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MOLDING MATERIALS IN PROSTHETIC DENTISTRY

(Requirements, Properties and Clinical Significance of Molding Materials)

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Introduction

Molding materials play a key role in prosthetic dentistry, especially in the manufacture of cast metal structures. The quality of the casting mold directly affects the accuracy, strength, and clinical efficacy of orthopedic restorations. Modern casting technologies place high demands on the physical and chemical characteristics of molding materials.

The Concept of Molding Materials

Molding materials are special refractory composite systems designed to create casting molds. Their main task is to accurately reproduce the geometry of the wax pattern and to ensure the stability of the mold during heat treatment and casting.

Composition of molding materials

A typical molding compound consists of a refractory filler, a binder and various modifying additives. The refractory filler provides heat resistance, the binder forms the structure of the material, and the additives adjust the setting time, expansion and strength.

Classification of molding materials

Molding materials are classified according to the type of binder. Gypsum materials are used for low-melting alloys, phosphate materials for high-temperature alloys, and silicate materials for special casting technologies. The choice of material is determined by the temperature regime and the type of alloy.

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Main properties of molding materials

The most important properties of molding materials include fire resistance, strength, fluidity, gas permeability, and the ability to expand in a controlled manner. These characteristics determine the stability of the casting mold and the accuracy of the casting.

Expansion of molding materials

One of the critical parameters is the expansion of the material. It is necessary to compensate for the shrinkage of the metal during cooling. A distinction is made between hygroscopic, thermal, and reaction expansion. Controlled expansion ensures the accuracy of the fit of the prosthetic structure.

Molding Material Requirements

Molding materials must provide high accuracy of reproduction of model parts, have sufficient heat resistance and mechanical strength. The material must be chemically inert, provide gas removal and have predictable expansion parameters. Ease of use and stability of characteristics are also important.

Casting defects associated with molding materials

Impaired molding properties can lead to casting defects, including porosity, surface roughness, deformations, and dimensional inaccuracies. Improper expansion can cause design inconsistency with clinical requirements.

Clinical significance

The correct choice of molding material ensures the accuracy of the fit of the prosthetic structure, reduces the likelihood of complications and increases the durability of restorations. Modern molding compounds are an important element of high-precision dental casting.

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Conclusion

Molding materials are a fundamental component of the casting process in prosthetic dentistry. Their physical and chemical properties directly determine the quality of prosthetic structures. A thorough understanding of the characteristics of molding materials is a prerequisite for successful clinical practice.

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