

Vaulting Safety and the Use of Protective Headgear

Vaulting is defined as the performance of gymnastic and acrobatic exercises on a moving horse. This sport requires teamwork by the horse, the vaulter and the longeur who controls the horse in a circle.

In individual vaulting youth and young adults may demonstrate their individual abilities and skills in the gymnastics or skating, and by their own Kur or freestyle routines. In team vaulting all vaulters perform their compulsory exercises together with up to three vaulters on the horse at a time Their combined weight does not exceed 400 pounds on the horse.

Vaulting is one of the oldest known sports. In early Roman times the annual games consisted of chariot and horse racing as well as acrobatic displays on cantering horses. Vaulting, along with riding; fencing, archery and several other sports, was a permanent part of the educational program of young Romans of high social standing. During the middle ages knights practiced jumping onto horses and performing elegant exercises on horseback while in armor. During the Renaissance, vaulting was a preparatory exercise for equestrian disciplines but also evolved into an independent discipline in which the horse was replaced by a wooden model. It is at this point that exercises were developed which formed the basis of modern gymnastics.

Modern vaulting as it is practiced today, was first developed in Germany in the late 1940's with the first official rules being published in 1964. The first world championships were held in 1986 in Switzerland and in 1990 the sport was first included in the World Equestrian Games in Stockholm. The American Vaulting Association (AVA) was founded in 1969.

Vaulting is a hybrid sport involving a blend of the skills and discipline of the involved sports as well as blend of their safety standards. Although most of the activities would be familiar to gymnasts or dancers, like all other equestrian sports they must be adjusted to the movement and the rhythm of the horse. The horse is not a lifeless bit of gymnastic apparatus and no individual or team exercise can be performed satisfactorily unless it is done with consideration and in harmony with the horse.

Safety has been a major concern of modern vaulting. As safety standards have been developed for the sport, helmet use has been an issue which has been repeatedly reviewed by the Federation Equestre Internationale (FEI) in Europe. Helmet use in vaulting in the United States was initially reviewed by the U. S. Pony Clubs (USPC) 15 years ago. Several groups in the United States including the American Medical Equestrian Association, United States Pony Club and the American Riders Instructor Certification Program (ARICP) have questioned again the possible need for protective headgear.

Essentially all United States vaulters are members of the 60 teams comprising the American Vaulting Association (AVA) or are coached by AVA affiliated coaches. The annual safety reports of this organization as well as the reported injuries have been reviewed. Unfortunately injuries appear to have been recorded only for the national competition or for recognized events for most years. Although types of injuries were noted, it was not possible to tell which injuries occurred on the practice barrel as opposed to the horse and what injuries may have occurred in practice as opposed to competition. -A standardized reporting form has not, to this point, been utilized. Most injury categories report such low numbers, usually less than five each year, it is difficult to identify trend, calculate percentage incidence, etc. Standardized forms developed by the AVA safety committee for reporting vaulting injuries will hopefully come into wide-spread use this year.

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In the absence of adequate statistical data, it has been necessary- to fall back on information from retrospective surveys. An effort has been made in this study to evaluate the advisability of requiring the use of some variety of helmet for vaulting.

I was able to interview the coaches or managers for 40 of the 60 United States vaulting teams including almost all of the larger teams. They were asked about head injuries, either of their team or others in the past five years that required medical attention. While they could not be expected to remember every sprained ankle, it was felt that they could probably remember every significant head injury with which they had been involved.

The AVA statistics did not report any head injuries. In my interviews I was able to find only two head injuries occurring in the past five years. One injury occurred when a horse shied and a vaulter fell, striking her head on the ground. She developed a subcutaneous hematoma, but no medical attention was required and there was no evidence of neurologic injury. The other injury occurred in practice when a child fell from a horse and landed in a sitting position. Although the child's head never touched the horse or the ground, she did experience amnesia and confusion for the rest of the day and was diagnosed as having a concussion. It is doubtful if any helmet would have been helpful in this case.

While the United States has only about 500 active vaulters, Germany registers 40,000 vaulting competitors each year. I was able to interview Ulrike Rieder, president of the German Equestrian Federation's vaulting committee. She was aware of only one significant head injury in the past several years. This occurred when the vaulter's head struck a horse's hoof in a fall.

I was also able to interview vaulting coaches from Sweden and Denmark. They reported a similar absence of head injuries in their countries. It is of interest that Sweden and England did require helmets for vaulting for several years. Both countries decided that helmets did not contribute to the safety of their vaulters and discontinued their use.

United States and European vaulters have joined their gymnastic colleagues in taking the position that helmets are a hazard to their sport. Potentially, they adversely affect balance and can interfere with peripheral vision. An additional consideration in vaulting is that in many of the up side down positions, the vaulter's head is pressed against the horse's back or side in order to stabilize the vaulter while the horse is cantering. Any potentially movable object between the vaulter's head and the horse could be unsafe for the rider. I was able to find no one in the vaulting community who supports the use of helmets.

While some may wonder if vaulting can really have as low an injury rate, particularly head injuries, as its leaders claim, it is well to remember that this is a sport that has been very conscious of safety. Vaulting standards specifically related to safety, while not universally adhered to, have been developed by the FEI and the AVA and are as extensive as those available to any equestrian discipline. Education and enforcement of safety standards is improving in the United States.

Young horses are not permitted in competition (minimum age six years) and a horse that gives any evidence of being out of control is immediately eliminated from competition. The horse is controlled from the ground by a longeur who keeps the horse in a controlled 13 meter circle. This vaulting circle produces sufficient centrifugal force to ensure that an unstable vaulter will usually land well away from the horse. The environment is controlled by using deeper footing than is usually desirable for any other equestrian sport and by permitting no fences or other solid objects in the vicinity of the vaulting circle. Finally the vaulter is trained from the beginning how to dismount from a moving horse, either intentionally or unintentionally, in a controlled and safe manner. Additionally, vaulters are required to stay in good physical condition. Dismounts are practiced and falls critiqued as a routine part of training.

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After reviewing several hundred hours of videos of equestrian competitions range from backyard horse shows to major international events, it is the author's impression that no equestrian discipline gives much attention to techniques for safety dismounting a moving horse except vaulting. This may ultimately be vaulting's greatest contribution to equestrian safety. Even beginner vaulters, when they have a serious loss of balance or stability, are taught not to attempt to recover or hold on to horse or tack. They push away from the horse and accept a rolling controlled fall.

Although it may seem that the vaulter is at significant risk of head injury because of the height of the horse's back, it is probably worth noting that, by comparison, the higher of the gymnast's uneven bars is placed at 40 inches and the rings are at 105 inches. In the language of horses that would be the equivalent of 22 and 26 hands. The control of environmental hazards is quite similar in the two sports. It is interesting that equestrian disciples, even at the level of international competition, have generally not taken the seemingly obvious step of objectively measuring the shock absorbency of various footing and reported this in some standard recognizable form for the benefit of competitors, coaches and ring or course designers. This might be a useful engineering pursuit for vaulting or some other group.

In the National Horseback Riding Injury Survey reported by the National Center for Injury Prevention and Control at the Centers for Disease Control, and the Harborview Injury Prevention and Research Center, 33% of the injuries occurring in riders under age 25 were head injuries. In the National Electronic Injury Surveillance System (NEISS) of the U.S. Consumer Safety Commission report for 1995 head injuries are involved in 11.3% of emergency room treated injuries occurring in horse related activities.

My survey of vaulting injuries shares the limitation of all retrospective surveys and involved quite small numbers. It does have the advantage of involving reports on a majority of United States vaulters and a comparison with the much greater European vaulting communities and their experience

Head injuries have been quite rare in the modern vaulting experience in the United States and Europe. In both areas injuries have been primarily lower extremity injuries and have been comparable to the injuries usually seen in gymnastics and skating. It is the author's impression from talking to numerous coaches that the incidence of upper extremity injuries, and especially spine injuries, has been much less than is the case for gymnastics. It is hoped that more complete injury statistics will be available in the next few years permitting a clearer picture of the actual incidence of various injuries and the circumstances under which they occur.

While it is tempting to assume that helmets should contribute to the safety of vaulters it may be well to remember how often seemingly reasonable assumptions in medicine have been finally proven to be wrong. A current example is the long standing assumption that beta carotene supplements should reduce the risk of cancer. Finally at the completion of the Harvard Physician's Health Study in 1995 almost everybody was surprised and disappointed to find no significant evidence of any benefit from beta carotene supplements. Even more surprising, the multicenter Beta : Carotene and Retinol Efficiency Trial (CARET) revealed a 28% increase in lung cancer and a 17% increase in mortality in the group taking the vitamins. Because of obvious ethical considerations, the study was discontinued 21 months before it was scheduled to be completed.

Although we might believe that vaulters would benefit from the use of helmets, there is at this point no evidence of the existence of a head injury problem in vaulting. It is perhaps instructive to note that in the two countries with a trial of helmet use each independently decided to discontinue their use. As was mentioned earlier vaulting is a hybrid sport. While the equestrian community has been moving toward requiring more body armor for its participants and establishing standards for headgear, vests and boots, the gymnastic community has resisted the use of any impact protectors attached to the participant. It may well be that the gymnasts and vaulters are correct in their assertion that helmets would not contribute to safety and could be a safety hazard. Hopefully, adequate data will be available in the next few years to determine with more certainty whether there is a significant head injury hazard for the modern vaulter

Robert Faulkner, MD
Newton Professional Court, North Hill Street, Covington, GA 30209