

In some individuals, the cartilaginous disc between vertebrae may wear, causing pain and pressure on the spinal cord. For those individuals, spinal fusion surgery may offer relief. The procedure permanently connects two or more spinal vertebrae to improve spinal stability, correct deformations, and reduce pain. The procedure, however, can result in adverse patient outcomes such as high-impaction, neural or vascular injury, esophageal injuries, excessive blood loss, prolonged surgical duration, prolonged recovery, and incomplete return to work results. These adverse events result from static and non-expandable implants, misplaced implants, and implant pull-out after the operation.

Plaintiff patents minimally invasive spinal implants that are designed to reduce adverse outcomes in spinal fusion patients. Plaintiff's inventions include minimal impaction, steerable, and custom-fit intervertebral implants that reduce musculoskeletal disruption and nerve root retraction during and after the procedure. Defendant also is a spinal fusion company that sells intervertebral spinal implants.

B. Plaintiff's Patents

From January 15, 2013 through November 19, 2019, the United States Patent and Trademark Office ("PTO") issued the eight patents at issue here, which Plaintiff owns by assignment. (First Am. Compl. ¶¶ 17-24.) These patents are directed to intervertebral spinal implant screws, staples, and expandable implant systems. U.S. Patent Nos. 8,353,913 (the "913 patent"), 10,307,268 (the "268 patent"), and 10,478,319 (the "319 patent") are for tools used for manipulating and inserting spacers into a disc space between two vertebral bodies to facilitate bone and screw fusion. U.S. Patent No. 9,889,022 (the "022 patent") is for an intervertebral screw guide and fixation apparatus for insertion into a disc space between two vertebrae to encourage bone and screw fusion. U.S. Patent No. 10,028,740 (the "740 patent") claims a "curvilinear nail screw," a holding structure that is implanted into a vertebra and around the pedicle bones to avoid

penetrating them, which allegedly reduces risks associated from prior inventions that inserted into pedicle bones. U.S. Patent No. 10,251,643 (the “‘643 patent”) relates to an intervertebral mechanism that expands between vertebral bodies and engages vertebral endplates to keep the mechanism in place. U.S. Patent No. 10,076,367 (the “‘367 patent”) is for a bidirectional system inserted between vertebrae to facilitate their linking and fusion. Finally, U.S. Patent No. 10,376,386 (the “‘386 patent”) claims a spinal staple with a curved base and ridged spikes that hinder the staple’s removal.

C. Procedural Background

According to the Complaint, on June 3, 2015, Plaintiff’s counsel sent a letter to Defendant’s General Counsel that identified the ‘913 patent and the patent application for the ‘022 patent, which at the time was pending at the PTO. (First Am. Compl. ¶ 26.) In the letter, Plaintiff identified additional pending patent applications, of which the remaining patents at issue are continuations. (*Id.*) The parties failed to reach an agreement, and thereafter the PTO issued the seven pending patent applications. (*Id.* ¶¶ 17-24, 27-29.) Plaintiff alleges that Defendant has infringed the eight patents listed above and contained in the June 3, 2015 letter through selling various Globus products. (*Id.* ¶¶ 30.)

Plaintiff initiated this action on November 20, 2019, the day after the eighth patent—the ‘319 patent—issued.¹ On April 14, 2021, it filed its First Amended Complaint, setting forth allegations of direct infringement, inducement of infringement, contributory infringement, and willful infringement.

¹ Plaintiff initially filed the action in the United States District Court for the Western District of Texas, but on July 2, 2020, the case was transferred to the Eastern District of Pennsylvania. (Doc. No. 50.)

On May 13, 2021, the parties submitted opening claim construction briefs setting forth their positions on ten disputed claim terms in seven of the eight patents at issue.² I held a Markman hearing regarding these terms on July 27, 2021. Having fully reviewed the parties' briefing and evidentiary submissions, I now set forth the legal construction of the disputed claim terms.

II. STANDARD OF REVIEW

The first step in a patent infringement analysis is to define the meaning and scope of the claims of the patent. Markman, 52 F.3d at 976. Claim construction, which serves this purpose, is a matter of law exclusively for the court. Id. at 979. “[T]here is no magic formula or catechism for conducting claim construction.’ Instead, the court is free to attach the appropriate weight to appropriate sources ‘in light of the statutes and policies that inform patent law.’” SoftView LLC v. Apple Inc., No. 10-389, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (quoting Phillips v. AWH Corp., 415 F.3d 1303, 1324 (Fed. Cir. 2005)).

“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” Phillips, 415 F.3d at 1312 (internal quotation marks omitted). The focus of a court’s analysis must therefore begin and remain on the language of the claims, “for it is that language that the patentee chose to use to ‘particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.’” Interactive Gift Express, Inc. v. CompuServe, Inc., 256 F.3d 1323, 1331 (Fed. Cir. 2001) (quoting 35 U.S.C. ‘112, & 2). The terms used in the claims bear a “heavy presumption” that they mean what they say and have their ordinary and customary meaning. Texas Digital Sys., Inc. v. Telegeniz, Inc., 308 F.3d 1193, 1202 (Fed. Cir. 2002). That ordinary meaning “is the meaning that the term would have to

² The ‘319 patent does not contain any of the disputed claim terms.

a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” Phillips, 415 F.3d at 1313.

“Generally, a person of ordinary skill in the art would not understand the ordinary and customary meaning of a claim term in isolation.” Shire ViroPharma Inc. v. CSL Behring LLC, No. 17-414, 2019 WL 266327, at *3 (D. Del. Jan. 18, 2019). As such, the ordinary meaning may be derived from a variety of sources including intrinsic evidence, such as the claim language, the written description, drawings, and the prosecution history; as well as extrinsic evidence, such as dictionaries, treatises, or expert testimony. Dow Chem. Co. v. Sumitomo Chem. Co. Ltd., 257 F.3d 1364, 1373 (Fed. Cir. 2001).

The “most significant source” of authority is the “intrinsic evidence of record, i.e., the patent itself, including the claims, the patent specification³ and, if in evidence, the prosecution history.” Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996); see also Phillips, 415 F.3d at 1313 (holding that a person of ordinary skill in the art is deemed to read the claim terms in the context of the entire patent, including the specification). The specification “is the single best guide to the meaning of a disputed term” and is usually dispositive as to the meaning of words. Vitronics, 90 F.3d at 1582. Although it is improper to import limitations from the specification into the claims, “one may look to the written description to define a term already in a claim limitation, for a claim must be read in view of the specification of which it is a part.” Renishaw PLC v. Marposs Societa’ per Azioni, 158 F.3d 1243, 1248 (Fed. Cir. 1998). On occasion, “the specification may reveal a special definition given to a claim term . . . that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.”

³ The specification is “that part of a patent application which precedes the claim and in which the inventor specifies, describes, and discloses the invention in detail.” McCarthy’s Desk Encyclopedia of Intellectual Property 408 (2d ed. 1995).

Phillips, 415 F.3d at 1316. The specification may also “reveal an intentional disclaimer, or disavowal, of claim scope by the inventor . . . [, which] is regarded as dispositive.” Id. “The construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” Renishaw, 158 F.3d at 1250.

The court “should also consider the patent’s prosecution history, if it is in evidence.” Markman, 52 F.3d at 980. This consists of “the complete record of proceedings before the Patent Office and includes the prior art cited during examination.” Phillips, 415 F.3d at 1317. “Like the specification, the prosecution history provides evidence of how the [Patent and Trademark Office] and the inventor understood the patent.” Id. at 1317. Nonetheless, it is the least probative form of intrinsic evidence because it “represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation.” Id.

If ambiguity still exists after considering all the intrinsic evidence, the court may rely on extrinsic evidence, which is “all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” Markman, 52 F.3d at 980. “[D]ictionaries, and especially technical dictionaries, . . . have been properly recognized as among the many tools that can assist the court in determining the meaning of particular terminology.” Phillips, 415 F.3d at 1318. Additionally, expert testimony can provide background on the technology at issue, explain how it works, speak to what a person of ordinary skill in the art would understand, and establish that a particular term has a particular meaning in the pertinent field. Id. Notably, however, extrinsic evidence is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” C.R. Bard, Inc. v. U.S. Surgical Corp., 388

F.3d 858, 862 (Fed. Cir. 2004) (quoting Vanderlande Indus. Nederland BV v. Int’l Trade Comm’n, 366 F.3d 1311, 1318 (Fed. Cir. 2004)).

Ultimately, during claim construction, “[t]he sequence of steps used by the judge in consulting various sources is not important; what matters is for the court to attach the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law.” Phillips, 415 F.3d at 303.

III. DISCUSSION

Ten claim terms in seven of Plaintiff’s patents are in dispute. Specifically, the parties disagree on the correct construction of: (1) the term “universal” in the ‘913 and ‘022 patents; (2) the term “intervertebral / disc space / intervertebral space” in the ‘913, ‘022, ‘367, and ‘643 patents; (3) the phrase “third and fourth opposing side surfaces positioned on opposite sides of the second vertebral body engagement surface” in the ‘268 patent; (4) the phrase “gripper having a plurality of prongs” in the ‘913 patent; (5) the term “counterbore” in the ‘022 patent; (6) the phrase “curvilinear nail screw / curvilinear nail-screw” in the ‘740 patent; (7) the phrase “first [and second] means for engaging a cancellous core” in the ‘740 patent; (8) the term “shell” in the ‘643 patent; (9) the phrase “bone-piercing screw extendable from the at least one implant body” in the ‘367 patent; (10) and the phrase “means to facilitate irreversible extraction” in the ‘386 patent. I address each claim term below.

A. “Universal”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“universal” (‘913 patent claims 1, 15; ‘022 patent claim 47)	Plain and ordinary meaning <i>or</i> to the extent the Court believes this term requires construction: “stand-alone (<i>i.e.</i>, having the dual functionality of an intervertebral spacer and a transvertebral bone fusion screw apparatus)”	“an intervertebral bone fusion spacer designed to be inserted between two adjacent [vertebrae / vertebral bodies] in any region of the spine, <i>i.e.</i>, cervical, thoracic, or lumbar, using any approach, <i>e.g.</i>, posterior, anterior, or lateral”

The first disputed claim term is “universal,” which appears in claims 1 and 15 of the ‘913 patent and claim 47 of the ‘022 patent. (‘913 patent, col. 12, line 53, col. 14, line 46; ‘022 patent, col. 17, line 43.) Plaintiff contends that the ‘913 and ‘022 patent specifications make clear that “universal” refers to the inventions’ “dual functions of an intervertebral spacer . . . [and] a transvertebral bone fusion screw apparatus.” (‘913 patent, col. 1, lines 32-35; see ‘022 patent, col. 2, lines 21-23.) Defendant, however, highlights the sentence in the ‘913 patent immediately following Plaintiff’s quoted language, which enumerates invention uses in multiple spinal regions. (‘913 patent, col. 1, lines 35-43.) Defendant also emphasizes other specification language in both patents discussing the inventions’ ability to be modified to fit various spinal regions. (‘913 patent, col. 3, lines 39-41; ‘022 patent, col. 3, lines 52-54.)

I agree with Defendant’s proposed construction. The term “universal” does not have a plain meaning nor was it given a definition in either patent. Accordingly, this term must be construed. To that end, both patents’ specifications provide a multitude of invention uses in all three spinal regions. (See, e.g., ‘913 patent, col. 1, lines 35-43, col. 3, lines 50-53; ‘022 patent, col. 3, lines 52-54.) Indeed, both specifications note that the invention “can also be enlarged and modified to be suitable for cervical, thoracic and lumber vertebral” placement. (‘022 patent, col. 3, lines 52-54; see ‘913 patent, col. 3, lines 39-41.) Moreover, both specifications reference complications found in prior art, and discuss how the inventions address those complications by “propos[ing] the use of novel . . . screws which can be strategically inserted via anterior or posterior surgical spinal approaches into the anterior and middle columns of the intervertebral [sic] disc space.” (‘913 patent, col. 2, lines 33-37; ‘022 patent, col. 2, lines 39-43.) These portions of the specifications reflect the inventor’s intent that a universal invention is one that can be modified for use in any spinal region and via multiple surgical approaches. Therefore, the term “universal” is

construed as “**an intervertebral bone fusion spacer designed to be inserted between [vertebrae / vertebral bodies] in any region of the spine, i.e., cervical, thoracic, or lumbar, using any approach, e.g., posterior, anterior, or lateral.**”⁴

B. “Intervertebral / Disc Space / Intervertebral Space”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“intervertebral / disc space / intervertebral space” (‘913 patent claims 1, 15; ‘022 patent claim 47; ‘367 patent claim 1; ‘643 patent claim 1)	“ a disc space between two vertebral bodies ”	“ a bone fusion spacer designed to be inserted between two adjacent [vertebral bodies / vertebrae] ” <i>or</i> “ the disc space between two adjacent [vertebral bodies / vertebrae] ”

The next contested claim term is the phrase “intervertebral / disc space / intervertebral space,” which appears in claims 1 and 15 of the ‘913 patent, claim 47 of the ‘022 patent, claim 1 of the ‘367 patent, and claim 1 of the ‘643 patent. (‘913 patent, col. 12, lines 54, 58, 61-62, 67, col. 14, lines 46-47, 50, 52, 55-56, 65; ‘022 patent, col. 17, lines 43, 45, 49; ‘367 patent, col. 9, lines 22, 25-27, 52, 54, 58, 63; ‘643 patent, col. 10, lines 56, 58, col. 11, line 8.) Defendant contends that an intervertebral space is only between two adjacent vertebral bodies because the inventor did not contemplate the invention spanning more than two vertebral bodies. (Doc. No. 116 at 8.) Plaintiff, however, submits that the “adjacent” limiting language should not be read into the claims. (Doc. No. 117 at 13-14.)

I agree with Plaintiff’s proposed construction. Defendant improperly seeks to add limiting language from the specification into the claims. Although there are examples in the specification of the inventions’ uses between two adjacent vertebral bodies, there is nothing to suggest the inventor only conceived of adjacent insertions or intended to exclude non-adjacent insertions. For

⁴ For reasons discussed when construing the claim term “intervertebral / disc space / intervertebral space” in Section III.B *infra*, the adjective phrase “two adjacent” in Defendant’s proposed construction is removed from my construction.

example, dependent claims 6 and 55 of the '022 patent require fusion of adjacent bodies, giving relevancy to the omission of "adjacent" elsewhere in the patent. ('022 patent, col. 13, line 57, col. 18, line 46.)

Finally, it is noted that omission of "adjacent" is consistent with numerous extrinsic dictionary definitions defining "intervertebral" only as a space between two vertebrae, not necessarily two adjacent vertebrae. See, e.g., Intervertebral, Merriam-Webster.com Dictionary, [webster.com/dictionary/intervertebral](https://www.merriam-webster.com/dictionary/intervertebral). (Aug. 9, 2021) (defining "intervertebral" as "situated or occurring between vertebrae of the spinal column"). Thus, the phrase "intervertebral / disc space / intervertebral space" is construed as **"a disc space between two vertebral bodies."**

C. "Third and Fourth Opposing Side Surfaces Positioned on Opposite Sides of the Second Vertebral Body Engagement Surface"

<i>Claim Term</i>	<i>Plaintiff's Proposal</i>	<i>Defendant's Proposal</i>
"third and fourth opposing side surfaces positioned on opposite sides of the second vertebral body engagement surface" ('268 patent claims 1, 7, 22, 25)	"two surfaces located on opposite sides of the second vertebral engagement surface"	"two surfaces, each integral with the second vertebral body engagement surface and located on opposite sides of the second vertebral body engagement surface"

The third challenged claim term is the phrase "third and fourth opposing side surfaces positioned on opposite sides of the second vertebral body engagement surface," which appears in claims 1, 7, 22, and 25 of the '268 patent. ('268 patent, col. 13, lines 59-62, col. 14, lines 52-57, col. 19, lines 2, 4-5, 12, col. 19, line 24.) Defendant argues that the third and fourth sides of the invention must contain a vertebral body engagement surface because the first and second sides are so limited. (Doc. No. 116 at 26-27.) Conversely, Plaintiff avers it is improper to read the omitted limitation into the claims. (Doc. No. 117 at 14-16.)

I agree with Plaintiff’s proposed construction. Claim 1 of the ‘268 patent describes “a first implant structure defining the first vertebral body engagement surface and a first angled wedge portion” (‘268 patent, col. 13, lines 11-12.) However, when defining the second implant structure, which contains the third and fourth opposing side surfaces, the inventor only claimed “a second implant structure defining a second angled wedge portion,” omitting a vertebral body engagement surface limitation. (*Id.*, lines 36-37.) This distinction was purposeful and would render superfluous the first vertebral body engagement surface limitation. It thus is improper to read a limitation from the first implant structure into the second implant structure. Therefore, the phrase “third and fourth opposing side surfaces positioned on opposite sides of the second vertebral body engagement surface” is construed as **“two surfaces located on opposite sides of the second vertebral engagement surface.”**

D. “Gripper Having a Plurality of Prongs”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“gripper having a plurality of prongs” (‘913 patent claims 1, 15)	“a part of a tool assembly with two or more prongs”	“a tool having two or more prongs to grasp the slot or indentation of the spacer and the grooves of the screw guide”

The next disputed claim term is the phrase “gripper having a plurality of prongs,” which appears in claims 1 and 15 of the ‘913 patent. (‘913 patent, col. 12, line 64, col. 15, line 3.) In support of its proposed construction, Defendant emphasizes claim and specification language describing a gripper that includes a screw guide, and argues the language requires the gripper have means to grasp the screw guide. (Doc. No. 116 at 15-16.) Plaintiff again argues Defendant’s construction improperly reads limitations from the specification into the claim. (Doc. No. 117 at 16-18.)

I agree with Plaintiff’s proposed construction. Plaintiff’s construction mirrors the language in claims 1 and 15, which claim only a gripper having a plurality of prongs. (‘913 patent, col. 12, line 64, col. 15, line 3.) The gripper language is limited in later dependent claims that require, for example, that “the plurality of prongs engage and hold the screw guide” (‘913 patent, col. 15, lines 14-15.) Initially omitting the limitation was a deliberate choice of the patentee, and it is improper to read the later limitation into the broad definition of a gripper. Thus, the phrase “gripper having a plurality of prongs” is construed as **“a part of a tool assembly with two or more prongs.”**

E. “Counterbore”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“counterbore” (‘022 patent claim 47)	“an enlargement of the mouth of a cylindrical bore for accommodating a screw head”	“a flat-bottomed enlargement of the mouth of a cylindrical bore”

The fifth contested claim term is “counterbore,” which appears in claim 47 of the ‘022 patent. (‘022 patent, col. 17, lines 60-61.) Defendant argues that a “counterbore” necessarily has a flat-bottom and supports its position with extrinsic dictionary evidence defining a bore as a “deep vertical hole” (Doc. No. 116 at 17-18.) Plaintiff disagrees, highlighting two figures in the ‘022 patent specification that utilize angled-bottomed counterbores. (Doc. No. 117 at 18-20; ‘022 patent, Figs. 1C, 4C.)

I agree with Plaintiff’s proposed construction. First, two figures in the ‘022 patent show angled-bottomed counterbores. (Ids.) The intrinsic use of angled counterbore bottoms in these figures refutes the extrinsic evidence Defendant relies upon. Second, the dictionary definitions Defendant proffers define a counterbore as a “deep vertical hole” but are silent about the orientation of a counterbore’s bottom. (Doc. No. 116 at 17-18.) For these reasons, Plaintiff’s

construction is persuasive and the term “counterbore” is construed as **“an enlargement of the mouth of a cylindrical bore for accommodating a screw head.”**

F. “Curvilinear Nail Screw / Curvilinear Nail-Screw”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“curvilinear nail screw / curvilinear nail-screw” (‘740 patent claims 1, 16)	“a body having a curvilinear shape with the attributes of both a nail and a screw”	“a curved, threaded body for penetration into an intervertebral body along a horizontal trajectory” or indefinite

Next, the parties dispute the meaning of the claim term “curvilinear nail screw / curvilinear nail-screw,” which appears in claims 1 and 16 of the ‘740 patent. (‘740 patent, col. 13, lines 27, 30, 34, 37, 40, 43, 48, 51, 55-62, col. 14, lines 65-67, col. 15, lines 1, 3.) Defendant argues that the ‘740 patent inventor only contemplated inserting the curvilinear nail screw—the invention—in a horizontal, and not a vertical, trajectory to avoid piercing the spinal pedicle bones. (Doc. No. 116 at 20-21.) Defendant posits that threads are the distinguishing feature of a screw and must be included as part of the claimed nail screw. (*Id.* at 21-22.) Conversely, Plaintiff asserts that references to an insertion trajectory or restricting the screw to only have threads—as opposed to fishhooks, ridges, or equivalent structures—unduly limits the claim term. (Doc. No. 117 at 21-22.)

I agree with Defendant’s basic description of the curvilinear nail screw because it is more faithful to the ‘740 patent specification and “most naturally aligns with the patent’s description of the invention” *Renishaw*, 158 F.3d at 1250. However, Plaintiff’s arguments are convincing. First, reference to the curvilinear nail screw’s insertion angle unduly limits the claim term by reading in limitations from the specification. A reference to the curvilinear nail screw’s insertion angle is unhelpful because one would not know whether a product infringed the curvilinear nail screw until its insertion, as opposed to its production. Second, as will be discussed in more detail

in Section III.G *infra*, the ‘740 patent discloses a nail screw containing not only threads but also similar structures, such as fishhooks, and it is improper to limit the claim to only include threads. (See, e.g., ‘740 patent, col. 14, line 19; Figs 1E, 1F.) For these reasons, the term “curvilinear nail screw / curvilinear nail-screw” is construed as “**a curved body for penetration into an intervertebral body.**”

G. “First [and Second] Means for Engaging a Cancellous Core”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“first [and second] means for engaging a cancellous core” (‘740 patent claim 1)	Construe pursuant to 35 U.S.C. § 112(6): <u>Function:</u> engaging a first/second cancellous core of the first/second vertebral body <u>Structure:</u> a series of fishhooks, threads, ridges, or equivalent structure known to a POSITA, extending along a linear direction of the curvilinear nail-screw	Construe pursuant to 35 U.S.C. § 112(6): <u>Function:</u> engage a cancellous core <u>Structure:</u> threads or fishhooks

The seventh disputed claim term is the means-plus-function phrase “first [and second] means for engaging a cancellous core,” which appears in claim 1 of the ‘740 patent. (‘740 patent, col. 13, lines 34-35, 48-49.) The parties agree that their function constructions are similar. (Doc. No. 117 at 23.) However, as discussed in Section III.F *supra*, they dispute the structures of a curvilinear nail screw to engage a cancellous core. Defendant contends that the ‘740 patent only discloses threads and fishhooks as engagement structures. (Doc. No. 116 at 22-24.) Contrarily, Plaintiff submits that the fishhooks and threads examples in the ‘740 patent specification are only exemplary embodiments and should not limit the claim. (Doc. No. 117 at 23.)

I agree with Plaintiff’s construction. Regarding the parties’ function construction, although the parties’ constructions are similar, Plaintiff’s construction is preferred because it reflects the claim language. (‘740 patent, col. 13, lines 34-35, 48-49.) Concerning the structure construction, the claim should not be limited to only threads or fishhooks. The ‘740 patent discloses numerous embodiments utilizing threads and fishhooks, but also notes that “[o]ther variations and embodiments . . . can include any other type of mechanism that allows insertion and immobility . . . into and within the vertebral body” (*Id.*, col. 5, lines 12-15.) In fact, Claim 5 of the ‘740 patent claims ridges as one of these other mechanisms. (*Id.*, col. 14, line 19.) Accordingly, the inventor contemplated and disclosed mechanisms other than threads or fishhooks, and it is improper to limit the claim to only the exemplary embodiments in the specification. Therefore, the phrase “first [and second] means for engaging a cancellous core” is construed pursuant to 35 U.S.C. § 112(6), with a function of “**engaging a first/second cancellous core of the first/second vertebral body,**” and a structure of “**a series of fish-hooks, threads, ridges, or equivalent structure known to a POSITA, extending along a linear direction of the curvilinear nail-screw.**”

H. “Shell”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“shell” (‘643 patent claims 1, 2)	Plain and ordinary meaning <i>or</i> “ an exterior structure of the artificial expansile spinal implant ”	“ the ends of an implantable intervertebral device, which ends are capable of moving in at least two directions defined by at least two axes ”

The next disputed claim term is “shell,” which appears in claims 1 and 2 of the ‘643 patent. (‘643 patent, col. 10, lines 47-48, 53-54, 57, 62, 64, col. 11, lines 1, 11-12.) Defendant contends that in the ‘643 patent specification the patentee defined “shell” as “fully described in [a] . . . previous PCT Patent Application PCT/US2005/016493” (‘643 patent, col. 7, lines 36-38; see

also Doc. No. 116 at 28-29.) It argues the PCT Patent Application defined an outer shell as capable of “mov[ing] in multiple directions . . .” and “expand[ing] geometrically in all three x, y, and z planes, horizontally, vertically and width wise.” (Doc. No. 116 at 28.) Plaintiff submits that “shell” has a plain and ordinary meaning, and in the alternative, argues that neither the ‘643 patent nor the referenced PCT Patent Application defined “shell” and the claim should not be limited as Defendant proposes. (Doc. No. 117 at 25-27.)

I agree with Plaintiff’s proposed construction. The ‘643 patent discloses a shell as “fully described in [a] . . . previous PCT Patent Application PCT/US2005/016493;” however, that language shows an intent to incorporate the Application’s prior disclosures and not to define “shell.” (‘643 patent, col. 7, lines 36-38.) Further, Defendant’s proposed construction improperly seeks to read movement limitations from the ‘643 patent specification into the claim. For these reasons, I construe the term “shell” as **“an exterior structure of the artificial expansile spinal implant.”**

I. “Bone-Piercing Screw Extendable from the at Least One Implant Body”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“bone-piercing screw extendable from the at least one implant body” (‘367 patent claim 1)	“screw extendable from the implant body capable of piercing into the vertebral body”	“bone-piercing screw positioned entirely within the implant body and capable of extending from the implant body”

The next disputed claim term is the phrase “bone-piercing screw extendable from the at least one implant body,” which appears in claim 1 of the ‘367 patent. (‘367 patent, col. 9, lines 55-56, 59-60.) Defendant argues that the claim should be limited as it proposes because the ‘367 patentee only discloses inventions with screws positioned entirely within an implant body and that can extend from the body. (Doc. No. 116 at 24-26.) Plaintiff, however, alleges its construction

recites the claim language and it is improper, as Defendant proposes, to limit the claim with language from the specification. (Doc. No. 117 at 27-28.)

I find that the claim language “bone-piercing screw extendable from the at least one implant body” is unambiguous and construed as written. Defendant’s proposed construction improperly reads limitations from the specification into the claim language. Moreover, although Plaintiff states its proposed construction merely follows the claim language, it is unnecessary to alter the “bone-piercing screw” language in the claim to a screw “capable of piercing into the vertebral body.” The language as written in the patent has a facially plain and ordinary meaning. Thus, I conclude the phrase “bone-piercing screw extendable from the at least one implant body” needs no construction and has its plain and ordinary meaning of “**bone-piercing screw extendable from the at least one implant body.**”⁵

J. “Means to Facilitate Irreversible Extraction”

<i>Claim Term</i>	<i>Plaintiff’s Proposal</i>	<i>Defendant’s Proposal</i>
“means to facilitate irreversible extraction” (‘386 patent claim 1)	Construe pursuant to 35 U.S.C. § 112(6): <u>Function:</u> facilitate irreversible extraction <u>Structure:</u> ridges, fishhooks, or equivalent structures known to a POSITA	Indefinite

Finally, the last disputed claim term is the phrase “means to facilitate irreversible extraction,” which appears in claim 1 of the ‘386 patent. (‘386 patent, col. 13, lines 11-12, 21.)

⁵ The Federal Circuit Court of Appeals has held that the duty to resolve “fundamental dispute[s] regarding the scope of a claim . . . resides with the court because, of course, the ultimate question of construction” is a question of law. Eon Corp. IP Holdings v. Silver Spring Networks, 815 F.3d 1314, 1318 (Fed. Cir. 2016) (quotation marks and citations omitted). Accordingly, a court has the power to determine a claim “needs no construction.” Id.; see also O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., Ltd., 521 F.3d 1351, 1361 (Fed. Cir. 2008).

Defendant contends that the phrase is indefinite and cannot be construed because it is contradictory that the means used to insert the invention into bone also would serve to keep the invention permanently extracted from bone. (Doc. No. 116 at 29-30.) In contrast, Plaintiff contends that the '386 patent specification describes means such as fishhooks and ridges that anchor the invention into a bone and, upon the invention's removal from the bone, render the invention unsuitable for reinsertion. (Doc. No. 117 at 28-29.)

I agree with Plaintiff's proposed construction. Regarding the phrase's structure, the '386 patent discloses ridges and fishhooks as means to anchor the invention into a bone, and during the patent's prosecution, the patentee noted equivalent features can be used for anchoring. ('386 patent, col. 9, lines 40-42; Doc. No. 117 Ex. 25.) Moreover, regarding function, "irreversible extraction" has a plain and ordinary meaning of an inability to be reinserted after removal.⁶ (Doc. No. 135 at 14.) Accordingly, Defendant's contention that the phrase is indefinite, contradictory, and incapable of construction is rejected. Therefore, the phrase "means to facilitate irreversible extraction" is construed pursuant to 35 U.S.C. § 112(6), with a function of "**facilitate irreversible extraction,**" and a structure of "**ridges, fishhooks, or equivalent structures known to a POSITA.**"

IV. CONCLUSION

The claims shall be construed as set forth above and in the Claim Construction Order that follows.

⁶ Plaintiff provides a useful analogy to a desk staple, wherein the removal process deforms the staple such that it is incapable of being reused. (Doc. No. 123 at 30.)