



Marginal Integrity of Composite Resin and Glass Ionomer as A Restoration for Non-Carious Cervical Lesions: A Mixed Systematic Review and Cumulative Meta-Analysis in Pursuance of the Best Evidence Base

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Abstract

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Keywords: Composite; Glass Ionomer; NCCLs; Bonding; Retention; Marginal Discoloration; Marginal Integrity

Abbreviations

NCCLs: Non-carious Cervical Lesions

Introduction and Objective

Non-carious cervical lesion (NCCLs) is a very interesting topic in the field of restorative dentistry. This is for several reasons: (1) It considered one of the most common lesions in the permanent teeth. (2) The best restorative materials indicated for NCCLs is still controversial subject, and (3) despite many studies done and still ongoing, there is no consensus about bonding agent systems and their bonding effectiveness.

Currently, the restorative options for cervical lesions (in general) are composite resin, glass ionomer, gold foil and amalgam. Each of these options have different characteristics and properties. For example, gold foil is one of the best dental materials with respect to the physical properties; however, for conservative and esthetic reasons, composite is one of the best of the restorative dental materials. Glass ionomer comes after composite as an esthetic direct restorative material. Besides this, glass ionomer uniquely has an anti-carious property by releasing fluoride ions. In advanced NCCLs, since the tooth already lost part of its structure, it is preferred to restore these cases with restorations that do not require further

preparation for retention like composite resin and glass ionomer. Consequently, composite and glass ionomer are favored over amalgam and gold foil for esthetic and conservative purposes in NCCLs cases. Hence, in this study, we want to compare composite resin and glass ionomer as a restoration option for non-carious cervical lesions (NCCLs). More specifically, we want to evaluate the marginal integrity and retention rate of composite resin and glass ionomer materials as a restoration option for NCCLs.

Methods

Systematic reviews with or without meta-analysis, observational studies, and randomized clinical trials that assess the effectiveness of glass ionomer, composite resin, and/or adhesive systems such as a restorative material for NCCLs were chosen. Cochrane library, PubMed, ADA Center for Evidence-Based Dentistry, Google Scholar, Web of Science database were searched from September 2015 to April 2016. The review was restricted to papers with English language, and papers studying permanent teeth with a time frame no less than one year.

Results

Three clinical trials and three systematic reviews have been accepted as papers, that have high level and quality of evidence.

All the accepted clinical trials concluded, that glass ionomers have better marginal integrity than resin composite in the NCCLs. In the other hand, two of the systematic reviews agreed with our clinical trials; that glass ionomers as a restoration for NCCLs would have better marginal integrity than resin composite. Only one systematic review concluded that resin composite as a restoration for NCCLs has better marginal integrity than glass ionomer.

Clinical relevance

There is consensus that NCCLs are multifactorial lesion, caused by abrasive-erosive-ablative stress; hence the resulting dentine is a hyper-mineralized sclerotic dentine with partial or total obliteration of the tubules. Which negatively affects dentine bonding. Malocclusion and/or eccentric movements might contribute in initiating or worsening NCCLs. Flexure at the cervical region caused by parafunctional forces has been thought to be one of the etiological factors in NCCLs as well.

Unlike tooth with normal dentine, sclerotic dentine is difficult to restore by composite resin with bonding agents. Because sclerotic dentine differs anatomically, and it may need to be etched differently than sound dentin. Consequently, retention, marginal integrity, recurrent caries, micro-leakage, or sensitivity issues are usually shown in NCCLs restored with composite [1-16].

Conclusion

Based on the qualitative analysis of the accepted clinical trials and systematic reviews, restoring NCCLs with glass ionomer is going to yield a better marginal integrity with higher rate of retention and less marginal discoloration. These findings affirmed the superiority of glass ionomer over composite in respect of marginal integrity in NCCLs restorations.

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Bibliography

1. Adeleke A A and A O Oginni. "Clinical Evaluation Of Resin Composite And Resin Modified Glass Ionomer Cement in Non-Carious Cervical Lesions". *Journal of The West African College of Surgeons* 4th Ed. 2 (2012): 21-37.
2. American Dental Association Center for Evidence-Based Dentistry (2016).
3. Chiappelli Francesco. *Fundamentals Of Evidence-Based Health Care And Translational Science*. New York Dordrecht London: Springer Heidelberg New York Dordrecht, N.D. Print. 978-3-642-41856-3.
4. Dijken Jan WV. "Retention of A Resin-Modified Glass Ionomer Adhesive in Non-Carious Cervical Lesions. A 6-Year Follow-Up". *Journal of Dentistry* (2005): 541-547.
5. Franco E B., *et al.* "5-Year Clinical Performance of Resin Composite Versus Resin Modified Glass Ionomer Restorative System in Non-Carious Cervical Lesions". *Operative Dentistry* (2006): 403-08.
6. *Guideline On Restorative Dentistry* (2016).
7. Heintze Siegwald D., *et al.* "Clinical Performance of Cervical Restorations— A Meta-Analysis". Elsevier, www.intl.elsevier-health.com/journals/dema. 993-1000.
8. Hewlett Edmond. "An Introduction to Non-Carious Cervical Lesions". UCLA School of Dentistry (2016).
9. Heymann Harald O., *et al.* "Sturdevant's Art and Science of Operative Dentistry". Fifth Ed. St. Louis: Mosby, (2006).
10. Long A and Harrison S. "The Balance of Evidence. Evidence-Based Decision Making". *Health Services Journal*, Glaxo Wellcome Supplement 6 (1995): 1-2.
11. Peumansa MF, *et al.* "Clinical Effectiveness of Contemporary Adhesives For The Restoration Of Non-Carious Cervical Lesions. A Systematic Review". *Dental Materials* 30 (2014): 1089-1103.
12. Phi L., *et al.* "Quantification and Validation of The Expansion of The Grading of Recommendations Assessment, Development, And Evaluation (Ex-GRADE) For Evidence-Based Clinical". *Open Dentistry Journal* (2012): 31-40.

13. R-AMSTAR Checklist - Quality Assessment For Systematic Reviews (2016).
14. Revised Preferred Reporting Items For Systematic Reviews And Meta-Analyses (PRISMA) (2016).
15. Sakaguchi Ronald L and John M Powers. "Craig's Restorative Dental Materials". Ed. Inc Ann Arbor, Michigan The Dental Advisor Dental Consultants. Thirteen Edition. Philadelphia: ELSEVIER MOSBY, (2012).
16. Santos., *et al.* "Retention Of Tooth-Colored Restorations In Non-Carious Cervical Lesions—A Systematic Review". Springer-Verlag Berlin Heidelberg, (2014): 1369-381.