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MECHANICAL PROPERTIES OF ?-wollastonite CEMENT WITH DIFFERENT COMPOSITION FOR BONE REGENERATION

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In the last decades, life expectancy has been growing along with bone diseases such as arthritis and osteoporosis. Degenerative pathologies, injuries, and traumas can damage bone tissues, requiring treatment to repair or replace. Developing biomaterials that could improve the recuperation and diminishing time to recovery is important to the patient. One of the most used biomaterials utilized for bone regeneration is the calcium silicate due to their ability to promote hydroxyapatite formation and their biocompatibility, osteoinduction, and osteoconduction. Besides these desirable properties, this silicate presents some restraints such as mechanical properties, which limits some applications. In this context, the aim of this work is to evaluate two types of cement-based ?-wollastonite (CaSiO3). The wollastonite was prepared by sol-gel method, using as precursors orthosilicate acid and calcium chloride. The cements were formulated using two supersaturated tampon solutions of ammonium phosphate dibasic and potassium phosphate dibasic. Phosphoric acid was added until the neutral pH. The samples were molded and characterized by XRD, SEM and the compress mechanical properties were analyzed. XRD data showed the formation of hydroxyapatite in both types of cement. The samples morphologies presented significant differences. Both cements presented equivalents compressive strength and Weibull modulus, with values adequate for dentistry applications. More studies are necessary to complete characterization of both cements, but they show great potential for being used as biomaterials.