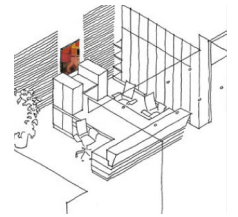


An architectural conception for an orthodontic office



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ABSTRACT

The design for the site of an orthodontic office has to encompass a wide variety of heterogeneous concepts that have little or no logical connection with each other including functional and ergonomic requirements, the available existing space, the existing building itself, the flow of traffic, the conduct of the practice, costs, colors, materials, textures, and lighting.

Carrying out this transformation cannot be done without an in depth study of the specifications and characteristics of every phase of the operation, a careful analysis of the needs and mode of operation of the office team. But this plan for a facility remodeling should not respond solely to functional needs; every office location should be designed to house a particular activity. The waiting room and reception desk should encourage communication and empathy. The consulting room should soothe fears and stimulate dialogue. The treatment rooms or area should reflect professionalism. The sterilization area must gleam with an almost virginal cleanliness and demonstrate the rigor of its antiseptic qualities. Throughout, management of space, forms, dimensions, and the choice of materials and colors must flow from a well thought out plan where they all participate in the creation of an atmosphere that sends a message to patients. "Architectural works speak to men's hearts, awakening emotions. The task of architecture is to stimulate righteous emotions."²

KEYWORDS

Orthodontics

Dental office

Facility design.

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Orthodontists are the chief operating officers of enterprises that should be sustained by smoothly operating infra-structures, whose construction bespeaks the best possible relationship between costs and qualities. Architects combine their art and their science to build and furnish appropriate buildings for these undertakings. They translate the essentials of the tasks orthodontic professionals fulfill with their staffs into clear terms that can be elaborated into a project will sup-

port their functional activities in an ergonomic fashion. They assure its efficiency and endow it with a communicative atmosphere. They use a critical eye trained to evaluate readily the basic concepts, transforming them or contesting them when necessary, so that the eventual construction will satisfy orthodontic exigencies. This architectural conception is complex and must be carried out over a difficult, non-linear route that nevertheless follows a strict methodology.

1 - THE BIRTH OF A CONCEPT: DECODING DREAMS

Before initiating this undertaking, practitioners should already have a reasonably precise idea of what their future office will be like. They

should project themselves into the future and outline their notions of how an ideal practice will be organized. This conception will give the



Figure 1
The time frame of the project has as much impact on the demarche as the end result of the work.

(Projet, 1938, Paul Klee Zentrum Paul Klee (1879-1940), Bern.)

architect a foundation to analyze the basic nature of the project, an indispensable first step before any constructive action can begin. It is also interesting to note that the time frame of the project defines its demarche as much as does its essential nature (fig. 1).

*"Sentiment and dreams are immeasurable and have no language, and everyone's dream is unique"*¹ the American architect Louis Kahn said. This observation

leads us to examine the subtle relationship between imagination and the architectural concept.

In order to understand a concept more thoroughly, we must take all these oneiric sentiments into account. But first we have to decode them so that they can move intelligibly into the concrete world. This physical world, in which matters can be measured, welcomes the container and the thing contained, which are indissolubly intertwined.

2 - SPACE AND A PROGRAM: THE PRACTICAL WORLD AND THE WORLD OF IDEAS

To think effectively about furnishing an orthodontic office we must determine as fully as possible what the space will be like and how it will function. This program expresses the daily use of the area. The architect will decide how this will translate into a unity of the entire structure that will satisfy the projected requirement. The difficulty is that this plan must translate smoothly into two different languages. The complex task consists of making the abstract words, quantities, and surfaces match perfectly with the physical site. The project's conception must find the essential balance between the world of the senses, the space, and the world of ideas, the program.

2 - 1 - The space

The world of the senses exists in space. It is the world we perceive with our body. It determines the specific furnishing of the office. The space, wherein everything is possi-

ble, extends through three dimensions, length, width, and height. It becomes the place where we deliver health care, a place that practitioner, assistants, and patients inhabit together. It is an interior space, with boundaries beyond which an exterior world extends into the endless distance. To live in this bounded interior space we must have liaison with the outside. These communication bridges between the inside and the outside obey different modalities. The door through which we pass, the window that permits light to enter, the electricity that provides us with energy, the pipes that carry water and waste are all included in their number.

The space is above all an area that is partly filled and partly empty. The filled constitutes the form of our action; the empty derives from the area where evolution is possible. The couple of space/form is united by reciprocity and solidarity. The empty is an energetic space.

It provides, with the place where we can station ourselves, the passageways through which we can move. The station we occupy is devoted to our practice and the passageways permit us to transfer from one activity to another.

Between stability and movement, the filled area displays the envelope and the structure with which it is built, assuring stability, but also the hidden liaisons. Whether they are technical and/or functional, the liaisons unite the inner and the outer, in both senses. At the interface between the space in which we live and the form that represents the construction, appear the characteristic, personalized boundaries of the office. This specificity nourishes the program that

is specific to the individual practicing orthodontist.

2 - 2 - The program

The program is constituted from a compilation of quantitative data and functional recordings that are primarily surface measurements, and the calculation of the types and frequency of the activities carried out in the office. This becomes a document that does not yet have the status of a spatial configuration. This transformation obeys a translation always subjected to interpretation. It is never literal. It is only one transition state which should not betray the spirit of the project. Writings cannot become directly spaces.

3 - FROM THE CONCEPT TO THE SKETCH AND FROM THE SKETCH TO THE PLAN

Progress is made in steps. The program first generates schemata, which are preludes to a sketch that makes an idea concrete. The goal is to meld designs and written plans together. From this medley a fruitful exchange between practitioners, their staffs, and the architect can emerge. All participants will find in it a translation into their own language of the sense of the schemata, which performs like a common tongue understood by everybody providing them with a dominant simplified theme that outlines the major features of a plan and the direction in which to proceed.

Out of the available strategies the representation of a system of voluntary relationships without dimensions is formed. From this a sketch is

progressively elaborated. It can simultaneously integrate a coherent blend of the three dimensions of space and the activities that will take place in it. Stations and assignments are now tied together. The design codes change, rough edges are smoothed off until precision is reached. At this point they may be harder to read, but they always reflect the original directing notions.

And, at this time in taking a reflective step back we can consider each space as part of a unified ensemble where area and programs merge harmoniously. This ideal project nourishes the status of each of the office's activities, which are divided into two principal categories, those that are open to all and those that are reserved for the practitioner and staff.

4 - AREAS DESIGNED FOR PATIENTS

4 - 1 - The reception area and the business office

It is the region where patients and families make their first contact with office personnel. Here they can begin a warm dialogue to receive information and be directed to the waiting room. The stand the secretary sits behind can be a simple bit of furniture over which the receptionist can observe those waiting. So there is no visual separation between the front room reserved

for patients and the office behind the secretary's desk where the reception staff is stationed. This area includes a variety of tables and desks of varying heights carrying the information technology and secretarial tools and machines required for the business management and record maintenance of the office. How much room these activities will demand depends on how highly the office has been computerized. The introduction of software systems that reproduce administrative data, photographic and radiographic

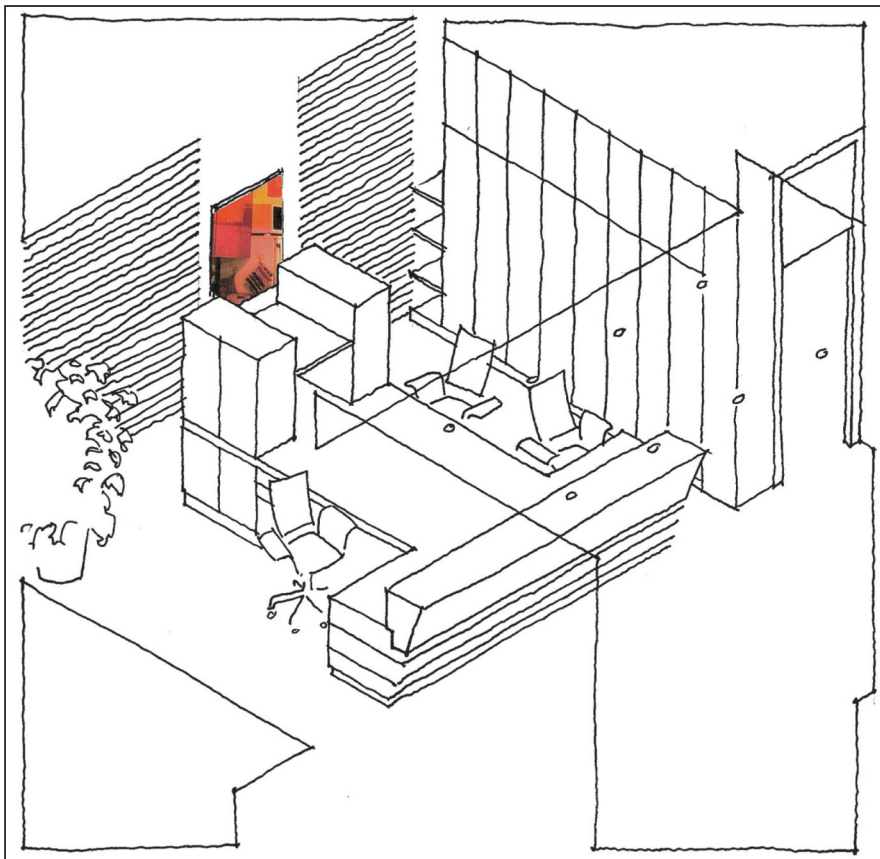


Figure 2

The reception desk is the place where visitors make their first contact with the office.

images, and clinical records and files has greatly reduced the space needed for storage in modern offices. And, of course, the working chairs for all staff should provide an optimum of comfort and ease of performance for every worker in the accomplishment of their diverse daily tasks.

4 - 2 - The waiting room

Situated near the office entrance it should be a sort of combination of a friendly living room and library (fig. 3). Its comfort should be enhanced by its generous dimensions and gracious furnishings.

Readily available books and magazines that tempt youthful and mature readers alike should be well sorted and neatly arranged in shelves rather than scattered on a coffee table.

4 - 3 - The consultation room

This area is devoted to communication, education, and information. It should not radiate a stark medical aura that might augment the already high anxiety level of many prospective patients. To avoid provoking apprehension because of feelings of insecurity or vulnerability in the face of the unknown, the decor should be reassuring and peaceful. A large table, an informative projection screen, comfortable seating in addition to the consultation chair should be included in the room's simple furnishings. To protect the atmosphere of serenity and to keep the lines of communication free of distraction, the area should have no connection to the clinical treatment zone.

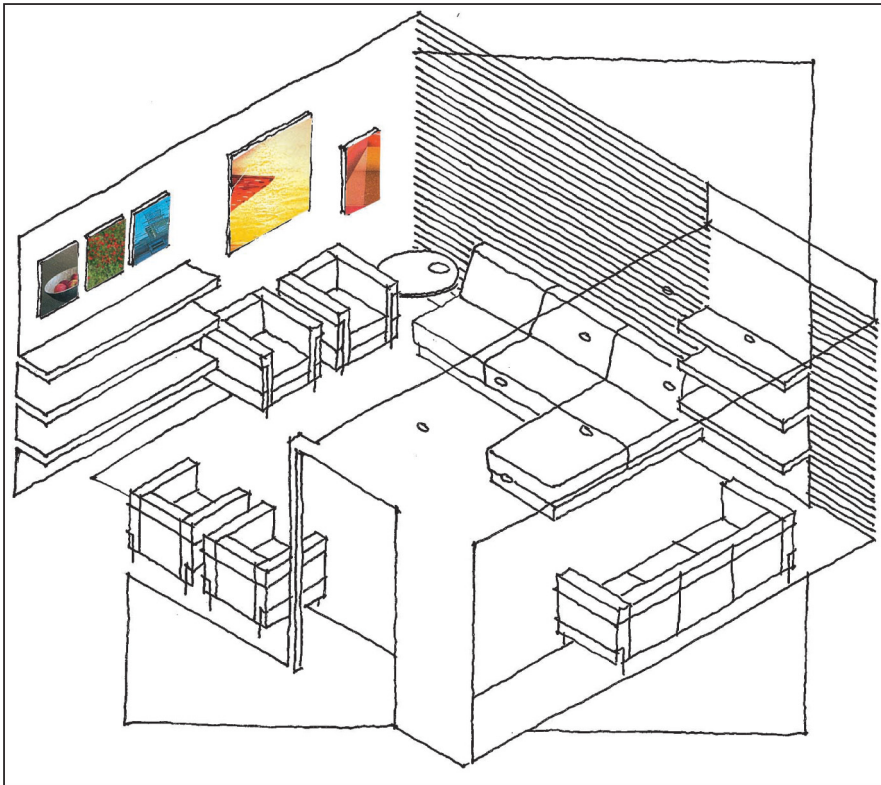


Figure 3
The waiting room, located near the reception, is a salon/library where patients and family can relax before office visits.

4 - 4 - The treatment area

It is, of course, the office's vital center and its *raison d'être*. (fig. 4) where orthodontist and staff treat patients. Distances between the motorized chair, the treatment cabinets, and the instrument trays are all calculated to conform to the exact ergonomic needs of the practitioner. Orthodontists and staff should have unfettered room to carry out their activities. Measurements for the physical arrangement of cabinets, instruments, and furnishings must be precise to the centimeter to achieve this goal. Optimal illumination provided by articulated scyalitic or professionally installed ceiling lights, all preferably directed upward, should not overwhelm patients nor tire

practitioners when they must extend their gaze beyond the work area. There should be enough room around the chairs for patients who have hung up their coats and left their school bags on accessible tables to install themselves comfortably. On the side where the bracket table is placed there should be a small table or cabinet on which a computer screen can be supported. On the other side of the chair assistants should be able to move about without interfering with the practitioner. A sink operated by a "no hands" cellular starter should be available in every corner of the room for handwashing disinfection. A suitable selection of soothing photographs, paintings, and even framed stamp collections should grace the walls.

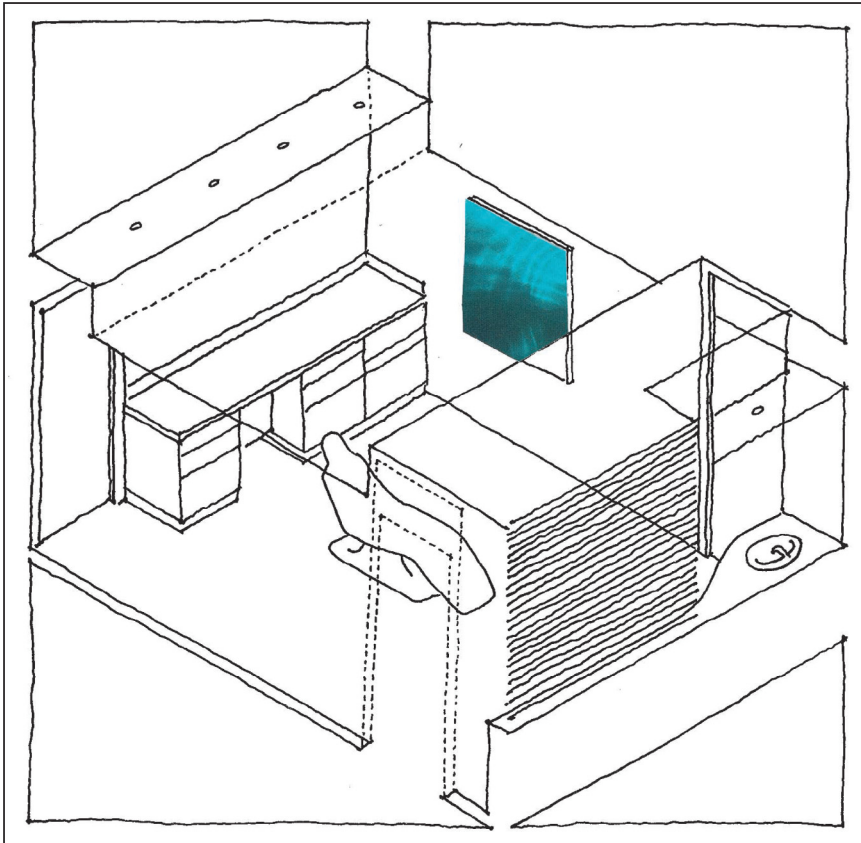


Figure 4
The treatment area is the office's vital center and its very *raison d'être*.

4 - 5 - The X-Ray room

This section of the office should be constructed and furnished in strict conformity with the applicable safety regulations that lack of space prevents us from listing here. Appropriate inspection schedules should be adhered to and personnel should operate radiation producing machines with vigilance and rigorous adherence to protocol. Space reserved in architectural plans will depend on the number of machines to be used and their power. In conformance with current regulations, dou-

ble lead layers must be included in all horizontal surfaces, floors and ceilings, as well as horizontal structures such as walls, doors, and windows. The thickness and extent of this protective barrier is determined by:

- the orientation X-ray generating devices
- the activities occurring in the rooms adjacent to the X-ray room
- the varying amounts of resistance to the passage of ionizing radiation that are inherent in the materials, each of which has its own "lead-equivalent" thickness value, used to construct the office building.

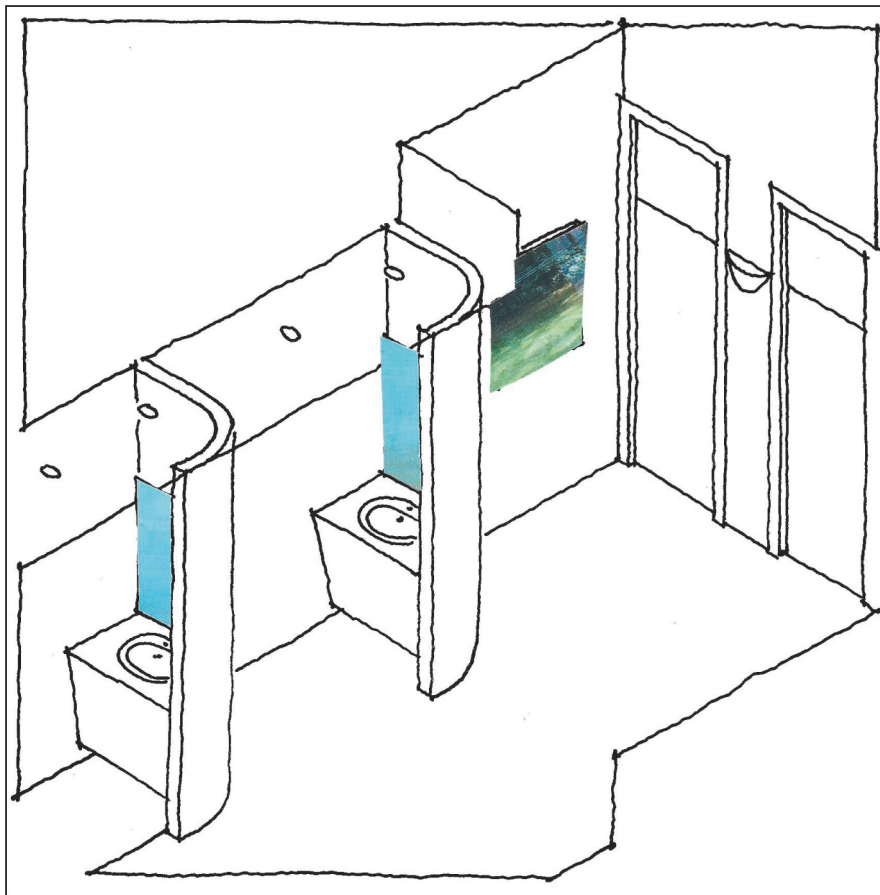


Figure 5
The area devoted to oral hygiene.

The operator taking X-rays should step out of the room before pushing the button but should be able to continue observing the patient through a leaded window. Offices not using digital X-rays will have to have a dark room on the premises.

4 - 6 - Toilets

Toilets for the use of patients must now be readily accessible for handicapped persons, which means that the proper height for toilets and sink basins is determined by law.

4 - 7 - The oral hygiene room's

Basic furnishings consist of a wash basin and a mirror. It should be located, in a somewhat isolated

position free from intruding eyes that might intimidate shy patients, between the waiting room and the treatment area (fig. 5).

4 - 8 - The passageways between various office sites

These passageways in addition to providing means of coming and going for staff and patients also provide landmarks for everyone. Their size, which is governed by the number of people that use them and the frequency of movement, should be generous enough to guarantee free circulation without hindrance and even give the sensation that distances between sites are shorter than they actually are.

5 - SITES RESERVED EXCLUSIVELY FOR PRACTITIONERS AND ASSISTANTS

5 - 1 - The business office

It does not need to be spacious, just large enough for the staff working in it and to receive working visitors like accountants and sales representatives comfortably. Its furnishings will include desks, filing cabinets, and chairs.

5 - 2 - The sterilizing area

It is an essential office component that must be located near the treatment area to accomplish its specific function in the orthodontist's provision of safe health care, but, in addition, should also be sufficiently conspicuous in its rigorously

sanitary qualities to assuage the most exaggerated fears of contamination that patients may have. In this respect, a properly run sterilization area presents the office in the most positive light to an observing world (fig. 6) displaying the scrupulous care with which instruments are treated. Patients and parents should be able watch the careful and reassuring routine in which instruments are separated, washed, sterilized, and sorted for re-use. In this site, the arrangement of the technical material, the sinks, the dryers, the sterilizers, the working spaces, and the storage areas should conform not only to work ergonomics but also to the strictest demands of antiseptics.

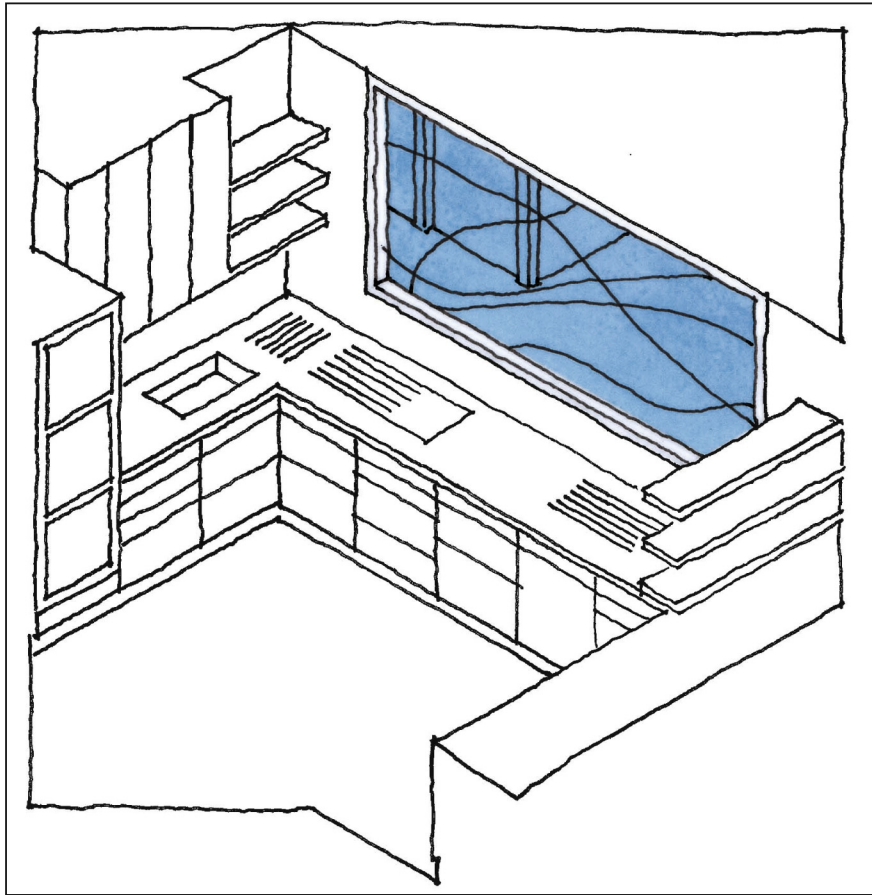


Figure 6

The sterilization room is a window through which the office's dedication to antiseptic conditions can be visualized.

5 - 3 - The laboratory

It is a multi-use workshop that must be provided generously with electric outlets and water spigots. This is the room where minor appliance adjustments are made and models are poured and finished. Its size will depend on how much in-house lab work the practitioner will plan to accomplish and how much will be sent to external laboratories. So it is imperative that practitioners deter-

mine in advance what lab work will be done on the premises and what will be sent to outside providers before the architect draws up plans.

5 - 4 - Staff rooms

The money they earn helps to motivate employees and make them loyal to the office but other, less material factors are also important, including their camaraderie with fellow

workers, their training, their participation in decision making, and the respect and esteem their employers have for them. All these elements contribute to the creation of a happy and positive work atmosphere that can defuse the loss of enthusiasm that can affect any group of workers with the passage of time. The manner in which staff rooms are furnished is critical but, perhaps the most important aspect of the area reserved for staff is that all team members find it a place where they can feel at home.

- **The staff room** is a place where busy staff members can unwind, have a cup of coffee, eat a rapid lunch, or just chat with co-workers. So it should be a self-contained site, somewhat removed from the hustle of the office, but not so isolated that staffers cannot keep an eye on waiting patients.

- **The staff bathroom** should have a wash basin, a toilet, and a cabinet where every member of the office team can keep personal items.

- **The cloakroom** instead of being near the entranceway should be located near the staff toilet and be large enough to for staff to hang up their outer garments and store their working uniforms.

5 - 5 - The storeroom

It should be large enough and well enough furnished with shelving and cabinets to accommodate the stocking of tools and materials bought in volume to reduce cost. Cleaning equipment needed for keeping the office impeccable can also be kept there. Records may also be stored in this room, but if plaster models begin to pile up they may have to be moved to another site outside the office until that happy day arrives when models and other records can be completely replaced with digitized photographs that require virtually no storage space whatever.

5 - 6 - The machine room

It is where the air compressor, the pumps supporting saliva ejectors and aspirators, or air conditioners and heating devices, and information technology storing and routing devices can be kept. Because of the complex nature of these items this room will have to be well ventilated and designed so that it will not contribute to noise pollution in the office.

6 - PARTITIONING AND PASSAGEWAYS

Once this inventory of the function of each area in the office has been established, the next step is to map the pathways that will allow unfettered movement to take place from the larger spaces toward the smaller in much the same way a storage container is arranged so that materials

can be kept in proper locations between planned limits, separations, and divisions. An orthodontic office needs walls to isolate certain areas but fortunately this isolation is never complete. Every compartment of an orthodontic office needs to have an appropriate opening or entrance

because they are all designed to communicate with each other through corridors. These will allow the orthodontist to move from one site to another and doorways will make it possible for certain areas to be sealed off when the activities they are supporting require it. The placement of each site defines the working pathways orthodontists will have to traverse to accomplish the various tasks they assume in the place designed for that function.

So the general and the specific placement of the office units is designed to accommodate the hierarchy of the movements the office personnel must make to perform their duties. This design should also take the needs of patients into account. When patients move from the front door to the waiting room, then to the treatment room, and, finally to the exit, their movements should be as

easy and as unhampered as possible. Similarly assistants should be able to move quickly and easily from the sterilizing area to the treatment area by the shortest possible route without breaking any of the strict injunctions of sterilization protocol. Inevitably, various actors in the office drama must pass each other as they go their various ways and the floor plan must ensure that they can do thus without interference. Other movements, often the most hidden from view, have to be well provided for because the office cannot run without provision throughout the building for the flow of water, compressed air, surgical aspiration, gas, electricity, information technology, and telephone lines all with adequate ventilation. The necessary pipelines should be set, in accordance with the needs at the points of arrival, in the floor, in the walls, or in the ceiling.

7 - LIGHTING

Architects, orthodontists, and others on the planning team should pay particular attention to lighting, both natural and artificial, so that illumination will be well controlled and integrated throughout the office.

Accordingly, the types, location and distribution of the sources of lighting must harmonize with the activity of the site they serve. Spotlights, lamps, bulbs, ceiling lamps and scyaltic lighting work in

different ways and respond to different needs. In the selection of lighting, as in the choice of all furnishings, the orthodontist, the architect, and other planners will be making selections of materials whose essence, durability, and care requirements will determine the ambiance of the office. This essential quality, so difficult to control, is, nevertheless, the soul of the office and every activity that takes place in it is bathed in its spirit.

8 - CONCLUSION

Architectural plans should respond to the professional needs of the orthodontist. They should ensure that

the finished project will provide for the efficient functioning of the facility with rigorous exactitude.

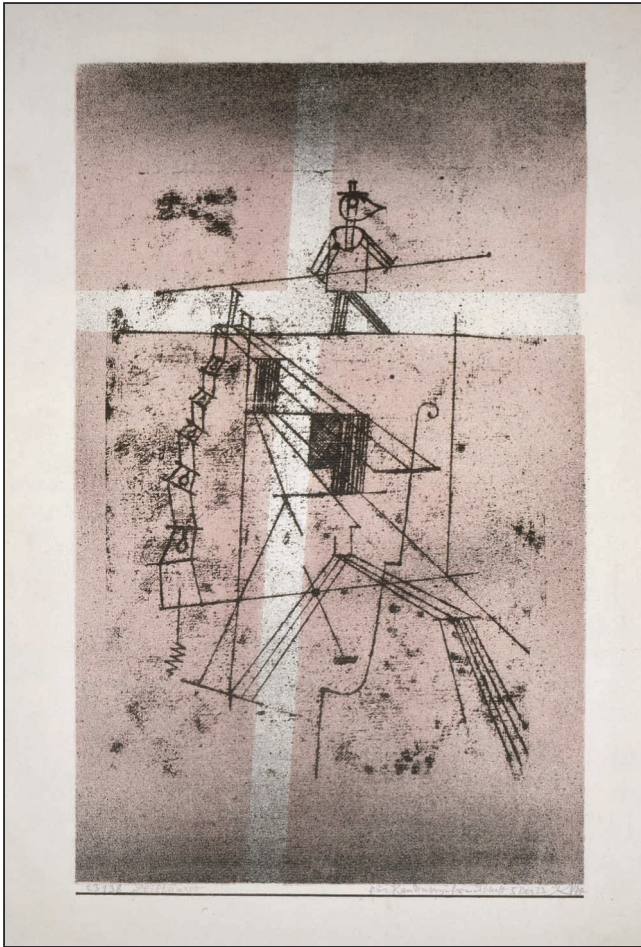


Figure 7
The best balance between the site and the requirements (The dancer and the cord, 1923, Lithograph. Paul Klee (1879-1940), Musée d'art moderne – Centre Georges Pompidou, Paris).

The concepts we have outlined here were not an attempt to provide a ready to use cookbook recipe for planning an orthodontic office but instead to show how to set up a dialogue between the architect and the therapeutic team. This exchange, which is indispensable for the successful outcome of the project, must be fruitfully established before any action is taken. This is the best way to guarantee that the physical structure of the finished building will fully satisfy the needs of those that use it (fig. 7).

As the plans proceed, a harmony that is special for every office begins to take form. It reflects how space and

esthetics are being treated and how the selection of materials, in their essence, their color, their durability, and the care they demand all contribute to the ambiance of the office.

For every project, the architects are called upon to dip into their reserve of imagination one more time and to find by their faculty of invention suitable responses to individual requirements. By making this ultimate effort, they conceptualize new building projects that will ultimately be put into the service of orthodontic care teams who will spend one third of their lives in the finished office.

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