Does a relationship exist between the prevalence of anterior cruciate ligament injuries in females and the use of estrogen and progesterone containing contraception?

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Abstract. Introduction: Women’s involvement in athletics has increased in the last twenty years. With the increase in participation, there has also been an increase in injury rates. Female athletes are at a 4-8 times higher risk of sustaining an Anterior Cruciate Ligament Sprain (ACL) than male athletes. There have been a number of research studies looking at endogenous hormonal influence on ACL injuries, but there is little research looking at the correlation between contraceptive use and ACL injuries. Purpose: This retrospective research study was conducted to determine if a correlation exists between prescription contraceptives and ACL injury rates in collegiate athletes. Methodology: Two hundred and fifty surveys were sent to collegiate volleyball and basketball coaches for distribution to female athletes. The survey included questions about the athlete’s history of ACL injury and prescription contraceptive use. Results: There was a 10.4% response rate. Of the 26 responses, 34% of the athletes have not sustained an ACL injury while using prescription contraceptives for greater than 12 months. Conclusion: No conclusion can be drawn concerning the relationship of prescription contraceptives and ACL injuries from the study due to a low response rate. Some research has shown an association between hormones and female ACL injuries; however, no definitive correlation has been shown.

1. Introduction

More females have been participating in competitive athletics in the past twenty years than previously. As female athletics grows and becomes more competitive, the health of the athlete becomes more important. Females have as much interest in remaining injury-free as male athletes. One trend involves anterior cruciate ligament (ACL) injuries, which have a higher incidence in females than in males. One study cites that women have a four to eight times higher chance of sustaining a grade three sprain of the ACL than men [1]. The results are the same across the board, regardless of which sport or the mechanism of action, contact or non-contact [2]. One factor that researchers have been exploring involves the female hormones estrogen and progesterone. Hormonal influence has yet to be unanimously accepted among the medical community as a precipitating factor. The purpose of this study was to determine if a relationship exists between the use of hormonal contraceptives and the prevalence of ACL injuries in females. Since some studies suggest that there are hormonal factors that predispose an athlete to this injury, use of prescribed contraceptives may decrease or increase the incidence. Results from this study may influence the decision to use prescribed contraceptives as a prophylaxis to prevent injury or discontinue them due to a higher susceptibility of injury.

2. Literature Review

One study that supports the theory of hormonal influence in knee injury was conducted by Wojtys et al [3]. In this study, 40 women who had recently sustained an ACL injury were asked questions relating their menstruation cycle to their injury. The results showed that the rate of injury was higher during the ovulation phase and that...
there were the fewest incidences of injury during the follicular phase. Also, they found a correlation between oral contraceptive use and ACL injury. Their results showed a decrease in the number of injuries in those using contraceptives compared to those who were not using. They suggested that there may be “a protective effect of hormone level stabilization” when using oral contraceptives [3]. However, another study published by Lebrun showed that there is no difference in performance (aerobic capacity, anaerobic capacity, isokinetic strength, and high intensity endurance) between menstruating women and women who were not menstruating at that time. The study showed that hormones had no effect on athletic performance. Also, there is no difference between oral contraceptive users and those athletes who did not use oral contraceptives [4]. Another study disputing the claim that there is a connection is a study performed by Agel, Bershadsky, and Arendt. They looked at the rates of ACL and ankle injuries during the 2000-2001 basketball season and the 2001-2002 basketball and soccer seasons. Their results showed that there was no difference between hormonal therapy users and athletes not using hormonal therapy [5]. These studies show that there is no consensus about whether or not hormones have an effect on female athletes’ susceptibility to injury.

3. Methodology and Results

After the Wichita State University’s Institutional Review Board approved the research project, surveys were sent to female collegiate athletes participating in either varsity basketball or volleyball. The total number of athletes who were asked to participate was 250. The coaches were sent an email asking for permission to include their athletes in the study. After consent was given, the surveys were mailed to the coaches for distribution to their athletes. The athletes were asked to complete the survey and return it by the due date listed on the survey. Confidentiality was ensured by not using any names or identifying marks on the surveys. Completing and returning of the survey was taken as evidence of the athlete’s willingness to participate and consent to have the information used for the purposes of the study. The surveys were sent to the coaches in September, 2005, with minimal response. A second email was sent out late September. The second email received a larger response, but still only yielding 26 athlete responses or 10.4% of the athletes asked to participate. Of the 26 responses, 34% of the athletes, who had used prescription contraceptives for more than 12 months, did not sustain an ACL injury. Sixteen athletes, 61.5%, responded that they had no history of ACL injury and no history of prescription contraceptive use. Only 2 athletes that responded had sustained an ACL injury; therefore, no comparison can be made between users of prescription contraceptives and non-users. Due to the lack of participants in the study, no conclusion can be made at this time in response to the research question.

4. Conclusion

Although no conclusion could be made from this pilot study, the ongoing debate over this issue indicates the need for further research to determine what role endogenous hormones play in ACL injury susceptibility and whether or not exogenous hormones can be beneficial in preventing ACL injuries in female athletes. As female athletics increases in popularity, so does the need for research to ensure female athletes are able to compete at their optimal level and are not hindered by injuries that could possibly be prevented.

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