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Editorial

World Health Organization manual for the processing of human semen-2010

Manual de procesamiento de semen humano de la Organización Mundial de la Salud-2010

Over time, the World Health Organization has published a manual for the processing of human semen as a tool to achieve consistency in all clinical, andrology and research laboratories across the world. The first version of the manual was published in 1980, the second in 1987, the third in 1992, and the fourth in 1999. The fifth edition of the manual for the processing of human semen was published recently; it is improved with better explanations that render a more comprehensible manual for the analysis of semen in research and clinical laboratories. This fifth edition comprises three parts: a) semen analysis; b) sperm preparation, and c) quality assurance.

Previous editions were unclear as to the source of reference values for semen parameters, and the morphology standards were less "strict" than in the 2010 version, where semen parameters were published separately (~4,500 men[1]), demonstrating that the current manual is the result of an endeavor conducted with more academic rigor. Table 1 shows the changes in semen parameters in each edition of the manual and the significant changes in normal values for each parameter in the latest version.

This manual will immediately allow to improve the performance of spermiograms done throughout the world because, even though this analysis is done in many places, not all labs have adequately qualified/trained staff; thus, this manual is presented as a universal standardizing tool to permit the analysis interpretation worldwide. The need for global standardization stems from specific problems such as reports of sperm concentration and an absence of tails in all "spermatozoa", very high motility with tail abnormalities in all spermatozoa, reporting higher-than-normal ranges as abnormal, exaggerated number of normal spermatozoa,[2] and samples with motilities that are higher than viable or with 100% motile spermatozoa.

The following premises of human semen analysis highlight the importance of conducting this test more rigorously following standardized guidelines. Cooper et al[3] showed that there is a difference between measuring semen volume with a pipette, a scale, or a cone flask, and Brazil C et al,[4] even demonstrated that the difference between pipetting and weighing is of approximately 0.5 mL.

In the specific case of concentration, the question is, which is the accepted method to mix the semen sample before examination, since this may cause an important difference in the final number of spermatozoa per ejaculate. The editors of the new manual consider the number of spermatozoa

Table 1 – Changes in semen parameters through time (1980–2010)

	1980	1987	1992	1999	2010
Volume (mL)	–		≥2.0		1.5
pH	–		7.2–7.8	≥7.2	
Concentration (10^6/mL)	20–200		≥20		15
Motility (%)	≥60		≥50 (progressive a and b)		40 (a+b+c)
Viability	–	≥50	≥75	≥75	58
Morphology	80.5	≥50	≥30	14	4
Leukocytes	<4.7	<1.0	<1.0	<1.0	<1.0

per ejaculate to be the most reliable parameter of testicular function; therefore, an accurate measurement of the volume becomes important.

Motility, one of the parameters that is most observer-dependent and which has shown to be overestimated by inexperienced testers,[2] is in this new version a more quantitative parameter, as it is analyzed in three groups: a) progressive spermatozoa; b) non-progressive spermatozoa, and c) non-motile spermatozoa.

Finally, regarding morphology, all spermatozoa observed in a microscope stained slide are classified as normal or abnormal, and the latter are subclassified as having head, midpiece, and tail abnormalities.[5] The new 2010 manual accepts a normal lower limit of 4%, and the strict criteria proposed by Menkveld et al[6-8] mentioned in the 1999 manual are also accepted, with the criterion established that all spermatozoa bordering between normality and abnormality shall be considered abnormal.

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