casings and wound dressings. The stability of alginate has been checked in alginate impressions by neodymium ions concentration, which showed that they can be used as an effective material for dental casing [67]. Similarly, in another study, extended pouring of gypsum on alginate impression showed that it performs as better casting without any dimensional changes [68]. When alginate was tested for its stability with commonly used disinfectants used in dental surgery, glutaraldehyde and hypochlorite solutions, they were found to remain unaffected for 60 minutes and other disinfectant sprays were found to cause no harm [69, 70]. The conformation changes of alginate impression with stainless steel were found to be not affected for 30 minutes, and it remains unchanged even at 100 hours of time, making them a perfect candidate for its use in dental casings [71].

14.4.4 Ionic Binding Property

The ion binding ability of alginate determines the gel formation. The alginates are known to bind well with earth metals such as Ca^{2+}, Mg^{2+}, Sr^{2+}, and Ba^{2+}. This binding ability of alginate with the divalent or sometimes the monovalent earth metals is because of its configuration in the G blocks. It has been found in previous studies that G blocks have the ability to bind with metals, and therefore, the polymer with more GG blocks rather than the M blocks or MG blocks tends to have less binding and therefore less gelling ability [72–74]. This phenomenon of binding metals with G blocks in gel formation has been explained in an "egg box model." This model explains the phenomenon of binding based on the ligands present in G blocks and also the steric interferences of them with G blocks. However, this model is based completely on the intuitive understanding; it is still used as the base model for ion binding properties of alginate [56, 75, 76].

This egg box model has been studied to better understand the interaction of earth metals with alginates and has been found that interaction of Ca^{2+}-induced alginates was unable to produce chains but is able to produce sufficient short bondings with the oligoguluronate, which resulted in less gelling properties with respect to its interaction with non-Ca^{2+}-limited regimes. This study made clear that the oligoguluronate oligomers either sequester calcium by binding with the oligoguluronate sequence or between the free oligoguluronates [77]. Later, in the year 2013, Borgogna *et al.*, [78] proposed a tilted egg box model, which says that addition of calcium even in smaller amounts to alginates causes multicomplex binding modality. This was in contrast with the monocomplex model proposed by Fang *et al.*, [79]. The alginate has been bound to Cu^{2+} to study its gelling abilities and has been proved that they can function better than calcium