

Suture material for small animal surgery



Guideline for selecting suture material in small animal surgery

It is not uncommon for the selection of suture material to be based on the operator's lengthy experience or recommendations from colleagues or universities. It is always a good idea to take a critical look at your own medical cabinet and the sutures it contains. Not only because many new materials have been developed over the years, but also as streamlining your selection of products makes economic sense.

Why not read through the following list of threads we offer and find out which indications they are suitable for. Take advantage of our advice on sutures and knotting techniques. These recommendations are based on textbooks for small animal surgery and the experience of Dr. med. vet. ECVS Daniel Koch, referral practice for small animal surgery, and Dr. med. vet. Dipl. ECVO Marianne Richter, veterinary surgeon specialising in ophthalmology.



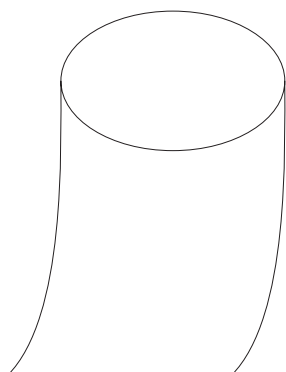
Surface quality of sutures

There are three different surface qualities. All mono- or multifilament sutures can be used with many tissues. When using monofilament suture material, two additional loops have to be made on the knots to secure them. It is only the use of multifilament sutures that represent an absolute contraindication when closing the gastrointestinal tract.

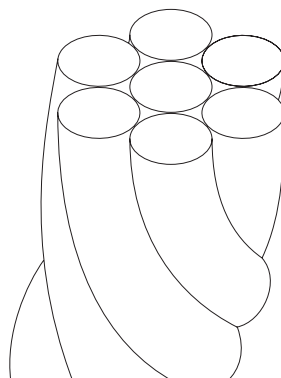
Fig. 1:

Surface quality

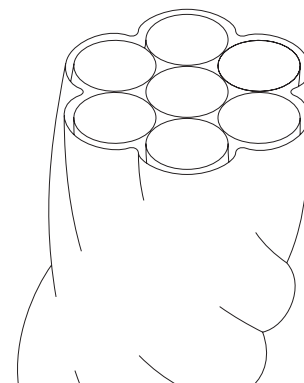
Monofilament suture



Multifilament suture



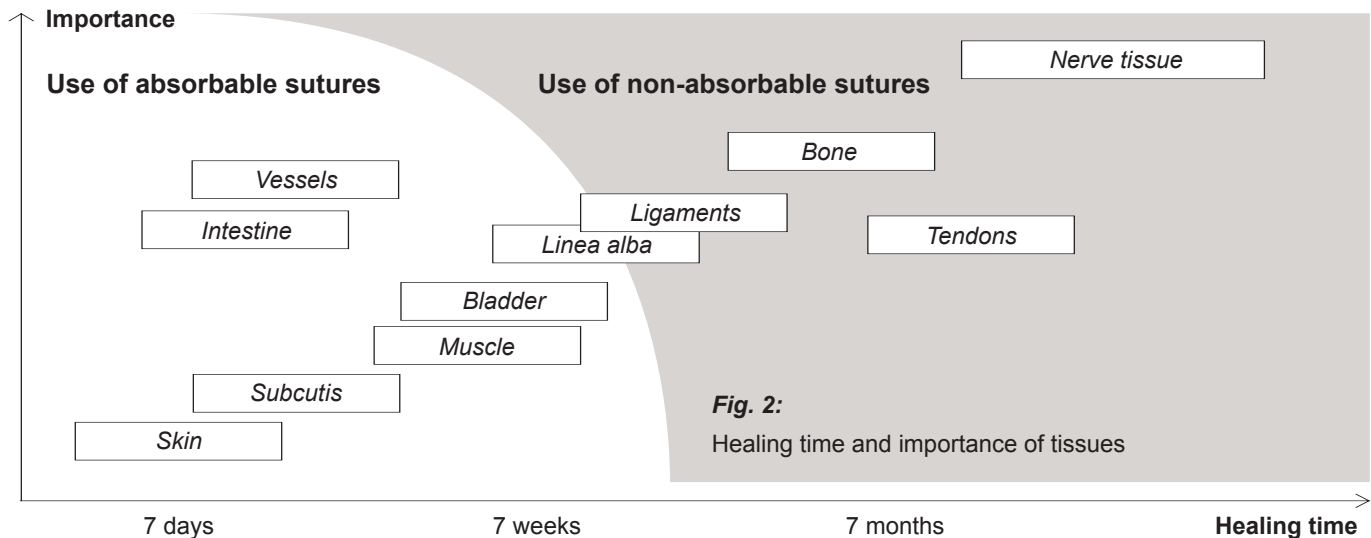
Pseudomonofilament suture



Absorption times of suture material and tissue healing times

It is a principle here that tissue should only be supported by a suture until it has healed. A little more time is added as a safety margin. The skin is the exception here: If suturing is necessary, non-absorbable material is selected. It does not leave any visible reactions, especially since the suture can be easily removed.

The healing times of tissue varies depending on the age of the animal and its state of health. The wound strength to be developed is in particular adversely affected by corticosteroids, cytostatic drugs, certain nonsteroidal anti-inflammatories (in the first five days), disinfectants, liver disease, malnutrition or infections.



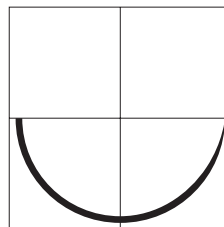
Types of needle

Vitrex offers **Japanese** needles of high quality of 300 series stainless steel. Cutting needles have a tapercut and are good at piercing thick and tough tissue, such as the skin, the fascia or the linea alba. Needles with a blunt point (round body needle) are in particular indicated for the intestine and bladder, where the trauma caused by suturing should not be too great. Also, in comparison with pointed needles that make a rounded puncture hole, no specific tissue tear direction is predefined here.

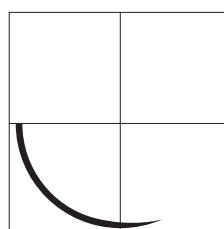
The following criteria are likewise important when selecting the right needle: Distance between point of the needle and swage, cross-section of the needle body (round, conventional or reverse cutting, spatulated) and the curvature of the needle. The size of the needle is defined by the animal undergoing surgery and the space available in each case. Standard needle lengths are between 15 and 30 mm. The half-circle needle is a good choice for most indications. The needle is shown in its actual size on all conventional packagings, which also include all the above data characterising the material of the suture.

Fig. 3:
The most important shapes of needle

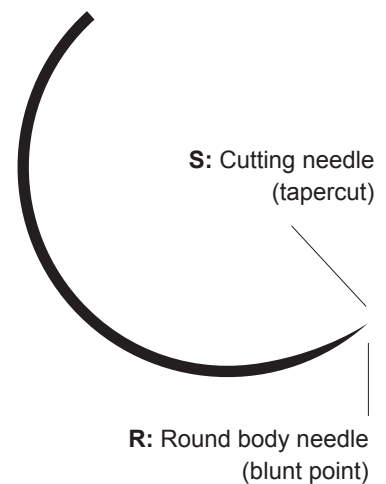
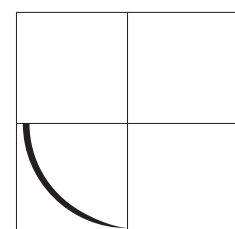
H (1/2):
Half-circle needle



D (3/8):
3/8 circle needle



V (1/4):
1/4 circle needle
(esp. for ophthalmic surgery)



The most important suture materials

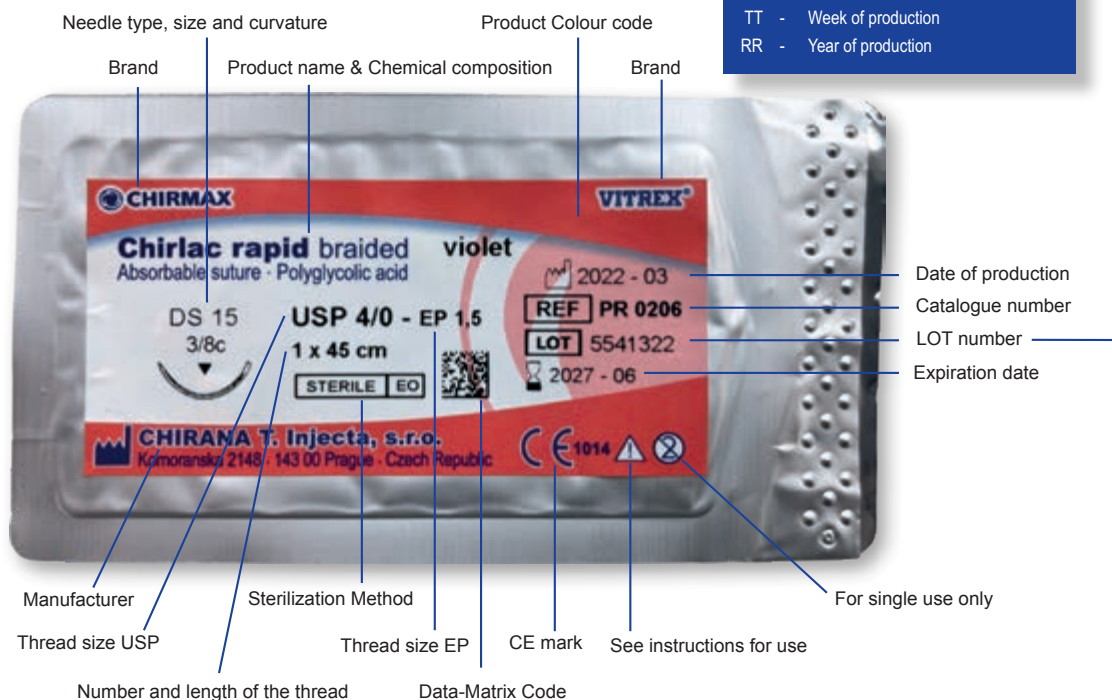
Suture material	Vitrex brand	Surface	Knot security	Tensile strength	Absorption time	Typical indications
Glycolide/L-lactide	Chirasorb rapid	Multifilament	Very good	12 days	42 days	Oral cavity, subcutis
Glycolide/L-lactide	Chirasorb	Multifilament	Very good	35 days	56-70 days	Subcutis, gynaecology, ligatures; corresponds to polyglactin 910
Glycolide/caprolactone	Monolac	Monofilament	Good	30 days	90-120 days	Subcutis, gastrointestinal tract, bladder
Polydioxanone	Polydox	Monofilament	Good	90 days	180-240 days	Gastrointestinal tract, joints, fascia, linea alba
Polypropylene	Chiralen	Monofilament	Good	Non-absorbable		Tendons, ligaments, vascular surgery, skin
Polyamide	Silon	Monofilament	Good	Non-absorbable		Skin closure
Polyester	Tervalon	Multifilament	Good to very good	Non-absorbable		Ligament replacement, cardiac and vascular surgery

In addition to the most common materials, we also offer the following:

- Chirasorb plus (mid-term absorbable, braided glycolide/L-lactide suture with an antibacterial coating)
- Chirlac rapid (short-term absorbable, braided polyglycolic acid suture)
- Chiraflon (non-absorbable Teflon suture for plastic and vascular surgery)
- Silk (non-absorbable suture made from silk for ligatures)

Fig. 34:

Information on the packaging



LOT number YPPTRR
 Y - Shelf life in years
 PP - Production number
 TT - Week of production
 RR - Year of production

Table of indications

(SBS = single button suture, CNS = continuous suture)

Tissue	Vitrex suture material	Needle type	Recommendation for knotting pattern		Suggestion for cat, small dog (USP, order number)			Suggestion for large dog (USP, order number)	
Skin	Silon	Tapercut, DS	SBS or CNS	4/0	SM 2267	19 mm	3/0	SM 2268	19 mm
	Chiralen	Tapercut, DS	SBS or CNS	4/0	PP 5110	19 mm	3/0	PP 5111	19 mm
Subcutis	Chirasorb	Tapercut, DS	SBS or CNS	4/0	LV 0211	19 mm	3/0	LV 0212	19 mm
	Monolac	Tapercut, DS		4/0	MV 0211	19 mm	3/0	MV 0212	19 mm
Intestine	Monolac	Blunt, HR	Small bowel: SBS or CNS Colon: SBS	4/0	MV 0257	18 mm	3/0	MV 0258	18 mm
	Polydiox	Blunt, HR		4/0	DX 0258	18 mm	3/0	DX 0259	18 mm
Stomach	Polydiox	Tapercut, HS	Everting, then inverting, continuous	2/0	DX 0172	30 mm	0	DX 0178	37 mm
Bladder	Monolac	Blunt, HR	Adapting, then inverting, continuous	3/0	MV 0258	18 mm	2/0	MV 0267	27 mm
Vascular ligature	Chirasorb	-	SBS	3/0	LV 0212	-	3/0	LV 0212	-
Ovariectomy	Chirasorb	-	SBS	2	LV 0028	-	2	LV 0028	-
Linea alba	Polydiox	Tapercut, HS	CNS	2/0	DX 0172	30 mm	1	DX 0179	37 mm
Vascular suture	Chiralen	Blunt, HR	SBS	5/0	PP 5152	18 mm	4/0	PP 5153	18 mm
Oral surgery	Chirasorb rapid	Tapercut, DS	SBS	4/0	LQ 1216	15 mm	3/0	LQ 1217	15 mm
	Monolac	Tapercut, DS	SBS	4/0	MV 0211	19 mm	3/0	MV 0212	19 mm
Joint capsule	Polydiox	Tapercut, DS	SBS or cross mattress	3/0	DX 0216	19 mm	2/0	DX 0228	25 mm
Muscle fascia	Polydiox	Tapercut, DS	CNS	3/0	DX 0216	19 mm	2/0	DX 0228	25 mm
	Polydiox	Tapercut, DS	Tension suture, e.g. locking loop or Bunnell suture	3/0	DX 0216	19 mm	2/0	DX 0228	25 mm
Ligament suture	Chiralen	Tapercut, DS		3/0	PP 5111	19 mm	2/0	PP 5117	25 mm
Cruciate ligament replacement, extracapsular	Tervalon	Tapercut, HR	SBS	1	TG 4464	27 mm	5	TG 4438	50 mm
Tendon suture	Chiralen	Tapercut, DS	Tension suture, e.g. locking loop or Bunnell suture	2/0	PP 5117	25 mm	0	PP 5122	30 mm
Skin of eyelid	Silon	Tapercut, DS	SBS	4/0	SM 2267	19 mm	4/0	SM 2367	19 mm
Conjunctiva	Chirasorb	Blunt, HR	CNS	6/0	LV 0200	15 mm	5/0	LV 0254	13 mm

Vitrex Sutures Product Range

Absorbable threads

CHIRASORB rapid braided



Composition	Colour	Range	Characteristics
Braided and coated suture made from 90% glycolide and 10% L-lactide	Violet and Natural	6/0 to 2 USP	Absorbable, multifilament, coated, synthetic, high tensile strength, reduced capillary effect, short-term healing

CHIRLAC rapid braided



Composition	Colour	Range	Characteristics
Braided and coated suture made of Polyglycolic acid (PGA)	Violet and Natural	6/0 to 4 USP	Absorbable, multifilament, coated, synthetic, high tensile strength, reduced capillary effect, short-term healing

MONOLAC monofilament



Composition	Colour	Range	Characteristics
Monofilament suture made of Glycolide and ϵ -caprolactone	Violet and Natural	6/0 to 2 USP	Absorbable, monofilament, synthetic, high tensile strength, excellent handling properties, mid-term healing

CHIRASORB braided



Composition	Colour	Range	Characteristics
Braided and coated suture made from 90% glycolide and 10% L-lactide	Violet and Natural	10/0 to 6 USP	Absorbable, multifilament, coated, synthetic, high tensile strength, reduced capillary effect, mid-term healing

CHIRASORB Plus braided

Antibacterial



Composition	Colour	Range	Characteristics
Antibacterial, braided and coated suture made from 90% glycolide, 10% L-lactide and chlorhexidine diacetate	Violet and Natural	5/0 to 4 USP	Absorbable, multifilament, antibacterial coating, synthetic, high tensile strength, reduced capillary effect, mid-term healing

CHIRLAC braided



Composition	Colour	Range	Characteristics
Braided and coated suture made of Polyglycolic acid (PGA)	Violet and Natural	9/0 to 6 USP	Absorbable, multifilament, coated, synthetic, high tensile strength, reduced capillary effect, mid-term healing

POLYDOX monofilament



Composition	Colour	Range	Characteristics
Monofilament suture made of Poly-p-dioxanone	Violet	7/0 to 4 USP	Absorbable, monofilament, synthetic, high tensile strength, excellent knotting properties, long-term healing

Vitrex Sutures Product Range

Non-absorbable threads

CHIRAFLON monofilament



Composition	Colour	Range	Characteristics
Monofilament suture made of Polyvinylidene Fluoride (PVDF) - similar to Teflon	Blue	8/0 to 3 USP	Non-absorbable, monofilament, synthetic, no capillary effect, very smooth, excellent knotting properties, easy to handle, physiologically inert

CHIRALEN monofilament



Composition	Colour	Range	Characteristics
Monofilament suture made of Polypropylene	Blue and Black	10/0 to 2 USP	Non-absorbable, monofilament, synthetic, no capillary effect, smooth, non-porous surface, suitable for stitches in infected wounds

SILON monofilament



Composition	Colour	Range	Characteristics
Monofilament suture made of Polyamide 6	Blue and Black	10/0 to 2 USP	Non-absorbable, monofilament, synthetic, very smooth, excellent knotting properties, easy to handle, loss of tensile strength after long-term implantation

TERVALON braided



Composition	Colour	Range	Characteristics
Braided and coated suture made of Polyester	Green and White	6/0 to 6 USP	Non-absorbable, multifilament, synthetic, high tensile strength, no capillary effect, well tolerated by the tissue, low friction

SILON braided



Composition	Colour	Range	Characteristics
Braided suture made of Polyamide	White and Black	5/0 to 5 USP	Non-absorbable, multifilament, synthetic, high tensile strength, excellent knotting properties, loss of tensile strength after long-term implantation

SILK braided



Composition	Colour	Range	Characteristics
Braided and coated suture made of Silk	Black	9/0 to 5 USP	Non-absorbable, multifilament, synthetic, no capillary effect, loss of tensile strength after long-term implantation

CATGUT plain Bottles

EP	USP	Length	Cat. No
2	4/0	100 m	103 VP
3	3/0	100 m	104 VP
3.5	2/0	100 m	105 VP
4	0	50 m	106 VP
5	1	50 m	107 VP
6	2	50 m	108 VP
7	3	25 m	109 VP
8	4	25 m	110 VP



CATGUT chrom Bottles

EP	USP	Length	Cat. No
2	4/0	100 m	103 VC
3	3/0	100 m	104 VC
3.5	2/0	100 m	105 VC
4	0	50 m	106 VC
5	1	50 m	107 VC
6	2	50 m	108 VC
7	3	25 m	109 VC
8	4	25 m	110 VC

Comparison chart for thread diameter

All suture packagings show two measuring units for the thread diameter. The American measurement USP (United States Pharmacopeia) with its illogical classification system is still commonly used. Considerably more information about the diameter is however provided by the European metric unit EP (European Pharmacopeia). An EP unit corresponds to 0.1 mm.

EP metric	USP	Effective diameter in mm
0.7	6/0	0.07-0.09
1	5/0	0.10-0.14
1.5	4/0	0.15-0.19
2	3/0	0.20-0.29
3	2/0	0.30-0.34
3.5	0	0.35-0.39
4	1	0.40-0.49
5	2	0.50-0.59
6	3+4	0.60-0.69
7	5	0.70-0.79
8	6	0.80-0.89

Example A:

Sterilisation of a female dog

This dog weighed 23 kg and had no underlying health conditions. The vascular stumps cranially to the ovaries were ligated with a thick, braided thread (glycolide/L-lactide, Chirasorb, USP 2, without using a needle, LV 0028) and severed. We used the same thread for the ligature at the body of the uterus. For the linea alba we used a long-term absorbable suture (polydioxanone, Polydiox, USP 1, cutting needle, DX 0179), with continuous suturing. The subcutis was closed with interrupted sutures and a short-term absorbable thread (glycolide/caprolactone, Monolac, USP 3-0, cutting needle, MV 0212). For the skin we used a nylon thread (Silon, USP 3-0, cutting needle, SM 2268). Whenever tissue is tough, we recommend using cutting needles as round body needles become blunt after being passed through multiple times and bend.

Fig. 5:

Closing the subcutis, single button suture with Monolac.



Example B:

Closure of the knee joint on a male dog

Surgery on a mixed-breed dog weighing 15 kg to repair a torn cruciate ligament via ligament replacement was followed by multi-layer closure of the knee joint (polyester, braided, USP 5 Tervalon, TG 4438). The joint capsule and fascia were sutured with a polydioxanone thread and cutting needle (Polydiox, USP 3-0, DX 0216), using the cross-mattress technique for the first layer and continuous suturing for the second one. The subcutis was stitched using a single button suture with a braided, short-term absorbable thread (glycolide/L-lactide, Chirasorb, USP 3-0, cutting needle, LV 0212), while the skin was closed with interrupted sutures and nylon (Silon, USP 4-0, cutting needle, SM 2267).

Fig. 6:

Closing the medial knee fascia, start of a continuous suture with Polydiox



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