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# Ready to perform

## Building-up training & getting back in shape

## Recommendations from a dance science & sport scientific point of view

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## With additional modules

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# Modules

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## Nutrition for dancers in times of the Corona pandemic

Eva-Maria Kraft, BA Dance Education, Dipl. Ernährungstrainerin

## Circuit Training as Strength & Endurance Training for Dance

Andrea Popp M.A., MAS Dance Science

## Plyometric jump training for dancers – getting a good foundation for better jumps

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## Communicational exchange for ballet masters & teachers: build-up of fitness & training

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Introduction to the recommendations

# Dance is art. The dancer is an artist and an athlete.

Caused by the Covid-19 lockdown most dancers found themselves in a long period of reduced and limited training with no performances. This surely had an influence on their fitness levels and their technique. It is important to compensate these months of lost training properly in order to deal with a higher risk for injuries.[1]

How can dancers get back in shape efficiently so that they are ready for intensive training and rehearsals, and what do they need to truly be ready for when performances on stage resume again?
Meeting the aesthetic goals is important because dance is art. However, we must not forget that dancers are performing athletes and as such they are subject to the same training principles - just as athletes in general.[2(p658)]

These recommendations from a dance science and sport scientific point of view provide background knowledge and practical suggestions not only for dancers, ballet masters and rehearsal directors but also for choreographers and the members of the artistic administration management.

Exercise science is a complex field with a rich body of knowledge and a rightfully vibrant scientific discussion. To maintain accessibility these recommendations are kept simple and straight forward without losing their truthfulness; thus serving their aim to give general advice to the professional dance community in these unusual times. However, specific modifications may be needed for certain individuals and can be discussed with ta.med experts in range of additional modules.

Reference to scientific literature has been added to provide reliability.
Descriptions of the modules can be found at the end of these recommendations and online under www.tamed.eu.

## Fitness & technique belong together.

Fitness is a term that covers several conditional areas: strength, endurance, speed, flexibility and coordination. These closely interact with dancers' technique, their dance-specific coordinative abilities and motor skills. This interaction between condition and technique is essential because both areas mutually depend on each other.[3(p801),4(pp771-784),5]

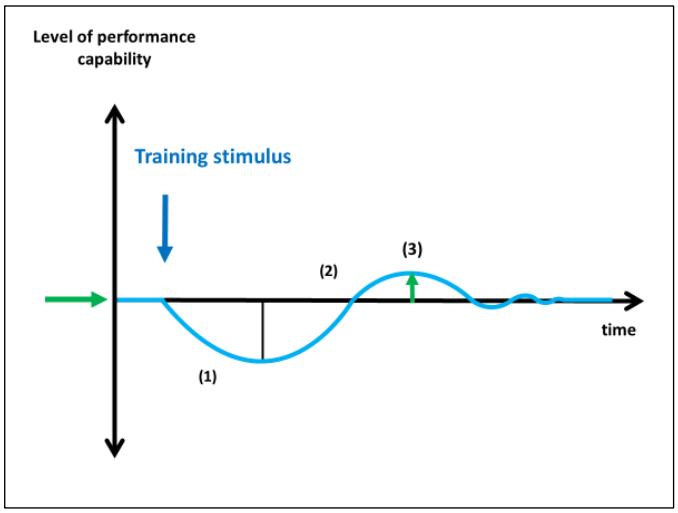
Because of this close link, dancer's fitness needs extra time and focus in order to build up what was lost during the past months in lockdown. Regaining good fitness levels is necessary for dancers to reclaim their technique since the two go hand in hand. Therefore, before the amount of rehearsals increase and performances are being scheduled, this process of restoring fitness and technique should become the priority focus. It should be part of the dancers working hours so that they don't have to compensate their loss of fitness supplementary to a normal rehearsal schedule; which could consequently lead to overload.

## Training & rest are a unit

The path to getting back into shape is not a straight road that dancers can race down with high speed. It urgently needs to be orchestrated progressively. For a valuable build-up, training and rest must be seen as a unit that belongs together.[3(pp50-54)] To ensure for dancers to have adequate time to physically and mentally adapt to the training load, a regular shift between training and recovery must take place. Therefore, including recovery phases in the program will help provide the right amount of balance between necessary training load in conjunction with the amount of rest needed.

The underlying principle behind this is the supercompensation cycle.[6(p15)]
Training that causes an **irritation of a biological balance (1)** and is followed by **recovery (2)** will cause **adaptations.** This provides a **higher level of capability (3)** for a while. During this time, the cycle starts again with a new irritation caused by training.[3(p52),7(p14)]

Figure 1 Supercompensation




In order to improve, everybody needs to be provided with new stimuli throughout the training process. However, not everybody needs or can handle the same intensity of training. Depending on the individual, the current fitness level or how well-rested a dancer is, the required training intensity might be higher or lower and the necessary breaks between training sessions may need to be shorter or longer.
This implies three things:

1. The training needs to evoke a stimulus to the biological balance to have an effect. Therefore, it needs to be more than a warm-up for rehearsals to actually train dancers. (➔ see: The building-up within the company classes).

2. The dancers need enough rest to respond to the new stimulus with a good quality recovery and adaptation. (➔ see: Quality of recovery time)
3. The right intensity of training and necessary amount of rest may vary between different dancers.

## Ability to recover is the limiting factor

As just stated, a good relationship between both regular training and rest is fundamental to the development of a dancer's performance capability. The ability to recover is the limiting factor on how much training a dancer can handle and benefit from.
If that is being exceeded the training becomes ineffective because the results fail to appear. If this continues over time, the dancer can slide into an overtraining syndrome with decreasing ability and higher risks for injury. When practising in groups or within class, the dancers need the possibility to adapt their training behaviour with consideration of what their bodies need or can handle at a certain moment. This implies that dancers, ballet masters, rehearsal directors and choreographers are well informed about these basic principles of training and are in good communication with each other.
It is important that dancers have the chance to specifically listen to their bodies and then react to it in order to be able to navigate their training-rest cycle.

Giving dancers such a choice implies not only trust but also the knowledge that it's the same goals everyone is working towards: expressive and exciting art that is performed on stage by fit and healthy dancers. The ability to recover and the speed of recovery is influenced by several aspects.

### Aspects influencing the individual speed and of recovery:

- The amount and quality of recovery time ( ➔ see: Quality of recovery time)
- The right nutrition ( ➔ see: Module on Nutrition)
- The fitness levels and especially the level of aerobic endurance ( ➔ see: The fundamental role of aerobic endurance)
- Age, gender, genetic and constitutional factors

## The fundamental role of aerobic endurance

Endurance is the physical and psychological resistance against fatigue and it is the ability to recover fast.[7(p110)] Therefore, it is generally an important aspect within intensive training programs for kinds of all athletes.[3(pp50-55, 233-234, 255)]

Dancers also need an appropriate aerobic endurance as a foundation. This is not only coherent from a sport scientific point of view, but has also been pointed out by many empirical studies with dancers over the past decades.[1,8–15] Looking at how good the aerobic endurance of dancers is, we can see: that the levels differ a lot between dancers and they often have been stated to be too low.[16,17,18(p38)]

To be ready for an intensive training and rehearsal program, the foundation of a good aerobic endurance is necessary[3(p233),19(p7)] since it increases the ability to recover faster.[7(p110)] This improves how well dancers' regenerate between exercises during short pauses, in breaks

throughout the day, during the night's sleep and on days off. In effect, a good aerobic foundation allows more trainings and rehearsals per week because the body can tolerate it as well as and benefit from it.[3(pp50-55, 233-234, 255),20(p849)]

Intensive training and rehearsals without a well-established aerobic fitness foundation will be less effective for the dancers because their bodies will tire earlier[9(p29)] and adapt more slowly.[21,22(p766)] This likely leads to fatigue and overwork; two elements that many dancers perceived among the main reasons for their injuries.[23(p22)] Various studies with dancers see a distinct link between the lack of aerobic fitness and a higher risk for injuries.[3(p233),9,19(p7),24–26]

## A good aerobic foundation prevents early fatigue & prolongs the time dancers can train and rehearse effectively[3(pp50-55, 233-234, 255),20(p849)].

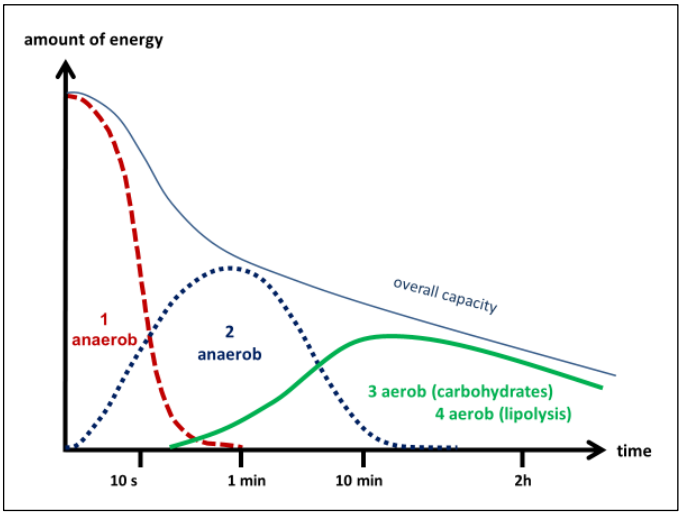
As a result, difficult elements can be rehearsed longer and more often with a higher quality of coordination because the dancer is physically able to do so. This influences the time frame in which dancers can regain their technique including their technically demanding movements.[7(p110)] Practicing such movements with a tired body often means working unnecessary muscles with imprecise coordination; simply because the body is not able to perform properly any more. Therefore, practicing can become inefficient and even lead to decreasing learning results.[27(pp2, 151)]

Studies show that the way many dancers train and rehearse does not often train the aerobic endurance.[11,18(p157),28,29] During performances however, the demand on the aerobic energy system is higher in comparison to training and rehearsals, because dancers are usually moving for longer periods and with shorter breaks. That leaves a gap between what the aerobic energy system of a dancer needs to deliver on stage to what dancers are prepared for.[11,12,28,30] This explains why researchers have suggested that regular performances were the reason for dance professionals higher aerobic fitness compared to what they found in dance students who had less performances.[16(p477),31(p4),32,33] This is not ideal, because dancers should be physically prepared for their performances rather than getting fit as a result from the performances. A lockdown with no performances and without aerobic training most likely causes a significant loss of aerobic fitness.

### Why dancers' aerobic endurance often is too low

Here is a little context to help understand why dancers' aerobic endurances often is too low. Simplified: endurance means for the muscles to have and to maintain enough energy to function in order for the dancer to continuously work. Physiologically speaking, this energy comes in the form of *creatine phosphate (KrP)* and *adenosine triphosphate (ATP)*. The body has different ways of providing this energy. It can be stored; it can be provided without oxygen (anaerobic process) and it can be provided with oxygen (aerobic process). To always have this energy accessible the body shifts between these different possibilities and mixes them because they are differently available depending on the *length* of an exercise and how *intensive* it is.

Figure 2 Time scale of energy supply 34(p61)




It basically is a clever system that provides stored energy immediately (1), it provides ATP without oxygen at the beginning of exercising (2) and during high intensities and it provides ATP with oxygen when exercises are longer - as long as there is enough oxygen available (3, 4). When a longer exercise increases in intensity the energy supply becomes more and more anaerobic because there is a lack of oxygen.
By mixing these different possibilities the body makes sure that energy in form of ATP is always available. [34(pp135-161)]

As the aerobic energy supply kicks in later (hence, after an exercise has been commencing for a while), the problem in dance quite often arises from the exercises being too short and too intensive to trigger the aerobic energy system.[11,14,18(p157),28,29]

Some literature suggests that "85 percent of the technique class is not undertaken at the cardiorespiratory level required to match that of performance."[35(p77),36]

Run-throughs that may have the potential to train the aerobic energy system are usually not done regularly enough and often happen too close to the premiere to allow enough time for adaptation. Dancers may also preserve their energy during a run-through because it is close to a performance where they want to be ready to give their all.
Therefore, the improvement of the aerobic system needs to occur at an earlier stage of the training process, i.e. at the beginning of the season when intensive rehearsals and run-throughs are not yet scheduled.
These circumstances often lead to the situation that the aerobic energy system of dancers is not as good as it needs to be neither for dancer's ability to recover fast nor for the requirements needed on stage. The aerobic energy system of dancers is not as good as it needs to be.

## Anaerobic capacity

The anaerobic capacity describes the ability to supply energy without the availability of oxygen. This is mainly the case during high intensity movements like jumps or other quick movements. There are two sources that provide explosive short-term energy: creatine phosphate (KrP) and adenosine triphosphate (ATP) (➔ see Plyometric jump training module).

Both energy systems, the aerobic and anaerobic support each other and are essential for dancers. In dance the anaerobic capacity is often used during performances. On the other hand, this energy system is often neglected during rehearsals even though it needs to be trained in order to be ready for the demands on stage. Further information on the anaerobic energy system and how it can be trained for example with jumps can be found in the module plyometric training.

## How to train endurance

Generally, there are different ways of training endurance depending on what target and training effect should be achieved. The main parameters to be considered are: the *duration* of the exercise, the *training intensity* of the exercise and the *length* of the breaks between exercises.[37(pp111-158)] Though it may be unusual for a dancer to consider questions like: "How intensive is this exercise for me?" and "How long am I doing it for?" it provides essential guidance for achieving the targeted goals and showing specific results.

To estimate the individual training intensity during exercising the Borg RPE Scale can be utilised.[38–40] These *ratings of perceived exertion* (Borg RPE Scale 6-20) have been widely incorporated to measure subjective exertion levels. It is available in different languages and can be applied without any technical equipment. Though other means of measuring training intensity are supported by evidence more comprehensively the Borg RPE Scale does shows a moderate to strong validity.[41(p1344)] The German and English version of the RPE scale 6-20 with a short introduction can be found at the end of these recommendations.

In order to establish, improve and extend the aerobic capacity, continuous exercising (meaning exercising without breaks) has been recommended.[37(p117),42(p1336)] Continuous exercising can be divided into three main categories. On the one hand, they prepare for each other and on the other hand each individual category trains aspects essential for dancers. In their order they follow the basic principle: from general to specific.[3(p48)]

1. Extensive continuous exercise
2. Intensive continuous exercise
3. Variable continuous exercise

To create a solid foundation for dancers' specific abilities and skills that supports their needs in rehearsals and on stage it is important to work through each of these three phases. Especially after a longer phase of lockdown.

4. Anaerobic capacity

Of course, there are other methods of training endurance. They for example focus on anaerobic processes and incorporate strength training as well as strength endurance training. These are methods like interval training, interval training in series as used for example in circuit training, plyometric training and high intensity intermittent training (HIIT) (➔ see Modules on Circuit training, Plyometric training).

### 1. Extensive continuous exercises

Extensive continuous work is recommended to improve general fitness, economising cardiovascular work, speeding up recovery and maintaining an already achieved higher level of performance.[37(p119)]

| Extensive continuous exercising | |
|---|---|
| Light active warm up | About 5 minutes |
| Continuous exercising of moderate intensity, RPE 12-13 | Minimum of 30 minutes up to 60 minutes |
| Light active cool down | About 5-7 minutes |

37(pp117-120),42(pp1336, 1341)

#### How can it be implemented?

Extensive continuous training can be implemented by each dancer individually. Options include running, cycling, swimming or using a rowing machine - basically whatever suits the individual best and what they enjoy doing most. It does not have to be dance specific movements, it can also be classic cardio classes or Zumba classes as long as the intensity level is appropriate for the dancer and it lasts for a long enough period of time. Two to three sessions a week with a day of rest in between for a period of approximately three weeks will provide a good foundation before moving on to intensive continuous exercises (➔ see: Phases of coming back).

### 2. Intensive continuous exercises

Just like extensive continuous exercises, intensive continuous exercises can be executed by each dancer individually with activities like running, cycling, swimming or using a rowing machine. The only difference is a slightly higher intensity and a potentially shorter duration of the exercising.

It aims to:

- further develop the cardiovascular system
- trigger a fast increase of the aerobic capacity (though not stable)
- train the compensation of lactate
- increase capillaries in the skeletal muscles (improved oxygen transport)[37(pp117-120)]

| Intensive continuous exercising | |
|---|---|
| Light active warm up | About 7 minutes |
| Continuous exercising of vigorous intensity, RPE 14 - 17 | Minimum of 20 minutes up to 60 minutes |
| Light active cool down | About 7-10 minutes |

37(pp117-120),42(pp1336, 1341)

#### How can it be implemented?

See extensive continuous exercises. Train two to three times a week with a day of rest in between for a period of about 3 weeks before moving on to variable continuous exercising.

### 3. Variable continuous exercises

Variable continuous exercises trigger training effects that dancers often need on stage[31] where they find themselves in situations where intensive, short sequences (anaerobic) are followed by short breaks or prolonged continuous movement on a lower intensity level (aerobic). This requires the ability to recover fast.

It aims to:

- improve the ability to shift between aerobic and anaerobic energy supply
- increase a fast recovery in short breaks after intensive movement sequences
- improve the ability to compensate and eliminate lactate
- further extend the aerobic capacity, as long as the exercise period is a duration of more than 45 minutes.[37(pp117-120)]

| Variable continuous exercising | |
|---|---|
| Light active warm up | About 7 minutes |
| Continuous exercising shifting between moderate and vigorous intensity, RPE 12-17 | Minimum of 30 minutes up to 60 minutes in total |
| Light active cool down | About 10 minutes |

37(pp117-120),42(pp1336, 1341)

#### How can it be implemented?

Dancers technical classes can be modified into focusing more on endurance once the exercises are known by all the dancers. For example, always on the last training day of the week focus on endurance.[43] (see ➔ The building-up within the company classes).
However, combining technical demands with fatigue resulting from continuous exercising that induce high intensities is not such a good idea as it would increase a risk for injury. Also, combining the typical high intensity of dancer's technical exercises (mainly during the second half of the class) with endurance training would easily shift to more anaerobic work than intended.

Therefore:
For teachers and ballet masters:

- Keep the exercises simple and of lower technical demand[14,15]
- No interruptions for feedback in this phase.
- Double the amount of repetitions of the exercises, so that they fill up the necessary amount of time all together.
- Little jogging moments on the spot or once in a circle can help to make an active transition to the next exercise and loosen up the situation when it becomes monotonous.
- Check with the pianist if playing continuously for so long is possible.
- Maybe repeat the same 4 exercises without a break, then add 1' with jogging on the spot, repeat the same or other 4 exercises, add another 1' with jogging on the sport and so on…

For dancers:

- When the class becomes too strenuous, lower the intensity for example by leaving out the relevés, use lower legs or leaving out the arms.
- This way the body is still moving in a dance specific way, adaptations are triggered in the areas of the body where dancers need it, yet the exercises are executed continuously and without pauses.

### 4. Anaerobic capacity

Is often needed on stage during high intensities that don't last much longer than 10 seconds.
It aims to:

- Improve the ability to use the anaerobic energy supply and to prepare for the demands on stage.
- It prepares the body for high intensity movements that only last for a short amount of time.

| Intermittent exercising | |
|---|---|
| Active warm up | About 10-15 minutes |
| Intermittend exercises shifting between high or very high intensity and pauses RPE 17-20 | Needs to be designed according to the individual capacity |
| Light active cool down | About 15 minutes |

#### How can it be implemented?

To focus on anaerobic capacity, exercises need to be short and of high intensity. The pauses in between sets, however, need to be longer. More information is being provided in the Module Plyometric training, where the specific preparations for this kind of training are also being discussed and taken care of to ensure healthy execution.

## Periodization

Not everything can be trained simultaneously, nor is that necessary. Establishing foundations first that are followed by specific abilities later allows dancers to build up their skills on a solid ground that serve their specific abilites.[3(pp57-58)] One fundamental tool in the planning of training and rest is periodization[3(p48),6] which also can be used in dance.[8] Periodization is based on scheduling when to do what, increasing and decreasing training load and training intensity in order to trigger and allow specific adaptations. This way we can look at training with more specific questions such as: how is the training day put together for the dancer and also from a more general perspective: how are different periods planned in order for the dancers not only to be fit for a premiere but also for subsequent performances throughout the season.

In the context to these recommendations, three basic rules can help to improve the training plan for dancers:

## Build up a good aerobic foundation first before the season starts.
## Then establish it at the beginning of the season.

This way the dancers have the ability to recover fast, manage long rehearsals and benefit from them. The dancers can support choreographic processes with a body that remains fresh for a long period of time, therefore reducing the risks of injuries. Once the amount of rehearsals increases during the season, the dancers will already have an aerobic fitness level and will therefore not need to further enhance it. Instead they can focus on other important aspects of their artistry such as the choreographic process, stage presence, expressive ability and so on. This ensures that the dancers are not overloaded in their daily/weekly schedule. During phases of moderate workload some aerobic training sessions can help maintain the fitness levels that have already been established at the beginning of the season. This also follows the principle: from general to specific.[3(p48)]

## Technical & coordinative exercises should be done with a warm but not tired body.

This means supplemental strength training and endurance training should be rendered after class or later in the day. This way the body is still fresh when fine coordination and economic ways of dancing are being trained. This principle should not to be confused with a good effective warm-up that should include continuous active movements and some strengthening exercises to activate the body and central nervous system. It's important to differentiate between a warm-up and a training session that focusses on endurance or strength. To alleviate a dancer's weekly schedule, one technical class during the week may be replaced by a fitness class to avoid overtraining.

## Changing between lower & higher training intensities, shorter & longer days, training & rest.

The key to good adaptation is not only the shift between training, rehearsals, rest and days off but also between the alterations of different intensities. Before increasing the amount of training days per week, increase the intensity of the existing days and keep the days of rest in between! The body needs time to adapt and not all structures in the body adapt with the same speed. Some of these need more time and will benefit from an easier training day or rest with some tender loving care. Taking it easier for a while especially when a dancer feels there is a slight overload in a certain part of the body can prevent a small problem in becoming a bigger one.

## Phases of coming back

**Phase 1: During the summer before coming back to the theatre**

- Before picking up training again take care you also took a phase of rest this summer
- Building-up aerobic endurance first on moderate then vigorous intensity (see ➔ 1. Extensive continuous exercises & 2. Intensive continuous exercise)
- Supplemental training with one-on-one sessions for individual feedback from a specialist
- Start the first phase of the plyometric jump training (see ➔ Module on plyometric training) focusing rather on the quality of the jumps (take-off and landing patterns)

**Phase 2: Beginning of the season when starting with the company again**

- Endurance training, supplementary training, company class, some rehearsals
- Starting company classes including a clear build-up within these classes
- Some rehearsals but reduced amount 50%
- Including a good amount of individual feedback to compensate the circumstances (e.g.one-on-one sessions, dancers supporting each other, sessions with certified specialists in areas of Pilates, Girotonics, Girokinesis, Yoga, somatic practices with good quality feedback.
- Increase your plyometric training going through phase 2/3

**Phase 3: When performances are coming closer**

- Increased rehearsing with run-throughs
- Still 90 min classes (during the build-up after the lockdown)
- Reduced 60 min classes only when dancers are fully fit.
- Still enough days off (2 per week)
- Mix of intensive training & rehearsals with proper phases of rest (separating working & intensive working from good quality rest)
- Taking care of good quality recovery times

| Phase 4: Just before a premiere |
|---|
| – As difficult as it may seem, reducing the overall workload a few days before the premiere (tapering) allows the dancers to become fresh enough to not only deliver high quality but also to achieve it safely.<br>– Not all the rehearsals need to be done full out.<br>– Focussing on artistic, organisational and spatial aspects can be achieved also with a physical reduced intensity<br>– Focus on shorter and concentrated working times instead of reducing recovery periods by extending rehearsals into long days<br>– Shorter classes<br>– Still enough time off<br>– Taking care of good quality recovery periods |

After an intensive phase make sure you rest for long enough and with a good quality of rest. Extraordinary stress needs and deserves extraordinary rest.[3(pp955-966)] (see ➔ Quality of recovery time)

## Building-up within the company classes & rehearsals

### Company classes should not be shortened

To reduce the daily company training to 60 minutes or even less to serve as a warm-up for rehearsals, may only be relevant when dancers are fit.
During the phase of build-up where dancers need to get back in shape, the daily classes should not be shortened so that they can properly serve as a training effective stimulus. Allowing them to range between 90 minutes and sometimes even 120 minutes, should give enough time to cover the different areas of the class without having to rush. This allows time for dancers to shortly rest in between exercises and to stay fresh while regaining their technical abilities. It also gives time for feedback. Classes should be followed by a long enough break for the dancers to shortly rest, freshen up and be ready for rehearsal without having to rush.

Dancers have been training alone and in unusual environments for quite a while and may have collected compensating habits that they are unaware of and that need to be addressed. Individual feedback from their ballet masters and mistresses, rehearsal directors and teachers are essential. Consulting other dance professionals such as Pilates and Girotonics teachers, outside of classes will help dancers to tackle weaknesses that may become problematic later if not properly taken care of. Investing money in working with such experts is investing into health and fitness.

**In the first weeks and months after the lockdown, enough time needs be set aside for these processes.**

### Gradual build-up

Three things that can help:

- In the weekly schedule place well-demanding trainings followed by easier days before "filling up the whole week" resulting in less time to recover.
- Plan shorter rehearsals at first rather than a full day immediately.
- Keep 2 days off every week for at least the first month.

### Plan a gradual build-up both in intensity & technical demand.

Because of the higher impact this is especially important with jumps.
Keep them simple to focus on technical clean execution before increasing the intensity and complexity.
Focus first on jumps that land on two legs (e.g. sautés, échappés, smaller assemblés) and increase the length of the exercises or the amount of repetitions before exercises become more complex or technically demanding. This should help the dancer's bodies to get back in shape while sustaining a clean and safe execution.

### Include grand allegro only later

Don't include grand allegro for the first couple of weeks if possible, in any way. Once you start, do it with elements like grand échappé, bigger assemblés (again, landing on two legs first).

Dancers: "hold your horses" and give yourself time for a proper build-up. Just because you are able to give it a go at grand allegro in the second week does not mean your body is ready for it! It may feel nice at first because you are "finally back" but not being ready for correct landing the way you used to be able to may take its toll. One step at a time, clean and controlled landing is the key.

### Individual pathways of coming back

Dancers need support and access to good quality classes and feedback. They also are experts when it comes to the signals of their own bodies - only they can hear them. Giving dancers space to listen and react to their individual situations is important in helping them find their individual way back safely. A healthy relationship on eye-level with good communication will combine the expertise of dancers and their trainers and coaches. Not every pathway back will be the same nor will it happen at a continuous speed.
Dancers, when you add to your schedule and within classes: test it for a few days and listen to how your body responds.

- Dare to stay on one level when the level is challenging enough.
- Dare to take a step back if you realize you went too fast, when you start getting generally tired and "it all starts becoming a bit much".
- Dare to ask for a day off if you need to.
- In case of problems see a physiotherapist or a medical doctor early on.

Teachers dare to give dancers the space to do so and adapt within your classes. Dancers often have to deliver during rehearsals and performances where the process is more often beyond their individual needs. They need good classes and enough space to prepare themselves in

order to follow their individual pathways. However, they also need your support, guidance and expertise.

## Good communication and a well-balanced relationship on eye-level will be a rewarding ground to stand on.

Generally, it's not a competition who (seemingly) arrives first. It's a phase where proper build-up can not only keep dancers healthy but if done well, it can even increase the dancer's ability and skills. Performances in many cases are still far enough away. Allow that to eliminate some of the pressure that might normally be there.

### Quality of recovery time

## Cool down - the first phase of recovery

Active cool down is the first phase of physical and possibly also mental regeneration. It increases the regenerative metabolism. With a still increased temperature in the body, lactate is being resynthesized. An active cool down optimizes the venous reflow (muscular pump). For example, easy running on a low intensity level after a grand allegro supports the transportation and elimination of lactate away from the muscles. This way lactate is being "washed out" which is necessary especially after vigorous exercising such as plyometric training. During an active cool down the heart rate stays slightly alleviated causing a blood volume circulation of nearly three times as much as if the dancers would stop abruptly.[3(p951)]
The more intensive and anaerobic the exercising has been, the longer the active cool down needs to be.

## Slight stretching of the used muscles

After the active cool down slight stretching of the used muscles decreases the tonus of the muscles and helps them to relax. These stretches can be shorter since the aim is not to increase the range of motion but preferably to lower the tonus of the muscles.[3(p951 ff)] According to a nationwide research in the UK, dancers that finished with a cool down after rehearsals were statistically less likely to be injured.[23(p35)]

## Mental relaxation and well-being

Generally, the aim of the cool down is to enter the phase of relaxation and regeneration. Mental relaxation can help this process of increasing the individual subjective well-being. After a time of giving, investing and training comes a point of rest; withdrawing, recovering and giving back to yourself. The recovery time is a very individual phase and can be designed as such. Contrast showers, sauna, a cold bath, massage, sleep, good nutritious food and liquid intake, positive self-talk, listening to music, letting it go, meeting friends, change of scenery... all these are individual options to increase the enjoyment and quality of the recovery phase.[3(p957)]

## Have the right balance

Dancers have different personalities and within our dance culture there are different philosophies and convictions about dance and how to pursue it. This makes our landscape colourful and adds to a rich diversity. Like often in life, when it comes to training it is also important to find the right balance.

## Listen to yourself, know who you are and in which environment you are in.

**Is discipline easy for you?**
**Are you a perfectionist and only satisfied when things are done properly?**
**Is it stressful for you to not be at the same level you used to be at?**
Take care that you don't overstrain yourself. Good quality rest and letting it go regularly is also a necessary part of the process. Yes, invest and work hard but also give it time, give it rest and yourself some tender loving care.[44]

**Are you not so good with regular training, do you often finish classes earlier?**
**Do you see class and training mainly as a warm-up for rehearsals and the artistic work?**
Take care that you are following a good build-up. Training and training intensively for the sake of getting fit will make you stronger and resilient against injuries. Increased physical fitness will support not only the physical aspects of your dancing, research also suggests it could support the aesthetic outcome.[35(p76),45]

## A challenge that can be an opportunity

While the lockdown and the recovery from it clearly is a challenge; it might as well offer a possibility to pause and to re-evaluate the way dancers train and rehearse.

The demands on dancers are high and seem to have risen in the past decades. Along with that the injury levels of dancers remain high.[23(pp16, 20, 22, 30),46,47] Dr. Emma Redding, Past-president of the International Association for Dance Medicine and Science (IADMS) pointed out that this still is the case even though there has been an exponential increase of dance science research in the past decades. A reason for that might be due to the lack of translating such valuable knowledge and making it "available for all those who work with dancers on a daily basis".[xi 35]

On the other hand, dancers, dance educators, rehearsal directors and choreographers need to be curious and willing to develop their knowledge and broaden the horizon to help advance the perspective and well-being of their own profession.

Such an unusual time may trigger understandable insecurities and honest questions regarding how to safely return to full potential. It can also be a time to discover what is already out there and how it can be used in our dance community. We hope these recommendations and the additional modules may support such a process.

## Additional modules

These additional modules and others can be booked via www.tamed.eu.

# Communicational exchange for ballet masters & teachers: build-up of fitness & training

Angélique Keller, MSc Sports Science, MAS Dance Science, Sports Therapist
Univ.Prof. Andreas Starr, MSc, Diplom-Tanzpädagoge

Ballet masters, mistresses and rehearsal directors, administrative staff and choreographers are in a unique and highly demanding position and responsibility.
Responding well to this unusual period not only means to alter our familiar ways of doing things, changing schedules, rehearsals and performances, but to also adapt to this currently ever-changing situation and provide a good build-up for the dancers we are responsible for.

In addition to these recommendations, questions about the practice application can be followed-up in zoom meetings. These can cover areas from how to gain and establish dancer's fitness, the build-up of training and rehearsals or adaptations within company classes or rehearsal scheduling etc.

This offer aims to provide further sport scientific and dance science support, room for questions as well as general exchange of thoughts and can be booked as:

- Individual online sessions one-on-one as well as in smaller groups whichever way preferred.
- Short online presentations about these recommendations that are followed by a Q&A session.

# Nutrition for dancers in times of the Corona pandemic.

Eva-Maria Kraft, BA

Online presentation (90 min + 30 min questions/discussion)
In this current situation dancers are affected in many ways. These times at home without regular training and rehearsals are raising many new questions, also concerning nutrition.
In the past months everyone was challenged to provide food for themselves, cook daily and taking care about one's own nutrition more than usually. For some this may be a joyous experience and for others it might be connected to various difficulties.
For dancers this period is being shaped by unusual training routines, changed daily rhythms and new eating behaviour which can lead to changes in the body.

In this workshop the basics of a generally healthy diet for dancers are being highlighted. A focus will be on the current time, its problems like loss and gain of weight and increased consumption of semi luxury food like sweets or alcohol. Furthermore, topics like injury and regeneration, the

advantages and disadvantages of complete self-subsistence will be covered and how these insights can be taken into the up and coming active future.

The 90-minutes presentation is followed by a Q&A session with discussion.

## Circuit Training as Strength & Endurance Training for Dance

Andrea Popp, M.A., MAS Dance Science

In this module, the theoretical part describes why circuit training tailored to dance can be a useful addition to dance training and a supportive measure to re-enter after the corona-related training break. The components of strength and endurance are briefly presented, possible advantages or results of this training are shown and concrete suggestions for practical implementation are made.

The theoretical part can be supplemented with an "exercise library":

- with circuit exercises for shoulder girdle organisation and strength, trunk stability, abdominal muscle training, entire back muscles, arm muscles, pelvic stability, leg alignment or the entire leg muscles and foot muscles.
- Exercise increases, with combinations of different muscle groups
- Exercises with small props such as Theraband, small ball, large ball, balancing plate, rotational disk, Bosu
- The exercises are marked according to their level of severity with suggestions for useful combinations
- There are either written explanations with photos or, depending on the complexity, a small film sequence
- There is also an explanation of how to attach a short cardio session after the circuit

## Plyometric jump training for dancers – getting a good foundation for better jumps

Angélique Keller, MSc Sports Science, MAS Dance Science, Sports Therapist

The theoretical part of the plyometric jump training module will be presented in an information leaflet in either English or German. It will discuss the mechanical and neurophysiological processes during the plyometric training. Then, it will talk about training principles and training suggestions, including prerequisites that are necessary in executing plyometric training safely. Finally, the three phases of plyometric training will be presented in a general way taking ideas from the sports world and finally applying it dance-specifically.

The theoretical part may be supplemented by a written exercise pool for each phase complemented with photos or video sequences depending on the complexity or needs of the dancers.

- In phase 1, observational points will be delivered to help dancers apply safe take-off and landing (ideal for pair work starting in parallel and slowly moving to turned-out jumps).
- In phase 2, more complex exercises will be introduced
- In phase 3, the focus lies on swift movements and overcoming high props such as plyometric boxes and hurdles, fast and in combination.

A weekly zoom jump session including a thorough warm-up, core-workout applying interval training or HIIT-training, followed by plyometric jump training for 6 or 8 weeks can be booked online via www.tamed.eu

Alternatively, a practical workshop concentrating on the content of the 3 phases of the plyometric jump training may be organised either via zoom or in person.

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## Borg RPE scale 6-20 English

RPE scale 6-20 English

Introductions on how to use the Borg RPE scale[38]

[…] During the exercise you are to rate your perception of exertion.
Use this scale where 6 means no exertion at all and 20 means a totally maximum effort.

- 9: Very light. As for a healthy person taking a short walk at his or her own pace.
- 13: Somewhat hard. It still feels OK to continue.
- 15: It is hard and tiring, but continuing is not terribly difficult.
- 17: Very hard. It is very strenuous. You can still go on, but you really have to push yourself and you are very tired.
- 19: An extremely strenuous level. For most people this is the most strenuous exercise they have ever experienced.

Try to appraise the feeling of exertion as honestly as possible.
Do not underestimate nor overestimate it. It is of no value to underestimate the level to produce an impression of being "brave" or "tough". Your own feeling of effort and exertion is all that is of interest. Look at the scale and wordings and decide on the word that best describes your effort level and the number alternative associated with that description.

Table 1 Introductions on how to use the Borg RPE scale ENGLISH

Borg RPE scale 6-20 English[38]

| | |
|---|---|
| 6 | No exertion at all |
| 7 | Extremely light |
| 8 | |
| 9 | Very light |
| 10 | |
| 11 | Light |
| 12 | |
| 13 | Somewhat hard |
| 14 | |
| 15 | Hard (heavy) |
| 16 | |
| 17 | Very hard |
| 18 | |
| 19 | Extremely hard |
| 20 | Maximal exertion |

Table 2 Borg RPE scale ENGLISH

## Borg RPE scale 6-20 Deutsch

Anleitung zum Gebrauch der Borg-RPE-Skala[39(p1020)]

Borg RPE skala 6-20 deutsch [39,40]

[…] Das Anstrengungsempfinden hängt von der Beanspruchung und Ermüdung der Muskulatur ab, ferner von Atemlosigkeit (beziehungsweise Luftnot) oder Brustschmerzen.
Auf dieser Skala bedeutet 6: überhaupt nicht anstrengend und 20 bedeutet maximale Anstrengung.

- 9: entspricht einer sehr leichten" Anstrengung, wie bei einer Normalperson das normale Gehen im eigenen Tempo.
- 13: auf der Skala ist: „etwas anstrengend", man kann bei der Belastung aber gut weitermachen.
- 15: ist „anstrengend" und „schwer", aber Fortfahren ist noch möglich.
- 17: „sehr anstrengend". Sie können die Belastung noch weitermachen, sie müssen sich aber sehr anstrengen und sind bald erschöpft.
- 19: „sehr sehr anstrengend", für die meisten Personen ist dies eine sehr anstrengende Belastung, die stärkste, die sie jemals erlebt haben.

Versuchen Sie, Ihr Anstrengungsempfinden so spontan und ehrlich wie möglich anzugeben, ohne über die aktuelle Belastung nachzudenken.
Versuchen Sie, die Anstrengung weder zu über- noch unterschätzen. Ihre eigene Empfindung von Leistung und Anstrengung ist wichtig, nicht die im Vergleich zu anderen. Schauen Sie auf die Skala und die begleitenden Worte, und geben Sie eine Zahl an.

Table 3 Anleitung zum Gebrauch der Borg-RPE Skala DEUTSCH

| | |
|---|---|
| 6 | **Überhaupt nicht anstrengend** |
| 7 | **Extrem leicht** |
| 8 | |
| 9 | **Sehr leicht** |
| 10 | |
| 11 | **Leicht** |
| 12 | |
| 13 | **Etwas anstrengend** |
| 14 | |
| 15 | **Anstrengend** |
| 16 | |
| 17 | **Sehr anstrengend** |
| 18 | |
| 19 | **Extrem anstrengend** |
| 20 | **Maximale Anstrengung** |

Table 4 Borg Skala DEUTSCH

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