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Music Supported Exercises in Gymnastic Education*

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Research Article
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Abstract

Balance and rhythm skills are very important in gymnastics education. Therefore, the aim of this research, examine the effects of coordination exercises on balance performance and rhythm skills in children when applied with music as a different method in basic gymnastics education. The study was conducted in an experimental design with pretest posttest control group and lasted for 11 weeks. 20 children aged between 9-12 participated the study. All of the children got gymnastics education for a maximum of 2 years. A personal information form was used to identify the participants. Balance measurements were taken with the Y-Balance Test (YBT), and rhythm measurements were taken with the Rhythmic Competence Analysis Test (RCAT). Mann-Whitney U and Wilcoxon signed-rank tests were used in the analysis of the data. As a result of the study, a significant difference was obtained between the pretest-posttest rhythm measurements and balance scores of both the experimental and control groups. It was concluded that musical coordination exercises gave similar results in terms of balance and rhythm development in line with the standard gymnastics program, but it was not more effective as a different method.
Keywords: Gymnastics, Teaching Methods, Music, Rhythm, Balance.

Cimnastik Eğitiminde Müzik Destekli Egzersizler

Öz

Cimnastik eğitiminde denge ve ritim becerileri çok önemlidir. Bu nedenle bu araştırmanın amacı, temel cimnastik eğitiminde farklı bir yöntem olarak müzik eklenen koordinasyon çalışmalarının çocuklarda denge performansı ve ritim becerileri üzerine etkisini incelemektir. Araştırma, ön test son test kontrol gruplu deneysel desende yürütülmüş ve test ölçümleri dâhil 11 hafta boyunca sürmüştür. Çalışmaya 9-12 yaş arasında 20 çocuk gönüllü olarak katılmıştır. Çocukların tamamı en fazla 2 yıl cimnastik eğitimi alan kişilerden oluşmaktadır. Katılımcıları tanımak için kişisel bilgi formu kullanılmıştır. Denge ölçümleri Y-Denge Testi (YDT) ile ritim ölçümleri ise Ritmik Yeterlilik Analizi Testi (RYAT) ile alınmıştır. Verilerin analizinde Mann-Whitney U testi ve Wilcoxon işaretli sıra testi kullanılmıştır. Araştırma sonucunda hem deney hem de kontrol grubunun öntest-sontest ritim ölçümleri ve denge puanları arasında anlamlı bir farklılık elde edilmiştir. Sonuç olarak müzikli koordinasyon egzersizlerinin standart cimnastik programı ile karşılaştırıldığında denge ve ritim gelişimi açısından benzer sonuçlar verdiği ancak farklı bir yöntem olarak daha etkili olmadığına ulaşılmıştır.
Anahtar Kelimeler: Cimnastik, Öğretim Metodları, Müzik, Ritim, Denge.

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INTRODUCTION

As a natural consequence of the rapid changes in technology and today's living conditions, physical inactivity is a growing problem. Research reveals that the time spent by today's children with technology-oriented devices at home is increasing day by day (Kim, 2020). There is a very strong relationship between the use of these products and physical inactivity (Sisson, Broyles, Baker & Katzmarzyk, 2011). According to WHO data (2018), three out of every four adolescents (11-17 years old) are below the acceptable level of physical activity for this age group. The data of this report reveal that as the economic levels of the countries increase, the level of inactivity also increases.

Scientific evidence shows that physically active people have higher levels of fitness, lower risk profiles and lower rates of chronic disease (Dere & Günay, 2021). Physical inactivity is one of the main causes of many health problems, especially cardiovascular problems (Meyer, Landry, Gustat, Lemmon & Webster, 2021). Leading an active life is extremely important, especially in childhood. Because the foundation of general health and the habits that will support it are laid in these years. According to Orhan (2019), mobility is a prerequisite for healthy and positive child development rather than importance.

One of the most important instruments that will increase physical mobility, which is an integral part of general development in children, is undoubtedly sports. According to Ekici, Çolakoğlu & Bayraktar (2011), participation in sports activities not only supports physical mobility and development, but also supports all aspects of children's mental, emotional and social development. In this context, gymnastics, which is a preparatory sport for other sports branches and shown among the basic sports, is a sport that provides the best body awareness and the best development of basic motoric features (Çimen, 2012). Also, gymnastics is based on the struggle of the individual with herself/himself, requires patience and develops self-discipline.

However, despite all these benefits, gymnastics is a relatively difficult sport to learn because it is based on the individual's struggle with herself/himself and on constant repetition (Kangal, 2008). It is not always easy to provide motivation, which is the most important element of learning for these age groups, since the age of starting this branch is very early, where the foundations of sports and healthy development are laid together. According to Çamlıyer & Çamlıyer (2015), motivation is the basic element of learning. Ensuring this makes learning effective and efficient. In the light of all this information, it is an important issue to focus on how to increase the learning motivation of especially young children in sports environments.

Making music an integral element of sports environments, such as games, entertainment and excitement, which should be included in sports, can be a supporter of children's participation motivations. Because music is used to improve the psychological state of people, to maintain their motivation, to counter their mental and emotional fatigue and to create an effective mentality for them (Koç & Curtseit, 2009). For children, rhythm development through music can help them develop coordinated body management (Steward, 1990). Music can be applied in many different ways towards exercise, training and competition. Music, which is

used synchronously (simultaneously), increases work efficiency and makes repetitive movement patterns such as cycling or running more energetic and efficient (Karageorghis, 2008). In addition, music has been associated with significant beneficial effects on emotional value, physical performance, perceived exertion, and oxygen consumption, and as a result, the use of music in physical activity has been suggested to increase physical performance, reduce perceived effort, and increase physiological efficiency (Terry, Karageorghis, Curran, Martin & Parsons-Smith, 2020). It has been also widely demonstrated that rhythmic and musical training improves coordination, sense of direction, laterality and organisation of space and time (Liparoti & Minino, 2021).

Since the relationship between the brain and music is strong, it is a very natural process for people to react to the music they hear (Yener, 2011). Based on this response, it has been argued that when rhythmic components are included in physical activities, practitioners can help develop their gross and fine motor skills (Harmon & Kravitz, 2007). In this respect, music allows especially children to experience pleasurable activities, enabling them to develop muscle functions and grow up healthy (Özçelik, 2007). Rhythmic movements performed with music contribute to the development of small and large muscle groups, allowing children to act more coordinated, aesthetically and agile (Güryıl, 2011).

Gymnastics, which includes many movement patterns in terms of the development of basic skills, it is a branch that contributes to the development of the body and mind with fun and aesthetic activities in which movements are carried out in a controlled manner (Ballı, 2006). Gymnastics is based on the struggle of the individual with himself, requires patience and develops self-discipline. Coaches and teachers, who are aware of this challenging nature of gymnastics, need to make the activities more meaningful and attractive for children.

From the point of view of gymnastics, it is thought that performing the rhythm and balance skills, which are the basic elements of this sport, accompanied by musical coordination exercises can contribute to the learning of these skills and to save the educations from monotony. With this in mind, the aim of this research is to examine the effects of musical coordination exercises on balance performance and rhythm skills in children in basic gymnastics education. Within the scope of the research, the following two main hypotheses will be questioned:

H_1: Musical coordination exercises have an effect on balance performance.

H_2: Musical coordination exercises have an effect on rhythm skills.

METHOD

Study design

This study was carried out in an experimental design with pretest-posttest control group.

Study group

Twenty volunteers aged between 9 and 12, who received gymnastics training for a maximum of 2 years at Manisa Spil Youth and Sports Club, participated in the research. Participants and their parents were verbally informed about the study and written informed consent was obtained from the parents. Participants were randomly assigned to the experimental group (n=10) and the control group (n=10). The research was carried out in Manisa Spil Youth and Sports Club for 11 weeks, including the pre-test and post-test measurement weeks.

Data collection tools

A personal information form prepared by the researcher was used to get to know the participants. Tape measure for height and leg length measurements, to determine balance performances, The Y-Balance Test (YBT) (Plisky et al., 2009) and the Rhythmic Proficiency Analysis Test (RPAT) (Weikart, 1989) were used to measure rhythm skills.

Y-Balance Test Measurement: YBT was used to measure dynamic balance. YBT was developed to improve the reproducibility in measuring components of SDBT. It was found that the intra-rater reliability of the test ranged between 0.85 and 0.91, and the inter-rater reliability ranged between 0.99 and 1.00. Leg lengths of all participants were measured before the balance test to eliminate the leg length advantage. While the athlete was lying on his back on a flat surface, the distances between the anterior superior iliac spine and the farthest points of the medial malleolus of both legs were measured and recorded in centimeters with the help of a tape measure (Cited by Fişek, 2019). Then, YBT measurement was started. The participant stood alone on the plate barefoot with the toe on the starting line and reached anterior, posteromedial, and posterolateral directions relative to the free limb and stance foot. Participants were warned to keep their hands on the waist during reaching. The test sequence was performed as three forward attempts on the right foot followed by three forward attempts on the left foot. This procedure was repeated for the posteromedial and posterolateral access directions. Maximum reach was recorded as the point reached by the outermost part of the foot. In the evaluation, the most successful reach after 4 attempts for each direction was used in the statistics. Also, by collecting the most successful reach from all aspects, a composite access was obtained for the analysis of the overall performance in the test (Plisky et al., 2009). As reported by Ateş & Öztürk (2019) and Gribble & Hertel (2004), after the data are obtained, composite reach distance was calculated with the formula 3-way reach total score/ 3 x leg length x 100.

Rhythmic Proficiency Analysis Test (RPAT) Measurement: RPAT is designed to assess the ability to perform a variety of movement tasks in harmony with the rhythm of music. The movements in the test are performed in two different conditions, sitting and standing. The musical selection in the study should have approximately 120 metronome rhythms and the other selection should have approximately 132 metronome rhythms (Cited by Yıldız and Yoncalık, 2019). This test was applied to the participants in two different tempos, 120 and 132

bpm, in the gymnasium with the help of a metronome, one by one and in sequence. In this study, rhythm measurements were measured separately at two different tempos, with the thought that it would be more appropriate to analyze the individual's responses to beats at different speeds, not at a single speed, in order to evaluate the rhythm skill. During the test, the participants were asked to perform the following movements in order and were scored by the subject expert observer music teachers using the form below.

1- Striking the knees with both hands

2- Striking the knees with both hands alternately

3- Counting while sitting down

4- Standing counting

5- Forward walking

6- Backward walking

Observer teachers decided independently from each other and used the scores of 3, 2 and 1 while evaluating. They gave 3 points if there is a good harmony between the movement and the metronome, 2 points if the harmony between the movement and the metronome speed is sufficient, and 1 point if the harmony between the movement and the metronome is not sufficient (Dizdar, 2019).

Experimental Group Teaching Content

Except for the measurements, the content of the 9-week program received by the experimental group is as follows;

Table 1. Experimental Group Teaching Content

Weeks	Contents
1.week	Using your own body or playing gymnastic sticks, clubs, etc. the study of making sounds using materials and maintaining and diversifying these sounds in a way that is suitable for music.
2.week	Practice to perform warm-up movements and basic steps in harmony with music.
3.week	Practice to progress in different formations (straight, side to side, back and forth, jumping, etc.) by using the coordination ladder and gymnastics circles.
4.week	Step-aerobic exercise with music (basic).
5.week	Step-aerobic exercise with music (hard).
6.week	Jumping rope in different formations (single leg, double leg, jogging, going straight, going sideways, going backwards, etc.) and jumping by adapting to different metronome speeds.
7.week	Performing different jump types on the trampoline and then transforming the used jump types into strength exercises on the ground and rhythmic strength training accompanied by music.
8.week	On two and one leg; hand-eye coordination practice with a small pilates ball, accompanied by music and following the rhythm of the music
9.week	A balanced walking practice with different adaptations while maintaining hand-eye coordination with a small pilates ball on the gymnastics bench.

The entire 9-week program was implemented by an expert and active gymnastics trainer. The same coach gave gymnastics lessons to both groups. The control group received the same training without using music in this process.

Analysis of Data

In order to decide which tests will be used in the analysis of the scores obtained from the participants, the normality test of the data was conducted with the Shapiro-Wilk Test. The Shapiro-Wilk test is a test of normality used in cases where the sample size is less than 50 (Büyüköztürk, 2011). When the results of the normality test of the study were examined, it was understood that the other two data sets showed normal distribution, except for the pre-test balance. However, due to the small sample size, non-parametric tests (Mann-Whitney U and Wilcoxon signed-rank test) were used in the analysis of the data. The data were analyzed using the IBM SPSS Statistics 25.0 package program.

Research Ethics

The research was approved by Manisa Celal Bayar University Faculty of Medicine Health Sciences Ethics Committee on 26.05.2021 with the decision form no 20.478.486/818. Ethical principles were meticulously complied with at all stages of the research.

FINDINGS

Table 2. Descriptive Information about Participants

Participants	Gender	Age	Gymnastics experience	Music education	Instrument playing	Inst. playing in family
C1	Female	12	2 years	-	-	-
C2	Female	12	2 years	-	-	-
C3	Female	12	2 years	+	+	-
C4	Male	12	2 years	+	+	+
C5	Female	12	2 years	-	-	-
C6	Female	11	2 years	-	-	-
C7	Female	9	2 years	+	+	+
C8	Female	9	1 year	-	-	-
C9	Male	9	2 years	-	-	-
C10	Female	9	1 year	-	-	-
E1	Female	11	1 year	-	-	-
E2	Female	10	2 years	-	-	-
E3	Female	9	1 year	-	-	-
E4	Female	9	2 years	+	+	-
E5	Female	10	2 years	-	-	-
E6	Female	9	1 year	-	-	-
E7	Female	10	1 year	-	-	-
E8	Female	9	1 year	-	-	+
E9	Female	11	1 year	-	-	-
E10	Female	10	2 years	-	-	-

C: control group, E: experimental group

It is seen that the study group was equally distributed between the experimental group and the control group (n= 10), the majority of them were female, their age ranged from 9 to 12,

they had been educated in gymnastics for a maximum of 2 years, and most of those who received music educated were in the control group.

Table 3. Mann Whitney-U Test Results regarding the Difference in Pretest Balance, Rhythm 120 Bpm and Rhythm 132 Bpm Measurement Between Experimental and Control Groups

	Groups	**N**	**Median**	**Rank Averages**	**Row Totals**	**U**	**p**
Balance Composite Score (Right+Left)	Control	10	81.3	11.3	113	42	.545
	Experimental	10	89.5	9.7	97		
Rhythm(120bpm)	Control	10	1.8	10.1	100.5	45.5	.733
	Experimental	10	2.1	10.1	109.5		
Rhythm(132bpm)	Control	10	1.8	10.5	105	46.5	.790
	Experimental	10	1.9	10.5	105		

*p<.05

As a result of the pre-test performed to determine whether there was a significant difference between the pre-test balance (U=42, z=.605, p>.05, r=.135), rhythm 120bpm (U= 45.5, z=.341, p>.05, r=.107) and rhythm 132bpm (U=50, z=.226, p>.05, r=0,05) scores of the experimental and control groups, it was found that there was no significant difference between them.

Table 4. Pretest, Posttest and Difference Scores Obtained from the Groups

	Pretest score			**Posttest score**			**Difference scores**		
	Balance Comp.* Score	**Rhythm 120bpm**	**Rhythm 132bpm**	**Balance Comp.* Score**	**Rhythm 120bpm**	**Rhythm 132bpm**	**Balance Comp.* Score**	**Rhythm 120bpm**	**Rhythm 132bpm**
C1	87.9	2.7	2,6	91.8	2.7	2.8	3.9	.0	1.3
C2	76.4	1.7	1,7	87.6	2.0	2.0	11.2	.3	.3
C3	75.2	1.8	1,9	76.2	2.0	1.9	.1	.2	.0
C4	88.4	2.2	2,0	95.8	2.3	2.3	7.4	.1	.3
C5	92.5	2.5	2,4	91.2	2.5	2.5	1.4	.0	.1
C6	81.6	1.6	1,5	85.2	1.7	1.8	3.6	.1	.3
C7	70.5	2.2	2,1	80.4	2.3	2.0	9.9	.1	.1
C8	72.8	1.0	1,2	76.2	1.5	1.3	3.4	.5	.1
C9	75	1.5	1,6	77.4	2.3	2.5	2.4	.8	.8
C10	72.5	1.1	1,3	83.3	1.9	2.0	11.3	.8	.7
E1	74.2	2.2	2.2	98.1	2.8	2.6	23.9	.6	.4
E2	76.1	2.3	2.3	84.2	2.5	2.5	8.1	.2	.2
E3	82.6	2.0	1.9	87.9	2.6	2.5	5.3	.4	.6
E4	72.4	1.9	1.8	88.7	2.3	2.4	16.3	.4	.6
E5	77.8	2.3	1.9	95.1	2.6	2.5	17.3	.2	.6
E6	89.7	2.1	1.9	92.9	2.2	2.3	3.2	.2	.4
E7	76.3	1.2	1.2	86.9	2.4	2.4	10.6	1.2	1.2
E8	73.5	2.1	1.6	100.9	2.2	2.0	27.4	.1	.4
E9	93.9	1.6	1.5	87.9	2.1	2.1	6	.5	.6
E10	87.7	1.4	1.5	98.1	2.0	2.0	10.4	.6	.5

*Comp: Composite

When the pre-test, post-test and difference scores of the groups are examined as a whole in Table 4, it is seen that the difference scores are generally positive.

Table 5. Wilcoxon Signed-Row Test Results Including Pretest-Posttest Balance Measurement Difference Analyzes of the Experimental and Control Groups

	N	Rank averages	Row totals	Z	p
Experimental negative rank	0	.00	.00	-2.666	.008
Experimental positive rank	10	5.5	55		
Experimental equal	0				
Control negative rank	0	.00	.00	-2.803	.005
Control positive rank	10	5.5	55		
Control equal	0				

*p<.05

As a result of the analysis performed to determine whether there was a significant difference in the pre-test and post-test balance measurements of the groups, the difference was found to be significant in experimental (z=2.666, p<.05) with a large effect size (r=.881) and control groups (z=2.803, p<.05) with a large effect size (r=.887). It is seen that the difference scores are in favor of the posttest.

Table 6. Wilcoxon Signed-row Test Results Including Pretest-posttest Rhythm (120bpm) Measurement Difference Analysis of the Experimental and Control Groups

	N	Rank averages	Row totals	Z	p
Experimental negative rank	0	.00	.00	-2.812	.005
Experimental positive rank	10	5.5	55		
Experimental equal	0				
Control negative rank	0	.00	.00	-2.536	.011
Control positive rank	8	4.5	36		
Control equal	2				

*p<.05

As a result of the analysis performed to determine whether there was a significant difference in the pre-test and post-test rhythm (120bpm) measurements of the groups, the difference was found to be significant in experimental group (z=2.812, p<.05) with a large effect size (r=.889) and control groups (z=2.536, p<.05) with a large effect size (r=.801). It was determined that the difference scores were in favor of the posttest.

Table 7. Wilcoxon Signed-row Test Results Including Pretest-posttest Rhythm (132bpm) Measurement and Difference Analysis of the Groups

	N	Rank averages	Row totals	Z	p
Experimental negative rank	0	.00	.00	-2.829	.005
Experimental positive rank	10	5.5	55		
Experimental equal	0				
Control negative rank	3	2	6	-1.96	.05
Control positive rank	6	6.5	39		
Control equal	1				

*p<.05

As a result of the analysis performed to determine whether there was a significant difference in the pre-test and post-test rhythm (132bpm) measurements of the groups, the

difference was found to be significant in experimental group (z=2.829, p<.05) with a large effect size r=.894) and control group (z=1.96, p=.05) with a large effect size (r=.619). It was determined that the difference scores were in favor of the posttest.

Table 8. Mann Whitney-U Test Results Regarding the Difference In Pretest-Posttest Balance Measurement Between the Experimental and Control Groups

	N	Rank Averages	Row Totals	U	p
Control	10	8.5	85	30	.13
Experimental	10	12.5	125		

*p<.05

As a result of the analysis performed to determine whether there was a significant difference between the pre-test and post-test balance test difference scores of the experimental and control groups, no significant difference was found between them (U=30, z=1,512, p>.05) with a middle effect size (r=.478).

Table 9. Mann Whitney U Test Results Regarding the Difference in Pretest-posttest Rhythm (120 Bpm) Measurement Between the Experimental and Control Groups

	N	Rank Averages	Row Totals	U	p
Control	10	8.75	87.5	32.5	.181
Experimental	10	12.25	122.5		

*p<.05

Analysis results show that there is no statistically significant difference between the experimental and control groups' pre-test post-test rhythm test (120bpm) difference scores (U= 32.5, z=1.338, p>.05) with a middle effect size (r=,423).

Table 10. Mann Whitney-U Test Results Regarding the Difference in Pretest-Posttest Rhythm Measurement (132 Bpm) Between the Experimental and Control Groups

	N	Rank Averages	Row Totals	U	p
Control	10	9.6	96	41	.489
Experimental	10	11.4	114		

*p<.05

As a result of the analysis performed to determine whether there was a significant difference between the pre-test and post-test rhythm (132bpm) test difference scores of the experimental and control groups, it was found that there was no significant difference between them (U=41, z=.692, p>.05) with a middle effect size (r=.218).

DISCUSSION AND CONCLUSION

In this study, the effect of musical coordination exercises on the balance performance and rhythm skills of children receiving basic gymnastics training was investigated. Except for this study, in which balance and rhythm issues were examined together, no study was found in the related literature.

Regarding the use of music in sports, Hevner (1937) put forward for the first time the thesis that the fast-paced music listened to can affect the performance positively by stimulating the athlete due to the fast and distinct rhythms it contains. Anshel & Marisi (1978) stated that movement can improve physical endurance when it is rhythmically coordinated with a musical stimulus. Pates, Karageorghis, Fryer & Maynard (2002) stated that music improves netball shooting performances. Bigliassi, Dantas, Carneiro, Smirmaul & Altimari's (2012) study and Dyer and Mckune's (2013) study showed that music does not affect performance and psychophysiological parameters. Jones, Tiller & Karageorghis (2017) found that music listened to after exercise shortens the recovery time of athletes. Stephenson, Beddoes, Otterson & Rugen (2022) stated that they can use musical elements such as tempo (bpm) to help children reach their goals. In addition, they advocated the use of music in sports activities, arguing that the motivation of students can be increased by using music in sports. Zachopoulou, Mantis, Serbezis, Teodosiou & Papadimitriou (2000) found that children's participation in motor skills training has a positive affect on their rhythmic performance. This result shows that physical activity and rhythm skills are related to each other.

The studies of Akın and Yüksel (2016) indicate that the average balance values of children who do sports are higher than those of children who do not do sports. These results, it is possible to interpret that physical activity has an effect on the development of balance in children. Côté-Laurence (2000) found that rhythmic abilities facilitate success in ballet. Similarly according to the findings of Beyazıt et al. (2014), it is seen that gymnastics training supports the development of balance. In this study, balance improvement was observed in all of the participants who did gymnastics. In the study of Altınkök et al. (2020), it was concluded that the children who participated in the movement training program diversified by the coordination method had higher flexibility and balance basic motor capacity development than the children who participated in the standardized movement training program. According to these results, it can be said that the findings in the literature support the development of balance in this study.

From a different perspective, it can be said that the existence of studies that have determined a relationship between auditory perception and balance is a finding in the literature that (Çetin & Emük, 2018; Hatipoğlu, 2005) supports the idea of using musical exercises to improve balance in this study. In applications where rhythm and music are used in specific sports branches or physical activities, improvement in hand-eye coordination and an increase in the series technique scores specific to the gymnastics branch were observed (Atılgan, 2013). In addition, it was observed that the effect of basketball training performed with rhythm support on the layup skills caused a significant increase in the movement skills of the participants (Tanır, 2019). In Beyazıt's (2012) study, it was found that active music activities increased the development of children's body coordination. The findings of the study show that music is

effective in the development of coordination. The results of this study; supports the hypothesis that the use of music with coordination exercises will also improve some parameters. In Ölmez's (2017) study, it was determined that musical rhythm studies improve balance in taekwondo training. In this respect, the results of Ölmez's (2017) study also support the findings of this study. Since this study is a pioneer and there is no other study in the literature examining the effect of musical coordination exercises on balance and rhythm performance, it is not possible to reach a clear conclusion on this subject.

The results of this research revealed that musical coordination exercises positively affect balance and rhythm skills in children. There was a significant increase in the balance and rhythm skills of the children who participated in gymnastics exercises with or without music. There is no statistically significant difference between the difference scores of the groups; It can be interpreted that the exercises in basic gymnastics training do not have an extra effect when supported with music.

Conflict of Interest: There is no personal or financial conflict of interest within the scope of the study.

Researchers' Contribution Rate Statement: Research Design was carried out by MA and SY, Statistical analysis MA; Preparation of the article MA and SY; Data Collection SY

Information on Ethics Committee Permission

Board Name: Manisa Celal Bayar University Faculty of Medicine Health Sciences Ethics Committee

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