Stress and fracture in ceramic-porcelain and metal-porcelain combinations

Responsible scientist:	John E. Tibballs
NIOM visiting researcher:	Christian Erneklint (Gøteborgs Universitet)
NIOM staff:	Ketil Kvam
Collaborating laboratory:	Ceramics Department, Institute Josef Stefan, Ljubliana, Slovenia
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The stresses that occur at the interface between materials in dental restorations arise from both biting forces and manufacturing stresses. Porcelain is composed to a large extent of glass that has visco-elastic properties that change with each firing. If one is to understand the build-up of stresses during cooling from the firing furnace, a description of the thermal history needs to be incorporated into the materials data for the porcelain.
By combining measurements of thermal expansion and mechanical relaxation in porcelains with the deflection of bi-material bending specimens, one learns about the stress that develops at the interface between specimens. The project explores methods for obtaining and representing the necessary data.

Reference: K. Kvam and H. Herø. *Stress relaxation in titanium-ceramic beams during veneering* Biomaterials **22**(11) , 1379-1384 (2001)

Publication: K. Kvam, J.E. Tibballs & T. Kosmaÿ *Bond strength and thermal relaxation of 3Y-TZP and dental porcelain. Abstr no. 21 PEDR, Dublin 13-16.9.2006*