ADVENTURE RACING: ROLES AND PROTOCOLS FOR THE SPORTS CHIROPRACTOR

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ABSTRACT

Objective: To describe and discuss the health care needs within the sport of adventure racing, specifically relating to the parameters for sports chiropractors serving at such events, and to help further develop these in a scholarly format to assist in overcoming the paucity of such information.

Methods: A review of the diminutive literature base available pertaining to adventure racing was used in conjunction with a retrospective analysis of injury statistics from a multi-day adventure race.

Discussion: Adventure racing is an ultra-endurance, multi-discipline, team sport. Races typically cover great distances, often under brutal conditions and circumstances. Training for and competing in such events frequently causes deleterious health consequences and sports chiropractors are uniquely qualified to provide treatment for most of these problems. Specific preparatory and participatory parameters are discussed to assist the sports chiropractor in his or her health care service role within the sport of adventure racing.

Conclusion: Adventure racing is a new and expanding sport, and so is chiropractic's role of involvement. Few published papers exist in peer-reviewed journals relative to what health care providers can expect at adventure races, and how they can most effectively participate. This paper adds published material to the scientific literature regarding the health care needs and the treatment parameters within the sport of adventure racing. (J Chiopr Med 2003;2:1-7)

Key Words: Athletic Injuries; Chiropractic; Physical Endurance; Sleep Deprivation; Survival; Adventure Racing

INTRODUCTION

Adventure racing is a multidiscipline, ultra-endurance, team sport. Races vary tremendously both in their

length and in the various physical disciplines, which are called activities or events. No two adventure races are the same and all members of each team must complete each and every leg/discipline of the racecourse together. Races run continuously from start to finish, through forbidding wilderness, and often under brutal conditions.

Adventure racing is growing at a phenomenal rate, garnering it the title "The New Sport of the New Millennium." However, the nearly exponential growth of adventure racing has created an insufficiency of qualified health care personnel to attend to the complex needs of adventure racers. The physical stresses of training for and racing in adventure races, combined with the variety and type of injuries commonly sustained, presents the ideal opportunity for chiropractors to direct and provide the health care needed by competitors in this ever-expanding sport.

Being a relatively new sport, adventure racing is continually evolving while braving the maturation process that most new sports must endure. As such, chiropractic's involvement with the sport will likely continue to be modified. The current literature available pertaining to health care providers' roles in adventure racing exists in the popular press and little is available in peer-reviewed journals. The purpose of this paper is to begin to establish peer-reviewed literature surrounding this topic, along with helping to develop and define the role of the chiropractor in adventure racing.

METHODS

The following databases were searched using the terms 'adventure racing' and 'adventure race:' MEDLINE (1966-October 5, 2000), Sport Discus (1975-October 5, 2000), Atlantes (1980-1996), Heracles (1975-1997), CINAHL (1982-October 5, 2000), and MANTIS (through October 5, 2000). This resulted in a total of 8 citations, only 2 of which were peer-reviewed publications. (1,2)

A retrospective analysis of injury statistics sustained during a multi-day adventure race involving 75 athletes is presented. Currently established adventure racing protocols and criteria are presented. The interface of the sport of adventure racing with the role of the chiroprac-

tor is discussed based upon my experience providing chiropractic care for these athletes as well as my experience as an active adventure racer.

DISCUSSION

The Race

Adventure racing has its origin in France, from whence it slowly expanded to other countries. (3) It was not until a handful of Americans competed in adventure races that the United States populace even became aware of adventure racing. An American reporter covering the Raid Gauloises race first coined the term "adventure racing." (4)

Adventure racing teams consist of 3–5 people, depending upon the race specifications, with at least 1 team member from each gender. Some race directors have recently introduced 1 person, 2 person, and same gender categories, but the premier division is the coed team. (5) All team members must start and finish the race together, completing each and every leg/discipline of the race. The loss of 1 or more team members either disqualifies the team, or moves it down a category, eliminating the possibility of placing in the premier category.

Adventure races vary tremendously both in their lengths (Table 1) and in the various disciplines involved. (5) "Sprint" races may take only a few hours for a winning team to complete while "expedition" length races may take up to 2 weeks.

Races consist of multiple disciplines, which may include hiking or trekking, running, horseback riding, mountain bike riding, climbing, flat and/or white water paddling (kayaking, canoeing, rafting, other), swimming, sailing, land and water navigation, orienteering, Nordic skiing, snow shoeing, in-line skating, and more. (5) Special tests are an increasingly popular addition to shorter US races, consisting of surprise tests of physical or mental strength or agility, occurring at any time during the race. No 2 adventure races include the exact same disciplines.

TABLE 1
ADVENTURE RACE TYPES AND LENGTHS

SPRINT	ONE-DAY	MULTI-DAY	EXPEDITION LENGTH
3–8 HOURS	10–24 HOURS	25–72 HOURS	4 DAYS–2 WEEKS

The different race disciplines are revealed well before the race, but the exact length of each discipline, and the order in which they will occur, is usually kept concealed until just prior to the start. Special tests are kept secret until the racers meet the challenge. The exact race location, as well as the course itself, is not usually revealed to the racers until shortly before the race begins. (5,6) Races primarily occur through untamed wilderness, often in remote areas, and frequently under extremely difficult conditions.

Perhaps the most unique aspect to adventure racing is that of navigation. Adventure races take place all over the world, extensively throughout the US. (5) Each race is unique, but all share 1 particular quality: adventure racers must find their way from 1 point to the next. This discipline is called navigation, and often plays a major role in deciding the winning teams, as well as determining who will finish the race. Land, and occasionally water, navigation take place throughout the race, with each team possessing at least 1 team member who is skilled at navigation. Active or retired military personnel and outdoorsmen are often sought out for their ability to find their way across unmarked territory. The potential for getting lost is very real in adventure races, with each team carrying an emergency beacon as part of their required gear.

Once an adventure race begins, it continues around-the-clock until the racers reach the finish line, or commonly, retire from the competition. There are no designated periods of rest. Racers can rest, or sleep in longer races, whenever they desire. Slower speeds of travel without rest or sleep versus faster speeds of travel with rest or sleep are strategies that teams must choose between. (6) Teams often forego rest or sleep for extended periods of time, even days on end, during adventure races. For example, the winning team members at the 2000 Eco Challenge adventure race held in Borneo slept less than 12 hours during their 144 hours of covering 509 kilometers. (7)

Types of Injuries and Triage

The majority of injuries sustained by adventure racers are musculoskeletal in nature. As such, chiropractors are uniquely qualified to prepare such athletes for event participation and to provide treatment for the vast majority of injuries and maladies encountered relative to the sport.

It is incumbent upon the chiropractor preparing to serve a health care provider role at adventure races to be cognizant of the requirements of the race and the ex-

pected conditions to be encountered. It has been my experience that factors such as race length, location, disciplines, altitude, and temperatures greatly influence potential health infirmities, and thus influence pre-race preparation.

In addition to the various musculoskeletal injuries commonly encountered during adventure race training and competition, there are other infirmities that are infrequently found in other sports. Such problems discussed here are sleep deprivation, cold and hot weather emergencies, insect bites, and trauma from accidents in the wilderness.

While sleep deprivation is of little concern during most sporting events, including sprint length adventure races, the longer multi-day and expedition length adventure races possess a near certainty that competitors will suffer from this condition. In adventure racing, highly productive periods, activity patterns, and physical or mental stress may decrease the immediate need for sleep. (8) While sleep deprivation studies have not revealed specific or long-lasting ill effects of sleep deprivation, (8) the interruption of REM sleep can produce emotionally labile behavior. (9) Sleep deprivation presents as fatigue, and with excessive fatigue there is the obvious disruption of functional ability with activities. (10) Racers possessing such a physical and mental state are more prone to injuring themselves, or other racers.

Preparation is the key to prevent and treat the effects of cold weather emergencies, such as frostbite, frostnip, and hypothermia. (11) Adventure racers are required to carry their own clothing and equipment throughout the race. Carrying extra clothing for warmth versus less clothing for lighter travel is a strategic choice that adventure racers must make. Miscalculations, which are not always avoidable, can cause deleterious consequences. Hypothermia can occur in any part of the country, (11) but adventure races held in colder conditions or of longer duration present a greater likelihood of such an occurrence. The prompt recognition and treatment of hypothermia is paramount. (11)

Races held in warmer climates, especially during summer months, present the potential for heat-related problems. Proper re-hydration techniques applied during warm or hot environmental conditions are basic concepts in the prevention of heat-related conditions. Adventure racers carry their own fluids and foods throughout the race, being re-supplied by their support crews only at infrequent, usually pre-designated checkpoints or transition areas. Races with lengthy sections

render the racers unable to carry adequate amounts of fluid replacement. Lightweight water purification systems are a required equipment item in longer adventure races as potable water supplies are often a serious concern for many adventure racers and directors. When recreational athletic events occur at remote locations, there exists the potential that no potable water sources will be available. (12) It is critical to address this situation in advance. For example, at least 20 athletes who participated in the Eco-Challenge 2000 in Borneo, Malaysia contracted acute febrile illness attributed to *Leptospira*. Water from the Segama River was determined to be the primary source of infection. (1)

Insect and snake bites, stings and dermatological maladies occur regularly. To date, thirteen French competitors returning home from a competition in South Africa were diagnosed with Rickettsial infections. Most of the athletes presented with fever, headache, multiple inoculation eschars, regional lymphadenopathies, and 15.4% possessed a cutaneous rash. (2)

The majority of injuries that will be seen by a sports chiropractor at an adventure race are listed in Table 2. However, it is best to be prepared for anything. Altitude sickness is always a possibility in races occurring at elevated locations. Hyponatremia, fatigue, and mental debility are frequently encountered with the sport. Fractures, dislocations, head injuries, and spinal injuries occur. When combined with often remote and difficult working conditions, these problems present a challenge to the sports chiropractor's abilities and resources.

Table 3 details the serious injuries encountered at the inaugural 1999 Walkabout Adventure Race, a multi-day event. In most of the itemized cases, once an assessment was performed, the athlete was convinced to withdraw from the competition. In addition to the conditions itemized in Table 3, there were several minor ankle sprains/strains, 1 case of moderate dehydration, and numerous cases of moderate to severe fatigue and exhaustion. Mild fatigue and exhaustion and minor cuts and abrasions were common. There were no reported cases of stings, bites, poisonings, heat exhaustion or heat stroke, spine or head injuries.

Roles for the Chiropractor

Based upon discussions with health care providers and competitive adventure racers, I have identified 3 principal categories of service that he proposes the sports chiropractor can provide to adventure racers. These roles include the event chiropractor, the team chiropractor, and the personal chiropractor. Each cat-

TABLE 2
INJURIES AND IMPAIRMENTS COMMONLY ENCOUNTERED IN ADVENTURE RACES

	SPRINT	ONE-DAY	MULTI-DAY	EXPEDITION
LACERATIONS, CONTUSIONS, ABRASIONS	X	X	X	X
SPRAINS/STRAINS	X	X	X	X
FRACTURES	X	X	X	X
DISLOCATIONS	X	X	X	X
HEAD INJURIES	X	X	X	X
SPINAL INJURIES	X	X	X	X
ALTITUDE SICKNESS		X	X	X
HYPOTHERMIA			X	X
HYPONATREMIA			X	X
DEHYDRATION	X	X	X	X
HEAT EXHAUSTION	X	X	X	X
HEAT STROKE	X	X	X	X
RESPIRATORY PROBLEMS	X	X	X	X
EPISTAXIS			X	X
BITES & STINGS	X	X	X	X
POISON OAK/IVY	X	X	X	X
FATIGUE/EXHAUSTION	X	X	X	X
NERVE PALSIES		X	X	X
MENTAL DEBILITY			X	X

TABLE 3
SERIOUS INJURIES AT THE 1999 WALKABOUT ADVENTURE RACE

CASE 1—RACER CRASHED WHILE MOUNTAIN BIKING DOWN TRAIL AT HIGH SPEED RACER CONTINUED MOUNTAIN BIKING TO NEXT TRANSITION COMPLETE AC SEPARATION RACER CONCEDED HE COULD NOT CONTINUE (KAYAKING WAS THE NEXT DISCIPLINE)
CASE 2—RACER TURNED ANKLE WHILE RUNNING ON ROCKY TRAIL RACER COMPLETED RUN GRADE III ANKLE SPRAIN/STRAIN RACER UNABLE TO CONTINUE AFTER RESTING DURING TRANSITION (SEVERE SWELLING)
CASE 3—RACER TWISTED KNEE WHILE RUNNING ON UNEVEN SURFACE OF TRAIL RACER COMPLETED TRAIL RUNNING SECTION (WITH ASSISTANCE FROM TEAMMATES) GRADE II SPRAIN TO MEDIAL COLLATERAL LIGAMENT RACER UNABLE TO CONTINUE AFTER RESTING DURING TRANSITION
CASE 4—RACER CRASHED WHILE MOUNTAIN BIKING ALONG MOUNTAIN TRAIL RACER INITIALLY BANDAGED INJURY WITH PLASTIC WRAP HELD IN PLACE WITH DUCT TAPE DEEP ABRASIONS & CONTUSIONS OVER ENTIRE LATERAL THIGH, EXPOSING TFL RACER COMPLETED RACE WITH EXTENSIVE BANDAGING
CASE 5—RACER CRASHED WHILE MOUNTAIN BIKING DOWN VERY STEEP, VERY ROCKY DESCENT RACER COMPLETED RACE (HIS TEAM WON) DEEP ABRASIONS AND CONTUSIONS TO APPROXIMATELY 30% OF BODY UNILATERALLY

egory presents its own challenges and is summarized below.

Event chiropractor: Pursuant to the arrangement made between the doctor of chiropractic and the race director,

the event chiropractor is available to assist competitors at an adventure race. It is imperative that the event chiropractor gets involved early in the planning stages of an event. This includes supervising the planning, organization, and coordination of health services, preventive measures and emergency protocols. (13)

Potential working conditions for health care personnel at an adventure race ranges from deluxe hotel accommodations with a full compliment of ancillary staff, to primitive dirt clearings distant from any hygienic facilities or running water. Tables 4 and 5, which describe issues to consider before a race and equipment to have available during the race, can assist in the preparation of an efficient triage and treatment area. It is also important to assess the location of the nearest emergency medical facility and available transportation.

TABLE 4
PRE-EVENT PREPARATION LIST

☐ TRANSPORTATION TO/FROM VARIOUS REGIONS OF THE RACE COURSE (INCLUDING EMERGENCY TRANSPORTATION) ARE CONFIRMED.
☐ COMMUNICATION SYSTEM IS IN PLACE.
☐ AVAILABILITY OF EMERGENCY PERSONNEL IS KNOWN.
☐ AVAILABILITY OF ANCILLARY PERSONNEL IS KNOWN.
☐ AVAILABILITY OF A POTABLE WATER SOURCE IS CONFIRMED AND LOCATED.
☐ ANTICIPATED RACE LENGTH IS KNOWN.
☐ COURSE DESIGN/DIFFICULTY IS CONFIRMED.
☐ DISCIPLINES TO BE INCLUDED IN RACE ARE CONFIRMED.
☐ NUMBER OF COMPETITORS IS KNOWN.
☐ SNAKES, INSECTS, ETC. INDIGENOUS TO THE AREA THAT TIME OF YEAR ARE IDENTIFIED.
☐ PROBLEMATIC FOLIAGE INDIGENOUS TO THE AREA THAT TIME OF YEAR (POISON IVY/OAK, CACTUS, HEAVY POLLEN PRODUCERS, ETC.) ARE IDENTIFIED.

TABLE 5
SUPPLIES AND EQUIPMENT FOR ADVENTURE
RACE COVERAGE

- COMMUNICATION SYSTEM: CELL/DIGITAL TELEPHONE (ASSURE COVERAGE), TWO-WAY RADIO, OTHER
- COPIOUS AMOUNTS OF STERILE BANDAGES, DRESSINGS, VARIOUS TAPING SUPPLIES
- BANDAGE SCISSORS
- EXAMINATION AND TREATMENT TABLE
- PORTABLE CHAIRS
- WOUND IRRIGATION FLUID (AUTHOR PREFERS D.A.G. FOR ITS COMBINED ANTIBIOTIC AND NUMBING ABILITIES, AND USE FOR DERMATOLOGICAL REACTIONS)
- ANTIBIOTIC OINTMENT
- BITE KIT/TREATMENT SUPPLIES
- STETHOSCOPE
- SPHYGMOMANOMETER
- OTOSCOPE (WITH DISPOSABLE SPECULA)
- LARGE AMOUNT OF ICE/INSTANT ICE PACKS (INSTANT ICE PACKS ARE PREFERRED IN ALL BUT SPRINT ADVENTURE RACES)
- BLANKETS
- INSTANT HEAT PACKS
- PENLIGHT
- PORTABLE LIGHT(S)
- SPLINTS/BRACES APPROPRIATE FOR THE RACE AND CONDITIONS
- OXYGEN (IF AVAILABLE)
- THERMOMETER
- SPINE BOARD

Since racers often travel greater than 50 to 100 miles from the main staging area during various sections of the race, and frequently into very remote areas, the event health care team must possess the ability to be mobile and self-sufficient. Emergency supplies and equipment should be lightweight and portable. The carrying of emergency supplies using a standard emergency medical technician type of case is often impractical. I prefer a customized overnight hiking pack, which is capable of carrying copious quantities of supplies and equipment.

The number of competitors at adventure races may range from as few as 50 to as many as 400 or more. Considering the number of racers and the number of injuries and health care problems, it is advisable for the

event chiropractor to have assistance. The event chiropractor must be skilled and comfortable with simultaneously managing multiple emergencies, dwindling resources, and directing emergency and other ancillary personnel.

It is important for the event chiropractor at an adventure race to follow injury assessment protocol typical of emergency care (See Table 6). Adventure racing competitors have teammates who will often be able to relate most of the injury history to the doctor. Time should not be wasted obtaining a detailed history if the competitor's injuries are severe. There must be no delay in the detection of life-threatening problems. (14) It is vital to remember the key aspects of injury treatment protocol: ABC's (airway, breathing, circulation), do not move unstable regions, especially the spine, and shock prevention.

The psychology of this sport presents some unique situations. Most adventure racers are a different "breed" from other athletes. By their very nature adventure racers do not see limits to their physical abilities. At the very least they seek to expand these limits. A sprint length race for an adventure racer is a 3–8 hour event, which is 2 to 3 times longer than a marathon. Sleep is considered a luxury in longer adventure races. What may sideline an athlete at another sporting event might only represent an annoyance to an adventure racer (eg, table 3). An event chiropractor at an adventure race must exercise his or her authority to prohibit a competitor from continuing when it is felt that the competitor's condition might prove harmful to him/herself or others, if they continue to race.

Team chiropractor: The team chiropractor has a more controlled environment within which to work, compared with the event doctor. Being responsible solely to the immediate team members, it is possible for the team doctor to be acutely familiar with each of the racers

TABLE 6
ON-SITE ADVENTURE RACER INJURY ASSESSMENT PROTOCOL

PRIMARY	SECONDARY
1. ASSESS AND SECURE THE SCENE (SAFETY FIRST—STAY CALM)	11. EXPANDED HISTORY OF INJURY
2. DECLARE WHO YOU ARE	12. EXAMINATION OF ALL INJURED REGIONS (INCLUDING SECONDARY INJURIES/AREAS)
3. CALL FOR EMERGENCY ASSISTANCE/TRANSPORT (AS NEEDED)	13. STABILIZE/TREAT AS APPROPRIATE
4. ABC'S (AIRWAY, BREATHING, CIRCULATION)	14. TRANSPORT/RELEASE AS APPROPRIATE
5. ASSESS VITALS (REPEAT EVERY 5 MIN.)	
6. HISTORY OF INJURY (TEAMMATES ARE OFTEN HELPFUL)	
7. STABILIZE	
8. IMMOBILIZE (AS NEEDED)	
9. TREAT FOR SHOCK (AS NEEDED)	
10. CONTROL BLEEDING	

under his or her care. Additionally, the team chiropractor has the luxury of adequate time to provide a more complete treatment due to the smaller number of people under his or her care.

The team chiropractor should assess every team member prior to the race and during each transition for proper physical and mental status. In this latter role, the team doctor functions under the same conditions as the event chiropractor described above, except that the care is focused on only members of his or her team. Observations should be made regarding injuries, temperature, the amount of water consumed by each racer on the previous leg, as well as how much solid food each competitor is consuming. A common practice to determine adequate hydration is to divide the amount of water consumed by the time since the last recording and adjust for temperature and humidity. One small oversight in this area can lead to the team heading out for the next portion of the race looking sound, only to be later returned by the race support crew or ambulance due to a severe problem.

Malpractice issues should be addressed well in advance of providing onsite coverage of an adventure race. Major chiropractic malpractice carriers would cover an insured doctor at such events, but variable conditions are placed upon the situation depending upon the insurance company. With only 2 exceptions, all companies interviewed via telephone require the doctor of chiropractic to be licensed in the state in which the event coverage is occurring. In the case of both exceptions, the company must be notified in advance, and authorizations obtained prior to the event.

Personal chiropractor: The personal chiropractor typically treats adventure racers before and after competition, in an office setting, and rarely provides services at the actual competition site. However, the need for this type of provider cannot be over-emphasized. Due to the arduous nature of training for and competing in adventure races, coupled with the high incidence of injuries, sports chiropractors can keep quite busy providing care to these unique athletes.

Suggestions for Future Involvement

The newness of adventure racing requires it to develop and mature. Concomitantly, chiropractic's role in the sport will require cultivation and refinement. Further study and observation will assist both chiropractors and adventure racers and directors in discerning the ideal

role for the involvement of sports chiropractors in the sport of adventure racing. Such study should help to further edify and promulgate chiropractic's effectiveness in caring for these athletes, along with further developing the parameters for such care.

CONCLUSION

Adventure racing is a combination of many different sporting activities, but is itself a sport unlike any other. By removing the confines of location, length, and difficulty, adventure racing attempts to discover and expand the limits of what is humanly possible. As with so many sports, experiencing the limits of physical and mental abilities often comes with a physiological price.

Only 2 papers exist in peer-reviewed journals relative to what health care providers can expect at adventure races. No literature exists that describes how health care providers can most effectively assist in this sport. This paper offers a contribution to the literature regarding the health care needs and the treatment parameters within the sport of adventure racing.

The sports chiropractor's role in adventure racing is a developing 1, but thus far has exhibited great potential. Parameters proposed in this paper illustrate the potentially large role the sports chiropractor might play in providing health care for adventure racers. Further study will produce more refined parameters and thus define the full potential for chiropractic's involvement in this ever-burgeoning sport.

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