

The Risk of Osseointegration in the Coronavirus Disease 19 Pandemic

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Abstract: Coronavirus disease 19 (COVID-19) is associated with respiratory complications but also with alterations on bone metabolism. Coronavirus disease 19, therefore, might be a risk factor for osseointegration. Recent studies suggest that severe acute respiratory syndrome coronavirus 2 is related with bone abnormalities mainly for act via renin-angiotensin system. This report aims to list the bone alterations caused by coronavirus disease 19 and the possible consequences on the peri-implant bone healing. The current data add to the accumulating knowledge that coronavirus disease 19 may negatively impact the osseointegration and it requires further research.

Key Words: Bone, COVID-19, osseointegration, renin-angiotensin system

BRIEF REPORT

Coronavirus disease 2019 (COVID-19) is a major risk factor for respiratory death worldwide, mainly for causing pulmonary complications such as pneumonia and acute respiratory failure. In addition, patients with COVID-19 are already associated with low serum calcium level,¹ decreased bone mineral density² and osteonecrosis.³ Given the search of a favorable bone for implant placement, it is crucial to understand the consequences of COVID-19 on bone metabolism. Even though there is a lack of studies identifying COVID-19 as a risk factor in implantology.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain affect enzyme angiotensin-converting enzyme 2 (ACE2) expressed in epithelial cells of the respiratory tissues.³ Besides the lungs, osteoblasts and osteoclasts express ACE2 on bone tissue.⁴ Severe acute respiratory syndrome coronavirus 2 infection causes deficiency of ACE2 and low production of Ang-(1-7).³ Angiotensin-converting enzyme 2 downregulates angiotensin II (Ang II) and synthesizes Ang-(1-7).³ Angiotensin II is responsible for bone reabsorption⁵ and Ang-(1-7) has essential function to maintaining bone structure.⁴ Consequently, ACE2 targeted by severe acute respiratory syndrome coronavirus 2 may decrease bone mass. Thus, the depletion of ACE2 on bone tissue could impair osseointegration.

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Another point, severe hypocalcaemia was highly prevalent in severe acute respiratory syndrome patients.¹ Thus, it could implicate a down regulation of calcium delivered during the osseointegration. Furthermore, COVID-19 promotes an excessive inflammation by proinflammation cytokines as interleukin-1, interleukin-6, and tumor necrosis factor α .⁶ In attempt to stop this extreme inflammation, one of most proposed treatment to COVID-19 is the corticotherapy.⁶ Prolonged corticotherapy can suppress bone mineral mass and bone formation.⁶ Additionally, diabetes, smoking, vitamin D deficiency are conditions associated with severe COVID-19 patients and risk factors for osseointegration.

Our present report may encourage studies to analyze peri-implant bone healing in patients who have had COVID-19. Although the infected patient could be asymptomatic, diagnostic tests can be necessary to avoid metabolic effects of COVID-19 on bone tissue. This information reinforces the concerns about biosafety. In conclusion, the current article adds to the accumulating knowledge that COVID-19 is possible risk factor in implantology.

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Acute Invasive Fungal Rhinosinusitis and Coronavirus Disease 2019

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Abstract: Acute invasive fungal rhinosinusitis (mucormycosis) is a rare, highly fatal disease. This opportunistic fungal infection causes

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