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Steffee

[54] METHOD FOR USING SPINAL INPLANTS

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- [51] Int. Cl.⁶ A61F 2/44
- [52] U.S. Cl. 623/17; 128/898

[56] References Cited

U.S. PATENT DOCUMENTS

4,834,757	5/1989	Brantigan	623/17
5,015,247	5/1991	Michelson	623/17
5,306,309	4/1994	Wagner et al.	623/17

FOREIGN PATENT DOCUMENTS

0560141	9/1993	European Pat. Off	623/17
1107854	8/1984	U.S.S.R	623/17

5,443,514

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[57] ABSTRACT

A method of fusing together the adjacent vertebrae using the spinal implant includes removing at least a portion of the spinal disc between the adjacent vertebrae. The spinal implant is inserted between the adjacent vertebrae with the first and second parallel side surfaces facing the adjacent vertebrae. The spinal implant is rotated into a position in which the parallel side surfaces extend from one of the adjacent vertebrae to the other adjacent vertebrae and the upper and lower surfaces engage the adjacent vertebrae.

7 Claims, 3 Drawing Sheets



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METHOD FOR USING SPINAL INPLANTS

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BACKGROUND OF THE INVENTION

The present invention relates to a spinal implant, and to a method of using the spinal implant to fuse together adjacent vertebrae of a spinal column.

A known spinal implant has a rectangular shape and a tapered front end. The spinal implant includes nubs to 10 grip adjacent vertebrae. The nubs have inclined front faces that accommodate forward sliding movement of the spinal implant into channels cut in the adjacent vertebrae. This known spinal implant is described in U.S. Pat. No. 4,834,757. By cutting channels into the 15 vertebrae for receiving the spinal implant nerve roots are put at risk.

SUMMARY OF THE INVENTION

spinal implant and method of using the spinal implant to fuse together adjacent vertebrae of a spinal column. The spinal implant of the present invention includes first and second side surfaces extending substantially parallel to each other. Upper and lower surface means for engaging the adjacent vertebrae extend between the first and second side surfaces and extend from a first end portion to a second end portion of the spinal implant. Recesses in the first and second side surfaces receive an instrument for rotating the spinal implant when the implant is 30 located between the adjacent vertebrae.

The method of using the spinal implant to fuse together the adjacent vertebrae of a spinal column includes removing at least a portion of the spinal disc between the adjacent vertebrae. The spinal implant is 35 inserted between the adjacent vertebrae with the first and second substantially parallel side surfaces facing the adjacent vertebrae. The spinal implant is rotated into a position in which the parallel side surfaces extend from one of the adjacent vertebrae to the other of the adja-40 cent vertebrae and the upper and lower surface means engage the adjacent vertebrae. There are no channels cut in the adjacent vertebrae. Thus, the operation takes less time and lessens the risks to the patient.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features of the present invention will become more apparent to one skilled in the art upon reading the following description of the present invention with reference to the accompanying 50 implant 10. The surfaces 40 and 42 of the tooth 36 interdrawings, wherein:

FIG. 1 is an elevation view of a human spinal column having a spinal implant in accordance with that of the present invention placed therein;

FIG. 1;

FIG. 3 is an enlarged plan view looking at a portion of the spinal implant of FIG. 2 from the side;

FIG. 4 is a sectional view of an instrument for holding the spinal implant of FIG. 2 to facilitate inserting the 60 spinal implant between adjacent vertebrae and rotating the spinal implant;

FIG. 5 is a sectional view of an intermediate portion of the instrument of FIG. 4;

FIG. 4:

FIG. 7 is a sectional view of a clamp portion of the instrument of FIG. 4;

2 FIG. 8 is a plan view of the clamp portion of FIG. 7 taken along the line 8-8 of FIG. 7;

FIG. 9 is a view showing a method of inserting spinal implants in a side-by-side relationship between adjacent vertebrae:

FIG. 10 is a view similar to FIG. 9 further showing the method of inserting the spinal implants between the adjacent vertebrae;

FIG. 11 is a view similar to FIG. 10 further showing the method of inserting the spinal implants between the adjacent vertebrae; and

FIG. 12 is a view similar to FIG. 11 further showing the method of inserting the spinal implants between adjacent vertebrae.

DESCRIPTION OF A PREFERRED EMBODIMENT

One or a pair of substantially rigid spinal implants 10 The present invention provides a new and improved 20 adjacent vertebrae 12 and 14 of a spinal column 16 in a (one of which is shown in FIG. 1) are placed between side-by-side relationship to fuse together the adjacent vertebrae. Preferably, the spinal implants 10 are made by injection molding a chopped carbon fiber reinforced polymer. However, the spinal implants 10 can be made of other suitable implantable materials such as stainless steel or titanium. Also, preferably, the ultimate tensile strength of the material used to make the spinal implants 10 is higher than 10,000 psi so that the spinal implants will prevent relative movement between the adjacent vertebrae 12 and 14 and will support the compressive load of the spinal column.

> Each of the spinal implants 10 (FIG. 2) has parallel side surfaces 20 and 22. An upper surface 24 and a lower surface 26 for engaging the adjacent vertebrae 12 and 14 extend between the side surfaces 20 and 22. The upper and lower surfaces 24 and 26 adjacent a first end portion 30 of the spinal implant 10 are spaced apart by a first distance. The upper and lower surfaces 24 and 26 adjacent a second end portion 32 of the spinal implant 10 are spaced apart a second distance. The second distance is preferably greater than the first distance to give the spinal implant a wedge shape for use in portions of the spine with a lordotic curve.

> The upper and lower surfaces 24 and 26 include a plurality of triangular-shaped teeth 36 that extend from the side surface 20 to the side surface 22 for engaging the vertebrae 12 and 14. Each tooth 36 (FIG. 3) includes a surface 40 facing toward the end portion 30. A surface 42 of the tooth 36 faces the end portion 32 of the spinal sect each other to form an edge 44. The surfaces 40 and 42 of adjacent teeth 36 intersect to form edges 46. The edges 46 are parallel to each other and lie in a plane 48.

The surface 40 of the tooth 36 extends at an acute FIG. 2 is a perspective view of the spinal implant of 55 angle x to the plane 48. The surface 42 of the tooth 36 extends at an acute angle y to the plane 48. Preferably, the angles x and y are equal and have a value of 45° so that surfaces 40 and 42 extend perpendicular to each other. Therefore, the teeth 36 are not preferential. The teeth 36 prevent the spinal implant 10 from moving toward the anterior portion of the spinal column 16 as much as they prevent the spinal implant from moving toward the posterior portion of the spinal column 16.

A plurality of openings 56 and 58 extend from the FIG. 6 is a plan view of a handle of the instrument of 65 side surface 20 to the side surface 22 to provide for blood flow and bone growth from one side of the implant 10 to the other side of the implant. The openings 58 are located near the end portion 30 of the implant.

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