This paper discusses the mechanism appearing during fiber debonding in fiber reinforced cementitious composite. The investigation is performed on the micro scale by use of a Finite Element Model. The model is 3 dimensional and the fictitious crack model and a mixed mode stress formulation are implemented. It is shown that the cohesive law for a unidirectional fiber reinforced cementitious composite can be found through superposition of the cohesive law for mortar and the fiber bridging curve. A comparison between the numerical and an analytical model for fiber pull-out is performed.