The European Proceedings of
Social & Behavioural Sciences
EpSBS

Future Academy

ISSN: 2357-1330

https://dx.doi.org/10.15405/epsbs.2019.02.55

ICPESK 2018
International Congress of Physical Education, Sports and Kinetotherapy. Education and Sports Science in the 21st Century, Edition dedicated to the 95th anniversary of UNEFS

THE DIFFICULTY OF EXERCISES ON UNEVEN BARS BETWEEN THE TWO MILLENNIA

Ana-Maria Gavojdea (a)*, Ionuț Corlaci (b)
*Corresponding author

(a) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania
(b) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania

Abstract

The uneven bars apparatus is part of women's gymnastics polyathlon. Over time, this apparatus has had several modifications, which have gradually led to the evolution of the execution technique, an increase in the element difficulty and learning techniques. Scientific progress is an important factor that has led to the spectacular development of uneven bars. The state-of-the-art materials used in the construction of the apparatus, the decrease in the bar radius, the change in the distance between bars and the apparatus height have encouraged the emergence of new elements, within the limits of the regulations in force. The purpose of this study is to point out the evolution of the degree of difficulty and the share of the elements used by gymnasts in the composition of exercises performed in the apparatus finals at the Olympic Games, particularly on the uneven bars apparatus. Also, we want to present the elements which women gymnasts have used over time and whether there are certain elements that, if included in exercises, provide an advantage to certain women gymnasts. The methods used are: bibliographic study, observation, videographics, as well as mathematical, graphical and tabular methods. To this purpose, we analysed the exercises of women gymnasts presented on this apparatus in the finals of the Olympic Games since 1980 up today. Judging according to the regulations, we notice that the scores granted for difficulty are constantly increasing. This makes us conclude that the difficulty of exercises performed on uneven bars is constantly increasing.

Keywords: Women's Artistic Gymnastics, uneven bars, difficulty of exercises.

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

The uneven bars apparatus is part of the women's gymnastics polyathlon. Over time, this apparatus underwent several modifications. These modifications have gradually led to an evolution of the execution technique, an increase in element difficulty and learning techniques. Scientific progress is an important factor which has led to the evolution and increase in the beauty of performance on uneven bars. The cutting-edge materials used in the construction of the apparatus, the decrease in bars' radius, and the modification of the distance between bars and the apparatus height have promoted the emergence of new elements, within the limits of the regulations in force.

In order to execute the integrals on uneven bars, the men's apparatus was used, raising one of the bars higher. In 1952, starting with the Olympic Games held in Helsinki, the uneven bars event has become an official competition, without being an alternative to another competition.

In the late 1960s, the uneven bars apparatus began to be manufactured as a separate, specific apparatus. It was designed in such a way as to allow the bars to be adjusted.

The types of elements that could be executed at that time, when the two bars were close, are circles, underswings, casts, swings, in different forms, and the positions in which the elements were made, were hang, supported, sitting and seated. Characteristic of the integrals on uneven bars is the "continuous passage from one bar to the other, with the face, with one side or with the back towards the apparatus" (Stroescu, 1962, p. 10).

Nowadays, due to the changes made to this apparatus, numerous and unusual elements can be executed, performed with different bindings, bar-leaving elements, grip changes. When performing these elements, the body can move between the bars, outside them, below or above the bars (Vieru, 1997).

In the *Code of Points* (FIG, 2017), under the Uneven Bars section, we find six groups of elements. Each group is divided into subgroups with different categories of elements.

The groups of uneven bars elements are:

- Group 1 – Mounts;
- Group 2 – Casts and clear hip circles;
- Group 3 – Giant circles;
- Group 4 – Stalder circles;
- Group 5 – Pike circles;
- Group 6 – Dismounts.

Elements are divided into subgroups according to the value of the element. These elements start from A value, 0.10 points, up to G value, 0.70 points.

A D scoring for Uneven Bars consists of 8 elements with the highest difficulty (VD), Compositional Requirements (CR) and Connection Value (CV).

2. Problem Statement

We highly recommend carrying out a scientific analysis for both the specialist and the athletes. Such analysis is aimed at evolving by increasing the complexity of exercises and introducing new elements in the exercises on uneven bars in the most important competitions, the Olympic Games. Given that this analysis is made only for exercises performed by highly-skilled top athletes who participated in the Uneven

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Bars Finals at the last ten Olympic Games. Five Olympic Games took place at the end of 2nd Millennium and the other five at the beginning of the 3rd Millennium. We consider it is interesting to see the number of items used by athletes and the groups of elements they belong to. We also mention that the elements that form the exercise presented in the contest must comply with certain regulatory requirements in order to be recognised by the panel of judges.

3. Research Questions

This analysis allows us to determine the prevalence of used elements and also which of them constitute the exercises of gymnasts on uneven bars between the two millennia.

3.1. The most used elements in the past millennium

What are the most used elements on uneven bars in the past millennium and to which groups of elements do they belong?

3.2. The most used elements in this millennium

What are the most used elements on uneven bars in this millennium and to which groups of elements do they belong?

4. Purpose of the Study

The purpose of this study is to point out the difficulty degree evolution and the share of elements used by gymnasts in the composition of exercises performed in the apparatus finals at the Olympic Games, particularly the uneven bars apparatus. We also want to show what elements have been used by gymnasts over time and whether there are elements that would deserve to be included in exercises.

5. Research Methods

The research methods used are the following: bibliographic study, observation, videographics, as well as mathematical, graphical and tabular methods. For this paper, we studied the *2017-2020 Code of Points* (FIG, 2017), watched on the YouTube website and analysed 78 exercises presented by as many gymnasts in the Olympic Games (OG) Finals on this apparatus: OG 2016, Rio de Janeiro - 8 exercises, OG 2012, London - 8, OG 2008, Beijing - 8, OG 2004, Athens - 8, OG 2000, Sydney - 8, OG 1996, Atlanta - 8, OG 1992, Barcelona - 8, OG 1988, Seoul - 8, OG 1984, Los Angeles - 8, OG 1980, Moscow – 6 (www.wikipedia.org). Following the analysis of these exercises, simple descriptive statistics were made and the results were put together in tables and represented graphically.

6. Findings

To accomplish the proposed aim, we analysed the exercises of gymnasts present in the Uneven Bars Finals at the Olympics, since 1980 to date. Exercises were analysed in terms of difficulty, according to the *Code of Points* (FIG, 2017) in force. Thus, we considered only the first 8 elements in terms of difficulty in each exercise and we compared the two elements with respect to: the percentage of elements used in each

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

group of elements, the number of elements corresponding to each difficulty value, the most used 10 items, the most valuable 10 items and the average difficulty score for each Olympic cycle.

In Table 01 and Figures 01 and 02, we present the number and percentage of elements in each group of items used by gymnasts in the exercises presented on uneven bars in the 2nd Millennium (Olympic Games 1980, 1984, 1988, 1992 and 1996) and the 3rd Millennium (Olympic Games 2004, 2008, 2012 and 2016) and the relative total.

Table 01. Number and percentage of elements in each element group

Element group	No. elements 2nd Millennium	Element percentage 2nd Millennium	No. elements 3rd Millennium	Element percentage 3rd Millennium	Total elements	Total percentage
Group 1	40	13.61%	8	2.50%	48	7.82%
Group 2	76	25.85%	18	5.63%	94	15.31%
Group 3	114	38.78%	163	50.94%	277	45.11%
Group 4	21	7.14%	64	20.00%	85	13.84%
Group 5	9	3.06%	27	8.44%	36	5.86%
Group 6	34	11.56%	40	12.50%	74	12.05%

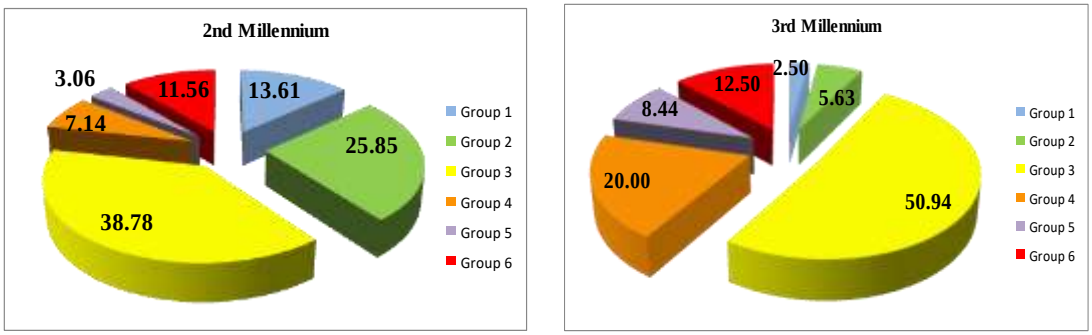

Figure 01. Percentage of elements in each group of elements used in the 2nd Millennium and 3rd Millennium

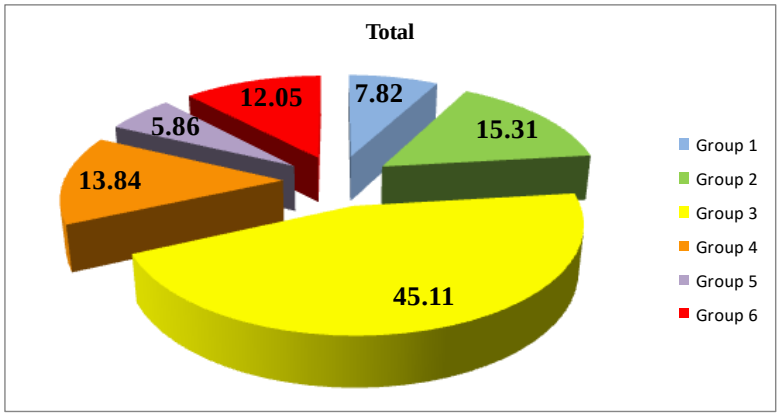

Figure 02. The percentage of elements in each group of elements used in the two millennia, in total

In Figures 03 and 04, we present the number of elements executed in exercises corresponding to each difficulty degree.

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

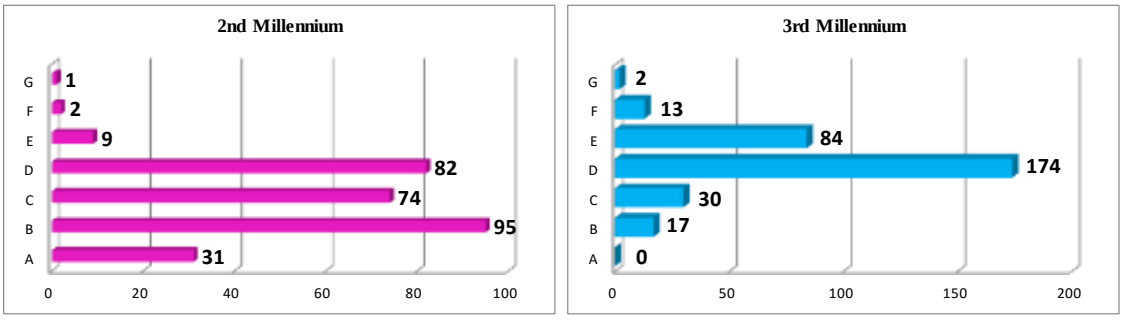

Figure 03. The number of elements executed in exercises corresponding to each difficulty degree, in each millennium

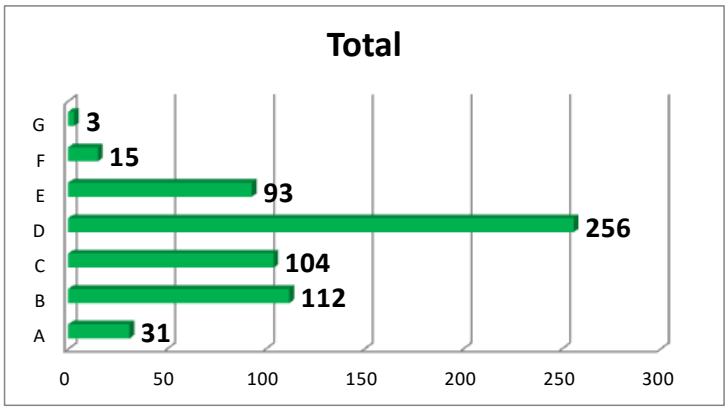

Figure 04. The number of elements executed in exercises, corresponding to each difficulty degree in the two millennia

Figures 05 and 06 show the graphs of the 10 most commonly used elements in the 2nd Millennium, the 3rd Millennium, and the total thereof in the two millennia.

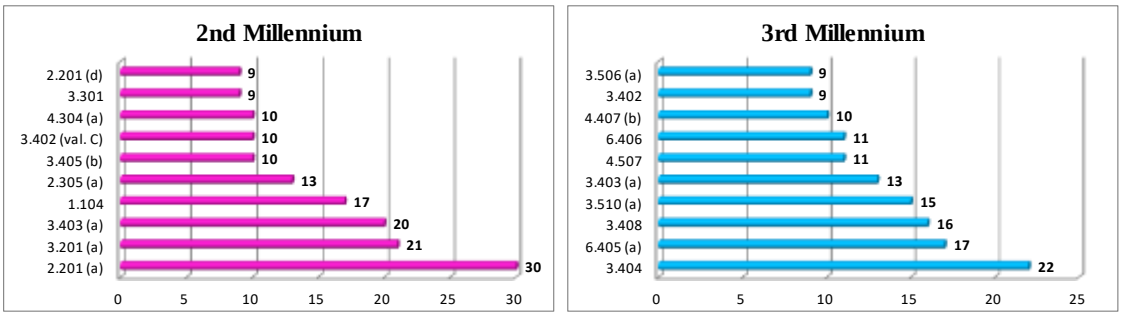

Figure 05. The most used 10 elements in the 2nd Millennium and 3rd Millennium

Note: 2nd Millennium: 2.201 (d) = Cast to handstand with legs together and hips extended; 3.301 = Giant circle backward with 360° turn to handstand; 4.304 (a) = Stalder backward to handstand; 3.402 (val. C) = Hang on high bar – Swing forward with 180° turn and flight to handstand; 3.405 (b) = Gienger Salto; 2.305 (a) = Clear hip circle to handstand; 1.104 = Jump to hang on high bar, kip to support; 3.403 (a) = Davydova (also known as Tkatchev); 3.201 (a) = Giant circle backward in regular grip; 2.201 (a) = Cast to handstand with 180° turn, legs straddled
3rd Millennium: 3.506 (a) = Giant circle forward in reverse grip to handstand with initiation of 360° turn on one arm before handstand phase; 4.407 (b) = Clear pike circle backward with 180° turn to handstand; 6.406 = Swing forward - double salto backward stretched; 4.507 = Clear pike circle backward with 360° turn to handstand; 3.510 (a) = Bi; 3.408 = Jaeger Salto straddled; 6.405 (a) = Chouchovitina-Morio; 3.404 = Pak Salto

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

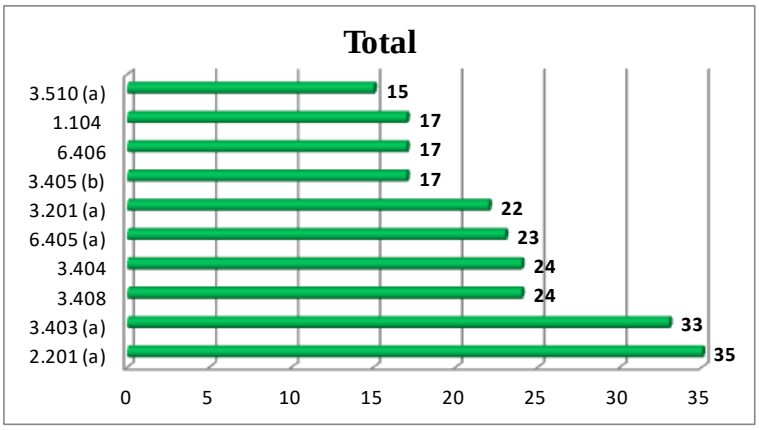

Figure 06. The most used 10 elements

Figures 07 and 08 show the most valuable 10 elements used by gymnasts in the exercises on uneven bars in the 2nd Millennium, the 3rd Millennium and throughout the entire study.

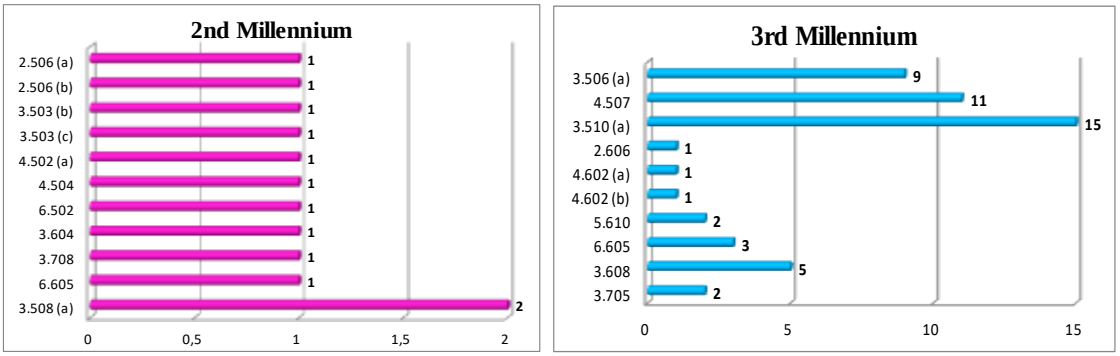

Figure 07. The most valuable 10 elements used in the 2nd Millennium and 3rd Millennium

Note: 2nd Millennium: 2.506 (a) = Hindorff; 2.506 (b) = Khorkina; 3.503 (b) = Kononenko; 3.503 (c) = Schuschunova; 4.502 (a) = Ricna; 4.504 = Chow-Khorkina; 6.502 = From high bar – clear underswing with salto forward tucked with 540° turn; 3.604 = Counter Kim; 3.708 = Mo Salto; 6.605 = Fabrichnova; 3.508 (a) = Jaeger Salto piked
3rd Millennium: 2.606 = Chunsong; 4.602 (a) = Downie; 4.602 (b) = Clear pike Circle backward with counter pike – reverse Hecht over high bar to hang; 5.610 = Tweddle; 3.608 = Cappuccitti; 3.705 = Hristakieva

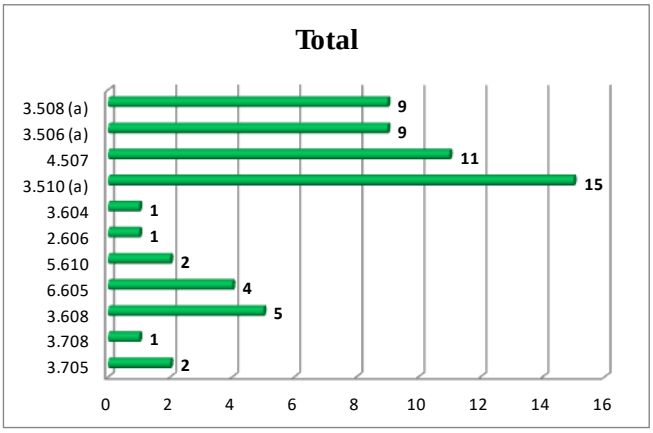

Figure 08. The most valuable 10 elements used in uneven bars exercises

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Figure 09 graphically shows the means of difficulty scores at each Olympic Games edition.

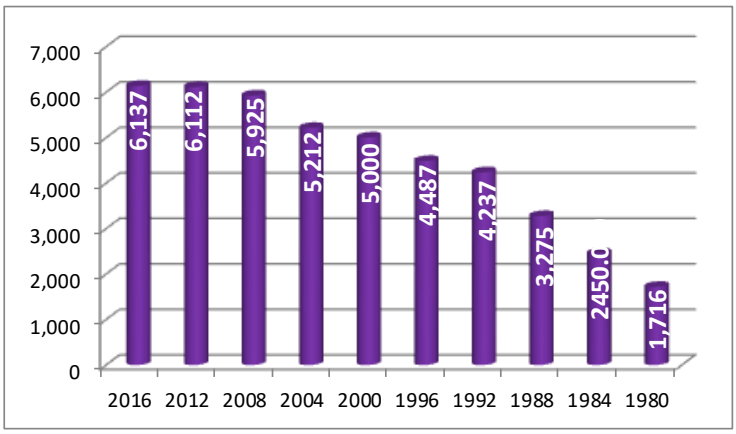

Figure 09. The mean of the difficulty score for each Olympic Games edition

7. Conclusion

The number of elements in groups 1 (Mounts) and 2 (Casts and clear hip circles) decreased in the 3rd Millennium as compared to the 2nd Millennium. The number of elements executed in the other groups increased in the 3rd Millennium.

In the 2nd Millennium several valuable elements A, B and C were executed (0.1 - 0.3 points), and in the 3rd Millennium, more difficult elements, difficulty D, E , F, G (0.4 - 0.7 points). In total, over the past two millennia, most of the elements presented were of D value (0.4 points) and the lowest of G value (0.7 points). The latter are very difficult and risky, so they are not very often performed by gymnasts.

The most used elements in the 2nd Millennium were: 1 element in group 1 (Mounts), 3 elements in group 2 (Casts and clear hip circles), 5 elements in group 3 (Giant circles) and 1 element in group 4 (Stalder circles). Also, the values of these elements were: A (1 element), B (3 elements), C (4 elements) and D (2 elements). In the 3rd Millennium, the 10 most used elements were: 6 elements in group 3 (Giant circles), 2 elements in group 4 (Stalder circles) and 2 elements in group 6 (Dismounts). The values of these elements were: D (7 elements) and E (3 elements).

In the 2nd Millennium, eight E-elements were made, two F-elements and one G-element. In the 3rd Millennium, 3 E-elements were performed, 6 F-elements and 1 G-element. Overall, in all the 10 Olympic Games editions studied, the most valuable elements were E - 4 elements, F - 5 elements and G - 2 elements.

The score received for difficulty is constantly growing. This allows us to state that the difficulty of exercises presented on uneven bars is constantly growing.

References

FIG. (2017). *2017-2020 Code of Points*: *Women's Artistic Gymnastics* (Section 11: Uneven Bars, pp. 73-106). Retrieved from http://www.fig-gymnastics.com/publicdir/rules/files/en_WAG%20CoP%202017-2020.pdf

Gymnastics at the 1980 Summer Olympics – Women's uneven bars. (2017). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_1980_Summer_Olympics_%E2%80%93_Women%27_uneven_bars#Final

Gymnastics at the 1984 Summer Olympics – Women's uneven bars. (2016). In *Wikipedia*. Retrieved from

https://dx.doi.org/10.15405/epsbs.2019.02.55
Corresponding Author: Ana-Maria Gavojdea
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

https://en.wikipedia.org/wiki/Gymnastics_at_the_1984_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 1988 Summer Olympics – Women's uneven bars. (2017). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_1988_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 1992 Summer Olympics – Women's uneven bars. (2016). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_1992_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars#Final

Gymnastics at the 1996 Summer Olympics – Women's uneven bars. (2016). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_1996_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 2000 Summer Olympics – Women's uneven bars. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_2000_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 2004 Summer Olympics – Women's uneven bars. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_2004_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 2008 Summer Olympics – Women's uneven bars. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_2008_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 2012 Summer Olympics – Women's uneven bars. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_2012_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Gymnastics at the 2016 Summer Olympics – Women's uneven bars. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/Gymnastics_at_the_2016_Summer_Olympics_%E2%80%93_Women%27s_uneven_bars

Stroescu, A. (1962). *Paralele inegale*. București: Editura Uniunii de Cultură Fizică și Sport.

Vieru, N. (1997). *Manual de gimnastică sportivă*. București: Driada.