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Prelamination of the radial forearm flap using tissue engineered mucosa

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Introduction

The radial forearm flap (RFF)[1] was described for intraoral reconstruction in 1983[2]. Since, the RFF has become the "pack horse" for microvascular reconstruction procedures. Disadvantages are donor site and recipient site complications[3]. The poor adaption of the skin to the mucosa and the possible growth of hair are discomforts which can be omitted by the prelamination procedure[4]. Mucosa can be tissue engineered for intraoral wound coverage[5] and we were interested in using this technique for prelamination of the RFF.

Material and Methods

Patients: In four patients suffering from squamous cell carcinomas - localisation: floor of the mouth (n=3), inner right cheek (n=1), tumor size: T_4 (n=1), T_2 (n=3) the tissue engineered prelamination technique was applied.
Tissue Engineering of Mucosa Graft: When taking the biopsy for histopathology, from an additional biopsy of healthy contralateral mucosa primary mucosa cultures were established[5]. After 14 days the keratinocytes were seeded on a collagen foil, (Tissue Foil ®, size 5 x 6 cm, Baxter) and kept for 2 days (see Table 1)
Prelamination of Radial Forearm Flap and Transplantation: The cell covered foil was implanted subcutaneously at the lower forearm (Fig.1). Six days later at tumor resection the tissue engineered mucosa on the fascial flap with the vessel pedicle was harvested (Fig.2) then grafted intraorally. Microvascular anastomosis followed.

Fig.1

Fig.2

Tab 1) Timetable & Steps of Prelamination Procedure and Grafting

Approx Day - 23	**Biopsy for Cell Culture &** Biopsy Pathohistology
Day - 22	*Gingival Keratinocyte Primary Culture*
Day - 8	*Gingival Keratinocyte Subcultures on Collagen Sheet Tissue Foil ®*
Day - 6	*Keratinocyte on Collagen Sheet subcutaneous Implantation at Lower Forearm*
Day 0	*Flap - Transplantation*

Results

In all patients prelamination healed uneventfully. In one case a hematoma had formed between the skin and the collagen foil. The gingival keratinocytes seeded collagen foil adhered firmly to the underlying tissue. After trans-plantation the donor side healed primarily (Fig.3). Intraorally no dehiscence occured at the borders of the grafted mucosa fascia flap in the postop interval. Microvascular anastomosis showed no failure. In the patient with the buccal defect an infection at the resection side developed and was drained without jeopardizing the flap. The surface of the flap initially covered with debris and easily vulnerable was in the further postoperative period ede-matous and settled to pink-pale mucosa after 6 weeks (Fig 4).

Fig.3

Fig.4

Discussion and Conclusions

This clinical application of tissue engineering technique and microvascular grafting has the advantages that no additional donor side for a skin graft is necessary and that a normal mucosa lining develops intraorally.

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Poster Faksimile:

Prelamination of the Radial Forearm Flap using Tissue Engineered Mucosa

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Conclusion

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Literatur

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