The Effect of Custom Orthotics on the Vertical Leap of Athletes in a Sport Demanding Jumping

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The chiropractic literature is almost devoid of any studies related to vertical leap. In fact, scientific literature, in general, is devoid of any reference to orthotics affecting vertical leap. A number of companies have attempted to produce noncustom shoe insoles or shoe-related devices designed to improve vertical leap in jumping sports (i.e., basketball, volleyball, track and field jumping events). The current pilot project attempts to gather the first data on whether the use of custom orthotics in athletic shoes of a jump sport team can positively affect the vertical leap in a controlled, blinded study.

METHODS

Eleven female high-school-age volleyball players from a local elite club team were recruited into this pilot study. Parental informed consent was obtained. The subjects, who were blinded to the end point of the study, were fitted for custom orthotics supplied by Foot Levelers, Inc. Standing (first session) and three-step approach vertical reach were measured on separate days with and without orthotics to minimize complicating fatigue factors. Testing was done at almost the same time of day and at the same point in practice at both test sessions. The order (with orthotics and without orthotics) was randomized for each girl and each measurement date. Vertical leap measurements were made using a Vertec® vertical leap measurement device to minimize measurement bias. This device measures to the nearest half-inch. Vertical leap was determined as the best of three attempts for each of the four measurement conditions (i.e., standing vertical with and without orthotics, and approach vertical with and without orthotics). Statistical analysis was done using descriptive statistics and linear regression.

RESULTS

The mean increase in vertical leap using orthotics in the first testing session was 0.14 inch and in the second testing session was 0.23 inch. In the first test session, five subjects showed improvement, two stayed the same, and four showed a decrease in vertical leap after putting in orthotics. At the second testing session, five subjects showed an increase, four stayed the same, and two showed a decrease in vertical leap after wearing orthotics. Linear regression indicated a high correlation ($r^2 = .896$ for the first testing session and .950 for the second session) for vertical leap values before and after orthotics within one testing session but not for vertical leap changes ($r^2 = .05$) for individuals between test sessions.

DISCUSSION

Despite limitations such as a very underpowered subject number, difficulties in blinding study subjects, difficulty controlling all possible variables, small ($\leq$1.0 inch per subject) magnitude changes, and, finally, lack of break-in period for the orthotics, the pilot study was performed with the intention of determining if a larger, more well-controlled study should be undertaken. The results show trends that would indicate that there is some benefit to orthotics in improving vertical leap even in the limited exposure to orthotics (i.e., right before the test). The linear regression analysis shows good correlation between vertical leap values pre- and postinsertion of orthotics and there is a mean positive effect in both standing (0.14 inch) and three step approach (0.23 inch) when wearing orthotics during the test.

CONCLUSION

Although the exact mechanism of positive effect on vertical leap from orthotics is not yet understood, and the limited results and magnitude of changes do not lend themselves to extensive statistical analysis, the results of this study suggest that further studies are warranted and needed to determine the magnitude, if any, of positive changes on vertical leap from orthotics. It is suggested that well-controlled studies be carried out.