

Thomas Edlinger, BA
Public relations and event management

Medical University of Graz
Neue Stiftingtalstraße 6
8010 Graz
thomas.edlinger@medunigraz.at

Press release
For immediate publication

AI in dentistry:
Artificial intelligence interprets X-rays

Graz, 11 November 2022: From learning algorithms that influence our social media experience to bots that respond to customer inquiries on the web and on the telephone, artificial intelligence (AI) has arrived in many areas of life. Science and medicine also benefit from these digital aids. How exactly artificial intelligence can be sensibly employed is still a subject of research. At Med Uni Graz, Barbara Kirnbauer is investigating whether and how artificial intelligence can be used with the results of 3D X-rays of the jaw.

A look inside the jaw

The subject of Barbara Kirnbauer's most recent research project was digital volume tomography, with which it is possible to create three-dimensional X-ray data sets about the jaw and its adjacent structures. It was investigated how well a newly developed artificial neuronal network can detect pathological changes in the jaw bone around the root tips. The interpretation of X-ray data sets is time-consuming and demands great expertise, and mistakes can have serious consequences for patient health, not only in the area surrounding the jaw. It is already known that the use of artificial intelligence has the potential to reduce sources of error, increase safety and save time for medical professionals.

The root of the problem

The data sets were examined for periapical osteolytic lesions. Periapical refers to something at or around the root of a tooth, osteolytic means bone dissolving and a lesion is a pathological change in tissue—in this case due to bacterial infection where the site of entry was the crown. If left untreated, these inflammatory lesions can lead to problems such as toothache, abscesses or tooth loss. With the tooth as the epicenter, pathological changes may occur not only in the area of the jaw but throughout the body as the invading bacteria spread through the bloodstream. That is why quick, precise and reliable detection of a few millimeters of small changes is particularly important.

In this study, the newly developed AI system was tested on 144 three-dimensional data sets with a total of 2,128 teeth. At a rather early stage of research, it was able to produce an impressive number of investigated objects of study. The programmed neuronal network also delivered extremely promising results that were published in high-ranking journals. Conducted in cooperation with TU Graz, Barbara Kirnbauer's project can now be seen as a sufficient basis for further development and refinement of the algorithm with the long-term goal of using AI in everyday dental practice at Med Uni Graz.

Pioneering Minds - Research and Education for Patients' Health and Well-Being

Medizinische Universität Graz, Neue Stiftingtalstraße 6, 8010 Graz, www.medunigraz.at

Rechtsform: Juristische Person öffentlichen Rechts gem. UG 2002. Information: Mitteilungsblatt der Universität, DVR-Nr. 210 9494.
UID: ATU57511179. Bankverbindung: UniCredit Bank Austria AG IBAN: AT931200050094840004, BIC: BKAUATWW
Raiffeisen Landesbank Steiermark IBAN: AT44380000000049510, BIC: RZSTAT2G

Profile: Barbara Kirnbauer

Barbara Kirnbauer is a dentist at the Division of Oral Surgery and Orthodontics and the head of the special oral radiology clinic. She conducts clinical oral surgery research as well as educational research in dentistry.

Further information and contact

Barbara Kirnbauer
Medical University of Graz
Division of Oral Surgery and Orthodontics
Tel.: +43 / 316 / 385-30674
barbara.kirnbauer@medunigraz.at

To the publication:

Automatic Detection of Periapical Osteolytic Lesions on Cone-beam Computed Tomography Using Deep Convolutional Neuronal Networks
<https://pubmed.ncbi.nlm.nih.gov/35952897/>