XXII CONGRESSO BRASILEIRO
DE REPRODUÇÃO ASSISTIDA

FATOR MASCULINO: ESTADO DA ARTE

FERTILITY
MEDICAL GROUP

Edson Borges Jr.

Declaro:

Ausência de Conflito de Interesse

Resolução do Conselho Federal de Medicina nº 1.595/2.000

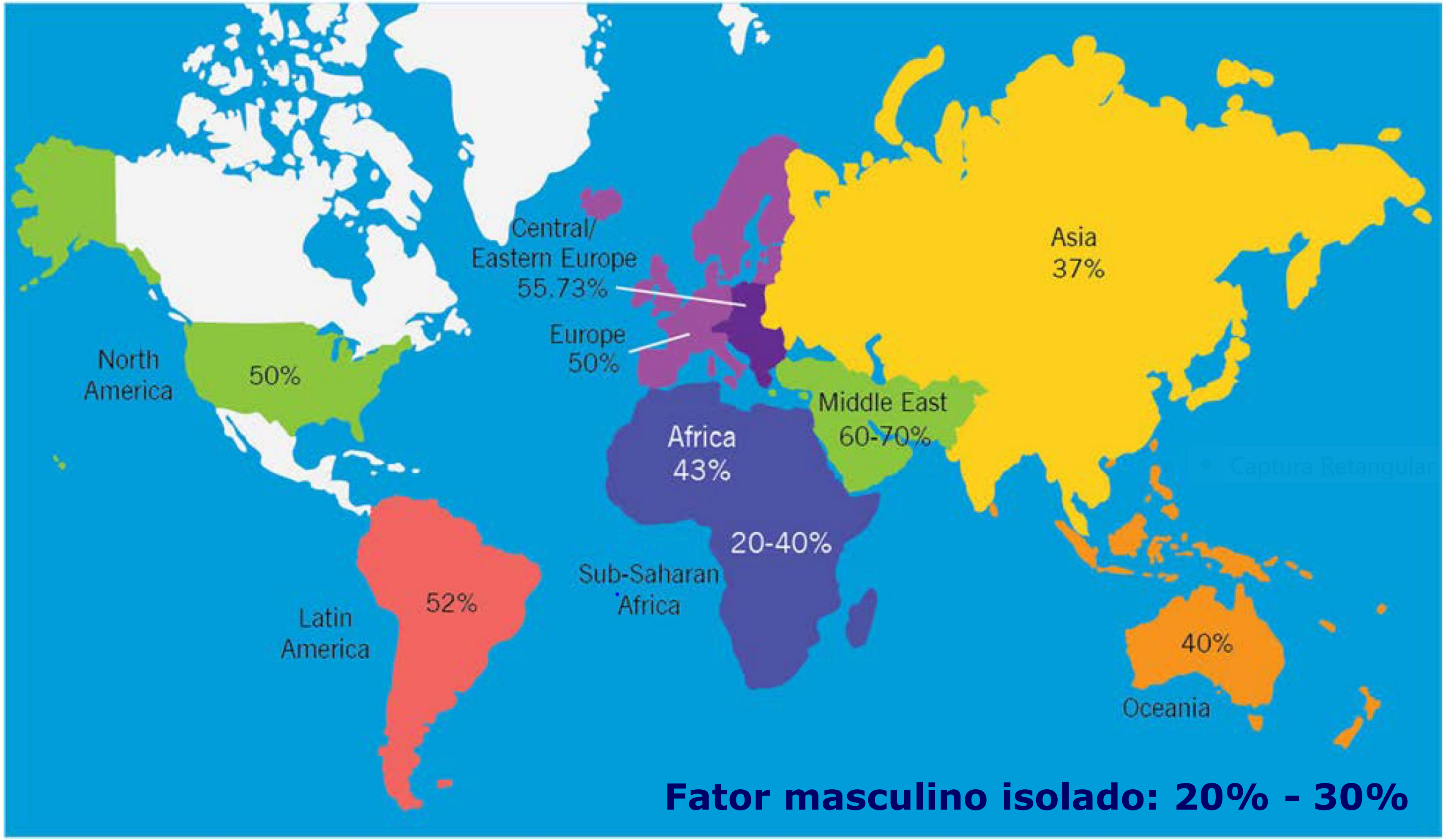


Figure 2 World map containing percentages of infertility cases per region that are due to male factor. This figure demonstrates rates of infertility cases in each region studied (North America, Latin America, Africa, Europe, Central/Eastern Europe, Middle East, Asia, and Oceania) due to male factor involvement.

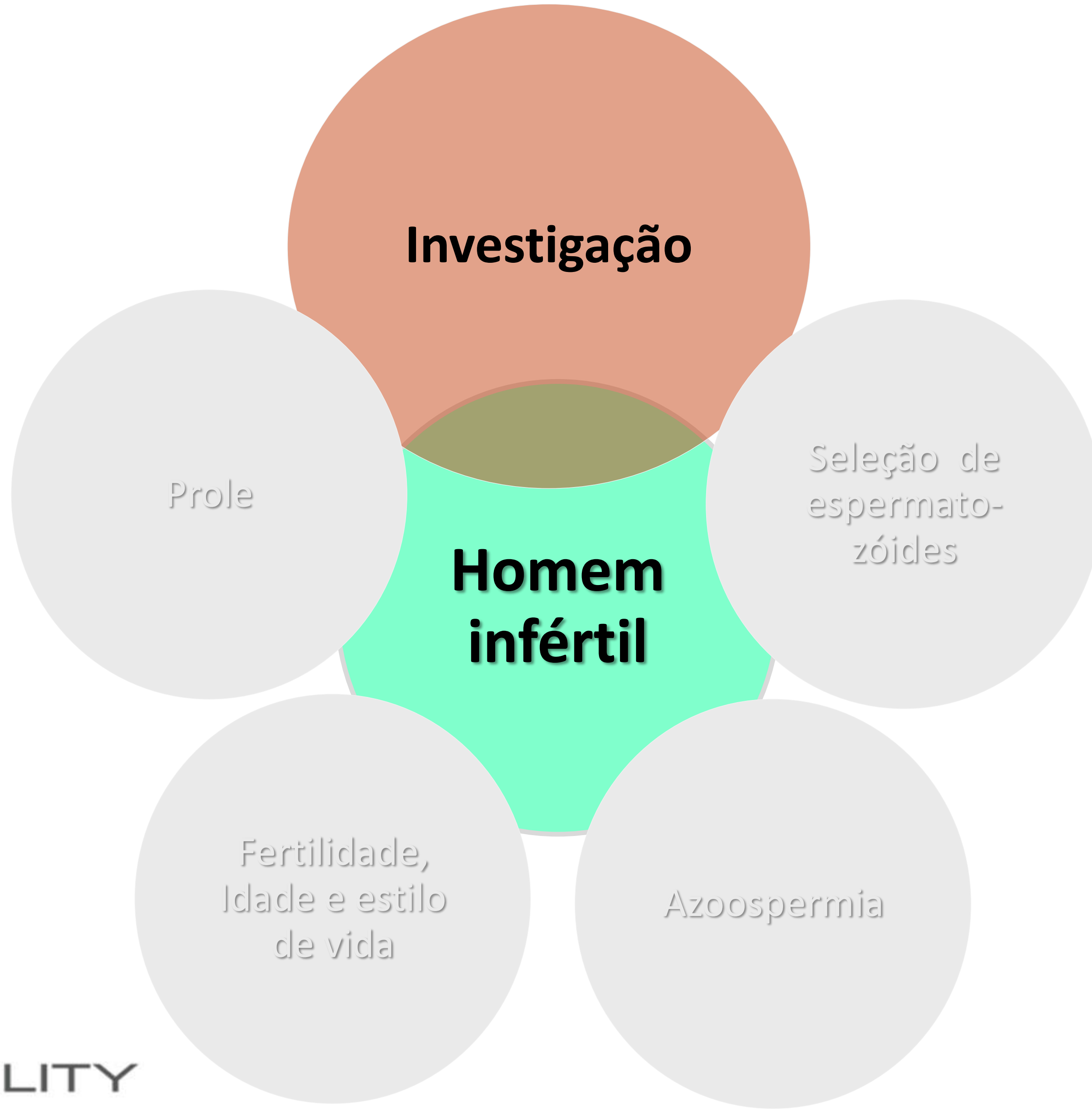
FERTILITY

RB&E REPRODUCTIVE BIOLOGY AND ENDOCRINOLOGY

Agarwal *et al. Reproductive Biology and Endocrinology* (2015) 13:37
DOI 10.1186/s12958-015-0032-1


Investigação
Prole
Homem infértil
Seleção de espermato-zóides
Fertilidade, Idade e estilo de vida
Azoospermia

FERTILITY


Investigação
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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***

FERTILITY

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

FERTILITY

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

FERTILITY

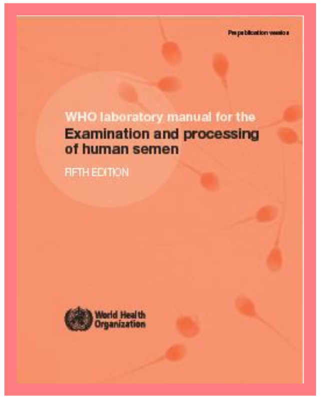

Table II Distribution of values, lower reference limits and their 95% CI for semen parameters from fertile men whose partners had a time-to-pregnancy of 12 months or less (n= 1953)

	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.

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Manual O.M.S. 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 !!

FERTILITY

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

- ***Definição: 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
- ✓ 1.177 casais

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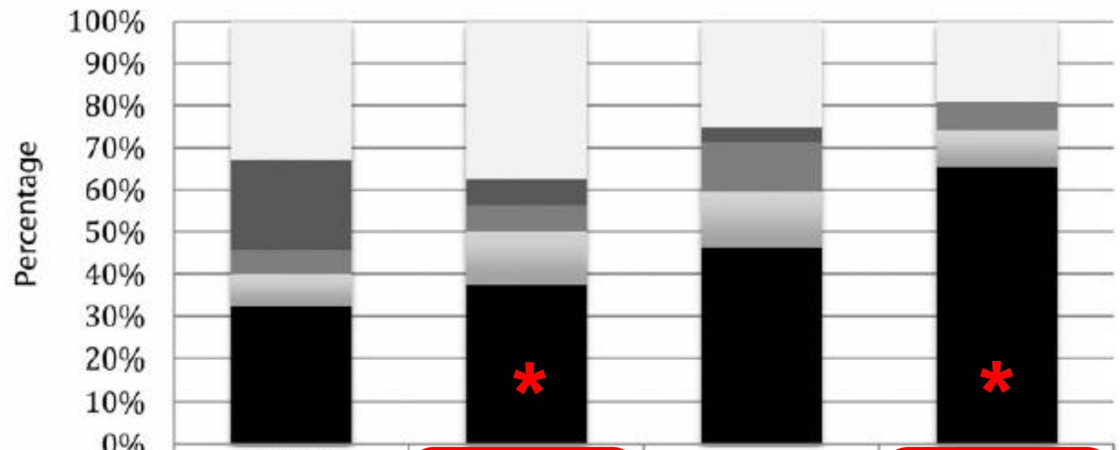

	TMSC abnormal - WHO abnormal	TMSC abnormal - WHO normal	TMSC normal - WHO abnormal	TMSC normal - WHO normal
No pregnancy	205	6	57	59
Pregnancy after ICSI	133	1	8	1
Pregnancy after IVF	36	1	27	20
Pregnancy after IUI	48	2	30	27
Spontaneous	201	6	105	202

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.

FERTILITY

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ANDROLOGY

ORIGINAL ARTICLE

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Keywords:
intracytoplasmic sperm injection, infertility, sperm count, sperm motility, spermatozoa

Received: 18-Dec-2015
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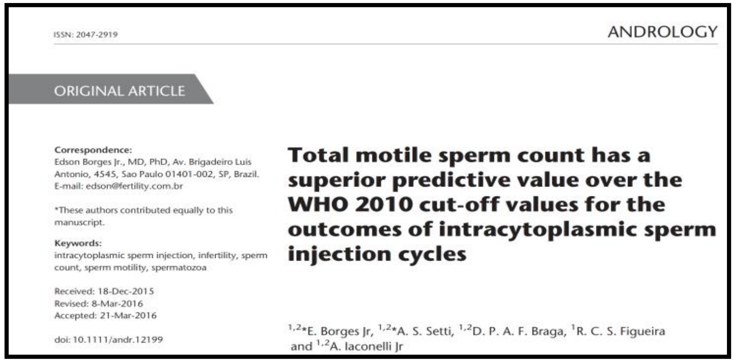
Total motile sperm count has a superior predictive value over the WHO 2010 cut-off values for the outcomes of intracytoplasmic sperm injection cycles

[1,2]*E. Borges Jr, [1,2]*A. S. Setti, [1,2]D. P. A. F. Braga, [1]R. C. S. Figueira and [1,2]A. Iaconelli Jr

- 518 ciclos de ICSI
- OMS / TMSC
- TMSC normal: > 20 milhões

FERTILITY



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ANDROLOGY

ORIGINAL ARTICLE

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- OMS: 518 (100%) fator masculino
  - Oligozoospermia: 148
  - Astenozoospermia: 106
  - Teratozoospermia: 361

- TMSC
  - normal: 190 (36,7%): ausência de fator masculino
  - anormal: 328 (63,3%): fator masculino +

FERTILITY

Table 4 Comparison of ICSI outcomes between normal and abnormal TMSC groups

Variables	Normal TMSC group (n = 328)	Abnormal TMSC group (n = 190)	p-value
Paternal age (year-old)	37.4 ± 4.8	38.1 ± 6.1	0.187
Maternal age (year-old)	35.4 ± 3.9	33.5 ± 4.0	<0.001
Number of aspirated follicles	17.8 ± 9.7	20.8 ± 11.2	0.002
Number of obtained oocytes	12.7 ± 7.2	15.1 ± 8.1	0.001
Number of mature oocytes	9.7 ± 5.5	11.2 ± 6.2	0.003
Number of injected oocytes	9.4 ± 4.3	10.2 ± 4.9	0.067
Fertilization rate (%)	84.9 ± 14.4	81.1 ± 15.8	0.016
Number of obtained embryos	8.2 ± 3.8	8.7 ± 4.4	0.204
Number of transferred embryos	2.2 ± 0.6	2.2 ± 0.5	0.469
Implantation rate (%)	25.1 ± 36.0	25.8 ± 35.2	0.832
Pregnancy rate (%)	134/328 (40.9)	94/190 (49.5)	0.060
Miscarriage rate (%)	29/162 (17.9)	23/78 (29.5)	0.041

SD, standard deviation; TMSC: total motile sperm count.

FERTILITY

Table 5 Linear and binary regression analysis results for the influences of TMSC and WHO cut-off values on ICSI outcome

Variables	Method	OR or RC	CI or R^2	*p*-value
Fertilization rate	Concentration	3.994	1.4%	0.015
	Motility	0.097	0.0%	0.957
	Progressive motility	2.299	0.5%	0.163
	Morphology	8.735	0.9%	0.047
	TMSC	3.784	1.5%	0.013
	Normal TMSC	−0.253	0.1%	0.592
Formation of high-quality zygotes on D1	Concentration	1.64	1.09–2.46	0.018
	Motility	1.34	0.85–2.12	0.208
	Progressive motility	1.22	0.80–1.85	0.355
	Morphology	0.89	0.65–1.22	0.461
	TMSC	1.13	1.01–1.28	0.049
	Normal TMSC	0.99	0.97–1.02	0.629
Formation of high-quality embryos on D2	Concentration	0.93	0.76–1.09	0.101
	Motility	0.91	0.79–1.06	0.222
	Progressive motility	1.06	0.92–1.22	0.420
	Morphology	0.84	0.60–1.18	0.314
	TMSC	1.18	1.03–1.35	0.013
	Normal TMSC	0.97	0.94–1.01	0.098
Formation of high-quality embryos on D3	Concentration	0.91	0.79–1.06	0.229
	Motility	0.93	0.79–1.09	0.379
	Progressive motility	1.00	0.85–1.17	0.969
	Morphology	1.18	0.83–1.67	0.354
	TMSC	1.12	1.07–1.29	0.037
	Normal TMSC	0.98	0.95–1.02	0.319
Formation of blastocyst on D5	Concentration	1.11	0.97–1.27	0.116
	Motility	1.03	0.90–1.19	0.660
	Progressive motility	0.91	0.70–1.23	0.303
	Morphology	1.13	0.83–1.55	0.427
	TMSC	1.16	1.04–1.26	0.011
	Normal TMSC	1.00	0.97–1.04	0.802
Blastocyst expansion grade on D5	Concentration	0.83	0.66–1.05	0.120
	Motility	1.01	0.79–1.29	0.948
	Progressive motility	1.08	0.85–1.38	0.533
	Morphology	0.99	0.57–1.71	0.962
	TMSC	1.27	1.01–1.60	0.042
	Normal TMSC	1.03	0.98–1.07	0.287

Guideline

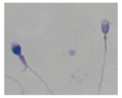
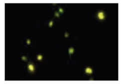
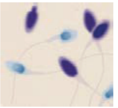
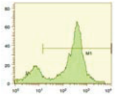
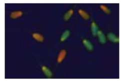
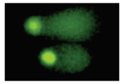
Clinical utility of sperm DNA fragmentation testing: practice recommendations based on clinical scenarios

Ashok Agarwal[1], Ahmad Majzoub[2], Sandro C. Esteves[3], Edmund Ko[4], Ranjith Ramasamy[5], Armand Zini[6]

Transl Androl Urol 2016;5(6):935-950

FERTILITY

Table 1 Sperm DNA fragmentation (SDF) testing methods

	Test	Principle	Advantage	Disadvantage
 [1]	AO test	Metachromatic shift in fluorescence of AO when bound to single strand (ss)DNA. Uses fluorescent microscopy	Rapid, simple and inexpensive	Inter-laboratory variations and lack of reproducibility
 [2]	AB staining	Increased affinity of AB dye to loose chromatin of sperm nucleus. Uses optical microscopy	Rapid, simple and inexpensive	Inter-laboratory variations and lack of reproducibility
 [3]	CMA3 staining	CMA3 competitively binds to DNA indirectly visualizing protamine deficient DNA. Uses fluorescent microscopy	Yields reliable results as it is strongly correlated with other assays	Inter-observer variability
 [4]	TB staining	Increased affinity of TB to sperm DNA phosphate residues. Uses optical microscopy	Rapid, simple and inexpensive	Inter-observer variability
 [5]	TUNEL	Quantifies the enzymatic incorporation of dUTP into DNA breaks. Can be done using both optical microscopy and fluorescent microscopy. Uses optical microscopy, fluorescent microscopy and flow cytometry	Sensitive, reliable with minimal inter-observer variability. Can be performed on few sperm	Requires standardization between laboratories
 [6]	SCSA	Measures the susceptibility of sperm DNA to denaturation. The cytometric version of AO test. Uses flow cytometry	Reliable estimate of the percentage of DNA-damaged sperm	Requires the presence of expensive instrumentation (flow cytometer) and highly skilled technicians
 [7]	SCD or Halo test	Assess dispersion of DNA fragments after denaturation. Uses optical or fluorescent microscopy	Simple test	Inter-observer variability
 [8]	SCGE or comet assay	Electrophoretic assessment of DNA fragments of lysed DNA. Uses fluorescent microscopy	Can be done in very low sperm count. It is sensitive and reproducible	Requires an experienced observer. Inter-observer variability

[1] Acridine orange (AO) stains normal DNA fluoresces green; whereas denatured DNA fluoresces orange-red. [2] Aniline blue (AB) staining showing sperm with fragmented DNA and normal sperm. [3] Chromomycin A3 (CMA3) staining: protamine deficient spermatozoa appear bright yellow; spermatozoa with normal protamine appear yellowish green. [4] Toulidine blue (TB) staining: normal sperm appear light blue and sperm with DNA fragmentation appear violet. [5] Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay fluorescent activated cell sorting histogram showing percentage of SDF. [6] Sperm chromatin structure assay (SCSA): flow cytometric version of AO staining. [7] Sperm chromatin dispersion (SCD) test: spermatozoa with different patterns of DNA dispersion; large-sized halo; medium-sized halo [2]; very small- sized halo. [8] Comet images showing various levels of DNA damage.

Human Reproduction, Vol.27, No.10 pp. 2908–2917, 2012
Advanced Access publication on July 12, 2012 doi:10.1093/humrep/des261

human reproduction

META-ANALYSIS *Andrology*

The effect of sperm DNA fragmentation on miscarriage rates: a systematic review and meta-analysis

Lynne Robinson[1,*], Ioannis D. Gallos[1,2], Sarah J. Conner[1,2], Madhurima Rajkhowa[1], David Miller[3], Sheena Lewis[4], Jackson Kirkman-Brown[1,2], and Arri Coomarasamy[1,2]

- ***16 estudos – 2.969 casais***
- Aumento significativo de *abortamento* em homens com aumento da *fragDNA espermática*: RR =2,16 (1,54 – 3,03)
- TUNEL: RR = 3,94 (2,45 – 6,32)

FERTILITY

Editorial REPRODUCTIVE BIOMEDICINE ONLINE 34 (2017) 3–4

Sperm DNA fragmentation in miscarriage – a promising diagnostic, or a test too far?

Um número de revisões sistemáticas tem avaliado o efeito da *fragDNA espermático* nos resultados de IIU/FIV/ICSI (Osman et al.,2015; Zini et al., 2011, Simon et al., 2016), com resultados não totalmente conclusivos e dependentes da técnica de avaliação.

Perda gestacional:

- Sem evidências (Coughlan et al.,2015)
- Confirmam resultados de 2012 (Carlini et al.,2017; Bareh et al., 2016; Zidi-Jrah et al., 2016).

FERTILITY

COCHRANE SUMMARIES
Independent high-quality evidence for health care decision making

Antioxidants for male subfertility

Showell MG, Brown J, Yazdani A, Stankiewicz MT, Hart RJ

Published Online: March 14, 2012

Oxidative stress may cause sperm cell damage. This damage can be reduced by the body's own natural antioxidant defences. Antioxidants can be part of our diet and taken as a supplement. It is believed that in many cases of unexplained subfertility, and also in instances where there may be a sperm-related problem, taking an oral antioxidant supplement may increase a couple's chance of conceiving when undergoing fertility treatment. This review identified 34 randomised controlled trials involving 2876 couples. Pooled findings from three small trials suggest an increase in live birth rates for the partners of subfertile men taking an antioxidant supplement as part of an assisted reproductive program. However, further well-designed large randomised placebo-controlled trials are needed to confirm these findings.

- 34 estudos randomizados – 2.876 casais
- Aumento da taxa gestação (OR=4,18)
- Aumento na taxa de nascidos vivos (OR=4,85)

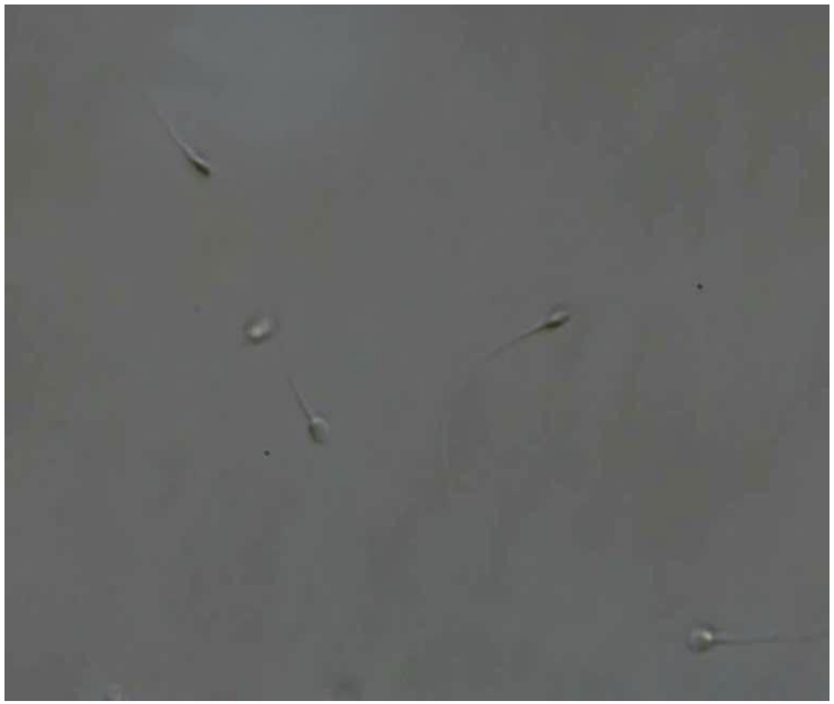
FERTILITY

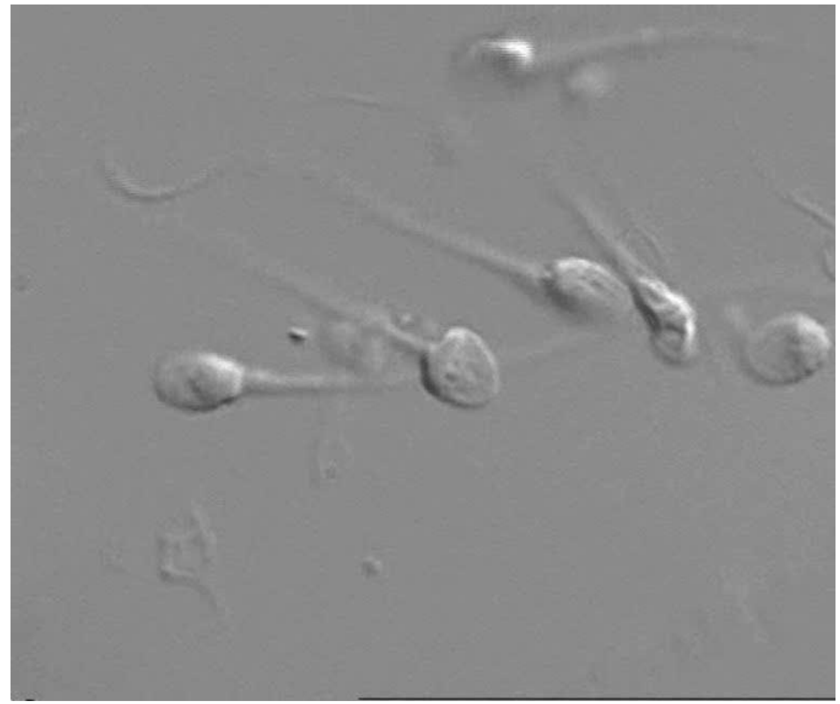

Investigação
Prole
Homem infértil
Seleção de espermato-zóides
Fertilidade, Idade e estilo de vida
Azoospermia

FERTILITY

MSOME Motile Sperm Organellar Morphology Examination

IMSI Intracytoplasmic Morphologically Select Sperm Injection





FERTILITY

European Journal of Obstetrics & Gynecology and Reproductive Biology 183 (2014) 96–103

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journal homepage: www.elsevier.com/locate/ejogrb

Review

Intracytoplasmic morphologically selected sperm injection results in improved clinical outcomes in couples with previous ICSI failures or male factor infertility: a meta-analysis

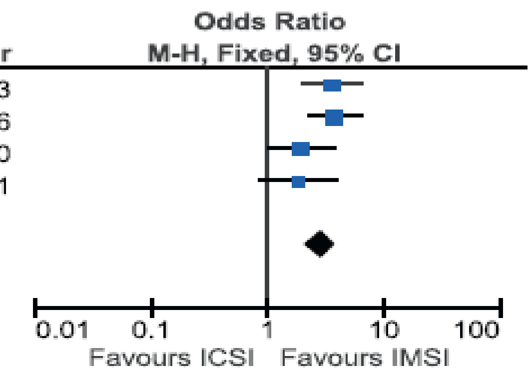
Amanda S. Setti [a,b,c], Daniela P.A.F. Braga [a,b], Rita C.S. Figueira [b,c], Assumpto Iaconelli Jr.[a,b], Dr.Edson Borges [a,b,*]

2.1 Previous ICSI failures

a) Implantation

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Bartoov et al.	53	190	17	175	24.0%	3.60 [1.99, 6.50]	2003
Berkovitz et al.	69	248	23	248	31.2%	3.77 [2.26, 6.29]	2006
Gonzalez-Ortega et al.	35	78	25	84	25.0%	1.92 [1.01, 3.67]	2010
Oliveira et al.	24	164	11	128	19.8%	1.82 [0.86, 3.88]	2011
Total (95% CI)		**680**		**635**	**100.0%**	**2.88 [2.13, 3.89]**	
Total events	181		76				

Heterogeneity: Chi² = 4.52, df = 3 (P = 0.21); I² = 34%
Test for overall effect: Z = 6.88 (P < 0.00001)

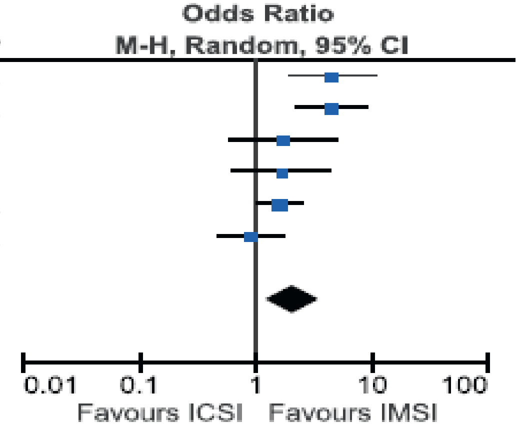


b) Pregnancy

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
Bartoov et al.	33	50	15	50	15.3%	4.53 [1.95, 10.51]	2003
Berkovitz et al.	48	80	20	80	17.8%	4.50 [2.29, 8.84]	2006
Gonzalez-Ortega et al.	19	30	15	30	12.8%	1.73 [0.62, 4.84]	2010
Oliveira et al.	14	63	8	55	13.8%	1.68 [0.65, 4.37]	2011
Klement et al.	52	127	97	322	21.6%	1.61 [1.05, 2.46]	2013
El Khattabi et al.	22	90	34	130	18.7%	0.91 [0.49, 1.70]	2013
Total (95% CI)		**440**		**667**	**100.0%**	**2.07 [1.22, 3.50]**	
Total events	188		189				

Heterogeneity: Tau² = 0.29; Chi² = 16.40, df = 5 (P = 0.006); I² = 70%

Test for overall effect: Z = 2.71 (P = 0.007)

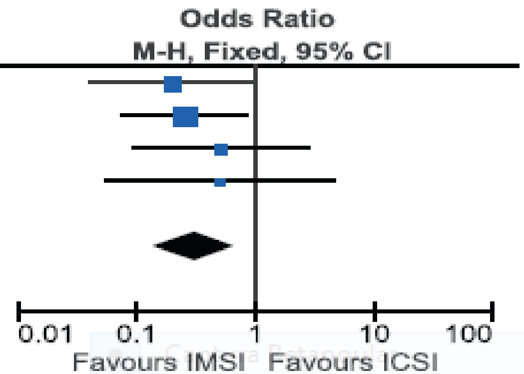


c) Miscarriage

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Bartoov et al.	3	33	5	15	28.6%	0.20 [0.04, 0.99]	2003
Berkovitz et al.	7	48	8	20	44.2%	0.26 [0.08, 0.85]	2006
Gonzalez-Ortega et al.	3	19	4	15	17.2%	0.52 [0.10, 2.77]	2010
Oliveira et al.	2	14	2	8	10.0%	0.50 [0.06, 4.47]	2011
Total (95% CI)		**114**		**58**	**100.0%**	**0.31 [0.14, 0.67]**	
Total events	15		19				

Heterogeneity: Chi² = 0.92, df = 3 (P = 0.82); I² = 0%

Test for overall effect: Z = 2.96 (P = 0.003)



FERTILITY

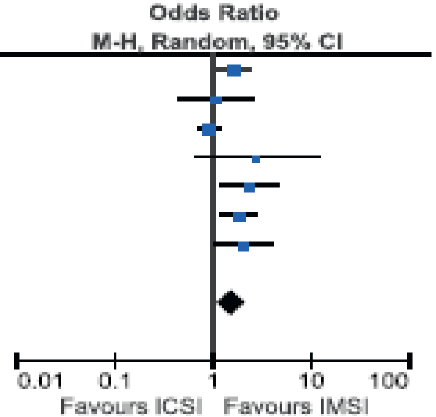
2.2 Male factor

a) Implantation rate

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
Antinori et al.	97	560	59	521	19.9%	1.64 [1.16, 2.32]	2008
Oliveira et al.	11	93	13	116	9.6%	1.06 [0.45, 2.50]	2011
Setti et al.	158	664	156	613	22.0%	0.91 [0.71, 1.18]	2011
Knez et al.	6	35	3	44	4.4%	2.83 [0.65, 12.24]	2011
Balaban et al.	32	108	16	105	12.6%	2.34 [1.19, 4.59]	2011
Wilding et al.	86	355	48	324	18.8%	1.84 [1.24, 2.72]	2011
Knez et al.	27	93	19	115	12.7%	2.07 [1.06, 4.02]	2012
Total (95% CI)		**1908**		**1838**	**100.0%**	**1.56 [1.11, 2.18]**	
Total events	417		314				

Heterogeneity: Tau² = 0.12; Chi² = 17.98, df = 6 (P = 0.006); I² = 67%

Test for overall effect: Z = 2.58 (P = 0.010)

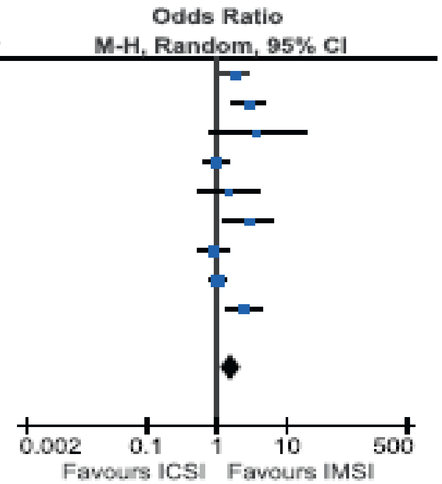


b) Pregnancy rate

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
Antinori et al.	89	227	58	219	14.0%	1.79 [1.20, 2.67]	2008
Wilding et al.	80	122	44	110	12.0%	2.86 [1.68, 4.87]	2011
Knez et al.	5	20	3	37	3.5%	3.78 [0.80, 17.89]	2011
Setti et al.	93	250	92	250	14.5%	1.02 [0.71, 1.46]	2011
Oliveira et al.	12	37	11	45	6.9%	1.48 [0.56, 3.90]	2011
Knez et al.	25	52	17	70	8.8%	2.89 [1.34, 6.24]	2012
De Vos et al.	43	125	51	139	12.4%	0.90 [0.55, 1.50]	2013
Klement et al.	126	269	473	1033	15.8%	1.04 [0.80, 1.37]	2013
El Khattabi et al.	61	132	33	126	12.1%	2.42 [1.43, 4.09]	2013
Total (95% CI)		**1234**		**2029**	**100.0%**	**1.61 [1.17, 2.23]**	
Total events	534		782				

Heterogeneity: Tau² = 0.15; Chi² = 27.87, df = 8 (P = 0.0005); I² = 71%

Test for overall effect: Z = 2.90 (P = 0.004)

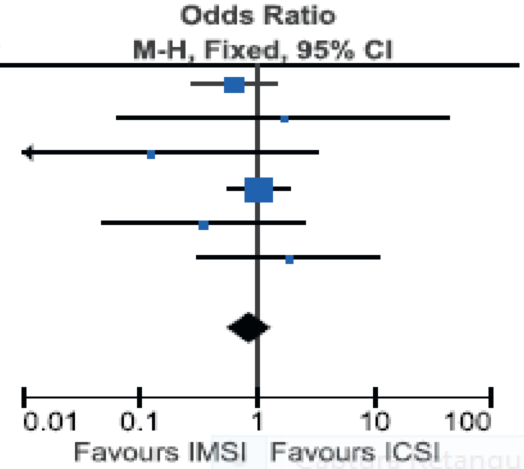


c) Miscarriage rate

Study or Subgroup	IMSI Events	IMSI Total	ICSI Events	ICSI Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Antinori et al.	15	89	14	58	31.2%	0.64 [0.28, 1.44]	2008
Wilding et al.	1	80	0	44	1.4%	1.68 [0.07, 42.09]	2011
Knez et al.	1	5	2	3	4.4%	0.13 [0.00, 3.22]	2011
Setti et al.	29	158	28	156	51.0%	1.03 [0.58, 1.82]	2011
Oliveira et al.	2	12	4	11	7.7%	0.35 [0.05, 2.47]	2011
Knez et al.	5	25	2	17	4.2%	1.88 [0.32, 11.02]	2012
Total (95% CI)		**369**		**289**	**100.0%**	**0.86 [0.56, 1.32]**	
Total events	53		50				

Heterogeneity: Chi² = 3.96, df = 5 (P = 0.55); I² = 0%

Test for overall effect: Z = 0.70 (P = 0.48)



FERTILITY

ANDROLOGY

ISSN: 2047-2919

ANDROLOGY

ORIGINAL ARTICLE

Correspondence:
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E-mail: edson@fertility.com.br

Keywords:
blastocyst, intracytoplasmic sperm injection, male infertility, motile sperm organelle morphology examination, semen analysis

Received: 5-Dec-2017
Revised: 15-Jan-2018
Accepted: 16-Jan-2018

doi: 10.1111/andr.12473

Sperm morphological normality under high magnification is correlated to male infertility and predicts embryo development

[1,2]B. F. Zanetti, [1,2]D. P. A. F. Braga, [1]R. R. Provenza, [1]R. C. S. Figueira, [1,2]A. Iaconelli Jr. and [1,2]E. Borges Jr.

[1]Fertility Medical Group, São Paulo, SP, Brazil, and [2]Instituto Sapientiae – Centro de Estudos e Pesquisa em Reprodução Humana Assistida, São Paulo, SP, Brazil

MSOME I+II

Grade I:
- Normal form
- No vacuoles

Grade II:
- Normal form
- ≤ 2 small vacuoles

Grade III:
- Normal form
- > 2 small vacuoles or at least one large vacuole

Grade IV:
- Abnormal head shapes or other abnormalities
- Large vacuole

FERTILITY

Linear regression analysis of the association between sperm parameters and MSOME

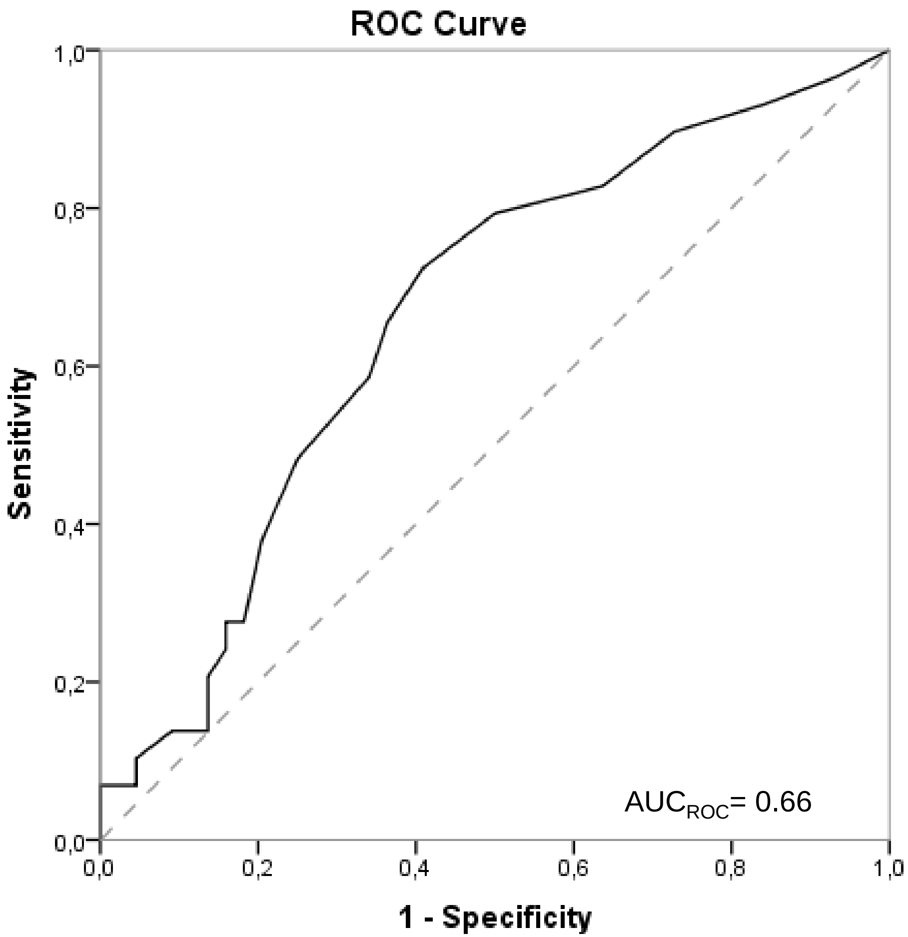
SEMEN PARAMETER	MSOME I+II		MSOME III		MSOME IV	
	β	p	β	p	β	p
Volume	-0.031	0.508	-0.029	0.539	0.025	0.592
Concentration	0.281	<0.001	0.022	0.630	-0.252	<0.001
Total sperm count	0.224	<0.001	-0.013	0.782	-0.193	<0.001
Total motility	0.178	<0.001	-0.012	0.791	-0.175	<0.001
Progressive motility	0.192	<0.001	0.008	0.856	-0.188	<0.001
Morphology	0.341	<0.001	0.136	0.003	-0.350	<0.001
TMSC	0.210	<0.001	-0.017	0.716	-0.180	<0.001

Logistic regression analyses of MSOME grades correlation with ICSI outcomes

	MSOME I+II		MSOME III		MSOME IV	
	β	*p*	β	*p*	β	*p*
Fertilization rate	0.197	0.044	0.150	0.134	-0.192	0.052
High-quality embryos rate	0.306	0.013	0.379	0.002	-0.378	0.002
Blastocyst rate	0.248	0.047	0.008	0.954	-0.195	0.130
Implantation rate	-0.098	0.405	-0.137	0.252	0.138	0.244
	95% CI	*p*	**95% CI**	*p*	**95% CI**	*p*
Cancelation rate	0.95; 1.07	0.817	0.94; 1.12	0.557	0.95; 1.03	0.716
Pregnancy rate	0.90; 1.05	0.493	0.84;1.09	0.528	0.96; 1.09	0.396

FERTILITY
MEDICAL GROUP

ROC Curve of MSOME grades I+II and blastocyst formation rate (below or equal and above 50%)



AUC: 0,66
MSOME I+II
cut-off: 5,5%
sensitivity of 0.72
specificity of 0.41

Descriptive statistic of ICSI outcomes per MSOME I+II normality classification

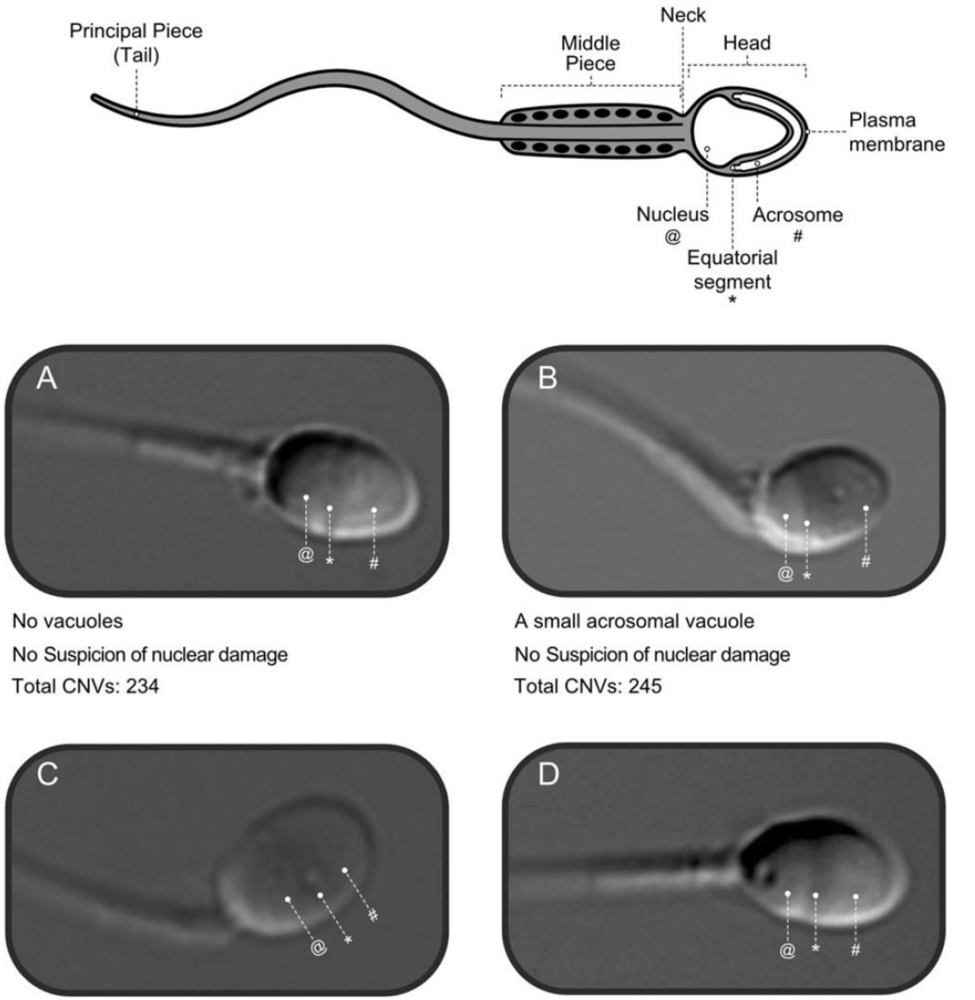
	Normal (MSOME I+II ≥5.5%)	Abnormal (MSOME I+II <5.5%)	p
Female age (years)	36.18 ± 4.29	36.66 ± 3.58	0.527
Total dose of FSH administered (IU)	2346.38 ± 680.43	2422.61 ± 704.55	0.560
Number of follicles	14.28 ± 12.49	14.06 ± 10.97	0.925
Number of retrieved oocytes	9.92 ± 9.95	10.81 ± 7.74	0.608
Fertilization rate	86.94 ± 19.04	84.59 ± 14.79	0.708
High-quality embryos rate	41.78 ± 16.04	38.40 ± 21.73	0.463
Blastocyst rate	50.14 ± 5.05	28.53 ± 5.69	0.005
Implantation rate (%)	20.10 ± 35.59	24.24 ± 37.05	0.618
Pregnancy rate (%)	28.26	36.36	0.472

Human Reproduction, Vol.33, No.4 pp. 563–571, 2018
Advanced Access publication on February 6, 2018 doi:10.1093/humrep/dey019

human reproduction ORIGINAL ARTICLE *Andrology*

The significance of human spermatozoa vacuoles can be elucidated by a novel procedure of array comparative genomic hybridization

Arie Berkovitz[1,*], Yaron Dekel[2,3,4,5], Revital Goldstein[3,4], Shhadeh Bsoul[3], Yossy Machluf[6], and Dani Bercovich[3,4]

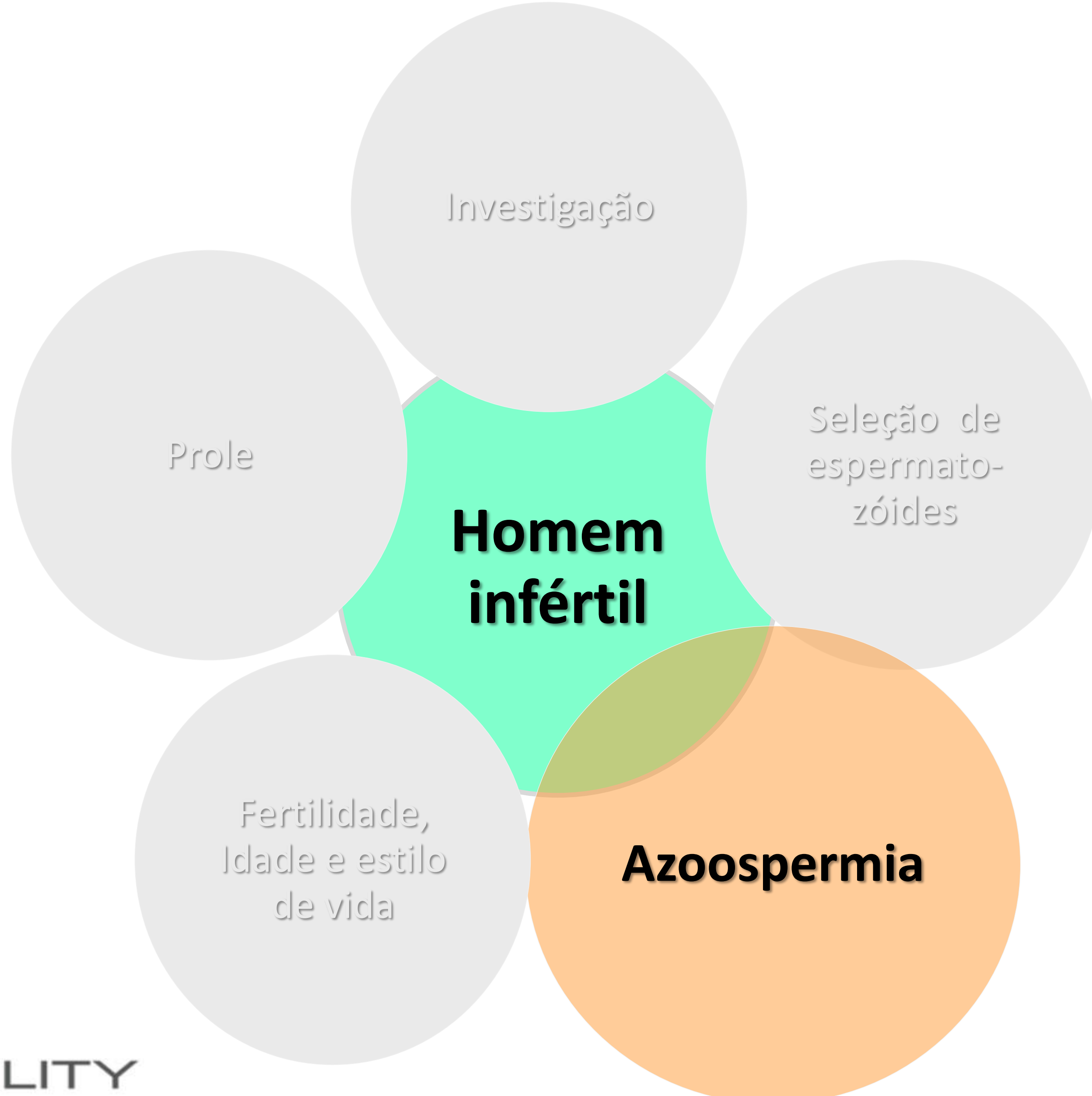


No vacuoles
No Suspicion of nuclear damage
Total CNVs: 234

A small acrosomal vacuole
No Suspicion of nuclear damage
Total CNVs: 245

Two small equatorial vacuoles
Suspected of nuclear damage: Vacuole location
Total CNVs: 285

Small and deep nuclear vacuole
Suspected of nuclear damage: Vacuole location & depth
Total CNVs: 744


Investigação
Prole
Seleção de espermato-zóides
Homem infértil
Fertilidade, Idade e estilo de vida
Azoospermia

FERTILITY

RECUPERAÇÃO DE ESPERMATOZÓIDES NÃO EJACULADOS

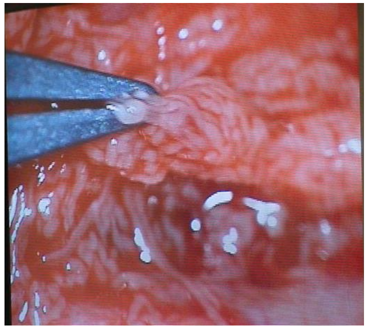
ESPERMATOZÓIDES ESPIDIDIMÁRIOS

PERCUTANEOUS
EPIDYDIMAL
SPERM
ASPIRATION

ESPERMATOZÓIDES TESTICULARES

TESTICULAR
SPERM
ASPIRATION
EXTRACTION

Micro
TESTICULAR
SPERM
EXTRACTION



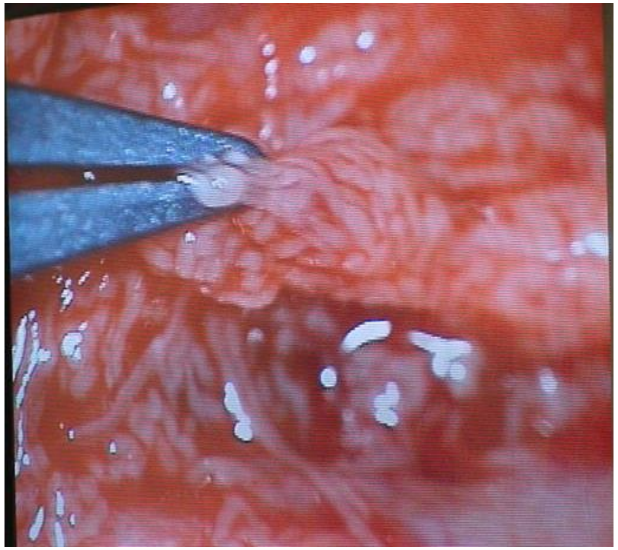
FERTILITY

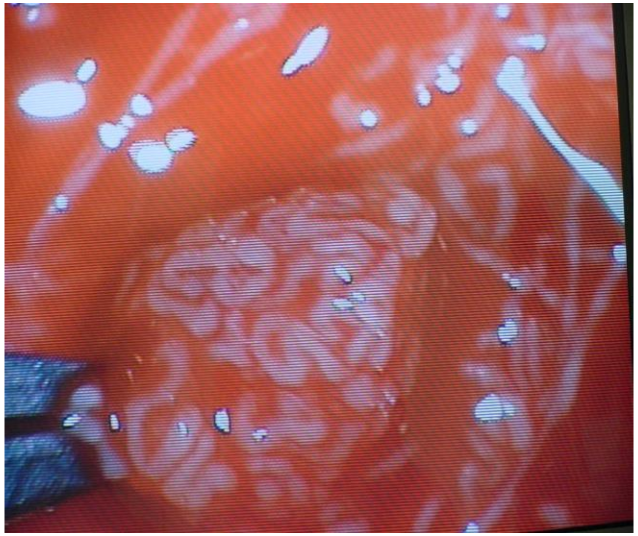
PESA

TESE MICROCIRURGICA
MicroTESE

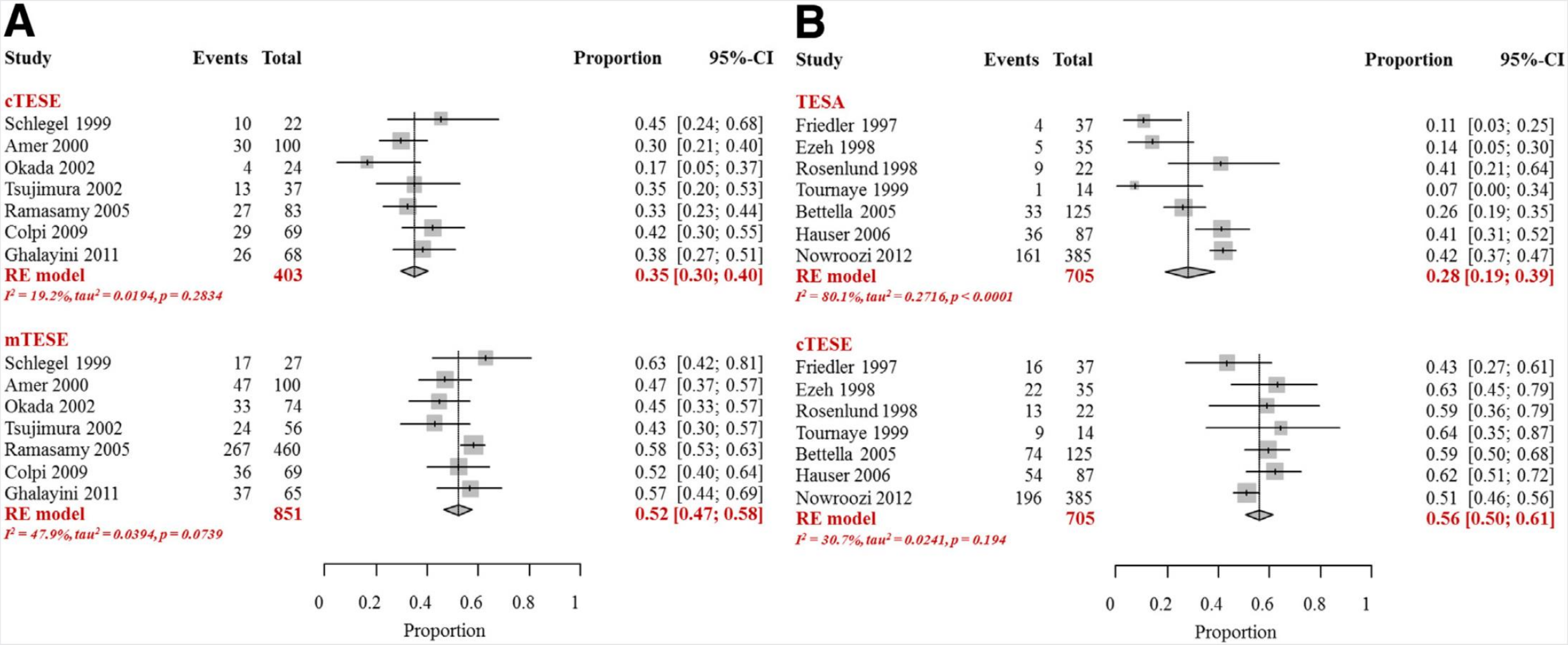
PETER SCHLEGEL. *HUMAN REPROD*, 14: 131-135, 1999

SHERMAN J. SILBER. *HUMAN REPROD*, 15: 2278-2284, 2000





FERTILITY



(**A**) Meta-analysis of the association of cTESE vs. micro-TESE with SR outcome for men with nonobstructive azoospermia. (**B**) Meta-analysis of the association of TESA vs. cTESE with SR outcome for men with nonobstructive azoospermia.

Bernie. Comparison of micro-TESE, cTESE, and TESA. Fertil Steril 2015.

FERTILITY

The Aging Male, Month 13(1):44-50, 2010 Edson Borges Jr., *et al.*

informa healthcare

[1] *Fertility – Assisted Fertilization Center, São Paulo, SP, Brazil,* [2] *Sapientiae Institute – Educational and Research Center in Assisted Reproduction, São Paulo, SP, Brazil, and* [3] *Institute of Biotechnology – Caxias do Sul University, Caxias do Sul, RS, Brazil*

ORIGINAL ARTICLE

Assisted reproductive technology outcomes in azoospermic men: 10 years of experience with surgical sperm retrieval

Table II. ICSI outcomes from patients with obstructive azoospermia when the injected spem were retrieved from the testicle (TESA) or epididymis (PESA).

	Study group		
Variable	OA-TESA (n=103)	OA-PESA (n=171)	*p* value
Normal fertilization rate (%)	57.9 ± 9.5 (48.5–67.5)	65.2 ± 4.1 (54.7–69.3)	*0.0017*
Abnormal fertilization rate (%)	13.2 ± 6.3 (6.5–19.5)	12.7 ± 5.3 (7.9–18.0)	0.9437
Fertilization failure rate (%)	28.9 ± 8.9 (20.2–37.8)	22.1 ± 6.0 (15.8–28.1)	0.1081
Non-cleaved rate (%)	9.87 ± 5.9 (4.2–15.8)	7.46 ± 3.9 (3.5–11.4)	0.4406
Pregnancy rate (%)	31.9 ± 9.0 (23.0–41.0)	32.5 ± 7.5 (25.9–40.0)	0.8803
Abortion rate (%)	38.8 ± 9.6 (29.6–48.4)	18.0 ± 5.8 (12.2–23.8)	*0.0387*
Implantation rate (%)	9.4 ± 5.6 (3.8–15.0)	10.5 ± 4.0 (5.5–14.5)	0.6054

Values in percentage expressed as mean ± SD (confidence interval of the frequencies).

F

The Aging Male, Month 13(1):44-50, 2010 Edson Borges Jr., *et al.*

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ORIGINAL ARTICLE

Assisted reproductive technology outcomes in azoospermic men: 10 years of experience with surgical sperm retrieval

Table IV. ICSI outcomes when the injected sperm were retrieved from the testicle (TESA) of patients with obstructive (OA) or non-obstructive (NOA) azoospermia.

	Study group		
Variable	OA-TESA (n=103)	NOA-TESA (n=102)	*p* value
Normal fertilization rate (%)	57.9 ± 9.5 (48.5–67.5)	50.4 ± 9.3 (40.3–59.7)	*0.0050*
Abnormal fertilization rate (%)	13.2 ± 6.3 (6.5–19.5)	13.98 ± 6.8 (7.3–20.7)	0.4421
Fertilization failure rate (%)	28.9 ± 8.9 (20.2–37.8)	35.65 ± 11.8 (27.6–47.4)	*0.0023*
Non cleaved rate (%)	9.87 ± 5.9 (4.2–15.8)	16.1 ± 17 (8.9–23.1)	*0.0034*
Pregnancy rate (%)	31.9 ± 9.0 (23.0–41.0)	29.7 ± 9.2 (21.1–38.9)	0.4166
Abortion rate (%)	38.8 ± 9.6 (29.6–48.4)	37.0 ± 9.4 (27.6–46.4)	0.9992
Implantation rate (%)	9.4 ± 5.6 (3.8–15.0)	9.65 ± 6.1 (4.2–15.8)	0.8519

Values in percentage expressed as mean ± SD (confidence interval of the frequencies).

The Aging Male, Month 13(1):44-50, 2010 Edson Borges Jr., *et al.*

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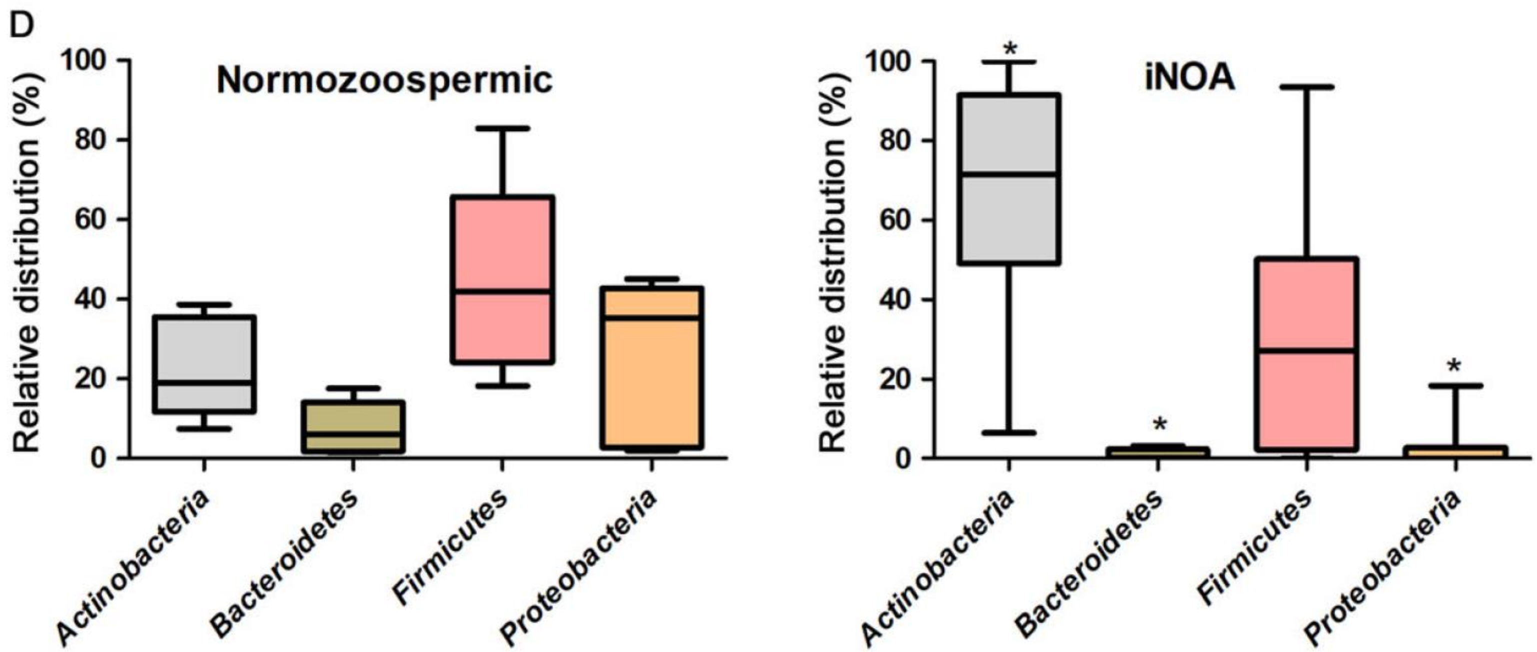
Values in percentage expressed as mean ± SD (confidence interval of the frequencies).

Human Reproduction, pp. 1–6, 2018
doi:10.1093/humrep/dey116

human reproduction ORIGINAL ARTICLE *Andrology*

Testicular microbiome in azoospermic men—first evidence of the impact of an altered microenvironment

Massimo Alfano[1,*], Roberto Ferrarese[2], Irene Locatelli[1], Eugenio Ventimiglia[1,2], Silvia Ippolito[1], Pierangela Gallina[3], Daniela Cesana[3], Filippo Canducci[4], Luca Pagliardini[5], Paola Viganò[5], Massimo Clementi[2], Manuela Nebuloni[6], Francesco Montorsi[1,2], and Andrea Salonia[1,2]



FERTILITY

Human Reproduction, pp. 1–6, 2018
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human reproduction | ORIGINAL ARTICLE *Andrology*

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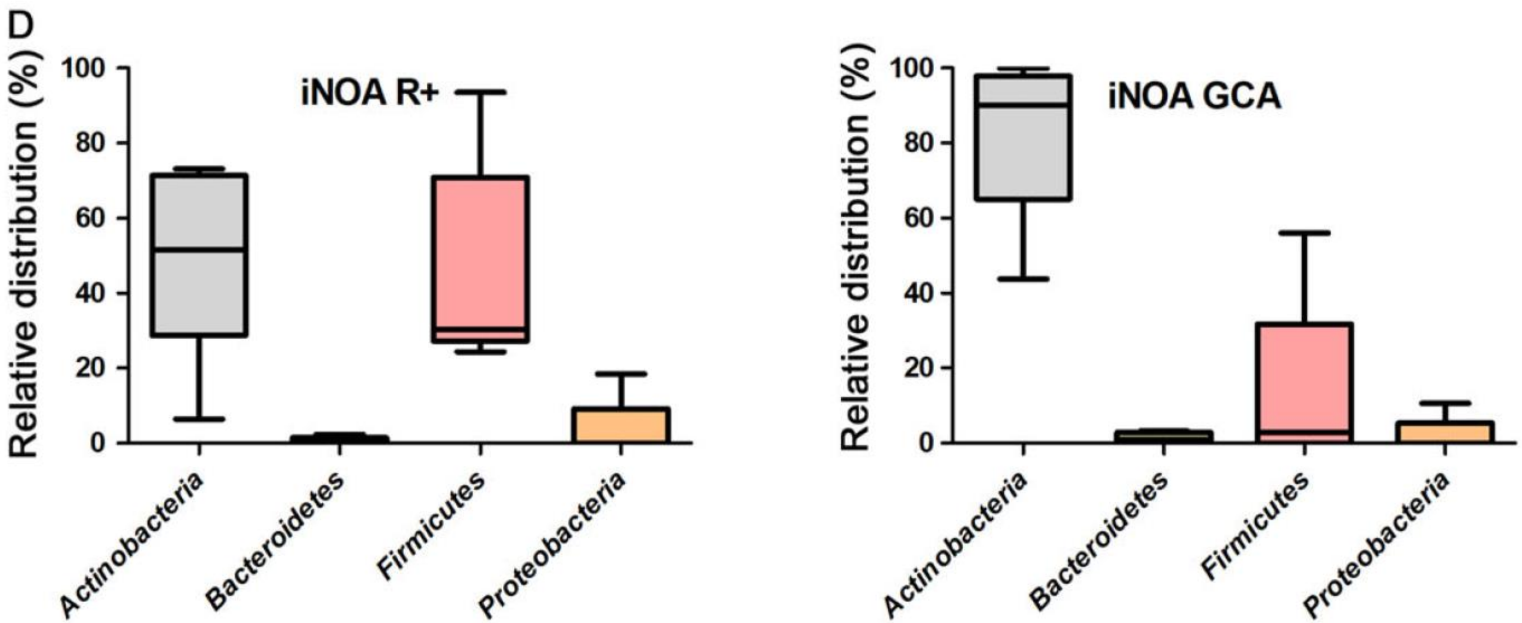
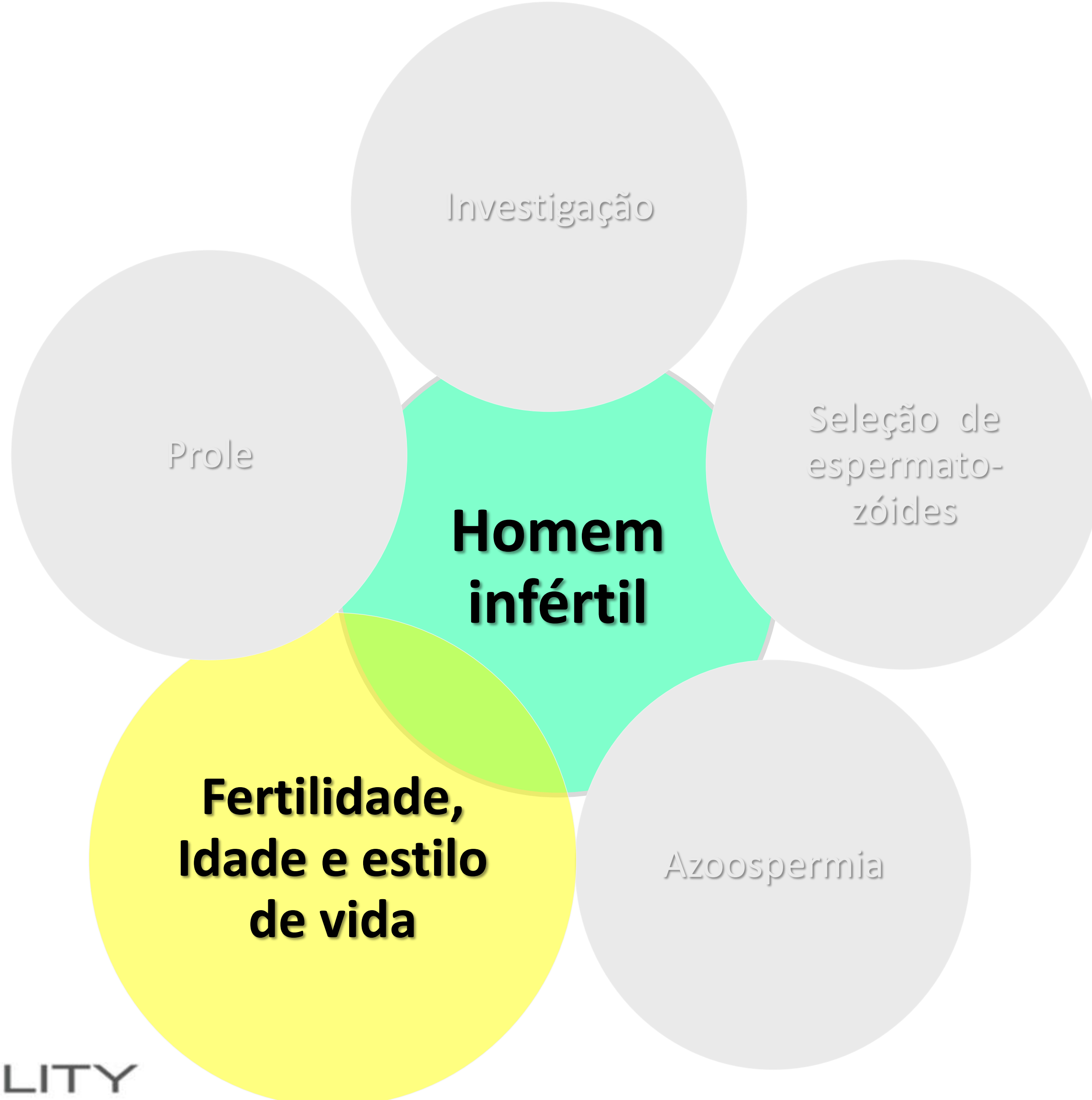


FERTILITY


Investigação
Prole
Seleção de espermato-zóides
Homem infértil
Fertilidade, Idade e estilo de vida
Azoospermia

FERTILITY

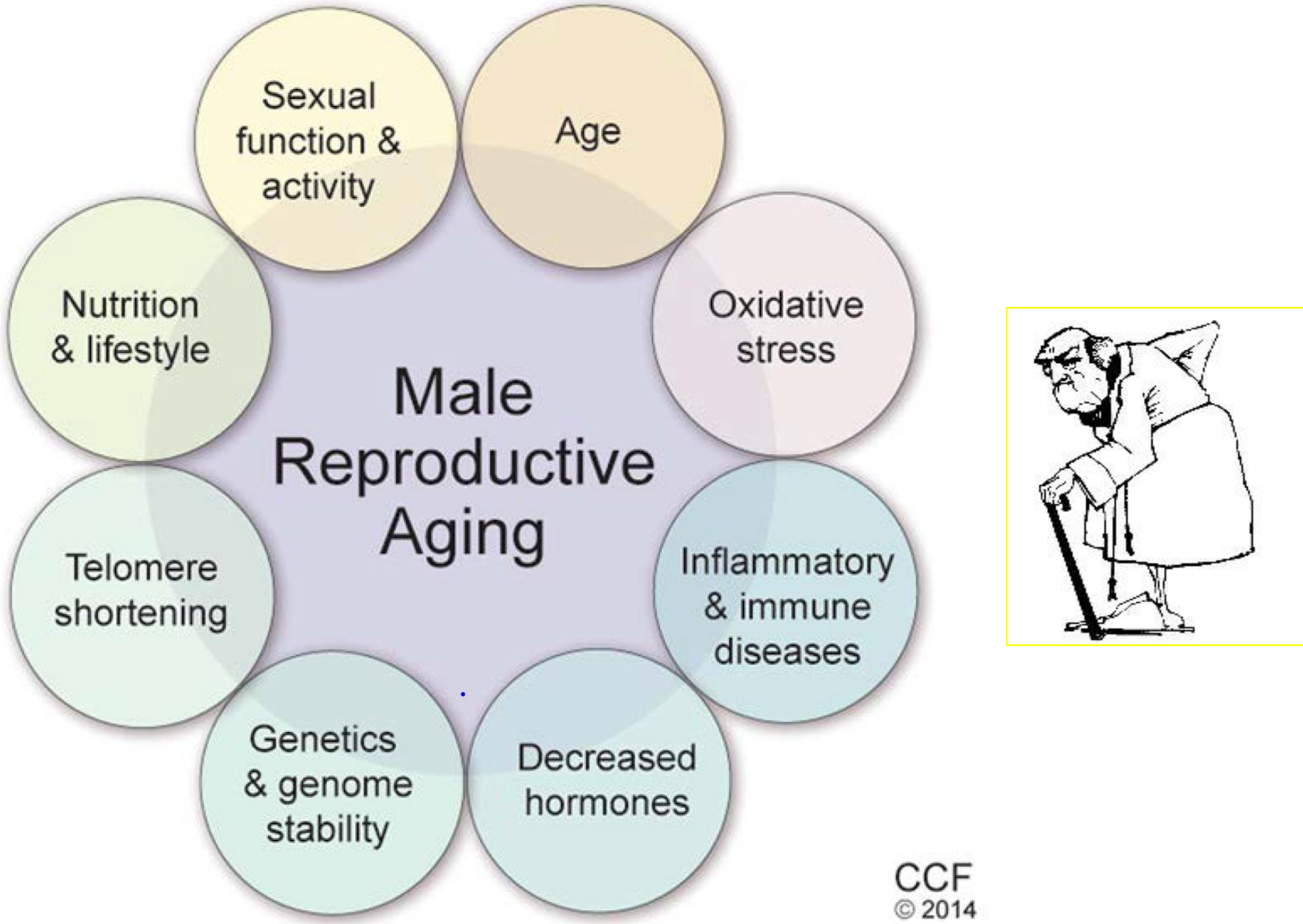


Figure 1 Main factors involved in impaired male infertility due to reproductive aging.

FERTILITY

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:

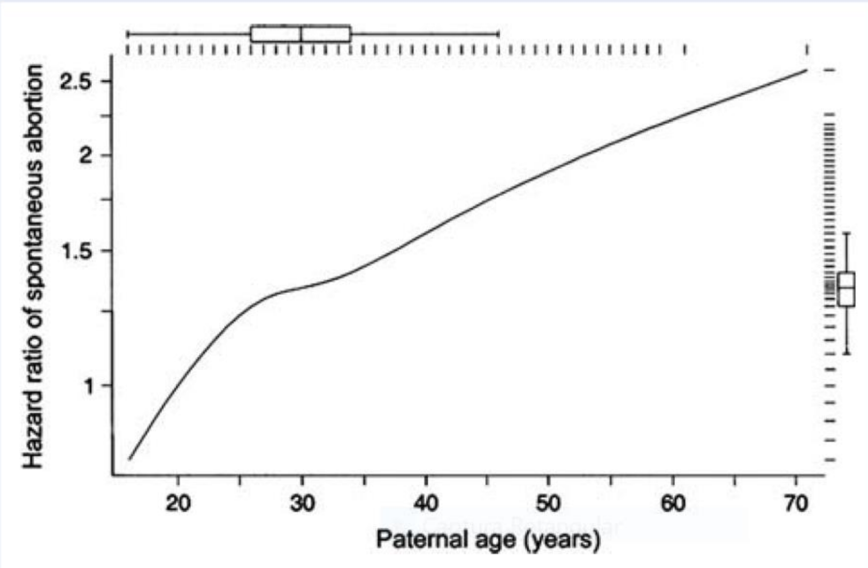


Figure 3 Hazard ratios of spontaneous miscarriages between 6 and 20 weeks according to paternal age adjusted for different confounders including maternal age (using prospective data from 5121 Californian women, men aged 20 years as referent).

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

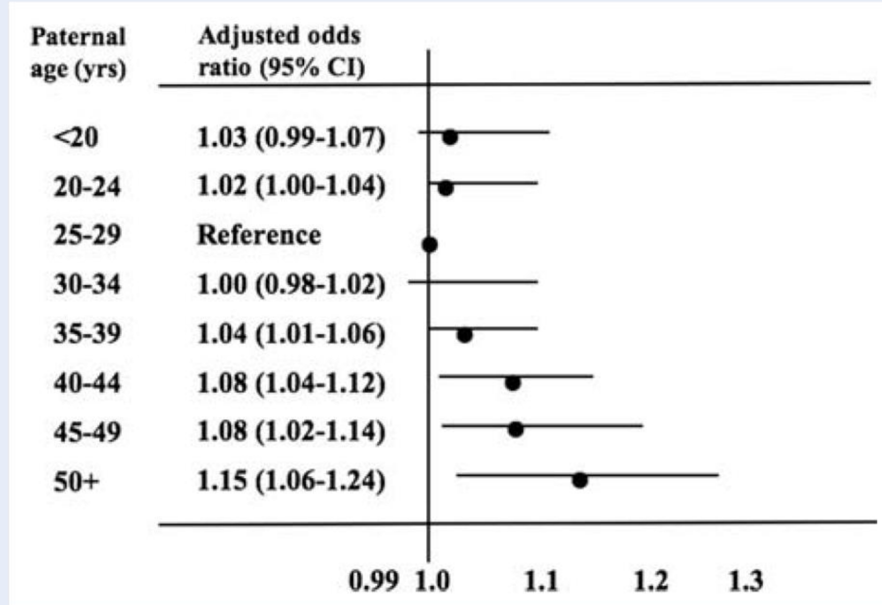


Figure 4 Relative risk of birth defects depending on paternal age.

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).

FERTILITY

Is advanced paternal age a health risk for the offspring?

Anne-Marie Nybo Andersen, M.D., Ph.D. and Stine Kjaer Urhoj, M.Sc.
Department of Public Health, University of Copenhagen, Copenhagen, Denmark

Adverse health outcomes in offspring probably affected by advanced paternal age, their occurrence, and assessed evidence for the paternal age effect (strong/medium/weak).

Adverse health condition	Population-based prevalence/lifetime risk	Evidence for a paternal age effect
Fetal death[a]		
Miscarriage (early fetal death)	1,500/10,000 clinically recognized pregnancies	Weak
Stillbirth (late fetal death)	0.4/10,000 births	Medium
Congenital syndromes and anomalies[b]		
Achondroplasia	<1/10,000 births	Strong
Thanatophoric dysplasia	<1/10,000 births	Strong
Osteogenesis imperfecta	<1/10,000 births	Strong
Apert syndrome	<1/10,000 births	Strong
Pfeiffer's syndrome	<1/10,000 births	Strong
Crouzon's syndrome	<1/10,000 births	Strong
Marfan syndrome	2/10,000 births	Strong
Neurofibromatosis (NF-1)	3/10,000 births	Strong
Syndactyly	5/10,000 births	Medium
Cleft palate	15/10,000 births	Strong
Patent ductus arteriosus	5/10,000 births (term babies)	Medium-weak
Down syndrome	5/10.000 births[c]	Weak
Club foot	15/10.000 births	Weak
Other perinatal conditions[a]		
Preterm birth	700/10,000 births	Medium
Preeclampsia	300/10,000 births	Weak
Childhood cancers[a]		
Retinoblastoma	0.6/10,000 individuals	Medium
Acute lymphatic leukemia	12/10.000 individuals	Strong
Neurodevelopmental outcomes[d]		
Autism spectrum disorders	93/10,000 individuals	Strong
Schizophrenia/psychosis	367/10,000 individuals	Strong
Attention deficit-hyperactivity disorder	192/10,000 individuals	Weak
Bipolar disorder	184/10,000 individuals	Weak

[a] If the occurrences vary substantially between countries, we have given population-based occurrence measures from Denmark, 2000–2010.
[b] Prevalence according to www.orpha.net.
[c] Prevalence among births in a population with prenatal screening and termination of pregnancy on demand. The prevalence is approximately 130/10,000 in an unscreened population, depending on parental age distribution.
[d] Lifetime prevalence according to Pedersen et al. (68).

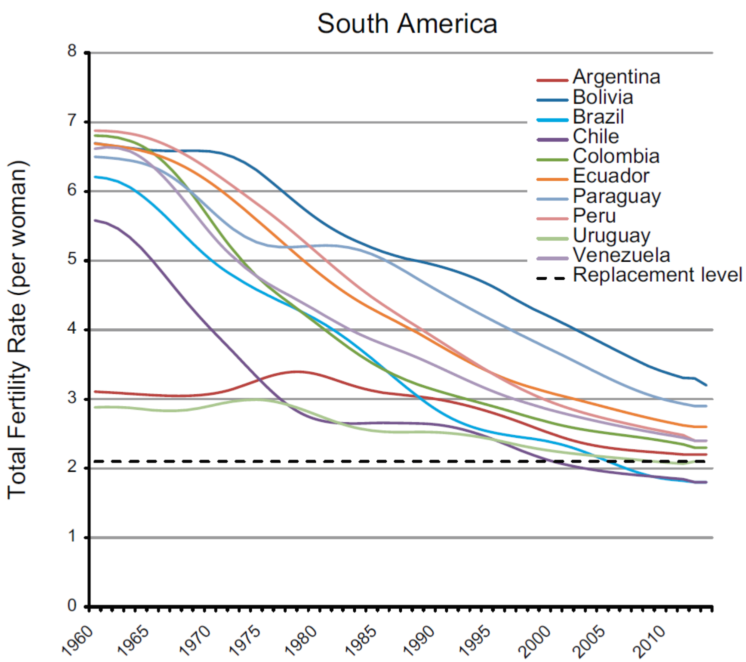
FE

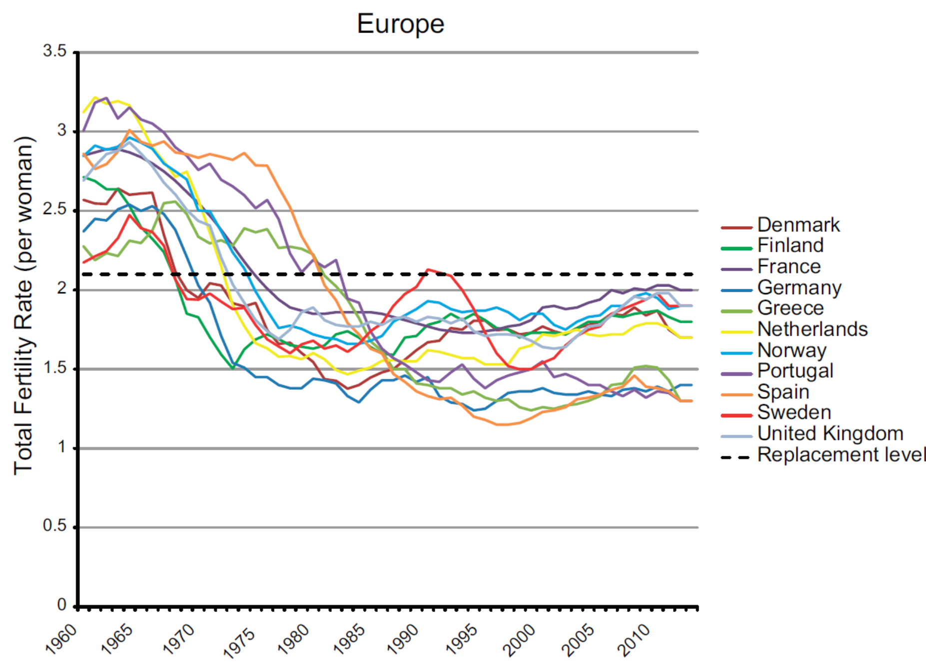
Physiol Rev 96: 55–97, 2016
Published November 18, 2015; doi:10.1152/physrev.00017.2015

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





FERTILITY

Physiol Rev 96: 55–97, 2016
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MALE REPRODUCTIVE DISORDERS AND FERTILITY TRENDS: INFLUENCES OF ENVIRONMENT AND GENETIC SUSCEPTIBILITY

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Incidência de Criptorquidia

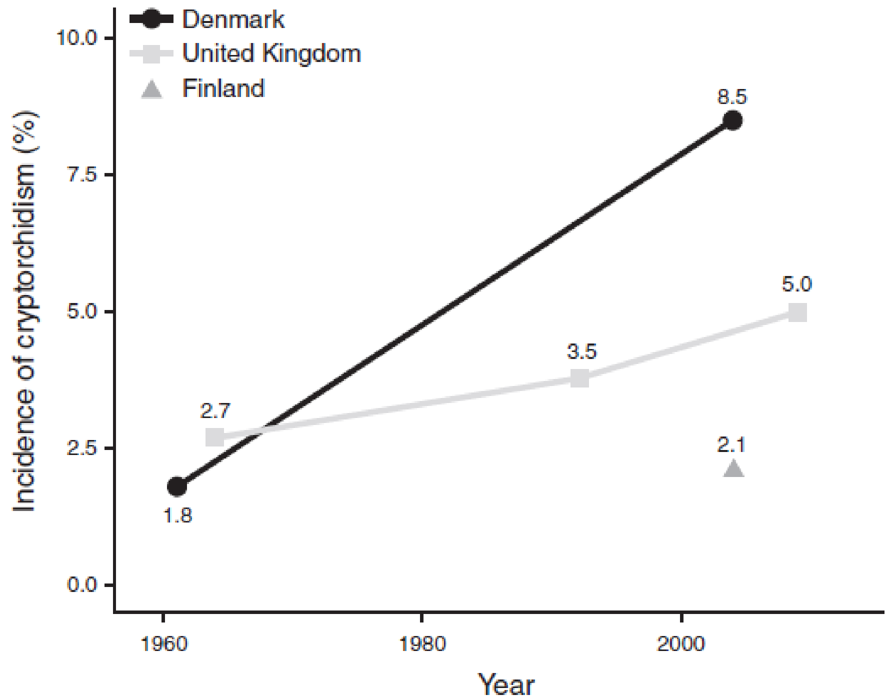

FIGURE 7. Incidence of cryptorchidism at birth on the basis of prospective clinical studies from the 1950s to the 2000s in Denmark, Finland, and United Kingdom. The data points are marked on the year of the publication of the study which represents the preceding incidence rate (3, 47, 61, 184, 377).

FERTILITY

Physiol Rev 96: 55–97, 2016
Published November 18, 2015; doi:10.1152/physrev.00017.2015

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

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Incidência de Câncer de Testículo

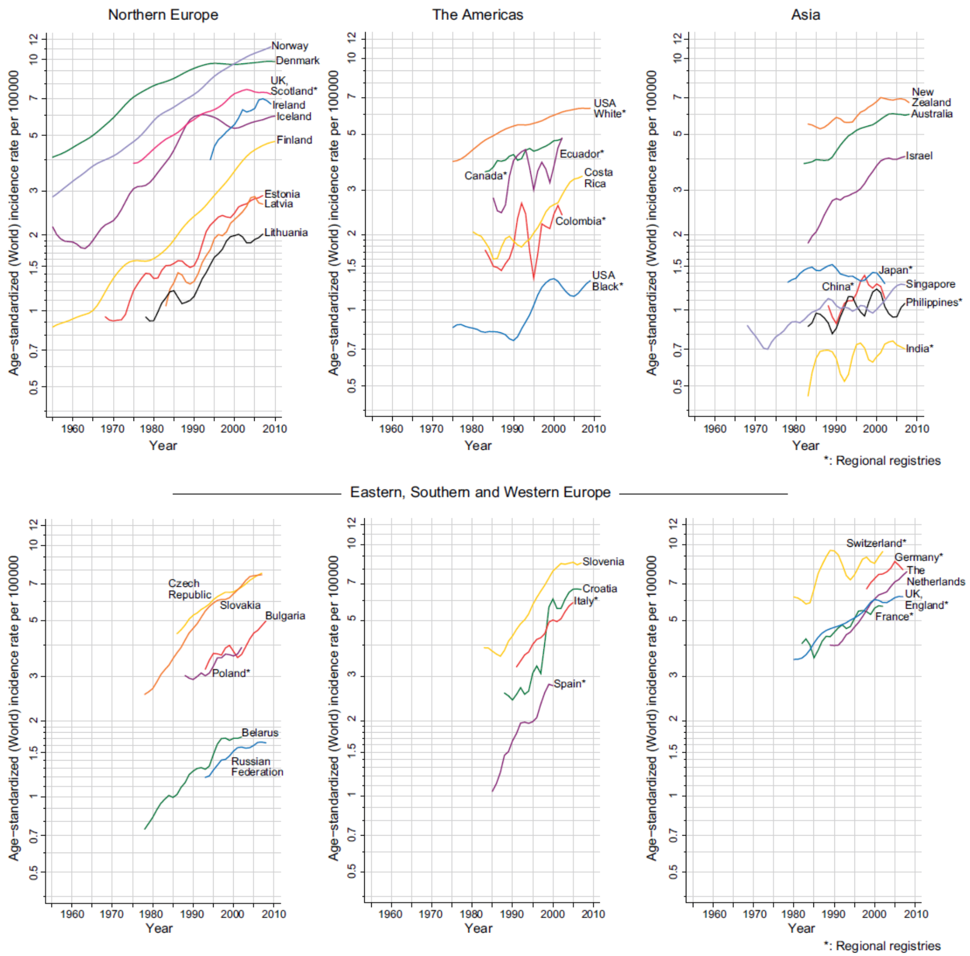

FIGURE 4. Trends in testicular cancer; age-standardized (world) incidence (regional or national), all ages. [Modified from Znaor et al. (481). Courtesy of Dr. Arinana Znaor and statistician Mathieu Laversanne, M.Sc., WHO, International Agency for Research in Cancer (IARC), Lyon, France.]

FERTILI

Physiol Rev 96: 55–97, 2016
Published November 18, 2015; doi:10.1152/physrev.00017.2015

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

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Idade da Puberdade

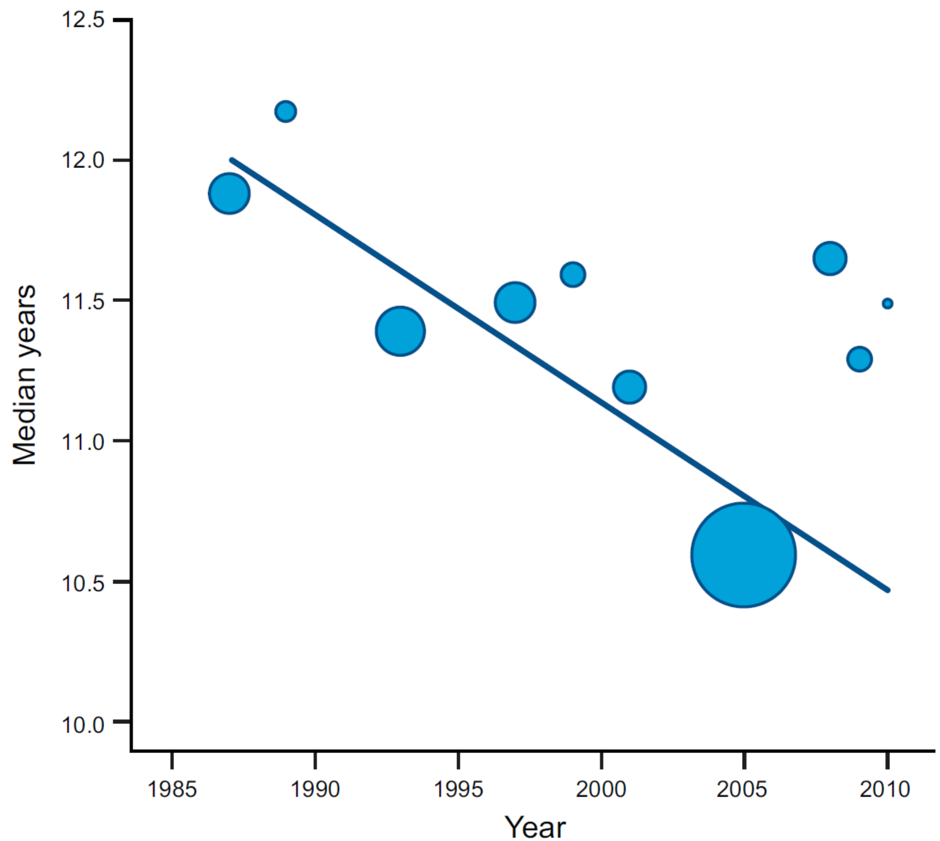


FIGURE 8. Recent changes in male pubertal timing. Testicular volume was >3 ml. [From Mouritsen et al. (293).]

FERTILITY

Article

Human and Experimental Toxicology
1–9

DOI: 10.1177/0960327117703690
journals.sagepub.com/home/het
SAGE

Decline in sperm count in European men during the past 50 years

P Sengupta[1,2], E Borges Jr[3], S Dutta[4] and E Krajewska-Kulak[2]

Purpose: To investigate whether the sperm concentration of European men is deteriorating over the past 50 years of time.
Materials and Methods: We analysed the data published in English language articles in the past 50 years in altering sperm concentration in European men.

FERTILITY

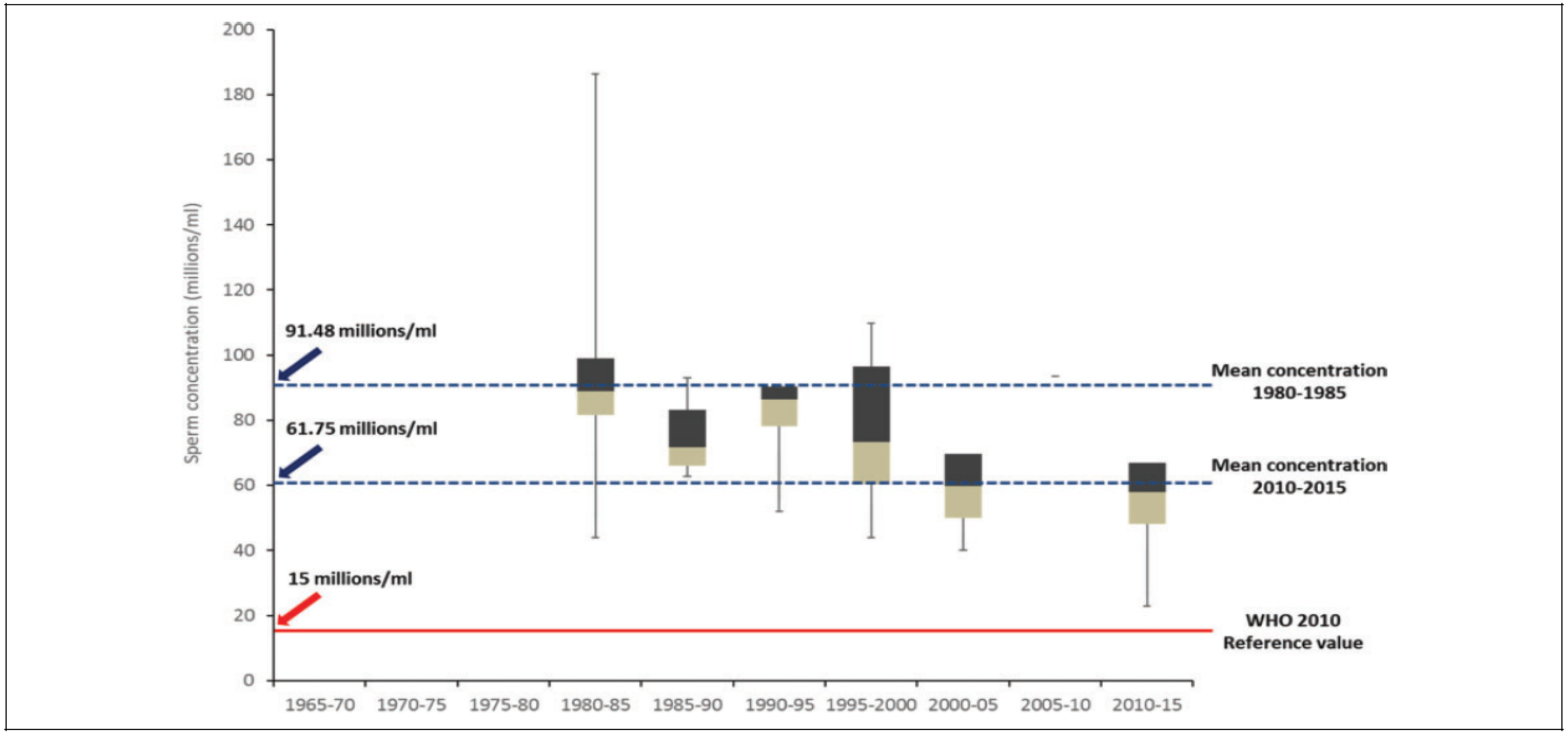


Figure 2. Box and whisker plot of sperm concentration data of European men of the past 50 years.

Declínio tempo-dependente na concentração esopermática observada de 1965 to 2015 (r= -0.307, p<0.02; diminuição de 32.5%)

FERTILITY

ORIGINAL ARTICLE

Vol. 41 (4): 757-763, July - August, 2015
doi:10.1590/S1677-5538.IBJU.2014.0186

Decline in semen quality among infertile men in Brazil during the past 10 years

Edson Borges Jr. [1,2], Amanda Souza Setti [1,2], Daniela Paes de Almeida Ferreira Braga [1,2], Rita de Cassia Savio Figueira [1], Assumpto Iaconelli Jr. [1,2]

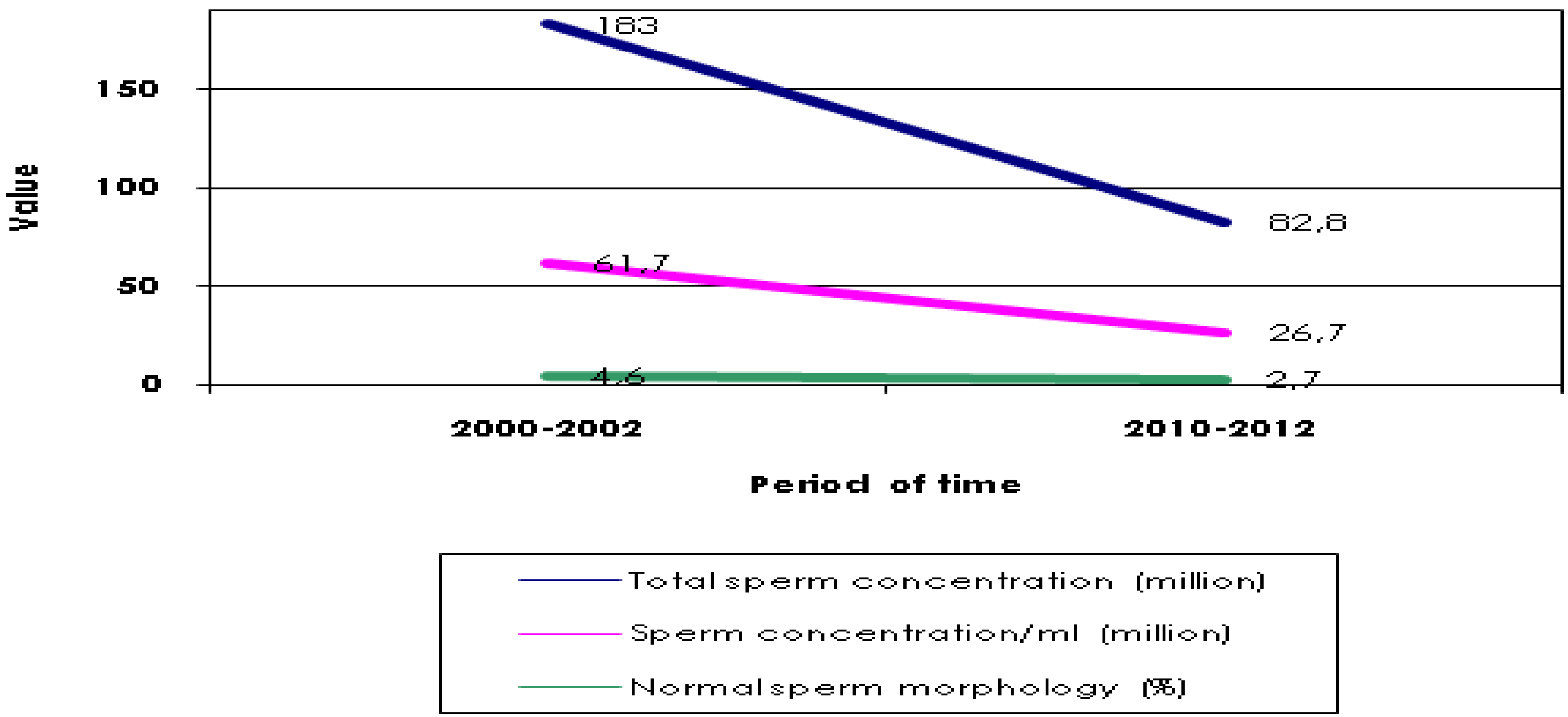
Table 1 - General characteristics of analyzed semen samples (n=2300).

Variable	Mean	SD	Min	Max
Male age (y-old)	35.7	7.8	15.0	71.0
Days of abstinence	4.2	2.8	0.0	30.0
Semen sample volume (ml)	3.3	1.7	0.1	11.3
Sperm concentration/ml (million)	38.3	46.7	0.0	540.0
Total sperm concentration (million)	116.0	143.0	0.0	984.0
Progressive sperm motility (%)	36.9	18.9	0.0	84.0
Sperm morphology	3.4	2.9	0.0	16.0

values are mean ± SD, unless otherwise noticed. **SD**= standard deviation; **Min**= minimum; **Max**= maximum.

FERTILITY

Pacientes submetidos à ASC	2300 amostras	
Divisão em grupos	2000-2002 n = 764	2010-2012 n = 1536
Submetidos à ICSI	n = 315	n = 842



FERTILITY

Variável	2000-2002 (n=764)	2010-2012 (n=1536)	*p*
Idade masculina (anos)	35.0 ± 8.6	35.3 ± 8.1	0.318
Dias de abstinência	4.2 ± 3.1	4.2 ± 2.7	0.777
Volume da amostra (ml)	3.4 ± 1.8	3.3 ± 1.6	0.473
Concentração/ml (milhão)	61.7 ± 69.4	26.7 ± 27.3	**<0.001**
Concentração total (milhão)	183.0 ± 197.0	82.8 ± 89.5	**<0.001**
Motilidade progressiva (%)	36.4 ± 18.3	36.5 ± 19.2	0.812
Morfologia normal (%)	4.6	2.7	**<0.001**
Azoospermia (%)	38/764 (4.9)	131/1536 (8.5)	**<0.001**
Oligozoospermia grave (%)	114/726 (15.7)	426/1405 (30.3)	**<0.001**

Food intake and social habits in male patients and its relationship to intracytoplasmic sperm injection outcomes

Daniela Paes de Almeida Ferreira Braga, D.V.M., M.Sc.,[a,b] Gabriela Halpern, M.Sc.,[a] Rita de Cássia S. Figueira, M.Sc.,[a] Amanda S. Setti, B.Sc.,[b] Assumpto Iaconelli Jr., M.D.,[a] and Edson Borges Jr., M.D., Ph.D.[a,b]

Fertility and Sterility® Vol. 97, No. 1, January 2012

- ❖ Influência dos hábitos sociais e alimentares no sêmen e nos resultados de ICSI
- ❖ Estudo coorte observacional com 250 homens tratados com ICSI

FERTILITY

❖ *Concentração*:

- negativamente influenciada pelo IMC e álcool;
- positivamente influenciada pelo consumo de cereal e nº. refeições/dia

❖ *Motilidade*:

- negativamente influenciada pelo IMC, álcool e cigarro;
- positivamente influenciada pelo consumo de cereal e frutas

FERTILITY

TABLE 2

Linear regression analysis of eating and social habits that may affect the sperm concentration, sperm motility, and sperm morphology.

Response variable	Predictor variable	RC	*P* value
Sperm concentration	Cereals	15.293	<.01
	Vegetables	5.380	.104
	Legumes	7.983	.035
	Fruits	5.541	.129
	Meat	−7.776	.310
	Fish	2.764	.441
	Dairy products	2.834	.440
	Sweet foods	−4.046	.089
	Alcoholic drinks	−5.003	<.01
	Soft drinks	−0.233	.897
	Coffee	2.749	.138
	Exercising	7.888	.074
	Weight loss diet	9.487	.045
	Smoking	−0.238	.945
	Meals/d	5.836	.046
	BMI	−2.3331	<.01
Sperm motility	Cereals	10.974	<.01
	Vegetables	9.602	.436
	Legumes	2.861	.444
	Fruits	7.453	.028
	Meat	−0.078	.991
	Fish	4.091	.217
	Dairy products	2.579	.445
	Sweet foods	2.568	.239
	Alcoholic drinks	−8.5592	<.01
	Soft drinks	0.595	.721
	Coffee	−0.109	.949
	Exercising	2.861	.444
	Weight loss diet	−3.848	.374
	Smoking	−8.003	.013
	Meals/d	4.295	.110
	BMI	−2.7780	<.01
Sperm morphology	Cereals	0.749	.327
	Vegetables	6.029	.643
	Legumes	6.823	.326
	Fruits	5.760	.609
	Meat	−5.829	.878
	Fish	6.456	.564
	Dairy products	3.765	.604
	Sweet foods	1.963	.421
	Alcoholic drinks	−8.865	.974
	Soft drinks	0.934	.612
	Coffee	−0.312	.906
	Exercising	3.164	.231
	Weight loss diet	−2.484	.984
	Smoking	−8.003	.567
	Meals/d	3.457	.476
	BMI	−0.876	.573

Note: BMI = body mass index; RC = regression coefficient.

Braga. Lifestyle and assisted reproduction. Fertil Steril 2012.

❖ *Álcool:*

- impacto negativo na fertilização

❖ *Carne vermelha e dieta (perda peso)*:

- impacto negativo na implantação
- diminui as chances de gestação

TABLE 3

Linear regression analysis of eating and social habits that may affect the fertilization and implantation rates.

Response variable	Predictor variable	RC	*P* value
Fertilization rate	Cereals	1.151	.646
	Vegetables	3.539	.246
	Legumes	1.483	.601
	Fruits	1.201	.657
	Meat	−8.096	.152
	Fish	5.028	.164
	Dairy products	0.715	.792
	Sweet foods	−1.727	.339
	Alcoholic drinks	−3.958	.007
	Soft drinks	−1.471	.115
	Coffee	−3.963	.007
	Exercising	0.681	.801
	Weight loss diet	−18.046	.019
	Smoking	−3.540	.018
	Meals/d	0.313	.887
	BMI	0.2620	.542
	Female smoking	−4.352	.043
	Female BMI	0.575	.398
Implantation rate	Cereals	6.555	.292
	Vegetables	11.081	.072
	Legumes	5.733	.320
	Fruits	7.234	.213
	Meat	−36.2	.003
	Fish	4.507	.446
	Dairy products	3.061	.602
	Sweet foods	3.031	.428
	Alcoholic drinks	−3.100	.314
	Soft drinks	−0.541	.861
	Coffee	−1.269	.690
	Exercising	3.833	.568
	Weight loss diet	−17.43	.028
	Smoking	−0.713	.896
	Meals/d	4.513	.347
	BMI	0.8011	.380
	Female smoking	−2.984	.543
	Female BMI	−12.43	.035

Note: BMI = body mass index; RC = regression coefficient.

Braga. Lifestyle and assisted reproduction. Fertil Steril 2012.

TABLE 4

Binary regression analysis of eating and social habits that may affect the pregnancy and miscarriage outcome.

Response variable	Predictor variable	OR	95% CI	*P* value
Pregnancy	Cereals	1.59	0.73–2.48	.259
	Vegetables	1.67	0.87–4.32	.398
	Legumes	1.93	0.33–2.47	.107
	Fruits	0.62	0.28–1.35	.230
	Meat	0.06	0.06–0.7	.042
	Fish	0.81	0.36–1.81	.605
	Dairy products	0.71	0.33–1.55	.393
	Sweet foods	1.06	0.63–1.77	.838
	Alcoholic drinks	1.02	0.69–1.50	.936
	Soft drinks	0.93	0.62–1.39	.737
	Coffee	0.83	0.54–1.26	.380
	Exercising	1.69	0.86–2.70	.341
	Weight loss diet	0.21	0.01–1.19	.011
	Smoking	0.86	0.38–1.93	.706
	Meals/d	1.23	0.64–2.35	.540
	BMI	1.04	0.92–1.17	.579
	Female smoking	1.02	0.88–2.02	.484
	Female BMI	0.43	0.25–1.13	.027
Miscarriage	Cereals	1.02	0.91–1.12	.674
	Vegetables	1.43	0.83–1.84	.763
	Legumes	0.89	0.63–1.16	.549
	Fruits	1.23	0.87–2.24	.976
	Meat	0.85	0.43–1.16	.267
	Fish	1.21	0.68–1.48	.293
	Dairy products	1.09	0.97–1.16	.653
	Sweet foods	0.78	0.65–1.18	.784
	Alcoholic drinks	0.98	0.89–1.12	.736
	Soft drinks	1.02	0.97–1.24	.540
	Coffee	1.01	0.89–1.12	.182
	Exercising	1.08	0.97–1.21	.943
	Weight loss diet	0.98	0.78–1.32	.432
	Smoking	0.85	0.65–1.74	.273
	Meals/d	1.23	0.56–1.98	.187
	BMI	1.13	0.93–1.65	.298
	Female smoking	1.02	0.96–1.67	.476
	Female BMI	0.96	0.79–1.34	.354

Note: BMI = body mass index; CI = confidence interval; OR = odds ratio.

Braga. Lifestyle and assisted reproduction. Fertil Steril 2012.

FERTILITY

Received: 7 March 2018 | Revised: 4 June 2018 | Accepted: 12 June 2018
DOI: 10.1111/and.13090

ORIGINAL ARTICLE

WILEY andrologia

Paternal lifestyle factors in relation to semen quality and in vitro reproductive outcomes

Edson Borges Jr[1,2] | Daniela Paes de Almeida Ferreira Braga[1,2] | Rodrigo R. Provenza[1] | Rita de Cassia Savio Figueira[1] | Assumpto Iaconelli Jr[1,2] | Amanda Souza Setti[1,2]

- Fator masculino isolado
- 1º. ciclo de tratamento
- Idade mulher < 36 anos
- 233 ciclos ICSI

1. Quantos cigarros/dia?
2. Consumo semanal de álcool?
3. Frequência de exercícios ?
4. Medicações nos últimos 3 meses? Qual?
5. Exposição a agentes tóxicos, pesticidas, radiação etc..

FERTILITY

Linear regression analyses' results for the influence of paternal lifestyle factors on semen quality (n=965)

	Cigarette smoking		Alcohol consumption	
	B	P	B	p
Semen volume	-0.417	0.047	-0.1363	0.592
Sperm count/mL	-7.363	0.014	-12.527	0.040
Total sperm count	-4.43	0.023	-34.91	0.156
Total sperm motility	2.316	0.347	0.342	0.895
Progressive sperm motility	-0.369	0.887	2.547	0.240
TMSC	- 1.38	0.045	-16.33	0.278
Sperm morphology	-0.0563	0.779	0.3751	0.180
SDF	0.014	0.033	5.833	0.002

FERTILITY

Linear regression analyses' results for the association between paternal lifestyle factors and ICSI outcomes (n=233)

	Cigarette smoking		Alcohol consumption	
	B	p	B	p
Fertilisation rate	-1.349	0.039	-3.617	0.041
High-quality embryos (day 3)	4.383	0.450	9.559	0.166
Blastocyst formation rate	-14.244	0.025	-34.801	0.042
Implantation rate	5.384	0.451	-0.770	0.190

Human Reproduction Update Advance Access published December 12, 2012
Human Reproduction Update, Vol.0, No.0 pp. 1–11, 2012
doi:10.1093/humupd/dms050
human reproduction update

BMI in relation to sperm count: an updated systematic review and collaborative meta-analysis

N. Sermondade[1,2], C. Faure[1,2], L. Fezeu[2], A.G. Shayeb[3], J.P. Bonde[4], T.K. Jensen[5], M. Van Wely[6], J. Cao[7], A.C. Martini[8], M. Eskandar[9], J.E. Chavarro[10,11], S. Koloszar[12], J.M. Twigt[13], C.H. Ramlau-Hansen[14], E. Borges Jr[15], F. Lotti[16], R.P.M. Steegers-Theunissen[13], B. Zorn[17], A.J. Polotsky[18], S. La Vignera[19], B. Eskenazi[20], K. Tremellen[21], E.V. Magnusdottir[22], I. Fejes[23], S. Hercberg[2,24], R. Lévy[1,2†], and S. Czernichow[25,26,*†]

- ***21 estudos, 13.077 homens da população geral e em investigação de infertilidade***
- ***Estudo da relação entre BMI e incidência de oligozoospermia / azoospermia***
- ***Comparados com homens com peso normal:***

❖ Sobpeso: OR= 1,15 (0,93-1,43)

❖ Sobrepeso: OR= 1,11 (1,01-1,21)

❖ Obeso: OR= 1,28 (1,06-1,55)

❖ Obeso mórbido: OR= 2,04 (1,59-2,62)

FERTILITY

Human Reproduction, Vol.31, No.12 pp. 2668–2680, 2016
Advanced Access publication on October 12, 2016 doi:10.1093/humrep/dew246

human reproduction ORIGINAL ARTICLE *Andrology*

Semen quality impairment is associated with sexual dysfunction according to its severity

F. Lotti[1,†], G. Corona[1,2,†], G. Castellini[1], E. Maseroli[1], M.G. Fino[1], M. Cozzolino[3], and M. Maggi[1,4,*]

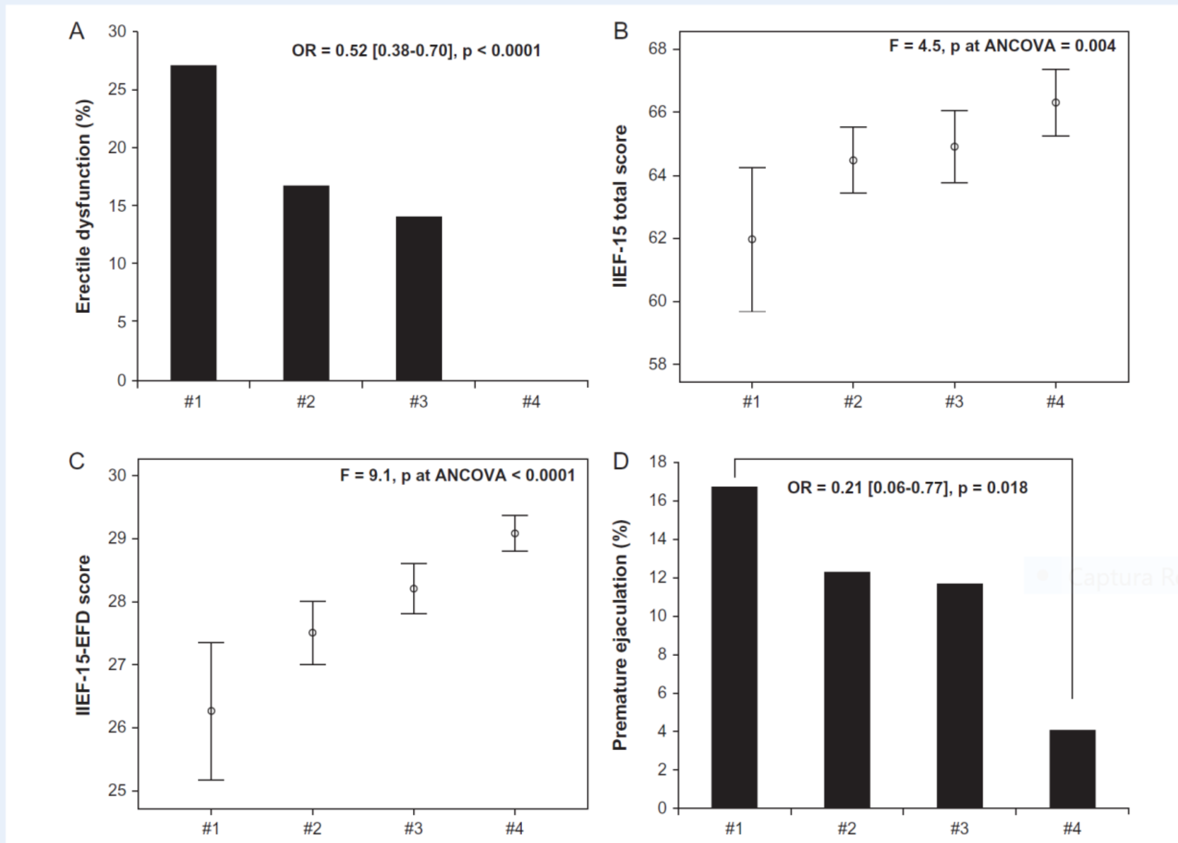
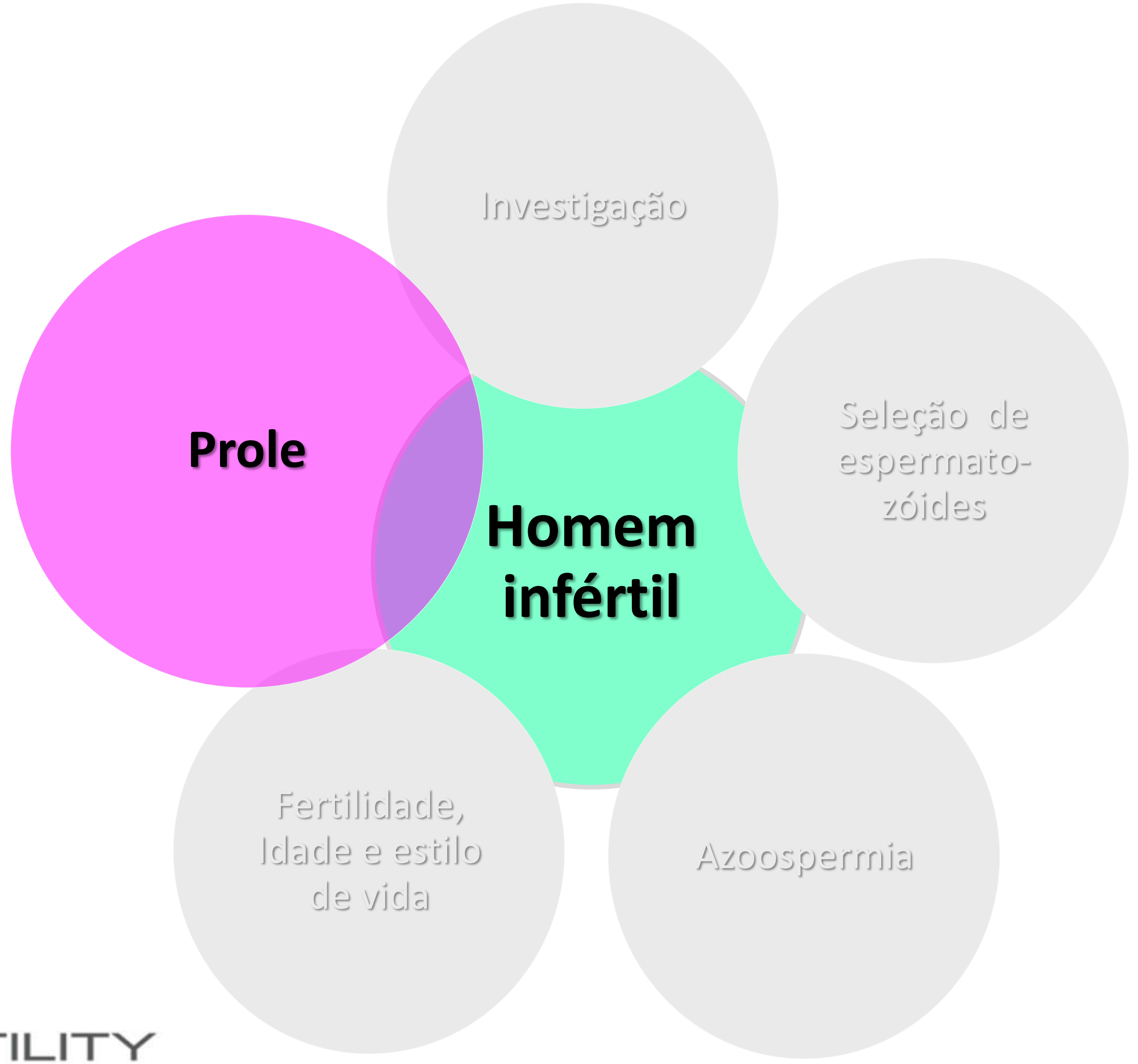


Figure 4 Comparison among groups of men for erectile dysfunction (ED) and premature ejaculation (PE). Comparison among groups for: ED prevalence (panel **A**); overall sexual function (IIEF-15 total score) (panel **B**); erectile function (IIEF-15-erectile function domain score) (panel **C**); PE prevalence (panel **D**). Groups #1–4 indicate: #1–3, males of infertile couples (#1, azoospermic; #2, males with at least one sperm abnormality; #3, normozoospermic); #4, fertile men. The insets show the age-adjusted comparison among groups. IIEF-15, International Index of Erectile Function-15; EFD, erectile function domain. In panels A–D, mean ± 95% CI of the parameters evaluated has been plotted for each group considered (#1–4).

FERTILITY


Investigação
Prole
Seleção de espermato-zóides
Homem infértil
Fertilidade, Idade e estilo de vida
Azoospermia

FERTILITY

Birth defects in children conceived by in vitro fertilization and intracytoplasmic sperm injection: a meta-analysis

Fertility and Sterility® Vol. 97, No. 6, June 2012

Juan Wen, B.S.,[a,b] Jie Jiang, B.S.,[a,b] Chenyue Ding, B.S.,[d] Juncheng Dai, M.D.,[b] Yao Liu, B.S.,[b] Yankai Xia, M.D., Ph.D.,[a,c] Jiayin Liu, M.D., Ph.D.,[a,d] and Zhibin Hu, M.D., Ph.D.[a,b]

- 124.468 crianças: FIV/ICSI comparadas com Concepção natural (CN)

- RR Anormalidades Congênitas: ***1,37*** (95%; CI: 1,26-1,48)

- FIV (46.890) x ICSI (27.754): ***sem diferença***
  (RR: 1,05, 95%; CI: 0,91-1,02)

FERTILITY

Human Reproduction, Vol.32, No.1 pp. 239–247, 2017
Advanced Access publication on December 6, 2016 doi:10.1093/humrep/dew289

human reproduction ORIGINAL ARTICLE *Reproductive epidemiology*

Risk of childhood mortality in family members of men with poor semen quality

Heidi A. Hanson[1,2,*], Erik N. Mayer[3], Ross E. Anderson[3], Kenneth I. Aston[3,4,5], Douglas T. Carrell[3,5], Justin Berger[2], William T. Lowrance[3], Ken R. Smith[2,6], and James M. Hotaling[3,4]

- Relação entre Fertilidade e Malformações Congênitas
- O risco de defeitos congênitos ao nascimento pode não ser devido as TRA, mas a fatores genéticos e ambientais
- ***Risco aumentado de morte devido a Malformações Congênitas em descendentes de 1º. grau de homens com <u>alterações dos parâmetros seminais</u>***

FERTILITY

Human Reproduction Update, Vol.24, No.3 pp. 320–389, 2018
Advanced Access publication on February 15, 2018 doi:10.1093/humupd/dmy005

human reproduction update

The effect of paternal factors on perinatal and paediatric outcomes: a systematic review and meta-analysis

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- 14.371 artigos, 238 incluídos, 81 para a meta-análise
- Idade, estilo de vida, peso, altura, gordura corporal, cigarro

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

*Exposure: Paternal age >45 years.

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INVITED SESSION

SESSION 01: KEYNOTE SESSION

Monday 2 July 2018 Forum (Auditorium) 08:30–09:30

O-001 Human Reproduction Keynote Lecture - Semen quality of young adult ICSI offspring: The first results

F. Belva[1], M. Bonduelle[1], M. Roelants[2], D. Michielsen[3], A. Van Steirteghem[4], G. Verheyen[4], H. Tournaye[4]

- UZ Brussel, entre 03/2013 – 04/2016, 54 jovens
- Saúde reprodutiva e metabólica de jovens 18-22 anos, nascidos de ICSI com espermatozóide ejaculado x concepção natural (CN)

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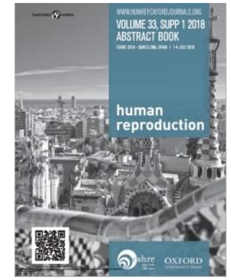

ICSI: menor concentração espermática/mL, total, TMSC (17,7 mil/ml, 31,9 mil e 12,7 mil) que os nascidos por ***CN*** (37 mil/ml; 86.8 mil; 38.6 mil)

- ***CN:*** dobro na concentração espermática/mL (*ratio 1.9*, 95% CI 1.1-3.2)

- ***ICSI:*** duas vezes menor concentração espermática total (*ratio 2.3*, 95% CI 1.3-4.1) e TMSC (*ratio 2.1*, 95% CI 1.2-3.6)

ICSI:

- 3X menor chance de ter concentração espermática/mL (15 mil/mL) abaixo OMS (*AOR 2.7*; 95% CI 1.1–6.7)
- 4X menor chance de ter concentração espermática total (39 mil) (*AOR 4.3*; 95% CI 1.7-11.3)

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Considerações

- TMSC na avaliação do espermatozoide, principalmente no prognóstico do ICSI
- *fragDNA* espermático como nova ferramenta diagnóstica; antioxidantes como forma de tratamento
- MSOME – IMSI eficazes no selecionamento espermático e resultados do ICSI
- Espermatozóide epididimário melhor que o testicular nas AO
- Espermatozóide testicular da AO melhor que o ANO
- Idade do homem como prognóstico da função espermática e DNA
- Estilo de vida muito relacionado com o comportamento do espermatozoide (também no ICSI)
- Idade paterna e cigarro: influência na prole
- Filhos de homens tratados com ICSI: maior probabilidade alteração seminal

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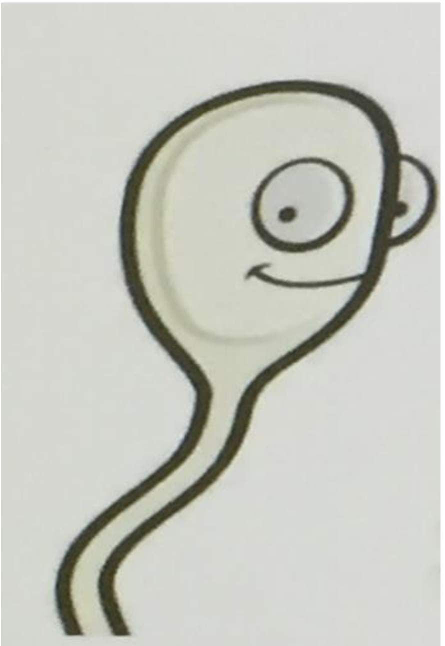
http://fertility.com.br/producao-cientifica-2018/

Obrigado !



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