 to 12 inches deep to allow for maintenance and cleaning of the processor rollers. Check with local codes for any special modifications necessary in plumbing or installation of this equipment and ask the manufacturer for specifications. The equipment's specifications instruct the architect in how to correctly provide plumbing, electrical requirements, framing to house the equipment, and capacity. It may also be helpful to have a floor drain in the darkroom in case of an overflow.

Today, many dental offices make use of digital radiography. According to dental office design experts this new technology has many features such as: quicker image acquisition; improved image reproduction; lower x-ray dosages; patient education; less environmental impact; improved archival methods; and the elimination of a darkroom! Dentists perceive digital radiography as being quite costly, but according to users, the investment pays off.

Sterilization and Tray Preparation Area

The overall office layout will require the designer to plan for the efficient management of a sterilization area. The size of this area is dictated by the function that is to take place there. For example, with a tray system, the sterilization area will need to accommodate both a soiled side and a clean side with a progression from one to the other. Logical placement of scrub sink, ultrasonic cleaners and sterilization equipment indicates that the items for sterilization should progress through these steps and end up in a storage area for sterilized items. In busy offices, an area with 12 to 16 feet of counter space for sterilization procedures will probably be necessary. Counter space in the sterilization area can be designed as totally linear, L-shaped, as a U-shaped, or as two parallel linear surfaces.

Out of concern for infection control, many experts now recommend that dentists work from trays prepared outside the treatment room. Using prepared trays has the advantage of eliminating a potential cross-contamination point where a dentist or staff member involved in a procedure may be tempted to reach into a drawer for items. One suggestion is to store minimal equipment or supplies inside the treatment room in drawers. In general, it is more efficient and less likely to violate infection control procedures to work from sterile procedure trays that are completely assembled in advance away from the treatment room. These trays have no missing items and when needed they may be quickly brought into a treatment room for use.

Dentists will need to decide in advance how extensive their inoffice laboratory needs will be. If a simple pourup and polish laboratory is all that is necessary, less space will be needed. Prudent infection control management, however, would suggest that the laboratory area should be separate from the sterilization area. However, infection control procedures are also necessary in the dental laboratory.

Generally in a laboratory, linear countertop requirements can vary but are usually 8 to 16 feet. Also, plaster bins should be placed over a sink to allow easier cleanup. It is also important to place a plaster trap in the sink drain line to prevent costly drain clogs. Develop a routine maintenance schedule for cleaning this trap.

Storage Areas

Make sure you have plenty of storage space in your office. Devote at least 100 to 120 square feet for inoffice storage.

Central storage areas can be used to reduce the inventory necessary in the treatment rooms and to decrease the chances of cross contamination as was indicated earlier.

It is usually easier to have one storage area, if possible, for both small and bulk items: It should be accessible and easy to manage for all staff.

Utility Rooms

The office will, depending upon whether a basement exists or is planned, need an area to house the mechanical utilities. Items such as dental compressors, evacuation systems, gas tanks, and water should be housed in a well enclosed area to prevent transfer of sound. In addition, if a basement is not available or planned, sufficient crawl space is desirable to facilitate plumbing installation and repairs.

Check on state and local regulations and manufacturer's recommendations for any requirements concerning separation of mechanical pumps from chemical storage.

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