

### **Biomechanics**

*Nordic Walking Practice Might Improve Plantar Pressure Distribution* (pp. 593–599)

Pedro Pérez-Soriano, Salvador Llana-Belloch, Alfonso Martínez-Nova, G. Morey-Klapsing, and Alberto Encarnación-Martínez

Nordic walking (NW), characterized by the use of two walking poles, is becoming increasingly popular (Morgulec-Adamowicz, Marszalek, & Jagustyn, 2011). We studied walking pressure patterns of 20 experienced and 30 beginner Nordic walkers. Plantar pressures from nine foot zones were measured during trials performed at two walking speeds (preferred and 20% faster), and under two walking conditions (NW vs. normal walking). In comparison to normal walking, NW experience led to a significant ( $p < .05$ ) pressure reduction of about 50% on the central metatarsals. No significant increases were detected in other foot regions. The differences between experienced and beginners during normal walking, including a 40% pressure reduction on the metatarsal area, suggests that regular NW practice might also have a beneficial effect on plantar pressure when walking without poles.

### **Epidemiology**

*Evaluation of Low-Cost, Objective Instruments for Assessing of Physical Activity in 10–11-Year-Old Children* (pp. 600–609)

Teresa L. Hart, Timothy Brusseau, Pamela Hodges Kulinna, James J. McClain, and Catrine Tudor-Locke

This study compared step counts detected by four, low-cost, objective, physical-activity-assessment instruments and evaluated their ability to detect moderate-to-vigorous physical activity (MVPA) compared to the ActiGraph accelerometer (AG). Thirty-six 10–11-year-old children wore the NL-1000, Yamax Digiwalker SW 200, Omron HJ-151, and Walk4Life MVP concurrently with the AG during school hours on a single day. AG MVPA was derived from activity count data using previously validated cut points. Two of the evaluated instruments provided similar group mean MVPA and step counts compared to AG (dependent on cut point). Low-cost instruments may be useful for measurement of both MVPA and steps in children's physical activity interventions and program evaluation.

### **Measurement and Evaluation**

*The Bland-Altman Method Should Not Be Used in Regression Cross-Validation Studies* (pp. 610–616)

Daniel P. O'Connor, Matthew T. Mahar, Mitzi S. Laughlin, and Andrew S. Jackson

The purpose of this study was to demonstrate the bias in the Bland-Altman (BA) limits of agreement method when it is used to validate regression models. Data from 1,158 men were used to develop three regression equations to estimate maximum oxygen uptake ( $R^2 = .40, .61, \text{ and } .82$ , respectively). The equations were evaluated in a cross-validation sample of 581 men. The BA means and differences were correlated ( $p < .001$ ) in the cross-validation sample for each model ( $r = .55, .39, \text{ and } .26$ , respectively), thus demonstrating bias. The BA method is inappropriate for validation of regression models. Validation of regression equations is properly conducted by plotting the residuals against the estimated values and examining the magnitude of the estimation error.

*Accuracy and Feasibility of Video Analysis for Assessing Hamstring Flexibility and Validity of the Sit-and-Reach Test* (pp. 617–623)

Constance M. Mier

The accuracy of video analysis of the passive straight-leg raise test (PSLR) and the validity of the sit-and-reach test (SR) were tested in 60 men and women. Computer software measured static hip-joint flexion accurately. High within-session reliability of the PSLR was demonstrated ( $R > .97$ ). Test-retest (separate days) reliability for SR was high in men ( $R = .97$ ) and women  $R = .98$ ) moderate for PSLR in men ( $R = .79$ ) and women ( $R = .89$ ). SR validity (PSLR as criterion) was higher in women (Day 1,  $r = .69$ ; Day 2,  $r = .81$ ) than men (Day 1,  $r = .64$ ; Day 2,  $r = .66$ ). In conclusion, video analysis is accurate and feasible for assessing static joint angles, PSLR and SR tests are very reliable methods for assessing flexibility, and the SR validity for hamstring flexibility was found to be moderate in women and low in men.

### **Motor Behavior**

*Decreasing the Proportion of Self-Control Trials During the Acquisition Period Does Not Compromise the Learning Advantages in a Self-Controlled Context* (pp. 624–633)

Jae T. Patterson, Michael Carter, and Elizabeth Sanli

The present experiment examined the learning effects of participants self-controlling their receipt of knowledge of results (KR) on all or half of their acquisition trials (50%). For participants who were provided 50% self-control, the first half of their acquisition period consisted of receiving KR on all trials, or according to a faded-KR schedule. Participants practiced a sequential timing task. The results showed that independent of practice condition, participants who self-controlled their KR during the acquisition period demonstrated superior performance compared to the respective yoked conditions in the retention and transfer portion of the experiment. These results extend previous research by suggesting that decreasing the proportion of self-control trials does not compromise learning in a self-controlled context.

*Decreasing Internal Focus of Attention Improves Postural Control During Quiet Standing in Young Healthy Adults* (pp. 634–643)

Gilel Nafati and Nicolas Vuillerme

This experiment was designed to investigate whether and how decreasing the amount of attentional focus invested in postural control could affect bipedal postural control. Twelve participants were asked to stand upright as immobile as possible on a force platform in one control condition and one cognitive condition. In the latter condition, they performed a short-term digit-span memory task. Decreased center-of-gravity displacements and decreased center-of-foot-pressure displacements minus center-of-gravity displacements were observed in the cognitive condition relative to the control condition. These results suggest that shifting the attentional focus away from postural control by executing a concurrent attention-demanding task could increase postural performance and postural efficiency.

*Comparison of Dynamic Visual Acuity Between Water Polo Players and Sedentary Students* (pp. 644–651)

Lluïsa Quevedo-Junyent, José Antonio Aznar-Casanova, Dolores Merindano-Encina, Genís Cardona, and Joan Solé-Fotó

In this study, we examined differences in dynamic visual acuity between elite and subelite water polo players and sedentary students. To measure dynamic visual acuity binocularly, we asked participants to indicate the orientation of a broken ring, similar to the Landolt C, which increased in size as it moved across a computer screen. Two different speeds, three possible trajectories, and two different levels of contrast were evaluated. There were statistically significant differences between elite players and sedentary students for each combination of speed, contrast, and trajectory. Elite players achieved better dynamic visual acuity scores, and results also improved for some combinations of speed, contrast, and trajectory. Comparison between elite and subelite groups failed to reveal any difference.

*Attentional Focus and Control Parameter: Effect on Throwing Pattern and Performance* (pp. 652–666)  
Dan Southard

In two separate experiments, this study examined changes in motor pattern and performance accuracy when low-level throwers focused on internal variables, external variables, and/or velocity of throw. In Experiment 1 the task goal was to improve the throwing pattern. In Experiment 2 the task goal was to throw as accurately as possible at a target. The results of Experiment 1 indicated that increasing velocity was most effective for changing the throwing pattern, with external focus more effective than internal focus. The results of Experiment 2 indicated that external focus was the most accurate condition and increasing velocity was most effective for changing the throwing pattern.

*Differentiating Experts' Anticipatory Skills in Beach Volleyball* (pp. 667–674)  
Rouwen Cañal-Bruland, Merel Mooren, and Geert J. P. Savelsbergh

In this study, we examined how perceptual-motor expertise and watching experience contribute to anticipating the outcome of opponents' attacking actions in beach volleyball. To this end, we invited 8 expert beach volleyball players, 8 expert coaches, 8 expert referees, and 8 control participants with no beach volleyball experience to watch videos of attack sequences that were occluded at three different times and to predict the outcome of these situations. Results showed that expert players and coaches (who were both perceptual-motor experts) outperformed the expert referees (who were watching experts but did not have the same motor expertise) and the control group in the latest occlusion condition (i.e., at spiker-ball contact). This finding suggests that perceptual-motor expertise may contribute to successful action anticipation in beach volleyball.

### **Pedagogy**

*Pedagogical Content Knowledge of Experienced Teachers in Physical Education: Functional Analysis of Adaptations* (pp. 675–684)  
Shiri Ayvazo and Phillip Ward

Pedagogical content knowledge (PCK) is the teacher's ability to pedagogically adapt content to students of diverse abilities. In this study, we investigated how teachers' adaptations of instruction for individual students differed when teaching stronger and weaker instructional units. We used functional analysis (Hanley, Iwata, & McCord, 2003) of the instructional interaction to examine PCK. We observed and measured student-teacher interactions and their appropriateness. Participants were 2 experienced elementary physical educators who taught stronger and weaker units. Primarily, the appropriateness data indicated PCK differences between the stronger and weaker units. Results show that functional analysis of instructional adaptations is an effective strategy for examining PCK and that teachers were better able to meet students' needs in the stronger unit.

### **Physiology**

*The Relationship Among HR<sub>peak</sub>, RER<sub>peak</sub>, and VO<sub>2peak</sub> During Treadmill Testing in Girls* (pp. 685–692)  
Karissa Peyer, James M. Pivarnik, and Dawn Podulka Coe

Clear criteria for maximal oxygen consumption (VO<sub>2max</sub>) determination in youth are not available, and no studies have examined this issue in girls. Our purpose was to determine whether different peak heart rate (HR<sub>peak</sub>) and peak respiratory exchange ratio (RER<sub>peak</sub>) cut points affect girls' ( $N = 453$ ;  $M$  age = 13.3 years,  $SD = .1$ ) VO<sub>2max</sub> during a maximal treadmill test. A multivariate analysis of variance revealed VO<sub>2max</sub> ( $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ) differed significantly among HR<sub>peak</sub>, 180–189  $\text{b}\cdot\text{min}^{-1} = 34$  ( $SD = .8$ ), 190–194  $\text{b}\cdot\text{min}^{-1} = 35$  ( $SD = .9$ ), 195–199  $\text{b}\cdot\text{min}^{-1} = 38$  ( $SD = .8$ ), 200–204  $\text{b}\cdot\text{min}^{-1} = 40$   $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$  ( $SD =$

.8), and  $\geq 205 \text{ b}\cdot\text{min}^{-1} = 42 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$  (SD = .7) but not RER<sub>peak</sub>. In studies where evidence of a VO<sub>2</sub> plateau was examined, peak oxygen consumption (VO<sub>2peak</sub>) did not differ between plateau and no-plateau groups. Although our results suggest the association between lower VO<sub>2peak</sub> and lower peak heart rate is a true cardiovascular limit to aerobic energy production, we cannot rule out participant effort.

*Interleukin-6 and Delayed Onset Muscle Soreness Do Not Vary During the Menstrual Cycle* (pp. 693–701)

Morgan E. Chaffin, Kris E. Berg, Jessica R. Meendering, Tamra L. Llewellyn, Jeffrey A. French, and Jeremy E. Davis

The purpose of this study was to determine if a difference in interleukin-6 (IL-6) and delayed onset muscles soreness (DOMS) exists in two different phases of the menstrual cycle. Nine runners performed one 75-min high-intensity interval running session during the early follicular (EF) phase and once during the midluteal (ML) phase of the menstrual cycle. Estrogen and progesterone levels were significantly reduced in the EF phase when compared to the ML phase. IL-6 levels increased from pre- to postexercise in the EF and ML phases ( $p < .001$ ). There was no relationship between the IL-6 level and DOMS. The results suggest that menstruating female runners need not vary training throughout the month to reduce DOMS.

## **Psychology**

*Kids Speak: Preferred Parental Behavior at Youth Sport Events* (pp. 702–711)

Jens Omli and Diane M. Wiese-Bjornstal

News reports (e.g., Abrams, 2008) and scholarly research (e.g., Wiersma & Fifer, 2005) have indicated increasing concern that parent-spectator behavior at youth sport events may be problematic. Multiple strategies have been used to influence spectator behavior in youth sport contexts (e.g., “Silent Sundays”). However, it is unlikely that interventions aimed at changing parent-spectator behaviors have adequately considered young athletes’ perspectives, because little is known about how children want parents to behave during youth sport events. Therefore, children (ages 7–14 years) were asked to describe how parents actually behaved at youth sport events and how they wanted parents to behave. Through grounded theory analysis (Charmaz, 2000), three parent “roles” emerged from the data—supportive parent, demanding coach, and crazed fan.

*Effects of Acute Exercise on Long-Term Memory* (pp. 712–721)

Jeffrey D. Labban and Jennifer L. Etnier

In this study, we tested the effect of acute exercise on long-term memory, specifically the timing of exercise relative to the memory challenge. We assessed memory via paragraph recall, in which participants listened to two paragraphs (exposure) and recounted them following a 35-min delay. Participants ( $n = 48$ ) were randomly assigned to one of three groups: exercise prior to exposure, exercise after exposure, or no-exercise. Exercise consisted of 30 min on a cycle ergometer, including 20 min at moderate intensity. Only the exercise-prior group recalled significantly more than the control group ( $p < .05$ ). Differences among the exercise groups failed to reach significance ( $p = .09$ ). Results indicated that acute exercise positively influenced recall and that exercise timing relative to memory task may have an impact on this effect.

*Coach Autonomy Support, Basic Need Satisfaction, and Intrinsic Motivation of Paralympic Athletes* (pp. 722–730)

Hailey R. Banack, Catherine M. Sabiston, and Gordon A. Bloom

The purpose of the present study, grounded in self-determination theory, was to explore the relationship between Paralympic athletes' perceptions of autonomy-supportive coach behavior, basic psychological needs, and intrinsic motivation to know, accomplish, and experience stimulation. One hundred thirteen Canadian Paralympic athletes completed an online survey, consisting of measures of coach autonomy support; of perceptions of autonomy, competence, and relatedness; and of intrinsic motivation. Perceived coach autonomy support was a predictor of athletes' perceptions of autonomy and relatedness. Perceived competence was a significant predictor of all three forms of intrinsic motivation, while perceived autonomy was a significant predictor of intrinsic motivation to accomplish and experience stimulation. The results highlight the important relationship between coach behavior and athlete motivation in disability sport.

*The Role of Sport as a Social Status Determinant for Children: Thirty Years Later* (pp. 730–739)  
Melissa A. Chase and Moe Machida

The purpose of this study was to examine the role of sport as a social status determinant among racially diverse children. Participants were 1,233 fourth- to seventh-grade children. Results indicated there were gender, grade, and racial differences for the selection of social status determinants. Boys placed more importance than girls on being good at sports and wealth. Girls placed more importance than boys on getting good grades and being attractive. Fourth- and fifth-grade students ranked getting good grades as most important, while sixth- and seventh-grade students ranked being attractive as most important. Non-Hispanic Caucasian students ranked being good at sports and being attractive as most important, while African American students ranked getting good grades and wealth as most important.

### **Sociocultural Foundations**

*Some Empirical Notes on the Epo Epidemic in Professional Cycling* (pp. 740–754)  
Hein F. M. Lodewijkx and Bram Brouwer

The 1990–2010 period in professional cycling is labeled by some as the epo epidemic. Surprisingly, performance enhancement by epo and blood doping is not that clear-cut for endurance athletes, leading to the question whether doping indeed strongly influenced cyclists' performances from the 1990s onwards. We examined the records (1947–2008) of the Tour de France, Giro d'Italia, and Vuelta a España ( $N = 181$ ) and assessed the time it took riders to win the race. The findings revealed normally distributed performances and linear and quartic relationships in victors' performances over time that correspond with Brewer's (2002) sociohistorical analysis of professional cycling, suggesting that effects of the epo epidemic on professional cyclists' achievements may be overestimated.

*"It's Cheesy When They Smile:" What Girls Prefer in Images of Female College Athletes* (pp. 755–768)  
Vikki Krane, Sally R. Ross, Montana Miller, Kristy Ganoë, Cathryn Lucas-Carr, and Katie Sullivan Barak

Building on previous research in which we provided an opportunity for female college athletes to construct their own photographic portrayals, this study explored young female athletes' perceptions of the college athlete photographs. Fifty-two girls participated in focus group interviews where they viewed and discussed the images. The young athletes particularly liked images they perceived to show authentic athletes (e.g., in athletic settings, with appropriate sport attire), images they could relate to due to personal experiences, and images that reflected competent and passionate sportswomen. Images perceived as revealing a lack of motivation, poor sporting attitudes, and nonathletic poses generally were disliked. Images depicting multiple social identities (e.g., an athlete in a dress) were controversial and generated much discussion.

*A Pictorial View of the Physical Activity Socialization of Young Adolescents Outside of School* (pp. 769–778)

Michael W. Beets, Jorge A. Banda, Heather E. Erwin, and Aaron Beighle

Childhood obesity prevention has fallen short of anticipated impact. Therefore, intervention programs need to be redirected to other potential settings to increase youth physical activity. This qualitative study, using autodriver interview techniques, was conducted to identify out-of-school settings that youth perceive as important for physical activity. Sixty-six children took photographs involving their physical activity involvement. A subsample completed follow-up focus groups. Salient themes included types of physical activities related to free play, fitness, organized sports, and chores. Most photographs included multiple children of similar age and were taken outdoors. Data suggest children associate chores with physical activity and engage in fitness-related activities. In addition, friends and family, the outdoors, and importantly, the home emerged as natural intervention components that may prove useful towards decreasing the physical inactivity and obesity of youth.

### **Research Notes**

*Identification of Accelerometer Nonwear Time and Sedentary Behavior* (pp. 779–783)

Melody Oliver, Hannah M. Badland, Grant M. Schofield, and Janine Shepherd

*Quantity and Quality of Practice: Interrelationships Between Task Organization and Student Skill Level in Physical Education* (pp. 784–787)

Peter A. Hastie, Antonio Calderón, José Palao, and Enrique Ortega

*Selected Metabolic Responses to Skateboarding* (pp. 788–793)

Ronald K. Hetzler, Ian Hunt, Christopher D. Sticklely, and Iris F. Kimura

*Psychological Needs as Mediators? The Relationship Between Leisure-Time Physical Activity and Well Being in People Diagnosed With Osteoporosis* (pp. 794–798)

Katie E. Gunnell, Diane E. Mack, Philip M. Wilson, and J. D. Adachi