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Microsurgery for male infertility

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INDICATIONS

vaso-vasostomy

vaso-epididymostomy

Microsurgical varicocelectomy

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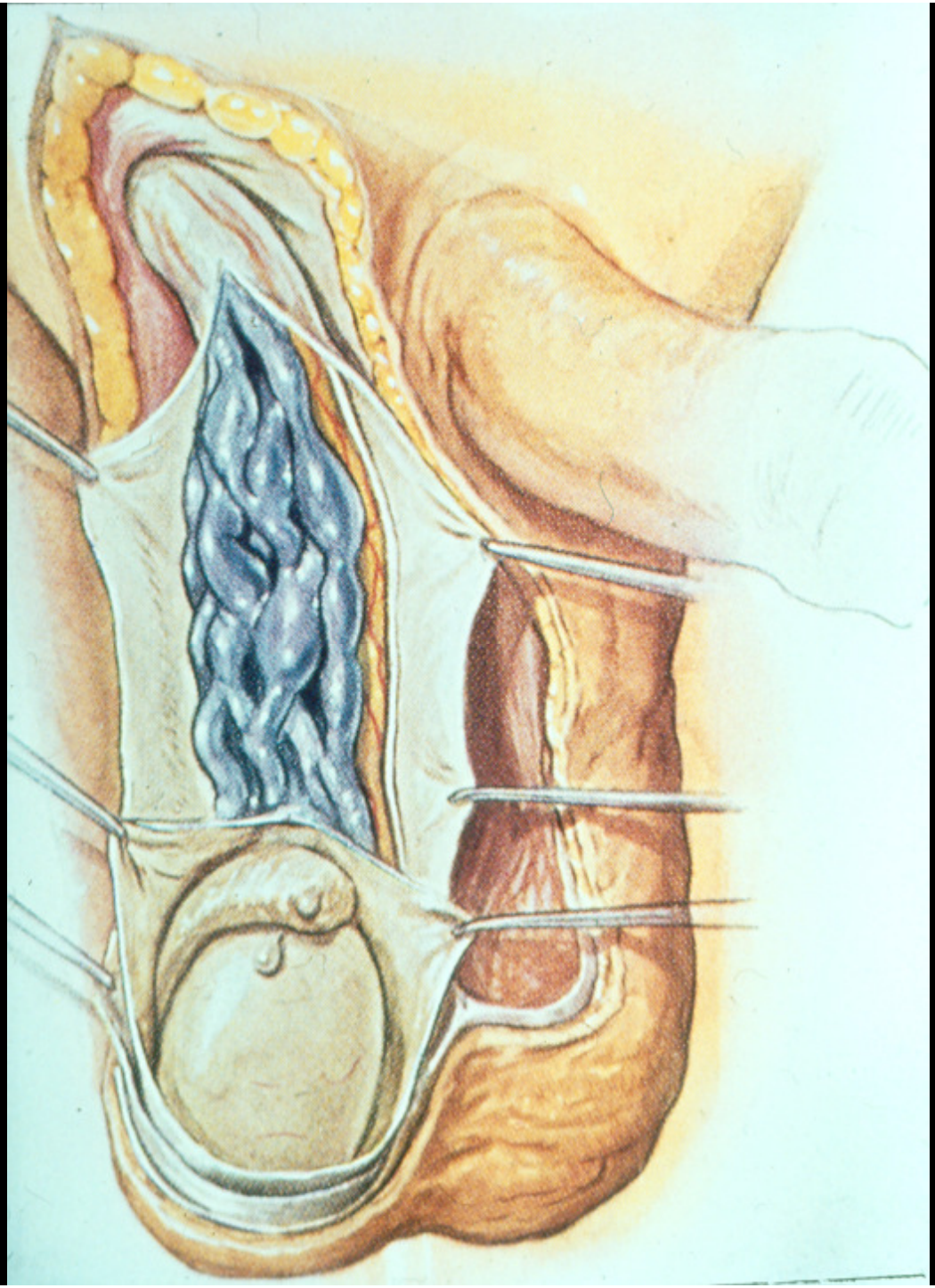

Some facts about varicoceles

- 11% of men with normal sperm count have a varicocele, 25% of subfertile men have a varicocele (WHO 1992)

- Most men with a varicocele have normal sperm count and no problems achieving spontaneous pregnancy (Zargooshi J. *et.al.* Fert Steril 2007)

- Profylactic treatment is only advised in case of documented growth deterioration of the testis or in case of impaired semen quality (AUA practise guidelines, Fertil Steril 2004, ASRM practise committee , Fertil Steril 2008)

- After treatment 85% of these men will show an improvement of their semen quality. (Agarwal A. *et.al.* J. Urol 2007)

- Spontaneous pregnancies after varicocele treatment are observed in 25-35% of the couples within one year (Dubin and Amelar , J Urol 1977, Evers and Collins, Cochrane analysis 2009)

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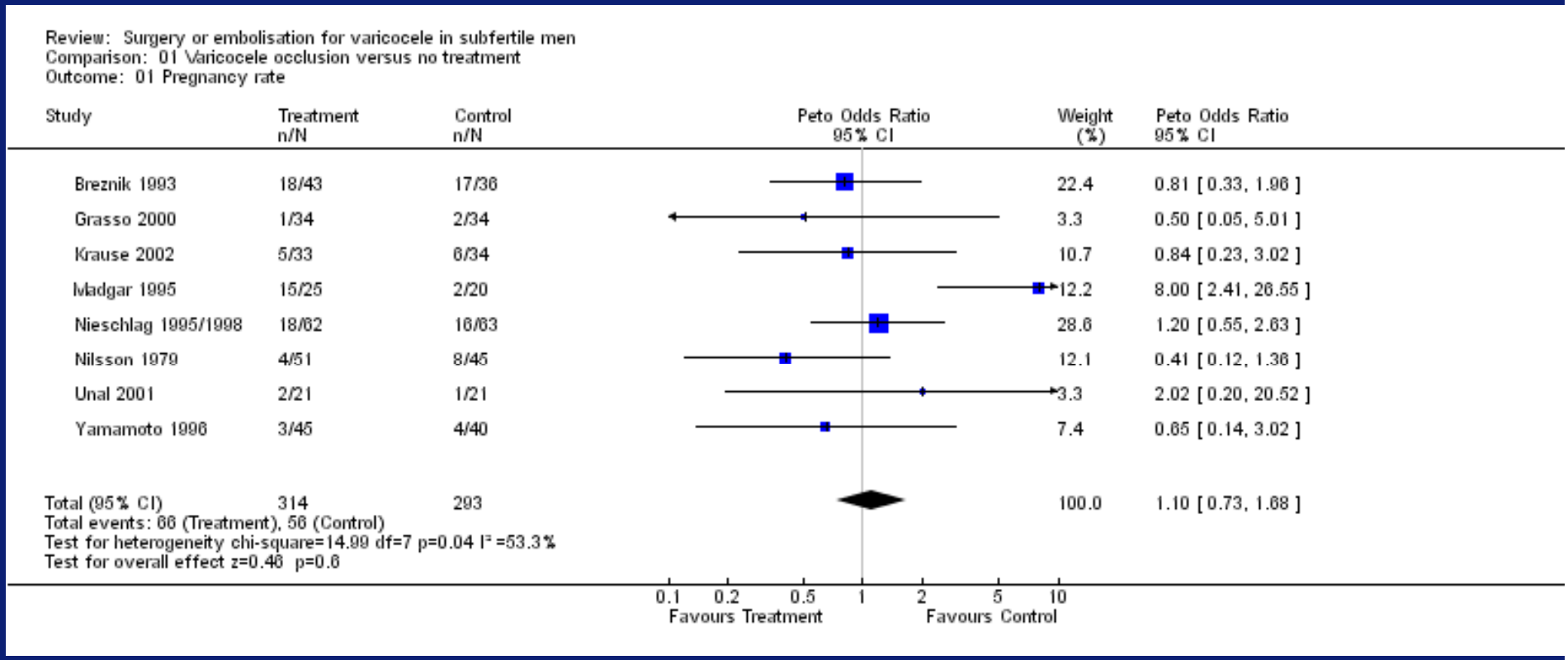
Meta-Analysis Of Randomized Controlled Trials Of Varicocele Repair In Men From Infertile Couples



Evers JL and Collins JA, Cochrane analysis 2004

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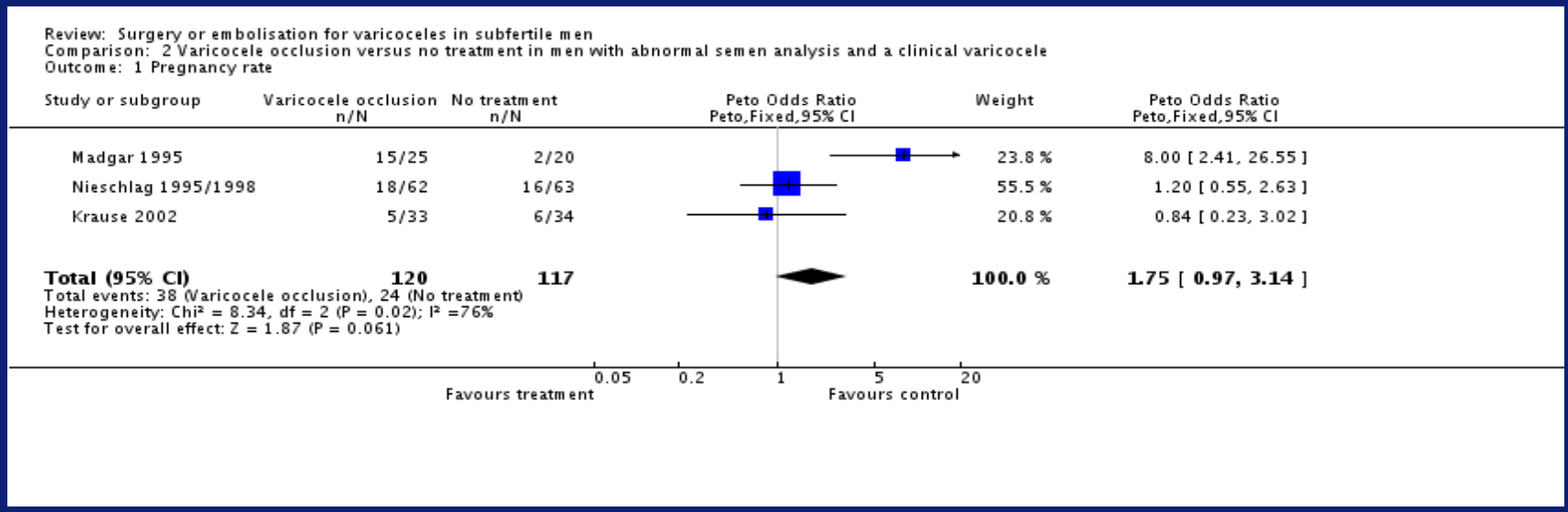
Re-analysis of the Cochrane meta-analysis

Ficara V. et. al. Eur Urol 2006 49:258-263

If we include only studies of men with abnormal sperm analysis and a clinical varicocele only 3/8 studies from the Cochrane analysis remain (Nieschlag, Krause and Madgar):

120 men treated and 117 controls

Pregnancies in 36% of the treated group versus 20% of the controls



A meta-analysis of poor quality studies cannot result in a recommendation against of in favor of varicocelectomy. ***Ficara V. et. al. Eur Urol 2006 49:258-263***

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Does varicocele repair result in more spontaneous pregnancies? A prospective randomized trial (1997-2007).

Study design

Inclusion/exclusion

- Infertility duration of at least 1 year
- Oligospermia: <20 million sperms/ml., but not azoospermia
- No other abnormality than a clinical varicocele (grade 1-3)
- Female partner younger than 36 years of age and no obvious fertility problems

Randomization

- Immediate treatment (surgical varicocelectomy)
- or
- delayed treatment (controls) after 1 year (ART or varicocelectomy)

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Clinical Evaluation

Before randomization:

- Semen analysis twice (WHO, 1999), interval of one month

- Endocrine screening (FSH, Inhibin-B)

- Scrotal ultrasound, criteria for varicocele:
  diameter >3mm after valsalva maneuver
  reflux > 2 sec. into the venous plexus

- Informed consent (take home video, explain the study and randomization)

- Randomized for either direct surgical varicocele repair or delayed treatment after one year

After randomization:

- Follow-up of at least 1 year in both groups with repeated semen analysis at 3 and 6 months, scrotal ultrasound and endocrine evaluation at 3 months

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Final analysis

Treatment group N=65
Loss to FU =5

Age partner 29,6 years
Infert. duration 2,5 years

Semen analysis
concentration 9,7->18,5
motility 19% -> 24%

Spontaneous pregnancies within 1 year 19/60 (31%,CI 19.9%-43.4%)

After 2 years FU: (37%) spontaneous pergnancies

No treatment group N =65
Loss to FU = 7

Age partner 29,3 years
Infert. duration 2,3 years

Semen analysis
concentration 8,5 -> 11,0
Motility 22% -> 23%

Spontaneous pregnancies within 1 year 6/58 (10%, CI 2.5%-18.2%)

After 2 years FU: (14%) spontaneous pregnancies

Statistical difference in pregnancy rates between the treated and not-treated groups: P= 0.005

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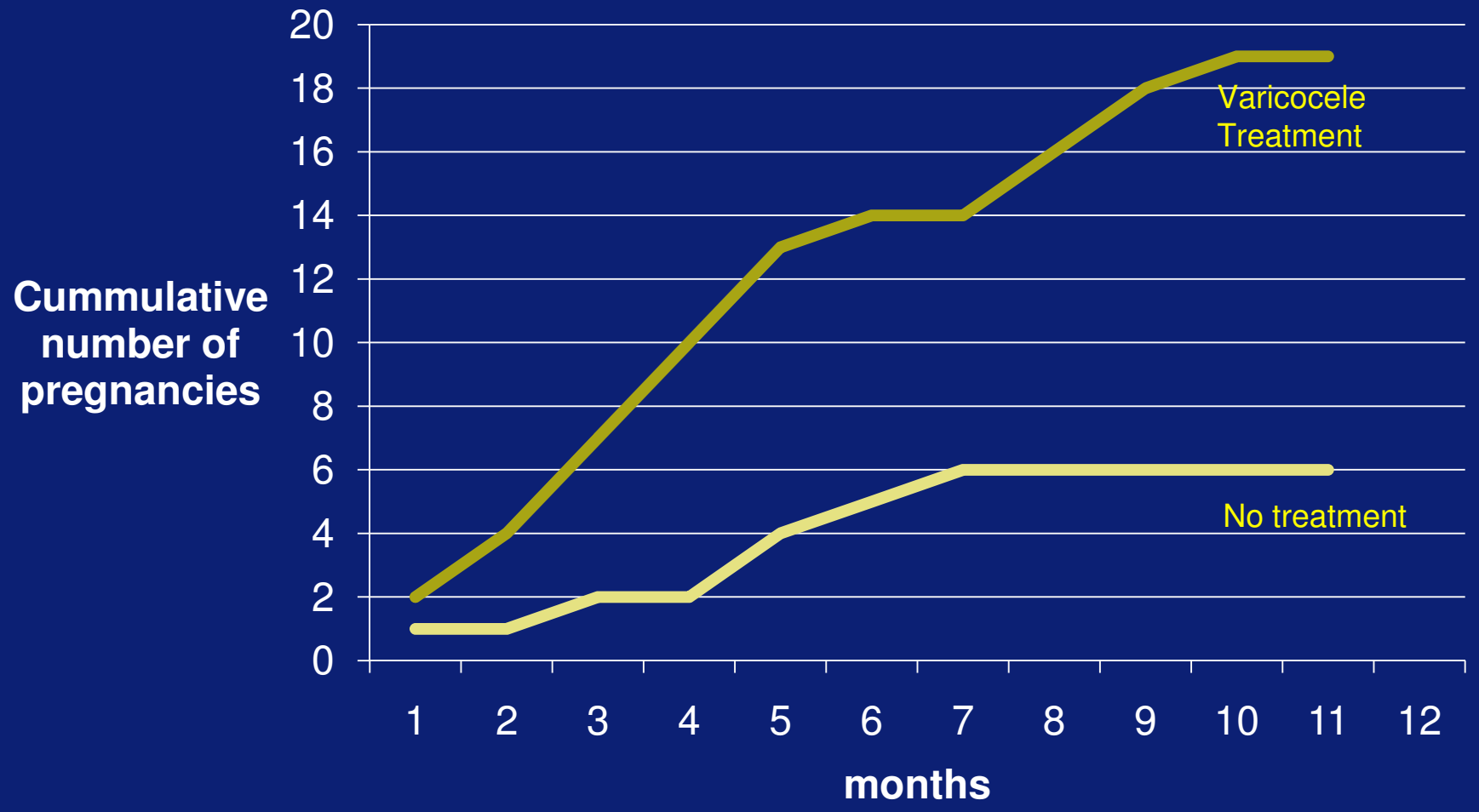
Cumulative pregnancy rates in the treated and the non-treated group



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TREATMENT

Operation/Embolisation

- High-inguinal (Palomo): 43 x, 4 reccurrences (9%)
- Embolisation 7 x, 3 reccurrences (42%)
- Microsurgery (Goldstein procedure) 7 x, no recurrences

Table 1. Recurrence and complication rates of different treatment methods for variocele

Treatment	Recurrence Rates	Complications
Antegrade Sclerotherapy	9%	Epididymitis - Testicular atrophy - Flank erytema
Retrograde Embolisation	10-15%	Trombophlebitis – Bleeding/heamatoma – Vene perforation Dislocation of the coil – Contrast allergy
Open Operation	13-30%	Hydrocele – Testicular atrophy – Haematoma
Laparoscopy	7-15%	Intestinal damage – Peritonitis – Pulmonary embolism
Microsurgery	1-4%	Testicular atrophy – Hydrocele – Scrotal heamatoma

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Treatment after 1 year of follow-up

Varicocele repair :

23 men from the non-treated group had a (delayed) varicocele repair after the study follow-up period of 1 year.

This resulted in 7/23 (30,4%) spontaneous pregnancies within one year after surgery

Artificial reproductive techniques:

52 couples treated (IUI, IVF, ICSI)

This resulted in 20 ongoing pregnancies (38,4%)

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Summary of the studies

Treatment is only recommended if:

- The duration of infertility is about 2 years or longer
- There is a significant oligozoospermia: <20 milj. spermatozoa/ml.
- The partner is younger than 36 years of age and without obvious fertility problems

Treatment was not shown beneficial in men with normospermia and in case of a subclinical varicocele.

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CAUSES OF OBSTRUCTIVE AZOOSPERMIA

- CONGENITAL FORMS
  - CONGENITAL BILATERAL ABSENCE OF THE VAS DEFERENS
  - EPIDIDYMAL BLOCKAGE/YOUNG`S SYNDROME
  - EJACULATORY DUCT OBSTRUCTION/MULLERIAN CYSTS
- AQUIRED FORMS
  - POST-VASECTOMY
  - POST-INFECTIVE
  - POST-SURGERY (HYDROCELE, HERNIA REPAIR)

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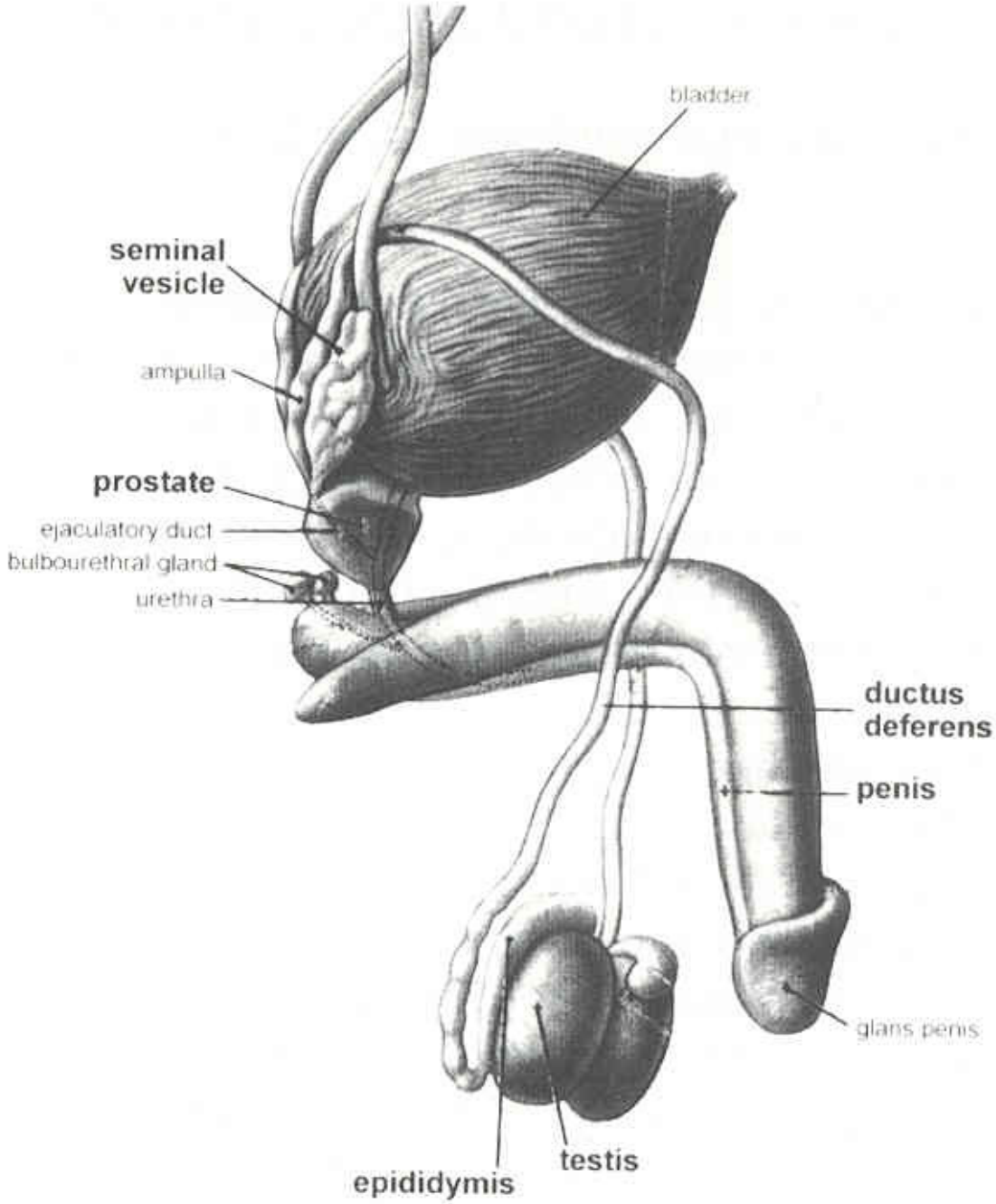
bladder
seminal vesicle
ampulla
prostate
ejaculatory duct
bulbourethral gland
urethra
ductus deferens
penis
glans penis
epididymis
testis


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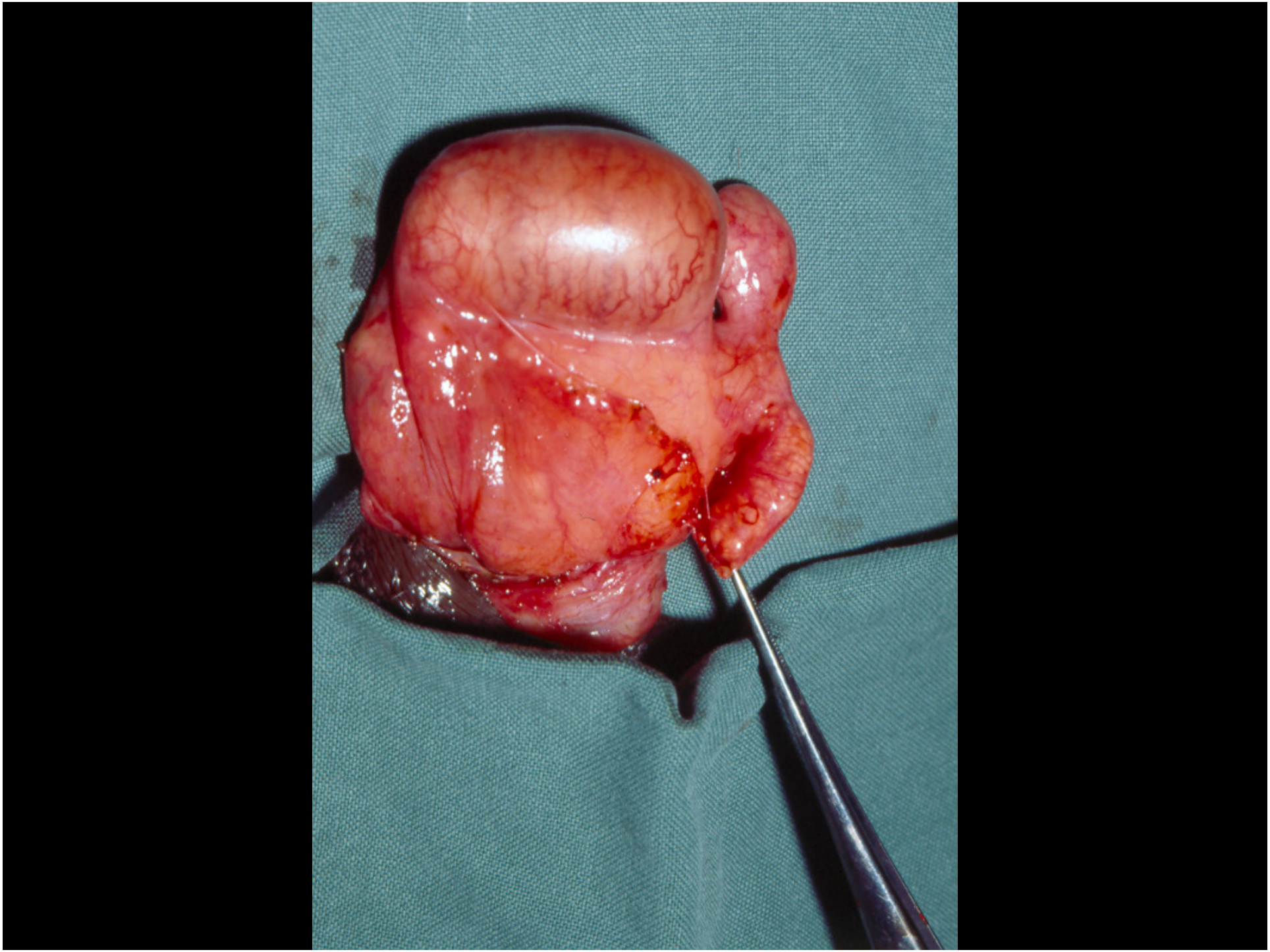
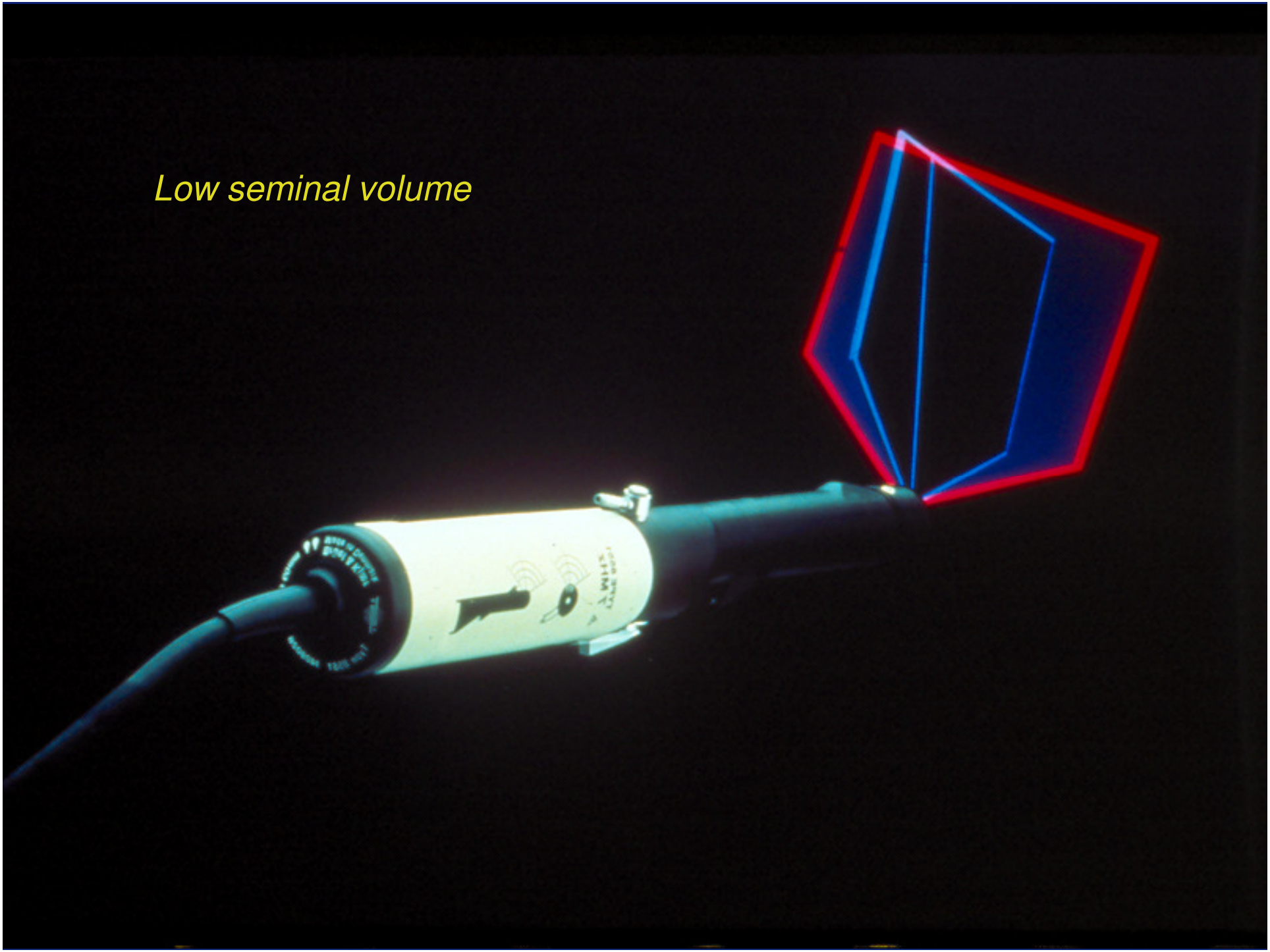
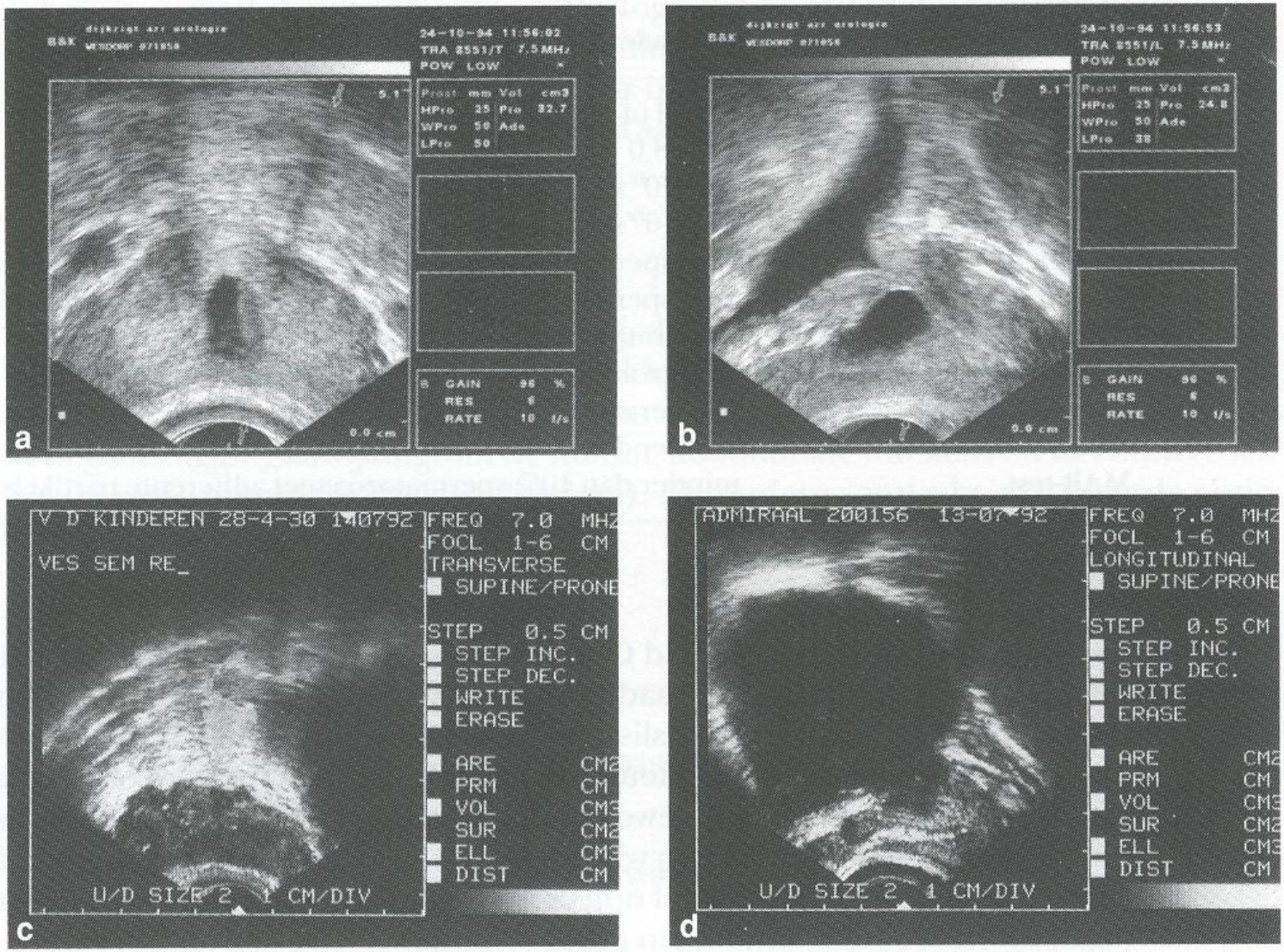



Low seminal volume


a
24-10-94 11:56:02
TRA 8551/T 7.5MHz
POW LOW
b
24-10-94 11:56:53
TRA 8551/L 7.5MHz
POW LOW
c
V D KINDEREN 28-4-30 140792
VES SEM RE_
U/D SIZE 2 1 CM/DIV
FREQ 7.0 MHZ
FOCL 1-6 CM
TRANSVERSE
SUPINE/PRONE
STEP 0.5 CM
STEP INC.
STEP DEC.
WRITE
ERASE
ARE CM2
PRM CM
VOL CM3
SUR CM2
ELL CM3
DIST CM
d
ADMIRAAL 200156 13-07-92
U/D SIZE 2 1 CM/DIV
FREQ 7.0 MHZ
FOCL 1-6 CM
LONGITUDINAL
SUPINE/PRONE
STEP 0.5 CM
STEP INC.
STEP DEC.
WRITE
ERASE
ARE CM2
PRM CM
VOL CM3
SUR CM2
ELL CM3
DIST CM

Figuur 15.6

Ejaculatory duct obstruction

Calcifications and dilatation of the peri-prostatic plexus and seminal vesicles are the most consistent findings in transrectal ultrasound investigations in men with genital infections (Schipper et. al., Fert Steril, 2001).

These signs of infections are found in at least 50% of men with EDO (Paick et. al., BJU, 2000)

Trans-urerthral resection of the ejaculatory ducts (TURED) results in sperm improvement in 61% and spontaneous pregnancy in 25 % (Jarrow, J Urol, 1993)

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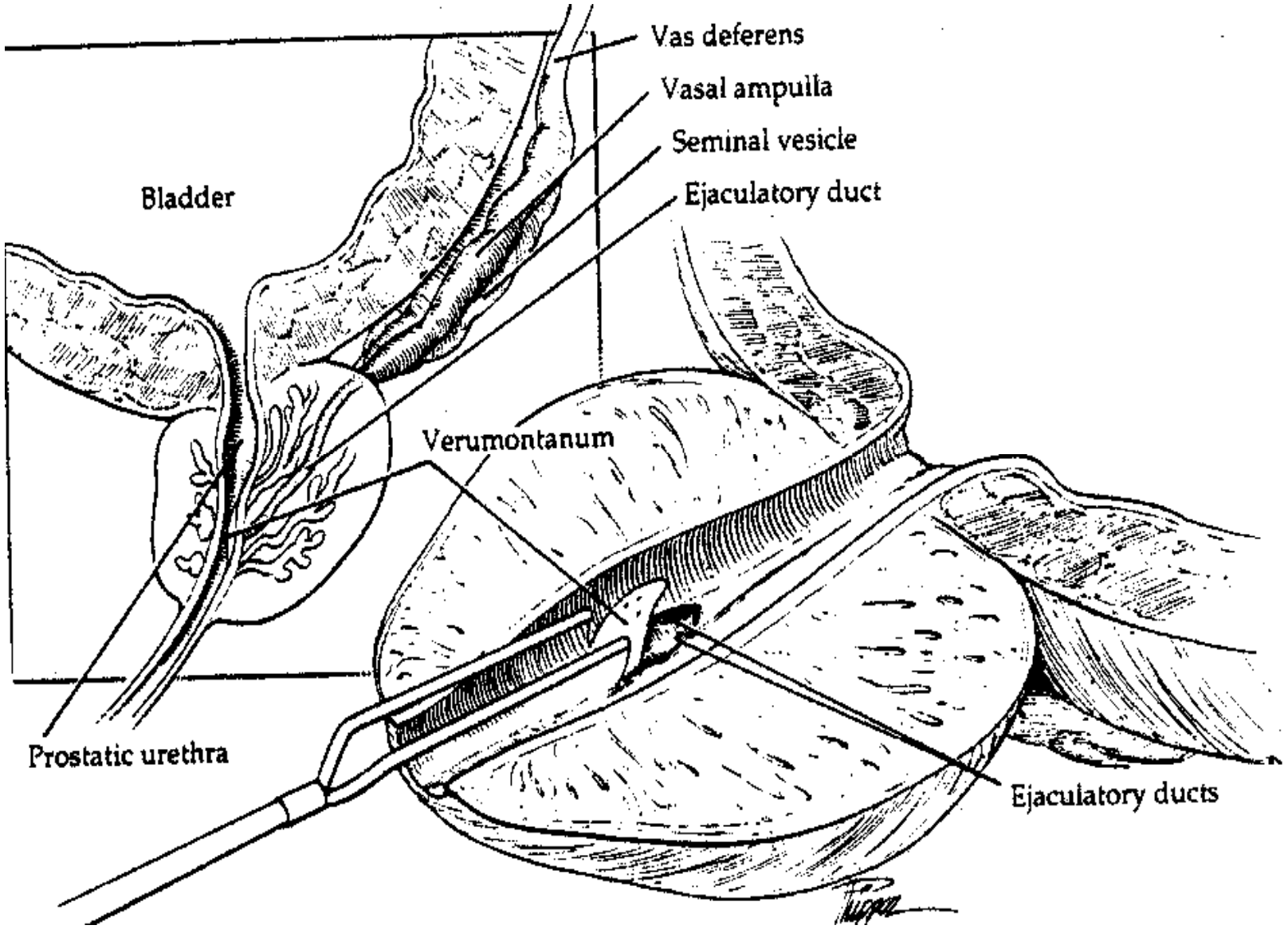
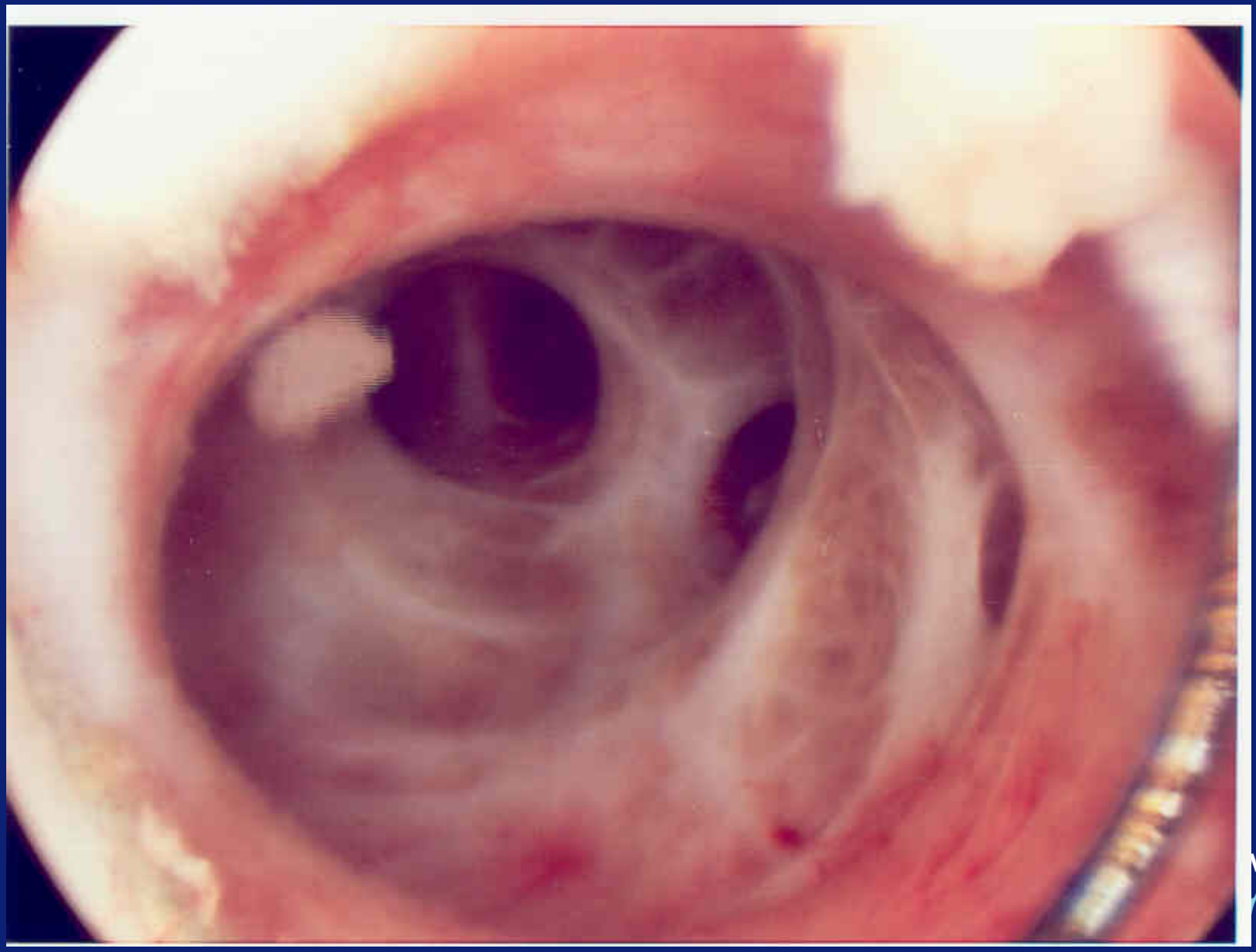
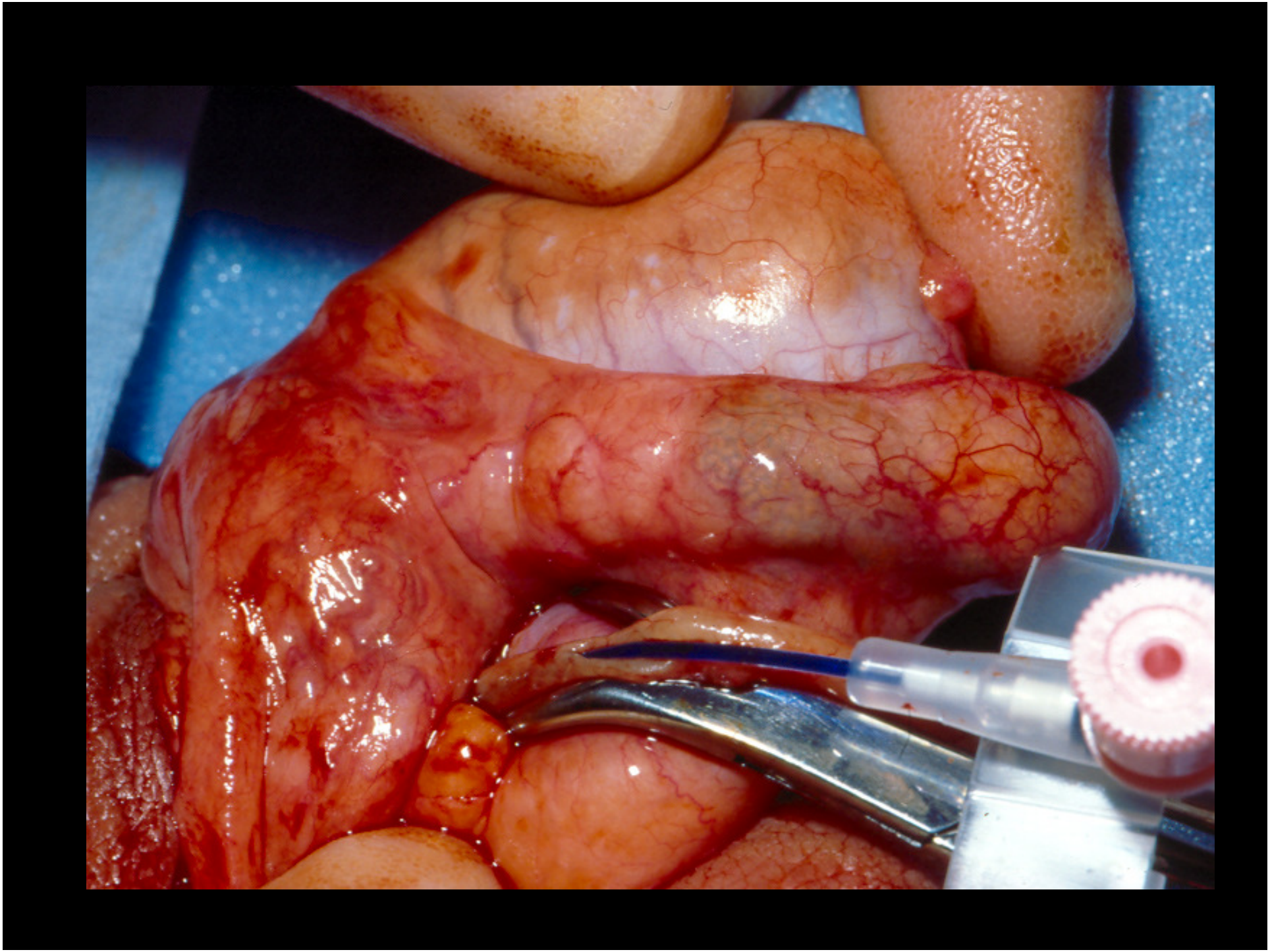
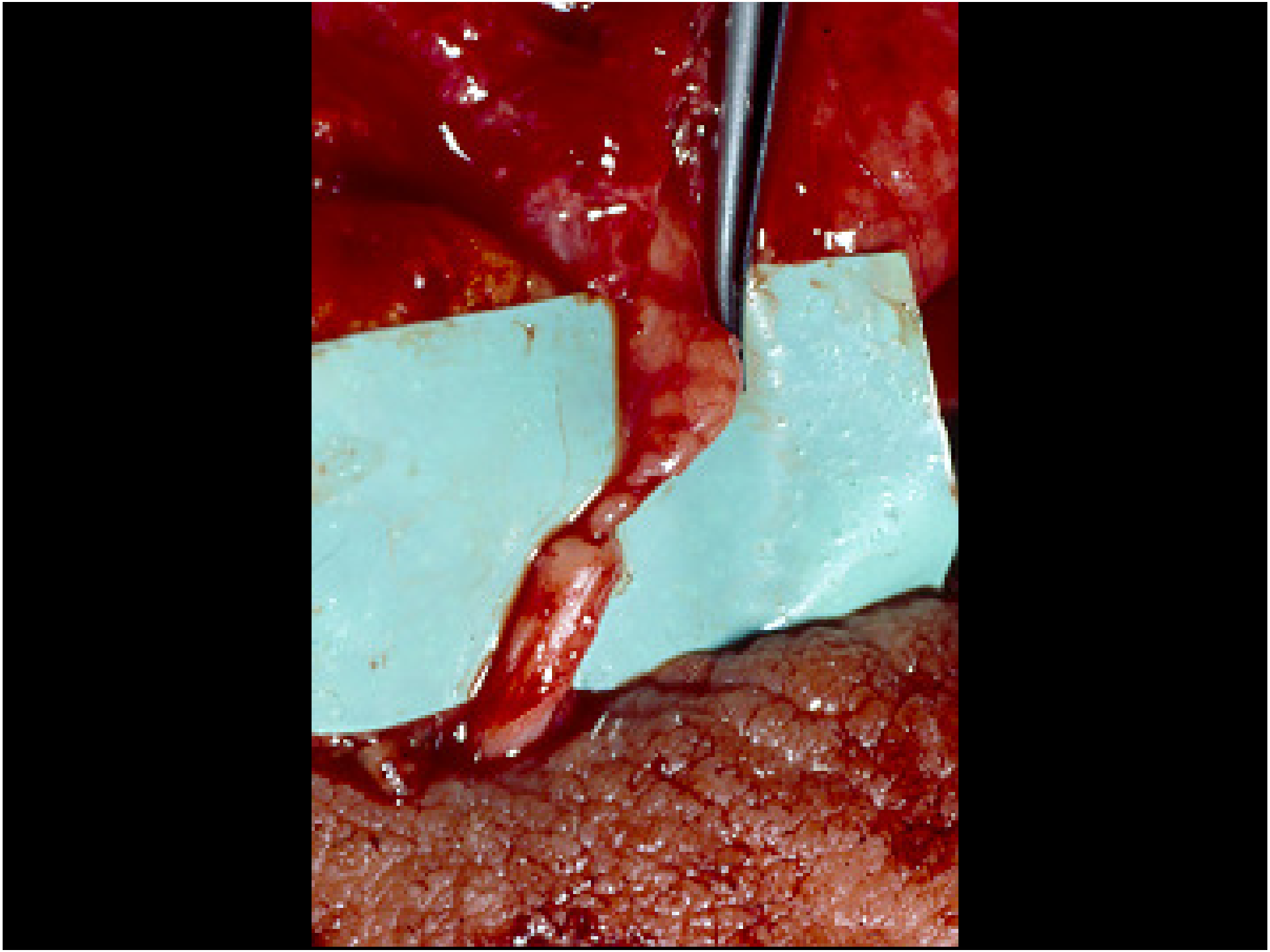
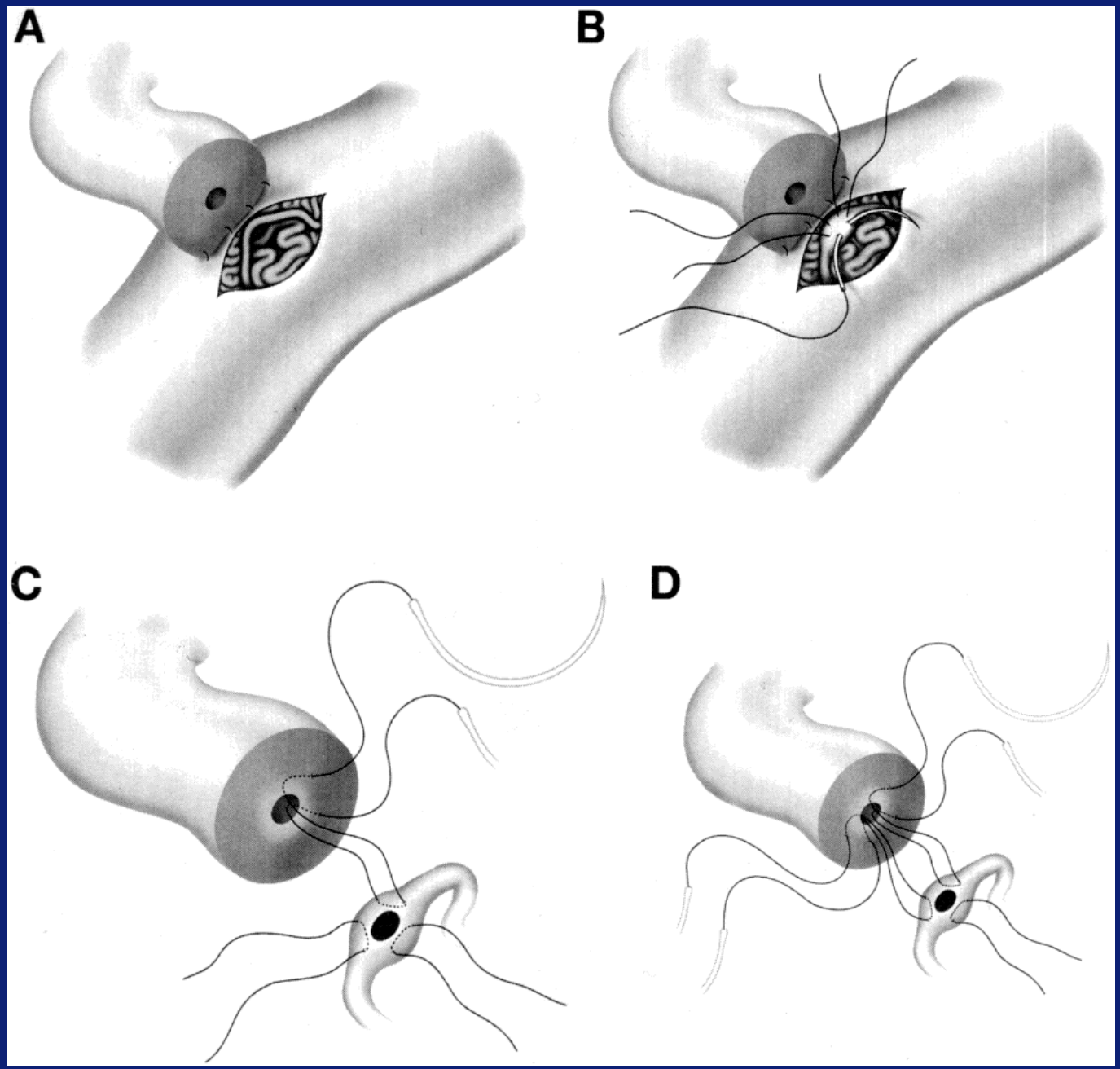
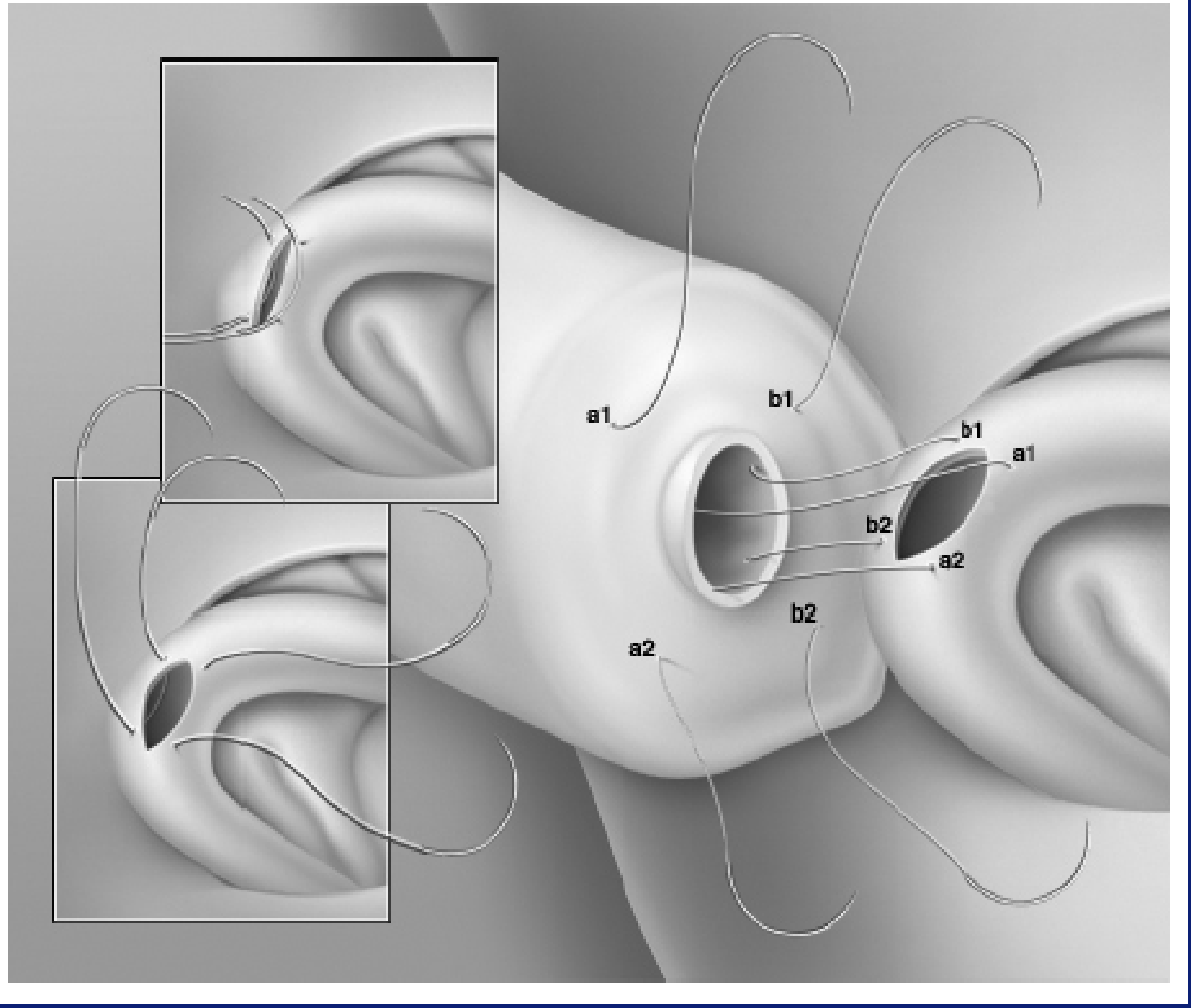

Vas deferens
Vasal ampulla
Seminal vesicle
Ejaculatory duct
Bladder
Verumontanum
Prostatic urethra
Ejaculatory ducts








A
B
C
D



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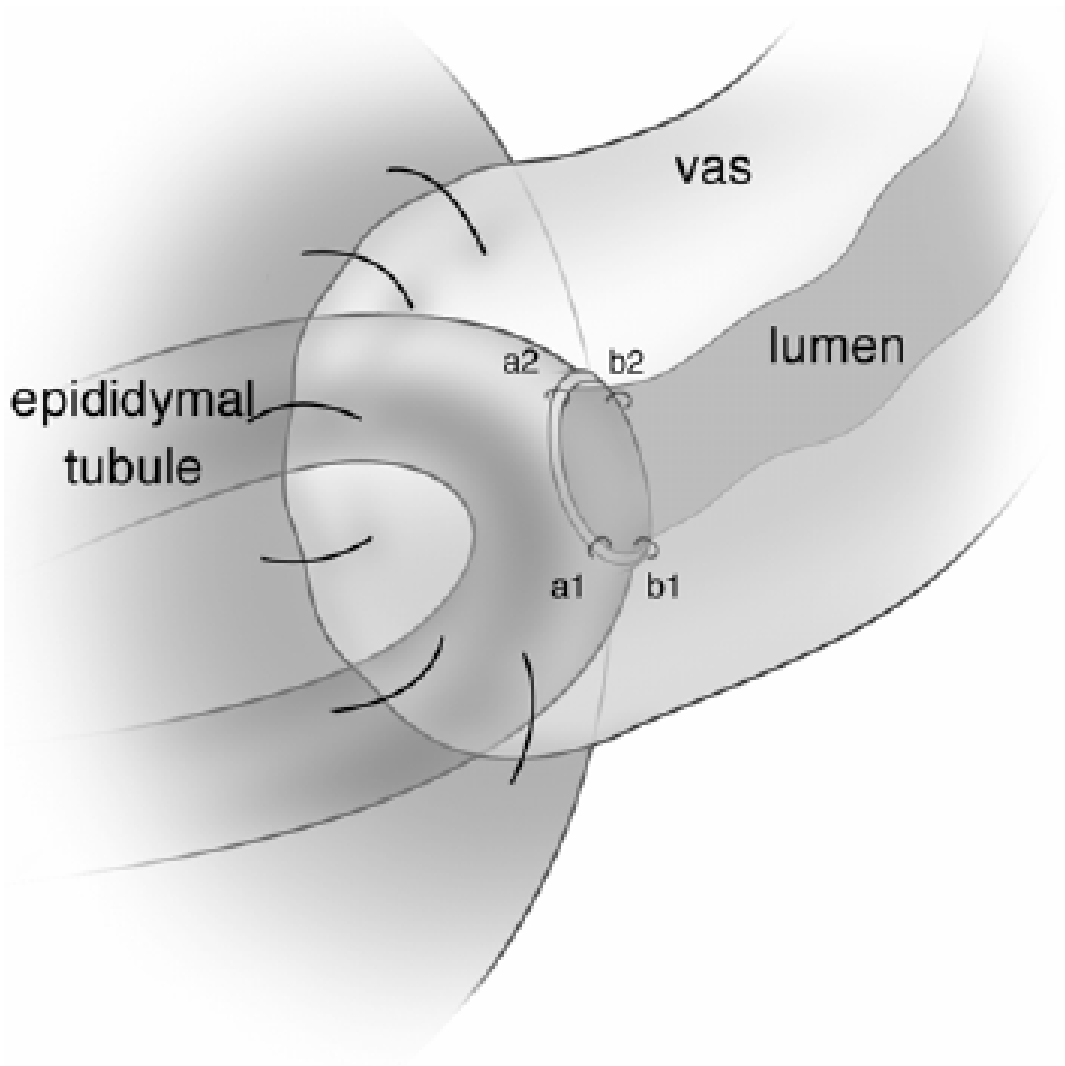

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TREATMENT OPTIONS

In case of obstructive azoospermia: scrotal exploration - vasography - vaso-epididymostomy

Succes rate: 25-40% pregnancies.

In case of Low volume ejaculate and severe oligozoospermia: Transurethral resection of the ejaculatory ducts (TURED).

Success rate: 25% pregnancies

In case of failure: Sperm aspiration and ICSI.

Success rate: 25% pregnancies per treatment cycle

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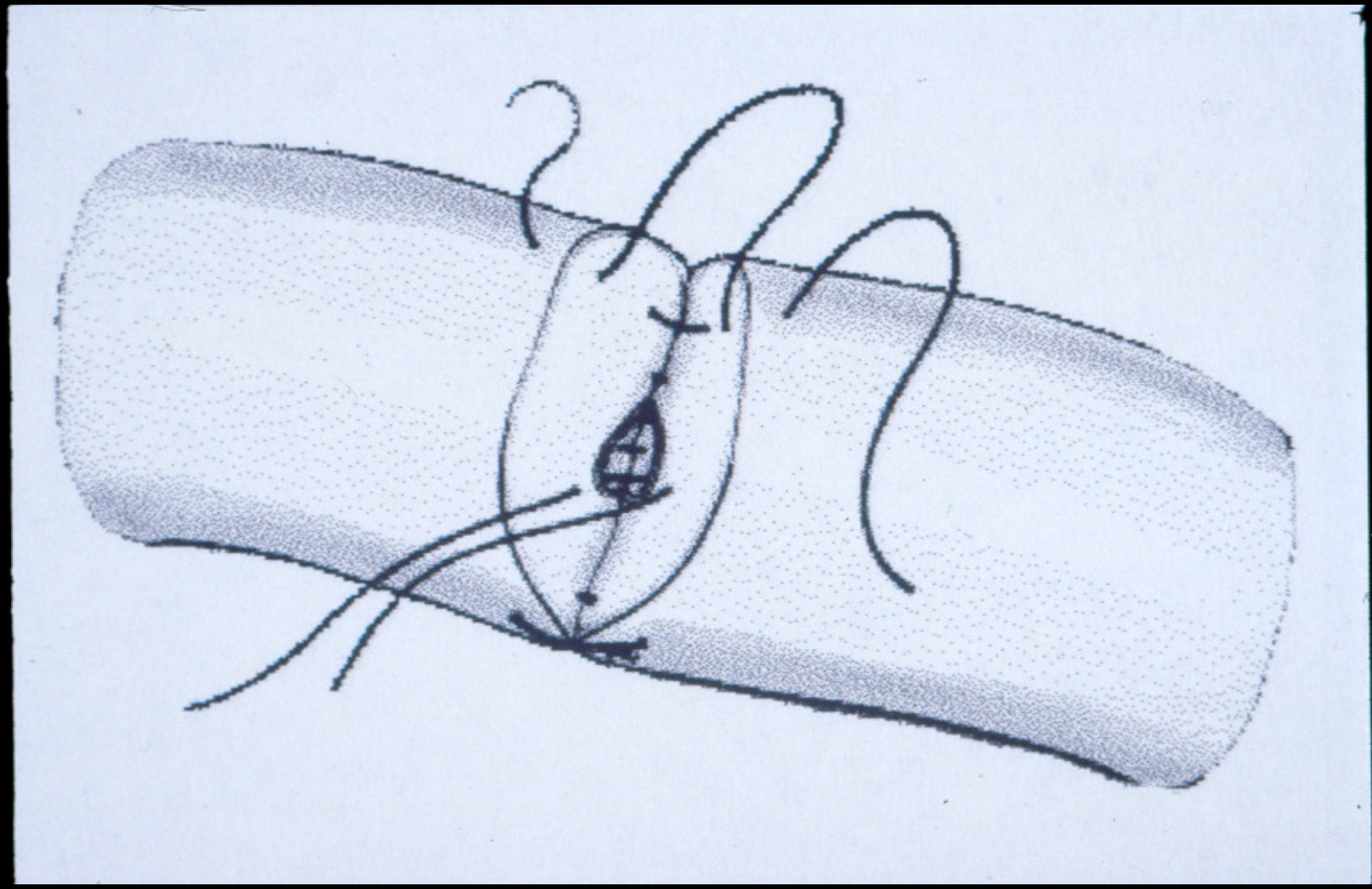

STUDY

From 1998 to 2002 a modified one-layer VVS was performed in 223 men.

Semen analysis was performed after 3 and 6 months (WHO-criteria)

The results of spontaneous pregnancies and assisted reproductive techniques were evaluated by questionnaires.

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	Percentage	pregnancy (%)	No pregnancy (%)
Normal sperm count	22%	65%	35%
Mild oligospermia	37%	33%	67%
severe oligospermia	18%	13%	87%
Azoöspermia	23%	-	100%
Motility < 10%	42%	40%	60%

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RESULTS (1)

A correlation was found between the obstructive interval and the spontaneous pregnancy rate (Fig.1)

After an interval < 10 years patency was found in 84% and pregnancy in 50%.

After an interval > 10 years patency was found in 66% and pregnancy in 23%.

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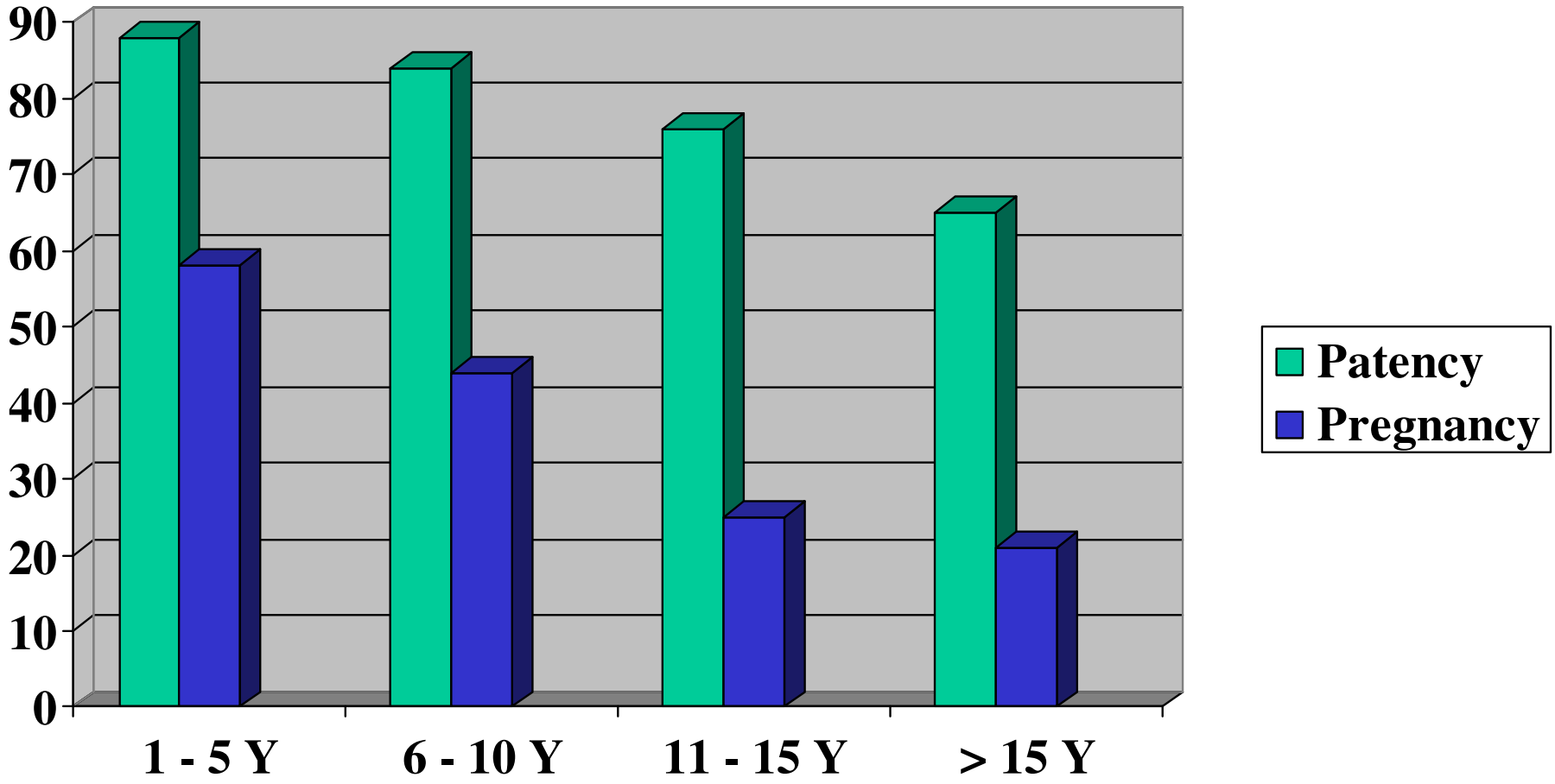
90
80
70
60
50
40
30
20
10
0
1 - 5 Y
6 - 10 Y
11 - 15 Y
> 15 Y
Patency
Pregnancy

TABLE 2: results of the sperm count, sperm progressive motility and antisperm antibody (MAR) test according to the lenght of the obstructive interval between vasectomy and reversal.

SPERM COUNT	< 1,0 MILJ./ML (%)	1,0-20 MILJ./ML (%)	> 20 MILJ./ML (%)	< 10% MOTILITY (%)	MAR-TEST POS. (%)
OBSTRUCTIVE INTERVAL < 10 YEARS	8/62 (12.9)	34/62 (54.8)	20/62 (32.3)	9/30 (30.0)	29/41 (70.7)
OBSTRUCTIVE INTERVAL > 10 YEARS	14/77 (18.2)	42/77 (54.5)	21/77 (27.3)	25/46 (54.3)	18/31 (58.1)
Student`s T-test (P-value)	N.S.	N.S.	N.S.	P = 0.025	N.S. (P=0.49)

RESULTS ART

Assisted reproduction (IUI,IVF,ICSI) was performed in couples with patency, but without spontaneous pregnancy and resulted in 20% ongoing pregnancies per couple

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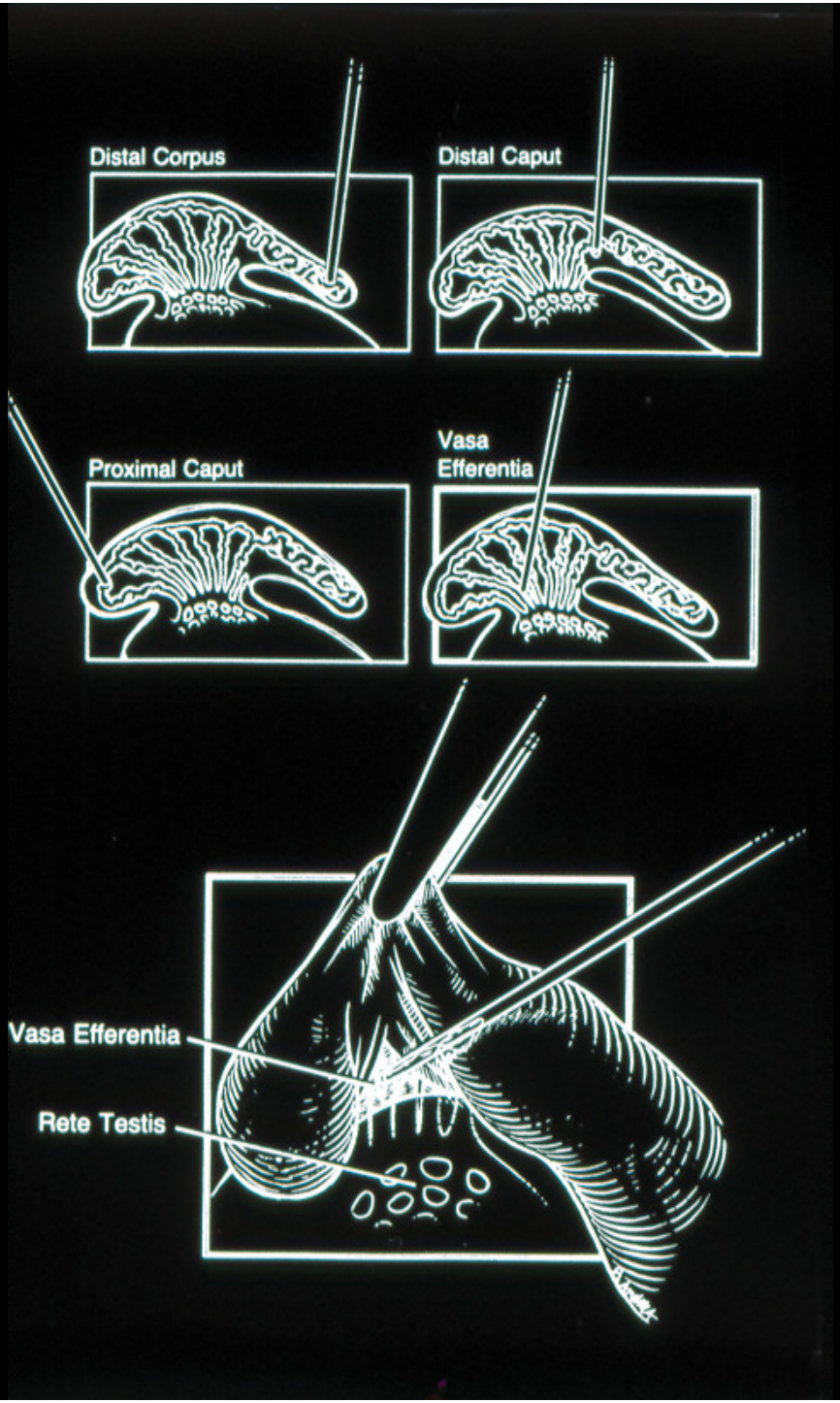
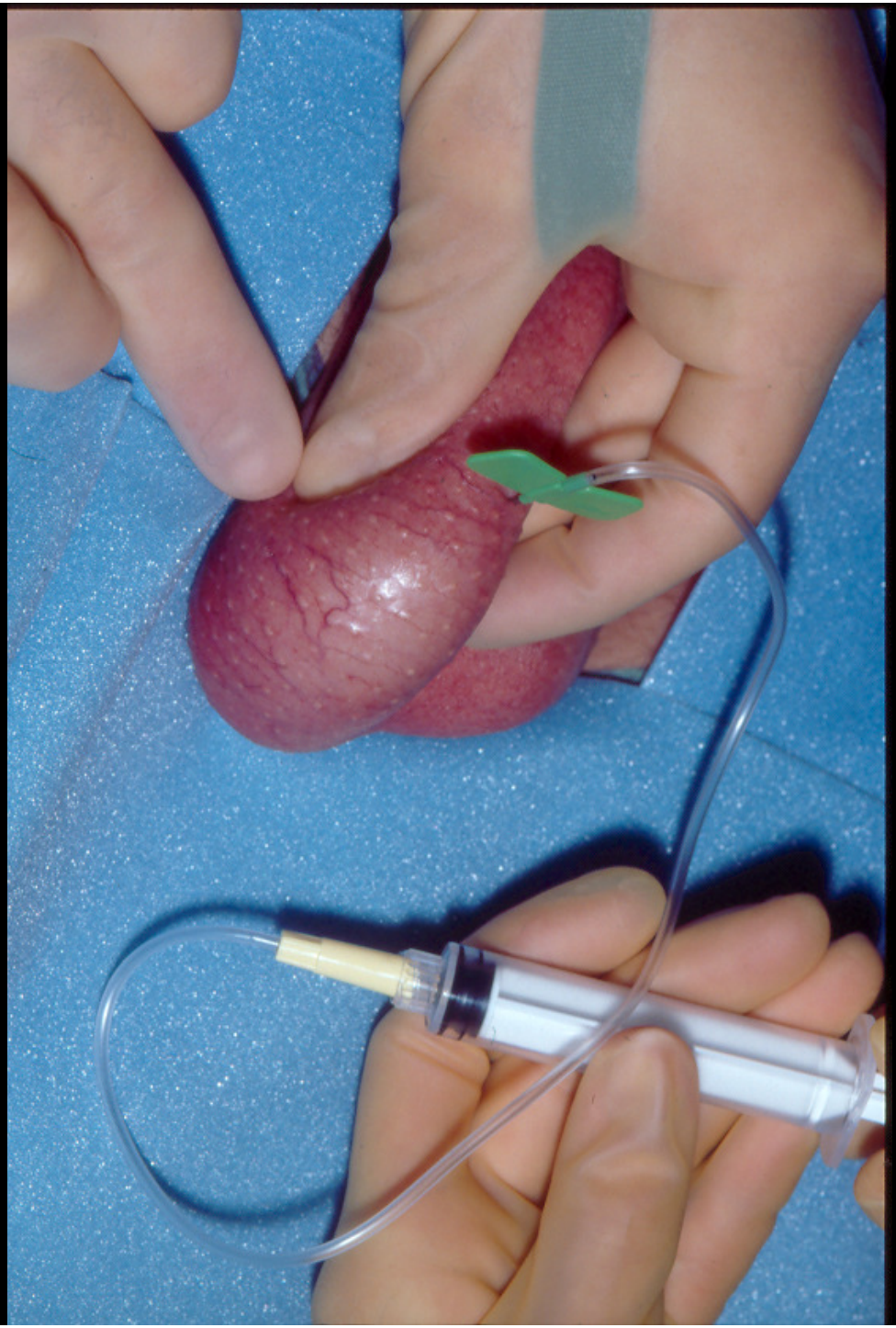
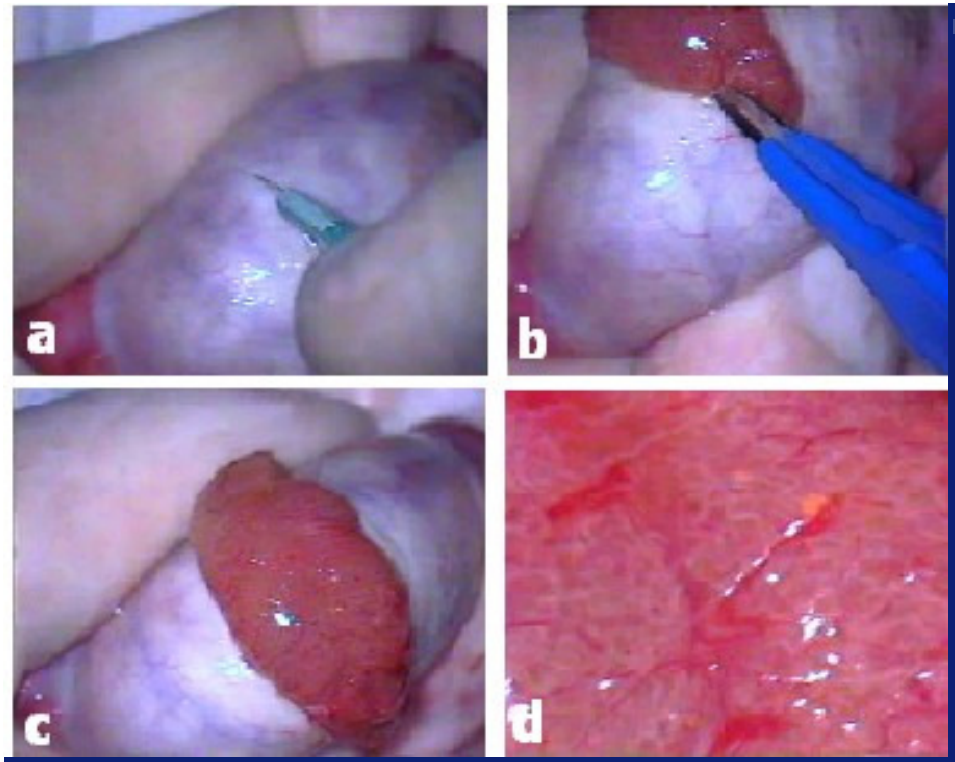
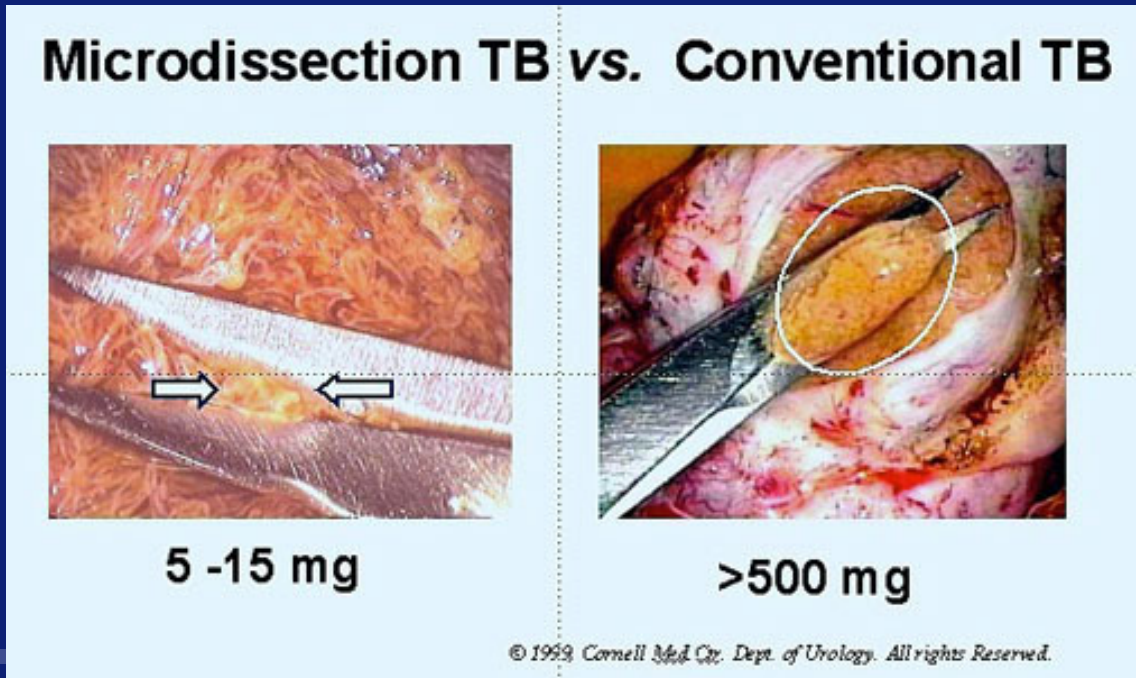

Distal Corpus
Distal Caput
Proximal Caput
Vasa
Efferentia
Vasa Efferentia
Rete Testis





TESTICULAR SPERM EXTRACTION (TeSE)

MICRO-TeSE



RESULTS (2) PARTNER`S AGE

The age of the partner as a prognostic factor:

33 men had a partner > 36 years

Spontaneous pregnancy occurred in 8/36 (20%)

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RESULTS ART (1) (data from Tournaye H.)

In Brussels MESA or TESE with ICSI was performed in couples after failed VVS in men with female partners >36 years.

The mean age of the partners was 39,2 years.

129 cycles resulted in 21 deliveries (16,2% per cycle)

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COST IN EURO`S FOR A VASOVASOSTOMY (vvs) PROCEDURE AND A MESA/TeSE AND ICSI PROCEDURE

	VVS	MESA/TESE and ICSI
Cost/delivery, DM	3,610.40	3,610.40
Twins (% × 5,718 DM)	40.03	1,143.79
Triplets (% × 6,530 DM)	6.53	130.61
Cost/VVS, DM	1,800	–
Cost/MESA or TESE, DM	–	720
Cost/ICSI cycle, DM	–	5,800
4 cycles/1 life newborn, DM	–	17,400
Total costs, DM	5,447.06	28,804.80
Euro	2,793.36	14,547.88

From: Heidenreich A, Altmann P, Engelmann UH. Eur Urol 2000 37:609-14

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VASECTOMY REVERSAL OR ICSI

The results of the VVS procedure are depending mainly on the duration of the obstructive interval between vasectomy and reversal and the age of the female partner.

After an interval >10 years progressive loss of semen quality is found after VVS, especially loss of sperm motility.

ICSI with surgically retrieved spermatozoa after vasectomy in men with partners > 36 years probably does not result in more pregnancies compared to VVS.

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