

Fire safety in the dental practice: a literature review

Précis

The aim of this literature review is to establish how fire safety regulations relate within the dental practice setting, in accordance with current legislation.

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Introduction

Fire is a small word with a serious meaning. Few persons have had first hand experience of the consequences of a serious fire and as such most people do not realise the devastation, destruction and damage to human life and property that fire can cause. The outbreak of fire poses a significant threat to all persons within a building, and it can also have serious financial implications. In addition, fire in the workplace is likely to represent a major psychological upheaval that is potentially distressing for both the employer and employees.¹

Given the potentially devastating consequences, there is a significant onus on all business proprietors, and thus dental practitioners, to consider their responsibilities in terms of fire safety and implement precautions as appropriate.

Legislation

The main legislation in the Republic of Ireland governing fire safety in the workplace is the Fire Services Act 1940, and 1981:

"It shall be the duty of every person having control over premises to take all reasonable measures to guard against the outbreak of fire on such premises, and to ensure as far as is reasonably practicable the safety of persons on the premises in the event of an outbreak of fire."²

The Building Control Regulations 1997-2010 define a legislative requirement for dental practices to obtain a fire safety certificate from the local building control authority.

Amendment of this legislation in June 2006 (Part B Building Regulations) includes a specific section on fire safety. These requirements must be observed if extending or refurbishing a dental practice. Alterations to the practice must allow provision of an adequate means of escape to a place of safety outside the building in the event of an emergency. The design and construction of all new premises or extensions should include measures to minimise the risk of both internal spread of fire, and external spread to neighbouring buildings.³

Furthermore, the European Union directives have, as part of a series of health and safety regulations, outlined new fire precautions (workplace) regulations, which extend the duty of an employer to carry out a fire risk assessment of the workplace, and to take appropriate action to either reduce the risk to persons in case of fire, or implement procedures to counter risks.⁴

Inspection

Enforcement of fire precautions legislation in the Republic of Ireland rests with 37 local fire authorities, governed at local council level.⁵ Under the provisions of the Fire Services Act, 1981, authorised inspectors from the fire services can visit and inspect any building, including dental practices, within their jurisdiction. Responsibility for complying with fire safety regulations rests with the practice owner or employing dentist as the 'responsible' person.

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Over the course of a fire safety inspection the assessor may ask for any of the following details:

- the number of employees or occupants in the building;
- the purpose of any room or area in the building;
- the materials used in the building's construction; and,
- any official documents relating to the building's safety.

The inspectors are permitted to bring any necessary equipment with them into the practice and to examine or test any heating, lighting or ventilation systems, and any substances used or stored within the premises.⁵ If the inspector is not happy with their findings, they may make an application to the High Court for an order requiring the removal, alteration or making safe of any structure, fitting or piece of equipment. Should such an order be granted, its terms are legally binding on the practice owner. Failure to comply with fire safety requirements can lead to prosecution, with offenders facing up to six months' imprisonment and, in extreme cases, closure of the practice.⁶

Risk assessment

All dental practices have a duty under the Health and Safety at Work Act 2005 to continuously provide safe working conditions compatible with the provision of proper services to patients. Consequently, risk management is as important as any other area in practice.⁷

Every employer, or person responsible for common areas of buildings in multiple occupation, has an absolute duty to carry out a fire risk assessment. This should be separate from the overall practice health and safety assessment. Although they will provide advice, the local fire authority will not carry out fire risk assessments for individual businesses.

A fire risk assessment is basically a structured look at the workplace activities and the workplace itself, to allow identification of hazards and assessment as to whether existing precautions are satisfactory, or need to be updated. There are five steps in the process:⁸

1. Identify potential fire hazards.
2. Identify who is at risk should a fire occur.
3. Evaluate the risk caused by each hazard and decide if existing fire precautions are adequate to control or eliminate the risk. Carry out additional control measures as necessary.
4. Record the findings and inform your employees about the actions you have taken as a result.
5. Review your fire risk assessment periodically, or if your situation or workplace practices change.

For fire to occur there must be a source of ignition, fuel and oxygen. If all three are present and in close proximity in the workplace, then the risk of fire could increase. In the average workplace, fire hazards will fall into the first two categories, while the oxygen will be present in the air in the surrounding space.⁹ However, in the dental setting oxygen is stored as a gas in portable cylinders and thus presents a potential hazard.¹⁰ Potential sources of ignition likely to be found in a dental practice include naked flames (Bunsen burners), lighting and electrical equipment. Anything that burns is a potential fuel and of particular note are dental chemicals and solvents, which should be stored in small quantities in sealed containers (**Figure 1**).¹¹

If the practice employs five or more staff, then the significant findings of the fire risk assessment must be recorded. All employees must be informed of the findings, including those identified as being at risk. More importantly, the record must show whether the existing control measures are adequate and, if not, what further action is required to reduce the risk to an acceptable level.⁹

It is important to remember that fire risk assessment is a continuous process and as such must be monitored and audited.⁹

Fire precautions

Provision of adequate means of escape in the event of a fire or emergency

The responsible person must make sure that everyone on the premises can escape safely in the event of a fire-related emergency. This includes employees, visitors, patients, contractors and cleaners, including part-time staff. Particular consideration should be given to those who may have a disability or need special help.¹² An exit route is defined as a continuous and unobstructed path from any place in the workplace to the outside of the building.

Every dental practice should have at least two exit routes, although the exact number required will be dependent on the size of the premises. If the persons present within a working practice can reasonably be expected to congest and render unsafe two exit routes, additional exits may be required. For example, dental practices with more than two or three stories with multiple operational surgeries, and thus high patient turnover, may consider an external escape route. Generally, in determining the design for means of escape, every part of the building should be within a reasonable distance from either an exit to a place of safety at ground or access level, or an exit to a protected stairway that leads to a place of safety.¹³ Advice on this matter can be taken from the local building authority. Lifts, portable ladders or self-rescue apparatus are not acceptable for means of escape in the case of fire. Works that comply with the provisions of the Building Regulations for means of escape and structural fire precautions will be satisfactory for those related aspects regarding fire certification.¹⁴

Provision of adequate means for protecting the means of escape

The means of escape must be clearly marked with the provision of exit signs and notices, which should be made of flame-retardant materials. Signs should include a pictogram so that they are self-explanatory for employees and patients. In a multicultural environment, care should be taken to ensure that the pictogram in use represents the same safety message to all the cultural groupings.¹⁵ The displaying of safety signs should not be taken lightly. Where the incorrect sign is displayed or the sign is not visible when needed, disaster may result. Therefore, it is mandatory to mark all doors that are part of the exit route with a large, legible sign, as well as placing notices at various points along the route to direct people toward the building exit that leads to a place of safety outdoors. The next sign should always be visible to anyone travelling along the exit route. Ideally, an emergency safety

	HAZARD	CONTROL MEASURE
Source of ignition	Fixed electrical installations	A competent person should regularly check the fixed electrical installation.
	Portable electrical appliances, e.g., light curing unit, amalgamator	A competent person should examine and test all portable electrical appliances within the time period recommended by the manufacturer.
	Trailing leads and adaptors	Reasonable limitations on the use of trailing leads and adaptors.
	Smoking	A no smoking policy should be in place in accordance with the 2007 ban on smoking in the workplace.
	Radiation machines	Ensure that equipment meets all appropriate standards and is serviced and maintained according to the manufacturer's recommendations.
	Bunsen burners	Ensure that a naked flame is not left unattended.
Sources of fuel	Combustible materials	Combustible materials must not be kept in excessive quantities. Fuel should not be allowed to accumulate in places where it could be subject to arson.
	Waste	Waste should be stored in closed fire-resistant containers or in a closed fire-resistant area and disposed of regularly.
	Furniture and fittings	All furniture must be in good condition and any foam filling covered.
	Flammable gas cylinders, e.g., oxygen, nitrous oxide	Store in line with the manufacturer's guidance.
	Heating systems	Gas- and oil-fired boilers should be serviced regularly.
Sources of oxygen	Oxidising chemicals, e.g., hydrogen peroxide, sodium hypochlorite	These must be stored in accordance with the manufacturer's instructions.
	Oxygen cylinders	<ul style="list-style-type: none"> ▶ Use a purpose-built trolley to transport them; ▶ Keep cylinders chained or clamped to prevent them falling over; ▶ Store in a well ventilated storage area; ▶ Check regularly to ensure equipment is leak-tight; ▶ Always open valves slowly; and, ▶ Use in accordance with the manufacturer's guidance.
	Ventilation systems	Doors and windows should be kept shut when the premises are not occupied.

FIGURE 1: Potential fire hazards within the dental practice.

lighting system should be in place to illuminate the exit route should a power failure occur.⁸ It is mandatory to ensure that all corridors, stairways, common escape routes and fire exit doors are kept clear at all times. All doors through which persons may have to pass to

evacuate the premises should only be fastened so that they can be easily opened by an easy opening device without the use of a key. All fire doors leading to the means of escape should be kept closed when not in use.

Provision of means for fighting fire

If fire breaks out and trained staff can safely extinguish it using suitable fire-fighting equipment, the risk to others will be removed. All dental practices should have suitable fire-fighting equipment. The water-type extinguisher or hose reel is the most useful fire-fighting equipment for general fire risks. In dental practice, a minimum of one water-type extinguisher per floor is recommended; however, where fire sources may be, for example, electrical, other types of extinguishers should be considered.¹² Fire extinguishers should be sited on exit routes, preferably near to exit doors or, where they are provided for specific risks, near to the hazards they protect. Location of fire-fighting equipment should be easily identifiable with appropriate safety signs. Maintenance and testing of fire safety equipment is mandatory, and should follow the manufacturer's recommendations.⁸

Provision of means for raising fire alarm

In the event of a fire, it is essential that everyone in the workplace is alerted as quickly as possible. Early discovery will allow people to escape safely before the fire takes hold and blocks escape routes or makes escape difficult. Although in most cases fires are detected by people in the workplace, who then subsequently raise the alarm, a fire may break out in an unoccupied part of the practice and thus a suitable fire detection system should be installed.⁸ As a general rule, this should comprise an automatic manual electric alarm system, with both break glass call points placed at emergency exit points, and smoke detection system.¹³ Smoke detectors should be provided in common areas and high hazard zones such as operational surgeries and sterilisation areas. The warning needs to be distinctive, audible above other noise and recognisable by everyone. Fire detection devices should be regularly checked to ensure their continued good working order.

Access facilities for the fire brigade

In accordance with health and safety legislation, a safe place of work must have a safe means of access and egress. In an emergency situation this will allow access for emergency vehicles and equipment, and ensure that fire fighters are able to operate in reasonable safety.⁵

Staff training and policies

If staff members are not trained in how to identify and eliminate fire hazards, they can create situations that put themselves, other staff and patients at risk of fire death or injury.

With respect to fire safety, training is critical for owners and staff of small facilities, such as dental practices, because they are responsible for all facets of fire prevention and protection.¹⁶ Training should be carried out to ensure that employees understand the actions to be taken in the event of fire, as well as precautions to reduce the possibility of a fire occurring, such as housekeeping and safe working practices.⁹ Courses are available to instruct on the use of fire-fighting equipment, as well as basic fire safety awareness and risk management, and must be strongly considered for all staff in dental practice, including cleaners and part-time employees. These are

In the event of a fire, no matter how small, the following instructions and procedures

MUST BE ADHERED TO:

- Raise the alarm using the nearest 'Break glass' call point
- Dial 999 – to call the fire brigade
- Remain calm and evacuate the premises
- **DO NOT** attempt to fight the fire unless it is safe to do so
- **DO NOT** use lifts
- **DO NOT RE-ENTER** the premises until *told* it is safe to do so by a fire brigade officer
- Report to assembly point – front of building

FIGURE 2: Example of an emergency evacuation procedure.

provided by various independent health and safety consultancy firms nationwide. Training should be based on written instructions and should be provided by a competent person, ideally at induction and at least once a year in each period of 12 months.¹⁷

In accordance with health and safety guidance, each practice must have in place a fire policy statement, both to reduce the risk of fire starting and to ensure that all staff members are familiar with the building's emergency fire evacuation procedures. This should be displayed clearly in public areas, including the dental surgeries and waiting room.¹² Each employee should be given a copy of the policy. Consideration should be given to any outside contractors who may be required to carry out potentially hazardous works as part of ongoing practice maintenance. As they may not be as familiar with the premises as permanent employees, they cannot be expected to know the correct actions to take in the event of a fire. Every effort must be made to make certain that such individuals are aware of the risks involved with their work.¹⁷

The main responsibility for dealing with a serious outbreak of fire lies with the fire brigade. However, all staff should be familiar with and be confident that they can carry out the practice's pre-arranged emergency evacuation procedures in the event of an emergency occurring. Periodic fire drills should be carried out, preferably every six months but at least once a year.¹⁷ Details of the drill may be recorded in a fire safety logbook kept available for inspection as part of the risk assessment.⁸ Within the practice setting one person should be responsible for organising fire instruction, training and drills (Figure 2).¹⁷

Conclusion

An employing dentist has a general duty to ensure, so far as is reasonably practicable, the health, safety and welfare of employees while at work.¹² This duty of care extends to patients and visitors who may be on the premises. Ensuring a risk-appropriate standard of fire safety is mandatory as part of this duty of care. Appropriate standards can be achieved by comprehensive risk assessment, implementation of suitable fire precautions and detailed staff training.

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