Boyles Impressive In 20 Km Debut

Yellow Springs, Ohio, April 21--Rio Grande University's Matt Boyles was impressive in the junior ranks last year. His 45:18.03 put him just .02 seconds behind Ben Shorey in the National Junior 10 Km, less than 6 months after he had taken up the sport. Only Tim Seaman had gone faster than these two in a junior national.

Well, today he bettered that time by nearly a minute...over the second half of his first try at 20 Km. That's entering the senior ranks with quite a splash. In his first race at any distance over 10 km, the 19-year-old sophomore won the Jack Mortland 20 Km in 1:30:27 accelerating the second half of the race when a 45:59 first 10 apparently seemed a bit too leisurely. This despite no competition and a driving, bone-chilling rain (temperature in the mid to low to mid 40s, with winds picking during the race.) Only Chad Eder with a 1:29:56 in 1996 has gone faster on this course, which has seen the likes of Gary Morgan and Jonathan Matthews. Morgan still holds the meet record of 1:27:30, set when the Mortland races were held in Columbus at Whetstone Park.

Matt may be rather small in stature, he may represent a small school, and he may come from a small town (Toppers Plains, Ohio), but he has a big heart. He set out with the goal of bettering 1:36, which would have been an impressive enough debut. Gosh, it would have bettered the best ever by the guy the races are named after. That required a 9:36 pace on the 2-km loop. After a 9:30 on the first lap, he started to pick up the pace and was sailing along in the 9:05 to 9:10 through the first 10 km. Then he pushed it down to 8:50 and under and had a possible sub-1:30 effort in sight with two laps to go. His form held up beautifully, but with no one to push him and with the cold starting to stiffen him up, he could 'only' maintain a 9 minute-pace to the finish. Has any U.S. walker in history gone faster in his first 20 Km?

In second place, Rod Craig improved on his last year's winning time by 21 seconds with a 1:45:43, but was about a lap-and-a-half behind the fleet-footed Boyles. But besides his improved time, he had the consolation of collecting the $100 winner's prize, which Matt couldn't collect if he wants to keep competing for Rio Grande. The women's winner, Debbie Topham also took home $100 for her efforts. 10 Km winners were Bill Reed and Miriam Jackobs and 5 Km titles went to Ken Lampar and Katie Rulapaugh. In the 5, 14-year-old Tina Peters, daughter of race director Vince, competed in her seventh straight Mortland race, finishing third among the women. The results:


Women's 20 Km: 1. Debbie Topham (45+), Peasus TC 2:03:59 2. Lynette Heinlein (45+), GLOW 2:12:04 3. Janet Higbie (60+), Indiana Walkers 2:12:06 (DNF--Jill Cobb (nee Zenner), New Balance


Women's 10 Km: 1. Miriam Jackobs (50+), Cin. Walkers 72:34
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Approximate deadline for submission of material is the 20th of the month, but it is usually the 25th or later before we go to the printer, so material received by then may get in.


Eastler, Vaill Top National Invitational Races

Manassas, Va., Apr. 14—After a year away from the racewalking wars because of his Air Force 1st Lt. Kevin Eastler successfully launched his 2002 campaign with a win in the National Invitational 20 Km today. His 1:33:51 qualifies him for the National in June, a key step in his comeback. On the women's side, Teresa Vaill remains as the only winner of the Invitational Women's 20 km with her fourth straight title. Prior to 1999, the women contested a 10 Km.

The 24-year-old Eastler, who was ranked fourth in the nation in 2000 and fifth in 1999, before his hiatus walked a well-planned, conservative race to overcome Canadians Arutro Huerta and Patrick Boisclair, setting a fast pace in the oppressive heat. Eastler fayed before his hiatus walked a well-planned, conservative race to overcome Canadians Arutro Huerta and Patrick Boisclair. Letting the Canadians set a fast pace in the oppressive heat, Eastler fayed in the 1:33:51 qualifies him for the Nationals in June, a

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Other Results


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From Heel To Toe

Errata. Results of the Freehold, N.J. 10 Mile race in last month's issue should have shown Shawn Frederick finishing second in 1:31:22. We apologize for the error. Also, our schedule of races showed a CC contact for the National 15 Km in Evansville, but we also used CC as the contact for a Prescott, Arizona race and showed the address for that race in the list of contacts. However, the first CC was cleverly hidden at the end of the AA contact line. The proper contact is shown in this month's schedule. Rohling right on. Michelle and Michael Rohl welcomed Gabriel Orion Rohl to their household on March 28. He joins siblings Sebastian, Molly, and Ayla. Michelle Rohl is probably back on the road training by this time. More next time. This is an abbreviated From Heel To Toe in order to leave space to conclude the Gary Westerfield article we started last month. We will catch up next month.

Biomechanics For the Racewalk Judge

by Gary Westerfield

(This is the second and final installment of an article by Gary, an IAAF judge, former competitor and coach. See the March 2002 ORW for the first installment.)

The Biomechanics of A Straightened Leg

1. Muscle Contractions. An explanation of how the racewalker straightens the leg in front of the body, and maintains it in a straightened position until the body passes the vertical position, requires a basic understanding of the way muscles work. Muscles are either contracted (at work) or relaxed (not at work). They receive nerve impulses to turn them on. When that impulse is not present, they are off. Contracting (working) muscles are turned on in three ways: statically,
concentrically, or eccentrically. During static contraction, muscle fiber length is unchanged. Enough force has not been applied to cause movement. Accordingly, this type of contraction need not be discussed further, because it is not used to describe motion. Racewalk judges must know: a.) the difference between concentric and eccentric contractions; b.) how these contractions affect movement; and, c.) what these contractions look like in the leg, particularly at the front of the thigh.

2. Concentric Contraction. When muscle fibers undergo concentric contractions, the muscle shortens and becomes thicker. The muscle bulges. Concentric contractions are employed to move a limb and a weight away from the pull of gravity.

3. Eccentric Contraction. During eccentric muscle contractions, muscle fibers become elongated and thinner over the length of the muscle. Converse to concentric contractions, eccentric contractions are employed to resist the pull towards gravity.

To illustrate the difference, grab a heavy object and bend your elbow to lift it. As your forearm moves towards your shoulder, your biceps bulge as it contracts to move your forearm and the object away from the pull of gravity. Release the contraction and slowly allow your forearm and the object to return to the starting position. To prevent your arm and the object from falling too quickly, your biceps changes the work it does to contract eccentrically. The biceps lengthens to resist the pull of gravity.

4. Straightening the Leg. To understand how muscle functions when straightening or bending the leg, imagine lifting an object off the ground. If you lift the object with your arm bent, you are performing a concentric contraction. If you slowly raise the object with your arm extended, you are performing an eccentric contraction.

5. When the Knee Unlocks What Happens? When the knee is unlocked, the knee flexes or, bends. And simultaneously, to avoid falling, eccentric contractions in the leg muscles resist further flexion in the joint. Falling of the body with the pull of gravity is resisted. The knee is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off. The leg is straightened, or it is being straightened. If there is an obvious outline of the anterior thigh exhibits little or no tension, the quadriceps is off.
The Visible Loss of Contact Rule

Although it may be more difficult for racewalk judges to visualize double contact, a minimal period of this is implied by the rules and is therefore required of the race walker. This rule, by definition, clearly distinguishes the act of walking from the act of running.

1. Double Contact or Not? This so-called "heel and toe" rule has generated much controversy in the athletic community. At higher speeds, such as in elite racewalking, double contact is hard to see and even disappears. The rules were re-written in 1995 to require that judges see "visible loss of contact" before issuing a warning. Double contact is no longer required if loss of contact can not be seen. The old rules of walking (before 1995) required double support where "unbroken contact with the ground is maintained," and, "that the advancing foot...make contact with the ground before the rear foot leaves." Biomechanical studies showed periods of flight phasing for almost all walkers at this level. The old rules were more stringent with regard to continuous contact, and nobly made racewalking more like normal walking. In the 1990's, the proponents of liberalized rules advocated elimination of the contact provision altogether. The rule changes of 1995 altered the wording to "no visible (to the human eye) loss of contact," prohibiting video or still photo analysis by the judges, putting the onus completely in the eyes of the judges. To the event's detriment, walkers may very well be off and can get away with it when not visible to the judges. Today's rules are bewildering to the non-racewalking public. And, rightly so, because they have further separated racewalking from normal walking and running and have transformed it into a unique discipline unto itself.

2. Attempts to Slow Walkers Down. It was hoped that the straightened-leg on contact revision would make loss of contact easier to see. Without the heel contact provision, it has not. Another solution to reduce speed was to increase the distance of serious competition for women, doubling the international distance to 20 kilometers. It was hoped that the judges would have more opportunity to see loss-of-contact violations. The women have not slowed much. Videotapes still show many instances of loss of contact by athletes (both male and female) who escape the scrutiny of the judges.

3. Electronic Devices? Many in the highest circles of sport are calling for radical change in officiating to bring race walkers back to constant contact. Some call for an electronic device to show many instances of loss of contact by athletes (both male and female) who escape the scrutiny of the judges. Video tapes still show many instances of loss of contact by athletes (both male and female) who escape the scrutiny of the judges.

The Biomechanics of Double Contact

1. The Gait Cycle. To understand contact in racewalking, it is necessary to first discuss the human gait cycle. The gait cycle, the interval of time from heel strike from one foot to heel strike by the same foot at the next step, is divided into two phases: the stance phase, or contact period, and the swing phase, the period when the foot is not in contact. The stance phase begins with heel strike and ends with toe off of the same foot. During stance, the foot supports body weight. Swing occurs between toe off and heel strike, and is non-weight bearing.

2. Stance. There are three periods to stance: contact, mid-stance, and propulsion. Contact is from heel strike until flatfoot, when the whole foot is on the ground. Mid-stance occurs from flat foot until heel lift, when the calf flexes the knee and the heel is raised. Propulsion is initiated with heel lift and terminates with toe off. In normal walking, unlike running, there is a period of double support, when both feet are on the ground.

3. Oscillation of Center of Mass. In normal walking, the center of mass oscillates. The center of mass is lowered at double support, and at mid-stance, it is raised again. To conserve energy, normal walkers usually bend their leg at mid-stance to decrease the up and down movement, avoiding excess muscle work from raising and lowering body weight with each stride.

4. Heel and Toe. In racewalking, pronounced arm swing and emphasis on strong toe off and heel lift replaces much of the oscillation and levels the center of mass as it moves forward. Compared to the normal walking gait, the heel is lifted higher and toe off appears more exaggerated. At the moment of contact, the back of the heel is directed at the ground. To raise the center of mass at double support, the swinging arms are bent and swung upward. To lower center of mass, but to keep from bending the knee at mid-stance, the center of mass is lowered slightly by dropping the arms as they pass the hip, and the hip on the swing side is dropped slightly producing pelvic list. Some very legal racewalkers avoid pelvic list altogether, by dropping their arms more at mid-stance.

5. Walkers Do It With Their Hips. In order to lengthen the stride without reaching with the leg too far in front of the center of mass (and encountering braking ground reaction forces), racewalkers must rotate the hip forward and fully extend the opposite leg behind them. Forward hip rotation repositions the body's center of mass without forward lean of the torso and lengthens the stride by as much as one tenth of a meter. To reduce side-to-side pelvic motion, or sway, foot placement is on line with arms not crossing the vertical.

6. Calves and Buttocks. In the propulsive phase of stance, eccentric contractions of the posterior leg muscles, the hamstrings and gastrocnemius (in the calf), function primarily to provide stability, preventing the leg from moving forward and down into the pull of gravity, and work to hyperextend the leg to the posterior. Simultaneous concentric contraction of the gluteus muscles in the buttock, thrusts the torso and pelvis forward, enhancing external hip rotation and movement of the swing leg. Together, the result of these contractions is a push back in line with the torso and the forward moving swing leg, and a greater percentage of the support phase behind the center of mass.

7. Heel Lift and Toe Off. At the end of mid-stance, the gastrocnemius muscle contracts concentrically to begin heel lift. The straightened knee bends with hamstring muscle contraction, and hip flexion begins with psoas muscle contraction.

8. Appearance of Contact. So then, how do elite race walkers appear to be in contact? Because there is no visible flight phase, as in running, a legal racewalker demonstrates increased use of the upper body. To counter-balance lower body activity, arm motion is more pronounced. Emphasis is on the backward swing, counterbalancing forward moving legs. The torso is kept upright, and there is increased hip flexion and forward pelvic rotation. To avoid braking while overriding in front of the center of mass, the legal racewalker demonstrates a greater percentage of the stance phase behind the center of mass than that which is to the front. Pelvic rotation (which because of momentum, is always forward, not forward and backward as many coaches teach), moves footprint anterior by as much as 10 centimeters without the effects of overriding. A further increase in stride length is achieved through a "lengthening" of the leg, by landing on the heel at contact. The normal walker increases speed by lengthening the stride by reaching forward with the
Forward Motion Without Loss of Contact

To determine if the race walker has lost contact, we must consider why the body moves forward.

1. **Three Sources of Forward Motion.** There are three primary sources of forward motion related to bi-pedal locomotion. The body can be propelled or pushed forward. The body can fall forward, as if pulled by gravity. And the legs can be lifted and swung forward, generating momentum and repositioning the body one step ahead. In racewalking all three are used. The questions that relate to this understanding involve the degree to which these sources are used in legal racewalking. One should remember that legal racewalking should yield a technique that conserves energy through efficient motion, that is constant and smooth, and of course that is fast.

2. **Propulsion.** The muscles of the lower leg, or calf and foot propel the body forward. This is fundamental to all forms of upright human locomotion. The action of propulsion is highly developed in racewalking technique. Without it, the initial step would not occur, and the following steps would not be very long. Without the ability to push against the ground, the racewalker can only rely on the arms to raise the body at double support. Propulsion and arm swing make racewalkers more point-to-point, or heel-to-toe. There is a sense in which "point-to-point" racewalkers seem to float over the ground. Floating implies contact (boats float on the water). However, to what degree can the race walker use push before there is obvious visible loss of contact? What should the racewalk judge look for when there is too much propulsion?

Visible Contact Faults:

1. **Full extension of the ankle at toe off from an over emphasis of pushing.**
2. **Forefoot (on the ball of the foot) contact, at or near the vertical position because of a lack of hip rotation.**
3. **Extreme bounces.**
4. **High swing leg and flat footed contact.**

Efficient Racewalking

Which of the three sources of forward movement is most efficient and smooth; the push, the fall, or lift and swing? Technically, the racewalker must use all of these movements. Common sense would dictate that the use of the hip and knee flexors to lift and swing the weight of the leg (which is about one fifth of the body’s weight) forward requires less effort than pushing the whole body weight forward each step. As the body moves forward, the rear foot is pulled off the ground without the use of the calf and foot muscles to push against the total body weight. If contact is at the back of the heel and toe off is high, and if the arms raise the center of mass, shifts in the center of mass are reduced. Emphasis on proper motion of the swing leg reduces calf and ankle joint motion. In technique, the race walker must make a compromise between stride length and turnover. Turnover utilizes the hip flexors, accelerates the body, and thereby increases momentum. It alone does not contribute to loss of contact. However, overstriding and increased propulsion from pushing too much, and forward lean does.

Warning Signs of Illegality

To make calls as a racewalk judge, a list of “faults” must be delineated.

1. **Visible Contact Faults:**
   a. Full extension of the ankle at toe off from an over emphasis of pushing.
   b. Forefoot (on the ball of the foot) contact, at or near the vertical position because of a lack of hip rotation.
   c. Extreme bounces.
   d. High swing leg and flat footed contact.

2. **Failure to Straighten the Leg at Contact:**
   a. Eccentric contraction of the quadriceps at, or after contact because the leg was not locked by the knee.
   b. A decreasing angle of the leg, and forward movement of the knee after contact.
Conclusions

This paper has had three goals: To clarify what is mandated by the IAAF definition of racewalking, to present a biomechanical model based on that definition for accurate judging, and to educate coaches on how a mandated legal technique is also the most efficient way to race walk.

A judge that understands the definition of racewalking will use the same terminology when enforcing or discussing the rules. No judge should say, "The leg was not straight." Rather they will say, "The leg was not straightened."

Secondly, by presenting the biomechanics of legal racewalking in motion, the racewalk judge now has a model to compare legal race walkers with racewalkers that are at variance with the definition. Using this model of a legal racewalking, the judge can make observations and judgments about competitors who deviate from the technique mandated by the IAAF definition. The racewalk judge needs no longer to rely on simple intuition: "I think the leg has straightened." He or she can now understand what is required for the leg to be straightened before or at the moment of contact and how it is kept straightened through the moment when the body is vertical. The judge will no longer say, "I think the walker is off," because he or she will now know the causes for loss of contact and how the judge can see it.

Finally, the race walk athlete, in addition to avoiding disqualification, can now work with his or her coach on efficient forward motion based on the proper straightening of the leg and double-contact mandated by the IAAF definition of racewalking.

Looking Back

40 Years Ago (From the April 1962 American Race Walker, edited by Chris McCarthy)—John Allen won the National 40 Km in Buffalo in 3:30:22, beating Ron Laird by more than 12 minutes. Laird just 3 seconds ahead of Bob Mimm, with Ron Daniel, Carl Kurr, and Jack Blackburn taking the next three spots, just 2 to 2 1/2 minutes behind Mimm. The Penn AC 12 mile in Philadelphia went to Ron Zinn in a course record 1:33:31 with Jack Mortland 1:23 back in second. Ron Laird (1:36:02 and Bob Mimm (1:37:00) followed. In discussing the World Lists for 1961, McCarthy noted he would like to talk to Rein Leius of the USSR and ask him how it feels to turn in a 4:44:05 50 km and finish in 55th place in a national. There was some depth over there 40 years ago, too.

35 Years Ago (From the April 1967 ORW)—On the West Coast, Don DeNoon took the measure of Ron Laird by 22 minutes, winning a 30 Km race in 2:30:00. Then Laird turned the tables at 20 Km, winning by just 1 second in 1:33:23. The Ohio 20 Km title went to Jack Mortland in 1:41:13.

30 Years Ago (From the April 1972 ORW)–The National 25 Km title went to Larry Young in 1:57:28 following a race-long duel with Goetz Klopfer. Goetz hung tough until the final mile and finished a half-minute back, only to find that he had been DQd. So second with Bill Ranney in 2:03:13 with Todd Scully third. The race was held in Seattle. The annual 50-mile in New Jersey went to Shaul Ladany in 7:23:10, with Bill Walker a half-hour behind. Shaul went through the 50 Km mark in 4:30:36. Young added the National 20 Km title to his laurels, winning on Long Island in 1:32:43. Ron Daniel was second in 1:34:10, followed by Floyd Godwin, John Knifton, Jerry Brown, and Todd Scully. Your editor decided Long Island didn't like him as he received the second DQ of his career, the first having come 12 years earlier in the National 10 Km—on Long Island. In East Germany, Karl-Heinz Stadtmüller bettered the world record for 30 Km with a 2:14:16 on the track.

25 Years Ago (From the April 1977 ORW)—Wayne Glusker and Dave Himmelberger shared the National 35 Km title, finishing in 3:03:50 in Palo Alto. Bryan Snazelle was just 40 seconds back. Shaul Ladany continued his domination of the ultras, winning the National 75 Km title in a record 7:04:48 (4:35:44 at 50 Km). Martin Kraft was second in 7:27:15, Alan Price third, and Gerry Boci fourth. In Turku, Finland, Reima Salonen did an indoor 3 Km in 11:05:1, passing 1 mile in 5:53:2.

15 Years Ago (From the April 1987 ORW)—Tim Lewis and Debbi Lawrence emerged victorious in the DC Invitational walks. Lewis had 1:27:16 for 20 Km, 38 seconds ahead of Carl Schueler. Ray Sharp had 1:29:24 and Mike Stauch and Steve Pecinovsky 1:29:59. Dave McGovern was 3 seconds over the 1:30 mark. Lawrence was convincing as her 47:33 put her 63 seconds ahead of Lynn Weik, with Maryanne Torrellas third in 48:56. The Vail sisters, Teresa and Lisa, also broke 50 minutes.

10 Years Ago (From the April 1992 ORW)—Carl Schueler and Marco Evoniuk both qualified for their fourth Olympic team at the 50 Km trial in New Orleans. Joining them was Henn Nelson, who gutted it out in second place for a 4:04:38, just under the qualifying standard of 4:05. Evoniuk, in third (4:09:44) already had met the standard. Schueler won the race in 4:02:10, after going through 25 Km in 1:56:57, which proved a bit quick on the day, but he was never in danger of losing the race. Following the first three were Andrez Chylinski (4:11:53), Jonathan Matthews (4:12:28), and Dan O'Connor 4:13:53. At the National Invitational in Washington, DC, Canada's Janice McCaffrey edged Teresa Vail in the 10 Km, 45:07 to 45:16. Lynn Weik (45:38) and Maryanne Torrellas (48:06) followed. Tim Lewis won another title at 20 Km in 1:28:47, 25 seconds ahead of Ian Whatley. Dave McGovern led a closely bunched pack for third in 1:29:31, as five more (Ray Funkhouser, Mark Manning, Steve Pecinovsky, Carl Schueler, and Marc Varsano came in under 1:30. Alan James passed on the D.C. race, but a week earlier blasted a 1:25:01 in Long Beach. Dave Marchese followed in 1:28:56. A competitive 20 Km in Monterey, Mexico saw Czech Igor Kollar winning in 1:22:57, with six others at 1:24 or better. Another Czech, Roman Mrazek was second, followed by Russia's Mikhail Schennikov, Ernesto Canto, Italy's Walter Arena, Joel Sanchez, and Daniel Garcia. In a show of strength, Spain had five walkers under 3:50 in their National 50, won by Jaime Barroso in 3:48:08.

5 Years Ago (From the April 1997 ORW)—Russia dominated the World Cup races held in the Czech Republic, taking both men's and women's team titles. They finished one-two in the women's 10 Km race with Irina Stankina finishing in 1:51:52 and Olga Panova in 1:51:49. China's Yan Gu was third in 42:15, with Erica Alfridi of Italy fourth. Italy, China, and Belarus followed the Russians in the team standings. The U.S. finished 14th of the 31 teams, led by Victoria Herazo's 46:31 in 50th place. The men's 20 went to Olympic Champion Jefferson Perez, Ecuador, in 1:18:24, just 3 seconds ahead of Mexico's Daniel Garcia, who led Russia's Ilya Markov by just 3 seconds. Curt Clasen led the U.S. contingent with a 1:24:41 in 60th. At 50, Spain's Jesus Garcia won in 3:39:54, 18 seconds ahead of Oleg Ishutkin, Russia. Finland's Valentin Kononen and Russia's Nikolai Matsuykin were third and fourth. Andrez Chylinski was the top U.S. finisher with a 4:07:15 in 44th place. In the team standings, Russia finished well ahead of Mexico and Belarus. The U.S. was 16th among the 44 teams competing.