From Sprint to Marathon: Physiological Adaptation of a Professional Dancer to Long-Term Theatrical Contracts

[1]Valeriia Zhyltsova
[1]Dance With Me Long Island Studio Manager New York City, USA

Received: 10th Dec 2025 | Received Revised Version: 16th Jan 2026 | Accepted: 28th Jan 2026 | Published: 12st Feb 2026

Volume 08 Issue 02, 2026 | 10.37547/tajiir/Volume08Issue02-07

Abstract

The study is oriented toward an integrated comprehension of the physiological, biomechanical, and psychoemotional determinants of a dancer's professional transformation during the transition from the domain of competitive ballroom dancing to the entertainment-show format on ocean cruise liners. The transition is analyzed on the basis of the author's clinical and training case material and is interpreted through the figurative continuum from sprint to marathon, in which competitive ballroom dancing, grounded predominantly in submaximal anaerobic power and short-term interval loads, is contrasted with the functional profile of onboard work that presupposes the predominance of prolonged aerobic endurance, stable tolerance of monotonous repetitive actions, and specific sensorimotor adaptation to continuously changing support characteristics. Within the study, the neurophysiological mechanisms of neuroplasticity underlying the formation of the sea legs phenomenon are examined in detail; the structure and frequency of injuries are analyzed with an emphasis on the redistribution of mechanical loads from the distal segments of the lower limb (the ankle joint) to proximal links, namely the knee joint and the lumbar spine; and the phenomenon of a nutritional paradox is described under conditions of practically unlimited access to buffet-style nutrition onboard. On the basis of integrating data from sports medicine, maritime physiology, and dietetics, personalized protocols for the periodization of the training process and for nutritional support strategies have been developed, aimed at optimizing the dancer's functional performance capacity and reducing the probability of developing relative energy deficiency in sport syndrome (RED-S) under the conditions of a prolonged contract cycle of 6–9 months.

Keywords: professional dancers, physiological adaptation, cruise contract, aerobic endurance, sea legs (vestibular adaptation), overuse injury burden, RED-S, nutritional periodization.

Cite This Article: Zhyltsova, V. (2026). From Sprint to Marathon: Physiological Adaptation of a Professional Dancer to Long-Term Theatrical Contracts. The American Journal of Interdisciplinary Innovations and Research, 8(2), 50–60. https://doi.org/10.37547/tajiir/Volume08Issue02-07

Introduction

Over the past two decades, the contemporary entertainment industry has undergone changes so profound that the dance-genre performer has, in effect, evolved into an aesthetic athlete whose functional characteristics are comparable to, and in certain parameters even exceed, those of elite Olympic-level athletes. Whereas dance was previously interpreted primarily within coordinates of artistic expressiveness and stage plasticity, within contemporary evidence-based medicine professional choreography is regarded as high-intensity motor activity that demands a unique combination of explosive muscular power, local endurance, extreme joint mobility, and high cognitive plasticity.

In this context, the author's professional trajectory, formed within the rigidly regulated environment of competitive ballroom dancing, renders the transition into the performer roster of Royal Caribbean International (RCI) not merely a change in employment format, but a substantial intervention into the organism's established homeostatic equilibrium. Ballroom dancing, especially in its competitive version, is close in its bioenergetic structure to sprint disciplines and constitutes a series of brief, ultra-intense efforts during which heart rate reaches peak values within a matter of seconds [1]. In contrast, contract work on a cruise liner is functionally analogous to a marathon distance: across 6–9 months, a continuous cycle of physical and psychoemotional loads is formed, in which the key determinants of success become the speed of recovery, the resilience of the immune system, and the efficiency of energy metabolism.

Royal Caribbean, as one of the recognized leaders of the cruise industry, imposes exceptionally high requirements on its performance personnel. The production process begins at the rehearsal base in North Miami, where over the course of 6–8 weeks performers master from three to five full-scale show programs [2]. The total volume of work during this period can reach 300 hours, creating an enormous load on the musculoskeletal system and regulatory systems. Thereafter, upon going into operation, especially on vessels of the Oasis or Icon classes, the performer may be required to present up to 130 shows per year, not including parades, themed programs, and regulated duties for ensuring passenger safety [2].

The study's key hypothesis proceeds from the assumption that successful adaptation of a ballroom dancer to the work regime on a cruise liner is fundamentally impossible without a purposeful reconfiguration of the body's energy systems. In competitive ballroom dancing, particularly within the Latin American program, the anaerobic-glycolytic pathway of ATP resynthesis predominates; motor activity is constructed as work at maximum revolutions for 90–120 seconds followed by a period of relative rest. By contrast, a musical-theater or revue performer on a liner must maintain high performance capacity for 45–60 minutes, often executing two to three shows per evening. Such a format requires an established aerobic base, developed mechanisms of fat oxidation, and the ability for rapid lactate utilization directly during performance.

An additional modifying factor is the specificity of the cruise-ship environment, which introduces a unique biomechanical variable: instability of support. Constant low-frequency vibration of the hull, as well as ship motion (roll, pitch, heave), creates an ongoing sensory conflict among the vestibular, visual, and proprioceptive systems [3, 4]. The formation of stable adaptation to these conditions, known as acquiring sea legs, is accompanied by increased energy expenditure for postural control, a factor that is often underestimated when calculating energy balance and planning recovery measures.

The nutritional dimension of onboard life constitutes an independent layer of problems. Formally, performers have practically unlimited access to food in around-the-clock buffets (Crew Mess and partially Guest Buffet), which creates an illusion of abundance and complete satisfaction of the body's needs. However, the qualitative composition of available macronutrients frequently does not correspond to the requirements of high-intensity motor activity: refined carbohydrates, technologically processed fats, and excessive sodium predominate, against a relative deficit of complete protein and micronutrients [5]. As a result, a risk of latent nutrient deficiency emerges against the background of an overall caloric surplus. For a dancer accustomed to strict control of body mass and body composition within the aesthetics of ballroom dancing, such a mismatch may result either in undesirable increases in the fat component (Cruise Ship 10 pounds) or in the development of disordered eating patterns and relative energy deficiency in sport syndrome (RED-S), associated with the risk of stress fractures and endocrine dysfunctions [6, 7].

The **objective** becomes the development of a scientifically grounded strategy of physiological conversion that includes rational periodization of the training process, optimization of recovery protocols, and construction of adequate nutritional support under the conditions of a prolonged cruise contract.

The scientific novelty of the work consists in an interdisciplinary integration of sports physiology, maritime neurophysiology, and dietetics into a unified sprint to marathon model that simultaneously describes energy reconfiguration (anaerobic power → aerobic robustness), sensorimotor re-weighting during the formation of sea legs, a shift in the injury profile (distal → proximal segments), and the nutritional paradox of buffet eating as a risk factor for RED-S.

The author's hypothesis is based on the assumption that a purposeful restructuring of energy supply toward an aerobic base and lactate utilization, supplemented by balance training for sensorimotor adaptation to unstable support and by structured nutritional periodization, reduces the risk of cumulative overuse injuries and manifestations of RED-S during a 6–9-month cruise contract while preserving high onstage performance capacity.

Materials and Methods

To ensure the validity and scientific substantiation of the conclusions, the report employs a comprehensive approach that combines the method of a systematic literature review with a comparative analysis of empirical data. The study relies on the methodology of evidence-based medicine and integrates findings from adjacent fields, including sports physiology, biomechanics, maritime medicine, and dietetics, which makes it possible to consider the phenomenon of a dancer's adaptation to working conditions on a cruise liner within an interdisciplinary framework.

The informational base was formed through analysis of peer-reviewed publications presented in specialized outlets such as Journal of Dance Medicine & Science, Medicine and Science in Sports and Exercise, International Maritime Health, and Journal of Strength and Conditioning Research. Within this body of sources, several data clusters were identified and systematized. The first cluster included studies that compared the physiological profiles of elite ballroom dancers and musical-theater performers, with emphasis on VO_2max indices, heart rate, and lactate levels under standardized loads [1, 10]. The second cluster encompassed biomechanical and epidemiological characteristics of injury patterns in professional dance ensembles and on cruise vessels, as well as works devoted to the features of postural control under conditions of maritime motion [11, 14]. The third cluster was linked to nutritional aspects: assessment of macro- and micronutrient requirements in aesthetic sports, analysis of the risk of developing relative energy deficiency in sport syndrome (RED-S), and the specifics of eating behavior and dietary patterns among seafarers [6].

A comparative analysis of the disciplines was carried out on the basis of a predefined set of quantitative metrics that allow differences in load characteristics and their physiological consequences to be objectified. The intensity of motor activity was assessed through the percentage of maximal heart rate (%HRmax) and oxygen consumption in ml/kg/min. The metabolic cost of work was characterized by energy expenditure in kcal/min and by values expressed in metabolic equivalents (METs), which ensured comparability of different forms of activity on a single scale. Additionally, injury density was analyzed, expressed as the number of injuries per 1000 hours of dance exposure hours, which made it possible to assess not only acuity but also the cumulative risk of damage across different professional contexts.

In developing practical recommendations for adapting a dancer to the conditions of a prolonged cruise contract, theoretical modeling was used, grounded in the concept of allostasis, which interprets the maintenance of stability through dynamic change. The transition to work on a liner is interpreted as a powerful allostatic stressor that requires restructuring not only of the muscular and cardiorespiratory systems, but also of neuroendocrine regulatory mechanisms. In addition, a block periodization model was applied, modified with consideration of the specificity of performing arts, where there is no clearly delineated season and off-season in the traditional sporting sense. Such an adaptation of the model makes it possible to structure the training and recovery process under conditions of an almost continuous performance schedule.

Results and Discussion

An analysis of the available literature demonstrates fundamental differences in the character of the body's physiological response to load in competitive ballroom dancing and in musical theater, which objectively necessitates purposeful functional retraining. Elite ballroom dancers are characterized by high indices of aerobic power: according to data from Bria and coauthors, maximal oxygen consumption (VO_2max) in men reaches 59.6 ± 5.1 ml/kg/min, and in women 51.2 ± 6.2 ml/kg/min, which is comparable to the level of middle-distance runners [1]. At the same time, a paradoxical feature is the fact that competitive activity in ballroom dancing is realized predominantly within the anaerobic zone. Under conditions of competition modeling in women dancers performing the Latin American program, heart rate reached 106.7 ± 5.9% of the anaerobic threshold (AT), indicating the dominance of brief yet extremely intense glycolytic loads [1].

In the performance practice of musical theater, the energy profile of the load has a different configuration and shifts into the zone of mixed aerobic–anaerobic productivity.

According to Wyon and coauthors, peak oxygen consumption in musical performers is lower (in women 55.6 ± 4.42 ml/kg/min); however, the structure of the work is fundamentally different: performance duration is 45–90 minutes, which requires stable maintenance of submaximal intensity across a prolonged time interval [10]. A key modifying factor is the necessity of combining vocal and motor activity. During simultaneous singing and dancing, performers exhibit reductions in respiratory rate and tidal volume, which constrains ventilatory capacity, contributes to the development of hypoxia in working muscles, and accelerates lactate accumulation to values of 6–8 mmol/L, even with a smaller volume of mechanical work compared with pure dance [10]. In the context of adaptation, this means that breathing patterns typical for competitive ballroom dancing (rapid shallow breathing or breath holding at the moment of exertion) lose functional suitability under musical-theater conditions, where breathing is subordinated to the logic of vocal phrasing and must simultaneously sustain phonation and muscular work capacity.

Table 1 will present a comparative characterization of the physiological requirements of the disciplines.

Table 1. Comparative characterization of the physiological requirements of the disciplines (prepared by the author on the basis of [1, 9, 10, 20]).

Physiological parameter	Competitive ballroom dancing (Latin / Standard)	Musical theatre / cruise show	Significance for adaptation
Load profile	Interval-based: 90–120 seconds of work, pause.	Continuous / interval-based: 45–60 minutes per show.	The necessity of developing the oxidative capacity of glycolytic fibres (IIa).
VO2max (women)	~51.2 ml/kg/min	~45–55 ml/kg/min	An aerobic base is present, but specificity for prolonged work is required.
Peak lactate concentration	8.9–13.3 mmol/l	4.0–9.0 mmol/l	Ballroom dancers are accustomed to lactate accumulation at the end of a dance. In show performance, it is necessary to be able to utilise lactate while continuing to move.
Heart rate (% of HRmax)	85–100% (plateau during the dance)	60–95% (variability, peaks within numbers)	The Heart Rate Recovery parameter between numbers is important.
Biomechanical focus	Static core and upper body, explosive lower body, isometrics.	Whole-body dynamics, floorwork, jumps.	Risk of back injuries when transitioning from a rigid frame to a mobile spine.

The literature indicates extremely high values of lactate concentration in athletes specializing in competitive ballroom dancing: after final rounds its level can reach

13.3 mmol/L [19]. Such values reflect high power and strong conditioning of the glycolytic component of energy supply. However, under the working conditions of a cruise liner, where a performer is often required to execute three shows in succession with rest intervals of approximately 30 minutes, the key factor of functional viability becomes not so much the capacity for intensive lactate production as the capacity for its efficient oxidation and use as a substrate for energy generation. If the habitual sprint-style work regime characteristic of competitive ballroom dancing is preserved, the probability of developing metabolic acidosis by the middle of the second performance is high, which will lead to deterioration of intermuscular coordination and a substantial increase in injury risk.

Work in a maritime environment forms fundamentally different biomechanical requirements for the postural control system as compared with shore-based theater stages. The constant movement of the platform associated with ship motion and hull vibration functions as a chronic mechanical stimulus that changes kinematics and the spatiotemporal organization of movement. Studies by Stoffregen and coauthors elucidate the mechanisms of postural adaptation to the maritime environment and the sea legs phenomenon [4, 8]. For individuals without maritime experience, an immediate reflex increase in stance width is typical, which expands the area of the base of support and reduces the risk of loss of balance. This strategy, while functionally justified from the standpoint of stabilizing the center of mass, conflicts with the aesthetic and technical canons of a number of dance styles, above all ballroom, where lower-limb work is often constructed along a single line.

An additional complication is the sensory conflict. Under terrestrial conditions, balance maintenance is ensured by coordinated interaction among the visual, vestibular, and proprioceptive systems. Onboard a vessel, the visual system loses the reliability of its reference cue (the horizon is visually displaced or entirely unavailable within an enclosed stage space), the vestibular apparatus registers accelerations that are not directly tied to motor actions, and an increased role in postural stabilization shifts to proprioceptive signals. As a result, the nervous system is forced to carry out a reinterpretation of sensory inputs and to alter their hierarchy of significance.

Maintaining an upright stance on a moving platform is accompanied by constant, often nonconscious activity of postural muscles, in particular the soleus muscle, deep trunk stabilizers, and the muscles of the pelvic girdle. Such background work creates an additional component of the overall daily load and increases energy expenditure without being directly linked to performance activity. Postural and balancing stereotypes formed over years of training on a stationary dance floor cannot be directly transferred to the maritime environment and require recalibration described as re-weighting of sensory inputs [12, 21]. During the first 48–72 hours onboard, pronounced fatigability and temporary discoordination may occur, due primarily to increased neuronal expenditure for redistribution of sensory priorities and the development of new stabilization strategies.

Epidemiological studies of injury patterns in the dance industry demonstrate a clear association among dance style, type of motor activity, and the predominant localization of damage [11]. A change in professional context, namely the transition from competitive ballroom dancing to work in the cruise-musical format, inevitably transforms the map of vulnerable zones and shifts risk emphases, which requires a reconsideration of both the structure of the training process and injury-prevention strategies (see Table 2).

Table 2. Comparative analysis of the injury profile (prepared by the author on the basis of [4, 11, 21]).

Localization / Type	Ballroom dancing (background)	Show / contemporary dance (goal)	Risk mechanism during the transition
Foot and ankle	Achilles tendinitis, bursitis (hallux valgus), metatarsalgia. Associated with heel use and footwork mechanics.	Lateral ligament sprains, metatarsal stress fractures, impingement.	A change of footwear (heels → jazz shoes / barefoot) alters landing biomechanics. Impact loading on the heel increases.
Knee joint	Meniscal injuries (rotation), but jumper's knee is less common.	Patellofemoral pain syndrome, patellar tendon tendinitis.	A sharp increase in jump volume and deep pliés. Insufficient quadriceps elasticity increases compressive loading.
Lumbar spine	Spasms of the spinal extensors (hyperlordosis).	Intervertebral disc herniations, spondylolysis.	A shift from static stabilisation to active mobility (waves, twists) and to partner lifts.
Hip	Femoroacetabular impingement (FAI) due to turnout.	Snapping hip syndrome.	Increased range of leg swings without adequate control.

Particular concern is raised by the injury structure on cruise vessels, where up to 50% of all medical visits are attributable to lower-extremity injuries [11]. The leading mechanism in their development is overuse damage arising against the background of cumulative fatigue and systematic work on hard surfaces. Stage platforms on liners, despite the presence of professional-grade flooring, are often supported by a steel base, which reduces the shock-absorbing properties of the surface compared with the traditional wooden sprung floors of ballroom halls and intensifies impact loading on the joint-ligament apparatus and osseous structures [13, 15].

The nutritional status of professional dancers is traditionally characterized by a high risk of insufficient energy availability. Studies show that a substantial proportion of performers consume less than 30 kcal/kg of fat-free mass (FFM), which corresponds to the threshold level for the development of relative energy deficiency in sport syndrome (RED-S) [16]. Under cruise-liner conditions, this problem is exacerbated by the specifics of food organization. Despite formal dietary abundance, access for crew members to high-quality sources of micronutrients, such as fresh berries, dark-green leafy vegetables, and high-quality fish, is often limited, which increases the risk of latent deficiency states.

Of particular importance are vitamin D status and iron provision. Dancers who spend most of their time indoors often demonstrate reduced vitamin D levels, which adversely affects bone tissue status and immune function [17, 18]. Additional factors, such as chronic exposure to impact loads (mechanical hemolysis) and menstrual losses, increase iron requirements; iron deficiency leads to reduced oxygen-transport capacity of the blood and, consequently, to diminished aerobic performance capacity.

Hydration status is also subject to specific threats. Water on vessels is usually desalinated and is characterized by a low content of naturally occurring minerals. In combination with dry conditioned air and high levels of sweating, this creates a risk of electrolyte imbalance and the occurrence of muscle cramps, especially under high density of rehearsals and shows [23].

Taken together, these factors determine the necessity of a fundamental shift in the training-process paradigm for successful adaptation to Royal Caribbean requirements. The traditional preparation model in competitive ballroom dancing, based predominantly on repeated run-throughs of short competitive combinations, proves insufficient for forming the required level of endurance and resistance to prolonged loads. As a more adequate approach, the use of block or undulating periodization models is advisable [24], since they allow the simultaneous development of strength, endurance, and flexibility while reducing the risk of overtraining and ensuring a more harmonious adaptation to the complex demands of the cruise musical.Below,

Figure 1 presents a model of physiological adaptation and injury risk over the course of a 6-month contract.

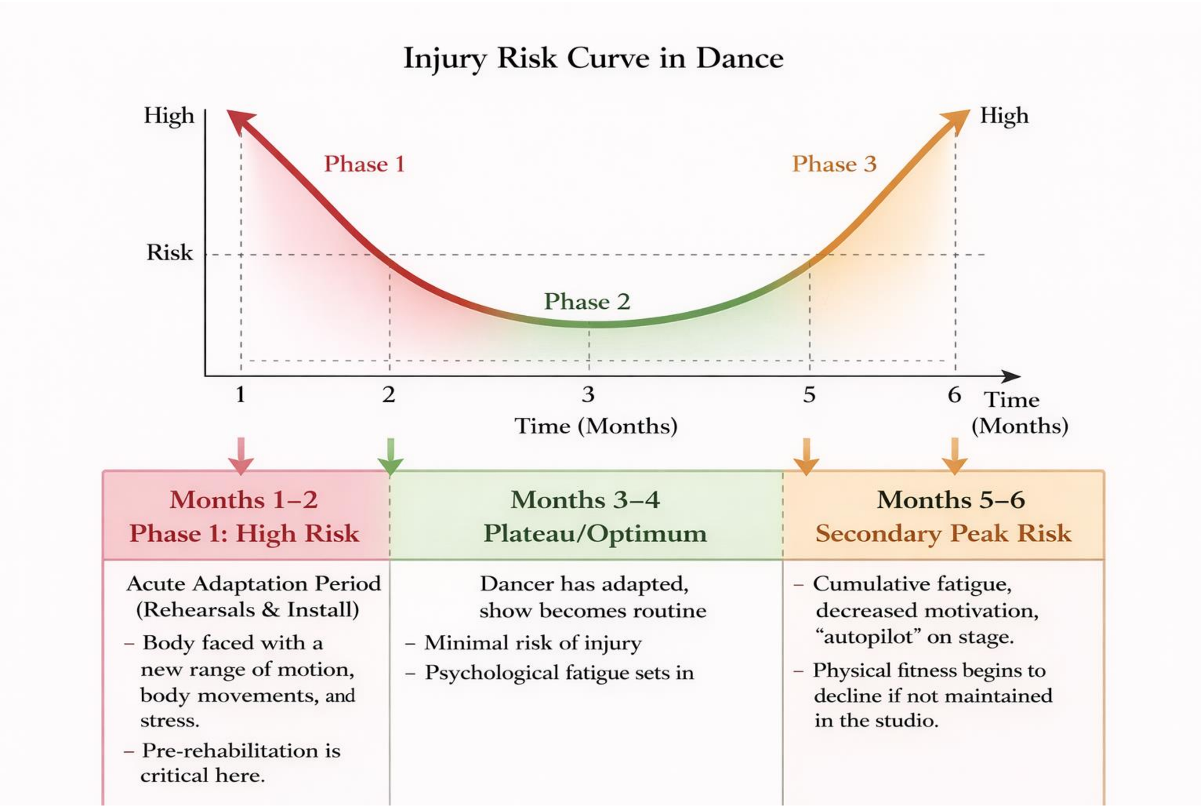

Fig. 1. Model of physiological adaptation and injury risk during a 6-month contract (prepared by the author on the basis of [11]).

Of fundamental importance is the integration into the training process of high-intensity interval loads with extended work bouts in an HIIT format. An optimal model can be a protocol in which 4 minutes of work at approximately 90% of the individual maximal heart rate (in its character comparable to a full dance number) alternate with 2 minutes of active recovery performed at low or moderate intensity. The sequential repetition of such a cycle for 4–6 series forms a metabolic profile close to the structure of a show and purposefully trains the body’s capacity to accelerate lactate utilization during recovery intervals, rather than only to accumulate it during the peak-effort phase [22, 24].

Given the impending transition to work on an unstable support surface, a key component of preparation becomes neuromuscular training using unstable surfaces (BOSU, balance pads, and analogous devices). The inclusion of such exercises in the pre-contract phase makes it possible in advance to load the proprioceptive system under conditions approximating the Sea Legs phenomenon, to reduce the intensity of the sensory conflict between visual, vestibular, and proprioceptive afferentation, and, as a consequence, to mitigate the first days of adaptation to the maritime environment.

A separate emphasis is required for landing technique. In competitive ballroom dancing, well-rehearsed motor stereotypes often presume a more rigid landing with a pronounced foot roll-through, whereas contemporary dance and the musical-theater format require a soft landing with active use of the eccentric work of the quadriceps and gluteal muscles to attenuate the shock wave. Targeted training of the eccentric phase of squats and plyometric drills becomes a mandatory element of preventing overuse injuries and protecting the knee joints under conditions of a rigid deck structure.

The onboard nutritional strategy should be constructed as a system of counteraction to the so-called buffet paradox. Eating on a liner requires a high degree of self-regulation, because studies show that crew members are prone to gaining body mass due to frequent social eating and the constant availability of high-calorie dishes, while deficiencies of vital nutrients are often formed [25, 26].

Table 3 describes nutritional periodization for a cruise-liner performer.

Table 3. Nutritional periodization for a cruise-liner performer (prepared by the author on the basis of [24-26]).

Nutrient / Factor	Target values	Onboard strategy (Crew Mess Hacks)
Energy	>45 kcal/kg FFM (for women ~2400–2800 kcal/day)	Avoid skipping meals. Maintain an emergency reserve (protein bars) in case the crew mess is closed after the show.
Carbohydrates	3–5 g/kg (moderately high)	Prioritise complex carbohydrates (rice, quinoa, oats) in the first half of the day and before the show. Limit sugar from desserts.
Protein	1.4–1.7 g/kg (high)	Seek clean protein sources: boiled eggs, unbreaded fish, cottage cheese. Use protein shakes as a supplement, because meat quality may vary.
Micronutrients	Iron, Calcium, Vitamin D	Mandatory supplementation with Vitamin D3 (2000–4000 IU) due to working in darkness. Periodic monitoring of ferritin.
Hydration	30–35 ml/kg + losses through sweat	Use electrolytes (tablets / powders) in water, because desalinated water washes out minerals.

Work on a cruise liner is accompanied by specific psychoemotional pressure that differs both from shore-based theaters and from the competitive environment of sports ballroom dancing. Studies describing the dyadic approach proposed by Wan and coauthors [27, 28] emphasize that optimal protection of mental well-being under conditions of chronic load is achieved through a combination of targeted emotional support and structured physiological rest. In the context of a prolonged contract, this means the necessity of consciously delineating professional and personal spheres, despite their de facto spatial fusion within the enclosed onboard environment. It is critically important to create predictable temporal windows for recovery: to plan periods of minimizing communicative and sensory stimuli days of silence, and to use port calls not only as logistical pauses but as an instrument of psychohygiene. Engagement in green exercise, meaning walks and moderate physical activity in a natural onshore environment, is associated with reductions in cortisol levels, decreases in subjective stress, and diminished mental fatigue, which makes it possible to partially offset the cumulative effect of isolation, a dense schedule, and constant presence in the high-stimulus environment of the liner.

Conclusion

The transition from competitive ballroom dancing to professional activity on Royal Caribbean cruise liners represents a complex, multilevel adaptive process in which the determining significance lies not so much in already formed choreographic competencies, which are traditionally high among performers with a ballroom-sport profile, as in the degree of metabolic flexibility and the capacity for rational management of the body's resources under conditions of prolonged, practically continuous stress.

The formulated conclusions and practical recommendations can be consolidated into several interrelated blocks. First, a purposeful aerobic conversion is required, namely a shift from a sprint-oriented preparation model toward the development of aerobic power and lactate tolerance. This presupposes the mandatory integration into the training process of both high-intensity interval training (HIIT) and prolonged low-intensity sessions (LISS) that build a stable aerobic base while preserving the capacity to tolerate high peak loads.

Second, biomechanical protection of the musculoskeletal system is necessary: the feet and knee joints should be prepared in advance for the change of footwear characteristic of the musical-theater format and for a different stage and flooring structure, and training of balance and postural control should enter the daily program of predictive prevention (pre-hab), compensating for the influence of ship motion and vessel vibrations.

Third, nutritional discipline plays a critical role. Managing nutrition under conditions of constant availability of a buffet requires a high degree of mindfulness and a refusal of spontaneous, socially determined eating behavior. The priority becomes the nutrient density of the diet, monitoring and correction of vitamin D and iron status, and a constructed hydration strategy with consideration of electrolyte requirements, which constitutes a key condition for preventing overuse injuries and functional burnout.

Fourth, management of the load–recovery cycle across the entire contract acquires special significance. Awareness of the phased nature of the process, consisting of initial adaptation, a relative plateau, and a period of accumulated fatigue, makes it possible in advance to modify the volume and intensity of work, to adjust the recovery regime, and thereby to reduce the probability of industry-typical damage through the mechanism of overuse, especially characteristic of the second half of the contract.

References

1. Liiv, H., Jürimäe, T., Mäestu, J., Purge, P., Hannus, A., & Jürimäe, J. (2014). Physiological characteristics of elite dancers of different dance styles. European Journal of Sport Science, 14(Suppl 1), S429–S436. https://doi.org/10.1080/17461391.2012.711861.
2. Inside Cruise Entertainment | Royal Caribbean. Retrieved from: https://www.royalcaribbean.com/guides/inside-look-at-cruise-entertainment-production (date accessed: September 15, 2025).
3. View Upcoming Auditions In Your City | Royal Caribbean Entertainment. Retrieved from: https://royalcaribbeanentertainment.com/productions/upcoming-auditions/ (date accessed: September 29, 2025).
4. Sea legs | Grokipedia. Retrieved from: https://grokipedia.com/page/Sea_legs (date accessed: October 14, 2025).
5. Healthy diet | World Health Organization. Retrieved from: https://www.who.int/news-room/fact-sheets/detail/healthy-diet (date accessed: October 26, 2025).
6. Food and nutrition of seafarers on merchant ships. (2013). International Maritime Health. https://doi.org/10.5603/IMH.2013.0003.
7. Koutedakis, Y. (2000). "Burnout" in dance: The physiological viewpoint. Journal of Dance

Medicine & Science, 4(4). https://doi.org/10.1177/1089313X0000400402.

8. Nordin-Bates, S. M., Raedeke, T. D., & Madigan, D. J. (2017). Perfectionism, burnout, and motivation in dance: A replication and test of the 2×2 model of perfectionism. Journal of Dance Medicine & Science, 21(3), 115–122. https://doi.org/10.12678/1089-313X.21.3.115.
9. Jensen, K., & Johansen, L. (2002). Heart rate and blood lactate concentration during ballroom dancing [Abstract]. Medicine & Science in Sports & Exercise. https://doi.org/10.1097/00005768-200205001-01732.
10. Wyon, M. A. (2019). Physiological characteristics of musical theatre performers and the effect on cardiorespiratory demand whilst singing and dancing [Repository PDF]. University of Wolverhampton. Retrieved from: https://wlv.openrepository.com/bitstreams/52ec9ce4-59df-43d0-8b37-0071a2c22f6a/download (date accessed: November 9, 2025).
11. Jeffries, A. C., Wallace, L., Coutts, A. J., Cohen, A. M., McCall, A., & Impellizzeri, F. M. (2020). Injury, illness, and training load in a professional contemporary dance company: A prospective study. Journal of Athletic Training, 55(9), 967–976. https://doi.org/10.4085/1062-6050-477-19.
12. Barreau, X., Courtin, C., Ramos-Pascual, S., Kumble, A., Saffarini, M., & Nogier, A. (2024). Epidemiology of musculoskeletal injuries in professional ballet dancers at the Opéra de Paris. Clinical Journal of Sport Medicine, 35(4), 489–497. https://doi.org/10.1097/JSM.0000000000001316.
13. Hincapié, C. A., Morton, E. J., & Cassidy, J. D. (2008). Musculoskeletal injuries and pain in dancers: A systematic review. Archives of Physical Medicine and Rehabilitation, 89(9), 1819–1829. https://doi.org/10.1016/j.apmr.2008.02.020.
14. Glenney, B. (2024). Polluted leisure enskilment: Skateboarding as ecosophy. Leisure sciences, 46(8), 1212-1236.
15. Bharatan, I., Oborn, E., & Swan, J. (2025). Finding your sea legs: Exploring newcomer embodied learning in an extreme context. Journal of Management Studies, 62(3), 1265-1299.
16. Sousa, M., Carvalho, P., Moreira, P., & Teixeira, V. H. (2013). Nutrition and nutritional issues for dancers. Medical Problems of Performing Artists, 28(3), 119–123. https://doi.org/10.21091/mppa.2013.3025.
17. Ghazzawi, H. A., Hussain, M. A., Raziq, K. M., Alsendi, K. K., Alaamer, R. O., Jaradat, M., Alobaidi, S., Al Aqili, R., Trabelsi, K., & Jahrami, H. (2023). Exploring the relationship between micronutrients and athletic performance: A comprehensive scientific systematic review of the literature in sports medicine. Sports (Basel), 11(6), 109. https://doi.org/10.3390/sports11060109.
18. Stephens, N., & Wyon, M. (2020). Physiological characteristics of musical theatre performers and the effect on cardiorespiratory demand whilst singing and dancing. Medical Problems of Performing Artists, 35(1), 54–58. https://doi.org/10.21091/mppa.2020.1007.
19. Pilch, W., Tota, Ł., Pokora, I., Głowa, M., Piotrowska, A., Chlipalska, O., Zuziak, R., & Czerwińska, O. (2017). Energy expenditure and lactate concentration in sports dancers in a simulated final round of the standard style competition. Human Movement, 18(2), 62–67. https://doi.org/10.1515/humo-2017-0012.
20. Senior competitive ballroom dancers underestimate their exertion in final rounds training. (2020). German Journal of Sports Medicine. https://doi.org/10.5960/dzsm.2020.428.
21. Dai, M., Raphan, T., & Cohen, B. (2013). Getting your sea legs. PLOS ONE, 8(6), e66949. https://doi.org/10.1371/journal.pone.0066949.
22. Isom, W. J., Accilien, Y.-D., Chery, S. B., Mederos-Rodriguez, D., & Berne, J. D. (2018). Patterns of injury amongst cruise ship passengers requiring hospitalisation. International Maritime Health, 69(4), 243–247. https://doi.org/10.5603/IMH.2018.0039.
23. Sousa, M., Carvalho, P., Moreira, P., & Teixeira, V. H. (2013). Nutrition and nutritional issues for dancers. Medical Problems of Performing Artists, 28(3), 119–123. https://doi.org/10.21091/mppa.2013.3025.
24. Johnson, Q. R. (2025). Periodization for success—in-season external training load modulation within collegiate American football. Frontiers in Sports and Active Living. https://doi.org/10.3389/fspor.2025.1662240.
25. Weldon, A., Trewin, J., & others. (2022). Practices of strength and conditioning coaches in professional sports: A systematic review. Biology of Sport, 39(3), 715–726. https://doi.org/10.5114/biolsport.2022.107480.

26. Overweight among seafarers working on board merchant ships. (2019). BMC Public Health. https://doi.org/10.1186/s12889-018-6377-6.
27. Fatigue | International Maritime Organization. Retrieved from: https://www.imo.org/en/OurWork/HumanElement/Pages/Fatigue.aspx (date accessed: November 23, 2025).
28. Impact of touring, performance schedule, and definitions on 1-year injury rates in a modern dance company | ResearchGate. Retrieved from: https://www.researchgate.net/publication/310627837_Impact_of_touring_performance_schedule_and_definitions_on_1-year_injury_rates_in_a_modern_dance_company (date accessed: December 10, 2025).