Source:	Medical University of Vienna
Title:	Att.3 – Presentation - AI in the field of Oral Surgery
Purpose:	Discussion
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Abstract:	This PPT contains the presentation from the Dental Symposium on "AI in the field of Oral Surgery " .

AI in the field of Oral Surgery

TG Dental Symposium
Helsinki, Finland, 19.09.2022

Ulrike Kuchler, Assoc. Prof., MD, DMD

Department of Oral Surgery

School of Dentistry, Medical University of Vienna
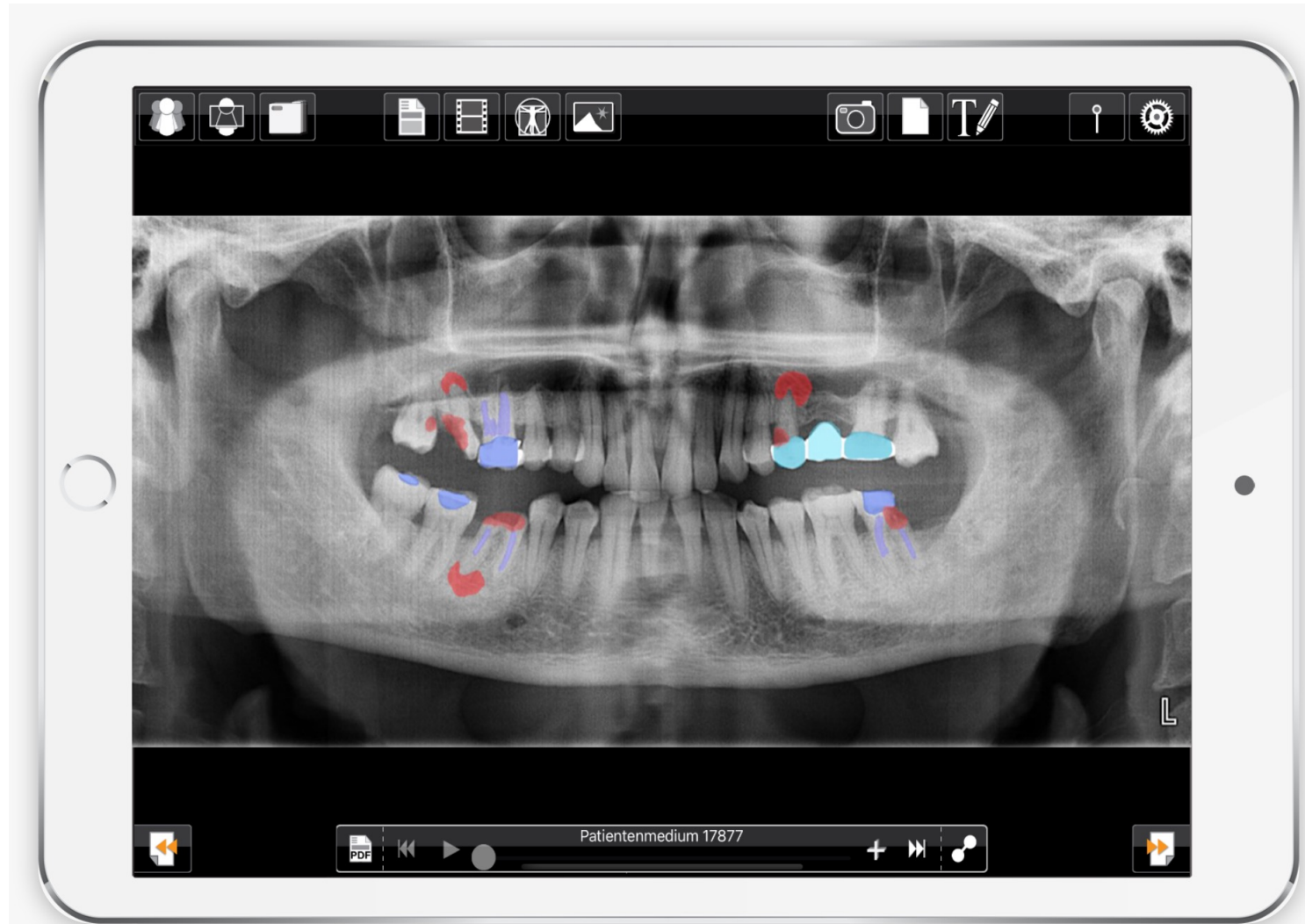
No conflict of interest

Employed by

Peer Reviewed funding

Active Membership

MEDIZINISCHE
UNIVERSITÄT WIEN

ITI International Team
for Implantology

EAO))
EUROPEAN ASSOCIATION
FOR OSSEOINTEGRATION

UK
DDr. Ulrike Kuchler
Zahnmedizin & Implantologie

Osteology
Foundation

ÖGN

FWF Der Wissenschaftsfonds.

ÖGZMIK

City of
Vienna

OCMR

ONB
OESTERREICHISCHE NATIONALBANK
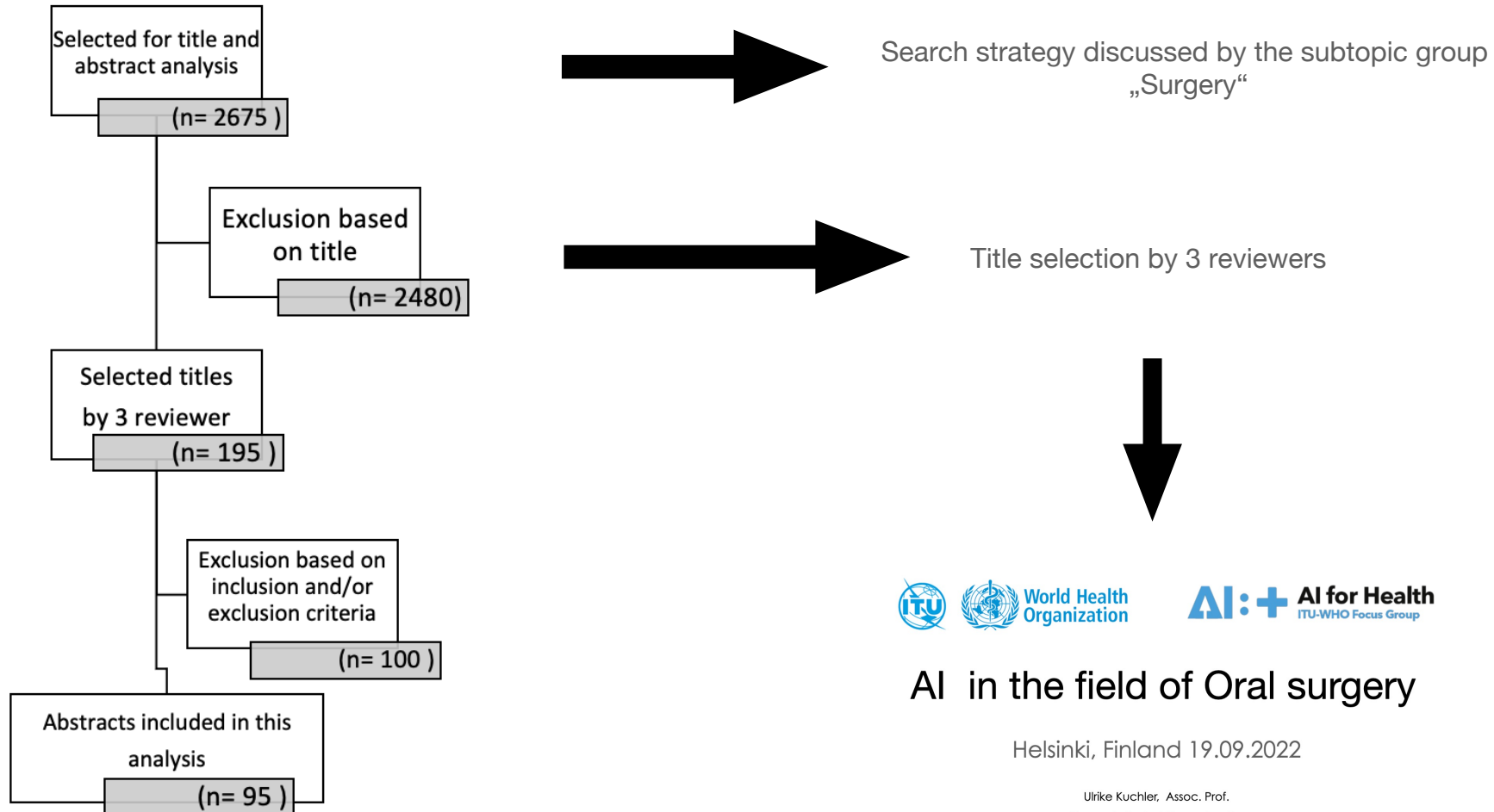EUROSYSTEM

The future of AI in dental practice - is here

Publication AI - Oral Surgery - Maxillofacial Surgery

Status quo ?

Pubmed 09.2022

Search AI in Oral Surgery & Maxillofacial Surgery

Selected for title and
abstract analysis
(n= 2675)

Exclusion based
on title
(n= 2480)

Selected titles
by 3 reviewer
(n= 195)

Exclusion based on
inclusion and/or
exclusion criteria
(n= 100)

Abstracts included in this
analysis
(n= 95)

Pubmed, Scopus, Medline, Cochrane, IEEE

Search strategy discussed by the subtopic group „Surgery"

Title selection by 3 reviewers

ITU **World Health Organization**   **AI:+ AI for Health** ITU-WHO Focus Group

AI in the field of Oral surgery

Helsinki, Finland 19.09.2022

Ulrike Kuchler, Assoc. Prof.
Dr. med. dent et Dr. med. univ.
Department of Oral Surgery,
School of Dentistry - Medical University of Vienna

Search AI in Oral & Maxillofacial Surgery

Maxillofacial Surgery & Cephalometrics — 32%

Anatomy — 23%

Dental Implantology — 22%

Cysts and Tumors — 13%

3rd Molars — 7%

Diagnostics — 3%

Maxillofacial Surgery
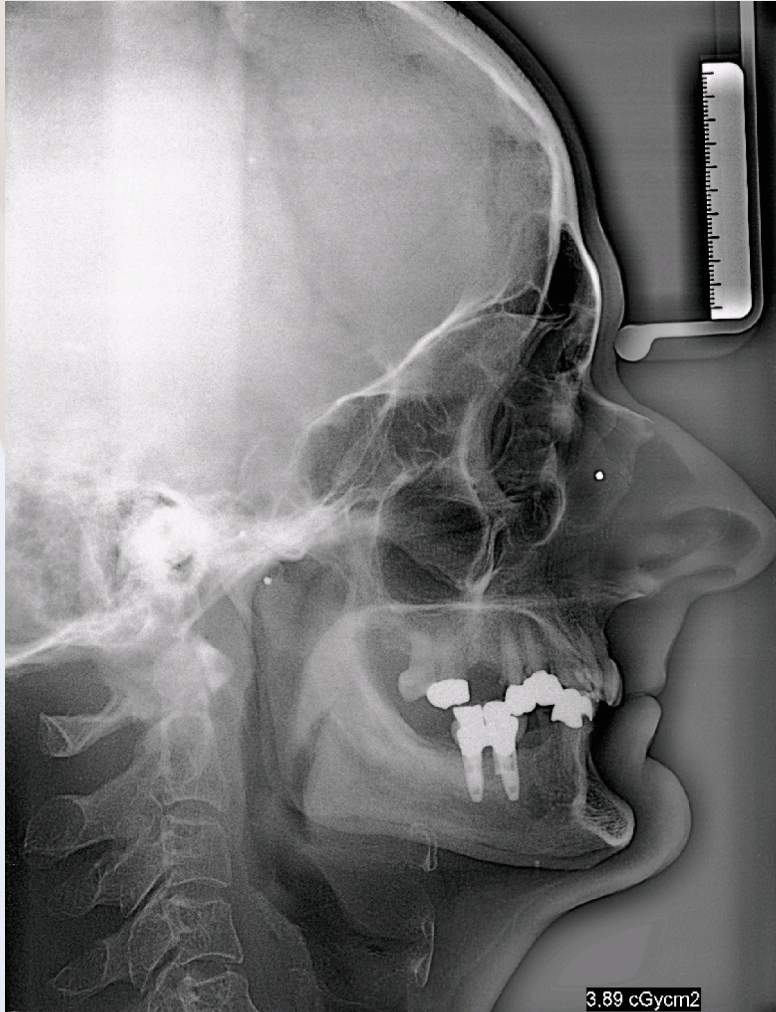
Courtesy Kotlarenko/Krier

Cephalometric studies

Muraev AA et al 2020
Ma Q. Et al 2020
Lee JH et al 2020
Kim I.H. et al 2021
Kwon H.J et al 2021

Orthognatic surgery

Bouletreau P et al 2019
Stehrer R et al 2019
Shin W et al 2020
Kim Y.H. 2021
Jeong SH et al 2020
Rasteau S et al 2020

Maxillofacial surgery general

Bhalodia R et al 2020
Mak et al 2020

Cysts

Detection - Classification

Frydenlund A. et al 2014
Lee J.H. et al 2014
Poedjiastoeti W. et al 2018
Ismael A.K. et al 2020
Lee J. et al 2020
Yang H. et al 2020
Endres MG. et al 2020
Bispo MS. et al 2021
Sivasundaram S. et al 2021
Watanabe H .et al 2021

Anatomy

Mandibular nerv detection

Kwak GH et al 2020
Vinayahalingam S et al 2019
Qiu B et al 2021
Uma Maheswari P 2021
Jaskari J 2020
Kainmueller D 2009

Surgery planing

Ter Horst R et al 2021
Lee S et al 2020
Verdugo F et al 2009

**Maxilla
And
Mandibula**

Cha J 2021
da Silva R.D.C. 2021

3M - Third Molar

Decision for extraction

Brickley and Sheppard et al 1997

Prediction for eruption

Vranckx M et al 2020

Prediction surgical difficulty

Zhang et al 2018
Ki m et al 2021
Yo et al 2021

Prediction postoperative swelling/complication

Yoo et al 2021
Zhang et al 2018

Anatomy
Detection of 3M
Alveolar Nerv - Mandibular Canal

Yoo et al 2021
Vinayahalingam S et al 2019
Kainmueller 2009
Fukuda et al 2020
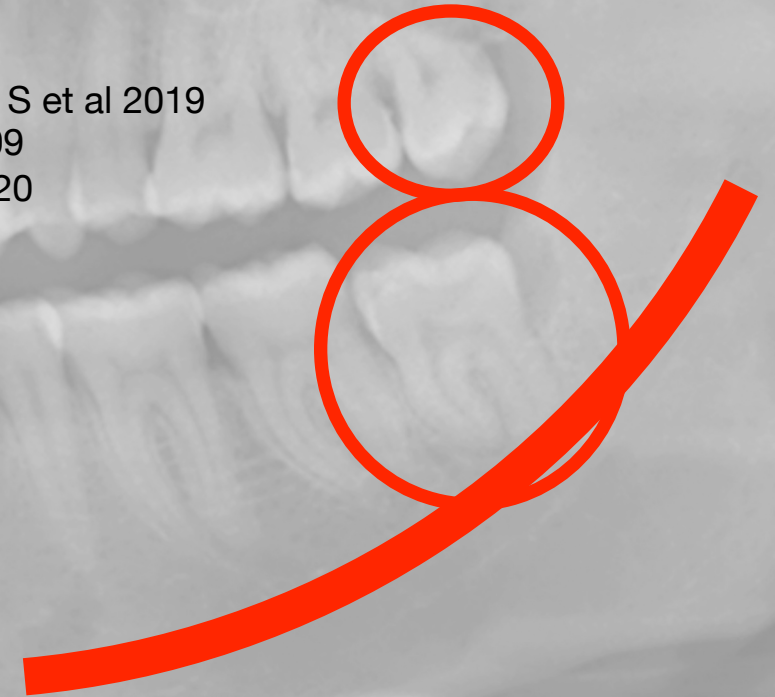
Implant

Implant planning

Kurt Bayrakdar S. et al 2021
Benakatti V. et al 2021

Finite element Analysis Implant design

Roy C. et al 2018
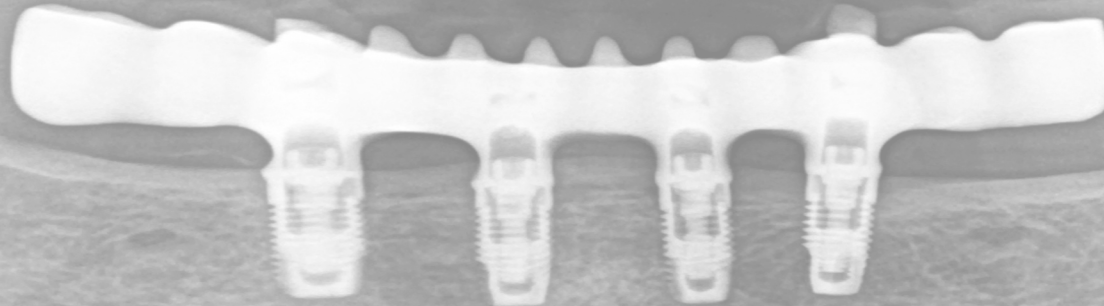Revilla-Leon et al 2021

Implantplacement with Ai

Hashem M. L. et al 2020

Prognosis of dental implants

Ha SR et al 2018

Classification implant brand

Lee et al 2020
Sukegawa S et al 2021
Saïd M.H. 2020
Sukegawa S 2020
Takahashi 2020
Lee 2020
Lee at al 2020
da Mata Santos RP 2021
Hadj Said M et al 2020

AI models

Machine learning

Decision tree learning:
Prediction model using classification tree
- Random Forest

Logistic Regression (LR): as a classification model

Regression Analysis: estimates the relationship among variables

Multidimensional unfolding analysis (MDU)

Ensemble based models: combination of different models to improve accuracy

Artificial Neural Networks

- Naive Byes
- Deep Convolutional Neural Networks (CNN)
- Residual Neural Network
- Artificial Neural Network (ANN)

Revilla- Leon et al 2021
Zhang H et al 2020
HA SR et al 2018
Liu C et al 2018
Papantonopoulos G et al 2017
Moayeri RS et al 2016
Oliveira et al 2005
Li et al 2019

SCHOOL OF DENTISTRY
MEDICAL UNIVERSITY OF VIENNA

Thank you