



Australian Government

Department of Education, Employment and Workplace Relations

HLTDA410C Apply the principles of radiation biology and protection in dental practice

Release: 1

HLTDA410C Apply the principles of radiation biology and protection in dental practice

Modification History

Not Applicable

Unit Descriptor

Descriptor

This unit of competency describes the skills and knowledge required to minimise the risk of radiation to the client, the operator and others during the exposure of a prescribed dental radiographic image. It also describes the quality assurance measures necessary to ensure all radiographs are of consistent diagnostic standard

All procedures are carried out in accordance with occupational health and safety policies and procedures, current infection control guidelines, Australian and New Zealand Standards for maintaining infection control and the policies and procedures of the dental practice or organisation

All tasks are carried out in accordance with State/Territory legislative requirements

Application of the Unit

Application

This unit applies to dental assistants who assist at the chairside

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Pre-requisite units

This unit must be assessed after successful achievement of pre-requisites:

- HLTIN301C Comply with infection control policies and procedures
- HLTIN302B Process reusable instruments and equipment in health work
- HLTOHS300B Contribute to OHS processes

Employability Skills Information

Employability Skills

This unit contains Employability Skills

Elements and Performance Criteria Pre-Content

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in *italics* are elaborated in the Range Statement.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | |
|---|---|
| 1. Apply knowledge of ionising radiation to produce a dental radiograph | 1.1 Apply knowledge of <i>X ray properties</i> correctly |
| | 1.2 Identify and select technical variables of dental x-ray generating equipment correctly according to manufacturers' specifications and client requirements |
| | 1.3 Identify the main components of the tubehead |
| | 1.4 Identify and select the appropriate technique for the type of cone |

ELEMENT

PERFORMANCE CRITERIA

- | | |
|--|---|
| 2. Apply knowledge of radiation biology to protect client, operator and others from ionising radiation | 2.1 Apply knowledge of the biological effects and risks associated with X-rays to implement <i>safe work practices</i> to minimise radiation risks to operator, clients and others
2.2 Interpret the immediate and long term effects of radiation
2.3 Apply the correct <i>units of radiation measurement</i>
2.4 Implement <i>radiation safety measures for the client, operator and others</i>
2.5 Work in accordance with relevant OHS policy and procedures |
| 3. Determine image characteristics of a dental radiographic image to minimise the necessity for re-takes | 3.1 Ensure visual qualities of the radiograph are of a diagnostic standard
3.2 Ensure geometric qualities of the radiograph are of a diagnostic standard |

ELEMENT

PERFORMANCE CRITERIA

4. Minimise radiation by maintaining quality in processing

- 4.1 Identify the contents of the film package and determine the use of each item
- 4.2 Maintain *quality assurance for processing* dental radiographic images
- 4.3 Follow quality assurance processes for the use of radiographic chemicals in accordance with manufacturer specifications
- 4.4 Maintain appropriate conditions for manual and automatic processing in accordance with manufacturer specifications
- 4.5 Identify a range of *processing errors* and implement corrective measures to produce a diagnostic radiograph

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

The candidate must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes knowledge of:

- The code of practice for radiation protection in dentistry:
 - procedures for minimising radiation risks to clients, self, the oral healthcare team and the public
 - methods for monitoring the adequacy of radiation protection
 - the organisation's quality assurance policy for producing radiographs to a consistent diagnostic standard
 - the purpose of quality assuring dental radiographs and its relationship to radiation protection
- The production, properties and interactions of X-rays including
 - basic knowledge of atomic physics
 - main features and practical requirements of the X-ray tube
 - the sequence of events that result in the production of X-rays

REQUIRED SKILLS AND KNOWLEDGE

- hazards associated with X-rays including the mechanisms by which X-rays cause damage to human tissues
- The biological effects and risks associated with X-rays including:
 - immediate or acute effects
 - long term or chronic effects
- Radiographic appearance of anatomic landmarks, normal dentition and associated bony structures
- Reasons for processing and technique inaccuracies and methods to minimise errors
- Units of radiation measurement

Essential skills:

It is critical that the candidate demonstrate the ability to

- Apply radiation occupational health and safety policies and procedures to minimise the risk of radiation to the client, the operator and others during the exposure of a prescribed dental radiographic image
- Correctly prepare clients for dental radiographic imaging procedures
- Implement quality assurance measures to ensure production of radiographs to consistent diagnostic standard

In addition, the candidate must be able to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes the ability to:

- Apply correct dental terminology
- Consistently use safe work practices to minimise the risk of transmission of infection
- Consistently use correct accessories in dental radiographic techniques
- Consistently minimise technical inaccuracies in dental radiographic images
- Consistently minimise errors and maintain quality assurance in processing procedures
- Select appropriate film variables including:
 - film speed
 - film size
 - intensifying screens
- Select and use correct techniques including:
 - bisecting angle (intraoral)
 - extraoral
 - paralleling (intraoral)

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate this competency unit:

- The individual being assessed must provide evidence of specified essential knowledge as well as skills
- Observation of workplace performance is essential for assessment of this unit
- Consistent compliance with current infection control guidelines, Australian Standards and legislative requirements as they relate to the dental assistant's specific job role
- Consistency of performance should be demonstrated over the required range of workplace situations

Context of and specific resources for assessment:

- Access to appropriate workplace or simulation of realistic workplace setting where assessment can be conducted
- Access to dental radiographic imaging units and resources normally used in the workplace
- Relevant dental practice/organisation policy and procedures manuals such as:
 - incident reporting procedures
 - infection control guidelines and relevant Australian Standards
 - OHS policy and procedures
- Relevant state/territory legislation
- Manufacturer specifications for dental radiographic units
- Radiographic viewing equipment
- Assessment should be conducted on more than one occasion to cover a variety of circumstances and to establish consistency
- A diversity of assessment tasks is essential

EVIDENCE GUIDE

Method of assessment

- Observation in the work place is essential. Assessment in the workplace must be flexible to allow for client confidentiality and organisation policies
- Evidence of essential knowledge and understanding may be provided by:
 - traditional or online (computer-based) assessment
 - written assignments/projects
- Case study and scenario as a basis for discussion of issues and strategies to contribute to best practice
- Questioning
- Staff and/or client feedback
- Supporting statement of supervisor
- Authenticated evidence of relevant work experience and/or formal/informal learning

Access and equity considerations:

- All workers in the health industry should be aware of access and equity issues in relation to their own area of work
- All workers should develop their ability to work in a culturally diverse environment
- In recognition of particular health issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on health of Aboriginal and Torres Strait Islander people
- Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on health of Aboriginal and/or Torres Strait Islander clients and communities

Related units:

This unit should be assessed in conjunction with the following related units:

- HLTDA411C Prepare to expose a prescribed dental radiographic image
- HLTDA412C Produce a dental radiographic image

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

X ray properties may include but are not limited to:

- The intensity of the diagnostic X-ray beam
- The quality of the diagnostic X-ray beam

Safe work practices must include:

- Current code of practice for radiation protection in dentistry
- Dental practice/organisation policy and procedures
- Legislative requirements
- Radiographer's Licensing Board requirements

Units of radiation may include:

- Collective affective dose
- Dose rate
- Effective dose
- Equivalent dose
- Radiation-absorbed dose

Radiation safety for the client includes but is not limited to:

- Appropriate technique
- Correct processing procedures to minimise re-takes
- Film selection
- Legislative requirements and codes of practice
- Technical features of the radiographic unit as determined by manufacturer specifications including kilovoltage, filtration, x ray beam collimation
- Use of film locating devices
- Use of lead aprons

RANGE STATEMENT

Radiation safety for the operator and others includes but is not limited to:

- Determination of pregnancy
- Distance from primary beam
- Legislative requirements
- Maintenance of radiographic equipment
- Maximum permissible dose (MPD) of radiation
- Use of lead lined barriers

Geometric characteristics of the image may include:

- Blurred image due to motion of client
- Distortion due to incorrect technique

Quality assurance for processing dental radiographic images may include but are not limited to:

- Darkroom and image receptors including x-ray film and cassettes
- Image quality assessment
- Processing
- Working procedures
- X-ray equipment and appropriate maintenance

Processing errors may include:

- Film that is too dark
- Film that is too light
- Film with inadequate or low contrast
- Film that is marked

Unit Sector(s)

Not Applicable