

Biomechanics

Characteristics of the Vertical Ground Reaction Force Component Prior to Gait Transition (pp. 229-237)
Li Li and Joseph Hamill

The purpose of the study was to examine the vertical ground reaction force component when approaching the gait transition point from either a walk-to-run or run-to-walk perspective. The vertical ground reaction forces (VGRF) of five steps before gait transitions for both walk-to-run and run-to-walk were collected on a motor driven treadmill with embedded force plates. Transition specific characteristics of the VGRF were observed for both types of gait transition. Running peak force and time to peak force reduced dramatically in a quadratic fashion as approaching to the run-to-walk transition. The walking VGRF first peak increased linearly, and the second peak decreased quadratically prior to walk-to-run transition. Walking VGRF appearing to be more sensitive to acceleration than the running VGRF.

Epidemiology

Childhood Movement Skills: Predictors of Physical Activity in Anglo American and Mexican American Adolescents? (pp. 238-244)
Thomas L. McKenzie, James F. Sallis, Shelia L. Broyles, Michelle M. Zive, Philip R. Nader, Charles C. Berry, and Jesse J. Brennan

We assessed the relationship between young children's movement skills and their physical activity in early adolescence. Balance, agility, eye-hand coordination, and skinfold thicknesses in 207 Mexican American and Anglo American children (104 boys, 103 girls) were measured at ages 4, 5, and 6 years. Habitual physical activity was assessed at the age of 12 years by two interviewer-administered 7-day recalls. Ethnic differences in movement skills were not found. Young girls were better at jumping and balancing, and young boys were better at catching. Tracking of skills was low, and children's early childhood skills were not related to their physical activity 6 years later. Further studies involving additional movement skills and other populations are recommended to determine if enhanced movement skills in children promote subsequent physical activity.

Growth and Motor Development

Individual Pathways in the Development of Forceful Throwing (pp. 245-256)
Stephen J. Langendorfer and Mary Ann Robertson

Halverson, Robertson, and Langendorfer (1982) reported the development of children ages 6-13 years filmed longitudinally performing the forceful overarm throw. These authors described the children's progress through developmental sequences for trunk, humerus, and forearm actions; however, they did not study developmental relationships ("profiles") across these components. This paper reports how the profiles changed in the same children across trials within filming sessions and over time. The data revealed both common and individual developmental pathways. The frequencies of some pathways were not chance occurrences ($p < .01$), suggesting that within-person constraints eliminated certain movement relationships while encouraging others. The authors hypothesize that the kinematics of trunk rotation may serve as a control parameter for pattern change.

Measurement and Evaluation

Cross-Cultural Validity of the Physical Self-Description Questionnaire: Comparison of Factor Structures in Australia, Spain, and Turkey (pp. 257-270)
Herbert W. Marsh, Inés Tomás Marco, and F. Hülya Aþçý

We evaluated the cross-cultural generalizability of the factor structure for the Physical Self-Description Questionnaire (PSDQ) using confirmatory factor analysis. The factor structure was reasonably invariant over large samples of responses by Australian, Spanish, and Turkish students. Consistent with a priori predictions, the factor structures based on Australian and Spanish high school students were somewhat more similar to each other than to those based on Turkish university students, but these differences were small. Psychometric, theoretical, cross-cultural, and

practical considerations support the PSDQ's usefulness in a variety of research and applied settings. The study also provides a model for comparing psychometric properties based on responses to original and translated versions of sport psychology measures.

Motor Control and Learning

Postcontraction Influences on Reaction Time (pp. 271-281)

Bruce Etnyre and Takashi Kinugasa

The purpose of this study was to compare reaction time (RT) and fractionated RT components (premotor and motor times) between normal and postcontraction conditions. Twelve participants performed 20 trials each of control and postcontraction RT conditions. For the control condition, participants executed a learned, rapid, knee-extension contraction response to an auditory stimulus. The postcontraction condition was identical to the control condition except that the participants performed a 3-s isometric contraction of the knee extensor muscles prior to an auditory stimulus. Muscle activity was recorded from the quadriceps muscle group. Results indicated that the postcontraction condition was significantly faster than the control condition for the average RT, premotor time, and motor time. It was concluded that reaction time, processing time, and muscle contraction time for a learned task could be significantly reduced following an isometric contraction.

Physiology

Are Intensified Physical Education Sessions Able to Elicit Heart Rate at a Sufficient Level to Promote Aerobic Fitness in Adolescents? (pp. 282-288)

Georges Baquet, Serge Berthoin, and Emmanuel Van Praagh

The purpose of this study was to determine the effects of intensified physical education sessions on adolescents ages 11-16 years. They were divided into two experimental groups-high-intensity running group (HIRG) and high-intensity jumping group (HIJG)-and a control group (C). During the sessions, heart rate (HR) was monitored. There was no significant difference between mean HR for HIRG and HIJG, while the mean HR was significantly lower for C ($p < .001$). For both HIRG and HIJG, the mean HR was significantly higher for girls than for boys ($p < .001$). Our results suggested that these intensified physical education lessons require a high percentage of maximal HR in adolescents and can be used to improve aerobic fitness.

Effects of Multicycle-Run Training on Triathlete Performance (pp. 289-295)

Olivier Hue, Alex Valluet, Stephen Blanc, and Claude Hertogh

The purpose of this study was to determine the effect of triathlon training using multiple, short cycle-run sequences (multicycle-run training) on cycle-run performance. Twelve competitive triathletes, randomized into two groups, underwent multicycle-run training or normal training for 6 weeks. During this period, baseline training remained the same for both groups, and only the high-intensity component differed. The differentiated exercises were performed at or above 100% maximal aerobic velocity. The improvements in overall cycle-run performance were similar ($3.3 \pm 1.4\%$ and $6.1 \pm 1.7\%$ rise in performance in multicycle-run and normal training, respectively). However, the improvement in performance was significantly greater for the multicycle-run training (-11.2 ± 6.8 s versus -1.2 ± 7.7 s for multicycle-run training and normal training, respectively) during both the cycle-run change and the first 333-m lap, which together are termed the cycle-run transition. We concluded that 6 weeks of multicycle-run training did not induce greater improvement in cycle-run performance than did normal training in competitive triathletes. However, it did induce significant improvement in the cycle-run transition. This finding indicates that multicycle-run training may help competitive triathletes to develop greater skill and better physiological adaptations during this critical transition period of the triathlon race.

Field Testing of Physiological Responses Associated With Nordic Walking (pp. 296-300)

Timothy S. Church, Conrad P. Earnest, and Gina M. Morss

This study compared the physiological responses (oxygen consumption and energy expenditure) of Nordic Walking to regular walking under field-testing conditions. Eleven women (M age = 27.1 years, SD = 6.4) and 11 men (M age = 33.8 years, SD = 9.0) walked 1,600 m with and without walking poles on a level, 200-m track. For women, Nordic

Walking resulted in increased oxygen consumption ($M = 14.9 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, $SD = 3.2$ vs. $M = 17.9 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, $SD = 3.5$; $p < .001$), caloric expenditure ($M = 4.6 \text{ kcal}\cdot\text{min}^{-1}$, $SD = 1.2$ vs. $M = 5.4 \text{ kcal}\cdot\text{min}^{-1}$, $SD = 1.2$; $p < .001$), and heart rate ($M = 113.7 \text{ bpm}$, $SD = 12.0$ vs. $M = 118.7 \text{ bpm}$, $SD = 14.8$; $p < .05$) compared to regular walking. For men, Nordic Walking resulted in increased oxygen consumption ($M = 12.8 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, $SD = 1.8$ vs. $M = 15.5$, $SD = 3.4 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$; $p < .01$), caloric expenditure ($M = 5.7 \text{ kcal}\cdot\text{min}^{-1}$, $SD = 1.3$ vs. $M = 6.9 \text{ kcal}\cdot\text{min}^{-1}$, $SD = 1.8$; $p < .001$), and heart rate ($M = 101.6 \text{ bpm}$, $SD = 12.0 \text{ bpm}$ vs. $M = 109.8 \text{ bpm}$, $SD = 14.7$; $p < .01$) compared to regular walking. Nordic Walking, examined in the field, results in a significant increase in oxygen use and caloric expenditure compared to regular walking, without significantly increasing perceived exertion.

Psychology

Affective Responses to an Aerobic Dance Class: The Impact of Perceived Performance (pp. 301-309)

John B. Bartholomew and Bridget M. Miller

The current study tests the mastery hypothesis as an explanation for the affective benefits of acute exercise. Participants were 204 undergraduate women who were participating in self-selected aerobic dance classes. Following the class, participants were asked to rate their exercise performance on a 5-point, Likert-type scale. Affect questionnaires were completed prior to and at 5 and 20 min following the aerobic dance class. Results indicated an overall improvement in affect following exercise. Negative valenced subscales were unaffected by performance ratings. Both groups showed similar reductions in these states. There was, however, a significant Group x Time interaction for the positive valenced subscales. High-performance participants reported greater increase in these variables throughout recovery than did low-performance participants. These data support the mastery hypothesis as an explanation for the exercise-induced change in positive affective states.

Injury Rehabilitation: A Goal-Setting Intervention Study (pp. 310-319)

Lynne Evans and Lew Hardy

The study examined the effects of a 5-week goal-setting intervention on athletes' rehabilitation adherence, self-efficacy, treatment efficacy, and the psychological response variables: dispirited and reorganization. Participants were matched across six variables and randomly assigned to one of three groups: goal-setting intervention, social support control, and control. The results confirmed some of the hypothesized effects of the goal-setting intervention: (a) athlete self-report of adherence showed the goal-setting group adhered significantly more to the rehabilitation program than the other two groups; (b) the goal-setting intervention resulted in significant group differences for self-efficacy (the goal-setting group having the highest level of self-efficacy); and (c) there was a significant increase across time for reorganization and decrease across time for dispirited (between specific time phases).

Injury Rehabilitation: A Qualitative Follow-up Study (pp. 320-329)

Lynne Evans and Lew Hardy

The current qualitative follow-up study was conducted to enhance the interpretability and meaningfulness of the findings emerging from a 5-week goal-setting intervention study with injured athletes. Semistructured interviews were conducted with a sample of 9 injured athletes, 3 from each of the three intervention study groups (goal-setting, social support control, and control), and cross-case summaries were inductively derived. The study highlighted the importance of individual difference variables, and the interaction of person and situational variables, including support from coaches and club, inability to train, weight gain, slowness of progress, physiotherapist support, and the importance of long-term outcome goals. Possible mechanisms for the observed effects of the goal-setting intervention included the effects of goal-setting on self-efficacy, attributions, perceptions of control, and attention.

Research Notes

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