Comparative Studies of the Peri-implant Epithelium of Rat Gingivae between “Platform-switched” and “Non-switched” Implant System

Ikiru Atsuta, Yasunori Ayukawa, Yoichiro Ogino, Kiyoshi Koyano

Section of Removable Prosthodontics, Division of Oral Rehabilitation, Faculty of Dental Science Kyushu University, Japan

Purpose: The “platform-switched” implant system has emerged as one of the effective implant treatment. However, supportive basic studies in this system have not yet been reported. To prove the importance of this system, we have done two studies; (1) the observations of the morphology of peri-implant epithelium (PIE), (2) the attachment of PIE to the implant surface, comparing the “platform-switched” and “non-switched” implant model, respectively.

Materials and methods: Six-week-old male Wistar rats were used for the “platform-switched” and “non-switched” implant model. The experiments are as follows; (1) the distribution of Laminin-5 (Ln-5), location between junctional epithelial and regulator of epithelial cell migration and adhesion, is investigated during the formation of PIE in two models, (2) the comparison of the extent of penetration of Horseradish peroxidase (HRP) as an exogenous factor, laid on the gingival margin around the implant body, with two models.

Results: (1) The formation of PIE: New epithelium was formed from the keratinized oral sulcular epithelium, extending apically with Ln-5-positive cells. After 1-2 weeks, new epithelium was differentiated into the PIE and spread further apically, facing the implant surface. Ln-5 was expressed at the PIE-connective tissue interface, but not at the implant-PIE interface. Finally, after 4 weeks, Ln-5 was only expressed at the implant-PIE interface. These results in two models have no significant differences. (2) The penetration of an exogenous factor: In the “platform-switched” implants system, strong DAB reaction based on HRP is only seen in the coronal region of the PIE, whereas the reaction is seen in the apical region and the connective tissue in the “non-switched” implants system.

Conclusion: The “platform-switched” implant system allows PIE to elongate apically. However, this system can inhibit penetration of HRP from the gingival sulcus into the connective tissue under the PIE, compared with “non-switched” implant system. These findings suggest that this system is effective for the sealing of the epithelium-implant interface.