Radiation in dental practice

Reinhilde Jacobs

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ABOUT US

IAEA RESOURCES & EDUCATION

Widely known as the world's "Atoms for Peace and Development" organization within the United Nations family, the IAEA is the international center for cooperation in the nuclear field. The Agency works with its Member States and multiple partners worldwide to promote the safe, secure, and peaceful use of nuclear technologies.
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Watch the free webinars on the radiation protection topics in medical uses of ionizing radiation, and take the opportunity to learn from the world's leading radiation protection experts.

Webinar's overview

Sarah Baatout
What can radiobiology bring to the dentomaxillofacial radiology? a radiation protection perspective

Ruben Pauwels
Optimization of dental cone-beam computed tomography exposures: a practical guide

Eva Levring Jäghagen
Improved justification and optimization of dental 2D and 3D imaging through education and training

Keith Horner
Justification of X-ray examinations in dentistry

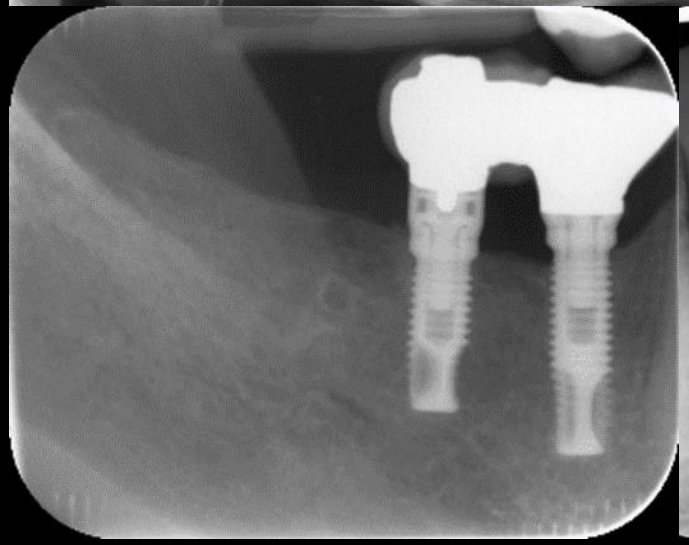
PUBLICATIONS

Radiation Protection and Safety in Medical Uses of Ionizing Radiation

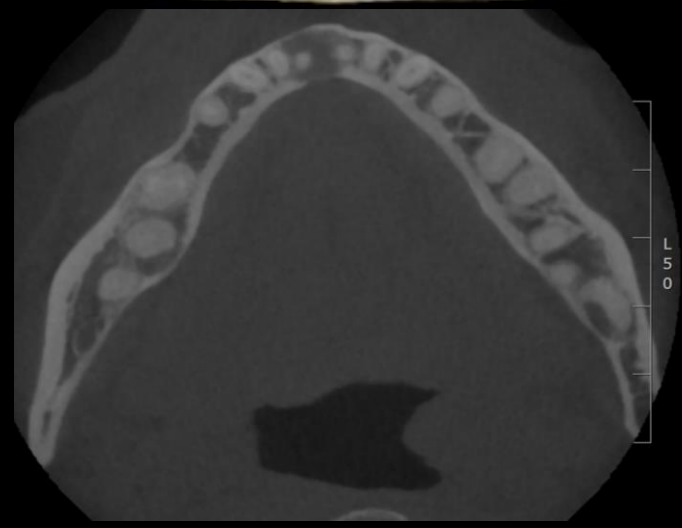
Radiation Protection in Dental Radiology

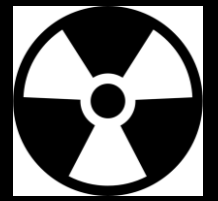
IAEA publications

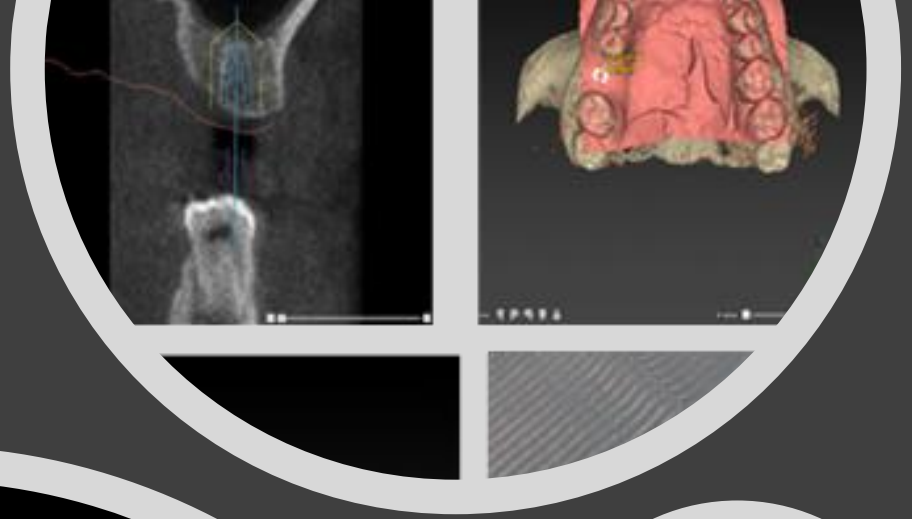
FAQ RADIOPROTECTION DENTISTRY

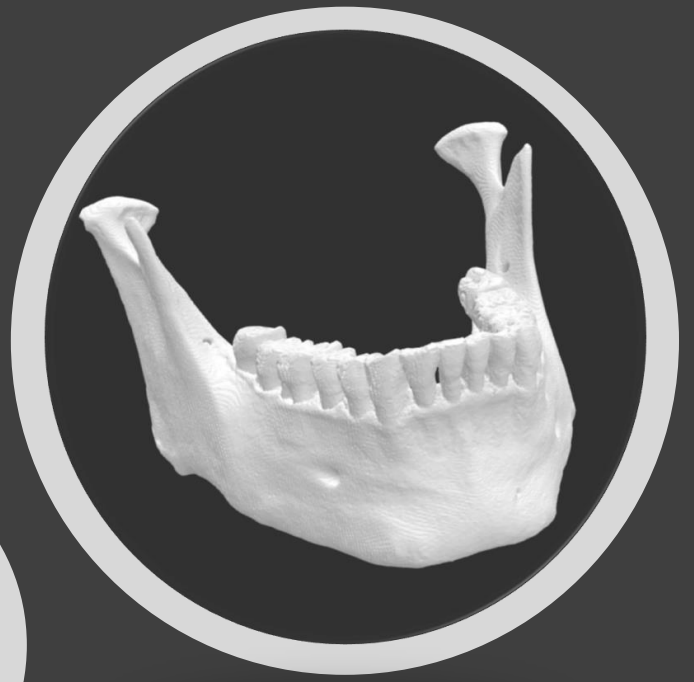


Justification?



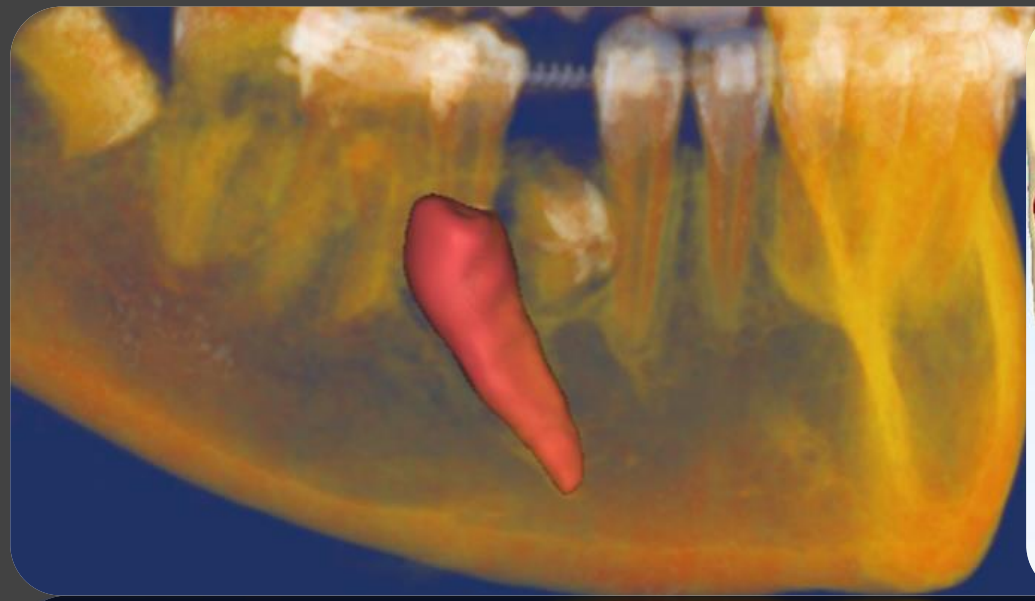


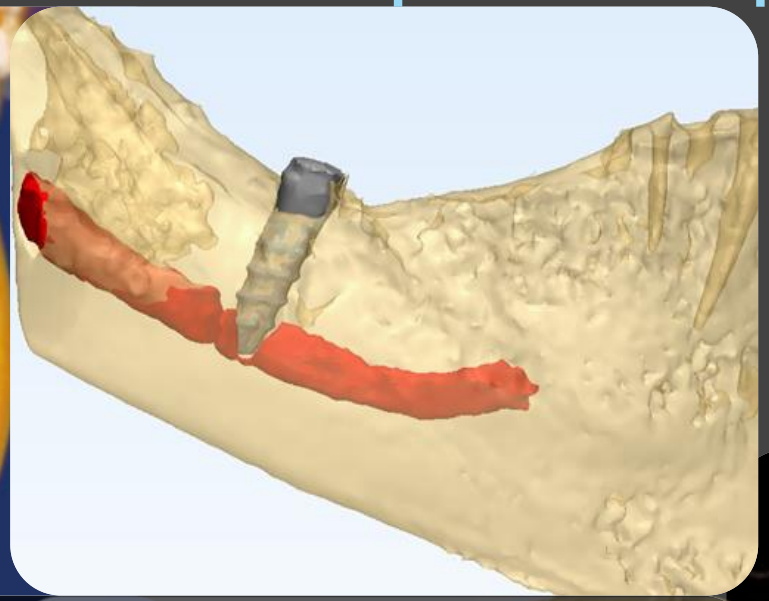


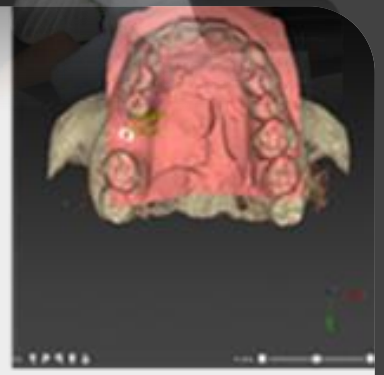


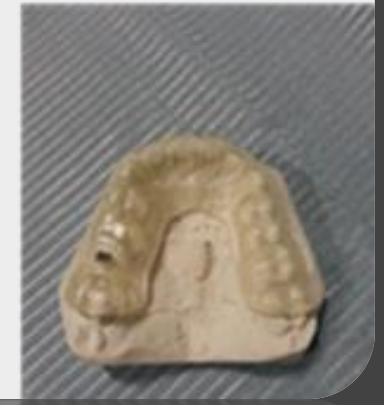
CBCT
3/4 virtual planning
1/4 diagnosis

ALADA IP: indication oriented & patient specific imaging









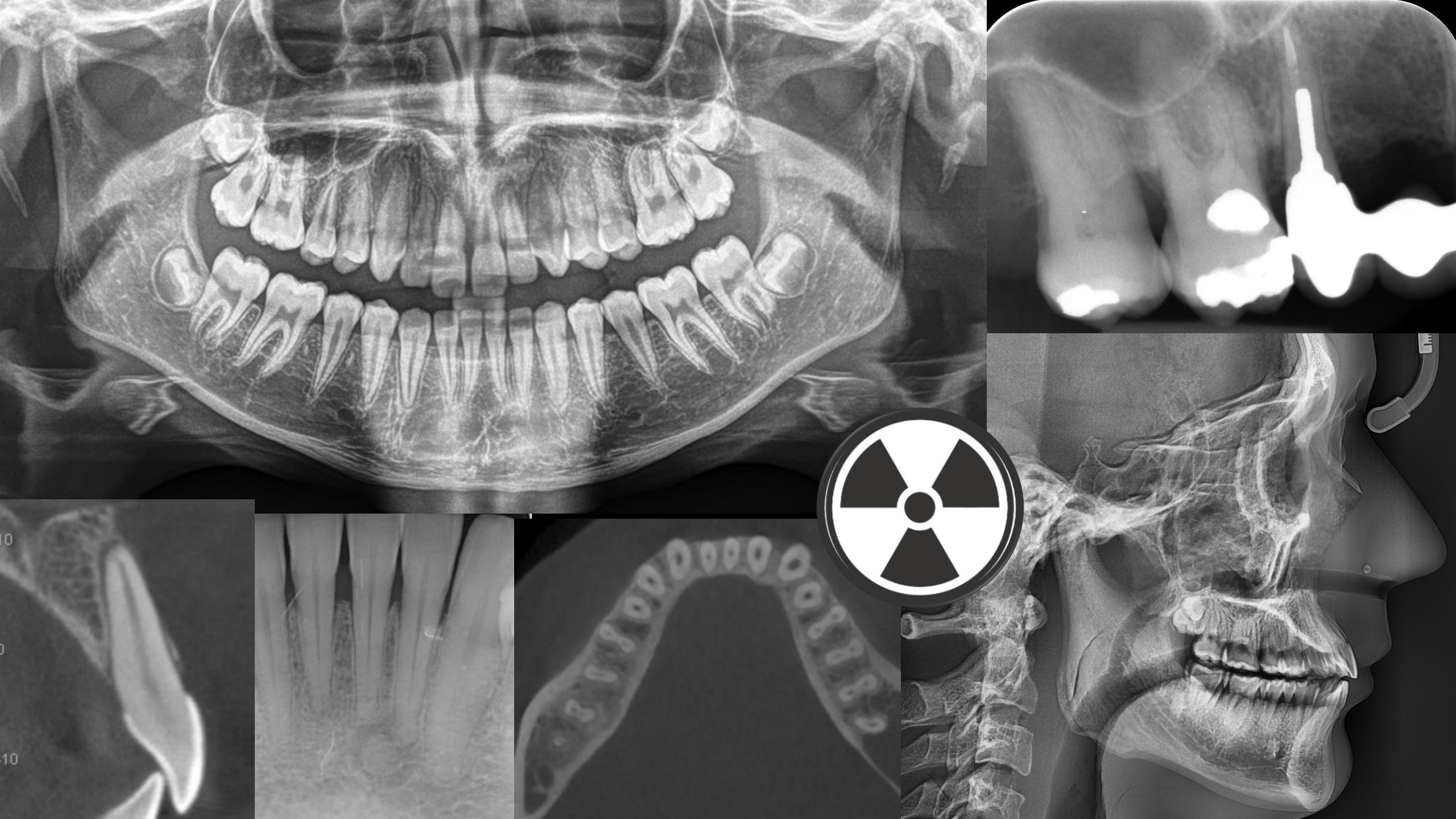
INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

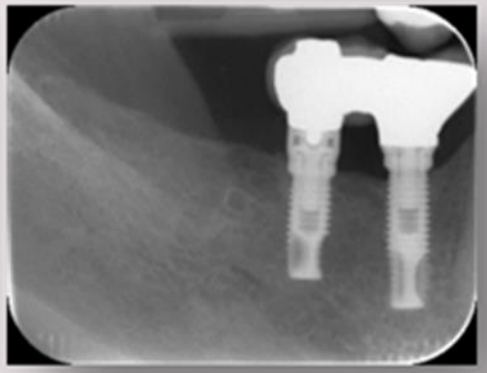
LETTER TO THE EDITOR

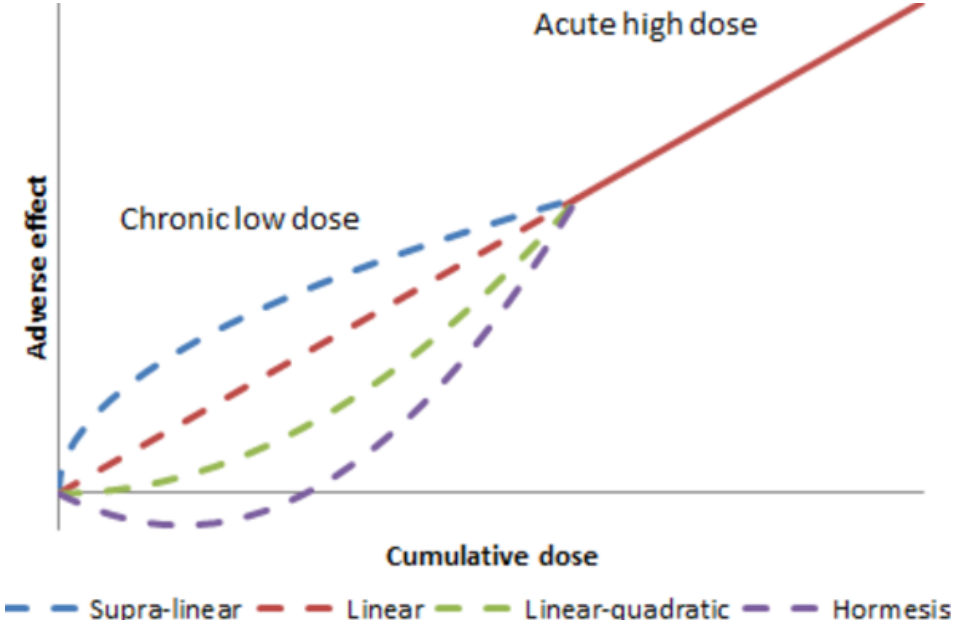
ALADAIP, beyond ALARA and towards personalized optimization for paediatric cone-beam CT

Anne Caroline Oenning, Reinhilde Jacobs, Benjamin Salmon ✉, the DIMITRA Research Group (http://www.dimitra.be)

First published: 12 April 2021 | https://doi.org/10.1111/ipd.12797 | Citations: 1







Hormesis

Very low dose radiation

Dentomaxillofacial Radiology (2020) 49, 20200145

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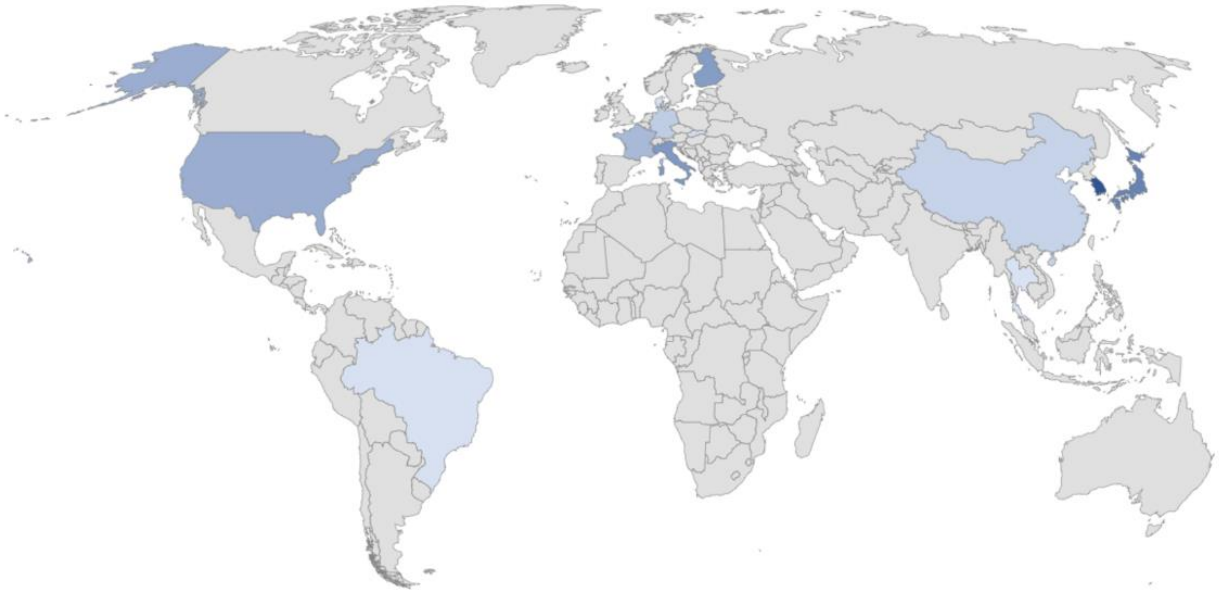
DMFR 50TH ANNIVERSARY: REVIEW ARTICLE

Cone beam computed tomography in dentomaxillofacial radiology: a two-decade overview

[1,2]Hugo Gaêta-Araujo, [1]Tamara Alzoubi, [1]Karla de Faria Vasconcelos, [1,3]Kaan Orhan, [4,5]Ruben Pauwels, [6]Jan W Casselman and [1,7]Reinhilde Jacobs



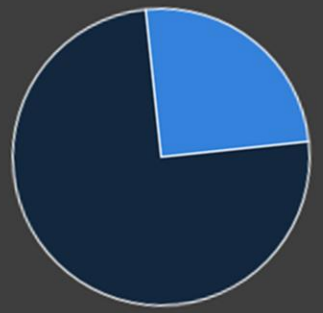
280 CBCT models

CBCT ≠ CBCT

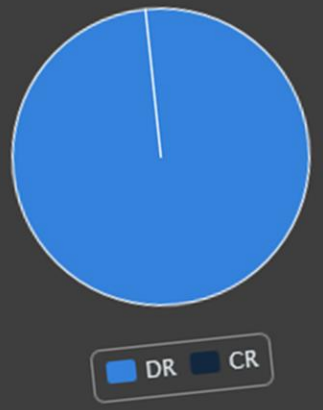
4
studies found for this patient

53,15 mSv
total effective dose for this patient

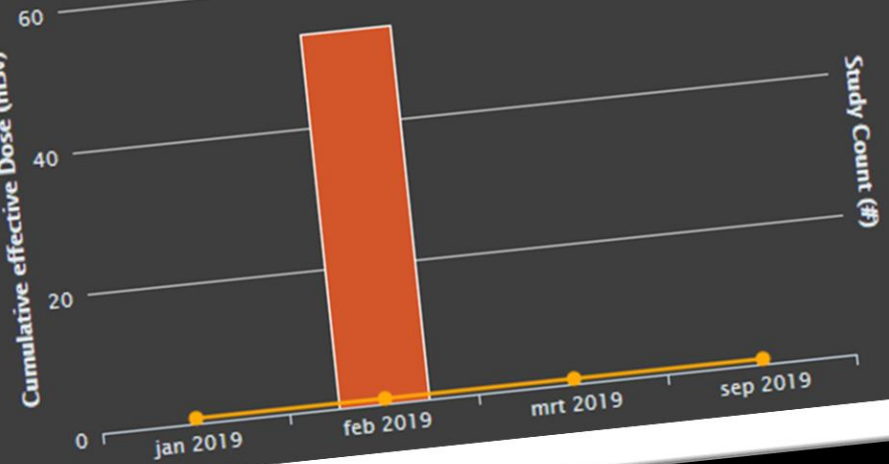
studies / modality



dose / modality

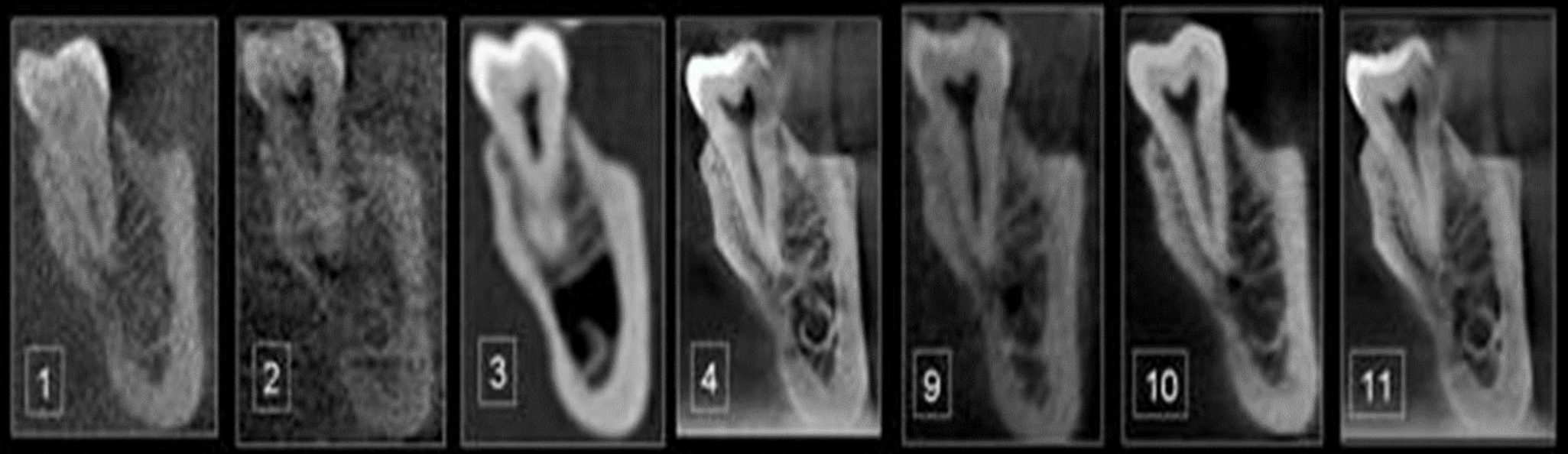


History Dose overview

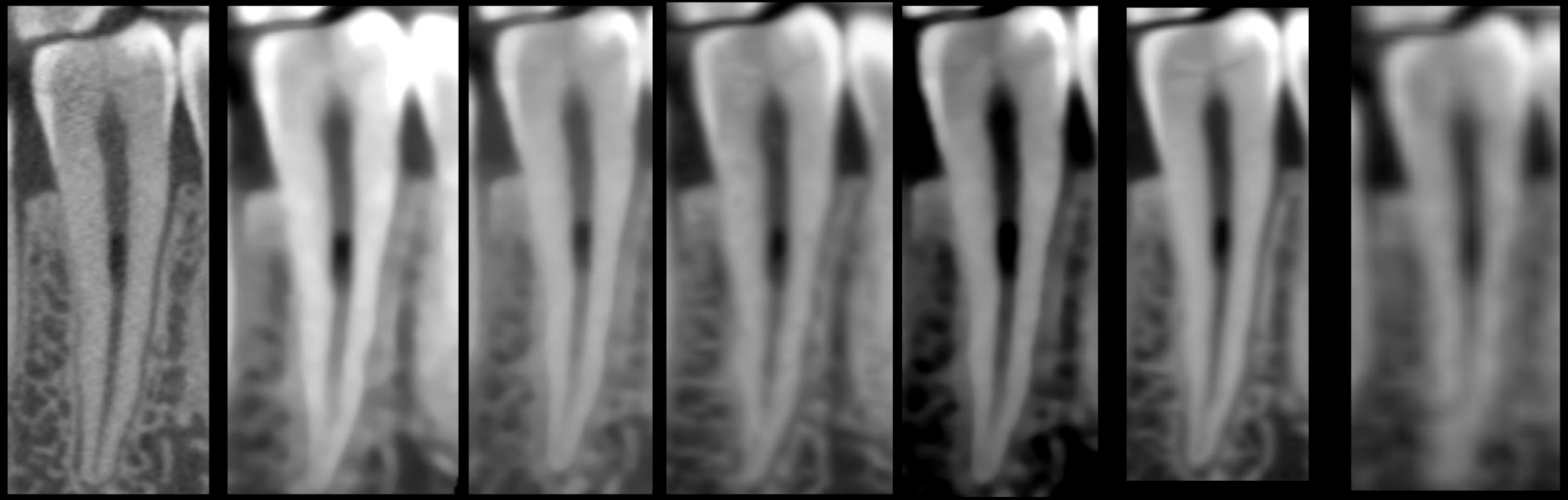


CBCT ≠ CBCT

Liang et al 2010, Ezeldeen et al 2017, Oenning et al 2019



IQ

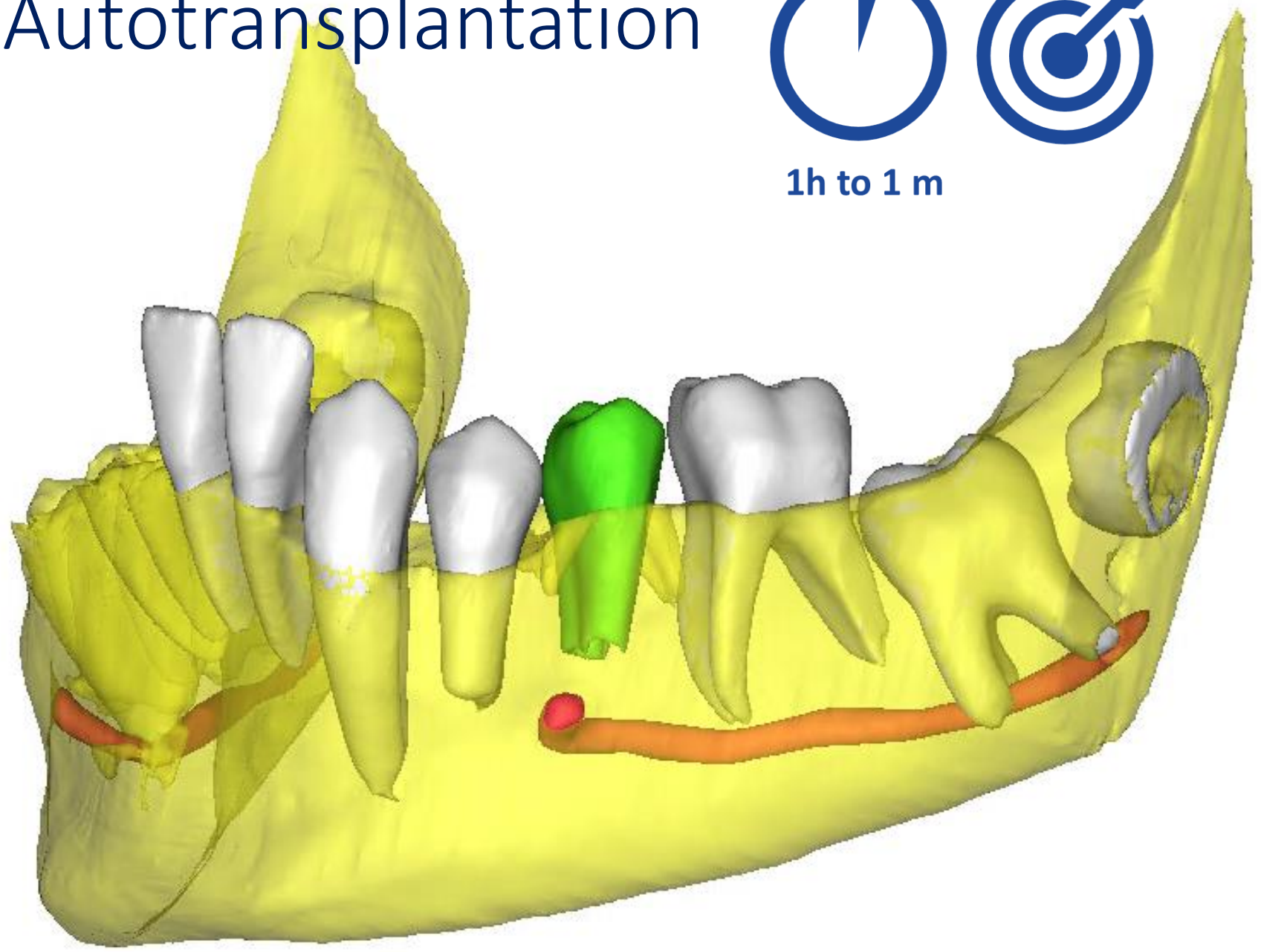


1CBCT ≠ 50x

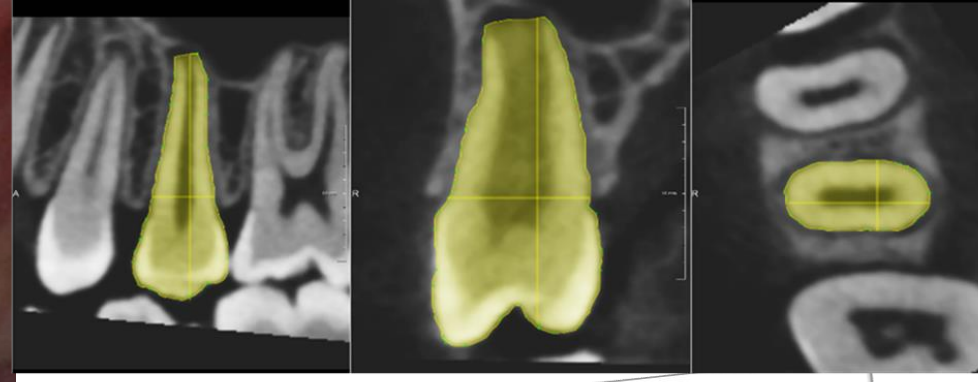
DIMITRA

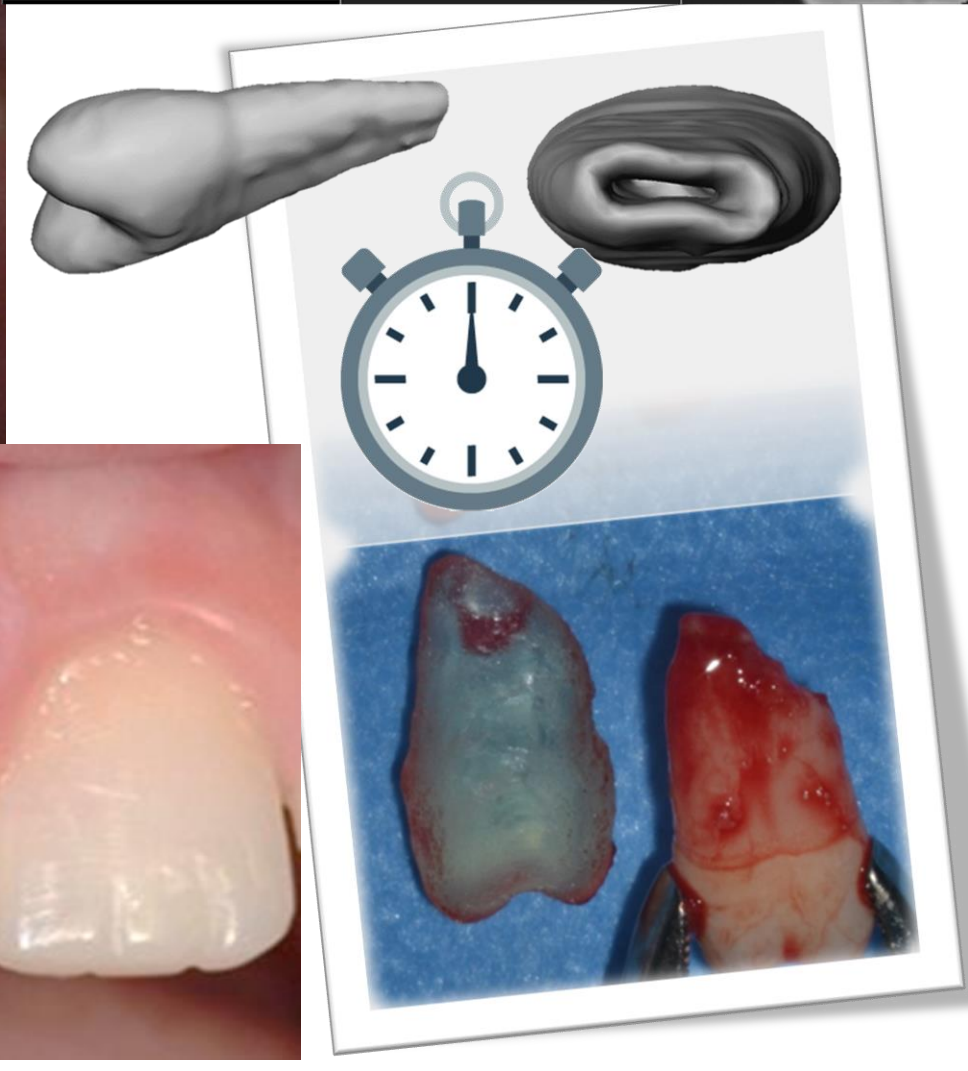
Dentomaxillofacial paediatric imaging:
an investigation towards low dose radiation induced risks

Planning Tooth Autotransplantation

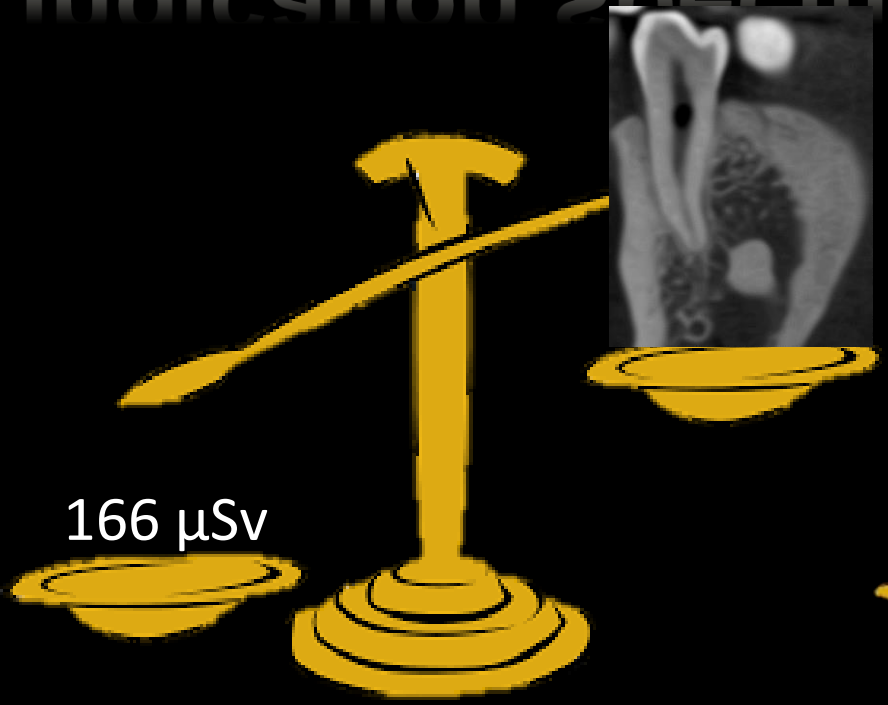


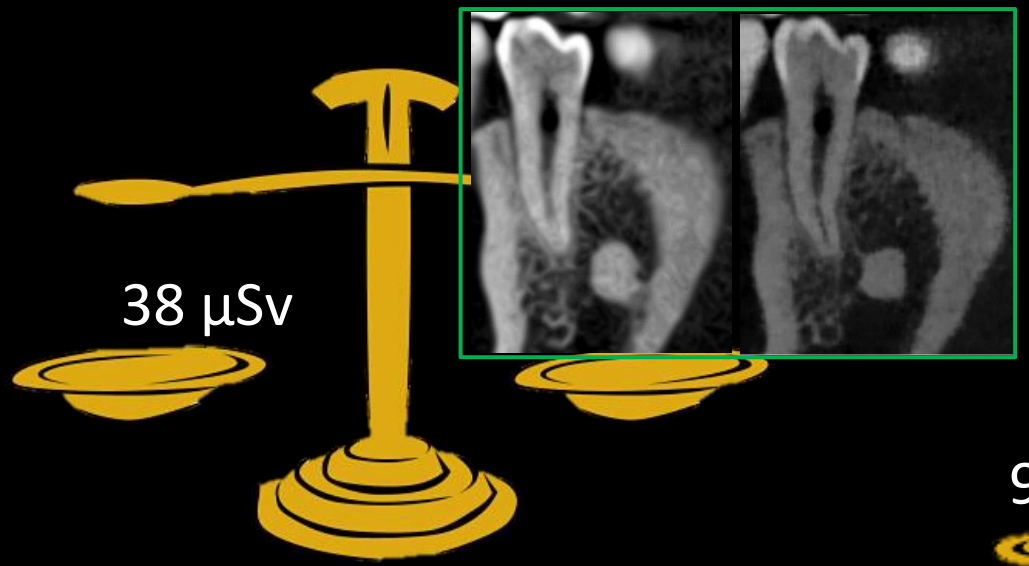
1h to 1 m

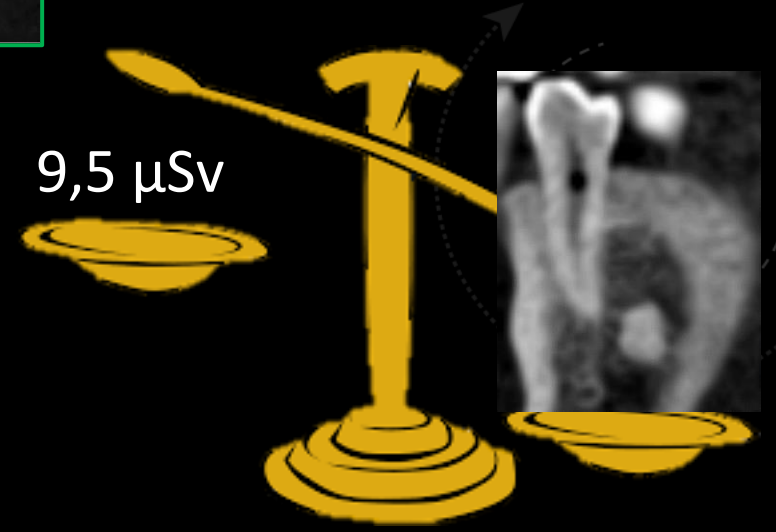




Indication specific optimization



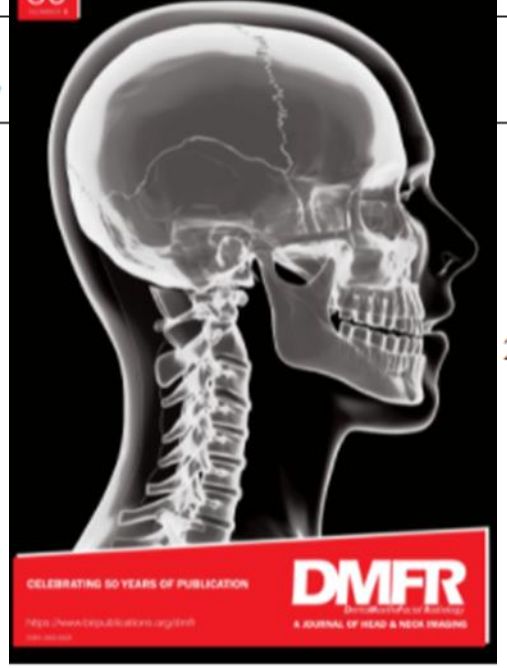




Clinical Research

As Low Dose as Sufficient Quality: Optimization of Cone-beam Computed Tomographic Scanning Protocol for Tooth Autotransplantation Planning and Follow-up in Children

Mostafa EzEldeen, DDS, MScD,† Andreas Stratis, MSc,* Wim Coucke, PhD,‡ Marina Codari, MSc,*§ Constantinus Politis, MD, DDS, MHA, MM, PhD,* and Reinhilde Jacobs, DDS, PhD, MSc, Dr hc**



	Age (years)	Dose	Time of sampling	Tissue examined	Tissue used	Biological effects	References
	24 ± 1.023	21.4 μSv	Before and 10 days after examination	Oral cavity	Exfoliated oral mucosa cells	No induction of MN, and cytotoxicity (pyknosis, karyolysis). Significant induction of karyorrhexis.	Cerqueira *et al.* (2004)[112]
	20 subjects ≤ 22.520 subjects > 22.5	21.4 μSv			keratinized mucosa of theupper dental arch	Significant induction of MN	Cerqueira *et al.* (2008) [113]
	7.70 ± 1.50	0.08 Roentgen(Entrance dose)			Exfoliated oral mucosa cells	No induction of MN, and cytotoxicity (pyknosis, karyolysis). Significant induction of karyorrhexis.	Angelieri *et al.* (2007)[114]
	18–40	0.057 mSv(Average dose)			Cells of the lateral border of the tongue	No induction of MN, but increased cytotoxicity (pyknosis, karyolysis, karyorrhexis). The number of karyorrhexis and binucleated cells was greater after multiple X-rays	Da Silva *et al.* (2007)[115]
					Exfoliated oral mucosa cells	No induction of MN, but increased cytotoxicity (pyknosis, karyolysis, karyorrhexis).	Popova *et al.* (2007)[116]
					Keratinized gingival cells	Significant induction of MN, and cytotoxicity (pyknosis, karyolysis, karyorrhexis)	Cerqueira *et al.* (2008)[113]
					Exfoliated oral mucosa cells	No induction of MN, but increased cytotoxicity	Ribeiro and Angelieri (2008)[117]

Dentomaxillofacial Radiology (2021) 50, 20210153

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DMFR 50TH ANNIVERSARY: REVIEW ARTICLE

Radiobiological risks following dentomaxillofacial imaging: should we be concerned?

[1,2]Niels Belmans, [3]Anne Caroline Oenning, [4,5]Benjamin Salmon, [1]Bjorn Baselet, [1,6]Kevin Tabury, [7]Stéphane Lucas, [2]Ivo Lambrichts, [1]Marjan Moreels, [8,9]Reinhilde Jacobs and [1,10]Sarah Baatout

2023

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