



SEMMELWEIS UNIVERSITY

Faculty of Dentistry

Department of Restorative Dentistry and Endodontics

Head:

Professor János Vág DMD, PHD

Study Group name: Microcirculation Study Group

Topic: Study of oral wound healing

1. Group members:

Leader: Réka Fazekas

Post-doc: Bálint Molnár (SU, Department of Periodontology), Eszter Molnár

PhD student: Eleonóra Sólyom (SU, Department of Periodontology)

Other collaborators: Ferenc Bartha

2. Study title: **Blood flow kinetics following human alveolar ridge augmentation procedure measured by Laser Speckle Contrast Imager**

3. Abstract:

In periodontal surgery, various incisions, flaps, grafts and wound closure techniques are used, resulting in varying degrees and duration of ischemia. However, post-operative wound healing is significantly influenced by the preservation of the gingival microvasculature and the revascularisation of the surgical site. Our working group aims to study the effects of different types of surgery on regeneration. In our studies, we use a Laser Speckle Contrast Imager (LSCI) (Fazekas, Molnar et al. 2019), which can be used non-invasively and reproducibly (Molnar, Fazekas et al. 2018) to measuring capillary blood flow, even covering the entire surgical site, thus providing an objective comparative assessment of the impact of surgical factors on healing. Previously, we have successfully used LSCI to characterize the reperfusion curves of regions distinguished in the surgical field during the incorporation of various grafts (Molnar, Molnar et al. 2017, Fazekas, Molnar et al. 2019) and also to individually monitor oral wound healing (Fazekas, Molnar et al. 2018). In addition to blood flow measurements, we complement our studies on wound healing by studying angiogenesis, i.e. the quantification of wound fluid and measuring Vascular Endothelial Growth Factor (VEGF) expression.

Address: 1088 Budapest, Szentkirályi utca 47.

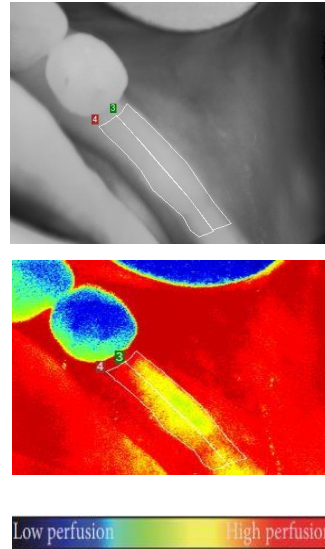
Postal address: 1085 Budapest, Üllői út 26.; 1428 Budapest, Pf. 2.

E-mail: helyreallito.fogaszat@semmelweis.hu

Phone No.: 00-36-1-317-1598

<https://semmelweis.hu/konzervalo-fogaszat/en/>





4. Winning application:

OTKA FK_2020 – 135348, topic leader: Bálint Molnár

5. Congress participation on the subject:

R. Fazekas, B. Molnár, F. Bartha, F. Veress, K. Weninger: Blood flow kinetics after alveolar ridge augmentation assessed by Laser Speckle Contrast Imaging. EAO Digital Days 2021

6. Publications:

- Molnar, E., B. Molnar, Z. Lohinai, Z. Toth, Z. Benyo, L. Hricisak, P. Windisch and J. Vag (2017). "Evaluation of Laser Speckle Contrast Imaging for the Assessment of Oral Mucosal Blood Flow following Periodontal Plastic Surgery: An Exploratory Study." *Biomed Res Int* **2017**: 4042902. <https://www.ncbi.nlm.nih.gov/pubmed/28232940>. DOI: 10.1155/2017/4042902.
- Fazekas, R., E. Molnar, P. Nagy, B. Mikecs, P. Windisch and J. Vag (2018). "A Proposed Method for Assessing the Appropriate Timing of Early Implant Placements: A Case Report." *J Oral Implantol* **44**(5): 378-383. <https://www.ncbi.nlm.nih.gov/pubmed/29870305>. DOI: 10.1563/aaid-joi-D-17-00295.

Cím: 1088 Budapest, Szentkirályi utca 47.

Postacím: 1085 Budapest, Üllői út 26.; 1428 Budapest, Pf. 2.

E-mail: helyreallito.fogaszat@semmelweis.hu

Tel.: 36-1-317-1598

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- Molnar, E., R. Fazekas, Z. Lohinai, Z. Toth and J. Vag (2018). "Assessment of the test-retest reliability of human gingival blood flow measurements by Laser Speckle Contrast Imaging in a healthy cohort." Microcirculation **25**(2).<https://www.ncbi.nlm.nih.gov/pubmed/28976050>. DOI: 10.1111/micc.12420.
- Fazekas, R., B. Molnar, L. Kohidai, O. Lang, E. Molnar, B. Ganti, G. Michailovits, P. Windisch and J. Vag (2019). "Blood flow kinetics of a xenogeneic collagen matrix following a vestibuloplasty procedure in the human gingiva-An explorative study." Oral Dis **25**(7): 1780-1788.<https://www.ncbi.nlm.nih.gov/pubmed/31336001>. DOI: 10.1111/odi.13163.
- Fazekas, R., E. Molnar, B. Mikecs, Z. Lohinai and J. Vag (2019). "A Novel Approach to Monitoring Graft Neovascularization in the Human Gingiva." J Vis Exp(143): e58535.<https://www.ncbi.nlm.nih.gov/pubmed/30688301>. DOI: 10.3791/58535.
- Molnar, B., E. Molnar, R. Fazekas, B. Ganti, B. Mikecs and J. Vag (2019). "Assessment of Palatal Mucosal Wound Healing Following Connective-Tissue Harvesting by Laser Speckle Contrast Imaging: An Observational Case Series Study." Int J Periodontics Restorative Dent **39**(2): e64-e70.<https://www.ncbi.nlm.nih.gov/pubmed/30794263>. DOI: 10.11607/prd.3878.