frontiers | Frontiers in Dental Medicine

EDITORIAL
published: 14 June 2022
doi: 10.3389/fdmed.2022.949367

Editorial: Remineralization Procedures in Pediatric Dentistry

Mine Koruyucu[1]*, *Elif Bahar Tuna İnce*[1], *Andrea Ferreira Zandona*[2] and *Adriana Modesto Vieira*[3]*

[1] Faculty of Dentistry, Istanbul University, Istanbul, Turkey, [2] Tufts University School of Medicine, Boston, MA, United States, [3] School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA, United States

Keywords: remineralization, demineralization, fluoride, CPP–ACP, caries

Editorial on the Research Topic

Remineralization Procedures in Pediatric Dentistry

Dental caries is the most common chronic and multifactorial disease caused by the disruption of the ecological balance of the oral microbiome in the mouth mediated by diet. If the pH drops below the critical pH (pH = 5.5) as a result of the acidic environment formed in the mouth, it can lead to the dissolution of the impure hydroxyapatite structures and hard tissues in the tooth, a process called demineralization (1). The concentrations of calcium and phosphate in saliva have significant influence on the protective mechanisms of dental hard tissues within the oral environment which means also a lower critical pH. Critical pH is a dynamic metric directly dependent on salivary calcium and phosphate levels. On the other hand, remineralization is the process of returning minerals from the surrounding environment such as saliva and biofilm to the demineralized tooth structures. It can be the result of a natural process or by increasing the availability of minerals thru preventive modalities such as fluoride applications (2). The mechanisms by which the demineralization-remineralization process takes place in teeth and new methods that prevent and/or reverse demineralization or increase remineralization have been meticulously researched. Recent developments in material sciences and tissue engineering offer considerable potential to dental therapies. Transforming these new technologies into products and applications is critical to improving and developing healthcare worldwide (3).

There is a wide range of remineralizing agents (4, 5).

1) These agents may include fluoride-containing products;

   Oligopeptides,
   Theobromine,
   Arginine,
   Self-assembling peptides,
   Polydopamine,
   Proanthocyanidin (PA);

2) Electric field-induced remineralization;
3) Non-fluoride remineralizing agents,

   Casein phosphopeptide–amorphous calcium phosphate (CPP–ACP),
   Amorphous calcium phosphate (ACP),
   Alpha tricalcium phosphate (TCP) and Beta TCP (β-TCP),
   Sodium calcium phosphosilicate (bioactive glass),

OPEN ACCESS

Edited and reviewed by:
David John Manton, University Medical Center Groningen, Netherlands

***Correspondence:**
Mine Koruyucu
minekoruyucu@gmail.com
Adriana Modesto Vieira
ams208@pitt.edu

Specialty section:
This article was submitted to Pediatric Dentistry, a section of the journal Frontiers in Dental Medicine

Received: *20 May 2022*
Accepted: *30 May 2022*
Published: *14 June 2022*

Citation:
Koruyucu M, Tuna İnce EB, Zandona AF and Modesto Vieira A (2022) Editorial: Remineralization Procedures in Pediatric Dentistry. Front. Dent. Med. 3:949367. doi: 10.3389/fdmed.2022.949367

Dicalcium phosphate dehydrate (DCPD),
Xylitol,
Calcium phosphate-based nanomaterials,
Nanoparticles (calcium fluoride nanoparticles),
Nano- hydroxyapatite particles,
Nanobioactive glass materials and combinations of these.

Recent papers say, a better understanding of regenerative and physiochemical mechanisms has influenced the development of a number of innovative remineralization technologies that go beyond fluoride-mediated remineralization (6). While traditional fluoride-based remineralization remains the cornerstone for caries management applications with the highest level of supporting evidence, additional remineralizing agents to enhance fluoride effects are specially needed in high caries risk individuals and population groups (7, 8).

Remineralization agents can be geared toward home care or professional use (4). Studies are ongoing about the differences among the various remineralizing agents and their effectiveness with the goal of identifying best options for patients.

The articles in this Research Topic will provide the guest Editorial team hopes that the present special additional information on this important Research Topic and encourage further work in this rapidly progressing area of dental science.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

REFERENCES

1. Struzycka I. The oral microbiome in dental caries. *Pol J Microbiol.* (2014) 63:127–35. doi: 10.33073/pjm-2014-018
2. González-Cabezas C, Fernández CE. Recent advances in remineralization therapies for caries lesions. *Adv Dent Res.* (2018) 29:55–9. doi: 10.1177/0022034517740124
3. Abou Neel EA, Aljabo A, Strange A, Ibrahim S, Coathup M, Young AM, et al. Demineralization-remineralization dynamics in teeth and bone. *Int J Nanomedicine.* (2016) 11:4743–63. doi: 10.2147/IJN.S107624
4. Chandna P, Srivastava N, Ali S. Remineralizing agents: the next frontier. *Curr Clin Pharmacol.* (2016) 11:211–20. doi: 10.2174/1574884711666160607084813
5. Arifa MK, Ephraim R, Rajamani T. Recent advances in dental hard tissue remineralization: a review of literature. *Int J Clin Pediatr Dent.* (2019) 12:139–44. doi: 10.5005/jp-journals-10005-1603
6. Philip N. State of the art enamel remineralization systems: the next frontier in caries management. *Caries Res.* (2019) 53:284-95. doi: 10.1159/000493031
7. Amaechi BT, van Loveren C. Fluorides and non-fluoride remineralization systems. *Monogr Oral Sci.* (2013) 23:15–26. doi: 10.1159/000350458
8. Fontana M. Enhancing fluoride: clinical human studies of alternatives or boosters for caries management. *Caries Res.* (2016) 50:22–37. doi: 10.1159/000439059

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.