The Effect on a Racewalker's Sports Performance with Chiropractic Treatment: A Case Report

BRETT S. JAROSZ and W. BRUCE ELLIS

ABSTRACT: *Objective:* To describe the enhanced sporting performance of an elite masters' racewalker following chiropractic care. *Clinical Features:* A 50-year-old male elite racewalker preparing for the World Masters Athletic Championships presented for chiropractic care. *Intervention and Outcome:* Treatment involved chiropractic spinal manipulative therapy (SMT) and tibiofemoral adjustments. Four days post treatment the patient recorded a two-and-half-minute improvement on his previous personal best (PB) 15km racewalking time. His previous 15km PB was the current state record (set one year earlier) and his 10km PB was the national record (set six years earlier). He was seen twice in the month prior the World Masters event (one visit per fortnight) where the above treatment was administered. The patient returned from the championships with two medals and two further PB performances over the 5km and 10km distances. *Conclusion:* There has been minimal research published regarding the enhanced sporting performance of athletes receiving chiropractic care. From this case report and the evidence presented, it appears that chiropractic intervention can play a role in optimizing athletic performance. This should be further investigated in randomized controlled and clinical trials.

INDEX TERMS: (MeSH): CHIROPRACTIC; MANIPULATION, CHIROPRACTIC; SPORTS; (Other): ATHLETIC PERFORMANCE.

Chiropr J Aust 2010; 40: 117-19.

INTRODUCTION

Sport within Australia continues to grow in popularity and professionalism.[1] This growth, at both the amateur and professional levels, has produced a corresponding interest among athletes in chiropractic treatment.[2,3] As a result, numerous chiropractic practitioners and academics have begun evaluating, studying and publishing research in the field of sports chiropractic.[3-9]

Although there is a growing body of evidence[10-21] reporting the positive effects of chiropractic management on sports-specific diagnoses and sports-related injuries, there has been minimal information published regarding chiropractic's effect on overall athletic performance.

Lauro and Mouch[22] found that athletes who trained and received a 12-week program of chiropractic care had a significant increase in their reaction time when compared with athletes who trained but did not receive chiropractic care. Schwartzbauer *et al*[23] showed significant improvement in muscle strength, long jump distance and microcirculation (capillary counts) in baseball players after a specific duration of upper cervical chiropractic care. Shrier *et al*[24] found that elite athletes involved in sprint sports tended to perform better in both vertical jump height and flying 40 meter sprint time after high-velocity, low-amplitude manipulation (HVLA). Sandell *et al*[25] demonstrated that chiropractic treatment can improve hip extension ability, but the possible effect of chiropractic treatment to enhance running velocity, by increasing hip extensibility and thereby increasing the running step, remained unproven. Costa *et al*[26] concluded that chiropractic spinal manipulative therapy (SMT) in association with muscle stretching seems to be associated with an improvement of golf players' full-swing performance when compared with muscle stretching alone.

The purpose of this case report is to contribute to the body of empirical evidence by describing the enhanced sporting performance of an elite masters' racewalker following chiropractic care.

CASE REPORT

The patient was a 50-year-old male elite racewalker preparing for the World Masters Athletic Championships. For many years, he utilized various health care professionals (chiropractors, physiotherapists, sports medicine practitioners, remedial therapists) in an attempt to optimize his athletic performance and prevent and/or recover from injury. Previous treatment consisted of: (1) chiropractic HVLA SMT to the cervical, thoracic and lumbopelvic regions, (2) mobilization of the lower extremity articulations and (3) soft tissue therapies to the gastrocnemius/soleus complex, psoas, gluteal, erector spinae, quadriceps femoris and hamstring musculature. He reported that this method of management provided him with the "freedom" (mobility and function) he required to continue training and performing at his elite level.

In the month prior to the World Masters Athletic Championships, the patient presented to the clinic complaining of generalized lower extremity pain and low back stiffness.

Brett S. Jarosz, BAppSc(CompMed), MClinChiro, CertPT
Private Practice of Chiropractic
Gisborne, Victoria

W. Bruce Ellis, BAppSc(Chiro), BBSc, MChiroSc, DipAppSc(HumBiol), CertChiroClinPaeds, FACC
Private Practice of Chiropractic
Gisborne, Victoria

Conflict in Interest Notice: There were no funding sources for this study and no conflict of interest has been identified.

Received: 17 May 2010, accepted 28 June 2010

He reported that his routine yearly training program had concluded, and he was now "trying to maintain his fitness in preparation for the competition."

On physical examination, the right pelvis was higher compared to the left in standing posture. There was weakness of the bilateral psoas and quadriceps muscles on resisted muscle testing, graded 4/5. Prominent motion restriction of both tibiofemoral articulations, the thoracolumbar spine and right sacro-iliac joint (SIJ) were noted during dynamic (motion) palpation. Other physical examination findings and testing procedures including neurological and orthopaedic examinations were unremarkable.

Treatment involved HVLA SMT to the right SIJ and thoracolumbar spine, and the application of a wrist extension technique[27] to a posterior tibia subluxation bilaterally. Post treatment, muscle strength of the psoas and quadriceps was graded 5/5 bilaterally.

The patient completed a 15km racewalking time trial four days after the treatment. He recorded a two-and-half-minute improvement on his previous personal best (PB) time. He detailed the significance of this improvement - his previous 15km PB was the current state record (set one year earlier) and his 10km PB was the national record (set six years earlier). He was seen twice in the month prior to the World Masters event (one visit per fortnight) where the above treatment was administered. The patient returned from the championships with two medals and two further PB performances over the 5km and 10km distances.

DISCUSSION

There has been minimal documentation regarding the effect of chiropractic treatment on enhanced sporting performance, despite the significant increase in the demand and support for chiropractic care by athletes.[3,8,28,29] A recent review of the literature revealed five studies that investigated the effect of chiropractic treatment on various components of athletic performance.[22-26] The literature suggests that athletic performance can be enhanced by chiropractic intervention. However, only two of these studies demonstrated significant improvements.[22,23]

This case report demonstrated the enhanced sporting performance of an elite masters' racewalker following chiropractic treatment. Research has demonstrated that the endurance performance of masters' athletes decreases with age.[30-34] According to the literature, peak physiological function for men occurs just before age 30 and then regresses between 0.75 per cent and 1 percent per year.[35] Aerobic power (VO2max) has been shown to decrease by 22 per cent between the ages of 40 and 70.[36] This is supported by Rittweger *et al*[30] who demonstrated metabolic power decreases by 26 per cent in masters' endurance athletes between the ages of 40 and 90. However, this case revealed a significant improvement in PB endurance performances, where the prior PB times were achieved up to six years earlier.

For many years the patient had been managed with the same treatment modalities applied to the same body regions (chiropractic HVLA SMT, generalized lumbopelvic-hip and lower extremity soft tissue therapies, lower extremity mobilisations). It is the opinion of the authors that the positive response seen in this case was related to addressing the biomechanics of the tibiofemoral articulations. Importantly, it should be noted that the physical examination findings of prominent tibiofemoral motion restriction and the treatment thereof, were reported by the patient to be the first time this alteration in biomechanics had been observed and/or treated.

Biomechanical analysis of racewalking gait demonstrates significantly increased maximal knee extension and external peak knee hyperextension moment than did running or walking.[37] During racewalking, participants spend 44 to 51 percent of stance with the knee in hyperextension.[37] Knee extension requires anterior movement of the tibia on the femur in the sagittal plane and external rotation of the tibia relative to the femur in the transverse plane.[38] It could be suggested that the correction of the posterior-to-anterior tibial motion restriction in relation to the femur enhanced this patient's racewalking biomechanics.

Furthermore, Hamill *et al*[39] illustrated that decreased sagittal range of motion (*i.e.* loss of flexion) of the knee joint does not attenuate shock as well, passing an unreduced force to L5/S1, possibly contributing to or resulting in low back pain. It can be theorized that the increased maximal knee extension nature of the racewalking gait biomechanics may have resulted in this patient's low back stiffness. Therefore, by addressing the patient's tibiofemoral biomechanics it can also be hypothesised we increased the sagittal range of motion of the knee, improving the shock attenuating abilities of the lower kinetic chain.

Additional mechanisms could be proposed to explain the positive effect of chiropractic treatment seen in this case. These mechanisms include, but are not limited to, the effects that chiropractic adjustments have on proprioception, somatosensory processing and feed-forward muscle activation.[40-42]

Stump and Redwood[3] state, "because professional sports are highly competitive and thus intensely pragmatic, they provide an arena in which new techniques can potentially move quickly toward widespread acceptance once their efficacy is established." This case report contributes to the literature that suggests athletic performance can be enhanced by chiropractic intervention.[22-26] It must be noted however, that the treatment protocol used in this case cannot be generalised to all athletic populations. Athletes necessitate a specific treatment protocol designed and implemented with their particular biomechanical, athletic and sporting performance requirements in mind. In this case the athlete had prominent motion restrictions of both the tibiofemoral articulations. Therefore, the emphasis of the treatment was to increase the motion of the tibia in relation to the femur.

CONCLUSION

There has been minimal research published regarding the enhanced sporting performance of athletes receiving chiropractic care. From this case report and the evidence presented, it appears that chiropractic intervention can play a role in optimizing athletic performance. This should be further investigated in randomised controlled and clinical trials. Future directions for chiropractic research should investigate both specific aspects of athletic performance and specific sports.

REFERENCES

1. Orchard JW, Brukner PD: Sport and exercise medicine in Australia. Med J Aust. 2005;183(7):383.
2. Greenberg M. Chiropractic is world-class care. Today's Chiropr. 1996;25:46-8.
3. Stump JL, Redwood D. The use and role of sports chiropractors in the National Football League: A short report. J Manipulative Physiol Ther. 2002;25(3):1-4.
4. Ames R. Weightlifting injuries and their chiropractic management: a clinical review. Part 1: a clinical framework for management. J Sports Chiropract Rehabil. 1998;12(2):65-70.
5. Ames R. Weightlifting injuries and their chiropractic management: a clinical review. Part 2: injury and management overview. J Sports Chiropract Rehabil. 1998;12(2):71-81.
6. Kohler MK. Adventure racing: Roles and protocols for the sports chiropractor. J Chiropr Med. 2003;2(1):1-7.
7. Pollard H, Hoskins W, McHardy A, Bonello R, Garbutt P, Swain M, Dragasevic G, Pribicevic M, Vitiello A. Australian chiropractic sports medicine: half way there or living on a prayer? Chiropr Osteopat. 2007;15:14.
8. Kazemi M, Shearer H. Chiropractic utilization in Taekwondo athletes. J Can Chiropr Assoc. 2008; 52(2):96-102.
9. Hoskins W, Pollard H, Garbutt P. How to select a chiropractor for the management of athletic conditions. Chiropr Osteopat. 2009;17:3.
10. Hoskins WT, Pollard HP. The effect of a sports chiropractic manual therapy intervention on the prevention of back pain, hamstring and lower limb injuries in semi-elite Australian Rules footballers: a randomized controlled trial. BMC Musculoskelet Disord. 2010;11(1):64. [Epub ahead of print]
11. Jarosz BS. Chiropractic treatment of chronic patellar tendinopathy in a professional basketball player: A case report. Chiropr J Aust. 2010;40(1):3-8.
12. Brantingham JW, Globe G, Tong V, Bates CC, Jukes G, Van-Houten C, Doorly K. Diversified chiropractic adjusting and management in the treatment of five clinically diagnosed meniscus injury patients with MRI Imaging in Four Cases. J Am Chiropr Assoc. 2008;45(5):11-24.
13. Brantingham JW, Chang MN, Gendreau DF, Price JL. The effect of chiropractic adjusting, exercises and modalities on a 32-year-old professional male golfer with hallux rigidus. Clin Chiropr. 2007;10(2):91-6.
14. Aspegren D, Hyde T, Miller M. Conservative treatment of a female collegiate volleyball player with costochondritis. J Manipulative Physiol Ther. 2007;30(4):321-5.
15. Devitt BM. Use of conservative and sport-specific management strategies for a baseball pitcher with persistent elbow pain. J Chiropr Med. 2006;5(3):97-100.
16. Konczak CR, Ames R. Relief of internal snapping hip syndrome in a marathon runner after chiropractic treatment. J Manipulative Physiol Ther. 2005;28(1):e1-e7.
17. Hoskins WT, Pollard HP. Successful management of hamstring injuries in Australian Rules footballers: two case reports. Chiropr Osteopat. 2005;13:4.
18. Gillman SF. The impact of chiropractic manipulative therapy on chronic recurrent lateral ankle sprain syndrome in two young athletes. J Chiropr Med. 2004;3(4):153-9.
19. Moreau CE. Moreau SR. Chiropractic management of a professional hockey player with recurrent shoulder instability. J Manipulative Physiol Ther. 2001;24(6):425-30.
20. Hoven JJ Jr. Snyder RB, Andrew TL. Management of peroneal nerve entrapment in an elite skier: a case report. J Sports Chiropract Rehabil. 2000;14(3):70-4.
21. Glasco W, Glasco G. Conservative evaluation and intervention of a sport-related injury: turf toe. J Sports Chiropract Rehabil.1998;12(2):82-5.
22. Lauro A, Mouch B. Chiropractic effects on athletic ability. J Chiropr Res Clin Inv. 1991;6(4):84-7.
23. Schwartzbauer J, Kolber J, Schwartzbauer M, Hart J, Zhang J. Athletic performance and physiological measures in baseball players following upper cervical chiropractic care: a pilot study. J Vertebral Subluxation Res. 1997;1(4):33-9.
24. Shrier I, Macdonald D, Uchacz G. A pilot study on the effects of pre-event manipulation on jump height and running velocity. Br J Sports Med. 2006;40:947-9.
25. Sandell J, Palmgren PJ, Björndahl L. Effect of chiropractic treatment on hip extension ability and running velocity among young male running athletes. J Chiropr Med. 2008;7(2):39-47.
26. Costa SM, Chibana YE, Giavarotti L, Compagnoni DS, Shiono AH, Satie J, Bracher ES. Effect of spinal manipulative therapy with stretching compared with stretching alone on full-swing performance of golf players: a randomized pilot trial. J Chiropr Med. 2009;8(4):165-70.
27. Charrette MN. Chiropractic extremity adjusting: Charrette adjusting protocols. Roanoke, VA: Foot Levelers, Inc. 2002. p. 51-3.
28. Nichols AW, Harrigan R. Complementary and alternative medicine usage by intercollegiate athletes. Clin J Sport Med. 2006;16(3):232-7.
29. Nook BC, Nook DD. Demographics of athletes and support personnel who used chiropractic physicians at the 6th all African Games. J Sports Chiropract Rehabil. 1997;11(4):136-9.
30. Rittweger J, di Prampero PE, Maffulli N, Narici MV. Sprint and endurance power and ageing: an analysis of master athletic world records. Proc Biol Sci. 2009. Feb 22;276(1657):683-9.
31. Galloway MT, Kadoko R, Jokl P. Effect of aging on male and female master athletes' performance in strength versus endurance activities. Am J Orthop (Belle Mead NJ). 2002 Feb;31(2):93-8.
32. Baker AB, Tang YQ, Turner MJ. Percentage decline in masters superathlete track and field performance with aging. Exp Aging Res. 2003;29:47-65.
33. Donato AJ, Tench K, Glueck DH, Seals DR, Eskurza I, Tanaka H. Declines in physiological functional capacity with age: a longitudinal study in peak swimming performance. J Appl Physiol. 2003;94:764-9.
34. Tanaka H, Seals DR. Age and gender interactions in physiological functional capacity: insight from swimming performance. J Appl Physiol. 1997;83:846-51.
35. Bradbury JC. Peak athletic performance and ageing: evidence from baseball. J Sports Sci. 2009 Apr;27(6):599-610.
36. Wiswell RA, Hawkins SA, Jaque SV, Hyslop D, Constantino N, Tarpenning K, Marcell T, Schroeder ET. Relationship between physiological loss, performance decrement, and age in master athletes. J Gerontol A Biol Sci Med Sci. 2001 Oct;56(10):M618-26.
37. Cairns MA, Burdett RG, Pisciotta JC, Simon SR. A biomechanical analysis of racewalking gait. Med Sci Sports Exerc. 1986 Aug;18(4):446-53.
38. Beynnon BD, Johnson RJ, Coughlin KM. Relevant biomechanics of the knee. 28. Knee. In: DeLee JC, Drez D, Miller MD. Orthopaedic sports medicine. 2rd edn. Philadelphia: Saunders-Elselvier, 2003: 1577-95.
39. Hamill J, Moses M, Seay J. Lower extremity joint stiffness in runners with low back pain. Res Sports Med. 2009;17(4):260-73.
40. Haavik-Taylor H, Murphy B. Transient modulation of intracortical inhibition following spinal manipulation. Chiropr J Aust. 2007;37(3):106-16.
41. Haavik-Taylor H, Murphy B. Cervical spine manipulation alters sensorimotor integration: A somatosensory evoked potential study. Clin Neurophysiol. 2007;118:391-402.
42. Marshall P, Murphy B. The effect of sacroiliac joint manipulation on feed-forward activation time of the deep abdominal musculature. J Manipulative Physiol Ther. 2006;29(3):196-202