

# American Journal of Sports Medicine

<http://ajs.sagepub.com>

---

## A Popular Cult

Bruce Reider

*Am. J. Sports Med.* 2008; 36; 1467

DOI: 10.1177/0363546508322745

The online version of this article can be found at:

<http://ajs.sagepub.com>

---

Published by:



<http://www.sagepublications.com>

On behalf of:



[American Orthopaedic Society for Sports Medicine](http://www.aossm.org)

**Additional services and information for *American Journal of Sports Medicine* can be found at:**

**Email Alerts:** <http://ajs.sagepub.com/cgi/alerts>

**Subscriptions:** <http://ajs.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

**Citations** (this article cites 8 articles hosted on the  
SAGE Journals Online and HighWire Press platforms):

<http://ajs.sagepub.com#BIBL>

# A Popular Cult

"To write prescriptions is easy, but to come to an understanding with people is hard."

—Franz Kafka, *A Country Doctor*  
*In Wedding Preparations in the Country and*  
*Other Stories*. Harmondsworth: Penguin, 1982

It's the perfect location for a household shrine: a small, open loft under the eaves at the east end of our family room. From this elevated perch, the shrine keeps watch over our domestic life. Since the main visual focus of the room, a Sony widescreen television, is located on the opposite wall, visitors seldom notice the shrine. Even family members tend to forget its presence. Nevertheless, the shrine maintains its vigil, peering over our shoulders as we browse through the morning newspaper, screening the latest videos with us in the evenings, and dutifully supervising the pets in our absence. Its limited space is cluttered with important artifacts; the principal objects carefully arranged in prominent locations, many smaller ones scattered informally among them. We seldom visit the shrine except to add to the trove, leaving its venerated objects encased in a thick patina of dust. Yet this neglect is not a sign of irreverence; in fact, it is an essential aspect of the rite celebrated in this special place. You see, this is our family shrine to Non-Compliance.

The centerpiece is an object common to such shrines: an exercise bike that was to have served as our passport to renewed youth and cardiovascular fitness. Additional contents stand in silent tribute to other unfulfilled but noble intentions: the high-tech sewing machine that was to have decorated the house with artistic quilts; the scrapbooks that we envisioned chronicling the growth and development of our children, their intended contents "temporarily" sheltered in a variety of corrugated cardboard boxes; the space station kit that my teenage son received for his sixth birthday and will someday no doubt assemble, perhaps for his own offspring. Reassuringly, I know that we are far from alone in our membership in the Cult of Non-Compliance. Towering over the numerous achievements of humanity is the mountain of tasks that we really wanted to accomplish but never quite finished or, in some cases, never quite began.

Two recent articles in the *American Journal of Sports Medicine (AJSM)* emphasize how the gods of Non-Compliance can conspire to derail our efforts to prevent sports injuries. The first, "Prevention of Injuries Among Male Soccer Players" by Engebretsen et al,<sup>3</sup> appeared in the June issue. In this study, the authors first undertook to identify by history professional soccer players who were at increased risk of sustaining ankle, knee, hamstring, or groin injuries. Those deemed at high risk were then randomized into groups that were or were not given an injury prevention program.

Ambitiously, the investigators allocated the players individually, rather than by team. To prevent cross-contamination among teammates who were in different treatment groups, they asked the players to perform the preventive exercises outside of normal team practices.

Careful documentation of the injuries that occurred during the 2004 season showed that the authors were indeed able to differentiate between athletes at high and low risk for injury. Unfortunately, they were unable to demonstrate that their prophylactic interventions did anything to lower the injury rate within the high-risk group. Looking deeper into the possible causes for the failure of their program, the investigators discovered that only 19% to 29% of the targeted athletes actually carried out the various prevention programs at a minimally acceptable level. They did note that when they restricted their analysis to compliant athletes only, they still did not demonstrate a beneficial effect for the program. Since the power of the study was considerably reduced by the limited size of the compliant group, this lack of efficacy may not be conclusive. The injury prevention strategies that many of the professional teams already had in place probably also compromised the ability of the experimental interventions to demonstrate a measurable effect.

In the current issue of the *AJSM*, Croisier et al present the results of another sophisticated study designed to predict and reduce the incidence of injuries in professional athletes, "Strength Imbalances and Prevention of Hamstring Injury in Professional Soccer Players." In this case, the authors used criteria from their previous research<sup>2</sup> to place players in normal and high-risk categories for hamstring injury based on strength imbalances detected by preseason isokinetic testing. The medical staff of each team decided whether to attempt to correct any imbalances through remedial exercises and also whether to use subsequent isokinetic testing to verify that adequate correction had occurred. This resulted in 4 groups of athletes: 1) players with normal preseason isokinetic test results, 2) players with isokinetic imbalances who made no attempt to correct their deficits, 3) players with imbalances who underwent remedial training but did not have subsequent testing to verify that their imbalances had been eliminated, and 4) players with imbalances who underwent remedial training and were retested until resolution of their deficits was documented. All subjects were then followed for new hamstring injuries during the subsequent playing season.

The results were quite striking. Athletes with normal preseason isokinetic profiles showed an injury frequency of 4.1%, while those with isokinetic imbalances who made no attempt at correction had a 16.5% injury frequency; a 4-fold increase in injury risk. The athletes who underwent remedial conditioning but did not have follow-up testing to verify that their efforts were adequate had an injury frequency of 11%, not significantly different from the players who made no attempt to correct their problem. Finally,

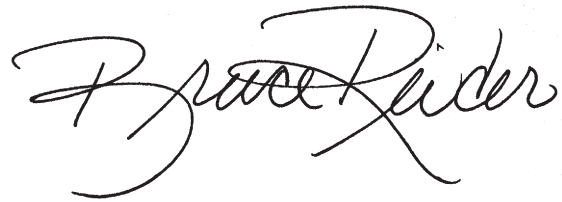
players whose satisfactory rehabilitation was verified with follow-up testing had an injury frequency of 5.7%, which was not significantly different from the athletes with no preseason imbalance.

The work of Croisier et al leads to three important conclusions. First, that their testing algorithm was indeed able to identify professional soccer players at increased for hamstring injury. Second, that normalizing preseason strength imbalances eliminated an athlete's increased risk of hamstring injury. Finally, that the prevention program only worked when adequate compliance was verified by subsequent retesting.

Some authors hold that the very concept of *compliance*, which evokes images of a paternalistic physician molding a pliant patient to accept a particular therapy, is itself an impediment to producing the desired behavior. Instead, they stress, a clinician should work to create *concordance*, collaborating with the patient toward a common goal.<sup>1,6,7</sup> While the exigencies of scale may make this approach difficult to apply to injury prevention across entire leagues of athletic teams, concordance and thus compliance can still be encouraged by designing prevention programs that are palatable or even enjoyable and by offering athletes a variety of exercise options whenever feasible. In addition, the experience of Engebretsen et al suggests that it may not be realistic to expect athletes to do preventive exercises outside of normal team training sessions; indeed, others have emphasized the benefit of social support and group cohesion in exercise compliance for health-related purposes.<sup>5</sup> In fact, this approach worked for my wife and me. We accomplished our goal of regaining the fitness level of teenage triathletes by joining a health club, where the increased variety of exercise options and the possibility of peer social interaction made our pursuit of fitness a pleasure rather than a chore.

Willem van Mechelen<sup>8</sup> delineated 4 classic steps that have been frequently cited as essential for the development of any injury prevention strategy: 1) Documenting the incidence of a specific injury, 2) identifying the risk factors and mechanism for that injury, 3) designing and introducing an intervention to mitigate the risk factors, and 4) conducting a clinical trial to test the effectiveness of that intervention in reducing the incidence of the specific injury. The studies of Engebretsen et al and Croisier et al suggest that verification of compliance might be considered an adjunctive fifth step to be kept in mind as this process is carried out. When investigators embark on the design of an injury

prevention program, they should look for an intervention strategy that is likely to be acceptable to athletes.<sup>4</sup> When they test the effectiveness of that intervention, they need to verify that their experimental subjects are actually complying with it. Yet even that is not enough, because compliance in a structured clinical trial does not ensure compliance in real-life conditions. After the effectiveness of an intervention has been proven in an experimental situation and incorporated into routine use, it is important to verify that athletes who are not part of a clinical trial do not drift back into the Cult of Non-Compliance.



Bruce Reider, MD  
Chicago, Illinois

## REFERENCES

1. Campbell R, Evans M, Tucker M, Quilty B, Dieppe P, Donovan JL. Why don't patients do their exercises? Understanding non-compliance with physiotherapy in patients with osteoarthritis of the knee. *J Epidemiol Community Health*. 2001;55:132-138.
2. Croisier JL, Forthomme B, Namurois M, Vanderthommen M, Creilaard JM. Hamstring muscle strain recurrence and strength performance disorders. *Am J Sports Med*. 2002;30:199-203.
3. Engebretsen AH, Myklebust G, Holme I, Engebretsen L, Bahr R. Prevention of injuries among male soccer players: a prospective, randomized intervention study targeting players with previous injuries or reduced function. *Am J Sports Med*. 2008;36:1052-1060.
4. Finch C. A new framework for research leading to sports injury prevention. *J Sci Med Sport*. 2006;9:3-9.
5. Fraser SN, Spink KS. Examining the role of social support and group cohesion in exercise compliance. *J Behav Med*. 2002;25:233-249.
6. Mullen PD. Compliance becomes concordance. Making a change in terminology produce a change in behavior. *BMJ*. 1997;314:691-692.
7. Scales R, Miller JH. Motivational techniques for improving compliance with and exercise program: skills for primary care clinicians. *Curr Sports Med Rep*. 2003;2:166-172.
8. Van Mechelen W. Sports injury surveillance systems: 'one size fits all'? *Sports Med*. 1997;24(3):164-168.