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Revisiting Oligo-Astheno-Teratozoospermia in Male Infertility: An Integrative Ayurvedic Review

Dr. Vidyadhar Suryawanshi[1], Dr. Meenakshi Manerikar[2], Prof.Dr. Arun Mishra[3], Prof. Dr. Krishnakumar K.[4]

1. MD PhD scholar , Mandsor University. Mandsor (M. P.); HoD, Panchakarma dept PSS Ayurvedic chikitsa college, Ratlam (MP) Email ID : drvps226@gmail.com
2. Professor & HoD department of Rasashastra and Bhaishajya kalpana , Nootan Ayurvedic College and research centre, Sankalchand Patel University, Visnagar Gujarat
3. MD PhD, HoD shalya Dept, Mandsor institute of Ayurved education and Research, Mandsor, (M.P)
4. MD PhD, HoD kayachikitsa Dept. MVR Ayurvedic Medical College, Parasinikkadavu. Kerala

Abstract: Male infertility contributes to nearly half of infertility cases worldwide. One of the most clinically significant seminal abnormalities is Oligo-Astheno-Teratozoospermia (OAT), characterized by decreased sperm concentration, reduced motility, and abnormal morphology. Contemporary management largely depends on assisted reproductive technologies; however, these methods frequently bypass the underlying pathophysiological defects. Ayurveda explains male reproductive physiology through the concept of *Shukra Dhatu* (reproductive tissue responsible for fertility) and describes seminal abnormalities under *Shukra-dushti* (vitiation of semen). Among these, *Ksheena Shukra* (quantitative and qualitative depletion of semen) shows conceptual similarity with OAT. The present review evaluates classical Ayurvedic literature and modern biomedical research to explore the correlation between OAT and *Shukra-dushti*. Literature was retrieved from PubMed, Google Scholar, DHARA, and the AYUSH Research Portal. A total of 86 records were identified, of which 17 studies were included after screening. Evidence suggests that oxidative stress, endocrine dysfunction, and metabolic disturbances play significant roles in OAT pathogenesis. Ayurvedic therapeutic approaches including *Shodhana* (purificatory therapies), *Vajikarana* (aphrodisiac therapy), and *Rasayana* (rejuvenation therapy) aim to restore reproductive physiology and improve semen parameters. Integrating Ayurvedic concepts with modern andrology may provide a comprehensive approach for the management of male infertility.

Keywords: Oligo-Astheno-Teratozoospermia (OAT), *Vajikarana* (aphrodisiac therapy), *Rasayana* (rejuvenation therapy), *Shodhana* (purificatory therapies).

Introduction

Infertility is a significant global reproductive health concern affecting approximately one-fifth to one-sixth of couples in the reproductive age group.[1] The World Health Organization (WHO) defines infertility as the inability to achieve pregnancy after a reasonable period of regular unprotected sexual intercourse, commonly considered as one year in clinical practice. In India, the prevalence is reported to be around between 3.9% and 16.8% as per WHO reports.[2] Although infertility is not life-threatening, it carries profound psychological, social, and emotional consequences for affected couples.

Male factors account for nearly 30–40% of infertility cases [3], making evaluation of male reproductive health essential in infertility management. Semen analysis remains the cornerstone of male infertility evaluation. Among the various abnormalities observed in semen parameters, Oligo-Astheno-Teratozoospermia (OAT) represents a severe condition characterized by reduced sperm count, impaired motility, and abnormal morphology. Oligo-astheno-teratozoospermia (OAT Syndrome) is the condition presenting in males which is diagnosed by isolated astheno ± teratospermia (no alteration in sperm concentration);

moderate (sperm concentration < 20 × 106/mL and > 5 × 106/mL); or severe (sperm concentration < 5 × 106/ mL).[4] Management options in contemporary medicine are limited, particularly in severe cases, often leading couples toward assisted reproductive techniques or donor insemination.[5] These abnormalities significantly reduce fertilization potential and are frequently associated with oxidative stress, hormonal disturbances, infections, environmental toxins, and genetic factors.[6]

From an Ayurvedic perspective, conception depends upon four essential factors *Ritu* (Ovulatory phase), *Kshetra* (healthy reproductive tract), *Ambu* (nutrition), and *Beeja* (gametes), collectively known as *Garbha Sambhava Samagri*. In males, *Beeja* corresponds to *Shukra*, whose primary function is *Garbhotpadana* (procreation). Vitiation of *Dosha* due to stress, excessive physical exertion, improper lifestyle, chronic illness, or excessive sexual indulgence leads to *Shukradushti*, resulting in impaired fertility. Classical texts describe eight types of *Shukradushti* [7], including conditions which significantly impact fertility. *Ksheena Shukra* is included in one of the varieties of *Dosha* that are vitiated; the quality and quantity of the *Shukra* alter and result in *Shukradushti*, especially *Ksheena Shukra.* [8,9]

Although OAT is described in modern andrology as a combined seminal abnormality, the clinical manifestations resemble conditions described in Ayurveda under *Ksheena Shukra* (diminished semen) and other forms of *Shukra-dushti*. Ayurveda contains an elaborate discussion on male reproductive health and seminal abnormalities under *Vajikarana Chikitsa* (aphrodisiac therapy), one of the eight branches (*Ashtanga Ayurveda*). Proper administration of *Swayoni vardhana dravyas* [10] (drugs having similar qualities of *Shukra dhatu*) *Vajikarana dravyas* [11] is described to enhance fertility, strength, complexion, and reproductive capability. Thus, revisiting OAT through an integrative Ayurvedic lens may provide deeper insights into its pathogenesis and potential therapeutic strategies.

Aim and Objective

To review classical Ayurvedic literature and modern biomedical research related to Oligo-Astheno-Teratozoospermia and to explore its conceptual correlation with *Shukra-dushti* described in Ayurveda.

Materials and Methods

This study was conducted as a narrative literature review. Classical Ayurvedic references were collected from authoritative texts including *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. Relevant descriptions of *Shukra Dhatu*, *Shukravaha Srotas* (channels carrying reproductive tissue), and *Shukra-dushti* were compiled.

Modern scientific literature was retrieved from electronic databases including PubMed, Google Scholar, DHARA, and the AYUSH Research Portal. Search terms included “male infertility”, “oligoasthenoteratozoospermia”, “oligozoospermia”, “Ayurveda male infertility”, and “Shukra dushti”.

Studies published between January 2000 and March 2025 were considered. Clinical trials, observational studies, experimental studies, and review articles relevant to male infertility and semen abnormalities were included.

Results

Maximum descriptions related to male reproductive physiology and seminal abnormalities are available in classical Ayurvedic texts such as *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. These texts elaborate the concepts of *Shukra Dhatu* (reproductive tissue), *Shukravaha Srotas* (channels of reproductive tissue), and *Shukra-dushti* (vitiation of semen), which are considered responsible for male infertility.

A comprehensive electronic search was conducted using PubMed, Google Scholar, DHARA, and the AYUSH Research Portal. The search period included publications from January 2000 to March 2025.

The initial search identified 86 records**.** After removal of 18 duplicate articles**,** 68 studies remained for title and abstract screening. During this stage, 39 articles were excluded because they focused on unrelated topics such as female infertility or assisted reproductive technology outcomes without evaluation of seminal parameters. The remaining 29 articles underwent full-text assessment. Among these, 12 studies were excluded due to inadequate methodological details or lack of relevance to OAT or *Shukra-dushti*.

Finally, 17 studies were included in the present review. These studies comprised clinical trials, observational studies, and experimental investigations evaluating male infertility, seminal abnormalities, and the role of Ayurvedic interventions in improving semen quality. Several studies reported improvements in sperm concentration, motility, and morphology following administration of Ayurvedic formulations and medicinal plants possessing *Vajikarana* (aphrodisiac) and *Rasayana* (rejuvenative) properties.

Correlation between OAT and *Shukra-dushti*

Modern Semen Parameter	**Modern Description**	**Ayurvedic Correlation**	**Pathophysiological Interpretation**
Oligozoospermia	Low sperm concentration	*Ksheena Shukra* (decreased semen)	Quantitative depletion of *Shukra Dhatu*
Asthenozoospermia	Reduced sperm motility	*Vata-dushti* affecting *Chala Guna*	Impaired movement of sperm
Teratozoospermia	Abnormal sperm morphology	*Vata-Pitta dushti* causing structural defects	Defective formation of reproductive tissue
Abnormal seminal plasma	Altered viscosity/colour	*Tanu*, *Phenila*, *Vivarna Shukra*	Qualitative abnormalities of semen

Discussion

Male infertility is a multifactorial condition involving genetic, hormonal, metabolic, and environmental influences. OAT represents one of the most severe seminal abnormalities because it involves simultaneous defects in sperm concentration, motility, and morphology. Contemporary studies indicate that oxidative stress plays a major role in the pathogenesis of OAT by damaging sperm DNA and impairing mitochondrial function, which ultimately reduces sperm motility and viability.[12,13]

Hormonal imbalance is another important contributor to male infertility. Disturbances in the hypothalamic–pituitary–gonadal axis may affect spermatogenesis and lead to abnormal semen parameters. [14] Environmental toxins, lifestyle factors such as smoking and obesity, and exposure to endocrine-disrupting chemicals have also been implicated in the development of OAT. [15]

In Ayurveda, male reproductive physiology is governed by *Shukra Dhatu* (reproductive tissue). Proper formation of *Shukra Dhatu* occurs through the process of *Dhatu Parinama* (sequential transformation of body tissues). Disturbances in this process or obstruction of *Shukravaha Srotas* (reproductive channels) lead to abnormalities in semen quality and fertility potential. [16]

Among the conditions described under *Shukra-dushti*, *Ksheena Shukra* represents depletion of semen and reduced reproductive potency. The pathogenesis involves predominance of *Vata* and *Pitta Dosha*. *Vata Dosha* governs movement and functional activity, and its aggravation may impair sperm motility, which corresponds to asthenozoospermia. *Pitta Dosha* governs metabolic processes and when vitiated may lead to degenerative changes affecting spermatogenesis, thereby contributing to abnormal sperm morphology.

Ayurvedic therapeutic strategies aim to restore systemic balance and improve reproductive function. *Shodhana* therapies such as *Virechana* (therapeutic purgation) and *Basti* (medicated enema) eliminate aggravated *Doshas*, while *Vajikarana* (aphrodisiac therapy) and *Rasayana* (rejuvenation therapy) enhance reproductive vitality and improve semen quality.

Modern research has also demonstrated beneficial effects of several Ayurvedic medicinal plants on male fertility. Clinical studies have shown that *Withania somnifera* improves sperm count, motility, and hormonal balance in infertile men. [17] Similarly, *Mucuna pruriens* has been reported to improve spermatogenesis and reduce oxidative stress by modulating the hypothalamic–pituitary–gonadal axis. [18]

These findings indicate that Ayurvedic therapies may address underlying mechanisms involved in male infertility, including oxidative stress, endocrine imbalance, and impaired spermatogenesis. Therefore, correlating OAT with *Shukra-dushti* provides a meaningful integrative framework for understanding and managing male infertility.

Conclusion

Oligo-Astheno-Teratozoospermia is a significant cause of male infertility characterized by combined abnormalities in sperm concentration, motility, and morphology. Modern therapeutic approaches frequently rely on assisted reproductive technologies, which facilitate fertilization but may not correct underlying pathophysiological disturbances.

Ayurvedic literature describes similar conditions under the concept of *Shukra-dushti*, particularly *Ksheena Shukra*, which involves depletion and qualitative impairment of reproductive tissue. The pathogenesis involves imbalance of *Vata* and *Pitta Dosha* affecting *Shukravaha Srotas* and the process of *Shukra Dhatu* formation.

An integrative understanding of OAT through both modern and Ayurvedic perspectives may provide a broader approach for the management of male infertility. Further well-designed clinical studies are required to evaluate the efficacy of Ayurvedic interventions in the management of OAT.

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