

SUTURAL MATERIALS IN MICROSURGICAL PROCEDURES

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Microsurgical diffusion has greatly contributed to progress in ophthalmological procedures, but if we consider the wound closure in the most frequent event, that is in ordinary cataract extractions, only with a suitable magnification and a biomicroscopical control of the Tissutal planes and with an adequate choice of the sutural material, can we obtain the best. The best is what Paton calls "a nontraumatic surgery" and Troutman an "anatomic reconstruction of the wound".

The final goal is a rapid recovery of function and the patient's comfort.

Firts step in microsurgical procedures and material selection

Correct incision

Correct wound closure

*Correct wound closure
(precise apposition)
obtainable
with*

Choice of material

Choise of suturing technique

The most important microsurgical materials are:

- synthetic absorbable
- virgin silk
- synthetic non-absorbable or absorbable monofilaments

MICROSURGICAL MATERIALS TO BE PREFERRED

Synthetic

(derivates of polyglycolid acid)

Absorbable: 30-90 days

Size: 8/0

Diam. (approx.): 45-50 microns

Dexon or Vicryl

Partially absorbable

(by means of degradation,
fragmentation or extrusion)

Vegetal derivate Protineaceous
but without antigenic reactions

Size: 8 or 9/0

Diam.: 45-35 microns

Size: 10/0

Diam.: 25-27 microns - In experimentation

Virgin Silk
(white or dyed)

Synthetic monofilament

(polyamid 66)

Size: 9-10-11/0

Diam.: 35-25-18 microns

Tissutal inertness (relative)

High elasticity

Non absorbable but
partial absorption and
degradation may occur
after 1-3 years

Supramid
Perlon
Nylon

Synthetic monofilament

Diam.: 13 microns

black

Nylon 13 microns

Polypropylene

9-10/0

Non-absorbable

Degradation or dissolvation: nihil

Non-wettable, stiffer
than nylon

Prolene

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Non-absorbable material
 (completely inert)
 No elasticity
 Diam.: 60-45 microns

Thin steel

Synthetic monofilament
 (polyglycolic 100 copoly-
 merlactic acid)
 Absorbable: 30-60 days
 Elasticity (2-3%)
 Size: 9/0
 Diam.: 35 microns (approx.)

Vicryl monofil

Omitting here the enumeration of the generally known "basic performances" of the materials preferred today in microsurgical procedures and emphasizing how they have been submitted to refinements and caliber reduction (actual choice from 45 to a fantastic 13 microns), the *clinical demands of the sutures can be summarized as follows:*

inertness or scarce tissutal reaction

(immediate or tardive)

adequate wound retention and reduced

healing time

good handling - postoperative carefree

In reference to literature, experimentation and personal experience, we classify sutures as: *excellent, usable, unadvisable.*

The suturing technique and clinical situations are to be considered apart.

Sutures caliber

USP	12/0	11/0	10/0	9/0	8/0	7/0
Microns	14	18	25	35	45	64
ø in mm.	0.014	0.018	0.025	0.035	0.045	0.064

CHOICE OF MATERIAL IN MICROSURGICAL PROCEDURES

	Cat. Corneal incisions		Corneal repairs		Sclero-corneal incisions		Iris repairs		I.O.L. (prosthesis fermature)	
	<i>Kerat.</i>		<i>Mixed sut. in Kerat.</i>		<i>Repairs</i>					
Virgin Silk 8-9/0	--	--	++	++	++	++	--	--	--	--
Dexon-Vicryl 8/0	--	--	++	++	++	++	--	--	--	--
Nylon mon. 9-10-11/0	++	++	--	++	++	++	--	++	--	--
Nylon mon. 13 m.	++	++	--	++	++	++	++	++	--	--
Prolene 9-10/0	--	++	--	++	++	++	++	++	++	++
Vicryl monofil. 9/0	++	++	--	++	++	++	--	--	--	--

EXCELLENT = + + + + + Cat. = Cataract
 USABLE = -- -- + + Kerat. = Keratoplasty
 UNADVISED = -- -- -- I.O.L. = Intraocular lenses

N.B. Monofilaments absorbable (Vicryl) or non-absorbable (Nylon-Prolene-Mersilene-Perlon) must be preferred for continuous sutures or buried knots.

Virgin silk, Dexon and Vicryl are preferred for interrupted sutures.

Prolene is less degradable than Nylon but stiffer. To be preferred in I.O.L.

Nylon 13 microns is reserved for special performances and requires more capability and assistance.

Virgin silk 10/0 is actually in experimentation.

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Considerations and conclusions

Synthetic monofilament non-absorbables (nylon, prolene, perlon) appear to be the most eclectic and versatile material available today and meet microsurgical requirements better than any other types, keeping in mind that the best results can be obtained only with a *correct incision* and a *correct wound closure*.

Personal preference is given to nylon 9 or 10/0 with micropoint side-cutting spatulated needles (length 5-7.5 mm.) curvature 3/8 or 1/2, diam. 100-150 microns. Preferable is the more steeply curved needle in deeper suturing (one-or two-plane incisions).

Prolene should be preferred in special demands as for lens implantation and iris repairs or prosthesis legatures or in keratoplasty continuous suturing. Its convenience becomes apparent as it results non-degradable as nylon.

Some shortcomings of the nylon monofilaments, such as the *delayed wound healing* time and the *more elaborate suture technique* must be evaluate and taken into account.

The possible secondary *need of remotion* (postoperative care) must also be considered.

When clinical situations can give preference to a sclero-corneal wound closure (flap covered), you can use the more simple and faster suture, still clinically valid, that is virgin silk 8 or 9/0. This material can give satisfactory results also in mixed sutures.

The quality must be particularly selected to avoid possible bad wound cicatrisation or micronecrosis and extrusion.

We also are favouring this material and we agree with Paton saying that "silk suture can be tightened to a more precise and less changeable tension than that of the more elastic nylon suture".

A new virgin silk 10/0 is actually being used by us on experimentation.

Synthetic absorbable (Dexon or Vicryl) or the absorbable monofilament Vicryl 9/0, offer some clinical advantages but do not seem to be a real alternative of the more eclectic non-absorbable synthetics (nylon, prolene, perlon).

In selecting a sutural material, one must considerer:

The *basic performances*, the *tissutal structure* (cornea-sclera-iris), the

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type of incision and suturing technique, assistance-equipment-capability of the surgeon, operative situations and patient's conditions which can differ during the procedure.

Surgeon should switch to a new material when he becomes familiar with its performances and he knows how to handle it properly.

“Don't change material and suturing technique if you have already obtained a good functional result and patient's comfort in the fellow eye”.

Microsurgical desirable sutural performances as yet unachieved are the following:

- full versatility
- wound healing time reduced
- no postoperative problems.

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