

Proposal

Title - The Effect of Barefoot Running Using Two Separate Running Styles on Lower Extremity Joint Reaction Forces

Program of Study – Exercise Science (EXSC)

Presentation Type – Print Poster

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Category: Experimental (Applied)

Abstract example: As running is a popular worldwide pastime, it is beneficial to investigate potential differences in joint forces in order to determine whether or not there is a “best” biomechanical running pattern. This thesis discusses both background information and research conclusions of rearfoot and forefoot running patterns; specifically, the effects on the major lower extremity joints. Research was conducted on twenty runners to observe the differences in internal joint reaction forces at the hip, knee, and ankle. Ten male and ten female participants who all naturally run with the same initial foot contact pattern (rearfoot runners) were included in this study. Each subject ran barefoot on an instrumented treadmill under the following conditions: two trials with a natural rearfoot initial contact and two trials with an induced forefoot strike. Peak joint reaction force data was averaged from five strides during both conditions to determine the peak forces experienced at the ankle, knee, and hip in each X, Y, and Z plane. Statistical analysis of the results revealed no statistical difference between rearfoot or forefoot running patterns. The results of this study suggest that there may be no superior foot initial contact pattern to reduce joint reaction forces in the lower extremity. Findings from other studies in the

literature support the conclusions of this current study which is discussed in detail. It is recommended that additional research be conducted in order to gain more insight as to whether or not a superior running pattern does indeed exist. If so, this would aid in helping runners improve their biomechanical efficiency and potentially reduce the possibility of overuse injuries. This thesis will detail the importance of the strike pattern during the gait cycle, the observed differences between rearfoot and forefoot initial contact in previous research, injury relationships to the different initial contact patterns, and the findings of the conducted research for this study.

Christian worldview integration: My Christian worldview has influenced my research and resulting discussion by displaying the Christian values of honesty and integrity throughout the research process. I conducted my research design while acting as an ambassador for Christ. I wanted God to be glorified in the kindness of how I treated my subjects, the method in which I conducted the research, and how I maintained honesty in my results. Proper guidelines were followed with the IRB and subject information was kept private. Respect was shown for the research and the individuals I was working with. While writing my results, I included all the information without intentionally adding personal bias to maintain truthful results. It is common knowledge that much of the scientific community are not God-fearing people. Therefore, I wanted to contribute to my field of study as a Christian researcher: being able to observe the human body as it was designed by God.

This research is extremely beneficial to current society. Many people in the world today utilize running as a form of exercise. However, many lower extremity overuse injuries are observed in runners. Foot strike patterning is a major topic for research and discussion for many health professionals who deal with runners interested in a way to decrease the possibility for injury. It is essential for health professionals to determine what effects a foot strike may have on the

possibility of injury due to the observed forces the body experiences. The results of this research demonstrate that foot strike pattern alone may not have any effect on the forces experienced by the lower extremity joints. Therefore, injury rates in runners may be resulting from a multitude of factors including strength, mobility, footwear, pronation, gender, age, running mileage, or other controllable and uncontrollable factors. Future research can build on this study to determine the extent that foot strike pattern or these other factors may have on overuse injuries in runners.