Alumina and Zirconia

Esthetic reasons and the desire to use non-metallic restorative materials have increased the use of dental ceramics. The ceramic materials used for Nobel Biocare’s all-ceramic crowns, bridges, laminates and abutments are densely sintered high purity (99.5%) aluminum oxide (alumina) and yttria-stabilized zirconium oxide (Y-TZP) (zirconia). These ceramic materials possess several desirable characteristics for use in modern dentistry, such as biocompatibility and good mechanical properties

Alumina

Studies aiming to evaluate the clinical performance of all-ceramic alumina crowns, bridges, and abutments in dental practice have shown good results. Cumulative success rates of 98% and 92% after 5 and 10 years, respectively, have been reported for alumina crowns and tests have shown that the alumina crowns and bridges exceed the biomechanical requirements for all-ceramic fixed partial dentures. Moreover, both short and long-term clinical studies have shown good results for the alumina abutments; a cumulative success rate of 98% after 5 years, favorable marginal bone levels, and healthy surrounding soft tissue have been reported.

Zirconia

Zirconia has a flexural strength and fracture toughness almost twice as high as that of alumina, which makes zirconia very resistant to masticatory forces, with maintained exact precision of fit. Clinical studies aiming at evaluating zirconia abutments have shown high success rates and good esthetic results, with healthy mucosal conditions and stable marginal bone levels. Furthermore, compared to titanium, zirconia has been shown to accumulate less bacteria in vivo in terms of presence and total number of potential putative pathogens. Clinical studies evaluating the performance of zirconia crowns and bridges are ongoing.

References


