Exposure to alkaline substances can result in damaged teeth

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It has long been known that acids can erode tooth enamel but a new Swedish study from the Sahlgrenska Academy at the University of Gothenburg, Sweden, shows that strong alkaline substances can damage teeth too - substances with high pH values can destroy parts of the organic content of the tooth, leaving the enamel more vulnerable.

The study was carried out at the Department of Occupational and Environmental Medicine at the Sahlgrenska Academy and published in the Journal of Dentistry.

"The study shows that exposure to alkaline substances can result in damaged teeth, but that the process is different to that caused by exposure to acidic drinks or acidic industrial vapours," says Fabian Taube, occupational hygienist and one of the researchers behind the study.

It was occupational injuries from reconditioning of cars that attracted the attention of the researchers. The common denominator was exposure to an alkaline degreaser that was sprayed onto various parts of the cars. The spray turned out to have a pH value of between 12 and 14, which is very alkaline.

"Exposure to this substance damaged the surface of the teeth resulting in "flaked" enamel," says Jörgen Norén, professor/senior dental officer at the Sahlgrenska Academy. "This type of damage markedly increases the risk of caries and other dental damage."

Alkaline degreasers are used in the food industry, among other things to clean professional kitchens, but are also common in car care industry and to remove vandalism painting.

"Occupational damage to teeth from exposure to alkaline substances is probably not as common as damage from acidic substances, but it becomes a problem when employers fail to inform employees of the risks or do not give them access to the right protective equipment," says Taube.

The study exposed extracted teeth to degreasers and other alkaline solutions. Enamel samples were then examined with a scanning electron microscope and analysed using various spectroscopic methods. The researchers found that organic material on the surface of the tooth dissolves rapidly. The results indicate that the organic components of the enamel are also affected, as the enamel becomes more porous.

"However, we were not able to show that alkaline substances change the composition of the minerals that constitute the main component of enamel," says Taube. "In that sense, it differs from the effects of exposure to acids."

Source: University of Gothenburg (news : web)