Reliability and precision - our suture materials

NON-ABSORBABLE

Convincing down to the smallest detail
As the oldest German manufacturer of surgical suture material, SERAG-WIESSNER uniquely combines decades of experience with the latest medical know-how. It is 150 years since the company began manufacturing sterile catgut.

The manufacture of surgical suture material is characterised by the contrast between state-of-the-art production technology and a large number of manual production processes. At SERAG-WIESSNER, we manufacture and sterilise needle-suture combinations in our cleanrooms using computer-controlled automated equipment. At the same time, many of the production steps require the sensitive and reliable manual skills of our highly experienced workers. To ensure consistently high quality, we maintain a certified quality management system in accordance with the international standards DIN EN ISO 13485.
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### Raw materials

Suture material can be classified according to whether it is of natural or synthetic origin.

Natural suture materials include silk. The other group consists of synthetically produced polymers such as threads made of polyamides, polyolefins and polyester. Absorbable polymers made from polyglycolic acids also belong in this group.

### Absorbability

An important characteristic for classifying sutures is whether or not they are absorbable. Absorbability is the desired and deliberate dissolution of the thread in human or animal tissues. There are both absorbable and non-absorbable materials, although it has to be remembered that even non-absorbable sutures such as silk and polyamide may disintegrate in the tissues after a long period of time.
Knot holding remains secure and the sutures are less stiff than monofilament sutures. In addition, the coating reduces capillarity.

Suture sizes

Besides the raw materials and thread structure, the suture size significantly contributes to determining the tensile strength and knotting properties of a surgical suture. Suture sizes are therefore strictly regulated. Within the jurisdiction of the European Pharmacopoeia (EP), the decimal system is used. The diameter is metric and gives the suture size in 0.1 mm. Although the EP system is more rational, the United States Pharmacopoeia (USP) classification is more often used in practice.

Thread structure

Monofilament sutures

Monofilament threads of synthetic materials are obtained by a special melt spinning process. The molten synthetic is thereby extruded through very fine spinning nozzles or spinnerets under high pressure. Monofilament sutures are preferably used in smaller sizes, since the wiriness, which is found in all monofilament threads, causes the handling to become progressively more difficult as the thread increases in thickness. In particular, it is less easy to knot. Monofilament sutures are relatively sensitive to external damage, e.g. when grasping the thread with instruments. The smooth closed surface, as well as the completely closed interior, prevents any capillary action in the monofilament fibres. At the same time, they slide the most smoothly through the tissues.

Multifilament sutures

Multifilament or polyfilament threads are made up of many thin individual filaments. These can be twisted or braided. The diameter of all twisted threads varies greatly and their surface tends to be rough. The longitudinal direction of the individual fibres results in relatively high capillarity. The individual filaments in a braided suture lie more or less transversely to its longitudinal axis, which means that braided sutures have less capillary action than twisted threads. Multifilament sutures have a rough surface that affects their passage through the tissues. On the other hand, they have considerably better knot-holding security.

Multifilament sutures are usually coated. This coating makes the irregular surface of the thread smooth, so that it passes through the tissues more easily.
Knot holding remains secure and the sutures are less stiff than monofilament sutures. In addition, the coating reduces capillarity.

**Suture sizes**

Besides the raw materials and thread structure, the suture size significantly contributes to determining the tensile strength and knotting properties of a surgical suture. Suture sizes are therefore strictly regulated. Within the jurisdiction of the European Pharmacopoeia (EP), the decimal system is used. The diameter is metric and gives the suture size in 0.1 mm. Although the EP system is more rational, the United States Pharmacopoeia (USP) classification is more often used in practice.

<table>
<thead>
<tr>
<th>EP (metric)</th>
<th>USP</th>
<th>Ø in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>12-0</td>
<td>0.001-0.004</td>
</tr>
<tr>
<td>0.05</td>
<td>-</td>
<td>0.005-0.009</td>
</tr>
<tr>
<td>0.1</td>
<td>11-0</td>
<td>0.010-0.019</td>
</tr>
<tr>
<td>0.2</td>
<td>10-0</td>
<td>0.020-0.029</td>
</tr>
<tr>
<td>0.3</td>
<td>9-0</td>
<td>0.030-0.039</td>
</tr>
<tr>
<td>0.4</td>
<td>8-0</td>
<td>0.040-0.049</td>
</tr>
<tr>
<td>0.5</td>
<td>7-0</td>
<td>0.050-0.069</td>
</tr>
<tr>
<td>0.7</td>
<td>6-0</td>
<td>0.070-0.099</td>
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<tr>
<td>1</td>
<td>5-0</td>
<td>0.100-0.149</td>
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<tr>
<td>1.5</td>
<td>4-0</td>
<td>0.150-0.199</td>
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<tr>
<td>2</td>
<td>3-0</td>
<td>0.200-0.249</td>
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<tr>
<td>2.5</td>
<td>-</td>
<td>0.250-0.299</td>
</tr>
<tr>
<td>3</td>
<td>2-0</td>
<td>0.300-0.349</td>
</tr>
<tr>
<td>3.5</td>
<td>0</td>
<td>0.350-0.399</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0.400-0.499</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>0.500-0.599</td>
</tr>
<tr>
<td>6</td>
<td>3+4</td>
<td>0.600-0.699</td>
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<td>7</td>
<td>5</td>
<td>0.700-0.799</td>
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<td>6</td>
<td>0.800-0.899</td>
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<td>7</td>
<td>0.900-0.999</td>
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<tr>
<td>10</td>
<td>8</td>
<td>1.000-1.099</td>
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<tr>
<td>-</td>
<td>9</td>
<td>1.200-1.199</td>
</tr>
<tr>
<td>-</td>
<td>10</td>
<td>1.200-1.299</td>
</tr>
</tbody>
</table>
SERA TAn® is a new generation of suture material, based on plasma technology. Very fine polyamide threads are coated with titanium. The metallic coating is about a thousand times thinner than a human hair, which means that the titanium moves absolutely together with the suture thread. From practical experience, we know today that almost no granulation tissue forms with healing around titanium implants in the body.

**Material**
- POLyAMID titanised

**Symbol**
- K undyed, monofilament, titanised

**Size**
- USP 6/0 to 2/0
- EP 0,7 to 3

**Absorption**
- non-absorbable

**Profile**
- Available

**Uses**
- Cosmetic-plastic surgery / Reconstructive surgery and after burn injuries

SERA TAn®

Titanium coating promotes more rapid wound healing

The best cosmetic results

Logical alternative for hypertrophic scars

**Atraumatic needles**

Atraumatic suture material is understood to mean needle-suture combinations in which the thread is firmly attached (swaged) to the needle, thus minimising tissue trauma. We offer a wide range of atraumatic needles for these needle-suture combinations. They are made of 300 series stainless steel, which has a high resistance to bending, excellent penetrating qualities, and exceptional breaking strength (ductility) - all qualities that allow the surgeon to work easily and safely. The designation of our atraumatic needles uses a combination of letters and numbers as recommended by the Technical Committee of the Association of Surgical Suture Manufacturers.

- Round-bodied needle, with standard point
- Round-bodied needle, with trocar point
- Reverse cutting needle
- Reverse cutting needle with special point
SERATAN® is a new generation of suture material, based on plasma technology. Very fine polyamide threads are coated with titanium. The metallic coating is about a thousand times thinner than a human hair, which means that the titanium moves absolutely together with the suture thread. From practical experience, we know today that almost no granulation tissue forms with healing around titanium implants in the body.

**Material**
- POLYAMID titanised

**Symbol**
- undyed, monofilament, titanised

**Size**
- USP 6/0 to 2/0
- EP 0.7 to 3

**Absorption profile**
- non-absorbable

**Available combinations**
- Needled DQL
- Single sutures

**Uses**
- Cosmetic-plastic surgery / Reconstructive surgery and after burn injuries
SERALON® is a polyamide thread that is extremely soft and pliable compared with conventional monofilament sutures.

**Material**
- POLYAMID

**Symbol**
- undyed (SERALON®), monofilament or
- blue (SERALON®), black (NYLON) monofilament

**Size**
- SERALON®: USP 7/0 to 3+4
- blue: EP 0,5 to 6
- SERALON®: USP 5/0 to 2
- undyed: EP 1 to 3

**Absorption profile**
- non-absorbable

**Available combinations**
- Unneedled: Single sutures / multipacks / cassette packs
- Needled: DR / DRM / DRT / DS / DSL / DSS / DSX / GR / GS / HR / HRT / HRX / HS / HSL / KS
- Single sutures / multipacks

**Uses**
- Ligatures / general surgery / orthopaedics / plastic surgery
At sizes larger than 4-0, SUPRAMID has a multifilament character. It consists of twisted polyamide fibres that are coated. SUPRAMID has high tensile strength, good knotting properties and the advantages of a monofilament thread. In smaller diameters, 7-0, 6-0, and 5-0, SUPRAMID is monofilament.

**Material**

- POLYAMID

**Symbol**

- undyed, multifilament (twisted, coated) or
- black, multifilament, (twisted, coated)

- USP 5/0 and finer: ▲ or ▼

**Size**

- black: USP 6/0 to 3+4
  - EP 0,7 to 6
- undyed: USP 5/0 to 6
  - EP 1 to 8

**Absorption profile**

- non-absorbable

**Available combinations**

- Unneedled: Single sutures / multipacks / cassette packs
- Needled: DS / DSS / GS / GR / HR / HRT / HS / VSP
  - Single sutures / multipacks

**Uses**

- Ligatures / general surgery / oral and maxillofacial surgery / skin closure

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**SUPRAMID**

Exceptional knot-holding security

Extremely smooth passage through tissues

High linear and knot tensile strength

Economical cassette packs

*SERA®lon® is a polyamide thread that is extremely soft and pliable compared with conventional monofilament sutures.*

**Material**

- POLYAMID

**Symbol**

- undyed (SERA®lon®), monofilament ▲
- blue (SERA®lon®), black (NYLON) monofilament ▼

**Size**

- SERA®lon® black: USP 6/0 to 3+4
  - EP 0,7 to 6
- SERA®lon® undyed: USP 5/0 to 6
  - EP 1 to 3

**Absorption profile**

- non-absorbable

**Available combinations**

- Unneedled: Single sutures / multipacks / cassette packs
- Needled: DR / DRM / DRT / DS / DSL / DSS / DSX / GR / GS / HR / HRT / HRX / HS / HSL / KS
  - Single sutures / multipacks

**Uses**

- Ligatures / general surgery / orthopaedics / plastic surgery
SuLENE® differs from Terylene® in that it has a special coating that markedly reduces the sawing effect, which is always present with braided sutures, and reduces capillarity to a minimum.

**Material**

- **POLYESTER**

**Symbol**

- green, multifilament (braided), coated

**Size**

- uSP 6/0 to 5
- EP 0,7 to 7

**Absorption profile**

- non-absorbable

**Available combinations**

- unneedled: Single sutures / multipacks / cassette packs
- needled: DR / DRT / DS / DSS / FRX / GR / GS / HR / HRT / HRX / HS / KS

**Uses**

- Ligatures / holding sutures / marking / MIS / universal use

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NYLON is a monofilament polyamide suture. Thanks to its easy passage through the tissues and high tensile strength, it is particularly suitable for microsurgery where the most delicate stitches are required.

**Material**

- **POLYAMID**

**Symbol**

- black, monofilament

**Size**

- USP 11/0 to 8/0
- EP 0,1 to 0,4

**Absorption profile**

- non-absorbable

**Available combinations**

- Needled: DR / DRM / DRT / DS / DSL / DSLA / DSS / DSX / GR / GS / HR / HRT / HRX / HS / HSL / KS
  - Single sutures / multipacks

**Uses**

- Plastic surgery / Neurosurgery / Eye surgery
SULENE® differs from TERYLENE in that it has a special coating that markedly reduces the sawing effect, which is always present with braided sutures, and reduces capillarity to a minimum.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>green, multifilament (braided), coated</td>
</tr>
<tr>
<td>Size</td>
<td>USP 6/0 to 5 EP 0.7 to 7</td>
</tr>
<tr>
<td>Absorption profile</td>
<td>non-absorbable</td>
</tr>
<tr>
<td>Available combinations</td>
<td>Unneeded: Single sutures / multipacks / cassette packs</td>
</tr>
<tr>
<td>Uses</td>
<td>Ligatures / holding sutures / marking / MIS / universal use</td>
</tr>
</tbody>
</table>

Universal sutures
Optimal passage through the tissues
Very high linear and knot tensile strength
Economical cassette packs

NyLON is a monofilament polyamide suture. Thanks to its easy passage through the tissues and high tensile strength, it is particularly suitable for microsurgery where the most delicate stitches are required.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYAMID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>black, monofilament</td>
</tr>
<tr>
<td>Size</td>
<td>USP 11/0 to 8/0 EP 0.1 to 0.4</td>
</tr>
<tr>
<td>Absorption profile</td>
<td>non-absorbable</td>
</tr>
<tr>
<td>Available combinations</td>
<td>Needled: DR / DRT / DS / DSS / FRX / GR / GS / HR / HRT / HRX / HS / KS</td>
</tr>
<tr>
<td>Uses</td>
<td>Plastic surgery / Neurosurgery / Eye surgery</td>
</tr>
</tbody>
</table>

Extremely smooth passage through tissues
Very easy handling
This reliable braided polyester suture was developed especially for cardiac surgery. SERA cor® is a braided polyester suture, which meets all the requirements in this field, thanks to its structure and coating. The material is also biochemically and physiologically inert, which means that it is stable in the long term and is extremely well tolerated by the tissues.

**Material**
- POLYESTER

**Symbol**
- undyed, multifilament (braided), coated or green, multifilament (braided), coated

**Size**
- green: USP 6/0 to 5, EP 0,7 to 7
- undyed: USP 5/0 to 8, EP 1 to 10

**Absorption profile**
- non-absorbable

**Available combinations**
- Unneeded: Single sutures / multipacks / cassette packs
- Needled: DR / DRT / DS / DSS / FRX / GR / GS / HR / HRT / HRX / HS / KS / VSP
  - Single sutures / multipacks

**Uses**
- Ligatures / holding sutures / marking / universal use

TERYLENE is a non-absorbable suture material that has proved its worth in all fields of use over the past decades. Its high tensile strength is a particularly positive characteristic.

**Universal sutures**

**Exceptional passage through the tissues**

**Very high linear and knot tensile strength**

**Very easy handling**

**Economical cassette packs**

**Material**
- POLYESTER

**Symbol**
- undyed, multifilament (braided), coated or green, multifilament (braided), coated

**Size**
- green: USP 6/0 to 5, EP 0,7 to 7
- undyed: USP 5/0 to 8, EP 1 to 10

**Absorption profile**
- non-absorbable

**Available combinations**
- Unneeded: Single sutures / multipacks / cassette packs
- Needled: DR / DRT / DS / DSS / FRX / GR / GS / HR / HRT / HRX / HS / KS / VSP
  - Single sutures / multipacks

**Uses**
- Ligatures / holding sutures / marking / universal use
This reliable braided polyester suture was developed especially for cardiac surgery. SERACOR® is a braided polyester suture, which meets all the requirements in this field, thanks to its structure and coating. The material is also biochemically and physiologically inert, which means that it is stable in the long term and is extremely well tolerated by the tissues.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>undyed, multifilament (braided), coated or green, multifilament (braided), coated</td>
</tr>
</tbody>
</table>
| Size     | undyed: USP 6/0 to 0  
|          | EP 0,7 to 3,5  
|          | green: USP 6/0 to 1  
|          | EP 0,7 to 4 |
| Absorption profile | non-absorbable |
| Available combinations | Needled: DRT / HR / HRT / Single sutures / multipacks with and without pledgets |
| Uses | Cardiac surgery, Special heart valve sutures, also for paediatric cardiac surgery with small pledgets |
SERAPREN® is a non-absorbable monofilament polypropylene thread. It is the tried and tested standard suture material in vascular surgery.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYPROPYLEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>blue, monofilament</td>
</tr>
<tr>
<td>Size</td>
<td>USP 8/0 to 1 / EP 0.4 to 4</td>
</tr>
<tr>
<td>Absorption profile</td>
<td>non-absorbable</td>
</tr>
<tr>
<td>Available combinations</td>
<td>DR / DRM / DRT / DS / DSL / DSS / HR / HRT / HRX / Single sutures / multipacks / long pack / intracutaneous sutures</td>
</tr>
<tr>
<td>Uses</td>
<td>Ligatures / vascular surgery / microsurgery / orthopaedics / plastic surgery</td>
</tr>
</tbody>
</table>
SERA pren® is a non-absorbable monofilament polypropylene thread. It is the tried and tested standard suture material in vascular surgery.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYPROPYLENE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>blue, monofilament</td>
</tr>
<tr>
<td>Size</td>
<td>USP 8/0 to 1/0 EP 0,4 to 4</td>
</tr>
<tr>
<td>Absorption</td>
<td>non-absorbable</td>
</tr>
<tr>
<td>Available</td>
<td>DR / DRM / DRT / DS / DSL / DSS / HR / HRT / HRX combinations</td>
</tr>
<tr>
<td>Uses</td>
<td>Ligatures / vascular surgery / microsurgery / orthopaedics / plastic surgery</td>
</tr>
</tbody>
</table>

Best results for skin closure

SERA pren® is made entirely of polytetrafluoroethylene (PTFE). This fully fluorinated polymer is characterised by a very low coefficient of friction, i.e. the material slides very well compared to other materials and remains inert in the body.

<table>
<thead>
<tr>
<th>Material</th>
<th>POLYTETRAFLUORIDETHYLENE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>undyed, monofilament</td>
</tr>
<tr>
<td>Size</td>
<td>USP 7/0 to 2/0 EP 0,5 to 3</td>
</tr>
<tr>
<td>Absorption profile</td>
<td>non-absorbable - inert</td>
</tr>
<tr>
<td>Available combinations</td>
<td>DR, DRT, DS, DSS, HR, HRT, HS single sutures with and without pledgets Chordae Loops for heart valve reconstruction</td>
</tr>
<tr>
<td>Uses</td>
<td>vascular surgery / cardiac surgery / oral and maxillofacial surgery</td>
</tr>
</tbody>
</table>

SERA Mon® is made entirely of polytetrafluoroethylene (PTFE). This fully fluorinated polymer is characterised by a very low coefficient of friction, i.e. the material slides very well compared to other materials and remains inert in the body.

Optimal handling

- Very low coefficient of friction = Extremely smooth passage through tissue
- Particularly low tissue reactivity
- Biologically inert
- Anti-adhesive
- Minimal memory
- High knot tensile strength
SERALENE® is a non-absorbable suture developed especially for vascular surgery, since its smooth pore-free surface ensures that it passes optimally through the tissue. PVDF is related to PTFE. In comparison with polypropylene, SERALENE® has much greater durability, i.e. the material remains unchanged in the body for a longer period. This ensures long-term stability of the stitches.

Material

POLYVINYLIDENE FLOURIDE

Symbol

blue, monofilament

Size

USP 8/0 to 2
EP 0.4 to 5

Absorption profile

non-absorbable

Available combinations

Needled: DR / DRM / DRT / DRTA / DSS / GR / GS / HR / HRT / HRX / HS / KS
Single sutures / multipacks / Award-winning long pack

Uses

Ligatures / vascular surgery / microsurgery / plastic surgery
The raw material used is the fine thread from silkworm cocoons. The raw silk threads are specially braided and coated to make them water-repellent and resistant to serous secretions. Silk is a non-absorbable suture material of natural origin which has been used effectively in surgical procedures for centuries.

**Material**  
ปาติ้ง: Silk

**Symbol**  
ปก: undyed, multifilament (braided), coated  
สีดำ: black, multifilament (braided), coated

**Size**  
สีดำ: USP 7/0 to 5  
EP 0,5 to 7

undyed: USP 4/0 to 5  
EP 1,5 to 7

**Absorption profile**  
non-absorbable

**Available combinations**  
Unneeded: Single sutures / multipacks / cassette packs
Needled: DR / DRT / DS / DSS / DSX / GR / GS / HR / HRT / HRX / HS / HSM / KS / VSP  
Single sutures / multipacks

**Uses**  
Ligatures / holding sutures / marking / oral and maxillofacial surgery / ophthalmology
This innovative method of coating the sternal wire with titanium has the effect of accelerating the healing process. Furthermore, titanium has proven itself to be a particularly well-tolerated material in the field of medicine. At the same time, the outstanding mechanical properties of steel wire are retained.

**Material**

- **Titanium-coated steel**

**Fadensymbol**

- **monofilament, coated (titanium nitride)**

**Size**

- USP 5 to 7
- EP 7 to 9

**Absorption**

- non-absorbable

**Profile**

- Needled: HRK
- Combinations: Single sutures / multipacks

**Uses**

- Cardiac surgery (sternum) / orthopaedics / trauma surgery

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**SERANOX®**

**Greatest tensile strength**

- Various accessories available

**With special laser-swaged needles for closing the sternum**

**Material**

- **STEEL**

**Fadensymbol**

- **multifilament, twisted or**
- **multifilament, twisted, coated or**
- **monofilament**

**Size**

- USP 5/0 to 6
- EP 1 to 8

**Absorption profile**

- non-absorbable

**Available combinations**

- Unneedled: Single sutures / multipacks
- Needled: DS / GR / GS / HRK / HRT / HS
- Single sutures / multipacks / long packs
- Special combinations for trauma surgery and cardiac surgery

**Uses**

- Cardiac surgery (sternum) / orthopaedics / trauma surgery
This innovative method of coating the sternal wire with titanium has the effect of accelerating the healing process. Furthermore, titanium has proven itself to be a particularly well-tolerated material in the field of medicine. At the same time, the outstanding mechanical properties of steel wire are retained.

<table>
<thead>
<tr>
<th>Material</th>
<th>Titanium-coated steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fadensymbol</td>
<td>monofilament, coated (titanium nitride)</td>
</tr>
<tr>
<td>Size</td>
<td>USP 5 to 7</td>
</tr>
<tr>
<td></td>
<td>EP 7 to 9</td>
</tr>
<tr>
<td>Absorption profile</td>
<td>non-absorbable</td>
</tr>
<tr>
<td>Available</td>
<td>Needled: HRK</td>
</tr>
<tr>
<td></td>
<td>Single sutures / multipacks</td>
</tr>
<tr>
<td>Uses</td>
<td>Cardiac surgery (sternum)</td>
</tr>
</tbody>
</table>

Titanium coating - for more rapid healing

Better tissue tolerability

Sure handling thanks to smooth sliding

Minimised fracture behaviour with twisting

Laser swaging ensures a stable hold and sure needle control even with high bending stress