



# Challenges and Solutions in Managing a Handball Team, During COVID-19 Crisis, in Romania

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## ABSTRACT

The purpose of this paper is to identify the methods of adapting the physical training for a women's handball team, during the State of Emergency declared on March 2020. Moreover, our objective is to analyse the specialised literature in order to consult the opinion of specialists regarding physical activity during the isolation caused by COVID-19, but also during competition breaks, periods of inactivity, withdrawal from sports, etc. The players involved in our study had carried out the training, according to the individual training protocols communicated by the team's coach, in two different environments: inside, in narrow spaces, and outside, close to their personal homes. The main objectives pursued during the isolation period at home were to minimize the effects of physical deconditioning and preparing the body for the new training plan, by using exercises for adjusting the muscles, tendons, and ligaments and exercises for preventing injuries.

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## 1. Introduction

The new coronavirus (SARS-CoV2 or COVID-19) was declared on March 2020 the cause of an unprecedented pandemic (Cucinotta & Vanelli, 2020). As consequence, the World Health Organization urged worldwide governments to "urgent and aggressive activities" in order to delay and reduce the infection (Corsini et al., 2020). These decisions have resulted in a global crisis with effects in all areas of activity.

In Romania, as a support measure for citizens during this period, the Ministry of Youth and Sports encouraged the public to constantly practice physical activity in order to stay healthy and keep the mental state balance, taking into account the measures of social distancing and the applied restrictions. One of the measures adopted by the Ministry in partnership with the Televiziunea Română (*Romanian Television*) was to start the #*campioniacasă* (#*championsathome*) campaign whose objective was the awareness of the importance of a good physical condition.

In performance sports, any period of physical inactivity can have a significant impact on the physical and psychical state of each athlete. Regardless of the period, the isolation/quarantine period represented an unprecedented situation. The COVID-19 pandemic has dramatically changed the conditions of training and competition in all individual and team sports.

The quarantine imposed by authorities may compromise the athletic performance capacity by leading to partial or total loss of accumulations during training. The new living condition, in forced isolation, required the training to be carried out at home or outdoors near home which made it difficult to train due to the lack of necessary conditions (space, equipment, moral support, etc.).

This study aims at the following:

- identifying and highlighting the possible effects of isolation on the physiological mechanisms of the handball players and the methods of combating them, based on sources from the specialised literature;
- determining the challenges of the COVID-19 pandemic on planning and periodize the training sessions;
- identifying the methods of adapting the home physical training for the CSM Galați handball players, a newly promoted team in the National League.

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## 2. Methodology

For this study, we have reviewed the specialised literature by accessing databases like: PubMed, Google Scholar, ResearchGate. The keywords that we have introduced in the search were: handball, effects of isolation, pandemic, coronavirus, COVID-19, home isolation, quarantine. In order to acquire the photos and video recordings of the athletes' training, we have collaborated virtually with the coach, fitness trainer, and players of the CSM Galați team by WhatsApp and Messenger.

## 3. Results

### 3.1. The possible effects of isolating athletes

The State of Emergency that was established in Romania on March 16<sup>th</sup>, 2020, brought itself a series of consequences on how the training of athletes is organized, like: the lack of training sessions and competitions, poor communication between coaches and athletes, lack of free movement and adequate exposure to sunlight, inadequate conditions for training (Chen et al., 2020a; Owens et al., 2018).

Among the negative consequences of an extended period of inactivity, the occurrence of some changes in muscle fiber properties can range with:

- Contractility - the muscles' ability to shorten their length (to contract themselves).
- Extensibility - the ability of muscle fibers to stretch (extend), i.e. to increase their length.
- Elasticity - the muscle's ability to return to its initial length when relaxing (after the contraction has stopped).
- Excitability - the muscle's property to react to stimulus.

The recovery of athletes and their performances can be influenced by free movement. It is considered that the appearance of some muscle disorders like myofascial tissue tension or the appearance of some localized adhesions (for example knots) can lead to a decrease of the amplitude of movements and implicitly compromising general muscle activity caused by a poor blood supply (Bompa, 2002b).

Other physiological changes brought to the athletes' body with sudden cessation of the usual physical activity can be: muscle atrophy (Enoiu et al., 2009), increase of the body fat's percentage (Chen et al., 2020b), or decreased immunity (Halabchi et al., 2020).

The social aspect of the athletes' lives is another side affected by the pandemic. Home isolation can lead to altering the quality of sports life, having unfavourable effects on the diet which can become poor or inadequate, on rest in which insomnias can appear, or on the emotional state. Athletes can be prone to depression, addictions, loneliness, etc. (Chen et al., 2020b; Halabchi et al., 2020). In the case of team sports, isolation of athletes can lead to diminishing the feeling of belonging to and unity of the group, loss of team spirit, decrease in self-confidence and in colleagues, loss of motivation, or loss of sight of initial performance goals.

### 3.2. Physical deconditioning and de-training

According to the principle of continuity in sports training, uninterrupted training throughout the annual cycle is the essential condition for maintaining the optimal physical shape for athletes in order to achieve great performances. Sudden cessation of training and quickly going to a new situation for the body can have negative effects on the adapting mechanism like illness and injuries. In the absence of exercises that determined and maintained the improvements characteristic of the training, the body's organs and systems adapt to the new conditions, functional capacity, their structure and dimensions being reduced to the level of the new, lower stress to which they are subjected (Bompa, 2002b).

Until the pandemic, the causes of sudden suppression of physical efforts were related to different scenarios in the athlete's life, like illness, injuries, competitive breaks, transition period. The quarantine imposed by authorities is a totally new, unknown situation that can compromise the sports performance ability by leading to partial or total loss of the accumulations from the training period. This phenomenon is called *deconditioning* and it may represent the worst consequence of forced quarantine on sports life (Jukic et al., 2020).

Israel (1972) quoted by Bompa (2002a), suggested another term that describes the cessation of some intense training stimulus on athletes: *de-training* or the decrease training syndrome.

In order to minimize the effects of deconditioning and de-training, experts recommend planning some programs to gradually reduce physical training. In 1993, Alexe, N., discovered that the improvements acquired by training are lost in a period 3 - 4 times shorter than the one necessary to gain them. According to this principle, morphofunctional adaptations and improvements induced to the body by training are reversible and can disappear when the physical load is insufficient. The body's organs and systems adapt to the new conditions and their functional capacity, their structure and dimensions are reduced to the level of the new, lower demands to which they are subjected (Bompa, 2002b; Bosquet & Mujika, 2012).

A measure to reduce the deconditioning effects is suggested by a recent study (Sousa et al., 2019) that recommends using cardio training combined with weight training. Even though this training is disputed,

this study talks about the benefits brought to the neuromuscular and metabolic systems under the conditions of using high-intensity efforts for cardio training combined with moderate-intensity effort for weight training.

Moreover, for reducing the deconditioning effects, another study suggests the RCBT- resistance circuit-based training which requires minimum equipment and can be done at home (Freitas et al., 2016).

Basically, the analysed research concludes that stopping the training or reducing their intensity can lead to the total loss of physical accumulations in 2 - 4 weeks (Neufer et al., 1987) in the absence of controlled de-training programs.

The optimization of future training periods should take into account data from previous acquisitions that can be obtained through means of technology like video analysis softwares (Dobre, 2020).

### **3.3. Individualised training, training method in isolation**

Individualization involves making the most of the athlete's availability, which is why it applies at all phases and in all training stages. Under normal living and training conditions, the individualization would have taken place during, before, or after the collective training, the place being at the sports facilities available for athletes. The new living condition in forced isolation imposed carrying out the training at home or outside close to the home, an aspect that made difficult the development of the training due to the lack of the necessary conditions (space, equipment, moral support, etc.)

A phenomenon specific to team sports is that there are always differences between the somatic, motor, functional, and technical-tactical particularities of the individual players. In handball, each position presents a different profile with precise game tasks and this aspect implies different demands of the effort. If in 1976, professor Andrei Demeter considered that during the game of handball "field players are equally engaged throughout the game", recent foreign studies (Karcher & Buchheit, 2014), both from the men and women's handball contradict him and make references to different physical demands according to the position and highlight the different involvement of players in the match. According to those, the pivot players cover the smallest distances on the field but maintain a high level of effort intensity due to permanent exposure to physical contact. The wings have recorded the longest distances covered at high intensity, being at the same time the players least exposed to physical contacts. The insides are exposed to less physical contact than the half players, but more than the extremes. On this position, on the other hand, there were several technical actions (throws, overtaking, passes) compared to the players from the other positions.

The data gathered by the Danish League, both from women and men's handball make clear references to the physical demand and different technical-tactical evolutions for each position. According to the characteristics, modern performance handball and the different demands of athletes discovered in the last years (Karcher & Buchheit, 2014; Karpan et al., 2015; Michalsik, 2018; Michalsik et al., 2013; Michalsik & Aagaard, 2015), the training planning should be made in such a way as to take into account:

- the specific particularities of each position (goalkeepers/field players; wingmen, backcourts, halves);
- the physical potential and the need for recovery specific to each athlete;
- gender (according to a study done by Michalsik et al. in 2014, the predominantly aerobic effort in women's handball involves anaerobic compensation in training while in men's handball we encounter a reverse situation).

These aspects show that even though handball is a team game, the training must be planned and carried out with more emphasis on individualization, a method which gives the athletes the possibility to optimize their motor qualities but also acquire the specialization on their own position or positions. The existent positions in handball are: goalkeeper, wingman, backcourt, centre, and pivot. After studying the last tendencies in modern handball, we can observe an improvement of the motor and technical-tactical abilities of the players displayed by specializing in at least two positions on the attack: wingman-pivot, backcourt-centre, centre pivot but also goalkeeper-backcourt/centre. The most obvious tendencies of the modern game of handball are increasing the game speed and multiplying the physical contacts. As a consequence, the fatigue occurs much faster (especially when lacking the proper physical training), an aspect which leads to the need of preparing some players specialised in a single play phase: offense or defence. Thus, besides developing a training plan adapted to the new solicitations during the matches, a coach must come up with the game strategy so that the entire's team potential will be exploited to the maximum. This way it will be possible to maintain an optimally functional state of all players, by delaying the onset of fatigue or diminishing it.

The process of individualised training can be organized separately, in groups, or in couples of players. The importance of individualised training is noticed in older studies from the Romanian handball. Kunst-Ghermănescu (1983), underlined the directions of this kind of training:

- the continuous improvement of the positive sides that have consecrated the respective player, in order to further capitalize him in the game at higher odds;
- rectifying some deficiencies manifested in the overall training and ascertained by the results obtained when passing the control tests or by pedagogical observations.

### 3.4. Adapting the individualised training, at home, for the women's handball team, CSM Galați

The de-training period coincided during the pandemic with the transition period. Thus, its planning had to start from the progressive decrease of the training parameters. Initially, the number of training lessons and their intensity will be reduced (3 - 5/week) and after the training volume will be reduced in order to then return to an increase of the parameters on the background of the gradual transition to the training period. The training sessions in this period (of transition) can contain exercises from other sports that can help maintain an optimal level for physical preparation like running, swimming, and cycling. These were among the popular forms of sports activity among handball players, in the usual living conditions. The pandemic came with new conditions of organizing the training, thus right after entering in quarantine the players from CSM Galați have suddenly entered the de-training period which until then had appeared for two reasons:

- illness, injury, or rest during the transition period;
- retirement.

Normally, according to Dragnea (2006, p. 74), "the transition period must ensure the connection between two macrocycles at the same time as ensuring the overcompensation phase for the next phase of effort". For continuously improving the performances, athletes must be capable of beginning a new training cycle at a higher level and complete rest without any form of physical activity represents an inappropriate approach which can be still found in the style of many handball coaches and players in Romania.

The most recent studies state that it is necessary to continue the training during the transition, thus the players' effort capacity is maintained at approximately 60-70% from the maximum possibilities (Michalsik, 2018).

The effort intensity and volume during transition must be gradually reduced and the physical activity oriented towards exercises different from those practiced regularly. Under normal conditions, swimming, cycling, or fitness would have been on the list of activities recommended for handball players having beneficial and quick effects on physiological and psychological recovery. In the absence of these alternatives, the players were advised to purchase helping materials for individual training at home like simple and loop resistance bands, dumbbells, fitball, electrostimulation device, foam-roller, etc.

As the competition period in Divizia A (*Division A*) was stopped 3 stages earlier than the planning in the competition calendar established by the Romanian Handball Federation, the transition period at CSM Galați started prematurely and lasted 21 days. The planning of the training session content, volume, and intensity was adopted according to the conditions imposed by the authorities, the living space of the athletes, and the available support materials.

The State of Emergency which caused the home isolation led to shutting down the swimming pools and gyms and prohibiting movement away from home without a good reason. Movement outside the home for individual physical activities was possible only close to the home and based only on an affidavit. However, going outside became a stress factor due to the danger posed by the new coronavirus. In this regard, useful advice on hygiene and protection measures has been provided online, periodically and the help of the sports psychologist had the role to reduce the psychological stress by different evaluation and assistance strategies (questionnaires, group and individual online discussions).

Even in these conditions, the players from CSM Galați were able to train outside, thus benefiting from the much-needed sun exposure and oxygenation.

The transition period contained a number of 3 microcycles different as structure and proposed objectives:

- **The first type of microcycle**, presented in Table 1, did not contain any training session, only passive recovery, because in that period the players returned home and focused more on reconnecting with the family and adapting to the new living style imposed by the pandemic. In the same period, there was a close online collaboration between the players and the team staff (coach, medic, masseur, physical trainer) for psychological support, reducing the stress caused by the pandemic, and even for organizational purpose for the next period.

**Table 1. The structure of the first type of microcycle in the transition period**

Month	Date	Day	Time of day	Location	Content	Time	Intensity
March 2020	11	Wednesday	Optionally	home	passive recovery	✗	✗
	12	Thursday	Optionally	home	passive recovery	✗	✗
	13	Friday	Optionally	home	passive recovery	✗	✗
			am pm				
14	Saturday	Optionally	home	passive recovery	✗	✗	
							am pm
	15	Sunday	BREAK				

- For the **second type of microcycle** (Table 2) the players had the possibility to choose the methods, means, and time of day for carrying out the sessions for active recovery. According to Hultman and Sahlin 1980 quoted by Bompa, 2001, the active recovery must not exceed 60% of the maximum possibilities or 220 minus the age of the athlete. Depending on individual possibilities, the players could opt for: stretching, yoga, walking, jogging, electrostimulation, foam roller, massage. The training variables transmitted by the coach were the duration of 30 minutes of the recovery program, at intensities between 30% - 60% and the main objectives were to eliminate physiological and psychological fatigue.

**Table 2. The structure of the second type of microcycle in the transition period**

Month	Date	Day	Time of day	Location	Content	Time	Intensity		
March 2020	16	Monday	optionally	am	home	active recovery	30'	30%	
				pm					
	17	Tuesday	optionally	am	home	active recovery	30'	40%	
				pm					
	18	Wednesday	optionally	am	home	active recovery	30'	50%	
				pm					
	19	Thursday	optionally	am	home	active recovery	30'	60%	
			pm						
	20	Friday	optionally	am	home	active recovery	30'	60%	
				pm					
	21	Saturday	Optionally	am	home	questionnaire	×	×	
				pm					
	22	Sunday	BREAK						

- The **third type of microcycle** presented in Table 3 contained 5 training sessions (3 at home and 2 outside), the main objectives in this period being: minimizing the effects of physical deconditioning; muscle, tendons, and ligaments accommodation for the new training plan; injury prevention and the circuit work method was used.

**Table 3. The structure of the third type of microcycle in the transition period**

Month	Date	Day	Time of day	Location	Content	Time	Intensity		
March 2020	23	Monday	optionally	am	home	Training 1	60'	50%	
				pm	outside	active recovery	30'	50%	
	24	Tuesday	optionally	am	outside	Training 2	60'	60%	
				pm	home	passive recovery	optionally	×	
	25	Wednesday	optionally	am	home	Training 3	60'	60%	
				pm	outside	active recovery	30'	50%	
	26	Thursday	optionally	am	outside	Training 4	60'	70%	
				pm	home	passive recovery	optionally	×	
	27	Friday	optionally	am	home	Training 5	60'	60%	
				pm	outside	active recovery	30'	50%	
	28	Saturday	optionally	am	outside	active recovery	60'	60%	
				pm	home	questionnaire	×	×	
	29	Sunday	BREAK						
	30	Monday	optionally	am	home	Training 1	60'	50%	
pm				outside	active recovery	30'	50%		
31	Tuesday	optionally	am	home	Training 2	60'	60%		
			pm	home	passive recovery	optionally	×		

The 3 training sessions at home (1-3-5) contained in the second microcycle type (Table 3) and detailed in Table 4 followed the development of strength and endurance of the main muscle groups and had the following variables:

- Time: 60 min.
- Measuring: 12-15 reps.
- Number of sets: 2-3 x 3 circuits.
- Intensity: 50-60%.
- Break length between circuits: 1-5 min.
- Materials: simple and loop resistance bands, adapted materials such as water bottles.
- Content: exercises established and used by athletes throughout the year, for the development of general strength and for the prevention of injuries

The training sessions were programmed to start with a 15 min. warm-up (gymnastics and dynamic stretching) and at the end 15 min. body recovery after effort (static stretching and foam-rolling).

The presented complex (Table 7) contains exercises already established in the training routine of the players from CSM Galați, with no need for additional explanations regarding the correct and efficient execution of them. Due to the individual nature of the training, the players were allowed to choose the time interval for training which they had to combine with active recovery in the second part of that day.

**Table 4. Complex of exercises for the prevention of injuries and strength development in the main muscle groups, in conditions of home isolation**

Crt. no.	Target muscle groups	Exercise	Necessary materials	
1	Lower limb muscles	Quadriceps	Half squats Squats	- Loop resistance band
		Adductors	Side lunges	Normal and with weight/water bottle on shoulders/at chest
			Bringing the lower limbs to the upper side	Loop resistance band
		Biceps femoris	Front and back lunges	-
		Glutes	Raising and lowering the pelvis while keeping the loop resistance band in tension	Loop resistance band
		2	Upper limb muscles	Rotator cuff
Deltoid	Lifting the upper limbs (alternately) by stretching the resistance band fixed under a lower limb			Simple resistance band
Brachial biceps	Sitting with the resistance band under the sole, grabbed by the ends, arms next to the body, flexing the arms at the elbows			
Brachial triceps	Sitting with the resistance band under the sole, grabbed by the ends, arms bent at the nape of the neck and elbows up: stretching the arms and coming back			Simple resistance band / weights
3	Abdominal muscles	Abdomen	Lying on the back with the legs raised and bent at the knee joint at 90, arms outstretched next to the body: raising and lowering the torso	-
4	Back muscles	Trapezius	lying forward: raising the legs back up and slowly lowering them	-

The outside training (2-4) contained in the second microcycle type, focused on maintaining the effort capacity at 60-70% of the maximum potential and was carried out close to the athletes' home (stadium, park alleys, or varied areas of land or undeveloped spaces but which have suitable dimensions for movement) having the following variables:

- Time: 60 min.
- Content: running 1000 m - 800 m - 600 m.

- Measuring: 2 sets.
- Intensity: 50-60% of the maximum possibilities (150-160 bpm).
- Break length between exercises: 1 min. active pause (walking).
- Break length between sets: 5 min., active pause (walking).

The training sessions were programmed to start with a 20 min warm-up (7 min. jogging, running technique drills, and dynamic stretching exercises) and at the end 15 min. body recovery after effort (static stretching).

#### 4. Conclusions

In performance sports, any period of physical inactivity can have a significant impact on the physical and psychical state of each athlete. Regardless of the period, the isolation/quarantine period represented an unprecedented situation. The COVID-19 pandemic has dramatically changed the conditions of training and competition in all individual and team sports.

These changes in training may have a significant managerial impact. As in the case of all sporting activities, the management aims at transforming the financial resources into sports results, which can be obtained only through sports competitions. The Covid 19 pandemic situation affected the fulfillment of the performance objectives of all handball sports clubs in Romania, taking into consideration the fact that the Romanian Handball Federation stopped all forms of collective training or official competitions.

Moreover, in order to ensure the financial stability, managers must always do their best to obtain an optimal balance between sports performance and profit. Thus, continuing the training and maintaining an optimal physical condition are essential factors for achieving the performance objectives. The annual budgets of sports clubs are based on revenues granted by central and local public administration bodies but also on sources of income such as sponsorships, advertising and publicity revenues obtained from transfer fees of athletes, allowances obtained for participation in competition, etc. The impact of individual training in improper training conditions cannot be predicted immediately, however, changes in the team's collective training can lead to significant decreases in the performance of players, which may lead to the loss of sponsorship or other sources of funding.

The period of home isolation coincided with the transition period within the structure of a competitive season. During this time, it was very important for athletes to maintain an optimal physical condition, especially the aerobic capacity and muscular endurance in order to quickly adapt to the increase in the frequency and intensity of training, from the normal training period. At the same time, continuing the training during the transition period reduces the risk of injury when resuming normal physical activity.

The training of the CSM Galați players aimed in the first part to reconnect with the family and to adapt to the new living style imposed by the pandemic. Elimination of physiological and psychological fatigue was achieved by using active recovery (30-60% of  $VO_{2max}$ ) in the second part of the training. The third part of the training focused on:

- minimizing the effects of physical deconditioning;
- accommodating the muscles' tendons and ligaments for the new training plan;
- injury prevention.

In this context, we can agree that the training of the CSM Galați players was done according to the methods recommended by the specialised studies with the mentioning that the real effects of home isolation (especially on the maximum aerobic capacity) can be noted objectively with the help of specialized tests like the 30-15 Intermittent Fitness Test (Buchheit et al., 2009).

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