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'073 PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

PATENT: 7,087,073

INVENTOR: PETER M. BONUTTI

FILED: APR. 14, 2003

ISSUED: AUG. 8, 2006

TITLE: METHOD OF SECURING  
BODY TISSUE

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**DECLARATION OF WAYNE J. SEBASTIANELLI, MD REGARDING  
U.S. PATENT NO. 7,087,073**

I, Wayne J. Sebastianelli, declare as follows:

1. My name is Wayne J. Sebastianelli.
2. I am a Professor of Orthopedic Surgery and Rehabilitation and  
Director of Athletic Medicine at Penn State University, where I have taught,  
conducted research, and practiced surgery for 18 years.
3. I graduated from the University of Rochester with an A.B., magna  
cum laude, in 1979, and an M.D., with Honor, in 1983. I completed my residency

at the University of Rochester in 1988 as the Chief Orthopedic Resident. I then received a one-year Orthopedic Sports Medicine Fellowship at Pennsylvania State University (“Penn State”) as a Clinical Instructor in Surgery.

4. From 1989 to 1992, I was an Assistant Professor in the Department of Orthopedics at the University of Rochester while continuing to practice orthopedic surgery. I returned to Penn State in 1992 as an Assistant Professor and the Director of Athletic Medicine.

5. I have been the Head Team Physician for Penn State’s athletic programs from 1995 to present.

6. In addition to my work at Penn State, I have served as the Chief of Surgery at Centre Community Hospital in State College, Pennsylvania from 2000 to 2003 and the Chief of Staff of Mount Nittany Medical Center in State College, Pennsylvania from 2004 to 2008 and 2010 to present.

7. I have licenses to practice medicine and surgery in New York and Pennsylvania, and I have been certified by the American Board of Orthopedic Surgery, with a subspecialty certificate in orthopedic sports medicine.

8. I have authored or co-authored over 80 articles on orthopedic and athletic medicine, as well as chapters of 15 books. I have delivered over 75 presentations on orthopedic and athletic medicine at conferences across the United

States and worldwide. I also have served on numerous committees of professional organizations in arthroscopic medicine and sports medicine.

9. My practice and research has focused on all aspects of orthopedic surgery including treating injuries of the shoulder, knee, hip, and other major orthopedic injuries. I have treated many patients for torn tendons and muscles and have used suture anchors throughout my entire career.

10. In the course of my work during the past 25 years, I have worked, spoken, authored papers, treated patients, performed surgeries, and generally engaged with a wide array of surgeons and other professionals who practice orthopedic and sports medicine.

11. My areas of expertise include orthopedic surgery, including shoulder and knee repair. Approximately 30% of my surgical cases are shoulder repairs. As described in my *curriculum vitae* (CV), attached as Appendix A.

12. I have reviewed the specification and claims of U.S. Patent No. 7,087,073 (the “’073 patent”; Ex. 1001). I have been informed that the ’073 patent was filed on Apr. 14, 2003. It was a divisional of U.S. patent application Ser. No. 09/789,621, filed Feb. 21, 2001, now U.S. Pat. No. 6,635,073, which was itself a continuation-in-part of U.S. patent application Ser. No. 09/556,458, filed on May 3, 2000, now U.S. Pat. No. 6,592,609. *See* ’073 patent, at cover page (Ex. 1001). I

understand this means the earliest effective filing date of the '073 patent is May 3, 2000 for the purposes of determining whether a reference will qualify as prior art.

13. I have also reviewed the following references:

- U.S. Patent No. 4,955,910 (“Bolesky ’910” (Ex. 1003)), which has an issue date of Sep. 11, 1990, and is prior art to the '073 patent under 35 U.S.C. § 102(b).
- U.S. Patent No. 5,500,000 (“Feagin ’000” (Ex. 1004)), which has an issue date of Mar. 19, 1996, and is prior art to the '073 patent under 35 U.S.C. § 102(b).
- U.S. Patent No. 5,569,306 (“Thal ’306” (Ex. 1005)), which has an issue date of Oct. 29, 1996, and is prior art to the '073 patent under 35 U.S.C. § 102(b).
- U.S. Patent No. 5,817,107 (“Schaller ’107” (Ex. 1009)), which has an issue date of Oct. 6, 1998, and is prior art to the '073 patent under 35 U.S.C. § 102(b).

14. I am being compensated at my normal consulting rate for my work, which is \$500/hr. My compensation is not dependent on and in no way affects the substance of my statements in this Declaration.

15. I have no financial interest in Petitioner. I similarly have no financial interest in the '073 patent, and have had no contact with the named inventor of the '073 patent.

### **Background of the Technology**

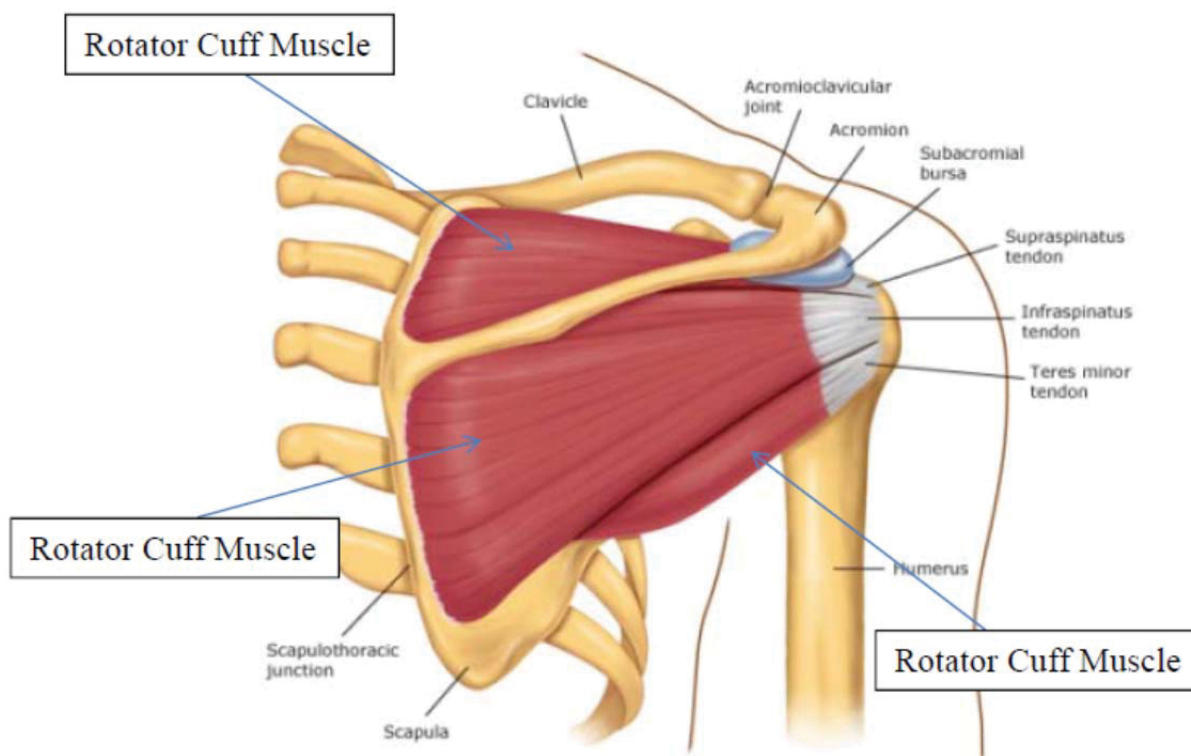
16. Tissue fixation using suture anchors is an orthopedic surgery technique that is predominantly used to fix soft tissues like tendons or muscle to bone. A suture anchor is a device, shaped, for example, like a hook, nail, or screw, that is inserted into the body. The anchor itself may fix a tissue to bone, or may be used to anchor a suture that is used to fix the tissue into place. When a suture anchor is inserted into bone and holds a suture in place, it allows a surgeon to place large amounts of tension on a particular tissue by leveraging the suture against the anchor in the bone and then using the anchored suture to manipulate the tissue.

17. The amount of tension required to complete a given tissue repair is dictated by a number of biological and anatomical factors. For example, the extent of the injury can increase the amount of tension required to close the wound. If the tear in the tissue is large, then the surgeon will necessarily need to apply more force to close the tear. Additionally, the age of the injury is also critical to the amount of tension required for the repair. Immediately after an injury, the body's natural repair mechanisms are triggered. Key among these is the formation of scar tissue. Because scar tissue is less pliable than normal tissue, more force is required

to pull the tissue back to its anatomical location. A surgeon will assess these and other factors during surgery in order to determine the amount of tension required to best to accomplish the repair.

18. A surgeon can use multiple anchors to complete a repair. When more than one anchor is used, generally the anchors are placed on the opposite sides of the injury and then the sutures are used to pull the two tissues together to allow for healing to occur. One particular common injury that involves the use of suture anchors in its repair is a torn rotator cuff in the shoulder.

19. The shoulder is a complex joint that allows for the enormous range of motion of the human arm. The mobility of the shoulder joint is provided by the muscles that make up the rotator cuff. The diagram below shows the anatomy of the shoulder:



### **Diagram of Anatomy of Human Shoulder**

20. The rotator cuff muscles extend from the scapula (shoulder blade) to the head of the humerus. They connect the humerus to the shoulder and provide motor stability to the arm as it moves. A rotator cuff tear involves a tear of the tendon and/or muscle of one of the rotator cuff muscles. To repair a rotator cuff tear, a surgeon usually uses multiple suture anchors to reattach the tendon to the humeral head of the arm. Below is a diagram of a typical repair:

FIG. 1: ROTATOR CUFF TEAR

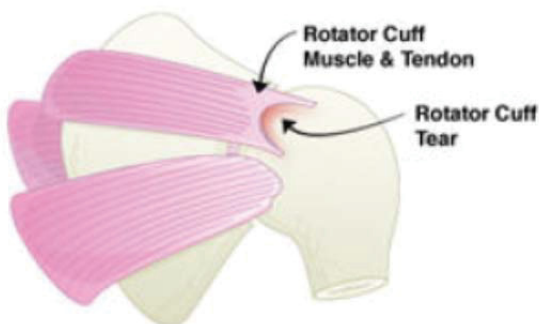


FIG. 2: MEDIAL ANCHORS

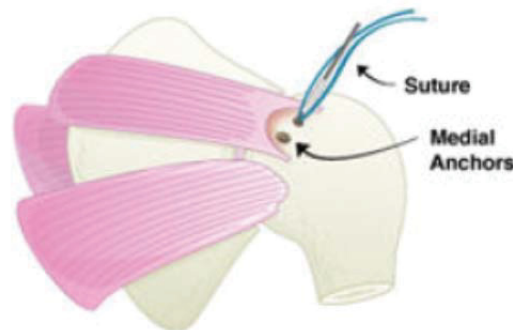


FIG. 3: MEDIAL ROW OF ANCHORS WITH SUTURE

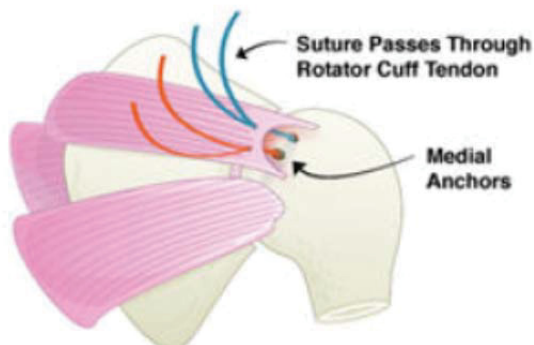
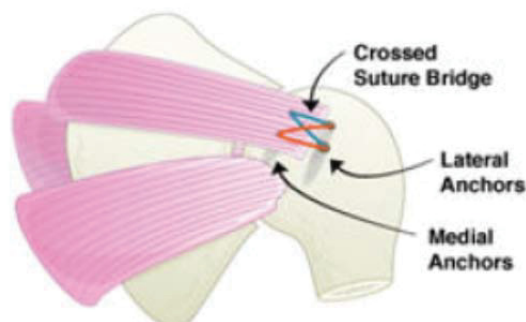


FIG. 4: COMPLETED DOUBLE-ROW ROTATOR CUFF REPAIR



### Diagram of Typical Rotator Cuff Repair Technique

21. As can be seen above, in a typical rotator cuff repair, two anchors are placed directly into the humerus insertion site. The sutures from these two anchors are then drawn through the torn rotator cuff. As the surgeon applies tension on the medial sutures, the tendon advances into its proper anatomical position. After placing the initial sutures, the surgeon places additional suture anchors (here a third and fourth) lateral to the first two anchors in order to finalize the repair. The sutures connected to each of the anchors are connected to each other by a knot or a



suture clip either before or after they are tensioned. *See* Feagin '000, col. 2, ll. 57-60 (Ex. 1004); Thal '306, col. 8, ll. 1-5 (Ex. 1005). The connecting step allows the suture anchors to permanently hold the sutures in place, allowing the tendon to remain in its proper position.

22. As discussed in detail below, it was well known in the art that it was beneficial to have suture anchors and fixation systems that could repair a tissue injury while allowing the surgeon flexibility to control the amount of tension in the repair.

### **The '073 Patent**

23. The challenged claim of the '073 patent is directed to a method of securing two body tissues together using two suture anchors whose sutures are interconnected and tensioned to a predetermined tension. The challenged claim is reproduced below:

35. A method of securing first body tissue with second body tissue, said method comprising the steps of moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor, moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor, tensioning the first and second suture portions, determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions, interconnecting the

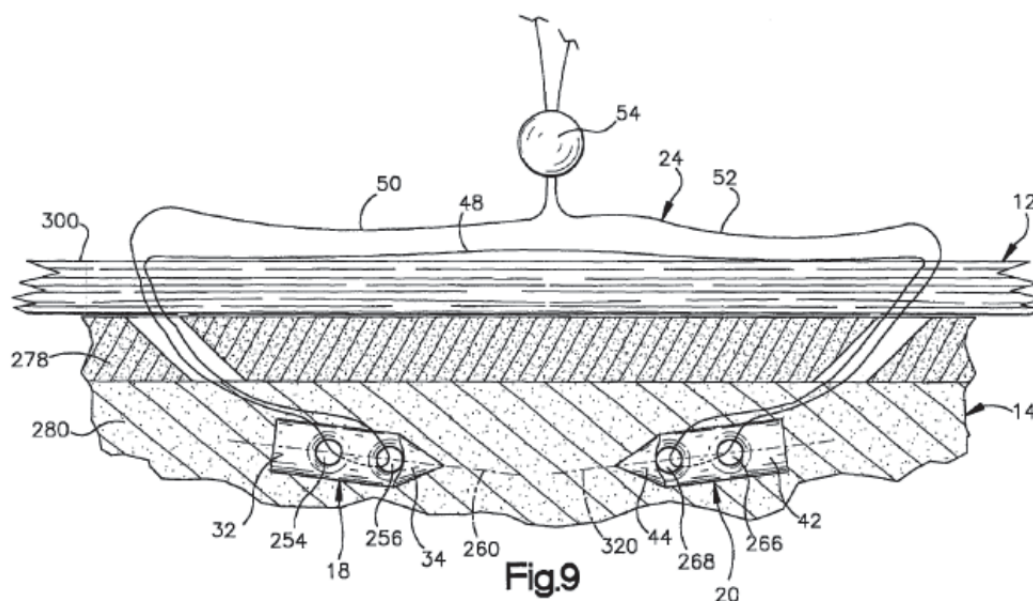
first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and transmitting force through the suture to the first body tissue.

'073 patent, claim 35 (Ex. 1001).

24. Claim 35 does no more than claim the use of two standard suture anchors in a predictable way such that their sutures are permanently connected after a desired tension is reached in the repair. There is no question this technique was practiced years before the priority date of the '073 patent (*i.e.*, May 3, 1999).

25. The '073 patent describes methods for attaching body tissues together with a “predetermined tension” by using multiple interconnected suture anchors.

The '073 patent describes an example of the claimed method in Figure 9:



'073 patent, Fig. 9 (Ex. 1001).

26. As depicted in the figure, two anchors (18) and (20) are inserted into a tissue (14) and each has suture (50, 52) that extends out of the tissue. '073 patent, Fig. 9 (Ex. 1001). The suture from the anchors is then interconnected by a separate suture retention device (54). See '073 patent, col 6, ll.15-21 (Ex. 1001). The '073 patent describes the types of tissue repairs that can be done using the method: soft to hard (*e.g.*, a tendon to bone); soft to soft (*e.g.*, muscle repair); or hard to hard (*e.g.*, bone to bone). '073 patent, col. 1, ll. 38-44 (Ex. 1001).

27. With respect to the tension placed on the suture during the repair, the '073 patent states:

A desired tension may be established in the suture by moving the anchors into the body tissue. Alternatively, a desired tension may be established in the suture by applying force to portions of the suture and then interconnecting the portions of the suture. A retainer or a knot may be utilized to interconnect portions of the suture.

'073 patent, col. 2, ll. 1-6 (Ex. 1001).

28. The '073 patent also states, without explanation, that regardless of how the tension is achieved, “it may be desired to establish a predetermined tension in the suture.” '073 patent, col. 28, ll. 41-42 (Ex. 1001). In the example of Figure 9, the sutures are pulled to establish the tension and the suture retainer or “crimp” (54) is used to interconnect the suture ends. '073 patent, col. 6, ll. 15-16

(Ex. 1001). The '073 patent also states that a knot may be used to interconnect the sutures. '073 patent, col. 6, ll. 17-18 (Ex. 1001).

29. Fundamentally, and as discussed in greater detail below, the alleged invention of the '073 patent is nothing more than a standard method of repairing tissue using suture anchors.

### **Claim Construction**

30. I have been informed and understand that the terms of the claim must be given their broadest reasonable interpretation. Based on that information and understanding, I agree with and have applied the following broadest reasonable interpretations of the claim terms below to my analysis contained in this declaration:

31. The term “predetermined tension” should be defined to mean “a tension that is determined beforehand or chosen in advance.”<sup>1</sup>

32. The term “interconnected” should be defined to mean “connected together.”<sup>2</sup>

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<sup>1</sup> I understand that this claim construction is appropriate under the “broadest reasonable construction” standard applied at the U.S.P.T.O. and does not indicate what claim construction would be appropriate in a District Court proceeding.

**The Prior Art That Renders the Challenged Claim Unpatentable**

33. The challenged claim recites known or obvious variations of known methods for tissue fixation using multiple suture anchors. The alleged invention is at most the expected result of a combination of features known by those of skill in the art before the priority date of the '073 patent.

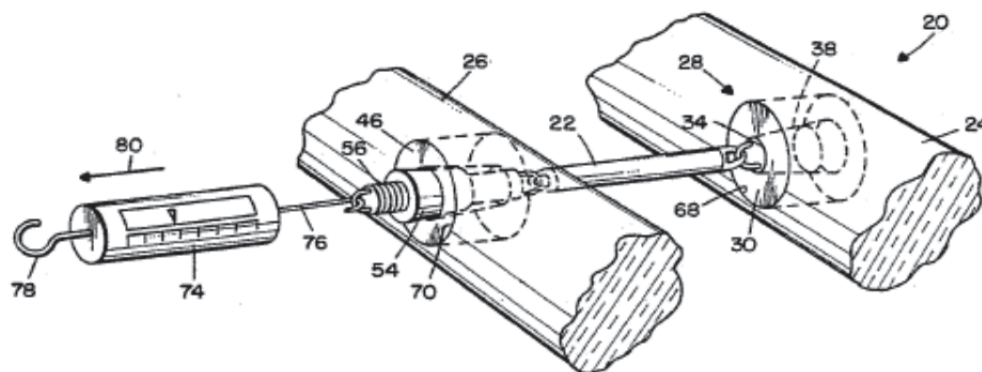
34. The grounds presented below make clear that the claimed method of securing tissues using multiple suture anchors that are tensioned and connected together was known or that known methods could have been modified in known ways that would have achieved the expected result of fixation of tissue. Based on the prior art discussed below, claim 35 should be cancelled.

**Bolesky '910**

35. U.S. Patent No. 4,955,910 to Bolesky discloses systems for fixating elongated prosthetic ligaments, pretensioning the ligaments, and installing the ligaments at a “predetermined magnitude of tension.” Bolesky '910, col. 2, ll. 47-50 (Ex. 1003). The disclosed system uses anchors to hold a tendon prosthesis in place between two bones:

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<sup>2</sup> I understand that this claim construction is appropriate under the “broadest reasonable construction” standard applied at the U.S.P.T.O. and does not indicate what claim construction would be appropriate in a District Court proceeding.



Bolesky '910, Fig. 1 (Ex. 1003).

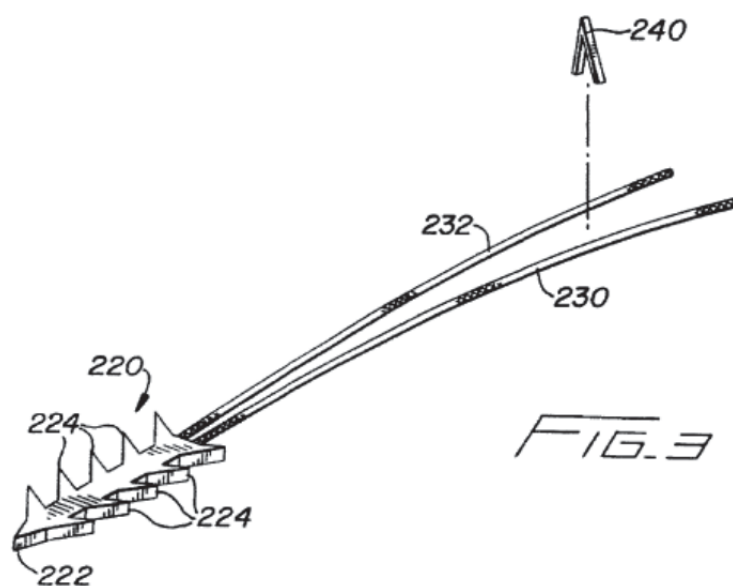
36. The figure above depicts a synthetic tendon (22) between two bones (26 & 24). Bolesky '910, col. 3, ll. 26-30 (Ex. 1003). That tendon is held in place with two bone anchors (56 & 54). Bolesky '910, col. 4, ll. 6-10 (Ex. 1003).

During the surgery, the surgeon attaches an extensometer (74) to the end of the tendon and pulls it to apply tension to the tendon. Bolesky '910, col. 4, ll. 57-62. (Ex. 1003). Bolesky '910 states that once “a predetermined magnitude of tension has been applied to the [tendon] 22 which is generally in keeping with normal body conditions” the anchor nearest the extensometer is then deployed to permanently fix the tendon to the bones. Bolesky '910, col. 4, ll. 62-66 (Ex. 1003) (emphasis added). The customizable tension allows this design to be “adjustable to accommodate a variety of required sizes.” Bolesky '910, Abstract; col. 2, ll. 20-24 (Ex. 1003). Bolesky '910 thus teaches that surgeons were aware of how to achieve the proper anatomical functionality of repaired tissue by inserting an anchor and

applying a varying amount of tension to the anchored substance until a predetermined amount of tension is achieved. The adjustable methods of Bolesky '910 allow for greater flexibility in the amount of tension placed in surgical repair.

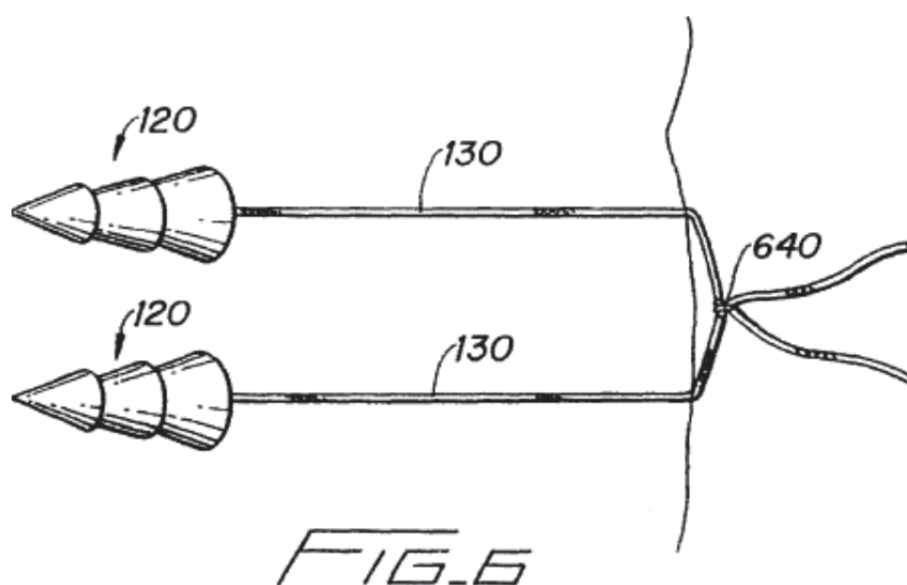
**Feagin '000**

37. U.S. Patent No. 5,500,000 to Feagin discloses methods of repairing soft tissue comprising “a barbed suture anchoring member attached to at least one suture member [and] a suture retaining member [that] engages the suture member such that the length and tension can be adjusted before the suture is permanently engaged in the retaining member.” Feagin '000, Abstract (Ex. 1004) Figure 3 shows one example of a suture anchor and a suture retaining member:



Feagin '000, Fig. 3 (Ex. 1004).

38. Feagin '000 teaches that there are two sutures that extend from the anchor portion depicted in Figure 3, and that the “suture retaining member 240 comprises a clip adapted to hold both suture members 232 following tensioning.” Feagin '000, col. 5, ll. 11-12 (Ex. 1004). Further, Feagin discloses that more than one anchor can be used to accomplish a tissue repair:



Feagin '000, Figure 6 (Ex. 1004).

39. In Figure 6, two suture anchors are inserted into the tissue in order to accomplish the repair. And “when inserted across a soft tissue defect such as a tear, the suture member of one anchoring member serves as the suture retaining member of the other anchoring member, such as by forming knot 640 from the two suture members.” Feagin '000, col. 5, ll. 43-45 (Ex. 1004).



40. Feagin '000 describes that “the length and tension of the suture may be selectively adjusted before the suture is permanently engaged in the retaining member,” Feagin '000, col. 2, ll. 57-60 (Ex. 1004), that a “[s]uture retaining member 40 is used to engage suture member 30 such that the length and tension of the suture member may be selected by the user during closure of the tissue,” Feagin '000, col. 4, ll. 15-17(Ex. 1004), and that “the desired length and tension of the suture member may be achieved for optimal tear closure.” Feagin '000, col. 4, ll. 28-29 (Ex. 1004) (emphases added). In summary, Feagin teaches that it was known in the art to use multiple suture anchors with attached sutures to repair tissue injuries; that it was known to tension the sutures to a selected tension as desired to complete the repair; and that it was known to interconnect the sutures to complete the fixation.

#### **Thal '306**

41. U.S. Patent No. 5,569,306 to Thal discloses methods of using multiple suture anchors to attach tissues together by applying tension to the sutures extending from those anchors and interconnecting the sutures after a desired tension is reached. Figure 10 is a representative example that demonstrates the teachings in Thal '306:

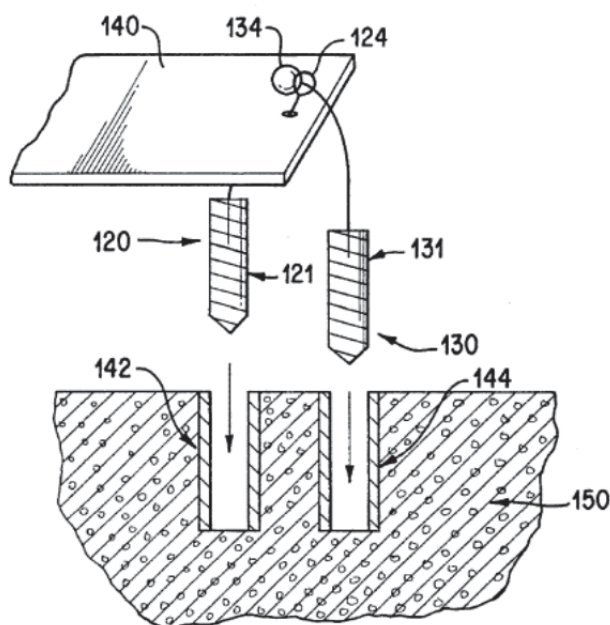


FIG. 10

Thal '306, Fig. 10 (Ex. 1005).

42. The figure above depicts a standard tissue repair wherein the soft tissue (140) is secured to the bone (150) using two suture anchors placed into the bone at two locations. Thal '306, Fig. 10 (Ex. 1005). Sutures are attached to the ends of the two anchors, and, as depicted in the example of Fig. 10, the two sutures are joined together by a “stop means” or ball (134) and a “catch device” or loop (124). Thal '306, Fig. 10 (Ex. 1005). The suture anchors are then inserted into the bone, and the ball and loop connection “drag[s] the tissue into a secure fit with the bone mass.” Thal '306, col. 7, ll. 54-67 (Ex. 1005). Thal '306 makes clear that once the anchors have been inserted, “they can be ratcheted down to a desired

depth to adjust the tightness of the soft tissue repair to bone mass.” Thal ’306, col. 8, ll. 1-5 (Ex. 1005) (emphasis added). Thal ’306, therefore, teaches that it was known in the art to perform a tissue repair using sutures wherein the surgeon adjusts the tension, or tightness, of the repair to a predetermined amount and that it was known in the art to interconnect multiple sutures used in a repair once the repair is complete.

**Schaller ’107**

43. U.S. Patent No. 5,817,107 to Schaller discloses methods and systems for “fixing a knot in a suture at a remote surgical location,” where a “spring-loaded mechanism enables the applied force to be predetermined for achieving a reliable knot strength.” Schaller ’107, Abstract (Ex. 1009). For example, Schaller ’107 discloses knot pushers that can measure the force applied to tighten a knot, such as by markings on the knot pusher tube that correspond to the actual force applied. Schaller ’107, col. 2, ll. 18-43; Figs. 1-3; col. 3, ll. 34-58 (Ex. 1009). Schaller ’107 therefore teaches that it was known in the art to adjust the force applied to tighten a suture knot to yield a predetermined tension in the knot. The adjustable force of Schaller ’107 allows for greater flexibility in the amount of tension placed in surgical repair.

**Technical Basis Underlying the Grounds of Rejections Set Forth in the  
Petition for *Inter Partes* Review**

44. I now turn to the references applied in the grounds of rejections set forth in Section IX of the Petition.

45. Challenged claim 35 recites:

- (a) A method of securing first body tissue with second body tissue, said method comprising the steps of
  - (b) moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,
  - (c) moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor,
  - (d) tensioning the first and second suture portions,
  - (e) determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,
  - (f) interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and
  - (g) transmitting force through the suture to the first body tissue.

'073 patent, claim 35 (Ex. 1001).

Each of these limitations of claim 35 is shown in the prior art references as discussed further below.

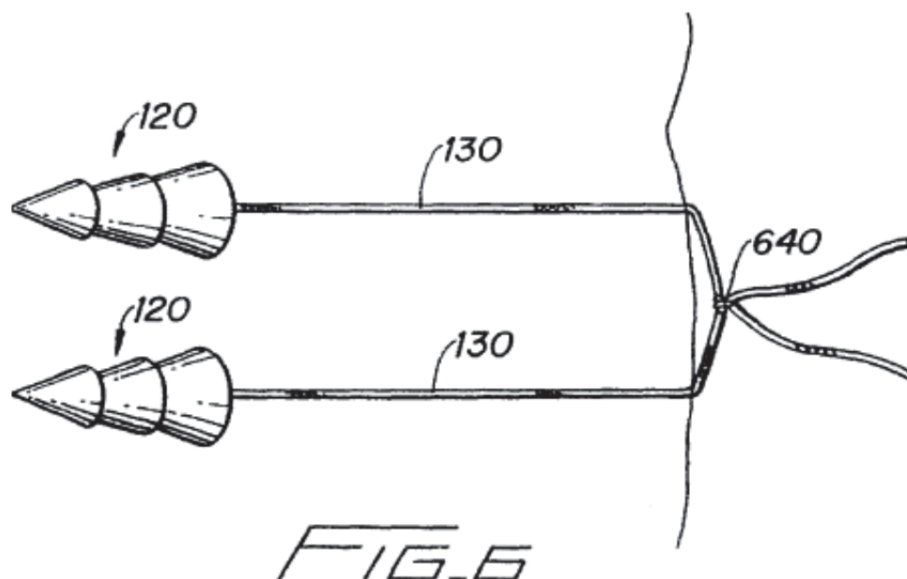
**Claim 35 Is Unpatentable Over Feagin '000 in view of Bolesky '910 or Schaller '107**

46. As shown in the summary chart below, the method of claim 35 is rendered obvious by the combination of Feagin '000 in view of Bolesky '910 or Schaller '107.

47. Feagin '000 discloses (a), “[a] method of securing first body tissue with second body tissue, said method comprising the steps of” as recited in the preamble. The embodiments of Feagin '000 discuss the process of repairing a tear in the meniscus of the knee. Feagin '000, col. 2, ll. 49-51 (Ex. 1003). As disclosed in Feagin '000, the tear is repaired by drawing together the two sides of the tear (*i.e.*, first and second body tissue) until they are joined. Feagin '000, col. 6, ll. 25-27 (Ex. 1003). A person of ordinary skill in the art recognizes that a tear in tissue will create separate tissue portions that will need to be rejoined in order to complete the repair. Therefore, the disclosure in Feagin '000 demonstrates the joining of a first and second tissue.

48. Feagin '000 also discloses (b), “moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor.” As discussed in Feagin '000, the repair method can be used with “a pair

of barbed anchoring members having suture members . . . [that can be interconnected] by forming a knot from the two suture members as shown in Fig. 6.” Feagin ’000, col. 5, ll. 39-43 (Ex. 1004).



Feagin ’000, Fig. 6 (Ex. 1004). As seen in Figure 6, Feagin ’000 also teaches (c), “moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor.” Fig. 6 discloses two anchors, each of which has suture extending from it and is inserted into the same body tissue, but along two different paths. Feagin ’000, Fig. 6 (Ex. 1004).

49. Feagin ’000 also teaches (d), “tensioning the first and second suture portions” as required by the claim. Feagin ’000 discloses a method of soft tissue repair that uses suture anchors attached to suture and retaining members (*e.g.*, suture clips) that allows the surgeon to adjust the length and tension of the suture

“before the suture is permanently engaged in the retaining member.” Feagin ’000, col. 2, ll. 59-60 (Ex. 1004). Feagin ’000 further discusses the closing of a meniscal tear by “tension[ing]” the suture. Feagin ’000, col. 6, ll. 25-28 (Ex. 1004).

50. The step of (e) “determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,” is also disclosed in Feagin ’000. Feagin ’000 describes that “the length and tension of the suture may be selectively adjusted before the suture is permanently engaged in the retaining member,” Feagin ’000, col. 2, ll. 57-60 (Ex. 1004), that a “[s]uture retaining member 40 is used to engage suture member 30 such that the length and tension of the suture member may be selected by the user during closure of the tissue,” Feagin ’000, col. 4, ll. 15-17 (Ex. 1004), and that “the desired length and tension of the suture member may be achieved for optimal tear closure.” Feagin ’000, col. 4, ll. 28-29 (Ex. 1004) (emphases added).

51. To the extent that the Patent Owner argues that step (e) is not disclosed in Feagin, it would have been obvious to a person of ordinary skill in the art to consider Feagin ’000 in view of Bolesky ’910 or Schaller ’107. The person of ordinary skill would be motivated to take the suture anchor techniques of Feagin ’000 and use the adjustable tensioning methods disclosed in Bolesky ’910 or

Schaller '107 to allow for a greater flexibility in the amount of tension placed in a surgical repair.

52. Bolesky '910 teaches a method for installing an artificial tendon between two bones by affixing that tendon to implanted suture anchors and tensioning the tendon such that “a predetermined magnitude of tension has been applied to the [tendon] 22 which is generally in keeping with normal body conditions” prior to the final fixation of the tendon. Bolesky '910, col. 4, ll. 62-66 (Ex. 1003) (emphasis added). Bolesky '910 thus discloses that surgical repairs need to be adjusted in line with normal body conditions and that the surgeon predetermines the magnitude of the tension desired and then applies that tension.

53. Schaller '107 teaches a method for adjusting the force applied to tighten a suture knot to yield a predetermined tension in the knot: “[a] spring-loaded mechanism enables the applied force to be predetermined for achieving a reliable [suture] knot strength.” Schaller '107, Abstract (Ex. 1009) (emphasis added). For example, Schaller '107 discloses knot pushers that can measure the force applied to tighten a knot, such as by markings on the knot pusher tube that correspond to the actual force applied. Schaller '107, col. 2, ll. 18-43; Figs. 1-3; col. 3, ll. 34-58 (Ex. 1009). Schaller '107 thus discloses that suture knot tension can be adjusted and that the surgeon predetermines the magnitude of the tension desired and then applies that tension.



54. The person of ordinary skill in the art would have been motivated to take the teachings of Feagin '000 that indicate a need for adjustability and the desire to reach certain levels of tension in a tissue repair and combine them with the teaching of Bolesky '910 or Schaller '107 in a predictable way. This combination creates the known benefit of providing the clinician greater flexibility when determining and providing a desired amount of tension in a surgical repair. The use of adjustable tensioning to effect the desired clinical outcome is known and the result of tensioning a suture or anchored substance to a predetermined value is predictable and expected. The expected outcome is a positive clinical result from the surgery, as suggested by the prior art discussed above. Therefore, it is an obvious combination with no unexpected results.

55. Feagin '000 also describes (f), “interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and” as required by the claim. The methods discussed in Feagin use “[a] disk-shaped button as the suture retaining member.” Feagin '000, col. 6, ll. 25-28 (Ex. 1004). The button is used by drawing the sutures through the hole to allow them to be tensioned and to hold the tension in the suture when the ends of the suture are released: “[a]s the suture member is pulled, [the] button may be pressed against [the] meniscus to aid in the tensioning process.” Feagin '000, col. 6, ll. 30-32 (Ex. 1004). In Feagin '000, the meniscal repair is not

complete until “[t]he length of the suture member contained within the meniscus of the knee is . . . fixedly engaged in the suture retaining member as by knotting [or] clipping.” Feagin ’000, col. 6, ll. 34-36 (Ex. 1004).

56. Finally, Feagin ’000 also teaches (g), “transmitting force through the suture to the first body tissue.” As discussed above, the embodiments of Feagin ’000 show a process of repairing meniscal tears in the knee by drawing together the two sides of the tear with tension (*i.e.*, first and second body tissue) until they are joined, and then completing the repair with a knot. Feagin ’000, col. 6, ll. 25-27; col. 4, ll. 28-29 (Ex. 1004).

57. The person of ordinary skill in the art could apply the tensioning technique taught by Bolesky ’910 or Schaller ’107 to the surgical repair methods taught in Feagin ’000 and would predictably arrive at the alleged invention in claim 35 of the ’073 patent. The combination of these references is just the predictable application of known methods in the art to achieve the known outcome of a surgical repair that applies a desired amount of tension to the injury. Therefore, the combination of Feagin ’000 in view of Bolesky ’910 or Schaller ’107 discloses each of the limitations of the challenged claim and renders it obvious. The chart below identifies where the above prior art references disclose the limitations of claim 35 of the ’073 patent.

<b>Claim 35: (a) A method of securing first body tissue with second body tissue, said method comprising the steps of</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32; col. 1, ll. 11-20; 28-34; col. 2, ll. 48-51; col. 3, ll. 1-11; col. 3, ll. 30-32; col. 3, ll. 36-45; col. 6, ll. 25-27; Figs. 7A-7C (Ex. 1004)
<b>(b) moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32, 55-60; col. 5, ll. 3-10; col. 5, ll. 39-43; col. 3, l. 65-col. 4, l. 13; col. 6, ll. 15-24; Figs. 1-6, 7A-7C (Ex. 1004)
<b>(c) moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32, 55-60; col. 5, ll. 3-10; col. 5, ll. 39-43; col. 3, l. 65-col. 4, l. 13; col. 6, ll. 15-24; Figs. 1-6, 7A-7C (Ex. 1004)
<b>(d) tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 35-43, 55-60; col. 3, ll. 6-11; col. 4, ll. 14-17, 25-29, 56-61; col. 6, ll. 25-37; Figs. 7A-7C (Ex. 1004)
<b>(e) determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,</b>	<p><i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 35-43, 57-60; col. 4, ll. 15-17; col. 4, ll. 28-29 (Ex. 1004)</p> <p><i>See, e.g.,</i> Bolesky '910, Abstract; col. 2, ll. 3-13, 19-26, 45-50; col. 4, ll. 59-66; col. 5, ll. 16-20, 54-59; col. 6, ll. 3-8; col. 7, ll. 9-20, 38-46; col. 8, ll. 48-55 (Ex. 1003)</p> <p><i>See, e.g.,</i> Schaller '107, Abstract; col. 2, ll. 18-43; Figs. 1-3; col. 3, ll. 34-58 (Ex. 1009).</p>
<b>(f) interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 33-35; col. 4, ll. 14-36; col. 4, ll. 50-61; col. 4, ll. 11-24; col. 5, ll. 11-23, 34-37; col. 6, ll. 25-28; col. 6, ll. 30-32; col. 6, ll. 34-36, 39-49; Figs. 1-6 (Ex. 1004)

<b>(g) transmitting force through the suture to the first body tissue.</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 61-64; col. 3, ll. 1-11; col. 3, ll. 30-32; col. 3, ll. 36-45; col. 6, ll. 25-27; Figs. 7A-7C (Ex. 1004)
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**Claim 35 is Unpatentable over Feagin '000**

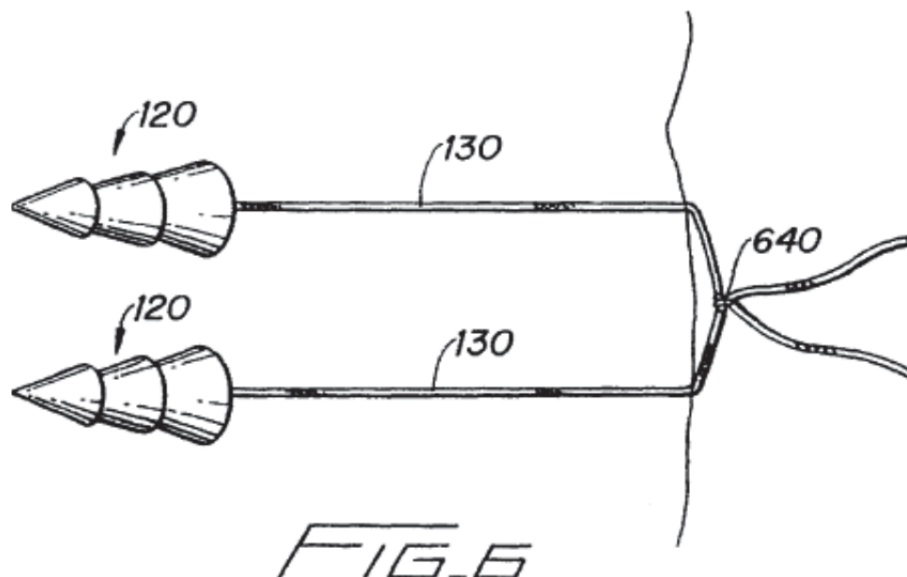
58. As shown in the summary chart below, the method of claim 35 is anticipated by Feagin '000.

59. Feagin '000 discloses (a), “[a] method of securing first body tissue with second body tissue, said method comprising the steps of” as recited in the preamble. The embodiments of Feagin '000 discuss the process of repairing a tear in the meniscus of the knee. Feagin '000, col. 2, ll. 49-51 (Ex. 1003). As disclosed in Feagin'000, the tear is repaired by drawing together the two sides of the tear (*i.e.*, first and second body tissue) until they are joined. Feagin '000, col. 6, ll. 25-27 (Ex. 1003). A person of ordinary skill in the art recognizes that a tear in tissue will create separate tissue portions that will need to be rejoined in order to complete the repair. Therefore, the disclosure in Feagin '000 demonstrates the joining of a first and second tissue.

60. Feagin '000 also discloses (b), “moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor.” As discussed in Feagin '000, the repair method can be used with “a pair of barbed anchoring members having suture members . . . [that can be

interconnected] by forming a knot from the two suture members as shown in Fig.

6.” Feagin ’000, col. 5, ll. 39-43 (Ex. 1004).



Feagin ’000, Fig. 6 (Ex. 1004). As seen in Figure 6, Feagin ’000 also teaches (c), “moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor.” Figure 6 discloses two anchors, each of which has suture extending from it and is inserted into the same body tissue, but along two different paths. Feagin ’000, Fig. 6 (Ex. 1004).

61. Feagin ’000 also teaches (d), “tensioning the first and second suture portions” as required by the claim. Feagin ’000 discloses a method of soft tissue repair that uses suture anchors attached to suture and retaining members (*e.g.*, suture clips) that allows the surgeon to adjust the length and tension of the suture “before the suture is permanently engaged in the retaining member.” Feagin ’000,

col. 2, ll. 59-60 (Ex. 1004). Feagin '000 further discusses the closing of a meniscal tear by “tension[ing]” the suture. Feagin '000, col. 6, ll. 25-28 (Ex. 1004).

62. The step of (e), “determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,” is described in Feagin '000. Feagin '000 describes that “the length and tension of the suture may be selectively adjusted before the suture is permanently engaged in the retaining member,” Feagin '000, col. 2, ll. 57-60 (Ex. 1004), that a “[s]uture retaining member 40 is used to engage suture member 30 such that the length and tension of the suture member may be selected by the user during closure of the tissue,” Feagin '000, col. 4, ll. 15-17 (Ex. 1004), and that “the desired length and tension of the suture member may be achieved for optimal tear closure.” Feagin '000, col. 4, ll. 28-29 (Ex. 1004) (emphases added).

63. Feagin '000 describes (f), “interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and” as required by the claim. The methods discussed in Feagin '000 use “[a] disk-shaped button as the suture retaining member.” Feagin '000, col. 6, ll. 25-28 (Ex. 1004). The button is used by drawing the sutures through the hole to allow them to be tensioned and to hold the tension in the suture when the ends of the suture are released: “[a]s the suture member is pulled, [the]

button may be pressed against [the] meniscus to aid in the tensioning process.”

Feagin '000, col. 6, ll. 30-32 (Ex. 1004). In Feagin '000, the meniscal repair is not complete until “[t]he length of the suture member contained within the meniscus of the knee is . . . fixedly engaged in the suture retaining member as by knotting [or] clipping.” Feagin '000, col. 6, ll. 34-36 (Ex. 1004).

64. Finally, Feagin '000 also teaches (g) “transmitting force through the suture to the first body tissue.” As discussed above, the embodiments of Feagin '000 show a process of repairing meniscal tears in the knee by drawing together the two sides of the tear with tension (*i.e.*, first and second body tissue) until they are joined, and then completing the repair with a knot. Feagin '000, col. 6, ll. 25-27.

65. Therefore, Feagin '000 discloses each of the limitations of the challenged claim and renders it anticipated. The chart below identifies where the above prior art reference discloses the limitations of claim 35 of the '073 patent.

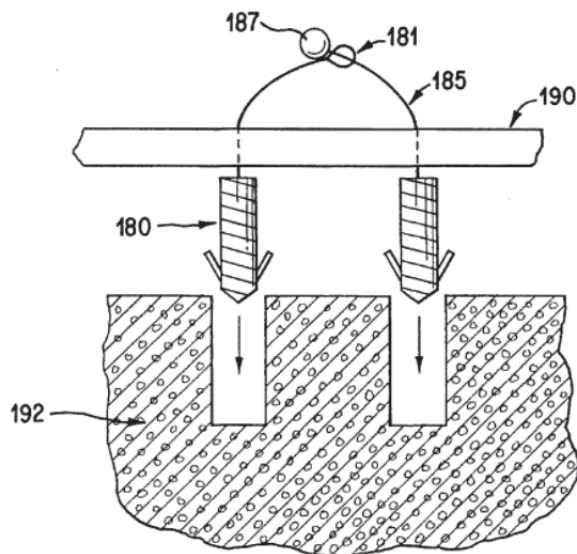
<b>Claim 35: (a) A method of securing first body tissue with second body tissue, said method comprising the steps of</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32; col. 1, ll. 11-20, 28-34; col. 2, ll. 48-51; col. 3, ll. 1-11; col. 3, ll. 30-32; col. 3, ll. 36-45; col. 6, ll. 25-27; Figs. 7A-7C (Ex. 1004)
<b>(b) moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32, 55-60; col. 5, ll. 3-10; col. 5, ll. 39-43; col. 3, l. 65-col. 4, l. 13; col. 6, ll. 15-24; Figs. 1-6, 7A-7C (Ex. 1004)
<b>(c) moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 29-32, 55-60; col. 5, ll. 3-10; col. 5, ll. 39-43; col. 3, l. 65-col. 4, l. 13; col. 6, ll. 15-24; Figs. 1-6, 7A-7C (Ex. 1004)
<b>(d) tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 35-43, 55-60; col. 3, ll. 6-11; col. 4, ll. 14-17, 25-29, 56-61; col. 6, ll. 25-37; Figs. 7A-7C (Ex. 1004)
<b>(e) determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 35-43, 57-60; col. 4, ll. 15-17; col. 4, ll. 28-29 (Ex. 1004)
<b>(f) interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 33-35; col. 4, ll. 14-36; col. 4, ll. 50-61; col. 4, ll. 11-24; col. 5, ll. 11—23, 34-37; col. 6, ll. 25-28; col. 6, ll. 30-32; col. 6, ll. 34-36, 39-49; Figs. 1-6 (Ex. 1004)
<b>(g) transmitting force through the suture to the first body tissue.</b>	<i>See, e.g.,</i> Feagin '000, Abstract; col. 2, ll. 61-64; col. 3, ll. 1-11; col. 3, ll. 30-32; col. 3, ll. 36-45; col. 6, ll. 25-27; Figs. 7A-7C (Ex. 1004)



**Claim 35 is Unpatentable Over Thal '306 in View of Bolesky '910  
or Schaller '107**

66. As shown in the summary chart below, the method of claim 35 is rendered obvious by Thal '306 in view of Bolesky '910 or Schaller '107.

67. Thal '306 discloses limitation (a), “[a] method of securing first body tissue with second body tissue, said method comprising the steps of.” Figure 15 depicts this element of the claim:



**FIG. 15**

Thal '306, Fig. 15 (Ex. 1005). Thal '306 discloses that two tissues (192) and (190) are joined together by two anchors (180) and (185). Thal '306, col. 8, ll. 54-56 (Ex. 1005). Further, Thal '306 teaches (b), “moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,” and (c), “moving a second anchor along the second path into the second

body tissue with a second suture portion extending from the second anchor.” Thal ’306 depicts two separate paths into the tissue (192) (shown with downward arrows in Figure 15 above and described in the specification). Thal ’306, col. 8, ll. 49-56 (Ex. 1005). Each of the anchors has a suture portion attached to the end of the anchor: the “other end [has] a means for attachment of a suture material.” Thal ’306, col. 2, ll. 59-60 (Ex. 1005).

68. Thal ’306 also teaches, (d) “tensioning the first and second suture portions.” As described by Thal ’306, “[t]he sutures 183 and 188 are pulled taught to securely attach soft tissue 190 to bone mass 192.” Thal ’306, col. 8, ll. 42-48 (Ex. 1005).

69. The step of (e), “determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,” is also described in Thal ’306. Specifically, Thal ’306 it teaches that the “tightness of the soft tissue repair” can be adjusted as needed. Thal ’306, col. 8, ll. 1-5 (Ex. 1005). Thal ’306 thus recognizes that surgical repairs need to be adjusted to the proper tension as predetermined by the surgeon.

70. To the extent that the Patent Owner argues that step (e) is not disclosed in Thal ’306, it would have been obvious to a person of ordinary skill in the art to consider Thal ’306 in view of Bolesky ’910 or Schaller ’107. The person

of ordinary skill would be motivated to take the suture anchor techniques of Thal '306 and use the adjustable tensioning techniques disclosed in Bolesky '910 or Schaller '107 to allow for greater flexibility in the amount of tension placed in the surgical repair.

71. Bolesky '910 teaches a method for installing an artificial tendon between two bones by affixing that tendon to implanted suture anchors and tensioning the tendon such that "a predetermined magnitude of tension has been applied to the [tendon] 22 which is generally in keeping with normal body conditions" prior to the final fixation of the tendon. Bolesky '910, col. 4, ll. 62-66 (Ex. 1003). Bolesky '910 recognizes that surgical repairs need to be adjusted in line with normal body conditions and that the surgeon predetermines the magnitude of the tension desired and then applies that tension.

72. Schaller '107 teaches a method for adjusting the force applied to tighten a suture knot to yield a predetermined tension in the knot: "[a] spring-loaded mechanism enables the applied force to be predetermined for achieving a reliable [suture] knot strength." Schaller '107, Abstract (Ex. 1009) (emphasis added). For example, Schaller '107 discloses knot pushers that can measure the force applied to tighten a knot, such as by markings on the knot pusher tube corresponding to the actual force applied. Schaller '107, col. 2, ll. 18-43; Figs. 1-3; col. 3, ll. 34-58 (Ex. 1009). Schaller '107 thus discloses that suture knot tension

can be adjusted and that the surgeon predetermines the magnitude of the tension desired and then applies that tension.

73. The person of ordinary skill in the art would have been motivated to take the teachings of Thal '306 that indicate a need for adjustability and the desire to reach certain levels of tension in a tissue repair and combine them with the teachings of Bolesky '910 or Schaller '107, which expressly state that a predetermined tension can be applied to a surgical repair. This combination creates the known benefit of providing the clinician greater flexibility when determining and providing a desired amount of tension in a surgical repair. The use of adjustable tensioning to effect the desired clinical outcome is known and the result of tensioning a suture or anchored substance to a predetermined value is predictable and expected. The expected outcome is a positive clinical result from the surgery, as suggested by the prior art discussed above. Therefore, it is an obvious combination with no unexpected results.

74. Thal '306 also describes step (f), "interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and." The ends of the sutures in the devices of Thal '306 are designed to be interconnected together to hold the tissue in place once the repair is complete. Thal '306, col. 7, ll. 31-34 (Ex. 1005). When practicing the method in Figure 15, the loop (181) of a suture attached to the first

anchor (180) is inserted through soft tissue (190) from the underside of the tissue. Thal '306, col. 8, ll. 49-56 (Ex. 1005). That anchor is then inserted into the bone (192). Thal '306, col. 8, ll. 49-56 (Ex. 1005). The suture portion of the second anchor is also threaded through the tissue. Thal '306, col. 8, ll. 49-56 (Ex. 1005). The second anchor is also deployed in the bone. Thal '306, col. 8, ll. 49-56 (Ex. 1005). The two suture portions are joined with the ball and loop. Thal '306, col. 8, ll. 49-56 (Ex. 1005).

75. The Patent Owner may argue that claim 35 requires that the interconnecting step (f) must occur after the tensioning step (e), and that because Thal '306 discloses interconnecting the sutures attached to the anchors before tensioning, Thal '306 is not sufficient to render the claim obvious. I have been told that the steps of a method claim are not required to be performed in order absent disclosure to the contrary. Even if it were correct that the claim requires a specific order, which it does not, the Thal '306 reference still renders the claims obvious. It is well within the skill of one in the art to use the method shown in Fig. 15 and tension the sutures after inserting the anchors but before the loop and ball of the sutures are connected. As discussed above, tensioning sutures before tying them together (*i.e.*, interconnecting them) was a well-known practice in the art. Moreover, there is nothing in the prior art, or in the description of the alleged invention of the '073 patent, that indicates that the order of steps (e) and (f)

provides any unexpected benefit. Therefore, even if the claim requires that step (e) tensioning is required before step (f) interconnecting, that is obvious from the teaching of Thal '306.

76. Finally, Thal '306 teaches (g), “transmitting force through the suture to the first body tissue.” During the procedure the surgeon uses the sutures connected to the anchors to “drag the tissue into a secure fit with the bone mass.” Thal '306, col. 7, ll. 54-67 (Ex. 1005).

77. The person of ordinary skill in the art could apply the tensioning technique taught by Bolesky '910 or Schaller '107 to the surgical repair methods taught in Thal '306 and would predictably arrive at the alleged invention in claim 35 of the '073 patent. The combination of these references is just the predictable application of known methods in the art to achieve the known outcome of a surgical repair that applies a desired amount of tension to the injury. Therefore, the combination of Thal '306 in view of Bolesky '910 or Schaller '107 discloses each of the limitations of the challenged claim and renders it obvious. The chart below identifies where the above prior art references disclose the limitations of claim 35 of the '073 patent.

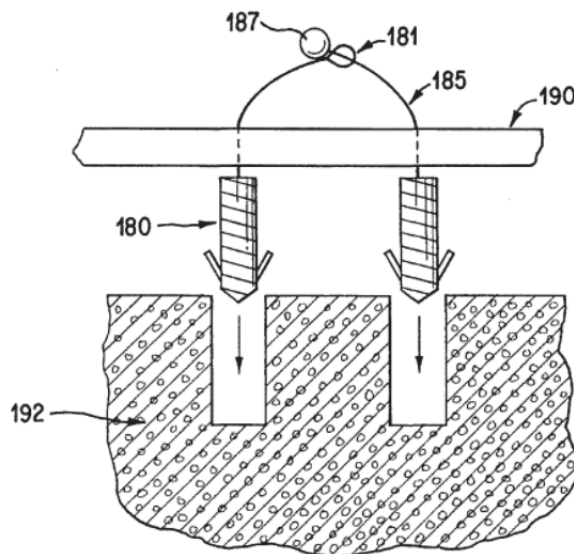
<b>Claim 35: (a) A method of securing first body tissue with second body tissue, said method comprising the steps of</b>	<i>See, e.g.</i> , Thal '306, Abstract, Figs. 4, 5, 7, 8, 10-11, 13, 15; col. 2, ll. 13-16, 29-31; col. 6, ll. 20-29; col. 8, ll. 54-56 (Ex. 1005)
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<b>(b) moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,</b>	<i>See, e.g.,</i> Thal '306, Abstract; Figs. 2, 4-21; col. 2, ll. 59-60; col. 2, l. 64-col. 3, l. 6; col. 7, l. 54-col. 8, l. 14; col. 8, ll. 49-56 (Ex. 1005)
<b>(c) moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor,</b>	<i>See, e.g.,</i> Thal '306, Abstract; Figs. 2, 4-21; col. 2, ll. 59-60; col. 2, l. 64-col. 3, l. 6; col. 7, l. 54-col. 8, l. 14; col. 8, ll. 49-56 (Ex. 1005)
<b>(d) tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)
<b>(e) determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,</b>	<p><i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)</p> <p><i>See, e.g.,</i> Bolesky '910, Abstract; col. 2, ll. 3-13, 19-26, 45-50; col. 4, ll. 59-66; col. 5, ll. 16-20, 54-59; col. 6, ll. 3-8; col. 7, ll. 9-20, 38-46; col. 8, ll. 48-55 (Ex. 1003)</p> <p><i>See, e.g.,</i> Schaller '107, Abstract; col. 2, ll. 18-43; Figs. 1-3; col. 3, ll. 34-58 (Ex. 1009)</p>
<b>(f) interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and</b>	<i>See, e.g.,</i> Thal '306, Abstract; Figs. 9, 10, 11, 14, 15; col. 3, ll. 19-32; col. 7, l. 14-col. 8, l. 14; col. 7, ll. 31-34; col. 8, ll.41-56; col. 8, ll. 49-56 (Ex. 1005)
<b>(g) transmitting force through the suture to the first body tissue.</b>	<i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)

**Claim 35 is Unpatentable Over Thal '306**

78. As shown in the summary chart below the method of claim 35 is anticipated or, in the alternative, rendered obvious by Thal '306.

79. Thal '306 discloses limitation (a), “[a] method of securing first body tissue with second body tissue, said method comprising the steps of.” Figure 15 depicts this element of the claim:



**FIG. 15**

Thal '306, Fig. 15 (Ex. 1005). Thal '306 discloses that two tissues (192) and (190) are joined together by two anchors (180) and (185). Thal '306, col. 8, ll. 54-56. Further, Thal '306 teaches (b), “moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,” and (c), “moving a second anchor along the second path into the second body tissue



with a second suture portion extending from the second anchor.” Thal ’306 depicts two separate paths into the tissue (192) (shown with downward arrows in Figure 15 above and described in the specification). Thal ’306, col. 8, ll. 49-56 (Ex. 1005). Each of the anchors has a suture portion attached to the end of the anchor: the “other end [has] a means for attachment of a suture material.” Thal ’306, col. 2, ll. 59-60 (Ex. 1005).

80. Thal ’306 also teaches (d), “tensioning the first and second suture portions.” As described by Thal ’306, “[t]he sutures 183 and 188 are pulled taught to securely attach soft tissue 190 to bone mass 192.” Thal ’306, col. 8, ll. 42-48 (Ex. 1005).

81. The step of (e), “determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,” is described in Thal ’306. Specifically, it teaches that the “tightness of the soft tissue repair” can be adjusted as needed. Thal ’306, col. 8, ll. 1-5 (Ex. 1005). Thal ’306 thus recognizes that surgical repairs need to be adjusted to the proper tension as predetermined by the surgeon.

82. Thal ’306 also describes step (f), “interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions.” The ends of the sutures in the devices of

Thal '306 are designed to be interconnected together to hold the tissue in place once the repair is complete. When practicing the method in Figure 15, the loop (181) of a suture attached to the first anchor (180) is inserted through soft tissue (190) from the underside of the tissue. Thal '306, col. 8, ll.49-56 (Ex. 1005). That anchor is then inserted into the bone (192). Thal '306, col. 8, ll. 49-56 (Ex. 1005). The suture portion of the second anchor is also threaded through the tissue. Thal '306, col. 8, ll. 49-56 (Ex. 1005). The second anchor is also deployed in the bone. Thal '306, col. 8, ll. 49-56 (Ex. 1005). The two suture portions are joined with the ball and loop. Thal '306, col. 8, ll. 49-56 (Ex. 1005).

83. The Patent Owner may argue that claim 35 requires that the interconnecting step (f) must occur after the tensioning step (e), and that because Thal '306 discloses interconnecting the sutures attached to the anchors before tensioning, Thal '306 is not sufficient to render the claim obvious. I have been informed that steps of a method claim are not required to be performed in order absent disclosure to the contrary. Even if it were correct that the claim requires a specific order, which it does not, the Thal '306 reference still renders the claims obvious. It is well within the skill of one in the art to use the method shown in Figure 15 and tension the sutures after inserting the anchors but before the loop and ball of the sutures are connected. As discussed above, tensioning sutures before tying them together (*i.e.*, interconnecting them) was a well-known practice

in the art. Moreover, there is nothing in the prior art, or in the description of the alleged invention of the '073 patent, that indicates that the order of steps (e) and (f) provides any unexpected benefit. Therefore, even if the claim requires that step (e) tensioning is required before step (f) interconnecting, that is obvious from the teaching of Thal '306.

84. Finally, Thal '306 teaches (g), “transmitting force through the suture to the first body tissue.” During the procedure the surgeon uses the sutures connected to the anchors to “drag the tissue into a secure fit with the bone mass.” Thal '306, col. 7, ll. 54-67 (Ex. 1005).

85. Therefore, Thal '306 discloses each of the limitations of the challenged claim and renders it anticipated or, in the alternative, obvious. The chart below identifies where the above prior art reference discloses the limitations of claim 35 of the '073 patent.

<b>Claim 35: (a) A method of securing first body tissue with second body tissue, said method comprising the steps of</b>	<i>See, e.g.</i> , Thal '306, Abstract, Figs. 4, 5, 7, 8, 10-11, 13, 15; col. 2, ll. 13-16, 29-31; col. 6, ll. 20-29; col. 8, ll. 54-56 (Ex. 1005)
<b>(b) moving a first anchor along a first path into the second body tissue with a first suture portion extending from the first anchor,</b>	<i>See, e.g.</i> , Thal '306, Abstract; Figs. 2, 4-21; col. 2, ll. 59-60; col. 2, l. 64-col. 3, l. 6; col. 7, l. 54-col. 8, l. 14; col. 8, ll. 49-56 (Ex. 1005)

<b>(c) moving a second anchor along the second path into the second body tissue with a second suture portion extending from the second anchor,</b>	<i>See, e.g.,</i> Thal '306, Abstract; Figs. 2, 4-21; col. 2, ll. 59-60; col. 2, l. 64-col. 3, l. 6; col. 7, l. 54-col. 8, l. 14; col. 8, ll. 49-56 (Ex. 1005)
<b>(d) tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)
<b>(e) determining when a predetermined tension is present in the first and second suture portions during performance of said step of tensioning the first and second suture portions,</b>	<i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)
<b>(f) interconnecting the first and second suture portions after determining that the predetermined tension is present in the first and second suture portions, and</b>	<i>See, e.g.,</i> Thal '306, Abstract; Figs. 9, 10, 11, 14, 15; col. 3, ll. 19-32; col. 7, l. 14-col. 8, l. 14; col. 7, ll. 31-34; col. 8, ll.41-56; col. 8, ll. 49-56 (Ex. 1005)
<b>(g) transmitting force through the suture to the first body tissue.</b>	<i>See, e.g.,</i> Thal '306, Abstract; col. 3, ll.19-32, 39-51; col. 6. ll. 2-14; col. 7, ll. 7-12, 63-66; col. 8, ll. 1-5, 32-40, 42-48 (Ex. 1005)

### **Availability for Cross-Examination**

86. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place

within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

**Right to Supplement**

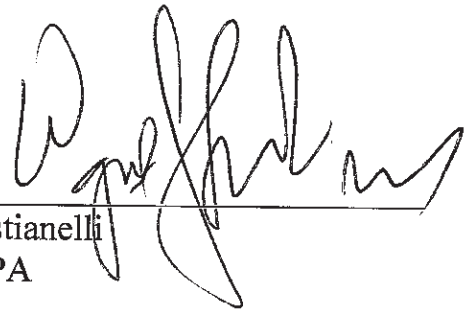
87. I reserve the right to supplement my opinions in the future to respond to any arguments that Patent Owner raises and to take into account new information as it becomes available to me.

**Jurat**

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1101 of Title 18 of the United States Code.

Dated:

9/24/13



Wayne J. Sebastianelli  
State College, PA

# APPENDIX A

## WAYNE JOSEPH SEBASTIANELLI, M.D.

Penn State Hershey Bone and Joint Institute  
Penn State Orthopaedics and Sports Medicine  
1850 East Park Ave., Suite 112  
University Park, PA 16803  
phone 814-865-3566 fax 814-865-4054  
<http://www.pennstatehershey.org/boneandjoint>

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### PERSONAL

Date and Place of Birth: October 10, 1957, Peckville, Pennsylvania  
Spouse: Michele A. Sebastianelli  
Children: Geoffrey A. Sebastianelli and Alyssa M. Sebastianelli

### EDUCATION

Fellowship:	Milton S. Hershey Medical Center, Hershey, PA Orthopaedic Sports Medicine Fellowship Clinical Instructor in Surgery	1988–1989
Residency:	University of Rochester, Rochester, NY Chief Orthopaedic Resident Orthopaedic Surgery General Surgery	1987–1988 1985–1987 1984–1985
Internship:	University of Rochester, Rochester, NY General Surgery	1983–1984
M.D.,	University of Rochester, Rochester, NY	1983
A.S. in Biology and Anthropology,	University of Rochester, Rochester, NY	1979

### INSTITUTIONAL EXPERIENCE AND ACADEMIC APPOINTMENTS

Kalenak Professor in Orthopaedics, Director of Athletic Medicine, Penn State University/Milton S. Hershey Medical Center, Department of Orthopaedic Surgery/Rehabilitation, Hershey, PA	2004-present
Sports Medicine Fellowship Director, Department of Orthopaedic Surgery and Rehabilitation, College of Medicine, Milton S. Hershey Medical Center, The Pennsylvania State University, University Park, PA	2007-present
Chief of Staff, Mount Nittany Medical Center, State College, PA	2009-present
Chief of Staff, Mount Nittany Surgical Center, State College, PA	2003-present
Director of Athletic Medicine and Head Team Physician, Penn State Athletics, and Associate Professor, Department of Orthopaedic Surgery and Rehabilitation, College of Medicine, Milton S. Hershey Medical	



Center, The Pennsylvania State University, University Park, PA	1995–2003
Tenure, Department of Orthopaedic Surgery and Rehabilitation, College of Medicine, Milton S. Hershey Medical Center, The Pennsylvania State University, University Park, PA	1998
Sports Medicine Fellowship Instructor, Department of Orthopaedic Surgery and Rehabilitation, College of Medicine, Milton S. Hershey Medical Center, The Pennsylvania State University, University Park, PA	1993–1998
Assistant Chief of Staff, Mount Nittany Medical Center, State College, PA	2008–2009
Chief of Staff, Mount Nittany Medical Center, State College, PA	2004–2008
Assistant Chief of Staff, Surgical Center, Centre Community Hospital, State College, PA	2000–2004
Chief, Department of Surgery Centre Community Hospital, State College, PA	2000–2003
Director of Athletic Medicine, Penn State Athletics, and Assistant Professor, Department of Orthopaedic Surgery and Rehabilitation, College of Medicine, Milton S. Hershey Medical Center, The Pennsylvania State University, University Park, PA	1992–1995
Attending Orthopaedic Surgeon, Monroe Community Hospital, Rochester, NY	1990–1992
Assistant Professor, Department of Orthopaedics, School of Medicine, University of Rochester, Rochester, NY	1989–1992
Associate Surgeon, Strong Memorial Hospital, Rochester, NY	1989–1992

## LICENSURE AND CERTIFICATION

American Board of Orthopaedic Surgery:	Maintenance of Certification	2009
	Subspecialty Certificate, Orthopaedic Sport Medicine	2007
	Recertification	1998
	Certification	1991
License to Practice Medicine and Surgery:	State of Pennsylvania—040932E	1988
	State of New York—159601	1984
National Medical Board:	Part III	1984
	Part II	1983
	Part I	1981

## PROFESSIONAL MEMBERSHIPS

American Academy of Orthopaedic Surgeons	1993
American Academy of Orthopaedic Surgeons (Fellow)	1992
American Board of Orthopaedic Surgery	1991
American College of Sports Medicine	1994
American Medical Association	1980
American Orthopaedic Society for Sports Medicine	1992
Arthroscopy Association of North America	1993
Eastern Orthopaedic Association	1994
International College of Surgeons (Fellow)	1996–1997
Lackawanna County Medical Society	1993–2001
Pennsylvania Orthopaedic Surgery	1992
Pennsylvania State Medical Society	1988
Monroe County Medical Society	1989–1992
New York Orthopaedic Society	1989
New York State Medical Society	1989
Rochester Orthopaedic Society	1989–1992

## SERVICE TO THE PROFESSION

### National

American Academy of Family Physicians, Consultant, <i>Home Study Self-Assessment Fractures and Dislocation</i> , by Dr. James Swenson	1990
American Academy of Orthopaedic Surgeons:	
Fellow Instructor, ACL Course, Chicago, IL	1989
Resident Instructor, ACL Course, Tucson, AZ	1987
American Board of Orthopaedic Surgery:	
Field Test Task Force for Sub-specialty Certification Exam in Sports Medicine	
Oral Examiner	1999–present
American Orthopaedic Association, Membership Committee	2011
Arthroscopy Association of North America:	
Communications Committee	2001–2003
Ethics and Standards Committee	1998–2000
Membership Committee	1998–2000
Organizer, AANA Learning Center, Chicago, IL	January 13–14, 1995
Editorial:	
Editor, <i>Current Opinions in Orthopaedics</i> 12(2)	April 2001
Editorial Board, <i>Techniques in Knee Surgery</i>	2002–present
Manuscript Reviewer, <i>American Journal of Sports Medicine</i>	2000–present
Manuscript Reviewer, <i>Journal of Orthopaedic and Sports Physical Therapy</i>	1991–present
Merck, Inc. Clinical Faculty	1990–present

## **Regional and State**

Big Ten Sports Medicine:	
Subcommittee on Eligibility,	1998–present
Chairman, Subcommittee on Eligibility	2000–2001
Chairman, Subcommittee on Eligibility	2011–2012
Pennsylvania Orthopaedic Society:	
President	2009–2010
Voting Board Member	2005–present
Board Member	2003–present

## **Milton S. Hershey Medical Center, The Pennsylvania State University**

Athletic Training Thesis Committee (Thomas Dompier)	1998
General Clinical Research Advisory Committee	2000–2001
IM/Club Sports Programs, Consultant	1998
Life Sciences Study Group	1993
Penn State Sports Medicine Newsletter, Editorial Panel	1992–1997
Penn State Summer Sports Camps, Orthopaedic Consultant	1992–present
Primary Care Sports Medicine Symposium, Program Co-Chairman	1993–1994
Promotion and Tenure Review Committee	2000–present
University Workmen’s Compensation Panel	2000–2001
Instructor/Co-Director, Penn State Sports Medicine Symposiums	1992–present
Graduate Faculty of Kinesiology, The Pennsylvania State University	2010–present

## **Mount Nittany Medical Center, State College, PA**

Affiliation Oversight Committee	2006–present
Board Ad Hoc Committee	2006–present
Board of Trustees	2002–present
Board of Trustees, Mount Nittany Health System	2011–present
Centre Community Surgical Center Executive Committee	1998–present
Continuing Education Committee	1998–present
Credentials Committee	2000–present
Education Subcommittee	2001–2004
Finance Committee	2002–2004
General Clinical Research Advisory Committee, Organizer	1997–present
Joint Conference Committee	2000–present
Medical Executive Committee	2005–present
Medical Staff Executive Committee, Member and Chairman	1999–present
New Medical Surgical Intensive Care Unit, Planning Team	2001–present
Operating Room Committee, Chairman	2000–2004
Operating Room Report Ad Hoc Committee	2000–present
Operating Room Structure Collaborative Team	2000–present
Orthopaedic Performance Improvement Committee, Chairman	1996–2005
Orthopaedic Quality Assurance Committee	1996–present
Patient Care Committee	2005–present
Patient Care Evaluation Committee	1999–2005
Phase XIVE In-patient Unit, Design Team	2001–present

## University of Rochester

Admissions Interviewer, School of Medicine and Dentistry	1990–1992
Ethics Committee, Rochester Orthopaedic Society	1990–1992
Instructor/Co-Director, University of Rochester Sports Medicine Symposia	1989–1992

## Strong Memorial Hospital

Human Ethics Committee	1990–1992
Quality Assurance Committee	1990–1991

## HONORS AND AWARDS

Named Principal Reviewer for the <i>American Journal of Sports Medicine</i> In recognition of dedication to providing high-quality evaluations of submitted papers	2009-2010
Named a <i>Best Doctor in America</i> ® by Best Doctors, Inc. (a nationally recognized organization that surveys physicians throughout the United States, asking them to rate the clinical abilities of physicians in their subspecialty; only those who earn the consensus support of their peers, through this peer review polling process, can be included in the list)	1996–2012
Recognized “For extraordinary service and dedication to the Mount Nittany Medical Center”	2009
Unanimous Selection to the Department of Athletics Hall of Fame, University of Rochester, Rochester, NY	2006
First Alternate AOSSM-ESKA Sports Medicine Traveling Fellowship	1994
Alpha Omega Alpha Medical Honor Society	1983
Doctor of Medicine Degree, with Honors	1983
J. Stewart Hamilton Medical School Scholarship	1981
Dr. Marvin J. Hoffman Medical School Scholarship	1981
Ella Miller Medical School Scholarship	1981
Baccalaureate Degree, Magna Cum Laude	1979
Member, Phi Beta Kappa	1979
Rochester Plan, Medical School Early Admission, University of Rochester, Rochester, NY	1977

Honorable Mention, Academic All-American in Football, University of Rochester, Rochester, NY	1976
Letterman in Football, University of Rochester, Rochester, NY	1975–1976

## PATENTS

Prophylactic Bactericidal Implant. US Patent 8135466. 2010
Prophylactic Bactericidal Implant. Japan Patent 5175185. 2009
Prophylactic Bactericidal Implant. Singapore Patent 138725. 2006

## TEACHING ACTIVITIES

### National/Regional

“Patellar Instability—Tubercle Osteotomy vs. Medial Patellofemoral Ligament Surgery” Pennsylvania Orthopaedic Society, Spring Scientific Update, Key Largo, FL. Invited Faculty	May 9, 2008.
“Meniscus Repair—Current Concepts” Pennsylvania Orthopaedic Society, Spring Scientific Update, Key Largo, FL. Invited Faculty	May 9, 2008
“Management of Patella Flex Instability,” Department of Orthopaedics, University of Maryland, College Park, MD. Visiting Professor	2007
“Tunnel Place: Howell Tibial Guide Philosophy,” Keith Lawhorn, M.D. Sponsored by Arthrotek. Orthopaedic Learning Center, Rosemont, IL. Moderator	January 9, 2003
“Knee Course” Arthroscopy Association of North America, San Antonio, TX. Instructor	November 1996
“Sixth R. Plato Schwartz Lectureship” University of Rochester, Rochester, NY.	June 16–17, 1995
“The Masters Experience: Knee Course,” Arthroscopy Association of North America Learning Center, Chicago, IL.	January 13–14, 1995
“Meniscal Repair: Current Concepts,” Department of Orthopaedic Surgery, Hahnemann Medical Center, Philadelphia, PA. Visiting Professor	December 1992
“Management of Anterior Cruciate Ligament Injuries,” Sports Medicine Symposium for Primary Care Physicians, University of Rochester, Rochester, NY. Visiting Professor	December 1992
“Treatment of Patellofemoral Instability,” Sports Medicine Symposium for Primary Care Physicians, University of Rochester, Rochester, NY. Visiting Professor	December 1992

“Osteochondritis Dissecans of the Knee, Update 1992,” Radiology Grand Rounds, University of Rochester, Rochester, NY. Visiting Professor	December 1992
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“Postoperative Changes in the Extensor Mechanism of Anterior Cruciate Ligament Reconstructed Knees,” Sixth R. Plato Schwartz Seminar, University of Rochester, Rochester, NY. Visiting Professor	June 1992
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**University Park, State College, and Danville, PA**

Judge for Graduate Exhibition Alumni Hall at the Hub-Robeson Center, Milton S. Hershey Medical Center/The Pennsylvania State University, University Park, PA	March 26, 2006
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“Clinical Management, Epidemiology, and Prevention of Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) Among Sports Participants,” State College, PA,	May 24, 2006
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“The Influence of Everyday Things on Medicine,” Graduate Seminar in the Engineering, Science and Mechanics Department, The Pennsylvania State University, University Park, PA	February 8, 2006
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“Clinical Management, Epidemiology, and Prevention of Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) Among Sports Participants,” State College, PA,	May 25, 2005
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“Concussion in Athletics: Ongoing Controversy,” State College, PA	April 29-30, 2005
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“Overuse Injuries in the Pediatric Athlete,” Grand Rounds, Sports Medicine Conference, Penn State Orthopaedics, University Park, PA	January 26, 2005
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“Concussion in Athletics: Ongoing Controversy,” Sports Medicine Conference, Penn State Orthopaedics, University Park, PA	December 9, 2004
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“Medical Imaging,” Kinesiology Undergraduate Class, The Pennsylvania State University, University Park, PA	November 24, 2003
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“Arthrofibrosis of the Knee Following ACL Surgery,” Athletic Trainers and Graduate Assistant Program, Penn State Orthopaedics, University Park, PA	August 22, 2003
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“Current Concepts in ACL Surgery,” Athletic Trainers and Graduate Assistant Program, Penn State Orthopaedics, University Park, PA	August 22, 2003
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“Update of Thermal Capsuloragaphy of the Shoulder,” Sports Medicine Conference, Penn State Orthopaedics, University Park, PA	September 18, 2002
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“Possible Pitfalls of Hamstring ACL Reconstruction,” Grand Rounds, Penn State Orthopaedics, University Park, PA	September 4, 2002
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“Sports Medicine,” Penn State Coaches Conference, State College, PA	April 30, 2002
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“Common Athletic Cervical Spine and Brachial Plexus Injuries,” Winter Medicine Update— Focus on Sports Medicine, University Park, PA	February 27, 2002
“Medical Imaging,” Kinesiology Undergraduate Class, The Pennsylvania State University, University Park, PA	December 3, 2001
“Common Ankle Injuries in the Athlete,” Grand Rounds, Penn State Orthopaedics and Sports Medicine, University Park, PA	September 17, 2001
Course Chairman Arthrotek/Penn State Orthopaedics Conferences, State College, PA	May 19-20, 2001
“Throwing Injuries,” Sports Medicine Conference, Penn State Orthopaedic and Sports Medicine Center, University Park, PA	October 18, 2000
“Fractures in the Elderly,” Musculoskeletal Medicine for the New Millennium, Centre Community Hospital, State College, PA	May 17, 2000
“General Health Issues of the Athlete,” Penn State University Coaches’ Meeting, State College, PA	May 3, 2000
“Sports Medicine at Penn State,” Penn State Retired Faculty Tailback Club, State College, PA	January 19, 2000
“Breakdown of Throwing Mechanics,” Sports Medicine Conference, Penn State Geisinger Sports Medicine, University Park, PA	September 27, 1999
“Treatment of Meniscal Lesions,” Grand Rounds, Penn State Geisinger Sports Medicine, University Park, PA	September 25, 1999
“Treatment of RSD and RSI in the Active Population,” Sports Medicine Symposium, Penn State Geisinger Primary Care, State College, PA	May 20, 1999
“Athletic Medicine,” Grand Destiny, The Pennsylvania State University, University Park, PA	April 23, 1999
“Athletic Injuries to the Hand,” Sports Medicine Conference, Penn State Geisinger Sports Medicine, University Park, PA	March 3, 1999
“Sports Medicine,” Huddle with the Faculty—Alumni Continuing Education, The Pennsylvania State University, University Park, PA	November 28, 1998
“ACL—Anterior Cruciate Ligament,” Sports Medicine Conference, Penn State Geisinger Sports Medicine, University Park, PA	October 7, 1998
“Osteochondritis Dissecans,” Grand Rounds, Penn State Geisinger Sports Medicine, University Park, PA	September 28, 1998
“Lower Extremity Injuries in Sports Medicine,” Centre Community Hospital, Continuing Medical Education, State College, PA	May 27, 1998
“Elbow Injuries in the Athlete,” Primary Care Orthopaedic Sports	



Medicine Symposium, Penn State Geisinger Health System, Danville, PA	May 21, 1998
“Injuries in the Hands,” Pennsylvania Athletic Trainers’ Society Meeting, State College, PA	May 15, 1998
“Anterior Cruciate Ligament Deficient Knee,” Sports Medicine Conference, Penn State Geisinger Sports Medicine, University Park, PA	September 29, 1997
“Meniscus Repairs Issues 1997,” Grand Rounds, Penn State Geisinger Sports Medicine, University Park, PA . Invited Faculty	September 18, 1997
“Posterior Cruciate Ligament Issues,” Sports Medicine Conference, Penn State Sports Medicine, University Park, PA. Invited Faculty	April 21, 1997
“Anterior Cruciate Ligament Deficient Knee,” Grand Rounds, Penn State Sports Medicine State College, Pennsylvania. Invited Faculty	February 24, 1997
“ACL Repair Issues,” Grand Rounds, Penn State Sports Medicine, University Park, PA	January 1997
“Anatomy,” for Athletic Training Students, The Pennsylvania State University, University Park, PA	January 1997
“Anatomy of the Spine,” Pennsylvania Athletic Trainers’ Society Meeting, State College, PA	May 19, 1995
“Anterior Cruciate Ligament Reconstruction and Restricted Range of Motion,” Center for Locomotion Studies Seminar, The Pennsylvania State University, University Park, PA	April 18, 1995
Sports Medicine Update, State College, PA	April 5, 1995
“Fractures in the Elderly,” Pennsylvania Society of Physician Assistants CME Annual Conference, State College, PA. Invited Speaker	October 20, 1994
“Sacroiliac Anatomy,” Pennsylvania Athletic Training Society Meeting, State College, PA	May 1994
“Meniscal Repair,” Spring Semester Colloquium, Department of Exercise and Sport Science, The Pennsylvania State University, University Park, PA	February 17, 1994

**Milton S. Hershey Medical Center, The Pennsylvania State University**

“Athletic Concussions: Helmets: Do They Prevent Athletic Injury,” Sports Medicine Conference, Penn State Orthopaedics, University Park, PA	June 24, 2013
“Common Athletic Injuries in Collision Sports,” Mini Medical School, Hershey, PA.	March 13, 2011
“Mild Traumatic Brain Injury,” Grand Rounds, Department of	



Orthopaedics and Rehabilitation, Hershey, PA . Invited Faculty	January 20, 2006
“Sports Medicine Update,” Penn State Spring Coaches Conference, State College, PA	May 2, 2005
“Acute Head Trauma Coverage: Our Responsibilities as Physicians,” Concussion in Athletics: Ongoing Controversy, Sports Medicine Conference, Penn State Orthopaedics, University Park, PA	April 30, 2005
“Sports Medicine,” Penn State Fall Coaches Conference, State College, PA	August 31, 2004
“Promoting Wellness in the Athlete,” Penn State Spring Coaches Conference, State College, PA	May 14, 2004
“Common Sports Medicine Injuries: Are They Preventable?” Mini-Medical School, University Park, PA	October 19, 2003
“Meniscus Injuries,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	January 22, 2003
“Meniscus Injuries,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	January 23, 2002
“Posterior Cruciate Ligament / Posterolateral Corner Injuries,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	May 23, 2001
“Meniscus Injuries,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	January 23, 2001
“Knee Posterolateral Instability,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	May 17, 2000
“Thermal Shrinkage for Shoulder Injuries,” Primary Care Sports Medicine Symposium	April 28, 2000
“Current Concepts in Meniscus Surgery,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	February 16, 2000
“Osteochondritis Dissecans,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	December 16, 1998
“Advances in Osteochondritis Dissecans,” Grand Rounds, Department of Orthopaedics and Rehabilitation	May 14, 1998
“Posterior Cruciate Ligament Tears and Posteromedial Complex,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	April 15, 1998

“Meniscus Repairs Issues 1997,” Grand Rounds, Department of Orthopaedics and Rehabilitation. Invited Faculty	May 29, 1997
“Posterior Cruciate Ligament Tears and Posteromedial Complex,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	April 16, 1997
“Anterior Cruciate Ligament Deficient Knee,” Primary Care Sports Medicine Symposium. Invited Faculty	March 14, 1997
“Arthroscopy the Hip—Triumph of Technology Over Reason,” Grand Rounds, Department of Orthopaedics and Rehabilitation. Invited Faculty	April 25, 1996
“Wrestling Shoes Versus Competition Surface,” Annual James Buchanan Memorial Lecture, Department of Orthopaedics and Rehabilitation	June 7, 1995
“Osteochondritis Dissecans: Fact and Fiction,” Grand Rounds, Department of Orthopaedics and Rehabilitation	April 12, 1995
“Section C: Shoulder, Elbow, Hand, and Knee Anatomy,” Sports Medicine Symposium	March 11, 1995
“Elbow Ligament Injuries,” Sports Medicine Symposium	March 10, 1995
“The Groin Pull Anatomy and Differential Diagnosis,” Sports Medicine Symposium	March 10, 1995
“Physical Examination of the Elbow and Hand,” Sports Medicine Symposium	March 10, 1995
“Physical Examination of the Shoulder,” Sports Medicine Symposium	March 10, 1995
“Socratic Debate: Shoulder Separation,” Sports Medicine Symposium	March 10, 1995
“Ankle Sprains,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	December 15, 1994
“Brachial Plexus/Peripheral Nerve,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	November 3, 1994
“Advanced Arthroscopic Shoulder Procedures,” sponsored by Linvatec Corporation, Milton S.Hershey Medical Center, Hershey, PA. Instructor/Co-Director	July 1994
“Determination of TGFβ Levels in Synovial Fluid in Patients with Arthrofibrosis,” James Buchanan Memorial Lecture, Department of Orthopaedics and Rehabilitation	June 1994
“Posterior Pelvic, Sacral, and Hip Anatomy,” Department of Orthopaedics and Rehabilitation, Pennsylvania Athletic Trainers Society Meeting, Hershey, PA	May 1994

“Posterior Cruciate Ligament, Posterolateral,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	May 18, 1994
“Treatment of Collateral Ligament Injuries of the Knee,” Sports Medicine Symposium	March 1994
“Osteochondritis Dissecans of the Knee,” Sports Medicine Symposium, Hershey, PA	March 1994
“Socratic Debate: The Treatment of Anterior Cruciate Ligamentous,” Sports Medicine Symposium	March 1994
“Meniscus,” Residency, Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	March 2, 1994
“Ankle Sprains,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	December 15, 1993
“Anterior Cruciate Ligament Techniques Pre-op and Post-op Prep,” Outpatient In-Service for Nurses, Milton S. Hershey Medical Center	November 1993
“Adhesive Capsulitis,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	October 20, 1993
“Rotator Cuff Diseases,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	October 16, 1993
“Meniscus Issues 1993,” Department of Orthopaedics and Rehabilitation	September 1993
“SC/AC Joint Injuries,” Sports Medicine Conference, Department of Orthopaedics and Rehabilitation	September 15, 1993
“Prevention of Arthrofibrosis Following ACL Reconstruction Using One-Third Patellar Tendon Autograft,” Department of Orthopaedics and Rehabilitation, Biomedical Research Building Dedication, Hershey, PA	April 1993
“Physical Examination of the Shoulder,” Sports Medicine Symposium	March 1993

## RESEARCH GRANTS

“The Effects of Mild Traumatic Brain Injury on Neuropsychological Test Scores, Postural Stability, and General Brain Function,” Arnett P, Slobounov S, Sebastianelli WJ (Co-Investigator), Ray W, Thompson J. Dean’s Feasibility Grant, The Pennsylvania State University, \$15,000. 1997

“Multi-Dimensional Strategies for Enhanced/Treatment of Injuries,” Slobounov SM, Sebastianelli WJ (Co-Investigator) Barr Foundation, Inc., \$150,000 per year.

“Investigation of Athletes at Risk for Traumatic Brain Injuries,” Slobounov S, Sebastianelli WJ (Co-Investigator) National Institutes of Health (proposal pending).

“Fall-Related Traumatic Brain Injury in the Elderly,” Slobounov S, Arnold S, Elavsky S, Newell S, Sebastianelli WJ (Co-Investigator), Tutweiler R. National Institutes of Health. (proposal pending)

“Long-Term Use of Collagen Hydrolysate as a Nutritional Supplement in Athletes with Diagnosed Joint Pain,” Clark K, Sebastianelli WJ, Co-Investigator Gelita.

“Risk for TBI Due to Single and Repeated Exposures,” Slobounov S, Newell K, Sebastianelli WJ (Co-Investigator), Eslinger P, Tutwiler R, Arnett P, Arnold S. National Institutes of Health.

“Aircast Tibial Stress Fracture Study,” Sebastianelli WJ (Principal Investigator), Kalenak A, Hanks GA, and Cox JS, Bergfeld J. \$15,000. 1989.

“Identification of Athletes at Risk for Traumatic Brain Injuries,” Slobounov S, Hallett M, Newell K, Sebastianelli WJ (Co-Investigator), Tutwiler R, Arnold S, Salvaterra G. Arnett P  
National Institutes of Health. \$2,709,357. 2008–2012.

“Advanced Technology for Assessment of Mild Brain Injury in Athletes,” Thompson JW, Ray WJ, Slobounov SM, Sebastianelli WJ (Coordinator/Contact). November 1, 2004–October 31, 2005.

“Alterations of Brain Function Associated with Perceptual Motor Postural Tasks in Athletes Suffering from Concussions: EEG Study,” Slobounov SM, Sebastianelli WJ (Co-Investigator) \$14,974. October 2, 2003–October 1, 2004.

“Advanced Technology for Assessment of Mild Brain Injury in Athletes,” Sebastianelli WJ (Principal Investigator), Slobounov S, Tutwiler R, Slobounov E, Ray W, Newell K. Dean’s Feasibility Grant, The Pennsylvania State University, \$37,290. 2002–2003.

“Poroelastic Response of Virtual Organs Assemblages,” Sebastianelli WJ (Principal Investigator), Tutweiler R, Slobounov S, Slobounov E. \$50,000. 1999–2001.

“Natural Standing/Standing Carrying Fatigue and the Role of Compression Garments,” Kraemer WJ, Sebastianelli WJ (Co-Investigator). El DuPont de Nemours & Company, Wilmington, DE, \$118,282. 1997–1998.

“The Biomechanical Analysis and Training Performance Training Adaptations Using Meridian Sports Shoes,” Kraemer WJ, Sebastianelli WJ (Co-Investigator). Meridian Sports Incorporated, Indianapolis, IN. \$57,918. 1997–1998.

“Smart Helmet,” Swanson D, Kenney J, Kraemer WJ, Sebastianelli WJ (Co-Investigator) Internal Grant System, Applied Research Laboratory. The Pennsylvania State University. \$10,000. 1997–1998.

“Elastic and Viscoelastic Modeling for a Virtual Reality Haptic Feedback Tissue Cutting Simulation Related to Arthroscopic Surgery,” Sebastianelli WJ (Principal Investigator), Tutwiler RL, Slobounov E. \$25,000. 1997.

“Distribution of Nitrogen Dioxide in the Intact Human Lung,” Ultman JS, Ben-Jebria A, Sebastianelli WJ (Co-Investigator). National Institutes of Health, \$200,000. 1996.

“Muscle Performance Proprioception and Recovery: Understanding the Roles of Compression Garments,” Kraemer WJ, Sebastianelli WJ (Co-Investigator). EI DuPont de Nemours & Company, Wilmington, DE, \$88,824. 1996.

“Computer Graphics Visualization for Rehabilitation of Injured Athletes,” Slobounov SM, Sebastianelli WJ (Co-Investigator). U.S. Diving Commission, Colorado Springs, CO, \$69,400. 1995

“Ultrasound: Mechanisms of Healing and Repair of Bone,” Kraemer WJ, Sebastianelli WJ (Co-Investigator), Hymer WC, Deaver D, Mastro A, Borkowski G. Orthofix, American Medical Electronics, Richardson, TX, \$100,000. 1995.

“Restoring Diminished Mobility: Computer Visualization,” Slobounov SM, Newell KM, Buckley W, Masters R, Sommer J, Ray W, Sebastianelli WJ (Co-Investigator). National Institutes of Health, \$5,000. 1995.

“Chondrogenesis and Osteogenesis in Arthrofibrotic Tissues of the Knee,” Sebastianelli WJ (Principal Investigator), DeHaven KE, Schell J, Puzas E. Arthroscopy Association of North America, \$15,000. 1992.

“The Effects of Suture Technique in Medial Meniscal Vascularity,” Brooks H., Sebastianelli WJ (Co-Investigator), DeHaven KE. Commonwealth Fund, National Medical Fellowships, Inc., \$5,000. 1991–1992.

## OTHER RESEARCH

“Are Functional Deficits in Concussed Individuals Consistent with White Matter Structural Alterations: Combined fMRI and DTI Study,” Zhang K, Johnson B, Pennell D, Ray W, Sebastianelli WJ, Slobounov S. 2010

“Alteration of Brain Functional Network at Rest and in Response to YMCA Physical Stress Test in Concussed Athletes: rs-fMRI Study,” Slobounov S, Gay M, Zhang K, Johnson B, Pennell D, Sebastianelli WJ, Horovitz W, Hallett M, Department of Kinesiology, Department of Orthopaedics and Rehabilitation, Social, Life and Engineering Sciences Imaging Center, The Pennsylvania State University, University Park, PA, and National Institutes of Health, Bethesda, MD. 2011.

“Hamstrings Tendons Harvest for Anterior Cruciate Ligament Reconstruction Decreases Muscular Performance and Dynamic Balance in Patients 12–36 Months Post-Surgery,” Vairo G, Miller S, McBrier N, Sebastianelli WJ, Sherbondy P, Buckley W, Athletic Training Research Laboratory, Department of Kinesiology, Department of Orthopaedics and Rehabilitation, The Pennsylvania State University, University Park, PA; Health Sciences Department, Lock Haven University of Pennsylvania, Clearfield Campus, Clearfield, PA. 2010-2011

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#### **Non-Peer-Reviewed Articles**

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## **Books and Book Chapters**

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### **Manuscripts in Process**

1. Slobounov, S., Gay, M., Sebastianelli, W., Alteration of functional connectivity in concussed athletes during rest and in response to YMCA physical stress test: rs-fMRI study. Neuroimage.
2. Barwick, F., Arnett, P., Jaiswal, N., Cao, C., Sebastianelli, W., Slobounov, S., A Multimodal Assessment of Fatigue During Administration of a Neuropsychological Concussion Test Battery. *Journal of Clinical and Experimental Neuropsychology*.

### **Other Publications**

1. Preventing sports injuries: an (un)obtainable goal. *Centre Daily Times*. February 3, 2003: Health Break Column.
2. Virtual reality graphics in a clinical assessment of concussion. In: Brooks AL, ed. *Proceedings ArtAbilitation 2006*. Esbjerg, Denmark; September 19–20, 2006.
3. Vairo G, Miller S, McBrier N, Sebastianelli WJ, Sherbondy P, Buckley W. Functional performance capacity responses subsequent to ipsilateral hamstrings autograft anterior cruciate ligament reconstruction in patients 12–26 months post-surgery. 2011 American Orthopaedic Society for Sports Medicine Annual Meeting. (Submitted and under review.)
4. Vairo G, Miller S, McBrier N, Sebastianelli WJ, Sherbondy P, Buckley W. Functional performance capacity responses subsequent to ipsilateral hamstrings autograft anterior cruciate ligament reconstruction in patients 12–26 months post-surgery. 2011 National Athletic Trainers’ Association 62nd Annual Meeting and Clinical Symposium. (Submitted and under review.)

5. Vairo G, Miller S, McBrier N, Sebastianelli WJ, Sherbondy P, Buckley W. Performance capacity deficits in patients 12–36 months following ipsilateral hamstrings autograft anterior cruciate ligament reconstruction. 2011 American College of Sports Medicine 58th Annual Meeting and World Congress on Exercise in Medicine. (Submitted and under review.)
6. Vairo G, Miller S, McBrier N, Sebastianelli WJ, Sherbondy P, Buckley W. Hamstrings tendons harvest decreases muscular performance and dynamic balance in patients 12–36 months post-surgery. 2011 Eastern Athletic Trainers' Association 63rd Annual Meeting and Clinical Symposium. Graduate Oral Presentation Award Winner (Submitted and under review.)

## PRESENTATIONS AT SCIENTIFIC MEETINGS

### International

Slobounov S, Sebastianelli WJ, Aukerman D, Bosha P. “Residual Deficits in Concussed Athletes.” Third International Conference on Concussion in Sport. Zurich, Switzerland, October 30, 2008. (Abstract is in press.)

Slobounov S, Newell K, Sebastianelli WJ. “Virtual Reality Graphics in a Clinical Assessment of Concussion.” ArtAbilitation. Denmark, September 18–20, 2006.

Sebastianelli WJ, Schnell J, Hicks DG, DeHaven KE, Gillespie MJ. “Determination of TGF $\beta$  Levels in Synovial Fluid in Patients with Arthrofibrosis.” Combined Congress of the International Arthroscopy Association and the International Society of the Knee. Hong Kong, May 27–31, 1995.

Cosgarea AJ, Sebastianelli WJ, DeHaven KE. “Prevention of Arthrofibrosis Following ACL Reconstruction Using One-Third Patellar Tendon Autograft.” Eastern Orthopaedic Association. Dorado, Puerto Rico, October 1992.

Sebastianelli WJ, Langhans MJ, DeHaven KE, Totterman SM, Peppard AP. “Comparative Analysis of Extensor Mechanism Function and Morphology after Patellar Tendon Anterior Cruciate Ligament Reconstruction by Arthroscopically Assisted or Mini-Arthrotomy Technique.” Eastern Orthopaedic Association. Dorado, Puerto Rico, October 1992.

Sebastianelli WJ, Langhans MJ, DeHaven KE, Totterman SM, Peppard AP. Comparative Analysis of Extensor Mechanism Function and Morphology after Patellar Tendon Anterior Cruciate Ligament Reconstruction by Arthroscopically Assisted or Mini-Arthrotomy Technique.” Combined NJOS and NYSSOS Annual Meeting. Grand Cayman, April 1992.

### National

Hanks GA, Gause TM, Sebastianelli WJ, O'Donnell CS, Kalenak A. Repair of Peripheral Meniscal Tears—Open versus Arthroscopic Technique. AOSSM, Traverse City, Michigan, June 1989.

Banas M., Dalldorf PG, Sebastianelli WJ, DeHaven KE. Long-Term Follow-Up of the Modified Bristow Procedure. Twenty-Fourth Annual Residents' Conference, Kansas City, Kansas, April 10–13, 1991.

Sebastianelli WJ. Comparative Analysis of Extensor Mechanism Function and Morphology after Patellar Tendon Anterior Cruciate Ligament Reconstruction by Arthroscopically Assisted or Mini-Arthrotomy Technique. AOSSM/ESKA European Traveling Fellowship, University of Rochester, Rochester, New York, June 1991.

Banas MP, Dalldorf PG, Sebastianelli WJ, DeHaven KE. Long-Term Follow-Up of the Modified Bristow Procedure. AOSSM Annual Meeting, Orlando, Florida, July 1991.

Totterman SM, Adams MJ, Langhans MJ, Weiss SL, Sebastianelli WJ, Barsotti JB. MR Imaging of Knee after Reconstruction of Anterior Cruciate Ligament. Academy of Radiology Annual Meeting, 1991.

Sebastianelli WJ. Common Shoulder Injuries in the Athlete. Eastern New York Medical Society, Ciba Geigy Sports Symposium, Utica, New York, Spring 1991.

Sebastianelli WJ, Hicks DG, Brooks H, DeHaven KE, Wong H. The Effects of Suture Technique on Medial Meniscal Vascularity. Presented to National Medical Fellowships Inc., The Commonwealth Fund, Washington, DC, February 1992.

Cosgarea AJ, Sebastianelli WJ, DeHaven KE. Prevention of Arthrofibrosis Following ACL Reconstruction Using One Third Patellar Tendon Autograft. American Academy of Orthopaedic Surgeons, San Francisco, California, February 1993. (Supervisor)

Sebastianelli WJ, Hurwitz SR, Gelb DE, Machalko K. The Distribution of Talar Contact Area and Pressure with Lateral Ankle Subluxation. American Orthopaedic Association, Twenty-Sixth Annual Residents Conference, Seattle, Washington, March, 1993.

Gelb DE, Sebastianelli WJ, Hurwitz SR, Machalko K. The Distribution of Talar Contact Area and Pressure with Lateral Ankle Subluxation. Twenty-sixth Annual Residents' Conference, American Orthopaedic Association, Seattle, Washington, March, 1993. (Supervisor).

Sebastianelli WJ, Hicks DG, Brooks H, DeHaven KE, Wong H. The Effects of Suture Technique on Medial Meniscal Vascularity. Arthroscopy Association of North America, Palm Desert, California, April, 1993. (Presenter)

Sebastianelli WJ, Gillespie MJ, Hick DG, DeHaven KE, Cosgarea AJ. The Histopathology of Arthrofibrosis. Arthroscopy Association of North America, Palm Desert, California, April, 1993. (Presenter)

Sebastianelli WJ. Pertinent Ankle Anatomy. National Athletic Trainers Association National Meeting, Kansas City, Missouri, June 1993.

Gelb DE, Hurwitz SR, Machalko K, Sebastianelli WJ. A Radiographic and Biomechanical Investigation of Lateral Talar Shift. American Orthopaedic Foot and Ankle Society, Asheville, North Carolina, July, 1993. (Supervisor)

Sebastianelli WJ, Schnell J, Hicks DG, DeHaven KE, Gillespie MJ. Determination of TGF $\beta$  Levels in Synovial Fluid in Patients with Arthrofibrosis. American Orthopaedic Association, Twenty-Seventh Annual Residents' Conference, Atlanta, Georgia, March, 1994. (Presenter)

Gillespie MJ, Sebastianelli WJ, Stout S, DeHaven KE, Peppard A. Isokinetic Normative Values of the Quadriceps and Hamstring Musculature in the Female NCAA Division I Gymnast. American Orthopaedic Association, Twenty-Seventh Annual Residents' Conference, Atlanta, Georgia, March, 1994. (Supervisor)

Freudigman PT, Sebastianelli WJ, Little T. Anatomy of the Saphenous Nerve with Respect to Medial Meniscus Repair. American Orthopaedic Association, Twenty-Seventh Annual Residents' Conference, Atlanta, Georgia, March, 1994. (Supervisor)

Sebastianelli WJ, Schnell J, Hicks DG, DeHaven KE, Gillespie MJ: Determination of TGF $\beta$  Levels in Synovial Fluid in Patients with Arthrofibrosis. American Orthopaedic Society of Sports Medicine, Palm Desert, California, June, 1994. (Presenter)

Stube KC, Black KP, Moulton MJR, Sebastianelli WJ, Kalenak A: Effects of Interference Screw Length on Tibial Tunnel Fixation for Anterior Cruciate Ligament Reconstruction. American Academy of Orthopaedic Surgeons, Sixty-Second Annual Meeting, Orlando, Florida, February, 1995. (Supervisor).

Cummings PD, Sebastianelli WJ, Kalenak A, Black KP, Kretzler J. Localization of Femoral and Tibial Bone Tunnels using Computerized Tomography and Three-Dimensional Reconstruction following Anterior Cruciate Ligament Surgery, American Orthopaedic Association, Twenty-Eight Annual Residents' Conference, University of Pittsburgh, Pennsylvania, March, 1995. (Supervisor).

Swenson EJ, DeHaven KE, Sebastianelli WJ, Kalenak A, Hanks GA, Lynch JM, Peppard A. The Effect of a Pneumatic Leg Brace on Return to Play in Athletes with Tibial Stress Fractures. American Medical Society for Sports Medicine, Hilton Head, South Carolina, April 1–4, 1995. (Co-author)

Swenson EJ, DeHaven KE, Sebastianelli WJ, Kalenak A, Hanks GA, Lynch JM. The Effect of a Pneumatic Leg Brace on Return to Play in Athletes with Tibial Stress Fractures. American Orthopaedic Society for Sports Medicine Annual Meeting, Toronto, Canada, July 18, 1995. (Co-author)

Sebastianelli WJ. The Masters Experience—Knee Course Arthroscopy Association of North America, Chicago, Illinois January 13–14, 1995.

Sebastianelli WJ, Schnell J, Hicks DG, DeHaven KE, Gillespie MJ. Determination of TGF $\beta$  Levels in Synovial Fluid in Patients with Arthrofibrosis. American Academy of Orthopaedic Surgeons, Orlando, Florida, February 16–20, 1995. (Poster)

Stube KC, Black KP, Moulton MJR, Sebastianelli WJ, Kalenak A. Effects of Interference Screw Length on Tibial Tunnel Fixation for Anterior Cruciate Ligament Reconstruction. American Academy of Orthopaedic Surgeons, Sixty-Second Annual Meeting, Orlando, Florida, February, 1995. (Poster).

Nindl BC, Gotshalk LA, Volek JS, Harman FS, Tokeshi SA, Mazzetti SA, Loebel CC, Marx JO, Gordon SE, Duncan ND, Hymer WC, Putukian M, Sebastianelli WJ, Kraemer WJ: Growth

hormone and insulin-like growth factor 1 responses to acute resistance exercise in untrained women. Experimental Biology 97, New Orleans, Louisiana, April 1997.

Sebastianelli WJ. Hip Arthroscopy Study Group Arthroscopy Association of North America, The Study Group, Washington, DC, April 13, 1997.

Moderator: “Long-Term Follow-Up of Distally Attached Over-the-Top Semitendinosis and Gracilis Anterior Cruciate Ligament Reconstruction,” “Internal Fixation of Radial Head Fractures,” “Management of Osteomyelitis: Update I,” Pennsylvania Orthopaedic Society Spring Scientific Meeting, Charleston, SC, April 18, 1997.

Incleton T, Volek JS, Clark KL, Gordon SE, McBride JM, Putukian M, Sebastianelli WJ, Puhl S, Kraemer WJ. Physiological Adaptations to a Weight-Loss Dietary Regimen and Exercise Programs in Women. American College of Sports Medicine Annual Meeting, Denver, Colorado, May 28–31, 1997. (Co-author)

Volek JS, Kraemer WJ, Clark KL, Incledon T, McBride JM, Gordon SE, Putukian M, Sebastianelli WJ. Body Composition and Physical Performance following Weight Loss with Endurance and Resistance Exercise in Men. American College of Sports Medicine Annual Meeting, Denver, Colorado, May 28–31, 1997. (Co-author)

Loebel CC, Nindl BC, Gotshalk LA, Meth S, Mastro A, Putukian M, Sebastianelli WJ, Häkkinen K, Duncan ND, Kraemer WJ. Prolactin Responses to Acute Resistance Exercise in Untrained Women: Relationship to Cortisol and Testosterone. National Strength and Conditioning Association Conference, Las Vegas, Nevada, June 25–28, 1997. (Co-author)

Meth S, Nindl BC, Gotshalk LA, Loebel CC, Duncan ND, Tokeshi SA, Putukian M, Sebastianelli WJ, Häkkinen K, Kraemer WJ. Comparison of Absolute Strength vs Absolute Occupational Lifting Performance in Untrained Men and Women. National Strength and Conditioning Association Conference, Las Vegas, Nevada, June 25–28, 1997. (Co-author)

Kraemer WJ, Newton RU, Bush JA, Duncan ND, Volek JS, Nindl B, Harman F, Häkkinen K, Denegar C, Canavan P, Putukian M, Johnston J, Sebastianelli WJ. Influence of a Compression Sleeve on Muscle Function and Soreness after Maximal Eccentric Exercise. National Strength and Conditioning Association Conference, Las Vegas, Nevada, June 25–28, 1997. (Co-author)

Moderator: “Surviving/Succeeding in Orthopaedic Practice,” “Comparison of Exertional Indices Following Moderate Training in Collegiate Athletes,” “The Plantar Lateral Cyst: An Indication of Impending Failure for Operatively Treated Jones’ Fractures,” “Meniscus Salvage/Repair,” Pennsylvania Orthopaedic Society, Spring Scientific Meeting, Orlando, FL, April 22–25, 1998.

Kraemer WJ, Hymer WC, Nindl BC, Welsch JR, Harman FS, Gotshalk LA, Volek JS, Marx JO, Häkkinen K, Newton RU, Duncan ND, Gordon SE, Fleck SJ, Putukian M, Sebastianelli WJ. Growth Hormone Variants and Bioactivity in Response to Heavy Resistance Exercise in Women. American College of Sports Medicine Annual Meeting, Orlando, Florida, June 3–6, 1998.

Gotshalk LA, Kraemer WJ, Nindl BC, Tokeshi S, Volek J, Bush JA, Sebastianelli WJ, Putukian M. Contribution of Upper Body Training on Total Body Strength and Power in Young Women. American College of Sports Medicine Annual Meeting, Orlando, Florida, June 3–6, 1998.

Tokeshi SA, Kraemer WJ, Nindl BC, Gotshalk LA, Marx JO, Harman FS, Lamont HS, Sebastianelli WJ, Putukian M, Fleck S, Newtown RU, Häkkinen K. Power and Strength in

Women: Adaptations following Six months of Resistance Training. American College of Sports Medicine Annual Meeting, Orlando, Florida, June 3–6, 1998.

DeHaven KE, Sebastianelli WJ, Rodkey WG. Current Concepts in Meniscus Surgery. American Orthopaedic Society for Sports Medicine Annual Meeting, Traverse City, Michigan, June 19–22, 1999.

“Arthroscopic Debridement of Acetabular Labrum Tears,” and “Surgical 25 Consecutive Cases Treatment of Chronic Groin Pain (Pubalgia) in Athletes: A Review of 25 Consecutive Cases” (Discussion), American Orthopaedic Society For Sports Medicine, Traverse City, Michigan, June 21, 1999.

Martin, T.J., Stokes, W.L., Sebastianelli, W.J.. Chronic Compartment Syndrome. American Academy of Pediatrics Meeting, Washington, D.C., October 11, 1999.

Sebastianelli, W.J.. Meniscus Repair 2000—Surgical Techniques and Results. Pennsylvania Orthopaedic Society Spring 2000 Scientific Meeting, Orlando, Florida, April 7, 2000.

Sebastianelli, W.J., Swanson, D.C., Evans, T.: Development of a Smart Helmet for Monitoring Head Impacts. Pennsylvania Orthopaedic Society Spring 2000 Scientific Meeting, Orlando, Florida, April 8, 2000.

Dompier TP, Denegar CR, Miller SJ, Sebastianelli WJ, Buckley WE, Salvaterra GF, Hertel J. Effect of General Anesthesia on Passive Knee Extension Motion. National Athletic Trainers' Association Annual Meeting and Symposium: Nashville, Tennessee, June 19–24, 2000.

Domorski, S.N., Evans, T.A., Sebastianelli, W.J., Putukian, M., Hertel, J.. Persistent Foot Pain in a Female Collegiate Soccer Player. National Athletic Training Association, Nashville, Tennessee, July 1, 2000.

Cosgarea, A.J., DeHaven, K.E., Sebastianelli, W.J.. Arthrofibrosis of the Knee. American Academy of Orthopaedic Surgeons 68<sup>th</sup> Annual Meeting, San Francisco, California, March 2, 2001.

Laws KD, Evans TA, Gay MR, Salvaterra GF, Sebastianelli WJ. Persistent shoulder dysfunction in a collegiate football player. National Athletic Trainers' Association Annual Meeting and Symposium: June 19–24, 2001, Los Angeles, CA.

Hertel, J., Kaminski, T., Sebastianelli, W.J.. Etiology and Management of Functional Ankle Instability. American College of Sports Medicine 48<sup>th</sup> Annual Meeting, Baltimore, Maryland, June 1, 2001.

Sebastianelli, W.J.. Arthrofibrosis of the Knee Following Ligament Injury. American Academy of Orthopaedic Surgeons 69<sup>th</sup> Annual Meeting, Dallas, Texas, February 14, 2002.

Sebastianelli, W.J.. Possible Pitfalls of Hamstring ACL Reconstruction. Pennsylvania Orthopaedic Society 2002 Spring Scientific Meeting, Westin Rio Mar, Puerto Rico, April 11, 2002.

“Hamstring ACL “My Experience,” Biomet Sports Medicine Symposium, Indianapolis, Indiana, May 16, 2002.



“Cancer Prevention in the Young Athlete” Pennsylvania Orthopaedic Society 2005 Spring Scientific Meeting, Orlando, Florida, April 15, 2005.

“Epidemiology of Football Injuries NCAA Experience” AOSSM Annual Meeting, Hollywood, Florida, May 11, 2006.

“The Young Athlete with a Degenerative Knee—Which Should I Choose? Arthroscopy, Osteotomy, Unicompartamental Replacement, or Total Knee Replacement?” Pennsylvania Orthopaedic Society (POS) Fall Meeting, Philadelphia, Pennsylvania, November 16, 2006.

“Acute Knee Injuries in Sport: Diagnosis and Treatment” American Academy of Physician Assistants 35th Annual Conference, Philadelphia, Pennsylvania, May 31, 2007.

“Virtual Reality Graphics in a Clinical Assessment of Concussion” North American Brain Injury Society Sixth Annual Conference on Brain Injury, New Orleans, Louisiana, October 2008 (abstract submitted April 2008)

Slobounov, S., Sebastianelli, W., (2010). Concussion in Athletics: from Brain to Behavior. Neuroscience Grand Rounds, NINDS, NIH.

Slobounov, S., Sebastianelli, W., (2010) Brain Imaging in Concussion Research. University of Oregon, EGI.

Vairo, G., Miler, S., McBrier, N., Sebastianelli, W., Sherbondy, P., Buckley, W., Hamstrings tendons harvest decreases muscular performance and dynamic balance in patients 12–26 months post–surgery. 63rd Eastern Athletic Trainers’ Association Annual Meeting and Clinical Symposium Free Communications Research Abstract Presentation January 8, 2011 Philadelphia, PA. \*Graduate Oral Presentation Award Winner

## **Regional/Local**

“Reducing the Incidence of Arthrofibrosis Following ACL Reconstruction,” Wyeth-Ayerst Seminar, Scranton, Pennsylvania, July 1993. (Invited Professor)

“Disorders of the Rotator Cuff,” Linvatec Corporation Arthroscopic Treatment of Rotator Cuff and Acromioclavicular Joint Disease Meeting, Hershey, Pennsylvania, July 1994.

Meese, M., Sebastianelli, W.J., Black, K.P., Kraemer, W., Newton, R.. Determination of Co-Efficiency of Friction of Wrestling Shoes versus Competition Surface. Pennsylvania Orthopaedic Society Annual Meeting, Williamsburg, Virginia, April 7, 1995. (Supervisor)

“Knee Pain,” Primary Care Sports Medicine Program, Coalition of Academic Medical Centers, Hershey, Pennsylvania, September 22, 1995.

“Evaluation of the Acutely Injured Knee,” Primary Care Sports Medicine Program, Coalition of Academic Medical Center, Hershey, Pennsylvania, September 22, 1995.

“Meniscus Repairs 1996,” Central Susquehanna Valley Orthopaedic Society, Lewisburg, Pennsylvania, April 1, 1996. (Invited Faculty)

Sebastianelli, W.J.. Meniscus Salvage/Repair. Pennsylvania Orthopaedic Society Spring Scientific Meeting, Orlando, Florida, April 22–25, 1998.

Rieber, M.H., Lohrer, W.A., Sebastianelli, W.J.. The Plantar Lateral Cyst, an Indication of Impending Failure for Operatively Treated Jones' Fractures. Pennsylvania Orthopaedic Society Spring Scientific Meeting, Orlando, Florida, April 22–25, 1998.

“New Technologies in the Treatment of Sports Related Injuries,” Pfizer Alta Pharmaceuticals, Lewistown, Pennsylvania, March 16, 2000.

“Sports Medicine Issues of the Team Physician,” Community Medical Center's Department of Continuing Education, Visiting Professor Specialty Program, Scranton, Pennsylvania, May 4, 2000.

“Knee Kinematics,” Arthrotek/Penn State Meeting, State College, Pennsylvania, May 19–20, 2001.

“Athletic Cervical Spine Injuries: Evaluation, Treatment and Criteria for Return to Play,” New York State Athletic Trainers Association Meeting, Rochester, New York, May 7, 2004.

“Sports Medicine: Changes and Challenges in Clinical Practices,” Pennsylvania Athletic Trainers Society 24<sup>th</sup> Annual Meeting and Symposium, Harrisburg, Pennsylvania, May 22, 2004.

“Sports Medicine Update,” Health Update for Pediatric and School Nurses, Hershey, Pennsylvania, June 17, 2004.

“Pediatric Sport Injuries,” Touching the Future of Children Conference, Harrisburg, Pennsylvania, November 9, 2004.

Program Chairman, Pennsylvania Orthopaedic Society, Spring Scientific Meeting, Orlando, FL, April 14–16, 2005.

Moderator: “Treatment of Meniscal and Articular Disease of the Knee,” Pennsylvania Orthopaedic Society, Spring Scientific Meeting, Orlando, FL, April 14, 2005.

“Acute Head Trauma Coverage: Our Responsibilities as Physicians, Concussion in Athletics: Ongoing Controversy, Penn Stater Conference Center Hotel, State College, PA, April 30, 2005.

Visiting Professorship at University of Rochester Fellowship Graduation, Rochester, New York, June, 2005.

Slobounov, S., Sebastianelli, W., (2005). Concussion in Athletes: EEG and balance symptoms. Conference: Concussion in Athletics: Ongoing Controversy. Penn State University, University Park, PA.

Slobounov, S., Sebastianelli, W. (2008), Concussion in Sport, New Development. Sports Medicine Clinic, Penn State University, University Park PA.

## **Poster Exhibits**

### International:

Sebastianelli WJ, Schnell J, Hicks DG, DeHaven KE, Gillespie MJ. Determination of TGFb Levels in Synovial Fluid in Patients with Arthrofibrosis. Combined Congress of the International



Arthroscopy Association and the International Society of the Knee. Hong Kong, May 27–31, 1995. *Best Poster Exhibit Award*.

Sebastianelli WJ, Gillespie MJ, Hicks DG, DeHaven KE, Cosgarea AJ. “The Histopathology of Arthrofibrosis.” Combined Congress of the International Arthroscopy Association and the International Society of the Knee. Copenhagen, Denmark, June 1993.

Sebastianelli WJ, Hicks DG, Brooks H, DeHaven KE, Wong H. “The Effects of Suture Technique on Medial Meniscal Vascularity.” Combined Congress of the International Arthroscopy Association and the International Society of the Knee. Copenhagen, Denmark, June 1993.

Cosgarea AJ, DeHaven KE, Sebastianelli WJ. “Prevention of Arthrofibrosis Following ACL Reconstruction Using One-Third Patellar Tendon Autograft.” Combined Congress of the International Arthroscopy Association and the International Society of the Knee. Copenhagen, Denmark, June 1993.

#### National:

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