

Manuscript Title

Polymer Infiltrated Ceramic Hybrid Composites as Dental Materials

Author(s)

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Summary

The manuscript was received on August 14, 2017 and was peer reviewed by three reviewers and an editor.

The initial recommendation of Major Revision was made on October 25, 2017.

The first revision was submitted on December 13, 2017 and was re-evaluated by the editor.

The manuscript was accepted for publication on January 23, 2018.

Peer Review Comments

Reviewer 1

The topic is very interesting but the title and abstract are misleading.

The authors fail to fully address the topic that was set out to investigate. It is not a coherent piece of work.

English is a major issue throughout the manuscript. The authors use terms that are not appropriate for a scientific manuscript (e.g. Introduction, line 2 'fascinates'; page 4, penultimate line 'amount of monomer in the performs' etc.).

Several sentences need supporting references 9e.g. page 2, paragraph 2, both sentences that begin with 'In addition..').

Page 2, last sentence is a statement which is not justified.

Page 3, references 25-26 end of first paragraph seem to be out of sequence

Page 3, reference 9 has no relevance for the text cited.

Page 3, reference 42 is out of sequence.

Page 5, last paragraph, mention of 10% vol reduction needs to be referenced.

These issues are repeated throughout the text and it seemed pointless to carry on highlighting them."

Reviewer 2

General:

1. Is the topic of the paper under the scope of the journal? **Yes**
2. Does the paper conform to the guidelines to authors of the concerned journal? **Yes**
3. Is the topic of research worthy of investigation? **Yes**
4. Does the work add anything new to the existing literature in the field? **No, it is a literature review. Such an article can be of value.**

Presentation:

1. Does the title correctly reflect the content of the paper? **Yes**
2. Has the paper been logically constructed? **Somewhat. There is some logic to the order.**
3. Is the paper readable and easy to understand? **No**
4. Is the paper grammatically correct and free from typos/language errors? **No**

Abstract:

1. Does the abstract present an accurate synopsis of the paper? **No**
2. Is the abstract in accordance with the journal guidelines? **No. The final statement should not be, "will be discussed". The phrase "toward their wider application" needs to be more specific in an abstract.**

Introduction and Aims:

1. Is the introduction appropriate to the paper's subject? **It would be if all of the statements made were accurate. There may be a language problem. One does not want to "enhance the brittleness of ceramics." The appropriate statement would be to mitigate or decrease the brittleness of a pure ceramic, or improve the toughness.**
2. Is the introduction too long or too short? **No**
3. Does the introduction review the literature correctly and adequately? **There are statements in the introduction that go beyond what the referenced article can support. Phrases like "it is not surprise" does not belong in scientific writing.**
4. Is the aim of the study clearly stated? **It is not a study, but the article is a review.**

Methods: There are no Materials and Methods. This article is strictly a review of the literature.

1. Is the design of the study consistent with the aim of the study?
2. Is the sample size sufficient to represent the population?
3. Is the methodology correctly and adequately described?
4. Are the statistical tests used correctly and clearly described?
5. Are there any ethical objections on the study? If yes, has the approval been taken from concerned ethics committee?

Results: There are no results of any study.

1. Are the results presented in a clear manner (with the use of tables and graphs)?
2. Are the statistical tests used appropriate?
3. Are the results statistically significant?
4. Is the sample size too small to justify and generalize the findings?

Discussion:

1. Does the discussion appropriately explain the results? **No results therefore no discussion of results.**
2. Does the discussion appropriately compare and discuss the results of the present study with other published results?

Conclusions:

1. Do the conclusions accurately infer the results of the study?

2. Are the conclusion clearly mentioned?
3. Are there any limitations of the study, which might have influenced the study outcomes?

Acknowledgements: There is no information provided on authors, funding, or acknowledgements.

1. Is there any source of funding?
2. Are the sources of funding appropriately acknowledged?
3. Is there any statement on how each author should've or must've contributed to the paper?
4. Are there any conflicts of interests?

References:

1. Are the references as per the format given in author guidelines of the journal? **Yes**
2. Are the references accurate, up to date, and relevant? **One typo is "Plurddemann" It should be Pleuddemann**

Specific Comments to the author:

The concept being discussed is interesting, but the inaccuracies are significant. There are also incomplete sentences in the article. There are also sentences with a structure that makes it impossible to understand what the meaning is supposed to be.

In the discussion of refractive index mismatch, the author(s) suggest that the infiltration of resin into the ceramic would reduce the mismatch. There would still be interfaces between the resin and ceramic which would refract light and thus increasing the opacity. The resin and ceramic are not miscible.

There is mention of using photopolymerization. Then there should be some discussion of molar absorptivity of the spectral absorbance of the photoinitiator.

This article does not mention a replamineform process for a ceramic/polymer anastomosing composite. White RA, Weber JN, White EW. Replamineform: A New Process for Preparing Porous Ceramic, Metal, and Polymer Prosthetic Materials. *Science*. 176(4037):922-924, May 26, 1972. But many other authors do not identify this early interpenetrating network of polymer and resin.

There are also inaccurate statements. A few examples are:

"polymerization from monomer to polymer, a volume reduction approximates 10%." The shrinkage is highly dependent on the monomer, degree of conversion, and the type of polymerization.

"almost all the materials used in restorative dentistry are homogeneous and isotropic." They may be isotropic, but composites are not homogeneous." Most of the indirect restorative materials that start in a plastic state are definitely not homogeneous. The phrase is also a direct quote (though inaccurate) though not identified as such.

There is a phrase indicating an advantage of "intra-oral reparability". It is tacked onto the end of a sentence with reference #42 before the phrase. Reference #42 does not suggest reparability. Neither is there a rationale provided in this article for the reparability.

The article suggests that this composite is a better match to tooth structure in abrasivity or abrasion resistance. Though there may be truth to the statement, there is no support for this conjecture provided.

Reviewer 3

I recommended that this undergo a major revision. They ignore the most important example for restorative dentistry, the new product Enamic from Vita. Their discussion is almost entirely devoted to alumina and zirconia, which are not being used in this manner in dentistry. Their process they highlight is only being used experimentally for tissue engineering scaffolds. I doubt that they obtained permission to use the figures.