Journal of Coaching Education

Knee Injury Prevention Attitudes and Practices among High School Coaches

Laura Miele
Elite Sports Medicine, Farmington, CT/Injury Prevention Center, Connecticut Children's Medical Center, Hartford, CT

Carl W. Nissen and Kevin Fitzsimmons
Elite Sports Medicine, Farmington, CT

Trudy Lerer and Garry Lapidus
Injury Prevention Center, Connecticut Children's Medical Center, Hartford, CT

Abstract

Injury prevention programs have a positive effect on performance and the reduction of risk in most studies and reviews. However, not all teams and coaches utilize them. In order to better understand this, a 19-item survey was conducted to assess high school coaches' perceptions, attitudes, and current practices regarding knee injury prevention among adolescent athletes during a mandatory Connecticut certification/re-certification course. The results of the survey show that high school coaches report a wide variability in their attitudes and utilization of training programs related to knee injury prevention. Coaches reported several barriers to employing the programs; the leading issue being time. Future education and outreach efforts should address the barriers in order to increase use of injury prevention training.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Journal of Coaching Education

Knee Injury Prevention Attitudes and Practices among High School Coaches

Background

Sport activities can subject the knee joint to severe stresses that increase the risk of both acute traumatic injuries and chronic overuse injuries. There are approximately 210,500 knee injuries among high school athletes annually in the U.S (Comstock, Yard, Know, & Manring, 2005). Most knee injuries are self-limiting, such as abrasions, bruises, and muscle strains. However, more serious and potentially debilitating injuries such as anterior cruciate ligament (ACL) injuries can occur. It is known that these serious knee injuries occur in adolescent female athletes four to eight times more frequently as compared with male athletes participating in the same sport (Arendt & Dick, 1995; Chandry & Grana, 1985; Lindenfeld, Schmitt, Hendy, Mangine, & Noyes, 1994). Approximately 70% of the ACL injuries occur during non-contact situations such as landing from a jump or during turning, twisting activities when a sudden knee imbalance occurs (JD Chappell, Yu, Kirkendall, Almekinders, & Garrett, 2000; Lephart, Ferris, & Fu, 2002). The enormous cost of these ACL injuries to athletes and society has led to the development of knee injury prevention programs (KIPP), also known as 'Jump Training '(Caraffa, Cerulli, Projetti, Aisa, & Rizzo, 1996; Jonathan Chappell & Limpisvasti, 2008; Hewett, Lindenfeld, Riccobene, & Noyes, 1999; Mandelbaum, Silvers, Watanabe, & al, 2005; Myer, Brent, Ford, & Hewett, 2008).

Jump training, also referred to as neuromuscular training, is a set of exercises which attempts to alter forces about and within the knee in order to reduce knee injuries. Some of the changes are simple such as increasing knee and hip flexion when landing. Exercises that could be part of jump training are plyometric (explosive movements). These exercises are used to achieve strength and neuromuscular control which also assist with strength, power, and speed gains resulting in improved athletic performance and potentially reducing injuries. Plyometric exercises generally begin with low intensity (i.e., skips) and progress to a high intensity (i.e., depth jumps). These exercises are used as part of the jump training to focus on the functional movements of the jump-and-landing technique. Previous surveys have examined high school coaches beliefs, attitudes, observations, and practices regarding smokeless tobacco, (Korn, 2000) wrestling and nutrition, (Sossin, Gizis, Marquart, & Sobal, 1997) drug use, (Shields, 1995) oral-facial injuries and mouth guard use (Berg, Berkey, Tang, Altman, & Londeree, 1998), but there are no published studies involving the role that coaches play in knee injury prevention. Therefore, the purpose of this study was to assess high school coaches' attitudes, and current practices regarding knee injury prevention among adolescent athletes.

Methods

A literature review revealed no previously developed self-administered survey to assess high school coaches about their understanding, attitudes, and practices regarding knee injury prevention and training programs. We

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

developed a survey to evaluate injury prevention attitudes and strategies adapted from a coaches' survey of wrestling and nutrition (Sossin, Gizis, Marquart, & Sobal, 1997). The survey was pilot tested and the final version consisted of 19 questions, including demographic questions.

We surveyed 185 coaches who were members of the Connecticut Interscholastic Athletic Conference during mandatory credentialing meetings during the spring 2007. After verbal informed consent and allowing coaches to ask questions regarding the survey and its purpose, they were asked to complete the self-administered survey with none refusing to do so. Demographics collected from the survey included age, gender, education level, athletic history as a member of an organized team, length of high school coaching employment, history of knee injury prevention training within the last three years, and sport coached. Further, coaches were asked if they coached a boy or girls' team; club, freshman, junior varsity or varsity; and if they were the assistant or the head coach. We also asked about experience with athletes sustaining an ACL injury within the last year and use of knee injury prevention practices (weight training, warm-up, cool-down, and jump training).

In order to determine the coaches' familiarity and understanding of injury prevention programs, we used a five-point ordinal scale (strongly agree to strongly disagree) asking if sport injuries are preventable and if serious knee injury (missing one week of games and/or practice, requiring treatment by a health care professional) was a problem among their athletes. We also asked the coaches if the following methods were effective in reducing the frequency of serious knee injury: stretching, weight training, knee bracing, and jump training.

Finally, coaches were asked about potential barriers to participating in knee injury prevention program training. Proposed barriers included time, interest, cost, credentials of the presenters, evidence of effectiveness in decreasing knee injury rates, evidence of increasing athlete performance, and availability of funds to support the training cost.

Summary statistics were calculated for all variables and we compared differences between coaches using chi-square and exact test. Significance level of $p<.05$ was used. This study was approved by the Institutional Review Board of Connecticut Children's Medical Center.

Results

Coach demographics

Fifty-one percent of the coaches were under the age of 40, a majority were male (78%) and 20% earned more than a BS degree. Over half of coaches surveyed (54%) competed on a college/national team, 56% had one-to-five years coaching experience, 65% coached a varsity sport, and 57% coached an ACL injury-prone sport (defined as boys/girls soccer, basketball, volleyball, football or field hockey). Twelve percent reported participating in a previous knee injury prevention training program (Table 1).

Use of training methods

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Among all coaches, routine training activities with athletes included warm-up (99%), cool-down (65%), weight training (48%), and jump training (44%). Weight training was significantly ($P < .05$) more likely to be used by coaches who: were younger than 40 years of age compared to those 40+ (57% vs. 38%), were male rather than female (53% vs. 28%), has personal experience on a college/national team (compared to high school team only (58% vs. 32%), had more than one year of coaching than less than one year of coaching (54% vs. 36%), and experience as a varsity coach than a lower level (55% vs. 30%).

Cool down training was more likely to have been used by coaches who competed on a college/national team than coaches who only played on a high school team (72% vs. 56%, $p<.05$) and had less than one year of coaching (73% vs. 55%, $p<.05$). Coaches who competed on a college/national team were also more likely to use plyometrics (51% vs. 35%), as were those involved in an ACL injury-prone sport (53% vs. 30%), and those who participated in a knee injury prevention program (KIPP) (73% vs. 39 %).

Attitudes regarding the reduction of knee injuries

There were no differences among the coaches on their attitudes about ACL injury rates in boys versus girls, stretching, and weight training based upon age, gender, level of education, highest level of competition, years coaching, level of coaching, coaching an ACL injury-prone sport or participation in a KIPP. Coaches with more than a BS degree were more likely to believe knee bracing was not an effective way to reduce the frequency of knee injuries as compared to those with less education (39% vs. 20%, $p<.05$). The percentage of coaches reporting that plyometric training was effective was higher among coaches of an ACL injury-prone sport (63% vs. 38%, $p<.05$) and among those who personally participated in a KIPP (77% vs. 47%, $p<.05$).

Factors affecting participation in a knee injury prevention training program

Coaches reported time (73%), interest (63%), and cost (60%) as the most important factors affecting their participation in a KIPP. Less frequent reported factors included credentials of the presenters (44%), evidence of effectiveness in decreasing knee injury rates (43%), evidence of increasing athletic performance (31%) and availability of funds to support the training cost (25%).

Discussion

In this survey, high school coaches reported notable variation in the use of routine training practices and use of methods to specifically reduce knee injuries. Coaches who were younger, had competed at the college/national level, or reported more than one year of coaching experience were more likely to use training methods such as weight training, cool down, and jump training. Coaches who used jump training were more likely to coach ACL injury-prone sports and to have previously participated in a knee injury prevention training program.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

In 1995, Arendt and Dick presented their findings of the significant discrepancy in ACL injury rates between males and females at the NCAA level. There has been a significant increase in research to determine the cause of ACL injuries in general as well as how to prevent them (Arendt & Dick, 1995). One aspect of this research has been to look at the biomechanical factors associated with these primarily non-contact injuries. The best known of these original studies originated from Cincinnati where the connection between hard landings, valgus knee positioning (knock-kneed), and ACL strain was presented (Hewett, Stroupe, Nance, & Noyes, 1996). There are a multitude of risk factors involving ACL injuries therefore, further efforts are needed to identify these factors.

Several authors have established risk factors for serious knee injuries as well as programs directed at reducing them (Chappell, Yu, Kirkendall, Almekinders, & Garrett, 2000). Hewett et al. demonstrated the positive effect for females on both serious knee injuries and performance following a jump training and exercise program focused on soft landings and lower leg positioning in high school athletes (Hewett, Lindenfeld, Riccobene, & Noyes, 1999). Semi-professional male soccer players (Caraffa, Cerulli, Projetti, Aisa, & Rizzo, 1996), and US female soccer players (Mandelbaum, Silvers, Watanabe, & al, 2005) also demonstrated a positive effect with a similar training regimen, along with numerous other injury reduction and performance enhancement programs. (Jonathan Chappell & Limpisvasti, 2008; Gilchrist et al. 2008; Pasanen et al. 2008; Prodromos, Han, Rogowski, Joyce, & Shi, 2007). Studies that did not show any detrimental effect, questioned whether the failure to produce a positive effect was due to their sample size or duration of training (Berg, Berkey, Tang, Altman, & Londeree, 1998; Myklebust et al. 2003; Soderman, Werner, Pietila, Engstrom, & Alfredson, 2000). One of these studies by Myklebust and Skjolberg, (2008) has subsequently refined the training program for Norwegian handball players and produced a positive effect.

Despite its likelihood of being effective both at reducing serious knee injuries and improving performance, a majority of coaches in our study are not implementing injury prevention programs. Time, interest, and cost were reported as the most significant barriers affecting their participation in a knee injury prevention training program. These barriers are real and should be addressed. The use of injury prevention programs by some coaches in our study indicates that these barriers are neither universal nor insurmountable. Many authors have pointed out that the trends in ACL injuries are continuing and while many injury prevention programs have been designed and implemented, most schools even at the NCAA level do not utilize them (Agel, Arendt, & Bershadsky, 2005).

The barrier of time and cost could be minimized by coaches attending a clinic in their area that would educate them on proper technique and execution of the jump training program or by allowing a certified athletic trainer to run a program for their athletes. Additionally, coaches should seek out opportunities to become better educated and informed on comprehensive programs that would reduce any possibility of injury to their athletes. To address the interest barrier, we suggest activities that raise awareness among parents and athletes of the benefits of such programs. It is possible that when parents and athletes are made aware that this program exists, and what the statistics are for the incidence of ACL injuries, parents may want to learn more and in fact want their children to participate in the knee injury prevention program. In general, in order for there to be an

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

invested interest, everyone involved in the athletic program needs to be aware of the risks. Unfortunately, interest arises when injury arises among their team or child.

To assist with such barriers such as time, cost and interest, we recommend:

1) Education and training initiatives to inform coaches about the value of knee injury prevention programs
2) Standardize knee injury prevention programs to facilitate widespread adoption by coaches and athletic trainers.
3) Adopt, implement, and monitor knee injury prevention policy and practice guidelines for coaches at local, state and national levels.

Historically, there are examples of changes in coaching practice and training based upon study and new knowledge. New preventive practices have been implemented, with varying degrees of success, in concussion management, mouth-guard use, (Heintz, 1968) hydration/fluid replacement, (Casa, Armstrong, Hillman, & al, 2000) and heat-related illness (Binkley, Beckett, Casa, & al, 2002). The reduction of cervical spine and concussion injuries for instance, was brought to the forefront of the sports medicine community when the incidence of serious, permanent injuries were reported on in the 1960's, 1970's and 1980's in high school and college football (Torg, Vegso, Sennett, & Das, 1985). The high number of serious injuries issued in an era of rule and equipment changes in football has significantly reduced the number of cervical spine and head injuries (Powell & Barber-Foss, 1999). Other studies pointed out the high incidence of oral and dental injuries occurring in football due to unsatisfactory mouth guards, or lack of mouth guard use which have led to the mandate for the use of mouth guards in football and other sports. More recently, similar changes in fluid replacement and heat illness have been 'discovered' and addressed along with other issues facing today's athletes (Almquist et al., 2008).

Our study was performed on a sample of accredited high school coaches in Connecticut. The coaches surveyed attended a regularly required coaching certification/recertification course. The proportion of first time coaches was similar to all coaches in the state and therefore is a representative sample. It is also possible that different injury prevention and training practices exist in other states in New England and across the US.

The use of sport injury prevention practices such as the jump training program combined with a proper warm-up, weight training regimen and cool down could substantially create stronger athletes and reduce the incidence of injuries. Despite its effectiveness, most coaches are not using jump training as part of their routine practice to reduce knee injuries. These methods should be incorporated into training, which involves utilizing a proper warm-up, weight training regimen, jump training program (regarding the prevention of knee injury), and a cool down. Quite often, coaches and athletes are limited in regard to time and may elect to skip this important aspect of their training. However, a warm-up is essential because it prepares the body for work. The warm-up and cool-down are key components of a balanced conditioning program for athletes. If facilitated correctly, this warm-up contributes to productivity, performance enhancement and the prevention of injuries. The warm-up should provide some light exertion such as running in place for several minutes to then prepare the body for a dynamic warm-up which includes stretches or light plyometric exercises that assist with body flexibility. This method alone can help reduce the likelihood of an injury, but not necessarily knee injury.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Weight training also is an effective way to assist athletes to be injury free. Leg presses and squats can improve knee stability and help reduce knee injuries. The stresses of these exercises in regard to movements are more functional and offer natural stresses to the joints and muscles.

The jump training programs involves the education of athletes, a warm-up, and exercises aimed to increase flexibility, increase strength, increase proprioception, and to improve form and retrain the body to perform jumping exercises with proper mechanics. This training regimen can be incorporated as part of the practice routine, and/or for pre-season workouts.

The cool-down is a necessary component to assist the body to recover from the highly intense practice or workout program. This is also important because heart rates are elevated, there is increased blood flow to the muscles and overall the body is physiologically aroused; a cool down will assist in decreasing all of these activities in a gradual manner. It provides an excellent opportunity to address injury prevention exercises (i.e., specific stretches and routines). All of these methods added to a training program can contribute to reducing injury and enhancing performance.

Since coaches' knowledge and practices of injury prevention can widely vary, this survey was created to obtain preliminary information as baseline data to better understand what coaches are using and not using in their practices in regard to injury prevention. Replication of this study with a larger sample in a different geographical location would strengthen its generalizability. It would also be valuable to compare responses provided by athletic trainers who are more likely to be implementers of a plyometric training program.

Conclusion

The present study demonstrates that high school coaches report wide variability in their attitudes, knowledge, and practice of knee injury prevention training methods. Although some of the coaches had responded as utilizing some training methods that would assist in the prevention of knee injuries, not all of the coaches in the state of Connecticut are even aware that these programs exist. Additionally, they may not have been educated nor informed enough to practice these methods. It is important to note that knee injury prevention programs, such as jump training has proven to be successful in reducing knee injuries. Therefore, it would be beneficial for coaches to maintain current knowledge and practices about how to effectively develop and implement training programs while promoting injury prevention. Current methods to reduce knee injuries including warm-up, cool down, weight training, and jump training should be included as part of a comprehensive knee injury prevention program. It is important to note that coaches can have a positive effect on their players' enjoyment of sport participation and also increase the competitive ability of their players by improved training methods that act to limit the occurrence of knee injury.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

References

Agel, J., Arendt, E. A., & Bershadsky, B. (2005). Anterior Cruciate Ligament Injury in National Collegiate Athletic Association Basketball and Soccer: A 13-Year Review. *Am J Sports Med, 33*(4), 524-531.

Almquist, J. L., McLeod, T., Cavanna, A., Jenkinson, D., Lincoln, A., Loud, K., et al. (2008). Summary statement: Appropriate medical care for the secondary school-aged athlete. *J Ath Train, 43*(4), 417-428.

Arendt, E., & Dick, R. (1995). Knee injury patterns among men and women in collegiate basketball and soccer. NCAA data and review of literature. *American Journal of Sports Medicine, 23*(6), 694-701.

Berg, R., Berkey, D., Tang, J., Altman, D., & Londeree, K. (1998). Knowledge and attitudes of Arizona high-school coaches regarding oral-facial injuries and mouth guard use among athletes. *J Am Dental Assoc, 129*(10), 1425-1432.

Binkley, H., Beckett, J., Casa, D., & al, e. (2002). National Athletic Trainer's Association Position Statement: Exertional heat illness. *J Ath Train, 37*(3), 329-343.

Caraffa, A., Cerulli, G., Projetti, M., Aisa, G., & Rizzo, A. (1996). Prevention of anterior cruciate ligament injuries in soccer. A prospective controlled study of proprioceptive training. *Knee Surgery, Sports Traumatology, Arthroscopy, 4*(1), 19-21.

Casa, D., Armstrong, L., Hillman, S., & al, e. (2000). National Trainer's Association Position Statement: Fluid replacement for athletes. *J Ath Train, 35*, 212-224.

Chandry, T., & Grana, W. (1985). Secondary school athletic injury in boys and girls: a three-year review. *Phys Sportsmed, 13*, 106-111.

Chappell, J., & Limpisvasti, O. (2008). Effect of a neuromuscular training program on the kinetics and kinematics of jumping tasks. *AJSM, 36*(6), 1081-1086.

Chappell, J., Yu, B., Kirkendall, D., Almekinders, L., & Garrett, W. (2000). Knee kinetics and kinematics in different landing tasks: implication to anterior cruciate ligament injuries. *JBJS*.

Comstock, D., Yard, E., Know, C., & Manring, J. (2005). High school RIO (Reporting information online): Internet based surveillance of injuries sustained by US high school athletes, 2005-2006. Summary report.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Gilchrist, J., Mandelbaum, B. R., Melancon, H., Ryan, G. W., Silvers, H. J., Griffin, L. Y., et al. (2008). A Randomized Controlled Trial to Prevent Noncontact Anterior Cruciate Ligament Injury in Female Collegiate Soccer Players. *Am J Sports Med, 36*(8), 1476-1483.

Heintz, W. (1968). Mouth protectors: A progress report. *J Am Dental Assoc, 77*(3), 632-636.

Hewett, T., Lindenfeld, T., Riccobene, J., & Noyes, F. (1999). The effect of neuromuscular training on the incidence of knee injury in female athletes: a prospective study. *AJSM, 27*, 699-706.

Hewett, T. E., Stroupe, A. L., Nance, T. A., & Noyes, F. R. (1996). Plyometric training in female athletes. Decreased impact forces and increased hamstring torques. *American Journal of Sports Medicine, 24*(6), 765-773.

Korn, K. (2000). Coaches' attitudes towards smokeless tobacco and intentions to intervene with athletes. *J Sch Health, 70*(3), 89-94.

Lephart, S., Ferris, C., & Fu, F. (2002). Risk factors associated with noncontact anterior cruciate ligament injuries in female athletes. *Instr Course Lect, 51*, 307-309.

Lindenfeld, T. N., Schmitt, D. J., Hendy, M. P., Mangine, R. E., & Noyes, F. R. (1994). Incidence of injury in indoor soccer. *American Journal of Sports Medicine, 22*(3), 364-371.

Mandelbaum, B., Silvers, H., Watanabe, D., & al, e. (2005). Effectiveness of a neuromuscular and proprioceptive training room program in preventing anterior cruciate ligament injuries in female athletes: two-year follow up. *AJSM, 33*, 1003-1010.

Myer, G. D., Brent, J. L., Ford, K. R., & Hewett, T. E. (2008). A pilot study to determine the effect of trunk and hip focused neuromuscular training on hip and knee isokinetic strength. *Br J Sports Med, 42*(7), 614-619.

Myklebust, G., Engebretsen, L., Braekken, I., Skjolberg, A., Olsen, O., & Bahr, R. (2003). Prevention of ACL injuries in female team handball players. a prospective intervention study over three seasons. *Clin J Sports Med, 13*, 71-78.

Myklebust, G., & Skjolberg, A. (2008). *ACL injuries in Norwegian female team handball after the intervention*. Paper presented at the Conference Name|. Retrieved Access Date|. from URL|.

Pasanen, K., Parkkari, J., Pasanen, M., Hiilloskorpi, H., Makinen, T., Jarvinen, M., et al. (2008). Neuromuscular training and the risk of leg injuries in female floorball players: cluster randomised controlled study. *BMJ, 337*(jul01_2), a295-.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Powell, J., & Barber-Foss, K. (1999). Injury patterns in selected high school sports: a review of 1995-1997 seasons. *J Ath Train, 34*(3), 277-284.

Prodromos, C., Han, Y., Rogowski, J., Joyce, B., & Shi, B. (2007). A meta-analysis of the incidence of ACL tears as a function of gender, sport, and a knee injury reduction regimen. *Arthroscopy, 23*(12), 1320-1325.

Shields, E. (1995). Sociodemographic analysis of drug use among adolescent athletes: observations-perceptions of athletic directors-coaches. *Adolescence, 30*(120), 839-861.

Soderman, K., Werner, S., Pietila, T., Engstrom, B., & Alfredson, H. (2000). Balance board training: Prevention of traumatic injuries of the lower extremity in female soccer players. A prospective randomized intervention study. *Knee Surg Sports Traum Arthrosc, 8*, 356-363.

Sossin, K., Gizis, F., Marquart, L., & Sobal, J. (1997). Nutrition beliefs, attitudes, and resource use of high school wrestling coaches. *Int J Sport Nutr, 7*(3), 219-228.

Torg, J. S., Vegso, J., Sennett, B. J., & Das, M. (1985). The National Football Head and Neck Injury Registry: 14-year report on cervical quadriplegia, 1971 through 1984. *JAMA, 254*, 3439-3443.

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

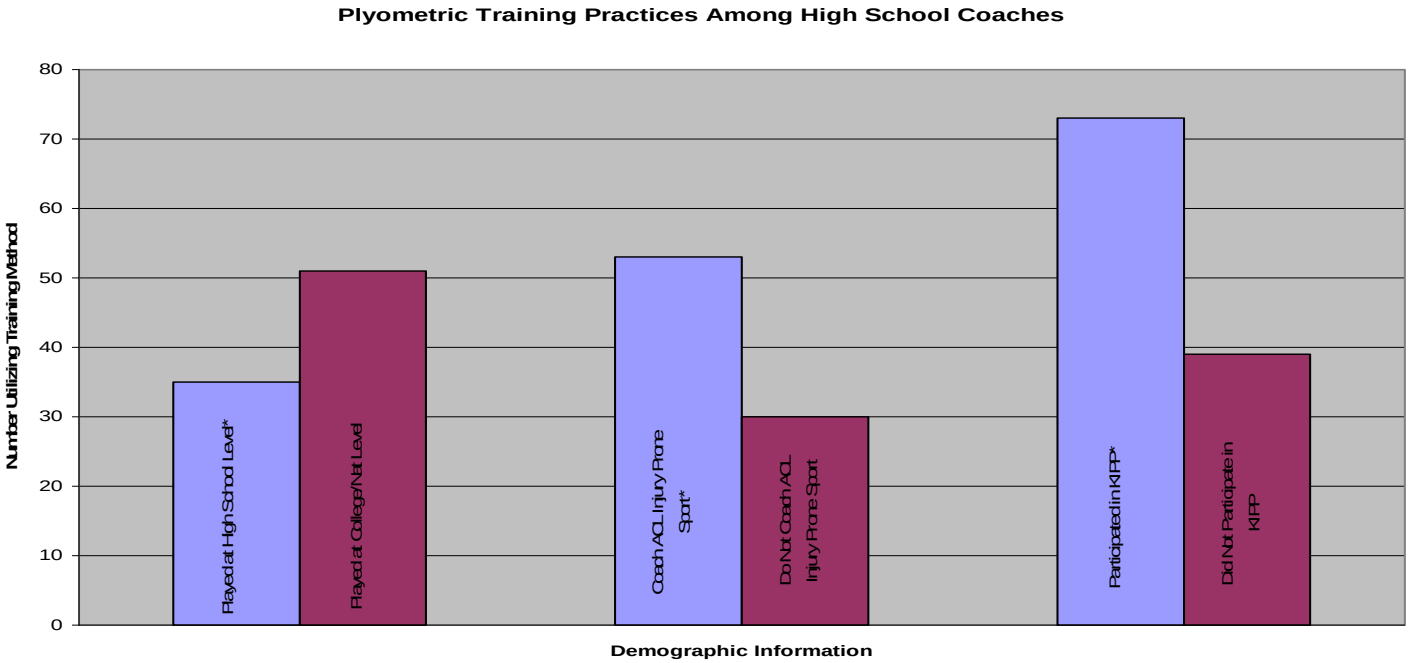
Table 1 Demographic, education, and work experience (n=185)*

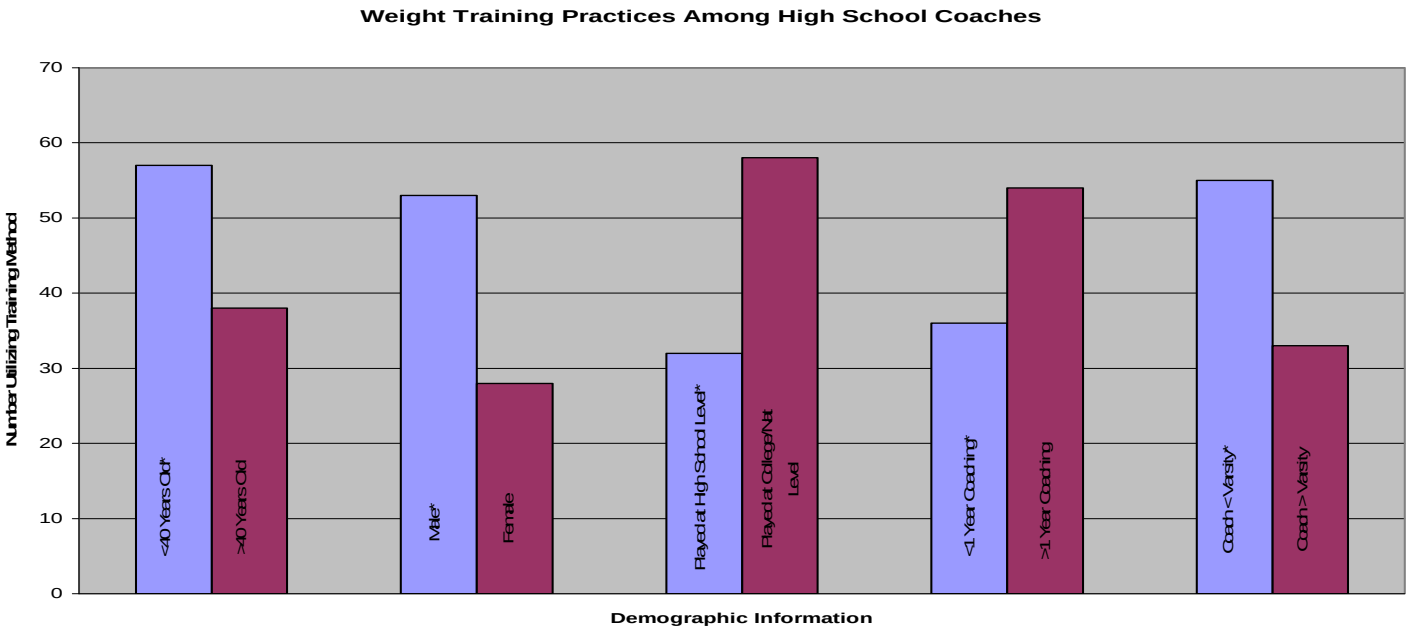
	n	%
Age:		
<40	95	51
40+	89	48
Gender:		
Female	39	21
Male	145	78
Education:		
At most a BS degree	148	80
More than a BS degree	36	20
Competed on organized team:		
Not beyond high school	71	38
Some College/National	109	59
HS coaching experience:		
< 1 year	53	29
1-5 years	104	56
> 5 years	20	11
Level coaching:		
No varsity	53	29
Varsity	121	65
Coach ACL injury-prone sport	105	57
Previous knee injury prevention training	22	12

*Missing data excluded from table

A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410

Fig 1. Use of various training practices among coaches by demographic variables (n=185)





A publication from the National Association for Sport and Physical Education (NASPE), an association in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
1900 Association Drive • Reston, Virginia • 20191 • www.NASPEinfo.org • 703.476.3410