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RESEARCH AREA

My research focuses on two main areas. First, for nearly 30 years, I have studied the microcirculation of oral tissues. In recent years, we have conducted human studies to understand the restoration of blood circulation in periodontal flaps after surgery. This is significant because regenerative surgeries, widely used today to replace soft and bone tissue and prepare for implant placement, often involve large tissue grafts. These grafts can cause tension in the mucosal flap, which hinders blood circulation and delays healing.

The second area of focus is digital dentistry. We primarily investigate the accuracy of intraoral scanners and CAD/CAM manufacturing processes. Additionally, we explore the usability and reliability of intraoral scanners for human identification. The geometry and rugae patterns of the palate are unique to each individual. By digitizing the palate in 3D with an intraoral scanner and analyzing it using machine learning techniques, this approach shows promise for rapid identification of victims in mass disasters.

TECHNIQUES AVAILABLE IN THE LAB

- Non-invasive measurement of the blood flow in patients by Laser Speckle Contrast Imaging for blood flow.
- Usage of intraoral scanning, CAD design, and CAM manufacturing.
- Digital 3D analysis of meshes.
- Digital Forensic investigation.

SELECTED PUBLICATIONS

Nagy, Z., Simon, B., Mennito, A., Evans, Z., Renne, W., **Vag, J.** (2020) Comparing the trueness of seven intraoral scanners and a physical impression on dentate human maxilla by a novel method. **BMC Oral Health 20(1):** 97.

Revell, G., Simon, B., Mennito, A., Evans, Z.P., Renne, W., Ludlow, M., **Vag, J.** (2022) Evaluation of complete-arch implant scanning with 5 different intraoral scanners in terms of trueness and operator experience. **J Prosthet Dent 128(4):** 632-638.

Borbola, D., Berkei, G., Simon, B., Romanszky, L., Sersli, G., DeFee, M., Renne, W., Mangano, F., **Vag, J.** (2023) In vitro comparison of five desktop scanners and an industrial scanner in the evaluation of an intraoral scanner accuracy. **J Dent 129:** 104391.

Borbola, D., Mikolicz, A., Romanszky, L., Sersli, G., DeFee, M., Renne, W., **Vag, J.** (2024) Complete-arch accuracy of seven intraoral scanners measured by the virtual-fit method. **J Dent 149:** 105281.

Stevens, C.D., Renne, W.G., **Vag, J.** (2024) Translucency of chairside monolithic zirconias using different sintering ovens: An in vitro investigation, **J Dent 142:** 104839.