



Polytetrafluoroethylene (PTFE) Use in the Dental Field

A Alizadeh, M Beaman, P Kulkarni, J Londono, D Pannu

Advanced Education Program in Prosthodontics, Department of Restorative Sciences

The Dental College of Georgia, Augusta University, Augusta, GA.



ABSTRACT

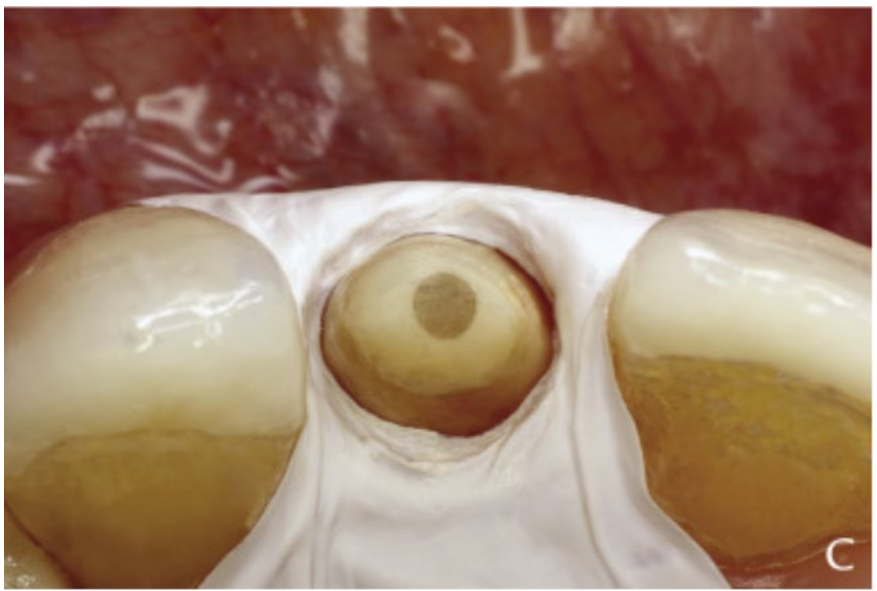
In dentistry, Polytetrafluoroethylene (PTFE) has been incorporated to produce nonbiodegradable barriers that have been used successfully for GBR and GTR.¹⁴ PTFE has been incorporated in suturing materials to produce durable non-resorbable sutures and monofilament expanded polytetrafluoroethylene (e-PTFE).³ Aside from being incorporated with other biocompatible materials, PTFE can also be used alone or for an array of purposes in the dental field. Dental applications of PTFE may include but are not limited to:- use as a barrier material, interdental separator in adhesive dentistry, sealing of screw access channels, pulpal access in multi-step RCT procedures, and occlusal stamping in direct restorative procedures.^{2, 4, 5, 7, 13} The purpose of this article is to summarize the use and application of PTFE in dental field.

INTRODUCTION

PTFE is chemically stable, non-toxic to humans, highly resistant to heat and chemicals, and has an extremely low coefficient of friction. These properties of PTFE make it a suitable material for medical use.¹³

MATERIALS & METHODS

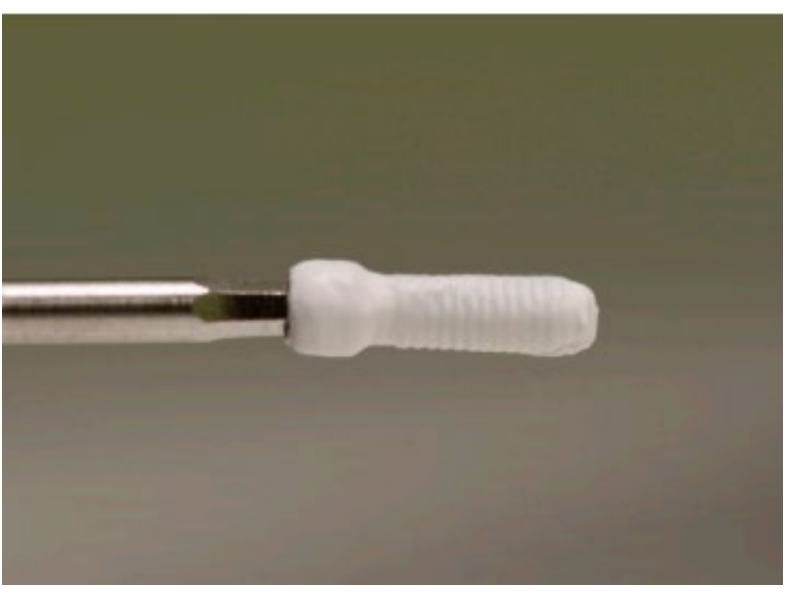
The PubMed database was searched for published studies in the English language from 2012-2022. The following MESH terms were used to generate a search: "PTFE tape," "Teflon tape," "dental materials," "use in dentistry". From the searches, 14 relevant articles were included for documented uses of PTFE in the dental field.



PTFE used for isolation in adhesive cementation.¹²



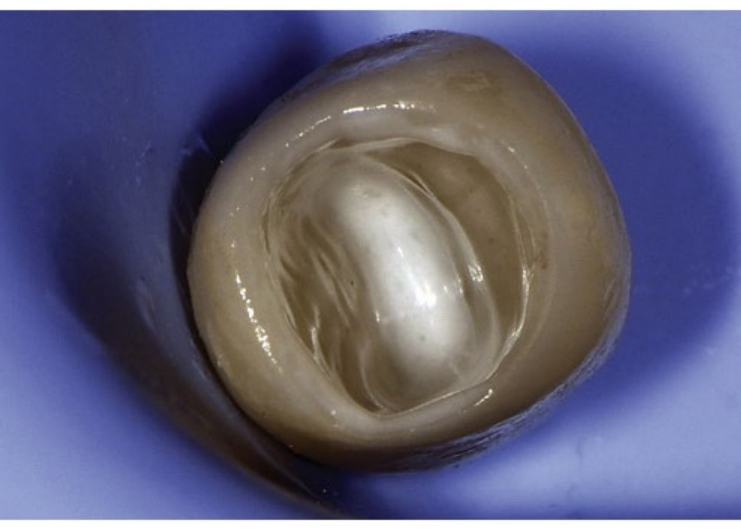
PTFE used to solve screw loosening complication.²



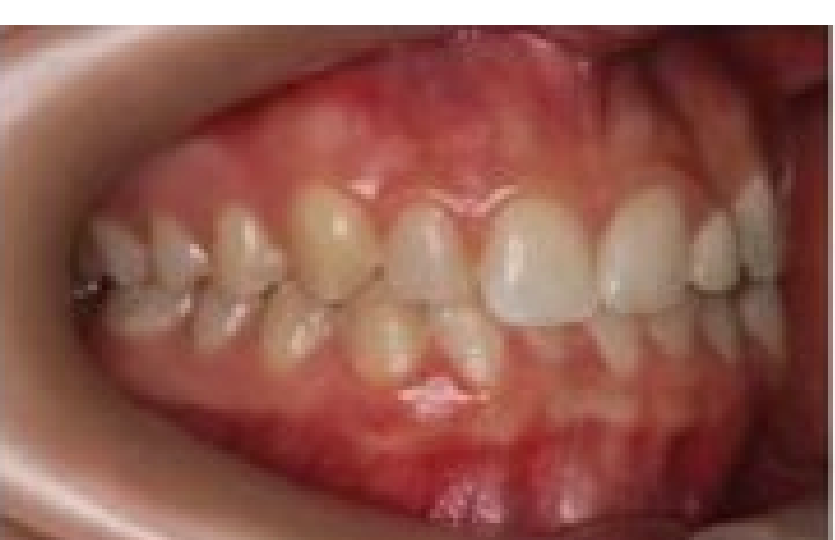
Management of screw access channels in implant supported prostheses.⁹



PTFE-based stamp techniques for restoring occlusal anatomy using resin-based composites.⁷



PTFE used to minimize residual cement on cement retained implant crowns.⁴



PTFE used for isolation.¹³



PTFE used to reduce residual cement during FPD cementation.¹³



PTFE use to seal endodontically treated tooth.¹³



PTFE reinforced membrane and PTFE suture.^{3,14}

DISCUSSION

Documented research has shown that PTFE can be used both alone and/or incorporated with other biocompatible materials in a wide array of procedures across the dental field.^{3, 14} PTFE is used in sutures, in barrier materials, as a separator, as an access channel sealer, and other uses.^{2, 4, 5, 9, 11, 12, 13} The widespread use of PTFE in clinical practice is because it is easily sourced, inexpensive and not technique sensitive. Most commercially available PTFE has not been FDA approved as a medical device. In some countries, only medical grade PTFE can be used.

CONCLUSION

PTFE is a valuable material serving many purposes in the field of dentistry. Use of medical grade PTFE is recommended, as industrial PTFE is not FDA approved. If industrial grade PTFE is utilized for non-invasive treatment, it must be autoclaved.

REFERENCES

1. Alsalleeh, Fahd, and Manal Alkadi. "Ex Vivo Microbial Leakage Analysis of Polytetrafluoroethylene Tape and Cotton Pellet as Endodontic Access Cavity Spacers." *Journal of Conservative Dentistry*, vol. 22, no. 4, 2019, p. 381.
2. Félix, Luis F., et al. "A Novel Technique Using Polytetrafluoroethylene Tape to Solve Screw Loosening Complication in Implant-Supported Single Crowns." *International Journal of Environmental Research and Public Health*, vol. 18, no. 1, 2020, p. 125.
3. González-Barnadas, Albert, et al. "In Vitro Tensile Strength Study on Suturing Technique and Material." *Journal of Oral Implantology*, vol. 43, no. 3, 2017, pp. 169–174.
4. Haas, Ronald C., and Steven E. Haas. "Cement Shield Membrane Technique to Minimize Residual Cement on Implant Crowns: A Dental Technique." *The Journal of Prosthetic Dentistry*, vol. 123, no. 2, 2020, pp. 223–227.
5. Hess, Timothy A. "A Technique to Eliminate Subgingival Cement Adhesion to Implant Abutments by Using Polytetrafluoroethylene Tape." *The Journal of Prosthetic Dentistry*, vol. 112, no. 2, 2014, pp. 365–368.
6. KAMEDA, Takashi, et al. "Polytetrafluoroethylene (PTFE): A Resin Material for Possible Use in Dental Prostheses and Devices." *Dental Materials Journal*, vol. 38, no. 1, 2019, pp. 136–142.
7. Klein, Christian, et al. "A Quantitative Assessment of Silicone and PTFE-Based Stamp Techniques for Restoring Occlusal Anatomy Using Resin-Based Composites." *Clinical Oral Investigations*, vol. 26, no. 1, 2021, pp. 207–215.
8. Mathew, Abhishek. "Microbial Contamination Comparison between Cotton Pellet and Polytetrafluoroethylene Tape Endodontic Spacers: A Systematic Review." *European Endodontic Journal*, 2021.
9. Moráquez, Osvaldo D., and Urs C. Belser. "The Use of Polytetrafluoroethylene Tape for the Management of Screw Access Channels in Implant-Supported Prostheses." *The Journal of Prosthetic Dentistry*, vol. 103, no. 3, 2010, pp. 189–191.
10. Pacinelli, Andrew, et al. "A Technique for Identifying Implant Abutment Screw Heads and Corresponding Implant Drivers by Using Colored Polytetrafluoroethylene Tape." *The Journal of Prosthetic Dentistry*, vol. 127, no. 1, 2022, pp. 59–60.
11. Prabhakar, Attiguppe Ramasetty, et al. "Microbiologic Evaluation of Cotton and Polytetrafluoroethylene (PTFE) Tape as Endodontic Spacer Materials in Primary Molars an in Vivo Study." *Journal of Clinical Pediatric Dentistry*, vol. 42, no. 1, 2018, pp. 21–26.
12. Roig-Vanaclocha, Ana, et al. "Polytetrafluoroethylene Relative Isolation for Adhesive Cementation of Dental Restorations." *The Journal of Prosthetic Dentistry*, 2022.
13. Sattar, M. M., et al. "Clinical Applications of Polytetrafluoroethylene (PTFE) Tape in Restorative Dentistry." *British Dental Journal*, vol. 222, no. 3, 2017, pp. 151–158.
14. Sheikh, Zeeshan, et al. "Collagen Based Barrier Membranes for Periodontal Guided Bone Regeneration Applications." *Odontology*, vol. 105, no. 1, 2016, pp. 1–12.