



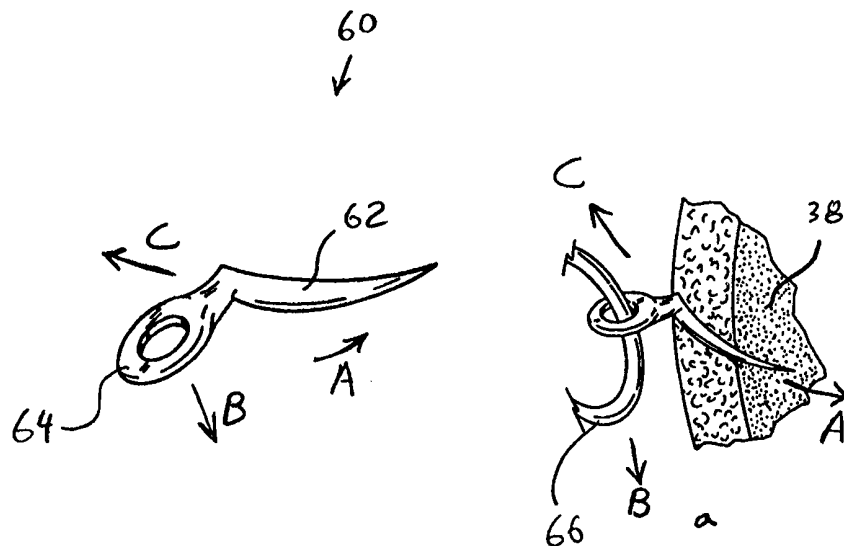
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<p>(21) International Application Number: PCT/US99/27690 (22) International Filing Date: 22 November 1999 (22.11.99) (30) Priority Data: 09/197,938 23 November 1998 (23.11.98) US (71) Applicant: SPRINGBOARD MEDICAL VENTURES, LLC [US/US]; 28202 Cabot Road, Suite 300, Laguna Hills, CA 92653 (US). (72) Inventors: BENDEREV, Theodore, V.; 26975 Magnolia Court, Laguna Hills, CA 92653 (US). RYAN, Timothy, Charles; 25082 Sausalito Street, Laguna Hills, CA 92653 (US). (74) Agent: STETINA BRUNDA GARRED & BRUCKER; 24221 Calle De La Louisa, 4th floor, Laguna Hills, CA 92653 (US).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>With amended claims.</i> Date of publication of the amended claims: 13 July 2000 (13.07.00)</p>

(54) Title: SYSTEMS FOR SECURING SUTURES, GRAFTS AND SOFT TISSUE TO BONE AND PERIOSTEUM

(57) Abstract

Devices for affixing sutures, grafts and tissues to bone, and soft tissues such as periosteum. In a first embodiment, the invention comprises a piton member (62) implantable within bone having a post or eyelet (64) formed thereon to which the suture or tissue may be attached. The piton member is designed to become more firmly secured within the bone when pressure is applied to a first axis pushing the piton member into the bone, but may be easily removed when such force is applied in a generally opposed direction. In a second embodiment, the invention comprises affixation devices (70, 80, 90) that are designed to detachably ensnare with periosteum. Such devices are provided with attachment structures, such as one post, eyelet or other means for securing sutures, grafts, synthetic materials or tissue.



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AMENDED CLAIMS

[received by the International Bureau on 17 May 2000 (17.05.00);
original claims 1, 9, 10 and 29 amended; original claims 11 and 13-28 cancelled;
remaining claims unchanged (3 pages)]

1. (Amended) A surgical implant for securing sutures, grafts, synthetic materials, and soft tissue to bone or soft tissue at selected target site comprising:

5 a) a piton member formed from non-bioabsorbable material having proximal and distal ends, said distal end being designed and configured to penetrate into and become embedded within said bone or tissue at said target site, said piton member being insertable within bone such that said
10 piton member defines a pathway of penetration therewithin;

b) an attachment member formed upon said proximal end of said piton member, said attachment
15 member being formed from non-bioabsorbable material and designed to receive and securably hold said suture, graft or soft tissue such that a strain is imparted thereto; and

c) wherein said attachment member is formed
20 relative said piton member such that in use, when said suture, graft or soft tissue is attached to said attachment member and tension is applied thereto, said piton member is caused to advance toward said penetration pathway.

25 2. The surgical implant of Claim 1 wherein said first pathway of penetration extends along a first axis and said strain imparted to said attachment member is applied along a second axis, wherein said first and second axes are not parallel to one another.

30 3. The surgical implant Claim 1 wherein said first pathway of penetration extends along a first axis and said strain imparted to said attachment member is applied along a second axis, wherein said first and second axes are parallel to one another.

35 4. The surgical implant of Claim 1 wherein said attachment member comprises an eyelet.

5. The surgical implant of Claim 1 wherein said attachment member comprises a post.

6. The surgical implant of Claim 1 wherein said attachment member comprises a hook.

5 7. The surgical implant of Claim 2 wherein said piton member comprises an arcuate blade member having a tapered distal end and a gradually widening proximal end.

8. The surgical implant of Claim 2 wherein said piton member comprises a sickle-shaped member, said sickle-shaped member defining a path of penetration having generally C-shaped configuration.

9. (Amended) The surgical implant of Claim 2 wherein said piton member comprises an elongate member having at least two opposed, outwardly-flaring prongs formed at the distal end thereof for piercing directly through and thereafter becoming embedded within said bone or soft tissue, each respective one of said prongs defining dedicated pathway of penetration.

10. (Amended) The surgical implant of Claim 3 wherein said piton member comprises an elongate member having two opposed, outwardly-flaring prongs formed at the distal end thereof for piercing directly through and thereafter becoming embedded within said bone or soft tissue, each respective one of said prongs defining a dedicated pathway of penetration.

11. Canceled.

12. The surgical implant of Claim 3 wherein said piton member comprises an elongate shaft member defining a generally straight pathway of penetration.

30 13. Canceled.

14. Canceled.

15. Canceled.

16. Canceled.

17. Canceled.

35 18. Canceled.

19. Canceled.

20. Canceled.

21. Canceled.
22. Canceled.
23. Canceled.
24. Canceled.
- 5 25. Canceled.
26. Canceled.
27. Canceled.
28. Canceled.
29. (Amended) The surgical implant of Claim 1
10 wherein said piton member remains resident within said
bone or tissue and said attachment member comprises a
crimping member that, in use, may be compressed to pinch
and securably hold said suture.