REVIEW ARTICLES

Favourable effects of Prelox® on testosterone levels

Subtitle: Prelox® and Testosteron

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Abstract

The combination of French maritime pine bark extract (Pycnogenol®), aminoacids and roburin (Prelox®) was tested in a randomized, double-blind, placebo-controlled, cross over study with 50 infertile men. Primary outcome of the study was the improvement of sperm quantity and quality, results have been already published.

Secondary outcome of the study were monitoring of testosterone levels and blood pressure.

Testosterone levels increased significantly ($p<0.001$) following intake of Prelox®. The slightly elevated blood pressure of the participants was lowered to normal values after treatment.

Key words: Prelox®, Pycnogenol®, pine bark extract, testosterone, blood pressure

1 Introduction

The combination of Pycnogenol®, L-arginine, L-citrulline and roburins (Prelox®) enhances quality and quantity of sperms (1). Following treatment of 1 month, sperm volume, concentration of spermatozoa, mobility and morphology were significantly ($p<0.001$) improved vs placebo in a double-blind, placebo-controlled, randomized, cross-over study with 50 infertile men (1). A clinical study, using the same design, revealed a restoration of erectile function and sexual wellness in a cohort of 50 men with confirmed erectile dysfunction (2). Within the frame of the clinical study directed to test the influence of Prelox®R on seminal quality (1) testosterone levels and blood pressure of the participants were tested. These unpublished results are subject of this communication.

2 Study design

50 men were distributed at random into two groups, receiving in a double-blind, placebo-controlled, cross-over study either Prelox®R or placebo (group A). After the first period of treatment for 4 weeks, a washout period of weeks followed, thereafter the group A receiving Prelox before changed to placebo for 4 weeks and the group B, starting with placebo, received Prelox®R in the second period of treatment.

Semen analysis was performed at start and in intervals of 4 weeks during the study. Blood pressure was measured at start and at the end of the study, testosterone levels were monitored in intervals of 4 weeks.

2.1 Subjects

Infertile men, with deviations in sperm morphology, mobility or concentration were included into the study. Age between 30 and 50 years. The groups A and B did not differ in respect to mean age: 37,3 years.

2.2 Study medication

Patients received 4 tablets daily, either Prelox®R or placebo. The daily dose of Prelox®R consisted of 80mg Pycnogenol®,

1.92g L-arginine, 1.2g L-citrulline and 40mg roburins. Pycnogenol®, an extract from the bark of the French maritime Pine (*Pinus pinaster* Aiton, subsp. *Atlantica*) contains mainly procyanidins, biopolymers composed from catechin and epicatechin units and phenolic compounds as taxifolin, catechin and phenolic acids (3). Roburins are tannins extracted from the wood of the French Oak tree, *Quercus robur*, active against chronic fatigue syndrome (4) and oxidative stress (5).

3 Statistics

Results were evaluated using the two-sided t-test for comparison of results at start and following treatment.

4 Results

4.1 Testosterone levels

The testosterone levels at start were within the normal range for this age for both groups of 25 men (table 1). Values increased significantly ($p<0.001$) after treatment with Prelox®R in group B, but not significantly in group A under placebo. Following cross-over, testosterone concentration increased in group A after intake of Prelox®R ($p<0.001$) whereas testosterone declined in group B. The results from both groups present an increase of the mean testosterone levels of 18.9%.

Tab. 1 Testosterone Level (nmol/L)

Group	A		B	
	mean	SD	mean	SD
Start	17.51	3.70	18.13	2.35
1. Treatment	18.29	3.06	21.97*	2.63
2. Treatment	22.24*	2.85	19.33	2.07

*$p< 0.001$ vs start

4.2 Blood pressure

At start, both groups presented a borderline enhanced blood pressure (Tab 2). Blood pressure decreased significantly ($p<0.001$) to normal values after the second treatment period with Prelox®R and placebo. Unfortunately, blood pressure was not controlled following first treatment. The fact, that blood pressure was still lower compared to start in group B under placebo, seems to point to a long lasting carry-over effect of Prelox®R.

Tab. 2 Blood Pressure (mmHg)

Group	A		B	
	mean	SD	mean	SD
Start				
BP syst.	132.40	7.65	134.60	7.06
BP diast.	86.00	5.00	85.80	4.49
2. Treatment				
BP syst.	121.60*	6.37	123.40*	5.72
BP diast.	79.90*	3.95	81.20*	2.18

*$p<0.001$ vs start

4.3 Semen quality

The improvement of semen quantity and quality has been reported earlier (1).

5 Discussion

The increase of testosterone levels following intake of Prelox®R corresponds with results from previous studies. In an investigation with men presenting erectile dysfunction (6) testosterone values increased by 25% following intake of Prelox®. Aoki et al (7) reported a significant ($p<0.01$) increase of testosterone after treatment of patients with erectile

dysfunction with another combination of Pycnogenol® and L-arginine aspartate.

In context with the improvement of erectile function and quality of sperms (8) it seems apparently obvious that these positive effects are attributed to a hormonal action, by an enhancement of testosterone production by Prelox®.

However, there is a solid body of evidence that the erectile function as well as the quality of sperms are connected to a non-hormonal mechanism.

The constituents of Prelox®, Pycnogenol® and L-arginine, act synergistically to enhance the production of NO. Pycnogenol® stimulates the activity of the endothelial NO synthase (e-NOS) (9,10), to produce more NO from L-arginine. As Prelox® contains also a high amount of L-arginine, it provides a surplus of substrate for NO production. NO stimulates the cGMP, which subsequently leads to smooth muscle relaxation and filling of corpus cavernosmum (11,12) and to enhancement of production of sperms (13,14). The improvement of erectile function by Prelox® (2), enabling patients to higher sexual activity, may result in higher testosterone levels. Several publications report a correlation between increased sexual activity and following elevation of testosterone values (15-20). Therefore, the enhanced testosterone values after intake of Prelox® may considered as a secondary effect of improved sexual wellness.

An enhanced production of testosterone by stimulation of enzymes contributing to biosynthesis of testosterone seems to be less likely, as Pycnogenol® inhibits aromatase (21) which is needed for conversion of androsterone to testosterone.

The reduced oxidative stress may contribute further to an increase of testosterone levels. As consequence of a decrease oxidative stress, testosterone values increased in animal experiments and human trials (22). Pycnogenol®, acting as a strong antioxidant (23) enhanced the antioxidative activity of plasma in several clinical studies.

The slight, but significant decrease of blood pressure after Prelox® is in line with the antihypertensive effect of Pycnogenol®, which could be documented in several publications (24-29). The normalization of blood pressure of the slightly hypertensive patients participating on the present study may contribute to the improvement of sexual activity and to higher testosterone levels. Hypertension has a negative impact on sexual activity and is associated with a reduction of testosterone levels (30).

Even when the antihypertensive effect of Prelox® was not that pronounced, the lowering of blood pressure may contribute to both, enhanced testosterone levels and better sexual activity.

6 Conclusion

The lowering of blood pressure and the increase of testosterone levels following intake of Prelox® may contribute to an improved sexual activity apart from the erectogenic potential of Prelox®.

7 Conflict of interests: The author works as a scientific consultant for Horphag Research Ltd.

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