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Editorial

# Osteo-Odonto-Keratoprosthesis (OOKP): A Visionary Integration of Dentistry and Ophthalmology

**Arpit Sikri[1]* and Jyotsana Sikri[2]**

*[1]Associate Professor and Post Graduate Teacher, Department of Prosthodontics, Crown and Bridge and Oral Implantology, Bhojia Dental College and Hospital, Budh (Baddi), Himachal Pradesh, India*

*[2]Associate Professor and Post Graduate Teacher, Department of Conservative Dentistry and Endodontics, Bhojia Dental College and Hospital, Budh (Baddi), Himachal Pradesh, India*

***Corresponding Author:** Arpit Sikri, Associate Professor and Post Graduate Teacher, Department of Prosthodontics, Crown and Bridge and Oral Implantology, Bhojia Dental College and Hospital, Budh (Baddi), Teh. Baddi, Distt. Solan, Himachal Pradesh, India.

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In the realm of ocular surface reconstruction, few procedures exemplify the convergence of surgical innovation and interdisciplinary collaboration as remarkably as the osteo-odonto-keratoprosthesis (OOKP). Developed in the mid-20$^{th}$ century, OOKP stands as a testament to the ingenuity of combining dental tissue with ophthalmic prosthetics, offering a final beacon of hope for patients suffering from end-stage bilateral corneal blindness-particularly when conventional keratoplasty or other artificial corneal implants are bound to fail.

## Historical evolution and conceptual genesis

The concept of using a tooth to support an optical cylinder was pioneered by Italian ophthalmologist Prof. Benedetto Strampelli in the 1960s. His technique was later refined by Prof. Giancarlo Falcinelli, resulting in what is now widely practiced as the modified osteo-odonto-keratoprosthesis (MOOKP) [1]. The rationale behind using an autologous tooth-bone lamina lies in its superior biointegration and long-term tolerance in the hostile ocular environment, which is often plagued by dryness, inflammation, and scarring in patients with cicatrizing ocular surface disorders.

## Indications: A niche but crucial role

OOKP is primarily indicated in patients with severe bilateral corneal blindness who are poor candidates for conventional corneal grafting. These include cases of Stevens-Johnson syndrome, ocular cicatricial pemphigoid, chemical burns, trachoma, and severe dry eye syndromes [2]. The most significant contraindication remains the absence of a healthy canine tooth or poor general health status that precludes extensive surgical intervention.

## The surgical journey: A multistage odyssey

The procedure is highly intricate and conducted in multiple stages:

1. Stage I includes removal of keratinized ocular surface tissues and placement of a buccal mucosal graft onto the ocular surface. Simultaneously, a single-rooted tooth (preferably a canine) is harvested along with surrounding alveolar bone. This osteodental lamina is sculpted to house a polymethyl methacrylate (PMMA) optical cylinder and is implanted in a subcutaneous abdominal pouch for vascularization [3].
2. Stage II, conducted several months later, involves retrieval of the lamina and its implantation into the eye after removing the central portion of the cornea. The optical cylinder acts as a new visual axis, with the osteodental lamina ensuring stability and biointegration.

The technique demands seamless coordination between prosthodontists, oral and maxillofacial surgeons, and ophthalmologists-a true interdisciplinary feat.

### Outcomes and prognosis

OOKP boasts remarkable long-term retention rates, with studies reporting visual rehabilitation in over 60-85% of patients with follow-up periods exceeding 10 years [4]. Visual acuity can be restored to functional levels (20/200 or better), transforming lives of individuals once consigned to total blindness. Moreover, the unique immunoprivileged environment afforded by the autologous tooth-bone complex minimizes the risk of rejection seen with other keratoprosthetic devices [5].

However, complications such as lamina resorption, glaucoma, retinal detachment, and extrusion of the cylinder are notable concerns. A vigilant follow-up protocol and timely intervention are essential to sustain visual outcomes [6].

### Challenges and Ethical Considerations

Despite its success, OOKP is not without criticism. The technique is labor-intensive, costly, and requires prolonged hospitalization. Ethical questions have been raised regarding the invasiveness of using dental tissues and the risks involved in such a high-stakes procedure, particularly in developing countries where access and affordability remain major hurdles [7]. Moreover, patient selection and counseling are of utmost importance, given the life-long implications of the surgery and its maintenance.

## The future: Innovation meets biology

The advent of biocompatible materials, tissue engineering, and regenerative ophthalmology may one day offer less invasive alternatives. Yet, until such technologies mature to match the stability and integration seen with OOKP, the procedure will continue to serve as the gold standard for certain categories of corneal blindness. Research into 3D printed osteodental analogs and bioengineered scaffolds also holds promise for expanding this technique to edentulous patients [8].

## Conclusion

Osteo-odonto-keratoprosthesis represents more than just a surgical technique-it embodies the resilience of medical science in addressing the most challenging cases of blindness. By merging the strengths of prosthodontics and ophthalmology, OOKP not only restores sight but also redefines the boundaries of interdisciplinary medicine. As long as there are patients for whom conventional vision-restoring methods fail, OOKP will remain a critical, albeit last-resort, solution-a literal and symbolic fusion of tooth and eye in the quest to see again.

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