Kodak

X-rays in Dentistry

The object of this book is to provide the dentist with a set of standardized procedures that will help him to produce radiographs of uniformly high quality. Accordingly, the main body of the book, which consists of the second and third sections, is devoted to these procedures. The first section of the book gives the information about X-rays and X-ray equipment that is essential for anyone making dental radiographs; the reader's attention is particularly drawn to the recommendations on safety procedure (page 5) and to the information on the interconversion of exposure values (also page 5). The latter will be needed by those whose X-ray apparatus operates at a kilovoltage and milliamperage different from the standard values used in this book.

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Introduction

X-rays

X-rays are produced when fast-moving electrons collide with matter. The following of their properties are of significance to the dental radiographer:

1) They can penetrate matter to an extent dependent on its density and thickness.
2) They travel in straight lines.
3) They can produce a developable image on film.
4) They can produce changes, both somatic and genetic, in living tissues.
5) When they impinge on matter, some of the rays are scattered in random directions.
6) They are not detectable by the human senses.

The first three of these properties are useful in radiography; the last three necessitate great caution in the use of X-rays.

Dental X-ray equipment

The dental X-ray tube (see Figure 1) is an evacuated glass envelope containing a cathode (the source of the electrons), and an anode (the target or focus at which they are directed). The electrons are emitted from a heated filament within the cathode, and are accelerated from the cathode to the anode by a very high voltage applied between the two. From the target area of the anode, X-rays are emitted in all directions.

The tube is surrounded by a heavy metal housing that absorbs all the X-rays except for a narrow beam, which is allowed to escape through a window or portal. The beam is further limited, to the minimum area necessary for the work being done, by a diaphragm. This is a heavy-metal disc with a circular hole, which can be fitted in front of the tube window. The window is also covered with an aluminium filter, which absorbs the least-penetrating X-rays; these would otherwise be absorbed or scattered by the patient's skin.

The plastics cone fitted in front of the tube is merely a positioning device and has no focusing or directional action on the X-ray beam. The point of the cone indicates the middle of the X-ray beam, normally termed the central ray.