(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199734685 B2
(10) Patent No. 733690

(54) Title
Arrangement for an implant system

(51)[6] International Patent Classification(s)
A61C 008/00

(21) Application No: 199734685

(22) Application Date: 1997.06.12

(87) WIPO No: WO98/01081

(30) Priority Data

(31) Number	(32) Date	(33) Country
9602636	1996.07.04	SE

(43) Publication Date : 1998.02.02
(43) Publication Journal Date : 1998.03.26
(44) Accepted Journal Date : 2001.05.24

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(56) Related Art
EP 0419431

OPI DATE 02/02/98 APPLN. ID 34685/97
AOJP DATE 26/03/98 PCT NUMBER PCT/SE97/01034
AU9734685

(51) International Patent Classification 6 :
A61C 8/00

A1

(11) International Publication Number: WO 98/01081

(43) International Publication Date: 15 January 1998 (15.01.98)

(21) International Application Number: PCT/SE97/01034

(22) International Filing Date: 12 June 1997 (12.06.97)

(30) Priority Data:
9602636-4 4 July 1996 (04.07.96) SE

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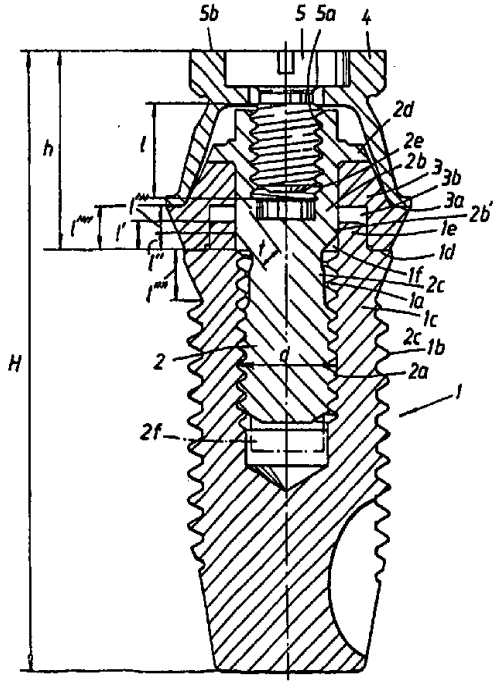
(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
In English translation (filed in Swedish).

(54) Title: ARRANGEMENT FOR AN IMPLANT SYSTEM

(57) Abstract

An implant system includes an anchoring element/a fixture (1) and a spacer screw (2) which can be screwed securely to the latter, with associated spacer element (3), and a unit (4) which can be screwed securely to the spacer screw. The fixture has an internal thread (1a) which the spacer screw can be screwed into by means of a corresponding external thread (2a). The fixture also has a contact plane (1d) for the spacer element, and a spanner attachment part (1e). The spacer screw is designed with a cylindrical portion (2b) located above its external thread (2a). The fixture is arranged with a recess (1f) at the spanner attachment part. The cylindrical portion (2b) is partially engaged in the recess when the spacer screw is drawn tight in the fixture.



TITLE

Arrangement for an implant system.

TECHNICAL FIELD

The present invention relates to an arrangement for an implant system which includes a fixture (anchoring element) and a spacer screw which can be screwed securely to the latter, with associated spacer element. It also includes a unit, for example a cylinder (prosthesis structure), which can be screwed securely to the spacer screw. The fixture has an internal thread which the spacer screw can be screwed into by means of a corresponding external thread. The fixture also has a contact plane for the spacer element, and a spanner attachment part. The said spacer screw is designed with a cylindrical portion located above its external thread.

PRIOR ART

Implant systems of the type specified above are already known and are sold by Nobelpharma on the open market.

DISCLOSURE OF THE INVENTION

TECHNICAL PROBLEM

In implant systems of the type specified above, it is necessary to be able to combine a low structural height with the required mechanical strength of the various components of the system. Thus, it is necessary, in some cases, to provide the lowest possible structural height between the contact plane of the fixture and the top surface of the prosthesis unit (cylinder) without neglecting the mechanical strength of, for example, the prosthetic securing screw. The aim of the invention is to solve this problem, among others.

It is also important to be able to achieve the greatest possible strength in the upper parts of the fixture wall, and this is also afforded by means of the invention.

Implant systems of the type in question have small dimensions and it is necessary to be able to provide good guidance functions which ensure thread engagement of each respective screw in the initial stage. It also has to be possible to facilitate the tightening function itself. This is achieved as an added effect in the present invention.

It is also possible, as regards the subject of the invention, to make additional improvements which increase still further the initial thread engagement function.

SOLUTION

The feature which can principally be regarded as characterizing an arrangement according to the invention is that the fixture or the anchoring element is arranged with a recess which is located in the spanner attachment part and in which the cylindrical portion of the spacer screw can be completely or partially engaged when the spacer screw is drawn tight in the fixture or the anchoring element.

In one embodiment, the depth of the recess, and thus the degree to which the cylindrical portion can be engaged in the recess, is arranged such that it essentially corresponds to 2 - 4 thread turns of the said internal thread of the anchoring element. The engagement of the cylindrical portion in the recess is dependent, inter alia, on the height of the said spacer element. In a further embodiment, an external thread, arranged on a holding screw for securing the unit in the spacer screw, has an extension function which corresponds to the engagement of the cylindrical portion in the recess of the spanner attachment part, compared to the case where there is no recess in the spanner attachment part. The extension of the said external thread ensures a desired strength function for the holding screw and the implant system as such.

The diameter of the recess slightly exceeds the diameter of the external threads on the spacer screw,

which means that the recess exercises an initial guidance function for the spacer screw as it is being screwed into the internal thread of the anchoring element. The spacer screw can moreover be provided with a tap at its free end for affording an important guidance function in the said recess as the spacer screw is being screwed into the fixture.

In one embodiment, the cylindrical portion of the spacer screw merges into an unthreaded portion which in turn merges into the said external thread of the spacer screw.

In accordance with the concept of the invention, the recess entails the absence of internal thread turns in the upper parts of the fixture. The said absence of thread turns means that the fixture, in the upper parts, remains essentially unloaded by impinging forces when the spacer screw is being tightened in the fixture. Moreover, in one embodiment, the recess in the fixture has a maximum depth which guarantees mechanical strength in the wall portion of the fixture in the said upper parts where internal thread turns in the fixture themselves form a reinforcement of the wall portion, compared to the case where there are no internal thread turns. The depth of the recess is chosen within a range of 0.5 - 2.0 mm, and is preferably about 1.0 mm. The total height of the fixture, spacer element and unit is chosen within the range of 10 - 20 mm. The height between the top surface of the unit and the contact plane of the fixture for the spacer element is 4 - 8 mm.

ADVANTAGES

By means of the invention it is possible to construct implant systems which are suitable for different purposes and which have a high degree of adaptability to existing cortical dentine layers of different thicknesses. The prosthesis structure can be given a reliable anchoring function even when there is a requirement for a low structural height between the contact plane of the fixture and the position or level at

which the prosthesis structure is secured.

DESCRIPTION OF THE FIGURE

A presently proposed embodiment of an arrangement having the characteristic features of the invention will be described hereinbelow with reference to the attached drawing, in which:

the figure shows a vertical section through an implant system with fixture, spacer screw and spacer element, and a unit (cylinder) which can be screwed securely into the screw for supporting the prosthesis structure (not shown).

DETAILED EMBODIMENT

In the figure, reference label 1 designates a fixture or anchoring element which is intended to be screwed securely into dentine (not shown) in a manner which is known per se. The anchoring element is assumed to be known per se and will therefore not be described in detail in terms of its structure and function. The anchoring element has an internal thread 1a, an external thread 1b and a wall portion 1c. It also has a contact plane 1d and a spanner attachment part 1e.

A so-called spacer screw 2 can be screwed into the element 1 via an external thread 2a which can interact with the internal thread 1a of the fixture 1. The spacer screw has, in addition to the screw part 2, a cylindrical portion 2b which merges into an unthreaded portion 2c, which in turn merges into the said external thread 2a. A spacer element 3 belonging to the spacer screw 2 is placed between a projecting flange 2d of the screw and the contact plane 1d of the fixture 1. The height of the spacer element can be chosen on a case by case basis. The spacer element has a bearing surface 3a for a unit 4 (a gold cylinder) which is intended to support a prosthesis structure (tooth replacement, crown, etc.) which is not shown here.

In its upper parts, the spacer screw has an internal thread 2e by means of which the unit can be screwed securely by means of a holding screw 5 via an external thread 5a which corresponds to the internal thread 2e. This securing is also known per se and will not be described in detail here, other than to say that when the screw 5 is tightened, the unit 4 clamps the spacer element against the fixture 1 and that the components included in the implant system are held together in this way. It will be appreciated that the length l of the thread 5a constitutes a critical function for the securing of the components in the implant system.

The length l can be kept to an optimum by using a recess 1f, in which a part 2b' of the cylindrical portion 2b can be engaged. The recess 1f and the cylindrical portion 2b/2b' are cylindrical in the illustrative embodiment, and the diameter of the recess 1f slightly exceeds the diameter of the cylindrical portion 2b/2b'.

The recess 1f has been created by boring out internal thread turns 1a in the upper parts. In the illustrative embodiment, 2 to 4 thread turns have been bored out. The depth of the recess is shown by l' and corresponds essentially to the said 2 to 4 thread turns. The spacer screw can function for different heights of the spacer element. The said depth of the recess is 0.5 to 2.0 mm, preferably about 1 mm. The screw can be engaged further by a distance l'' (where the spacer element has a lower height) and, in the screwing example shown here, is engaged by a distance l'''.

By means of the arrangement, a material thickness t in the spacer screw, between the recess for the thread 2e and the transition between the cylindrical portion 2b and the unthreaded part 2c of the spacer screw, can be kept to a value which is acceptable from the point of view of strength, despite an appreciable length l of the thread 5a of the holding screw 5. The depth of the recess is also determined by a value l'''' for the upper level of the internal thread 1a and the level of the external

thread 1b. If further turns of the internal thread 1a were bored out, this would result in a weakening of the upper parts of the wall 1c, which would cause difficulties from the point of view of strength when the spacer screw is being tightened. In the case shown here, the greatest stresses occur at a position 3 to 4 thread turns below the recess, by virtue of the unthreaded portion 2c.

The invention affords a low structural height h between the contact plane 1d of the fixture and the top surface 5b of the unit 4, which low structural height h can be reduced by the distance l'''.

The diameter of the recess 1f slightly exceeds the diameter d of the internal thread 1a. The recess can in this case serve as a guide for the spacer screw. A further improved guidance function can be obtained with a tap 2f at the free end of the spacer screw. The total height of the system is shown by H and is chosen within the range of 6 - 13 mm, and is preferably about 10 mm. The spacer element 3 has an internal recess 3b which corresponds to the spanner attachment 1e which fixes the spacer element in terms of its angle of rotation. The flange 2d on the spacer element can be displaced relative to the spacer element as the spacer screw is being tightened in the fixture.

The invention is not limited to the embodiment which is shown hereinabove by way of example, and instead can be modified within the scope of the attached patent claims and the inventive concept.

"Comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

PATENT CLAIMS

1. Arrangement for an implant system which comprises a fixture (1) (anchoring element) and a spacer screw (2) which can be screwed securely to the latter, with associated spacer element (3), and a unit (4), for example a cylinder (prosthesis structure) which can be screwed securely to the spacer screw, the fixture having an internal thread (1a) which the spacer screw can be screwed into by means of a corresponding external thread (2a), a contact plane (1d) for the spacer element, and a spanner attachment part (1e), and the spacer screw (2) has a cylindrical portion (2b) located above its external thread, characterized in that the fixture is arranged with a recess (1f) which is located in the spanner attachment part and in which the cylindrical portion (2b) of the spacer screw is engaged when the spacer screw is drawn tight in the fixture.

2. Arrangement according to Patent Claim 1, characterized in that the depth (1') of the recess (1f), and thus the extent to which the cylindrical portion can be engaged in the recess, corresponds essentially to 2 - 4 turns of the said internal thread (1a) on the fixture.

3. Arrangement according to Patent Claim 1 or 2, characterized in that an external thread (5a) arranged on a holding screw (5) for holding the unit (4) securely in the spacer screw has an extension which corresponds to the degree of engagement (1''') of the cylindrical portion in the recess (1f) of the spanner attachment part, compared to the case with no recess in the spanner attachment part, which ensures a desired strength function of the holding screw (5).

4. Arrangement according to Patent Claim 1, 2 or 3, characterized in that the diameter of the recess slightly exceeds a diameter (d) of the external thread (2a) of the spacer screw, with the result that the recess exercises a guidance function for the spacer screw when this is being screwed into the internal thread of the fixture.

5. Arrangement according to any of the preceding

patent claims, characterized in that the spacer screw (2) is provided with a tap (2f) at its free end for the purpose of affording an important guidance function in the said recess (1f) when the spacer screw is being screwed into the fixture (1).

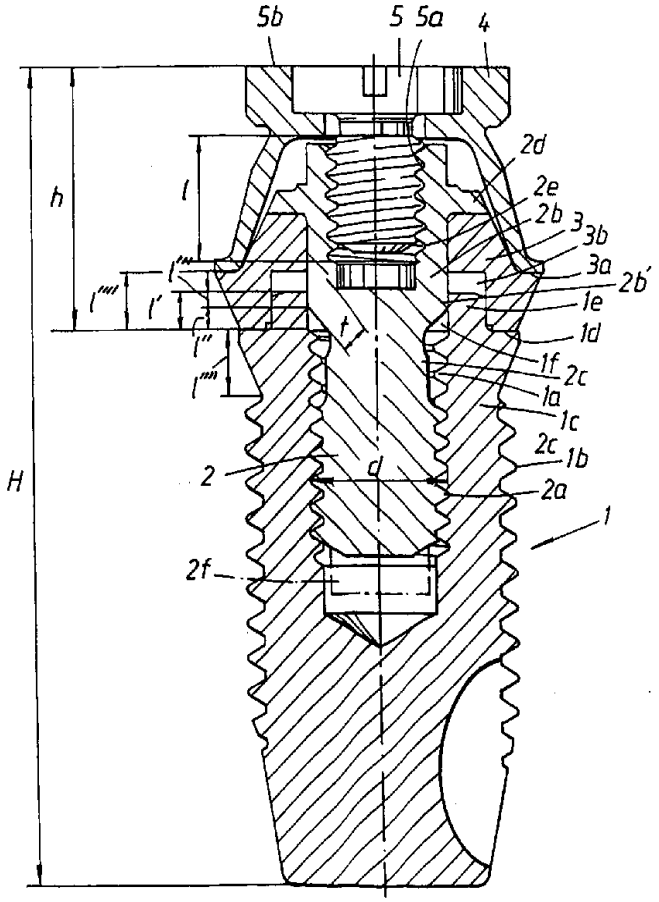
6. Arrangement according to any of the preceding patent claims, characterized in that the cylindrical portion (2b) of the spacer screw merges into an unthreaded portion (2c) which in turn merges into the said external thread (2a) on the spacer screw.

7. Arrangement according to any of the preceding patent claims, characterized in that the recess entails the absence of a thread in the upper parts of the fixture, preferably in the upper parts which essentially correspond to the spanner attachment part (1e) in the fixture, and in that the said absence of a thread (thread turns) means that the fixture, in the said upper parts, remains essentially unloaded by impinging forces when the spacer screw is being tightened in the fixture.

8. Arrangement according to any of the preceding patent claims, characterized in that the recess in the fixture has a maximum depth (l') which guarantees mechanical strength in the wall portion of the fixture at the said upper parts where the internal thread turns in the fixture themselves form a strengthening of the wall portion (1c), compared to the case where there are no internal thread turns.

9. Arrangement according to any of the preceding patent claims, characterized in that the depth (l') of the recess is chosen within a range of 0.5 - 2.0 mm, and is preferably about 1.0 mm.

10. Arrangement according to any of the preceding patent claims, characterized in that the degree of engagement (l''') of the cylindrical portion in the recess (1f) depends on the height (l''') of the spacer element.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