



INTRODUCTION

As time progresses, technology advances and materials become superior. The history of indirect dental restorations includes gold by Claude Mouton in 1746, porcelain jacket crowns in 1903 by Charles Land, "lost wax" casted restorations in 1907 by William Taggart, and porcelain-fused-to metal crowns developed in the late 1950s by Abraham Weinstein.¹⁻³ Since the 1990s, newer tooth-colored restorative materials (ie: lithium disilicate, zirconia) have been introduced into the dental market. Yet, the preparation designs have remained quite similar throughout the years. These esthetic dental materials rely on advanced adhesive dentistry and the preparation design for these newer materials need to be amended to maximize its benefits. Furthermore, dental schools must stay current in teaching these minimally invasive preparation designs for advanced adhesive dentistry to their students for long term success with the newer dental materials.

Preparation Design & Rationale

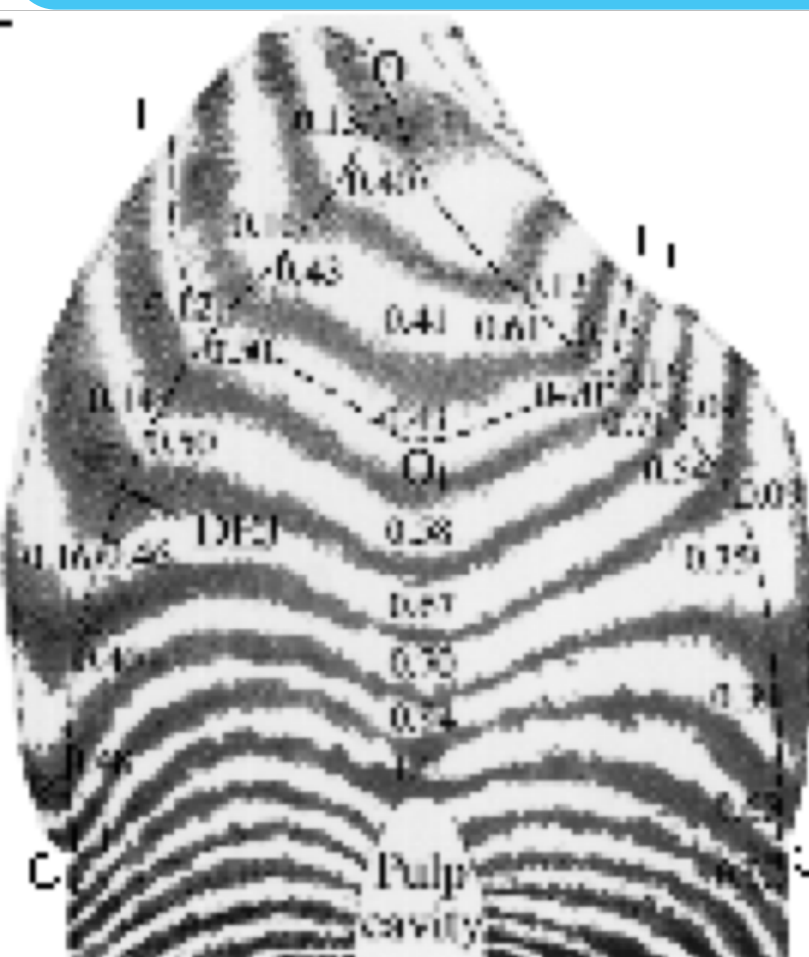


Fig. A⁴

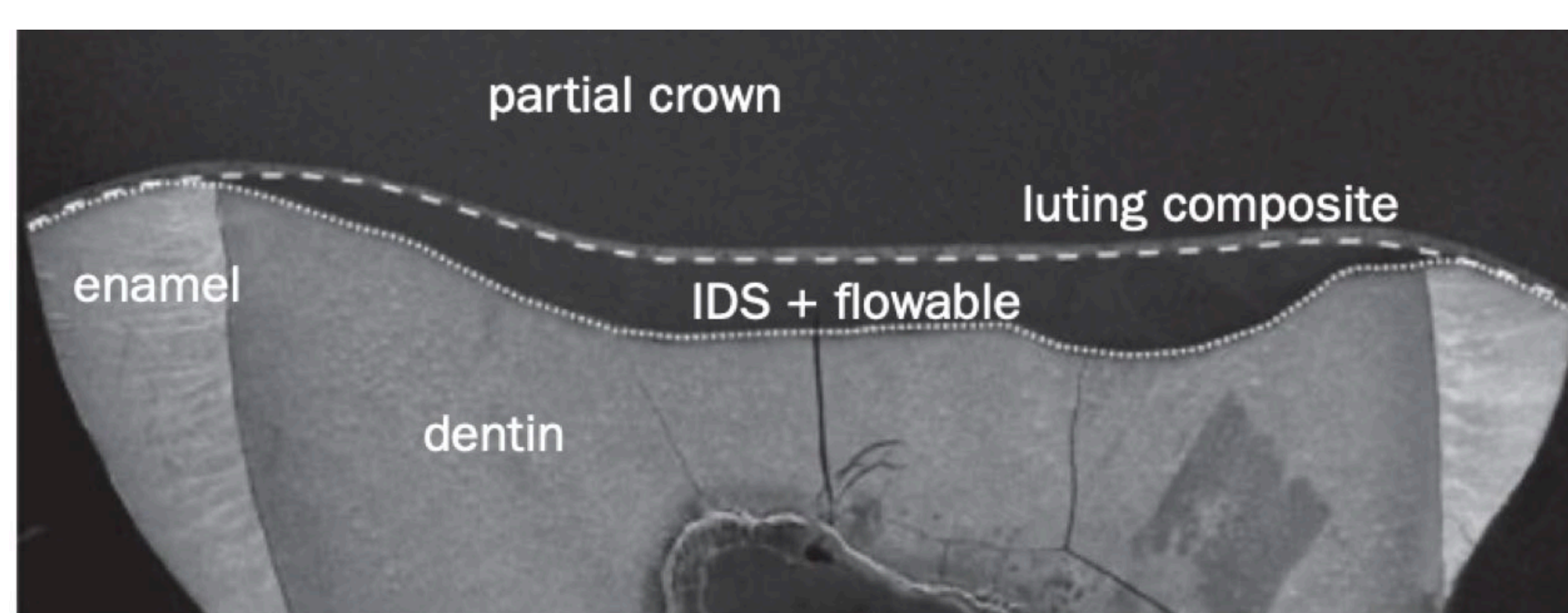


Fig. B⁵

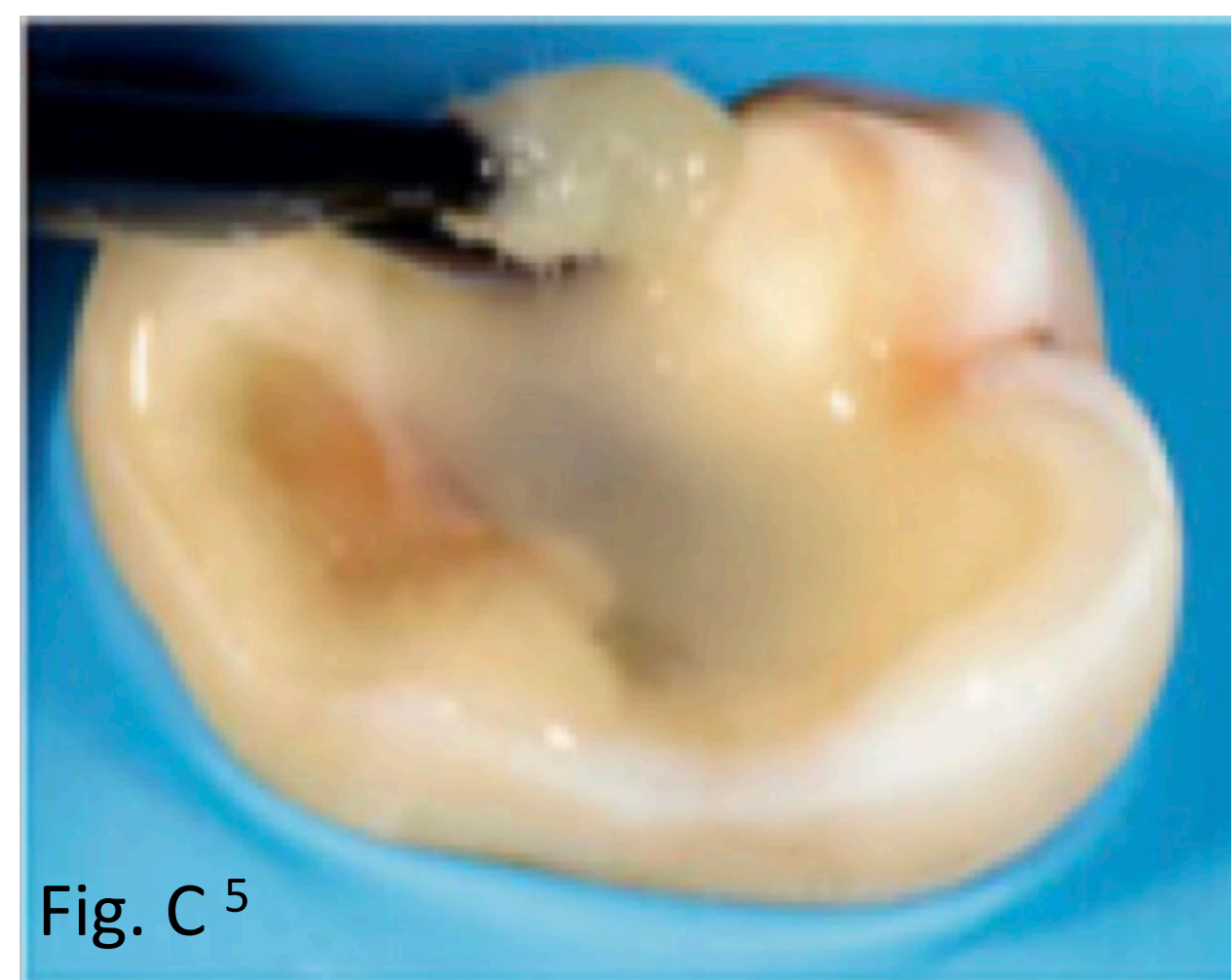


Fig. C⁵



Fig. D⁵

RESULTS

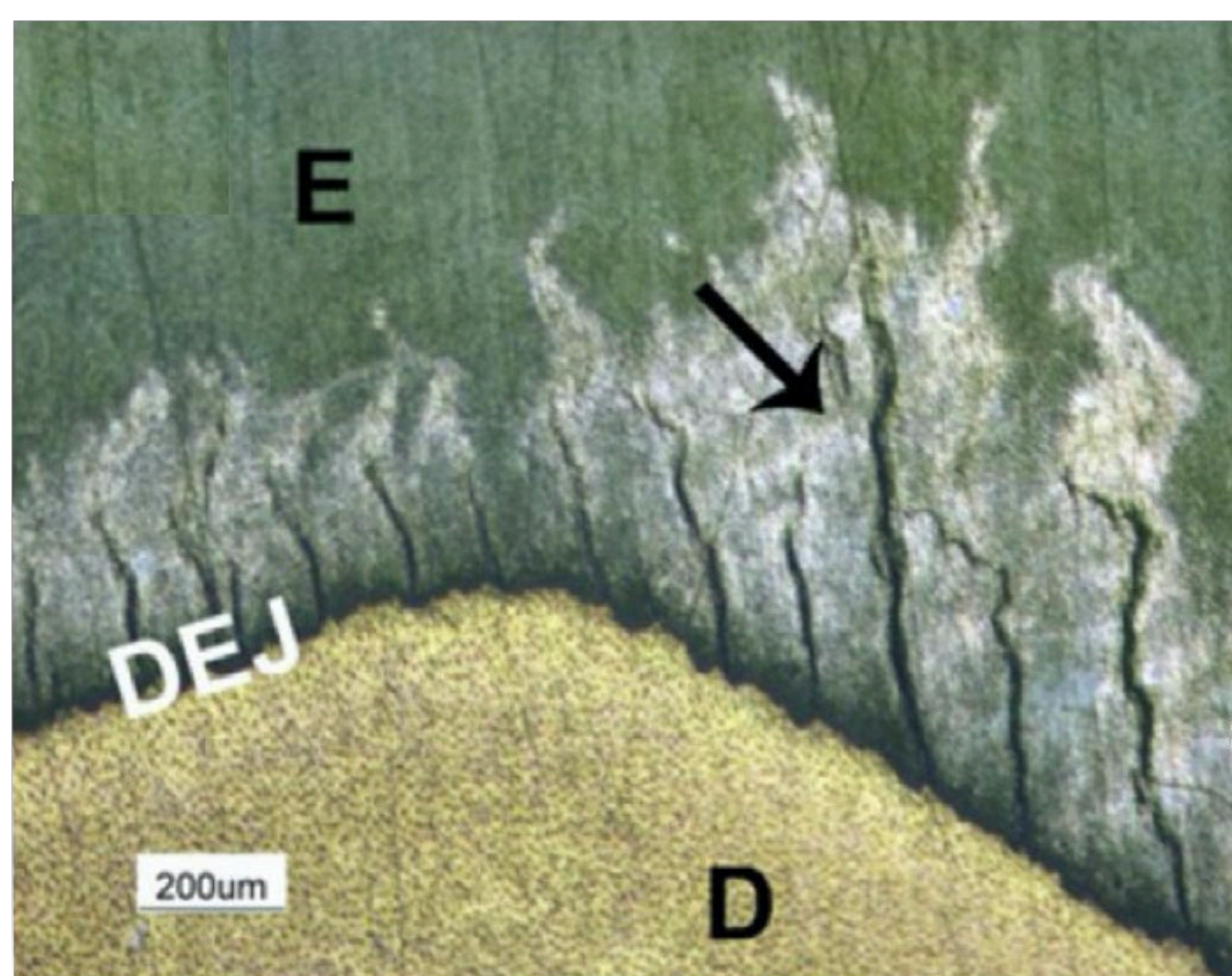


Fig. E⁶

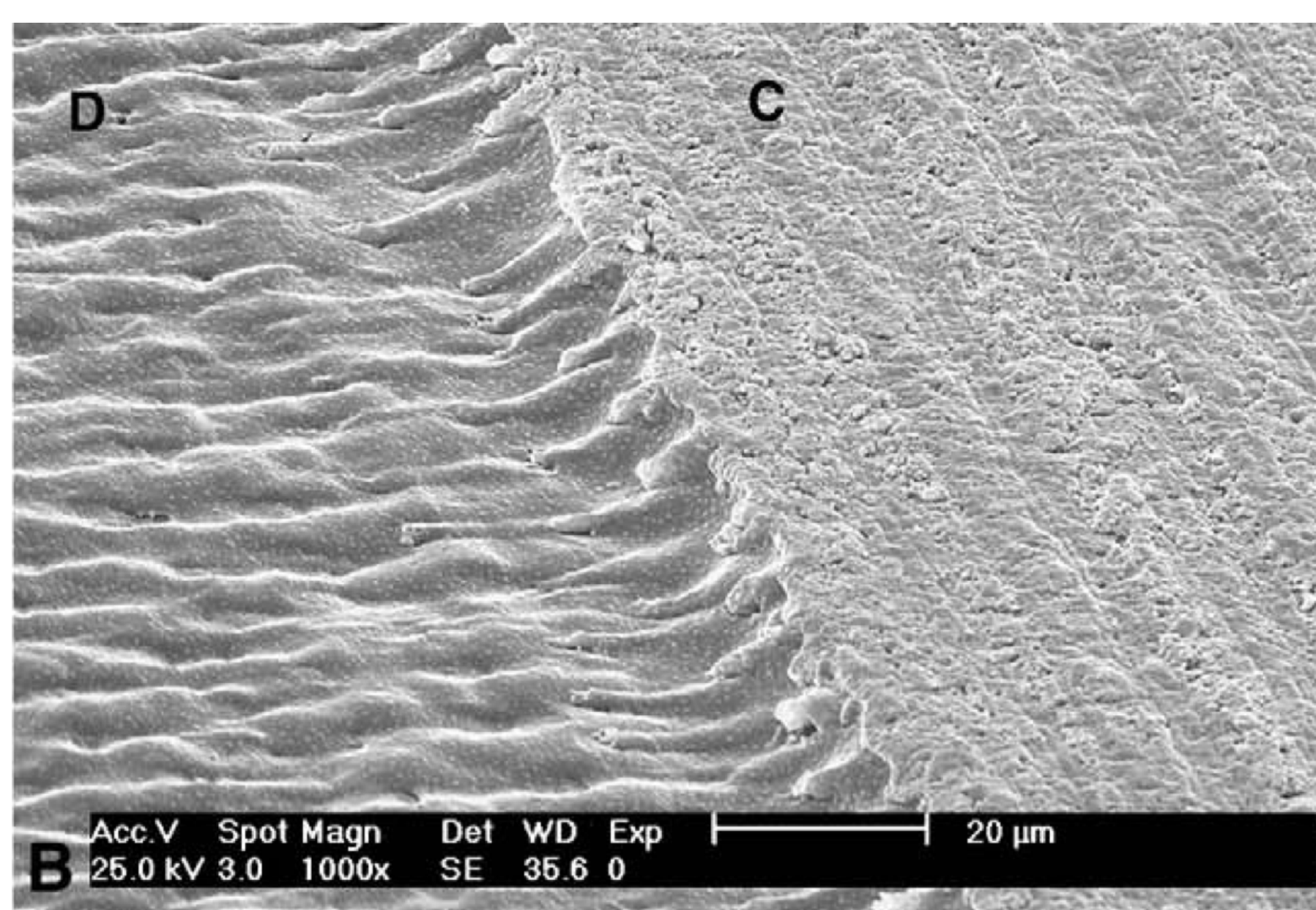


Fig. F⁷

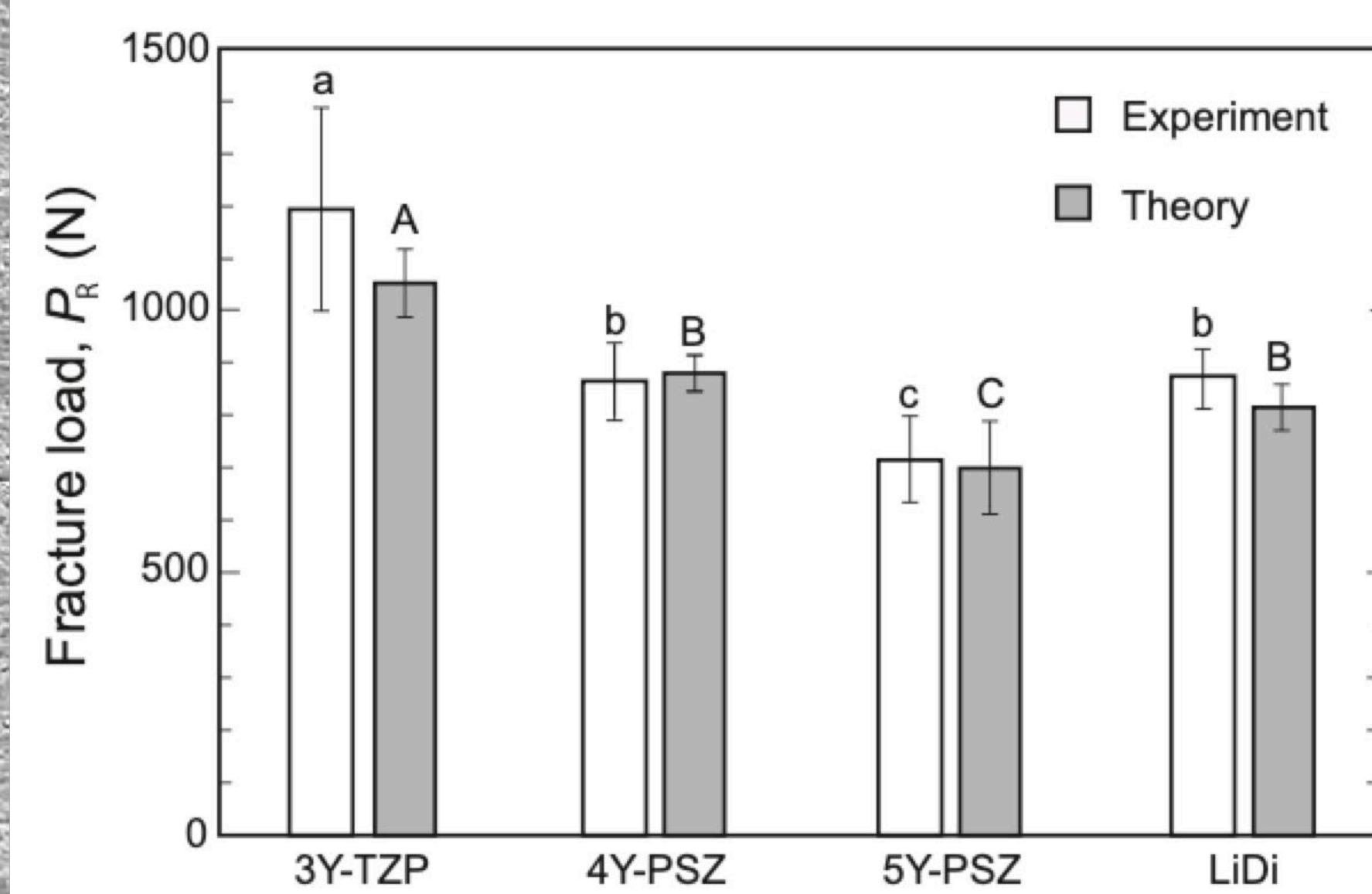


Fig. G⁸

CONCLUSION

As dental materials advance, the techniques utilized must also be amended to maximize the potential of the materials being used. Currently, today in dentistry, the same preparation designs are being utilized for various dental materials that work in completely different manners. The older materials, such as gold and PFM restorations, rely on retention and resistance forms by means of a cementation process. However, the newer dental materials today, such as lithium disilicate and zirconia, can be bonded and rely on advanced adhesion protocols which minimize reduction of tooth structure with the overlay design. This overlay preparation works harmoniously with the nature's intended structure of the tooth in a biomimetic method by means of fracture resistance and structural stress mitigation. As new materials are introduced, we must not only evolve our techniques, but also train our dental students with the newer concepts to stay current with the science.

REFERENCES

1. <https://www.ada.org/en/member-center/ada-library/dental-history>
2. Taylor JA. History of Dentistry: A Practical Treatise for the Use of Dental Students and Practitioners. Philadelphia, PA: Lea & Febiger; 1922: 142-156.
3. Asgar K. Casting metals in dentistry: past-present-future. Adv Dent Res.1998;2(1):33-43.
4. Wang RZ, Weiner S. Strain – structure relations in human teeth using Moiré fringes. J Biomech. 1998;31(2):135-141.
5. Politano G, Van Meerbeek B, Peumans M. Nonretentive bonded ceramic partial crowns – concept and simplified protocol for long-lasting dental restorations. J Adhes Dent. 2018;20(6):495-510.
6. Thompson VP. The tooth: An analogue for biomimetic materials design and processing. Dent Materials 2020(36):25-42.
7. Magne P, Kim TH, Cascione D, Donovan TE. Immediate dentin sealing improves bond strength of indirect restorations. J Prosthet Dent 2005;94:511-9.
8. Yan J, Kaizer MR, Zhang Y. Load-bearing capacity of lithium disilicate and ultra-translucent zirconias. Journal of the Mechanical Behavior of Biomedical Materials 2018(88) 170–175.

We would like to thank the Greater New York Dental Meeting, NYU College of Dentistry, Touro College of Dental Medicine, and biomimetic dental mentors for this opportunity. Thank you.