EVALUATING THE "INDUSTRIAL ATHLETE" UTILIZING ATHLETIC TRAINERS

BY

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As American industry and manufacturing strive to maximize the quality and quantity of products in the United States and foreign markets, productivity increases have become the driving force. Unfortunately, this relentless focus on productivity gains may lead to work related issues such as physiologic stress. This malady is taking its toll on the human body in the form of repetitive motion injuries or cumulative trauma disorders. The increasing cost of treating these musculo-skeletal disorders (MSDs) has become an enormous burden to many corporations. These burdens include not only the cost of direct medical treatment, but also in nonproductive time off and disability payments through the Worker's Compensation system. Of the total amount of money spent for worker's compensation in 1992, $18.3 billion or 60% was classified as disorders associated with repeated trauma. Most of these disorders involved the upper extremity and were thought to be the result of repetitive motion.[1] MSDs also comprised of the most costly type of worker's compensation claim. According to the National Council on Compensation Insurance (NCCI)[2] , these cases cost an average of $30,000 per case. They also account for a third of all occupational injuries that create lost work days. Approximately 700,000 reported medical cases from NIOSH involved time away from work due to cumulative trauma. These cases accounted for 14% of physician visits and 19% of hospital stays.[3] In

1996, healthcare costs for repetitive stress injuries cost industry approximately 7.4 billion dollars.[4]

The challenge now for the medical community is to figure out a way to control medical cost while at the same time providing good, sound medical care in these types of cases. As a medical community, we need to identify the resources required to recognize, prevent, and initiate musculo-skeletal evaluations for the many employees who suffer MSDs. These resources need to be armed with the education and experience to develop an innovative, streamlined approach to transform the traditional medical model into a more flexible/integrative approach in order to aid the recovery process. The sports medicine model is proving to be an effective method in taking care of our "Industrial Athletes". I believe that a multidisciplinary team approach that incorporates a Certified Athletic Trainer (ATC) in the industrial setting facilitates this process. The outreach or onsite clinic approach, similar to their function with a sports medicine approach, is becoming a useful adjunct among many large industries and manufacturers. It is apparent that if a worker remains healthy and productive, then that company or industry's bottom line is positively affected. Industry has taken notice of financial gains by limiting lost work days and developing therapeutic medical/rehabilitation programs at the workplace. Traditionally, these services were provided at multiple remote sites to include emergency rooms, physician offices, ambulatory/urgent care settings and physical or occupational therapy clinics. In this model, there is no need for the "Industrial Athletes" to leave the worksite; the ATC will come to you!

The next logical question is what is an "Industrial Athlete" and how does the concept of the ATC figure to make an economic impact in treating common musculo-

skeletal disorders? When observing the repetitive mechanical movements of an athlete, whether it is high school, college or at the professional level, [5] sports-specific injuries occur due to increased stress on tendons, ligaments and joints. Many similar movements performed repetitively on the job site by the worker/laborer are often the same type of injuries that an athlete will suffer. Comparatively, the employee/athlete would require an evaluation to determine physically if he or she could return to work/play quickly, safely and productively.[4]If we parallel employees or "Industrial Athletes" with the same notion as sports athletes, then applying a sports medicine model would encourage the ATC to be initially involved to treat both situations similarly. This set-up has proven to be cost effective while also returning players to competition expediently. By treating workers as "Industrial Athletes" and offering them services similar to competitive athletes, business can save money because workers also will return to work faster, [6] limiting costly lost work days.

There are several reasons why the ATC is the preferred choice for treating the "Industrial Athlete". ATCs are educated and experienced in performing assessments for most musculo-skeletal injuries. Statistically more than 70 percent of OSHA-recordable injuries and illnesses fall into the categories of sprain, strain, tendonitis, contusion and fractures- all conditions which athletic trainers are trained to evaluate and treat initially.[7] Traditionally most ATCs employment involves dealing with sports injuries at amateur and professional athlete levels. When these athletes become injured, the sports medicine model becomes the cornerstone of care. Because of the similarities involved in a sports related problem and a worker performing on the assembly line, the approach to care is identical.

The use of four key elements will facilitate the treatment course of injured athletes and "Industrial Athletes". The first is prevention which entails use of protective equipment during the sporting event or work environment. This is paramount in the realm of industrial medicine and has been a point of emphasis in the effort to reduce injury rates and expenditures. Second is conditioning which involves identifying weakness and adapting to the sport or job with specific training to enhance performance. Third, is identifying and intervening early with injuries to initiate quick measures to reduce the severity of disability. Last is progressive treatment and rehabilitation. This addresses flexibility, muscle balance and improving mechanical motion to the skeletal joints. One way this is accomplished, is the utilization of the ***SAID*** principle of rehabilitation. In short, it states that the musculo-skeletal system will attempt to make ***S***pecific ***A***daptations to the ***I***mposed ***D***emands that are placed on it.[4]The structures of this system, muscles, ligaments and tendons, become fatigued by overuse and repetition. Micro trauma occurs physiologically and the tissue breakdown then produces an inflammatory response. The body's rate of recovery and repair cannot keep up with the mechanical demand.[2] Rehabilitation protocols, established by the ATC, should help the worker adapt to the demands of his/her job just as athletes are trained to adapt to the demand of their sport. The goal is to help the body recover from the injury, protect the worker from re-injury, and return them to productive activity as quickly as possible.[4]If this protocol is ignored, scar tissue forms following repetitive micro trauma, and alters the normal mechanics of the musculo-skeletal system causing the first stages of MSDs.

The education process that ATCs are exposed to varies among many different college programs. Student ATCs curriculum includes lectures in medical risk

management, injury prevention, acute care of injury and illnesses. They also study the basic sciences, anatomy/physiology, nutrition, pharmacology, kinesiology, psychology of sport and biomechanics. They are expected to demonstrate knowledge of a systemic process that uses the medical model to obtain a history of and injury or illness that includes, but is not limited to, the mechanism of injury, chief complaint, and previous relevant injury of illnesses. As a student, learning the basics of performing a physical exam on all of the body's major systems, including digestive and cardio-pulmonary, is imperative. The use of a stethoscope to auscultate lung sounds, bowel sounds and heart sounds, is taught similar to what nursing students learn. ATCs also learn to assess vitals signs, perform CPR and first aid, and appropriately identify through a screening process, common acquired or congenital risk factors that would predispose athletes and others engaged in physical activity to certain types of injuries and illnesses.[8] ATCs are not expected or responsible for treating medical illnesses but are expected to appropriately refer the individual if necessary to their respective primary care physician or emergency room. They learn proper medical terminology necessary to communicate the results of an assessment and describe the components of medical documentation utilizing SOAP notes. ATCs are aware of basic legal concepts, such as, but not limited to, standard of care, scope of practice, liability, negligence, informed consent, and confidentiality , as they apply to their profession, as well as, other allied health care professionals.[8]

The bulk of their education, however, is recognizing the signs and symptoms of musculo-skeletal disorders of the human body and implementing a therapeutic rehabilitation program. This is accomplished by lectures, group studies and lab practica which require proficiency and competency evaluations. These lectures and practical

application involve learning techniques on taping and splinting multiple joints. This is done for a preventive as well as functional treatment. There is also the clinical application and learning the use of therapeutic modalities, which include electrotherapy, ultrasound, iontophoresis, ice and heat. The students are taught what modalities are used for specific conditions and how the body will recover due to the selection of the modalities.

The last step in the rehabilitation process is the application of therapeutic exercises. The athletic trainer is primarily educated to understand the indication, contraindication, theory and principles for the incorporation and application of various contempary isotonic, isometric and isokinetic movements. They also become well versed in PNF (proprioceptive neuromuscular facilitation) for muscular strength and endurance, stretching and improvement in active and passive range of motion with affected muscles, tendons and ligament structures.

As a final part of their formal education, the ATC has to accumulate a minimum requirement of 800 hours of direct supervised activity at sporting events. This time is spent learning to evaluate injured athletes, present the status of the injury and develop an onsite plan to the clinical instructor (CI), which is a certified trainer on the educational staff of that institution. The CI provides information and technical support, fulfills supervisory responsibilities, facilitates interpersonal communication, fosters student autonomy, promotes competence in the athletic training domain, and provides a professional role model.[9]This segment of education gives the student a practical application to which realistic awareness of acute injury evaluation and on site treatment is controlled. After graduation from an approved/accredited program, they become eligible to sit for the NATABOC (National Athletic Trainers Association Board of Certification)

exam. Except for Alaska, California, Maryland, Michigan, Montana, Washington, West Virginia and the District of Colombia, each state requires the passing of this exam in order to be credentialed or licensed. In order to maintain certification, ATCs must obtain 80 hours of continuing education every 3 years. This can be acquired by an hour for hour basis through attendance at annual conferences, journal writing, status as a NATABOC examiner, clinical instructor, home study courses, and journal reading with approved CME quizzes.

One of the more common MSDs that are seen in sports as well as industrial setting is lateral epicondylitis or "tennis elbow". This injury is a result of repetitive micro trauma, stretching or contracting,[10] to the extensor carpi radialis brevis tendon. With mechanical forearm supination and wrist extension, the attachment of this tendon insertion, proximally is at the lateral epicondyle of the elbow, becomes tender due to chronic overuse.[11] Histo-pathologically, the aponeurosis, a flat tendon juncture, becomes a gray, granulated and friable tissue microscopically. [12] Clinically, symptoms are reproduced with the patient experiencing pain in the proximal forearm/elbow on resisted dorsiflexion of the wrist and middle finger. Subjectively, they also complain about dropping objects secondary to reduced hand strength. Rarely is their any mention of numbness, tingling, decreased sensation or pain in the hand or digits. Occupations that pose a particular risk are carpentry, plumbing, typing and writing.[11] In the athletic arena, golf, tennis, racquet ball, badminton and sculling[13] are the most common sports one would see this orthopaetic problem.

Treatment consists of reducing the stress on the forearm by eliminating or modifying hand gripping and forearm supination activity such as hammering, using a

screwdriver or performing a back-hand hitting stroke in racquet sports. Medications such as ibuprophen or other NSAID therapy will reduce inflammation and control pain. If that initially fails to reduce symptoms, cortisone injection into the extensor tendon attachment may be required and repeated monthly for three months. Although there are obvious risks with the latter, infection or tendon disruption, the ATC is able to implement a more conservative sports medicine approach that is noninvasive and has little or no contra-indication. One option is the application of therapeutic modalities, which include ice, heat, ultrasound and electrical stimulation to the affected/stressed forearm extensor musculature. This will aid in reducing inflammation to the muscles and tendons as well as improve blood flow and oxygenation to the tissues. The time of the repair process is therefore significantly reduced. Stretching and muscle massage also restore function to the forearm by physiologically elongating muscle fibers back into their normal parallel alignment. After full AROM (active range of motion) without pain to the elbow is restored, the progressive isotonic wrist flexion and extension therapeutic exercise program is initiated. This increases strength into the affected muscles and prevents further injury. Secondly, applying a compression brace at the musculo-tendon aponeurosis reduces tension and friction during wrist extension and forearm supination. Most patients' symptoms will resolve in 2-4 weeks with this protocol. If symptoms persist, despite a conservative sports medical approach, the ATC can refer to the orthopedist for cortisone injection or surgical intervention.

The cost of initiating an outreach/onsite sports medicine-based rehabilitation program, led by the ATC, would more than pay for itself in terms of return on investment (ROI).[14] When reviewing the average income of ATCs working in this specialty area, the

salary and benefits is approximately $40,000 a year. Other incurred cost would be the purchase of exercise equipment. One study, performed by Criag Halls, MBA, ATC, CEES (certified ergonomic evaluation specialist), who is employed by Appleton Papers Inc. in Wisconsin. His duties, as the site manager of the ergonomic and wellness program, were, at that time, to develop an exercise and stretching rehabilitation program to reduce the incidence of MSDs. He purchased several special stretching apparatus that were less than $500 each and placed them strategically throughout the 900 employee complex. After educating the workers on proper exercise techniques to improve flexibility and strength, dramatic results were seen. He measured the reduction of sprains, strains and other overuse injuries and costs that were incurred. Prior to implementing this program, from 1997- 1999 retrospectively, the company spent annually $383,000 on treating MSDs. The three years following the programs' inception, yielded an average yearly reduction to $207,000, or 46% drop in cost. His company spent over $1.22 million for overuse sprains and strains from 1997-1999. The following three year period, again was reduced significantly to $951,000. Total work days lost from 1997-1999 was 406 secondary to work related injury. That number was lowered to 163 days lost. The reason, a preventive muscle conditioning rehabilitation program developed and implemented by the ATC.[15]

Another example of cost-effective use of ATCs is the study performed by Greg Zimmerman, MSA, ATC in the Saginaw Division-General Motors Corporation. From 1988-1990 the division saved $3,531,335 by conducting rehabilitation in-house versus outsource care. At that time the company employed two ATCs and 81% of their caseload work involved evaluating sprains, strains, contusions, fractures and other inflammatory

disorders.[16] He also makes note that savings can be measured in such diverse settings such as the educational arena. The Central Health Improvement Program at Central Michigan University (CMU) invested $450,000 into a healthletics program designed to reduce injuries and monies spent on workers' compensation payments. The university saved an estimated $213,244 in the first 6 months because of their employees, totaling 2,364, ability to return to work sooner. Again, this was due to an in-house rehabilitaion/fitness program.[16]

In conclusion, if industry is seeking a cost effective solution to keeping its "Industrial Athletes" healthy and productive, the sports medicine model, utilizing ATCs deserves serious consideration. Their knowledge of musculo-skeletal injury, treatment and preventive measures is paramount. When it comes to MSDs, there are many other medical professionals that help contribute to a multi-disciplinary treating team, the ATC working on-site, is, in my opinion, the team leader.