MALE INFERTILITY: SEMEN ANALYSIS

FACT #1 THE SEMEN ANALYSIS MUST BE EVALUATED IN CONTEXT

The semen analysis (SA) is a critical part of the overall male assessment but it does have limitations in assessing fertility potential.

1. SA cannot say if you will or will not have children (unless there are zero sperm)
2. Many men with results ‘in reference range’ can be infertile and conversely many men with results ‘out of range’ are capable of having children. There is NO ‘normal’.
3. SA results are subject to significant random fluctuation. Changes in the SA may not reflect a change in a man’s underlying fertility potential
4. SA is a ‘bulk’ measure – but only one sperm ultimately fertilizes the egg.
5. Sperm is the ‘vehicle’ for its passenger, DNA. SA does not evaluate the quality of DNA.
6. Not all the measured parameters are equally important.
7. SA ‘references ranges’ continue to evolve as our understanding evolves

Evolution of World Health Organization (WHO) Semen Reference Range

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<tbody>
<tr>
<td>Volume (mL)</td>
<td>–</td>
<td>≥2</td>
<td>≥2</td>
<td>≥2</td>
<td>≥1.5</td>
</tr>
<tr>
<td>CONCENTRATION (million/mL)</td>
<td>20-200</td>
<td>≥20</td>
<td>≥20</td>
<td>≥20</td>
<td>≥15</td>
</tr>
<tr>
<td>Motility (%)</td>
<td>–</td>
<td>≥40</td>
<td>≥40</td>
<td>≥40</td>
<td>≥39</td>
</tr>
<tr>
<td>Morphology (%)</td>
<td>80.5</td>
<td>≥50</td>
<td>≥30</td>
<td>≥15*</td>
<td>≥4*</td>
</tr>
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</table>

* Strict (Tygerberg/Kruger) Criteria.

FACT #2 SPERM CONCENTRATION = MOST IMPORTANT PARAMETER

CONCENTRATION: the number of sperm in a given volume

Concentration is the single best indicator in the semen analysis of your chances of conception. In fact, the correlation is such that the other parameters can almost completely be ignored. More sperm are better to a point – with more than about 50 million sperm per mL the female reproductive tract is saturated and higher counts do not provide additional benefit. Sperm concentrations less than 50 million per mL do have a negative impact but the effect is small until the concentration is less than about 15 million per mL.

General Guidance:

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Comment</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>≥ 50</td>
<td>Highest chance of conception, more sperm does not make any difference</td>
<td>Continue trying for a couple of years unless extenuating circumstances^</td>
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<tr>
<td>15-50</td>
<td>Small but measurably lower chance of conception</td>
<td>As above^</td>
</tr>
<tr>
<td>&lt;15</td>
<td>Large decrease in chances of conception – to about 1/3 of normal. Those with &lt;5 have a very low chance but those with NO sperm have no chance of natural conception*</td>
<td>Low threshold for seeking assisted reproduction especially if over a year. Concentrations less than about 5 million/mL require specialized assessment and advice – frequently assisted reproduction.</td>
</tr>
</tbody>
</table>

^ When to try Assisted Reproduction (ART): examples include female factor (such as age), prolonged failure to conceive (2-3 years), other male factor, personal preference;
* Surgical retrieval combined with IVF may be an option

This information is not intended to be used as a substitute for professional medical advice, diagnosis, or treatment. You should not rely entirely on this information for your health care needs. Ask your own doctor or health care provider any specific medical questions that you have.
MORPHOLOGY: outward appearance or form – ‘looks’ or ‘beauty’

Who gets to decide what constitutes a ‘good looking sperm’? The currently adopted criteria for sperm ‘beauty’ were developed by Dr. Kruger who worked at Tygerberg Hospital in South Africa (hence called ‘Kruger’, ‘Tygerberg’, or ‘Strict’ criteria). Shape and proportions for sperm were specified. He noted that couples undergoing intrauterine insemination seemed more likely to have success when more of the sperm fit his criteria. Importantly, he was not looking at conception by natural intercourse and his findings have not been supported by subsequent studies.

The World Heath Organization adopted the Strict criteria in 1999 for the 4th edition of the Semen Analysis Reference Ranges. “Low morphology” (aka teratospermia) is a common reason for consultation and a major source of anxiety for men and their partners. When it is the only parameter ‘out of range’ this is called isolated teratospermia. Common reactions include: “All my sperm are abnormal!”, “My baby is going to look abnormal?” and “That’s why we can’t get pregnant”. As a result, patients are often very skeptical when they are told:

FACT #3: THE MORPHOLOGY OF SPERM CAN BE DISREGARDED

‘Sperm shape is a puzzling parameter, as the semen of a typical fertile male is composed in large part of funny looking sperm [according to Dr. Kruger]. For the last 3 decades the trend in assessing sperm has been to become even stricter in calling its shape normal in an elusive quest to link the reproductive potential of a man to his best looking swimmers. Yet … the stricter a technician is in calling sperm shape normal, the worse the predictive value of the test. It is a counterintuitive finding that calls into question the usefulness of sperm morphology in the first place.” Dr. Niederberger 2011 (Infertility expert for the Journal of Urology). A large body of literature and expert consensus supports Dr. Neiderberger’s view – that sperm morphology doesn’t matter (see references below for a few).

It bears emphasizing again that morphology can be disregarded as an indicator of chances of becoming pregnant, carrying a pregnancy to term, how your children will look and what their genetic endowment will be. Furthermore, using ‘better looking sperm’ does not seem to predict success with intrauterine insemination (IUI) or in-vitro fertilization (IVF) (references 2 and 3). It is entirely possible that most if not all of us were conceived from ‘wonky’ looking sperm. It should come as no surprise that you can’t judge a book by its cover.

VOLUME: Minimal to no importance unless very low – less than about 1 mL. Reasons for low volume: failure to abstain from ejaculation for at least 4 days, problems with collection (e.g. spilled, awkward or unnatural), problems with getting it out of the collection cup.

MOTILITY: Minimal to no importance unless zero motility or inflammatory cells (WBC).

References for Semen Analysis & Teratospermia


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