

Keratin-based enamel regeneration: A promising frontier in conservative dentistry

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Dear Editor, Tooth enamel regeneration continues to be a major challenge in the field of conservative dentistry. I recently came across an article published in *Advanced Healthcare Materials* (August 2025), which introduces an innovative method utilising keratin derived from human hair and sheep wool to create an enamel-like coating on demineralised tooth surfaces.¹ This biomaterial effectively attracted calcium and phosphate ions from saliva, aiding in the natural restoration of enamel hardness and structure, without the use of synthetic polymers or invasive procedures. This represents a significant advancement in dental research. I would like to express my interest in contributing insights from our dental practice in Pakistan.

Given the high prevalence of dental caries in Pakistan, estimated to be about 56% of the population, particularly in low-resource settings,² this breakthrough holds significant potential. A meta-analysis of 30 studies conducted between 2009 and 2020, involving 27,878 subjects, found the overall prevalence of dental caries in Pakistan to be 56.62% (95% CI: 49.54–63.57).³ These findings underscore the urgent need for effective, accessible solutions like the enamel-mimicking biomaterial described in the recent *Advanced Healthcare Materials* publication, in Pakistan.

We propose that dental research institutions in Pakistan initiate local feasibility studies on keratin-based enamel

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therapies. Clinical trials and biocompatibility testing under local oral microbiota and dietary conditions will be essential to establish utility across diverse populations. Pakistan's economic challenges negatively impact the oral health of its citizens, and poverty makes it difficult for many people to afford regular dental check-ups and essential treatments.⁴ Research like this presents an opportunity for affordable, eco-friendly, and locally adaptable treatment options that require minimal infrastructure. For instance, A topical keratin-based coating or toothpaste formulation may offer a cost-effective and non-invasive approach to managing early-stage enamel erosion. We must not lag in adopting such transformative health advancements.

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