Effect of physical activity on seminal quality – a short commentary

Efeito da atividade física na qualidade seminal - um pequeno comentário

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ABSTRACT
A number of studies that analyze the effect of physical activity on male reproductive health had been published over the last years. Findings indicate that significant changes in semen quality can occur due to the practice of physical activity, which can alter its quality according to the type of physical activity, intensity and duration. Intense physical activity may cause strong hormonal changes and impair seminal quality. On the other hand, moderate physical activity appears to have a neutral or beneficial effect on semen quality. In addition, the effect of physical activity on semen quality may differ depending on the type of physical activity. This short commentary deals with the effect of physical activity on seminal quality, addressing the main issues of this hot topic.

Keywords: male reproductive health, seminal quality, physical activity.

RESUMO
Vários estudos que analisam o efeito da atividade física na saúde reprodutiva masculina foram publicados nos últimos anos. Os achados indicam que mudanças significativas na qualidade do sêmen podem ocorrer devido à prática de atividade física, o que pode alterar sua qualidade de acordo com o tipo de atividade física, intensidade e duração. A atividade física intensa pode causar alterações hormonais fortes e prejudicar a qualidade seminal. Por outro lado, a atividade física moderada parece ter um efeito neutro ou benéfico na qualidade do sêmen. Além disso, o efeito da atividade física na qualidade do sêmen pode diferir dependendo do tipo de atividade física. Este breve comentário lida com o efeito da atividade física na qualidade seminal, abordando os principais problemas deste tópico quente.
Palavras-chave: saúde reprodutiva masculina, qualidade seminal, atividade física.

1 INTRODUCTION

Male reproductive health may be influenced by physical activity, and this has increased the number of studies that analyze the effect of physical activity on seminal quality.\textsuperscript{1, 2} Findings indicate that significant changes in semen quality can occur due to the practice of physical activity, which can alter its quality according to the type of physical activity, intensity and duration. The physical exercise is promoted as an alternative to health, to reduce stress and improve quality of life, and its effects are beneficial for different ages and genders.\textsuperscript{3, 4} However, there are some controversial approaches regarding not only the benefits of exercise, but also which type of exercise is the best choice for the treatment of male infertility.

Nowadays, infertility has become a worldwide problem,\textsuperscript{5} with incidence around 8\% to 15\%. In about 50\% of cases, the cause of infertility is male. Experts point out that in order to reduce these negative effects and improve male fertility, lifestyle changes must be applied.\textsuperscript{6-8} Physical exercise is one of the most important strategies used to prevent obesity, improving health status and thus reducing the risk of mortality.\textsuperscript{9}

Despite the andrological knowledge have been extensively studied in the scientific literature, the considerable influence of sports on the male fertility remains unknown, making evident the innumerable contradictions between studies that measure the fact that physical activity is good or not for male reproductive health. Some authors found a positive association between physical activity and the improvement of semen quality.\textsuperscript{10-12} On the other hand, other authors have found negative associations,\textsuperscript{13, 14} in which the seminal quality is impaired due to the practice of physical activity. However, considerable evidence among the studies considers that as the intensity of physical exercise increases, the parameters that characterize male reproductive health seem to decrease.\textsuperscript{2}
Regarding the variables related to physical activity, the intensity and the volume are extremely relevant on semen quality.\textsuperscript{13, 14} When the overload is increased to an ideal level (moderate intensity), there seems to be a better response to the hormonal parameters and male reproductive health.\textsuperscript{7} On the other hand, when the overload imposed by exercise is too high, there may be a negative influence on seminal quality.\textsuperscript{13} This suggests that sports played at high intensity can impair man’s fertility.

Other inherent parameters related to physical activity mention that dysfunction in the reproductive system will depend on the sporting modality in question.\textsuperscript{2, 13} In this perspective, the sports practice of cycling is seen as one of the main physical activities that can generate dysfunctions in the male reproductive system.\textsuperscript{15} This is due to the mechanical impact generated in the scrotum region with the bicycle seat, in addition to other factors, such as the use of tight clothing and gonadal overheating. Other sports, however, note that, in most cases, the preliminary results available do not point to any significant effect on male reproductive health.\textsuperscript{1}

\section*{2 MATERIALS AND METHODS}

Two experts reviewed perceptions about the effect of physical activity on seminal quality. This research aimed to investigate new perspectives on the theme. As for the methodological procedures, an argument was made by the authors, therefore, it is an opinion article. Thus, a search was made for relevant articles in the Scopus database. In the base, the keywords were inserted: “(Physical Activity or Exercise) and (Fertility or Semen Quality or Seminal Parameters)”.

In the Scopus database, the applied filters were: health sciences area, only articles, article title, abstract, keywords and period of all years. The Scopus Database belongs to the Elsevier platform. It is considered the largest database of abstracts and citations of peer-reviewed technical and scientific literature, comprising: books, scientific journals and conference proceedings.\textsuperscript{16}
3 RESULTS

Supported by strong clinical evidence, this opinion article shows that intense physical activity can impair seminal quality. On the other hand, moderate physical activity appears to have a neutral or beneficial effect on semen quality. In addition, the effect of physical activity on semen quality may vary according to the type of physical activity.

4 DISCUSSION

It is important to consider that physical activity is not easily quantified. Conclusions are hindered because of other lifestyle variables, such as diet, the environmental factors, stress, and medications. The fact that not only professional but also recreational athletes widely use hormonal doping becomes difficult of characterizing the exact level of physical activities studied.

Not enough, doubts about the control of semen analysis techniques are routinely raised. For this reason, tests involving semen can be performed according to standardized guidelines, such as, for example, those established by the World Health Organization (Fig. 1). However, the results vary widely, and more solid conclusions are expected in the search field in human reproduction.

5 CONCLUSION

In conclusion, intense physical activity can cause impair seminal quality. However, moderate physical activity appears to have a neutral or beneficial effect on semen quality. In addition, the effect of physical activity on semen quality may differ depending on the type of physical activity. In view of the evidence, there is still a lack of solid conclusions on this subject, due to the fact that there is a lot of contradiction between the existing studies. Additional long-term studies are needed to assess different physical activities, as well as different levels of intensity.
CONTRIBUTION OF THE AUTHORS

The author Leonardo Monteiro Nesello (author 1) participated in the initial idea and design of the research, obtaining literal data, analysis and interpretation of the data, writing of the manuscript, and critical manuscript review regarding the important intellectual content.

The author Fábio Firmbach Pasqualotto (author 2) participated in the initial idea and design of the research, help in drafting the manuscript, and obtaining research funding and critical manuscript review.

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CONFLICT OF INTEREST

The present study has no conflict of interest.

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To God, for being always by our side.
To our families, whose love has taught us acceptance, courage, dedication, persistence, and so many other things that words can not name, but which we will never forget.
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REFERENCES


### ANEXOS

Table 1 - Normal values for seminal analysis parameters

<table>
<thead>
<tr>
<th>SEMINAL PARAMETER</th>
<th>STANDARD VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>≥ 1.5 ml</td>
</tr>
<tr>
<td>pH</td>
<td>7.2-8.0</td>
</tr>
<tr>
<td>Color</td>
<td>Opaque white</td>
</tr>
<tr>
<td>Liquefactation</td>
<td>≤ 30 min, complete</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Normal</td>
</tr>
<tr>
<td>Concentration/ml</td>
<td>≥ 15x10^6 sperm per ml of semen</td>
</tr>
<tr>
<td>Total concentration</td>
<td>≥ 39x10^6 spermatozoa by ejaculate</td>
</tr>
<tr>
<td>Progressive motility</td>
<td>≥ 32% with linear progression</td>
</tr>
<tr>
<td>Total motility</td>
<td>≥ 40%</td>
</tr>
<tr>
<td>Morphology</td>
<td>≥ 4% with normal shapes</td>
</tr>
<tr>
<td>Vitality</td>
<td>≥ 58% of living forms</td>
</tr>
</tbody>
</table>

Note: values stipulated according to the WHO parameters. \(^{19}\)