Flathead Indian Reservation High School Athletic Injury Prevention Program.

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According to the National Athletic Trainers' Association (NATA), an estimated 5.6 million boys and girls participate in interscholastic athletic programs in United States high schools each year. The NATA further estimates that these participants suffer 800,000 time-loss injuries annually (absent at least one game or practice due to injury). Approximately 100,000 student athletes suffer injuries which prevent participation for at least 21 days.[1]

Several studies have evaluated the overall injury experiences of adolescents. These studies reveal that 3-11 percent of school aged children are injured in sports each year and that most of the injuries are minor in nature.[2-4] Sources of bias have provided numerous discussions within the field of sports medicine and have been identified through these studies. Sources of bias include inconsistent definitions of injury, inaccurate data, use of select populations and inability to control for certain variables.

The athlete, through participation in athletic competition, assumes a risk of injury; however, all sports are not equal in risk. Injuries are due to the nature of the sporting activity, variations in energy exchange which the body cannot withstand, athletic conditioning and physical attributes which include overall fitness, excessive body fat, lack of flexibility, preexisting orthopedic problems, a history of previous injury and other associated factors.[5-8]

Injury rates and severity can be reduced or minimized through appropriate physical screenings, conditioning, treatment and rehabilitation programs. In the State of Montana, mandatory physical examinations are required prior to participation in high school sport activities. The completeness of examinations vary widely according to individual-physician training and specialties. Sports-directed examinations and assessments have been used to identify conditions that may preclude, interfere with, or be aggravated by sports participation. Standardized examination protocols have been suggested by several sport-directed practitioners for use on the national level.[9-10]

The use of Certified Athletic Trainers at the high school level and within the school-system sport programs have had a significant effect on sports-related injuries. Studies by NATA have shown that schools without trainers have a 50% injury rate and a 71% re-injury rate among athletes, while schools with trainers show an injury rate of 29% and re-injury rate of only 3%.

BACKGROUND

Serious injuries among the Flathead Indian population were documented and reviewed for the years 1986 and 1987. The intent of this review was to collect injury data specific to causal factors and total costs associated with treatment. The findings revealed that "organized-sports related injuries" were the second leading cause of all injuries requiring hospitalization on the Flathead Indian Reservation.

Injury prevention monies, totaling $15,000, were allocated through the U.S. Public Health Service, Indian Health Service, to implement the sports-injury program. These monies were used to support the initiation of a sports-injury prevention-demonstration project.

Two distinct, yet interconnected, programs were initiated at five high schools within the boundaries of the Flathead Indian Reservation. In August of 1988, Missoula Orthopedic and Sports Injury Clinic contracted to provide orthopedic and conditioning evaluation screenings for high school athletes prior to participating in the sports of football (boys), wrestling (boys), volleyball (girls), track (girls and boys), and basketball (girls and boys). The preseason screening was conducted to document injury histories (past and current) and isolate areas of de-condition and weakness that could predispose the athlete to injury.

Certified athletic trainers of the Western Montana Sports Medicine and Fitness Center (WMSM) were contracted to assist in the evaluation, identification, treatment and rehabilitation of injuries diagnosed during the 1988-89 school year. Thirty (30) weeks of practice, twice-a-week per school, and a combination of twenty-one (21) scheduled competitions were contracted for during the 1988-89 school year. WMSM provided educational programs for coaches and student trainers, coverage for major invitational meets hosted by the participating school and technical consultations without charge to the program.

OBJECTIVES

The objectives of this program were:

1. To establish an efficient and effective, school-based, athletic injury prevention program.
2. To improve athletic medical screenings prior to participation, to promote immediate treatment of injured athletes, and to establish a program for rehabilitation and reduce sports related injury/re-injury of participating reservation high school athletes.
3. To determine sport-specific injury and re-injury rates among reservation high school athletes, and the association

of prior sports-related injury to re-injury occurrence.
4. To provide coaches with information regarding the performance levels of their athletes; training opportunities concerning injury prevention; recognition, evaluation, treatment and stabilization of injured athlete; rehabilitation techniques and return-to-play protocols.
5. To recruit and provide training opportunities for student trainers at each participating reservation high school.
6. To initiate a time limited demonstration project with the intention of school programs adopting and assuming lead roles in sports-injury prevention.

ATHLETIC INJURY PREVENTION PROGRAM'S ATHLETIC SCREENING COMPONENT

The Missoula Orthopedic and Sports Injury Clinic, Missoula, Montana, contracted with the Public Health Service, Indian Health Center, St. Ignatius, to provide orthopedic and conditioning evaluations of high school athletes participating in organized sports at five (5) reservation schools.

This component involved preseason screening of athletes encompassing an orthopedic examination of each participant as well as evaluations of specific performance parameters. On-site athletic trainers were utilized to monitor conditioning and rehabilitation of identified, previously-injured athletes, as well as treatment of acute injuries. Preseason screening was used to isolate areas of de-condition and weakness that would predispose an athlete to injury.

Five (5) high schools participated in the program for the 1988-89 school year. A total of one-hundred and ninety-three (193) athletes were screened. The screening results which might predispose athletes to injury were divided into two (2) categories:

A. Minor Injuries: Lesions that DO NOT PREVENT PARTICIPATION, but require rehabilitation and conditioning along with close monitoring during the course of the season.
B. Major Injuries: Lesions that PREVENT PARTICIPATION without appropriate rehabilitation or bracing to protect the athlete from further injury until termination of season.

Summary of Preseason Screenings
LESIONS – MAJOR:
Mission: Three 3rd-degree anterior cruciate ligament sprains. All were braced and conditioned. One (1) required surgery.
Arles: One (1) brachial plexopathy. Athlete was prohibited from sport competition, prescribed specific daily exercises and rehabilitation program. Athlete has subsequently recovered, yet not approved for participation.
Charlo: One (1) 3rd degree anterior cruciate ligament sprain. Athlete was braced, prescribed specific daily exercises and rehabilitation program. Athlete returned to play without further injury during the competitive season.
Two Eagle River: Two (2) 3rd degree anterior cruciate ligament sprains. Of these, one (1) required surgery. The other athlete was braced, prescribed exercise & rehabilitation program and returned to competition without further incident of injury.
Note: All lesions isolated had previously gone undiagnosed.

Of the 193 athletes screened, ninety-two (92) lesions were isolated, seven (7) of which were of major significance. These were treated according to rehabilitative protocols with two major lesions requiring surgery. Of the 85 minor lesions identified, conditioning and exercise programs allowed for full participation in the chosen athletic activity.

FLEXIBILITY DATA

The results, obtained during the preseason screening of athletes, revealed the need to improve exercise technique and conditioning regimens to enhance athlete performance and minimize areas of high risk. Stretching, warm-up exercises and conditioning regimens were monitored by the Athletic Trainers and coaches, with biweekly clinical evaluations completed by medical personnel. Regular communication was maintained with the coaching staff to assist with assessment, treatment of acute injury and return-to-play guidelines.

ATHLETIC INJURY PREVENTION PROGRAM'S CERTIFIED ATHLETIC TRAINER COMPONENT METHODOLOGY

Injury data was entered on a computer file at WMSM. Files were later transferred to the Indian Health Service computer file for evaluation of the program. Files were created for each athlete within the sample population. Data included name, age, sex, height, weight, agility, flexibility, percent fat, sport participation, prior history of injury, commentary section for abnormal findings during prescreening, re-injury information, date of injury, body part affected/site of injury, severity index, date of treatment, treatment, attending physician, school and general

comments. The comment section includes specific information regarding surgical treatment, return-to-participation date, re-injury, injury associated with activity other than sports, and other comments.

Five high schools within the boundaries of the Flathead Indian Reservation volunteered to participate in this program. The program study was completed utilizing data collected and recorded of those injuries and preseason screening results documented during the 1988-89 sport seasons. All data entry and classification of injury severity was made by a Certified Athletic Trainer to ensure consistent data.

DEFINITIONS

1. 1st-degree injury: injury which involves little tissue damage and where the athlete may return to activity on same day or next.
2. 2nd-degree injury: injury which involves partial tearing of ligaments or tendons, moderate pain or swelling and absence from activity for 2-7 days.
3. 3rd-degree injury: injury which involves severe pain, swelling or disability and absence from activity greater than 7 days.

The following summarizes the prescreening data and injuries diagnosed and treated during the 1988 - 1989 sports season.

SUMMARY OF ATHLETIC TRAINER COMPONENT

1. A total of 113 athletes were injured during the 1988-89 fall sport season. Of these, 44 were classified as first-degree, 50 second-degree and 10 third-degree injuries. The remaining athletes were diagnosed as having chronic problems.
2. The sports of football, track and wrestling accounted for 72% of all injuries evaluated and treated by the athletic trainer.
3. The ankle and knee were the sites most often injured and evaluated by the athletic trainer.
4. Strains ranked #1 for type of injury, with sprains ranked #2 during the 1988-89 season.
5. The staff of WMSM were instrumental in:
    A. developing conditioning programs specific to athlete and school needs;
    B. providing support for athletic activities by properly taping, bandaging and bracing the athletes prior to competition, identifying equipment problems and providing solutions to minimize risk of injury;
    C. evaluating, treating and approving the return to play of injured athletes; and
    D. educating and opening lines of communication between coaches, athletes, parents, school administration and the medical community concerning the needs of exercise, fitness, care and prevention of injuries, rehabilitation and return-to-play protocols.

DISCUSSION

The project was funded by the Indian Health Service. Athletes were included within the project without regard for Native American or non-Native American race affiliation. The project was initiated during the 1988 fall sport seasons. (The original program was designed to address the sports of basketball, football, volleyball and wrestling at specific schools.)

In 1989, the project was acknowledged by the local school systems and funded independently by the school boards, parents and athletes without financial support from Indian Health Service. The program expanded to include the original sports, with the addition of track competition, at all schools.

This injury program and data contain numerous biases. These biases would need to be negated or reduced should anyone contemplate an epidemiological study or comparison. These bias include the sport activities, equipment, playing surfaces, physical condition of athlete, playing time and others too numerous to mention.

The use of preseason athlete injury and condition screenings, injury diagnosis, rehabilitation and data collection systems are essential, however, for a successful program. Athletes and injury histories can be followed more readily with these tools.

To minimize negative experiences, should any other school district wish to initiate a similar sport injury program, several suggestions are offered:

1. A written contract, with policy and procedures concerning the sports-injury program, should be developed and agreed to by all parties concerned. This would include school administration, coaches, trainers and parents.
2. Parental consent forms should be provided, completed and on file with the school and trainer prior to participation in the program.

3. Coaches should be required to provide the trainer with a team roster prior to the first practice or as soon as possible. Any student joining the team after the initial screening would have to report to the trainer prior to his/her participation.
4. No prospective sport participant should be allowed to take part in any practice or tryout who does not have proof of a physical examination and preseason screening on file with the athletic trainer.

CONCLUSION

The Flathead Indian Reservation Sport Injury Project was successful in several ways. First, and probably foremost, seven students were identified as having serious medical conditions which would have predisposed them to serious injury, and possible corrective surgery, should they have been allowed to participate in their sport of choice. The price of these surgeries combined would have exceeded the total dollars expended to initiate the injury prevention program.

Secondly, the school administration, coaches, parents and athletes have a greater understanding of sport injuries, prevention, rehabilitation practices, and the value of an athletic trainer. An increase in the number of athletes seeking assistance from the trainer has steadily increased. This increase is primarily due to the improved awareness of the athletes toward injuries, desire for appropriate treatment to resume participation and relationships developed between the trainers, coaches and athletes.

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