and the regulatory role of the cell cycle regulator p21 in alterations of the bone immune microenvironment.

Materials and methods: This research identified radiation-induced p21-positive cell populations and their secretory phenotypes using 10-week-old male C57BL/6 mice ORNJ model and Single-cell RNA sequencing analysis of irradiated jaw bone tissue.In vitro experiments verified how radiation-induced p21 upregulation and subsequent inflammatory factor release disrupt bone immune microenvironment homeostasis.

Results: Single-cell RNA sequencing analysis revealed distinct p21-positive cell populations with characteristic inflammatory secretory phenotypes in irradiated jaw bone tissue of the ORNJ mouse model. Further characterization of these populations demonstrated their enrichment in pro-inflammatory cytokines and bone metabolism mediators. In vitro experiments confirmed that this radiation-induced p21-related inflammatory secretory phenotype directly disrupts bone homeostasis, thereby serving as a key initiating factor in the dysregulation of the jaw bone immune microenvironment.

Conclusions: This discovery provides new molecular targets and theoretical foundations for the early diagnosis, intervention, and prevention strategies for ORNJ.

Key Words: Osteoradionecrosis of the jaws (ORNJ), Single-cell RNA sequencing (scRNA-seq), Bone immune microenvironment.

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Effect Of Surface Treatments On Zirconia-Titanium Bond Strength

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Aim or purpose: This study evaluates the influence of different surface treatments on the bond strength between 3D-printed zirconia and titanium using two resin cements, both immediately and after thermal aging.

Materials and methods: 3D-printed zirconia cylinders were divided into four groups: control (no treatment), sandblasting, micropore (depth: 0.04 mm, diameter: 0.4 mm, spacing: 0.1 mm), and pretreatment liquid application. Titanium discs were sandblasted before bonding. Two resin cements, GC CEM ONE and Clearfil SAC, were used for bonding. Shear bond strength was measured immediately and after thermal aging (20,000 cycles, 5°C-55°C). Statistical analysis was performed using two-way ANOVA (α=0.05).

Results: Immediately after bonding, SAC cement exhibited higher bond strength than GC cement across all groups. The micropore group showed the highest values for both cements ($p<0.05$). After thermal aging, all groups experienced a significant decrease in bond strength, but GC cement demonstrated greater stability than SAC. Among the surface treatments, the micropore group maintained the highest bond strength after aging ($p<0.05$). In contrast, the pretreatment liquid group exhibited the weakest bonding performance, especially after aging.

Conclusions: While SAC cement initially provided higher bond strength, GC cement demonstrated better durability after aging. The micropore treatment was the most effective in maintaining bond strength over time, suggesting its potential for enhancing long-term zirconia-titanium bonding stability.

Key Words: 3D-printed zirconia, titanium, shear-bond strength, thermal aging, resin cement.

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CA4200

Impact Of Polishing On Candida Albicans Adhesion To Dental Resins

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Aim or purpose: The aim of this study was to examine Candida albicans adherence to three different dental base resin materials, as microbial colonization of dentures, influenced by surface roughness and irregularities, increases the microbial load and lead to clinical complications such as denture stomatitis and other oral and health-related issues in edentulous patients relying on removable dentures for functional and aesthetic rehabilitation.

Materials and methods: Sixty square samples (1×1 cm) were divided into three groups (n=20): G1 (heat-cured acrylic), G2 (cold-cured acrylic), and G3 (thermoplastic nylon resin), each split into two subgroups: A (laboratory-polished) and B (office-polished). Samples were incubated in a 24-hour microbial suspension at 37°C for 30 minutes, rinsed with isotonic physiological solution for 3 seconds, and transferred onto Sabouraud dextrose agar using sterile tweezers and the rolling technique. After 24-hour incubation at 37°C, colony counts were recorded and verified via microscopy. Statistical analysis was conducted using SPSS 17.0.

Results: Colony Forming Unit (CFU) values ranged from 0.6×10^3 (G3A) to 11.85×10^3 (G2B), with an ANOVA p-value of 8.66×10^{-15}, indicating highly significant differences among groups and between polishing methods, as well as an extremely significant difference between G2 and G3.

Conclusions: Different dental base resin materials interact differently with C. albicans. The type of dental base material and polishing method significantly affect microbial adherence. Available evidence suggests that Candida is less likely to adhere to thermoplastic nylon resin compared to heat-cured and cold-cured acrylic resins.

Key Words: Candida albicans, dental polishing, dental resins, microbial adhesion.

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