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RESEARCH AREA

The research aims to reduce the complications of oral surgery interventions. One research direction deals with the heat production of hard tissue preparations. Heat effects on periodontal fibers can lead to ankylosis, those on bone can lead to thermal osteonecrosis, and heat effects on peripheral nerves can lead to neurosensory functional impairment. These thermal effects are sometimes unknown, but even if known, we must take them into account when determining the appropriate preparation methods. Our research is aimed at mapping temperatures and reducing them.

Another line of research focuses on the prevention of peripheral nerve injuries (inf. alveolar nerve, lingual nerve) associated with the removal of wisdom teeth. The precision and diagnostic/prognostic value of imaging procedures can be increased by searching for and monitoring specific radiologic signs, and by refining surgical procedures (sectioned tooth removal, coronectomy), these serious complications are more likely to be avoided, while not increasing the radiation exposure to patients.

TECHNIQUES AVAILABLE IN THE LAB

Infrared thermal registration techniques and measurement with thermocouple probes, bone removal with piezoelectric and conventional rotating instruments, analysis of panoramic radiographs and cone-beam CT images, examining neurosensory disturbances of the mandible and corresponding soft tissues.

SELECTED PUBLICATIONS

Pacheco, A., Soós, B., Lempel, E., Simon, I., Maróti, P., Möhlhenrich, SC., **Szalma J.** (2023) The effect of individual drilling sleeves on the precision of coronectomy tooth sections. An in vitro 3D-printed jaw model experiment. *Clin Oral Investig* **27**: 6769-6780.

Szalma, J., Janovics, K., Pacheco, A., Kaszás, B., Lempel, E. (2022) Pre-eruptive intracoronal resorption in "high-risk" impacted third molars: A report of four cases. *J Craniomaxillofac Surg* **25**: S1010-5182.

Janovics, K., Soós, B., Tóth, Á., **Szalma J.** (2021) Is it possible to filter third molar cases with panoramic radiography in which roots surround the inferior alveolar canal? A comparison using cone-beam computed tomography. *J Craniomaxillofac Surg* **49**: 971-979.

Lempel, E., **Szalma, J.** (2022) Effect of spray air settings of speed-increasing contra-angle handpieces on intrapulpal temperatures, drilling times, and coolant spray pattern. *Clin Oral Investig* **26**: 523-533.

Szalma, J., Vajta, I., Lovász, BV., Kiss, C., Soós, B., Lempel, E. (2020) Identification of specific panoramic high-risk signs in impacted third molar cases where cone beam computed tomography changes the treatment decision. *J Oral Maxillofac Surg* **78**: 1061-1070.

Szalma, J., Lovász, BV., Vajta, L., Soós, B., Lempel, E., Möhlhenrich, SC. (2019) The influence of the chosen in vitro bone simulation model on intraosseous temperatures and drilling times. *Sci Rep* **9**: 11871.