Express Search
Phone: 703.535.5455 , Email: Projects@ExpressSearch.com , Fax: 703.535.5475
5242 Port Royal Road #1811 Springfield, VA 22151

Mr. Express Search
Express Search, Inc
5242 Port Royal Road #1811
Springfield, VA 22151

Re:
Clearance Patent Search
Implant with Resorbable Stem
Express Search Sample Clearance Search

June 18, 2019

Dear Mr. Search,

In accordance with your e-mail received on June 11, 2019, a Clearance Patent Search was conducted for an implant with a resorbable stem.

This invention relates to a biodegradable anchor for a permanent implant of a bone joint, e.g. hip, shoulder, knee or finger. The biodegradable anchor is an elongated member which has an exterior surface which tightly engages a cavity in the bone and is substantially immovable within the cavity upon implant. A means of securing the anchor to the permanent implant is also included, in accordance with the disclosure provided.

The following references for 'Implant with Resorbable Stem' appear to be most relevant:

WO 2009108886A1 [May et al] discloses a press-fit prosthesis to replace bone with a resorbable fixation member on one side to resorb slowly enough for bone in-growth to knit the bone to the prosthesis (Claims 1, 4-6, 9-11 and 20-21; Figures 1-3).

8,506,608 [Cerynik et al] discloses an orthopedic fixation device for bone fractures by linking two bone portion with screws layered with bioresorbable material on the shaft (Figures 1-3 and 84-87; Claims 1-9 and 31-33).

8,414,583 [Prandi et al] discloses a resorptive intra-medullary implant for arthroplasty between hand bones with anchoring zones at each end, one cylindrical and the other is flattened (Figures 1-7; Claims 13 and 18).

EP 2749256A1 [Sander et al] discloses a bone screw that is implanted in a joint to correct motion for some time before being absorbed in the body (Claims 1-3; Figures 1A-1B; Column 5, Lines 14-34 in Paragraph [0005]).

4,990,161 [Kampner] discloses implant with resorbable stem which is an anchor for a permanent implant shaped to engage a bone joint cavity. Implant is constructed

substantially entirely of a biodegradable material so as to resorb after a period of time (Abstract; Figures 1-7; Claims 1, 7, 14, 15, 31-34).

2007/0038303 [Myerson et al] discloses a foot/ankle implant comprising a ceramic with a polymer component filling a macroporosity component, forming an anatomically-shaped and load-bearing graft for the foot; the ceramic component is gradually resorbable after implantation; the polymeric component is gradually degradable after implantation; and the composite structure is gradually replaceable by tissue/bone ingrowth (Abstract; Figures 1-4; Claims 1, 16, 18, 20).

6,113,604 [Whittaker et al] discloses a method for deploying a graft in a bone tunnel, where the prosthetic element comprises a rod selected from a group including rigid rods, prosthetic materials and substitute tissue and where the rods are formed of bio-absorbable material such as polylactic acid, polyglycolic acid and polydiaxanone (Abstract; Figures 6-9; Claims 1, 4-8).

2009/0062926 [Wyss] discloses an orthopaedic implant with a bioresorbable post configured to mate with the prepared end of the bone;a porous coating on the bone surfacepromotes bone ingrowth and the bioresorbable post extends into a prepared cavity in the bone (Abstract; Figures 1-9; Claims 1, 4, 10-14).

2004/0093081 [Nilsson et al] discloses an implant for reconstruction of joints which includes a spacer member (1) placed between the bone ends to be connected, and a joint-stabilizing connection (2, 3) between. The spacer member (1) is made of at least one tissue-compatible, degradable material consisting of polyurethane urea or other materials (Abstract, Paragraph [0019]; Figures 1-4, 11-22b; Claims 1-10, 22, 29).

2007/0142916 [Olson et al] discloses a bone graft and regenerative composition that includes a resorbable osteoconductive matrix with rigid nanofibers dispersed within and projecting out of the surface of the matrix to provide load bearing surface bristles. Implant is formed in a shape for implanting into a tissue area in need of regeneration (Abstract; Paragraph [0008]; Figures 2, 3, 7-9; Claims 1, 4-6, 11, 14-20).

7,192,447 [Rhoda] discloses an intervertebral implant with a central bore, top and bottom surfaces conform in size and shape with the end plates of adjacent vertebra, and gripping structures for engaging the vertebrae; implant is made from a resorbable material (Abstract; Figures 1-8; Claim 11).

2009/0157194 [Shikinami] discloses a bioabsorbable and bioactive implant composite material, and comprises a compact polymer composite with bioactive bioceramic particles and a porous composite of bio-degradable/absorbable polymer, where the porous composite is united with the compact composite (Abstract; Figures 1-20; Claim 1).

7,128,763 [Blatt] discloses a method for treating a joint to maintain slidable joint motion between the bones by selecting an implant made of bioresorbable material only and surgically contacting a prepared bone surface with it; the joint is used to allow resorption of the implant and stimulating the formation of fibroblast from the bone surface layer, so that the fibroblast can progress into fibrocartilage as the implant is resorbed. The bioresorbable implant may be made of a polymer of lactic acid (Abstract; Figures 2-3F; Claims 1, 2, 7-9).

4,344,190 [Lee et al] discloses plugs for the medullary canal of a bone for locating a hip prosthesis. The plugs are constructed to be push fit into the canal wherein said plug is made of a biodegradable material (Abstract; Column 2, Lines 46-48; Figures 1, 2; Claims 3-5, 9-14).

7,524,891 [Rose et al] discloses an implantable, biodegradable medical device is formed from a homogeneous polymer blend; device which may be a suture, anchor, interference screw, tissue engineering scaffold, maxial-facial plate, or a fracture fixation plate or rod (Abstract; Figures 1-10; Claims 1-9, 13, 14).

2007/0093895 [Donnelly et al] discloses a method of performing anterior cruciate ligament reconstruction which uses a biodegradable composite interference screw made from a biodegradable polymer and a bioceramic or a bioglass to secure ends of the graft in the femoral bone tunnel (Abstract; Figure 1A, 1C, 10; Claim 1, 2, 5, 6). 5,895,425 discloses a surgical bone implant for securing ligament grafts into a joint is made of a biologically resorbable material (Abstract; Figure 8; Claim 8).

5,201,738 [Scott et al] discloses an anti-displacement device for prosthetic bone joints that comprises a biodegradable biocompatible polymer directed into a bone joint to allow bone tissue growth to fix the prosthetic bone joint to the bone; body fluid contacting the elongate member biodegrades it. The biodegradable polymer has a sufficient shear resistance to allow permanent fixation of prosthetic bone joint. The device can be configured as a peg, pin, spike, screw, etc (Abstract; Figures 1, 5-8; Column 7, Lines 6-13; Claims 1, 12-16).

The following non-patent literature articles were uncovered during the search:

Briggs, Helen. "Silk screws used to repair fractures." BBC News, 4 March 2014. http://www.bbc.com/news/health-26438497
Disclosing screws made of silk that can be easily formed, are stronger than steel, share the properties of bone and eventually absorb into the body as proteins.

"Silk-Based Surgical Implants Could Offer a Better Way to Repair Broken Bones." Healthcare Technology, March 05, 2014. http://scicasts.com/healthcare-technology/2068-medical-devices/7450-silk-based-surgical-implants-could-offer-a-better-way-to-repair-broken-bones/
Disclosing implants made of silk for strength and eventual bio-absorption, eliminating revision surgery for out-grown implants in growing children.

Schwartz, Adam J., et al. "Combined anterior cruciate ligament reconstruction and fixed-bearing unicondylar knee arthroplasty: a report of two cases." Current Orthopaedic Practice 20.6 (2009): 706-710. https://journals.lww.com/c-orthopaedicpractice/citation/2009/11000/combined_anterior_cruciate_ligament_reconstruction.25.aspx
Disclosing femoral fixation of ACL allografts using metallic interference screws (7x20-mm Soft Silk Screw, Smith and Nephew, Andover, MA) in both patients.

Kuklo, Timothy R., Michael K. Rosner, and David W. Polly Jr. "Computerized tomography evaluation of a resorbable implant after transforaminal lumbar interbody fusion." Neurosurgical focus 16.3 (2004): 1-6. http://www.bmp2.com.br/BMPLiteraturas/Spine/J%20Neuro%20Focus%202004%20Kuklo%20TLIF.pdf
Disclosing synthetic bioabsorbable implants in spinal surgery with CT evaluation of the indications, applications, and results of using absorbable interbody spacers.

Neumann, H., et al. "Refixation of osteochondral fractures by ultrasound-activated, resorbable pins An ovine in vivo study." Bone and Joint Research 2.2 (2013): 26-32. http://www.boneandjoint.org.uk/highwire/filestream/64519/field_highwire_article_pdf/0/26.full-text.pdf

Disclosing implants that anchor axial stability with resorbable plastic pins (Pages 27-28).

The following Examiners were consulted regarding the field of search:

Examiner Bernard in Art Unit 3733
Examiner Bernard in Art Unit 3775

The following USPC classes and subclasses were searched:

Class 606 (Surgery)
Subs. 280, 298, 299, 300, 301, 331, 53, 60, 62, 65, 67, 76, 77, 908
Class 623 (Prosthesis (i.e., Artificial Body Members), Parts Thereof, Or Aids And Accessories Therefor)
Subs. 1.1, 1.38, 11.11, 13.18, 16.11, 18.11, 20, 22.11, 22.43, 23.34, 23.75, 23.76

The following IPC-8 class and subclasses were searched:

Class A61F (FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; DEVICES PROVIDING PATENCY TO, OR PREVENTING COLLAPSING OF, TUBULAR STRUCTURES OF THE BODY, E.G. STENTS; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS)

2/02 Filters implantable into blood vessels; Prostheses, i.e. artificial substitutes or replacements for parts of the body; Appliances for connecting them with the body; Devices providing patency to, or preventing collapsing of, tubular structures of the body, e.g. stents; Prostheses implantable into the body

2/30 Filters implantable into blood vessels; Prostheses, i.e. artificial substitutes or replacements for parts of the body; Appliances for connecting them with the body; Devices providing patency to, or preventing collapsing of, tubular structures of the body, e.g. stents; Prostheses implantable into the body; Joints

The following CPC classes and subclasses were searched:

Class A61F (FILTERS IMPLANTABLE INTO BLOOD VESSELS)

2/02 Filters implantable into blood vessels; Prostheses implantable into the body

2/30 Filters implantable into blood vessels; Prostheses implantable into the body; Joints

2002/30032 Filters implantable into blood vessels; Prostheses implantable into the body; Joints; {Additional features of subject-matter classified in A61F228 A61F230 and subgroups thereof}; {Material related properties of the prosthesis or of a coating on the prosthesis}; {The prosthesis made from materials having different values of a given property at different locations within the same prosthesis}; {differing in absorbability or resorbability ie in absorption or resorption time}

2002/30034 Filters implantable into blood vessels; Prostheses implantable into the body; Joints; {Additional features of subject-matter classified in A61F228 A61F230 and subgroups thereof}; {Material related properties of the prosthesis or of a coating on the prosthesis};

{The prosthesis made from materials having different values of a given property at different locations within the same prosthesis}; {differing in absorbability or resorbability ie in absorption or resorption time}; {made from both resorbable and non-resorbable prosthetic parts eg adjacent parts}

2002/30062 Filters implantable into blood vessels; Prostheses implantable into the body; Joints; {Additional features of subject-matter classified in A61F228 A61F230 and subgroups thereof}; {Material related properties of the prosthesis or of a coating on the prosthesis}; {Properties of materials and coating materials}; {absorbable biodegradable bioerodable resorbable resorptive}

2250/003 Special features of prostheses classified in groups A61F200&160-&160A61F226 or A61F282 or A61F900 or A61F1100 or subgroups thereof; having different values of a given property or geometrical feature eg mechanical property or material property at different locations within the same prosthesis; differing in adsorbability or resorbability ie in adsorption or resorption time

2250/0031 Special features of prostheses classified in groups A61F200&160-&160A61F226 or A61F282 or A61F900 or A61F1100 or subgroups thereof; having different values of a given property or geometrical feature eg mechanical property or material property at different locations within the same prosthesis; differing in adsorbability or resorbability ie in adsorption or resorption time; made from both resorbable and non-resorbable prosthetic parts eg adjacent parts

Class A61L (METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL)

27/58 Materials for {grafts or} prostheses or for coating {grafts or} prostheses; Materials characterised by their function or physical properties { eg injectable or lubricating compositions shape-memory materials surface modified materials}; Materials at least partially resorbable by the body

31/148 Materials for other surgical articles { eg stents stent-grafts shunts surgical drapes guide wires materials for adhesion prevention occluding devices surgical gloves tissue fixation devices }; Materials characterised by their function or physical properties { eg injectable or lubricating compositions shape-memory materials surface modified materials}; {Materials at least partially resorbable by the body}

The following U.S. references for 'Implant with Resorbable Stem' were cited in the search:

8,506,608 [Cerynik et al] 8,414,583 [Prandi et al] 7,524,891 [Rose et al]
7,458,975 [May et al] 7,455,674 [Rose] 7,192,447 [Rhoda]
7,176,284 [Oppermann et al] 7,175,662 [Link et al] 7,128,763 [Blatt]
7,041,106 [Carver et al] 6,926,741 [Kolb] 6,923,830 [Michelson]
6,770,078 [Bonutti] 6,716,217 [Mckernan et al] 6,565,606 [Bruce et al]
6,551,995 [Oppermann et al] 6,530,956 [Mansmann] 6,488,716 [Huang et al]
6,352,558 [Spector] 6,187,008 [Hamman] 6,113,604 [Whittaker et al]
6,071,312 [Lampe et al] 6,065,476 [Agrawal et al] 6,017,366 [Berman]
5,984,966 [Kiema et al] 5,895,425 [Grafton et al] 5,735,901 [Maumy et al]
5,624,463 [Stone et al] 5,425,776 [Cohen] 5,417,691 [Hayhurst]
5,201,771 [Belykh et al] 5,201,738 [Scott et al] 4,990,161 [Kampner]

4,904,264 [Scheunemann] 4,356,572 [Guillemin et al] 4,344,190 [Lee et al]

2009/0177282 [Bureau et al] 2009/0157194 [Shikinami] 2009/0062926 [Wyss]
2009/0005869 [Laurencin et al] 2008/0255618 [Fisher et al] 2008/0177378 [Asgari]
2008/0033577 [Kohan] 2007/0142916 [Olson et al] 2007/0093895 [Donnelly et al]
2007/0038303 [Myerson et al] 2005/0070906 [Clark et al] 2005/0060043 [Katsuya]
2004/0220574 [Pelo et al] 2004/0148026 [Bonutti] 2004/0117033 [Frondoza et al]
2004/0093081 [Nilsson et al] 2004/0073306 [Eichhorn et al] 2003/0105526 [Bryant et al]
2001/0043940 [Boyce et al]

The following foreign references for 'Implant with Resorbable Stem' were also noted of interest:

WO 2009108886A1 [May et al] WO 9641596A1 [Lehto et al]
JP 2005066354A [Shikinami et al] EP 2749256A1 [Sander et al]
DE 102004034331A1 [Grundei]

These patents are representative of the references searched. Copies of the cited references are enclosed for your further review. For additional information on the cited references, please see the patent family for related patents and the legal status of cited patents. Please do not hesitate to contact us with any questions regarding this search.

Best Regards,
EXPRESS SEARCH

Enclosure: References for 'Implant with Resorbable Stem' – 60 Patents and 5 NPL References
Ref: E00-40003