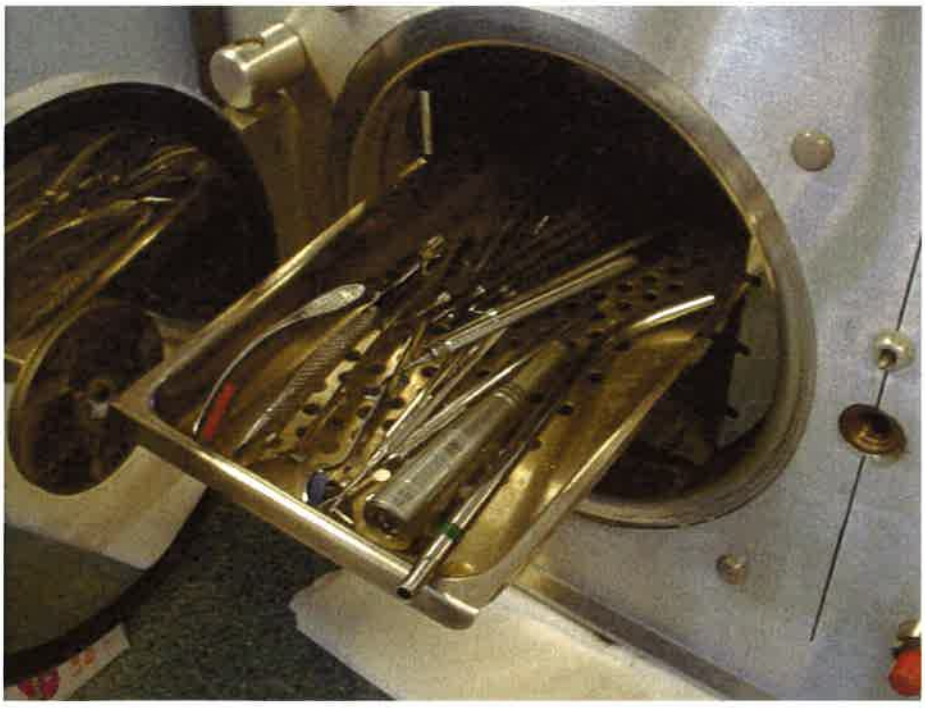
Infection Control Update

Proceedings of the 1st National Conference on Decontamination of Dental Instruments. Glasgow, Scotland.

Edited by AJ Smith



Design of Dental Practices

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Architects

Introduction

The practice of dentistry has changed markedly over the last several years. Yet little seems to have changed in the design of dental practices. The decontamination process in a dental practice is frequently taken for granted and fitted into available spaces after establishing the dental chair and work units. We cannot take the decontamination process for granted and in fact the whole of the practice has got to be designed to take this into consideration.

Aim

This paper describes the principles for designing dental practices around the decontamination processes.

Designing a dental practice

There are four principle factors to take into consideration when designing a dental practice (Table 1).

Table 1 *Principle Factors when designing a dental practice*

Design Factor	Comment
Infection control	Each surgery must be designed so that it can be cleared, cleaned and instruments sterilized adequately between patients.
Ergonomics	To enable the staff and the patients to circulate through the practice efficiently and as calmly as possible.
Light	To maximise light, especially natural light, and bring this as deeply into the practice as possible, especially in the surgeries. The maximum use of transparency and translucency helps to make a non-threatening environment.
Economics	To make the practice as efficient as possible and to generate the income necessary to run the practice profitably yet to give the patients a superlative service.

Designing for effective infection control

A fundamental principle in infection control is to design out clutter. The traditional surgery is a 'U' or an 'L' of kitchen cupboards around a dental chair (Figure 1 & 2). When a dentist is given all of this work surface, they will create nests for themselves. Dentists surround themselves with all the little things that they feel they cannot practice without. Devices exposed in those way may become contaminated and should then be re-cleaned and sterilized. In addition, the presence of the clutter inhibits proper access to cleaning of benchtop surfaces between patients (Figure 2). The presence of kitchen cupboards throughout the surgery is a symptom of poor design (Figures 2).

Figure 1 *Typical plan of a traditional surgery design*

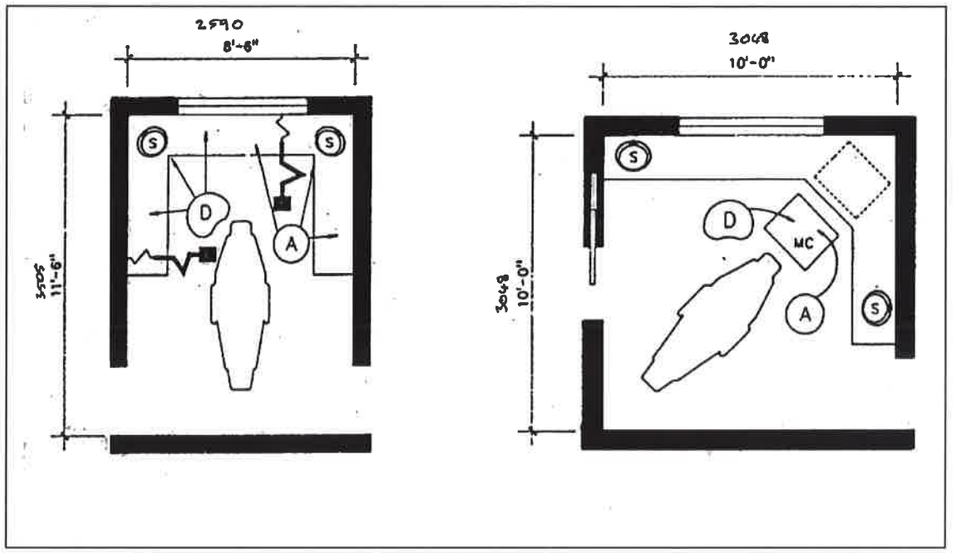
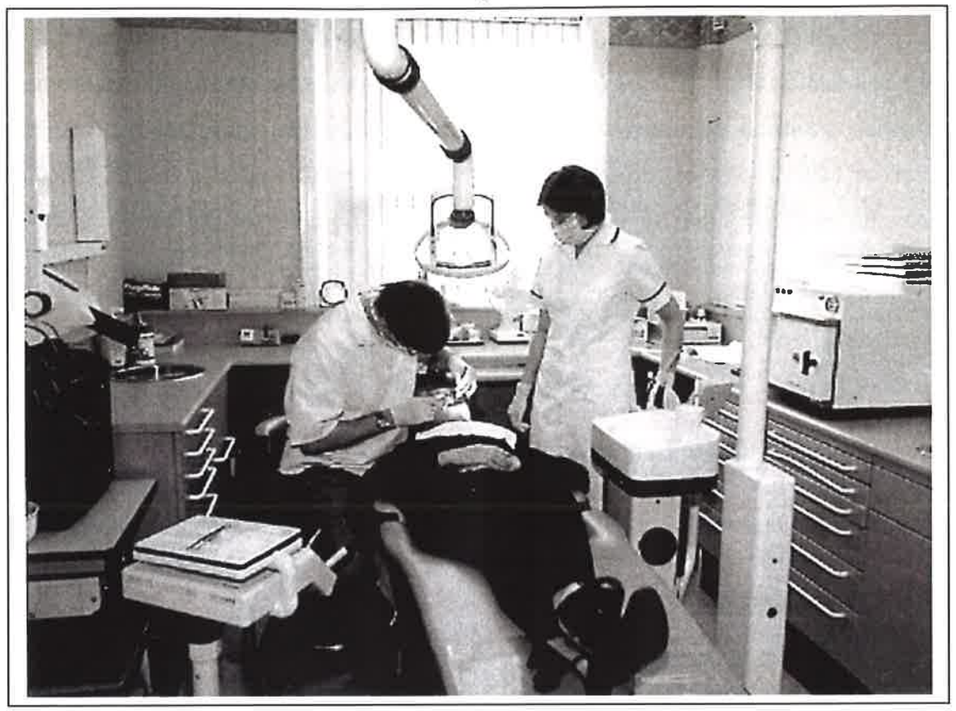
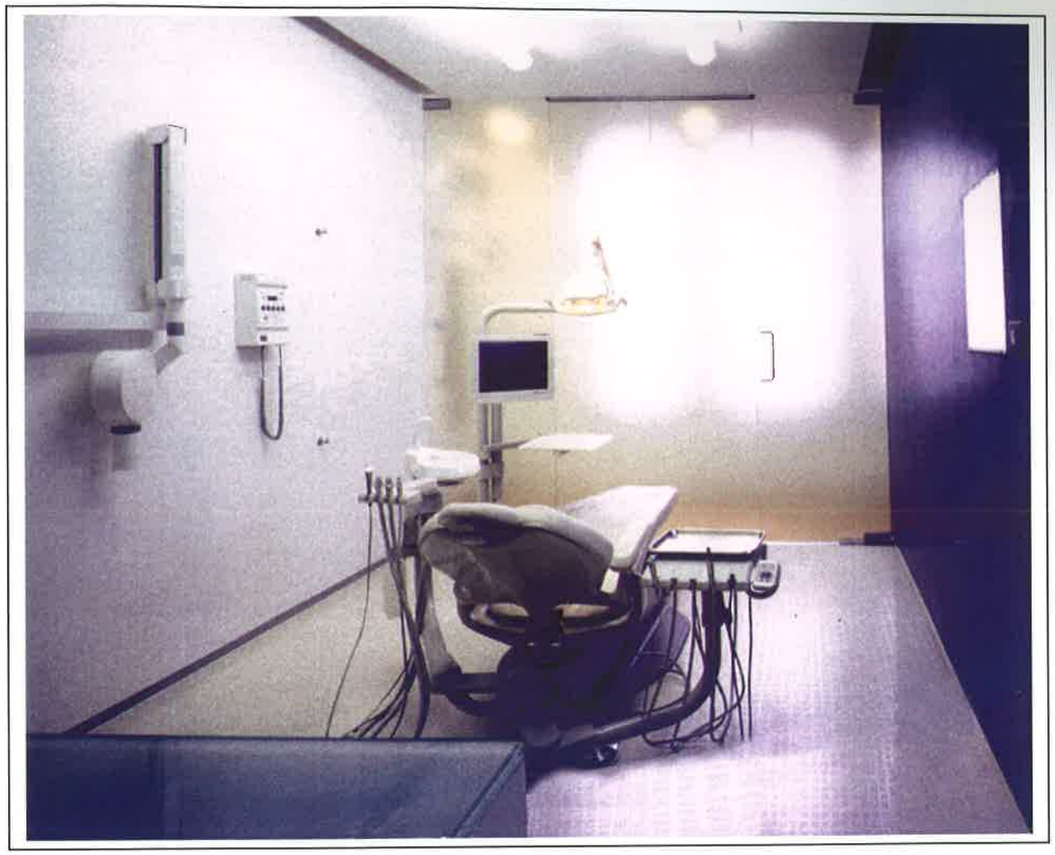


Figure 2 *Traditional surgery design and cluttered work surfaces*



The surgeries in figures 1 & 2 illustrate all the surfaces available for cluttering and the presence of a plethora of drawers. These drawers frequently contain material that is left, not from patient to patient, not from week to week but probably from year to year. These pictures also highlight the presence of sterilizing equipment in the dental surgery, a practice that is now contra-indicated. A different approach is required to address these short comings and a simple, basic design concept is required. A fundamental principle of this basic approach is that everything that is not essential for every procedure is removed from the surgery and stored elsewhere. The only surface in the surgery is a glass shelf, glass so that it can be seen to be clean (Figure 3).

Figure 3 *Design out clutter*

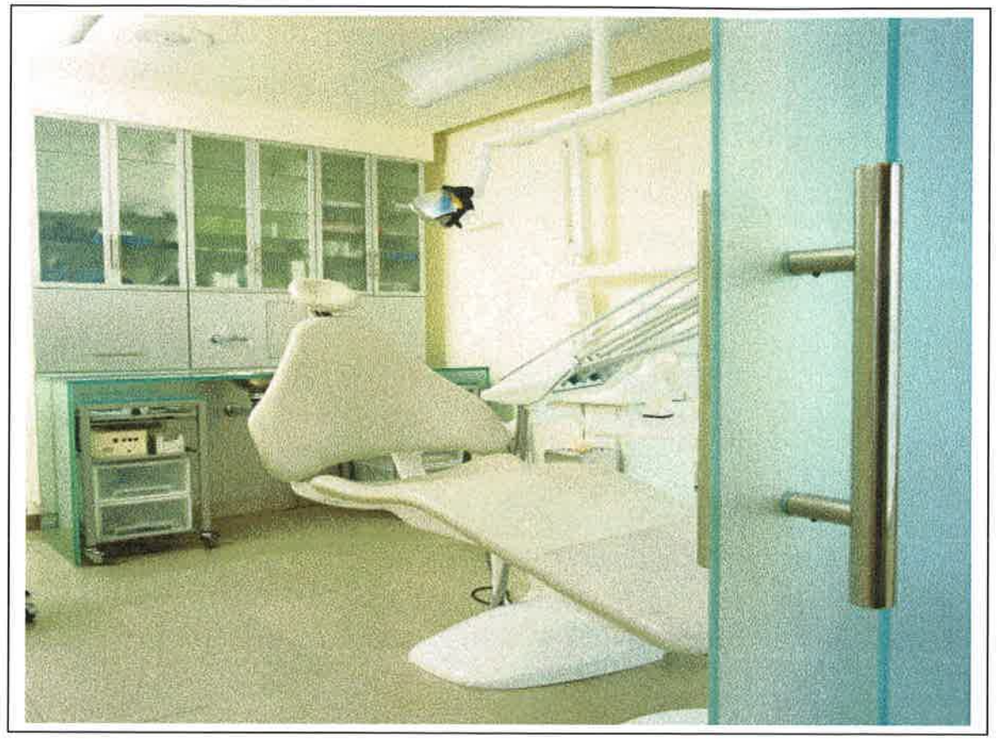


In Figure 3 & 4 the effect of having just one shelf behind the dental chair is that the whole surgery can feel much less cluttered, there are no fixed work surfaces either side of the chair.

Figure 4 *Design out clutter (II)*

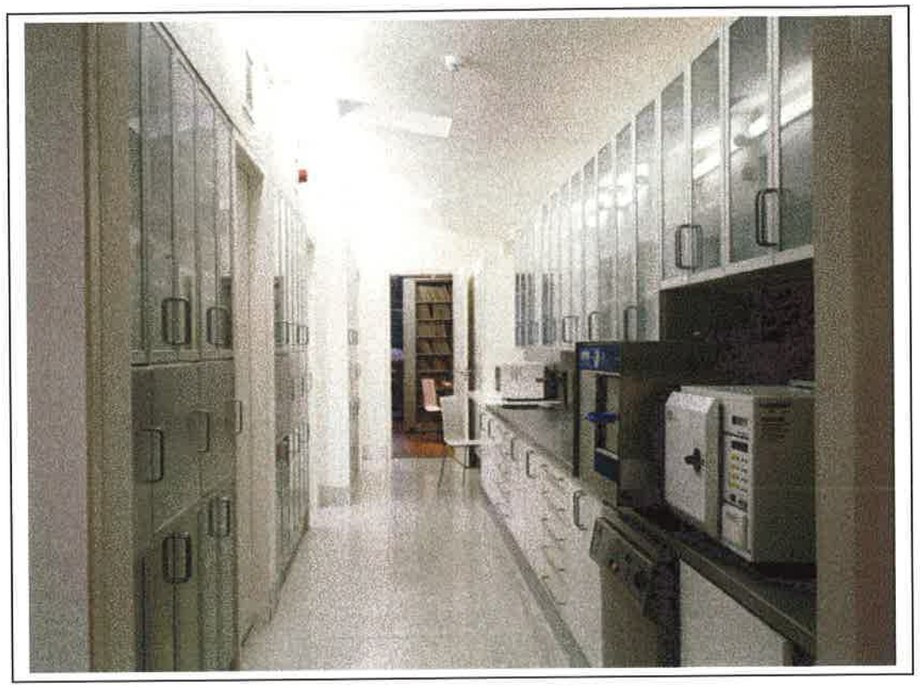
Within the surgery removable trolleys are used to contain all disposables, these have polypropylene drawers, which are easy to clean (Figure 5). These trolleys can also act as ancillary work surfaces. The surgery in Figure 4 also feels light and spacious. In reality it is just 3 metres across. It is essential to think about light, putting light into the practice and the use of a lot of glass and a lot of translucency helps bring a very tranquil, calm environment. The surgery in Figure 4 has a skylight above the dental chair and the surgery is totally top lit.

Figure 5 *Surgery with movable trolleys as work surfaces*



The surgery also has a glass work surface, suspended off a storage wall, glass so that it can be seen to be clean (figure 6). The patient walks into this surgery and can see a gleaming work surface, this provides a re-assurance that they are walking into a clean environment. The dental manufacturers have jumped on the band-wagon and there are plenty of dental cabinets on the market with glass worktops. This can be aesthetically pleasing, can be seen to be clean but they have missed the point completely. These units still have the drawers, they still have the cupboards and they still have the clutter but not only that, underneath this glass worktop there is this negative space that can be seen to be unclean and you cannot clean it.

Figure 8 *Sterilizing area*



Twin surgeries

Since the surgeries that I design are relatively small, only 3 meters wide and since they have got very little in them, just a glass shelf and chair, it is very easy to design twin surgeries for every dentist, two identical surgeries (Figure 9). This does not require much more space than a conventional dental surgery and it does not cost much more than a conventional surgery. But why go to the problems of doing this? The rationale behind this is that as you finish working on one patient, say goodbye, your next patient is already sitting in the neighbouring surgery and you can work on that patient immediately while the previous surgery is being cleaned and set up for the following patient. This is so important because it is the only way that we are ever going to be able to cope with the enormous amount of time and effort that we are going to put into the decontamination process. The only way you can do this is by making it affordable for the dentists to do it. This way the twin surgeries shares the work and raises the earning plateau of the dentists. The reason it does this is that the practice overhead remains virtually the same. However, it is important to stress that

you only work on one patient at a time. This is not about juggling patients merely more effective use of time and resources.

Figure 9 *Twin surgeries*

Ergonomics

In order to help the flow throughout a practice there is a requirement to build in dual circulation. This results in all of the patients going around the outside of the clinical areas and all of the staff move round the middle between the sterilising areas. This means that no one trips over each other, it builds up a calm atmosphere and it helps efficiency.

Figure 10 *Use of glass screens to act as transitional space*

The glass screens (figure 10) are intended to act as a transitional space between outside and inside and these glass screens borrow the light from outside and project it deep into the practice. In addition everyone moves around the outside of the practice and the result is that everyone can enjoy the light. If you put all the surgeries by the windows only that one surgery enjoys the light and no one else sees it. It is not only a transitional space between outside and inside, it is a transitional space between waiting and being treated and these corridors are quite a feature at my practices. It gives a calm, light translucent feel to the practice, so dual circulation is terribly important.

Consulting room

A separate consulting room away from the dental chair, is the last principle for design. We frequently forget as dentists, just how intimidating it is to sit in a dental chair with all of the instruments pointing at you whilst trying to have a lucid discussion about a treatment plan. The consultation room is just as a productive area as a treatment room. This can be used to interview new patients, take their histories, talk about their problems, talk about treatment plans, you can interview staff, take phone calls and use

it throughout the day but it should be away from the dental chair. The consultation room (figure 11) is just a glass box off the reception. It is less than 2M wide and there is plenty of room for three people to sit in there and talk, it does not have to be big.

Figure 11 *Consultation room*

Waiting room and reception

The waiting room and reception is where most people start when they want to design their dental practice – I want the "wow" factor, I want to get people off the street. The waiting room and reception is where you can put some of your personality into the practice (Figure 12)

Figure 12 *Waiting room and reception*

In many respects we are going back to the modernist ethic, form follows function and if you actually make this area clean and clutter free the patients actually appreciate this and they feel that they are coming into a sterile environment and this is automatically developed by getting all my previous principles right. The example in Figure 12 is the waiting room/reception in a practice that has been designed to resemble a Starbucks, with a coffee machine, the patients can just press a button and get their cappuccino or whatever else they want. This area should be very non-threatening and very light and bright.

In conclusion, the principles for designing a dental practice to maximise infection control principles are to design out clutter, use double access storage walls between the sterilizing area and the surgeries, use central sterilizing of storage, use twin surgeries, dual circulation and a separate consulting room.

References

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Heads you win, tails I lose – The general dental practitioners perspective

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Introduction

One of the frustrating areas of decontamination for dental practitioners are the limited reports of evidence that there is a problem of surgery-acquired infection that emanates from general dental practice. The dilemma is that most practitioners indulge in as good a practice as they can in a practical way but at the same time do not want to be smug and complacent about the risks of cross-infection. Many practitioners seeking advice on infection control get very confused over some of the issues involved.

Aims

The aims of this presentation are to highlight some of the areas of uncertainty that are frequently questioned by dental practitioners.

Risk management

Managing the risks of cross infection should start with a proper risk assessment. The risk assessment has got to be evidence based and there are a number of examples where this appears to have happened in reverse. For example, as a result of variant CJD many practitioners bought autoclaves with prion cycles which were known to be ineffective for the complete inactivation of prions. The risk assessment performed by the Department of Health on vCJD and dentistry is now classed as low risk and we have now been told that steam sterilisation is not fully effective anyway. The risk management for this disease now recommends universal precautions for dental procedures.

Single use devices

Another area of conflicting advice concerns single use devices. The NHS Estates website contains a list of recommendations for single use items in dentistry - three in one tips, scalpel blades aspirator tips, saliva ejectors and matrix bands. Previous workers (1,2) have already demonstrated how difficult these devices are to decontaminate. There are impression trays and interestingly burs are on the list. There

is also published evidence on the difficulty of decontaminating endodontic files (3), however, endodontic files and reamers do not appear on the list of single use devices from NHS Estates. This appears contradictory to the evidence, however, there may be economic grounds for this decision in that the provision of endodontic services within the NHS under the current fee structure with endodontic files and reamers becoming single use would collapse.

Autoclaves

There is still a debate raging over the use of a vacuum or non-vacuum sterilizer in dental practice. If we examine the Medical Device Bulletin (MDB) 2002(6) it states quite clearly that downward displacement benchtop autoclaves are not suitable for wrapped or hollow instruments. However, in the latest BDA Advice Sheet A12 on Infection control it states that benchtop steam sterilizers represent the best means available for the prevention of cross infection via dental handpieces in situations where porous load sterilisation facilities are not available. This highlights the conflicting sources of advice available to the practitioner. The MDB 2002(6) further recommends vacuum autoclaving for hollow devices. There are other hollow devices that we use routinely in dental practice besides handpieces. Most amalgam carriers for example would fall into the hollow device definition yet at the moment we are not being advised to use vacuum autoclaves for this equipment. Consider also the Bowie-Dick test for steam penetration, each test costs in excess of £5 each and must be performed on a daily basis but is it a representative challenge for most of the dental instruments that are placed in a sterilizer?

Glove wearing

An issue that has been highlighted by the introduction of gloves into general dental practice is access to occupational health services. There is little if any data routinely collected on the incidence of occupationally acquired infections in dentistry since most practitioners do not have access to professional occupational health services. This is also compounded by the absence of a robust compensation scheme for infected dental workers. Of concern is the rise in evidence concerning occupational exposure to natural rubber latex from which approximately 10-17% of healthcare personnel in Europe and the United States have been sensitised.

Evidence base

There is a very clear standard of infection control we should be performing and why we should be performing it. But that has to be based on evidence or where there is no evidence or the evidence has not yet been made available, advice should be scientifically based and must be practical. We must be able to introduce relevant processes and procedures into our dental surgeries every day so that it fits into our daily working patterns and funded to the appropriate level.

Conclusion

If gold standard infection control requirements are to be implemented in general dental practice then this must be accompanied by a realisation of the financial impact on dental practices. In order to comply with clinical governance requirements these processes must also be verifiable.

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