

Practical tips on interpreting semen analysis

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1 in 8 couples seek fertility treatment

40-50% cases due to male factor

Jargon buster

Oligospermia = low sperm concentration

Aesthenospermia = low sperm motility

Oligoaesthenospermia = O + A

Teratospermia = low percentage of normal sperm (<4%)

Azoospermia = no sperm

Causes of male infertility

Impaired sperm production

- Obesity, smoking, alcohol
- Infection – chlamydia, gonorrhoea
- Chemotherapy
- Undescended testes
- Previous mumps or TB
- Klinefelter's (XXY)
- Idiopathic

Obstruction – usually causes azoospermia

- Epididymal
- Seminal outflow

How does semen analysis help?

It helps you decide....

- 1) Is infertility due to male factor?
- 2) If male fertility present, how severe is it?
- 3) Does the couple require specialist referral?

Semen analysis

M3293347 Collect D/T: 21/09/2015 0845		Receive D/T: 21/09/2015 0900	
Order physician: GP RODGERS, S		Order account #: 100003 Order location: GPH	
Analysis 1			
(S) Volume of Semen	4.8	mL	(2549)
(S) No of sperm per ml of semen	94.5	10*6/mL	(2549)
(S) % Progressive motility	69	%	(2549)
(S) % Total motility	77	%	(2549)
(S) Time from ejaculation to test	55	min	(2549)
(S) Viscosity	Normal		(2549)
(S) Acidity	7.7		(2549)
(S) Nucleated cells not sperm	Occasional		(2549)
(S) Esterase Test	NOT TESTED		(2549)
(S) MAR	NEGATIVE		(2549)
(S) Abstinence	7	d	(2549)
(S) Vitality	NOT TESTED	%	(2549)
(S) Comment	NORMAL FORMS SEEN		(2549)
(S) Semen Diagnostic Ref			(496)
Values			
(NOTE)			
Normal semen profile.			
Reference values based on 5th Centile of a WHO patient cohort. They must be used in clinical context and do not represent minimal values for natural conception which remain elusive.			
Semen Volume 1.5mL.			
Sperm Concentration 15 million per mL.			
Total Sperm Numbers 39 million per ejaculate.			
Progressive Motility 32%, Total Motility 40%.			
Sperm Morphology 4%, Normal forms.			

Looking at a semen sample under microscopy

- Incubate sample for 30min for liquefaction
- Test 100ul semen in Leja 20 chamber
- Multiply up to quantify sperm number / ml
- **You cannot test the whole sample**



What if you cannot see any sperm?

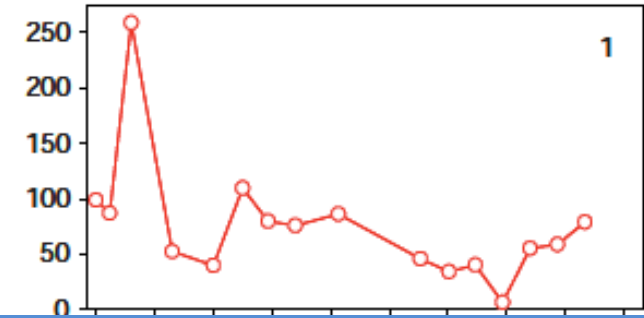
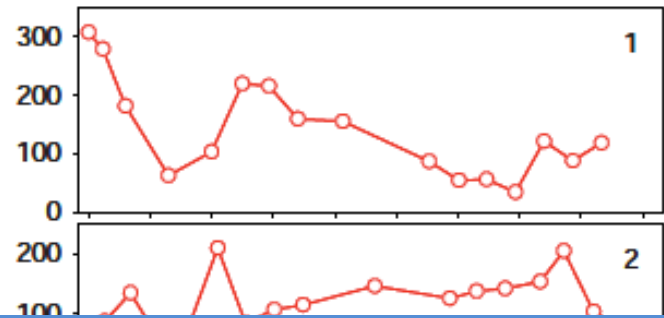
- Normal magnification (eg. Leja 20)
- Could be 0 - 50,000 sperm / ml

- Use higher magnification (eg. Leja 100)
- If you still see nothing, could be 0 - 5000 sperm / ml

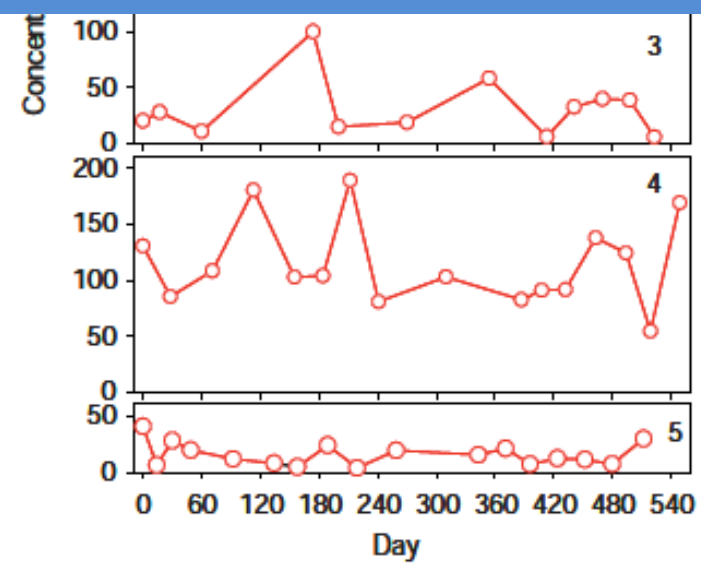
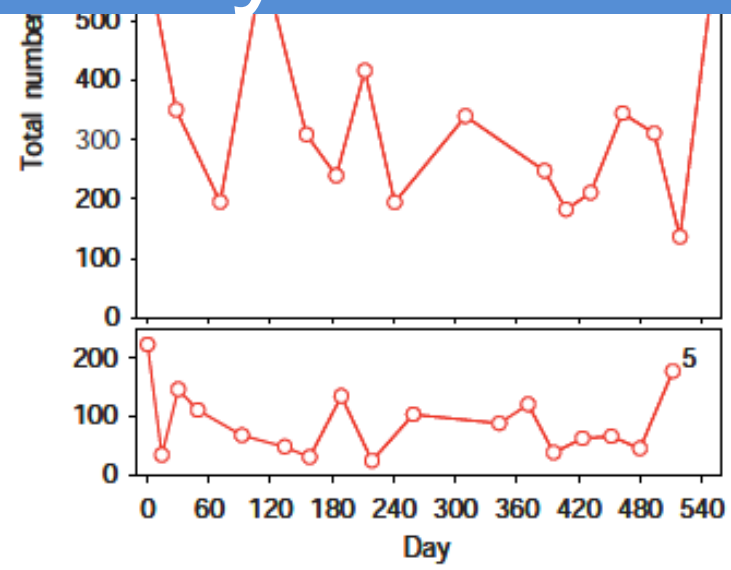


It is difficult to quantify sperm at low concentrations

- This is why reports often say ‘occasional sperm seen’



Sperm count varies a lot in healthy men



Limitations of semen analysis

- Big biological variation
- Sampling error, particularly at low concentrations
- Counting error – they move!!!!

Important request a confirmatory semen analysis in your patient

Computer Aided Semen Analysis (CASA)

- Good for high concentrations
- Not good at low concentrations
- (need to confirm with manual count)



Which numbers should we focus on?

- **Ejaculate volume** should be $>2\text{ml}$
 - <0.5 indicates seminal outflow
- **Sperm concentration** should be $>20\text{million}$
 - 5-20: possible to conceive naturally, but may take a bit longer
 - <5 : difficult to conceive naturally
- **Total motility** should be $>40\%$
 - $<20-40$: possible to conceive naturally, but may take a bit longer
 - < 20 : difficult to conceive naturally

Total motile sperm count

$$= \text{volume} \times \text{concentration} \times (\text{total motility}/100)$$

- >20 million = WHO reference range (i.e. normal fertility / above 5th centile)
- <5 million = difficult to conceive naturally – suggest referral
- 5-20 million = possible to conceive naturally, but may take a bit longer – suggest referral

Which numbers should we focus on?

- **Evidence of white cells** may indicate infection:
 - Esterase high
 - Peroxidase high
 - Lots of 'Nucleated cells not sperm (NCNS)'
 - Lots of 'Round cells'
- Morphology (>4% is normal)
 - Poor repeatability, difficult to interpret
 - Unsure what this adds, except for the IVF setting

Worked examples

Patient 1

M3293347 Collect D/T: 21/09/2015 0845		Receive D/T: 21/09/2015 0900	
Order physician [REDACTED]		Order account #: 100003 Order location: GPH	
Analysis 1			
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(S) Esterase Test	NOT TESTED		(2549)
(S) MAR	NEGATIVE		(2549)
(S) Abstinence	7	d	(2549)
(S) Vitality	NOT TESTED	%	(2549)
(S) Comment	NORMAL FORMS SEEN		(2549)
(S) Semen Diagnostic Ref			(496)
Values			

Patient 2

W3265593 Collect D/T: 09/09/2015 1020		Receive D/T: 09/09/2015 1037	
Order physician: [REDACTED]		Order account #: 100003 Order location: GPH	
Analysis 1			
(S) Volume of Semen	3.6	mL	(1374)
(S) No of sperm per ml of semen	VERY OCC NON PROGRESSIVE SPERM SEEN	10*6/mL	(1374)
(S) % Progressive motility	Not applicable	%	(1374)
(S) % Total motility	Not applicable	%	(1374)
(S) Time from ejaculation to test	60	min	(1374)
(S) Viscosity	Normal		(1374)
(S) Acidity	8.0		(1374)
(S) Nucleated cells not sperm	Occasional		(1374)
(S) Esterase Test	NOT TESTED		(1374)
(S) MAR	Not readable		(1374)
(S) Abstinence	3	d	(1374)
(S) Vitality	Unsuitable sample	%	(1374)
(S) Comment	UNSUITABLE FOR MORPHOLOGY		(1374)
(S) Semen Diagnostic Ref	SEE OVERLEAF		(181)

Patient 3

M3309885 Collect D/T: 28/09/2015 1050		Receive D/T: 28/09/2015 1124	
SECOND		Order account #:	Order location: HHOP
		30354175	
Order physician: [REDACTED]			
Analysis 1			
(S) Volume of Semen	2.0	mL	(2549)
(S) No of sperm per ml of semen	NO SPERM SEEN	10*6/mL	(2549)
(S) % Progressive motility	Not applicable	%	(2549)
(S) % Total motility	Not applicable	%	(2549)
(S) Time from ejaculation to test	60	min	(2549)
(S) Viscosity	Normal		(2549)
(S) Acidity	8.0		(2549)
(S) Nucleated cells not sperm	Occasional		(2549)
(S) Esterase Test	NOT TESTED		(2549)
(S) MAR	NOT TESTED		(2549)
(S) Abstinence	4	d	(2549)
(S) Vitality	NOT TESTED	%	(2549)
(S) Comment	UNSUITABLE FOR MORPHOLOGY		(2549)
(S) Semen Diagnostic Ref	Not applicable		(496)
Values			

Summary

- **Ejaculate volume** should be >2ml
- **Sperm concentration** should be >20million / ml
- **Total motility** should be >40%
- **Total motile count (TMC)** should be >20 million / ejaculate

- **Morphology** is not a reliable test

- **Refer patients with abnormal tests early (best chance of preventing IVF)**

Please contact us

- Male fertility clinic – joint urology - endocrinology
- Testicular sperm retrieval (Mr. J. Ramsay)
- Diagnostic semen analysis
- Sperm cryopreservation

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