SUMMARY OF THE INVENTION

[006] In one embodiment, this invention is directed to a shaped block comprising a dried cross-linked collagen matrix. In another embodiment, the dried cross-linked collagen matrix further comprising hydroxyapatite, titanium, a pharmaceutically active agent or any combination thereof.

[007] In one embodiment, this invention is directed to a shaped block for use as an add-on device for medical devices, implants, device attachments or any combination thereof, where the shaped block comprises a dried cross-linked collagen matrix. In another embodiment, the dried cross-linked collagen matrix further comprising hydroxyapatite, titanium, a pharmaceutically active agent or any combination thereof.

[008] ~~In one embodiment, this invention is directed to~~ According to a first aspect of the present invention, there is provided a dental implant abutment comprising an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix; wherein the shaped block is positioned between the abutment and the implant ~~as~~ such that it is in direct contact at least partially with the implant and~~/or~~ with the abutment, wherein the shaped block is shaped such that when implanted the dental abutment is in partial and/or full contact with bone and/or soft tissue surrounding the abutment. In another embodiment, the positioning of the shaped block within the dental-implant abutment allows a base for soft/hard tissue ingrowth. In another embodiment, sliding motion of shaped block between implant and abutment allows bridging the abutment and implant with the shaped block, giving rise to supported tissue ingrowth.

[009] ~~In one embodiment, this invention is directed to~~ According to a first aspect of the present invention, there is provided a dental implant abutment for use in the stimulation of bone or soft tissue growth, where the dental implant abutment comprises an implant, an abutment and a shaped block comprising dried cross-linking collagen matrix; wherein the shaped block is positioned between the abutment and the implant ~~as~~ such that it is in direct contact at least partially with the implant and with the abutment; the shaped block of the dental implant is shaped such that when implanted the abutment is in partial and/or full contact with the bone and/or soft tissue surrounding the dental implant abutment; and when implanted the dental implant abutment ~~of the invention~~ provides space and environment for cell ingrowth.

[009a] According to a third aspect of the present invention, there is provided a dental implant abutment comprising an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix, wherein said shaped block is positioned around the abutment and the implant such that it is in

direct contact at least partially with the implant and with the abutment, wherein the shaped block is shaped such that when implanted the dental abutment is in partial and/or full contact with bone and/or soft tissue surrounding the abutment.

[009b] According to a fourth aspect of the present invention, there is provided a dental implant abutment for use in the stimulation of bone or soft tissue growth, wherein said dental implant abutment comprises an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix; said shaped block is positioned around the abutment and the implant such that it is in direct contact at least partially with the implant and with the abutment; the shaped block of the dental implant is shaped such that when implanted the abutment is in partial and/or full contact with the bone and/or soft tissue surrounding the dental implant abutment; and when implanted the dental implant abutment provides space and environment for cell ingrowth.

[0010] In another embodiment, the shaped block is shaped as an O-ring-like, a sleeve-like or a tube-like (Figure 2a).

[0011] In one embodiment, this invention is directed to a method of preparing a shaped block comprising dried cross-linked collagen matrix, wherein the method comprises:

a. providing a dried cross-linked collagen matrix of this invention; and

b. carving out a shaped block from said dried matrix.

[0012] In one embodiment, this invention is directed to a method of preparing a shaped block of the dental implant abutment as described hereinabove, wherein the method comprises:

(i) providing an acidic solution of collagen, followed by neutralization the solution;

CLAIMS

1. A dental implant abutment comprising an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix, wherein said shaped block is positioned between the abutment and the implant ~~as~~ such that it is in direct contact at least partially with the implant and~~/or~~ with the abutment, wherein the shaped block is shaped such that when implanted the dental abutment is in partial and/or full contact with bone and/or soft tissue surrounding the abutment.

2. A dental implant abutment for use in the stimulation of bone or soft tissue growth, wherein said dental implant abutment comprises an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix; said shaped block is positioned between the abutment and the implant ~~as~~ such that it is in direct contact at least partially with the implant and~~/or~~ with the abutment; the shaped block of the dental implant is shaped such that when implanted the abutment is in partial and/or full contact with the bone and/or soft tissue surrounding the dental implant abutment; and when implanted the dental implant abutment ~~of the invention~~ provides space and environment for cell ingrowth.

3. The dental implant abutment of claim 1 or 2, wherein said shaped block further comprises hydroxyapatite.

4. The dental implant abutment of claim 1 or 2, wherein said shaped block further comprises titanium.

5. The dental implant abutment according to any one of claims 1-4, wherein said shaped block has a shape of an O-ring-like, a sleeve-like or a tube-like.

6. The dental implant abutment according to any one of claims 1-5, wherein the shaped block further comprises a pharmaceutically active agent.

7. The dental implant abutment of claim 6, wherein said agent comprises antibacterial agents, antifungal agents, anti-inflammatory agents, antibiotic agents, vitamins or any combination thereof.

8. A dental implant abutment comprising an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix, wherein said shaped block is positioned around the abutment and the implant such that it is in direct contact at least partially with the implant and with the abutment,

wherein the shaped block is shaped such that when implanted the dental abutment is in partial and/or full contact with bone and/or soft tissue surrounding the abutment.

9. A dental implant abutment for use in the stimulation of bone or soft tissue growth, wherein said dental implant abutment comprises an implant, an abutment and a shaped block comprising dried cross-linked collagen matrix; said shaped block is positioned around the abutment and the implant such that it is in direct contact at least partially with the implant and with the abutment; the shaped block of the dental implant is shaped such that when implanted the abutment is in partial and/or full contact with the bone and/or soft tissue surrounding the dental implant abutment; and when implanted the dental implant abutment provides space and environment for cell ingrowth.

10. The dental implant abutment of claim 8 or 9, wherein said shaped block further comprises hydroxyapatite.

11. The dental implant abutment of claim 8 or 9, wherein said shaped block further comprises titanium.

12. The dental implant abutment according to any one of claims 8-11, wherein said block has a shape of an O-ring-like, a sleeve-like or a tube-like.

13. The dental implant abutment according to any one of claims 8-12, wherein the shaped block further comprises a pharmaceutically active agent.

14. The dental implant abutment of claim 13, wherein said agent comprises antibacterial agents, antifungal agents, anti-inflammatory agents, antibiotic agents, vitamins or any combination thereof.

~~8.~~15. A method of preparing a shaped block of the dental implant abutment according to any one of claims 1-~~7~~14, wherein the method comprises:

a. providing the dried cross-linked collagen matrix; and

b. carving out a shaped block from said dried matrix.

~~9.~~16. The method of claim 15~~8~~, wherein the dried cross-linked collagen matrix is prepared by a method comprising:

(i) providing an acidic solution of collagen, followed by neutralization the solution;

(ii) concentrating the solution of step (i);

(iii) lyophilizing the concentrated mixture of step (ii), thereby obtaining a dried collagen composition;

(iv) incubating the composition with a crosslinker and a first solvent;

(v) washing the incubated composition of step (iv) with a second solvent; and

(vi) lyophilizing the washed composition of step (v);

thereby obtaining a dried cross-linked collagen matrix.

~~10.~~17. A method of preparing a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~, wherein the method comprises:

(i) providing an acidic solution of collagen, followed by neutralization the solution;

(ii) concentrating the solution of step (i); and pouring it into a mold with a pre-designed block shape;

(iii) lyophilizing the concentrated mixture of step (ii), thereby obtaining a dried collagen composition, optionally comprising hydroxyapatite;

(iv) incubating the composition with a crosslinker, a first solvent and optionally with a pharmaceutically active agent;

(v) washing the incubated composition of step (iv) with a second solvent; and

(vi) lyophilizing the washed composition of step (v);

thereby obtaining a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~.

~~11.~~18. A method of preparing a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~, wherein the method comprises:

(i) providing an acidic solution of collagen and a crosslinker, followed by neutralization the solution;

(ii) concentrating the solution of step (i); and pouring it into a mold with a pre designed block shape;

(iii) lyophilizing the concentrated mixture of step (ii), thereby obtaining a dried collagen composition, optionally comprising hydroxyapatite;

(iv) incubating the composition ~~with the crosslinker~~obtained by step (iii) with~~,~~ a first solvent and optionally with a pharmaceutically active agent;

(v) washing the incubated composition of step (iv) with a second solvent; and

(vi) lyophilizing the washed composition of step (v);

thereby obtaining a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~.

~~12.~~19. A method of preparing a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~, wherein the method comprises:

(i) providing an acidic solution of collagen, followed by neutralization the solution;

(ii) concentrating the solution of step (i); and pouring it into a mold with a pre designed block shape;

(iii) lyophilizing the concentrated mixture of step (ii), thereby obtaining a dried collagen composition, optionally comprising hydroxyapatite;

(iv) incubating the composition with a crosslinker and a first solvent;

(v) optionally adding a pharmaceutically active agent to the incubated composition of step (iv);

~~(v)~~(vi) ~~and~~ washing the resulting solution of step (v) with a second solvent; and

~~(vi)~~(vii) lyophilizing the washed composition of step (vi);

thereby obtaining a shaped block of the dental implant abutment according to any one of claims 1-14~~7~~.

~~13.~~20. The method according to any one of claims ~~8-12~~15-19, wherein said obtained shaped block has a shape of an O-ring-like, a sleeve-like or a tube-like.

~~14.~~21. The method according to any one of claims ~~8-9~~15-16, wherein said carving out is done by a CNC machine, a laser cutting machine, a waterjet cutter, a driller, an abrasive device OR by using casting molds or 3D printer during the manufacturing process.

~~15.~~22. The method according to claim ~~10-12~~17-19 wherein said mold is shaped using a method comprising 3D printing, cast molding or any combination thereof.