United States District Court,
W.D. Tennessee, Western Division.

SMITH & NEPHEW, INC,
Plaintiff.
v.
SYNTHES (U.S.A.) and Synthes-Stratec, Inc,
Defendants.

No. 02-2873 MA

Aug. 25, 2004.

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MEMORANDUM OPINION AND ORDER ON MARKMAN MOTION

MAYS**, J.**

Before the court is the parties' request for patent claim construction pursuant to Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed.Cir.1995), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The court held a *Markman* hearing on May 14, 2004. For the reasons stated herein, the court construes the claims as follows.

I. Background

In this case, the court is called upon to construe claims found within U.S. Patent Nos. 5,167,663 (the " '663 patent") and 5,312,406 (the " '406 patent"). Both of the patents in this case, as well as their ancestors, relate to the treatment of femoral fractures through the use of an intramedullary nail which allows for sliding compression. David L. Brumfield filed United States Patent Application No. 947,656 on December 30, 1986. U.S. Patent No. 5,167,663. That application resulted in the issuance of U.S. Patent No. 4,827,917 for a femoral fracture device. Id. Patent Application No. 697,155 was a continuation in part of Patent Application No. 337,191 (abandoned) which was itself a continuation in part of Application No. 947,656. *Id*. That application resulted in the issuance of the '663 patent for a femoral fracture device. Id. Patent Application No. 983,831 was a divisional of Patent Application No. 697,155. U.S. Patent No. 5,312,406. Application No. 983,831 resulted in the issuance of the '406 patent for a method of treating an intertrochanteric fracture. Id. Brumfield assigned both of the patents at issue to Smith & Nephew, Inc. ("Smith & Nephew"). Smith &

Nephew alleges that Synthes (U.S.A.) and Synthes-Stratec, Inc. (collectively "Synthes") have infringed the '663 and '406 patents.

II. Legal Standard for Claim Interpretation

A patent is a fully integrated written instrument, and claim construction is a matter of law for the court. *See* Markman, 52 F.3d at 978. In construing the language of a claim, the court should look primarily to intrinsic evidence. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Id.* Although a patentee may act as his own lexicographer, claim terms should be given their ordinary and customary meaning unless the patentee explicitly defines a term to have a different meaning. *See* Johnson Worldwide Assoc., Inc. v. Zebco Corp., 175 F.3d 985, 990 (Fed.Cir.1999). The ordinary and customary meaning of a term should be determined by considering what a person of ordinary skill in the art would have considered the term to mean at the time of invention rather than the subjective intent of the patentee. Markman, 52 F.3d at 986. The prosecution history should be consulted as well, because the patentee may not advocate an interpretation which he earlier disavowed in order to obtain allowance. *See* Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 452 (Fed.Cir.1985).

Where intrinsic evidence is dispositive, extrinsic evidence, such as expert testimony, inventor testimony, and prior art, should not influence the court's claim interpretation. *Vitronics,* 90 F.3d 1584. Judges, however, may "rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents," although dictionaries are extrinsic evidence. *Id.* at 1584 n. 6.

III. Claim Construction

A. Claim Language

The parties disagree about the proper construction of language found in four claims in the '663 patent and two claims in the '406 patent. Some of the contested language appears in both patents, and the parties agree that the court's construction of one patent will control the meaning of both patents. The contested words and phrases are underlined and the court will address them in their order of appearance in the patents.

The disputed claims within the '663 patent provide as follows:

1. Apparatus for treating fractures of the femur comprising:

a) a hollowed intramedullary rod having a longitudinal axis and a rod sidewall that surrounds a *longitudinal bore,* said rod having a proximal *head* and a *stem* distal thereto, and wherein the stem and a substantial portion of the head are adapted in use for insertion into the narrow canal of a femur;

b) the rod sidewall having a *first, generally uniform smaller wall thickness defining the stem,* and *a second, larger wall thickness defining the head;*

c) said head having a first *smooth opening* extending therethrough in an angled direction relative to the rod is in position within the marrow canal of the femur, the opening is positioned to intersect the longitudinal axis of the rod, and the axis of said opening is directed toward the head of the femur;

d) a first *screw for insertion* through said first opening in said head and including *first and second end portions;*

e) said first screw having a *threaded surface formed at the first end adapted in use to engage* bone tissue of the head and including first and second end portions;

f) wherein said threaded section is *spaced from the first opening during use* for maintaining *continuous sliding contact between said head of said rod and the first screw, to permit sliding compression* of the selected fracture.

2. Apparatus as recited in claim 1 which further comprises:

means associated with said rod for preventing rotation of the head of the femur relative to said first screw.

3. Apparatus as recited in claim 2 wherein:

said *head has a second opening extending therethrough in an angled direction relative to the longitudinal axis of said rod, the axis of said second opening being generally parallel with the axis of said first opening;* and

said means for preventing rotation comprises a *second screw having a threaded end and a smooth surface along the remaining major portion of its length, said smooth surface being adapted in use for sliding contact with said head of said rod through said second opening.*

5. The apparatus of claim 3 wherein the *first and second openings have smooth surfaces that engage corresponding smooth surfaces of the first screw and the rotation preventing means respectively.*

U.S. Patent No. 5,167,662, Column 8:4-57.

The disputed claims within the '406 patent provide as follows:

1. A method of treating an intertrochanteric fracture of a patient's femur that is located generally between the head of the femur and the intramedullary canal, comprising the steps of:

a) inserting an elongated intramedullary rod having a longitudinal axis into the patient's femur, wherein the rod has a distal stem portion, a head having a first smooth opening extending therethrough in an angled direction relative to the longitudinal axis of said rod such that when said rod is in position within the intramedullary canal of the femur, the opening is positioned to intersect the longitudinal axis of the rod, and the axis of said opening is directed toward the head of the femur;

b) positioning the rod so that the axis of the smooth opening extends across the fracture and into the head of the femur;

c) *inserting a first screw* through said first opening in said head and including first and second end portions;

d) said first screw having a threaded surface formed at the first end adapted in use to engage bone tissue of the head of the femur;

e) *compressing the fracture using the* bone screw while maintaining continuous sliding contact between the bone screw and the rod at the smooth opening;

f) wherein said threaded section is spaced from the first opening during use for maintaining continuous sliding contact between said head of said rod and the first screw, to permit sliding compression of the selected fracture; and

g) wherein in step "f" *the cross section of the smooth opening closely conforms to the cross section of the screw so that the smooth opening rigidity affixes the screw in a single angular position* relative to the rod, along said axis.

2....

3. The method of claim 1 wherein in step "e", the opening and the smooth surface of the bone screw are each *cylindrically shaped*.

U.S. Patent No. 5,312,406, Column 7:63-8:36.

B. Longitudinal Bore

Smith & Nephew proposes that "longitudinal bore" should be construed to mean "hollow along its length." Synthes would interpret "longitudinal bore" to mean "cavity or space that extends along the longitudinal axis with openings at the ends to the exterior." *Webster's* defines "bore" as "(1) a usually cylindrical hole made by or as if by boring (2) the long usually cylindrical hollow part of something (as a tube or gun barrel)." *Webster's Ninth New Collegiate Dictionary* 169 (1990). Based on the parties' briefs, the only point of contention is whether a longitudinal bore must have openings at both ends.

The claim language itself does not address whether a longitudinal bore must be open at one, both or neither end. The specification and prosecution history also fail to address this dispute. Synthes' only support for the contention that a longitudinal bore must be open at both ends is the dictionary definition. Synthes is incorrect, however, in arguing that holes, tubes and cylinder "inherently" have openings at both ends. A hole bored into an object need not extend through to the other side. Tubes and cylinders can be capped or uncapped. There is no justification for adding the limitation to the claim construction that a longitudinal bore must be open at both ends. *Cf.* Cordis Corp. v. Medtronic Ave, Inc., 339 F.3d 1352, 1356-57 (Fed.Cir.2003). The court, therefore, construes "longitudinal bore" to mean: the cavity extending along the longitudinal axis of the intramedullary rod.

C. Head, Stem and Claim 1(b) of the '663 Patent

The parties address head and stem in Claim 1(a) of the '663 patent and the language regarding head and stem in Claim 1(b) of the '663 patent separately. The language in Claim 1(b), however, purports to define head and stem. The court thus addresses these matters collectively.

Smith & Nephew proposes that "head" should be construed to mean "upper portion of the rod, closest to the hip, that extends from the top of the rod through and including the portion of the rod where any transition is made to the stem of the rod." Synthes would interpret "head" to mean "the uppermost portion of the intramedullary rod; the head does not include any transition between itself and the stem." Claim 1(b) of the

'663 patent refers to the "second, larger wall thickness defining the head." Smith & Nephew proposes that this means "wall thickness in portions of the head is greater than the wall thickness in the generally uniform portions of the stem." Synthes would have the court construe this language to mean "the head is distinctly characterized by a single sidewall dimension between the outer surface and inner surface of the rod which is greater than the 'smaller wall thickness defining the stem." '

Smith & Nephew proposes that "stem" should be construed to mean "lower portion of the rod along which portion the circumference of the outer surface is smaller than the circumference of the outer surface of portions of the head of the rod." Synthes would interpret "stem" to mean "the lower portion of the intramedullary rod; the stem does not include any transition between itself and the head." Claim 1(b) of the '663 patent refers to "a first, generally uniform smaller wall thickness defining the stem." Smith & Nephew proposes that this means the "wall thickness in the generally uniform portions of the stem is less than wall thickness in portions of the head." Synthes would have the court construe this language to mean "the stem is distinctly characterized by a single sidewall dimension between the outer surface and inner surface of the rod which is less than the 'larger wall thickness defining the rod." Smith & Nephew construes "generally uniform" to mean "not varying significantly" while Synthes interprets it to mean "a specific amount that does not vary significantly."

The parties do not dispute that the head and stem are both part of the intramedullary rod. The dispute centers on whether the transitional area of the rod is part of the head, the stem, or neither. The claim language clearly addresses this issue. Claim 1(b) defines the head and stem in terms of wall thickness, with the stem having a smaller wall thickness than the head. Synthes argues, however, that both the head and stem must have a "generally uniform" thickness. The structure of the claim does not support this contention. The "first, generally uniform smaller wall thickness" defines the stem. A "second, larger wall thickness" defines the head. The claim language does not support the contention that the second, larger wall thickness which defines the head must be "generally uniform." The phrase "generally uniform" follows the term "first," which refers to the portion of the rod having a smaller wall thickness and modifies the phrase "smaller wall thickness." The phrase does not appear between "second" and "larger wall thickness" and the structure of the claim does not indicate that earlier "generally uniform" modifier applies to this phrase as well. FN1

FN1. In 3M Innovative Properties Co. v. Avery Dennison Corp., 350 F.3d 1365, 1371 (Fed.Cir.2003), the Federal Circuit stated that "[t]he use of the terms 'first' and 'second' is a common patent-law convention to distinguish between repeated instances of an element or limitation." Synthes contends that this statement indicates that first and second in this patent must "mean a specific, distinct amount of wall thickness that is identifiably distinguishable from other amounts." The court interprets "first" and "second" to refer to different portions of the rod, repeatedly referred to as head and stem. The court rejects any further inferences Synthes draws from the terms "first" and "second."

The specification further supports the argument that the wall thickness in the head need not be "generally uniform" throughout. The abstract states that "[t]he rod has a head and a stem." Although the written description frequently refers to the head and the stem, there is no mention of a third part of the rod, which is part neither of the head nor of the stem. There are several figures showing an area of the rod which is thicker than the generally uniform wall thickness of the stem but still thinner than most of the head, indicating that the applicant anticipated that some transitional thickness between the stem and head would be present. *See* U.S. Patent No. 5,167,663, Fig. 2-3, 12. The specification indicates that that transitional portion

of the rod must be part of the stem or the head.

Synthes argues the prosecution history supports its contention that the thickness of the head must be uniform. Synthes points to the fact that Claim 1(b) was added to the '663 patent with the explanation "[t]he apparatus allows a heavier load to be carried at the top of the rod due to the thickened portion in the proximal head region." The transitional portion of the head is still thicker than the stem, however, and this amendment does not indicate the thickness of the head must be generally uniform.

Having considered the claim language, the specification and the prosecution history, the court interprets head, stem and the disputed terms in Claim 1(b) of the '663 patent as follows. "Head" means "the upper portion of the intramedullary rod extending from the end closet to the hip to the stem and includes any transitional wall thicknesses leading up to the stem." "Stem" means "the lower portion of the intramedullary rod having a generally uniform wall thickness." "First, generally uniform smaller wall thickness defining the stem" means "the wall thickness of the stem is thinner than the wall thickness of the head and that thickness does not vary significantly; the thinner wall and the uniformity define the stem as distinct from the head." "Second, larger wall thickness defining the head" means "the wall thickness of head is thicker than the wall thickness of the stem; the thicker wall defines the head as distinct from the stem."

D. Smooth Opening

Smith & Nephew proposes that "smooth opening" should be construed to mean "the opening is smooth in that its surface does not prevent the screw from sliding." Synthes would interpret "smooth opening" to mean "an opening through the intramedullary rod that is free from any surface irregularities, roughness or projections." The proposed definitions indicate that only the meaning of "smooth" is in dispute. *Webster's* defines "smooth" as "(1)(a) having a continuous even surface ... (d) causing no resistance to sliding." *Webster's* at 1114.

The claim language indicates that the contact point between the smooth opening on the rod and the smooth portion of the screw must allow for sliding. U.S. Patent No. 5,167,663, Column 8:30-32. The specification makes two points. In discussing the prior art, the patentee distinguishes between devices to treat femoral fractures that allow for sliding compression (and thus require smooth components to allow for sliding), id. at Column 1:31-33, and those that do not allow for sliding compression (because the openings are threaded, preventing sliding), id. at Column 1:65-2:2. The patent then makes clear that the claimed invention allows for sliding compression, and thus requires smooth components. Id. at 10-14. The prosecution history also makes clear that several examples of prior art were distinguished based on the fact that threading of various components prevented sliding. PH 9/22/89 Amend at 2-3; 1/8/88 Amend. at 3-5.

Having considered these three factors, the court concludes that the word smooth appears in the claim language to allow for sliding. Thus, the court construes "smooth opening" to mean "an opening through the intramedullary rod that consists of an even surface creating minimal resistance to sliding." This construction is consistent with the ordinary and customary meaning of the word.

E. Screw for Insertion

Smith & Nephew proposes that "screw" should be construed to mean "a part that has at least one spiral raised surface and turns as it advances into the bone." Synthes would interpret "screw" to mean "a bone screw consisting of a head, a shaft having a 'threaded surface' (as defined [in the construction of Claim 1(e)], and a tip, and that is inserted by an externally applied rotational twisting that is converted into a force that

squeezes together bone fragments; a device that is designed to be hammered into place is not a screw." The focus of these proposed constructions is on "screw," although both definitions do attempt to define "screw" in part by reference to how a screw is inserted or what it does during insertion. *Webster's* defines "screw" as "(1)(a) a simple machine of the inclined plane type consisting of a spirally grooved solid cylinder and a correspondingly grooved hollow cylinder into which it fits, (b) a nail-shaped or rod-shaped piece with a spiral groove and a slotted or recessed head designed to be inserted into material by rotating (as with a screwdriver)." *Webster's* at 1055.

The claim language refers to "said first screw having a threaded surface formed at the first end adapted in use to engage bone tissue of the head of the femur." U.S. Patent 5,167,663 at Column 8:25-27. This language refers to the structure of the screw and the purpose of the screw, but it does not refer to how the screw is inserted. The summary of the invention in the specification is similar. Id. at Column 3:10-13. The patent generally refers to insertion without explaining how that insertion is to be accomplished. In two places within the preferred embodiments section, the patent refers to insertion using a screwdriver or similar device. Id. at Column 5:11-15, 7:11-13. The prosecution history does not indicate that the definition of "screw" was ever a point of contention.

The parties have presented a multitude of definitions for "screw" from various dictionaries and technical sources. Most of those sources indicate that a "screw" can be defined both by its physical structure and by the fact that it was designed to be inserted by rotation. The claim language, however, defines screw only by reference to its physical structure. Only the preferred embodiments section refers specifically to insertion methods. Claim limitations should not be read from the preferred embodiments into the claim language itself where the claim language is broader than the preferred embodiments. *See* Envirco Corp. v. Clestra Cleanroom, Inc., 209 F.3d 1360, 1366 (Fed.Cir.2000). A screw can be adequately defined by reference to its physical structure. There is no justification for imposing further limitations based on how screws are generally inserted or even how they were designed to be inserted. *See* Cordis Corp., 339 F.3d at 1356-57. If something is a screw, it remains a screw regardless of whether one uses a screwdriver, a hammer or some other device (such as a Yankee screwdriver) to insert it.

Thus, the court construes "screw" to mean "a generally cylindrically-shaped simple machine of the inclined plane type, at least a portion of which is threaded."

F. First and Second End Portions

Smith & Nephew proposes that "first and second end portions" should be construed to mean "the first end portion is the end that goes in first when the screw is being installed." Synthes states that "the plain language meaning of these terms is self evident; the first end portion is later defined in the claim as having a threaded surface." There appears to be little dispute about the meaning of this phrase. The screws at issue have a smooth portion and a threaded portion. The portion of the screw inserted first is the threaded portion. The court interprets "first and second end portions" to mean "the threaded and smooth portions of the screw."

G. A Threaded Surface Formed at the First End Adapted in Use to Engage

Smith & Nephew proposes that "engage" should be construed to mean "contacts bone in the head of the femur when the screw is installed to help the screw to be retained in the head." Synthes would interpret "engage" to mean "to interlock or cause to interlock; mesh." *Webster's* defines "engage" as "to interlock with: mesh."

The parties also address how the entire phrase should be construed. Smith & Nephew proposes that "threaded surface formed at the first end adapted in use to engage" should be construed to mean "at least one spiral raised surface formed on the first end portion of the screw which contacts bone in the head of the femur when the screw is installed." Synthes would interpret "threaded surface formed at the first end adapted in use to engage" to mean "the spiral ridge on a screw that is the active part that converts an externally applied rotational twisting into a force that squeezes together bone fragments as it meshes with bone tissue."

The claim language provides nothing more than what is in the disputed phrase itself. The specification makes several references to a screw engaging the femoral head. All of these references seem to contemplate something more than mere contact. For instance, in discussing the prior art, reference is made to the threaded portions of a compression lag screw engaging the femoral head. U.S. Patent No. 5,167,663 at Column 1:24-29. To provide compression, there must be some interlocking or meshing of the threaded parts of the screw and the bone. Smith & Nephew argues, however, that "contact" is the appropriate construction because of the language in one of the preferred embodiments. That discussion refers to the setting screw engaging the lagging screw. Id. at Column 5:21-34. Smith & Nephew argues that the terms in a patent must be interpreted consistently and that "engage" cannot be read to mean "interlock or mesh" in this preferred embodiment. The patent, however, refers to the set screw being wedged securely against the lag screw. Id. at Column 5:33-34. This requirement is more consistent with interlocking or meshing than simple contact. Further, the patent refers in this same discussion to the "contact" of the set and lag screw as something distinct from "engagement." Id. at Column 5:31-32. Contact happens prior to engagement, where the set screw securely wedges against the lag screw. Id. Although the prosecution history contains many references to the importance of threading, it sheds no light on the proper construction of the phrase at issue.

As for threaded, the relevant definition from *Webster's* is "a projecting helical rib ... by which parts can be screwed together: screw thread." *Webster's* at 1228. There is no reason to add the further limitations Synthes proposes as part of the definition of threaded. Thus, the court construes "threaded surface formed at the first end adapted in use to engage" to mean "the portion of the screw with a projecting helical rib made to interlock."

H. Spaced from the First Opening During Use

Smith & Nephew proposes that "spaced from the first opening during use" should be construed to mean the "threaded surface of the screw does not extend into the first opening of the rod after the rod and screw are installed." Synthes would interpret "spaced from the first opening during use" to mean "the 'threaded surface' of the screw is spaced from the 'smooth opening' of the rod such that the smooth shaft of the screw is adjacent the opening."

The claim language indicates that purpose of keeping the threaded section of the screw "spaced from the first opening during use" is to allow for "continuous sliding contact between said head of said rod and the first screw, to permit sliding compression of the selected fracture." The specification makes clear that the smooth parts allow sliding while threaded parts do not permit sliding. U.S. Patent 5,167,663 at Column 1:31-34, 2:45-47, 3:10-13, 6:29-31. The prosecution history also establishes that the patentee distinguished prior art based on the fact that the smooth parts of the opening and screw would allow for sliding compression.

The court construes "spaced from the first opening during use" to mean "following insertion, a sufficient

distance is maintained between the smooth opening and the threaded portion of the screw such that the threaded portion of the screw does not contact the smooth opening during sliding compression." PH 9/22/89 Amend. at 2-3; 1/8/88 Amend. at 3-5.

I. Continuous Sliding Contact Between Said Head of Said Rod and the First Screw, to Permit Sliding Compression

Smith & Nephew proposes that "continuous sliding contact between said head of said rod and the first screw, to permit sliding compression" should be construed to mean "the screw can slide in the opening allowing bone surfaces on opposing sides of the fracture the ability to bear against each other as the screw slides in the opening." Synthes maintains that this phrase is indefinite and not enabled because it does not disclose how to achieve the sliding contact necessary for sliding compression. If the court rules against it on this issue, Synthes would interpret "continuous sliding contact between said head of said rod and the first screw, to permit sliding compression" to mean: "Uninterrupted contact between the smooth shaft of the bone screw and the smooth opening that allows the screw to slide in the opening such that the bone surfaces to be joined can bear against each other. A close registration between the smooth shaft of the screw and the smooth opening, such that the screw does not wiggle, is necessary to permit sliding contact. The screw must have a diameter and be made of a material that renders it sufficiently stiff for sliding and have a smooth shaft which also facilitates sliding. In addition, the wall at the opening must be sufficiently thick and also possess a smooth surface to permit sliding contact."

Synthes claims that the language in Claim 1(f) of the '663 patent is indefinite and that, therefore, the court should not construe the claim. This argument is not consistent with Federal Circuit precedent. Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed.Cir.2001). The Federal Circuit has indicated that claims should be held indefinite only after the court has made a reasonable attempt to construe the claim and the attempt had proved futile. *Id*. This process is necessary to respect the presumption of patent validity. *Id*. Although Synthes claims that the sliding contact necessary to achieve sliding compression is indefinite, the phraseology is adapted from language used to describe compression screw assemblies. U.S. Patent No. 5,167,663, Column 1:15-35, 3:1-6. Compression screw assemblies were well known in the art when this patent issued. Id. at Column 1:15-35.

Synthes also argues that, because a prior art reference was distinguished on the ground that it did not allow for sufficient sliding compression, the present claim must be held indefinite. The prior art was distinguished because the materials composing the prior art device were not suited for sliding compression and would bend and wear, rather than allowing for continuous sliding contact. Id. Synthes argues that the minimal required stiffness for the proximal screws should have been disclosed. The court can discern the meaning of the claim, however, and will construe the claim. *See* Bancorp Servs., LLC v. Hartford Life Ins. Co., 359 F.3d 1367, 1371 (Fed.Cir.2004) ("if the meaning of the claim is discernable ... the claim [is] sufficiently clear to avoid invalidity on indefiniteness grounds").

Synthes argues that the plain language of the phrase "continuous sliding contact" must mean that "the interaction between the head of the rod and the first screw is such that, without interruption, they maintain contact with each other as they move in relation to each other." To the extent that this definition indicates that some part of the rod and screw must be in continuous contact with each other and that the contact must allow each piece to move smoothly along the other piece's surface, the definition is unobjectionable. To the extent that Synthes seeks to imply that all points on the smooth opening must be in contact with some part of the screw at all times, there is no support for this argument in the claim language or the specification. The

claim language requires only that the continuous sliding contact between the rod and the screw must allow for sliding compression. The specification states that an object of the invention is to combine the attributes of intramedullary fixation with "the proven benefits of a sliding compression screw." *Id*. at Column 2:61-65. The summary of the invention also states that a smooth portion of the screw is adapted in use for continuous sliding compression. *Id*. at Column 3:10-13. The opening and the screw can maintain continuous sliding contact without all parts of the opening being in contact with a part of the screw.

Synthes argues that the prosecution history indicates that full contact between all points on the opening and the screw is necessary. In a January 8, 1988 amendment, the patentee sought to distinguish prior art, which showed a threaded screw inserted at a forty-five degree angle in a hole drilled at thirty degrees. PH 1/8/88 Amend. at 5. The patentee argued that this device would not allow for sliding compression and distinguished its invention based on the fact that its screw fit smoothly into the hole. *Id*. From this, Synthes argues that there must be a "close registration" between the screw and the opening. The amendment, however, did nothing more than emphasize that the portion of the screw which is in contact with the opening must be smooth rather than threaded and that screws inserted at angles different from those drilled in the rod are unlikely to move smoothly. *Id*. The goal was to demonstrate that sliding contact was unique within this subfield of invention. The patentee did not indicate that any particular points of the opening and the screw must be in contact, only that these elements should be in continuous sliding contact. The document cited does not support Synthes' proposed limitation.

The court interprets "continuous sliding contact between said head of said rod and the first screw, to permit sliding compression" to mean "the smooth movement of the unthreaded portion of the screw through the opening in the rod, such that some part of the screw and the opening are in uninterrupted contact, where such movement allows the opposing sides of the fracture to bear against each other."

J. Means Associated with Said Rod for Preventing Rotation of the Head of the Femur Relative to Said First Screw

Smith & Nephew proposes that "means associated with said rod for preventing rotation of the head of the femur relative to said first screw" should be construed to mean "at least a second screw, a nail, or a bolt, or a similar part, that passes through the head of the rod toward the head of the femur." Synthes would interpret "means associated with said rod for preventing rotation of the head of the femur relative to said first screw" to mean "a second screw, a nail or bolt that passes through the head of the rod and into the head of the femur to prevent rotation of the head of the femur." Both parties agree that this is a means-plus-function claim governed by 35 U.S.C. s. 122 para. 6. Further, the parties agree that the means are set forth in the '663 patent at Column 3:30-33 which states: "The apparatus may further include means, such as a nail, screw or bolt, associated with the rod for preventing rotation of the head of the femur relative to the first screw."

Thirty five U.S.C. s. 122 para. 6 states that the court looks to the specification to find the structure, material or acts that will accomplish the function listed in a means-plus-function claim. The court is also to consider the equivalents of the structures, materials or acts listed in the specification. A means-plus-function claim covers nothing more than corresponding structure or step disclosed in the specification and equivalents thereto. *See, e.g.,* Altiris, Inc. v. Symantec Corp., 318 F.3d 1363, 1370 (Fed.Cir.2003). The specification itself reflects this approach when it precedes the means with "such as." Synthes' proposed construction allows no room for equivalents and is, therefore, rejected.

The court construes "means associated with said rod for preventing rotation of the head of the femur relative to said first screw" to mean "a nail, second screw or bolt, or an equivalent to a nail, a second screw or a bolt, that passes through the head of the rod and into the head of the femur to prevent rotation of the head of the femur."

K. Head has a Second Opening Extending therethrough in an Angled Direction Relative to the Longitudinal Axis of Said Rod, the Axis of Said Second Opening Being Generally Parallel with the Axis of Said First Opening

Smith & Nephew proposes that "head has a second opening extending therethrough in an angled direction relative to the longitudinal axis of said rod, the axis of said second opening being generally parallel with the axis of said first opening" should be construed to mean the "head includes a second opening extending through it that is generally parallel to the first opening." Synthes would interpret "head has a second opening extending therethrough in an angled direction relative to the longitudinal axis of said rod, the axis of said second opening being generally parallel with the axis of said first opening" to mean "a second 'smooth opening' extending through the head of the rod, that is generally parallel to the first 'smooth opening." '

The only area of dispute is whether the second opening must be smooth. The claim language, specification and prosecution history all evidence the importance of sliding compression. Sliding compression requires that both the opening in the rod and the portion of the screw making contact with the rod have smooth surfaces. Smith & Nephew's opposition to including the word "smooth" in the construction results from its opposition to Synthes' proposed construction of "smooth." The court's construction of "smooth," *supra*, does not track the construction proposed by Synthes. The prior construction of "smooth" resolves this issue.

Because sliding compression requires a smooth opening, the court construes "head has a second opening extending therethrough in an angled direction relative to the longitudinal axis of said rod, the axis of said second opening being generally parallel with the axis of said first opening" to mean "a second smooth opening that is generally parallel to the first smooth opening extends through the head of the rod."

L. Second Screw Having a Threaded End and a Smooth Surface Along the Remaining Major Portion of its Length, Said Smooth Surface Being Adapted in Use for Sliding Contact with Said Head of Said Rod Through Said Second Opening

1. Smooth Surface

Smith & Nephew proposes that "smooth surface" should be construed to mean the "the exterior of the screw that permits it to slide in the opening, and does not include the threaded section." Synthes would interpret "smooth surface" to mean "the portion of the second screw that is free from irregularities, roughness or projections and which in combination with the second 'smooth opening' allows sliding contact." This disagreement, again, turns on the meaning of "smooth," which the court construed in Part III.D *supra*. Based on the analysis in Part III.D, the court construes "smooth surface" to mean "the unthreaded portion of the screw with an even surface that creates minimal resistance to sliding."

2. Being Adapted in Use for Sliding Contact

Smith & Nephew proposes that "being adapted for use in sliding contact" should be construed to mean the "the screw can slide in the opening." Synthes would interpret "being adapted in use for sliding contact" to mean "the 'smooth surface' of the second screw is designed to allow 'sliding contact' [which should be

construed consistent with Synthes' proposed construction of this phrase in Part III.I]." Again, "sliding contact" is a phrase the court has already construed, *supra,* in Part III.I. Thus, the court construes "being adapted in use for sliding contact" to mean "the 'smooth surface' of the second screw is designed to allow for the smooth movement of the unthreaded portion of the second screw through the second smooth opening in the rod."

3. Overall Construction

Smith & Nephew proposes that "second screw having a threaded end and a smooth surface along the remaining portion of its length, said smooth surface being adapted in use for sliding contact with said head at said rod through said second opening" should be construed to mean the "threaded surface of the second screw does not extend into the second opening of the rod after the rod and screw are installed, so that the second screw can slide in the second opening." Synthes would interpret the phrase to mean "a second screw (as defined above) having a threaded end (as defined above) and a smooth surface along the remaining major portion of its length, the smooth surface is designed to allow sliding contact (as defined above)." These opposing constructions indicate that the parties disagree only as to the meaning of individual phrases the court has previously construed. The court construes the overall phrase to mean "a second screw (as defined *supra*) having a threaded end (as defined *supra*) and a smooth surface along the remaining major portion of its length, the smooth surface is designed to allow sliding contact (as defined *supra*)."

M. First and Second Openings Have Smooth Surfaces that Engage Corresponding Smooth Surfaces of the First Screw and the Rotation Preventing Means Respectively

Smith & Nephew proposes that "first and second openings have smooth surfaces that engage corresponding smooth surfaces of the first screw and the rotation preventing means respectively" should be construed to mean "the first opening has a smooth surface that contacts the smooth surface of the first screw, and the second opening has a smooth surface that contacts the smooth surface of the second screw so that the screw can slide in the openings." Synthes would interpret the phrase to mean "the smooth surfaces of the first and second screws have a close registration with the first and second smooth openings in the head to allow 'sliding compression." '

The claim language itself precludes the court from adopting either of the proposed constructions. Claim 3 of the '663 patent addresses an apparatus using a second screw as a means of preventing rotation. For claim five to address something other than what claim three addresses, "the rotation preventing means" must refer to a nut, a bolt or an equivalent to a nut, a bolt or a screw. Thus, the court construes "first and second openings have smooth surfaces that engage corresponding smooth surfaces of the first screw and the rotation preventing means respectively" to mean "the first and second openings have smooth surfaces that come into contact with the corresponding smooth surfaces of the first screw and the nut, the bolt or the equivalent to a nut, a bolt or a screw that is used to prevent rotation." FN2

FN2. This construction of "engage" differs from its earlier construction. The two terms were not used consistently, however. In the prior usage, "engage" appeared in the context of a part wedging against another to prevent movement. In the context at issue here, "engage" is used to describe two parts that must slide across each other and allow for movement. One definition cannot suffice in these circumstances.

N. Intertrochanteric Fracture

Smith & Nephew proposes that "intertrochanteric fracture" should be construed to mean "a fracture that is located generally between the head of the femur and the intramedullary canal." Synthes would interpret "intertrochanteric fracture" to mean "a fracture of the femur in the intertrochanteric region, identified as the shaded area on the attached illustrations." Dorland's Illustrated Medical Dictionary defines "intertrochanteric" as "situated in or pertaining to the space between the greater and lesser trochanter." *Dorland's Illustrated Medical Dictionary* 943 (30th ed 2003). The dispute between the parties centers on whether the court should incorporate Synthes' illustration as part of its claim construction. The definition of this term is straightforward and the court need not resort to the use of an illustration. The court construes "intertrochanteric fracture" to mean "a fracture of the femur situated primarily in the space between the greater and lesser trochanter."

O. Inserting a First Screw

Smith & Nephew proposes that "inserting a first screw" should be construed to mean "inserting a part that has at least one spiral raised surface and turns as it advances." Synthes would interpret "inserting a first screw" to mean "installing the 'screw' (as defined by Synthes for the '663 Patent Claim 1), by applying an externally applied rotational twisting." The court has already construed "screw." The remaining question is whether one must insert a screw through externally applied rotational twisting. The answer is no.

The preferred embodiments section of the specification contains the only reference in the claim language, specification or prosecution history to how the screw should be inserted. One of the preferred embodiments includes a "hexagonally shaped inset in the head portion permit[ting] insertion of a suitable tool for compression of the lag screw." U.S. Patent No. 5,312,406 at Column 5:18-20. The preferred embodiments section later states that "a hexagonal screwdriver or any suitable tool can be used to compress lagscrew to a desired degree. Id. at Column 7:14-16. The preferred embodiments do not place limitations on the claim where the claim language is broader than the preferred embodiments, however. *See* Envirco Corp., 209 F.3d at 1366.

As a verb, *Webster's* defines screw as "to cause to rotate spirally about an axis." *Webster's* at 1055. Synthes argues that insertion of a screw must involve rotationally twisting force. The goal of rotational twisting, however, is to cause the screw to rotate spirally about its axis as it advances into the bone, thus preventing "cut out." PH 1/8/88 Amend. at 5. So long as the screw rotates spirally about its axis as it advances, insertion has been accomplished within the contemplation of the patent. There is no reason to add further limitations to the term "inserting." *See* Cordis Corp., 339 F.3d at 1356-57. Thus, the court interprets "inserting a first screw" to mean "causing the first screw to rotate spirally about its axis as it advances through the first hole."

P. Compressing the Fracture Using the Bone Screw

Smith & Nephew proposes that "compressing the fracture using the bone screw" should be construed to mean "permitting the screw to slide in the opening so that the bone surfaces on opposing sides of the fracture bear against each other." Synthes would interpret "compressing the fracture using the bone screw" to mean "applying an external rotational twisting to the bone screw, that is converted to an axial force to squeeze together the fractured bone fragments." This dispute centers on whether Claim 1(e) refers to sliding compression following surgery or active compression applied at the time of surgery.

The court considers the claim language dispositive of this issue. Claim 1(e) states that the bone screw is used to compress the fracture, thus indicating active compression by the physician. Absent any screws,

sliding compression would occur naturally. Prior art intramedullary nails blocked this process by preventing sliding compression. U.S. Patent No. 5,312,406, Column 1:61-2:50. The current invention is not used to achieve sliding compression that would not otherwise occur, but to allow for the sliding compression that would otherwise occur naturally. "Use" indicates an active process. Claim 2 further bolsters this interpretation when it refers to: "[t]he method of claim 1 wherein in step "e", the threaded section of the bone screw is spaced away from the opening during compressing of the fractures." Sliding compression requires that the threaded section of the screw be spaced away from opening. The fact that claim 2 exists indicates that something other than sliding compression must be addressed in claim 1(e).

The specification indicates that active compression is contemplated in some circumstances. *See* U.S. Patent 5,312,406 at Column 7:14-16. The prosecution history does not address the issue. Thus, the court construes "compressing the fracture using the bone screw" to mean "squeezing together the fractured bone fragments by means of a screw."

Q. The Cross Section of the Smooth Opening Closely Conforms to the Cross Section of the Screw so that the Smooth Opening Rigidly Affixes the Screw in a Single Angular Position

Smith & Nephew proposes that "the cross section of the smooth opening closely conforms to the cross section of the screw so that the smooth opening rigidly affixes the screw in a single angular position" should be construed to mean "the angle defined by the length of the screw and direction of the opening is constrained from changing substantially because of the close fit between the opening and portions of the screw that are not threaded." Synthes would interpret the phrase to mean "the smooth shaft of the screw has a close registration with the 'smooth opening' such that the angle of the screw relative to the longitudinal axis of the rod does not vary and the screw does not wiggle, thereby permitting sliding contact." Smith & Nephew states that it has no objection to Synthes' proposed definition other than Synthes' proposed definition of "smooth opening" and the requirement for "substantially close registration." The court has already construed the term "smooth opening." Thus, the only remaining issue is whether the fact that the cross section of the smooth opening and the cross section of the screw must closely conform requires a substantially close registration between the two.

Both sides rely on the claim language itself for their arguments. Neither indicates that the specification or the prosecution history supports its argument, nor could the court find anything relevant in those documents. *Webster's* defines conform as "to be similar or identical." *Webster's* at 276. The patent writer, however, was not content to indicate that the cross section of the smooth opening conforms to the cross section of the screw. The patent writer emphasized that the cross section of the smooth opening *closely* conforms to the cross section of the screw. Thus, identical is a more appropriate descriptor than similar.

The court construes "the cross section of the smooth opening closely conforms to the cross section of the screw so that the smooth opening rigidly affixes the screw in a single angular position" to mean "the cross section of the smooth opening is substantially identical to the cross section of the screw such that the angle of the screw relative to the longitudinal axis of the rod does not vary and the screw does not wiggle, thereby permitting sliding contact."

R. Cylindrically Shaped

Smith & Nephew proposes that "cylindrically shaped" should be construed to mean "the portion of the screw that slides in the opening and the opening itself have surfaces generally resembling cylinders." Synthes would interpret "cylindrically shaped" to mean "the portion of the screw that slides in the opening

and the opening itself both have cylindrically shaped surfaces." Nothing in the claim language, specification or prosecution history indicates that "cylindrically shaped" should be given anything other than its customary and ordinary meaning. Thus, the court construes "cylindrically shaped" to mean "the portion of the screw that slides in the opening and the opening itself both have surfaces shaped like cylinders."

IV. Conclusion

The foregoing constitutes the court's Markman construction of claim terms.

So ORDERED this *24th* day of August 2004.

W.D.Tenn.,2004.
Smith & Nephew, Inc. v. Synthes (U.S.A.)