

**WLJY-9000**

WEILI COLOR SPERM ANALYSIS SYSTEM

# Collection of Reports on Clinical Application

## **RESEARCH ORGANIZATIONS**

Medical Center of Human Pregnancy & Health,  
Technology Institute of National Family Planning Committee

Institute of Urinary Surgery,  
Beijing Medical University

Department of Urinary Surgery,  
No. 3 Hospital of Beijing Medical University

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## **Contents**

### ***Page 2***

**Clinical Application of WEILI Color Sperm Analysis System WLJY-9000**

Medical Center of Human Pregnancy & Health,

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### ***Page 6***

**Clinical Application of WEILI Color Sperm Analysis System WLJY-9000**

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### ***Page 10***

**Clinical Application of WEILI Color Sperm Analysis System WLJY-9000**

Department of Urinary Surgery

No. 3 Hospital of Beijing Medical University

# Clinical Application of WEILI Color Sperm Analysis System

## WLJY-9000

Chen, Zhenwen

Dean & Professor, Medical Center of Human Pregnancy & Health,

Technology Institute of National Family Planning Committee

## GENERAL

Sperm analysis is a basic and important means for the diagnoses, therapy and study of male sterility. A comprehensive analysis of sperm density, vitality and percentage of motile sperm is an important way to evaluate a man's procreation ability. Now, what is in common clinical use is the traditional manual analysis. Because difference exists in analysis methods, lab facilities and laboratory staff's skills and experience, it is hard to compare different reports, thus problems occurred in clinical diagnoses, therapy and research.

WEILI Color Sperm Analysis System WLJY-9000 is a solution of the problems. At first, microscope enlarged images of sperm sample are recorded by a camera. Then, image signal is inputted into an image collection card and is analyzed by the system. So, such data as sperm density, vitality and percentage of motile sperm are got. It can also analyze sperm motion track. And live sperm images can be displayed on a color monitor.

In this article, WEILI Color Sperm Analysis System WLJY-9000 was compared to the traditional manual analysis. And its clinical application is evaluated.

## MATERIAL AND METHOD

### **MATERIAL**

#### **Sample origin**

Thirty sperm samples are analyzed, which come from male patients and routine sperm providers of our lab.

#### **Instruments**

WEILI Color Sperm Analysis System WLJY-9000 provided by WEILI Technology & Trade Co. and Makler haemocytometer made in Israel used for manual analysis.

## **METHOD**

### **Repeatable operation test**

Six consecutive tests on the same sperm sample under 100X and 250X object lens respectively.

### **Manual analysis**

Collect sperm by masturbation and put it in a 37 centigrade constant temperature box. Drop the sample on a 37 centigrade Makler haemocytometer and wait two minutes. Analyze it under a 250X object lens microscope. Write down sperm density, vitality and percentage of motile sperm according to WHO standard.

### **WEILI Color Sperm Analysis System WLJY-9000**

After the manual analysis, analyze the sample immediately with WEILI Color Sperm Analysis System WLJY-9000 under 100X and 250X object lens respectively. Then, print and save the analysis results.

## **GET COMPARABLE DATA**

In order to get accurate and comparable results, all the analyses are performed by skilled professional staff. Use the same Makler haemocytometer in the two kinds of analysis and analyze more than 200 sperm.

## **STATISTIC ANALYSIS**

### Repeatable operation test

Perform statistic analysis to get the variability of sperm density, A+B vitality and percentage of motile sperm obtained in the six consecutive tests. The uniformity of the data got from two magnifying rates is examined by T examination for independent samples.

### Correlation and accuracy test

Evaluate the correlation of the corresponding parameters of manual analysis and WEILI Color Sperm Analysis System WLJY-9000 with correlation analysis. The significance of difference of manual analysis and WEILI Color Sperm Analysis System WLJY-9000 analysis is judged by T examination on the means of matched pairs.

## **TEST RESULTS**

### **REPEATABLE OPERATION TEST**

The variability of sperm density, vitality and percentage of motile sperm from WEILI Color Sperm Analysis System WLJY-9000 is excellent. Variability coefficients of sperm

density, vitality and percentage of motile sperm are 0.826548, 0.956757 and 2.548947 for 100X object lens and 0.9252, 2.859444 and 5.569769 for 250X object lens, as listed in table 1. P values of T examinations on uniformity of the data got from 100X object lens and 250X object lens are all larger than 0.05. The variability coefficients and P values testify that WEILI Color Sperm Analysis System WLJY-9000 has good performance on repeatable operation and uniformity of data got from two different magnifying rates.

Table 1 Statistic analysis on data from repeatable operation test

Items	100 × n = 6			250 × n = 6			Uniformity P
	Mean	SD	Variation coefficient %	Mean	SD	Variation coefficient %	
Density (M/ml)	180.745	1.4939	0.826548	182.243	1.6862	0.9252	0.134
Motile* (%)	86.825	0.8307	0.956757	84.868	2.4267	2.859444	0.091
A + B vitality (%)	79.348	2.0225	2.548947	77.002	4.2888	5.569769	0.253

\* Motile—Percentage of Motile Sperm (same for the following)

## CORRELATION AND ACCURACY TEST

There is high correlation between the results of WLJY-9000 and manual analysis. R values are all larger than 0.9, which are 0.990, 0.954 and 0.975 for 100X object lens and 0.993, 0.934 and 0.975 for 250X object lens, as listed in Table 2a. There is no significance of difference from T examination on the means of matched pairs. P values are all larger than 0.05 (as can be seen in table 2b), which testifies the accuracy of WEILI Color Sperm Analysis System WLJY-9000 compared to manual analysis.

Table 2a Correlation of data from manual analysis and WLJY-9000 (n=30)

Items	Manual analysis		100 ×			250 ×		
	Mean	SD	Mean	SD	r	Mean	SD	r
Density (M/ml)	82.40	45.623	82.59	45.756	0.990	83.48	45.597	0.993
Motile (%)	44.77	17.541	45.12	21.366	0.954	43.84	19.962	0.934
A + B vitality (%)	38.57	17.519	38.92	18.081	0.975	39.97	17.519	0.975

Table 2b Statistic analysis on matched pairs of manual analysis and WLJY-9000 (n=30)

Items	100 ×				250 ×			
	Mean	SD	t	P	Mean	SD	t	P
Density (M/ml)	0.1947	6.5159	0.164	0.871	1.0823	5.3712	1.104	0.279
Motile (%)	0.3503	7.0179	0.273	0.786	0.9240	7.2346	0.700	0.490
A + B vitality (%)	0.3560	4.0555	0.481	0.634	1.4063	4.3131	1.786	0.085

## CONCLUSION

Sperm analysis data especially sperm density, A+B vitality and percentage of motile sperm are fundamental to the evaluation of a man's pregnancy ability. With the continuous enhancement of living quality, more and more people now resume social responsibility voluntarily. Male prepotency, family planning and increase of male sterility pose an urgent need for accurate and fast sperm analysis means to substitute traditional manual analysis. WEILI Color Sperm Analysis System WLJY-9000 applies modern computer and advanced image processing techniques into sperm analysis. It has uniformity for data got from different magnifying rates and good repeatable operation ability. Sperm density, percentage of motile sperm and A+B vitality got from WEILI Color Sperm Analysis System WLJY-9000 have high correlation and accuracy compared with those of manual analysis, thus provide important references for the diagnoses of such symptoms as hyposperm, inert sperm and spermless. It can also provide various parameters related to sperm motion. And live sperm image can be displayed on a monitor, which is convenient to clinical diagnoses and the teaching and training of research stuff. It has good repeatable operation ability and analysis results can be compared to other data. It is easy to operate, thus lessening the mistake of manual analysis. Analysis reports can be printed out, saved and referred to, which is convenient for data comparison and clinic application and research. WEILI Color Sperm Analysis System WLJY-9000 is a solution for the scientific development and standardization of sperm analysis in clinic application and research.

**Medical Center of Human Pregnancy & Health,  
Technology Institute of National Family Planning Committee**

**(Stamp)**

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# Clinical Application of WEILI Color Sperm Analysis System

## WLJY-9000

He, Zhanju Wei, Zenghe Mu, Hongtao Guo, Yinglu  
Institute of Urinary Surgery  
Beijing Medical University

In clinic and research of urinary, genesiology and family planning, it is often necessary to evaluate a man's fertility. Sperm analysis is a basic and important way to do that. Manual sperm analysis is still in common use in China at present. The result of traditional manual sperm analysis is easy to be affected by such subjective factors as laboratorian's skills, experience and analysis methods. Often the analysis result is not accurate, thus impeding clinic diagnoses and therapy and research. The most efficient solution to this problem is to analyze sperm objectively with modern inspection instrument. We performed objective analysis on 30 sperm samples with WEILI Color Sperm Analysis System WLJY-9000 manufactured by WEILI Technology & Trade Co. And the results were compared with those of manual analysis.

## MATERIAL AND METHOD

### **MATERIAL**

#### **Sperm sample**

30 sperm samples from male sterility patients of the Clinic of Male Urinary of this institute.

#### **Instruments**

WEILI Color Sperm Analysis System WLJY-9000 and microscope and normal sperm counter (made in Nanjing, China) for manual analysis.

### **METHOD**

#### **Manual sperm analysis**

Collect sperm by masturbation and put it in a 37 centigrade constant temperature box. After liquefaction, analyze it with the standard and method prescribed by WHO. Sperm density, vitality and percentage of motile sperm are recorded. The analysis is completed by skilled professional staff in order to avoid errors.

## **WEILI Color Sperm Analysis System WLJY-9000**

### Repetitive operation test

A sperm sample is analyzed for six consecutive times under 100X and 250X object lens respectively in order to test if the system can be operated repetitively and if there is uniformity of data from different magnifying rates.

### Sperm analysis test

Analyze 30 sperm samples under 100X and 250X object lens and record sperm density, vitality and percentage of motile sperm.

### **Statistic analysis**

Perform T examination for independent samples on the data got from repetitive operation test and different magnifying rate uniformity test.

Perform T examination and correlation analysis on the corresponding data from manual analysis and WLJY-9000.

## TEST RESULTS

### **REPETITIVE OPERATION AND UNIFORMITY TEST**

The variation of sperm density, vitality and percentage of motile sperm of six consecutive tests is very little. The data of two different magnifying rate have no significance of difference ( $P>0.05$ , see Table 1). These results testify that WLJY-9000 can be operated repetitively and there is uniformity of data for different magnifying rate.

Table 1 Statistic analysis on data from repeatable operation test

	Density ( M/ml )	Motile* ( % )	A+B Vitality ( % )
<b>100 × n=6</b>			
Mean	94.01	64.73	49.72
Min. Value	93.73	64.21	48.35
Max. Value	94.26	65.06	50.55
Standard Deviation	0.17	0.31	0.76
Variation Coefficient %	0.1852	0.4845	1.5371
<b>250 × n=6</b>			
Mean	94.27	64.33	50.09
Min. Value	93.71	63.62	48.95
Max. Value	94.67	65.23	50.80
Standard Deviation	0.34	0.63	0.76
Variation Coefficient %	0.3640	0.9863	1.5265
P	0.129	0.193	0.419

\* Motile—Percentage of Motile Sperm (same for the following)

## COMPARISON OF THE DATA OF WLJY-9000 AND MANUAL ANALYSIS

Main parameters of WLJY-9000 and manual analysis such as sperm density, percentage of motile sperm and vitality (A+B) are highly correlated ( $r > 0.9$ , see Table 2). There is no significance of difference between the data of WLJY-9000 and manual analysis according to the result of T examination, which testifies that the results of WLJY-9000 are accurate and it can substitute manual sperm analysis (see Table 3).

Table 2a Correlation of data from manual analysis and WLJY-9000 (n=30)

Items	Manual analysis		100 ×			250 ×		
	Mean	SD	Mean	SD	r	Mean	SD	r
Density (M/ml)	115.70	73.15	118.20	75.03	0.995	116.90	74.76	0.998
Motile (%)	60.83	18.71	60.30	21.62	0.971	59.47	20.89	0.981
A + B vitality (%)	41.33	16.61	42.23	18.26	0.989	42.56	17.29	0.976

Table 2b Statistic analysis on matched pairs of manual analysis and WLJY-9000 (n=30)

Items	100 ×			250 ×		
	Mean	SD	P	Mean	SD	P
Density (M/ml)	2.45	7.33	0.078	1.22	4.80	0.176
Motile (%)	0.53	5.69	0.611	1.36	4.42	0.102
A + B vitality (%)	0.89	3.08	0.123	1.23	3.81	0.088

## CONCLUSION

Sperm analysis is the most fundamental and important measure to evaluate a man's pregnancy ability. In clinic and research, we discover that there is significance difference when analyzing the sperm of a patient more than one time. Except the affect of patient, laboratorian's subjective factors are the main reasons. Especially, the statistic analysis of sperm vitality and percentage of motile sperm is heavily relied on laboratorian's experience and subjective judgement. In order to solve this problem, automatic sperm analysis system is adopted to perform objective analyses in developed countries. In China, the modern method has not become a routine clinical application. With the development of medical technology, prepotency and family planning, modern objective sperm analysis should be applied in clinic and research as early as possible. WEILI Color Sperm Analysis System WLJY-9000 is composed of microscope, camera, computer and printer, etc. It combines modern computer and advanced image processing techniques. It is an objective way to analyze sperm. According to the results of clinical application, WEILI Color

Sperm Analysis System WLJY-9000 is a suitable substitute for traditional manual sperm analysis. The analysis results such as sperm density, percentage of motile sperm and A+B vitality are accurate. It can be operated repetitively and has good uniformity for the results of different magnifying rate. It can provide important data for the clinic and research of andriatics, genesiology and family planning. It can also provide many parameters which can't be got by manual analysis such as virtual grid, local enlargement, progressive velocity, velocity of curve, velocity of average path and sperm motion track graphs. It is a important assistance in related clinic application and research.

**Institute of Urinary Surgery  
Beijing Medical University**

**July, 1999  
(Stamp)**

# Clinical Application of WEILI Color Sperm Analysis System

## WLJY-9000

Wu, Weicheng Huang, Yi Chen, Xi Chen, Zhongcheng  
Department of Urinary Surgery  
No. 3 Hospital of Beijing Medical University

Sperm analysis is the most fundamental and important measure to evaluate a man's pregnancy ability. Manual sperm analysis is still in common use in China at present. The results of traditional manual sperm analysis are easy to be affected by facilities of different labs and by such subjective factors as laboratorian's skills, experience and analysis methods. Usually, there is significance of difference in the results for the same sperm sample from different labs and different laboratorians. The most efficient solution to this problem is to analyze sperm with modern automatic inspection techniques. In developed countries, automatic sperm analysis system is gradually taking the place of manual sperm analysis. But in China, the research in this field is just in the beginning stage and the modern method has not been applied in clinic.

WEILI Color Sperm Analysis System WLJY-9000 is developed by Beijing WEILI Technology & Trade Co. It is a combination of modern microphotography and computer image processing techniques. It can analyze sperm quantity and motion characters automatically. We analyzed 30 sperm samples with WEILI Color Sperm Analysis System WLJY-9000 and the results were compared with those of manual analysis.

## MATERIAL AND METHOD

### **MATERIAL**

#### **Sperm sample**

30 sperm samples from the laboratory of this hospital.

#### **Instruments**

WEILI Color Sperm Analysis System WLJY-9000 and microscope used for manual analysis.

### **METHOD**

#### **Manual sperm analysis**

Collect sperm by masturbation and put it in a 37 centigrade constant temperature box.

After liquefaction, perform routine manual analysis on it and record sperm density, vitality and percentage of motile sperm. The analysis is completed by skilled professional staff in order to avoid errors. The standard and method prescribed by WHO is strictly observed.

### **WEILI Color Sperm Analysis System WLJY-9000**

#### Repetitive operation test

The same sperm sample is analyzed for six consecutive times under 100X and 250X object lens respectively in order to test if the system can be operated repetitively.

#### Sperm analysis test

Analyze sperm samples under 100X and 250X object lens and put down sperm density, vitality and percentage of motile sperm.

### **Statistic analysis**

#### Repeatable operation test

Repetitive operation analysis and different magnifying rate uniformity analysis.

#### Comparison

Comparison on the corresponding data from manual analysis and WLJY-9000.

## TEST RESULTS

### **REPETITIVE OPERATION AND UNIFORMITY TEST**

Table 1 Statistic analysis on data from repeatable operation test

	Density ( M/ml )	Motile ( % )	A+B Vitality ( % )
<b>100 × n=6</b>			
Mean	114.82	78.54	54.96
Min. Value	114.23	77.52	52.37
Max. Value	115.62	78.96	58.33
Standard Deviation	0.51	0.53	2.34
Variation Coefficient %	0.4450	0.6799	4.2563
<b>250 × n=6</b>			
Mean	114.98	78.35	56.62
Min. Value	114.65	77.51	54.36
Max. Value	115.29	78.75	58.13
Standard Deviation	0.32	0.46	1.27
Variation Coefficient %	0.2788	0.5822	2.2397
P	0.518	0.522	0.159

\* Motile—Percentage of Motile Sperm (same for the following)

The variation of sperm density, vitality and percentage of motile sperm of six consecutive tests is very little. The data of two different magnifying rate have no significance of difference ( $P>0.05$ , see Table 1).

### COMPARISON OF THE DATA OF WLJY-9000 AND MANUAL ANALYSIS

Main parameters of WLJY-9000 and manual analysis such as sperm density, percentage of motile sperm and vitality (A+B) are highly correlated ( $r>0.9$ , see Table 2). There is no significance of difference between the data of WLJY-9000 and manual analysis according to the results of T examination, which testifies that the result of WLJY-9000 is accurate (see Table 3).

Table 2a Correlation of data from manual analysis and WLJY-9000 (n=30)

Items	Manual analysis		100 ×		r	250 ×		r
	Mean	SD	Mean	SD		Mean	SD	
Density (M/ml)	88.81	57.66	87.44	58.74	0.986	85.43	55.89	0.985
Motile (%)	63.67	20.25	64.58	23.83	0.965	65.74	23.56	0.965
A + B vitality (%)	51.00	19.58	51.16	20.67	0.982	51.71	19.59	0.992

Table 2b Statistic analysis on matched pairs of manual analysis and WLJY-9000 (n=30)

Items	100 ×			250 ×		
	Mean	SD	P	Mean	SD	P
Density (M/ml)	1.37	9.66	0.444	3.38	9.95	0.073
Motile (%)	0.91	6.80	0.467	2.07	6.66	0.099
A + B vitality (%)	0.16	4.00	0.823	0.71	2.49	0.131

## DISCUSSION

Sperm analysis is an indispensable check in clinic and research of male fertility, genesiology and family planning. The main shortcoming of manual sperm analysis is that the result is easy to be affected by subjective factors of the laboratorian. Especially, the statistic analysis of sperm vitality and percentage of motile sperm is heavily relied on laboratorian's experience and subjective judgement. So, it impedes the clinical diagnoses and therapy of male fertility and related researches.

WEILI Color Sperm Analysis System WLJY-9000 is composed of microscope, camera, computer, printer, etc. It can record the current sperm density and motion in a visual field automatically. The affect of subjective factors is got rid of and analysis results are accurate. It can be operated repetitively and the conformity of data from different magnifying rate is

excellent. Analysis results can be printed out and saved in computer. Dynamic sperm images can be recorded by a VTR, which is convenient to the training of clinical and research staff. Patients can observe their sperm image via a color monitor and get some first-hand knowledge of their problems. Using WLJY-9000 to analyze sperm is fast and accurate and is a scientific, practical and convenient method.

The parameters got from manual sperm analysis are limited. For example, sperm velocity and motion track are hard to be obtained by macrography, which probably impedes a comprehensive evaluation of a man's fertility.

But this is not a problem for WEILI Color Sperm Analysis System WLJY-9000. It has many functions and can provide many data that can not be got from manual sperm analysis, which include virtual grid, image zoom, bar chart of sperm progressive velocity, bar chart of velocity on curve, bar chart of velocity on average path, bar chart of sperm vitality grading and sperm motion track graphs. It is safe to say it is a great help for the comprehensive evaluation of a man's fertility.

## CONCLUSION

Through comparison of data from WEILI Color Sperm Analysis System WLJY-9000 and manual analysis on 30 sperm samples, the following conclusion can be got. WEILI Color Sperm Analysis System WLJY-9000 is a qualified substitute for manual sperm analysis. Sperm density, vitality and percentage of motile sperm obtained by the system are accurate. It can be repetitively operated and conformity of the data from different magnifying rate test are very good. It is a valuable reference for clinical diagnoses and therapy of male sterility, genesiology and family planning. Using WLJY-9000 to analyze sperm is fast and accurate and is a scientific, practical and convenient method. It has many functions which manual sperm analysis doesn't have.

**No. 3 Hospital of Beijing Medical University**

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