O que mudou na interpretação da análise seminal OMS 2010?

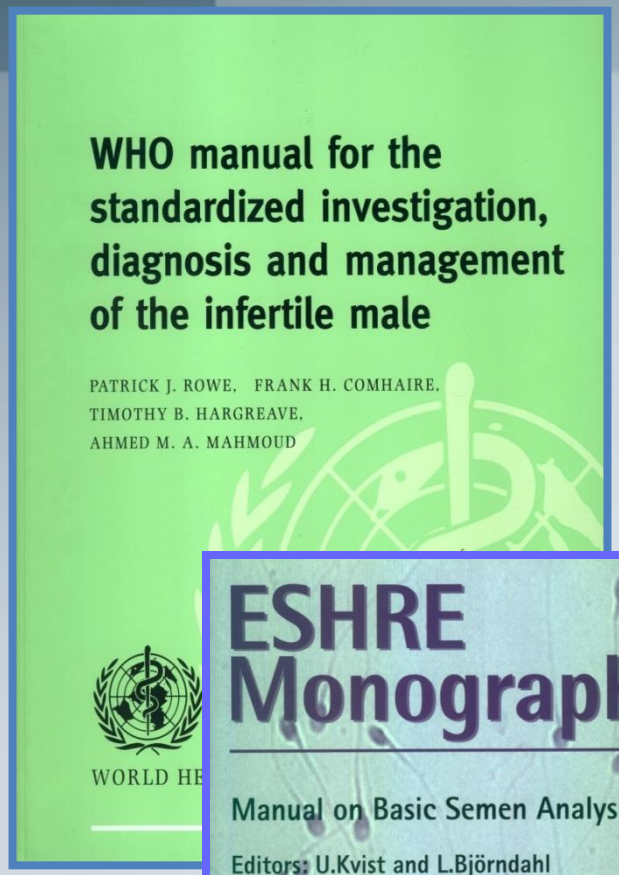
Reunião Científica Sapientiae
25.06.2015

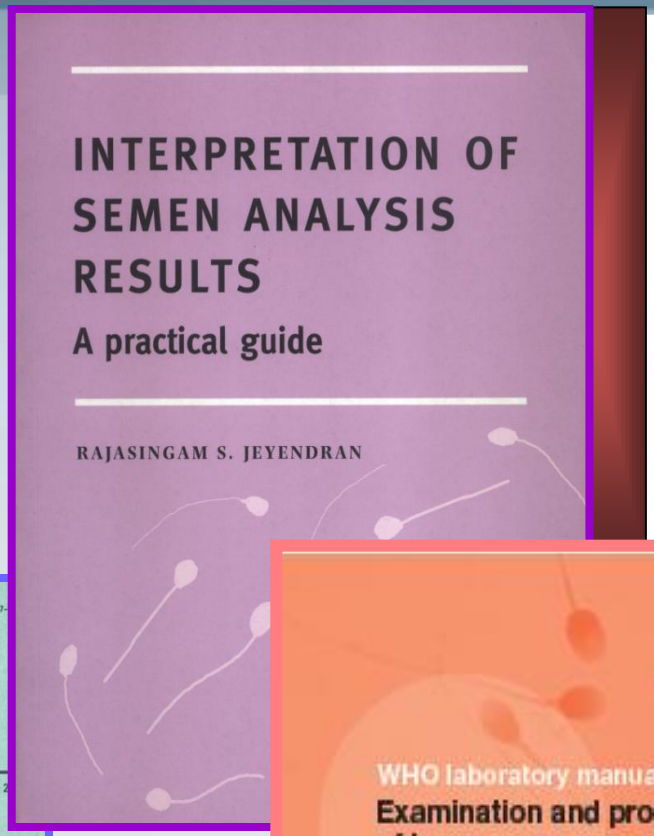
Edson Borges Jr.

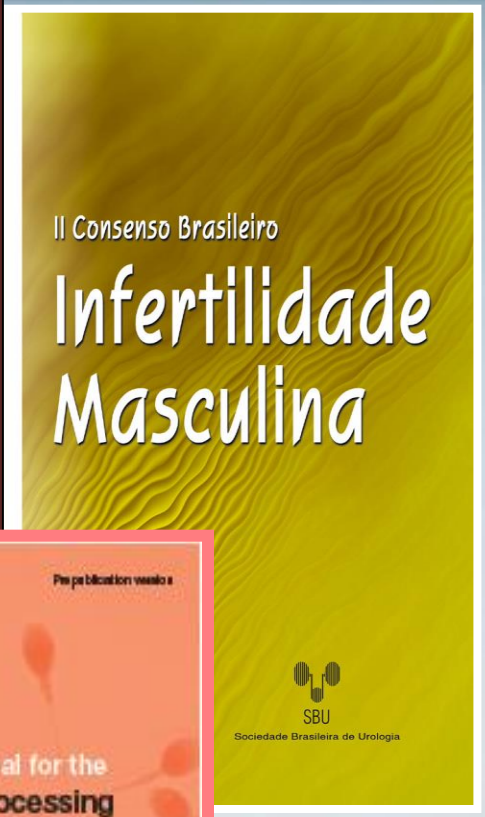
FERTILITY

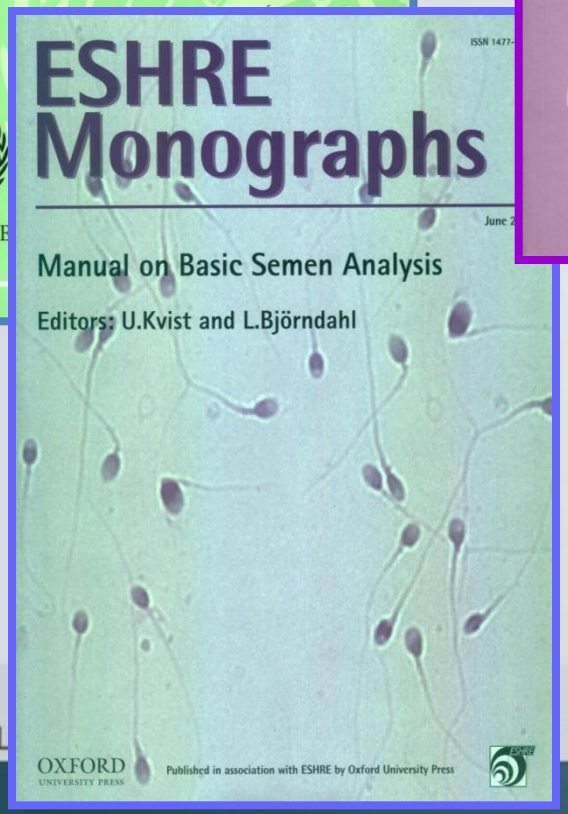
Análise Seminal

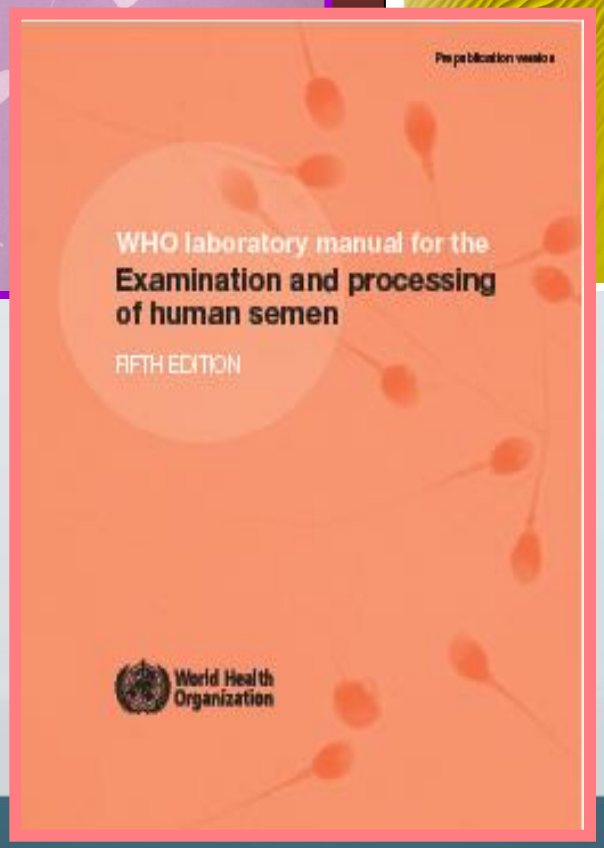
VAN LEEUWENHOEK	1677
SIMS	1866
WEISMAN	1940
AMERICAN FERTILITY ASS	1951
FREUND	1966
ELIASSON	1971
O.M.S.	***1980/87/92/99 /2010***


WHO manual for the standardized investigation, diagnosis and management of the infertile male
PATRICK J. ROWE, FRANK H. COMHAIRE,
TIMOTHY B. HARGREAVE,
AHMED M. A. MAHMOUD
WORLD HE


INTERPRETATION OF SEMEN ANALYSIS RESULTS
A practical guide
RAJASINGAM S. JEYENDRAN


II Consenso Brasileiro
Infertilidade Masculina
SBU
Sociedade Brasileira de Urologia


ESHRE Monographs
Manual on Basic Semen Analysis
Editors: U.Kvist and L.Björndahl
OXFORD UNIVERSITY PRESS
Published in association with ESHRE by Oxford University Press


WHO laboratory manual for the
Examination and processing of human semen
FIFTH EDITION
World Health Organization

FERTIL

Human Reproduction Update, Vol.16, No.3 pp. 231–245, 2010
Advanced Access publication on November 24, 2009 doi:10.1093/humupd/dmp048

human reproduction update

World Health Organization reference values for human semen characteristics*‡

Trevor G. Cooper[1,10], Elizabeth Noonan[2], Sigrid von Eckardstein[3], Jacques Auger[4], H.W. Gordon Baker[5], Hermann M. Behre[6], Trine B. Haugen[7], Thinus Kruger[8], Christina Wang[9], Michael T. Mbizvo[3,†], and Kirsten M. Vogelsong[3,†]

- 4.500 amostras seminais
- 14 países
- 4 continentes

População estudada

i. Homens férteis TTP < 12 meses; n=1.953

ii. População geral, jovens, fertilidade desconhecida; n=965

iii. Homens normozoospérmicos OMS 1999; n=934

iv. Homens férteis TTP desconhecido; n=817

Table II Distribution of values, lower reference limits and their 95% CI for semen parameters from fertile men whose partners had a time-to-pregnancy of 12 months or less

	N	Centiles										
		2.5	(95% CI)	5	(95% CI)	10	25	50	75	90	95	97.5
Semen volume (ml)	1941	1.2	(1.0–1.3)	1.5	(1.4–1.7)	2	2.7	3.7	4.8	6	6.8	7.6
Sperm concentration (10^6/ml)	1859	9	(8–11)	15	(12–16)	22	41	73	116	169	213	259
Total number (10^6/Ejaculate)	1859	23	(18–29)	39	(33–46)	69	142	255	422	647	802	928
Total motility (PR + NP, %)*	1781	34	(33–37)	40	(38–42)	45	53	61	69	75	78	81
Progressive motility (PR, %)*	1780	28	(25–29)	32	(31–34)	39	47	55	62	69	72	75
Normal forms (%)	1851	3	(2.0–3.0)	4	(3.0–4.0)	5.5	9	15	24.5	36	44	48
Vitality (%)	428	53	(48–56)	58	(55–63)	64	72	79	84	88	91	92

*PR, progressive motility (WHO, 1999 grades a + b); NP, non-progressive motility (WHO, 1999 grade c).
The values are from unweighted raw data. For a two-sided distribution the 2.5th and 97.5th centiles provide the reference limits; for a one-sided distribution the fifth centile provides the lower reference limit.

Table III Distribution of values, lower reference limits and their 95% CI for semen parameters from the general population of unscreened men

	N	Centiles										
		2.5	(95% CI)	5	(95% CI)	10	25	50	75	90	95	97.5
Semen volume (ml)	929	0.8	(0.7–1.0)	1.2	(1.0–1.3)	1.6	2.2	3.2	4.2	5.5	6.4	7
Sperm concentration (10^6/ml)	930	4	(1–6)	9	(6–11)	17	36	64	100	192	192	237
Total number (10^6/Ejaculate)	928	11	(3–14)	20	(14–29)	45	101	196	336	619	619	772
Total motility (PR + NP, %)*	928	26	(14–32)	36	(32–39)	45	55	62	70	85	85	88
Progressive motility (PR, %)*	708	20	(7–27)	31	(26–34)	39	49	57	65	78	78	81
Normal forms (%)	137	3.5	(2.0–4.5)	4.7	(3.8–5.5)	7	10.5	14	16	23.2	23.2	30

*PR, progressive motility (WHO, 1999 grades a + b); NP, non-progressive motility (WHO, 1999 grade c).
The values are from unweighted raw data. For a two-sided distribution the 2.5th and 97.5th centiles provide the reference limits; for a one-sided distribution the fifth centile provides the lower reference limit.

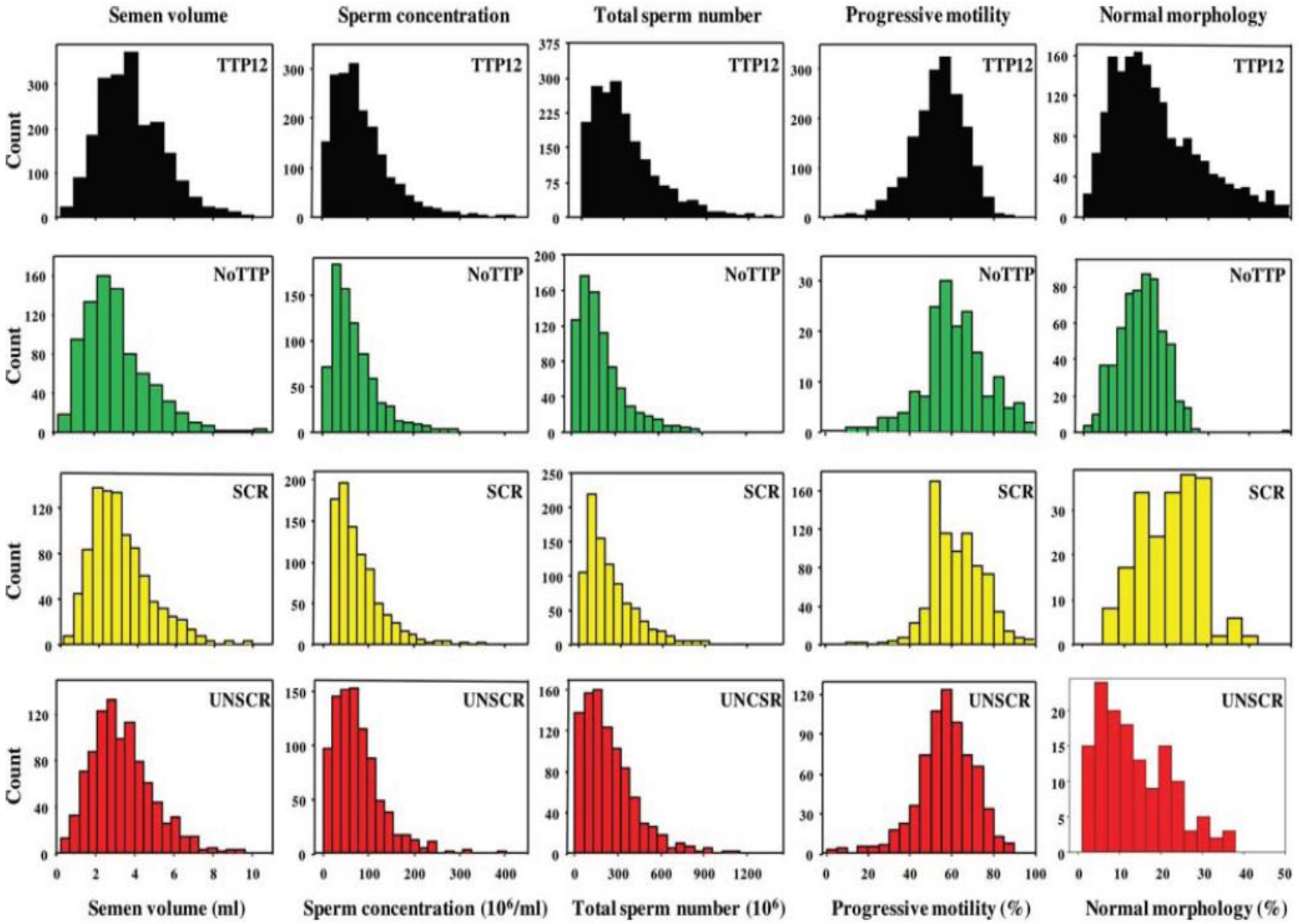
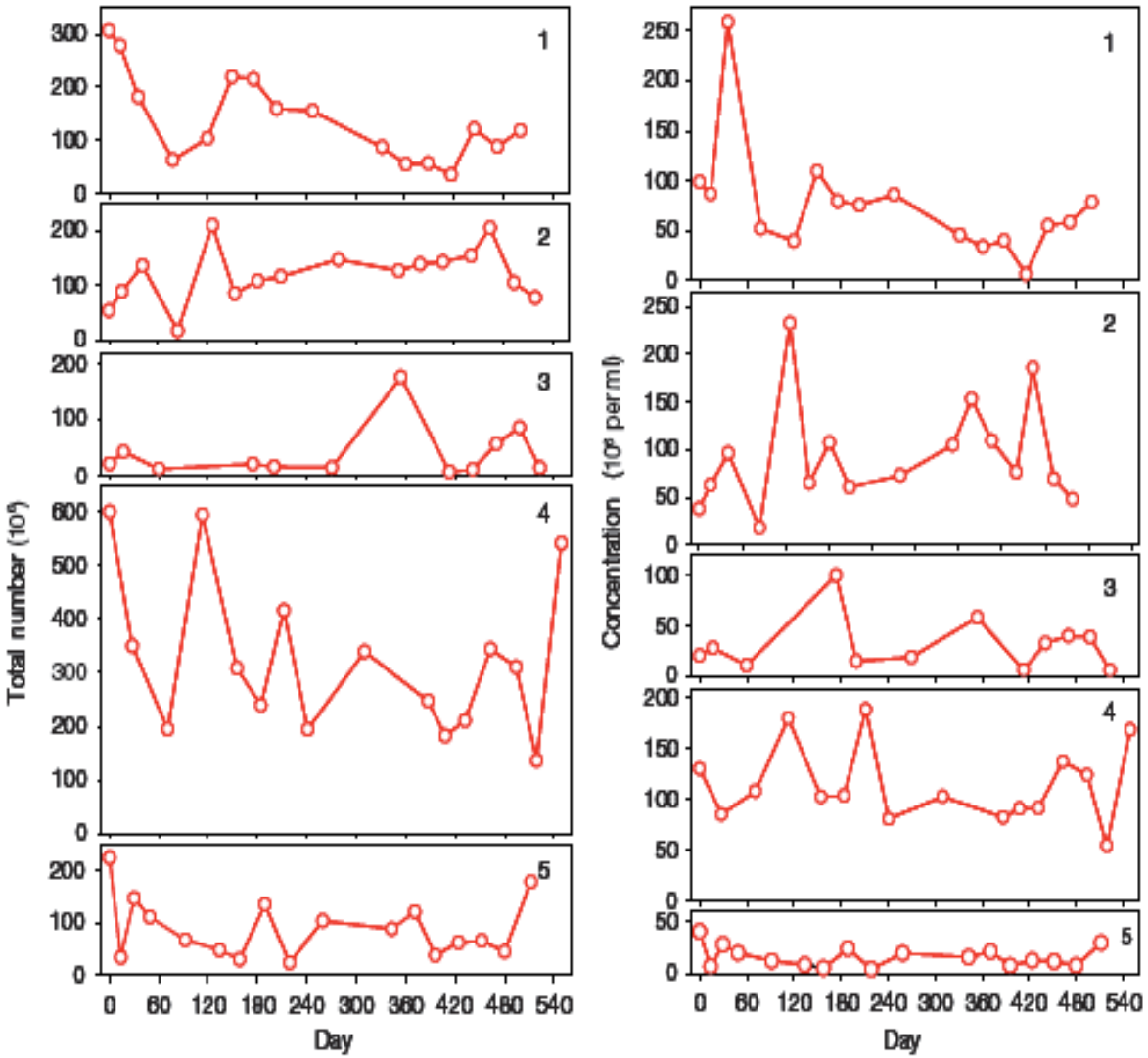

Semen volume
Sperm concentration
Total sperm number
Progressive motility
Normal morphology
TTP12
NoTTP
SCR
UNSCR
UNCSR
Count
Semen volume (ml)
Sperm concentration (10⁶/ml)
Total sperm number (10⁶)
Progressive motility (%)
Normal morphology (%)

Fig. 2.1 Variation in total number of spermatozoa and sperm concentration over a one-and-a-half-year period



CLINICS

REVIEW

CLINICS 2013;68(S1):35-38

The importance of semen analysis in the context of azoospermia

Nabil Aziz

Liverpool Women's Hospital & The University of Liverpool, Liverpool, United Kingdom

Reference	Recommended centrifugation
Mortimer (1994) (23)	1000 x *g* for 15 minutes
the Nordic Association for Andrology (24)	*At least* 1000 x *g* for 15 minutes
WHO manual (1999) (25)	600 x *g* for 15 minutes to concentrate samples with low sperm counts (less than 2 sperm per 400x field) *Less than* 3000 x *g* for 15 minutes for all samples in which spermatozoa are not detected
Corea et al. (2005) (20)	*A minimum* of 1000 x *g* for 15 minutes was adequate for the detection of azoospermia
WHO manual (2010) (2)	3000 x *g* for 15 minutes for all samples in which no spermatozoa are detected

18,6% Azoo Ob
22,8% Azoo NOb

Sptz móveis/imóveis

O.M.S. 1980/87/92/99/2010

Table 1. Cut-off values for semen variables as published in consecutive WHO manuals [6–9] and as proposed in the fifth World Health Organization (WHO) manual [1].

Semen variable	1980	1987	1992	1999	2010[1]
Volume (mL)	–	≥ 2.0	≥ 2.0	≥ 2.0	1.5
Concentration (10^6 mL^{-1})	20–200	≥ 20	≥ 20	≥ 20	15
Total sperm number (10^6/ejaculate)	–	≥ 40	≥ 40	≥ 40	39
Motility (% motile)	≥ 60	≥ 50 (a + b)[2]	≥ 50 (a + b)	≥ 50 (a + b)	40 (a + b + c)
Forward progression (for 1980 only)	≥ 2[3]	≥ 25 (a)	≥ 25 (a)	≥ 25 (a)	32 (a + b)
Morphology (% normal)	80.5[4]	≥ 50	≥ 30[5]	(14)[6]	4
Viability/vitality (% live)	–	≥ 50	≥ 75	≥ 75	58
White blood cells (10^6 mL^{-1})	< 4.7	< 1.0	< 1.0	< 1.0	< 1.0

Abnormal sperm count and motility on semen analysis are not sufficiently predictive of abnormal Kruger morphology

Sara S. Morelli, M.D.[a]
Aimee Seungdamrong, M.D.[a,b]
David H. McCulloh, Ph.D.[a,b]
Peter G. McGovern, M.D.[a,b]

Fertility and Sterility® Vol. 94, No. 7, December 2010

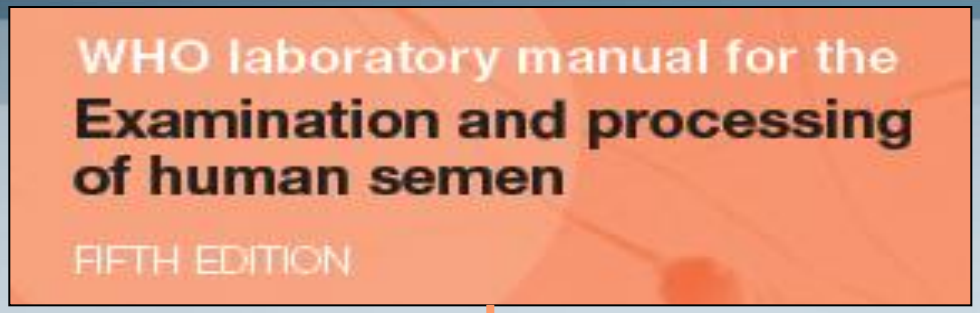
Abnormal morphology by Kruger's strict criteria cannot be predicted reliably by the presence of other abnormal parameters on semen analysis. Assessment of Kruger morphology therefore remains a necessary component of a complete semen analysis in the workup of the infertile couple. (Fertil Steril® 2010;94:2882–4. ©2010 by American Society for Reproductive Medicine.)

TABLE 1

Classification of semen analyses.

Count ($\geq 2 \times 10^7$/mL)	Motility (≥50%)	Kruger morphology (>4%)	No.	Percentage of total
Low	Low	Low	158	11
Low	Low	Normal	58	4
Low	Normal	Low	48	3
Low	Normal	Normal	41	3
Normal	Low	Low	69	5
Normal	Low	Normal	92	7
Normal	Normal	Low	187	14
Normal	Normal	Normal	731	53
Total			1,384	

Morelli. Correspondence. Fertil Steril 2010.



- Volume: ≥ 1,5 ml
- PH: ≥ 7,2
- Cor: branco opaco ou branco acinzentado
- Liquefação: < 30 minutos
- Concentração: ≥ 15x 10^6 / ml
  > 39 milhões / ejaculado
- Motilidade: > 40% (32% A+B)

  A – progressão rápida
  B – progressão lenta
  C – sem progressão
  D – imóveis

- Morfologia: ≥ 4 % Kruger
- Vitalidade: >58%
- Células redondas:
  Leucócitos ≤ 10^6 / ml
- Análise imunológica – espermatozóides móveis aglutinados com as partículas
  MAR test / Imonobeads: positivo ≥ 50%

WHO laboratory manual for the

Examination and processing of human semen

FIFTH EDITION

Parameter	Lower reference limit
Semen volume (ml)	1.5 (1.4–1.7)
Total sperm number (10^6 per ejaculate)	39 (33–46)
Sperm concentration (10^6 per ml)	15 (12–16)
Total motility (PR+NP, %)	40 (38–42)
Progressive motility (PR, %)	32 (31–34)
Vitality (live spermatozoa, %)	58 (55–63)
Sperm morphology (normal forms, %)	4 (3.0–4.0)
Other consensus threshold values	
pH	≥7.2
Peroxidase-positive leukocytes (10^6 per ml)	<1.0
MAR test (motile spermatozoa with bound particles, %)	<50
Immunobead test (motile spermatozoa with bound beads, %)	<50
Seminal zinc (μmol/ejaculate)	≥2.4
Seminal fructose (μmol/ejaculate)	≥13
Seminal neutral glucosidase (mU/ejaculate)	≥20

Manual OMS 2010: limitações

- Coleta seminal única
- População de TTP < 12 meses; correto seria população geral??
- Um único país A.L. (Chile); variações populacionais??
- Discordância com outras publicações criteriosas !!

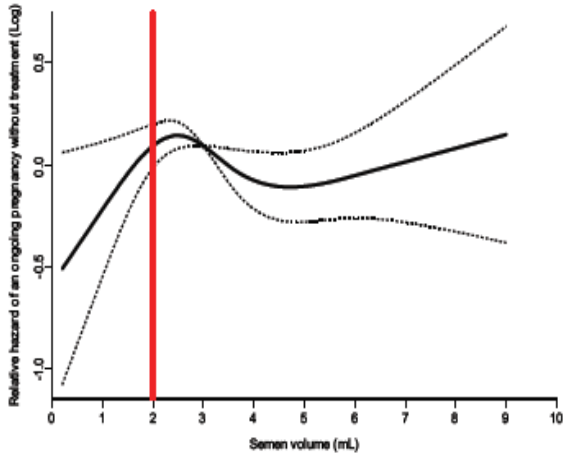
Role of semen analysis in subfertile couples

Fertility and Sterility® Vol. 95, No. 3, March 1, 2011 1013

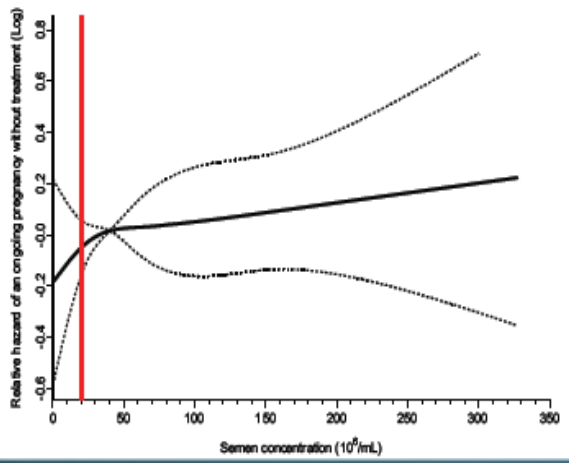
Jan W. van der Steeg, Ph.D. M.D.,[a,c,d] Pieternel Steures, Ph.D. M.D.,[a,c,d] Marinus J. C. Eijkemans, Ph.D.,[c] J. Dik F. Habbema, Ph.D.,[c] Peter G. A. Hompes, Ph.D., M.D.,[d] Jan A. M. Kremer, M.D.,[e] Loes van der Leeuw-Harmsen, Ph.D., M.D.,[f] Patrick M. M. Bossuyt, Ph.D.,[b] Sjoerd Repping, Ph.D.,[a] Sherman J. Silber, Ph.D., M.D.,[h] Ben W. J. Mol, M.D.,[a,g] and Fulco van der Veen, M.D.,[a] for the Collaborative Effort for Clinical Evaluation in Reproductive Medicine Study Group

Patient(s): A total of 3,345 consecutive couples presenting for subfertility.

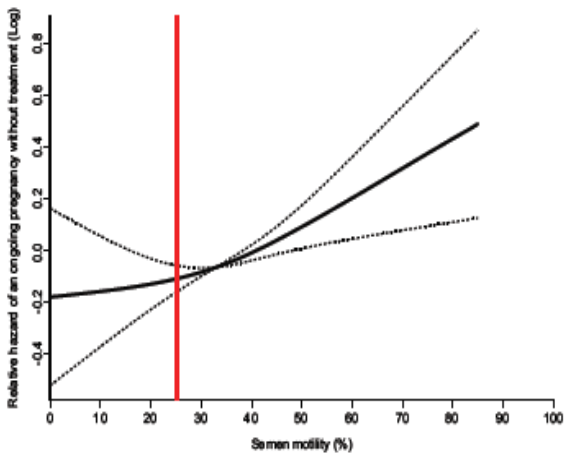
A volume

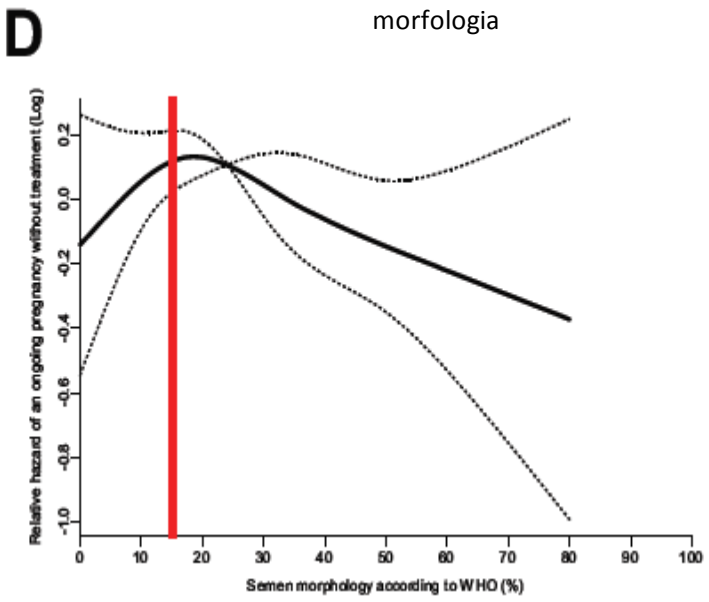


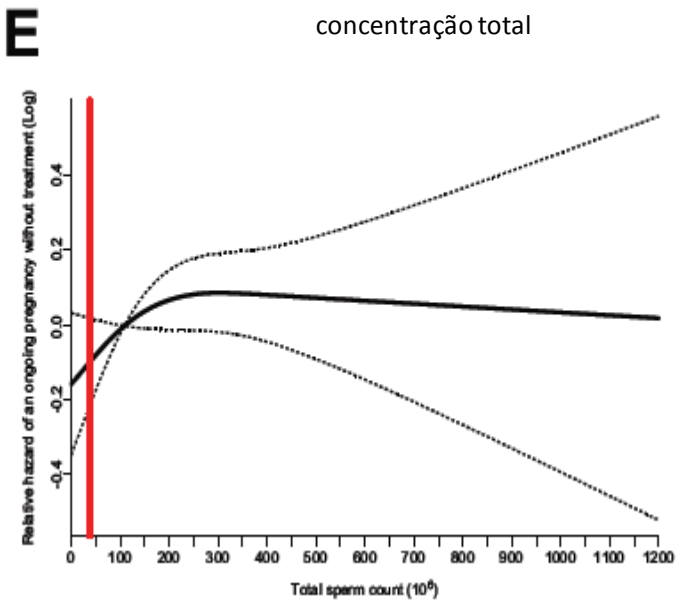
B concentração/ml



C motilidade







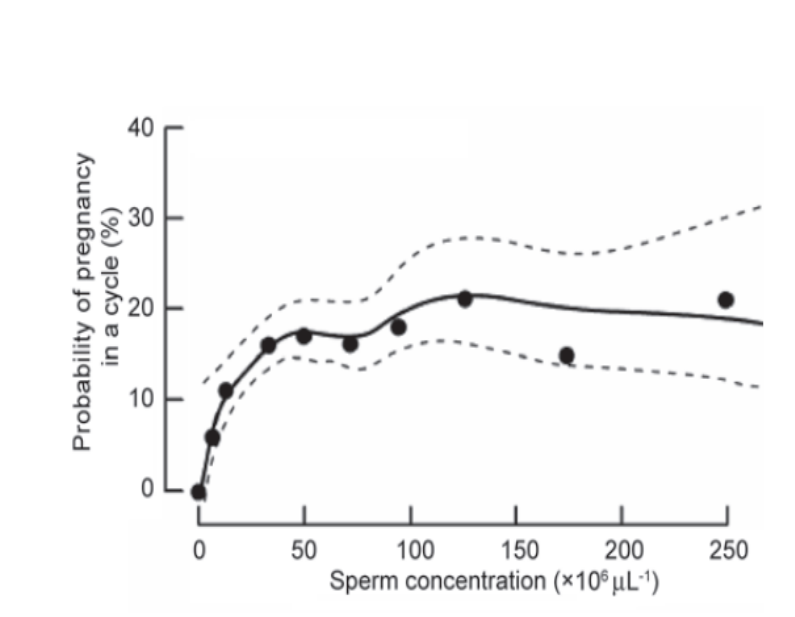
Result(s): Follow-up data of 3,129 couples (94%) were available, of which 517 (17%) had a healthy pregnancy without treatment. The 1-year pregnancy rate in men with WHO normozoospermia did not differ significantly from that in men with WHO impaired semen (24% vs. 23%). In contrast, we observed lower chances of fathering a child for sperm concentrations $<40 \times 10^6$/mL, total sperm count $<200 \times 10^6$, and sperm morphology <20% normal forms. With a multivariable regression model based on the redefined male semen subfertility criteria we were able to make a finer differentiation between subfertile men, with probabilities of fathering a child ranging from 7% to 41%.

Normal reference ranges for semen quality and their relations to fecundity

Asian Journal of Andrology (2010) 12: 95–98.

Niels E. Skakkebaek

University Department of Growth and Reproduction, Rigshospitalet, Copenhagen DK-2100, Denmark



Abstract

Several recent studies have shown that the fecundity of a man decreases progressively with sperm concentrations below 40 million spermatozoa per mL. Therefore, it is unfortunate that the new World Health Organization guidelines for semen analysis recommend lowering the lower cutoff value for normal sperm concentration from 20 to 15 million spermatozoa per mL. As a result large groups of subfertile men across the world may not receive appropriate andrological help in the future.

Clinical significance of the low normal sperm morphology value as proposed in the fifth edition of the WHO Laboratory Manual for the Examination and Processing of Human Semen

Roelof Menkveld

Asian Journal of Andrology (2010) 12: 47–58

Table 2. Comparison of fifth World Health Organization (WHO) manual for normal morphology values with recently published literature values.

Author	Population[1]	Cut-off value				
		Fertile	Subfertile	Infertile	TZI	AI
Van Zyl *et al*. [23, 29, 31]	*In vivo* pregnancies	20	10	3		
Kruger *et al*. [32, 33]	IVF fertilization rates					
Initial published intervals		≥ 15	14–4	≤ 3		
Intervals as used in practice		≥ 15	14–5	≤ 4		
Eggert-Kruse *et al*. [34]	*In vivo* pregnancies	14	7	4		
Ombelet *et al*. [35]						
Tenth percentile	Fertile population	10				
ROC curve analysis	Fertile *vs*. subfertile	5				
Zinaman *et al*. [36]	Healthy couples	8				
Günalp *et al*. [38]	Fertile *vs*. subfertile	12	5[2]			
Menkveld *et al*. [37]						
ROC curve analysis	Fertile *vs*. subfertile	4			1.64	8
Adjusted	Fertile *vs*. subfertile	3			2.09	3
Tenth (upper) percentile	Fertile population	2			1.82	5
Guzick *et al*. [39]	Fertile *vs*. subfertile	> 12	9–12	< 9		
Haugen *et al*. [40]						
Tenth percentile	Fertile population	4				
Fifth percentile		3			1.72	
Fifth WHO manual [1]						
Fifth percentile	Recent fathers	4				

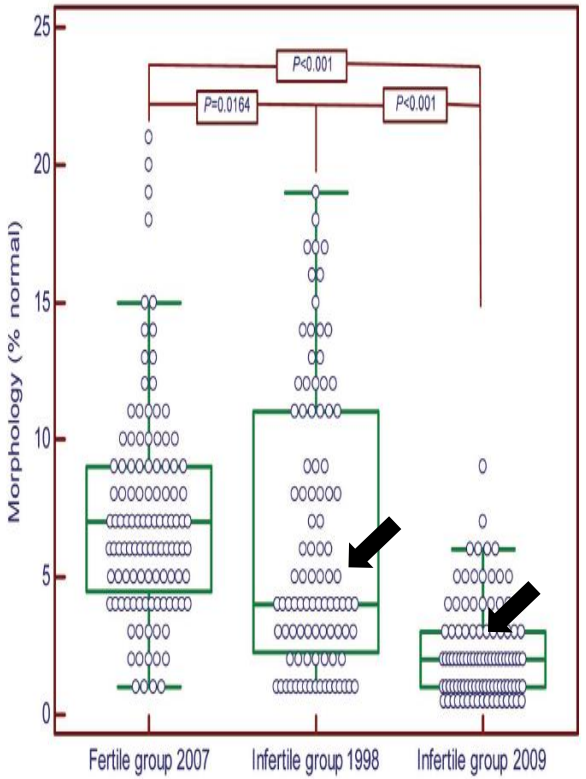
Measurement and significance of sperm morphology

Roelof Menkveld[1], Cas AG Holleboom[2] and Johann PT Rhemrev[2]

Asian Journal of Andrology (2011) 13, 59–68

Table 1 Recent published data of sperm morphology (% morphological normal) in fertile and subfertile populations

Publication	*Sperm morphology (% normal)*			
	Fertile population		*Subfertile population*	
	Mean (s.d.)	*Range*	*Mean (s.d.)*	*Range*
Ombelet *et al.*, 1997[46]	12.0	1.0–27.0	6.6	0.0–20.0
Zinaman *et al.*, 2000[47]	6.2 (3.7)	0.2–20.5	4.1(3.5)[a]	0.0–16.4
Günalp *et al.*, 2001[48]	14.9 (5.9)	2.0–30.0	10.1 (8.3)	0.0–32.0
Guzick *et al.*, 2001[49]	14.0 (5.0)	ND	11.0 (6.0)	ND
Menkveld *et al.*, 2001[44]	6.5 (3.9)	1.0–19.0	3.0 (2.6)[b]	0.0–12.0
Haugen *et al.*[c], 2006[45]	13.9 (7.6)	2.0–34.0	N/A	N/A
Jedrzejczak *et al.*, 2007[50]	15.9 (6.5)	3.0–29.0	9.3 (4.9)	0.0–19.0
Ombelet *et al.*[d], 2009[51]	7.4	0.0–23.0	N/A	N/A



Lack of compliance by UK andrology laboratories with World Health Organization recommendations for sperm morphology assessment

Human Reproduction Vol.20, No.12 pp. 3441–3445, 2005

Denise Riddell[1], Allan Pacey[2] and Kate Whittington[1,3]

been implemented in practice. METHODS: A survey of the methods used to undertake the assessment of sperm morphology during semen analysis was undertaken in 37 laboratories in the UK. RESULTS: In total, only two laboratories (5%) were compliant with all current WHO guidelines regarding morphology assessment, including methods of staining and observation, classifying and sampling methods, and the participation in internal and external quality control programmes. CONCLUSION: These results illustrate an urgent need for education and training initiatives to encourage laboratories to become compliant with current WHO guidelines for sperm morphology assessment.

National semen analysis reference range reporting: adherence to the 1999 World Health Organization guidelines 10 years later

Fertility and Sterility® Vol. 95, No. 7, June 2011

Heidi A. Penn, M.D.,[a] Andrew Windsperger, M.D.,[a] Zachary Smith, B.S.,[a] Sijo J. Parekattil, M.D.,[b] Wayne W. Kuang, M.D.,[c] Peter N. Kolettis, M.D.,[d] and Ajay K. Nangia, M.B.B.S.[a]

- *Analise Seminal:*

111 laboratorios / 31 estados USA

National semen analysis reference range reporting: adherence to the 1999 World Health Organization guidelines 10 years later

2320 Fertility and Sterility® Vol. 95, No. 7, June 2011

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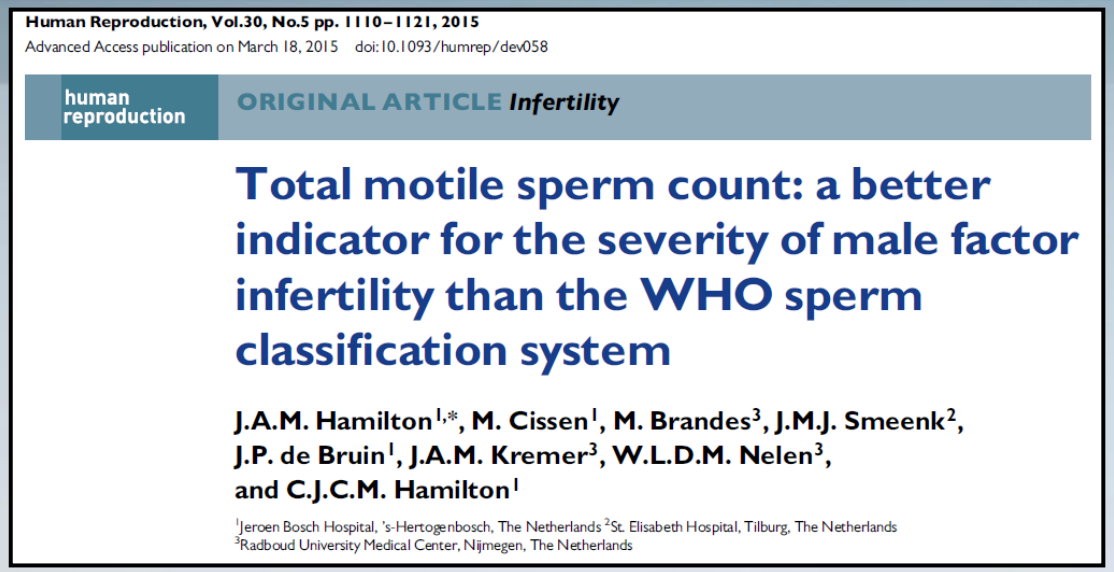
TABLE 2

Percentage of laboratories reporting semen parameters according to the 1999 WHO 4th edition manual reference values: comparison of ART vs. non-ART laboratories.

Parameter	ART	Non-ART	*P* value
No. laboratories	65	46	
Laboratories reporting all parameters recommended	21/65 (32)	5/46 (11)	.008
Laboratories reporting recommended concentration	62/65 (95)	31/46 (67)	.0004
Laboratories reporting recommended motility	50/65 (77)	28/46 (61)	.069
Laboratories reporting recommended morphology	26/65 (40)	5/46 (11)	.001



Human Reproduction, Vol.30, No.5 pp. 1110–1121, 2015
Advanced Access publication on March 18, 2015 doi:10.1093/humrep/dev058

human reproduction

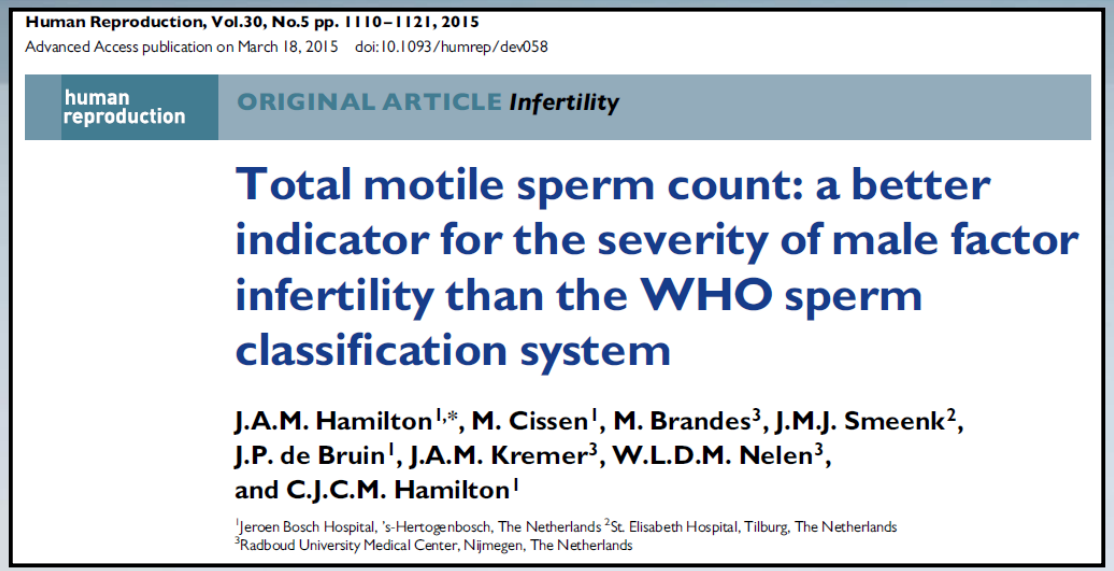
ORIGINAL ARTICLE *Infertility*

Total motile sperm count: a better indicator for the severity of male factor infertility than the WHO sperm classification system

J.A.M. Hamilton[1,*], M. Cissen[1], M. Brandes[3], J.M.J. Smeenk[2], J.P. de Bruin[1], J.A.M. Kremer[3], W.L.D.M. Nelen[3], and C.J.C.M. Hamilton[1]

[1]Jeroen Bosch Hospital, 's-Hertogenbosch, The Netherlands [2]St. Elisabeth Hospital, Tilburg, The Netherlands [3]Radboud University Medical Center, Nijmegen, The Netherlands

- ✓ TMSC = volume x conc/ml x % A+B / 100%
- ✓ TMSC: pré processamento seminal
- ✓ WHO e TMSC em gestação espontânea
- ✓ Seguimento de 3 anos
- ✓ TMSC > 20 x $10^{6:}$ normal
- ✓ 1177 casais



Human Reproduction, Vol.30, No.5 pp. 1110–1121, 2015
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Total motile sperm count: a better indicator for the severity of male factor infertility than the WHO sperm classification system

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- ✓ WHO: 76% FM – 24% normozoospermia
- ✓ TMSC: 60% FM – 40% normozoospermia

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human reproduction ORIGINAL ARTICLE *Infertility*

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TMSC groups

The same couples were also grouped according to the TMSC, calculated by multiplying the sample volume by the density and the percentage of A and B motility divided by 100% (Netwerkrichtlijn Nederlandse Huisartsen Genootschap, NVOG, 2011). Because a validated classification is missing, couples were divided into the following groups according to the degree of male infertility: group 1 TMSC $< 1 \times 10^6$ spermatozoa, group 2 TMSC $1-5 \times 10^6$, group 3 TMSC $5-10 \times 10^6$ and group 4 TMSC $10-20 \times 10^6$. A TMSC of $> 20 \times 10^6$ is considered normal. Group 5 consisted of couples for whom the first semen analysis was abnormal, but for whom the best test was normalized to a TMSC of $> 20 \times 10^6$.

Table II Characteristics of couples in the study with male infertility and unexplained infertility.

	Total cohort, $N = 1177^{\S}$	Spontaneous ongoing pregnancy, $N = 514$	No spontaneous ongoing pregnancy (=no pregnancy or pregnancy after treatment $N = 663$	*P*-value*	*P*-value**
Mean ± SD	3.0 ± 1.6 ($n = 1068$)	3.0 ± 1.5	3.0 ± 1.7	0.977	
Sperm concentration (10^6/ml)					
Mean ± SD	39.7 ± 47.0 ($n = 1068$)	46.5 ± 47.6	34.8 ± 46.0	0.000	
Motility, progressive					
Mean ± SD	32.1 ± 19.0 ($n = 1067$)	35.3 ± 18.9	29.8 ± 18.7	0.000	
A+B (%)					
Morphology (% normal)					
Mean ± SD	15.8 ± 17.6 ($n = 829$)	17.0 ± 17.5	14.8 ± 17.7	0.078	
TMSC, $N = 1070$					
Mean ± SD	43.5 ± 72.4 ($n = 1070$)	55.6 ± 77.1	34.8 ± 67.6	0.000	

Table II *Continued*

	Total cohort, *N* = 1177§	Spontaneous ongoing pregnancy, *N* = 514	No spontaneous ongoing pregnancy (= no pregnancy or pregnancy after treatment *N* = 663	*P*-value*	*P*-value**
TMSC per category (10^6)					
0–1	160 (13.6%)	37 (7.2%)	123 (18.6%)	0.000	
1–5	182 (15.5%)	48 (9.3%)	134 (20.2%)	0.000	
5–10	134 (11.4%)	56 (10.9%)	78 (11.8%)	0.641	
10–20	164 (14.0%)	66 (12.8%)	99 (14.9%)	0.305	
Normalized	61 (5.2%)	20 (3.9%)	41 (6.2%)	0.078	
Unexplained	475 (40.4%)	287 (55.8%)	188 (28.3%)	0.000	
WHO per category					0.012
O	90 (7.6%)	34 (6.6%)	56 (8.4%)	0.241	
A	294 (25.0%)	128 (24.9%)	166 (25.0%)	0.958	
T	60 (5.1%)	26 (5.1%)	34 (5.1%)	0.957	
O-A	181 (15.4%)	52 (10.1%)	129 (19.5%)	0.000	
O-T	17 (1.4%)	3 (0.6%)	14 (2.1%)	0.029	
A-T	67 (5.7%)	26 (5.1%)	41 (6.2%)	0.408	
O-A-T	143 (12.1%)	37 (7.2%)	106 (16.0%)	0.000	
Normalized	37 (3.1%)	15 (2.9%)	22 (3.3%)	0.697	
Unexplained	288 (24.5%)	193 (37.5%)	95 (14.3%)	0.000	

Table III Chance of spontaneous pregnancy in relation to the WHO groups.

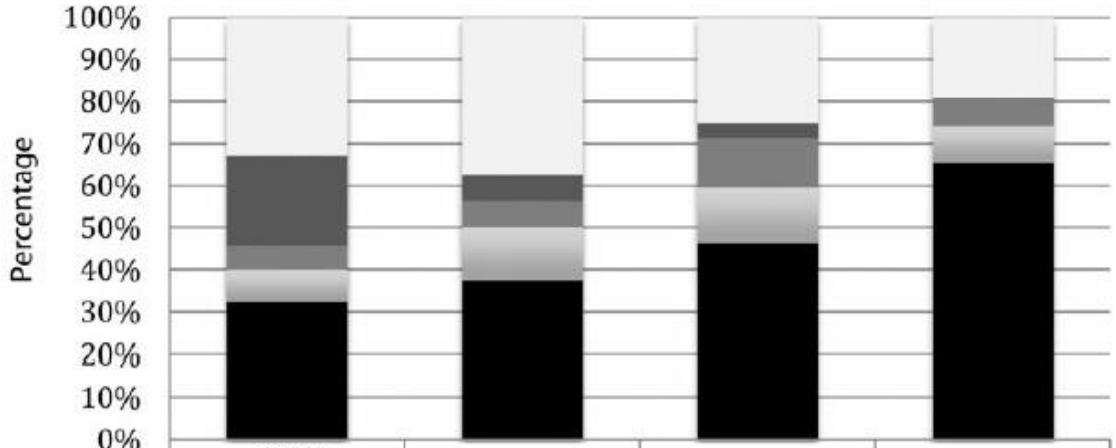
WHO group	O-T	O-A-T	O-A	O	A-T	A	T	Normalized	Unexplained
O-T	1	0.686 (0.181–2.604)	0.601 (0.161–2.247)	0.397 (0.103–1.531)	0.409 (0.104–1.617)	0.344 (0.94–1.251)	0.342 (0.086–1.356)	0.395 (0.092–1.690)	**0.136 (0.037–0.497)**
O-A-T		1	0.877 (0.525–1.465)	0.580 (0.319–1.052)	0.597 (0.310–1.149)	**0.501 (0.311–0.809**	**0.499 (0.252–0.988)**	0.576 (0.254–1.304)	**0.198 (0.120–0.328)**
O-A			1	0.661 (0.379–1.155)	0.681 (0.366–1.267)	**0.572 (0.373–0.877)**	0.569 (0.298–1.089)	0.657 (0.300–1.438)	**0.226 (0.143–0.357)**
O				1	1.030 (0.519–2.043)	0.865 (0.519–1.443)	0.861 (0.426–1.741)	0.993 (0.432–2.284)	**0.324 (0.200–0.584)**
A-T					1	0.840 (0.471–1.497)	0.836 (0.394–1.775)	0.965 (0.402–2.316)	**0.332 (0.183–0.603)**
A						1	0.995 (0.554–1.789)	1.148 (0.546–2.414)	**0.395 (0.275–0.568)**
T							1	1.154 (0.477–2.789	**0.397 (0.220–0.716)**
Normalized								1	**0.344 (0.162–0.733)**
Unexplained									1

Odds ratio (95% CI) after adjustment for female and male age, duration and type of infertility and the results of the PCT, using binary logistic regression analysis.
Data are bold if significant.

Table IV Chance of spontaneous pregnancy in relation to the TMSC groups.

TMSC group	0–1	1–5	5–10	10–20	Normalized	Unexplained
0–1	1	0.734 (0.437–1.234)	**0.371 (0.215–0.640)**	**0.383 (0.226–0.651)**	0.521 (0.259–1.049)	**0.171 (0.105–0.280)**
1–5		1	**0.505 (0.307–0.832)**	**0.522 (0.321–0.847)**	0.709 (0.365–1.377)	**0.233 (0.149–0.365)**
5–10			1	1.032 (0.634–1.681)	1.403 (0.723–2.722)	**0.461 (0.296–0.719)**
10–20				1	1.359 (0.712–2.594)	**0.447 (0.298–0.671)**
Normalized					1	**0.329 (0.180–0.600)**
Unexplained						1

Odds ratios (95% CI), after adjustment for female and male age, duration and type of infertility and the results of the PCT, using binary logistic regression analysis.
Data are bold if significant.



	TMSC abnormal - WHO abnormal	TMSC abnormal - WHO normal	TMSC normal - WHO abnormal	TMSC normal - WHO normal
No pregnancy	205	6	57	59
Pregnancy after ICSI	133	1	8	1
Pregnancy after IVF	36	1	27	20
Pregnancy after IUI	48	2	30	27
Spontaneous	201	6	105	202

Figure 4 Results showing where the TMSC and WHO classification systems overlap or disagree. The bars on the right and left show the outcome if the two systems are in agreement. The middle bars show the outcome if both systems give contradictory results. TMSC normal – WHO normal = 'real unexplained' infertility.

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MAIN RESULTS AND THE ROLE OF CHANCE: A total of 514 couples did and 663 couples did not achieve a SOP. All WHO groups have a lower SOPR compared with the unexplained group (ORs varying from 0.136 to 0.397). Comparing the couples within the abnormal WHO groups, there are no significant differences in SOPR, except when oligoasthenoteratozoospermia is compared with asthenozoospermia [OR 0.501 (95% CI 0.311–0.809)] and teratozoospermia [OR 0.499 (95% CI: 0.252–0.988)], and oligoasthenozoospermia is compared with asthenozoospermia [OR 0.572 (95% CI: 0.373–0.877)]. All TMSC groups have a significantly lower SOPR compared with the unexplained group (ORs varying from 0.171 to 0.461). Couples with a TMSC of $<1 \times 10^6$ and $1–5 \times 10^6$ have significantly lower SOPR compared with couples with a TMSC of $5–10 \times 10^6$ [respectively, OR 0.371 (95% CI: 0.215–0.64) and OR 0.505 (95% CI: 0.307–0.832)].

WIDER IMPLICATIONS OF THE FINDINGS: Roughly, three prognostic groups can be discerned: couples with a TMSC <5, couples with a TMSC between 5 and 20 and couples with a TMSC of more than 20×10^6 spermatozoa. We suggest using TMSC as the method of choice to express severity of male infertility.

Reproductive BioMedicine Online (2015) 30, 659–666

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ARTICLE

Cost-effectiveness of assisted conception for male subfertility

Lobke M Moolenaar [a,b,c,*], Maarje Cissen [d], Jan Peter de Bruin [d], Peter GA Hompes [b], Sjoerd Repping [a], Fulco van der Veen [a], Ben Willem J Mol [a,e]

- ✓ Mulheres ~30 anos
- ✓ TMSC entre 0 – 10 milhões
- ✓ ***Comparações:***
  - IIU c/ estímulo x FIV
  - IIU ciclo natural x FIV
  - FIV x ICSI

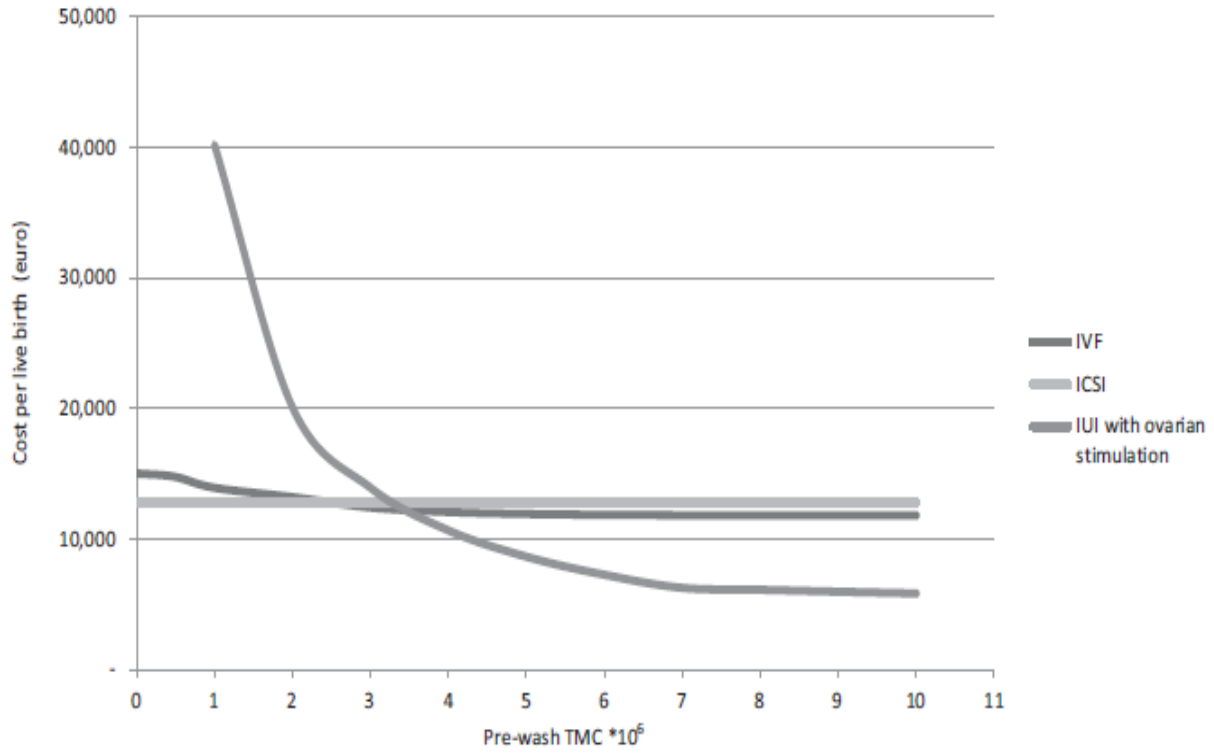

Figure 1 Cost per live birth. IUI = intrauterine insemination; ICSI = intracytoplasmic sperm injection; TMC = total motile count.

TMSC (x10⁶)	IIU	FIV/ICSI
0,1	0%	21,8%
10,0	10,2%	27,7%

FERTILITY

Approaches to improve the diagnosis and management of infertility

human reproduction update

Human Reproduction Update, Vol.15, No.4 pp. 391–408, 2009

P. Devroey[1,4], B.C.J.M. Fauser[2] and K. Diedrich[3] on behalf of the Evian Annual Reproduction (EVAR) Workshop Group 2008†

- *fator masculino leve/moderado:*

FIV / ICSI = 6 ciclos IIU

- *ESCA: eficiência IIU??*

ICSI leva < falha fertilização

human reproduction update

Human Reproduction Update, Vol.15, No.3 pp. 265–277, 2009

Intrauterine insemination

The ESHRE Capri Workshop Group[1]

The post-coital test is not, however, a recommended routine in most countries (The Practice Committee of the American Society for Reproductive Medicine, 2006).

Although widely utilized, there is little evidence of the effectiveness in male infertility (Bensdorp *et al.*, 2007), and one large trial found that stimulated IUI was not effective in the treatment of unexplained infertility (Steures *et al.*, 2006).

REPRODUÇÃO ASSISTIDA
"QUANDO INDICAR"

- ***COITO PROGRAMADO:***

TMSC > 15 milhões, morfologia estrita > 4 %

- ***INSEMINAÇÃO ARTIFICIAL (IIU):***

TMSC > 5 milhões, morfologia estrita > 4%

- ***FERTILIZAÇÃO "IN VITRO" (FIV):***

TMSC 1 - 5 milhões, morfologia estrita > 4%, falha em 3 IIU

- ***INJEÇÃO INTRA-CITOPLASMÁTICA (ICSI):***

TMSC < 1 milhão, morfologia estrita < 4%, falha de fertilização FIV