

RISKS OF TREADMILLS IN HEALTH/FITNESS FACILITIES:

Ready, Steady, Go?

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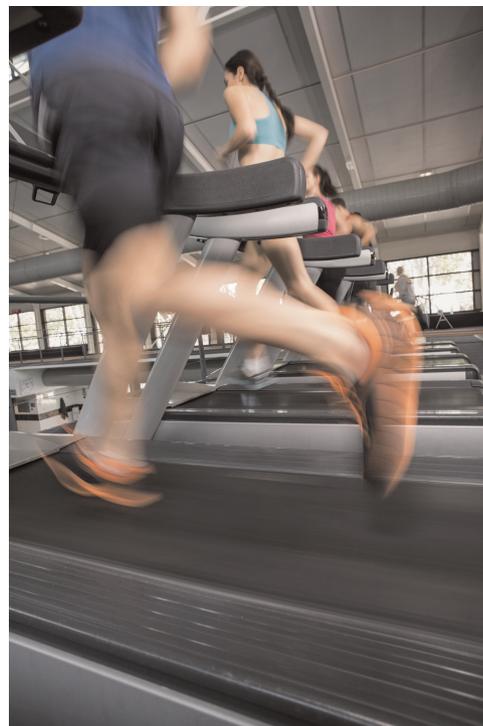
Learning Objective

1. To understand and identify the sources of hazards and associated risks with treadmills in health/fitness facilities.
2. To be able to develop and implement risk management strategies to control and minimize risks pertaining to the provision and use of treadmills in health/fitness facilities.

Key words: Health/Fitness Industry, Safety, Injuries, Risk Management, Legal Liability, Treadmills

INTRODUCTION

Physical inactivity is associated with most chronic diseases (*e.g.*, type 2 diabetes, heart disease, stroke, osteoporosis, and certain cancers including colon and breast cancer), decreased total and quality years of life, and premature death (3). It mostly affects the developed and developing countries because of busier and less activity-friendly built environments (5). Government policies have been developed that promote moderate-to-vigorous cardiorespiratory training on most days of the week with a combination of muscle-strengthening activities necessary to improve and maintain physical fitness and health (17). As a means toward this end, treadmills have become one of the most popular types of motorized fitness equipment in health/fitness facilities that allow people to fit personalized exercise into their busy schedules. Notwithstanding its common use and associated health benefits, the risk of injuries and adverse outcomes caused by treadmill use and pertinent legal liability claims are not unlikely. Although similar risks are associated with other pieces of fitness equipment as well, the focus of this article will be on motorized treadmills (1).



According to the U.S. Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System, between 2012 and 2014 there were approximately 72,900 injuries (24,300 injuries per year) associated with treadmills, which was the highest number in the exercise equipment category (16). According to available fatality reporting during the 10-year period between 2003 and 2012, there were 30 reported deaths associated with treadmills, or an average of approximately three per year. According to recent research in Australia that analyzed the Victorian Emergency Minimum Dataset (VEMD), which includes 39 Victorian hospitals with a 24-hour emergency service, between July 1999 and June 2013, treadmill injuries (n = 167, 9%) were among the most common injuries in fitness facilities and the most common of all involving motorized cardiovascular equipment (6). The most common cause associated with treadmill injuries in fitness facilities was trip and fall (n = 118, 70.7%) followed by overexertion and strenuous or unnatural movement (n = 17, 10.2%). Awkward landing or twisting during exercise (n = 13, 7.8%) and hit/contact with equipment or wall (n = 2, 1.2%) also were reported as causes associated with treadmill injuries. Knowing the types and causes of injuries undoubtedly is very important in developing injury-prevention strategies in exercise environments (7). However, the analysis of the hospital emergency department injury surveillance systems such as the VEMD is limited to the information the case narratives provide and therefore cannot adequately identify the sources of hazards associated with the risk of injury. For example, although trip and fall has been identified as a major cause for treadmill injuries, it does not answer why and how the trip and fall occurred so that it can effectively be controlled and prevented from happening again.

IDENTIFYING SOURCES OF HAZARDS AND RISKS

Health/fitness facility operators have a duty of care to their users, visitors, customers, and employees to protect their health and safety. If a facility operator's failure or omission to meet certain standards of practice causes harm to people, he or she can face the risk of legal liability. Therefore, having a comprehensive risk management plan is crucial to provide and maintain an injury-free, safe, and healthy environment in health/fitness facilities (13). According to the international standard on risk management, *ISO 31000:2009, Risk Management—Principles and Guidelines*, the risk management process involves (a) establishing the context (setting organizational objectives, identifying relevant laws, regulations, industry standards and practices), (b) identifying hazards and associated risks, (c) analyzing risks (the likelihood and consequences of risks), (d) evaluating risks (prioritizing risks according to the level of risk on a risk matrix), and (e) controlling risks (developing and implementing the most effective hazard control measures to minimize or eliminate risks that are reasonably practicable in the circumstances) (9). Continuous communication, monitoring, and reviewing are essential throughout the risk management process to ensure that the control measures are being implemented effectively, and modifications are made if necessary.



Identification of hazards and associated risks is the most important element for a risk management program to be successful. A hazard left unidentified would result in associated risks being excluded from the whole risk management process. Hence, most often, hazards and risks are incorrectly used interchangeably. The international standard on risk management, *ISO 31000:2009*, defines *hazard* as a source of potential harm and *risk* as the possibility that harm (death, injury, illness) might occur when exposed to the hazard (9). Identifying hazards and setting achievable and realistic hazard control measures (measured against a cost-benefit analysis) can enable an organization to minimize risks and make the success of organizational objectives possible.

Although hazard identification is the first step in assessing and managing risks, it should not be treated as a one-off activity. For example, in addition to routine inspections of the facility to continuously identify and report hazards, health/fitness facility operators should keep abreast of potential hazards by following product recalls announced by equipment manufacturers and government agencies such as the CPSC. In the event of injuries caused by product defects, the manufacturer likely would be held liable for injuries (*i.e.*, product liability/strict liability); however, health/fitness facility operators failing to adhere to the recalls also could be held liable for negligence. According to the CPSC, there have been 11 product recalls by high-profile international treadmill manufacturers between 1998 and 2008, affecting more than 168,000 units of equipment (16). The major type of risk involving these recalls was unexpected acceleration/deceleration of speed (n = 7, 64%) causing users to lose balance and fall off. The most common sources of hazards for this type of injury risk were overheating of the electric circuitry of the treadmills (n = 3, 27.3%), malfunctioning of the electric control unit (n = 2, 22%), or a programming defect (n = 2, 22%) (Table). There was one recall case involving the extreme risk of deadly

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TABLE: Sources of Hazards and Type of Risks Involving CPSC Treadmill Recall Cases Between 1998 and 2008

Hazards	Risks					Total
	Fire	Electric shock	Unexpected acceleration/ deceleration of speed	Unexpected elevation	Damaged and exposed parts	
	Consequences					
	Property damage/burn/ injuries/smoke damage to the area	Electrocution/ death	Lose balance/fall/injury	Lose balance/ fall/injury	Bystanders can get hit/injury	
Electrical short in the motor	1	1				2
Overheating of circuitry	2		1			3
Malfunctioning of the electric control unit			2			2
Programming defect			1	1		2
Improper assembly/ instructions					1	1
Dust accumulating inside treadmill hood	1					1
Unknown			3			3
Total	4	1	7	1	1	14

One type of hazard can be associated with more than one type of risk.

electrocution (9.1%) that affected more than 71,000 treadmills manufactured by eight companies.

SOURCES OF HAZARDS IN TREADMILL INJURY CASES

Case law is one of the primary sources of information that can help to identify sources of hazards and injury risks in exercise settings resulting in a serious risk of litigation (4,14). The following are recent exemplary cases that depict some of the most common sources of hazards resulting in serious treadmill injuries in health/fitness facilities.

1. Treadmill not turned off after use: In *Palmer v. Lakeside Wellness Center* (11), in the Supreme Court of Nebraska, the plaintiff, unaware that the treadmill was left running by the last user, stepped onto the treadmill from the back and was thrown off the belt into an elliptical training machine located behind her. Palmer asserted that the location of the treadmill was poorly lit, and the facility was so loud that she was unable to hear whether the machine was operating.
2. Non-secure exercise ball in the location: In *Roer v. 150 W. End Ave. Owners Corp.* (12), in the Supreme Court of New York, the gym operator's failure to secure a gym ball resulted in the severe injuries of the plaintiff, who fell off a treadmill and lost her balance as a result of

a rolling gym ball hitting and getting stuck under the running tread of the treadmill.

3. Malfunctioning of the control unit — sudden increase of incline function: In *Geczi v. Lifetime Fitness* (6), in the New York Court of Appeals, as the plaintiff started to increase the speed of the treadmill while running, the incline function engaged on its own, and the machine began jerking violently. In an attempt to steady herself, she grabbed the side railing of the treadmill with both hands. At that point, she suffered a severe pull on her left arm resulting in dislocation of her shoulder. When she reported the incident to an employee, she was told that the club was aware of the malfunctioning treadmill. However, they did not take any preventive measures that could have avoided its use or warned the user of the defective nature of the treadmill before her injury.
4. Malfunctioning of the control unit — defective motion sensor: In *Malouf v. Equinox Holdings* (10), in the Supreme Court of New York, the plaintiff suffered serious injuries, scraping her knee and dislocating her shoulder as she fell off a treadmill that was already running when she embarked. The plaintiff asserted that she did not realize that the belt of the treadmill was already running because of the location of the treadmill in the

back row of the cardio equipment area with poor lighting or shadows. Expert testimony implied that a defective motor control unit of the treadmill caused the motion sensor not to operate to stop the moving belt of the treadmill when no one was using it. However, the facility had no logs or written policies or procedures regarding preventive maintenance for treadmills.

5. Malfunctioning of the control unit — sudden increase of speed: In *Hague v. Summit Acres Skilled Nursing & Rehab* (8), in the Ohio Court of Appeals, the plaintiff had been walking on the treadmill for approximately a minute when the machine unexpectedly jerked and started increasing in speed. She tried to stop the treadmill by hitting the stop button several times, but it did not stop. When she called for help, no one responded. She lost her footing on the treadmill, and the treadmill pulled her legs back, but she held on to the front bar of the treadmill for approximately three minutes. Eventually, she released the front bar and fell off the treadmill resulting in the breaking of her shoulders.
6. Failure to provide proper instruction and supervision: In the aforementioned case of *Hague v. Summit Acres Skilled Nursing & Rehab* (8), the plaintiff claimed that the defendants were negligent in failing to provide any instruction or supervision on the operation of the treadmill on her first day at the facility. Hague contended that she could not ask for any assistance when she entered the facility because there was no one there to ask. Furthermore, she had to rely on the instructions on the operation of the treadmill that she received from a fellow member.

RISK MANAGEMENT RECOMMENDATIONS

Health/fitness facilities commonly house treadmills that provide an excellent opportunity to meet people's need to exercise and achieve health and fitness goals. However, a risk of injuries can result from the use of treadmills that can be caused by various sources of hazards. The analysis of product recalls and case law presented in this article shows that major sources of hazards cause fall-related treadmill injuries and are caused by



equipment malfunction and defects, improper or lack of preventive maintenance programs, poor location of the treadmills, and a lack of instruction and supervision. Although constant supervision of all exercise areas in health/fitness facilities is crucial, it also is recommended strongly to have proper signage that includes operating instructions and risk warnings next to exercise equipment. In *Hague v. Summit* (8), the instructions and the risk warnings about treadmill usage clearly posted next to the machine was an effective defense against the negligence claim that the plaintiff was injured as a result of the fitness instructor's failure to provide adequate supervision and instruction on the treadmill usage.

Often, when treadmill users fall, they may be caught in the motion of the belt and thrown backward. On landing, their head may slam against the treadmill, surrounding structures, other equipment, or even on the ground. This type of fall is especially dangerous if the treadmill is placed near a wall because severe head trauma, fracture, open wounds/bleeding, and even death can occur as a result. Industry standard-setting organizations such as the American Society for Testing and Materials (ASTM) require a minimum space of 2 meters behind and 0.5 meters on each side of the treadmill (2). Some leading treadmill manufacturers require up to 2 meters of space behind and 0.5–0.6 meters on each side (15). These space allocations are not mandatory; however, they can be used as the standard of duty of care in a negligence case where the plaintiff experienced harm as a result of falling off a treadmill and hitting against nearby equipment, mirror, window, or wall (4). However, providing that effective risk management strategies are implemented, health/fitness facility operators can control the hazards and minimize the foreseeable risk of injuries and adverse health outcomes as far as is reasonably practicable.

RISK MANAGEMENT STRATEGIES

- Treadmills should be located in health/fitness facilities according to the requirements of the manufacturer guidelines. If the manufacturer does not provide specific measurements or contradicts the ASTM standard, the greater recommended distance behind a treadmill should be followed to secure the safest free exit from a treadmill.
- The area surrounding the treadmills should be clear of any other equipment within the required space allocations. Loose equipment, such as exercise balls, should be securely stored away from the treadmills.
- Health/fitness facilities should have a preventive maintenance program for the treadmills and have them regularly maintained, cleaned, and serviced only by qualified personnel and technicians.
- Treadmills in health/fitness facilities should be regularly inspected for any sources of hazards, including malfunctioning, wear and tear, and cleanliness. A logging system should be used that shows when the inspections were

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conducted and any identified issues and preventive measures put in place.

- Proper instruction on the use of treadmills should be a part of an orientation program for all new members.
- Health/fitness facility operators should hire or contract only with fitness professionals holding nationally accredited qualifications.
- Health/fitness facility operators should ensure that fitness professionals conducting the instruction on how to use treadmills properly have received specialized training and are well versed in this area.
- Signage including general guidelines and illustrations demonstrating how to use treadmills should be displayed in an area accessible and visible to all members in the cardiovascular training zone.
- Users should be instructed to bring a treadmill to a complete stop and turn it off before disembarking. This rule should be reinforced through signage and constant supervision in the facility.

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BRIDGING THE GAP

Treadmills in health/fitness facilities help keep people physically active, fit, and healthy. However, a serious risk of injuries resulting from falling off treadmills can occur that can be caused by various sources of hazards. Health/fitness facility operators can satisfy their duty to protect the health and safety of their members by implementing effective risk management strategies to control and monitor the hazards and minimize the associated risk of injuries and subsequent legal liability.