



# Prevention in Musical Theatre and Dance

A self-care orientated teaching syllabus for multipliers at schools and theatres,  
part 1, 15 units (Scotsy.MD1.15)

**Guidelines and background information**

## Imprint

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### **Photograph/picture credits:**

#### **Background information**

U 10/11: “All about skin, hair and nails”

E.M. Wanke (figures 2,3), O. Zimmermann (figures 4,5)

A. Wanke (all illustrations except of U10/11 skin structure)

### **VBG – Ihre gesetzliche Unfallversicherung**

The VBG is a statutory accident insurance with around 36 million insurance relationships in Germany. VBG's policyholders are employees and voluntarily insured entrepreneurs, civic activists and many more. More than one million companies from more than 100 sectors belong to VBG – from architectural offices to temporary employment agencies.

**Further information: [www.vbg.de](http://www.vbg.de)**



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## Guidelines and background information

Version 1.0/2017-06

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## Foreword

Of all work-related accidents, about one third are sustained by arts performers according to the 'Stages and Studios' section of the German Social Accident Insurance (VBG). Close inspection of the accidents involving musical performers and dancers reveals a very wide spectrum of accident causes. In addition to safety and organizational hazards, many accidents suggest that preventive behavioural measures could not only reduce the serious consequences of injury, but could also help prevent accidents.

For various reasons, musical theatre performers – as well as professional dancers – often perceive accidents and chronic complaints as part of their work. It is therefore not uncommon to trivialise, but also, for existential reasons, to continue training or performance despite injuries. The aim must therefore be to impart knowledge on fundamental topics of occupational safety and health and to awaken prospective protection already at the formative stage of their training and education and to sensitise artists to the importance of their own health. In addition, the aim of musical performers and professional dancers already in employment must also be to expand their knowledge by means of well founded and target-group oriented information and thus generate more awareness of their own health.

The documents can be downloaded from website:  
[www.vbg.de/prevention-musical-dance](http://www.vbg.de/prevention-musical-dance)

# 1 Introduction to the topic

**“Musical theatre performers are the ‘all-rounders’ or ‘combiners’ of the performing arts.”**  
(Wanke 2016)

## Musical and dance

Musical theatre and dance performances have enjoyed constant popularity for many years.

The musical theatre emerged from existing, older forms of musical theatre, such as operetta. Musical theatre displays a vast and varied range of styles. This makes the definition of this term more difficult.

In present-day musical theatre, variations in overall design (set, costumes, masks, choreography, music) are practically non-existent. This means that audiences almost anywhere in the world will be watching almost identical versions of the production, regardless of venue. For musical theatre performers, on the other hand, this means meeting the demand for daily identical and perfect performances in combination with a very high frequency of performances (>300/year).

The basis of professional dance is the classical ballet. However, with generally increasing requirements, a higher versatility has become necessary in terms of dance styles to be mastered, which places an even greater burden on artists/dancers due to a more cross-genre qualification.

On average, a dancer’s actual career on stage is short, their training, on the other hand, is very long. It usually begins in childhood.

## Tasks

The tasks of musical theatre performers and professional dancers include the reproducible interpretation of roles. In musical theatre at least, these consist of creative (acting) tasks in combination with singing and dancing. For this reason, artists must have a broad education and possess acting as well as articulatory, dancing, singing and artistic capabilities.

The balancing of the individual genres of singing, dancing and acting within a role can be very variable – sometimes even completely omitting one genre, for example singing roles with no dancing involved. In addition, there is generally a double occupancy of

roles, meaning that the contract stipulates the preparation and rehearsal of two separate roles.

Musical theatre performers can also be described as the “all-rounders” or “combiners” of performing arts. The professional dancers can be both, specialists of their genre and all-rounders of different dance styles at a high performance level.

## Significance of the artist’s body

The basis for a successful education or career is determined by the capabilities of one’s own body. The body is thus the most important asset for a career (Wanke & Mill 2006). Supporting or facilitating work tools to maintain the body in the work process are seldom, if ever, found in musical theatre or professional dance. Therefore, the often maximum psychological and physical loads resulting from education and professional career directly affect the almost unprotected body. That implies that even small physical limitations can endanger or even prevent the vocational education or the subsequent professional career.

## Loads

In addition to physical stress, considerable psychological stress must also be taken into account.

Within musical theatre and dance there are great differences regarding the stress intensity to the voice, the musculoskeletal and the cardiovascular system. In principle however, education and the subsequent professional career are only possible with a healthy organism which is both functional and capable of withstanding loads. Even minor physical limitations can often not be successfully compensated, or only by means of compromises, which in turn can pose a hazard. Therefore, targeted prevention – by reducing work and education-related hazards and avoiding work and education-related accidents as well as occupational diseases – is of utmost importance (Wanke 2014).

## Versatility

The versatility required in the subsequent professional career is already considered during the training. Various dance styles are taught, which differ greatly in terms of physical prerequisites and requirements, terminology, footwear, equipment and the use of props. Nowadays, dance versatility is often required, which ultimately also includes cross-gender tasks and movement elements. However, even when the skills are extensive and the experience vast, extra skills are regularly required for specific musical theatre or dance choreography, such as roller skating or climbing, that create new challenges during a career.

## Education and training

The statutory full-time structured education in musical theatre and dance is focused on the expected requirements. It is made up of the following practical and theoretical contents (depending on the education with its corresponding focal points):

- dance classes with different (basic) dance styles such as ballet, contemporary – (e.g. jazz dance), tap dance and others,
- legitimate theatre and drama,
- singing,
- supplementary contents relevant to the subsequent professional activity (e.g. simulation of castings or auditions, sports scientific, medical and preventive contents, history, make-up technique, and so on),
- performance tests related to education (in theory and practice),
- participation in productions (professional theatre and school productions and so on), if applicable.

The time and content emphasis of the respective educational contents may vary depending on the educational institution.

## Prevention

The consequences of the high loads already present manifest principally in the form of acute injuries (accidents at work) and chronic damage caused by faulty use or overload or other illnesses.

This makes it all the more important to use this educational phase as the last available opportunity within the curriculum to mediate important aspects of prevention and self-care prior to a subsequent professional career. This knowledge should serve to support this occupational group and to encourage appropriate actions in case of hazards and injuries. This should reinforce the profession as a desirable occupation, while helping to maintain occupational health as long as possible.

## References

*Wanke, EM; Mill, H: Arbeitsmittel Körper – Zum Auftreten von Arbeitsunfällen im professionellen Bühnentanz. Sicherheitsbeauftragter 3/2006, 14–5.*

*Wanke, EM: Rahmenempfehlungen zur Prävention von Verletzungen im professionellen Bühnentanz. 2. überarbeitete und ergänzte Auflage. Unfallkasse Berlin und Deutsche gesetzliche Unfallversicherung (Hrsg.), 2014.*

## 2 Introduction to the syllabus

### Target group and qualification

The educational **syllabus** (methodological-didactic commentary and instruction aid/background information) is aimed at employees at vocational musical theatre schools or professional dance training institutions already active as multipliers or considered as such. These can be lecturers or teachers of the school in question but also other direct consultants such as the company doctor or external lecturers of the educational institutions (e.g. medical doctors, physiotherapists as well as occupational safety specialists experienced in the performing arts and so on).

The target group already has prior knowledge of occupational health and safety, occupational safety and prevention, knows the specifics of musical theatre and dance education and is also familiar with the education-related needs. This also includes knowledge of the causes of accidents and work-related illnesses. An appropriate didactic-pedagogical qualification is indispensable.

The instruction aid (without the methodological-didactic commentary) is intended to address three target groups:

- instructors at musical theatres or theatres with musical productions as well as theatres with own dance ensembles or regular dance performances. Since instruction is generally the responsibility of the entrepreneur, this may, for instance, include the artistic director or other superiors of the performers
- consultants, such as the company doctor, occupational safety specialists, physiotherapists, and so on, who thereby receive help in order to support the entrepreneurs' instructions
- prospective and vocational musical theatre performers as well as future professional dancers (students).

However, it should be noted that this module focuses on the preventive modification of risk-associated behaviour in prospective musical theatre performers and dancers and is therefore not intended as a complete guideline.

It may therefore be necessary to refer to the literary references provided as well as to further literature in consultations.

### Contents

This module follows the idea of a 'self-care orientated teaching syllabus' (Scotsy) for the category groups musical theatre (M) and dance (D) with 15 teaching units (1.15) in the first part.

Initially, the main focus of this basic module is on contents that are primarily assigned to accident prevention based on behavioural modification and could therefore be implemented by students of the musical theatre and dance education categories by changing their own behaviour before, during or after the execution of an activity and could also be implemented almost independently by the educational institution. In addition, the focus of the selection of topics is primarily on the musculoskeletal system. In the case of a module extension, other topics will also be considered (e.g. voice).

Aspects relating to the working environment are touched upon and mentioned with the primary aim of increasing levels of knowledge.

### Educational syllabus

The multipliers are provided with subject-specific information on prevention in the category of musical theatre and dance. The contents are prepared in such a way that multipliers can integrate these into their lessons. The preparation for the lessons is backed up by a didactic methodical guideline in order to make the preparation of the contents accessible, and to facilitate a mindset which would render the information passed on to the musical theatre and dance students comprehensible.

### Instruction aids/background information

Managers at musical theatres and theatres with musical productions and dance performances are accordingly responsible for instructing their employees as well as the employed musical theatre performers and professional dancers.

Therefore, selected, specific hazards and the consequential resulting protective measures are components of this instruction. The topics of the instruction aid have been designed to provide managers with meaningful and useful aids for the instruction in relevant topics. This also applies to company doctors, occupational safety specialists and so on in case of consultations.

### How to use this material

This module should be considered as a structured collection of teaching ideas. It is not intended to be 'complete' but is structured in such a way that teachers are free to add their individual design (e.g. creation of further work sheets, implementation of alternative games on the basis of available information and so on), fitting into the proposed concept.

The proposed procedure in the methodological-didactic commentary suggests that some of the working materials be prepared by the teachers themselves.

The existing learning tools, such as work sheets, or slides, are marked as follows:

- Slides x – xxx
- Work sheet x (Page x)

### Qualification

In addition to a content-related qualification, a teaching qualification of the teaching staff is required.

### Margins

The module in its present form can be used for the education or training of prospective students. At the same time, it offers sufficient room for the development of teachers' own ideas for expansion.

When using, even in extracts (for example formulations, photos and illustrations), care is to be taken to ensure correct citation.

### Form of address

Form of address for students and teachers depends on the composition, the group dynamics and the school concept and can be adjusted accordingly.

### Learning speed

The group dynamics must be taken into account when determining speed of learning and choice of activities. Here, too, didactic flexibility on the part of the teachers is essential.

### Structure

The individual teaching blocks are self-contained and can therefore be used independently of each other. Nevertheless, they are built on each other and follow a sequential structure with the final units representing the summarised knowledge transfer of what has been dealt with so far.

### Literature

The references used for the texts are listed by theme at the end of each instruction aid. Since the internet references have been directly incorporated into the text, no internet references are found in the bibliography. The literature does not claim to be complete. However, further information on the individual topics can be found in the reference listed there.

### Primary theoretical implementation

The contents presented are intended to be primarily imparted by theoretical-didactic methods, even if a partial practical implementation of the seminar or teaching contents would be conceivable and possible.

## 3 Syllabus



## Unit 1/2

### ...Introduction – “warm-up...”

Challenges – biorhythm – insurance system



“Musical performers are the ‘combiners’ within the performing arts”  
(Wanke et al. 2012)

## Summary

Depending on the musical theatre type or role, the activities of musical theatre performers or professional dancers include specific tasks that vary widely from genre to genre, at least in musical theatre. The requirements in musical theater result on the one hand from the variety of tasks in dance, singing and acting and on the other hand from the often high to very high frequency of performances with up to 300 performances per season. Dancers, on the contrary, are regarded as specialists in their genre, although the demands in versatility have increased in recent years and cross-genre tasks are possible.

The loads can be differentiated into psychological and physical loads and are already very high during education. Even at this early stage, the various genres are represented in the numerous theoretical, partial practical and practical educational syllabus.

It is indispensable that musical theatre and dance students be well informed about the diversity of challenges and the associated potential hazards and possible preventive measures (Evans et alii 1996a, 1996b, 1998, Bronner & Brownstein 1997, Wanke et alii 2012). It is important not only to know one's own behaviour patterns well and to learn to assess the possibilities (and limits) of individual resilience, but also to acquire basic knowledge of (statutory) structures of German occupational health and safety and how to deal with health problems.

## 1. Introduction

The education is focused on the expected requirements of the profession. It therefore includes not only the sometimes very variable physical loads resulting from the very different dance styles (dance), but also the legitimate and vocal theatre (musical theatre).

The body is the only asset and instrument in these occupations (Bronner & Brownstein 1997, Wanke & Mill 2006, Wanke et alii 2012). Reserve instruments, known from other professions, are neither found in musical theatre nor in dance. Therefore, **the means of work** (work tool) is one's own body. Even small physical restrictions can jeopardise, restrict or even prevent vocational education or the subsequent professional career. This applies not only to artists who are already working, but also to students undergoing education (Wanke 2014).

Due to the central significance of the body for education and the subsequent career, it is all the more important to improve the level of knowledge regarding health hazards and the resulting problems for the professional career. Only knowledge of psychological and physical demands, one's own behavioural patterns, possibilities and limits of individual resilience, as well as knowledge of potential work or education-related health hazards enables a targeted and successful preventive approach. To this end, it is important to acquire or expand basic knowledge of statutory occupational health and safety structures and to learn how to deal with work-related complaints and accidents.

### Part A) Challenges

The beginning of an education is the beginning of a new phase in life. This step is therefore associated with numerous physical and psychological loads. These can simply have a new and unfamiliar effect (e.g. acting lessons, new dance styles, new environment) on musical theatre and dance students, or an intensified one (e.g. amount of training, training intensity; see Table 1).

Physical	Psycho-social
Educational contents <ul style="list-style-type: none"> <li>• general information               <ul style="list-style-type: none"> <li>– new contents</li> <li>– level of difficulty</li> <li>– intensity/amount of the training content taught</li> </ul> </li> <li>• singing/voice training</li> <li>• drama</li> <li>• dance               <ul style="list-style-type: none"> <li>– different dance styles</li> <li>– high-level versatility</li> <li>– high-level loads on the musculoskeletal and cardiovascular system</li> <li>– physical exams</li> </ul> </li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• private modifications               <ul style="list-style-type: none"> <li>– possibly, phasing out of parental home</li> <li>– possibly, new surroundings (residence/apartment)</li> <li>– new social environment</li> </ul> </li> <li>• coping with performance pressure</li> <li>• coping with competitive pressure</li> <li>• developing a failure tolerance</li> <li>• other exam requirements than at school</li> <li>• independent time management</li> <li>• cultural differences to the home country and</li> <li>• possibly, German as a foreign language,</li> <li>• ...</li> </ul>
<b>Comprehensive psycho-physical:</b>	
<ul style="list-style-type: none"> <li>• additional loads due to participation in castings/auditions</li> <li>• additional work load due to part-time jobs to ensure livelihood</li> <li>• possibly, care of own children</li> <li>• waiving non-occupational activities involving potential hazards</li> <li>• ...</li> </ul>	

Table 1: Examples of challenges at the start of a professional education as a musical theatre performer (modified according to Wanke 2012)

### The following challenges may be added during professional life

(modified according to Wanke 2012):

- hierarchical structures, little influence on decisions
- maintaining an ideal physical image (role-based)
- possibly a short professional career
- work-related limitations of social life (friends, family)
- irregular working hours
- short-term contracts/poor social security coverage

The above-mentioned requirements result in potential hazards that can influence vocational education and pose a potential existential threat to the realisation of the career aspirations.

In order to be able to deal with the daily challenges of vocational education, it is of importance to know one's own strengths, weaknesses and behaviour patterns better.

### Part B) "How people tick..."

Human performance fluctuates over the course of a day. These fluctuations in the degree of activity, the so-called "circadian/biological clock", are also called biorhythms in humans. This results in phases of varying concentration and performance. Depending on when a person has his subjective high performance, one speaks of:

- **day type**
- or **night type**,
- or the **morning** or **evening type**.

Although there are many mixed types, the performance curve for most people has two highs, late in the morning (10:00–12:00) and early in the evening. Between the two performance highs lies the so-called **midday low**.

Morning types are fit in the morning, but often get tired before 21:00 in the evening. In contrast, evening types experience a late evening performance high (after 21:00). They go to bed late, but are less powerful in the morning or so tired that they appear to be a "morning grouch" (see set of slides).

In order to fulfill tasks, it is advisable – as far as possible – to place important tasks in the particularly powerful phases and to carry out routine work, maintain contacts and/or rest in the weaker times. By means of simple tests it can be determined when these individual phases are.

(Source: [https://www.uni-due.de/edit/selbstmanagement/content/content\\_k3\\_4.html](https://www.uni-due.de/edit/selbstmanagement/content/content_k3_4.html)).

In order to achieve a better insight into individual performance, it is useful to record and determine the individual performance curve over a few typical days.

This is aggravated by the fact that students and already employed persons have to adjust their individual work and life rhythm to the guidelines of the educational institution and the employer (theatre). They cannot set their own hours, but have to accept a training hour or rehearsal schedule, which is announced more (weekly planning) or less early (“rehearsals according to announcement”), depending on the institution, and which not necessarily has to accommodate their daily performance rhythm.

### **A morning type for education – an evening type for work...?!**

In principle, students must be able to perform well early in the morning when they start training. Professionals start later in the morning (training and rehearsals) and finish later in the evening. They need a high-performance phase. High loads in low-performance phases with reduced concentration increase the hazard potential – e.g. for sustaining injuries.

### **Part C) “If it comes to the worst” – things to know about occupational safety – occupational accident – statutory accident insurance**

Musical theatre and dance students are exposed to maximum physical and psychological loads. Their body is the asset of their professional career. This makes it all the more important for them to become familiar with the occupational health and safety system in the broadest sense as early as possible. Since the structures in other countries differ from the German system, it is all the more imperative to familiarise those with the system whose home country is not Germany. In addition to the rights and duties associated with the education, they should know who to turn to when they have questions or, for example, in the event of an injury, exactly what the proper procedure may be.

(<http://www.dguv-lug.de/904278.php?sid=84667703548720152645070607061230>, <http://www.anleiten.de/selbstorganisation/leistungskurve.html>)

### **Occupational safety**

Occupational health and safety includes all measures designed to protect employees, pupils, students or trainees from work-related hazards. This protection is triple statutory in Germany: by statutory institutions, the institutions for statutory accident insurance and prevention (BGs) and public-sector accident insurers (UKs) as social insurance carriers, and by the institution itself.

(Source: <http://www.dguv-lug.de/904278.php?sid=84667703548720152645070607070380>)

### **German Social Accident Insurance**

The German Social Accident Insurance (DGUV) is part of the social insurance (Seventh Book of the German Social Code, SGB VII). The bodies responsible are the institutions for statutory accident insurance and prevention (BGs), for example German Social Accident Insurance Institution for the administrative sector (VBGs), and the public-sector accident insurers (UKs). They are members of the central association, the German Social Accident Insurance (DGUV). The latter represents all accident insurers vis-à-vis politicians.

Employees and artists undergoing education are automatically registered with the relevant statutory accident insurance and prevention (BGs) by their employer/institution. The fee for this is paid by the employer or the educational institution. The responsible accident insurance institutions in the public sector (e.g. state theatres/state training institutions) are usually the public-sector accident insurers (mainly VBGs).

If prospective musical theatre students and dancers work free-lance after completing their vocational training, it is recommended for them to take out voluntary insurance with a BG, as private accident insurance generally does not include any benefits comparable to statutory accident insurance institutions.



### Tasks and benefits of statutory accident insurance institutions

Statutory accident insurance guarantees insurance protection against **accidents at work, commuting accidents as well as occupational diseases**. In the event of an accident, its aim is to provide the insured with optimum medical care and to reintegrate them into professional and social life.

The statutory accident insurance institutions provide students with multiple benefits. These include:

- accident preventive measures (prevention, protection against work-related health hazards, prevention of occupational accidents)
- rehabilitation after a work-related accident
- if appropriate, compensation in the form of a cash benefit or pension.

The benefits provided by statutory accident insurance institutions include non-cash benefits (costs for medical treatment, costs paid for rehabilitation up to re-establishing working capacity) and cash benefits, e.g. injury benefits) in the event of an insured event (accident at work, commuting accident, occupational disease).

### Occupational accident – definition

**A work-related accident is an accident an employee suffers at work or outside the place of work, for instance on the roads.**

An accident is an involuntary, temporary event (e.g. blow, fall, slipping movement, and so on) that affects the body exogenously from outside and results in

health damage or death. According to the DGUV, accidents at work are accidents suffered by insured persons as a result of the insured activity.

#### Prerequisite for an accident at work:

- the injured person is covered by statutory accident insurance, or the accident must have occurred as a result of an insured activity.
- errands done and routes directly related to the professional activity can also be recognised as insured activity and thus as an occupational accident. These mainly include journeys from home to the workplace (e.g. theatre, educational school) and back (commuting accidents). The insurance also covers the trips between the theatres with different rehearsal or performance venues. If you leave these routes, for example to do private errands, there is no insurance cover for this as the direct connection with the insured activity is no longer given (case study Lucia).

The system around recognition/acknowledgement is complex. Not all acute complaints occurring during work constitute an accident at work.

**Behaviour after an (occupational) accident**

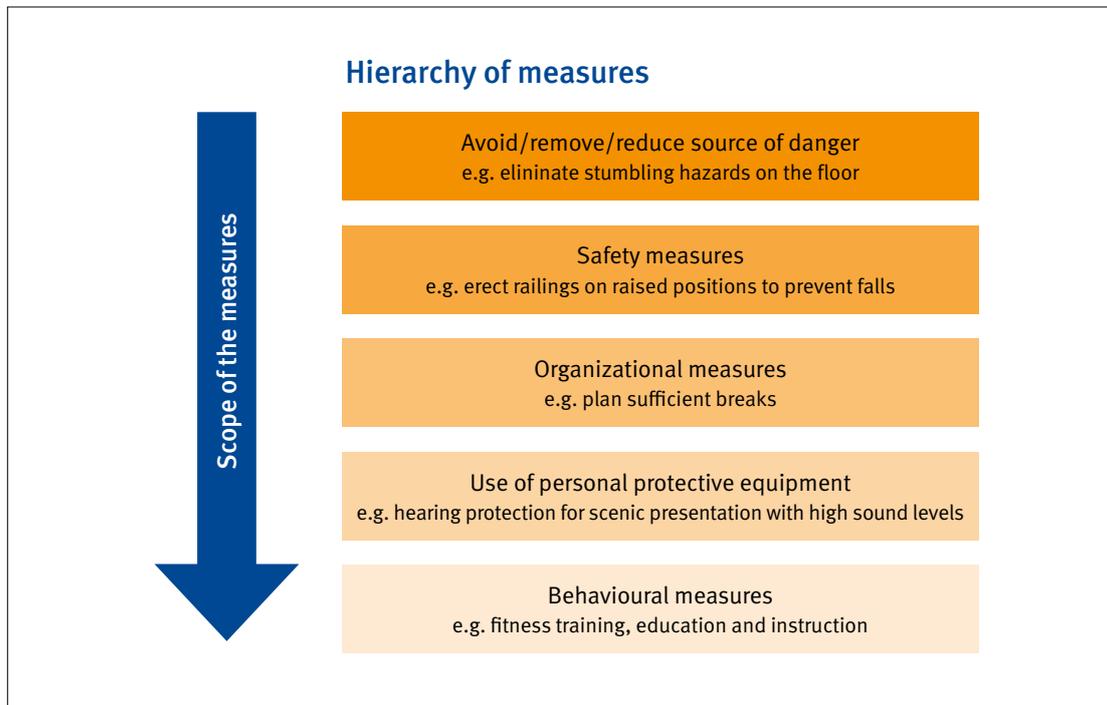
As a general rule, the earlier diagnostic clarification and reporting takes place, the earlier rehabilitative measures can be initiated. Only in this way can loss of financial benefits be kept to a minimum and education be continued.

Injured person	Employer/head of institution/medical doctor
<ul style="list-style-type: none"> <li>• consults an accident insurance consultant (D-doctor) for diagnostic clarification</li> <li>• discontinues the present activity, if necessary</li> <li>• reports the accident to the educational institution (Note: In principle, any accident, no matter how minor, should be reported. This is because complaints and damages occurring years later could be the result of an accident. Only documented accidents can then be included in the assessment.)</li> <li>• participates in completing an accident report (official forms)</li> </ul>	<ul style="list-style-type: none"> <li>• completes accident report (employer/educational institution) in accordance with the legal deadline</li> <li>• documents the F 1000 diagnostics.</li> <li>• initiates therapy and rehabilitation, decides on ability to work (doctor)</li> </ul>

**Occupational safety**

The tasks of the statutory accident insurance institutions include the prevention of occupational accidents. This should be achieved through improved safety in work-related activities. The implementation of preventive measures follows the TOP principle.

This is an interlocking of various measures. TOP means that the measures are both technical (T) and organizational (O) as well as personal (P). The employer/educational institution, respectively, is responsible for implementing the necessary measures.



Source: Goeltzer, VBG Mainz modified according to DGUV/BAuA: *Unterlagen zur Ausbildung von Fachkräften für Arbeitssicherheit*

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## Unit 3/4

### “... In search of the 25th hour...”

Planning effectively – saving time – living more healthily  
(health care in musical theatre and dance through time management)



**A few figures:**

- Nearly 2/3 of prospective musical performers have a part-time job
- More than half of them work as service staff (mostly) in the gastronomy sector
- Only one in five has a part-time job at a theatre (Wanke et al. 2012)

**Summary**

The time factor plays an important role in the prevention of health hazards and the maintenance of health. On the one hand, this concerns (A) one's own time management, i.e. the planning of daily educational/professional and non-occupational tasks. If this time planning is permanently ineffective, both one's own health and performance can be negatively affected. If, on the other hand, time management is effective, time resources could be created that are essential for the balance between loads and regeneration. Another aspect (B) is the "point of time" factor in the sense of temporal accumulations in the development of chronic damage caused by faulty use and overuse as well as acute injuries.

**Introduction****A) Time management**

The start of vocational education, whether in case of studies or at a school for further education, presents students with numerous new challenges that need to be mastered (cf. U 1/2). Besides the unfamiliar loads combined with the education, this also includes after-school organizational tasks, which can no longer be done by the family due to a change of residence and due to the education. In addition, there is often a part-time job which, for example, may be necessary to secure livelihood or financially contribute to the education. Besides the substantive obligations, other time-consuming ones are conceivable. Consequently, this phase places high demands in terms of effective self organization and time management.

The first step here is to define the daily tasks.

On the one hand, this includes defining the daily tasks with the education-related contents and, on the other hand, the entire leisure time, not to forget the general lifestyle tasks to prepare for the day-to-day education (e.g. precooking meals, preparing training clothes and so on, see Table 1).

Table 1: Examples of tasks in the daily life of a prospective musical theatre performer and dancer

Occupation!	"Other challenges"
<ul style="list-style-type: none"> <li>• daily 6–8-hours education in theory and practice on 5–6 days a week</li> <li>• clean training clothes</li> <li>• sew ribbons to pointe shoes</li> <li>• attach plates to tap shoes</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• part-time job</li> <li>• buying vegetables</li> <li>• buying basic food items</li> <li>• main door key to apartment lost</li> <li>• water pipe breakage</li> <li>• cooking</li> <li>• cleaning the apartment</li> <li>• ironing</li> <li>• washing</li> <li>• caring for pets</li> <li>• consulting medical doctors</li> <li>• physiotherapy</li> <li>• workout</li> <li>• repairing a bicycle</li> <li>• calling parents</li> <li>• meeting friends</li> <li>• going to the cinema</li> <li>• going to the sauna</li> <li>• congratulating grandpa on his 80th birthday</li> <li>• polishing shoes</li> <li>• mending training clothes</li> <li>• dealing with appointment matters</li> <li>• dealing with administrative matters</li> <li>• ...</li> </ul>

*"Time thieves" are everywhere.*

No one is so well organized that one doesn't know the "time thieves" who may prevent a structured and effective completion of upcoming tasks. Lacking organization, however, may have the effect that possible time resources, which could be used for regeneration or relaxation, are not available. That facilitates the development of chronic mental tension, which manifests itself in symptoms of stress and overload and could have negative effects on health (Info box 1). These symptoms can either be of psychological or physical nature and also include an increase in the injury risk and a reduction in performance (Wanke et alii 2011, 2012).

- long journeys from and to the educational institution/theatre
- no established goals, priorities or daily schedules
- putting off important things
- trying to do too much at once
- not being able to say 'No'
- not fulfilling tasks, getting distracted
- being disorganised, assuming unnecessary obligations
- leaving too much unfinished on the desk
- not being decisive
- being in a hurry, impatient
- being accessible to everyone at all times

Infobox 1: Examples of “time thieves” of daily life in the context of vocational education

*“Time can't be managed – priorities can”*

Several models are available to improve time management, such as:

- the **A-L-P-E-N method**  
The tasks are inserted in a schema with the following process considered:
  - A = Activities – note tasks
  - L = Length estimation
  - P = Planning ahead – buffer times
  - E = Establishing priorities – decide
  - N = Next day – check up
- the **ABC scheme**  
This method classifies tasks according to their priority:
  - **A-tasks** are the most important tasks. They bring the greatest work success and are to be processed with priority.
  - **B-tasks** are of average importance. They should nevertheless be completed soon, but can be delegated.
  - **C-tasks** can wait. They usually involve repetitive routine tasks.

**The Eisenhower Principle (Figure 2):**

With this method, which is visually very descriptive and therefore well suited for artistic professions, the tasks to be done must be classified according to importance (priority) and urgency. This is done using a predefined scheme. The **aim** is to transfer upcoming tasks to a ranking list and to clearly identify the category of important as well as urgent tasks.



Figure 2: Eisenhower Principle

## B) Temporal accumulations

Periods associated with an increased number of acute injuries (accidents) and chronic damages due to faulty use or overuse have been observed in studies (according to Wanke et alii 2011, 2012).

## Occurrence time of acute injuries

- An increased incidence of acute injuries can be observed in September/October and March/April.
- In the course of the day, more than half of the injuries occur in the first 3 hours after “start of work”, 1/5 after 16:00, i.e. at the end of the training day (Figure 3).
- Incidence decreases over the week (Figure 4).

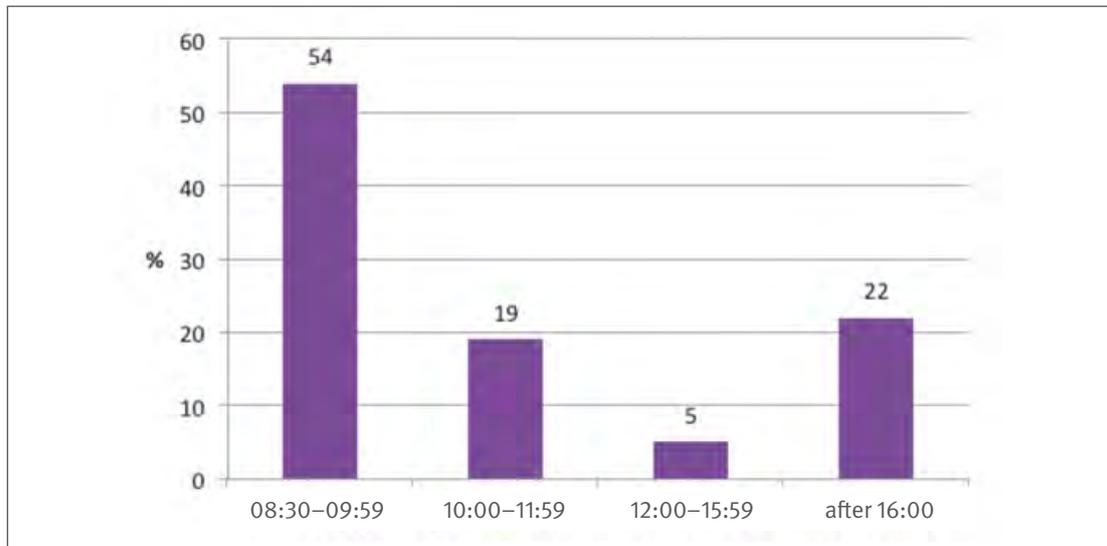


Figure 3: Injury frequency in the course of the day among prospective musical performers (modified according to Wanke et alii 2012)

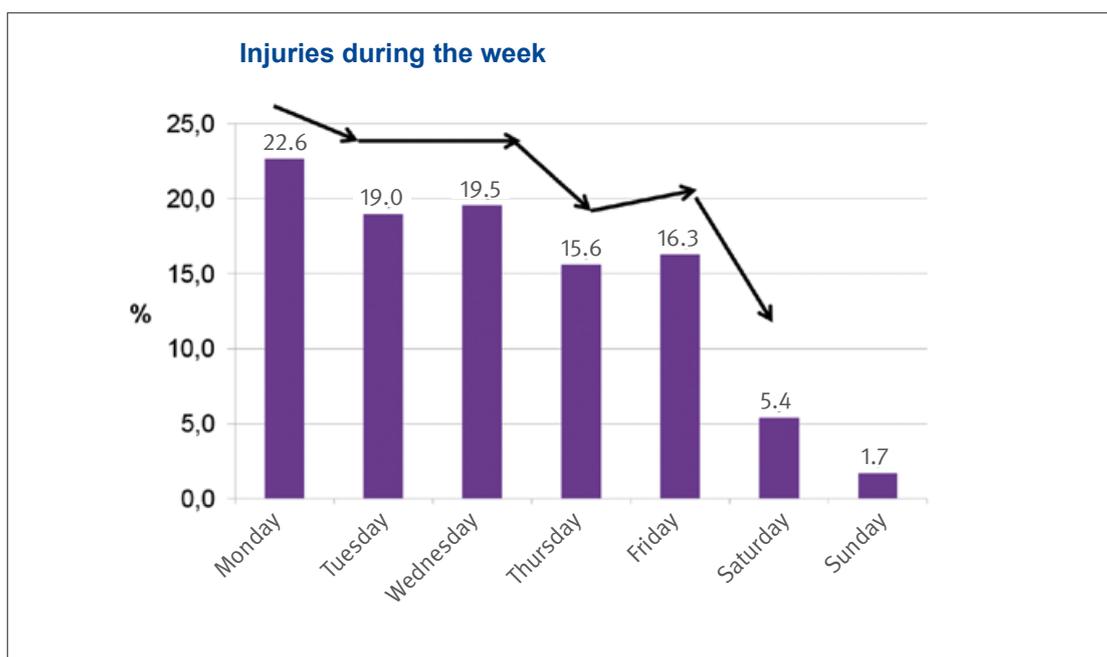


Figure 4: Acute injuries in students (dance) during the week (according to Wanke et alii 2011)

*Chronic damage caused by faulty use and overuse*

- An accumulation of chronic complaints occurs in September and November.
- 4 weeks after the beginning of each semester and
- before a highlight of the season (e.g. exam, premiere)

**Explanation:** At least in the third quarter, the increased number of injuries and damage due to overuse can be attributed to various causes: these include the discrepancy between the actual, mostly reduced training condition, intensity and extent. It must also be taken into account that old, insufficiently treated complaints, which were alleviated by the summer break, can reappear as a result of the increased loads. In March/April, on the other hand, when the educational year comes to an end, chronic fatigue cannot be ruled out.

*Duration of the complaints:*

In more than half of the cases the complaints last longer than 3 months, only in scarcely 1/5 up to 3 weeks and only one in 20 damages is already healed after 1 week.

The following strategies and measures which serve to create time resources, work more effectively and ultimately contribute to maintaining health result from these aspects (info box 2). These include:

- plan consistently and early (for the day, the week)
- do not allow distraction and avoid interruptions
- establish and maintain order
- do follow-up checks (Did the day go as planned? What worked and what didn't?)
- switch off regularly
- take routine activities into account with your planning
- 60% of the time for planned things, 20% for social things and 20% for unforeseen things.
- form time blocks: because 1 x 60 minutes is more than 6 x 10 minutes
- consider your individual performance curve, adjust better for the next working day
- plan the upcoming day
- set priorities
- remain calm in case of unforeseeable events

Infobox 2: Measures for effective scheduling

In cases where the above-mentioned measures are implemented, satisfaction and motivation as well as individual performance increases. Time pressure-related effects on health can be reduced and, by gaining time, more room is left for leisure activities.

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## Unit 5

**“...When the floor is too slippery  
and the costume too long...”**

Hazards



**A few figures:**

- Of all prospective musical theatre performers, 46% are taken ill up to two times a year, 30% even three to four times a year.
- Strains (49%), sprains (27%) and bruises (11%) are the most common types of injuries after accidents.
- Muscle tension (39%), tendon complaints (33%) and joint complaints are among the TOP 3 chronic complaints (*Wanke et alii 2012a*).

**Summary**

Due to the great significance of the unrestricted individual performance of one’s own body (e.g. voice training, speech, movement – and cardiovascular system, skin), avoiding acute injuries and chronic damages caused by misuse and overuse is of maximum importance.

In addition, a distinction can be made between acute injuries after an accident on the one hand and chronic damages caused by faulty use and overuse after microtrauma over a longer period of time on the other hand. Various definitions are found in the academic literature. In the case of acute injuries, the existence of an occupational accident including the underlying information is taken into account.

**1. Classification of hazards – introduction**

The educational – and later work-related – hazards vary considerably, depending on the variable loads. These can be differentiated into endogenous (=intrinsic, person-related) and exogenous (=extrinsic, work environment-related) hazards.

Acute injuries and chronic damage can affect each other. For example, due to technical compensation for residual complaints (e.g. uncured, existing consequences of an accident), chronic damage can resurface, or recurrence may even be precipitated following an acute accident. The development of an acute injury can also be facilitated if chronic symptoms are present.

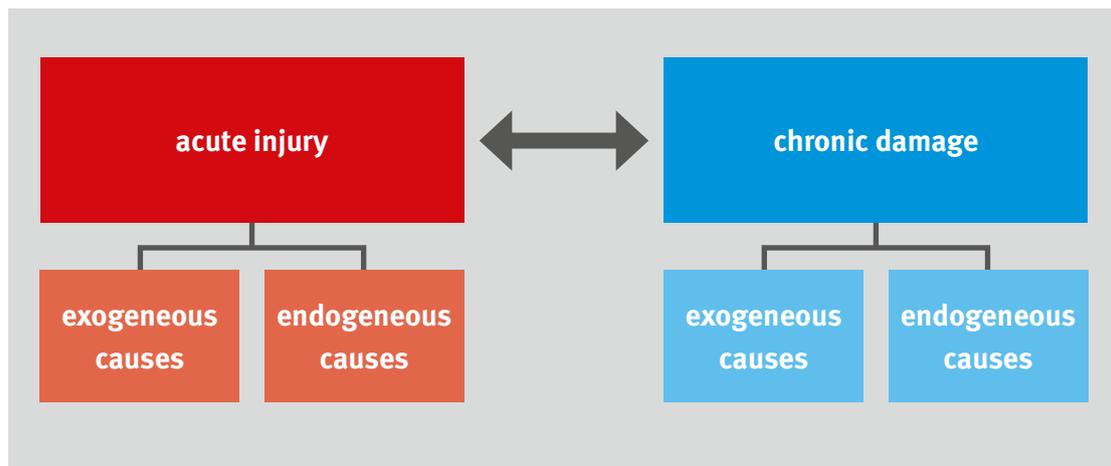


Figure 1: Relationship between acute injuries and chronic damages due to faulty use and overuse

**Examples:**

- An accident at work in February as a result of an intensive training phase with exam at the end of January accompanied by chronic complaints
- A chronic damage due to faulty use or overuse because the training was resumed too early after an accident at work

Untreated chronic complaints also favour the development of further complaints.

**Example**

- A gait modification due to complaints in the left knee joint results in overuse on the right side of the body and to hip joint complaints or back complaints.

This makes it all the more important to pay maximum attention to even minor complaints, i.e. alleged minor injuries, or accidents.

Exogenous or endogenous factors can be the cause of acute injuries as well as chronic damage caused by faulty use or overuse. It is easier to identify the cause in the case of exogenous factors, for they are usually clearly visible, however, endogenous factors are often based on a “multifactorial” event, i.e. a combination of numerous factors. It is often not possible to define which aspect triggered the accident in the end.

**2. Type and location of injuries**

The type and location of injury or damage depend not only on dance styles, but also on gender. On the one hand, this is related to gender-specific tasks, but also to a predisposition to the development of injuries and damage. These include, for example, different joint or axis angles in women and men, which lead to differences in frequency in either sex (e.g. cruciate ligament rupture: women > men).

**3. Causes**

Figure 2 shows the causes of acute injuries in the musical theatre category group. It becomes clear that it is mainly exogenous work place-related aspects that lead to health damages after accidents at work. Here:

- the partners,
- the props,
- as well as the stage and dance floors, respectively, were most frequently observed.

However, there are other factors that are presented in Infobox 1, including the endogenous factors.

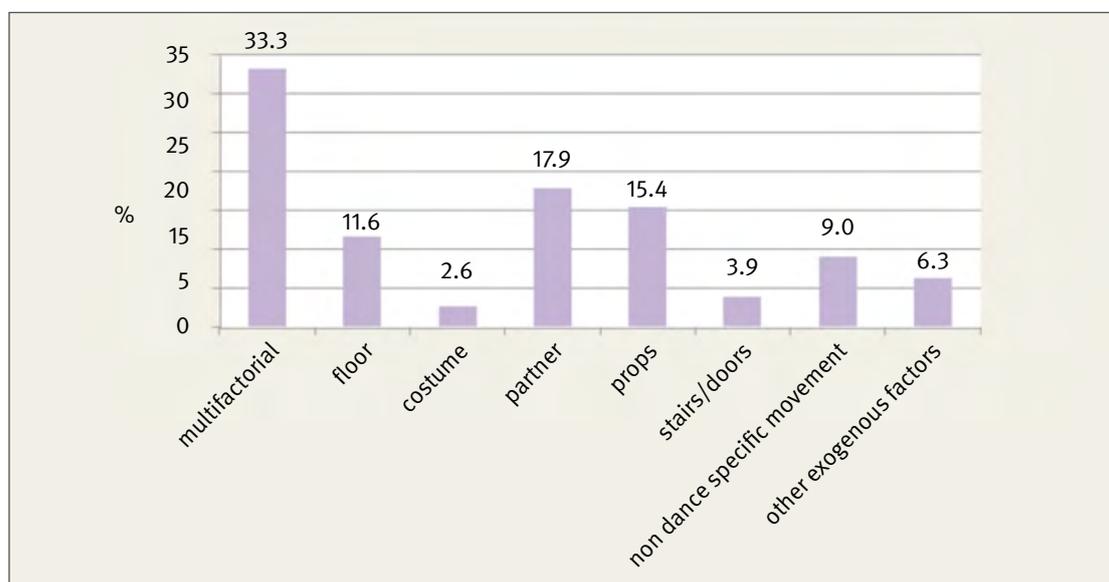


Figure 2: Causes of acute injuries in musical theatre performers (according to: Wanke et al 2011)

Exogenous causes	Endogenous causes
<ul style="list-style-type: none"> <li>• dance floor</li> <li>• dance partner, colleague</li> <li>• costume/work wear (e.g. footwear)</li> <li>• mask</li> <li>• props</li> <li>• (changing) working environment (rooms), stairs/corridors/sceneries</li> <li>• dance technique/voice technique</li> <li>• non-dance-specific movements, choreographic requirements</li> </ul> <p><b>Indirect exogenous factors:</b></p> <ul style="list-style-type: none"> <li>• lighting/illumination</li> <li>• climate (air temperature – velocity – humidity)</li> <li>• seasonal planning (training, rehearsals, exams and performance planning)</li> <li>• social environment in the educational institution</li> <li>• quality of offers</li> </ul>	<ul style="list-style-type: none"> <li>• anatomical-physiological conditions</li> <li>• physical condition/training condition (general performance, basic stamina)</li> <li>• technical skills</li> <li>• nutritional status</li> <li>• fluid balance</li> <li>• pre-seasonal preparation</li> <li>• psychological factors (e.g. stress tolerance, mental resilience)</li> <li>• social environment (e.g. financial security)</li> <li>• knowledge of self-care</li> </ul>

Infobox 1: Common exogenous and endogenous causes of acute injuries and chronic damage in musical and dance (modified according to Wanke et al 2011, 2012a and b, 2013, 2014 and Wanke 2012)

There is a wide variety of potentially accidental or health-damaging aspects of exogenous factors. Preventive measures are just as varied. The most important causes of injuries include the following (according to Exner-Grave 2008, p. 70ff, Wanke 2008, Wanke 2014):

### 3.1. Dance floor

The dance or stage floor is one of the most important work tools for (prospective) musical performers.

**Triggers/causes** for injuries are for example (according to Wanke et al 2012b, Wanke 2014):

- dirt particles (also choreographically caused), for example liquids, sweat
- bumps
- too “soft” or too “hard” flooring
- sloping stage
- different degrees of inclination, covering layers or degrees of hardness of the subfloor in the various working areas
- use of floors that are primarily inadequate for dance (e.g. artificial turf, lacquered floor, sand, and so on)

- frequent change of floors
- use of inadequate footwear (e.g. combination of pointe shoes on sanded stage floors or scatterings)

**Recommendations/preventive measures** are for example:

- choice of cover depending on style
- dance floors should comply with the DIN 18032 Part II standard
- regular inspection and proper cleaning

### 3.2 Stage partner, dance partner

**Triggers/causes** for injuries are for example:

- collision/fall/wrong grip
- lack of coordination in the couple/with colleagues dancing nearby
- new movement elements
- combination with other factors (e.g. fatigue, rehearsal duration)

**Recommendations/preventive measures** are for example:

- existence of physical requirements and technical standards
- cooperation between physically compatible partners
- adequate rehearsal planning
- consideration of other exogenous factors

### 3.3 Props

**Triggers/causes for injuries** are for example:

- use of health-endangering or potentially dangerous props

**Recommendations/preventive measures** are for example:

- early adaptation and risk-benefit calculation

In case education-related chronic improper load or overload damages occur, it is predominantly person-related aspects that seem to be the cause (figure 3).

## 4. “The perfect body?!”

There are numerous dance styles with very different physical demands on the body structure. Since the requirements sometimes differ extremely from each other, compromises must be made for effective prevention, especially in the execution of the dance technique (for example, in the outward rotation of the stretched leg – en dehors – in classical dance).

**To summarise**, numerous dangerous aspects can be differentiated, which on closer examination are very variable and multi-layered. In order to achieve a reduction in injuries and chronic damages, evaluation must be both differentiated and gender-specific.

Even though it is often not possible for students to eliminate workplace-related (exogenous) hazards (e.g. lack of sprung floors, poor adhesion), it is still necessary to identify possible hazards and reduce them by appropriate behaviour, ideally to eliminate them.

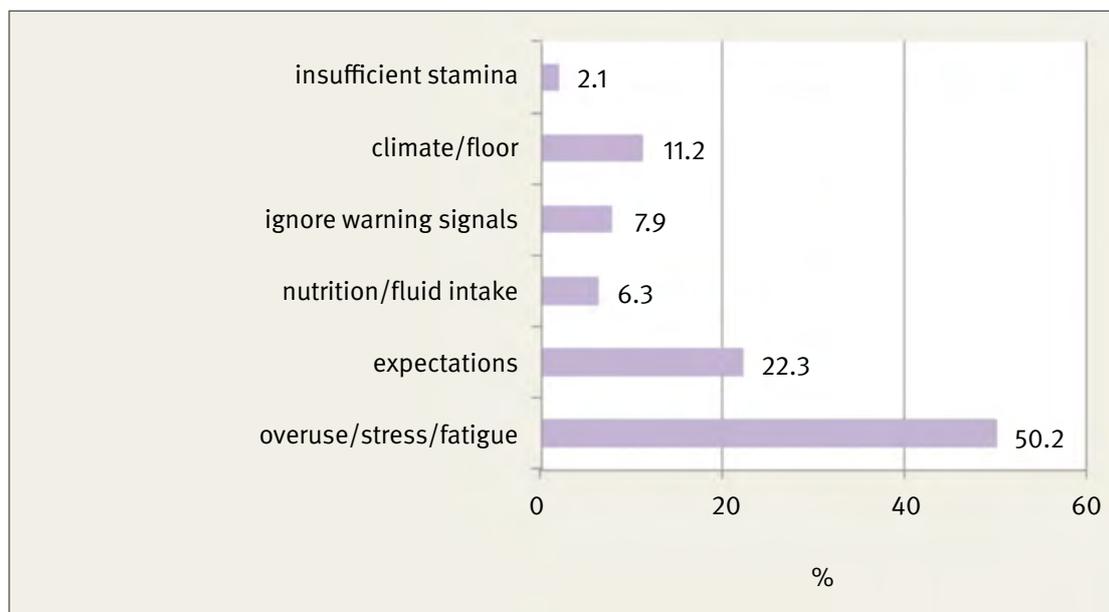


Figure 3: Causes of chronic faulty use and overuse loads and diseases in prospective musical theatre performers (According to: Wanke et alii 2012a)

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Unit 6/7

**“...When the heart is pounding like mad...” –  
Modify behaviour – become more efficient**



### A few figures:

- 4/5 = 80% of all injuries occur during repetition of known movements
- Overuse, fatigue and stress are the three most frequently cited causes of chronic musculoskeletal disorders (Wanke et alii 2012)

### Summary

The education implies both physical and psychological demands. These not only vary between the genres, but also strongly depend on the dance style and gender, which is illustrated by the location/localization of injuries.

Even with a very high quality of education success will also ultimately depend on individual students. It is not sufficient to perceive educational contents in a spirit of commitment and motivation, it is also important to prepare and follow up. This applies to both practical and theoretical subjects and includes a wide range of measures. These range – in addition to respecting one's own anatomical and physiological limits – from “pre-seasonal preparation” after a training break to “warm-up”, “cool-down”, “workout” in order to improve performance, proper stretching all the way to regeneration and relaxation.

“The realization of a total dance performance is determined by a series of conditions. This implies both, the external (exogenous) conditions as well as the internal (endogenous) performance prerequisites lying in the dancers themselves” (Wanke, 2011, p.75)

### 1. Training loads in dance

Unlike acting and singing, not only the musculoskeletal system, but also the cardiovascular system is regularly and sometimes maximally stressed during dance training and this in very different ways depending on the dance style practiced.

The consequences are often acute injuries and chronic damages caused by faulty use or overuse. Here, too, dance style and gender-specific differences become apparent (Wanke et. alii 2013). While the lower extremity is the most frequently affected extremity in all dance styles, considerable differences can be observed regarding other body regions such as the spine and upper extremity (arms and shoulders) (for example modern compared to classical dance).

### 2. Cardiovascular load

Typically, cardiovascular stress in dance is intermittent, which means that very strenuous, possibly sub-maximal or maximum stress phases alternate with breaks during which the heart rate drops to a resting level.

In the stress phases, heart rates can be reached that are so high that they are accompanied by anaerobic metabolic pathways and thus lactic acid formation. These paths – which ultimately limit performance – lead to fatigue of the musculoskeletal and cardiovascular system, accompanied by a temporary loss of coordination and concentration. This takes place in training phases that are usually also demanding in terms of coordination (e.g. jumps). The result is an increase in injury risks.

Fatigue is followed by a recovery phase in which acid metabolites are removed and the heart and respiratory rate drop again.

The more resilient an organism (body) is, the later fatigue processes are initiated and the faster regeneration takes place. It is therefore important to keep the body as resilient and healthy as possible. A number of measures can help to ensure this.

### 3. “...Prevention model kit...”

One objective of training is to achieve competitiveness in the labour market by acquiring skills or improving input performance capability in the relevant areas. The basis to improve performance is sometimes the daily training unit. The educational institution is responsible for quality and implementation. The aim here is to convey/teach as much as possible within the time frame of the training and to achieve the greatest possible enhancement of student performance.

However, just as two tyres do not make a bicycle, the training unit alone is not sufficient to guarantee the optimum increase in performance. In fact, it is the students themselves who can make an important contribution to success – and to themselves in the end.

#### 3.1 “Riding a bike is healthy...” – also in the musical theatre category group

Similar to the bicycle, the tyres (singing, acting and dancing) are held together by a frame and, backed up by many other additional things, become a functional bicycle (Wanke 2014). These are:

- warm-up
- cool-down
- pre-seasonal preparation
- workout
- regeneration/relaxation
- nutrition (compare UE 12–14)
- stretching (compare UE 8/9)
- general health behaviour

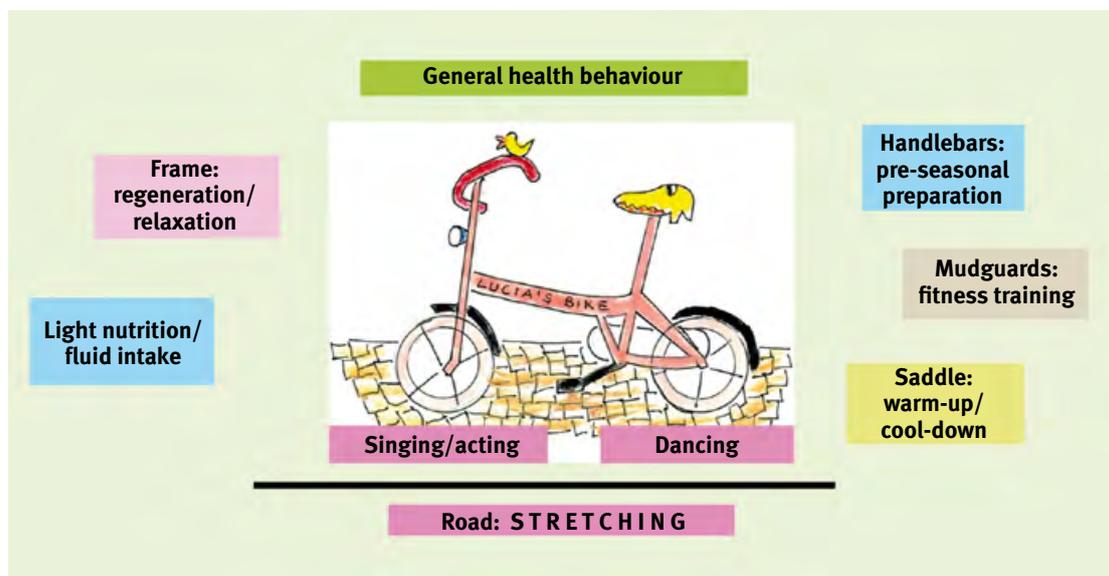


Figure 1: The focus is on training contents. But they can only be used comprehensively through specific preparation and follow-up.

### 3.2 “Warm-up”

The “warm-up” (warming up) is indispensable for optimal training preparation, rehearsals and performances. By definition, this refers to all measures which serve ...“prior to a physical/mental load (...) to create an optimal psychophysical and coordinative-kinaesthetic state of preparation and as injury prophylaxis” (Weineck 2007, p. 939).



Warming up can be done actively (own movements), passively (e.g. hot showers, massages, linements) and/or mentally. A comprehensive warm-up always consists of a specific and a non-specific part. During the specific warm-up phase the muscle groups needed for dancing should be specifically addressed, while the general warm-up phase is non-specific with regard to the movement elements (e.g. cycling, jogging and so on). The effects of a warm up are versatile (compare Infobox 1).

- increased blood circulation in the musculature and increased metabolism
- improved attention, perception and responsiveness
- increased willingness to perform
- improved coordinative performance
- increased elasticity (tendons, ligaments and musculature) and cardiac output
- increase performance and resilience
- reduced stage fright and anxiety

Infobox 1: Effects during a warm-up  
(compare Weineck 2007, p. 946)

The warm-up is influenced by numerous factors. These include the type of activity (e.g. dance style), age, motivation, training condition, time of day, outdoor temperature, clothing and subsequent loads (e.g. training, rehearsal or performance).

If possible, the external conditions at all workplaces (e.g. in a rehearsal/prior to a performance) should be largely identical. This applies, for example, to flooring, room temperature, lighting conditions and climatic conditions.

### 3.3. Cool-down

A cool-down should – like a warm-up – be a natural procedure after a load. The ultimate goal is to accelerate the processes that are useful for optimal regeneration (Weineck 2007, page 950).

The often bad conditions for regular performance (e.g. late evening, subsequent appointment, lack of premises and so on) are no reason to generally omit a cool-down, which should directly follow a load phase. Especially in training, one option would be to integrate the cool-down directly into the last 5–10 minutes of a training unit. Some aspects have to be considered. Besides an orientation on the previous load, pleasant lighting conditions, music, adaptation to the season, choice of an appropriate stimulus intensity and appropriate movements are part of it. (see Wanke 2005, Engel et al 2006, Weineck 2007, p. 950ff, Wanke 2011, p.128f).

### 3.4 “Pre-seasonal preparation” – fit for the new term

Only an optimally prepared body is capable of maximum performance, but the curriculum is full to bursting and the training period relatively short.

The body reacts to supra-threshold load stimuli by adapting the various organ systems (musculoskeletal and cardiovascular system, and so on) to a higher level (increase in performance). A decrease in load capacity and efficiency also results in the absence of load stimuli. This is the case, for example, after longer breaks such as a summer or injury break.

The required training loads may be too high after a break. This results in acute injuries and chronic damage.

Therefore, it is all the more important to prepare for the coming season (term) either as medium-term or timely preparation to be able to cope with the impending loads after a longer break. The seasonal preparation consists of the three elements movement, relaxation and nutrition/fluid intake (compare U 12–14).

In order to optimally structure this “becoming fit again” phase, good cooperation between the students, teachers and management is required:

For **prospective musical theatre performers** that **means** (modified according to Wanke 2005, 2011, 2012, 2014; Wanke et al 2012):

- **curing old (possibly chronic) injuries**
- **“getting into shape”** doing specific or non-specific forms of movements and loads to train the cardiovascular system from the second half of the holiday (e.g. during a 4-week holiday from the 3rd week: dance-unspecific forms of movements such as running/cycling or invigorating gymnastics/Pilates/intensity: moderate) to improve basic stamina  
**scope:** second last week before start: every two days 30–60 minutes. Last week before start: 4–5 times 30–60 minutes desirable.

### 3.5 “Fitness through dance” – the importance of good basic stamina

Studies have repeatedly shown that the structure of traditionally structured training is not suitable to train the important basic stamina although it would enable better coping with loads.

The development of strength characteristics in the combination of fast strength (e.g. jumps) and strength stamina (posture, straightening the spine, holding the arms and/or legs) are very well addressed by dance training. The same applies to flexibility in the sense of elasticity and all forms of coordination (versatility, rhythmicality, adaptability, balance) and, to a lesser extent, speed.

On the other hand, good basic stamina cannot usually be achieved through dance training unless specifically modified for this purpose. Nonetheless, well developed basic stamina is very important for maintaining health and is therefore essential to establish.

As a result of physiological adaptation processes in the body, good basic stamina can help to

- economise cardiovascular and lung function,
- perceive loads as less strenuous overall,
- delay the onset of fatigue,
- achieve faster and better regeneration following loading,
- avoid injuries resulting from fatigue.

It is easily possible to improve basic stamina either traditionally (jogging, cycling or swimming), additionally (about twice a week for 45 minutes) or to integrate it into the training within dance-specific load patterns (Wanke 2005, 2011, page 75, 2014).

### 3.6 Regeneration and relaxation

#### A few figures...

- Of all prospective musical theatre performers, 45.9% are taken sick up to two times, 29.7% even three to four times/educational year.
- Physical fatigue, expectation and performance pressure as well as the feeling of being overloaded play an important role in the development of the illnesses/diseases.
- **Without sufficient regeneration and relaxation phases, the load phases do not have the desired effect** (all: Wanke et alii 2012).

Recovery as regeneration and relaxation is the opposite of physical and mental load and strain, such as a training unit in dance or after a voice/vocal unit.

Before recovery there is the feeling of fatigue with a decrease in performance (in coordination/force/speed/stamina/concentration) and a loss of drive for renewed loads.

After physical loads, the fatigue process is based on physiological metabolic processes in the musculature, such as:

- an impoverishment of energy-rich compounds (ATP = adenosine triphosphate), reduction of sugar storage (glycogen)
- a simultaneous increase in metabolic products (e.g. lactic acid = lactate)

The fatigue process (beginning and progress) is individually very different and depends on numerous factors (individual constitution, performance, nutrition, and so on).

The fatigue process must be distinguished from excessive/over-training. This leads to a permanent imbalance between loads (too high and long load stimuli), and recovery (insufficient). This chronic disproportion can no longer be eliminated by normal recovery.

Especially in the context of training which is physically accentuated, or associated with great passion and ambition, it must always be taken into consideration, so as not to permanently disturb this sensitive imbalance of loads and regeneration. Warning signs are:

- unwillingness and stagnation of performance, possibly even reduction of performance
- increased load sensation and delayed recovery
- sleep disorders, loss of appetite, irritability, depression
- repeated infections
- repeated injuries/chronic overuse damage

In particular at the end of a season/ school year or prior to seasonal highlights, the risk is increased.

The injury risk or chronic damage is already increased during the fatigue phase. There are numerous measures for regeneration and relaxation, which are presented in Infobox 1.

All things considered, breaks and adequate regeneration are very important to increase performance. Breaks at the right time have a positive effect on the body and the psyche in addition to increased resilience and effectiveness in the work phases. In addition, injuries are less common.

Students	Educational institution
<ul style="list-style-type: none"> <li>• should take their time, and not just for training</li> <li>• quality takes precedence over quantity in training (“much does not automatically help much”)</li> <li>• adequate nutrition and fluid intake (compare U)</li> <li>• sleep sufficiently and restfully</li> <li>• avoid nicotine</li> <li>• minimise alcohol</li> <li>• relaxation methods and techniques, for example Autogenous Training, Pilates, Alexander Technique, Feldenkrais. They have a partly double preventive effect because they are relaxing and at the same time increase performance (strength and flexibility)</li> <li>• maintaining interests, acquiring/expanding knowledge if necessary (further training)</li> <li>• maintaining friendships and a social environment</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• periodisation of the year of training planning of general and special load phases and primarily regenerative intervals in the course of a season/ a semester/a year</li> <li>• offering relaxation rooms, special rooms, insulated against noise and, for example, equipped with a comfortable reclining area, which allow a complete retreat from the teaching process</li> <li>• performance tests with the prospective musical theatre performers and, if applicable, intervention (e.g. fitness training)</li> <li>• ...</li> </ul>

*Infobox 2: Measures for regeneration and relaxation (modified according to Wanke 2005, 2011, p. 129ff)*

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## Unit 8/9

### “...Stretching...”

Improving flexibility – the “when, where, why, how and how not” in musical theatre and dance



**A few figures:**

- Muscle strain is the most common type of injury in prospective musical theatre performers
- One in four injuries occurs during stretching
- More than 50% of injuries occur in the first 2 hours after the start of lessons units, with one in five after 16:00. (Wanke et al 2012)

**Summary**

A high degree of flexibility is of great importance for the execution of dance-specific movement elements and therefore has a performance-determining character (Dalichau 2011). A distinction is made between different methods which are used to improve flexibility. There are very different assumptions regarding the method, the timing, the benefits and the effects, which are only partially scientifically proven. Correctly performed and under consideration of individual limits, regular stretching can maintain the range of motion necessary for dance and is therefore important.

**1. Flexibility and stretching**

**Attention:** In dance, a basic distinction must be made as to whether stretching only serves to maintain an already achieved mobility or whether, for example, in the case of “hypermobile” people, it may also mean ritual or relaxation or whether it is actually about increasing the range of motion. This makes great differences in planning. This unit is about increasing the range of movements and the medical aspects associated with it.

**Flexibility** is according to Hollmann & Strüder (2009, page 159): “the arbitrarily possible range of motion in one or more joints”.

Regular stretching can improve, enable or maintain the range of motion and thus the execution of dance-specific movements. Furthermore, adjacent tendon structures are also influenced in such a way that they improve the protection of joints (Dalichau 2011 according to Skutek et al 2001).

In dance you stretch in a targeted manner. The aim is to improve and/or maintain your own flexibility. Various methods are used for this purpose:

- **Dynamic stretching**  
Repeated, controlled movements with moderate speed (springy), avoiding jerky movements.
- **Static stretching**  
The maximum stretching position is taken slowly and then held for several seconds (10–60 seconds).
- **PNF methods** (*proprioceptive neuromuscular facilitation*)  
Exploiting the body’s own reflex-like reactions to improve flexibility. Within the PNF methods a distinction is made between:
  - a) AC-stretching** (*Antagonist-Contract-Stretching*).  
The antagonist (the opponent of the muscle to be stretched) is actively tensioned during stretching. This “relaxes” the agonist (target muscle = muscle to be stretched). Example: when the back thigh muscles/hamstrings or ischiocrural muscles are stretched, the anterior thigh muscles (quadriceps) are tensed simultaneously).
  - b) CR-stretching** (*Contract-Relax-Stretching*):  
in addition, the muscle to be stretched is stretched before the beginning of the stretching.
  - c) CR-AC-stretching:** As b), but during stretching the opponent of the muscle to be stretched is additionally strained. Example: stretching the hamstrings in supine position. The leg to be stretched is raised. Now first a tension of the muscle to be stretched (*hamstrings*) follows, but only briefly. Then tension of the quadriceps and stretching of the *hamstrings simultaneously*.

## 2. Effects of stretching – “right and wrong”

### There is one stretching method which is THE BEST

**Wrong:** Each stretching method has advantages and disadvantages (*Dalichau 2011 according to Klee 2003*). The PNF method tends to be superior. However, stretching must be done often to maintain the effect. Just a few minutes after the completion of the stretching unit, the tension maintained within the muscles increases again and the stretching ability decreases.

### Everyone can achieve the same flexibility

**Wrong:** Anyone can improve mobility, but only within individual limits. These are determined not only by the ability to return the muscle fibres to their old position, but also by other connective tissue and joint structures.

### Stretching promotes performance

**Wrong:** Intensive stretching leads to a reduction of the bounce force (fast force), since the energy necessary for the contraction of the musculature cannot be stored as efficiently after intensive stretching. Strength stamina is also negatively affected (*Nelson et al 2005*). In addition, it must be taken into account that intensive stretching leads to a narrowing of the blood vessels in the musculature (vasoconstriction) and thus reduces the necessary blood supply in the musculature (*Alter 1996*).

### Stretching helps to prevent injuries

**Not proven yet:** However, good elasticity is a prerequisite for the execution of some dance-specific movements. If this elasticity is not present, overstretching and injuries can follow. Directly before an imminent high load, the risk of injury can even be increased. This happens, for example, after intensive stretching due to the micro-injuries associated with the stretching in combination with a subsequent jump load, for example (see above).

### Stretching reduces muscle soreness

**Wrong:** Sore muscles are the most subtle injuries within the muscle fibre. Stretching further reduces the blood circulation necessary for the regeneration of this “micro traumatization” (see above).

### Stretching enhances regeneration

**Wrong:** A tired muscle temporarily stores water. This reduces the blood supply. Stretching further reduces the blood supply. In addition, the risk of injury is increased due to the absence of ATP (plasticizer effect) in the rather rigid muscle. Instead of intensive stretching exercises, regeneration-promoting forms of movement should be chosen (e.g. cycling).

## 3. Recommendations for students

- **Intensive** stretching training units should be a separate teaching unit and should take place separately from the dance training. Intensive static stretching at the end of a workout is not recommended. Instead, stretching can be started approximately 1 hour after the end of training.
- If stretching exercises are to be included in a **warm-up**, swing exercises and submaximal stretching exercises should be performed in which the holding time of 10 seconds is not exceeded (*Eder 1991*).
- The **training aim/goal** should be planned for the long term, as an improvement in mobility does not happen overnight.
- Only submaximal elongations (moderate) or the active dynamic elongation method in an appropriate form are suitable as **cool-down**.

- Achieving improved mobility is costly – maintaining it is easier
- Women have greater flexibility for genetic reasons
- Warmed-up and in the evening, elasticity is increased, with reduced fatigue and stress
- Care must be taken to carefully select a basic stretching program and a specific program as an extension.
- If the goal is defined in improving the range of motion, a stretching program integrated into the training alone cannot bring about the desired success. Additional stretching units or a home program are required.

Infobox: "Optimal stretching"

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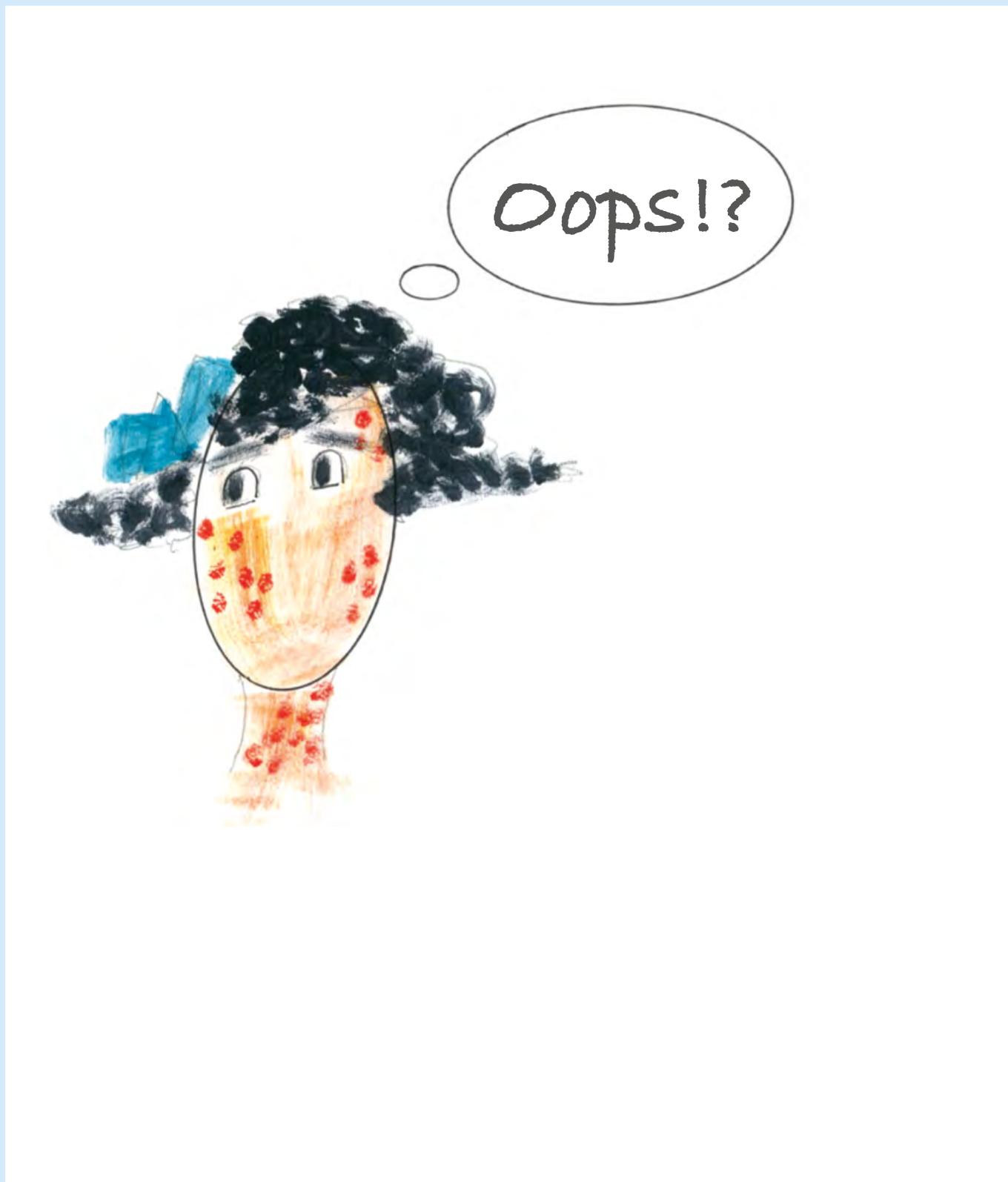
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## Unit 10/11

**“...All about skin, hair and nails...”**

Skin protection and care



**A few figures:**

- With about 2 m<sup>2</sup> and about 4–6 kg, the skin is the largest human organ
- On average, dancers shower 15.4 times a week and 8.7 minutes each time
- 90% shower hot or very hot
- 93% regularly take off their make-up
- Only ¼ use a silicone-free and pH-neutral face cream (Wanke, unpublished)

**Summary**

The skin is the largest organ of the human body. The organ consists of the skin, hair, nails and glands. The skin is exposed to very high loads with musical theatre performers. These loads begin during the education and increase again during professional activity. Special measures are therefore needed to help keep the skin and its appendages healthy.

**1. Introduction**

With about 2 m<sup>2</sup> and about 4–6 kg, the skin is the largest human organ. It is exposed to high levels of loads among artistic employees such as theatre performers. In contrast to many other professions, the musical theatre category group is not only about technical skills, but also about a characteristic appearance that corresponds to certain aesthetic and/or specific production-related requirements. The number of stage masks achieved with considerable effort is particularly high in the musical theatre category.

The loads on the skin are the result of numerous factors: in order to achieve the characteristic or improved appearance required for the respective role, measures are sometimes taken that can put considerable strain on the skin, hair and nails. The skin is also stressed by sweating and frequent showering. In combination with a high frequency of performances, the strain on skin and skin appendages is further increased. As a result, musical theatre performers are to be classified in an occupational group predisposed to the development of skin problems or problems with skin appendages (Fischer and Groneberg 2011).

From a dermatological point of view, beautiful skin is only possible in the long term if it is kept healthy. This includes appropriate care on the one hand and the avoidance of skin-damaging noxae on the other. In addition, the measures should start as early as possible and be implemented continuously.

**2. Skin structure and skin function**

The skin is composed of several layers and – depending on the localisation on the body – has different thicknesses (for example 0.1 mm on the armpit skin, 4 mm on the sole of the foot). The skin (*cutis*) consists of an epidermis and a dermis. Underneath lies the subcutis. Furthermore, the skin as an organ consists of the skin hair and nails as well as sweat and sebaceous glands.

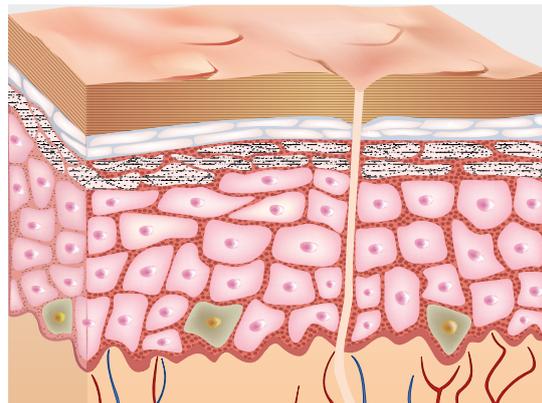


Figure 1: Structure of the skin

The skin has several functions. These include:

- mechanical protection
- temperature regulation
- defence against infections
- regulation of the water balance
- indirect participation in communication

Although targeted physical activity has a positive effect on skin circulation and metabolism as well as skin connective tissue and inflammatory skin diseases (e.g. *psoriasis*, *neurodermatitis*) can also be improved, it is above all the specific physical requirements during education and subsequent professional activities that can have a lasting adverse effect on skin and hair health (see Infobox 1).

**Example 1 – sweating**

Sweat provides bacteria and fungi with a good basis for growth. The salts contained in sweat also irritate the skin and any dirt particles can clog pores in combination with skin oils and lead to pimples. Dancers can easily lose up to 1.5 litres of fluid in 1.5 hours. The formation of sweat is correspondingly high.

**Example 2 – shoes**

Sometimes even the aspiring musical theatre performers spend several hours in the same shoes as part of their intensive training and rehearsal work. The permeability for moisture and heat is limited, so that the feet are in a humid-warm environment that – similar to a greenhouse – offers ideal growth conditions for bacteria and fungi (Figure 2).



Figure 2: Close-fitting shoes and the duration of wearing increase the risk of fungal infections on the feet (figure: Wanke).

- heavy sweating
- frequent showers
- mask/stage make-up
- work clothes (costumes if applicable)
- footwear
- hairstyles and wigs, if any
- nutrition

Infobox 1: Stress on skin in musical theatre and dance (modified according to Fischer & Groneberg 2011)

**3. “... An itching ....enough to drive you mad...” – typical problems and their avoidance**

Studies have shown that musical theatre performers belong to a professional group whose high loads may lead to problems and diseases of the skin (Wanke et al 2015 unpublished). Therefore, it is important to point out the risks to musical theatre and dance students in the sense of primary and secondary prevention and to discuss ways of avoiding dangers.

Studies have revealed numerous skin problems in musical theatre and dance. The TOP 5 are shown in Infobox 2.

1. foot and nail fungus
2. chicken skin
3. acne and acne-formed dermatoses
4. hair follicle inflammation after shaving
5. eczema (for example hand eczema)

Infobox 2 (according to Wanke et al 2015, unpublished): The TOP 5 skin problems in musical theatre and dance

### Regarding 1.: Foot and nail fungus

This is an infection of the skin by fungi occurring everywhere (so-called ubiquitous) (filamentous fungi, yeasts, more rarely moulds). If left untreated, a fungal attack of the skin can pass from the surrounding skin to the nails (nail fungus), which extends the duration of treatment by months (*Figure 3*).



Figure 3: Nail fungus on the big toe

#### Symptoms

##### *Athlete's foot:*

Itchy, scaly skin in the interdigital spaces of the toes (especially the small toes) and/or cracked dry skin on the soles of the feet

*Nail fungus:* Especially on the large or small toe; appearance: yellowish discoloration, possibly with crumbly decay of the nail plate.

**Therapy:** There is no self-healing tendency! Therefore, do not wait, but act and consult a dermatologist (even if it may take a little longer to get an appointment)

##### *For athlete's foot:*

Daily use of a cream that is effective against fungi, for several weeks.

##### *In case of nail fungus:*

Special nail polish or nail solution, possibly in combination with special tablets for up to 6–12 months, if necessary laser therapy.

**Nail fungus:** Once you have it, you must stay on the ball with a lot of patience and persistency.

#### Prevention

- always dry the interdigital spaces of your toes properly (dry after showering)
- wear bath shoes in changing rooms, showers and swimming pools
- use disinfectant foot sprays 2–3 times per week
- disinfect shoes with spray (especially dance shoes!)
- wash your soft shoes (if possible)
- use lavender oil or apple vinegar (naturopathic recommendation)

### Regarding 2.: “Chicken skin”

(*keratosis pilaris or follicularis*)

**Definition:** Chicken skin is a cornification disorder of the hair follicles that occurs more frequently in winter and with skin prone to neurodermatitis.

**Symptoms:** There are often areas with a rough surface on the outside of the upper arm and thighs when stroking over, the so-called chicken skin, often followed by hair loss at the affected area.

#### Therapy:

Use detergents such as syndets or soaps sparingly. Body oils should be preferred for “softening” the callosities, for cornification: greasy lotions with urea, salicylic acid or table salt after a consultation.



Figure 4: Chicken skin on the thigh  
(Photo: Zimmermann)

### Regarding 3.: Acneiform dermatitis

**Definition:** “Real acne” is distinguished from cosmetic acne (so-called *acne-form dermatitis*), which is caused by incorrect care of the skin (either a consequence of drying out or too rich care).

Real acne, on the other hand, is a combination of increased callosities, sebum production of the skin and a bacterial infection.

**Symptoms:** With cosmetic acne the spots often appear around the mouth (*perioral dermatitis*).

**Therapy:** “**Real acne**”: There are now many different methods to treat acne. A consultation with a dermatologist is recommended here. Patience is necessary because acne can worsen at the beginning of therapy.

#### Cosmetic acne:

- “zero diet” (discontinuation of all previously used cosmetics)
- prefer pH-neutral (skin pH: 4.5–5.75) care products, as this pH value offers protection against excessive colonization of the skin with acne bacteria
- rigorous make-up removal with mild products (e.g. micelle water)
- regular cleaning and disinfection of make-up utensils
- no overly rich creams (better: moisturizing or possibly oil-free products)

### Regarding 4.:

#### Inflammation of the hair follicle after shaving

(*shaving folliculitis*)

**Definition:** A shave (especially a wet shave) results in minor injuries of the skin, which can lead to small, local inflammations caused by bacteria. This often happens in body folds. This is where the humid, warm climate provides the best conditions for the growth of bacteria. But also in regions subject to particularly high mechanical stress (genital area, friction due to slip cuffs, and so on), inflammations of the hair follicle are common. Deodorants with aluminium salts may cause additional irritation under the armpit.

**Symptoms:** Pimples after shaving.

#### Therapy and prevention or reduction of problems:

- always use sharp razor blades
- use shaving foam before shaving
- first shave in direction of growth
- disinfect blades after shaving
- do not cause additional irritation by using deodorants containing alcohol or aluminium salts. Caution: unfortunately, there is now a very large selection of them in drugstores/at the chemists
- use antiseptics after shaving
- avoid clothing made of synthetic materials or close-fitting clothing, if possible
- change and wash clothing frequently, possibly with hygienic rinsing agents. This applies in particular to training or rehearsal clothing and towels used
- consider permanent hair removal (e.g. by laser), if applicable.

### Regarding 5.: (Hand) eczema

**Definition:** Eczema can develop on the basis of an allergy, neurodermatitis, an infection, for example with fungi, or due to irritative-toxic causes. The latter occurs when the activity lasts longer than 2 hours in a humid environment (also caused by heavy sweating while dancing).



Figure 5: Eczema in the interfinger fold  
(Photo: Zimmermann)

**Symptoms:** Reddened, itchy skin, possibly with blisters, crusts or dandruff. Often there is a deterioration in the winter months

**Therapy:**

- use good skin care. Urea creams in particular can provide the skin with moisture and thus provide protection
- use special skin protection preparations, if necessary
- avoid allergens/irritation if possible. Therefore an allergy test should be done first

### 4. Basics of skin care and prevention

“regular but gentle skin cleansing accounts for more than 50% of skin health...”  
(Fischer & Groneberg, 2011)

Frequent **showering** can also affect the protective mechanisms of the skin. Some recommendations should therefore be taken into account in order to maintain skin health (see Infobox 3).

- Do not take a shower immediately but after a short break (otherwise sweat formation will continue after taking a shower)
- Take a quick shower
- Do not shower too hot (dries out the skin)
- Do not wash your face with shower gel or shampoo (too much degreasing effect)
- Do not wash your body with shampoo
- Clean your face with special cleansing milk cleaners
- Use replenishing shower gels or shower oils with pH around 5.5
- Dry thoroughly (also inter-toe spaces and so on)
- Use moisturizing lotions (e.g. those containing urea) to care for the skin

Infobox 3: Tips for cleansing the skin after training/rehearsal/performance (modified according to Fischer & Groneberg 2011)

Basics of skin care – or: measures for beautiful and healthy skin (modified according to Fischer & Groneberg 2011, p. 128ff)

#### General information

- 2–3 l fluid intake
- physical activity/sport
- UV protection
- avoiding nicotine/alcohol
- healthy nutrition
- stress management
- perfume better to wear on clothing than on skin

### Skin-specific

- Do not shower too long, too often or too hot, then always use appropriate care for your skin type
- Occasional gentle peeling cures improve the appearance of the skin
- Use a good moisturiser with UV protection during the day and a serum with antioxidants during the night
- Use a mask that is appropriate for the skin type under the make-up
- A special eye cream should be used for the eye region
- The list of ingredients should be as short as possible
- Cosmetics should be comedogen-free and “hyopallergenic”
- Avoid fragrances/preservatives/alcohol/silicones/creams
- Use mild shampoos and 1/month hair treatment
- Blow-dry lukewarm – and only if absolutely necessary, otherwise air dry
- Use skin type appropriate cosmetics without perfumes

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## Unit 12

**“...drinking instead of limping...”**

Drink properly – prevent injuries – live more healthily  
(health care through healthy drinking behaviour)



## Summary

Appropriate drinking behaviour is essential for maintaining all bodily functions and one's own performance in aesthetic sports. Musical theatre and dance students have a high physical activity load (at least 3–4 h dance lessons/day) and thus a high fluid requirement, which should be covered by an appropriate selection of drinks and an adequate drinking quantity. If the fluid intake is insufficient for a long period of time, this can lead to loss of performance, muscle pain, fatigue or even injuries. Accordingly, drinking behaviour should be addressed as a component of preventive teaching aspects.

## Introduction

Supplying enough fluid is a problem for many students. However, the feeling of thirst is often only insufficiently perceived or the circumstances lead to the fact that drinking is even forgotten or too little is drunk. However, all body functions are dependent on the presence of water, for example the supply and removal of endogenous and foreign substances, heat regulation during physical activity through sweating or the body's own defence system. Depending on age and body composition, the water content of the body alone amounts to about 50 to 70% of the body weight. Approximately half of this is accounted for by water in the muscles. The water turnover or water balance per day is 10 litres. Fluid is therefore essential for the human body. Permanently insufficient drinking behaviour leads in the worst case to injuries, delays regeneration after physical exertion or the recovery after an injury. It is therefore imperative for (prospective) performers to absorb sufficient liquid during the day (Wanke 2011, page 165ff).

## Information on the “right” drinking behaviour

An increased body temperature during physical activity increases the blood flow to the skin in order to cool the body by sweating with subsequent evaporation (transpiration). As a result, the need of the musculature for water increases. During physical exertion, electrolytes such as sodium chloride and water are often released through perspiration. This is the reason why sweat often tastes salty (Raschka & Ruf 2012, p.92).

With a loss of fluid of 3% of body weight the physical efficiency can already be reduced. A 5% loss of fluid can ultimately contribute to impaired brain function, gastrointestinal complaints, feelings of weakness or muscle cramps. Adequate fluid replacement is therefore necessary before, during and after physical exertion (Elmadfa & Leitzmann 2004, p.45). The degree of dehydration is influenced by various factors. These include, for example, the intensity and duration of physical exertion, training condition, ambient temperature, clothing, predisposition, gender, age or hydration status before exertion. Taking these factors into account, the loss of fluid due to dance stress can amount to up to two litres per workout (Mastin 2009, p. 49).

The Deutsche Gesellschaft für Ernährung e.V. (German Nutrition Society) recommends covering the fluid requirement with 35 to 40 ml/kg body weight per day. This results in a fluid intake of 2 to 3 litres per day (DGE e.V. 2015). To prevent dehydration as a result of physical exertion, approximately 400 to 600 ml of fluid should be supplied about 20 minutes to two hours before physical exertion. For rehydration after exercise, an intake of 200 to 250 ml of fluid every 15 to 20 minutes is considered adequate. Hypotonic and isotonic drinks should be preferred. Hypotonic drinks such as tea, fruit spritzers and mineral and tap water are less concentrated than the blood and are very quickly transferred from the intestinal lumen into the bloodstream. In case of several hours of exposure, juice spritzers (three parts water and one part fruit juice) or isotonic drinks with maltodextrin for rehydration are particularly suitable.

The intake of highly concentrated fruit juices, alcohol, soft drinks and energy drinks (hypertonic) should be avoided. Beverages with a high sugar content increase dehydration by increasing water secretion in the small intestine, thus increasing the feeling of thirst. An increased caffeine intake often has a diuretic (stimulation of urine and urine production) effect and alcohol consumption leads, among

other things, to motor restrictions, an increased risk of injury and a reduction in blood sugar. Therefore, these beverages are not suitable for fluid resupply before, during and after a high physical load.

Equally critical is the insufficient supply of sodium chloride (common salt) to the body. The salt losses increase with the duration and intensity of the load due to sweat production. It is therefore recommended to avoid excessive intake of low-sodium drinks, such as low-sodium water. In addition, the supply of calcium, iron and folic acid is often insufficient. Calcium-rich water, milk and milk products, wholegrain cereals, green vegetables and certain fruit varieties such as oranges can meet the demand well (DGE e.V. 2014, Schek 2008).

In addition to drinks, water-rich foods, especially fruit and vegetables such as cucumber, banana, kiwi and so on are also suitable for supplying water. A so-called “pee chart” is used to determine the individual fluid requirement. The darker the color (dark yellow) of the urine, the greater the degree of dehydration. In addition, it is possible to weigh yourself without clothing before the physical load and accordingly after the physical load. The difference gives the liquid requirement (Hamm et al 2011, p.165ff).

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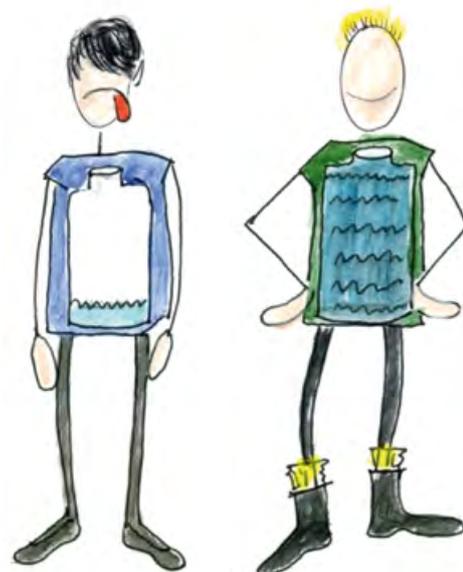
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Unit 13/14

**“...Through the day with energy...”**

Assess energy requirements and cover them competently (health care through healthy nutrition)



- Prospective musical theatre performers have previously acquired knowledge that should be trained (Vitzthum et al 2013).
- In the nutrition quiz, none of the interviewees answered more than 60% of the questions correctly (Vitzthum et al 2013).

### Summary

For performing artists, a wholesome diet is an important column/pillar for keeping the body healthy. Prospective musical theatre performers do an extensive amount of physical activity and therefore have a high energy consumption, which should be covered by a healthy and balanced diet. Accordingly, a precise combination of macronutrients is needed. If the diet is not adapted to the physical activity requirements and the energy and nutrient supply is inadequate for a long period of time, it may lead to

- loss of performance
- exhaustion
- fatigue
- and injuries

Nutrition should accordingly be addressed as a component of preventive teaching aspects (Hamm et alii in Wanke 2011, p. 149ff).

In a study on nutritional behavior and knowledge in musical theatre performers, little knowledge on nutrition was determined. In a nutrition quiz with a total of 114 questions, the participants were asked about current nutritional recommendations, ingredients in connection with day-to-day food and the relationship between nutrition and nutrition-related illnesses. According to the results, none of the 37 respondents knew more than 60% of the answers. In all sections there were gaps in knowledge and misjudgements. This indicates that although prior knowledge exists, additional training is needed (Vitzthum et alii 2013).

### 1. Introduction

The activities of musical theatre and dance students are physically demanding.

Students are expected to be highly motivated to perform, which is necessary in order to meet the requirements. Not only the physical conditions, the duration of sleep, the age or own resistance (resilience) influence the physical resilience, but so does

nutrition. Therefore, a balanced diet is just as much a prerequisite for keeping the body healthy as optimal training and a good mental attitude.

Especially due to the unregulated and very changeable daily routine, nutritional errors occur again and again and usually one's own nutrition and body perception is neglected in this regard (see Table 1).

Reasons for dietary errors
no feeling of hunger or thirst
state of exhaustion too high
full stomach before training
high training volume
too little remaining time
too late home for cooking
aesthetic ideal

Table 1: Subjective reasons for dietary misconduct in dance (Hamm et al 2011, p. 150 according to Wanke & Scheele 2000)

The students should be aware of the specific significance of nutrients in order to prevent injuries and illnesses and thus a drop in performance or loss of performance.

It is therefore necessary to adapt one's own needs to individual requirements (Huwyler 2005, p.149ff).

It may make sense to seek additional individual advice from qualified nutrition experts. Initially, however, the focus of the units is on providing basic nutritional recommendations.

## 2. Basics of nutrition for musical theatre and dance students

Basic nutrition recommendations for performers are based on the 10 rules of the German Nutrition Society (Deutsche Gesellschaft für Ernährung e.V. (DGE e.V.)), the D-A-CH reference values for nutrient supply and the DGE e.V. advisory standards.

### a) Determination and coverage of energy needs

The energy needs arise from the

- *basic metabolic rate* (BMR),
- energy expenditure in physical activity,
- thermogenesis after food intake,
- and the additional need in special life situations (pregnancy, lactation or growth).

The guideline values for energy intake are given in mega joule (MJ) or kilocalories (kcal). The conversion factor is  $4.18 \text{ kJ} = 1 \text{ kcal}$ .

The major part of energy consumption is represented by the basal metabolic rate, while thermogenesis after food intake is of less quantitative importance. The energy requirement for physical activity has a decisive influence on the *total energy expenditure*, TEE).

The quotient of TEE/BMR results in the average daily energy requirement in multiples of the BMR, depending on occupational activities and leisure behaviour. Under normal living conditions, this value can vary between 1.2 (sedentary or recumbent lifestyle only) and 2.4 (physically strenuous work) and is used as a measure of the physical activity level (PAL).

Considering the degree of activity of the population with predominantly sedentary occupational activity, a PAL value of 1,4 to 1,6 is estimated and reference values for nutrient intake related to energy are derived, resulting from the multiplication of 1,4 by basal metabolic rate.

For sports activities of 30–60 minutes, 4 to 5 times a week, an additional 0.3 PAL units per day can be added to the professional energy expenditure in physical activity (Kasper and Burghardt 2009, p. 1–4).



### Calculation

Assuming that a student spends about eight hours a day with moderate physical activity (PAL = 1.8) and another eight hours with less intensive activities (PAL = 1.4) and sleeps for an additional eight hours (PAL = 0.95), the energy expenditure (EE) is 1.4 BMR. If the basal metabolic rate per hour is estimated at 1 kcal/kg body weight, the total energy metabolic rate for a 60 kg performer is 1992 kcal/d.

### Formula:

$$EU = 1.65 * 60 \text{ kcal} * 24 \text{ h} = 1992 \text{ kcal/day}$$

The actual energy demand as a function of the different requirements on the day fluctuates around this value. In addition, there is a fluid requirement of 35–40 ml/kg body weight/day (Schek 2013).

### Relation of energy-producing substances

Basically, the energy requirement should be met with a nutrient distribution of:

- > 50% carbohydrates,
- 9–11% protein and
- maximum 30% fat (DGE e.V. 2009).

The energy intake should be distributed over a maximum of six but at least three meals a day. In addition, the distribution of meals should be coordinated with the time of day and the training units in order to avoid a drop in performance. This requires the development of individual nutrition strategies depending on the extent and level of physical exertion as well as the experiences and goals of the performers. It is also advisable to take at least 30 minutes between meals and training for small snacks and two to four hours for larger meals. This helps to avoid digestive problems and to have energy available for the performance requirement at the appropriate time (Mastin 2009, pp. 17–24).

An acyclic sequence of movements in the form of intervals is characteristic for dance. Loads with different intensities and breaks change in irregular sequences. In principle, dance is thus one of the glycogen-depleting sports, i.e. the students are primarily dependent on the production of energy from carbohydrates in the form of glucose from glycogen stores (Chmelar & Fitt 1990, p. 20).

### b.) Implementation in practice – 10 aids for musical theatre and dance students as well as professional artists

The implementation to cover the energy demand should be based on the 10 rules of the DGE e.V. as assistance and guidance:

#### 10 Rules

- 1 Enjoy the diversity of food
- 2 Rich cereal products and potatoes
- 3 Vegetables and fruit – take 5 a day
- 4 Milk and dairy products daily, fish once to twice a week, meat, sausages and eggs in moderation
- 5 Low fat and high fat foods
- 6 Sugar and salt in moderation
- 7 Plenty of liquid
- 8 Gentle preparation
- 9 Take time to eat and enjoy
- 10 Pay attention to weight and keep moving

Table 2: 10 Rules of the DGE e. V. (DGE e.V. 2013)

### **Pas de deux – nutrition and dance – 10 tips for students of musicals and dance as well as working artists**

In addition, students can orient themselves on the following guidelines for the implementation of a balanced diet for everyday life:

#### 1) Port de bras:

*Supporting framework of energy supply*  
→ *Plan ahead!*

As in many areas of life, it is also worthwhile to plan the energy supply a little ahead for the week or the day. When there are auditions, performances or times with very intensive training, the head is often filled with other things and you usually have little time. Therefore, it makes sense to think about the energy supply over the week or to organize the day. What helps:

- create recipes
- make shopping lists
- prepare snacks and meals the day before or, for example, at the weekend.

#### 2) Rond de jambe:

*Let your thoughts circulate and reflect on energy intake of the day*  
→ *Dietary diary*

To write down – for example over one week – what you have eaten and what you have drunk and in addition how much time you've had for eating and drinking, and how you've felt about it can help

- to determine which food items and dishes have done well and provided energy, without unpleasant bloating, abdominal pain, pangs of hunger or similar
- to reflect on one's own eating habits and to recognize where improvements are possible
- to show awareness of nutrition as an important component of maintaining health

#### 3) Pirouette:

*Don't lose focus*

→ *Turn – turn – turn : drink, drink, drink*

Supplying enough fluid is important to avoid feeling dizzy, muscle soreness, listlessness or fatigue. Two to three litres of liquid per day are required. Suitable drinks are spritzers, water, teas or diluted juices.

However, alcohol consumption should be avoided. Alcohol blocks the provision of energy from carbohydrates and fats, and impairs speed, balance capability, coordination and precision. Besides, alcohol increases the appetite.

Coffee's different. Caffeine is known to increase attention and performance. However, coffee consumption limits the intake of some micronutrients in the intestine. Consumption should therefore be limited to a maximum of four up to five cups a day (see UE drinking).

#### 4) Piqué:

*Hunger pangs in your stomach!*

→ *Avoid cravings*

There is often too little time during the day to eat a meal in peace. Often there is no feeling of hunger at all and meals are missed as a result of a tight training program or due to a lack of breaks. It's not uncommon for dancers to complain about hunger pangs in the evening. In such a case the body lacks carbohydrates, and reserves (glycogen) are almost exhausted. Either you go to bed with hunger and may be weakened the next day, or you give in to hunger, which makes it more difficult to fall asleep or sleep through. What can be done?

- Regular meals
- Distribute meals evenly throughout the day
- Breakfast (see No.6)
- Nibbling (see No. 8)
- Fill glycogen storage tank (see no. 8)

**5) Chassé:***On the way!**→ Things to bear in mind in restaurants/bars/café*

During auditions, out of town appointments or travels, it is not always easy to eat and drink healthily and maintain a balanced diet. Fast food restaurants and snack bars are numerous and sometimes the only thing nearby.

Basically, you have to prepare your own snacks, such as a salad with wholemeal rice or noodles. In any case, it should be a meal to do you good and give you energy. Particularly prior to auditions, it is not advisable to experiment and to try the unknown.

If there is no time for homemade snacks, it is possible to get nutritious snacks from the supermarket, such as muesli bars with little added sugar, dried fruits, nuts, fruits, vegetable sticks et cetera. In addition, it is important to find favourable alternatives in restaurants. These include, for example:

- rather choose oat bars or for example bars with dried fruits instead of chocolate, cake or sweets.
- choose wraps and sandwiches with tuna, chicken, low-fat cheese or salad instead of mayonnaise fillings or cured meats and bacon.
- rather choose vegetable burgers, burgers with chicken and tomato paste-based sauces than hot dogs, fries and mayonnaise-based burgers with lots of cheese.
- choose fresh vegetables, simple meat, low-fat sauces and dressings based on vegetables and do without batter, creamy and fatty sauces or fried food items.

If the nutrient requirement is difficult to cover, athletes in particular resort to dietary supplements. If there is a proven deficiency of a vitamin or mineral substance, additional intake (supplementation) is advisable after consulting a medical doctor. Apart from that, only a few substances have a demonstrable performance-enhancing effect, such as creatine, caffeine or, for example, multivitamin preparations. However, the correct dosage is important here!

**6) Développé:***Have breakfast and the day goes much better!*

“Breakfast is the most important meal of the day.”

This statement can be heard very often. But it's also true. This meal stimulates the metabolism and creates the energy base for the day. Especially with a variable daily routine breakfast is very important. A carbohydrate-rich breakfast is suggested here. This includes in particular a mixture of complex carbohydrates, such as whole-meal bread with jam, muesli with fruits, natural yoghurt with fruits, homemade smoothies, wholemeal toast with egg et cetera.

If you can't bring yourself to have breakfast, it is helpful to get used to a small meal such as a whole-meal toast or fruit at least to stimulate the metabolism. Another possibility is to drink lemon water which stimulates your appetite.

**7) Pas de bourrée:***Combination of eating, sleeping, drinking**→ Avoid irritating your senses*

Sufficient sleep of at least eight hours, sufficient hydration and regular meals are very important aspects for the regulation of hunger and satiety. Little sleep or insufficient fluid intake can result in irritating your perception and lead to either a lack of hunger feeling or an increased hunger feeling, i.e. more is eaten in the end than is actually necessary.

8) Grand jeté:

*Energy for big jumps? But how?*

Carbohydrates, proteins and fats are important for the energy supply of your body. For performers and dancers who move a lot, a few things regarding the combination are to be considered which are of benefit for an optimal performance:

- Snacks between meals. Note: when you move a lot, the energy requirement also increases. This is not necessarily covered with three meals, but rather depends on the amount of movement. Consequently, the nibbling principle applies, i.e. to eat small, energy-rich snacks (one portion corresponds to a handful) that are easy to digest and rich in carbohydrates (nuts, vegetable sticks, whole-meal bread with avocado, apple, dried fruit and so on).
- Selection of a combination of carbohydrates and proteins in the main meals and especially in the first hour after intensive training (ratio 4:1). So that
  - the blood sugar level can be stabilised more quickly,
  - regeneration is optimised and muscle soreness is prevented and
  - energy storages can be better filled (glycogen).
- Five to seven servings of fruit and/or vegetables per day

9) Pas de chat:

*Don't throw good eating habits overboard in your spare time!*

Once good nutritional behaviour has been established, it is important to also keep it up in the training-free time, since otherwise a drop in performance during the subsequent training period may occur. While the initial task is to adapt the energy demand to the changed load situation, the food components remain unchanged. Therefore, the food variety must be large and balanced also in your leisure time.

10) Grand plié:

*Enjoying your meals is the basis for everything*

With all the recommendations and hints, the most important thing is still to enjoy meals and not to lose your appetite for food. Stimulating the digestive juices, the digestion itself and the provision of energy always depend on how much interest in a certain dish you have, the mood or the environment and much more.



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## Unit 15

**“...from theory to practice...”**

Applied self-care: summary



**A few figures:**

- Only one in 17 persons immediately consults a specialist in the event of a health problem.
- Only one in five informs the teacher in the event of an injury.
- The offers of the educational institute to cope with stress are rated 'sufficient' by only 17%.
- The most commonly used method for coping with stress is "lazing around" (Wanke *et alii* 2012).

**Summary**

Not just the future professional activity, but already the training is accompanied by high and very different psychomental and physical demands (Vitzthum *et al* 2013, Wanke *et al* 2011). The same applies to the complex training and work situations where, despite everything, it is all about protecting and keeping the students' body asset healthy (Wanke *et al* 2014). Therefore, it is very important to recognise such complex situations and to be able to develop helpful measures in the prevention of education and work-related hazards.

**Self-care – preventive measures**

Education or studies, respectively, are associated with high physical and psychological loads. The syllabus/curriculum implies not only the numerous different theoretical and practical subjects, but also further contents such as the simulation of work situations (e.g. simulation of castings/auditions), education-related intermediate and final examinations or participation in professional musical theatre, dance or theatre productions already during the training (Wanke *et al* 2012).

The education usually last between 6 to 8 semesters in the musical theatre category. In professional dance the education lasts much longer, is partly state funded and partly subsidised by the BAföG (Berufsausbildungsförderungsgesetz). It is mainly designed as a full time program and therefore includes a weekly education of about 30 hours per week, depending on the educational institution. At times, the actual number of hours may be significantly higher (e.g. preparation for auditions, graduation, performances, examinations, and so on).

These high education-related loads, in combination with the non-education specific private loads, pose great challenges to the generally very young adults. They learn that their bodies are the assets of their careers and may even learn during education that minor physical deficits can lead to limitations and pose a danger to vocational education and subsequent employment as a consequence of acute injuries or chronic damages caused by misuse or over-use.

This phase of vocational education is the last curricular opportunity to impart important aspects of prevention and self-care before the professional activity. This knowledge should serve to support this occupational group, to behave properly in case of hazards and injuries and thus to stay healthy for as long as possible.

The teachers involved in the training have a great responsibility, since they are not only supposed to impart subject-specific contents, but also have the function of multipliers and thus pass on both good and sometimes less good behaviour. At best, they provide the foundation for a healthy working life (Wanke & Groneberg 2015).

For musical theatre and dance students, a whole bundle of measures can be defined that serve to maintain health (*primary prevention*) and improve health and performance (*secondary prevention*) as well as restore employability after injuries/illnesses/damages (*tertiary prevention*).

The hazards which justify these measures can be divided into exogenous (external, workplace-related and only indirectly influenceable), as well as endogenous (personal and activity-related and directly influenceable factors).

### Behavioural prevention – environmental prevention

They can be divided accordingly into environmental prevention (concerning the work environment/the workplace, the teacher/the institution/the employer) and behavioural prevention (concerning one's own behaviour in relation to activity). While measures of environmental prevention affect the environment and can therefore hardly be influenced by the students (e.g. costumes, rehearsal planning), behavioural prevention deals with their own attitude and behaviour.

In both environmental and behavioural prevention, the first step is to identify hazards and develop a resulting response in the form of adapting to the circumstances (e.g. floorings/folds) or, at best, avoiding or reducing hazards (e.g. optimal drinking behaviour).

### Complex situations are common

Already during the education it is important to stay in control within complex situations, e.g. singing and dancing along with a group, with props, heel shoes and long skirts and not to injure oneself. To this end, it is important to identify and act on endangering situations as a whole, i.e. to be able to develop measures that are helpful in the prevention of education and work-related hazards. The syllabus is intended to make a contribution to this.

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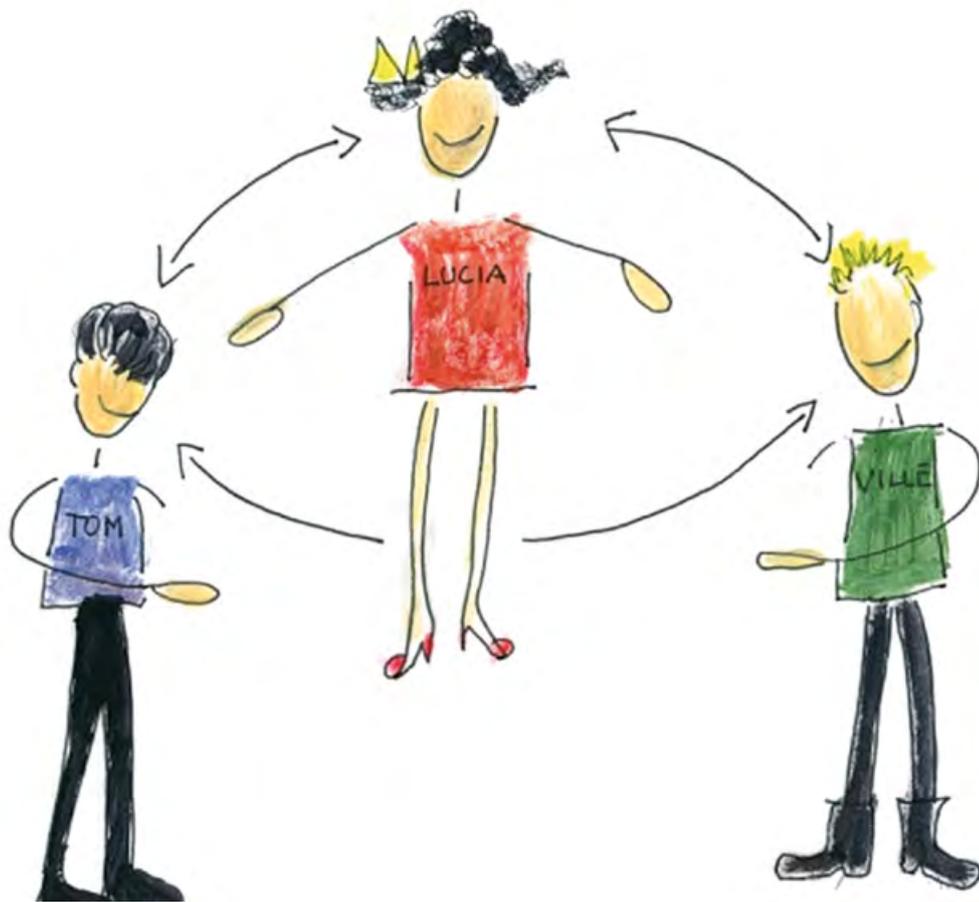
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Unit 15+

## Reflection on the entire syllabus (see methodological-didactical commentary)



## 4 List of prerequisite contents and terms

The list is not complete. Rather, it serves to check existing knowledge and to stimulate the acquisition of new knowledge, for example through self-study.

- agonist – antagonist (musculature)
- anaerobic and aerobic energy metabolism
- protein (structure)
- fats (structure)
- joint structure
  - bones
  - tendons
  - bursa
  - joint fluid (synovia)
  - joint capsule
  - band structures
- cardiovascular system
  - constituents
  - function
  - changes during physical exertion
- carbohydrates (structure)
- basic motoric characteristics
  - definitions of ...
    - stamina
    - flexibility
    - force
    - strength stamina
    - high-speed strength
    - speed
    - coordination
- muscle building
  - muscle stomach
  - muscle insertion
  - muscle fiber
  - muscle fibril
  - contractile filaments
- muscle contracture (sequence)
- sore muscles (cause)
- muscle groups, important
  - (for example, thigh muscles)



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