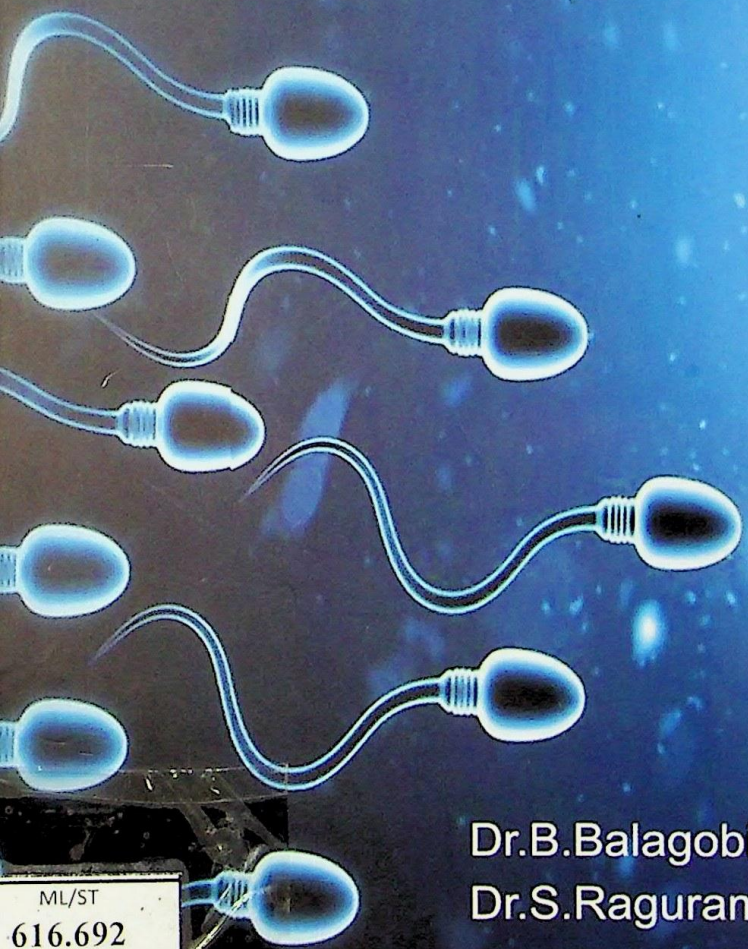
# FUNDAMENTALS OF SEMEN ANALYSIS
## - A PRACTICAL GUIDE-

(FOR UNDERGRADUATE AND POSTGRADUATES)



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Dr.S.Raguraman

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சேமமடு
2023

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By: Dr.B.Balagobi, Dr.S.Raguraman©
Edition 2023, Peges : viii+124, Quy:1000, Size:1/8 demy, Font:11
Publisher:Stp.Pathmaseelan

Published by Chemamadu Poththakasaalai
U.G.50 People's Park Colombo -11 Tel: 011-2331475, 0777345666
mail:chemamadu@yahoo.com, web.chemamdu.com

Printed by Chemamadu Press
180/1/48 Gaswork Street, Colombo -11,
Tel:071 2726778, mail:cbcseelan@gmail.com

**ISBN : 978-955-685-172-4**

**Rs.1000.00**

**CBCN:2023-04-01-273**

# Contents

# PREFACE

Subfertility is an inability to achieve a clinical pregnancy after 1 year or more of unprotected sexual intercourse. It is a global problem with 8 million couples. Male subfertility has been considered as one of the primary factors of Subfertility. Thus it influenced in infertile couples with 40% of the whole causes. So it is fundamental to evaluate the male subfertility factors to restore natural fertility. Semen analysis plays a major role in the assessment of male subfertility. Thus the semen analysis evaluate the nature of the sperm quantity quality and motile of the sperms.

This book illustrates the fundamental knowledge and practical aspects of seminal fluid analysis for all clinicians including undergraduate and postgraduates to facilitate the better fertility outcomes. It contains 10 chapters including basic science of male reproductive system, seminal fluid and explains the fundamentals of semen analysis assessment and management.

It leads to facilitate specialists, primary health care physician, postgraduate trainees and medical students in the field of male

subfertility / genito urology and specially involving with fertility treatment to get a compressive knowledge on the male subfertility.

I wish to express my sincere gratitude to Dr Rajasingam S.Jeyendran, Andrologist, Androlab.Inc, U.S.A his continuous guidance and the forward to this book.

I acknowledge Mrs.T.Sukrithan Technical Officer, Department of Obstetrics and Gynecology and Miss Shathana, Department of Surgery, Faculty of Medicine University of Jaffna for editing and proofreading. I thank, Chemamadu publications for publishing this book.

The Authors expected that this book will be a clinicians and student companion throughout their current and future clinical practice to uplift fertility care. Moreover, it would generate a passion in the subfertity care.

***Dr.B.Balagobi***

***Dr.S.Raguraman***

# FOREWORD

The first book that dealt exclusively with male fertility problems was published in the mid-1940s (*Fertility in Men: a clinical study of the causes, diagnosis and treatment of impaired fertility in men*, Robert Sherman Hotchkiss, J.B. Lippincott & Company, 1944). Surprisingly, this text had no follow-up until two decades later (*Infertility in Men*, Richard D. Amelar, F.A. Davis Company, 1966). Throughout these years, male fertility remained a secondary issue for overall fertility treatment. That status quo has been stubbornly clung to until recently, when semen analysis was slowly refined into a meaningful, logical framework, sufficient for routine clinical practice.

New technologies that enabled the extraction of viable sperm directly from the male reproductive tract shifted professional emphasis yet again, this time to the domain of the urologist. Through various newly developed clinical means, men once considered hopelessly infertile had the opportunity to provide viable samples. As semen analysis, interpretation and numerous sperm retrieval and enhancement methods became further refined

and standardized, urologists and andrologists became important to all fertility treatment programs.

Male reproductive status has finally become a significant and potentially enhanced, centrally determining factor. Once considered a passive variable in the fertility equation, sperm are now a directly observed and manipulated part of the overall fertility treatment regimen.

Contemporary fertility science places tremendous emphasis on sperm quality. With sperm naturally more plentiful and easier to manipulate than oocytes, male fertility programs remain a productive and wide-open field. And since examination of the male is typically much easier than female fertility evaluation, tests such as semen analysis are particularly practical and cost-effective for all couples seeking fertility treatment.

Given the ongoing advances in male fertility work, clinical semen analysis remains a significant and ever-expanding part of any fertility treatment program. This book is therefore a timely, informational, educational, and easy to follow format. It should be on the desk of everyone involved with infertility treatment and management.

***R.S. Jeyendran, BVSc, MS, PhD, HCLD, ALD***

Dr. R. S. Jeyendran has published more than 350 book chapters, reviews, publications, and abstracts. He has contributed significantly to studies in male infertility. Several of these original contributions have been accepted by peers as significant. He has mentored many students, residents and fellows in Obstetrics and Gynecology, and Reproductive Medicine. He has authored three medical books, four trade books and two booklets in the field of Andrology and Reproductive Physiology and is the holder of five patents.

# 1. INRODUCTION

Subfertility is defined as an inability to conceive despite regular unprotected sexual intercourse after one year. This affects 15-20% (1 in 7 couples) of a married couples and the incidence is rising over the years.


*Figure 1: Prevalence of Subfertility.*

The main goal of infertility evaluation and treatment is to facilitate/restore the natural fertility to the individual or couple. Since male infertility has been estimated as the primary or contributory factor in more than 40% of infertile couples, ejaculate analysis has become a major tool in fertility treatment regimens.

Normal fertility depends upon on following:

* Spermatogenesis
* Epididymal maturation of sperm
* Coitus
* Transport of sperm through female genital tract
* Fertilization
* Implantation at uterine endometrium

[illegible] factors are influenced by male factors.

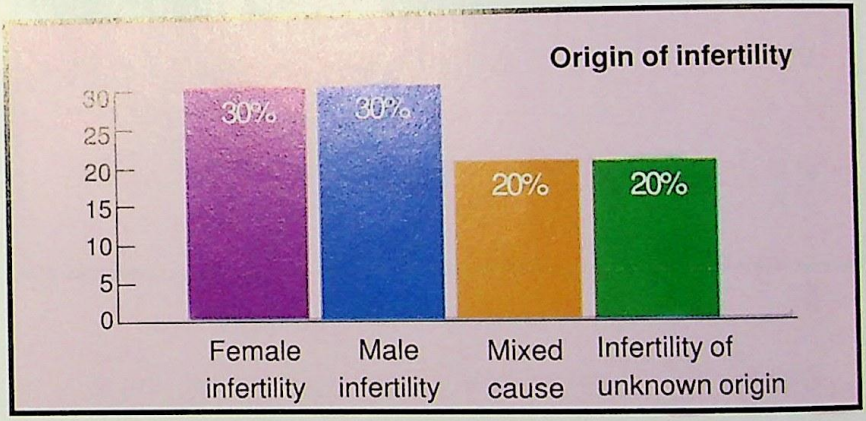


***Figure 2: Male infertility contributes >40% of infertile couples.***

Semen analysis evaluates male fertilization potential. Since male fertility is essentially dependent on sperm quantity and quality, sperm assessment is a central, fundamental test.

Specifically, sperm quality assessment is often utilized to determine relative sperm recovery rates before and after various processing procedures for intrauterine insemination and following semen cryopreservation. Sperm quality assessment also helps to adjust for the correct number of motile sperm needed for assisted reproductive techniques. Similarly, estimation of relative sperm presence before and after all vasectomy and vasovasostomy procedures is vital.

Even though the names are not interchangeable, they are commonly used together. The whitish fluid (semen) generated by male reproductive system and ejaculated by penis. Semen is also called as "seminal fluid".

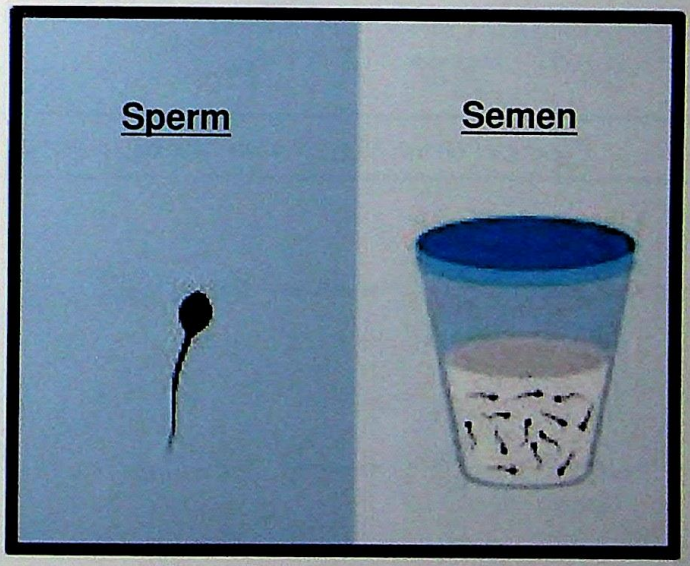


*Figure 3: Sperm versus Semen*

Semen contains sperm, which are tiny tadpole-like, microscopic structures, germ cells on their way to fertilize an egg. They have half the number of ordinary human chromosomes, whereas eggs have the other half, resulting in a complete set of chromosomes in a zygote. If a sperm fertilizes an egg with a chromosome X, then the zygote is female, and the zygote is male when it fertilizes an egg with a chromosome Y.

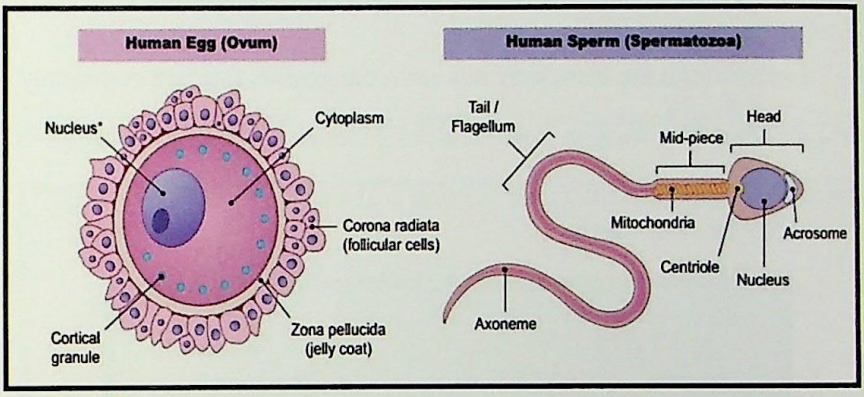


*Figure 4: Ovum (Egg) versus Sperm*

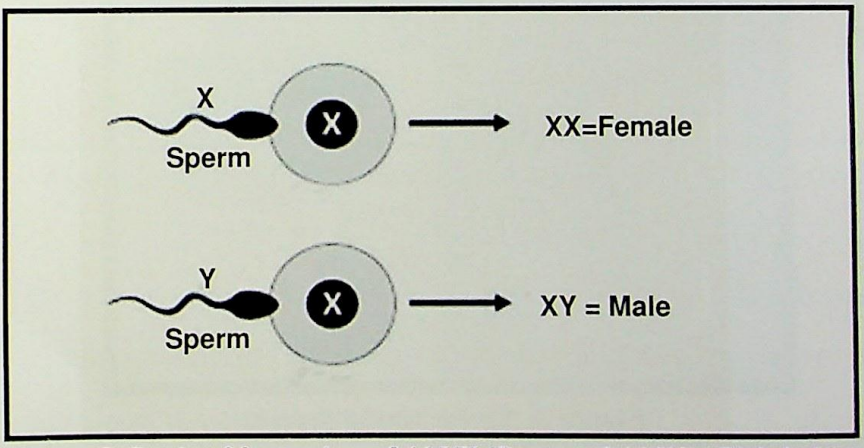


*Figure 5: Basis of formation of 46 XY (Boy) and 46 XX (Girl) babies*

* 1 in 7 couples is affected by subfertility.

* >40% of the couples' subfertility is attributed to male subfertility.

* Seminal fluid analysis is the main investigation during male subfertility assessment.

Semen, or seminal fluid, is an organic fluid created to contain and transport sperm, or spermatozoa, from the male reproductive tract into the female reproductive tract.