

Which dental materials inhibit cavity-causing bacteria?

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1 Introduction

The bacteria *Streptococcus mutans* lives in the mouth and causes cavities

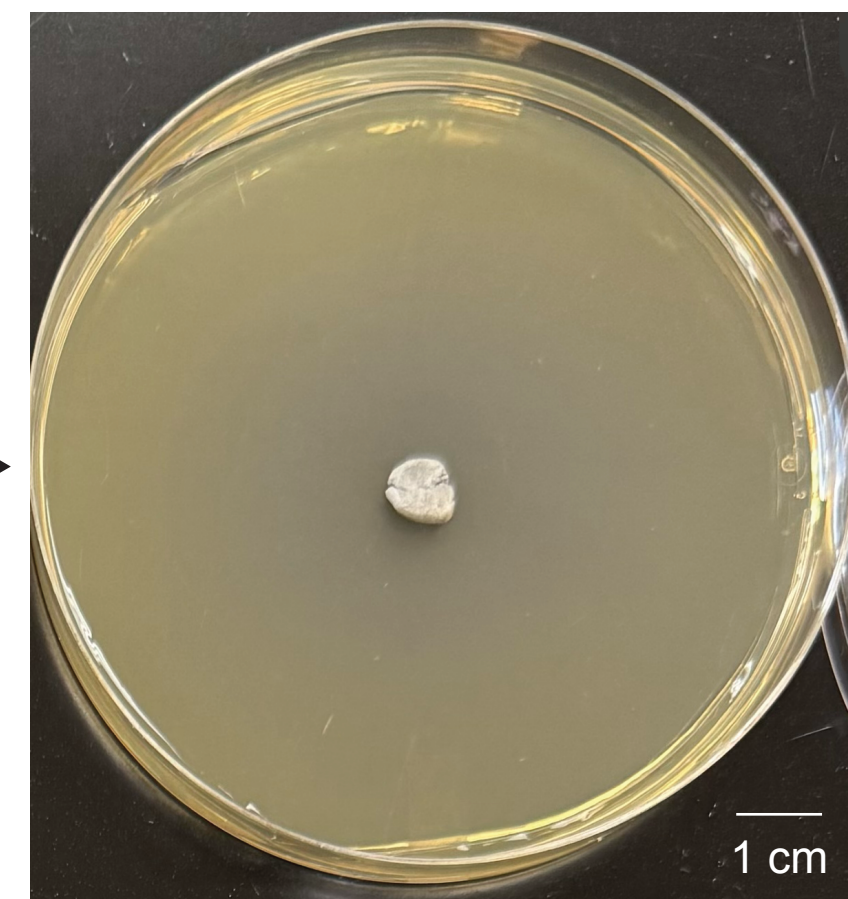
Various types of dental materials are used to fill cavities and repair the surface of teeth

How do different dental materials affect the growth of *Streptococcus mutans*?

We measured how well *Streptococcus mutans* lives on three types of dental materials: composite z250, glass ionomer, and amalgam.

2 Methods

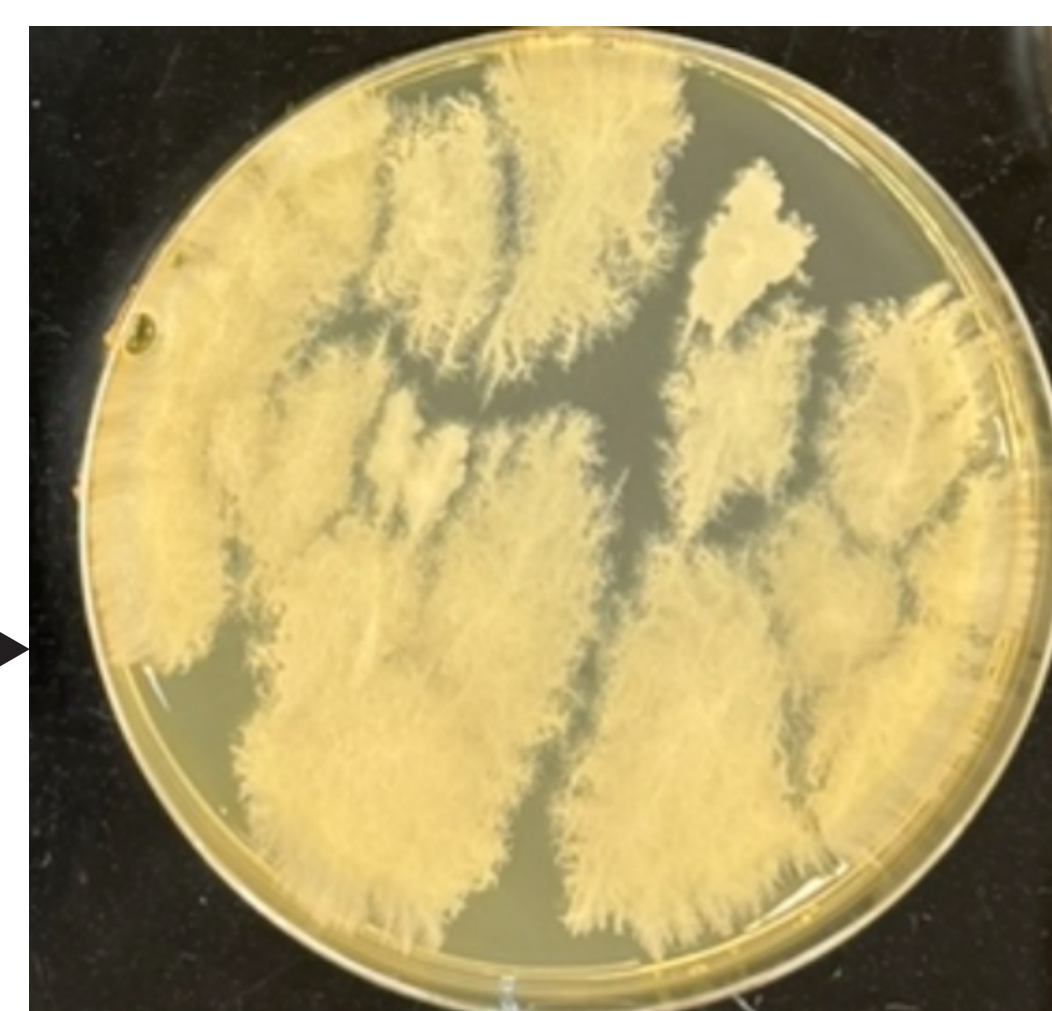
The three dental materials were molded into small discs, immersed in a broth of *Streptococcus mutans*, and plated individually onto nutrient agar



We first tested how much bacteria a disc transferred to the agar by measuring the size of bacterial colonies after incubation using custom Matlab software.



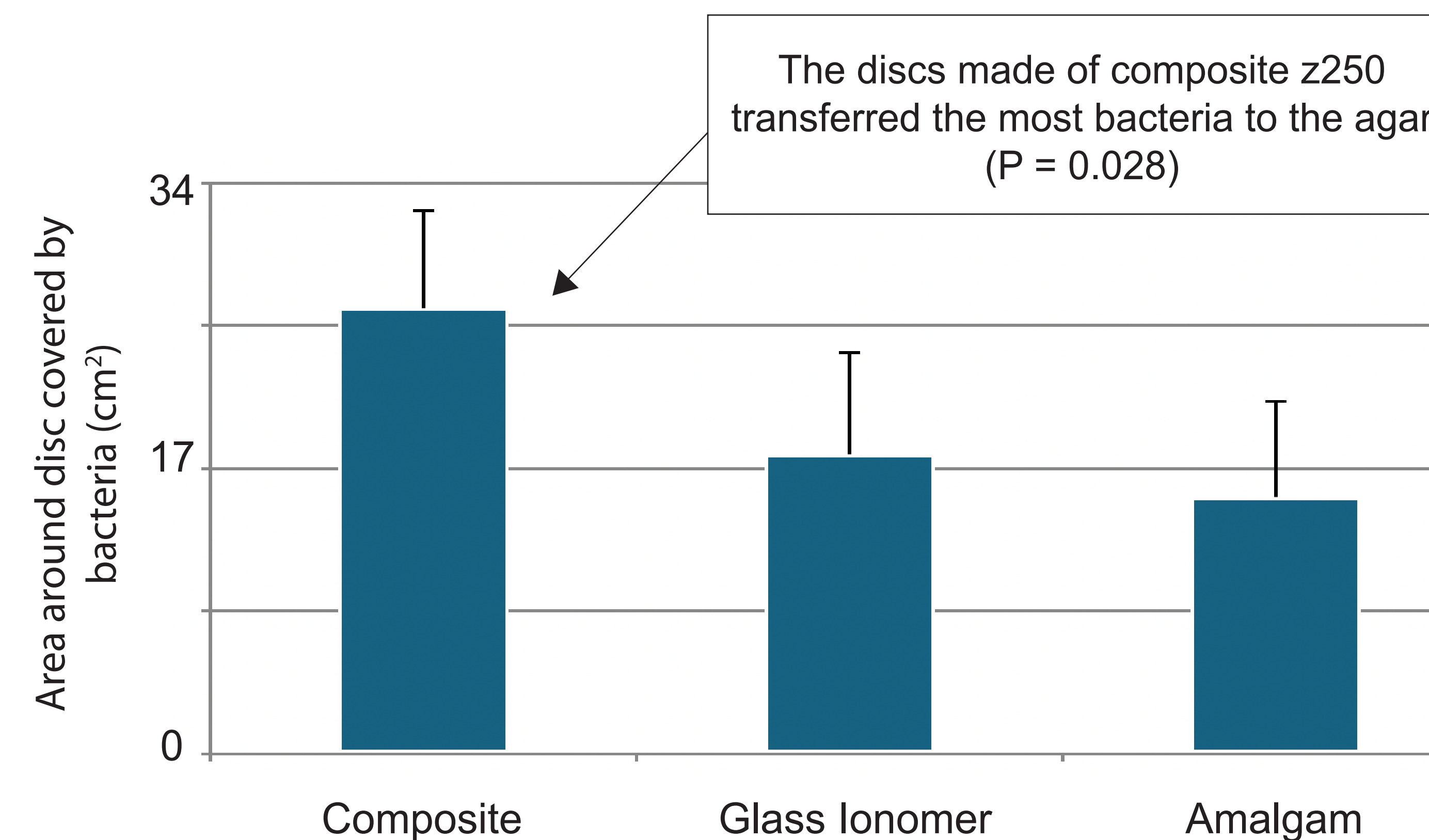
We also measured how well the bacteria survived on the discs by swabbing a disc after 24 and 48 hours, and plating these samples onto nutrient agar. The growth of the bacteria was then measured after incubation.



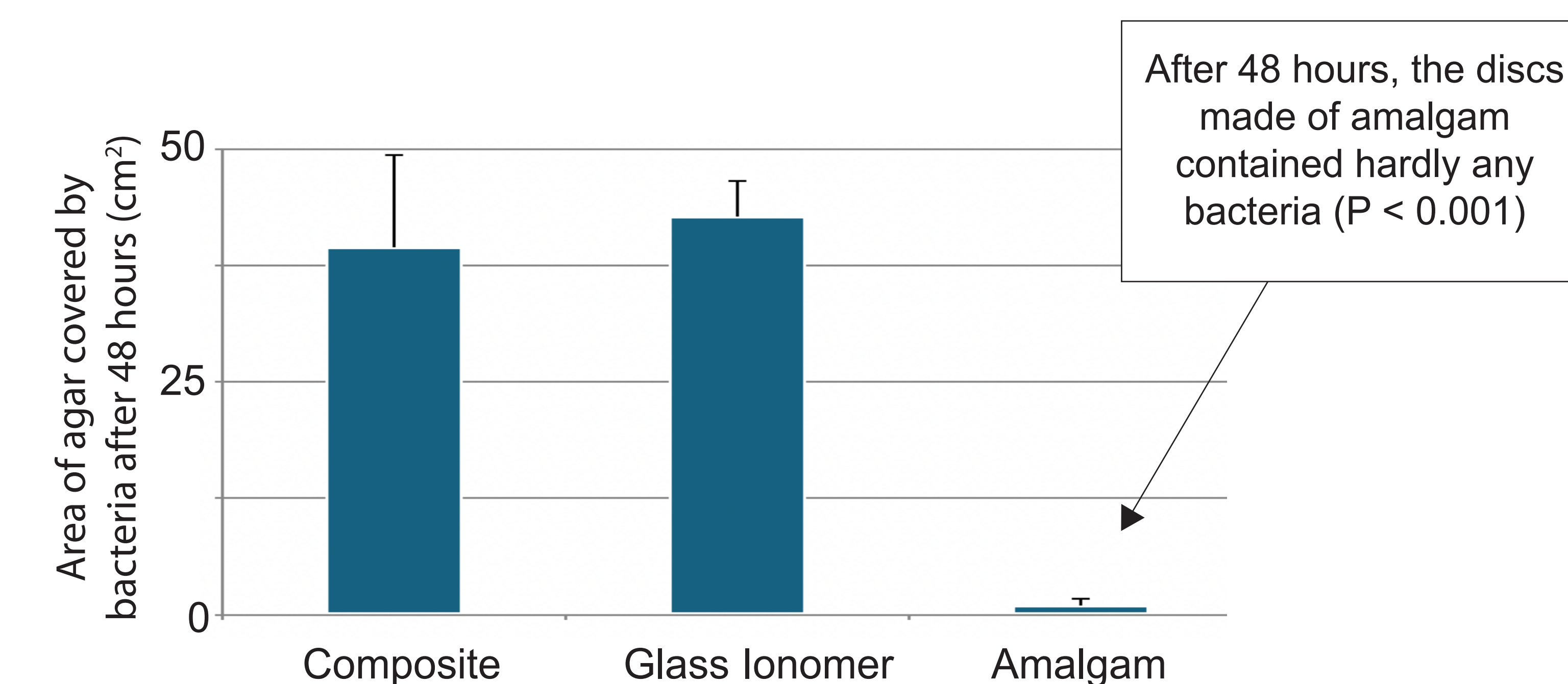
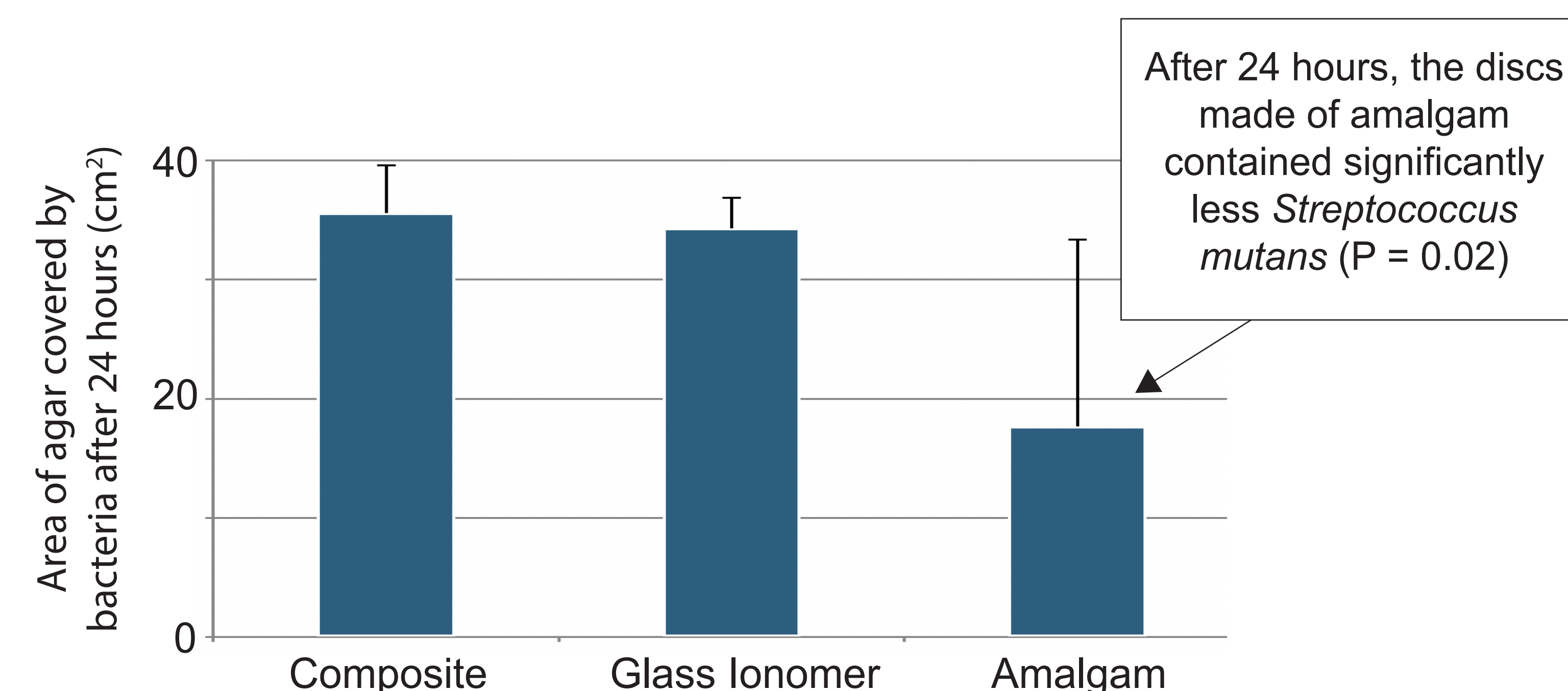
We repeated this process five times for each type of disc, and compared the results between groups using a 1-way ANOVA.

3 Results

All three dental materials transferred *Streptococcus mutans* to the agar



When the discs were sampled directly, amalgam contained the least amount of bacteria after both 24 and 48 hours.



4 Discussion

Amalgam demonstrated the strongest inhibitory effect on *Streptococcus mutans*

While the aesthetics of composite and glass ionomer are often preferred for dental repairs, our results suggest amalgam may reduce further decay

The observed variations in bacterial growth may be due to the different material compositions and surface properties of the dental materials. Amalgam is composed of metals (liquid mercury and a powdered alloy of silver, tin, and copper) that have been shown to be antimicrobial.

Further research is needed to evaluate how these materials perform in clinical conditions and to see if our results are consistent in real-world settings.

5 References

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