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Training Habits in Kickboxing before and during Lockdown

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Abstract During the lockdown, some clubs had the usual approach to training while others did not because of the prescribed measures. Differences in training also occurred due to compliance or non-compliance with the measures. Some sports theorists argue that this should affect results at all levels of sport. The aim of this paper is to examine aspects of kickboxing training during the lockdown. The second goal is to determine the correlation between the work model and the amount of training during the lockdown and kickboxing results. A validated questionnaire was used to collect data from 40 active fighters aged 24.13±5.67 years, including 34 men aged 24.29±5.73 years and 6 women aged 23.17±5.71 years. Data were analyzed by descriptive statistical parameters, whereas correlations were tested by Spearman's correlation coefficient. Kickboxers mostly trained at home or out in the open, no special program was implemented; it was usually decided by athletes themselves, and they received psychological support from the coach. Compared to previous sparring training, they did less than 50%, and TE-TA training was done at 60%, endurance at 70%, and strength at 80%. Fighters who had good results before the pandemic paid more attention to training. Fighters who worked harder on endurance had better placement in 2022. The difference between the results before and after the lockdown is significantly correlated to the amount of TE-TA training. Clubs need to balance between adherence to measures and results, and be aware of the fact that their competition still does some things that they are not allowed to do. Based on this research, instructions for training in similar situations can be given.

Keywords SARS-CoV-2, Combat Sport, Competition

1. Introduction

Kickboxing is a striking combat sport based on kicking and punching. By definition, it is an indoor contact sport, which makes it a high-risk activity during the pandemic [1, 2]. Studies have shown that athletes in contact sports had a higher frequency of training during the pandemic in comparison to athletes in non-contact sports [3]. Lockdown during the pandemic was most severe at the very beginning of the pandemic outbreak. People were suggested to only leave their homes for food and medicine, and working and schooling took place online wherever possible. This obviously led to a general decrease in physical activity [4-6], and young people, including athletes, had a problem with returning to previous levels of physical activity [4]. Besides a significant decline in motor skills [5] and negative changes in body composition, athletes also experienced negative changes in psychological status [7]. Various forms of training that can be practiced in lockdown conditions have been suggested to athletes [8, 9]. The pandemic also affected elite sports, but not in the same way. The consequences of lockdown are different for clubs of different socio-economic status, athletes of team and individual sports are affected differently, and there are also differences by gender [10]. Clubs differed in their ability to adapt to the new situation [11]. Some countries had a longer

lockdown, whereas some had a stricter one. One of the fundamental differences that can lead to differences in placement is the violation of anti-epidemic measures. A study investigating wrestlers showed that wrestlers with more sparring during training had better placement than others [12]. All wrestlers reported that sparring had decreased by 50% or more compared to previous years, though sparring was not allowed at all. It is assumed that these differences, which are present at all levels, will lead to changes in results among top athletes [13]. The question is: How did the kickboxing community react to the pandemic crisis, and how significant were the changes in the training of kickboxers? In this paper, we will collect data on changes in the training process during the lockdown by segments (sparring, technique/tactics, strength, and endurance) and investigate models, by which clubs tried to adapt to the new conditions. The final aim is to reveal the connection between the result and the training and adaptation models used by clubs.

2. Materials and Methods

2.1. Sample

The respondents are members of 6 kickboxing clubs from the wider Split area. As the study is based on results from the competition, the condition is that they competed at the national championships in 2020 (before the pandemic) and 2022 (after the pandemic). The coaches distributed the survey link to their competitors, and the athletes independently decided whether they would participate in the survey. Out of a possible 88 respondents, 62 respondents filled out the survey. Twenty-two respondents did not meet the requirement (they were not at both national championships), so the final number of respondents is 40 active kickboxers (34 men and 6 women) whose average age was 24.13±5.67 years. A detailed description of the sample is presented in Table 1.

Table 1. Descriptive statistical parameters (arithmetic mean and standard deviation – mean/SD, minimum and maximum result – min/max) for the variables describing the sample of participants.

	Mean±SD	min/max
Age (yrs)	24.13±5.67	14.00/42.00
Body height (cm)	180.50±9.42	165.00/203.00
Body mass (kg)	78.55±16.15	55.00/120.00
Body mass index	23.86±2.89	19.59/30.92
Placement 2020	1.93±1.12	1.00/7.00
Placement 2022	2.15±1.35	1.00/6.00
Difference 2020/2022	-0.23±1.27	-3.00/2.00

Data on the number and structure of training sessions were collected to determine training habits before the pandemic. Post-pandemic training structure was determined by the percentages that athletes were able to maintain during the lockdown. Table 2 shows that the kickboxers trained quite differently before the pandemic, which is logical since they come from different clubs. They had an average of 9.20 training sessions per week, of which 2.20 were aerobic and 1.98 were strength training. The rest was basic training, and sparring accounted for 28%. Most of the respondents indicated that aerobic and strength training took place in the morning, while basic training (TE /TA and sparring) took place in the afternoon.

Table 2. Descriptive statistical parameters (arithmetic mean and standard deviation – mean/SD, minimum and maximum result – min/max) for the training habits before lockdown.

Training habits before lockdown	Mean±SD	Min/Max
Total number of training sessions per week	9.20±2.05	5.00/14.00
Average training duration (min)	94.50±19.86	60.00/120.00
Proportion of sparring in basic training (%)	28.00±9.92	10.00/40.00
Aerobic training – running (number of sessions per week)	2.20±1.52	0.00/4.00
Strength training – weights (number of sessions per week)	1.98±0.70	0.00/5.00

2.2. Variables and Procedure

Karninčić created a questionnaire in 2021 to examine the connection between training and success during the lockdown crisis. The questionnaire is in the Croatian language and has high reliability on a sample from combat sports (wrestling); therefore it is suitable for this research. Variable sample included 12 variables. The items of the questionnaire (Karninčić, 2021) represented nine variables, which were further divided into two sets of variables. The first set included 5 variables which referred to the activities of the clubs during the lockdown: Models of behavior during the lockdown; Planning during the lockdown; Decisions during the lockdown; Psychological support during the lockdown; Training after the lockdown. In this part of the questionnaire, respondents must choose one of five statements. The statements were graded from the worst (score 1) to the best (score 5). For example (Psychological support): There was no psychological support - score 1; Athletes asked for psychological support themselves - score 2; The coach provided psychological support to fighters through conversations - score 3; The coach and the management consulted a psychologist and acted according to their instructions - score 4; The management hired a psychologist to take care of athletes' mental health during the pandemic - score 5. The second set of 4 variables referred to the amount of training that fighters managed to maintain despite the lockdown and training is divided by segments: Sparring (training fight with an opponent); TE-TA (technical-tactical training); Endurance (running, cycling, etc.); Strength (weights and similar training). Respondents chose one of 6 answers. Example - question: in what percentage did you manage to maintain strength training compared to the time before the pandemic, answers: ≤50%, 60%, 70%, 80%, 90% and 100%. The remaining three variables referred to the placement at the national championship: placement before the lockdown, placement after the lockdown, and the difference in placement before and after the lockdown. The questionnaire was voluntary and anonymous, and an example of the questionnaire can be found as supplementary file at the link:https://www.dropbox.com/s/nb3i6ddf8huai8d/Questionar%20Karnincic%202021.docx?dl=0. The study was conducted in accordance with the Declaration of Helsinki. The study has been approved by the Institutional ethical Board of Faculty of Kinesiology, University of Split (protocol code 2181-205-02-05-22-0012).

2.3. Statistical Analyses

The following descriptive parameters were calculated for the variables describing the sample: arithmetic mean, standard deviation, and minimum and maximum result. Median, mode and mode frequency were calculated for all items of the questionnaire, whereas the correlations to the result were tested using Spearman's coefficient of correlation. The p-level of 0.05 was applied for all analyses. Data were processed in the statistical package Statistica ver. 14. (TIBCO software Inc.).

3. Results

It can be seen in Table 4 that there is a statistically significant correlation between the 2020 placement and the model of behavior, psychological support during the lockdown, and the amount of sparring, endurance, and strength training. The 2022 placement is significantly correlated to the amount of endurance training. The difference in the result 2020/2022 is significantly correlated to the amount of TE-TA training.

Table 3. Descriptive statistical parameters (frequencies, median, and mode) for all items of the questionnaire referring to the work models during the lockdown.

Subscale	mode	f mode	median
1. Models of behavior during the lockdown	2. We trained at home or out in the open	16	3.5 = 3. We trained at the club but only one pair at a time; 4. We trained at the club in small groups
2. Planning the training procedure	1. No new plans and programs were made	13	2.5 = 2. Athletes planned themselves; 3. The coach designed new training plans and programs
3. During the pandemic, the decisions were made by	1. The athlete	13	2. The coach
4. Psychological support during the pandemic	3. Thecoach provided psychological support	25	3. The coach provided psychological support
5. Training after lockdown	1. We trained more intensely to make up for lost time	12	1. We trained more intensely to make up for lost time
6. Sparring	≤50%	15	60%
7. TE-TA training	60%	14	70%
8. Endurance training	70%	15	70%
9. Strength training	80%	9	70%

Table 4. Correlation between the models and the amount of training and the placement before and after the pandemic

	Placement 2020	Placement 2022	Difference 2020/2022
Models of behavior during the lockdown	-0.36*	-0.06	-0.18
Planning during the lockdown	0.19	-0.02	0.22
Decisions during the lockdown	-0.12	-0.06	-0.09
Psychological support during the lockdown	0.34*	0.25	0.00
Training after the lockdown	0.06	0.03	-0.10
Sparring	-0.39*	-0.15	-0.09
TE-TA	-0.17	-0.13	-0.32*
Endurance	-0.37*	-0.36*	0.04
Strength	-0.39*	-0.15	-0.15

4. Discussion

Interestingly, the sports results before the pandemic are related to the behavior during the pandemic. This can be explained by the fact that successful athletes paid more attention to adapting to new conditions and to both psychological and physical preparation. The fighters' frequency of training during the lockdown is conditioned by two variables: adherence to epidemiological measures and exercise dependency [3]. It can be assumed that successful athletes are more prone to exercise dependency and non-compliance with measures for the sports results. The differences in the results before and after the pandemic were significantly related only to the amount of TE-TA training. TE-TA training of kickboxers can be done without contact (working with a punching bag), however, most training is done with a partner or a coach [14]. Due to the measures, the fighters reduced the sparring, which includes a lot of contact, to the ≤50% of what they did before the lockdown (Table 3). TE-TA training (which includes contact) was reduced to 60%. It is logical that these segments are reduced the most, but the measure of distancing does not allow either sparring or most of TE-TA training. Similar results were found in wrestling [12]. In wrestlers, both TE-TA training and sparring are significantly correlated with the result before and after the lockdown. It can be assumed that in kickboxing, sparring was not significantly correlated since striking combat sports include less sparring than grappling combat sports [15]. A lesser amount of sparring may be caused by a higher chance of injury in striking sparring [16]. All indications are that the specific activity itself is most important for maintaining competitive form. If you want to be good at kickboxing, you must do TE-TA training, and if you want to win at kickboxing, you must practice it in competitive conditions (sparring). Running, weights, psychological preparation, and everything else used in kickboxers' preparation are part of additional sports preparation. Additional sports preparation is important, but if, due to a pandemic, you omit TE-TA training or sparring, you will jeopardize your sports result. Psychological support during a pandemic is important for athletes' mental health [17, 18], but in this study, psychological support is not related to post-lockdown results. The organizational efforts of the club are not related to the result after the lockdown. Numerous experts and scientific papers suggest alternative training methods and organizations during lockdown [19, 20], but even this had no effect on athletic outcome according to this study. Martial artists are accustomed to reducing their body weight to compete in lower weight classes. During the pandemic, there was an increase in body mass in martial artists [21-23]. Sparring, TE-TA training, or endurance training in a sauna suit or heated area are important strategies to reduce body mass [24-26]. These training segments are reduced by 20 to 50% according to this research (Table 3). Unfortunately, a lot of advice from sports psychologists comes too late [27]. This advice may be helpful in the next crisis if one ever occurs. This study showed that sports clubs did not cope well in a crisis. New training plans were not created, decisions were made by the athlete himself, and instead of a psychologist, the coach offered psychological support. The profession advises to start training slowly after such a crisis and then gradually increase the training [28]. After the lockdown, athletes started to train harder than before, which is the worst solution in this situation.

5. Conclusions

Based on this research, we can say that clubs generally respected the measures because most training was lost in the training segments with the most contact. The fighters managed to maintain strength and endurance training at the

highest level (80% and 70%, respectively) as these types of training can be done with adherence to the existing measures. However, the result was the best among those who did more TE-TA training which mostly cannot be done according to the epidemiological restrictions. Neither the clubs' efforts to adapt to the new situation nor psychological support affected the results after the lockdown. Clubs must balance the compliance with the measures and the sports result, as it is evident that non-compliance with the measures can lead to a better result. In general, kickboxing clubs did not manage well in the crisis, but this knowledge can help them in the next crisis.

6. Study Limitations

Studies that dealt with the phenomenon of sports during the pandemic considered different problems, but not the amount of training during the lockdown. Therefore, the results of this study cannot be compared with similar studies except one paper on wrestling sample (Karninčić 2021). Very few competitors came to the 2022 national kickboxing championship, due to the fear that the virus was still present. This reduced the number of respondents who could participate in this study.

REFERENCES

[1] Aghababa, A., Badicu, G., Fathirezaie, Z., Rohani, H., Nabilpour, M., Zamani Sani, S.H., Khodadadeh, E. Different effects of the COVID-19 pandemic on exercise indexes and mood states based on sport types, exercise dependency and individual characteristics. *Children* 2021, *8*, 438. p. 438. doi: 10.3390/children8060438

[2] Ambroży, T., Rydzik, Ł., Obmiński, Z., Klimek, A. T., Serafin, N., Litwiniuk, A., Czaja, R., Czarny, W. The impact of reduced training activity of elite kickboxers on physical fitness, body build, and performance during competitions. *International Journal of Environmental Research and Public Health* 2021, *18*, 4342. doi: 10.3390/ijerph18084342

[3] Asif, I. M., Chang, C. J., Diamond, A. B., Raukar, N., Zaremski, J.L. Returning athletes back to high school sports in the COVID-19 era: preparing for the fall. *Sports Health* 2020, *12*, 518-520.

[4] Conde, E., Martínez-Aranda, L. M., Sanz, G., López de Subijana, C., Sánchez-Pato, A., Díaz-Aroca, Á., Leiva-Arcas, A., García-Roca, J.A., Ramis, Y., Torregrossa, M. Effects of the COVID-19 health crisis on sports practice, life quality, and emotional status in Spanish high-performance athletes. *Frontiers in psychology* 2021, *12*, 736499. doi: 10.3389/fpsyg.2021.736499

[5] Curby, D. G. COVID-19: Considerations regarding the return to wrestling training. *Int. J. Wrestl. Sci* 2020, *10*, 1-14.

[6] Di Cagno, A., Buonsenso, A., Baralla, F., Grazioli, E., Di Martino, G., Lecce, E., Calcagno, G., Fiorilli, G. Psychological impact of the quarantine-induced stress during the coronavirus (COVID-19) outbreak among Italian athletes. *International journal of environmental research and public health* 2020, *17*, 8867. doi:10.3390/ijerph17238867

[7] Fikenzer, S., Fikenzer, K., Laufs, U., Falz, R., Pietrek, H., Hepp, P. Impact of COVID-19 lockdown on endurance capacity of elite handball players. *The Journal of sports medicine and physical fitness* 2020, *61*, 977-982. doi: 10.23736/s0022-4707.20.11501-9

[8] Gavrlilovic, D., Petrovic, A., Dopsaj, M., Kasum, G., Pajic, Z., Koprivica, V. Work and rest peak heart rate variability response during the different technical and tactical situations of elite kickboxers. *International Journal of Performance Analysis in Sport* 2016, *16*, 96-110. doi: 10.1080/24748668.2016.11868873

[9] Håkansson, A., Moesch, K., Jönsson, C., Kenttä, G. Potentially prolonged psychological distress from postponed olympic and paralympic games during COVID-19—career uncertainty in elite athletes. *International journal of environmental research and public health* 2021, *18*, 2. doi: 10.3390/ijerph18010002

[10] Hammami, A., Harrabi, B., Mohr, M., Krustrup, P. Physical activity and coronavirus disease 2019 (COVID-19): specific recommendations for home-based physical training. *Managing Sport and Leisure* 2022, *27*, 26-31. doi: 10.1080/23750472.2020.1757494

[11] He, M., Xian, Y., Lv, X., He, J., Ren, Y. Changes in body weight, physical activity, and lifestyle during the semi-lockdown period after the outbreak of COVID-19 in China: an online survey. *Disaster medicine and public health preparedness* 2021, *15*, e23-e28. p. e23-e28. doi: 10.1017/dmp.2020.237

[12] Herrera-Valenzuela, T., Valdes-Badilla, P., Franchini, E. High-intensity interval training recommendations for combat sports athletes during the COVID-19 pandemic. *Revista de Artes Marciales Asiáticas* 2020, 1-3.

[13] Jordan, B. D., Matser, E. J., Zimmerman, R. D., Zazula, T. Sparring and cognitive function in professional boxers. *The Physician and sportsmedicine* 1996, *24*, 87-98. doi: 10.1080/00913847.1996.11947957

[14] Karnincic, H. Različiti uvjeti treninga tijekom covid-19 krize i uspjeh u hrvanju grčko-rimskim načinom. In Proceedings of the 19th International Scientific Conference Physical Conditioning of Athletes 2021, Zagreb, Croatia, 19.02., 2021.

[15] Kirk, C., Langan-Evans, C., Clark, D. R., Morton, J. P. Quantification of training load distribution in mixed martial arts athletes: a lack of periodisation and load management. *PLoS One* 2021, *16*, e0251266.

[16] Moritz, S., Gottschick, C., Horn, J., Popp, M., Langer, S., Klee, B., Purschke, O., Gekle, M., Ihling, A., Mikolajczyk, R. The risk of indoor sports and culture events for the transmission of covid-19 *Nat Commun* 12, 5096 (2021). https://doi.org/10.1038/s41467-021-25317-9

[17] Mulcahey, M. K., Gianakos, A.L., Mercurio, A., Rodeo, S., Sutton, K.M. Sports medicine considerations during the COVID-19 pandemic. *The American Journal of Sports*

Medicine 2021, *49*, 512-521.

[18] Philippe, R. A., Schiavio, A., Biasutti, M. Adaptation and destabilization of interpersonal relationships in sport and music during the Covid-19 lockdown. *Heliyon* 2020, *6*, e05212.

[19] Bisciotti, G. N., Eirale, C., Corsini, A., Baudot, C., Saillant, G., Chalabi, H. Return to football training and competition after lockdown caused by the COVID-19 pandemic: medical recommendations. *Biology of sport* 2020, *37*, 313-319. https://doi.org/10.5114/biolsport.2020.96652

[20] Tjønndal, A. Quarantineworkout: The use of digital tools and online training among boxers and boxing coaches during the COVID-19 pandemic. *Frontiers in sports and active living* 2020, *2*, 589483. doi: 10.3389/fspor.2020.589483

[21] Brito, C. J., Roas, A. F. C. M., Brito, I. S. S., Marins, J. C. B., Córdova, C., Franchini, E. Methods of body-mass reduction by combat sport athletes. *International journal of sport nutrition and exercise metabolism* 2012, *22*, 89-97.

[22] Franchini, E., Brito, C. J., Artioli, G. G. Weight loss in combat sports: physiological, psychological and performance effects. *Journal of the international society of sports nutrition* 2012, *9*, 52. https://doi.org/10.1186/1550-2783-9-52

[23] Reale, R., Slater, G., Burke, L. M. Acute-weight-loss strategies for combat sports and applications to Olympic success. *International journal of sports physiology and performance* 2017, *12*, 142-151.

[24] Herrera-Valenzuela, T., J. J, N. V., Merlo, R., Valdés-Badilla, P. A., Pardo-Tamayo, C., Franchini, E. Effect of the COVID-19 quarantine on body mass among combat sports athletes. *Nutrición Hospitalaria* 2020, *37*, 1186-1189. doi: 10.20960/nh.03207

[25] Barley, O. R., Chapman, D. W., Abbiss, C. R. Weight loss strategies in combat sports and concerning habits in mixed martial arts. *International journal of sports physiology and performance* 2018, *13*, 933-939. https://doi.org/10.1123/ijspp.2017-0715

[26] Martínez-Rodríguez, A., Vicente-Salar, N., Montero-Carretero, C., Cervelló-Gimeno, E., Roche, E. Weight loss strategies in male competitors of combat sport disciplines. *Medicina* 2021, *57*, 897. https://doi.org/10.3390/medicina57090897

[27] Pensgaard, A. M., Oevreboe, T.H., Ivarsson, A. Mental health among elite athletes in Norway during a selected period of the COVID-19 pandemic. *BMJ Open Sport & Exercise Medicine* 2021, *7*, e001025. http://dx.doi.org/10.1136/bmjsem-2020-001025

[28] Halle, M., Bloch, W., Niess, A. M., Predel, H. G., Reinsberger, C., Scharhag, J., Steinacker, J., Wolfarth, B., Scherr, J., Niebauer, J. Exercise and sports after COVID-19—Guidance from a clinical perspective. *Translational sports medicine* 2021, *4*, 310-318. https://doi.org/10.1002/tsm2.247