Difference between classes of implants and their surface contamination

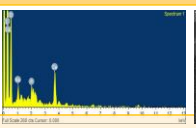
1Arsovski Ljupka, 1Carceva Salja Sofija, 2Veleska-Stevkovska Daniela,1 Nikolovski Bruno, 1Papakoca Kiro, 1Toneva Stojmenova 1Verica, 1Rogoleva Gjurovski Sonja
1 Faculty of Medical Sciences, Goce Delcev University, Stip, North Macedonia
2Ss. Cyril and Methodius University, Faculty of Dentistry, Skopje, North Macedonia

Aim or Purpose

The aim of this study was to differentiate the surface of high-end and low-end implants, i.e. which chemical elements are present on them during cleaning of the implants before putting them into use. All in order for doctors to be able to choose the higher quality dental implant in order to have successful implantation and satisfied patients.

Matherials and methods

Scanning electron microscope SEM
EDS (Energy Dispersive Spectroscopy) for chemical analysis
20 implants alayzed
10 low-end
10 high- end


Results

Using scanning electron microscopy, a range of chemical elements was detected on the surfaces of implants across all study groups. The first group (low-end implants) showed a high presence of these elements. In contrast, the second group (high-end) of implants exhibited a notably different surface composition, containing only a minimal number of chemical elements. These elements, however, had a beneficial effect on the osseointegration process and played a key role in the success of the implantation.

Conclusions

The chemical elements on the surface of a dental implant play a crucial role in the success of implantation. Titanium is the primary choice for implants due to its biocompatibility and durability, while the addition of elements such as calcium, phosphorus, zinc, magnesium, and silver can significantly enhance the process of osseointegration, increase stability, and reduce the risk of infections. However, the conclusion of this study is that each of these elements can have a negative impact if present in inappropriate concentrations or forms.

The most common elemental contamination of Ti surfaces potentially associated with implant defects are trace elements of N, Ca, P, Cl, S, Na, Si and F, some organic carbons and bacterial cells/ Some of the contaminants such as Si and P are beneficial for dental implants that promote osteointegration.