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GUIDELINE FOR DENTAL RADIOGRAPHY

This guideline document determines basic requirements and recommendations for radiation protection and safety in the dental radiography applications.

Document History

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1	<ul style="list-style-type: none">- Content structured on the new SAHPRA Guideline Template- A unique document number SAHPGL-RDN-XR-03 allocated to this Guideline	August 2022

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Contents

Document History.....	1
Glossary	3
1. INTRODUCTION	4
1.1 Purpose.....	4
1.2 Scope	4
2. LEGAL PROVISION	4
3. REQUIREMENTS AND RECOMMENDATIONS.....	4
3.1 Radiation Workers.....	4
3.2 Dental X-Ray Units	5
3.3 Image Quality.....	6
3.4 Patient Protection.....	6
3.5 Patient Records.....	6
4. REFERENCES.....	7
5. VALIDITY	7

Glossary

Abbreviation/ Term	Meaning
ALARA	As Low As Reasonably Achievable
CBCT	Cone beam computed tomography
IB	Inspection Body
SABS	South African Bureau of Standards
SAHPRA	South African Health products Regulatory Authority
TLD	Thermo luminiscent dosimeter

1. INTRODUCTION

X-Ray imaging is used widely in dentistry to diagnose, plan and follow up procedures. The imaging techniques used in dentistry comprise of intraoral radiography (i.e. bitewing, periapical and occlusal), panoramic radiography, cephalometric radiography and CBCT, with CBCT being the latest X-Ray imaging modality consistent with relatively high patient doses.

Even though the individual doses from dental procedures are low, because of the increasing frequency of dental imaging procedures, particularly of CBCT, the accumulative dose increases thereby necessitating radiation protection of patients every time an X-Ray is performed. Dentistry is an independent health care specialty whereby dentists prescribe the X-Ray examinations, and consequently bear the responsibility to justify medical exposure consistent with Alara principle.

1.1 Purpose

This guideline document is intended to ensure that license holders and users are updated with the requirements of the Act and Regulations.

1.2 Scope

This document includes parameters for the justification of medical exposure and the suitability of dental radiography procedures consistent with accurate diagnosis. It further provides guidelines for the optimization of radiation protection and safety for patients, public, and dental staff. It also provides guidelines for dental radiography equipment, including technical considerations, quality assurance, dosimetry and optimum operating standards.

2. LEGAL PROVISION

The guideline is implemented in promulgating the Hazardous Substances Act 15, 1973 (Act15 of 1973) the related Regulations R.1332

3. REQUIREMENTS AND RECOMMENDATIONS

3.1 Radiation Workers

3.1.1 Dental radiation examinations may only be performed by registered:

- dentists,
- radiographers,
- dental therapists, and
- oral hygienists

3.1.2 Operators of dental units are conditionally exempted from personal monitoring (wearing of TLD's - Thermo Luminescent Dosimeters).

3.1.3 Monitoring of workers

Under the following circumstances, operators are required to wear a personal dosimeter (TLD) when:

- i. the position of the worker during exposures is less than 2 metres
- ii. the weekly workload exceeds:
 - 100 intra-oral or
 - 50 pan/ceph exposures or
 - pro-rata combination of each type of examination (table 1)

Table 1 Examination

Examination	Exposures					
	Intra-oral and	100	80	60	40	20
Pan/ceph	0	10	20	30	40	50

3.1.4 The licence holder is responsible to determine whether TLD's must be issued to the persons performing dental examinations.

3.1.5 The licence holder must keep a register of the monthly reports furnished by the SABS for such radiation workers. This register must be kept for 10 years from the last date of entry.

3.2 Dental X-Ray Units

3.2.1 An appropriate exposure technique chart (manual and automatic exposures) must be displayed near the control panel of the X-Ray unit(s).

3.2.2 The exposure chart(s) must be established after optimizing the film- / image processing procedure so as to keep the dose to the patient to the lowest practical value, consistent with the clinical objectives.

3.2.3 Units below 50kv will not be licensed. If an X-Ray unit is found to be operating below 50kV, the unit will be sealed and not relicensed for use.

3.2.4 Point type dental cones are no longer allowed and units using point type cones will not be relicensed. Cones must conform to the following:

3.2.5 Circular: 60mm diameter at the open end of the collimator and it must be of the open-ended type of OR

3.2.6 Rectangular: 40x50mm at the open end of the collimator. Focus to skin distance of at least 200mm.

3.2.7 Second hand dental units that have not previously been licensed by the Directorate: Radiation Control, will not be licensed for use.

The licence holder must ensure that all the applicable requirements are implemented as stipulated in REQUIREMENTS FOR LICENCE HOLDERS WITH RESPECT TO QUALITY CONTROL TESTS FOR DENTAL DIAGNOSTIC X-RAY IMAGING SYSTEMS (Latest edition)), available at

<https://www.sahpra.org.za/radiation-control/>

3.2.8 The license holder shall ensure that only an Inspection Body (IB) approved by SAHPRA is used to perform all the acceptance tests as well as the routine tests.

** list of approved Inspection Bodies is available at www.sahpra.org.za

3.3 Image Quality

For the EVALUATION of the TOTAL IMAGE CHAIN the following MUST BE AVAILABLE:

- Film & digital- Intra- oral -Uni DENT PHANTOM or similar.
- Film - Intra-oral, Panoramic & Cephalometric radiography - TOR DEN conventional phantom or similar
- Digital - Intra-oral, Panoramic & Cephalometric radiography - TOR DEN conventional phantom or similar

3.4 Patient Protection

- i. The compulsory use of protection devices such as lead rubber aprons and thyroid shields for protection of patients during dental examinations is no longer a requirement.
- ii. Adequate precaution should, however, be taken to reduce radiation when examinations are performed on women of childbearing capacity and children

3.5 Patient Records

A record / register must be kept of all patients undergoing X-Ray examinations. The record / register must be preserved for 5 years containing the following information:

3.5.1 surname, name, date of birth/age and sex

3.5.2 date of examination

3.5.3 brief clinical indication of the examination

3.5.4 type of examination

3.5.5 number of exposures (repeat exposures included)

3.5.6 fluoroscopy time (if applicable)

3.5.7 brief statement of the diagnostic information obtained from the examinational text

4. REFERENCES

The following related documents are referenced:

- 4.1 Radiation Protection in Dentistry Code of Practice and Safety Guide for Radiation Protection in Dentistry (2005), RPS no 10, <http://www.arpana.gov.au/publications/codes/rps.cfm>
- 4.2 REQUIREMENTS FOR LICENCE HOLDERS WITH RESPECT TO QUALITY CONTROL TESTS FOR DENTAL DIAGNOSTIC X-RAY IMAGING SYSTEMS, <https://www.sahpra.org.za/radiation-control-guidelines-and-codes-of-practice/>
- 4.3 Test procedures for film processing and intensifying screens, <https://www.sahpra.org.za/radiation-control-guidelines-and-codes-of-practice/>

5. VALIDITY

This guideline is valid for a period of 5 years from the effective date of revision and replaces the old guideline for Dental Radiography, revised March 2017. It will be reviewed on this timeframe or as and when required.