In radiation therapy bolus is often used when treating uneven areas of a patient, such as at the nose or ears, to make up for missing tissue, or to provide build-up of dose to the skin surface. The bolus should be tissue equivalent, sufficiently flexible to conform to the patient surface, durable and cost effective. In this work we report an evaluation of a commercial material normally used for dental impressions for use as bolus material.

Ionization measurements have been made for 6, 12 and 20 MeV electron beams, and for 6 and 15 MV photon beams in a plastic water phantom with and without bolus material on the surface. The measurements used an SSD setup with a parallel plate ion chamber for electrons (PDD percent depth doses) and an SAD setup with a thimble chamber for photons (TMR tissue maximum ratio). The dependence of properties with different powder water concentrations is reviewed to determine the best preparation for use as tissue equivalent bolus. With a suitable preparation for the bolus, the depth in phantom data indicate that the bolus shifts the PDD or TMR by exactly the depth corresponding to the thickness of bolus added. The stability of the bolus material was investigated over a time duration typical of patient treatment by weekly measurements of ionization at depth 1 cm in plastic water under a 1.2 cm thick slab of dental mould stored in air and in water. Water storage stabilizes the properties of the bolus.