Claims

1. A dental stent comprising a stent base and a set of separators;

wherein the stent base comprises an outer shell, and an inner bed comprising a contoured cavity comprising a plurality of tooth cavities, wherein the contoured cavity corresponds to a patient-specific modified dental model comprising at least one tooth form which corresponds to a redesigned tooth form of the modified model; and

wherein the set of separators comprises a plurality of separator strips each of which are partially embedded into the inner bed.

2. A dental stent as claimed in claim 1 wherein the contoured cavity corresponds to a patient-specific modified dental model further comprising at least one natural tooth form.

3. A dental stent as claimed in claim 1 or claim 2 wherein the contoured cavity corresponds to a patient-specific modified dental model of a patient's upper or lower set of teeth.

4. A dental stent as claimed in any one of the preceding claims wherein the outer shell and the inner bed are each formed of clear or transparent materials.

5. A dental stent as claimed in any one of the preceding claims wherein the outer shell and the inner bed are formed of different materials.

6. A dental stent as claimed in claim 5 wherein the outer shell is formed of a clear acrylic.

7. A dental stent as claimed in claim 6 wherein the inner bed is formed of a clear silicone.

8. A dental stent as claimed in any one of the preceding claims wherein the separating strips are formed of a metal matrix strip.

9. A kit of parts for tooth restoration comprising a dental stent as claimed in any one of the preceding claims, and a composite resin material.

10. A kit as claimed in claim 6 further comprising a heater for heating the composite resin and the dental stent.

11. A kit as claimed in claim 9 or claim 10 further comprising a light cure unit.

12. A kit as claimed in any one of claims 9 to 11 further comprising a finishing set of tools comprising burs and polishing tools.

13. A method of manufacturing a dental stent according to any one of the preceding claims, the method comprising steps of:

(a) creating an initial model of a patient's teeth;

(b) digitally scanning the initial model to create a digital model;

(c) digitally re-designing at least some of tooth forms in the digital model, and digitally sectioning all re-designed tooth forms from a remainder of the digital model, thereby to create a modified digital model;

(d) 3D printing a modified model from the modified digital model, in which re-designed tooth forms are each individually removable from a corresponding socket provided in a base of the modified model;

(e) forming a template over the modified model;

(f) forming the outer shell of the stent over the template;

(g) removing the outer shell and the template from the modified model, and removing the template from the outer shell;

(h) forming the set of separator strips;

(i) inserting a separator strip between each pair of adjacent teeth forms of the modified model;

(j) filling the outer shell with an inner bed material;

(k) placing the outer shell over the model such that the teeth forms and the separator strips are caused to be inserted into the inner bed material;

(l) allowing the inner bed material to set;

(m) removing the dental stent from the modified model.

14. A method as claimed in claim 13 further comprising, before forming a template over the modified model, removing redesigned tooth forms, placing a wax-skim over the redesigned tooth forms, recontouring and texturing the redesigned tooth forms, and replacing the each redesigned tooth form back into its corresponding socket in the base of the modified model.

15. A method as claimed in claim 13 or claim 14 wherein the template comprises either a lab putty, or a 3D printed shell.

16. A method as claimed in any one of claims 13 to 15 wherein forming the outer shell of the stent over the template comprises vacuum-forming an acrylic sheet over the template.

17. A method as claimed in any one of claims 13 to 16 wherein the inner bed material is a silicone.

18. A method as claimed in claim 17 further comprising, before step (k), coating tooth forms of the modified model with the silicone.

19. A method as claimed in any one of claims 13 to 18 further comprising, after removing the dental stent from the modified model, drilling evacuation vents into the stent, through the outer shell and the inner bed.

20. A method as claimed in claim 19 wherein the relief holes are drilled into a most incisal part of each tooth cavity.

21. A method as claimed in any one of claims 13 to 20 further comprising, after step (h), forming at least one hole in each separator strip, close to a corner of the separator strip, and wherein, during step (k), inner bed material is caused to flow into the holes.

22. A method as claimed in any one of claims 10 to 21 further comprising, after step (l), placing the dental stent in a pressure vacuum.

23. A method of application of a composite resin to a patient's teeth using a dental stent;
the dental stent comprising a stent base and a set of separators;

wherein the stent base comprises an outer shell, and an inner bed comprising a contoured cavity corresponding to a patient-specific dental model; and

wherein the set of separators comprises a plurality of separator strips each of which are partially embedded into the inner bed;

wherein the method comprises steps of:

(a) inserting a heated composite resin into the stent;

(b) placing the stent over the patient's pre-prepared teeth such that the patient's teeth are inserted into composite resin and the separator strips locate between adjacent teeth to be treated; and

(c) curing the composite resin;

(d) removing the stent from the patient's teeth.

24. A method as claimed in claim 23 wherein the dental stent further comprises evacuation vents, and wherein, during step (b) excess composite resin is forced through the evacuation vents to an exterior of the dental stent.

25. A method as claimed in claim 23 or claim 24, wherein the stent is formed of clear or transparent materials, and wherein curing the composite resin comprises curing with a light-cure unit.

26. A method as claimed in any one of claims 23 to 25 further comprising, after step (d), sealing treated teeth with an oxygen-inhibiting gel, and curing through the oxygen-inhibiting gel with a light-cure unit.

27. A method as claimed in any one of claims 23 to 26 further comprising a subsequent finishing stage comprising removing excess composite resin from around the treated teeth.

28. A method as claimed in claim 27 further comprising a subsequent stage of adding surface texture to the treated teeth.