CLAIMS

1. Use of an endosteal guide pin for preparing a guide path for the implantation of a pedicle or orthopaedic screw, the pin (1, 1a, 1b, 1c) including a head (2, 2b) intended to be provisionally implanted in a bone (16), and a guide rod (4, 4b), coaxial with and rigidly connected to the head (2, 2b), ending in a free end (5, 5a, 5b) adapted such that it is at least flush with the skin surface (17) of the patient when the pin (1, 1a, 1b, 1c) is in the implanted position in the bone (16), which pin (1, 1a, 1b, 1c) includes a first coupling means (6, 21, 21b, 31) intended at least to ensure the rigid connection thereof to and the disconnection thereof from at least one part of a positioning trocar (8, 8b, 8c), and a second coupling means (6, 7, 7b, 21, 21b) intended at least to ensure the rigid connection thereof to a removal trocar (8, 12, 12a); and said first coupling means further comprises a rotation locking element (31) produced at the head (2, 2b) of the guide pin.

2. Use of the guide pin according to claim **1**, characterised in that the guide rod (4, 4b) of said pin (1, 1a, 1b, 1c) is capable of being cut so that the free end (5, 5a, 5b) thereof is located beneath and in the vicinity of the skin surface (17) when the pin (1, 1a, 1b, 1c) is in the implanted position in the bone (16).

3. Use of the guide pin according to any of claims **1** and **2**, characterised in that at least one part of the head (2, 2b) has a circular section with an average diameter D1, and in that the guide rod (4, 4b) has a circular section with an average diameter D2 that is less than the diameter D1 of the head (2, 2b).

4. Use of the guide pin according to claim **3**, characterised in that it is made of stainless steel or titanium, and in that the diameter D2 of the guide rod (4, 4b) is less than 2 millimetres.

5. Use of the guide pin according to any of claims **1** to **4**, characterised in that the head (2, 2b) has a free end formed by a bevel, double bevel (3, 3b) or diamond tip.

6. Use of the guide pin according to any of claims **1** to **5**, characterised in that the first coupling means (6) comprises a threading (21, 21b) produced on the guide rod (4, 4b).

7. Use of the guide pin according to claim **6**, characterised in that the threading (21, 21b) is produced away from the head (2, 2b).

8. Use of the guide pin according to any one of claims **1** to **7**, characterised in that the rotation locking element (31) is in the vicinity of the guide rod (4b).

9. Use of the guide pin according to any one of claims **1** to **8**, characterised in that the rotation locking element (31) has a polygon-shaped section, for example a hexagonal section.

10. Use of the guide pin according to any of claims **1** to **9**, characterised in that the second coupling means is formed by a threading (7b) produced on the head (2b).

11. Use of the guide pin according to claim **10**, characterised in that the threading (7b) is produced at the rotation locking element (31).

12. Use of the guide pin according to claim **11**, characterised in that the rotation locking element (31) includes a smooth part (23) and a threaded part (7b) also forming a second coupling means.

13. Use of the guide pin according to any of claims **1** to **11**, characterised in that the first and second coupling means are aligned.

14. Trocar for positioning an endosteal guide pin, comprising a first part comprising the guide pin (1, 1a, 1b, 1c), said pin including a head (2, 2b) intended to be provisionally implanted in a bone (16), and a guide rod (4, 4b), coaxial with and rigidly connected to the head (2, 2b), ending in a free end (5, 5a, 5b), and adapted such that it is at least flush with the skin surface (17) of the patient when the pin (1, 1a, 1b, 1c) is in the implanted position in the bone (16), the positioning trocar (8, 8b, 8c) further comprising a second hollow part (9, 13a, 13b) to which the first part (1, 1a, 1b, 1c) is coupled in a removable manner by means of a rigid connection system (11, 20; 11, 25) including a first coupling

means (6, 21, 21b, 31) provided on said pin (1, 1a, 1b, 1c) and a cooperating coupling means (22; 24) provided on the positioning trocar (8, 8b, 8c), the guide rod (4, 4b) of the guide pin (1, 1a, 1b, 1c) being fitted inside the hollow part (9, 13a, 13b) such that it slides, and the pin (1, 1a, 1b, 1c) comprising a second coupling means (6, 7, 7b, 21, 21b) intended at least to ensure the rigid connection thereof to a removal trocar (8, 12, 12a), characterised in that the first coupling means (6, 21, 21b, 31) and the cooperating coupling means (22, 24) of the bonding system (21, 21b, 25) are located at the free end of the hollow part (9, 9a, 29) of the positioning trocar (8, 8b, 8c); and said first coupling means further comprises a rotation locking element (31) produced at the head (2, 2b) of the guide pin.

15. Positioning trocar according to the claim **14**, characterised in that the free end of the hollow part (9, 13a, 13b) includes driving means (9a, 29) for driving the guide head (2, 2b) into the bone (16), in particular rotating means (29) and, where appropriate, grasping means (9a, 14).

16. Positioning trocar according to any one of claims **14** and **15**, characterised in that the first coupling means of the removable rigid connection system (20) includes a threading (21, 21b) made away from the head (2, 2b) of the guide pin (1, 1a, 1b, 1c), and in that the cooperating coupling means includes a tapping coincident with said threading (21, 21b).

17. Positioning trocar according to the claim **16**, characterised in that the tapping is produced in a nut (22, 24) disposed coaxially to said hollow part (9, 13a, 13b) of the positioning trocar (8b, 8c), which nut (22, 24) cooperates with the threading (21, 21b) such that the rotation of the nut (22, 24) drives the screwing or unscrewing of the guide rod (4, 4b) of the pin (1, 1a, 1b, 1c) relative to the rest of the positioning trocar (8b, 8c) in order to enable the guide pin (1, 1a, 1b, 1c) to be rigidly connected to or disconnected from the second hollow part (9, 13a, 13b) of the positioning trocar (8b, 8c).

18. Positioning trocar according to any one of claim **16** or claim **17**, characterised in that the tapping (25) is located at the driving means of the positioning trocar (8b, 8c).

19. Positioning trocar according to any one of claims **16** to **18**, characterised in that the removable rigid connection system (11, 20; 11, 25) further includes a rotation locking element (31) provided on the pin (1c) and a cooperating locking element (26) provided in the hollow part (13b) of the trocar (8c) in order to prevent the rotation of the guide pin (1c) relative to the hollow part of the positioning trocar around the axis of said positioning trocar.

20. Positioning trocar according to the any one of claims **14** to **19**, characterised in that the rotation locking element (31) is located in the vicinity of the rod (4b).

21. Positioning trocar according to any one of claims **14** to **20**, characterised in that the locking element (31) has a polygon-shaped section, for example a hexagonal section, and in that the cooperating locking element (26) is formed by a key made in the hollow part (13b) of the positioning trocar (8c) and adapted for cooperating with the first locking element (31).

22. Trocar for removing an endosteal guide pin for preparing a guide path for the implantation of a pedicle or orthopaedic screw, the pin including a head (2, 2b) intended to be provisionally implanted in a bone (16), and a guide rod (4, 4b), coaxial with and rigidly connected to the head (2, 2b), ending in a free end (5, 5a, 5b) adapted such that it is at least flush with the skin surface (17) of the patient when the pin (1, 1a, 1b, 1c) is in the implanted position in the bone (16), which pin (1, 1a, 1b, 1c) includes a first coupling means (6, 21, 21b, 31) intended to ensure the rigid connection thereof to and the disconnection thereof from at least one part of a positioning trocar (8, 8b, 8c), and a second coupling means (6, 7, 7b, 21, 21b) intended at least to ensure the rigid connection thereof to a removal trocar, characterised in that it includes a hollow fixing rod (13, 13a) intended to be fitted around the guide rod (4, 4b) of said pin (1, 1a, 1b, 1c), and a coupling means (10, 15) cooperating with the second coupling means (6, 7, 7b, 21, 21b) of said pin (1, 1a, 1b, 1c) to form a removable rigid connection system enabling the guide pin (1, 1a, 1b, 1c) to be removed when the second coupling means (6, 7, 7b, 21, 21b) of the pin (1, 1a, 1b, 1c) and the cooperating coupling means (10, 15, 22) of the hollow rod (13, 13a) of the removal trocar (8, 12, 12a)

are assembled together; and said first coupling means further comprises a rotation locking element (31) produced at the head (2, 2b) of the guide pin.

23. Removal trocar according to claim **22**, characterised in that the cooperating coupling means is formed by a tapping (15) made on the inside face of the hollow rod (13), and which is capable of being assembled with the second coupling means of the guide pin (1, 1a, 1b, 1c) formed by a threading (7, 7b) made on the guide rod (4) or on the end part of the head (2b) rigidly connected to the guide rod (4b).