

Effects of Laptop Computers' Electromagnetic Field on Sperm Quality

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Abstract

Background: Laptop computers are known sources of electromagnetic field and as the name implies a number of people use these computers frequently on their laps. To date, there seems to be only reports on the thermal effects of these devices on spermatogenesis in a laptop position. This study aimed to investigate the bioeffects of electromagnetic fields induced by laptop computers on rat spermatogenesis after blocking its thermal effects.

Methods: Thirty inbred Wistar rats (200–250 g) were randomly divided into a control and three experiment groups. The magnetic field strength of the lap-side of a computer was measured (in an upside down position) at different areas by using a TES 1390 EMF tester and marked it with an appropriate marker. The maximum magnetic field strength was $1.15 \mu T$. Animals in the test groups (21) were kept on the marked area on a thermal shield 7 hours a day for one week. The controls (9) were kept on a switched-off laptop for the same period. Subsequently, the animals were sacrificed and sperm parameters such as count, motility and morphology were analyzed. Non-parametric tests such as Mann Whitney U and Kruskal-Wallis tests were used to compare the results between the experimental groups and the controls.

Results: A significant and correlated decrease was seen in sperm motility parallel to the increase in the magnetic field. Sperm motility was divided into four groups (A to D), A exhibiting the highest and D the lowest motility. The relative frequency of group D sperms (immotile sperms) exposed to background, moderate, high and very high magnetic fields were 17%, 31%, 29%, and 68% and the relative frequency of sperm in class C sperms (non-progressive sperms) exposed to background, moderate, high and very high magnetic fields were 52%, 43%, 51% and 16%, respectively. After merging sperms in classes C and D, the relative frequencies of sperms in animals exposed to the background, moderate, high and very high magnetic fields were 69%, 74%, 80% and 84%, respectively. Although, the lowest sperm count was observed in animals exposed to the highest magnetic field but this difference was not significant.

Conclusion: There seems that sperm count and motility decrease as the magnetic field strength increases. In this light, magnetic fields induced by laptop computers may decrease sperm count and sperm motility, ultimately affecting male reproductive capabilities. It is advisable to limit the time these devices are used in a laptop position.

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