

Peri-Implant Mucosal Phenotype Modification Assessed By Ultrasound: A Novel Approach with Recombinant Human Epidermal Growth Factor

Saravanan Sampoornam Pape Reddy¹, Delfin Lovelina Francis¹

¹ Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar, India

Introduction

The quality and quantity of peri-implant soft tissue are critical determinants of long-term implant stability and esthetics. Thin mucosal phenotype and lack of keratinized mucosa predispose to peri-implant inflammation and disease. While autogenous grafting is considered the gold standard, biologically active molecules such as recombinant human epidermal growth factor (rhEGF) have shown promise in promoting soft tissue regeneration. This study evaluated the outcomes of combining a xenogeneic collagen matrix with rhEGF for peri-implant soft tissue augmentation.

Aim

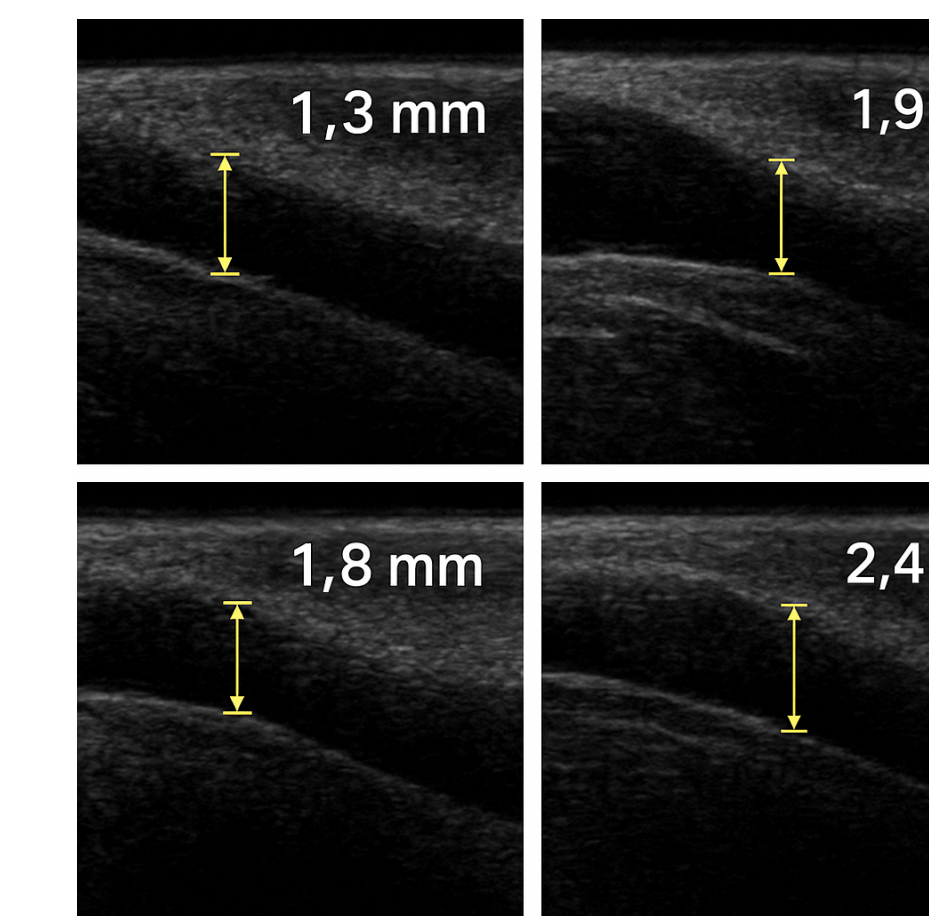
To assess the effect of rhEGF in combination with collagen matrix in modification of peri-implant soft tissue phenotype

Materials & Methods

In this prospective clinical trial, 20 patients with <2 mm of keratinized mucosa around single implants were allocated to receive either a xenogeneic collagen matrix alone (control, n=10) or collagen matrix with adjunctive rhEGF (test, n=10). Clinical parameters including keratinized mucosa width (KMW), mucosal thickness (MT), peri-implant probing depth (PD), and bleeding on probing (BOP) were recorded at baseline and 12 months. Standardized intraoral photographs and ultrasound-based thickness measurements were used for objective assessment.

Experimental Results

Both groups demonstrated significant improvement in KMW and MT compared to baseline. The test group (collagen + rhEGF) showed greater mean gain in mucosal thickness (1.8 ± 0.4 mm) versus the control group (1.2 ± 0.3 mm; $p < 0.05$). Improvements in peri-implant PD and BOP were observed in both groups, with no significant differences. Esthetic scores were higher in the test group. Healing was uneventful, with no graft exposure or complications.



Baseline vs. 12-Month Ultrasound Measurement

This figure depicts paired ultrasound images taken at baseline (left) and 6 months post-treatment (right). The mucosal thickness at baseline was 1.3 mm, which increased to 1.8 mm at follow-up. The vertical white arrows denote the measurement axis. The hyperechoic upper layer corresponds to keratinized epithelium, and the deeper hypoechoic band represents connective tissue.

Conclusion

Adjunctive application of rhEGF with collagen matrices enhances peri-implant soft tissue phenotype compared to collagen alone. This approach may reduce morbidity associated with autogenous grafting and improve long-term peri-implant tissue stability.

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