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**Original Article**

# How people with chronic spinal cord injury deal with sport in the Republic of Slovenia

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**Abstract:**
Regular physical activity brings physical, health, social, and psychological benefits for people with physical disabilities. The purpose of this research was to determine the effects of spinal cord injury on how adults with spinal cord injury deal with sport and on their inclusion in sports in Slovenia. We were interested in the differences regarding the level of spinal cord injury, current age, age when the spinal cord injury occurred, years of disability and gender. The study relied on descriptive and causal-non-experimental methods of empirical pedagogical research. The sample consisted of 125 people (between 19 and 70 years of age) with genetic and acquired spinal cord injury. The findings indicate that the frequency of engagement in sports increases after spinal cord injury. For example, the participation in recreational sport is reduced after spinal cord injury, and the sports engagement at a competitive level is increased. The functional capabilities of an individual associated with the level of spinal cord injury have the greatest influence on dealing with sport. The results of this research suggest that to increase the inclusion of people with physical disabilities in sports in Slovenia, it is necessary to establish a systematic training system for all sports-related activities, from kindergarten teachers to teachers of classroom education, sports teachers, and trainers of various sports disciplines.
**Key words:** sport, people with disabilities, spinal cord injury, recreational level, competitive level.

## Introduction

Currently, physical inactivity is a global health issue that causes many diseases. Women, older adults, individuals from lower socio-economic backgrounds and people with disabilities are less active (World Health Organization, 2003). Regular physical activity improves general health, reduces the risk of many diseases, strengthens bones and muscles, lowers blood pressure, slows heart rate, increases lung capacity, improves immune system, balance, and coordination of movements. In addition, it improves psychophysical abilities, affects overall well-being and the quality of life. Good physical fitness is particularly important during serious health problems or disabilities because it prevents the development of new functional limitations (Fentem, 1994; Nemcek, 2016; Marincek, 1981, Sherrill, & Williams, 1996). Sport has a positive impact on the development of positive self-esteem and positive self-image, enables increased control of self-determination and social inclusion and has a positive impact on the quality of life of people with disabilities because it equips them with important lifelong knowledge and empowers them for social integration in the community (Rimmer, Braddock, & Pitetti, 1996; Sherrill, & Williams, 1996). Physical activity of people with disabilities is also limited by architectural barriers, social exclusion and the physical inactivity trend (Fentem, 1994). High quality physical education during childhood and adolescence significantly contributes to educational achievements, personality development and health of child with disabilities. This influences movement development and builds the foundation for dealing with sport in adulthood, affects social and cognitive development, prevents behavioural problems and brings others long-term benefits (Doll-Trepper, & Scoretz, 1999). Inclusive physical activities are crucial for social integration because this, on the one hand, allows the society to accept diversity and increases tolerance, and on the other hand, it provides people with disabilities a greater independence and increases their self-image (Bürgel, & Carstens, 2012; Faganel, & Tusak, 2004; Sherrill, & Williams, 1996). The introduction should be understandable to a general reader. It gives a clear statement of the purpose of the paper and provides a relevant context to support the basis for the paper and the significance of the work. The reader does not have to exhaustively review the literature.

In Slovenian primary and secondary schools, the inclusion of children with physical disabilities in sports is determined by legislation. However, often, sports infrastructure is not accessible, and the professional competence of sports personnel is frequently of poor quality and inefficient (Filipcic, 2006; Kolar, Jurak, & Kovac, 2010; Krivonog, 2013; Stiftar, 2014; Strumbelj, & Zakrajsek, 2012; Verhovnik, 2012).


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The main organization for the majority of sports for people with disabilities is the Paralympic Committee of Slovenia - Sports Federation for the Disabled of Slovenia. Research shows that in Slovenia, sports participation of people with disabilities is increasing (Strumbelj, & Zakrajsek; 2012).

In Slovenia, there is no systematic education of personnel in the field of sports for people with disabilities. Subjects that are related to sports education for people with disabilities are optional. The best knowledge of sports activities for people with disabilities is provided by special and rehabilitation pedagogues as well as by class teachers in primary school (Fidler, 2016).

The main purpose of the research was to determine the effects of spinal cord injuries (SCI) on dealing with sport and the implementation of inclusion of adults with chronic SCI in sports in Slovenia. We were interested in the differences regarding the level of SCI, current age, age when SCI occurred, years of disability and gender.

**Materials and methods**

The study relies on descriptive and causal-non-experimental methods of empirical pedagogic research. The research approach is quantitative.

The participants in this study were members of the Slovenian Paraplegic Association. At the level of the applied inferential statistics, the sample was considered to be a random sample from a hypothetical population. The hypothetical population is infinite, and it is similar to our sample. In total, 150 questionnaires were distributed, of which 125 were fully completed and valid. The sample (N = 125) includes respondents with genetic and acquired SCI, of which, 66.1% were males, and 33.9% were females.

The sample (N = 125) represents adults between 19 and 70 years of age. The average age of participants is 46.2. The maximum age of the respondent to receive SCI is 60 years of age. Some respondents had SCI from birth. Thus, the average age is 24.0. The minimum period of disability of respondents is 1 year, the maximum is 60 years, and the average is 22.8 years. The sample covers 8.7% of people with Cervical SCI C1-C4, 23.6% of respondents with Cervical SCI C5-C7, 14.2% of respondents with Thoracic SCI T1-T5, 22.0% of respondents with Thoracic SCI T6-T11, 20.5% of respondents with Lumbar SCI T12-L3, and 3.9% of respondents with SCI below L4. The sample covers the majority of respondents with paraplegia (55.9%), and few respondents with tetraplegia (19.7%), tetraparesis (13.4%), and paraparesis (11.0%).

In total, 79.5% of respondents use a manual wheelchair, 21.3% use an electric wheelchair, 15.0% use crutches or other stents, 1.6% do not need accessories for moving. Furthermore, 17.3% of respondents have a primary or lower secondary education, 20.5% have a secondary and postsecondary non-tertiary education, and 62.2% have a tertiary education. In total, 62.2% are retired, of whom 58.3% retired before SCI appearance. In addition, 24.4% of the respondents are employed, of whom 16.5% are part-time employed, and 7.9% are full-time employed. Furthermore, 7.1% of the respondents are unemployment, and 4.8% are students.

The first data were experimentally gathered using a questionnaire on a small sample (N = 8). Based on the comments, we modified the questionnaire. We tested it experimentally on a new sample (N = 10) and prepared the final form and at the final meeting in December 2014 at the end of the year. The questionnaire was answered by the members of the Paraplegic Association from all regions. The survey was conducted anonymously and voluntarily. It was carried out individually and unguided.

The questionnaire consisted of 44 questions: 3 open questions, 11 multiple-choice questions with one answer and 30 questions with three or four-point scales. The first part of the questionnaire consisted of the questions related to independent variables, the second part was linked to the factors of occupational choice of people with SCI, and the third part dealt with issues of the involvement of people with SCI in sports. This paper presents the part of the questionnaire related to the involvement of people with SCI in sports.

The questionnaire validity was confirmed by reviewing the existing literature as well as using the experimental results. Objectivity was provided using multi-choice questions with given answers and open-ended questions for which the answers are short, and by implementing data collection, which was individual and unguided. During the reading phase, we did not change anything. Thus, there was no subjective influence. Reliability was provided using detailed instructions and specific questions. The reliability of the grading scales was checked using α-Cronbach's coefficient (α = 0.800). The results showed that the grading scales of the questionnaire are sufficiently reliable.

The data were processed using the IBM SPSS Statistics (Armonk, New York, USA). Analysis of individual statements is based on the means of the five-item agreement scale (1 - I disagree, 2 - I neither agree nor disagree, 3 - I agree). Descriptive statistics (frequency distribution) and inference statistics [nonparametric statistical tests: the Kruskal-Wallis (K-W) test, the Mann-Whitney (M-W) U test, and the Wilcoxon (W) signed ranks test] were analysed.

**Results**

Table 1. Numbers (f) and structural percentages (f %) in the degree of agreement with the statements related to the people with SCI dealing with sport.

| Statement | I disagree | I neither | I agree |
|---|---|---|---|

| | | | agree nor disagree | | | |
|---|---|---|---|---|---|---|
| | **N** | **f%** | **N** | **f%** | **N** | **f%** |
| Before SCI, I dealt with sport more than after the injury. | 56 | 44.8 | 24 | 19.2 | 45 | 36.0 |
| After SCI, I deal with the same sports discipline. | 91 | 72.8 | 18 | 14.4 | 16 | 12.8 |
| Before SCI, I dealt with a recreational sport. | 27 | 21.6 | 22 | 17.6 | 76 | 60.8 |
| After SCI, I deal with a recreational sport. | 38 | 30.4 | 22 | 17.6 | 65 | 52.0 |
| Before SCI, I dealt with a competitive sport. | 73 | 58.4 | 19 | 15.2 | 33 | 26.4 |
| After SCI, I deal with a competitive sport. | 50 | 40.0 | 18 | 14.4 | 57 | 45.6 |
| I deal with sports activities together with my colleagues that also have disabilities. | 31 | 24.8 | 11 | 8.8 | 83 | 66.4 |
| I deal with sports activities together with my colleagues without any disability. | 60 | 48.0 | 18 | 14.4 | 47 | 37.6 |

Table 1 shows that 36.0% of respondents dealt with sport more before SCI than after the injury. In total, 72.8% of people changed sports discipline due to an SCI. Before SCI, more respondents dealt with recreational sport (60.8%) than after the injury (52.0%). Less respondents (26.4%) dealt with competitive sport before SCI than after the injury (45.6%). Furthermore, 66.4% of respondents deal with sports activities together with their colleagues that also have disabilities, however only 37.6% of respondents deal with sports activities with their colleagues without any disability.

Table 2. Results of the Kruskal-Wallis (K-W) test of the differences in dealing with sport before and after SCI.

| **Statement** | | **Before SCI, I dealt with sport more than after the injury.** | | **After SCI, I deal with the same sports discipline.** | |
|---|---|---|---|---|---|
| **Level of SCI** | **N** | **MR** | **K-W test** | **MR** | **K-W test** |
| C1-C4 | 10 | 65.75 | | 51.15 | |
| C5-C7 | 30 | 76.98 | | 49.07 | |
| T1-T5 | 18 | 48.50 | $\chi^2 = 14.132$ | 50.31 | $\chi^2 = 11.681$ |
| T6-T11 | 28 | 49.14 | p = 0.015 | 74.67 | p = 0.039 |
| T12-L3 | 26 | 54.90 | | 59.54 | |
| ≥ L4 | 5 | 51.90 | | 66.60 | |

The results of the Kruskal-Wallis test (table 2) show statistically significant differences in the more frequent involvement in sport before SCI than after SCI (p = 0.015). Mean ranks show that the people with SCI at the level C1-C7 dealt with sport more before SCI than the people with SCI at the thoracic and lumbar level. The results of the Kruskal-Wallis test do not indicate statistically significant differences in this according to the current age, age when SCI occurred and years of disability (p > 0.05). The results of the Mann-Whitney U test do not indicate statistically significant differences in this according to gender (p > 0.05).

The results of the Kruskal-Wallis test (table 2) show statistically significant differences in dealing with the same sports discipline before and after SCI (p = 0.039). The mean ranks show that the people with SCI at higher levels of SCI changed their sports discipline after SCI than the people with SCI at lower levels of SCI. The results of the Kruskal-Wallis test do not indicate statistically significant differences in this according to the current age, age when SCI occurred and years of disability (p > 0.05).

The results of the Mann-Whitney U test do not indicate statistically significant differences in this according to gender (p > 0.05). Sports disciplines that people with SCI are more involved in after the injury than before it are: basketball, diving, swimming, chess, shooting, sports fishing, table tennis, and to a lesser extent darts, sports dancing, and archery.

Table 3. Results of the Wilcoxon (W) signed ranks test of the differences in dealing with recreational and competitive sport before and after SCI.

| Ranks | N | MR | W test |
|---|---|---|---|
| Recreational sport after SCI < recreational sport before SCI | 43 | 35.56 | Z = -1.948 |
| Recreational sport after SCI > recreational sport before SCI | 26 | 34.08 | p = 0.051 |
| Recreational sport after SCI = recreational sport before SCI | 56 | | |
| Competitive sport after SCI < competitive sport before SCI | 27 | 43.94 | Z = -2.547 |
| Competitive sport after SCI > competitive sport before SCI | 56 | 41.06 | p = 0.011 |
| Competitive sport after SCI = competitive sport before SCI | 42 | | |

The results of the Wilcoxon signed ranks test of the differences in dealing with recreational sport before and after SCI (table 3) show statistically significant differences (p = 0.051). In our sample, the majority of people dealt with recreational sport before and after SCI. Slightly fewer people dealt with recreational sport less before SCI than after the injury. The minority of people are those who dealt with recreational sport more after SCI than before the injury.

The results of the Wilcoxon signed ranks test of the differences in dealing with competitive sport before and after SCI (table 3) show statistically significant differences (p = 0.011). In our sample, the majority of people dealt with competitive sport more after SCI than before the injury. Slightly fewer people dealt with competitive sport before and after SCI. The minority of people are those who dealt with competitive sport more before SCI than after SCI.

Table 4. Results of the Kruskal-Wallis (K-W) test of the differences in dealing with recreational and competitive sport after SCI according to the level of SCI.

| **Statement** | | **After SCI, I deal with a recreational sport.** | | **After SCI, I deal with a competitive sport.** | |
|---|---|---|---|---|---|
| **Level of SCI** | N | **MR** | **K-W test** | **MR** | **K-W test** |
| C1-C4 | 10 | 19.60 | | 37.20 | |
| C5-C7 | 30 | 46.78 | | 53.37 | |
| T1-T5 | 18 | 65.94 | $\chi^2 = 30.158$ | 75.22 | $\chi^2 = 13.822$ |
| T6-T11 | 28 | 77.41 | p = 0.000 | 53.61 | p = 0.017 |
| T12-L3 | 26 | 64.27 | | 60.81 | |
| ≥ L4 | 5 | 47.70 | | 86.10 | |

The results of the Kruskal-Wallis test (table 4) show statistically significant differences in dealing with recreational sport after SCI according to the level of SCI (p = 0.000). Mean ranks show that people with SCI in the thoracic and level T1-L3 deal with a recreational sport the most, and people with SCI at the level C1-C4 the least. The results of the Kruskal-Wallis test do not indicate statistically significant differences in this according to the current age, age when SCI occurred and years of disability (p > 0.05).

The results of the Mann-Whitney U test do not indicate statistically significant differences in this according to gender (p > 0.05). The results of the Kruskal-Wallis test show (table 4) statistically significant differences in dealing with competitive sport after SCI according to the level of SCI (p = 0.017). Mean ranks show that people with SCI lower than L4, in the area from T1-T5, deal with a competitive sport the most, and people with SCI at the level C1-C4 the least. The results of the Kruskal-Wallis test do not indicate statistically significant differences in this according to the current age, age when SCI occurred and years of disability (p > 0.05). The results of the Mann-Whitney U test do not indicate statistically significant differences in this according to gender (p > 0.05).

Table 5. Results of the Mann-Whitney U test of the differences in dealing with recreational and competitive sport after SCI according to gender.

| **Statement** | | **After SCI, I deal with a recreational sport.** | | **After SCI, I deal with a competitive sport.** | |
|---|---|---|---|---|---|
| **Gender** | **N** | **MR** | **M-W U test** | **MR** | **M-W U test** |
| Male | 83 | 65.10 | U = 1568.5 | 69.19 | U = 1229.5 |
| Female | 42 | 58.85 | p = 0.344 | 50.77 | p = 0.006 |

The results of the Mann-Whitney U test (table 5) do not indicate statistically significant differences in dealing with recreational sport after SCI according to gender (p > 0.05). However, the results indicate statistically significant differences in dealing with competitive sport after SCI according to gender (p = 0.006). More men deal with a competitive sport.

Table 6. Results of the Kruskal-Wallis (K-W) test of the differences in dealing with sports activities together with people with disabilities or people without any disability.

| **Statement** | | **I deal with sports activities... ...together with people with disabilities.** | | **...together with people without any disability.** | |
|---|---|---|---|---|---|
| **Level of SCI** | **N** | **MR** | **K-W test** | **MR** | **K-W test** |
| C1-C4 | 10 | 26.35 | | 43.10 | |
| C5-C7 | 30 | 52.60 | | 58.65 | |
| T1-T5 | 18 | 72.11 | $\chi^2 = 17.288$ | 57.36 | $\chi^2 = 4.653$ |
| T6-T11 | 28 | 68.46 | p = 0.004 | 64.98 | p = 0.460 |
| T12-L3 | 26 | 56.19 | | 61.29 | |
| ≥ L4 | 5 | 67.40 | | 43.00 | |

The results of the Kruskal-Wallis test (table 6) show statistically significant differences in dealing with sports activities with other people with disabilities according to the level of SCI (p = 0.004). Mean ranks show that people with SCI at the region T1-T11 deal with sport with other people with disabilities the most, and

people with SCI at the level C1-C4 the least. The results of the Kruskal-Wallis test do not indicate statistically significant differences in dealing with sports activities with other people without any disability according to the level of SCI ($p > 0.05$).

The results of the Kruskal-Wallis test (table 6) do not indicate statistically significant differences in dealing with sports activities together with people with disabilities or people without any disability according to the current age, age when SCI occurred and years of disability ($p > 0.05$).

The results of the Mann-Whitney U test in dealing with sports activities with people with disabilities or other people without any disability also do not indicate statistically significant differences according to gender ($p > 0.05$).

**Discussion**

The purpose of the research was to determine the effects of spinal cord injury (SCI) on dealing with sport and the implementation of inclusion of adults with SCI in sports in Slovenia. We were interested in the differences regarding the level of SCI, current age, age when SCI occurred, years of disability and gender.

Other research shows that the formation of sporting identity of an individual is most intensively influenced by the age when SCI occurred and the level of disability (Sherrill, & Williams, 1996). Likewise, the level of SCI, which is directly related to the level of disability, has been proven as a statistically significant factor in our research. Gender has been proven to be a statistically significant factor only when dealing with sports at the recreational and competitive levels.

Other independent variables (current age, age when SCI occurred, years of disability) did not appear to be statistically significant in our research in contrast with other research (Longmuir, 2000, Wu, & Williams, 2001).

Our results indicate that the frequency of sports engagement increases after SCI. For example, involvement in a recreational sport is reduced, and sports engagement at a competitive level is increased. This differs from previous research (Tasiemski, Bergström, Savic, & Gardner, 2000). We assume that the results are mainly related to the significant influence and incentives by the Paralympic Committee of Slovenia - Sports Federation for the Disabled of Slovenia. They organize numerous sports practice and competitions in various sporting disciplines for people with SCI (Fidler, 2016).

People with SCI at the cervical level deal with sport the least. We assume that the results are related to the functional capabilities of the individual and the lower autonomy possibilities of people with SCI at the higher levels (Marincek, 1981; Sherill, & Williams, 1996), poor accessibility to sports facilities (Introductory report..., 2010), especially for people with severe physical disabilities, and, furthermore, weak inclusion of children with physical disabilities in sports lessons (Filipcic, 2006; Krivonog 2013; Verhovnik, 2012; Stiftar, 2014), which, consequently, results in a lower level of social integration (Rimmer, Braddock, & Pitetti, 1996; Sherrill, & Williams, 1996). The results of our research show that the same sports discipline was retained by 12.8% of people after SCI. In reference to the level of SCI, we can anticipate possible functional capabilities and related sports that can be dealt with by people with SCI (Winnick, 2005). Among sports disciplines that people after SCI no longer participate in are mainly those sports that people with SCI cannot possibly participate in. These are football, martial arts, handball, gymnastics, running. Some people with SCI occasionally deal with sports activities such as fitness, aerobics and parachuting. There are many sports disciplines that were not organized in Slovenia during the research such as volleyball and motorsport. Thus, this is the reason why these data were not analysed.

After SCI, 52.0% of people deal with recreational sport. Most of them are the ones with SCI at the thoracic level and the least of them are with SCI at the cervical, sacral and lumbar levels. The results are most likely linked to the functional capabilities of an individual and the related (in)autonomy and (in)dependence of people with SCI. The life of people with lower levels of SCI (lumbar and sacral level) has not changed to such a large extent compared with people with SCI at higher levels. Therefore, dealing with sport has not significantly changed. These people are more independent and more often employed compared with those with SCI at higher levels. Employment is the reason they have less free time. However, at the same time, their employment already offers a certain measure of social network that an individual needs (Eliott, Uswatte, Lewis, & Palmatier, 2000; Vornholt, Uitdewilligen, & Nijhuis, 2013). Retired people with disabilities most often build this social network based on sports activities (Hannon, 2005).

Analysis of the National Programme of Sport of the Republic of Slovenia 2000-2010 (Kolar, Jurak, & Kovac, 2010) showed that, in recent years, the process of inclusion of people with disabilities into sports federations is increasing. Our research has shown that people with SCI mostly deal with sport with other people with disabilities (66.4%) and, only to a lesser extent, with people without disabilities (37.6%). The majority of people with SCI at thoracic level deal with sport together with other people with disabilities. However, our research did not indicate statistically significant differences in dealing with sports activities with other people without any disability, according to the level of SCI.

**Conclusions**

Physical education and sports is a constituent of recreation, leisure, rehabilitation and social adaptation of people with disabilities (Rudenko, Mahliovanyy, Shyyan, & Prystupa, 2015). The inclusion into sport of

people with SCI in Slovenia is difficult due to the poor accessibility to sports facilities. However, things are gradually improving in the area of suitability of construction and equipment of sports facilities. A higher level of inclusion into sports federations is also difficult because of the unsystematic training and improvement training of professional staff (Kolar, Jurak, & Kovac, 2010).

Regarding the current education system, the most appropriate solution for the fastest and most successful inclusion of children with physical disabilities in sports education is seen in the elimination of architectural obstacles at sports facilities and sports fields. Further solutions include additional training of sports pedagogues to work with people with disabilities and a much greater role of special and rehabilitation pedagogues in the field of sport.

In 2013, the Paralympic Committee of Slovenia - Sports Federation for the Disabled of Slovenia started training sports instructors and teachers to work with people with disabilities. Therefore, it is anticipated that with the increased number of professional staff in the future, the percentage of inclusion of people with disabilities into sports federations will increase (Fidler, 2016).

The implementation of inclusion in the educational system is directly related to the teacher's understanding of inclusion, his/her subjective theories, which fundamentally direct the interpretation of phenomena, situations and, above all, lead to certain expectations towards individuals and groups (Rutar, 2012). The teachers' point of view towards inclusion is influenced by their expertise in working with children with disabilities (Cagran, & Schmidt, 2011).

A review of education programs of future classroom teachers and sports pedagogues in Slovenia shows that classroom teachers gain some basic knowledge in the field of children with disabilities. However, there is no specific knowledge related to sport. At the Faculty of Sport at the University of Ljubljana, where future sports pedagogues study, sports lessons on people with disabilities are optional, and, consequently, only a certain percentage of future sports pedagogues are acquainted with these contents. Specialized and rehabilitation pedagogues are still best qualified for the children with disabilities in the field of sports (Fidler, 2016). Research shows that there are three types of personal beliefs of both future classroom teachers and future sports pedagogues in Slovenia: the inclusion of children and adolescents with movement disabilities in sports education is a positive experience for peers without movement disabilities, the inclusion means a negative experience and problems for the teacher, and the inclusion means a negative experience for children with and without movement disabilities (Kudlacek, Blankova, & Filipcic, 2007). It is necessary to include a wide range of knowledge about children, adolescents and adults with disabilities as a required subject in the education of future sports pedagogues. As long as these matters are not regulated at the system level, the education of sports pedagogues for teaching sports to people with disabilities will continue to depend only on their interest.

These results suggest that to increase the inclusion of people with physical disabilities in the field of sports in Slovenia, it is necessary to establish a systematic training system for all those involved in sport, from kindergarten teachers to teachers of classroom education, sports teachers, and trainers of various sports disciplines.

The greatest limitation of our research is attributed to the study of only those with SCI, which represent only one part of people with physical disabilities. The average age of the respondents in the survey is high, and a high percentage of participants is retired. Therefore, it would be sensible to extend the research to people with other forms of physical disabilities and to the generation of young people with physical disabilities. We assume that due to the poor professional competence of sports personnel, the inclusion of children with physical disabilities in the field of sports will remain at a low level. However, to substantiate these claims, additional research is needed.

The research will be more comprehensive if we also obtain the opinions of class teachers and sports pedagogues about the inclusion of people with physical disabilities, as well as the opinions of faculty professors who teach subjects related to sports.

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