

Recommendations	Strength rating
Treat male accessory gland infections as it may improve sperm quality, although it does not necessarily improve the probability of conception.	Weak
Refer sexual partners of patients with accessory sex gland infections that are known or suspected to be caused by sexually transmitted diseases for evaluation and treatment.	Strong

11.5 Non-Invasive Male Infertility Management

11.5.1 Empirical treatments

11.5.1.1 Life-style

Environmental and lifestyle factors may contribute to male infertility acting additively on a susceptible genetic background [83, 1650]. Hence, lifestyle improvement can have a positive effect on sperm parameters.

This includes:

- Weight loss: non-controlled studies have suggested that weight loss can result in improved sperm parameters [83, 1831, 1832]. However, data derived from RCTs are more conflicting. A meta-analysis of 28 cohort studies and 1,022 patients, documented that bariatric surgery did not improve sperm quality and function in morbidly obese men [1833]. Data on ART outcomes are lacking. Furthermore, weight loss can improve obesity-related secondary hypogonadism, which may result in better outcomes in couples seeking medical care for infertility [1831, 1833].
- Physical activity: a meta-analysis has documented that moderate-intensity (20–40 metabolic equivalents [METs]/week) or even high-intensity (40–80 METs-h/week) recreational physical activity can result in better semen parameters [1834]. Moreover, physical activity might improve hormonal profile [1831].
- Smoking: data derived from a large meta-analysis of 20 studies with 5,865 participants showed a negative association between smoking and sperm parameters [1835].
- Alcohol consumption: Data derived from a recent meta-analysis including 15 cross-sectional studies and 16,395 men suggested that moderate alcohol does not adversely affect semen parameters, whereas high alcohol intake can have a detrimental effect on male fertility [1836] heavy chronic alcohol consumption (defined as > 2 drinks/day [1837]) can reduce testosterone levels [1837].

11.5.1.2 Antioxidant treatment

Oxidative stress is considered to be of the most important contributing factors in the pathogenesis of idiopathic infertility. Reactive oxygen species, the final products of OS, can impair sperm function acting at several levels, including plasma membrane lipid peroxidation, which can affect sperm motility, the acrosome reaction and chromatin maturation leading to increased SDF [1838]. Accordingly, seminal levels of ROS have been negatively associated with ART outcomes [1839]. Despite this, evidence for the role of antioxidant therapy in male infertility is still conflicting. A Cochrane systematic review and meta-analysis including 34 RCTs and 2,876 couples using various antioxidant compounds, it was concluded that antioxidant therapy had a positive impact on live-birth and pregnancy rates in sub-fertile couples undergoing ART cycles [1840]. Similar results were also reported in a meta-analysis including 61 studies with 6,264 infertile men, aged 18-65 years [1841]. However, the quality of the reported studies is poor. The Males, Antioxidants, and Infertility (MOXI) trial found that antioxidants did not improve semen parameters or DNA integrity compared to placebo among infertile men with male factor infertility. Moreover, cumulative live-birth rate did not differ at 6 months between the antioxidant and placebo groups (15% vs. 24%) [1842]. No clear conclusions were possible regarding the specific antioxidants to use or and/or therapeutic regimes for improving sperm parameters and pregnancy rate [1841].

11.5.1.3 Probiotic treatment

Prebiotic/probiotic supplementation may influence hormone secretion, facilitating the scavenging of free radicals, and improving the microenvironment of the prostate and indirectly enhance sperm function. A RCT including 56 men with idiopathic infertility treated with a prebiotic/probiotic compound vs. placebo showed a significant increase in sperm parameters in the treated group (i.e., sperm concentration, motility and normal morphology) as well as an increase in DNA integrity [1843]. An RCT of 78 infertile men who underwent varicocele surgery with or without postoperative probiotic supplementation found a significant early (3 months) increase of sperm parameters (sperm concentration and normal morphology) in favour of the probiotic group vs. placebo [1844]. Further high-powered RCTs are warranted to further investigate the use of prebiotic/probiotic supplementation in the context of male infertility.