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RESEARCH AREA

The primary objective of our research is to investigate the volumetric changes in both hard and soft tissues surrounding individual CAD/CAM and circular symmetric zirconia implant healing abutments in the aesthetic zone four months after fixation, performing immediate implant placement. The subsequent stage of the study will involve the fabrication of definitive screw-retained all-ceramic solo restorations anchored with a titanium base. In addition to the aesthetic and functional evaluation, biological and technical complications will be monitored in the short and long term. All workflows are digitally designed, and implants are inserted with a navigation template in a subcrestal position. The evaluation of hard tissue is based on intraoral radiography and CBCT, while the evaluation of soft tissue is based on intraoral scan, ultrasound and CBCT. Currently, blood flow is measured using Laser Speckle Contrast Imaging. It is our intention to complement this with ultrasonography. The objective is to utilise ultrasound technology to assess blood flow and mucosa thickness, thereby providing a more comprehensive understanding of the healing process.

A further key objective for the working group is the comparison of traditional vs digital impressions of the emergence profile in the aesthetic zone of the maxilla, in subjects with a thick phenotype. The clinical study will compare the accuracy of both implant positioning and emergence profile mapping, as well as the accuracy of traditional vs 3D printed models, based on in vivo and in vitro results.

Active involvement in research activities at the Translational Medicine Centre in the field of implantology.

A more profound comprehension of the biology, metabolism, cellular function and molecular regulation of tissue responses can significantly enhance the efficacy of regenerative therapy and wound healing in both periodontology and implantology. Our research encompasses the development of materials for use in wound healing, with the preliminary phase currently underway and a meta-analysis design in progress.

TECHNIQUES AVAILABLE IN THE LAB

The student will be able to become involved in and actively participate in the research described above, with the possibility of in vitro studies, clinical trials, and the statistical analysis of results at the Department of Prosthodontics.
The research group's projects include peri-implant marginal bone level change evaluation, soft tissue 2- and 3D evaluation, statistical data analysis and analysing the accuracy of digital and traditional impression techniques and modelling in implantology in the esthetic zone.

SELECTED PUBLICATIONS

Kelemen, K., König, J., Czumbel, M., Szabó, B., Hegyi, P., Gerber, G., Borbély, J., **Mikulás, K.**, Schmidt, P., Hermann, P. (2023) Additional splint therapy has no superiority in myogenic temporomandibular disorders: A systematic review and meta-analysis of randomized controlled trials. **J Periodontal Res 68(1):** 12-19.

Solyom, E., Szalai, E., Czumbel, M. L., Szabo, B., Váncsa, S., **Mikulas, K.**, Radoczy-Drajko, Z., Varga, G., Hegyi, P., Molnar, B.** et al. (2023) The use of autogenous tooth bone graft is an efficient method of alveolar ridge preservation – meta-analysis and systematic review. **BMC Oral Health 23(1):** 226.

Yang, F., Ruan, Y., Bai, X., Li, Q., Tang, X., Chen, J., Chen, Y., Wang, L. (2023) Alveolar ridge preservation in sockets with severe periodontal destruction using autogenous partially demineralized dentin matrix: A randomized controlled clinical trial. **Clin Implant Dent Relat Res 25(6):** 1019-1032.

Tajti, P., Solyom, E., Váncsa, S., Mátrai, P., Hegyi, P., Varga, G., Hermann, P., Borbély, J., Sculean, A., **Mikulás, K.** (2024) Less marginal bone loss around bone-level implants restored with long abutments: A systematic review and meta-analysis. **Periodontol 94(1):** 627-638.

Takács, A., Hardi, E., Cavalcante, B.G.N., Szabó, B., Kispélyi, B., Joób-Fancsaly, Á., **Mikulás, K.**, Varga, G., Hegyi, P., Kivovics, M. (2023) Advancing Accuracy in Guided Implant Placement: A Comprehensive Meta-Analysis: Meta-Analysis evaluation of the accuracy of available implant placement Methods. **J Dent 139:** 104748.