59º CBGO
Congresso Brasileiro de Ginecologia e Obstetrícia
2021 EDIÇÃO ONLINE
O congresso de todos os brasileiros
febrasgo

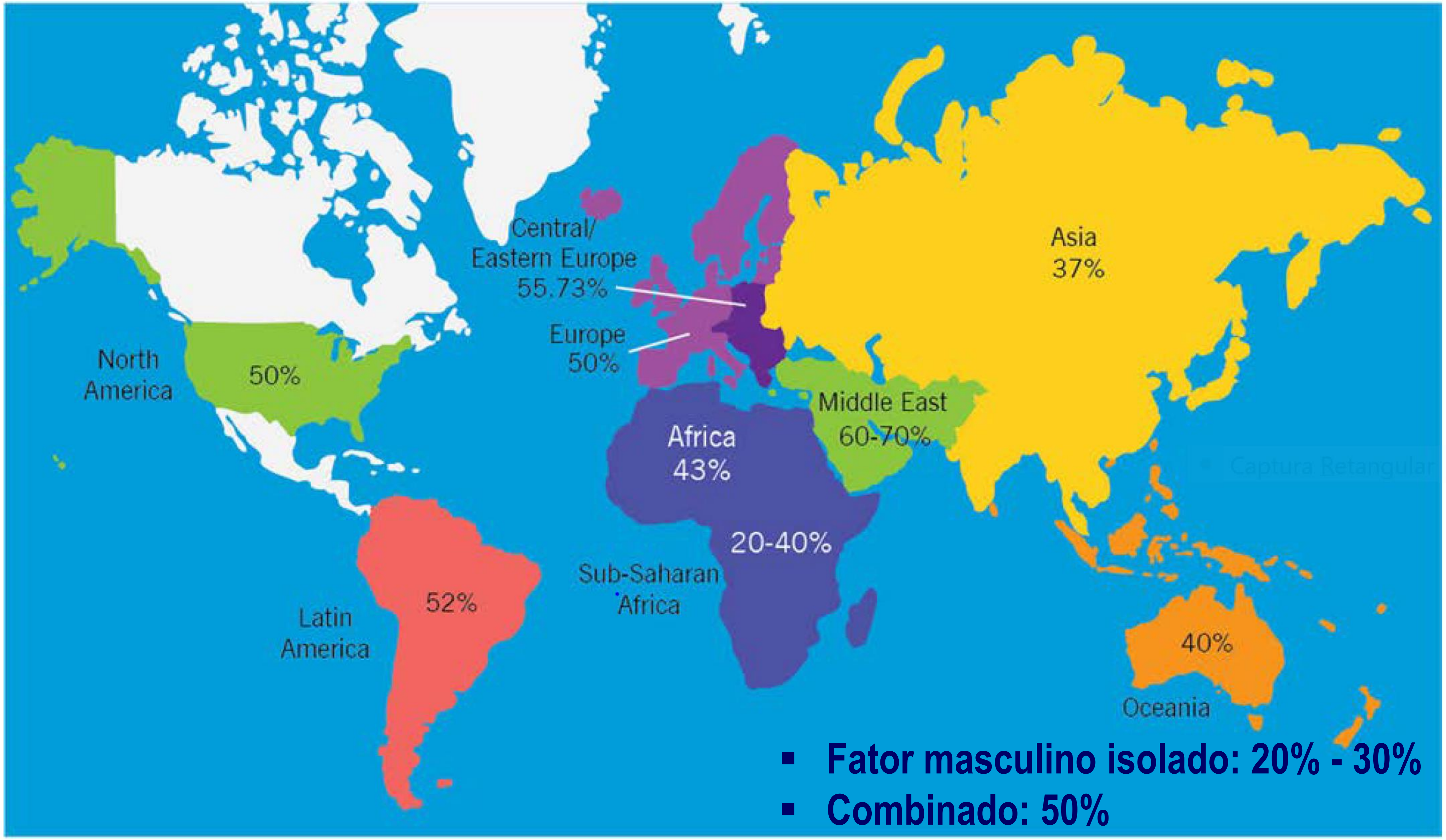
Papel do parceiro na Infertilidade

Edson Borges Jr.
CRM: 52.154 - SP

Conflito de Interesse

Ausência de Conflito de Interesse

Resolução do Conselho Federal de Medicina nº 1.595/2.000



- **Fator masculino isolado: 20% - 30%**
- **Combinado: 50%**

Figure 2 World map containing percentages of infertility cases per region that are due to male factor. This figure demonstrates rates of infertility cases in each region studied (North America, Latin America, Africa, Europe, Central/Eastern Europe, Middle East, Asia, and Oceania) due to male factor involvement.

RB&E REPRODUCTIVE BIOLOGY AND ENDOCRINOLOGY
Agarwal *et al. Reproductive Biology and Endocrinology* (2015) 13:37
DOI 10.1186/s12958-015-0032-1

QUANDO INICIAR A AVALIAÇÃO ?

➲ Casais com vida sexual normal, após 1 ano de tentativas, sem anticoncepção e sem gestação

➲ Antes de 1 ano

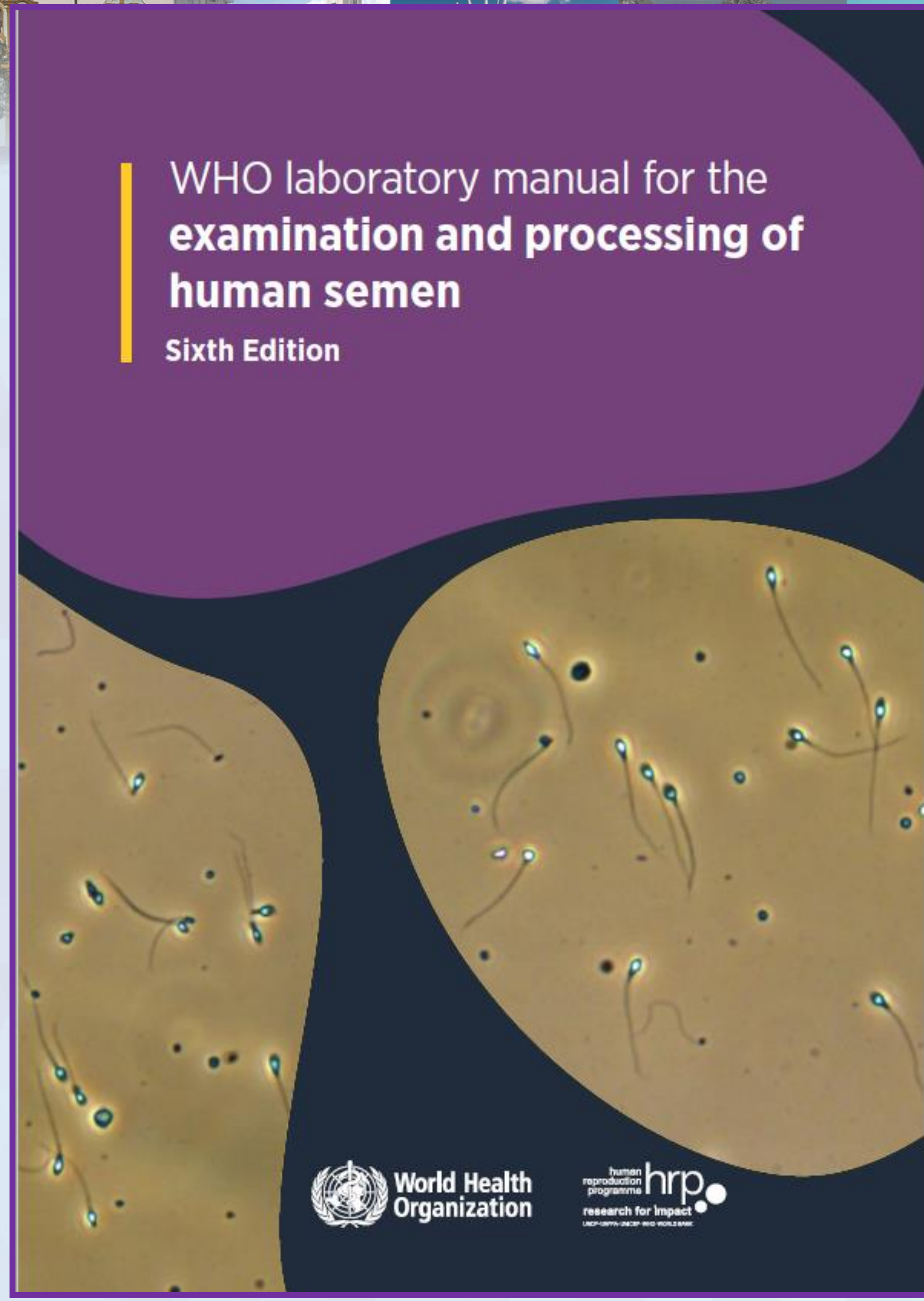
- Caso ♂ tenha um fator de risco conhecido para infertilidade (criptorquidia, patologia endócrina, varicocele, etc..)
- Caso ♀ tenha um fator de risco conhecido para infertilidade (idade > 35 anos, SOP, etc..)
- Caso ♂/ ♀ questionem seu potencial fértil

Etiologia da Infertilidade Masculina

Varicocele	42,2
Idiopática	22,7
Obstrução	14,7
♀ / ♂ Normais	7,9
Criptorquidia	3,4
Imunológica	2,6
Ejaculatório	1,3
Falência Testicular	1,3

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/ 2021***



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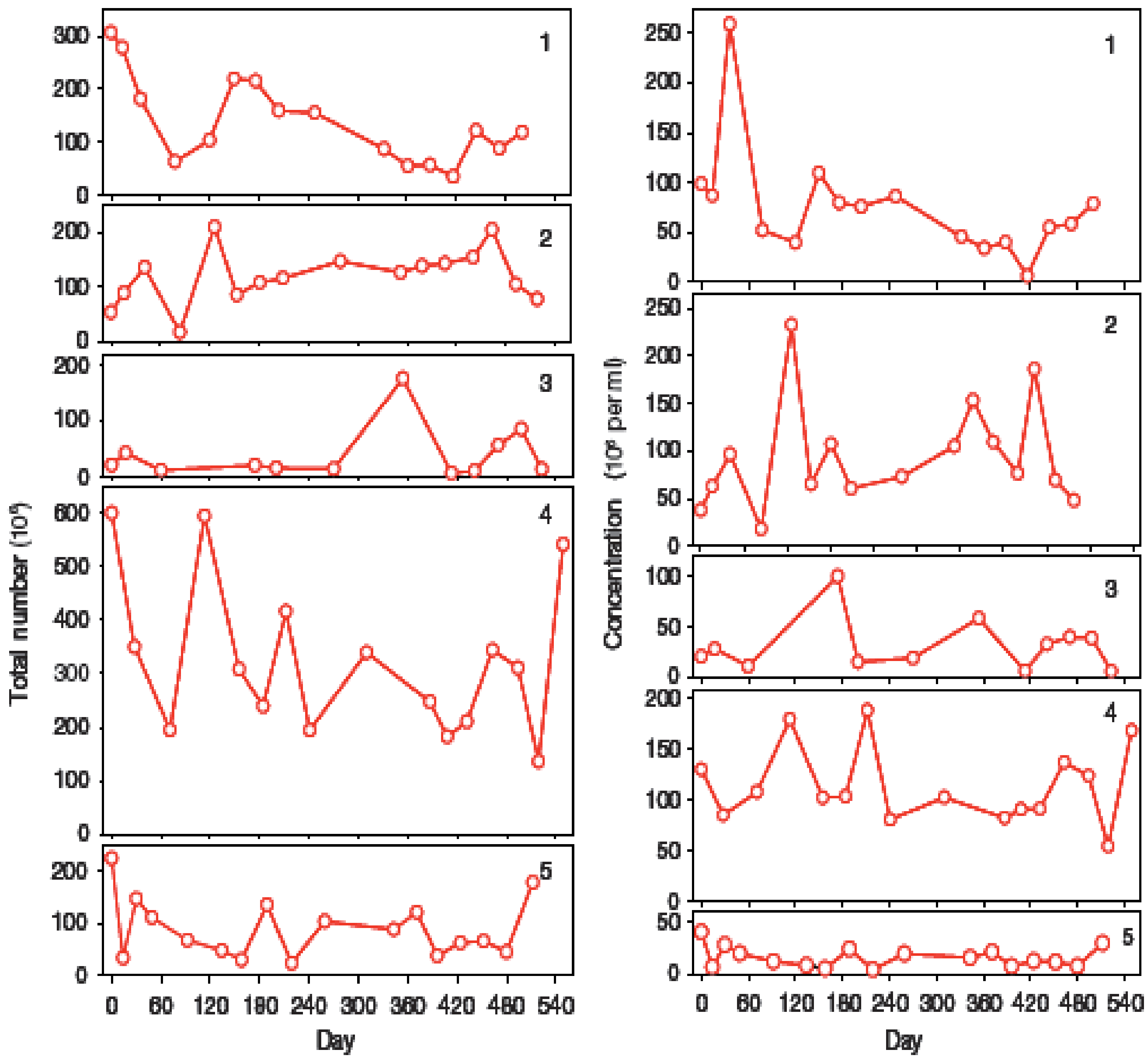
WHO laboratory manual for the **examination and processing of human semen**
Sixth Edition

		Centiles									
	N	2.5th	5th	(95% CI)	10th	25th	50th	75th	90th	95th	97.5th
Semen volume (ml)	3586	1.0	1.4	(1.3–1.5)	1.8	2.3	3.0	4.2	5.5	6.2	6.9
Sperm concentration (10^6 per ml)	3587	11	16	(15–18)	22	36	66	110	166	208	254
Total sperm number (10^6 per ejaculate)	3584	29	39	(35–40)	58	108	210	363	561	701	865
Total motility (PR + NP, %)	3488	35	42	(40–43)	47	55	64	73	83	90	92
Progressive motility (PR, %)	3389	24	30	(29–31)	36	45	55	63	71	77	81
Non-progressive motility (NP, %)	3387	1	1	(1–1)	2	4	8	15	26	32	38
Immotile spermatozoa (IM, %)	2800	15	20	(19–20)	23	30	37	45	53	58	65
Vitality (%)	1337	45	54	(50–56)	60	69	78	88	95	97	98
Normal forms (%)	3335	3	4	(3.9–4.0)	5	8	14	23	32	39	45

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



Análise Seminal

Análise Macroscópica

cor, viscosidade, pH, volume, liquefação

Análise Microscópica

concentração, motilidade,m orfologia

↓

<u>Pelo menos duas amostras!</u>

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.

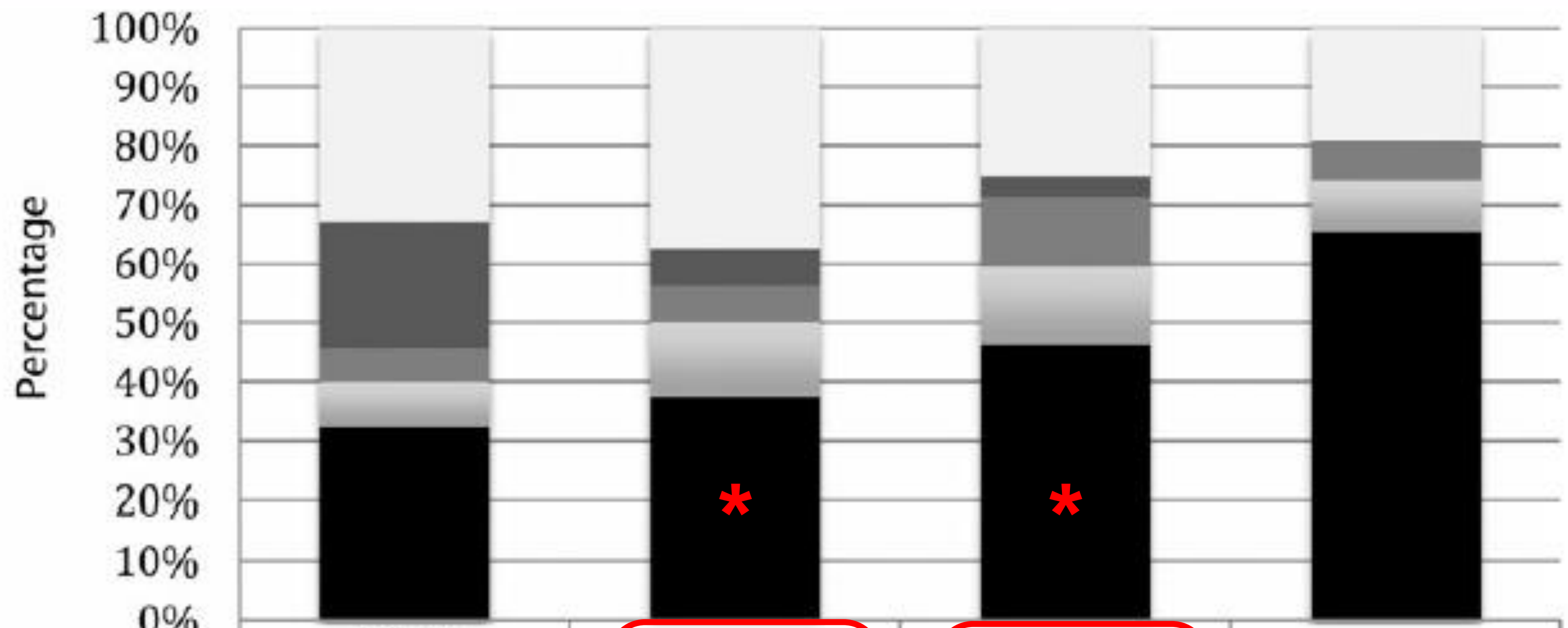
Count ($\geq 2 \times 10^7$/mL)	Motility ($\geq$50%)	Kruger morphology (>4%)	No.	Percentage of total
Low	Low	Low	158	11
Low	Low	Normal	58	4
Low	Normal	Low	48	3
Low	Normal	Normal	41	3
Normal	Low	Low	69	5
Normal	Low	Normal	92	7
Normal	Normal	Low	187	14
Normal	Normal	Normal	731	53
Total			1,384	

Morelli. Correspondence. Fertil Steril 2010.

TMSC (total motile sperm count)

Número total de espermatozoides móveis

= volume x conc/ml x % A+B / 100%

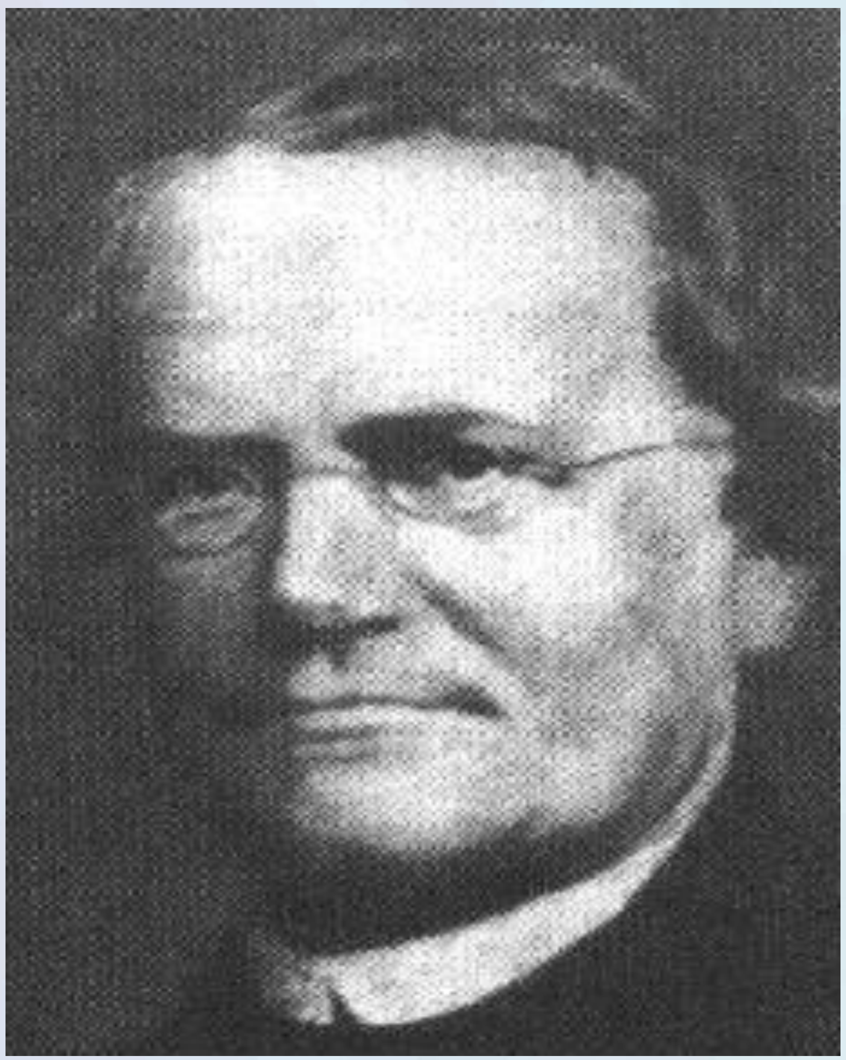


	TMSC abnormal - WHO abnormal	TMSC abnormal - WHO normal	TMSC normal - WHO abnormal	TMSC normal - WHO normal
No pregnancy	205	6	57	59
Pregnancy after ICSI	133	1	8	1
Pregnancy after IVF	36	1	27	20
Pregnancy after IUI	48	2	30	27
Spontaneous	201	6	105	202

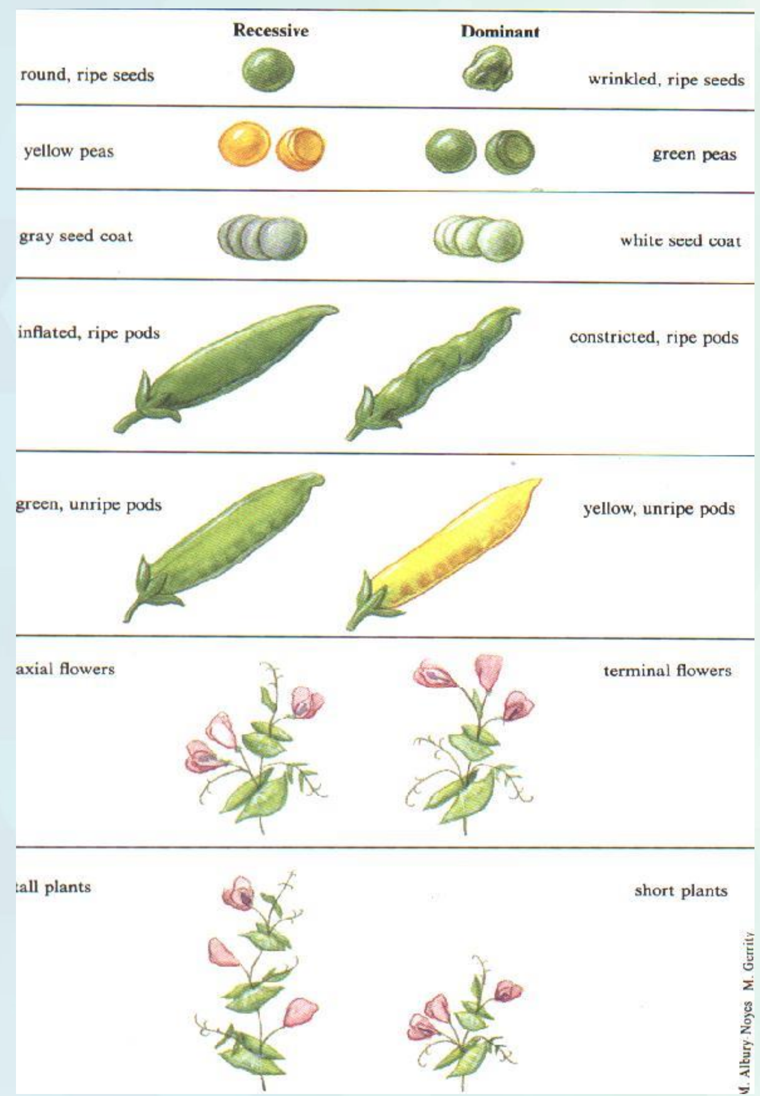
Figure 4 Results showing where the TMSC and WHO classification systems overlap or disagree. The bars on the right and left show the outcome if the two systems are in agreement. The middle bars show the outcome if both systems give contradictory results. TMSC normal – WHO nomal = 'real unexplained' infertility.

Genética e Infertilidade Masculina

GENÉTICA ⟷ FERTILIDADE



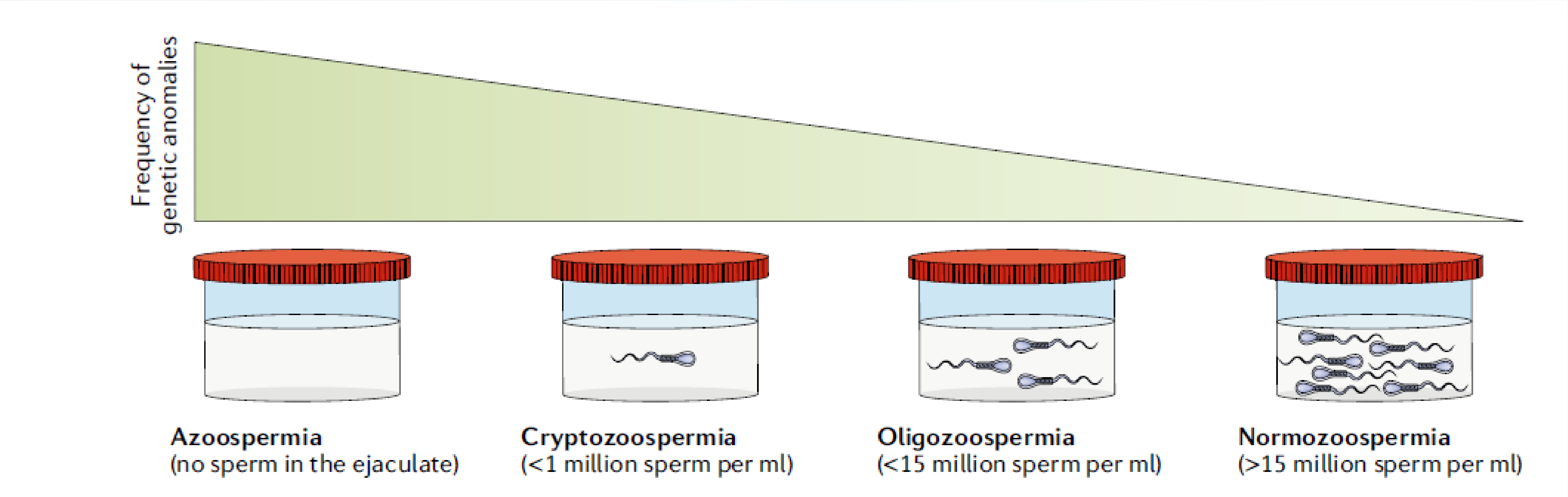
Gregor Mendel



ANORMALIDADES CROMOSSÔMICAS EM HOMENS INFÉRTEIS

REFERÊNCIAS	Nº	CROMOSSÔMOS SEXUAIS	AUTOSSÔMOS	TOTAL
KOULISCHER E SCHOYSMAN (1974)	1000	27 (2.7)	6 (0.6)	33 (3.3)
CHANDLEY (1979)	2372	33 (1.4)	18 (0.7)	51 (2.1)
ZUFFARDI E TIEPOLO (1982)	2542	175 (6.9)	40 (1.6)	215 (8.6)
ABRAMSSON *et al* (1982)	342	6 (1.8)	4 (1.2)	10 (2.9)
de GARDELLE *et al* (1983)	318	13 (4.1)	7 (2.2)	20 (6.3)
MATSUDA *et al* (1989)	295	0 (0)	5 (1.7)	5 (1.7)
YOSHIDA et al (1995)	1007	41 (4.1)	24 (2.4)	65 (6.5)
TOTAL	**7876**	**295 (3.8)**	**104 (1.3)**	$\boxed{\textbf{399 (5.1)}}$
NASCIDOS	**94.465**	**131 (0.14)**	**232 (0.25)**	$\boxed{\textbf{366 (0.38)}}$

ALTERAÇÕES CROMOSSÔMICAS MAIORES & DENSIDADE ESPERMÁTICA



Gekas et al. Human Reprod 16:82-90, 2001
Crausz et al. Nat Ver Urol, 15:369-84, 2018

MODERN TRENDS

Edward E. Wallach, M.D.
Associate Editor

Fertility and Sterility® Vol. 93, No. 1, January 2010

The genetic causes of male factor infertility: A review

Katherine L. O'Flynn O'Brien, B.A.,[a] Alex C. Varghese, Ph.D.,[b] and Ashok Agarwal, Ph.D.[a]

Prevalence and phenotypes of common chromosomal abnormalities associated with male infertility.

Genetic abnormality	Phenotype	Prevalence, %
Chromosomal abnormalities	Azoospermia to normozoospermia	5 (total infertile population); 15 (azoospermic)
Klinefelter syndrome	Azoospermia to severe oligozoospermia	5 (severe oligozoospermia); 10 (azoospermic)
Robertsonian translocation	Azoospermia to normozoospermia	0.8 (total infertile population); 1.6 (oligozoospermic); 0.09 (azoospermic)
Y chromosome microdeletions	Azoospermia to oligozoospermia	10–15 (azoospermic); 5–10 (oligozoospermic)
AZFa deletion	Azoospermia, Sertoli cell–only syndrome	0.5–1.0 (2)
AZFb deletion	Azoospermia, spermatogenic arrest	0.5–1.0 (2)
AZFc deletion	Severe oligozoospermia to nonobstructive azoospermia	6–12
Partial AZF-c deletions	From azoospermia to normozoospermia	3–5 (2)

- ***Klinefelter:*** **7 - 13% azoospérmicos**
- ***MicroDeleleção Y:*** **2 - 20% oligo grave / azoospérmicos**
- ***CBAVD:*** **1 - 2% homens inférteis`**
  10% azoospermias obstrutivas

Propedêutica em Infertilidade

Propedêutica Básica Homem

- Espermograma com morfologia estrita
- Número total de espermatozoides móveis (TMSC)
- Cariótipo
- Quando alteração seminal importante
- (conc < 2,0 milhões/ml): avaliação genética (cariótipo, microdeleção Y)
- Quando agenesia de deferentes: pesquisa de CFTR

Análise Seminal

Não é um teste de fertilidade!

Avaliação do *status* funcional do testículo no momento da coleta

EDITOR'S CORNER

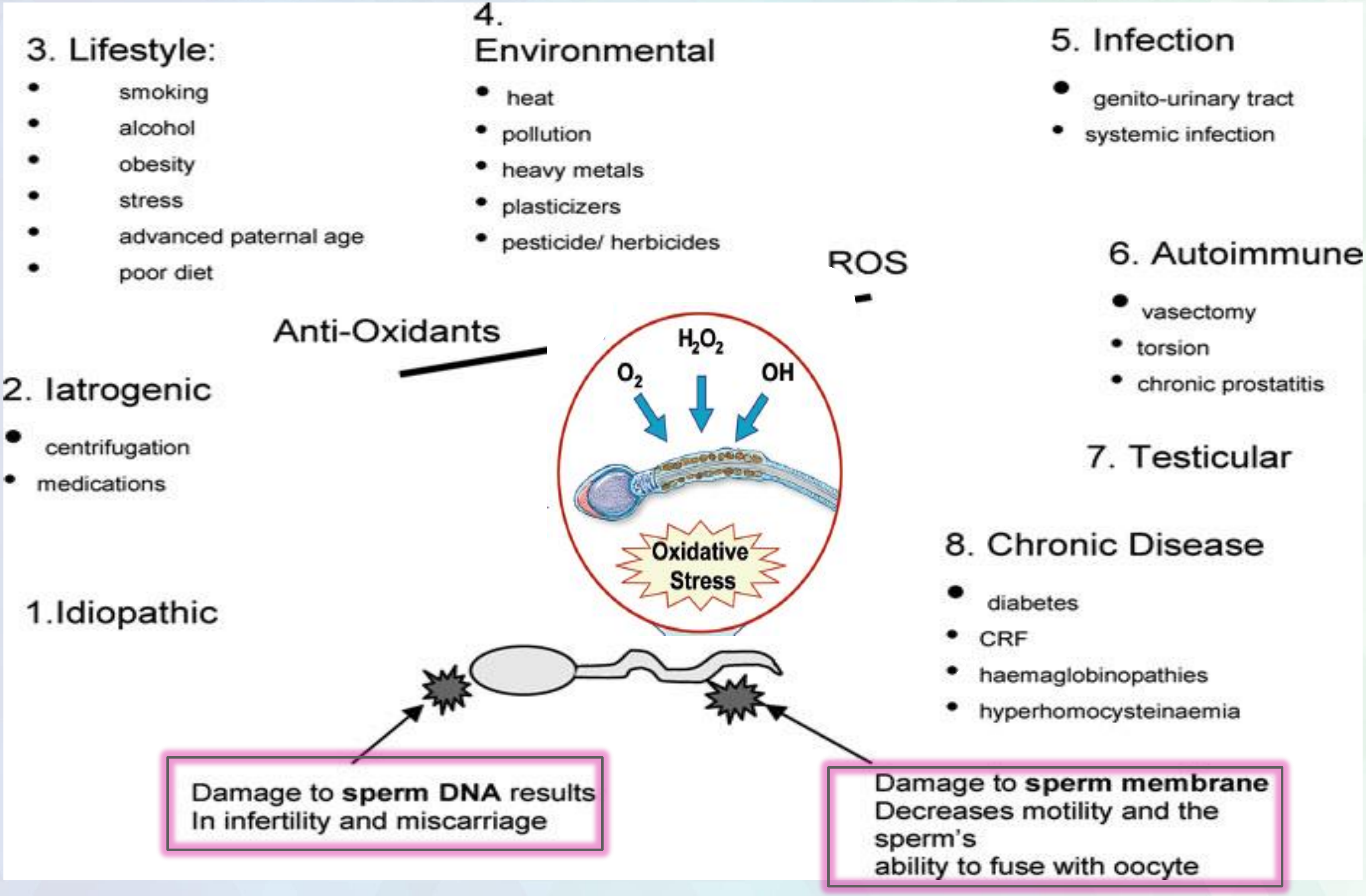
Evaluation of sperm damage: beyond the World Health Organization criteria

Nabil Aziz, M.R.C.O.G., M.D.,[a] and Ashok Agarwal, Ph.D., H.C.L.D.[b]

Fertility and Sterility® Vol. 90, No. 3, September 2008

- ✓ *grande flutuação na concentração, motilidade e morfologia*
- ✓ *variação intra / inter observador*
- ✓ *AS inadequada para o diagnóstico da infertilidade*
- ✓ *AS não investiga as propriedades biológicas e subcelulares do sptz*

☛ ***necessidade de outros testes funcionais mais específicos***



Kelton Tremellen; Human Reproduction Update, Vol.14, No.3 pp. 243–258, 2008

Review Article

pISSN: 2287-4208 / eISSN: 2287-4690
World J Mens Health 2019 Sep 37(3): 296-312
https://doi.org/10.5534/wjmh.190055

The World Journal of MEN's HEALTH

Check for updates

Male Oxidative Stress Infertility (MOSI): Proposed Terminology and Clinical Practice Guidelines for Management of Idiopathic Male Infertility

Ashok Agarwal[1,2], Neel Parekh[2], Manesh Kumar Panner Selvam[1,2], Ralf Henkel[1,3], Rupin Shah[4], Sheryl T. Homa[5], Ranjith Ramasamy[6], Edmund Ko[7], Kelton Tremellen[8], Sandro Esteves[9,10], Ahmad Majzoub[1,11], Juan G. Alvarez[12], David K. Gardner[13], Channa N. Jayasena[14,15], Jonathan W. Ramsay[15], Chak-Lam Cho[16], Ramadan Saleh[17], Denny Sakkas[18], James M. Hotaling[19], Scott D. Lundy[2], Sarah Vij[2], Joel Marmar[20], Jaime Gosalvez[21], Edmund Sabanegh[2], Hyun Jun Park[22,23], Armand Zini[24], Parviz Kavoussi[25], Sava Micic[26], Ryan Smith[27], Gian Maria Busetto[28], Mustafa Emre Bakırcıoğlu[29], Gerhard Haidl[30], Giancarlo Balercia[31], Nicolás Garrido Puchalt[32], Moncef Ben-Khalifa[33], Nicholas Tadros[34], Jackson Kirkman-Browne[35,36], Sergey Moskovtsev[37], Xuefeng Huang[38], Edson Borges Jr[39], Daniel Franken[40], Natan Bar-Chama[41], Yoshiharu Morimoto[42], Kazuhisa Tomita[42], Vasan Satya Srini[43], Willem Ombelet[44,45], Elisabetta Baldi[46], Monica Muratori[47], Yasushi Yumura[48], Sandro La Vignera[49], Raghavender Kosgi[50], Marlon P. Martinez[51], Donald P. Evenson[52], Daniel Suslik Zylbersztejn[53], Matheus Roque[54], Marcello Cocuzza[55], Marcelo Vieira[56,57], Assaf Ben-Meir[58], Raoul Orvieto[59,60], Eliahu Levitas[61], Amir Wiser[62,63], Mohamed Arafa[64], Vineet Malhotra[65], Sijo Joseph Parekattil[66,67], Haitham Elbardisi[64], Luiz Carvalho[68,69], Rima Dada[70], Christophe Sifer[71], Pankaj Talwar[72], Ahmet Gudeloglu[73], Ahmed M.A. Mahmoud[74], Khaled Terras[75], Chadi Yazbeck[76], Bojanic Nebojsa[77], Damayanthi Durairajanayagam[78], Ajina Mounir[79], Linda G. Kahn[80], Saradha Baskaran[1], Rishma Dhillon Pai[81], Donatella Paoli[82], Kristian Leisegang[83], Mohamed-Reza Moein[84], Sonia Malik[85], Onder Yaman[86], Luna Samanta[87], Fouad Bayane[88], Sunil K. Jindal[89], Muammer Kendirci[90], Baris Altay[91], Dragoljub Perovic[92], Avi Harlev[93]

Male Infertility

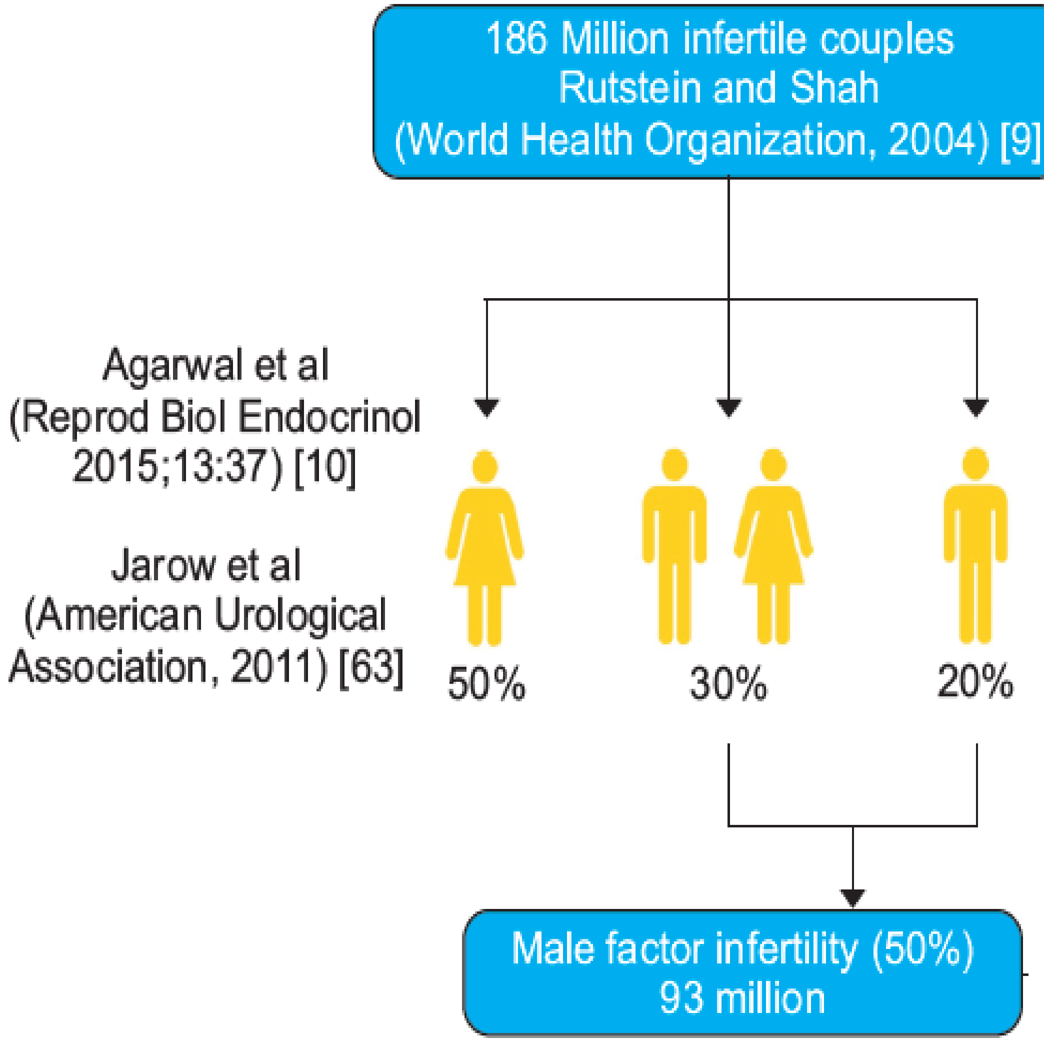


Fig. 3. Worldwide incidence of MOSI in infertile men. [a]National Institutes of Health (NIH) (https://www.nichd.nih.gov/health/topics/menshealth/conditioninfo/infertility) [61], Agarwal et al (2014) [62], Jarow et al (2011) [63].

Male Infertility

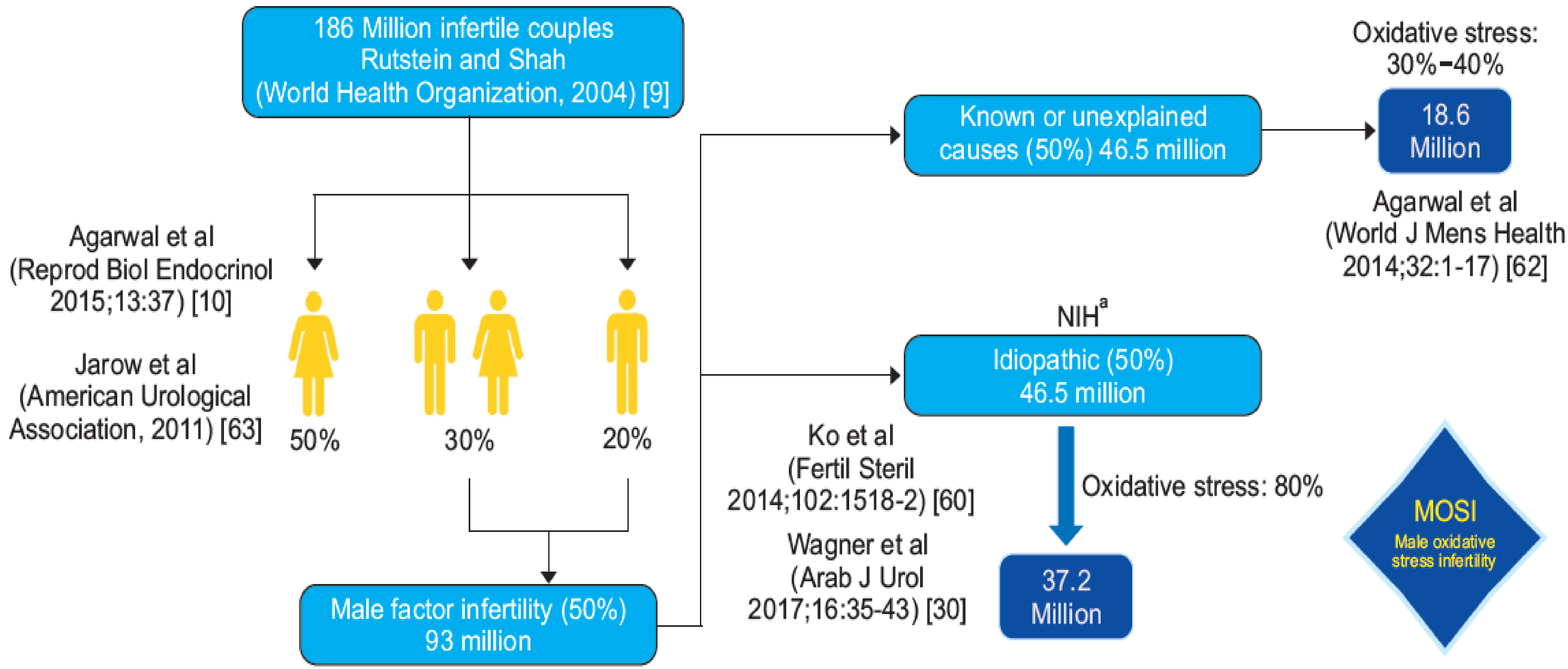
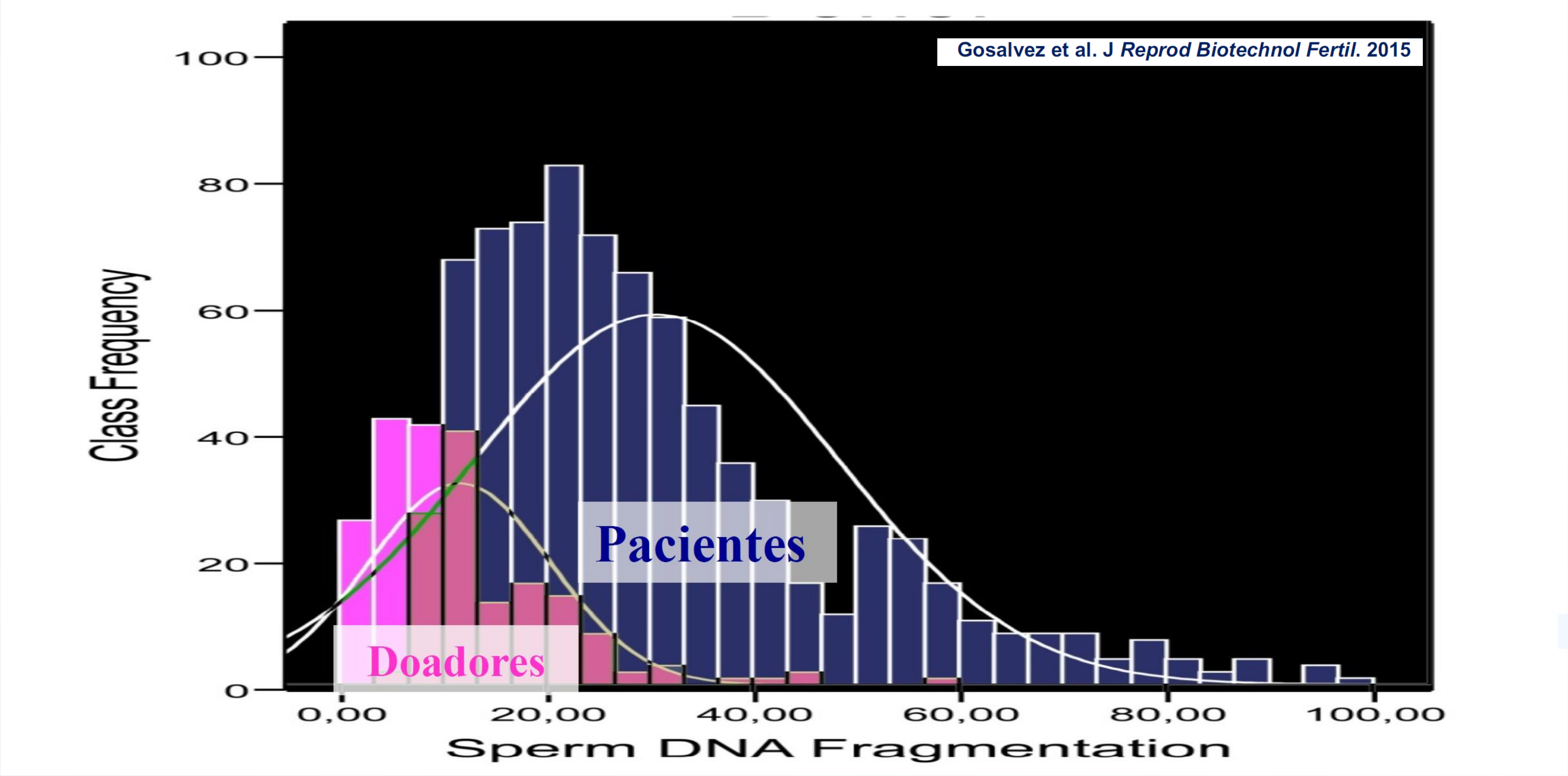


Fig. 3. Worldwide incidence of MOSI in infertile men. [a]National Institutes of Health (NIH) (https://www.nichd.nih.gov/health/topics/menshealth/conditioninfo/infertility) [61], Agarwal et al (2014) [62], Jarow et al (2011) [63].

Taxa de Fragmentação do DNA espermático



Asian Journal of Andrology (2017) 19, 80–90

www.asiaandro.com; www.ajandrology.com

Open Access

ORIGINAL ARTICLE

Sperm Biology

A systematic review and meta-analysis to determine the effect of sperm DNA damage on *in vitro* fertilization and intracytoplasmic sperm injection outcome

Luke Simon[1,*], Armand Zini[2,*], Alina Dyachenko[2], Antonio Ciampi[2], Douglas T Carrell[1,3,4]

Table 3: Meta-analysis summary: Overall and subgroup odds ratios of studies on sperm DNA damage and pregnancy

Effect	*Number of studies*	*Fixed effects model*		*Random effects model*	
		OR (95% CI)	*P*	*OR (95% CI)*	*P*
Overall effect	56	1.68 (1.49–1.89)	0.0000*	1.84 (1.5–2.27)	<0.0001*
Sperm DNA damage assays					
SCSA	23	1.18 (0.96–1.44)	0.1115	1.22 (0.93–1.61)	0.1522
TUNEL	18	2.18 (1.75–2.72)	0.0000*	2.22 (1.61–3.05)	<0.0001*
Comet	7	3.34 (2.32–4.82)	0.0000*	3.56 (1.78–7.09)	0.0003*
SCD	8	1.51 (1.18–1.92)	0.0011*	1.98 (1.19–3.3)	0.0086*
Types of assisted treatment					
IVF	16	1.65 (1.34–2.04)	0.0000*	1.92 (1.33–2.77)	0.0005*
ICSI	24	1.31 (1.08–1.59)	0.0068*	1.49 (1.11–2.01)	0.0075*
Mixed	16	2.37 (1.89–2.97)	0.0000*	2.32 (1.54–3.5)	0.0001*

Asian Journal of Andrology (2017) 19, 80–90

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Sperm DNA fragmentation and recurrent pregnancy loss: a systematic review and meta-analysis

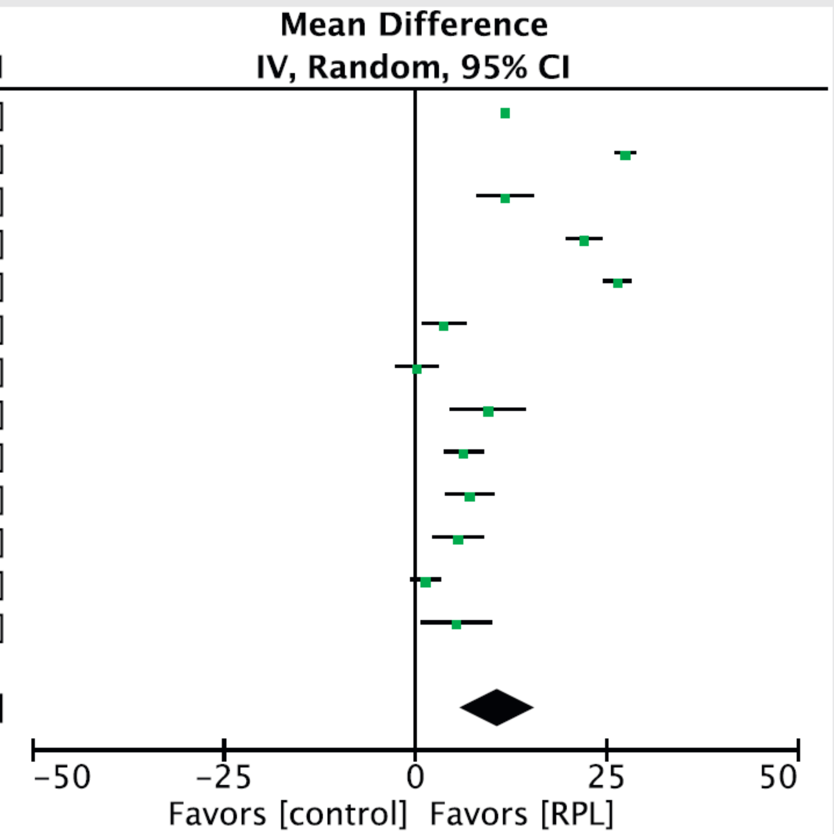
Dana B. McQueen, M.D., M.A.S., John Zhang, Ph.D., and Jared C. Robins, M.D.

Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, Northwestern University, Chicago, Illinois

	Recurrent Pregnancy Loss			Fertile Control				Mean Difference
Study or Subgroup	**Mean**	**SD**	**Total**	**Mean**	**SD**	**Total**	**Weight**	**IV, Random, 95% CI**
Absalan 2012	23.3	1.1	30	11.6	0.5	30	7.9%	11.70 [11.27, 12.13]
Bareh 2016	36.8	2.7	26	9.4	2.7	31	7.9%	27.40 [25.99, 28.81]
Bhattachara 2008	18.1	16.1	74	6.4	3.6	65	7.6%	11.70 [7.93, 15.47]
Brahem 2011	32.2	6.1	31	10.2	2.1	20	7.8%	22.00 [19.66, 24.34]
Carrell 2003	38.3	4.2	21	11.9	1	26	7.8%	26.40 [24.56, 28.24]
Coughlan 2014	10.9	1.9	16	7.2	3.7	7	7.7%	3.70 [0.81, 6.59]
Esquerre-Lamare 2018	6.8	5.6	33	6.6	5.5	27	7.7%	0.20 [−2.62, 3.02]
Imam 2011	23.4	9.9	20	13.9	5.4	20	7.3%	9.50 [4.56, 14.44]
Kumar 2012	28.1	5	45	21.8	4.8	20	7.8%	6.30 [3.74, 8.86]
Ribas 2012	19.3	6.1	20	12.2	4.6	25	7.7%	7.10 [3.88, 10.32]
Ruixue 2013	25.6	11.5	68	20	7.7	63	7.6%	5.60 [2.27, 8.93]
Zhang 2012	15.2	6.4	111	13.9	4.4	30	7.8%	1.30 [−0.67, 3.27]
Zidi-Jrah 2016	17.1	9.3	22	11.8	5.7	20	7.4%	5.30 [0.68, 9.92]
Total (95% CI)			**517**			**384**	**100.0%**	**10.70 [5.82, 15.58]**

Heterogeneity: $Tau^2 = 78.10$; $Chi^2 = 1019.62$, df = 12 ($P < 0.00001$); $I^2 = 99\%$

Test for overall effect: $Z = 4.30$ ($P < 0.0001$)



Primary outcome in overall analysis.

McQueen. Sperm DNA fragmentation and RPL. Fertil Steril 2019.

Fertility and Sterility® Vol. 112, No. 1, July 2019

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2021

ORIGINAL ARTICLE: ANDROLOGY
Fertility and Sterility® Vol. 112, No. 3, September 2019

Check for updates

Sperm DNA fragmentation is correlated with poor embryo development, lower implantation rate, and higher miscarriage rate in reproductive cycles of non–male factor infertility

Edson Borges Jr., M.D., Ph.D.,[a,b] Bianca Ferrarini Zanetti, Ph.D.,[a,b] Amanda Souza Setti, M.Sc.,[a,b] Daniela Paes de Almeida Ferreira Braga, Ph.D.,[a,b] Rodrigo Rosa Provenza, B.Sc.,[a] and Assumpto Iaconelli Jr., M.D.[a,b]

[a] Fertility Medical Group and [b] Instituto Sapientiae, Centro de Estudos e Pesquisa em Reprodução Humana Assistida, São Paulo, Brazil

Effect of SDF on laboratory and clinical outcomes.

Variable	< 30% SDF (n = 433)	≥30% SDF (n = 42)	*P* value
Laboratory outcomes[a]			
Fertilization rate	90.10 ± 3.50	85.67 ± 1.03	.226
Normal cleavage speed rate	72.16 ± 1.30	61.56 ± 4.40	.010
High-quality embryos at day 3 rate	36.47 ± 1.51	23.89 ± 5.51	.021
Blastocyst rate	56.25 ± 2.01	39.01 ± 1.40	.016
Blastocyst quality rate	30.54 ± 2.27	11.32 ± 7.72	< .001
Clinical outcomes[b]			
Implantation rate	46.09 ± 0.55	33.21 ± 1.96	< .001
Chemical pregnancy rate	34.99	33.11	.940
Clinical pregnancy rate	32.42	30.33	.774
Miscarriage rate	17.8	39.9	.018

[a] Adjusted for maternal age, maternal BMI, total FSH dose, number of retrieved oocytes, and paternal age.
[b] Adjusted for maternal age, maternal BMI, total FSH dose, number of retrieved oocytes, paternal age, number of transferred embryos, endometrial thickness.

Borges. Sperm DNA fragmentation and ICSI outcomes. Fertil Steril 2019.

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EDIÇÃO DE HOJE
8 PÁGINAS

JORNAL

Fundado em 2 de Janeiro de 1904

Manaus

ANO — LVI

O jornal é de 1904, veja a idade da vítima!

Onibus entrou na casa humilde e foi apanhar a velhinha de 42 anos

A foto mostra como ficou a cas... após o choque provocado pelo Onibus 14 da Transportamazon, quando resultou sair ferida a sua moradora, Maria Oliveira — Leia na última página

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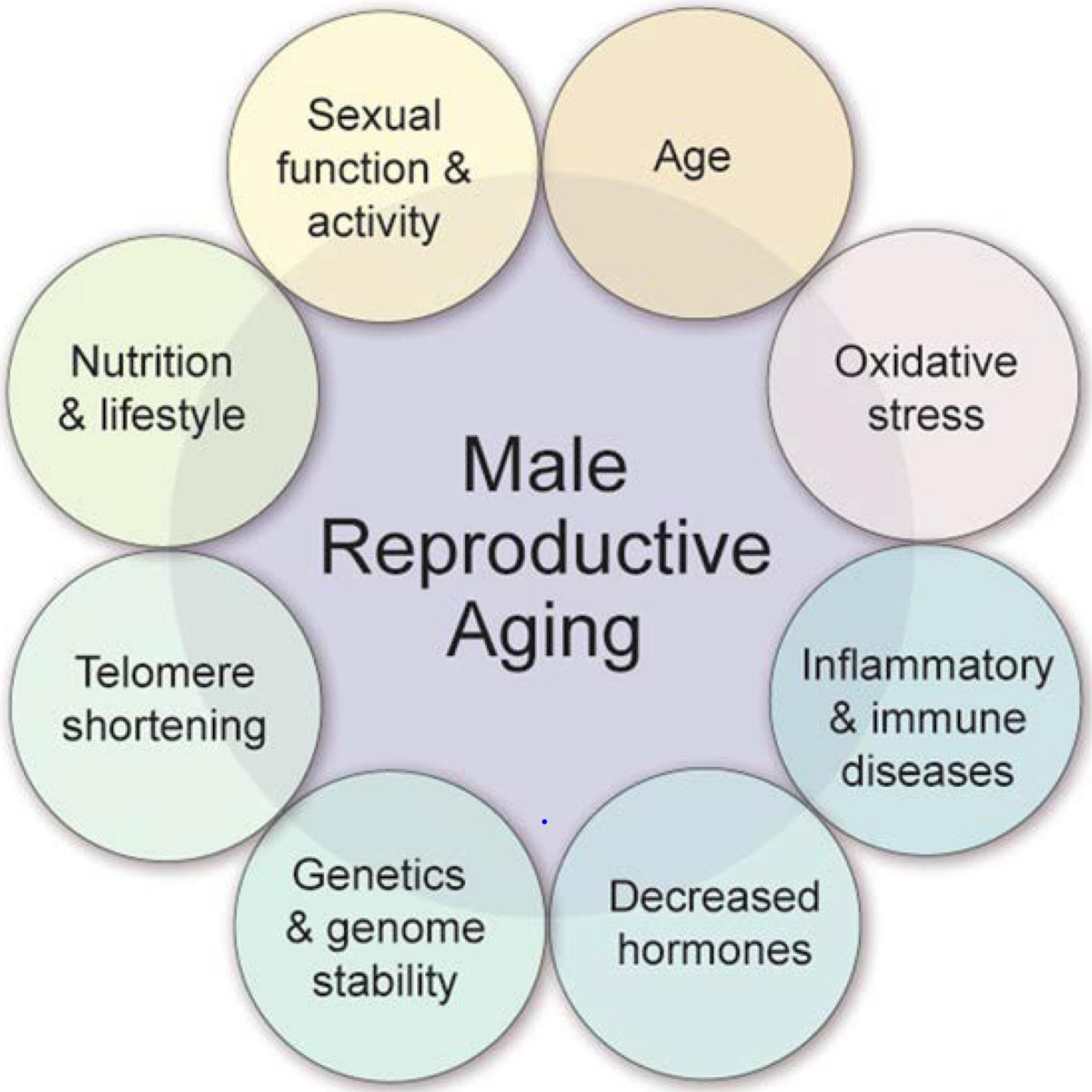

Figure 1 Main factors involved in impaired male infertility due to reproductive aging.

RB&E REPRODUCTIVE BIOLOGY AND ENDOCRINOLOGY

Sharma *et al. Reproductive Biology and Endocrinology* (2015) 13:35
DOI 10.1186/s12958-015-0028-x

Human Reproduction Update, Vol.16, No.1 pp. 65–79, 2010
Advanced Access publication on August 20, 2009 doi:10.1093/humupd/dmp027

human reproduction update

Paternal age and reproduction

Gideon A. Sartorius[1,2] and Eberhard Nieschlag[1,3]

[1]Centre of Reproductive Medicine and Andrology of the University, Domagkstrasse 11, D-48149 Muenster, Germany [2]Present address:

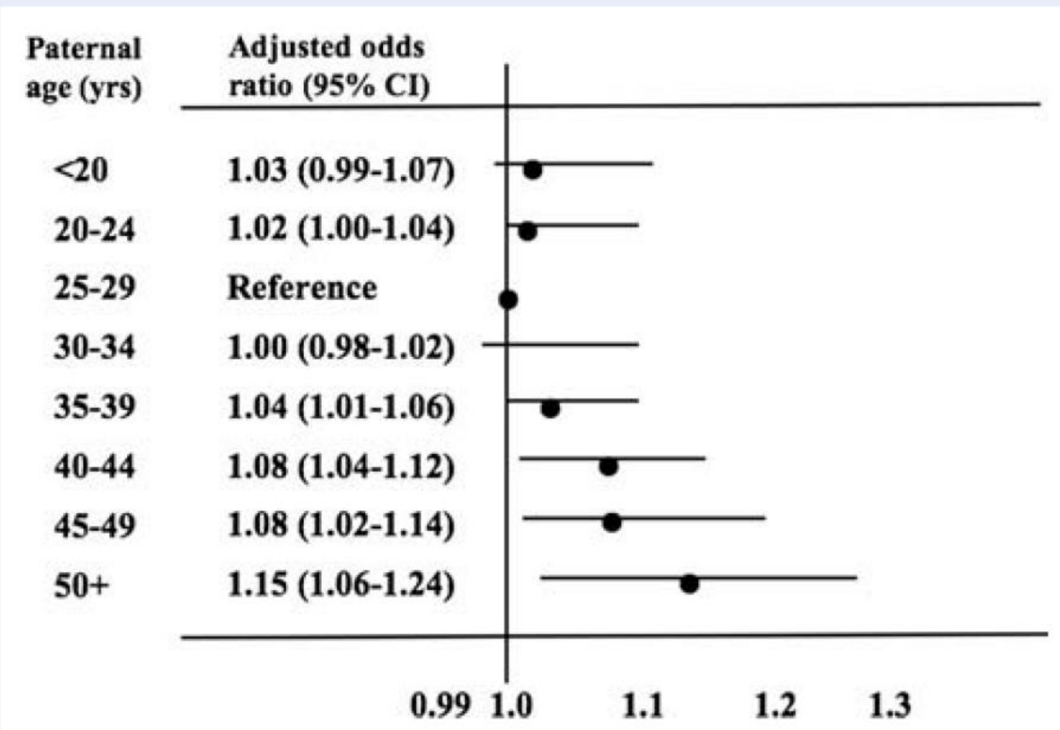

Figure 4 Relative risk of birth defects depending on paternal age.

Retrospective analysis of 5 213 248 subjects in the USA. Increased risk for heart defects, circulatory/respiratory defects, diaphragmatic hernia, tracheo-oesophageal fistulas, musculo-sceletal anomalies (data extracted from Yang *et al*., 2007).

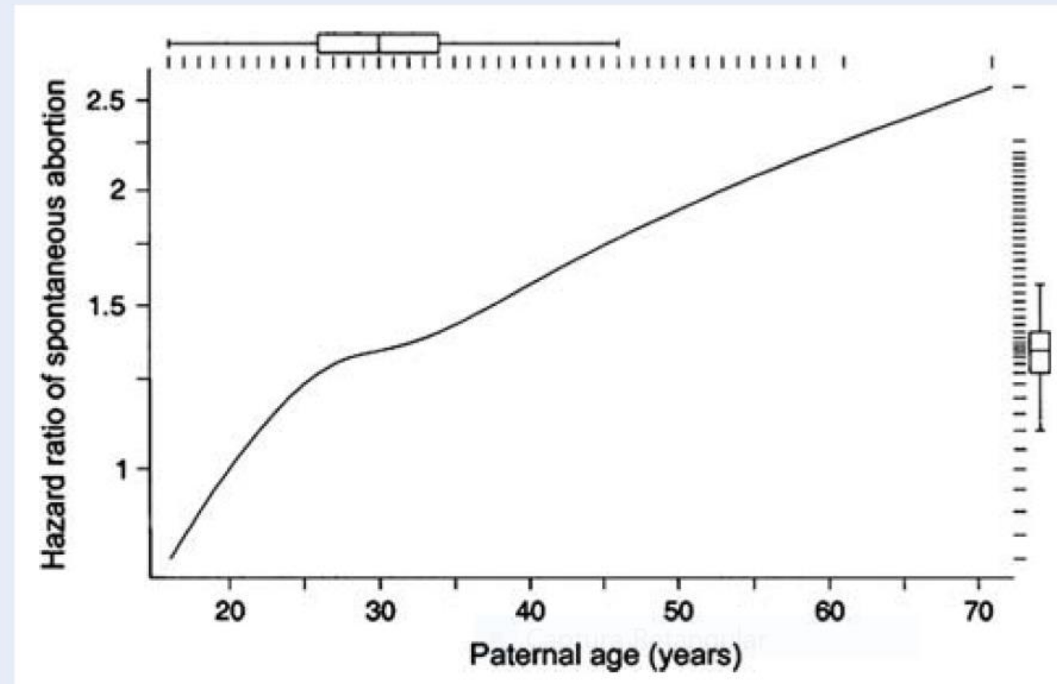

Figure 3 Hazard ratios of spontaneous miscarriages between 6 and 20 weeks according to paternal age adjusted for different confounders including maternal age (using prospective data from 5121 Californian women, men aged 20 years as referent).

Boxplots along the top and right side indicate data distribution according to each axis (with permission from Slama *et al*., 2005).

Table XI Summary results of the meta-analyses of the association between paternal factors and perinatal and paediatric outcomes.

Exposure	Outcome	Pooled estimate (with 95% CI)	Certainty of evidence GRADE
Paternal age	PTB	1.02 (1.00–1.05)	⊕⊕○○
	Low BW	1.00 (0.97–1.03)	⊕⊕○○
	Stillbirth	1.19 (1.10–1.30)	⊕⊕○○
	Children with any birth defects	1.05 (1.02–1.07)	⊕⊕⊕○
	CHDs	1.03 (0.99–1.06)	⊕⊕⊕○
	Orofacial clefts	0.99 (0.95–1.04) 1.14 (1.02–1.29)*	⊕⊕○○
	Gastroschisis	0.88 (0.78–1.00)	⊕⊕⊕○
	Spina bifida	0.97 (0.90–1.04)	⊕⊕⊕○
	Trisomy 21	1.13 (1.05–1.23)	⊕⊕⊕○
	Acute lymphoblastic leukaemia	1.08 (0.96–1.21)	⊕⊕⊕○
	Autism and ASDs	1.25 (1.20–1.30)	⊕⊕⊕○
	Schizophrenia	1.31 (1.23–1.38)	⊕⊕⊕○
Paternal BMI	No meta-analysis		
Paternal smoking	PTB	1.16 (1.00–1.35)	⊕⊕○○
	Low BW	1.10 (1.00–1.21)	⊕⊕○○
	SGA	1.22 (1.03–1.44)	⊕⊕○○
	CHDs	1.75 (1.25–2.44)	⊕⊕○○
	Orofacial clefts	1.51 (1.16–1.97)	⊕⊕○○
	Brain tumours	1.12 (1.03–1.22)	⊕⊕○○

*Exposure: Paternal age >45 years.

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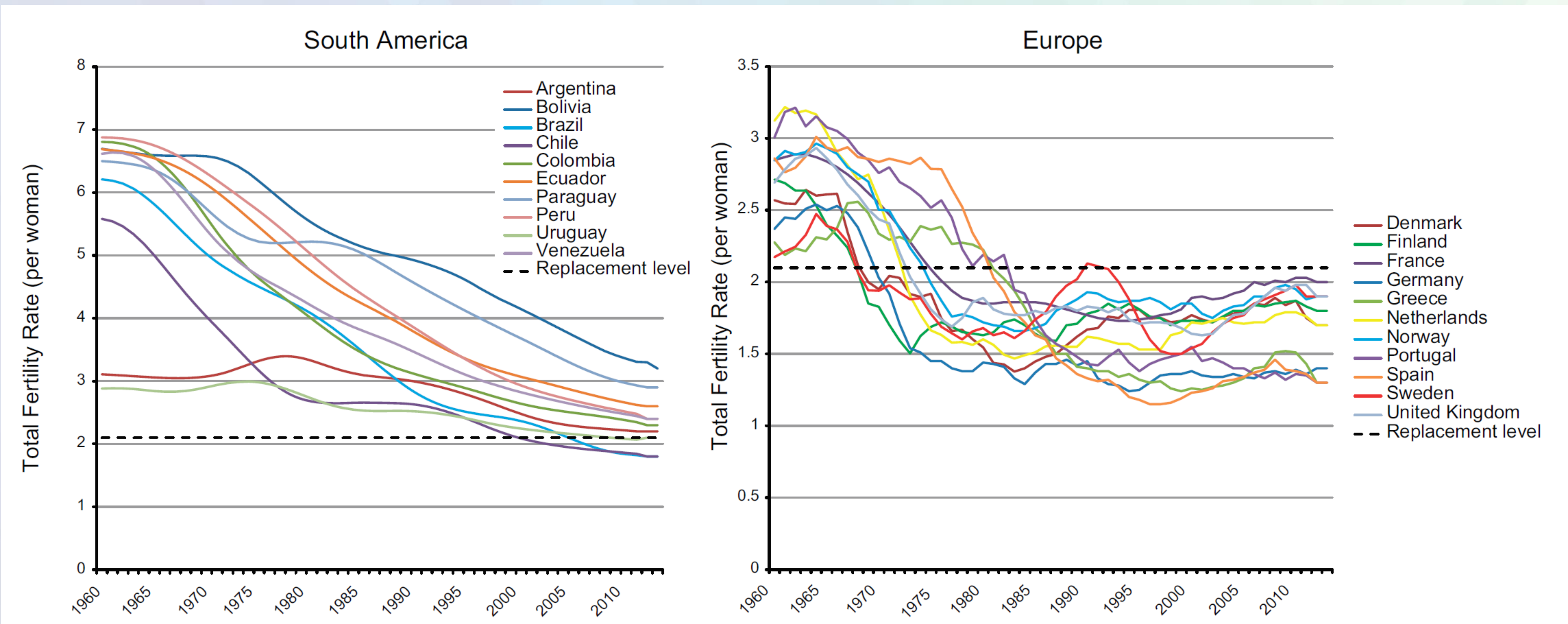
MALE REPRODUCTIVE DISORDERS AND FERTILITY TRENDS: INFLUENCES OF ENVIRONMENT AND GENETIC SUSCEPTIBILITY

Niels E. Skakkebaek, Ewa Rajpert-De Meyts, Germaine M. Buck Louis, Jorma Toppari, Anna-Maria Andersson, Michael L. Eisenberg, Tina Kold Jensen, Niels Jørgensen, Shanna H. Swan, Katherine J. Sapra, Søren Ziebe, Lærke Priskorn, and Anders Juul

Taxa de Fecundidade



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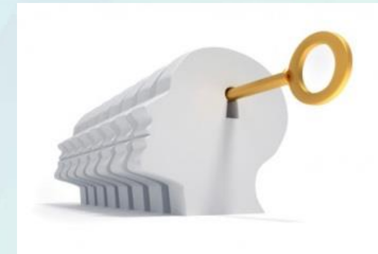
Take home message



- Análise seminal da OMS: não é um teste de fertilidade
- Número total de espermatozoides móveis (TMSC): melhor forma de avaliar a capacidade funcional dos espermatozoides
- fragDNA espermático: importante na avaliação da capacidade fértil do homem

Take home message

- **Infertilidade por estresse oxidativo masculino (MOSI):** novo diagnóstico de infertilidade masculina

- **Quanto maior a alteração seminal:** maior a possibilidade de alteração genética

- **Idade masculina:** relação direta com malformações na prole e maiores chances de perda da gravidez

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