

LECTURE NOTES ON  
CLINICAL MEDICINE AND SURGERY  
FOR DENTAL STUDENTS

Edited by  
D. Maclean

P. E. Preece

THIRD EDITION

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## Preface

The many recent advances in medical science make a new edition of this book essential. This differs from previous editions in that now each chapter has been contributed by an author who is currently practising in the field covered. Dr Peter M. Ford is succeeded as co-editor with Dr Derek Maclean by Mr Paul E. Preece.

The content of the curriculum for training of health care professionals has to change constantly in response to both the changing needs of the community being served and the continual advance in knowledge. The aspiring Bachelor of Dental Surgery, confronted by the need to learn Medicine and Surgery as but a small part of the undergraduate course, might be forgiven for wondering if society would not be better training its dentists as medical practitioners first! Realistically, dental students must study a distillate of Medicine and Surgery.

A consensus of what this should be in the UK was agreed in 1981 at a conference of those who teach these subjects to dental students. A summary of this was published in the *Lancet* in 1982.\* It is on the basis of these recommendations, to which the editors subscribed as participants at the conference, that this book has been compiled. Teaching in Medicine and Surgery is intended to broaden the basis of the professional education of dentists, helping them to understand new advances and to encourage continued learning. It is also of value in dental practice, where it should ensure the safety of patients and staff, recognition of high-risk subjects, good patient relations, with understanding of clinical phenomena, and the ability to cope with emergencies. The student's clinical judgment will be improved as will his ability to communicate effectively with other health care professionals, in particular to recognize where there is an indication for a second opinion and understand the principles of the maintenance of health. A sound knowledge of Medicine and Surgery also equips the dentist for career diversification, in teaching, research, preventive medicine, as well as in day to day clinical practice.

Sections have been written to stand on their own. We have intentionally omitted detailed accounts of areas which we know to be taught in detail in the dental curriculum.

\*Medical Teaching of Dental Students. *Lancet*, 1982,i,332. The full report is available from the Nuffield Foundation, Nuffield Lodge, Regents Park, London NW1.

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The editors have been greatly assisted by Dr Ian W. M. Jeffrey and his colleagues at Dundee Dental School who have read through the text to check clarity and relevance to dental students. Dr George Tudhope has made an overview of the whole text for consistency.

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# **1 History, examination and precautions**

## **History taking**

The dentist/patient relationship begins with history taking. This consists of:

- present symptoms,
- current drug treatment,
- past illness and operations and their sequelae,
- health and illnesses of relatives,
- occupation and pastimes.

Any patient may have the unacceptable or the unexpected in his background. Be alert, be suspicious and be prepared to elicit information not readily volunteered by the patient, e.g. a patient with abnormal bleeding of the gums may have leukaemia; a past history of rheumatic fever predisposes to the risk of subacute bacterial endocarditis. Unrecognized venereal disease is a danger to both the patient and the dentist.

## **Physical examination**

The extent of the physical examination varies. It is influenced by:

- symptoms of the patient,
- setting of the consultation,
- specialty of the clinician.

For the dentist, valuable information about general health is to be had from observation of exposed parts:

1. *General:*
  - nutrition,
  - respiration,
  - responsiveness.
2. *Skin:*
  - colour (pallor, cyanosis, jaundice),
  - texture (sweaty, scaly).

3. *Facies*:

thin and drawn,  
 found and plethoric.

4. *Lips*:

discoloured, cracked or ulcerated.

5. *Hands*:

colour,  
 clubbing,  
 arthropathy.

6. *Nails*:

cyanosed,  
 flattened,  
 infected.

The detection of signs previously unnoticed necessitates referral for elucidation of their precise cause.

**Precautions: principles of prevention: prophylaxis**

'Prevention is better than cure.'

Increasingly, clinical practice is capable of implementing this old cliché. To do so requires active consideration of all the possible complications of a given treatment before it is started. Prevention of the following apply particularly in surgery:

*Bleeding* (congenital, liver function, vitamin K, platelets);

*Coma* (diabetes, liver disease, nervous system, vascular);

*Infection* (incision, chest, systemic, e.g. tetanus);

*Renal failure* (adequate fluids, monitoring output);

*Thromboembolism* (dextran, heparin, mobilization);

*Wound dehiscence* (incisions, nutrition, suture materials).

***Bleeding***

Before causing any bleeding, ensure that it will stop. From the history, rule out anticoagulant therapy or any abnormal bleeding tendency. The coumarin drugs, particularly warfarin, are the most widely used anticoagulants, being less likely to cause sensitivity reactions than phenindione. Oral anticoagulant therapy is monitored by means of measurement of the *prothrombin time* or *thrombotest*. Treatment with other drugs affects the tendency to bleed in these patients, e.g. ingestion of aspirin is liable to cause haemorrhage, from inhibition of thromboxane synthesis, impaired platelet aggregation or reduced hepatic synthesis of clotting factors. Withdrawal of anticonvulsants in

patients who have been maintained on these in addition to oral anticoagulants similarly may cause haemorrhage because of the withdrawal of induction of the enzymes that normally metabolize warfarin. Some drugs, such as aspirin and dipyridamole, reduce platelet adhesiveness. They are used to reduce the tendency to thrombus formation in arteries. They can, however, also lead to increased blood loss at operation.

*Haemophilia A* is the most common of the potentially severe inherited bleeding disorders. Surgical procedures on patients so affected do not always require Factor VIII infusion (p.83). In practice, occasionally when bleeding is a problem in a surgical procedure, a diagnosis of *Christmas disease* is made where the inherited deficiency is that of Factor IX. Although not congenital, a deficiency of platelet numbers is called *thrombocytopenia*. The platelet precursors are present but they give rise to insufficient platelets. Clot retraction is impaired and the capillary fragility test is positive. The clotting time is normal, but the bleeding time is prolonged, making surgery without platelet supplementation dangerous.

Blood clotting is dependent on normal function of the liver which synthesizes prothrombin and Factors VII and X from the fat-soluble vitamin K, the absorption of which requires bile salts. These are prevented from entering the bowel in obstructive jaundice, a condition where parenteral vitamin K therapy is essential before surgery is performed.

Certain drugs are used to facilitate blood clotting. Aminocaproic acid and tranexamic acid work by inhibiting plasminogen activation and so interfere with fibrinolysis. They therefore have a role in dental extraction in haemophiliacs (p.84).

### *Coma*

Cerebral function can be affected by surgical procedures. The commonest problem in practice is the vasovagal attack, which can occur in any patient anticipating or being submitted to even very minor procedures such as venepuncture. Prophylaxis of harm from this is achieved by ensuring that patients are supine before any procedure is performed. In such a position, adequate cerebral blood flow can be maintained.

Diabetic patients require special consideration when undergoing surgery. The greatest danger from which known diabetics are at risk is peri-operative hypoglycaemia during operation under general anaesthesia. Modern diabetic management involves giving the insulin

as usual and controlling its hypoglycaemic effect with i.v. dextrose under blood glucose monitoring. Ketoacidosis is only likely to occur in previously unrecognized diabetics and can be prevented by the simple measure of always testing the urine for sugar before surgery.

Liver disease can impair the ability to metabolize drugs, including both local or general anaesthetics, and should be excluded before these are administered. Drugs given for their effects on the nervous system, particularly some psychotropic drugs and anticonvulsants, can interact adversely with analgesics and anaesthetics, predisposing to coma, either by direct action on the brain or by indirect action by suppressing respiration.

### *Infection*

The prevention of infection in surgical practice is fundamental. It is most conveniently subdivided into prevention of general (systemic) infection and local, i.e. confined to the site of operation. The whole gamut of aseptic technique, including the use of operating theatres, the wearing of special garments including masks and gloves, sterilization of instruments and antiseptic preparation of the operation site, is designed to minimize the risk of infection and its sequelae. All such measures, when effective, prevent local sepsis and thereby also systemic spread. Some specific measures are required, however, to prevent systemic infections or complications, e.g. patients sustaining contaminated (usually accidental) wounds must receive immunization against tetanus. Infection with this disease, followed by recovery, does not impart lifelong immunity. Systemic sequelae can ensue in operating on patients who have damaged heart valves or implanted prostheses. Such operations require systemic antibiotics to be given before surgery begins. Pre- and post-operative physiotherapy can help to prevent post-operative chest infections.

The prevention of local infection is facilitated by placing the incision in the line of the natural creases because this encourages faster healing. The scar is also less prominent. Tissue should be handled as gently as possible. Sutures should be as fine as possible and should just approximate the edges without being too tight.

### *Renal failure*

In addition to their function in effecting water and electrolyte balance, the kidneys have a role in metabolizing drugs, especially analgesics. Before surgery it is essential to know that a patient has normal or at

least adequate renal function, the simplest test for which is measurement of the serum urea and creatinine levels. During and after surgery, adequate urine output must be observed, with regular checks on the quantity of the urine passed. For prolonged surgical procedures, this necessitates the passage of a urethral catheter, which can be connected to a urinometer by means of which the volume of urine passed per unit time, e.g. per hour, can be checked. The specific gravity taken with repeat serum urea or creatinine measurements gives a simple guide to the concentrating power of the kidneys. For adequate renal function to be maintained, the surgeon must ensure that adequate fluids are given, the intravenous route being essential for these where patients have to be fasted. The prescription of fluids has to take account of not only volume and electrolyte requirements but also the balance between crystalloid (i.e. ionized salts like sodium chloride) and colloid (i.e. larger particles like albumin). These prescriptions require consideration of cardiovascular and pulmonary factors, such as whether the patient has a tendency to heart failure (as after myocardial infarction) or to bronchospasm (as in an asthmatic).

#### *Thromboembolism (p.69)*

One of the most terrible complications of surgery is the formation of a blood clot which then migrates to the lung where it occludes a major pulmonary vessel and so causes sudden death. This occurs after major surgery, i.e. operations on the abdomen or pelvis, and after surgery to the hip where the operation is adjacent to the large iliac veins. The risk is increased in patients who have been immobile prior to surgery, in the obese and in patients with malignant diseases. Agents are available which, if given over the operative period, significantly reduce the risk of deep vein thrombosis and pulmonary embolism. The macromolecular substance dextran (particularly dextran 70) lowers blood viscosity when given intravenously. To achieve this it expands the blood volume. Heparin is given for this purpose in low dose (5000 units) by subcutaneous injection, pre-operatively and then 8 or 12 hourly until the patient is ambulant. Both agents tend to increase the likelihood of peri-operative bleeding, but this disadvantage is far outweighed by the reduced risk of fatal thromboembolism.

#### *Wound dehiscence*

Separation of a wound, primarily closed at the time of operation, is a setback for both patient and surgeon. It is alarming, increases the risk of infection, predisposes to hernia formation, leaves an ugly scar, and

can necessitate another anaesthetic, with its attendant risks. Several of the factors which minimize infection after surgery also contribute to preventing wound dehiscence. These include:

- Aseptic technique,
- Antiseptic preparation of operation site,
- Clean-cut incision in a skin crease,
- Meticulous haemostasis,
- Fine suture materials just approximating the tissue without compression or tension.

Where it is difficult to obtain a good state of nutrition pre-operatively, parenteral feeding and dietary supplementation with vitamin C and zinc preparations, which are essential for wound healing, can prevent this problem.

## 2 First aid, emergency management and trauma

The objective of first aid is the maintenance of adequate cerebral oxygenation and the prevention of incidental damage, while normal self-preservation is impaired or impossible. The commonest situations where first aid is required are: collapse, haemorrhage, injury and post-operative care.

First aid involves attending to

- Airway,
- Circulation,
- Nervous system,
- Systemic effects of injury.

### Airway

Respiratory embarrassment can be caused by:

1. *Obstruction,*
2. *Inhalation,*
3. *Paralysis,*
4. *Trauma.*

1. In unconsciousness, particularly if the subject is supine, the tongue falls posteriorly, occluding the airway. This can be prevented by having the patient lying on his or her side, with the head dependent, with the angles of the mandibles drawn firmly forward. Oedema glottidis, as part of an acute allergic reaction, can obstruct the pharynx, and oedema or spasm of the vocal cords can obstruct the larynx. Foreign bodies can occlude any part of the lumen of the respiratory tract, which can also be obstructed suddenly by extrinsic means such as trauma or haemorrhage into an adjacent tumour.

A first-aid method for attempting to clear the airway into which a foreign body has been inhaled is known as the *Heimlich manoeuvre*. The patient lies with the head dependent. The rib cage is surrounded by the arms of the assistant who compresses this



forcefully, to expel the foreign body. The system is controversial since it may cause damage to the liver or the ribs and lungs. Nevertheless, in an emergency situation, where no skilled help or special equipment is available, it can save life.

Liquids, either extrinsic to the respiratory system, such as inhaled water or blood, or intrinsic, such as secretions from the respiratory tract itself, can effectively cause death by drowning. This is preventable by posture, aided by suction. Postural drainage can be specially effectively done by a physiotherapist and a flexible bronchoscope can be used to unplug distal parts of the bronchial tree, such as in lobar collapse.

2. In addition to the obstructive effects of inhalation, whether this be by foreign bodies or liquids, irritant substances can be inhaled, particularly gastric secretions, vegetable products, e.g. peanut, and toxic gases from fires. These induce an intense, acute inflammatory response within the entire bronchial tree, which rapidly impairs gaseous exchange, and can readily cause irreversible damage to the affected lung. If such irritation is suspected, in addition to mechanical removal of aspirated and inspired material, powerful anti-inflammatory drugs are given, particularly high doses of corticosteroids. Some inhaled gases, e.g. carbon monoxide, poison haemoglobin or the gas transport enzymes, a process which is irreversible.
3. Paralysis of the respiratory system occurs either within the central nervous system or peripherally. Trauma, infection and drugs can cause this, e.g. head injury, poliomyelitis and muscle relaxants respectively.
4. The effects of injury can be *direct* or *indirect*, e.g. division of the phrenic nerve (the fourth cervical nerve) immobilizes the hemidiaphragm which it supplies, limiting voluntary respiration and respiratory excursion. Fracture of a single rib can lead to puncture of the pleura and lung, which tends to collapse, sometimes progressively, embarrassing not only respiration, but also the circulation, by a tension pneumothorax kinking the vena cava. The first aid measure necessary here (and in haemothorax when this produces the same effect) is decompression of the overfilled hemithorax by inserting a chest drain. If a chest drain is not available, a wide bore needle, such as a large intravenous cannula, inserted between the ribs into the pleural cavity, will alleviate the problem, as a temporary measure. Double fractures of several adjacent ribs can result in a segment of the chest wall moving paradoxically, so-