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Program Speaker – Masanao Inokoshi

Title

Zirconia Ceramics - Aesthetic, Strong and Aging Resistant Restorative Materials

Abstract

Zirconia-based restorations including both ceramic-veneered zirconia and full-contour zirconia have been increasingly popular as aesthetic restorative materials in dentistry. Zirconia ceramics were first used as framework materials for fixed dental prostheses (1st generation of zirconia). At that time, majority of dental zirconia ceramics was 3 mol% yttria stabilized tetragonal zirconia polycrystals (3Y-TZPs). Later, highly translucent zirconia ceramics were introduced in dentistry (2nd generation of zirconia). At first, the highly translucent zirconia ceramics were 3Y-TZPs which contain less amount of alumina to improve their translucency. In 2013, more aesthetic highly translucent zirconia ceramics have been introduced (3rd generation of zirconia). This latest version of highly translucent zirconia ceramics contain higher amount of yttria (4 mol% or more) to improve their translucency. As they contain significant amount of cubic zirconia phase, they are referred as yttria stabilized partially stabilized zirconia ceramics (Y-PSZs).

In order to successfully employ zirconia ceramics as restorative materials, dentists need to understand several things: mechanical properties and translucency, changes after mechanical pre-treatments such as sandblasting or grinding. More importantly, understanding bonding strategy of zirconia ceramics to tooth structures is essential for long-term clinical success of zirconia-based restorations. In the past, zirconia ceramics were categorized as “un-bondable” materials. However, nowadays zirconia ceramics can be bonded to tooth structure, if dentists properly apply both mechanical and chemical pre-treatments with proper composite cements.

In this lecture, I will first explain the basic properties of dental zirconia ceramics. Then I will present the latest research topics for zirconia ceramics: influence of surface pre-treatments on highly translucent Y-PSZs, speed sintering of zirconia ceramics, additive manufactured zirconia. Finally, I will present some clinical cases of zirconia-based restorations and summarize tips for the proper bonding strategy in order to obtain durable bonding to zirconia ceramics.

Biography

Masanao Inokoshi obtained his DDS in 2006 and his first PhD in 2011 at Tokyo Medical and Dental University (TMDU) in Japan. In 2010, he got the Flemish scholarship for Japanese students and moved to KU Leuven (University of Leuven) in Belgium to conduct his second PhD training. During his stay in Leuven, he studied under Prof. Bart Van Meerbeek who is the head of KU Leuven BIOMAT research cluster. He obtained his second PhD in 2014 at KU Leuven (University of Leuven). In 2015, he became Assistant

Professor at Tokyo Medical and Dental University (TMDU) and since then has been teaching geriatric dentistry and working in the special care dentistry clinic at the Dental Hospital of TMDU.