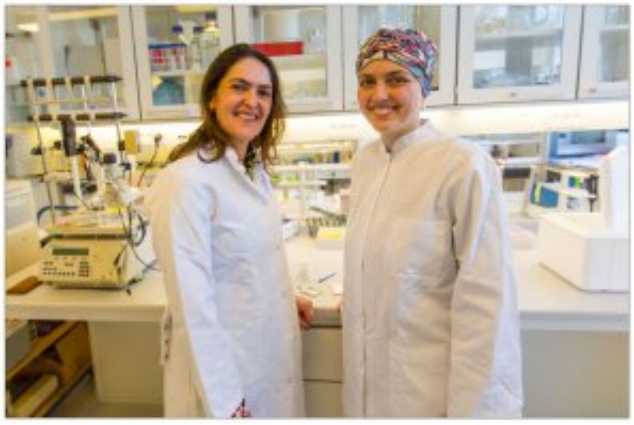
Will we have stronger, enduring teeth? New material for tooth fillings is being investigated

March 26 2015, by Inês Crespo, Nmi3 Communications Manager



Heloisa Bordallo and Ana Benetti in the lab. Credit: © The Niels Bohr Institute – University of Copenhagen

Dental fillings are normally used to restore teeth, for instance after a cavity. However, the materials currently in use need to be replaced often in patients who suffer from frequent cavities and they bind to the teeth through an adhesive that is rather vulnerable. A team of scientists from the University of Copenhagen are testing a glass ionomer that could potentially be used as alternative for dental fillings.

Glass ionomer cements are an interesting option for dental fillings as they do not require an adhesive. They release fluoride, which makes

teeth healthier, and have good biological properties. Furthermore, their preparation requires no special equipment or illumination, which is a big advantage in remote areas without electricity.

To better understand their structure and hydration process, Heloisa Bordallo and Ana Benetti from the University of Copenhagen analysed two different cements. They have conducted X-ray experiments at the Helmholtz-Zentrum Berlin in Germany (HZB), and to better see the hydrogen atoms, they used neutron scattering at the ISIS neutron source in the UK, the Institute Laue-Langevin in France and at HZB, the latter being funded by NMI3.

They then compared the images obtained from X-ray and neutron scattering to see whether the pores were dry or filled with liquid. The results suggest that the strongest material consists of cement powder mixed with a polyacid. The liquid binds faster to the cement, preventing free liquid to fill the pores. In fact, glass ionomer cements could be stronger if we could control how the hydrogen atoms move within the material. The researchers can now infer the material's durability and investigate further.

This is still a work-in-progress, but it seems that in the future, our smiles will show stronger, more enduring teeth.

More information: *Nature Scientific Reports*, 5: 8972, DOI:10.1038/srep08972

Provided by NMI3: Integrated Infrastructure Initiative for Neutron Scattering and Muon Spectroscopy

Citation: Will we have stronger, enduring teeth? New material for tooth fillings is being

investigated (2015, March 26) retrieved 24 April 2024 from
https://phys.org/news/2015-03-stronger-teeth-material-tooth.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.