DESCRIPTION

TITLE OF THE INVENTION: POST-CURING METHOD AFTER OPTICAL SHAPING OF 3D PRINTER

TECHNICAL FIELD

[0001]

The present invention relates to a post-curing method after optical shaping of a 3D printer. Specifically, the present invention relates to a manufacturing method for a prosthetic apparatus, a manufacturing apparatus for the prosthetic apparatus, the prosthetic apparatus, and a covering apparatus.

BACKGROUND ART

[0002]

In recent years, development of digital technologies by 3D printers has been remarkable, novel technologies have been applied in a field of dentistry, and various digital systems for dental techniques capable of improving efficiency of dental technical work have been developed. As 3D printers, there are known several methods, such as an optical shaping method, a powder method, a fused deposition modeling method, and an ink-jet method.

[0003]

The optical shaping method is mainly used for dentistry.

CLAIMS

1. A manufacturing method for a prosthetic apparatus for dental purpose, comprising:

acquiring scan data of a model that is a reproduction of at least a part of an inside of an oral cavity of a patient;

creating shape data of a shaped body for dental purpose on a basis of the scan data;

producing a shaped body in a semi-cured state on a basis of the shape data;

covering at least a part of the shaped body in the semi-cured state and at least a part of a model with film, the shaped body attached to the model;

releasing air in a part covered with the film to deform the film and bring the shaped body in the semi-cured state into close contact with the model; and

curing the shaped body in the semi-cured state in a state where the shaped body is in close contact with the model.

2. The manufacturing method for a prosthetic apparatus according to claim 1,

wherein the curing the shaped body includes at least either of

emitting light on the shaped body in a state where the shaped body is in close contact with the model, or

heating the shaped body in a state where the shaped body is in close contact with the model.

3. The manufacturing method for a prosthetic apparatus according to claim 1,

wherein the producing the shaped body includes

producing a shaped body in a first curing state on a basis of the shape data, and

producing a shaped body in a second curing state cured more than in the first curing state by emitting light on the shaped body in the first curing state, and

the curing the shaped body includes heating the shaped body in the second curing state in a state where the shaped body is in close contact with the model.

4. The manufacturing method for a prosthetic apparatus according to claim 2 or 3,

wherein heating temperature in the heating of the shaped body is 50°C or more and 130°C or less.

5. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 4,

wherein the releasing the air includes adjusting a vacuum degree of the part covered with the film to 40% or more and 99.9% or less.

6. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 5,

wherein a polymerization rate of the shaped body produced in the producing the shaped body is 50% or more and 98% or less.

7. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 6,

wherein an elongation percentage of the film is 50% or more and 500% or less, and

the film transmits light having a wavelength of 100 nm or more and 780 nm or less.

8. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 7,

wherein the producing the shaped body produces the shaped body with an optical shaping apparatus of a digital light processing method.

9. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 8,

wherein the shaped body includes any one of a crown, a bridge, a resin base, a resin base denture, or an orthodontic splint.

10. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 9, further comprising:

producing a mold for prosthetic apparatus manufacturing, by using the cured shaped body as a casting pattern;

introducing molten metal into the mold;

removing a cast metal by breaking the mold; and

finishing the cast metal into a prosthetic apparatus by adjusting the cast metal with an abrasive material and a polishing material.

11. The manufacturing method for a prosthetic apparatus according to any one of claims 1 to 9, further comprising bonding an artificial tooth to the shaped body.

12. A manufacturing apparatus that manufactures a prosthetic apparatus for dental purpose by producing a shaped

body in a semi-cured state produced on a basis of scan data of a model that is a reproduction of an inside of an oral cavity of a patient, and by curing the shaped body and the model in close contact with each other, comprising:

a covering apparatus that covers at least a part of the shaped body in the semi-cured state and at least a part of a model with film, the shaped body attached to the model,

wherein the covering apparatus includes an air releaser that releases air in a part covered with the film to deform the film and bring the shaped body in the semi-cured state into close contact with the model.

13. The manufacturing apparatus according to claim 12, wherein the covering apparatus further includes an adjuster that adjusts a vacuum degree of the part covered with the film to 40% or more and 99.9% or less.

14. The manufacturing apparatus according to claim 12 or 13, further comprising:

a shape data creating apparatus that acquires scan data of a model that is a reproduction of an inside of an oral cavity of a patient, and creates shape data of a shaped body for dental purpose on a basis of the scan data;

an optical shaping apparatus that produces a shaped body on a basis of the shape data; and

a curing apparatus that cures the shaped body in a state where the shaped body is in close contact with the model.

15. The manufacturing apparatus according to claim 14,

wherein the curing apparatus includes at least either of

a light emission apparatus that emits light on the shaped body in a state where the shaped body is in close contact with the model, or

a heating apparatus that heats the shaped body in a state where the shaped body is in close contact with the model.

16. The manufacturing apparatus according to claim 14,

wherein the optical shaping apparatus produces a shaped body in a first curing state on a basis of the shape data,

the manufacturing apparatus further comprises a light emission apparatus that produces a shaped body in a second curing state cured more than in the first curing state by

further emitting light on the shaped body in the first curing state, and

the curing apparatus includes a heating apparatus that heats the shaped body in the second curing state in a state where the shaped body is in close contact with the model.

17. The manufacturing apparatus according to claim 15 or 16,

wherein heating temperature of the heating apparatus is 50°C or more and 130°C or less.

18. A prosthetic apparatus produced with a shaped body obtained by bringing a shaped body in a semi-cured state into close contact with a model by, in a state where at least a part of the shaped body in the semi-cured state and at least a part of the model are covered with film, releasing air in a part covered with the film, and curing the shaped body in a state where the shaped body in the semi-cured state is in close contact with the model.

19. A manufacturing method for a prosthetic apparatus for dental purpose, comprising:

producing a shaped body in a semi-cured state for dental purpose;

covering at least a part of the shaped body in the semi-cured state and at least a part of a model with film, the model being a reproduction of at least a part of an inside of an oral cavity of a patient and the shaped body attached to the model;

releasing air in a part covered with the film to deform the film and bring the shaped body in the semi-cured state into close contact with the model; and

curing the shaped body in a state where the shaped body in the semi-cured state is in close contact with the model.