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ROZPRAWA DOKTORSKA

mgr Agata Gorączko

Zasoby osobiste i funkcje poznawcze a jakość życia wybitnych sportowców z uszkodzeniem rdzenia kręgowego

Personal resources and cognitive function and quality of life of elite athletes with spinal cord injury

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Promotor pomocniczy: dr Alina Żurek

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Spis treści

Podziękowania

„(...) życie to największa wartość i trzeba walczyć o każdy oddech i każdą jego minutę. Losu się nie przechytrzy, ale można sprawić, by ludzie chorzy i niepełnosprawni mogli się czasem uśmiechać”.

~ Elżbieta Baniewicz, Dymna ~

Pracę dedykuję wszystkim osobom z niepełnosprawnościami, a w szczególności uczestnikom niniejszego projektu badawczego oraz moim pacjentom. Jesteście dla mnie ogromną motywacją, niesamowitym przykładem niezłomnej postawy oraz zachowywania optymizmu pomimo niesprzyjających okoliczności. My, osoby „zdrowe” możemy wiele się od Was nauczyć jak cieszyć się z każdej najmniejszej rzeczy, doceniać to co mamy oraz zaprzestać narzekać na rzeczy niemające istotnego znaczenia.

W pierwszej kolejności pragnę podziękować wspaniałemu człowiekowi dr hab. Grzegorzowi Żurkowi, prof. AWF za zachętę do podjęcia studiów doktoranckich, wspieranie w chwilach zwątpienia, wyrozumiałość, kiedy przeżywałam trudne, osobiste momenty oraz bycie mentorem nie tylko naukowym ale również życiowym. Dziękuję za ogrom poświęconego czasu oraz życzliwą atmosferę, jaka panowała podczas naszych spotkań. Równocześnie dziękuję serdecznie promotorowi pomocniczemu – Pani dr Alinie Żurek za pomoc w powstaniu części psychologicznej niniejszej rozprawy oraz liczne cenne uwagi i wskazówki.

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Wszystkim uczestnikom składam ogromne podziękowania za poświęcenie czasu i podzielenie się swoją historią. To dzięki Wam praca mogła powstać.

1. Wskazanie osiągnięć

1.1. Tytuł osiągnięcia naukowego

Jako osiągnięcie naukowe, będące podstawą złożonego wniosku o przeprowadzenie postępowania doktorskiego, wskazuję cykl publikacji naukowych, w skład których wchodzi 5 artykułów prezentujących tematykę moich badań pod wspólnym tytułem:

Zasoby osobiste i funkcje poznawcze a jakość życia wybitnych sportowców z uszkodzeniem rdzenia kręgowego.

1.2. Wykaz publikacji zawartych w osiągnięciu naukowym

Zaprezentowany cykl został przedstawiony w kolejności od publikacji najstarszej do najnowszej:

1) **Gorączko A**., Żurek G., Lachowicz M., Kujawa K., Błach W., Żurek A. Quality of life after spinal cord injury: a multiple case study examination of elite athletes. International Journal of Environmental Research and Public Health 2020: vol. 17, nr 20, art. 7437, s. 1–10. Doi:10.3390/ijerph17207437.

IF: 3.390, MEiN: 140.00

2) **Gorączko A.,** Żurek G., Lachowicz M., Żurek A. Purpose in life of elite athletes after spinal cord injury. International Journal of Environmental Research and Public Health 2021: vol. 18, nr 11, art. 5563. Doi:10.3390/ijerph18115563.

IF: 4.614, MEiN: 140,00

3) **Gorączko A.**, Żurek A., Lachowicz M., Kujawa K., Żurek G. Is self-efficacy related to the quality of life in elite athletes after spinal cord injury? International Journal of Environmental Research and Public Health 2021: vol. 18, nr 20, art. 10866, s. 1–10. Doi:10.3390/ijerph182010866.

IF: 4.614, MEiN: 140.00

4) **Gorączko A.**, Żurek A., Lachowicz M., Kujawa K., Żurek G. The relationship between cognitive performance and quality of life in elite athletes after spinal cord injury. International Journal of Environmental Research and Public Health 2022: vol. 19, nr 2, art. 948, s. 1–11. Doi: 10.3390/ijerph19020948.

IF: 4.614, MEiN: 140.00

5) Żurek G., **Gorączko A.**, Lachowicz M., Kujawa K., Żurek A. Restored life of elite athletes after spinal cord injury. International Journal of Environmental Research and Public Health 2022: vol. 19, art. 8441, s. 1–13. Doi:10.3390/ijerph19148441.

IF: 4.614, MEiN: 140.00

Współczynnik IF dla całego cyklu wynosi 21.846, natomiast sumaryczna liczba uzyskanych punktów Ministerstwa Edukacji i Nauki wynosi 700.

Poszczególne artykuły wchodzące w skład osiągnięcia naukowego zostały zamieszczone w pełnych wersjach w rozdziale **10.**

Mój wkład w przygotowanie każdego manuskryptu obejmował wizualizację projektu, opracowywanie metodologii, przeprowadzenie badań, przygotowywanie pierwotnej wersji tekstów, redakcja manuskryptów po otrzymanych recenzjach oraz tworzenie ostatecznej wersji gotowej do publikacji.

1.3. Wykaz pozostałych artykułów

Łączna wartość współczynnika IF z pozostałych artykułów wynosi 14.8333 natomiast liczba punktów Ministerstwa Edukacji i Nauki wynosi 514.

1) Kowalska J., **Gorączko A.**, Jaworska L., Szczepańska-Gieracha J. An assessment of the burden on Polish caregivers of patients with dementia: a preliminary study. American Journal of Alzheimers Disease and Other Dementias 2017: vol. 32, nr 8, s. 506–515. Archives of Physiotherapy and Global Researches 2018: vol. 22, nr 2, s. 7–16. Doi: 10.1177/1533317517734350

IF: 1.602, MEiN: 20.00

2) **Gorączko A.**, Żurek G., Kujawa K. Care of patients after spinal cord injury in the Polish and English public health system. Archives of Physiotherapy and Global Researches 2018: vol. 22, nr 2, s. 7–16. Doi: 10.15442/apgr.22.2.1

MEiN: 4.00

3) Kujawa K., Żurek G., Serweta A., Stachowicz A., **Gorączko A.,** Olejniczak R. Students and emergency medicine: what is the standard level of first aid knowledge? Medical Science Pulse 2019: vol. 13, nr 3, s. 16–21. Doi: 10.5604/01.3001.0013.4549

MEiN: 40.00

4) Kujawa K., Żurek G., **Gorączko A.**, Olejniczak R., Poniatowski Ł. Augmentative and alternative communication systems with signs and eye tracker used in Poland. The Journal of Neurological and Neurosurgical Nursing 2020: vol. 9, nr 1, s. 39–45. Doi: 10.15225/PNN.2020.9.1.6.

MEiN: 70,00

5) Kujawa K., Żurek A., **Gorączko A.,** Olejniczak R., Żurek G. Monitoring Eye Movements Depending on the Type of Visual Stimulus in Patients with Impaired Consciousness Due to Brain Damage. International Journal of Environmental Research and Public Health. 2022: vol. 19, nr 10:6280. Doi: 10.3390/ijerph19106280.

IF: 4.614, MEiN: 140.00

6) Kujawa K., Żurek A., **Gorączko A.**, Olejniczak R., Żurek G. Implementing new technologies to improve visual-spatial functions in patients with impaired consciousness. International Journal of Environmental Research and Public Health 2022: vol. 19, nr 5. Doi: 10.3390/ijerph19053081.

IF: 4.614, MEiN: 140.00

7) Kujawa K., Żurek A., **Gorączko A**., Żurek G. Application of high-tech solution for memory assessment in patients with disorders of consciousness. Frontiers in Neurology 2022: s. 303. Doi: 10.3389/fneur.2022.841095.

IF: 4.003, MEiN: 100.00

1.4. Wykaz konferencji (aktywny udział)

1) XI Interdyscyplinarna Konferencja Naukowa Tygiel „Interdyscyplinarność kluczem do rozwoju", 23–24.03.2019, Lublin. Uszkodzenie rdzenia kręgowego u wybitnych sportowców a funkcje poznawcze – studium przypadku.
2) I Międzynarodowa Konferencja Naukowa „Fizjoterapia w nauce, profilaktyce i terapii", 7–9 czerwca 2019, Gdańsk. Wybitni sportowcy i uszkodzenie rdzenia kręgowego a funkcje poznawcze – studium przypadku.

3) III Ogólnopolska Konferencja dla Młodych Naukowców „Wieczór Naukowca 2019 – Wokół Człowieka", 23–24.05.2019, Wrocław. Zasby osobiste wybitnych sportowców z uszkodzeniem rdzenia kręgowego – studium przypadku.
4) 5th International Conference on Sports, Medicine and Fitness Paryż, 14–15 listopad 2019. Zasoby osobiste wybitnych sportowców z uszkodzeniem rdzenia kręgowego.
5) Ogólnokrajowa Konferencja Interdyscyplinarna „Omnibus cz. III", Kraków 1–12 czerwca 2020 r. Zasoby osobiste wybitnych sportowców z uszkodzeniem rdzenia kręgowego – badania jakościowe.

1.5. Wykaz nagród

Wyróżnienie za najlepsze wystąpienie podczas 5th International Conference on Sports, Medicine and Fitness. Paryż, 14–15 listopad 2019. Tytuł wystąpienia: Zasoby osobiste wybitnych sportowców z uszkodzeniem rdzenia kręgowego.

1.6. Osiągnięcia pozanaukowe

Nominacja przez kapitułę do nagrody VI edycji konkursu „Młode Talenty" w kategorii: sukces w działalności społecznej, za założenie i prowadzenie fundacji „Idziemy Dla", której celem jest pomoc osobom z niepełnosprawnościami. Wrocław 2022.

2. Streszczenie

Słowa kluczowe: uszkodzenie rdzenia kręgowego, jakość życia, zasoby osobiste, funkcje poznawcze, wybitni sportowcy

Wstęp. Uszkodzenie rdzenia kręgowego niesie ze sobą szereg problemów zdrowotnych i dotyczy każdego aspektu życia: fizycznego, psychologicznego, społecznego oraz materialnego. W konsekwencji osoby z SCI charakteryzują się obniżoną jakością życia oraz występowaniem zaburzeń funkcji poznawczych. Dla osób aktywnych fizycznie, dla których sport miał również charakter zawodowy niepełnosprawność funkcjonalna stanowi jeszcze szerszy wymiar oraz niesie ze sobą konieczność całkowitej zmiany dotychczasowego życia w celu dostosowania do nowej sytuacji życiowej. Holistyczne podejście do pacjenta jest kluczowe dla skutecznego przebiegu procesu leczenia, dlatego też w pracy podjęto temat jakości życia w kontekście zasobów osobistych i funkcji poznawczych wybitnych sportowców z SCI. Poznanie doświadczeń tej unikatowej grupy osób badanych może posłużyć jako wskazówka do polepszenia jakości życia innych osób z niepełnosprawnościami.

Cel. Celem pracy była ocena zasobów osobistych, funkcji poznawczych oraz jakości życia u wybitnych sportowców, którzy doznali uszkodzenia rdzenia kręgowego w trakcie trwania kariery sportowej.

Grupa badanych. Dane zbierane były w latach 2019–2020. Zaproszenie do udziału w badaniu zostało wysłane do 32 osób. Otrzymano 16 pozytywnych odpowiedzi, jednakże 4 osoby nie odesłały zgody na udział w badaniu. Wywiadu udzieliło 12 osób, z czego 3 osoby nie odesłały kompletnego formularza on-line. Ostatecznie do badania włączono 9 uczestników (7 mężczyzn i 2 kobiety) w wieku 24–55 lat, pochodzących z Ameryki Północnej oraz Europy. Kryteria włączenia obejmowały: SCI w trakcie trwania kariery sportowej, zdobycie medalu na zawodach minimum rangi krajowej oraz wyrażenie zgody na udział w projekcie i publikację wyników.

Metody badawcze. Udział w badaniu każdego uczestnika polegał na udzieleniu wywiadu za pomocą komunikatora internetowego oraz wypełnieniu kwestionariuszy on-line. Wywiad, który przeprowadzono metodą pół ustrukturyzowaną został nagrany, transkrybowany a następnie przeanalizowany przy użyciu indukcyjnej metody analizy tematycznej

z wykorzystaniem programu Maxqda®. Na koniec rozmowy wykonano trzy testy do oceny funkcji poznawczych: COWAT mierzący płynność słowną, Digit Span badający uwagę i zakres pamięci natychmiastowej oraz Stroop Color-Word testujący zdolność do hamowania interakcji poznawczych, uwagę i elastyczność poznawczą, szybkość przetwarzania, pamięć operacyjną oraz werbalną. Każdy uczestnik otrzymał link do formularza zawierającego kwestionariusz osobowy i trzy skale badawcze oraz został poproszony o jego wypełnienie w ciągu tygodnia. Do oceny jakości życia wykorzystano skalę WHOQoL. Poczucie sensu życia zbadano przy pomocy kwestionariusza PIL. Do oceny skuteczności radzenia sobie z trudnymi sytuacjami i przeszkodami użyto GSES.

Metody statystyczne. Z uwagi na liczebność badanej grupy większość danych była analizowana w sposób jakościowy. W celu pogłębienia analizy przeprowadzono obliczenia by wyodrębnić cechy wspólne oraz korelacje.

1. Do oceny jakości życia obliczono wartości średnie ($\bar{x}$) oraz odchylenie standardowe (sd), osobno dla pytań Q1, Q2 oraz poszczególnych domen WHOQoL-BREF.
2. Do oceny poczucia własnej skuteczności obliczono wartości średnie ($\bar{x}$) oraz odchylenie standardowe (sd) skali GSES.
3. Korelację pomiędzy domenami jakości życia oraz poczuciem własnej skuteczności, a także ich związek z bólem i liczbą lat od urazu, zbadano za pomocą korelacji rang Spearmana.
4. W celu oceny funkcji poznawczych obliczono średnie ($\bar{x}$) oraz odchylenie standardowe (sd) poszczególnych testów oceniających funkcje poznawcze.
5. Do oceny zależności między QoL a funkcjami poznawczymi wykorzystano korelacje rangowe Spearmana. Następnie, w celu wykluczenia występowania fałszywych statystycznie istotnych wyników, ze względu na dużą liczbę korelacji, zastosowano korekcyjną metodę Bonferroniego.

Wyniki. Spośród wszystkich uczestników siedmiu oceniło swoją QoL pozytywnie, natomiast dwóch negatywnie. Jeden z nich wskazał na pogorszenie zdrowia w ostatnim czasie, natomiast drugi, na depresyjną osobowość jeszcze przed wypadkiem. Czterech uczestników otrzymało wynik w skali PIL wskazujący na wysokie poczucie sensu życia, w przeciwieństwie do jednej osoby o znacznie niższym rezultacie. Badani uzyskali wyższe wyniki w GSES w porównaniu z wcześniejszymi badaniami z udziałem pacjentów po urazie SCI. Analiza wyników związków między zmiennymi wykazała, że poczucie własnej

skuteczności związane było z ogólną oceną jakości życia oraz zdrowia fizycznego, jak też domeny psychologicznej i środowiskowej skali WHOQoL-Bref. Poziom odczuwanego bólu, czas od wypadku oraz poziom SCI nie miały wpływu na QoL oraz GSE. W przeprowadzonych testach uczestnicy uzyskali wyniki wskazujące na obniżenie niektórych funkcji poznawczych, jednakże badanie nie wykazało istotnie statystycznej korelacji z obniżoną QoL.

Wnioski. Pomimo SCI uczestnicy badania pozytywnie ocenili swoją jakość życia i mogą być przykładem oraz motywacją dla innych osób z niepełnosprawnościami, jako że poważny uraz nie neguje szczęśliwego i spełnionego życia. Odnalezienie sposobu na życie w zgodzie z tożsamością przed urazową oraz akceptacja niepełnosprawności sprzyja procesie adaptacji. Wdrożenie programów interwencyjnych w zakresie wsparcia poczucia własnej skuteczności oraz pracy psychologicznej nad postrzeganiem swoich ograniczeń/możliwości, jako elementów rokujących na poprawę bez względu na niepełnosprawność fizyczną, może znacznie polepszyć jakość życia pacjentów z SCI. Brak korelacji obniżonego funkcjonowania poznawczego z obniżoną jakością życia w badaniu, nie oznacza braku takiej zależności w przypadku przeprowadzenia badania z udziałem większej liczby osób badanych. Wskazuje to kierunek przyszłych badań w celu weryfikacji wyników w większej grupie osób.

3. Abstract

Key words: spinal cord injury, quality of life, personal resources, cognitive function, outstanding athletes

Background. Spinal cord injury brings with it a number of health problems and affects every aspect of life: physical, psychological, social and material. Consequently, people with SCI are characterized by a reduced quality of life and the occurrence of cognitive impairment. For physically active people for whom sports were also professional in nature, functional disability represents an even broader dimension and brings with it the need for a complete change in their previous lives to adapt to their new life situation. A holistic approach to the patient is crucial for the successful course of the treatment process, so the paper addresses the topic of quality of life in the context of personal resources and cognitive functions of

outstanding athletes with SCI. Learning about the experiences of this unique group of subjects can serve as a guide to improving the quality of life of other people with disabilities.

Aim of the study. The purpose of this study was to assess personal resources, cognitive function and quality of life in outstanding athletes who suffered spinal cord injuries during their sports careers.

Materials. Data was collected in 2019–2020. An invitation to participate in the survey was sent to 32 people. 16 positive responses were received, however, 4 people did not return their consent to participate in the study. 12 people were interviewed, 3 of whom did not return the complete online form. Finally, 9 participants (7 males and 2 females), aged 24–55, from North America and Europe were included in the study. The inclusion criteria were as follows: SCI during sports career, winning a medal at a minimum national-level competition, and consent to participate and publish results.

Methods. Each participant's participation in the study consisted of an interview via instant messaging and the completion of online questionnaires. The interview, which was conducted using a semi-structured method, was recorded, transcribed and then analyzed using an inductive thematic analysis method using Maxqda® software. At the end of the interview, three tests were administered to assess cognitive function: COWAT measuring verbal fluency, Digit Span testing attention and immediate memory span, and Stroop Color-Word testing the ability to inhibit cognitive interaction, attention and cognitive flexibility, processing speed, working memory and verbal memory. Each participant received a link to a form containing a personal questionnaire and three research scales and was asked to complete it within a week. The WHOQoL scale was used to assess quality of life. Sense of meaning in life was examined using the PIL questionnaire. The GSES was used to assess the effectiveness of coping with difficult situations and obstacles.

Statistical methods. Due to the size of the study group, most of the data was analyzed qualitatively. In order to deepen the analysis, calculations were performed to extract common features and correlations.

1. For the assessment of quality of life, mean values ($\bar{x}$) and standard deviation (sd) were calculated separately for questions Q1, Q2 and the individual domains of WHOQoL-BREF.

2. To assess self-efficacy, mean values ($\bar{x}$) and standard deviation (sd) of the GSES scale were calculated.
3. The correlation between the domains of quality of life and self-efficacy, as well as their association with pain and number of years since injury, were examined using Spearman rank correlation.
4. To assess cognitive function, the means ($\bar{x}$) and standard deviation (sd) of individual tests assessing cognitive function were calculated.
5. Spearman's rank correlations were used to assess the relationship between QoL and cognitive functions. Subsequently, the Bonferroni correction method was used to exclude the presence of false statistically significant results due to the large number of correlations.

Results. Of all participants, seven rated their QoL positively, while two rated it negatively. One indicated that his health had deteriorated recently, while the other, a depressed personality even before the accident. Four participants received a score on the PIL scale indicating a high sense of meaning in life, in contrast to one person with a much lower score. Analysis of the results of the associations between variables showed that self-efficacy was related to overall quality of life and physical health scores, as well as the psychological and environmental domains of the WHOQoL-Bref scale. The level of pain, the time since the accident and the level of SCI had no effect on QoL and GSE. In the tests conducted, participants had scores indicating a reduction in some cognitive functions, but the study did not show a significant statistical correlation with reduced QoL.

Conclusions. In spite of SCI, the study participants were positive about their quality of life and can serve as an example and motivation for other people with disabilities, as a serious injury does not negate a happy and fulfilling life. Finding a way to live in harmony with one's pre-injury identity and accepting one's disability promotes the adaptation process. Implementing self-efficacy support intervention programs and psychological work on perceiving one's limitations/capacities as elements promising improvement regardless of physical disability can significantly improve the quality of life of SCI patients. The lack of correlation of reduced cognitive functioning with reduced quality of life in the study, does not imply the absence of such a correlation when a study with a larger number of subjects is conducted. This points the direction of future studies to verify the results in a larger group of subjects.

4. Wykaz stosowanych skrótów i pojęć obcojęzycznych użytych w pracy

Przyjęto zasadę o zastosowaniu skrótów w języku angielskim z uwagi na oryginalny tekst w jakim zostały napisane artykuły z osiągnięcia naukowego.

C – Szyjny (ang. *Cervical*)

CD – Zaburzenia Funkcji Poznawczych (ang. *Cognitive Disorders*)

GSE – Poczucie Własnej Skuteczności (ang. *General Self-Efficacy)*

GSES – Uogólniona Skala Poczucia Własnej Skuteczności (ang. *General Self-Efficacy Scale*)

L – Lędźwiowy (ang. *Lumbar*)

P – Uczestnik (ang. *Participant*)

QoL – Jakość Życia (ang. *Quality of Life*)

Th – Piersiowy (ang. *Thoracic*)

SCI – Uszkodzenie Rdzenia Kręgowego (ang. *Spinal Cord Injury*)

Whiplash – Uraz smagnięcia biczem (Uraz wyprostny odcinka szyjnego kręgosłupa)

5. Wprowadzenie do problematyki jakości życia, funkcji poznawczych i zasobów osobistych u osób z uszkodzeniem rdzenia kręgowego

5.1. Epidemiologia

Uszkodzenie rdzenia kręgowego jest poważnym urazem neurologicznym, mającym znaczący wpływ na zachorowalność oraz śmiertelność, a ze względu na długotrwałe, złożone i kosztowne leczenie stanowi istotne obciążenie systemów opieki zdrowotnej (Barbiellini Amidei i wsp. 2022). Ponadto SCI jest jednym z głównych przyczyn niepełnosprawności dotykającym zwłaszcza osoby młode, co przynosi znaczne konsekwencje ekonomiczne (Middleton i wsp. 2012). SCI może być spowodowane urazem (84%) lub innymi przyczynami nieurazowymi (18%). Urazowe SCI powstaje najczęściej w wyniku wypadków drogowych – 38%, upadków – 30,5%, przemocy fizycznej – 13,5% oraz uprawiania sportu – 9% (Barbiellini Amidei i wsp. 2022; NSCISC 2021). Przypadki nieurazowego SCI są spowodowane infekcjami bakteryjnymi i wirusowymi, nowotworami, chorobami zwyrodnieniowymi kręgosłupa oraz wadami wrodzonymi (Quadri i wsp. 2020).

Każdego roku przybywa od 250 do 500 tysięcy nowych przypadków SCI (Barbiellini Amidei i wsp. 2022; Quadri i wsp. 2020). Szacuje się, że na świecie żyje 2–3 miliony osób z niepełnosprawnością spowodowaną przez SCI (Quadri i wsp. 2020). Mężczyźni doznają SCI od dwóch do pięciu razy częściej niż kobiety, z największą częstotliwością przypadającą na wiek 18–35 lat (Ding i wsp. 2022; Quadri i wsp. 2020).

Uprawianie sportu, zwłaszcza wyczynowego niesie ze sobą wysokie ryzyko SCI, jednakże nieliczne badania opisują epidemiologię SCI wśród sportowców (Chan i wsp. 2016). W badaniu Chan i wsp. (2016) zidentyfikowano 6 krajów z najwyższym odsetkiem SCI spowodowanym przez sport: Rosja (32,9%), Fidżi (32,0%), Nowa Zelandia (20,0%), Islandia (18,8%), Francja (15,8%) oraz Kanada (13,1%) (Chan i wsp. 2016). Sporty o najwyższym ryzyku SCI to hokej, narciarstwo, nurkowanie oraz futbol amerykański, które powodują prawie wyłącznie uszkodzenia w odcinku C oraz jazda konna i snowboard, które odpowiadają głównie za urazy w odcinku Th oraz L (Chan i wsp. 2016).

5.2. Uszkodzenie rdzenia kręgowego i jego następstwa

Pierwotne SCI powstaje w wyniku złamania i przemieszczenia odłamów kostnych oraz rozerwania więzadeł kręgosłupa (Anjum i wsp. 2020; Dubendorf 1999). Dochodzi wtedy do zniszczenia miąższu nerwowego, przerwania sieci aksonalnej oraz krwotoku (Anjum i wsp. 2020). Uszkodzenie wtórne jest inicjowane bezpośrednio po urazie i jest związane z aktywacją biochemicznych, mechanicznych i fizjologicznych zmian w obrębie tkanek nerwowych (Dubendorf 1999).

Głównymi konsekwencjami w zależności od poziomu SCI są: przeważnie nieodwracalna utrata funkcji motorycznych, sensorycznych, zaburzenia związane z podstawowymi funkcjami układu moczowo-płciowego, pokarmowego, oddechowego oraz krążeniowego (Andresen i wsp. 2016; Liem i wsp. 2004). W dalszym etapie pacjenci po urazie kręgosłupa zmagają się z powikłaniami wynikającymi z SCI takimi jak: przewlekły ból neuropatyczny (60–75% osób) spastyczność (68–71%), zakażenia układu moczowego (38%), zaparcia (48%), biegunki (42%), odleżyny (39%), dysrefleksja autonomiczna występującą u 48–60% osób z SCI powyżej poziomu Th6 (Andresen i wsp. 2016; Anjum i wsp. 2020; Barker i wsp. 2009; Finnerup i wsp. 2016; Hennessey i wsp. 2019; Liem i wsp. 2004; Jörgensen i wsp. 2017). Ponadto ograniczona aktywność fizyczna lub jej brak powoduje znaczny wzrost ryzyka występowania zapalenia płuc oraz chorób układu krążenia, w tym m.in. choroby zakrzepowo-zatorowej (Liem i wsp. 2004).

Większość osób z SCI musi zrezygnować z dotychczasowej aktywności zawodowej, a ponadto stają się całkowicie zależni od swojej rodziny oraz pomocy zapewnianej ze strony służby zdrowia, co prowadzi również do pogorszenia sytuacji materialnej (Beauregard i wsp. 2012). Bariery architektoniczne oraz zły stan zdrowia zarówno fizyczny jak i psychiczny powodują izolację społeczną oraz nasilenie problemów na tle psychologicznym. Wszystkie powyższe czynniki wpływają znacznie na obniżenie jakości życia u osób z SCI (Andresen i wsp. 2016). Dla osób aktywnych fizycznie, dla których sport miał również wymiar zawodowy niepełnosprawność funkcjonalna stanowi jeszcze szerszy wymiar i niesie za sobą konieczność całkowitej zmiany dotychczasowego życia. Doświadczenie urazu, w wyniku którego sportowiec kończy karierę, powoduje dodatkowo negatywny wpływ na zdrowie psychospołeczne (Moore i wsp. 2022).

5.3. Jakość życia u osób z uszkodzeniem rdzenia kręgowego

QoL jest definiowana przez Światową Organizację Zdrowia jako postrzeganie przez jednostkę jej pozycji w życiu w kontekście kultury i systemów wartości, w których żyje oraz w odniesieniu do jej celów, oczekiwań, standardów oraz obaw (WHO, 1998). Na QoL wpływa w złożony sposób zdrowie fizyczne, psychiczne, relacje społeczne jak i relacje środowiskowe oraz osobiste przekonania (Cieślik, Podbielska 2015; Chatzilelecas i wsp. 2015). Liczne badania sugerują, że osoby z SCI oceniają swój stan fizyczny, psychiczny jak i społeczny gorzej niż osoby pełnosprawne oraz charakteryzują się obniżoną QoL (Andresen i wsp. 2016; Boakye i wsp. 2012; Dijkers 2004; Hearn, Cross 2020). Wskaźnik samobójstw pośród osób z SCI jest około pięć razy wyższy niż w ogólnej populacji (Dijkers 2004). Satysfakcja z życia, będąca głównym elementem QoL, zmienia się wraz z upływem czasu od urazu. Jest to ściśle związane z otrzymywanym wsparciem społecznym (Byra 2011). Czynnikami najbardziej determinującymi QoL są: zdolności poznawcze oraz cechy osobowości jednostki (Byra 2011).

Istnieją liczne badania na temat korzyści zdrowotnych, społecznych i psychologicznych a tym samym poprawy QoL, wynikającej z aktywności fizycznej podejmowanej przez osoby z SCI (Badenhorst i wsp. 2018; McVeigh i wsp. 2009). Ponadto wyniki sugerują, iż zawodnicy rywalizujący na wyższym poziomie prezentują wyższe postrzeganie QoL (Ciampolini i wsp. 2017). Jednakże badania dotyczące sportowców, którzy doznali SCI w wyniku uprawiania sportu były podejmowane niezwykle rzadko (Badenhorst i wsp. 2018; Smith, Sparkes 2005). Przedmiotem badania Smith i Sparkes (2005) była nadzieja w życiu czternastu mężczyzn, którzy doznali SCI podczas gry w rugby (Smith, Sparkes 2005). Większość z nich pokładała nadzieję wyłącznie w wyzdrowieniu, koncentrując całe swoje życie na dążeniu do odzyskania sprawności funkcjonalnej. W badaniu Badenhorst (2018) 90 byłych zawodników rugby, którzy doznali SCI podczas uprawiania sportu ocenili swoją QoL wyżej w porównaniu z osobami z SCI niezaangażowanymi w sport (Badenhorst i wsp. 2018).

5.4. Funkcje poznawcze u osób z uszkodzeniem rdzenia kręgowego

Funkcjonowanie poznawcze oznacza między innymi zdolność osoby do przetwarzania myśli, co obejmuje takie obszary jak pamięć, zdolność do uczenia się nowych informacji, mowy i komunikacji (Davidoff i wsp. 1992). Szlak przetwarzania informacji obejmuje kolejno percepcję bodźca, selektywną uwagę, pamięć operacyjną oraz funkcje wykonawcze (Jegede i wsp. 2010). Uprawianie sportu na wysokim poziomie wymaga, oprócz wyjątkowych możliwości fizjologicznych, również wybitnych zdolności w zakresie funkcjonowania poznawczego (Scharfen, Memmert 2019a, 2019b).

Występowanie zaburzeń funkcji poznawczych u osób dorosłych z SCI szacuje się na około 30 do 60% (Chiaravalloti i wsp. 2020; Craig i wsp. 2017). Tak duża rozbieżność wynika z różnic w definiowaniu deficytów kognitywnych oraz różnorodności procedur używanych do oceny i pomiarów funkcji poznawczych (Davidoff i wsp. 1992). U pacjentów z SCI zaburzeniu ulegają takie obszary kognitywne jak szybkość przetwarzania, pamięć nowego uczenia się i funkcjonowanie wykonawcze (Dowler i wsp. 1997; Molina i wsp. 2018).

Istnieje kilka potencjalnych przyczyn powodujących CD u osób z SCI, których częstość występowania jest 13 razy wyższa w porównaniu z osobami bez takiego urazu (Chiaravalloti i wsp. 2020). Często SCI współtowarzyszy uraz mózgu lub/i uraz wyprostny odcinka szyjnego kręgosłupa, które prowadzą do zaburzeń w funkcjonowaniu mózgu (Chiaravalloti i wsp. 2020; North 1999). Osoby z tetraplegią powszechnie mają problemy oddechowe podczas snu, a anoksja spowodowana obturacyjnymi bezdechami sennymi lub spłyceniem oddechów prowadzi do redukcji funkcji poznawczych (Bonekat i wsp. 1990). Koncentracja, uwaga słowna, krótkotrwała i długotrwała pamięć oraz elastyczność poznawcza mogą ulec obniżeniu na skutek spadku saturacji w nocy (Sajkov i wsp. 1998). Trudny do leczenia, przewlekły ból neuropatyczny powoduje spadek gęstości tkanki nerwowej w korze mózgowej, która odpowiada za percepcję bólu (ubytek około 0,5% rocznie), spadek przepływu mózgowego w wzgórzu i jądrach podstawy, co klinicznie objawia się zmianami w zachowaniu oraz upośledzeniem funkcji kognitywnych (Domżał 2008; Hadjipavlou i wsp. 2016). Zażywane znaczne ilości leków antyspastycznych, przeciwbólowych, usypiających oraz antydepresyjnych również ingeruje w funkcjonowanie poznawcze (Elliott, Frank 1996; North 1999). Depresja dotykająca 33% osób z SCI ogranicza wpływ somatosensoryczny, a tym samym redukuje korowe pobudzenie i wydajność poznawczą (Davidoff i wsp. 1992; Elliott, Frank 1996).

CD pojawiają się w ciągu pierwszych dwóch tygodni z SCI i z czasem ulegają pogłębieniu, co wpływać może na zaburzenie pierwszego, najbardziej intensywnego etapu rehabilitacji

oraz na jakość życia jednostki i jej integracje społeczną (Molina i wsp. 2018; Pasipanodya i wsp. 2021). Pomimo licznych prac dotyczących związku pomiędzy QoL a obniżeniem funkcji kognitywnych w różnych jednostkach chorobowych, przegląd piśmiennictwa pokazuje, że brakuje badań na temat związku pomiędzy jakością życia a zaburzeniami poznawczymi u osób z SCI (Buanes i wsp. 2015; Correa, Hess 2012; Lanzillo i wsp. 2016; Tognini i wsp. 2014; Ueoka i wsp. 2011; Wang i wsp. 2016).

5.5. Zasoby osobiste u wybitnych sportowców

Zasoby osobiste są definiowane przez Moosa i Schaefera jako złożony układ czynników osobowościowych, dyspozycyjnych i poznawczych, które determinują psychologiczny kontekst radzenia sobie (Moos, Schaefer 1993). Natomiast radzenie sobie określane jest jako czynniki osobowe (wewnętrzne) i społeczne (zewnętrzne), które mają wpływ na sposób, w jaki osoba stara się opanować sytuacje kryzysowe oraz stresowe (Moos, Schaefer 1993). Czynniki zewnętrzne to szeroko pojęte wsparcie społeczne, dotyczące obszarów: emocjonalnego, informacyjnego, instrumentalnego oraz duchowego (Glanz i wsp. 2008). Kontakt z ludźmi oraz poczucie przynależności do grupy pomaga osobie zaspokajać potrzeby w trudnych dla niej sytuacjach (Glanz i wsp. 2008). Do zasobów wewnętrznych, które określają przekonania i oczekiwania jednostki należą między innymi: poczucie własnej skuteczności oraz wartości, uogólniona wiara w siebie, optymizm, nadzieja, poczucie kontroli osobistej nad stresującymi wydarzeniami, samoakceptacja, poczucie koherencji, samoakceptacja i pozytywna samoocena oraz poczucie sensu życia (Livneh, Martz 2014; Poprawa 1996).

W rywalizacji sportowej do osiągnięcia sukcesów konieczne jest posiadanie przez zawodnika odpowiednich cech psychologicznych oraz umysłowych takich jak: odpowiedni poziom samomotywacji, samoświadomości oraz samokontroli (Sklett i wsp. 2018). Keer i Mckenzie (2012) w swoich badaniach wyodrębnili motywy uczestnictwa w sportach ekstremalnych: osiąganie celów, podejmowanie ryzyka, motywacja społeczna, przekraczanie granic osobistych oraz pokonywanie strachu (Kerr, Houge Mackenzie 2012). Wyniki badań Widyastuti i Dimyati sugerują, że zawodnicy karate charakteryzuje szybkie myślenie, siła bojowa, motywacja, inteligencja praktyczna, nieustępliwość, poświęcenie, kontrola i zdolność samokontroli oraz kreatywność (Widyastuti, Dimyati 2019). Sklett i wsp. (2018) stwierdzili, że czynniki psychologiczne, które regulują stany emocjonalne, strategie radzenia sobie,

konstruktywne myślenie oraz motywacja mogą mieć istotne znaczenie dla wyników skoczków narciarskich w Pucharze Świata (Sklett i wsp. 2018). Ponadto wyniki badań wykazały, że ogólna klasyfikacja w Pucharze Świata była związana z poczuciem własnej skuteczności (Sklett i wsp. 2018). W badaniach Gotwals i Wayment (2002) zawodnicy o wyższym poczuciu wartości osiągali lepsze wyniki sportowe (Gotwals, Wayment 2002).

Przytoczone badania sugerują, że osoby o wysokich osiągnięciach sportowych posiadają duże zasoby osobiste. W niniejszej pracy podjęto zagadnienie, w jaki sposób zasoby osobiste, dzięki którym wybitni sportowcy zdobyli wysokie wyniki sportowe, pozwoliły poradzić sobie z tak trudną sytuacją życiową jak SCI oraz w jaki sposób wybrane składowe zasobów osobistych (poczucie własnej skuteczności oraz poczucie sensu życia) wpływają na jakość życia. Temat ten jest niezwykle ważny w obecnym modelu holistycznego podejścia do pacjenta, w którym w procesie zdrowienia rozpatrywany jest każdy aspekt zdrowia: zarówno fizyczny, psychologiczny jak i społeczny (Mills 2017). Wielodyscyplinarne podejście pracowników służby zdrowia do pacjenta jest kluczowe w celu skutecznego przebiegu procesu leczenia (Kumthornthip i wsp. 2002). Ponadto prezentowane badania są pierwszymi z uczestnictwem wybitnych zawodników, którzy doświadczyli SCI podczas trwania kariery sportowej.

6. Cel projektu

Celem zadania badawczego było wyjaśnienie zależności między zasobami osobistymi i funkcjami poznawczymi a jakością życia sportowców, którzy w wyniku urazu rdzenia kręgowego zakończyli karierę sportową.

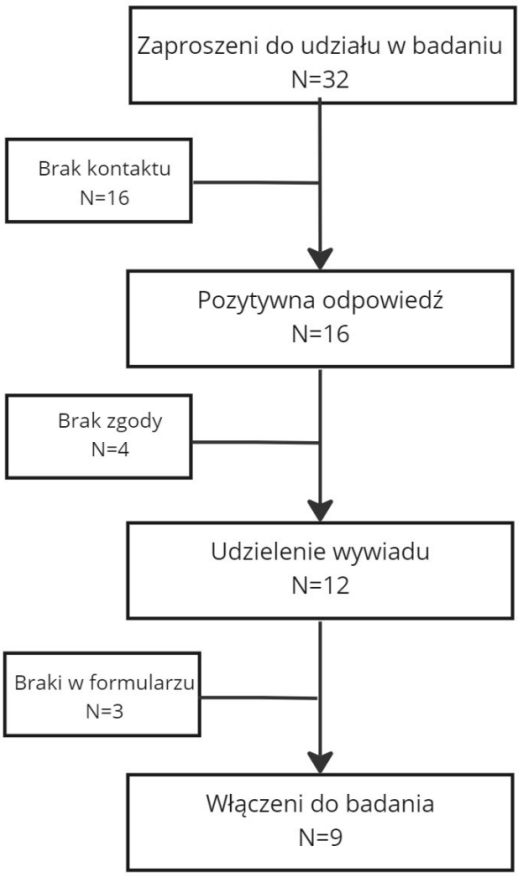
Dla zrealizowania projektu badawczego postawiono następujące pytania badawcze:

1) Jaka jest jakość życia, poczucie własnej skuteczności oraz poczucie sensu życia badanych w konieczności odnalezienia się ich w świecie osób niepełnosprawnych?
2) Czy występują, a jeśli tak to w jakim stopniu, zaburzenia funkcji poznawczych wśród uczestników projektu?
3) Czy i w jaki sposób byli sportowcy podejmują zadania życiowe i działania społeczne po wystąpieniu uszkodzenia rdzenia kręgowego? Jakie przyjmują strategie radzenia sobie z silnym stresem?
4) Gdzie znajdują źródło motywacji i siły do życia byli wybitni sportowcy, kończący dotychczasową karierę na skutek urazu rdzenia kręgowego?

7. Grupa badanych i metody badawcze

7.1. Charakterystyka grupy badanej

Na podstawie dostępnych źródeł internetowych dokonano analizy występowania uszkodzenia rdzenia kręgowego wśród grupy wybitnych sportowców. Zaproszenie do udziału w badaniu zostało wysłane poprzez e-mail do 32 osób, spełniających założone kryteria, z następujących krajów: Australia, Japonia, Austria, Polska, Wielka Brytania, Republika Południowej Afryki, Stany Zjednoczone, Kanada oraz Brazylia. 16 osób odpowiedziało pozytywnie na zaproszenie, jednakże 4 osoby nie odesłały zgody na udział w badaniu. Wywiadu udzieliło 12 osób, natomiast ostatecznie włączono do badania 9 osób, które również odesłały kompletny formularz on-line. Proces rekrutacji uczestników został przedstawiony na rycinie 1.



Rycina 1. Diagram rekrutacji osób badanych

Dane, które zostały wykorzystane do przygotowania zbioru publikacji zostały zebrane w latach 2019–2020. Przyjęto następujące kryteria włączenia do projektu:

- SCI (tetraplegia lub paraplegia) w trakcie trwania kariery sportowej,
- zdobycie medalu na zawodach rangi minimum krajowej,
- zgoda pacjenta na udział w badaniu oraz wykorzystanie wyników w publikacjach naukowych z uwzględnieniem faktu, iż pewne informacje mogą pozwolić na identyfikację osoby badanej,
- posługiwanie się językiem angielskim lub polskim w stopniu komunikatywnym.

Projekt badania został zatwierdzony przez Senacką Komisję ds. Etyki Badań Naukowych przy Akademii Wychowania Fizycznego we Wrocławiu (zgoda nr 37/2018, art. 27, Dz.U. 1997, poz. 553, 10.12.2018).

Uczestnikom badania został przesłany na adres e-mail formularz zgody, który zawierał cel, opis przebiegu badania oraz zasady etyczne. Z powodu braku możliwości funkcjonalnych na złożenie podpisu przez wszystkich uczestników, dla ujednolicenia procedury zgoda na udział w badaniu oraz publikację wyników, wraz z potencjalną możliwością identyfikacji ich osoby, została uzyskana w sposób werbalny na początku wywiadu.

Pierwszy uczestnik (P1) to 40 letni były zawodnik skoków na rowerze BMX, pochodzący z Wielkiej Brytanii. Treningi rozpoczął, gdy miał 3 lata, a już w wieku 5 lat wygrał pierwsze zawody narodowe stając się mistrzem juniorów w wyścigach na rowerze BMX w Wielkiej Brytanii. W tym samym wieku startując na zawodach międzynarodowych zajął 8 miejsce na świecie. Kolejny sukces na arenie międzynarodowej osiągnął w wieku 16 lat, zdobywając 4 miejsce. W tym samym roku zaczął przekwalifikowywać się z wyścigów na skoki na rowerze BMX i w celu doskonalenie w tej dyscyplinie przeprowadził się do Kalifornii. W swojej karierze został trzy razy mistrzem świata na największych imprezach sportowych X-Games oraz Gravity Games. W wieku 27 lat w trakcie zawodów w ostatniej rundzie podczas wykonywania autorskiej figury (podwójne salto w tył), stracił panowanie nad swoim ciałem. W wyniku upadku doznał SCI w odcinku C3/4, co spowodowało porażenie czterokończynowe. Dzięki intensywnej rehabilitacji, P1 zaczął samodzielnie oddychać i został odłączony od respiratora. Do dziś porusza się na wózku inwalidzkim, którym steruje głową za pomocą czujników umieszczonych na zagłówku. Z powodu braku możliwości funkcjonalnych nie uprawia sportu, jednakże uczestniczy w treningach na rowerze BMX swoich synów, utrzymuje kontakt z środowiskiem sportowym oraz udziela mów motywacyjnych dla zawodników różnych dyscyplin.

Drugi uczestnik (P2) to 28 letni były skoczek narciarski z Austrii, który zaczął trenować w wieku 12 lat. Bardzo szybko startował z coraz wyższych skoczni i po 5 miesiącach wykonał skok na obiekcie o punkcie konstrukcyjnym K = 84 m. W wieku 17 lat został podwójnym mistrzem świata juniorów. W tym samym okresie uzyskał 6 miejsce w Turnieju Czterech Skoczni w Austrii oraz po raz pierwszy wziął udział w zawodach na skoczni mamuciej rozpoczynając loty narciarskie. Na początku 2010 roku miał pierwszy wypadek, podczas którego nie doznał poważnych obrażeń. Trzy lata później kolejny upadek spowodował złamanie kości obojczyka w czterech miejscach. Podczas trzeciego upadku w 2013 roku P2 uszkodził rdzeń kręgowy na poziomie C6/7, w wyniku czego doznał paraliżu czterokończynowego. Dzięki intensywnej rehabilitacji porusza się na wózku aktywnym za pomocą kończyn górnych oraz jest w stanie przejść kilka metrów posługując się dwoma kulami. Obecnie pracuje zawodowo jako doradca finansowy. Jednocześnie zdobywa uprawienia trenera skoczków narciarskich. Prowadzi również działalność w celu pokonywania barier architektonicznych i dostosowania miejsc publicznych dla osób niepełnosprawnych. Wygłasza także mowy motywacyjne dla różnych środowisk takich jak uczniowie szkół, biznesmeni, sportowcy oraz jest ambasadorem w fundacji „Wings for Life", która wspiera przełomowe badania mające na celu wynalezienie metody leczenia urazów rdzenia kręgowego. Po wypadku P2 zaczął trenować rugby na wózku oraz narciarstwo alpejskie osób niepełnosprawnych.

Trzeci uczestnik (P3) to 23 letnia była zawodniczka karate, narodowości polskiej. Treningi rozpoczęła w wieku 13 lat i w ciągu pięcioletniej kariery wygrała mistrzostwa Polski oraz drużynowe mistrzostwa Europy, zdobywając czarny pas oraz łącznie 45 medali na zawodach różnych szczebli. W wieku 17 lat na obozie sportowym podczas konkurencji przejścia na linie doznała upadku z wysokości pierwszego piętra (około 4metrów), w wyniku czego doszło do SCI w odcinku Th11/12 i w konsekwencji do paraplegii. Ukończyła studia na Uniwersytecie Medycznym na kierunku techniki dentystyczne. Po wypadku odczuwała duży brak sportu i szukała dyscypliny, jaką mogłaby uprawiać. Rozpoczęła treningi tańca towarzyskiego na wózku oraz pływania. W drugiej dyscyplinie mocno się rozwinęła i zdobyła brązowy medal na mistrzostwach Polski. Ponadto udziela się w różnych wydarzeniach sportowych oraz pracuje w Fundacji Aktywnej Rehabilitacji jako instruktorka jazdy na wózku. Pisze także artykuły o stereotypach na temat osób z niepełnosprawnościami, w których dąży do tego by pokazać, że osoby poruszające się na wózku potrzebują normalności, czułości i przebywania z innymi osobami w społeczeństwie. W 2016 roku została wicemiss Polski na wózku, natomiast w 2022 roku zdobyła tytuł II Wicemiss Świata wśród kobiet jeżdżących na wózku.

Czwarty uczestnik (P4) to 37 letni były zawodnik rugby, pochodzący z Wielkiej Brytanii. Treningi rozpoczął w wieku 5 lat, 7 lat później dołączył do drużyny Syston Rugby Football Club, a następnie od 14 roku życia grał z zawodnikami w drużynie Leicester Tigers, która była jedną z najlepszych drużyn w Europie w tamtym czasie. Drużyna czterokrotnie w latach 1999–2002 wygrała profesjonalne zawody rugby – Premiership Rugby, które są uważane za jedną z trzech profesjonalnych lig na najwyższym poziomie na półkuli północnej. W wieku 21 lat, w 2005 roku podczas wznawiania gry w młynie, doznał SCI w odcinku C4/5 i w konsekwencji porażenia czterokończynowego. Z powodu wysokiego SCI, P4 korzysta z respiratora do wspomagania oddechu a brak możliwości funkcjonalnych uniemożliwia mu podjęcie aktywności sportowej. W 2011 roku założył fundację, która wspiera sportowców doznających SCI z całego świata. P4 udziela się jako trener dla drużyny rugby na wózku Leicester Tigers. W wybudowanym przez fundacje centrum odbywają się zajęcia rehabilitacyjne oraz zajęcia mające na celu wsparcie psychologiczne.

Piąty uczestnik (P5) to 45 letnia kanadyjka, była zawodniczka kolarstwa górskiego. W dzieciństwie trenowała różne dyscypliny sportowe takie jak koszykówka, softball, wyścigi Motocrossu Rowerowego (BMX). W szkole wyższej kontynuowała treningi koszykówki, a jej drużyna wygrała mistrzostwa narodowe. W wieku 17 lat rozpoczęła trenować wyścigi na rowerze górskim (MTB – Mountain Bike), a z czasem zajęła się tą dyscypliną w pełnym wymiarze czasowym. W wieku 23 lat została mistrzynią świata na zawodach Winter Extreme Games. Swoją karierę kontynuowała przez kolejne 7 lat i w tym czasie łącznie zdobyła 14 medali na zawodach narodowych oraz międzynarodowych. Podczas zawodów w 2007 roku, które były przedostatnimi przed planowanym zakończeniem wyścigów na rowerze górskim, miała wypadek, w wyniku którego doznała SCI na poziomie TH12/L1. Po intensywnym czasie rehabilitacji i zmaganiu z depresją rozpoczęła trenować tenis na wózku, co ponownie nadało jej życiu sens. Zajęła się tą dyscypliną sportową w pełnym wymiarze czasu. Z czasem zaczęła startować w zawodach, z początku lokalnych a następnie narodowych oraz w turniejach Międzynarodowej Federacji Tenisa (ITF – International Tennis Federation), gdzie najwyżej zajęła miejsce 40 w rankingu. Kwalifikacje na wyższe miejsca wymagały dużych nakładów finansowych i z czasem rozpoczęła treningi koszykówki na wózku. Po roku dostała się do drużyny narodowej, która zakwalifikowała się na igrzyska paraolimpijskie w Tokio. Na etapie prowadzenia badań ubiegała się o staż w Kanadyjskim Komitecie Paraolimpijskim, ze względu na plany o pracy w marketingu sportowców po zakończeniu kariery sportowej. P5 angażuje się również w adaptacje rowerów górskich dla osób niepełnosprawnych, organizacje obozów sportowych, organizacje dni otwartych

koszykówki na wózkach oraz mowy motywacyjne dla młodych kobiet w trudnych sytuacjach życiowych.

Szósty uczestnik (P6) to 29 letni były zawodnik wyścigów motocyklowych, pochodzący z Wielkiej Brytanii. W wieku 8 lat rozpoczął treningi na motocyklu mini cross o pojemności silnika 50 cylindrów (50cc mini cross bike). Kolejno przeszedł na motocykl 125cc w wieku 12 lat i brał udział w licznych wyścigach, dwukrotnie zdobywając brązowy medal na zawodach krajowych. W wieku 16 lat, w 2006 roku na treningu podczas próby skoku przez przeszkodę uległ wypadkowi, który spowodował uraz głowy, SCI na poziomie Th6/7 oraz zatrzymanie akcji serca na 9 minut. Po skutecznej reanimacji spędził kilka miesięcy w szpitalu. Tuż po opuszczeniu szpitala zrobił prawo jazdy, powrócił do szkoły oraz rozpoczął treningi tenisa na wózku. Po wypadku odnalazł fundację, prowadzoną przez P4, dzięki której otrzymał ogromne wsparcie psychologiczne. W 2012 roku wziął udział w paraolimpiadzie w dyscyplinie parakolarstwo. Jednakże sport ten nie był dla niego wystarczająco szybki i rozpoczął starania o uzyskanie prawa jazdy samochodami sportowymi związku krajowego, które uprawnia do udziału w wyścigach samochodów rajdowych w Wielkiej Brytanii. Po przejściu licznych testów, uzyskania prawa jazdy oraz pozyskaniu sponsorów na zakup samochodu rozpoczął udział w wyścigach samochodowych. W 2018 roku zajął 8 miejsce na mistrzostwach BMW Compact Cup. Obecnie pracuje jako specjalista sieci komputerowych.

Siódmy uczestnik (P7) to 39 letni były zawodnik judo pochodzący z Polski. Treningi judo rozpoczął w wieku 12 lat. W wieku 19 lat uzyskał 5 miejsce na Mistrzostwach Europy Juniorów, a kilka lat później zdobył złoty medal na młodzieżowych mistrzostwach Polski (kategoria poniżej 23 roku życia). W 2004 roku na skutek tragicznego zdarzenia z użyciem ostrego narzędzia doznał SCI w odcinku Th11/L1. Po kilku latach intensywnej rehabilitacji powrócił do uprawiania sportu wyczynowego – podnoszenia ciężarów. W tej dyscyplinie osiągnął mistrzostwo Polski. W 2011 roku, 7 lat po wypadku zainteresował się nowopowstałą dyscypliną w sporcie paraolimpijskim – kajakarstwem. Po 3 latach treningów zdobył mistrzostwo Europy, a następnie został podwójnym wicemistrzem świata. W wieku 35 lat został złotym medalistą Letnich Igrzysk Paraolimpijskich w Rio de Janeiro (kategoria KL1 – osoby z porażeniem kończyn dolnych), kiedy to kajakarstwo debiutowało w programie igrzysk.

Ósmy uczestnik (P8) to 47 letni zawodnik kolarstwa ręcznego, były żużlowiec. Od dziecka był związany ze sportem (piłka nożna, narciarstwo, kolarstwo), a w wieku 12 lat zaczął trenować wyścigi motocyklowe. W kadrze narodowej startował w licznych zawodach,

wielokrotnie dobywając złoty medal na mistrzostwach Polski. Został również mistrzem Polski amatorów w kolarstwie górskim. W wieku 32 lat podczas zawodów żużlowych miał wypadek, w wyniku którego doznał SCI na poziomi L1/2. Rozpoczął bardzo intensywną rehabilitację i już po 3 miesiącach od wypadku jeździł na quadzie, a po 5 miesiącach zaczął jeździć na nartach w formie siedzącej (monoski). Po 3 latach spróbował jazy na rowerze z napędem ręcznym i postanowił zając się tą dyscypliną zawodowo. Został trzykrotnym złotym medalistą igrzysk paraolimpijskich oraz pięciokrotnym mistrzem świata w kolarstwie ręcznym. P8 jest również wykładowcą przedmiotów: sport osób niepełnosprawnych i turystyka osób niepełnosprawnych na jednym z polskich uniwersytetów. Prowadzi także mowy motywacyjne dla pracowników różnych firm oraz założył fundację pomagającą osobom z niepełnosprawnością w powrocie do sprawności i życia oraz promującą sport adaptacyjny.

Dziewiąty uczestnik (P9) to 54 letni były zawodnik kolarstwa górskiego, pochodzący z Stanów Zjednoczonych. Jako dziecko rozpoczął rekreacyjnie treningi na rowerze BMX. Bardzo szybko osiągnął najwyższy poziom amatorski i zaczął startować w zawodach w wieku 13 lat. W wieku 15 lat zdobył 1 miejsce w swojej kategorii wiekowej, a wieku 19 miejsce 10. Z powodu licznych urazów spowodowanych upadkami ograniczył treningi na rowerze BMX i rozpoczął edukacje w celu uzyskania zawodu osteopaty. W tym czasie zaczął również trenować kolarstwo górskie i w wieku 31 lat wygrał zawody narodowe Dual Slalom Off-road Bicycle Association. W wieku 42 lat, po 10 letniej przerwie powrócił do sportu i zaczął startować w zawodach dual slalom oraz w wyścigach enduro. Mając 49 lat wygrał w zawody narodowe w swojej kategorii wiekowej (40–49 lat). Dwa lata później podczas treningu w dobrze znanym terenie w trakcie pokonywania przeszkody doznał upadku, w wyniku którego doszło do uszkodzenia SCI w odcinku C6/7. Dzięki intensywnej fizjoterapii jest w stanie chodzić przy pomocy chodzika oraz funkcjonalnie posługiwać się kończynami górnymi. Przez kilka lat zmagał się z głęboką depresją spowodowaną głownie ogromnym bólem neuropatycznym oraz innymi skutkami urazu. Niedługo przed przeprowadzeniem wywiadu zaczął angażować się jako wolontariusz w organizacji zajmującej się grupami wsparcia oraz spotkaniami dla osób z niepełnosprawnościami, odwiedzaniem chorych w szpitalach. Aktywności te spowodowały, że dostrzegł możliwość wykorzystania swojego doświadczenia oraz wiedzy. Dzięki temu poczuł się użyteczny oraz pomocny dla innych, co pomogło odzyskać poczucie wartości i powoli zaczął wychodzić z depresji. Zaczął również uprawiać dyscypliny sportowe przystosowane dla osób z niepełnosprawnościami: rugby na wózku, jazda na rowerze napędzanym ręcznie (ang. hand-cycling) oraz tenis na wózku.

Dane socjodemograficzne oraz medyczne uczestników zostały przedstawione w tabeli 1 oraz tabeli 2.

Tabela 1. Charakterystyka socjodemograficzna grupy

Uczestnik	Wiek	Płeć	Kraj pochodzenia	Stan cywilny	Sport przed SCI	Sport po SCI
P1	41	M	Wielka Brytania	Rozwiedziony	Skoki na rowerze BMX	–
P2	29	M	Austria	Panna	Skoki narciarskie	Rugby, narciarstwo
P3	24	K	Polska	Relacja nieformalna	Karate	Taniec na wózku
P4	37	M	Wielka Brytania	Relacja nieformalna	Rugby	–
P5	55	M	Stany Zjednoczone	Żonaty	Wyścigi rowerów górskich	–
P6	45	K	Kanada	Zamężna	Wyścigi rowerów górskich	Koszykówka na wózku
P7	31	M	Wielka Brytania	Relacja nieformalna	Wyścigi motocyklowe	Wyścigi samochodowe
P8	40	M	Polska	Relacja nieformalna	Judo	Kajakarstwo
P9	47	M	Polska	Kawaler	Wyścigi samochodowe	Kolarstwo ręczne

K – kobieta, M – mężczyzna

Tabela 2. Dane medyczne uczestników.

Uczestnik	Poziom SCI	Lata od urazu	Poziom bólu	Uraz mózgu/whiplash	Spłycenie oddechów/ Bezdechy	Liczba zażywanych leków
P1	C3/4	14	7	UM	Tak	8
P2	C6/7	5	7	W	–	1
P3	Th11/12	6	3	–	–	0
P4	C4/5	16	0	W	Tak	1
P5	C6/7	4	6	–	–	3
P6	Th12/L1	14	1	W	–	1
P7	Th6	15	0	UM	–	2
P8	Th11	17	3	–	–	0
P9	L1/2	15	7	–	–	0

7.2. Zastosowane metody badawcze

Udział w badaniu każdego uczestnika polegał na udzieleniu wywiadu za pomocą komunikatora internetowego (aplikacja zoom lub skype) oraz wypełnieniu kwestionariuszy on-line. Każdy wywiad został nagrany oraz poddany transkrypcji. Wywiad z jednym

uczestnikiem trwał 1,5–2,5 h i składał się z dwóch części. W pierwszej został przeprowadzony wywiad metodą pół ustrukturyzowaną, będący częściowo luźną, nie narzuconą z góry rozmową. Metoda ta dała dużą swobodę badanemu do wypowiedzi i tym samym stanowiła wartościowy oraz unikatowy materiał badawczy zapewniający wgląd w doświadczenia, spostrzeżenia lub opinie badanych (Łobocki 2011; Peters, Halcomb 2015). W celu uzyskania odpowiedzi na z góry ustalone tematy, dotyczące motywacji, celów życiowych oraz sposobów radzenia z trudną sytuacją, o ile badany sam ich nie poruszył, zadane zostały dodatkowe pytania. W drugiej części wywiadu zostały przeprowadzone trzy testy do oceny funkcji poznawczych. Wybrano testy, które były możliwe do przeprowadzenia zdalnie bez konieczności użycia kończyn górnych z uwagi na stan zdrowia badanych i ich ograniczenia funkcjonalne. Po zakończeniu wywiadu każdy uczestnik otrzymał na adres e-mail link do formularza on-line zawierający kwestionariusz osobowy oraz trzy skale badawcze i został poproszony o wypełnienie formularza w ciągu tygodnia. Zastosowano skale badawcze w polskiej oraz angielskiej wersji językowej w zależności od stopnia biegłości językowej osoby badanej. Kwestionariusz osobowy oprócz pytań dotyczących danych socjodemograficznych zbierał informacje na temat uszkodzenia rdzenia kręgowego, leczenia farmakologicznego oraz aktywności sportowej przed jak i po wypadku. Dodatkowo do kwestionariusza została załączona numeryczna skala bólu (NRS – Numerical Rating Scale), która zawiera 11 stopni intensywności odczuwanego bólu od 0 do 10 – załącznik 11.4.

7.2.1. Ocena jakości życia

Jakość życia została badana przy pomocy skróconej wersji Skali Jakości Życia WHOQoL--Bref (World Health Orgnization Quality of Life) – załącznik 11.5. Skala składa się łącznie z 26 pytań. Pierwsze dwa pytania dotyczą ogólnej, subiektywnej percepcji jakości życia oraz satysfakcji z zdrowia fizycznego. Kolejne 24 pytania, określają 4 domeny: zdrowie fizyczne, aspekt społeczny, psychologiczny oraz środowiskowy (WHO, 1998). Ocena w poszczególnych pytaniach jest oznaczana w pięciostopniowej skali Likerta, gdzie uczestnik określa swoje zadowolenie (bardzo zadowolony, zadowolony), niezadowolenie (niezadowolony, bardzo niezadowolony) lub pozostaje neutralny (ani zadowolony ani niezadowolony). Surowy wynik otrzymany przez uczestnika dla poszczególnej domeny został przeliczony na skale punktową 4–20, zgodnie z wytycznymi Światowej Organizacji Zdrowia, w celu możliwości porównania otrzymanych wyników z wynikami uzyskanymi w innych publikacjach naukowych (WHO, 1997). Im wyższy wynik, tym wyższa subiektywna ocena

jakości życia przez badanego. Skala WHOQoL uznawana jest obecnie za najbardziej odpowiednie narzędzie do oceny jakości życia u osób z uszkodzeniem rdzenia kręgowego (Jang i wsp. 2004; Lin i wsp. 2007).

7.2.2. Ocena poczucia sensu życia

Do zbadania poczucia sensu życia została wykorzystana Skala Poczucia Sensu życia (*PIL Purpose in Life*) autorstwa Crumbaugha i Maholica – załącznik 11.6. Test zawiera 20 pytań i składa się z 7 podskal, które mierzą: posiadane cele w życiu, sens życia, afirmację życia, ocenę siebie, ocenę własnego życia, wolność i odpowiedzialność, stosunek do śmierci i samobójstwa (Kossakowska i wsp. 2013). Uczestnicy zaznaczali odpowiedzi w siedmiostopniowej skali Likerta, gdzie 1 oznaczało skrajne poczucie braku celu, natomiast 7 poczucie silnego celu w życiu (Thompson i wsp. 2003).

7.2.3. Ocena poczucia własnej skuteczności

Skuteczność radzenia sobie z trudnymi sytuacjami i przeszkodami została zbadana przy pomocy Skali Uogólnionej Własnej Skuteczności (GSES) – załącznik 11.7. Skala została utworzona przez Ralfa Schwarzera i Matthiasa Jerusalema w 1981 roku (Sherer i wsp. 1982). Skala jest wyznacznikiem zamiarów oraz działań w różnych obszarach zachowań zdrowotnych i ocenia osobiste zasoby jednostki w sytuacji stresowej. GSES zawiera 10 pytań, a każde pytanie oceniane jest w czteropunktowej skali, gdzie ocena 1 oznacza całkowicie nieprawdziwe, natomiast ocena 4 oznacza prawdziwe. Wynik mieści się zatem w przedziale 10–40, gdzie wyższy wynik oznacza większą samo skuteczność (Peter i wsp. 2014).

7.2.4. Ocena funkcji poznawczych

Do oceny funkcji poznawczych użyto trzech narzędzi badawczych, które były możliwe do przeprowadzenia zdalnie bez konieczności użycia kończyn górnych z uwagi na stan zdrowia badanych i ich ograniczenia funkcjonalne.

1) Płynność słowna (fluencja) została zmierzona przy pomocy narzędzia COWAT (Ponichtera-Kasprzykowska, Sobow 2014). Badanie to, będące jedną z podstawowych metod oceny neurokognitywnej, angażuje funkcje mowy, pamięci oraz procesy wykonawcze. Narzędzie jest wskaźnikiem produktywności umysłowej, procesów językowych oraz funkcjonowania przede wszystkim płatów czołowych i skroniowych (Baldo i wsp. 2006; Ponichtera-Kasprzykowska, Sobow 2014). Uczestnik badania w ciągu jednej minuty podawał ustnie skojarzenia różnych liter alfabetu, wypowiadając wszystkie słowa które zaczynają się na daną literę. Odpowiedzi zostały nagrane, transkrybowane a następnie przeliczone. Standardowa ocena wyników ma charakter ilościowy i obejmuje liczbę słów zgodnych z podanym kryterium oraz błędów: odpowiedzi spoza kategorii i powtórzenia. Spójność wewnętrzna testu COWAT wynosi $\alpha = 0,83$ (14).
2) Uwaga oraz zakres pamięci roboczej została zbadana przy pomocy testu Digit Span (załącznik 11.8), który składa się z 2 części:
   a) test Digit Forward (DForw) –pozwala uchwycić efektywność oraz pojemność uwagi (Ab i wsp. 2010). Uczestnicy zostali poproszeni o powtórzenie odczytanej serii losowych cyfr w tej samej kolejności. Każda sekwencja liczb została podana sześciokrotnie (początkowa długość zawiera 2 cyfry). Po pomyślnym ukończeniu danej próby, poprzez powtórzenie sześciu cyfr z maksymalnie jednym błędem, uczestnikowi prezentowano następną parę z jednocyfrowym przyrostem. Test kończył się, gdy badany źle przedstawił liczby w więcej niż jednej próbie o tej samej rozpiętości lub pomyślnie powtórzył pięć sekwencji dziewięciocyfrowych. Zarejestrowany wynik (DForw) był liczbą prawidłowo przywołanych sekwencji (Sajkov i wsp. 1998).
   b) test Digit Backward (DBack) – jest zadaniem sprawnościowym, które jest szczególnie zależne od pamięci roboczej (Sajkov i wsp. 1998). Procedura postępowania jest taka sama jak w teście DForw, z tym że pacjenci muszą powtarzać cyfry w odwrotnej kolejności. Wynik punktowy w tył (DBack) jest liczbą prawidłowych sekwencji odwrotnych. Współczynnik alfa Cronbacha dla testu wynosi $\alpha = 0,74$ (Chiaravalloti i wsp. 2020).
3) Zdolność do hamowania interakcji poznawczych, uwaga, elastyczność poznawcza, szybkość przetwarzania oraz pamięć werbalna i operacyjna została zbadana przy pomocy Testu Stroop Color–Word – załącznik 11.9. Uczestnikowi zostały wysłane trzy strony testu i następnie były przez niego kolejno wyświetlane na ekranie komputera.

W pierwszej próbie czytania słów osoba badana miała za zadanie jak najszybsze odczytanie słów oznaczających nazwy kolorów napisanych czarnym drukiem na białej kartce papieru w 10 rzędach po 5 słów każdy. W drugiej próbie odczytywania kolorów uczestnicy odczytywali kolor druku poszczególnych sekwencji „xxxx". W próbie słowo-kolor (interferencja) uczestnicy nazywali kolor druku poszczególnych słów przy czym kolor druku nie pokrywał się z jego desygnatem. Wynik testu reprezentował liczbę słów przeczytanych w ciągu 45 s w każdej części testu. Wartość alfa Cronbacha dla testu kolorów-słów Stroopa wynosi od 0,71 do 0,88 (Zimmermann i wsp. 2015).

Skale badawcze zostały zinterpretowane przez autora pracy, a następnie poprawność interpretacji została skonsultowana z promotorem pomocniczym posiadającym wieloletnie doświadczenie jako psycholog kliniczny.

7.2.5. Analiza wywiadów

Materiał z wywiadów został przeanalizowany przy użyciu indukcyjnej metody analizy tematycznej, która jest uznawana za użyteczną metodę badania różnych perspektyw i obserwacji grup niereprezentatywnych (Clarke i wsp. 2015). Analiza tematyczna została podzielona na następujące etapy: 1 – wielokrotnej otwarte czytanie w celu zapoznania się z danymi; 2 – wyszukanie znaczeń niższego rzędu; 3 – uporządkowanie jednostek w kategorie wyższego rzędu; 4 – wykorzystanie tematów do opisu danych uzyskanych z wywiadów (Clarke i wsp. 2015; Vaismoradi, Snelgrove 2019). Ten sposób uzupełniał dane i jednostki tematyczne w skalach WHOQoL oraz PIL.

Do organizacji danych, całościowej analizy jakościowej oraz kodowania użyto programu Maxqda® wersja 2022 oprogramowania (Release 22.1.1, VERBI GmbH, Berlin, Niemcy). Analiza składała się z trzech etapów. W pierwszym z nich dwóch badaczy podczas analizy każdej wypowiedzi nadało jej etykietę, podobną do wyrażeń używanych przez uczestników. Dzięki temu wyodrębniono kody odpowiadające głównej myśli. Kolejno na podstawie analizy podkategorii, jednostki o podobnym znaczeniu były organizowane w kategorie. Ostatecznie zidentyfikowano trzy główne kategorie: tożsamość sportowa, wczesny wzorzec adaptacyjny oraz przystosowanie jako długoterminowy wzorzec zachowania po wypadku.

7.3. Analiza statystyczna

Z uwagi na liczebność badanej grupy większość danych została analizowana w sposób jakościowy. Jednakże w celu pogłębienia analizy przeprowadzono obliczenia by wyodrębnić cechy wspólne oraz korelacje. Było to możliwe ze względu na jednorodności grupy uczestników pod względem przyjętych kryteriów.

1. Do oceny jakości życia obliczono wartości średnie ($\bar{x}$) oraz odchylenie standardowe (sd), osobno dla pytań Q1, Q2 oraz poszczególnych domen WHOQoL-BREF.
2. Do oceny poczucia własnej skuteczności obliczono wartości średnie ($\bar{x}$) oraz odchylenie standardowe (sd) skali GSES.
3. Korelację pomiędzy domenami jakości życia oraz poczuciem własnej skuteczności, a także ich związek z bólem i liczbą lat od urazu, zbadano za pomocą korelacji rang Spearmana, przy czym $p<0,05$ oznaczało wyniki istotne statystycznie.
4. W celu oceny funkcji poznawczych obliczono średnie ($\bar{x}$) oraz odchylenie standardowe (sd) poszczególnych testów oceniających funkcje poznawcze (COWAT, test Digit-Span, Test Stroop Color-Word).
5. Do oceny zależności między QoL a funkcjami poznawczymi wykorzystano korelacje rangowe Spearmana, przy czym $p <0,05$ oznaczało wyniki istotne statystycznie. W dalszej części procedury, w celu wykluczenia występowania fałszywych statystycznie istotnych wyników, ze względu na dużą liczbę korelacji, zastosowano korekcyjną metodę Bonferroniego. Przy pomocy metody korekty alfa, określono minimalną wielkość grupy wymaganą do wykrycia efektu umiarkowanego (0,3) oraz dużego (0,5).

Obliczenia zostały wykonane w Akademii Wychowania Fizycznego we Wrocławiu z wykorzystaniem programu Statistica, ver. 13.1 PL przez statystyka posiadającego wieloletnie doświadczenie w wykonywaniu analiz statystycznych. Dla wszystkich analiz zastosowano poziom istotności $p < 0,05$.

8. Podsumowanie

Artykuł nr 1, pt. **Quality of life after spinal cord injury: a multiple case study examination of elite athletes** przedstawia jakość życia trzech wybitnych sportowców, którzy doznali SCI w trakcie trwania kariery sportowej.

Jakość życia zbadano za pomocą skali WHOQoL, a wyniki ilościowe każdej domeny (fizycznej, psychologicznej, społecznej i środowiskowej) zostały poszerzone o dane z analizy wywiadów.

P2 i P3 ocenili pozytywnie swoją jakość życia. Negatywna ocena QoL oraz zdrowia przez P1, była spowodowana aktualnym pogorszeniem stanu zdrowia i wystąpieniem odleżyny, która zmusiła go do pozostania w łóżku, co pogłębiło izolację społeczną. P1 wskazał, iż przed wystąpieniem pogorszenia oceniłby swoje zdrowie oraz QoL pozytywnie. W zachowaniu dobrej kondycji psychologicznej uczestnikom badania pomaga stawianie nowych celów, wyzwań, angażowanie w nowe zadania, poszukiwanie źródeł motywacji i siły wewnętrznej oraz docenianie tego, co posiadają. Bardzo ważne dla wszystkich uczestników jest ogromne wsparcie rodziny oraz przyjaciół. Uczestnicy pozostają obecni i aktywni w życiu sportowym w formie biernej takiej jak: trenerzy, motywatorzy, doradcy, lub aktywnej, uprawiając sport adaptacyjny.

Wyniki badań potwierdziły poprzednie doniesienia, że na ogólną percepcję zdrowia fizycznego większy wpływ mają wtórne powikłania po urazie, niż pierwotny poziom uszkodzenia i deficyt funkcjonalny. Koneksja z środowiskiem sportowym, zarówno w formie aktywnej jak i biernej sprzyja poczuciu wspólnoty, zaangażowaniu socjalnemu, utrzymaniu tożsamości sportowej oraz jest źródłem satysfakcji i spełnienia.

Wyniki wskazały, że badani charakteryzują się pozytywną subiektywną oceną QoL, a ich postawa i sposób w jaki odnaleźli się w trudnej sytuacji życiowej może być inspiracją dla innych osób z niepełnosprawnością oraz przykładem, że można wieść szczęśliwe życie pomimo SCI. Byli wybitni sportowcy o silnej osobowości, mogą być również pomocą dla sportowców, kończących karierę, którzy mają problem z adaptacją do życia pozasportowego.

Artykuł nr 2, pt. **Purpose in life of elite athletes after spinal cord injury** przedstawia poczucie sensu życia pięciu wybitnych sportowców, którzy doznali SCI w trakcie aktywności sportowej.

Wyniki ilościowe skali PIL uzupełnione zostały o dane z analizy wywiadów, która wyłoniła pięć obszarów: adaptacja do urazu rdzenia kręgowego, nowe cele w życiu, dawny i nowy sens w życiu, afirmacja życia oraz znaczenie sportu w życiu. Czterech uczestników otrzymało wynik w skali wskazujący na wysokie poczucie PIL, w przeciwieństwie do jednej osoby o znacznie niższym rezultacie. Wypadek spowodował weryfikację własnego obrazu i zmienił myślenie uczestników o sobie oraz o życiu i śmierci. P6 ogromnie docenia fakt, że przeżył wypadek, natomiast P9 przechodzi przez transformacje myślenia od deprawującego życie, do dostrzegania wartości pomimo cierpienia i niepełnosprawności. Uczestnicy stawiają krótko i długoterminowe cele rodzinne, socjalne oraz zdrowotne, skupiające się na jak najlepszej poprawie funkcjonalnej. Poszukiwanie nowego sensu życia, relacje z ukochanymi osobami i działanie na rzecz innych stanowią siłę do przezwyciężania trudności życia z niepełnosprawnością. Stawianie się w sytuacji osoby będącej w gorszej sytuacji uwalnia od egocentrycznego myślenia i skupianiu się na własnym cierpieniu. Uczestnicy badania pozostają związani z środowiskiem sportowym, co również ma znaczenie dla wysokiego poczucia sensu życia. Istotnym czynnikiem, który wpływa na PIL, nie są o tyle fizyczne ograniczenia same w sobie, ale to jak dana osoba postrzega utratę sprawności w wyniku urazu. Opowiadanie historii o swojej chorobie, jak również słuchanie historii innych osób pomaga w procesie samo regeneracji. Uczestnicy wskazują, że posiadanie pasji pomimo ciężkiego doświadczenia zwraca uwagę ludzi i daje im nadzieje. Pomimo wypadku, badani doceniają życie i doświadczają radości, dostrzegając możliwości jakie wciąż stoją przed nimi. Jako osoby sławne są obserwowani przez swoich fanów i zdają sobie sprawę, że ich postawa może być zachętą dla innych i kształtować podejście innych do trudności jakich doświadczają.

Artykuł nr 3, pt. **Is self-efficacy related to the quality of life in elite athletes after spinal cord injury?** przedstawia zależność poczucia własnej skuteczności i jakości życia dziesięciu wybitnych sportowców z SCI.

W badaniu wykorzystano skalę Uogólnionej Własnej Skuteczności (ang. General Self Efficacy Scale – GSES) oraz skróconą wersję skali Jakości Życia (WHOQoL-Bref). Korelacje pomiędzy domenami QoL oraz GSE, jak i ich zależności z bólem oraz latami, jakie minęły od urazu zbadano za pomocą korelacji Spearmana.

Spośród wszystkich uczestników siedmiu oceniło swoją QoL pozytywnie, natomiast dwóch negatywnie. Jeden z nich wskazał na pogorszenie zdrowia w ostatnim czasie, natomiast drugi, który jednocześnie uzyskał najniższy wynik w GSES, na depresyjną

osobowość jeszcze przed wypadkiem. Korelacja Spearmana wykazała, że GSE było zależne od ogólnej oceny QoL oraz zdrowia fizycznego, jak i domeny psychologicznej oraz środowiskowej skali WHOQoL-Bref. Interesujący jest fakt, że ani ból, ani czas od wypadku, jak i poziom SCI nie miały wpływu na QoL oraz GSE.

Uczestnicy badania z racji na wysokie osiągnięcia sportowe przed wypadkiem mogli liczyć na wsparcie środowiska sportowego, fanów, a ich zaangażowanie w formie pasywnej jak i aktywnej w sportowe życie po urazie może sprzyjać wysokim wynikom w domenie socjalnej. Pomimo SCI, badani uzyskali wyższe wyniki w GSES w porównaniu z wcześniejszymi badaniami z udziałem pacjentów po takim urazie. Wynik ten potwierdza fakt, iż GSE współgra z wynikami sportowymi. Większa zależność QoL od postawy osoby, niż od niezmiennych czynników, związanych z niepełnosprawnością daje nadzieję na poprawę jakości życia, pomimo braku wpływu na niepełnosprawność samą w sobie. Zaangażowanie w środowisko, jakie było ważne dla osoby przed urazem w formie pasywnej lub aktywnej sprzyja poprawie QoL i GSE.

Wyniki badania mogą posłużyć jako sugestia dla personelu medycznego do motywacji pacjentów do podjęcia aktywnej rehabilitacji, poprzez pokazywanie jako przykłady wybitnych sportowców, którzy pomimo SCI byli w stanie pozytywnie zaadoptować się do nowej sytuacji i osiągnąć zadowalającą QoL. Wprowadzenie programów interwencyjnych, wspierających GSE, jako czynnika rokującego poprawę, daje nadzieje na poprawę QoL.

W artykule nr 4, pt. **The relationship between cognitive performance and quality of life in elite athletes after spinal cord injury** porównano relacje pomiędzy wybranymi funkcjami poznawczymi a jakością życia dziewięciu wybitnych sportowców z SCI.

Do zbadania funkcji poznawczych użyto trzech narzędzi: test COWAT, test Digit Span oraz test Stroop Color-word, natomiast QoL oceniono za pomocą skróconej wersji skali Jakości Życia (WHOQoL – Bref).

Uczestnicy ogólnie pozytywnie ocenili zarówno QoL jak i zdrowie fizyczne. W przeprowadzonych testach uczestnicy uzyskali wyniki wskazujące na obniżenie niektórych funkcji poznawczych, jednakże badanie nie wykazało istotnie statystycznej korelacji z obniżoną QoL.

Pozytywna ocena jakości życia, pomimo poważnego SCI przez uczestników, mogła wynikać z akceptacji niepełnosprawności, pozytywnej adaptacji do nowej sytuacji życiowej oraz pozostaniu zaangażowanym w środowisko sportowe, któremu poświęcali większość swojego życia przed wypadkiem i wciąż w większym lub mniejszym pozostaje istotnym

elementem życia. Dokładna analiza wyników funkcji poznawczych wskazała, że na obniżenie poznawcze mogły mieć wpływ takie czynniki jak: zaburzenia oddychania podczas snu, odczuwany bólu, zaburzenia depresyjne lub zażywanie leków. Brak korelacji obniżonego funkcjonowania poznawczego z obniżoną jakością życia w badaniu, nie oznacza braku takiej zależności w przypadku przeprowadzenia badania z udziałem większej liczby osób badanych. Ponadto grupa badanych to elitarni sportowcy, którzy zdecydowanie mieli bardziej sprzyjające okoliczności takie jak wsparcie społeczne, szerokie zainteresowanie mediów, dostęp do rehabilitacji oraz możliwość uczestniczenia w życiu społecznym bez wykluczeń. Kolejnym czynnikiem protekcyjnym mogą być również wysokie zasoby osobiste, które to charakteryzują sportowców o znacznych osiągnięciach. Silna osobowość może pomóc w adaptacji i funkcjonowaniu z SCI oraz w odporności na niesprzyjające okoliczności.

Brak jednoznacznych wyników wskazuje na potrzebę indywidualnego podejścia do każdego pacjenta w celu określenia deficytów, potrzeb oraz jak najlepszej opieki.

W artykule nr 5, pt. **Restored life of elite athletes after spinal cord injury** przedstawiono strategie radzenia oraz zidentyfikowano czynniki, które pozwoliły na pozytywne przystosowanie ośmiu wybitnych sportowców do życia po SCI.

Metodyka badania obejmowała przeprowadzenie wywiadów pół ustrukturyzowanych, które zostały transkrybowane, a następnie przeanalizowane z wykorzystaniem oprogramowania MAXQDA®. W wyniku analizy tematycznej zidentyfikowano trzy główne kategorie wraz z podkategoriami: sposoby radzenia – wczesne wzorce adaptacyjne (zmagania, duch walki), tożsamość sportowca (wsparcie fanów, korzyści z bycia sportowcem, interakcje z środowiskiem sportowym) oraz przystosowanie – długoterminowy wzorzec adaptacyjny (odnalezienie znaczenia wypadku, źródła motywacji, akceptacja niepełnosprawności oraz plany i cele).

Uczestnicy posiadali następujące strategie adaptacyjne: racjonalizacje, odrzucenie, analizowanie przyczyn wypadku i poszukiwanie jego sensu, odkładanie konfrontacji poznawczej z konsekwencjami wypadku, wiara w Boga, poznawanie konwencjonalnych i niekonwencjonalnych metod leczenia oraz zachowania mające na celu rozładowanie napięcia – płacz, kontakt z bliskimi, intensywna rehabilitacja, praca czy zaangażowanie w nowy sport.

Wyniki badania wskazały, że pomimo utraty pewnego poziomu funkcjonalnego, uczestnicy nie utracili tożsamości sportowej i żyją dalej w zgodzie z tą tożsamością. Zaangażowanie w sport w formie aktywnej lub biernej sprzyjały akceptacji

niepełnosprawności, która jest niezbędna w procesie przystosowania do urazu oraz zapewnia przynależność do grupy. Godny uwagi jest fakt, iż pomimo braku możliwości funkcjonalnych P1 i P4 odnaleźli sposoby pozwalające żyć w zgodzie z tożsamością sportowca takie jak: bycie trenerem, mówcom motywacyjnym, uczestnictwo w treningach/zawodach w formie obserwatora, założenie fundacji pomagającej sportowcom z SCI. Z uwagi na czas jaki upłynął od wypadku (5–17 lat) badani przeszli przez różne etapy przystosowania i obecnie są pogodzeni z konsekwencjami urazu oraz doświadczają pourazowego wzrostu.

Wydarzenia, które mają miejsce bezpośrednio po wypadku, mają głębokie znaczenie dla przystosowania, dlatego bardzo istotna jest postawa pracowników służby zdrowia, z którymi poszkodowani mają w tym czasie największy kontakt. Ważna jest równowaga pomiędzy nieodbieraniem nadziei na wyzdrowienie a przedstawieniem realistycznej diagnozy. Kierowanie pacjentów do fundacji, które w danym obszarze wspierają osoby z SCI jest kolejną możliwością pomocy i może być ważnym krokiem w rozpoczęciu procesu pozytywnego przystosowania się. Znajomość historii elitarnych sportowców może być pomocnym przewodnikiem, jaki można wykorzystać do budowania motywacji, wsparcia pozytywnego myślenia i rozwijania chęci bycia niezależnym, w stopniu jaki jest możliwy.

9. Wnioski

1. Zastosowanie skali oceny QoL, PIL, GSES, narzędzi do oceny funkcjonowania poznawczego oraz analiza wywiadów pozwoliła na poznanie unikatowego świata elitarnych sportowców z SCI i zrozumienie ich sposobów radzenia oraz metod adaptacji do trudnej sytuacji życiowej.
2. Pomimo SCI uczestnicy badania pozytywnie oceniają swoją QoL i mogą być przykładem oraz motywacją dla innych osób z niepełnosprawnościami lub sportowców kończących karierę, jako że poważny uraz nie neguje szczęśliwego i spełnionego życia.
3. Ponowne zaangażowanie w sport, czy to w formie aktywnej czy biernej, pomaga nadaniu sensu życia na nowo oraz sprzyja resocjalizacji społecznej.
4. Osobista satysfakcja z zdrowia jest zależna nie tyle od obiektywnego stanu funkcjonalnego, ale od tego, jak dana osoba postrzega swoją sprawność i limitacje. Wdrożenie programów interwencyjnych zakresie wsparcia GSE oraz pracy psychologicznej nad postrzeganiem swoich ograniczeń/możliwości, jako elementów rokujących na poprawę bez względu na niepełnosprawność fizyczną, może znacznie polepszyć jakość życia pacjentów z SCI.
5. Satysfakcja z zdrowia fizycznego jest bardziej determinowana przez wtórne problemy zdrowotne niż pierwotne uszkodzenie spowodowane urazem.
6. Sportowcy o dużych osiągnięciach charakteryzują się wysokimi zasobami osobistymi, co sprzyja odporności wobec trudnych okoliczności i jest pomocą w adaptacji oraz funkcjonowaniu z SCI.
7. Akceptacja niepełnosprawności jest niezbędna do pozytywnego przystosowania się do nowej, pourazowej rzeczywistości.
8. Pomimo utraty sprawności fizycznej, elitarni sportowcy nie tracą swojej tożsamości i prowadzą życie spójne z tą tożsamością. Zaangażowanie w sport w formie aktywnej lub biernej jest pozytywnym czynnikiem w procesie akceptacji niepełnosprawności, co stanowi niezbędny element w procesie przystosowania. Jednocześnie uczestnictwo w życiu sportowym zapewnia przynależność do grupy i zapobiega izolacji społecznej.
9. Postawa pracowników służby zdrowia, jako osób z którymi pacjenci mają największy kontakt bezpośrednio po wypadku, jest bardzo ważna i może stanowić punkt wyjściowy do pozytywnej adaptacji. Promowanie sportu adaptacyjnego, pokazywanie

historii elitarnych sportowców z SCI jako motywujący przykład oraz kierowanie do fundacji wspierających takich pacjentów są to praktyczne wskazówki jakie mogą być wykorzystane przez personel medyczny.

10. Fizjoterapeuci po przeprowadzeniu wywiadu dotyczącego aktywności zawodowej, sportowej, społecznej pacjenta mogą pokierować w jaki sposób osoba z SCI może kontynuować dotychczasowe życie z jak największym wykorzystaniem pozostałych możliwości funkcjonalnych lub rokujących na poprawę poprzez rehabilitację. Może to być pomocne w określeniu zarówno krótko jak i długoterminowych celów fizjoterapeutycznych, a nadzieja na odzyskanie dotychczasowego życia, mimo że w zmodyfikowanej formie, jest ogromną motywacją dla pacjenta, bez której rehabilitacja neurologiczna nie przynosi zadowalających efektów.
11. Brak korelacji pomiędzy funkcjonowaniem poznawczym a jakością życia, nie oznacza, że taka zależność by nie wystąpiła w przypadku przeprowadzenia badania z udziałem większej grupy osób. Ponadto uczestnicy badania to elitarni sportowcy, tak więc czynniki protekcyjne takie jak wsparcie społeczne oraz wysokie zasoby osobiste również mogą mieć wpływ na uzyskane wyniki. Konieczne jest zatem przeprowadzenie badań z uczestnictwem większej grupy osób w celu weryfikacji wyników.

10. Opublikowane prace

10.1. Quality of life after spinal cord injury: a multiple case study examination of elite athletes

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Case Report

Quality of Life after Spinal Cord Injury: A Multiple Case Study Examination of Elite Athletes

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Abstract: A three-times World Champion in BMX (an acronym for Bicycle Motocross) dirt jumps, a Junior World Champion in ski jumping, and a European karate Champion sustained spinal cord injuries at the cervical and thoracic level. Such a severe trauma is tantamount to the end of a professional sporting career. In such a situation, the athlete's life significantly changes in every aspect of it: health, professional, and social. The greatest sports champions have not yet been portrayed in the context of a strategy they used to deal with an abrupt end of a professional career due to severe injury. A semi-structured interview was conducted with study participants who additionally filled out the WHO Quality of Life Scale. This multiple case series presents the quality of life in elite athletes as well as the social activities they have undertaken regardless of the tragic accident. The results of the research indicate that these people are characterized rather by a positive sense of quality in life, and the way they function in a difficult situation is an inspiration to others.

Keywords: spinal cord injury; quality of life; elite athletes

1. Introduction

Spinal cord injury (SCI) is a serious condition usually associated with irreversible loss of motor functions, deterioration of the financial situation, social isolation, and psychological problems [1,2]. The majority of people sustaining such injury are no longer able to work, becoming dependent on their family and health care support, all contributing to a significantly impaired quality of life (QoL) [3]. The World Health Organization defines the quality of life as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. It is a broad-ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and their relationship to the salient features of their environment [4,5]. It has been found that quality of life is deteriorating as a result of SCI and may be affected by personal (sociodemographic and psychological), cultural (race and ethnicity), economic, and environmental (availability of medical care, quality of education, employment opportunities, and place of residence) factors [6]. People with SCI on average tend to report a decreased feeling of well-being and grade their physical, mental, and social health lower than nondisabled persons [7].

Frequent problems in people after SCI include chronic pain and spasticity, with severe pain being particularly associated with a lowered quality of life [8–10]. Moreover, breaking the continuity of the spinal cord results in many disorders related to the basic functions of the urinary, digestive, respiratory, and cardiovascular systems, and sexual activity [11–13]. The quality of life of people following high spinal cord injury is relatively poorly described in the literature [14,15].

For physically active people, who consider sport their passion, functional disability takes an even greater dimension of tragedy. The injured person loses what was "their whole life" and faces a tremendous challenge to find new meaning and motivation in life [6]. Former elite athletes, with significant achievements to their credit, for whom sporting activities also had a professional dimension, represent a separate, special group of people with disabilities [16]. Practicing sport, especially extreme sport, involves an increased risk of serious injuries, including SCI [6]. Despite the recognition of sports as a significant contributor to the etiology of SCI, only several studies appear to have explored the epidemiology of SCI caused by sports [17]. In the USA, approximately 8.7% of new cases of such injuries are related to sporting activities. The greatest risk of cord injuries is found in soccer, ice hockey, wrestling, skiing, rugby, and snowboarding [17,18]. Research shows that in skiing and snowboarding the frequency of SCI is 0.01 and 0.04 per 1000 days of practice respectively [16]. American football, which is a contact sport, is also treated as a high-risk sport in the context of cervical cord injuries with potential neurological deficits [19]. A study by Ackery et al. (2007) shows that the number of spinal cord injuries has been increasing in recent years [20]. This may be due to the desire to perform more and more extreme stunts and the increase in competition in sport.

Recent literature suggests that extreme sports experiences are often extraordinary, transcending, transforming and the opportunity to transcend the everyday experience may provide more motivation and inspiration than experiencing short-term thrills through risk-taking [21]. Filbay et al. (2019) found that former athletes had a similar physical component score and a better mental component score, compared to the norms of the general population. On the other hand, former athletes with physical impairment reported better mental health than the rest of the population [22]. The authors as well as Smith and MacManus (2009) pointed out factors that may associate with worse QoL: involuntary retirement from sport (injury or deselection), increased Body Mass Index and osteoarthritis, or musculoskeletal issues, a strong, exclusive athletic identity, and lack of pre-retirement planning and support services [22,23]. Moreover, Smith pointed out that there are gaps in the scope of programs to address broader adaptation issues and greater emphasis should be directed towards the psychological, social, and physical transitions experienced by elite athletes prior to and after retirement to ensure a positive adaptation into post-sports life [23]. Lemenz (2015) found considerable support for superior longevity outcomes for elite athletes, particularly those in endurance and mixed sports [24]. On the other hand, process of athlete commodification (created by the consumption, media, fans, etc.) influences the quality of transition into lives after sport, seeing that very often they are not enough prepared for such a change [25].

Keer (2012) shows, that the range of motives for extreme sport participation included: goal achievement, risk-taking, social motivation, escape from boredom, pushing personal boundaries and overcoming fear, as well as connecting with the natural environment, and pleasurable kinaesthetic bodily sensations from moving in water or air [26]. In a sports competition, a successful athlete must have the psychological and mental characteristics as the appropriate level of self-motivation, self-awareness, and self-control needed to have achievements [27]. The findings of Sootmaker research (2018) suggest that BMX (an acronym for Bicycle Motocross) professionals are intrinsically motivated to take risks and set goals while placing little value on objective rewards [28]. Widyastuti and Dimyati found that karate fighters are characterized by fighting spirit, creativity, practical intelligence, control and self-control capacity, the spirit of sacrifice, intelligence, motivation, combat power, aggressiveness, tenacity, and quick thinking [27]. The results of Vegard's study (2018) show that psychological factors that regulate emotional states, coping strategies, constructive mindset, and motivation may have important meaning for World Cup ski jumping performance [29].

The literature on practicing sport by people after SCI is well established [1]. Numerous studies are indicating multiple health, social and psychological benefits of being physically active by people with disabilities [30,31]. Ciampolini (2017) assessed the quality of life in Brazilian wheelchair tennis athletes and compared the perception scores between competitive and elite athletes. The elite group has been found to exhibit statistically higher perceptions in the physical domain and the total QoL score [1]. McVeigh et al. (2009) compared the quality of life and social integration of people with spinal cord injury involved in sport with those who are not involved in sport [30]. In this study, the results of the Community Integration Questionnaire (CIQ) and Reintegration to Normal Living Index RNL were higher among participants involved in sports activities ($p < 0.05$) and correlated positively with quality of life. People who took part in sports before spinal cord injury were more likely to be involved in sports after the injury.

However, to our knowledge, so far only two articles have been published that concern former athletes who have suffered from SCI as a result of sports [6,32]. The subject of a study by Smith and Sparkes (2005) was narratives of hope in the life of men who experienced SCI during rugby games. Most of the respondents felt a strong hope, which was based on their belief in recovery. In a study by Badenhorst (2018), which involved 90 individuals with rugby-related spinal cord injury in South Africa, they rated their quality of life higher than those in the control group [6].

This work aims to assess the quality of life and methods of coping with the spinal cord injury situation in three elite athletes after their sporting careers have ended due to a serious spinal cord injury.

The respondents agreed to participate in the project and to publish the results obtained. The plan of the project was positively reviewed by the Bioethics Committee of the University School of Physical Education in Wroclaw.

2. Materials and Methods

A question about participation in the study was sent to 23 athletes from different countries of the world. A positive response was obtained from 3 people, who gave an interview and returned a completed personal questionnaire and WHOQoL (The World Health Organization Quality of Life questionnaire) so they were included in the study. These were people from the United Kingdom, Austria, and Poland. The criteria for inclusion in the study required that participants had represented their country in sporting competitions and that they had won the championship title in a sports event at the international level. An additional criterion was a communicative knowledge of English or Polish. The consent of the Senate Research Ethics Committee of the University School of Physical Education in Wroclaw for conducting a research project was obtained.

The first participant (P1) had been training to jump on a BMX bike since he was three years old. He became a three-time gold medalist of the biggest BMX sporting events—the Gravity Games and the X-Games. During the World Cup, while performing his own double backflip figure, he lost his orientation in space and fell to the ground hitting his head against the ground. As a result of the accident, he sustained a spinal cord injury at the C3/4 (cervical) level and quadrupedal paralysis. He now moves in a wheelchair, which he controls using sensors placed in the headrest.

The second participant (P2) is a former ski jumper, double junior world champion. During one of the training sessions, during the flight, his foot slipped out of the ski boot and an uncontrolled landing and fall caused damage to the spinal cord at the C6/7 level. He moves in a wheelchair, which he operates using his upper limbs on his own. Thanks to intensive rehabilitation he can maintain an upright posture, take a few steps on his own, and cover a short distance supported with a pair of crutches.

The third participant (P3) is a former European karate champion. During a sports camp, while moving on a rope suspended at the height of the first floor, her hands slipped and she fell to the ground, causing paraplegia (her spinal cord is damaged at the TH11/12 (thoracic) level). She moves on her own in a wheelchair with the help of her upper limbs.

Participation in the study consisted of giving an interview via an Internet communicator and filling an online WHOQoL and personal questionnaires. The participants agreed to use the collected material for scientific publications. Before the interview participants read consent of participation, which included: title and purpose of the project, explanation of procedures, and confidentiality. At the beginning of the interview, the participants gave verbal consent to the conditions of the project. Sociodemographic data were collected by means of a personal questionnaire, which also included questions about the date of the accident, the level of spinal cord injury, the circumstances of the accident, and the greatest sporting achievements. The Numerical Rating Scale of Pain (which contains 11 degrees of pain severity between 0 and 10) was attached to the questionnaire.

Participants' quality of life was examined using the shortened version of the WHO Quality of Life Questionnaire (version WHOQoL-BREF). Adaptations of the national WHOQoL scales were used. The scale contains two general questions and 24 questions that describe 4 domains: physical health, as well as social, psychological, and environmental aspects [33]. The WHOQoL BREF uses a five-level Likert scale, where athletes determine satisfaction (strongly agree, agree) or dissatisfaction (strongly disagree, disagree) or remain neutral by choosing the answer "neither agree nor disagree". A higher score indicates a subjectively better quality of life. The WHOQoL scale is currently considered the most appropriate instrument for assessing the quality of life in people with traumatic spinal cord injuries [34,35].

All semi-structured interviews were conducted by the first author, who has many years of clinical experience working with people after SCI. Each of the interviews lasted about two hours, was recorded, and then transcribed. The thematic analysis of the interviews was conducted by the first author and then verified by competent jurors (the two subsequent authors). The thematic analysis consisted of the following stages: getting familiar with the data through several times open-minded reading; search for meanings and themes, organizing themes into a meaningful wholeness [36,37]. The content corresponding to four areas: physical, psychological, social, and environmental was chosen. It resulted in extending the quantitative data retrieved using the WHOQoL with the subjective world of experiences, feelings, and thoughts of the subjects.

The quantitative and qualitative research project conducted allowed the research team to reach the unique subjective world of experiences of SCI athletes.

3. Results

3.1. Information on the Respondents

Sociodemographic and health data of the participants is presented in Table 1.

Table 1. Sociodemographic and health data of study participants. P1—participant one, P2—participant two, P3—participant three, SCI—spinal cord injury, C—cervical, TH—thoracic.

Categorical Variables	P1	P2	P3
Age	40	28	23
Nationality	British	Austrian	Polish
Level of SCI	C3/4	C6/7	TH11/12
Age when injured	27	24	18
Marital status	divorced	single	informal relationship
Respiratory disorders during sleep	apnea, shallow breathing	none	none
Numerical Rating Scale	7	3	3

3.2. Quality of Life—WHOQoL Results

To analyze the WHOQoL-BREF instrument results, the raw point values obtained for individual domains were recalculated on a scoring scale ranging 4–20, in line with the WHO recommendations [38]. The questionnaire is opened by two introductory questions on the quality of life rating and health

satisfaction. For the first question, "How would you rate your QoL", participants who answered "very poor", "poor" or "neither poor or good" were classified as having a negative perception, while those who answered "good" or "very good" were classified as having a positive perception of their QoL. Analyzing the overall quality of life feeling, P1 perceived his QoL negatively, while the other two were positive. P1 described his general health as very poor, while P2 and P3 were classified as very good and good, respectively (Table 2). In the personal questionnaire, P1 indicated the occurrence of respiratory disturbances during sleep and severe pain. Furthermore, he was in bed at the time of the interview because of a pressure sore in the buttock area. These factors may have affected his perception of his health as very poor and may have affected his overall quality of life. P1 also indicated that he would rate his quality of life as very good and his health as good before the latter started to deteriorate. The highest quality of his life in each domain was perceived by P3.

Table 2. WHOQoL (The World Health Organization Quality of Life questionnaire). Q1—Overall perception of the quality of life. Q2—Overall perception of health.

Domain	P1	P2	P3
Q1	3	4	4
Q2	1	5	4
Physical health	14	11	18
Psychological	13	15	19
Social relationships	13	12	20
Environment	16	16	17

3.3. Quality of Life—Analysis of the Interviews

The physical domain covers the following areas: pain, discomfort, energy and fatigue, mobility, sleep quality, daily activities, and work capacity. P1: "Right now I am isolated. I need to stay in bed all the time because of pressure sores. My health condition in the last 2 months has been terrible. I feel really bad". P2 indicates that a very high pre-traumatic fitness level had a major impact on success in rehabilitation. He appreciates and considers every functional achievement to be a success, even though he is paralyzed as a result of the accident. The limitations also apply to aspects that are unseen for other people, such as excretion, eating, sweating. P3 indicates increased muscle tension in the lower extremities and spinal pains.

The psychological domain includes positive and negative feelings, spirituality, religion, thinking, personal beliefs concentration, body image, appearance, and self-esteem. The study participants cope with this area by finding new tasks and goals, and sources of motivation and strength. They also fill their life after the accident with new content and appreciate the value and importance of what they have. They said (P2 and P3): "How good it is to have an agile head and hands!". In the context of psychological functioning, P2 clearly emphasized the sentence that he heard from his doctor informing him about the spinal injury: "I have to remind you that today you have a healthy head, a healthy mindset, and quite healthy hands, and these components ensure that you can lead quite a normal life'. Yeah and maybe this was the most important sentence in this whole journey which I've been making since that day." A sentence uttered by P3 is also interesting: "The accident has taught me a lot. From the very beginning, I was positive and kept on fighting. I was cheerful from the beginning. Karate before the accident taught me perseverance and diligence, which later became very useful in this daily fight. A year after the accident I passed my driving license. Now I drive my own car. Less than a year after the accident I signed up for the Miss Polonia competition in a wheelchair. I would never have thought of that before". P3 also said, "I've seen people look at me many times when I get out of the car and it's a wonder that I'm in a wheelchair and can drive at the same time. People are also surprised how I take care of myself, that I look so good, that I do not lock myself among four walls but go out to people, I do a lot of things". P3 attaches a lot of importance to how people react to her struggles,

efforts, successes, and the inner strength that drives her to act. They build her sense of value and allow her to believe in herself.

The social domain contains relationships and social support. Interpersonal relations are very important for each of the participants: among family, friends, and in the professional context. Particular attention should be paid to P2's and P3's statements in the context of relations. P2: "You have to learn so many things and you always have a feeling that you aren't ready for it, but it feels like somebody is pushing you into cold water. You always have to rely on other people because on your own it is impossible to do certain things. My family is my biggest support all the time, friends also, ski jumpers, my physiotherapist." P3: "I've been half-orphaned since I was 8 years old, I was only raised by my dad. I also have two brothers who support me, and I can always count on them. I have great friends at the university who always help me with architectural barriers, and I don't have any problems moving around either."

The environmental domain covers the following areas of life: safety, security, physical environment quality, finances, information access, leisure activities, home environment, access. The living environment and recognition by others before and after an accident are crucial for the quality of life, wellbeing, and finding a permanent commitment to work. The sport continues to fill the lives of the participants, although no longer as an active athlete but as a trainer, advisor, coach, or motivator. It is heard in the words of P1: "I was very lucky because it was quite public. I was highlighted a lot from my crash. People in sports insurance were amazing: they have set up a fund and people donated money". P2 formulated it as follows: "For me every message I get after my accident is so important because I'm not a robot, of course, I have my bad days, and on these bad days I try to remember what people wrote me. It's a little exit door from this bad day, those messages I got are these exit doors, so I'm really happy to have these messages. Because they remind me that people had hope and because I can give some inspiration back to them. So, it is a circle, and to keep it circling it is important to go on, even if it is not pleasant on some days... I wanted to stay here, because of ski jumping and training. The connection with the ski jumping team is still here and it is always fun to watch them at their training. I have my friends here and an ex-girlfriend". P3 is studying prosthetics and indicates that the dental institute is well adapted to people with disabilities. She is also active professionally, working in an active rehabilitation foundation as an instructor.

4. Discussion

In this article, an attempt has been made to illuminate the quality of life of former famous athletes, who finished their careers because of a sports injury. We have also tried to reflect on their social activities.

Analyzing the overall feeling of quality of life, P1 perceived his QoL negatively, while the other two respondents positively. P1's score may be associated with poor health in the last four weeks, and the WHOQoL scale refers to this period of time. People with chronic tetraplegia experience more subjective sleep problems and worse quality of life than their able-bodied counterparts [39]. A study involving 270 individuals who sustained SCI found that poorer QoL was associated with secondary impairments (for example, neuropathic pain, urinary tract infection), activity limitations, and participation restrictions, but not with neurological level, completeness of injury, age, or time since injury [11]. Secondary impairments in the last four weeks have significantly influenced the WHOQoL score of P1.

In the Badenhorst study (2018) carried out among individuals with rugby-related spinal cord injuries, participants had higher QoL scores compared to other studies in non-sporting cohorts. This may result from analyzing the results of a specific group of subjects (former athletes), which is associated with initial better physical health and support by sports organizations [6]. This was also emphasized by P2 in his own research.

Qualitative research with people who have suffered an SCI through doing sports revealed that individuals with strong athletic identity before the SCI can have adaptation difficulties after their

injury [40,41]. Smith (2005) found that most of the participants waited for the invention of a therapeutic method that will allow for a complete recovery. Medical unreliability is not taken into account, and the possibility of remaining disabled for the rest of one's life is rejected [32]. On the other hand, athletic identity has also been reported as a factor able to promote recovery and is considered as a means to enhance long-term adjustment to disability [40]. In a Saban study (2015) conducted among wrestlers at different athletic levels, the national-level wrestlers achieved the highest score in the social domain. The author explains this result by pointing to the fact that national wrestlers are in touch with athletes from different countries through national and international competitions, which is how they meet new cultures, also making them active in social domains [42]. Similar findings were observed among athletes participating in the presented study, who were strongly involved in sports, social life, and motivational speech.

The findings reported by Ciampolini (2017) suggest that even though participation in high-performance sports may offer a stressful and exhausting environment, elite wheelchair tennis athletes from Brazil perceived themselves as having a higher QoL than competitive athletes [1]. In contrast, the results of a study by Yazicioglu (2012), involving 60 participants with physical disabilities, indicated that people participating in sporting activities appropriate to their degree of disability have a significantly higher quality of life and life satisfaction compared to people not involved in any sport [43,44]. Similar results were observed in the present research: even passive participation in competitions and training, and the involvement of a disabled former athlete in work for the benefit of the sport ensures the maintenance of a sports-related identity and is a source of both satisfaction and fulfillment. P1 is not involved in any sporting activity due to functional limitations. However, he has two children who regularly train BMX and is active in this environment, giving motivational speeches (for example for Liverpool players). P2 is in constant contact with the ski jumping community and prepares for the profession of a coach. P3 has started to train dancing in a wheelchair. Thus, the difficult life experiences of people who were forced to end their sporting career because of an accident can be a motivation for other athletes, for example, those experiencing professional burnout [45]. The life testimonies of the participants can be used to build a positive picture of life even after SCI.

5. Conclusions

Despite a traumatic accident, the sudden end of a successful sporting career, and a completely changed life, the respondents in this study positively described their quality of life. However, it is important to note the dependence of the result on the state of exacerbation or alleviation of physical symptoms associated with SCI. Each participant maintains a strong connection to the sporting environment and is socially involved. As celebrities, they are observed by their fans, which motivates them to act. The involvement of athletes after SCI in the sporting environment prevents them from losing their sporting identity and makes it easier to find themselves in a new life situation [42]. This may also serve as an example for other people with severe disabilities, encouraging them to engage in social activities. Former elite athletes with strong psychological characteristics may be a help for the athletes ending their sports careers, who have problems with adaptation into post-sports life.

Differences between respondents may stem from a variety of factors that have not been taken into account, such as different national health care systems and family support; these factors significantly affect the perception of the quality of life [2].

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10.2. Purpose in life of elite athletes after spinal cord injury

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Purpose in Life of Elite Athletes after Spinal Cord Injury

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Abstract: *Background*: Searching for the meaning of human existence is man's fundamental orientation. People are free to find meaning in their lives, and while they are not always free to choose the conditions of life, they are free to choose their attitude toward the conditions in which they find themselves. When people experience an unchangeable situation, the most important thing is the attitude they take toward it. This study aimed to identify the sense of meaning in life among elite athletes after a spinal cord injury (SCI) and to analyze the different aspects contributing to this domain. *Methods*: The study involved five athletes with at least national-level achievements in sports prior to a SCI. The study consisted of an interview using a communicator and filling out two online questionnaires—a personal questionnaire and the Purpose in Life Scale. *Results*: Analyzing the quantitative results, four participants achieved results indicating a high sense of meaning in life, while one participant achieved a significantly lower result. *Conclusions*: What affects one's purpose in life is not so much the objective physical limitation but how much physicality one perceives to have lost as a result of the injury. Elite athletes stay involved in the sporting environment, which prevents the loss of purpose and maintains a sense of meaning at a high level. Both telling the story of your own illness and listening to the stories of others help the process of self-healing.

Keywords: purpose in life; spinal cord injury; athletes; global meaning; qualitative–quantitative study

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1. Introduction

Viktor Frankl is considered to be the only medical expert to have presented a scientifically and empirically based concept of human's search for meaning and existence, as well as putting existential questions at the core of his practice [1]. According to Frankl (2006), human beings' fundamental orientation, taking precedence over all other life projects, is searching for the meaning of human existence, called "the will to meaning" [2]. Meaning can be found in three typical modes, each allowing human beings to transcend themselves: through work and success, through love and the experience of beauty in nature and art, and through suffering. Man is the only species who can show determination to transcend suffering [2]. According to Frankl (1986), "life has meaning up to the very last breath," and when a person experiences an unchangeable situation, the most important thing is the attitude they take toward it [3]. Indeed, the basic tenet of Frankl's theory, repeated approvingly in the secondary literature, is that firstly, people are free to find their lives meaningful; secondly, they are not always free to choose the conditions of life; and thirdly, they are free to choose their attitude toward the conditions in which they have found themselves [4,5]. Frankl was the creator of logotherapy, the aim of which, he claimed, is to allow the individual to move beyond limitations and achieve fulfillment [6]. From his experiences in a concentration camp during World War II, he observed that life has meaning under all conditions and that it is psychologically damaging when a person's search for meaning is blocked [7].

One example of experiencing a difficult, unchangeable situation is an accident leading to damage to the spinal cord, often resulting in chronic physical and mental disorders [8].

Many traumatized people have difficulty coping with disorders and secondary conditions such as infections, chronic pain, persistent fatigue, cognitive disorders, increased mental stress, job loss, and difficulty participating in society. Traumatic life events, such as a spinal cord injury (SCI), affect almost all areas of life and pose a serious threat to the importance that people give to their lives [9]. Such people need to face everyday challenges along with questions on how to live a meaningful life again [9]. For people with a SCI, leaving the hospital and returning to the community, where they must be responsible for their own care, is a particularly stressful and challenging moment [8,10]. During rehabilitation, patients are taught to deal with the physical, mental, and social consequences of living with a SCI. In the process of adaptation and rehabilitation, "global meaning," which refers to global beliefs and global goals guiding people in their lives, may become a source of direction and continuity [9]. The SCI Adjustment Model (SCIAM) assumes that adaptation depends on a variety of factors: biological and medical (gender, age, injury level), psychological (personality traits, general self-efficacy), social (e.g., social support, family relationships, sexual relations, financial security, access to communities and transport), cultural, political, and religious. A person with an SCI evaluates the situation as negative/irrational or positive depending on the factors that modify it: the balance of positive and negative stressors and the level of personal resources they have at their disposal [8]. The next step is to use the coping strategies available. Predisposing and pre-disease factors have a strong influence on adaptation [11]. According to Catalano (2011), environmental factors and individual differences may pose a risk and cause poor adjustment or, conversely, may be a protective factor that increases the chances of adaptive adjustment [12]. Before optimal adjustment occurs, people need to pass through various linear stages of adjustment, which include denial, anger, bargaining, depression and despair, and finally acceptance of the new reality and a desire to grow following the trauma [13]. Feelings of anger, bitterness, sadness, and depression are not barriers to adjustment unless they persist and become chronic obstacles to long-term acceptance and adjustment [8]. Social support and focus on problem-solving (active and positive coping strategies) increase chances of resilience [8].

Numerous studies have been conducted on the connection between disability, hope, and the sense of life. In a research by Smith and Sparkes, 11 out of 14 former rugby players put their hope solely in recovery, and the pursuit of regaining functional capacity becomes the meaning of their lives [14]. Thomson's research indicates that purpose in life (PIL) is a powerful predictor of adjustment after SCI, mediating the effects of personality variables and locus control [10]. The Krause et al. study aimed to identify the relationship between personality and purpose in life, and the risk of multiple causes of death after SCI, using data from the SCI Longitudinal Health Study involving 3070 participants. Purpose in life was found to be a protective factor of mortality, especially for pneumonia and influenza. Krause et al. highlight the key role of promoting purpose in life as a means of increasing longevity [15]. The results of the Mota et al. study show that initiatives to promote greater purpose in life can help protect against the development of physical disability among U.S. veterans [16]. According to the research of Leeuwen et al., purpose in life as well as acceptance cognitions, self-efficacy, and mastery show more variability and seem to be particularly promising as targets for interventions, which may lead to an improvement in mental health in people with SCI [17]. Frank also refers to the sense of meaning in life of people with severe diseases. He points out that telling the story of one's illness helps to understand one's own suffering, which gives meaning to it and thus influences the process of self-healing. At the same time, the storyteller helps others to understand their suffering [18]. A systematic literature review by Peter et al. shows that a high spirituality and PIL are associated with higher life satisfaction and well-being, better mental health and adjustment, as well as reduced mortality [19]. Peter et al. also indicate that research on the psychological resources in SCI is broad but fragmented, while their relationship with participation has rarely been studied. Therefore, further development of resource-based interventions aimed at strengthening people with SCI is recommended [19].

To our knowledge, no research has been carried out to date concerning the sense of life in professional athletes who have suffered SCI as a result of sport practice. The purpose of this research was to determine the feeling of a sense of life among elite athletes after a SCI and to analyze the different aspects that make up this domain.

2. Materials and Methods

2.1. Participants

The following criteria were adopted for inclusion in the project: having sporting achievements minimally at the national level (winning a medal in at least one sporting event of national rank) and suffering a SCI while practicing sport. The invitation to participate in the survey was sent by e-mail to 30 athletes from various countries (USA, UK, Austria, Germany, Poland, Brazil, Australia, and India), meeting the above criteria. A positive answer was obtained from five people who gave an interview and filled out an online form containing a personal questionnaire and the Purpose in Life Scale.

The first respondent (R1) was a three-time world champion in BMX (an acronym for bicycle motocross) dirt jumps. He suffered a spinal cord injury during the BMX Dirt Finals as he performed his original double backflip trick. Head impact against the ground caused a C3/4 (cervical) damage and quadrupedal paralysis. Due to the extent of the damage and functional limitations of R1, it is not possible to take up a sporting activity. The second respondent (R2) was twice the junior world champion in ski jumping. During training, mid-flight, his foot slipped out of the ski boot and uncontrolled landing caused a fall and an SCI at the C6/7 level. R2 currently practices rugby in the wheelchair and skiing. The third respondent (R3) was a European karate champion. She suffered an injury to the spinal cord in the thoracic section (Th11/12) at a sports camp resulting from a fall of several meters. R3 currently practices dance in the wheelchair. The fourth respondent (R4) participated in multiple BMX races. His greatest achievement was winning the first place in the Dual Slalom off-road national competition. While riding in mountainous terrain, he suffered an accident that caused his core to be damaged at the C6/7 level. R4 does not currently practice any sporting activity despite possessing functional capabilities to do so. The fifth respondent (R5) has been involved in motorsport all his life. He had been involved in motocross racing for 8 years, with several wins and podiums along the way. His career in this discipline ended with an accident leading to a core injury at Th6. Due to his functional upper limbs, he obtained a driving license and started to practice race car driving and hand-cycling, with national and international success.

2.2. Methods

The research consisted of two parts: an interview and filling out an online form containing a personal questionnaire and the Purpose in Life Scale (PILS).

2.2.1. Personal Questionnaire (PQ)

The PQ contained basic sociodemographic questions, as well as those concerning the discipline practiced, the greatest sporting achievements, the level of spinal cord injury, involvement in sport after the accident, medications currently being taken, rehabilitation, and pain and respiratory disorders.

2.2.2. Purpose in Life Scale

The feeling of meaning of life has been examined using the PILS by Crumbaugh and Maholic, which assesses the extent to which people see their lives as purposeful and meaningful [20–22]. The test includes 20 questions, which are answered using a 7-point Likert scale, with 1 reflecting extreme feelings of no purpose, and 7—feelings of strong purpose in life [10]. The questions of the PILS are presented in Table 1. Adaptations of the national scales were used.

Table 1. Purpose in Life Scale—general content.

Item	General Content	Item	General Content
1	Enthusiasm/boredom	11	Having reasons to live
2	Excitement in life/routine	12	Role in life
3	Goals and aims	13	Responsibility
4	Purposefulness/senselessness	14	Free choice
5	Variety of each day	15	Preparation for death
6	Will to live	16	Suicidal tendencies
7	Plans after retiring	17	Ability to find purpose
8	Progress in achieving goals	18	Life control
9	Excitedness/despair	19	Attitude to duties
10	Worthwhileness of life	20	Purpose in life

2.2.3. Interviews and Analysis

Semi-structured interviews were conducted by the first author using an internet communicator with the option of recording. The interviews lasting 1.5–2 h consisted of a series of questions that were partly targeted and open-ended. The interviews were recorded and then literally transcribed. The transcriptions were analyzed using the inductive thematic analysis method by A.G. and A.Z.: the former has many years' experience working with people suffering from SCI, and the latter is an experienced clinical psychologist, using qualitative methods in her work. This exploratory approach was best suited to explain the nature of the conceptualized experience of the subjects. There is a growing body of literature exploring a wide range of health issues using inductive thematic analysis, which is considered a useful method of examining various perspectives and observations of unrepresentative groups [23]. The thematic analysis consisted of the following stages: (1) getting acquainted with the data through repeated open reading; (2) searching for content/designation units of a lower order, (3) ordering them into higher-order categories, and then (4) using topics to describe the results obtained from the interviews [23,24]. To identify potential topics, relevant and meaningful interview excerpts were collected first, which were considered as data. The data were systematically verified to provide the name of each identified meaning unit and then placed in a higher-order category. Often the same unit of the meaning of text could be placed in more than one category. All differences in identifying the basic content units, categories, and themes have been resolved through discussions between authors. In this way, the rigor and reliability of recruitment, ordering, and data analysis were ensured and the saturation process was observed [25]. This led to the extension of quantitative data obtained through the PILS to the subjective world of subjects' experiences, feelings, and thoughts. The quantitative and qualitative research projects allowed our team to reach the unique, subjective life perspectives of the SCI athletes surveyed. The final list of topics included the following: self-certification, value of life, and attitude toward death; new life goals; old and new meanings of life; affirmation of life; and perspective of sport in the new life.

2.3. Ethical Aspects

All participants in the study gave their verbal consent to participate in the study, to publish its results, and to be potentially deciphered. The study was approved by the Senate Research Ethics Committee of the University School of Physical Education in Wroclaw, Poland (corresponding ethical approval code: 37/2018, art.27, Dz.U.1997, poz.553).

3. Results

3.1. Personal Questionnaire

Sociodemographic data of the participants, their age, and the level and age of the SCI are presented in Table 2. The respondents come from four countries (two continents: USA and Europe).

Table 2. Study respondents' sociodemographic and health data.

Respondent	Age	Nationality	Marital Status	Profession	Age When Injured	SCI Level	Medications Used
R1	40	British	Divorced	Physical Education Teacher	27	C3/4	Painkillers, antispastic, for neurogenic disorders
R2	28	Austrian	Single	Financial Advisor	24	C6/7	For neurogenic disorders
R3	23	Polish	Informal relation	Dental technology student	18	Th11/12	None
R4	54	Asian American	Married	Chiropractor	51	C6/7	Painkillers, antispastic, antidepressants
R5	30	British	Informal relation	IT network specialist	16	Th6	Antispastic, for neurogenic disorders

3.2. Purpose in Life Scale

The possible score in the PILS ranges between 20 and 140 points. Higher scores suggest a higher perception of meaning in life [26]. Table 3 presents the results of respondents. Respondents 1, 2, 3, and 5 had a high sense of meaning in life, while R4 had a low sense.

Table 3. Participants' score on the Purpose in Life Scale.

Respondent	Score
R1	107
R2	106
R3	131
R4	67
R5	135

3.3. Analysis of the Interviews

The thematic analysis of the interviews revealed five topics. They were called the ways of discussion among our team members.

3.3.1. Adaptation to SCI

Serious damage to the spinal cord forces the self-verification of one's own image and changes the way we think about ourselves, life, and death. In R5 we can see a certain transcendent/timeless affirmative attitude to life, while in R4 we can see the evolution of thinking about life, from the desire to be deprived of life to finding the value of life as such, even in suffering and disability. Often acquiring a disability forces such verification, changes the thinking about life, and creates the need to think differently about the value of life. Even without fitness, life has a value.

R5: "I stopped breathing for some time [. . .] actually, it changed my attitude toward life. [. . .] When I opened my eyes, I felt so lucky to be alive. I did not exactly know what I went through but I had a vague idea because I felt such a terrific pain. It was the attitude which helped me want to recover, to move on, of course. I set the horizon that I wanted to chase and to follow in my life but it was a daily attitude that I wanted to get something to move forward. It did not matter if it was a small or big thing. I was told that I will be paralyzed, it was like 'well, ok,' shocking a bit. The range of opportunities for disabled people after this is huge."

R4: "I'm trying to rebuild my life. I'm not sure what it means right now. I struggled with depression during this time. From the very beginning, I wished they would have just put me to sleep. At first, it was the pain, I just couldn't take the pain. I wished they would just take me behind the hospital and shoot me like a horse. I just didn't want to suffer like that anymore. [. . .] I still have a lot of physical pain but the destruction of my life is what is a large part of my depression right now. With this injury, my life just turned over like a

basket. I lost my career, lost my retirement, along with my career [. . .]. I'm starting to think about what I could do with my life. You are encouraging me, there is something there. This injury destroyed my self-worth and my self-esteem. My whole value as a person has been at least shaken, if not crushed. I'm to rebuild this whole era of confidence and things."

3.3.2. New Life Goals

All participants wondered how their lives changed after the accident and during the treatment, and integrated their experiences, which resulted in a new identity after the SCI. They set themselves short- and long-term health, family, and social goals that were inspiring and motivating for them and changed the perspective of the experienced events.

R1: "After some time I was able to keep myself standing, it was so good for my mental condition, it was so inspiring and motivating."

R2: "I was thinking the whole time the more I'm able to do, the more I have to call myself lucky, although I'm paralyzed from that day on."

R3: "And if I do have some specific objectives, I do not know, to settle down after graduation. To start a family, and I think these are the goals of life, just like any other person's. Above all, it is about being happy and not making your health worse. I was thinking about taking up ballroom dancing professionally."

Individual health objectives are integrated with social ones. Often the "murderous" work on the maximum improvement of one's own functional capabilities is accompanied by a motivating thought of sharing one's experience with others in a similar situation. Living with a new human/sportsman identity with the experience of SCI, further social activity, is a life concept and mission to improve the quality of life and motivate other disabled people to go on living. The respondents pointed out that having a passion despite traumatic experiences and their consequences attracts other people and gives them hope.

R1: "I think I have done everything for myself already, so it is time to think about other people. That is what keeps me going. My goal is to make my talk, to adjust to different people, to be able to adjust my talks whoever I am speaking to, business people, children, whoever. My goals are to get me to ride a motorbike. [. . .] If you are passionate about something and you do it someone will follow. It is what happened to me with helping others. I'm passionate so they follow me to help others."

R2: "In my situation now, my goal is to improve my walking on crutches, or without crutches. [. . .] I feel that there is still much possible. I also want to raise the focus of the public when they build things to think about the disabled, but this is [a] long-term project."

Some participants emphasized that they are in the process of either seeking or renewing their life goals, and others that they have already found them. A serious obstacle for R4, even a psychological barrier to achieving new life goals, is the lowered, depressive mood he experienced both before the accident and now.

R4: "I've dealt with depression a lot throughout my adult life. I had it before. Just got so, so much worse since my injury, with my injury it has been consuming. [. . .] I started breaking it in a couple last months, so maybe there is hope [. . .] The depression and some of the negative feelings that I have been describing have slowed down my socialization. It's just in a couple of last months that I have become more outgoing and more communicative, even to friends and family. [. . .] I didn't think I would have a future, so why rekindle a relationship if there is no future, it's still in evolution, that's for sure [. . .] My goals are somehow to resume some type of volunteering. The reason I got into that career was that I wanted to help people. I hope that I can find something still that can do that. I was thinking that with that nutritional aspect, maybe I will be able to help even more people than before."

R5: "I am always on the lookout for new goals. So, at the moment my big goal is to compete the best I can, with my disability, in racing. That is my biggest goal, to make the most of this opportunity."

3.3.3. Old and New Meaning of Life

The search for, discovery of, and having meaning in life is proving to be the key driving force behind life with a disability. Love and relationships with the loved ones and acting for others define the discovered purpose. Acting for the benefit of other people becomes a life mission for SCI athletes. [. . .] Entering into the perspective of another person, often more difficult than one's own, frees one from the egocentric existence in the circle of one's own thoughts about oneself and experiencing one's own suffering.

R2: "You know it is important for me to do some things, because when you do some things you do not get into the struggle of thinking about the whole situation. Of course, there are some days when this is normal, and this is OK. When you think about it all the time, you have to really watch out not to get into this struggle which pulls you down all the time. Having some things to do prevents that."

R1: "After my accident, I wore a shirt saying 'Stay Strong' on the front and my name on the back. [. . .] It was such a strong message for other people. A clothing company reached out to me and spread it everywhere. It was great. [. . .] that gave me a good feeling and I started doing more [. . .] There is a bad, little skate park. They should do something to get those kids out of shoplifting, dealing drugs, etc. The skatepark is unusable, it is badly built. If I would do that, with the skate park, I would feel amazing. For these kids, it is the last chance. That makes me feel good, makes me feel a purpose."

Some participants particularly emphasized the importance of family and relations with the loved ones in finding meaning in life, and efforts to fight depression and hopelessness. Love for children and the loved ones, and the awareness of love and concern for those closest to them, have become a discovery, independent of the unfavorable circumstances, of the meaning of life even with a disability.

R1: "My kids, yeah. That's the main thing that keeps me going. You have to do what you have to do."

R4: "My motivation is the people that I loved and who supported me through this. I don't want to let them down. That's the reason why I think I'm still alive right now. How can I let them down? So, it starts with the closest to me, my wife and my family, even people from my past, going back to the BMX community."

R5: "I do not remember much, but the constant thing was that my family and friends were there to support me and that was key. There was a time, there was a well couple of European championships where all of my friends would turn up to the hospital and would watch it all with me. They were always there for me, my family was always there for me."

In opposition to the above statements, there is the reflection of R4, who is on a journey, searching and discovering the meaning of life after the accident. In this process, the patient's condition is not insignificant.

R4: "It opened my mind that there are still some areas that I can use my knowledge and experience in education. [. . .] I'm doing this volunteering and trying to just stay involved in groups and organizations. You never know who you may come across and what door it may open. [. . .] I'm just getting at this closed path that says that I can't do anything, I have no value, I have no worth, I'm overcoming that barrier to open my eyes to the possibilities of it. What I need to do soon is to learn to pursue these possibilities."

3.3.4. The Affirmation of Life as Such

Despite a serious injury and a completely changed life, the study participants appreciate life and find joy. They see the possibilities they still have before them. As celebrities, they realize that their activities are followed by their fans and their attitude can give hope to others, as well as shaping their approach to the difficult situations they experience.

R2: "I just try to make people smile because I know this is great for me too. I'm so happy I can be a person who people are proud of. I think I'm really privileged, I'm so happy I can be today a person who spreads some good news from time to time."

R5: "I feel I am a very lucky person because of what I have. Because I was able to turn my passion into my profession. This is a great privilege, believe me. I wanted to get my

driving license, finish college, get to the university, tick things off the list. So I was ticking and thinking about what will be next [. . .] I've been incredibly lucky to have had the opportunities that I had, but there is a very prominent saying at the end of the book, 'with a positive attitude positive things can happen to you,' with a negative attitude you are not going to achieve anything. It is like in *Shawshank Redemption*, with a good attitude you can achieve anything you want."

Participant R4 begins to recognize and appreciate the functional capabilities one has, despite high spinal cord injury, while R5 highlights the fact that many people are not aware of the possibilities they could use.

R4: "I wish it were more so, it's hard for me to appreciate it more. But I start to embrace it and appreciate the fact that I can stand it, which minimizes the many secondary consequences of the injury."

R5: "People just do not know about stuff. They are not depressed or something, they just do not know about the opportunities around them. Over the years I came across people, I met them for the first time. And we have a conversation, like, how they got injured etc. What do they do now? And when I say that I am a racing driver and they are really surprised. There is a stigma that disabled people cannot do a lot of stuff. I am a driver, and I am helping them, too. That makes people's eyes go big. The way I see the world is different but everything is possible. When there is no lift you just need to get down the stairs, it is possible, the process is quite long but it is possible."

3.3.5. Meaning of Sport in Life

Sport in life before the accident was the basis for character formation and is now the strength of such formed character to live with a disability. The importance of sport in the new life after an accident is not diminishing but is different. R1 gives motivational speeches to various groups of athletes and supervises his sons' BMX bike training. R3 has a strong connection with the sporting environment, which prevents the loss of one's sporting identity and makes it easier to find oneself in a new life situation.

R1: "I started doing more talks. I went to the Liverpool football club for a couple of weeks. They had this lady I knew from racing when I grew up. She is in charge in the premier league so I get to go there and get along with many people."

R3: "Karate before the accident taught me perseverance and diligence, which later became very useful in this daily fight. And last year I missed sport very much. I wanted to train something but I didn't know what exactly. I talked to people from the university sports association to set up a section for people with disabilities, and this year they succeeded, because they set up an integration section precisely for people with disabilities. One such section is the disabled dance section to which I belong. I have been learning how to dance starting this year, and recently I managed to show it in front of a larger audience, because I danced at a medical university beauty contest."

Another participant sees the sport he practiced before the accident as the way to shape his character, including the qualities of perseverance and finding the purpose and meaning of life. It is the sport that gives identity and personality to the athlete.

R4: "I have gravitated towards sport, it has done a lot for me, it helped build a lot of my character, my drive, even my ability to go to school, it taught me how to set goals, how to go towards them, and to go beyond these goals to higher goals, those are things that I picked up. I think sport has helped me through life. When I was younger, I came from an area where I could have been involved in problems, drugs, gangs, and things of that nature. Sport always drew me somewhere else, I felt that's what sport can do. Now it's different, I don't need it to keep me out of trouble so to speak but it gives you some more passions in life that you never experienced. Those passions, those good feelings . . . life would be much harder without them."

4. Discussion

The aim of our study was to explore purpose in life and the factors that form this domain, a concept not studied among elite athletes after a SCI.

Analyzing the quantitative results of the purpose in life test, four participants achieved results indicating a high sense of meaning in life (PILS between 106 and 135 points), and one participant significantly lower (PILS = 67). In the available literature, the highest results ($M = 111$) were achieved by Danish patients of rehabilitation centers in the Leeuwen et al. study, and the result remained stable over time (studies repeated after 6 months and 1 year) [17]. In the Krause et al. study, with 309 participants with traumatic SCI, the median result of the PILS was 100 for men and 93.8 for women [27]. In the Rossini study, with 79 veterans diagnosed with SCI, who were receiving medical treatment at a large midwestern VA medical center, the median of the PILS result was 98.9. The researchers found that sense of life was not correlated with the severity of the participants' medical injury. However, it was significantly and negatively related to a perceived loss of physical functioning [28]. In our study, R4, despite a better functional condition than the others, felt its disability and limitations more significantly than the others due to severe pain and depressive personality. This indicates that not an objective physical limitation but how much physicality one perceives to have lost as a result of the injury affects purpose in life and each person decides what makes his or her life meaningful. Most respondents scored higher (the average PILS result for R1–R5 was 109.2 and, excluding R4, 120) than in similar studies available in the literature. As an outlier, we can consider the R4 score, which could be caused by the following factors: depressive personality prior to the accident; lack of involvement in social and sporting life, resulting in loss of the athlete's identity, which, as he indicates, had a significant role in his life before the accident; the relatively short period that has passed since the SCI; and the age of the respondent making adaptation difficult. The low PILS score in R4 seems to be related to his depressive personality, both pre- and post-traumatic. A significant positive association was found between adaptation and retrospectively evaluated pre-injury personality. Specifically, patients who reported that their pre-injury personality was depressive or anxious-related also presented less adjustment [19,29]. The Kleftaras and Psarra studies showed a statistically significant negative correlation between the level of an individual's depressive symptomatology and the total meaning of life that he feels [30]. R4 also points to the significant role of sport in shaping one's personality, so a low PILS result may arise from a lack of this aspect in life and loss of purpose. Other participants remain connected to the sporting environment as a coach, motivator, or active participant at an amateur or professional level, which may explain the high score. Active participation in sport after an accident is also an aspect that gives meaning to life and prevents the loss of sporting identity. R3 emphasizes that sport before the accident has helped her develop perseverance and diligence. According to Kop and Jecauc, high emotional intelligence, which consists of personal competencies (self-awareness, self-regulation, and motivation) and social competencies, correlates with high sports performance [31]. It can therefore be concluded that a strong personality helps one to continue to function after SCI. This may result in greater perseverance and goal orientation, as well as greater resilience to the circumstances despite starting a changed life. Some studies revealed that individuals with strong athletic identity before the SCI can have adaptation difficulties after injury, while others showed that athletic identity has been reported as a factor that can promote recovery [32–34]. The results and statements of our studies support the second thesis.

Our results confirm those reported in unrepresentative samples suggesting that peri-traumatic factors (social support, pre-traumatic personality) appear to play a key role in the development and maintenance of post-traumatic responses [35,36]. Moreover, by coping with adversities such as SCIs, individuals appear to be able to experience growth, underlining the suggestion that the traumatic outcome of the disease is multidimensional, covering both negative and positive aspects [37–39]. In particular, this supports the thesis that self-perceived post-traumatic growth is both a coping effort and a coping effect [39].

A study by Saunders et al. indicated that increased time since injury was a protective factor in the occurrence of major depressive disorder [40]. R4 had the shortest time since SCI of all subjects. His depressive tendencies and lowest sense of meaning in life may be explained by the stage of transition from depression and despair to acceptance of the new reality and desire to grow. Another factor contributing to R4's low scores may be his age. He is the oldest of all the subjects and shows the greatest difficulty in adjusting to the new situation. Similar findings were noted in a study by Geyh et al. involving 511 participants after SCI, where participants with higher age at injury and shorter time since injury showed lower purpose in life and more negative experiences [41]. People experiencing SCI at an older age, with depressive tendencies before the accident and in the disability acceptance phase, are a group that should receive special psychological and social support.

During the interview, R4 becomes aware of the opportunities he has despite SCI and discovers the meaning of life with a disability. This is consistent with Frank's observations as well as the findings of Smith and Sparkes, who highlight the importance of the story-teller's telling his own story [18,42]. At the same time, R4 himself notes that he has limited social contacts and the fact that he participated in the research and had the opportunity to tell his story helped him to see that there is something there. Therefore, it can be said that the higher scores obtained by the other research participants can be related to good and frequent social contact and telling others about their SCI experiences, which helped their self-healing process.

In contrast to those studied by Smith and Sparkes, the participants accept the fact of moving in a wheelchair and, in addition to the rehabilitation undertaken, focus on social engagement [14]. This attitude is also highlighted in research by Byra, who noted a positive correlation between disability acceptance and post-traumatic growth and an enhancement of mental health and social adaptation in those who were positive about disability [43,44]. Previous studies indicate that the applied rehabilitation programs and interventions are a preventive factor against reducing the sense of life in people after SCI and in other diagnostic groups [10,45]. Frankl shows how physicians can be guides in their patients' personal search for meaning by providing care-oriented conversations engaging patients amid tragedy-ridden circumstances [6,46]. Until today, his concept has been the basis and starting point for a deeper understanding of man's condition and people's search for meaning in life [1]. The presented group is characterized by a high sense of meaning in life, and the analysis of factors that give them meaning may be a direction and guidance in support programs for people with SCI. Similar findings in the Thomson study, that activity and sociability are positively associated with purpose in life, can also be observed among the participants of this study [10]. The results presented here show that finding meaning in life prevents the adverse psychological effects of difficult and especially tragic situations. That is why it is so important to take into account their somatic, mental, as well as existential problems when helping people with SCI [47]. The study presented by us fits perfectly into the current existential research by exploring the meaning of life among elite athletes with SCI. It is also linked with rehabilitation psychology, where the development of a trend of exploring the positive psychological aspects of life after the occurrence of the disability is observed [28].

5. Conclusions

A goal in life is a powerful predictor of adaptation to SCI and this is not dictated by the severity of the injury, but rather by generating a goal in life that affects mental health [17]. A person living with a SCI who feels a lesser degree of impairment may report a greater sense of life, as well as deriving a greater value from daily activities [28]. It is we who give purpose and meaning to life, regardless of circumstances.

A strong personality in outstanding athletes is helpful to continue functioning after SCI. Staying involved in the sporting environment prevents the loss of purpose and maintains a sense of meaning at a high level. This may also serve as an example for other people with severe disabilities, encouraging them to stay engaged in social and sport activities. Both

telling the story of your own illness and listening to the stories of others help the process of self-healing.

Rossini et al. indicate that gaining knowledge from people living with a SCI, in many ways, provides a microcosm by which we may better understand the resilience, adaptability, and dignity of the human spirit [28]. It is therefore important to carry out further research among SCI patients from different backgrounds to improve the knowledge of how to deal with this traumatic event, to discover the meanings that generate better mental well-being and, on this basis, to implement actions aimed to help such people adapt and improve their quality of life.

Limitations

The relatively small number of participants in this study should be considered as a limitation. While the number of participants is appropriate in numbers for thematic analysis, it is relatively low for the generalization of the findings, which is why caution is advised. More surveys are clearly expected in larger populations, even when the populations are unrepresentative. Nevertheless, the study presents the first in-depth purpose in life study of championship-level athletes with SCI.

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10.3. Is self-efficacy related to the quality of life in elite athletes after spinal cord injury?

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Is Self-Efficacy Related to the Quality of Life in Elite Athletes after Spinal Cord Injury?

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Abstract: Background: A spinal cord injury (SCI) is a traumatic event that affects every aspect of life: physical, mental, economic, and social. The main aim of this study was to investigate self-efficacy, quality of life, and their correlations among outstanding athletes who have suffered spinal cord injuries, and to determine whether these individuals have specific psychological characteristics that contribute to a better quality of life. Methods: The study involved nine athletes with at least national-level achievements in sports prior to an SCI. Participation in the study consisted of an interview via an online communicator, followed by an online questionnaire consisting of a personal questionnaire and two scales: The World Health Organization Quality of Life Scale (WHOQoL-BREF), and the General Self-Efficacy Scale (GSES). Results: Spearman's correlation showed a correlation between general self-efficacy, perception of quality of life, and satisfaction with own physical health, as well as psychological resources and environmental support. Conclusions: Involvement in an environment that was important to the injured person before the accident, in either a passive (in the absence of functional capacity) or active form, promotes a greater sense of self-efficacy and good QoL, regardless of the time that has passed since the accident, and despite high levels of pain or secondary health issues. To fill the gap in professional long-term healthcare services for athletes after SCIs, intervention programs should be considered that support self-efficacy, which is an important factor that can be subject to improvement.

Keywords: quality of life; self-efficacy; spinal cord injury; elite athletes; sport

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1. Introduction

There is no question that spinal cord injury (SCI) is a traumatic experience causing a complete change in one's life. In terms of physical health, the injured person not only experiences limitations in sensory and motor functions, but also a range of other disorders related to the basic functions of the urinary, digestive, respiratory, and cardiovascular systems, as well as sexual activity, sleep, spasticity, and chronic pain [1–5]. Work activities are often disrupted, resulting in economic decline and social isolation [6]. There have been numerous studies on the consequences of SCIs—including psychological problems—and rehabilitation programs aimed at managing the effects of SCIs [7–12]. However, the benefits of these interventions are limited due to the extent of the challenges posed by SCIs, along with the associated social disadvantages and chronic pain [13,14]. De Roon-Cassini (2009) points out that what matters most is not the physical limitation of a person after their SCI, but how the impairment is perceived by the injured person [15]. Individuals who feel less impaired may report a greater sense of life and derive greater value from daily activities [16]. Quality of life (QoL) among people with SCIs depends not so much on factors related to disability (e.g., completeness of core injury, degree of motor impairment) as on factors that are modifiable by therapy, such as self-efficacy (S-E) [13]. The QoL scales, which present the judgment of people about their health life status in different domains,

and S-E, which assesses one's belief about the ability to cope with a variety of difficult situations, are both largely subjective measures [17–20]. Hampton (2001) found that S-E was a very significant contributor to QoL when compared with disability variables and, irrespective of social support, people with higher levels of S-E appeared to be more satisfied with their lives than did people with low S-E [21,22]. Longitudinal studies suggest that S-E is a potential determinant of adjustment outcomes in the long term [23].

Ackery et al., (2007) indicate that the number of spinal cord injuries has been increasing in recent years, which may be due to the desire to perform increasingly extreme stunts and the level increase in competitive sports [24]. The study of Chan et al., (2016) identified six countries where sports account for more than 13% of SCIs (Russia, Fiji, New Zealand, Iceland, France, and Canada), as well as the highest risk sports of diving, skiing, rugby, and horseback riding [25,26]. Hockey, skiing, diving, and American football almost exclusively produce cervical SCI injuries, while more than half of the injuries in horseback riding and snowboarding are thoracic or lumbosacral injuries [25].

The main objective of this study was to investigate the correlation between S-E and QoL in a group of outstanding athletes who have experienced spinal cord injury while being active athletes, and to determine whether they have specific psychological resources that influence a better quality of life [27]. The results provide insight into the unique world of elite athletes, potentially contributing to a better understanding of whether such people with intrinsic personal attributes may show resilience related to SCIs [28].

2. Materials and Methods

Participation in the study consisted of an interview via an online communicator, followed by an online questionnaire consisting of a personal questionnaire and two scales: The World Health Organization Quality of Life Scale (WHOQoL-BREF), and the General Self-Efficacy Scale (GSES). Before the interview, all participants (P) read a consent form—which included the title and purpose of the study, explanation of its procedures, and confidentiality rules—and then gave informed verbal acceptance of the conditions presented (Please see the Supplementary Material). All interviews were conducted by the first author, who has years of experience both in clinical work with patients after SCIs and as their assistant. The interview was semi-structured, wherein the first part was conducted using the dialogue method, allowing the respondent to speak freely, while the second part included questions about motivation, goals in life, and social activities, among others. Each interview lasted approximately 1.5–2.5 h, was recorded and then transcribed, and its content was used to analyze the results. Consent to conduct the research project was obtained from the Senate Research Ethics Committee of the University School of Physical Education in Wroclaw, Poland (corresponding ethical approval code: 37/2018, art.27, Dz.U.1997, poz.553).

The following eligibility criteria were adopted for the study: sports achievements at the minimum national level (winning a medal at national competitions) before SCI, spinal cord injury (tetraplegia or paraplegia), and consent to participate in the study. An additional criterion was the knowledge of either the Polish or English language at a level allowing the respondent to communicate.

The personal questionnaire included questions about the participants' demographic aspects (gender, nationality, age, marital status), injury (circumstances of injury, level of spinal cord injury, level of pain experienced daily), and sport practiced (type, best sports performance, sports activity after SCI).

Pain experienced daily was assessed using the 0–10 Numerical Rating Scale of Pain (0 = no pain, 10 = most intense pain).

Quality of Life was examined using the abbreviated version of the WHOQoL scale (WHOQoL-BREF). Adaptations of national scales were used. This scale is currently considered to be the most appropriate instrument for assessing the quality of life in people with SCIs [29,30]. Each item is described by a five-level Likert scale, where participants indicate satisfaction (5: strongly agree, 4: agree), neutrality (3: neither agree or disagree), or dissat-

isfaction (2: disagree, 1: strongly disagree). The two first items are examined separately and inform the researcher about one's overall perception of one's quality of life and health satisfaction. For the first question (Q1) of the questionnaire: "How would you rate your QoL?", participants who answered "very poor", "poor" or "neither poor nor good" were classified as having a negative perception of QoL, while those who answered "good" or "very good" were classed as positive. The next 24 questions describe 4 domains: physical health (D1), psychological (D2), social (D3), and material aspect (D4) [31]. For the analysis of the WHOQoL-BREF results, the raw point values obtained for the individual domain were recalculated on a scoring scale ranging from 4 to 20, in line with the World Health Organization recommendations [32]. The results are scaled in a positive direction—the higher the score, the higher the respondent's quality of life in each domain [31].

The General Self-Efficacy Scale (GSES) is a 10-item psychometric scale that assesses optimistic self-beliefs to cope with a variety of difficult demands in life, as well as own ability. For example, item 1 is phrased: "I can always manage to solve difficult problems if I try hard enough". The scale was created by Matthias Jerusalem and Ralf Schwarzer in 1981 and has been widely used in numerous studies worldwide [19]. Each item is rated on a four-point scale, where 1 = not at all true, and 4 = exactly true. Responses to the 10 items are summed to produce a total score, ranging from 10 to 40 points, where a higher score indicates higher self-efficacy [33]. Unlike other scales that assess optimism, this one specifically addresses personal agency.

The study conducted was qualitative. In order to deepen the analysis, calculations were performed to extract common features and correlations. This was possible due to the homogeneity of the group of participants in terms of the adopted criteria. The mean and standard deviation were calculated separately for questions Q1, Q2, and the individual domains of WHOQoL-BREF, GSES, and pain. The correlation between domains of QoL and S-E, as well as their relationship with pain and the number of years since the injury, were examined using Spearman's rank correlation, with $p < 0.05$ indicating statistically significant results. All calculations were performed using Statistica version 13.1 in the Biostructure Research Laboratory of Wroclaw University of Health and Sport Sciences (certificate ISO 9001).

3. Results

3.1. Participants

Figure 1 shows a flowchart of participants' inclusion in the study. After analyzing information about spinal cord injuries among prominent athletes, and selecting individuals who met the study criteria, an invitation to participate in the project was sent by e-mail to 32 athletes from 5 continents who had suffered spinal cord injuries, from the following countries: USA, UK, Canada, Brazil, Poland, Austria, Australia, Japan, and South Africa. Ultimately, nine participants from Europe and North America participated in the study.

Table 1 lists demographic and injury-specific information on the participants. The age of the participants ranged from 24 to 55 years. Participants were selected from among both tetraplegic and diplegic patients. All participants were successful, at a minimum, at a national level before the accident, with three participants being world champions and one a European champion. Three subjects did not participate in sports after their SCI, for two of whom this was due to the amount of damage and lack of functional capacity. After their accidents, six subjects participated in sports, competing in national and international competitions, and two of them became Paralympic champions.

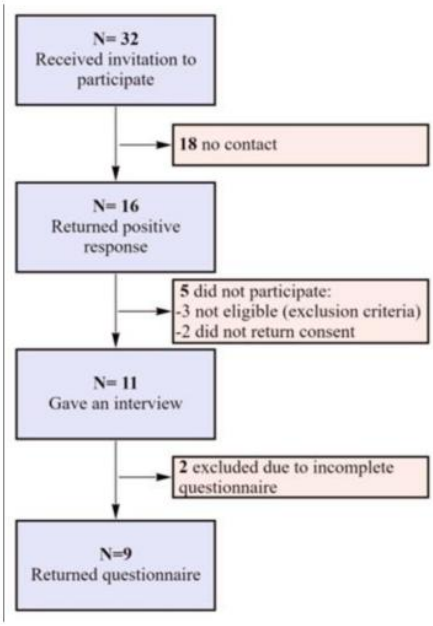

Figure 1. Flowchart of participant enrollment.

Table 1. Study respondents' sociodemographic and health data.

Patient	Age	Continent	Marital Status	Years Since Injury	SCI Level	Discipline before SCI	Sport after SCI
P1	41	Europe	Divorced	14	C3/4	BMX dirt jumps	No
P2	24	Europe	Informal relationship	6	Th11/12	Karate	Wheelchair dancing
P3	29	Europe	Single	5	C6/7	Ski jumping	Rugby, skiing
P4	55	North America	Married	4	C6/7	Mountain bike racing	No
P5	31	Europe	Informal relationship	15	Th6	Motocross	Car racing
P6	37	Europe	Informal relationship	16	C4/5	Rugby	No
P7	45	North America	Married	14	Th12/L1	Mountain biking	Wheelchair basketball
P8	40	Europe	Informal relationship	17	Th11	Judo	Canoe
P9	47	Europe	Single	15	L1/2	Speedway	Hand cycling

3.2. Quality of Life and Self-Efficacy

Table 2 shows the participants' scores on each scale and its components, along with the mean and standard deviation. For the overall quality-of-life question, the mean value was Q1 = 4.11, which is a positive rating. Only two participants (P1, P4) rated their quality of life negatively; these two individuals were also not satisfied with their health status. In a comment on the WHOQoL-BREF scale, participant P1 indicated that he had been in poor health for the past 4 weeks, which is the period referred to by the scale questions. Despite the severe pain experienced by participant P1 daily, according to his response in Q5, this pain does not prevent him from doing what he needs to do. The lowest scores in all domains of quality of life as well as the GSES scale were obtained by participant P4, who indicated in his interview that he already had a depressive personality before the accident, which worsened after the SCI. It is puzzling that participant P8 had one of the lowest scores on the self-efficacy scale, despite his high sporting achievements after the accident—that is, winning a gold medal at the Paralympics and silver twice at the world championships. At the same time, participant P9, who is a three-time Paralympic gold medalist and a five-time world champion in hand-cycling, had the highest GSES score. There were no statistically significant differences in the WHOQoL-BREF and GSES scale scores among post-injury athletes (n = 6) and non-athletes (n = 3), so no such division was used in the statistical analysis.

Table 2. WHOQoL-BREF and GSES scores.

Scale		P1	P2	P3	P4	P5	P6	P7	P8	P9	Mean ± SD
WHOQOL	Q1	3 *	4	4	2 *	5	5	5	4	5	4.11 ± 1.05
	Q2	1 *	4	5	2 *	5	3	5	4	5	3.78 ± 1.48
	D1	14	18	11 *	11 *	20	15	19	16	14	15.33 ± 3.24
	D2	13 *	19	15	7 *	17	15	19	15	20	15.56 ± 3.97
	D3	13 *	20	12 *	9 *	17	17	19	16	20	15.89 ± 3.83
	D4	16	17	16	13	20	17	20	13	20	16.89 ± 2.75
GSES		31	34	33	20 *	36	33	34	28 *	39	32.22 ± 4.89
Pain		7 *	3	7 *	6 *	0	0	1	3	7 *	3.77 ± 3.03

* Lowest scale scores and highest level of pain.

Spearman's correlation showed that self-efficacy was related to the general perception of quality of life (Q1) and satisfaction with one's physical health (Q2), as well as psychological resources (D2) and environmental support (D4) (Table 3). In contrast, it is interesting that neither pain nor time since the accident was significant for the QoL or GSES measures. In the context of the specificity of the group after spinal cord injury, the lack of correlation between self-efficacy and self-assessment of physical health (D1) and social relationships (D3) is noteworthy.

Table 3. Spearman's rank-order correlation.

	Q1	Q2	D1	D2	D3	D4	GSES
GSES	0.786844 *	0.736262 *	0.309322	0.781181 *	0.593220	0.870334 *	
Pain	−0.545816	−0.112136	−0.435410	0.043669	0.094842	−0.233482	−0.181061
Years since injury	−0.124132	−0.209849	−0.235302	−0.110663	−0.058826	−0.042938	−0.218495

* Correlation coefficients that are significant ($p < 0.05$).

4. Discussion

In this study, we presented the quality of life and self-efficacy of nine top athletes after SCIs, and at the same time attempted to search for the correlations between these measures. The relationship between quality of life and self-efficacy has been widely studied [13,21–23,27]. However, to the best of our knowledge, this study is the first to assess this aspect among elite athletes. We hypothesized that outstanding athletes, despite spinal cord injury, possess special intrinsic personal attributes that translate to good quality of life and high self-efficacy. This hypothesis is line with the findings of Kopp's (2018) meta-analytical investigation, which showed that high emotional intelligence correlates with high athletic achievement [34–36].

According to previous studies, individuals with SCIs had poorer quality of life and lower self-efficacy compared to the general population [12,18,23,27]. However, in other research among athletes, higher quality of life was declared by people with spinal cord injuries participating in sport more often and at a higher level [37]. In a study by Ciampolini (2017), who evaluated the quality of life among Brazilian wheelchair tennis athletes, higher perceptions in the physical domain and total QoL were found among an elite group [38]. Despite the traumatic accident and the necessity of a complete change of lifestyle—two subjects had to give up sport completely, and six had to give up their previous sport—the participants evaluated their quality of life positively.

Undoubtedly, spinal cord injury affects physical health and, thus, influences the low scores in this domain. Participant P1 gave the lowest score in the overall assessment of his health due to the presence of decubitus ulcers and the need to remain in bed during the study period, which also influenced some of the lowest scores in the psychological domain and the deterioration of social relationships. The remaining participants (except for P3 and P4), despite para- and tetraplegia, were generally satisfied with their health. There was also no correlation found between the amount of core damage and the results of the

WHOQoL-BREF and GSES scales. This confirms the findings of previous studies, where it was shown that health satisfaction is influenced more by secondary health issues than by primary accident-related damage [15,21,23,27].

According to previous studies, pain has a strong impact on quality of life [1,2,39]. However, in our study, there was no correlation between pain and QoL. Furthermore, participant P9, with one of the highest scores for pain experienced daily, also had the highest scores on the quality of life scale.

Previous studies have indicated that major problems after SCIs include social disadvantages arising from the impairment and social participation restrictions [8,13]. In Unver's (2015) study of wrestlers at different athletic levels, the national-level wrestlers achieved the highest scores in the social domain [40]; the author explains this result by pointing to the contacts national wrestlers have with athletes from different countries through competitions. Similar findings were observed among athletes participating in the study presented here who, because of their high sporting achievements before the accident, could count on the support of the sporting community, fans, and participation in sporting life in both active (sport for the disabled) and passive (motivational speeches, role of coach) form, making them active in the social domain.

P4 had the lowest scores on the QoL scale, self-efficacy assessment with high levels of pain, and the shortest time since the accident. Depressive tendencies were also noted in the interview, as indicated by the respondent himself. In studies by Kennedy et al., (2008) and Diemen et al., (2017), higher scores for depression and anxiety were correlated with lower scores for perceived resourcefulness and self-efficacy [41,42]. According to Middleton (2007), people with negative thinking may be at higher risk of negative medical outcomes, such as pain [13]. Furthermore, patients who reported their pre-injury personality as having been depressive presented less adjustment to their SCI [23,43].

Studies by Sklett et al., (2018) and Treasure (1996) indicate that self-efficacy is associated with performance in ski jumping and among wrestlers, respectively [44,45]. Despite spinal cord injury, our subjects' GSES scores were higher compared to previous studies involving SCI patients [33].

Prior research has produced data to suggest that S-E is associated with the perception of quality of life, general health quality, and WHOQoL domains, as also indicated by the results of our study [13,21,22]. Unlike previous studies, no correlation of S-E with the level of pain was observed, which may be related to the characteristics of the study group. The findings of previous studies suggest that sports with long durations of physically intense activity are associated with increased ability to tolerate pain [46]. The participants in this study indicated sport as having played a significant role in shaping their personalities.

The participants were characterized by a long time having passed since their accidents (>4 years). This may be the reason for the lack of correlation between the GSES and psychological or social domains, as subjects had already passed various linear stages of adjustment, leading to an optimal adjustment to SCI [47]. Only one participant (P4)—with the shortest time since the accident (4 years)—appeared to have yet to finally accept his new reality and express a desire to grow following the trauma, as is also indicated by his results. According to Catalano (2011), environmental factors are a protective element, increasing the chances of adaptive adjustment [10]. This is consistent with our results, where the correlation of the GSES scores with the environmental domain of the WHOQoL scale was shown. According to Hampton's studies (2000, 2001), regardless of social support, individuals with higher S-E levels were found to be more satisfied with their lives than those with lower S-E levels [21,22].

Previous studies on self-efficacy show that QoL among individuals with SCIs is more dependent on the attitude a person adopts than on permanent factors related to their disability—that is, the level or completeness of their impairment [15,21,23,27]. Such findings offer hope for improving the QoL of persons with SCIs, despite the lack of impact on the disability itself.

The original intention of this study was to collect a group of subjects from all over the world so that the results would be global in scope, regardless of nationality or healthcare system. Due to the specific group of subjects and the small number of individuals meeting the inclusion criteria, we were unable to fully achieve this goal, which can be seen as a limitation. However, reaching out to nine outstanding athletes with spinal cord injuries, coming from four countries located on two continents, gives some insight into the situation under study. It also seems that increasing the number of participants would allow us to observe possible differences between athletes who participate in sports after their injury and those who do not continue a professional sports career.

5. Conclusions

The results of this study indicate that S-E is significantly correlated with the general perception of QoL, health, and psychological resources, as well as environmental support. Sport positively influences the wellbeing of individuals after SCIs regardless of whether it was played before and currently is not, as it encourages the development of traits that allow for better adjustment. Involvement in an environment that was important to the injured person before the accident—in either a passive (in the absence of functional capabilities) or active form—promotes greater self-efficacy and good QoL, regardless of the time elapsed since the accident, and despite high levels of pain or secondary health issues.

The results of this study offer a suggestion for clinical professionals to motivate patients to undertake active rehabilitation by showing examples of outstanding athletes who, despite the shock they experienced after their injuries, were able to adapt to their new situation, resulting in a good quality of life. We also believe that intervention programs should be considered that support S-E, which is an important factor that is subject to improvement.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The datasets used and/or analyzed during this study are available from the corresponding author upon reasonable request.

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10.4. The relationship between cognitive performance and quality of life in elite athletes after spinal cord injury

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The Relationship between Cognitive Performance and Quality of Life in Elite Athletes after Spinal Cord Injury

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Abstract: Background: The present investigation was designed to determine cognitive performance and quality of life (QoL) in a group of elite athletes who sustained spinal cord injury (SCI). Methods: nine participants suffering a SCI participated in the study. Different cognitive functions were evaluated through the following tests: COWAT, Digit Span, Stroop color–word and QoL through the WHOQoL-BREF scale. Results: Generally, participants positively assessed their overall quality of life and health status. Although the tests conducted indicate reduced cognitive function among the athletes, it did not affect the reduction in QoL. Single correlations between the results of cognitive tests and QoL could be treated as coincidental. Conclusions: Despite the observed decline in selected cognitive functions, the participants positively assessed their quality of life and physical health.Reduced cognitive functioning could be influenced by the impact of sleep-disordered breathing, pain, depressive disorders and medication. This indicates the need for an individualized approach to define the patient's deficits, needs and best care. Further studies with a larger group of participants are needed.

Keywords: cognitive performance; cognitive disorders; spinal cord injury; elite athletes

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1. Introduction

In addition to the loss of motor and sensory function below the level of injury, spinal cord injury (SCI) is associated with a number of other consequences, which also typically include cognitive impairment. Cognitive functioning refers to, among other things, a person's ability to process thoughts [1]. The term cognitive function mainly refers to areas related to thinking such as memory, ability to learn new information, speech and communication. The information processing pathway successively includes stimulus perception, selective attention, working memory and executive functions [2].

Data on the prevalence of cognitive deficits in patients with spinal cord injury vary due to the definition of cognitive deficits used and the procedures used to assess and measure them in a given study [1]. It is estimated that cognitive disorders (CD) affect between 30 and up to 60% of the adult population after an SCI [1,3,4]. The risk of CD in individuals after an SCI is 13 times higher than in individuals without such injury [3,4]. Dovler et al.'s (1997) study demonstrated distinct patterns of CD in individuals with chronic SCI which affected cognitive areas such as processing speed, new learning memory and executive functioning [5,6].

There are various causes to explain the occurrence of CD in individuals after an SCI. Often, spinal cord injury is accompanied by brain injury and/or an upright injury to the cervical spine (whiplash), which leads to brain dysfunction [4,7]. Respiratory problems during sleep are common in individuals with tetraplegia. Anoxia due to obstructive sleep apnea or shallow breathing leads to reduced neuropsychiatric function [8]. Decreased saturation at night affects concentration, verbal attention, cognitive flexibility, short-term

and long-term memory [9]. A significant number of drugs, such as antispastic, analgesics, sleep aids and antidepressants, interferes with cognitive function [7,10]. In a study by Davidofi et al. (1992), depression was observed in 33% of people after a spinal cord injury, which reduces somatosensory input, thus reducing cortical arousal and cognitive performance [1]. A serious problem in people after a spinal cord injury is neuropathic pain, which is difficult to treat [11]. Chronic pain causes a decrease in the density of nerve tissue in the cerebral cortex, which is responsible for pain perception (a loss of about 0.5% per year), a decrease in cerebral flow (mainly in the thalamus and basal nuclei), which clinically manifests itself as behavioral changes and cognitive impairment [12]. Studies in mice have shown that extensive post-traumatic inflammation associated with SCI results in neuronal loss, cellular dysfunction through increased endoplasmic reticulum stress and impaired neurogenesis in areas associated with CD and depression [13].

Molina et al. (2021) demonstrated the occurrence of cognitive impairment in individuals after SCI already in the subacute phase, which worsened over time [14]. This may not only affect the disruption of the first, most intensive and most important stage of rehabilitation, but may also affect the individual's quality of life and their eventual integration into society [14,15]. This is supported by the findings of Craig et al. (2017), who found that the development of negative mood states was a significant problem in individuals with cognitive impairment after their transition to the community, at a time when personal resources were severely limited [4]. There are many papers about the relationship between QoL and cognitive impairment in various disease entities, such as mild thyroid hormone deficiency, migraine, schizophrenia, cancer, multiple sclerosis and cardiac goiter, but a review of the literature shows—to our best knowledge—that there is a lack of research determining the relationship between cognitive impairment and quality of life in individuals after an SCI [16–21]. According to Badenhorst et al. (2018), the QoL of individuals with rugby-related SCI was higher than that of non-sporting participants of other studies [22]. Therefore, we hypothesize that a group of elite athletes after SCI are characterized by positive quality-of-life scores and cognitive functions above average and that there are correlations between them.

The purpose of this study is to evaluate cognitive functions in outstanding athletes after an SCI and to demonstrate whether there is a relationship between cognitive level and quality of life in this group of individuals.

2. Materials and Methods

2.1. Participants

The participants were elite athletes who had suffered spinal cord injuries. The inclusion criteria adopted for the study were: informed consent to participate in the study, spinal cord injury (paraplegia or quadriplegia) and having won a medal in a sporting event of national or international rank before the SCI. For unhindered communication to be possible, all the participants also had to speak either Polish or English. Before starting the project, we analyzed information from media and national sports committees about elite athletes that had suffered SCIs in the last 20 years and selected 32 potential candidates who met the inclusion criteria from the following countries: Australia, Japan, Austria, Poland, UK, South Africa, USA, Canada and Brazil. They were invited by email, which contained a project description and the rules for the implementation of the survey. The participants' inclusion process in the study is shown in Figure 1. The athletes who responded positively to the invitation were interviewed online prior to the study to verify criterium eligibility and to schedule an interview and cognitive function testing.

Sociodemographic information related to the participants is presented in Table 1. Before the spinal cord injury, all participants had won a medal at least on the national level, with five of them having been World or European champions. After their SCI, most of them had continued their career in sports in another discipline according to their functional capacity. Six athletes were competing in national and international competitions and two of them became Paralympic champions.

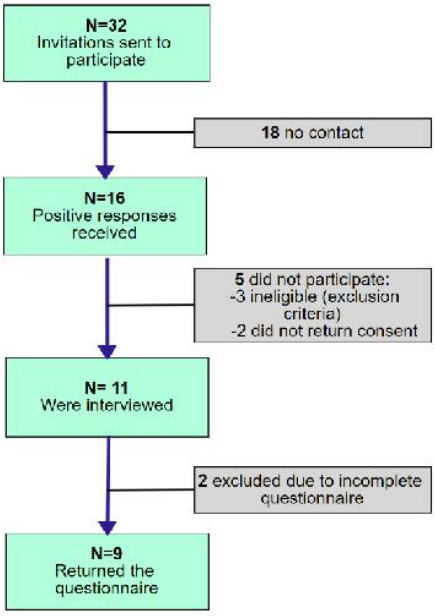

Figure 1. The flowchart of participant enrollment.

Table 1. Sociodemographic data of study participants.

Participant	Age	Gender	Nationality	Marital Status	Discipline before SCI	Sport after SCI
P1	41	Male	British	Divorced	BMX dirt jumps	No
P2	29	Male	Austrian	Single	Ski jumping	Rugby, skiing
P3	24	Female	Polish	Informal relation	Karate	Wheelchair dancing
P4	37	Male	British	Informal relation	Rugby	No
P5	55	Male	American	Married	Mountain bike racing	No
P6	45	Female	Canadian	Married	Mountain biking	Wheelchair basketball
P7	31	Male	British	Informal relation	Motocross	Car race
P8	40	Male	Polish	Informal relation	Judo	Canoe
P9	47	Male	Polish	Single	Speedway	Hand cycling

Table 2 shows health information about the study participants. They were selected among both tetraplegic and diplegic patients. Two of them had SCIs above the 4th cervical vertebra with diaphragmatic paralysis resulting in respiratory disorders during sleep (hypopnea and apnea). The main medications taken by patients after SCI were analgesics, antispastic, antidepressants and those used in neurogenic disorders, e.g., neurogenic bladder. In Table 2, the total number of drugs taken belonging to these groups is given.

Table 2. Health data of the participants.

Participant	SCI Level	Years since Injury	Pain	Brain Injury/Whiplash	Hypopnea/Apnea	Medicines (Number)
P1	C3/4	14	7	B	Yes	8
P2	C6/7	5	7	W	No	1
P3	Th11/12	6	3	No	No	0
P4	C4/5	16	0	W	Yes	1
P5	C6/7	4	6	No	No	3
P6	Th12/L1	14	1	W	No	1
P7	Th6	15	0	B	No	2
P8	Th11	17	3	No	No	0
P9	L1/2	15	7	No	No	0

2.2. Procedure

The athletes who participated in the study were interviewed via an online communicator. After the interview, they were asked to fill out an online personal survey and the WHOQoL-BREF (abbreviated version of the World Health Organization Quality of Life Scale). Prior to the interview, the participants were introduced to a consent form which contained all the detailed information about the project, including purpose, procedures and practical use of the collected data. The interviewer also presented the confidentiality rules; all athletes gave informed verbal consent for participation in the study and publication of the results in a way that allows them to be identified.

The first author, who has clinical experience and has been working for 12 years with patients after SCIs, conducted all the interviews. At the end of the interview, the second author, who is a clinical psychologist with 21 years of experience, conducted the following tests to assess cognitive functions: COWAT (Controlled Oral Word Association Test), Digit-Span and Stroop color–word. Each interview lasted approximately 1.5–2.5 h, was recorded and then transcribed. In the next step, the content was used to analyze and interpret the results. The plan of the research project was accepted by the Senate Research Ethics Committee of the Wroclaw University of Health and Sports Sciences, Poland (corresponding ethical approval code: 37/2018; art.27, Dz.U.1997, poz.553).

2.2.1. Demographics and Injury Characteristics

Sociodemographic data were collected using a personal questionnaire. In addition to personal information, the questionnaire included questions about athletic performance, information regarding spinal cord injury (level and time of injury) and factors that may influence the occurrence of CD, such as coexisting brain injury or whiplash, sleep-disordered breathing (hypopnea or apnea) and medications taken. Pain experienced daily was assessed using the 0–10 Numerical Rating Scale of Pain (0 = no pain, 10 = most intense pain).

2.2.2. Quality of Life

In order to assess the quality of life, the abbreviated version of the WHOQoL with national adaptation scales was used. There are investigations confirming this scale is recognized as the appropriate instrument for assessing the QoL of people with SCIs [23,24].

The WHOQoL BREF is composed of questions describing 4 domains (physical health—D1; psychological—D2; social—D3; and material aspect—D4). Additionally, it gives information about subjective overall perception of the quality of life and physical health satisfaction [25,26].

The participants were requested to answer the questions using a five-level Likert scale as follows: agree (5—strongly agree; 4—agree), neutral (3—neither agree nor disagree), or dissatisfied (2—disagree; 1—strongly disagree).

The collected raw point values were recalculated in each aspect of the WHOQoL-BREF scale on a scoring scale ranging from 4 to 20, according to the WHO recommendations [25]. A high score value indicated a high participant's quality of life [26]. The Cronbach's alpha coefficients for WHOQOL-BREF domains were: D1 $\alpha = 0.76$; D2 $\alpha = 0.81$; D3 $\alpha = 0.71$; and D4 $\alpha = 0.9$ [25].

2.2.3. Cognitive Performance

COWAT

Phonemic verbal fluency was assessed using the COWAT tool [27]. This test is one of the basic methods of neurocognitive assessment; during the test, the functions of speech, memory and executive processes are involved. The method provides an index of mental productivity, language processes and the functioning of, primarily, the frontal and temporal lobes [27,28]. The participant of the study was asked to give oral associations of different letters of the alphabet, saying all the words that can start with a given letter within 60 s. Three letters, F, A and S, with progressively increasing levels of associative difficulty, were sequentially presented as stimuli. The difficulty level of each letter was defined as the

relative frequency of words beginning with that letter. Responses were recorded, words were transcribed and then counted. The standard score was quantitative and included the number of words matching the given criterion and errors, i.e., out-of-category responses and repetitions. The internal consistency of COWAT was $\alpha = 0.83$ [29].

Digit Span Test

The Digit Span test consists of two parts, a digits forward test (DForw) and a digits backward test (DBack). DForw captures the efficiency and capacity of attention. The DBack test is a performance task that is particularly dependent on working memory [2,9]. In the DForw test, participants were asked to repeat, in the same order, a series of random digits that were read to them. The initial length included two digits. After successfully completing a given trial by repeating six digits with up to one error, the participant was presented with the next pair with a single digit increment. The test ended when the participant misrepresented numbers on more than one trial with the same span or successfully repeated five nine-digit sequences. The recorded score (DForw) was the number of sequences correctly recalled. The DBack test has the same procedure as the DForw test except that patients repeated the digits in reverse order. The DBack score was the number of correct reverse sequences. The Cronbach's alpha coefficient for the test was $\alpha = 0.74$ [3].

Stroop Color–Word Test

Cognitive interaction inhibition ability, attention, cognitive flexibility, processing speed and verbal and working memory were examined using the Stroop color–word test. Three pages of the test were sent to the participant and were sequentially displayed by them on a computer screen during the test. In the word-reading trial, the tested person read as quickly as possible the words denoting the names of colors written in black print on a white sheet of paper in 10 rows of 5 words each. In the color-reading trial, participants read the print color of the individual "xxxx" sequences. In the word–color (interference) trial, they named the print color of individual words with the print color not matching its designator. The test score represented the number of words read within 45 s in each part of the test. The Cronbach's alpha value of the Stroop color–word test ranged from 0.71 to 0.88 [30].

2.3. Data Analysis

To the best of our knowledge, the present study was the first attempt to analyze the quality of life and cognitive function of individuals after SCIs. Therefore, we calculated the mean and standard deviation of questions Q1 and Q2 and the individual domains of WHOQoL-BREF, as well as individual tests assessing cognitive function (COWAT, Digit-Span test and Stroop color–word test). To assess the relationships between the included variables, Spearman's rank correlations were used, with $p < 0.05$ indicating statistically significant results. In the following procedure, in order to exclude the occurrence of false statistically significant results, in view of the large number of correlations, a correction Bonferroni method was applied. In addition, using the alpha correction method, the minimum group size required to detect a moderate (0.3) and a large effect size (0.5) was determined. All the analyses were performed in Statistica (ver. 13.1) at the Biostructure Research Laboratory of Wroclaw University of Health and Sport Sciences (certificate ISO 9001).

3. Results

3.1. Quality of Life

Table 3 shows the participants' scores in two general items (Q1—overall perception of QoL; Q2—health satisfaction) and four domains (D1—physical health; D2—psychological; D3—social; D4—material aspect), along with the mean and standard deviation. The mean value for Q1 was 4.11, which indicates a positive assessment of overall quality of life (results >3). Only two participants (P1 and P5) rated their quality of life negatively (results $\leq$3); these two individuals were also not satisfied with their health status. In a comment on the WHOQoL-BREF scale, participant P1 indicated that he had been in poor

health for the past 4 weeks, which is the period referred to by the scale questions and it had the effect of impairing both physical and mental well-being, as well as social isolation, with the need to stay in bed. The lowest scores in all domains of quality of life were obtained by participant P5, who indicated a depressive personality, which worsened after the SCI.

Table 3. WHOQoL-BREF scores (* lowest scale scores).

Scale		P1	P2	P3	P4	P5	P6	P7	P8	P9	Mean ± SD
WHOQOL	Q1	3 *	4	4	5	2 *	5	5	4	5	4.1 ± 1.1
	Q2	1 *	5	4	3	2 *	5	5	4	5	3.8 ± 1.5
	D1	14	18	11 *	15	11 *	19	20	16	14	15.3 ± 3.2
	D2	13 *	19	15	15	7 *	19	17	15	20	15.6 ± 4.0
	D3	13 *	20	12 *	17	9 *	19	17	16	20	15.9 ± 3.8
	D4	16	17	16	17	13 *	20	20	13 *	20	16.9 ± 2.8

3.2. Cognitive Performance

Table 4 shows the participants' scores on tests assessing cognitive functions, COWAT, Digit Span and Stroop color–word, along with the mean and standard deviation. The lowest scores on the COWAT were obtained by P1 and P9, while both Digit Span and Stroop color–word tests were obtained by participant 4. In contrast, the highest scores on all cognitive tests were obtained by P8.

Table 4. COWAT, Digit Span (DForw and DBack) test and Stroop color–word test—correct answers (* lowest scale scores).

Scale		P1	P2	P3	P4	P5	P6	P7	P8	P9	Mean ± SD
COWAT	F	6 *	12	9	11	11	9	10	12	6 *	10.0 ± 2.0
	A	6 *	8	8	9	10	15	11	18	6 *	10.0 ± 4.0
	S	6 *	11	17	7	9	7	13	19	9	11.0 ± 4.6
	All	18 *	31	34	27	30	31	34	49	21 *	31.0 ± 8.8
Digit Span	DForw	7	7	6 *	3 *	7	7	7	8	5	6.0 ± 2.0
	DBack	4	6	4	3 *	4	4	2 *	6	2 *	4.0 ± 1.0
Stroop color–word test	Word correct answers	92	90	86	54 *	77	97	80	127	82	87.0 ± 19.0
	Color correct answers	54	58	42 *	42 *	60	76	71	75	70	61.0 ± 13.0
	Word and color correct answers	36	53	46	36	31 *	51	60	53	52	46.0 ± 10.0

Spearman's correlation showed that overall satisfaction with physical health and the physical domain was related to the Stroop color–word subtest and pain was related to one of the subtests of the COWAT (Table 5). The Bonferroni correction reduced the significance level to $\alpha = 0.0007$. Therefore, it should be assumed that no statistically significant relationships between the studied variables were demonstrated, but this is not equivalent to a conclusion that these relationships would not be observed in a larger group of participants. After applying the alpha correction, it was determined that the minimum sample size for at least a medium effect (0.3) should be $n = 19$.

Table 5. Spearman's rank order correlation.

		COWAT				Digit Span		Stroop		
		F	A	S	All	DForw	DBack	Word	Color	Word–Color
WHOQoL	Q1	−0.18	0.17	−0.05	0.07	−0.44	−0.60	−0.16	0.29	0.46
	Q2	0.03	0.17	0.34	0.37	0.00	−0.17	0.17	0.53	0.79
	D1	0.28	0.51	0.08	0.37	0.36	−0.02	0.27	0.59	0.73
	D2	−0.14	−0.07	0.10	0.08	−0.21	−0.23	0.17	0.40	0.67
	D3	−0.01	−0.12	−0.11	−0.12	−0.19	−0.17	0.12	0.32	0.58
	D4	−0.39	−0.11	−0.25	−0.16	−0.39	−0.62	−0.14	0.28	0.44

Table 5. *Cont.*

	COWAT				Digit Span		Stroop		
	F	**A**	**S**	**All**	**DForw**	**DBack**	**Word**	**Color**	**Word–Color**
Pain	−0.21	−0.67	−0.13	−0.46	0.10	0.33	0.27	−0.15	−0.12
Medicines	−0.09	−0.07	−0.57	−0.43	0.23	−0.09	−0.24	−0.10	−0.37

4. Discussion

The study presents the quality of life and cognitive functioning of nine top athletes after SCIs and, at the same time, attempts to search for the correlations between these measures. To date, there has been research on the relationship between quality of life and cognitive function in many disease entities, but, to the best of our knowledge, this study is the first to assess this aspect among population of patients with SCIs, besides analyzingelite athletes.

Despite the traumatic spinal cord injury and the many years passed since the accident (>4 years), the study participants generally described their quality of life as positive. Only two participants rated their quality of life negatively (scores ≤ 3), which may be explained by P1's poor health over the past 4 weeks and P5's depressive personality. P5 was also characterized by the shortest time elapsed since the accident. Saunders et al. (2012), in their study among 801 adults after SCIs, indicated that increased time since injury is a protective factor in the occurrence of major depressive disorders [31]. A similar finding was observed in this study, as the participants accepted their disability and had adapted to their new living situation because of the time that had passed since the accident. Six participants had changed their sport and were still physically active, while the others participated in sports life as coaches and motivational speakers. This may explain the high scores in the psychological, social and environmental domains of the quality-of-life scale. In addition, Byra et al. (2019), in their study, indicated a positive correlation among disability acceptance, post-traumatic growth, an enhancement of mental health and social adaptation in those who were positive about disability [32,33]. It is also worth noting that the majority of participants ($n = 6$), despite having biplegia or quadriplegia, were generally satisfied with their health. P5, despite having a better functional condition than others, rated his physical health negatively due to severe pain and depressive personality. This confirms the results of previous studies that concluded that it is the perceived physicality that has been lost as a result of the injury—and not an objective physical limitation—that determines satisfaction with one's health [34]. Previous studies also indicated that health satisfaction was influenced more by secondary health issues than by primary accident-related damage, which is also indicated by the results of our study [35–37].

In the COWAT, according to normative data by age, all participants except P8 scored significantly below the average for their age category, which indicates decreased memory functions and executive processes [38]. Among the athletes, the lowest scores were obtained by P1 and P9. Of the factors that may affect cognitive dysfunction, P1 was characterized by breathing disorders while sleeping, coexisting brain injury during the accident, severe pain and the highest number of medications taken (eight medications). In contrast, P9 experienced severe pain while not taking any pain medication, which may explain his low score on the COWAT, compared with the other participants. Comparing the results of the respondents in cognitive tests with available studies by age in the Digit Span test, only P4 ranked significantly below the average for their age category and P7 and P9 in the backward subtest for their age category [39]. The rest of the participants ranked above average, indicating normal performance and capacity of attention and working memory. The lowest scores in both the Digit Span test and Stroop color–word test were obtained by P4, which may be due to high spinal cord injury at the C4/5 level, occurrence of respiratory distress during sleep and coexistence of whiplash during the accident. The highest scores in all tests were obtained by P8, in whom no potential causes of cognitive impairment were observed. P8 also rated his quality of life and his physical health positively. At the same

time, P8 trained canoe professionally and, while performing the cognitive tests, he was also in the process of preparing for the Paralympics. Thus, high scores in cognitive tests may be a result of physical activity, which increases the level of circulating BDNF protein, which has neuroprotective and neurotrophic effects and positively influences cognitive processes [40].

Although the research study conducted indicated that some cognitive functions decreased among athletes, the study did not show a statistically significant correlation with decreased QoL. However, the fact that there was no significant correlation between the included variables in this study should be treated with great caution due to the small group of participants. It is also important to note that, to date, there has been no study of individuals with SCIs that has examined the relationship between cognitive functions and QoL; therefore, there is no reference point for conducting larger analyses in other, larger groups of participants. Considering this limitation, it is important to note that this occurrence would not necessarily be absent if similar studies were to be conducted on a larger sample. Furthermore, we are dealing with outstanding athletes where specific external and internal factors could be considered as determinants affecting the results. As elite sportsmen, they had definitely more opportunities to benefit from, such as various types of social support, wide interest from media and friends, continuous rehabilitation and the possibility of frequent leaving home, which eventually results into the fact of participation in social life without exclusion. In a study by Wang et al. (2016), 120 patients with migraine-associated vertigo showed an increased prevalence of white matter lesions in the brain, resulting in marked cognitive impairment and, consequently, a significantly impaired quality of life [17]. In addition, a study by Molina-Gallego et al. (2021) on a group of 100 participants showed that decreased cognitive functioning could negatively affect the quality of life and social interactions, but it was not observed in our study [14]. The athletes were characterized by the long time that had passed since the accident. This may be the reason for the lack of statistically significant correlation between cognitive level and QoL, as respondents had already passed various linear stages of adjustment, leading to optimal adjustment to SCI. SCI patients receive much less professional support and assistance after hospital discharge and their cognitive, emotional, social and mental resources that are necessary for independent coping and adjustment are challenged [4]. On the other hand, Lanzillo et al. (2016), in a study involving 54 people with multiple sclerosis, showed that cognitive decline was mainly influenced by physical disability and poor social engagement, concluding that affective relations and psychological flexibility could have a protective function on CD [19]. The participants, despite the long time that had passed since the injury, participated in sport life in both active (sport for people with disabilities) and passive (role of coach, motivational speeches) forms, which, despite the deterioration of some cognitive functions, allows them to maintain affective relations. High social support in elite athletes may influence the lack of statistical significant relationship between reduced level of some cognitive functions and positively rated quality of life. A protective factor may also be high emotional intelligence, which consists of personal competencies (self-awareness, self-regulation and motivation) and social competencies, characterized by athletes with high sporting achievements [41]. A strong personality can help to continue to function after SCIs and cause greater resilience to the circumstances despite starting a changed life [42].

The analysis of the present study was conditioned by the limitations resulting from the specific study group of elite athletes with SCI. One of them is the size of the study group, which was due to the prepared inclusion criteria. Although a twenty-year period was considered and cases of SCIs in outstanding athletes were analyzed, nine such individuals were ultimately able to be included in the project. The authors realize that the small number of subjects is a limitation, but this is the first study of quality of life and cognitive functions among people after SCI, as well as among outstanding athletes after SCI. Therefore, the results of the study can be regarded as valuable and interesting material for further comparisons. However, it should be kept in mind that the study participants, as individuals

with outstanding athletic achievements, were characterized by special conditions that may be relevant to the final interpretation of their results. Although the study shows the relationships between the included variables, it can be seen as a starting point for further, more extensive research. Secondly, due to the fact that they lived in different continents, the only possible form of conducting this type of study was remote. Thirdly, the form of the study had to be tailored to the participant with the least functional abilities, thus with the complete exclusion of the use of upper limbs, which significantly limited the possibility of using tests assessing cognitive performance. This limiting factor has also been pointed out by Pasipanoydia et al. (2021), highlighting the need for development and validation of neuropsychological test batteries for screening and assessment among patients with limited motor abilities [15]. Factors that were not considered may also contribute to CD, such as alcoholism, substance abuse, previous learning problems, or emotional problems. Although all participants were outstanding athletes, this group could not be treated as homogeneous due to the different information collected in the study. The consequence of the above is the difficulty in obtaining a result allowing unambiguous conclusions to be drawn and generalized to the entire population.

Despite these limitation, this study is the first to determine the relationship between QoL and cognitive disorders among SCI patients, as well as in a group of elite athletes. Given the inextricable link between cognitive status and QoL, in view of the inconclusive results, further studies involving a larger number of participants with SCI are indicated to help inform and guide interventional approaches. A larger number of participants would allow a broader analysis of the results in subgroups to be performed, such as level of SCI, pain, respiratory distress and medications taken. The introduction of a control group of non-athletic SCI patients is also an option for future studies.

5. Conclusions

Despite the traumatic accident, the participants in this study positively evaluated their health and quality of life. The careful analysis of the results obtained by the athletes suggested that their reduced cognitive functioning could have been influenced by the impact of sleep-disordered breathing, pain, depressive disorders and medication. This underscores the need to treat each patient individually to diagnose their problems and the reasons underlying them.

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10.5. Restored life of elite athletes after spinal cord injury

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Restored Life of Elite Athletes after Spinal Cord Injury

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Abstract: Spinal cord injury (SCI) affects every aspect of human life: medical, psychological, social, material. People with SCI face a variety of secondary conditions (e.g., chronic pain, urinary tract infections, cognitive impairment) that place a significant emotional burden, resulting in an increased risk of depression and reduced quality of life. The purpose of this study was to better understand the coping strategies and to identify factors that promote or hinder the successful adjustment of elite athletes after SCI. Individual semi-structured interviews were conducted with eight top athletes after spinal cord injury. The interviews were recorded, transcribed, and then thematically analyzed using MAXQDA software. Thematic analysis identified the following categories: coping, athletic identity, and adjustment. The results of the study indicate that loss of functional ability does not cause loss of athlete identity. Elite athletes live a life consistent with this identity, attempting to maintain it despite the loss of physical fitness. Involvement in sports provides meaning and is a positive factor in the process of disability acceptance, which is essential in the process of adjustment to injury and also provides group belonging.

Keywords: spinal cord injury; elite athletes; adjustment; athletic identity; coping

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1. Introduction

Spinal cord injury carries a number of consequences affecting every dimension of human life: health, psychological, social, material [1]. In addition to loss of functional abilities, sensory deficits, bowel and bladder dysfunction, respiratory and circulatory dysfunction, and sexual activity occur [2]. In addition, people after SCI struggle with secondary conditions such as chronic pain (musculoskeletal, neuropathic, visceral), spasticity, urinary tract infections, cognitive impairment, chronic fatigue, and thermoregulatory disorders [2,3]. These factors represent a significant emotional burden and cause an increased risk of depression (which occurs in 22.2% of patients on average) and consequently reduced quality of life [4–6].

Most epidemiological data on spinal cord injury are extrapolations based on data collected in clinical settings [7]. The global incidence of traumatic SCI (TSCI) is estimated at 23/million people in 2007 (179,312 cases per annum worldwide) [8]. The prevalence of TSCI worldwide ranges from 236 to 1298/million population, and in addition to regional variations, there has been a trend of increasing prevalence worldwide in recent decades [9]. The highest proportion of TSCI caused by sport was in Russia (32.9%), followed by Fiji (32.0%), New Zealand (20.0%), Iceland (18.8%), France (15.8%), and Canada (13.1%) [10]. The sports that cause the greatest number of TSCIs in the most countries were: diving, skiing, rugby, horseback riding, football, cycling, and motor racing [10].

Such a traumatic injury and change from ones previous life requires adjustment to the new situation. There are several theories explaining the adjustment process after SCI: stage theory (Trieschmmann, 1980), response shift theories (Spranger and Schwartz, 1999), the transactional model of stress and coping (Lazarus and Folkman, 1984), and

the SCI Adjustment Model (SCIAM; Middleton and Craig, 2008) [11–14]. The latter was developed to explain all aspects of SCI adjustment by combining different models and theories. SCIAM assumes that adaptation occurs under the influence of biological, medical, psychological, social, cultural, political, and religious factors, between which there is a synergistic relationship [15]. Pre-disease factors also have a strong influence on adjustment, which occurs through the assessment of the situation in relation to modifying factors at a given time and the use of available coping strategies. When positive stressors prevail and personal resources are high, the patient perceives the situation as positive [15]. In a study by Elfström et al. (2002), three psychometrically valid and reliable ways of coping with SCI were identified: acceptance of the physical consequences of the injury, fighting spirit including efforts to maintain independence and make the best use of life in spite of the circumstance, and social resilience, which is maladaptive [16]. Optimal adjustment is led by a process that consists of the following stages: displacement, anger, bargaining, depression and desperation, and ultimately acceptance of the new reality and posttraumatic growth [11]. As long as the negative feelings of anger, sadness, and depression are transient, they do not constitute an obstacle to long-term adjustment. The development of resilience is facilitated by social support and focus on problem-solving [15].

Despite the significant emotional burden in patients after SCI, previous studies indicate health long-term psychological adjustment of individuals in this group [17–20]. In a study by Bonanno et al., with the participation of 233 participants, it was shown that most patients after SCI have significant psychological resilience [18]. Tedeshi and Calhoun (1995) introduced the term posttraumatic growth (PTG), which refers to the post-trauma achievement of a number of benefits, deeper understanding of the world or oneself, and personal growth through ways of coping with difficulties [21]. The results of Byr's (2016) study in a group of 169 individuals with paraplegia show that in terms of PTG, the highest degree of positive change was indicated in appreciation of life [22]. In this study, coping strategies such as religion, focusing on the problem, humor, and hope are 60% responsible for PTG [22]. Kalpakjian et al. studied 824 participants, with most of them experiencing PTG, and the biggest change they observed was the discovery that they were stronger than they thought [23]. This phenomenon discovered in a group of athletes with disabilities can be transferred to a group of healthy athletes finishing their careers. Smith and McManus point to the shortcomings of programs that foster positive adaptation in athletes who are ending their athletic careers and the opportunity to utilize the experience of former athletes in developing programs to help minimize stress and make appropriate lifestyle choices [24].

There are numerous studies on the involvement in adapted sports of individuals after SCI and the physical as well as psychosocial benefits of this, including improved quality of life, life satisfaction, better community integration, and the development of new friendships [25–28]. In a qualitative study by Hawkins et al., participants were elite badminton players [29]. In contrast, research on athletes who have sustained a spinal cord injury as a result of sport has been undertaken extremely rarely. In a study by Sparkes and Smith involving 14 male athletes who had suffered SCI during rugby games, the majority of subjects felt strong hope associated with a belief in recovery [30]. Badenhorst et al. describes the quality of life of 90 individuals with rugby-related SCI as higher than the control group [31].

However, to the best of the authors' knowledge, no self-reported quality of life study has been conducted to date using interviews with world-class athletes who have suffered a spinal cord injury; therefore, the material collected is a valuable and unique source of information. The purpose of this study was to explore the life histories of the subjects and to provide a thorough analysis that allowed for a deeper and better understanding of the coping strategies they use and to identify factors that promote or impede the successful adjustment of elite athletes after SCI.

2. Materials and Methods

This paper deals with the life histories of eight prominent athletes who suffered spinal cord injuries. A descriptive–qualitative method was used in the study.

2.1. Participants

The following inclusion criteria were used: sport achievements at the minimum national level (winning a medal in at least one sporting event of national rank) before SCI, spinal cord injury (tetraplegia or paraplegia), and informed consent to participate in the study. Due to the nature of the study, participants included in the project had to know either Polish or English to a degree that allowed free communication and understanding.

Based on the available internet sources, sports committees on spinal cord injury among elite athletes were reviewed. Consequently, 32 subjects meeting the above criteria were selected and sent invitations to participate via e-mail. Sixteen subjects responded positively to the invitation, but three did not meet the inclusion criteria and five did not return the consent to participate in the study. Sociodemographic and SCI data are presented in Table 1.

Table 1. Sociodemographic data of study participants. C-cervical spine, Th–thoracic spine, L–lumbal spine.

Participant	Age	Gender	Nationality	Level of SCI	Years since Injury	Discipline before SCI	Sport after SCI
P1	41	Male	British	C3/4	14	BMX dirt jumps	No
P2	29	Male	Austrian	C6/7	5	Ski jumping	Rugby, skiing
P3	24	Female	Polish	Th11/12	6	Karate	Wheelchair dancing
P4	37	Male	British	C4/5	16	Rugby	No
P5	45	Female	Canadian	Th12/L1	14	Mountain Biking	Wheelchair basketball
P6	31	Male	British	Th6	15	Motocross	Car race
P7	40	Male	Polish	Th11	17	Judo	Canoe
P8	47	Male	Polish	L1/2	15	Speedway	Hand cycling

To conduct the study presented in this paper, the authors obtained the consent of the Senate Research Ethics Committee of the University School of Physical Education in Wroclaw, Poland (corresponding ethical approval code: 37/2018, art.27, Dz.U.1997, poz.553). Study participants gave informed consent both to participate in the study and to the publication of its results in accordance with the guidelines established by the Declaration of Helsinki.

2.2. Study Design

The final participants in the study were elite athletes who were interviewed and returned completed sociodemographic questionnaires. Figure 1 shows the study design along with the recruitment stage of the participants.

The study used semi-structured interviews, which is the most commonly used method of qualitative research in the health care field [32]. Due to the fact that participants live in different regions of the world, the interviews were conducted via instant messenger, recorded, and then transcribed. This made it possible to conduct each interview at a time and place most convenient for the participant, which contributed to a more productive interview process. Prior to the interview, participants were given a consent form, which included a description of the project, its purpose, and rules of ethics and anonymity, which they read and verbally agreed to at the beginning of the interview. The interviews were conducted by the second author. The duration of each interview was between one and a half and two hours. The interviews consisted of key questions that helped define the areas the authors wanted to explore while allowing the interviewee to speak freely. The

flexible format of interviewing allows for the discovery and development of information important to the participant [33]. Once verbal consent to participate was obtained, the interview began with a general, simple question, "Please tell us something about yourself", in order to help the respondent feel at ease, build trust and rapport, and ultimately obtain valuable and worthwhile data addressing more sensitive and difficult topics [33].

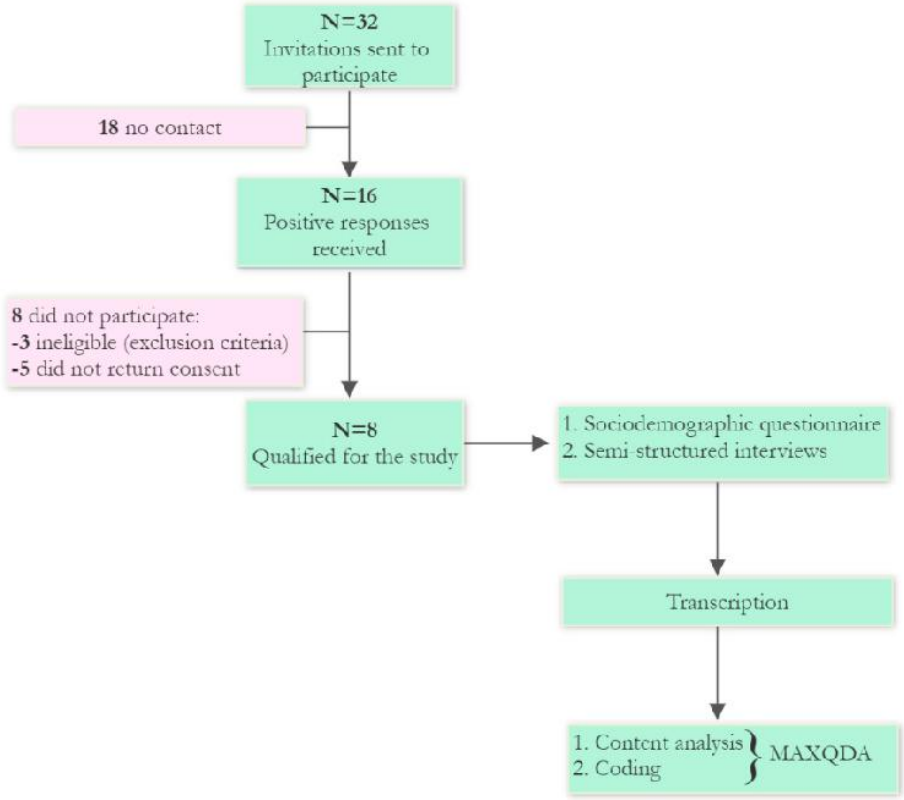

Figure 1. The flow chart of the study design.

2.3. Data Processing and Analysis

Data were collected in 2019–2020 from the semi-structured interviews. MAXQDA® version 2022 software (Release 22.1.1, VERBI GmbH, Berlin, Germany) was used to organize the data for qualitative analysis and coding. The thematic analysis of the content of the interviews proceeded in several stages. In the initial stage, two researchers analyzed each statement by giving it a label similar to the terms used by the respondents. In this way, semantic units or codes corresponding to the main idea were extracted. In the second stage, the researchers focused on the analysis of subcategories, where units of similar meaning were organized into categories. Eventually, three main meaning categories were identified: (1) sport identity, (2) coping in the initial pattern of reaction to the accident, and (3) adaptation in the long-term pattern of behavior after the accident.

3. Results

Following the thematic analysis, three categories emerged: coping, sport identity, and adjustment. The themes along with the categorization and matching quotes are presented in Table 2.

Table 2. Topics by subcategory.

Category	Subcategory	Quotation
Coping	Struggles	*P1: It is really difficult, your mental challenge is to keep going. Everything was a challenge when I woke up.*
	Fighting Spirit	*P7: I got into rehabilitation, intensive rehabilitation, which was replacing my sports training, and it lasted a couple of years.* *P8: "The sports anger in me woke up, I said to the doctor, you'll see I'll prove it to you I'll come in on crutches, whatever.*
Athletic Identity	Fans' support	*P1: I was very lucky because it was quite public. I was highlighted a lot from my crash. People in sports insurance were amazing, they have set up the fund, and people were donating money*
	The advantage of being an athlete	*P3: Karate before the accident taught me perseverance and diligence, which came in very handy later in this daily struggle.*
	Interaction with the sports community	*P2: The connection is still here and it's always fun to watch them at their training, and it's even more fun when I try to use their exercises for my training. And another thing is I just stand before coach exam, so I can train young ski jumpers. I wanted to stay here because i really lived in this area because of ski jumping and training. This is the middle point of my life.*
		P4: with Leicester Tigers, I coach sometimes. I support beneficiaries for Leicester tigers charity. It's pretty good really
		P5: and that gave me purpose and that was helpful for me but when that race ended and all through, but it gave me a purpose to get out of bed and to do something and so that was the that was sort of the baby steps.
Adjustment	Finding the meaning of the accident	*P2: I stopped to complain about things which I cannot change. That I think, was one of the best things i learned because this save so much energy.* *P3: For sure life is reevaluating and I am so positive people admire me because I don't worry about trivial things. P4: I believe, my accident happened for a reason so I can support young people who have a similar injury to me but don't have that support I received.*
	Motivation sources	*P1: My kids, yeah. That's the main thing that keeps me going.* *P1: After some time I was able to keep myself standing, it was so good for my mental condition, it was so inspiring and motivating.* *P2: When you see other people being proud of you because you just managed to move in the wheelchair.*
	Disability acceptance	*P5: I ended up I love the fact that I'm part of this community.*
	Goals, plans	*P1: I just want to do more motivational talks, raise my boys, they are great kids.* *P2: I want to raise the focus of the public when they build things to think about disable* *P4: The ambitions in my life is to make a foundation full of friends and spread the word about disability. I think as well we are changing the world for many disabled people, we empower them to do their best, make the most of their lives, try to look at the positives of their lives* *P6: at the minute my big goal is to compete the best I can with my disability in racing.*

3.1. Coping—An Early Adaptive Pattern

Participants described various ways of coping with a difficult post-accident situation. These included a variety of behaviors or defense mechanisms to protect against an existential sense of threat. Analyzing the interviews, we identified the following adaptive strategies: rationalization, repression, denial, postponing the cognitive confrontation with the consequences of the accident, analyzing/reflecting on the causes of the accident, seeking information about the chances of walking, learning about conventional and unconventional treatments, believing in God, seeking to make sense of the accident, behaviors to relieve tension such as crying and seeking contact with relatives and friends, and working. By adaptive pattern, we mean the presence of different coping strategies and the functions they perform. We observed the above strategies in all cases, although in different configurations and with varying degrees of intensity. We did not observe any recurring pattern in the order

of their occurrence, co-occurrence, or intensity. They also varied over time depending on their effectiveness. Their function was to bring about emotional and cognitive equilibrium and to reduce feelings of existential anxiety.

Up to the point of SCI, the participants had experienced accidents, and there were already shorter or longer moments of interruption in their athletic careers. They were aware of the risk of accidents and did not dwell on the thought that a serious injury such as SCI could befall them, especially since it was extremely rare in the sports they practiced. An accident is a turning point in the lives of participants who have played sports professionally. P1 emphasizes how difficult a mental challenge this incident was:

P1: It is really difficult, your mental challenge is to keep going. Everything was a challenge when I woke up.

P4: There were some dark days, and I really struggled initially but I had such a lot of support

P2 was aware from the first moment of the severity of the injury and the difficulties he would face. He points to the very important words of the doctor who gave him the diagnosis.

P2: I interrupted him 'That means I'm paralyzed from now on. Is that right?' and then he said 'Yes' that was the moment that brought some tears to my eyes. Then he continued talking immediately what was very important because he said 'I have to remind that today I have a healthy head, a healthy mindset, and quite healthy hands, and these components make sure that I can have quite normal life. Yea and maybe this was the most important sentence in this whole journey which I'm since that day.

In contrast, P3, in retrospect, doesn't even remember the moment of collapse.

P3: From the very beginning I had a positive and fighting attitude. I didn't understand myself fully but I didn't have a single moment of breakdown.

P6, in the first moment after opening his eyes, felt lucky to be awake and still alive despite such a serious accident. Regardless of the shock experienced and the challenges posed by the consequences of SCI and the initial struggle, the participants were set to fight. Contrary to the diagnosis they had heard, the participants were eager to prove it wrong and were confident of a complete rescission, focusing on intensive rehabilitation.

P7: I think in psychology it is described somehow, some kind of denial that I can do it. That 99 out of 100 couldn't make it, but I can make it. This is related to what I said, that after the accident I spent several years on rehabilitation, that very hard, professional work will have some effect, and although history teaches us that in some cases there is no effect. I explained to myself that there was no effect because these people were not determined enough, but I explained to myself that if I spent years I would think I would succeed.

At the same time, the hope of fully recovering allowed some to survive the most difficult initial moment:

P5: It was good that I had the hope that I had. I was 100-percent convinced that I was going to walk out of hospital. Without this hope, it would be so much more depressing.

3.2. Sports Identity

Analyzing the interviews, we noticed that the participants constructed their "self" in the area defined by the culture of the sports group they belonged to before the accident. These groups provided them with specific categories to describe themselves. Their personal identities were responses to questions about strong relationships with the sports group, parents, coaches, or athletes as important people in their lives. Membership in a particular professional group was therefore an acquired identity, formed as a result of group membership and consciously chosen. In the pre-traumatic past searches for answers to the questions Who am I? Who am I supposed to be? Who do I want to be?, our participants had constructed their sport identities:

P8: My life has always revolved around sports because my dad was a sportsman Well, I must have been soaked in it like a shell of an egg and this sport was absorbed by me as well Well, there was still some soccer later on because there was also speedway Well, I ended up on this speedway the way I ended up, Skiing and cycling were also passions that I continue somewhere now because I also ski and cycle, so it was such a cool life because maybe in the summer I rode speedway, cycling and then came winter. Since autumn I was already skiing because I also had a ski school. Also I was teaching skiing some trips we organized, training for children for adults of all ages and such a life to envy . . .

Participants after their accidents found certain advantages of having been athletes: physical strength, support from fans and sponsors, and opportunities for impacts on the lives of others:

P2: They also knew about that I was a sportsman so I could handle some things a bit better.

During their conversations with us, they referred to their sports past and planned for the future. They expressed the need to belong to their previous sporting environment and to identify with their immediate surroundings. Despite the fitness loss, they did not lose their identity. In accordance with their vision of themselves, they set new goals and chose ways to achieve them. They sought out activities and lived their lives in such a way as to live up to that identity even though they lacked functional capabilities. Achieving identity–life compatibility helped them to accept their disability at the same time:

P5: My identity has always been of an athlete and so now not to have that as my identity was frightening really scary during that time. ..... I think all of these things sort of happening when they happen gaining my confidence back from tennis and basketball. You know sort of being more outgoing. Where is for a while i was such an introvert because I didn't know I was not comfortable with myself. So you know it's taking a long years. You know what I think it's different for everyone in a chair. I learned to be totally ok with myself and that changed a lot for me not only in sport and to make the connections that I've made and to be able to talk about you know an accident and my process and my journey throughout the whole thing.

Most of the participants took up sport activities by changing the discipline: P2 rugby and skiing, P3 wheelchair dancing, P5 wheelchair basketball, P6 race car driving and handcycling, P7 canoeing, and P8 hand-cycling.

P7: I saw it and it made me feel really stupid, ashamed. Because I saw, let's call it broadly, people like me, and they were lifting such weights . . . How do we count these circles? How many are there? And at that moment the athletic soul was awakened, the perversity that I also have to here. And that was the beginning.

P8: . . . in fact life didn't end that you can still do sports, maybe a little bit in a different form because unfortunately for that you need some kind of special equipment, but it was possible. Well there was some kind of a signal that I was saying that he can continue to do that skiing that I used to do before the accident, I'm still doing it, and that's how it went.

Participants are also involved in sports life as coaches, as co-organizers of events, and as heads of foundations they started to support athletes after SCI.

P3: I still sometimes take part in, appear at the start or finish line of, for the benefit of the earth, or marathons, also supporting runners, because I myself enjoyed running before the accident. And after the accident, from friend to friend, it so happened that I also support the runners. Also at some stops, finish line or start I am with them. I don't run marathons with them because my arms would fall off, but at least this way I spend time with them

3.3. Adjustment—A Long-Term Adaptive Pattern

Because of the long time that had passed since their accidents (5–17 years), these participants had gone through various stages of adjustment and were currently in the stage

of coming to terms with the consequences of the injury and experiencing posttraumatic growth. By analyzing the interviews, we distinguished: (1) psychological resilience as evidenced by regaining meaning, (2) finding motivation to live both externally and internally, and (3) behavioral recovery-setting goals such as undertaking new sporting and advocacy activities. By long-term adaptive pattern, we mean the presence and functions of different coping strategies they had used over the years of their recovery. Their aims were primarily to maintain a state of emotional and cognitive balance, to come to terms with the consequences of the injury, and to experience posttraumatic growth in the new reality.

3.3.1. Finding the Meaning of the Accident

A complete acceptance of post-accident reality is evidenced by finding meaning and positive aspects of the incident. P3 points out how much she has learned and achieved and how life in a wheelchair has opened up new perspectives and opportunities for her. P2, because of winning the court battle for compensation with the sports committee, unequivocally states: "at least now my wheelchair has a reason". P2 and P3 have reevaluated their lives and, thanks to the accident, do not complain about small adversities. They always try to see the positive aspects of every situation. P4 finds meaning from the accident in being a support for other people:

P4: I believe, my accident happened for a reason so I can support young people who have a similar injury to me but don't have that support I received.

3.3.2. Sources of Motivation

For participants, sources of motivation are their families, the positive effects of the work they put into rehabilitation, and the admiration of others present in their lives:

P1: After some time I was able to keep myself standing, it was so good for my mental condition, it was so inspiring and motivating.

P2: When you see other people being proud of you because you just managed to move in the wheelchair.

Participants are also motivated by the stories of other people with disabilities who lead happy and fulfilled lives despite their disabilities.

P3: I watch motivational speakers on youtube who are also struggling and overcoming these barriers.

An additional motivation for both P7 and P8 are their rivals and people who make things difficult for them:

P7: Negative motivation, I will tell you what it is, in short, it means that when someone throws obstacles under my feet and is motivated by some, I don't know, malice, which I experienced. This motivates me very much to show them, to rub their noses in it.

3.3.3. Acceptance of Disability

At first, the participants were fully resistant and did not identify with the world of disabled people. With time, they started to realize themselves in another sport and to integrate into the society they started to belong to.

P5: I didn't want to be around anyone in a wheelchair because that made me really realise that was my world but when I did and it was when I started to go out to the tennis practices and I would hang out with everyone that was playing at the time. It makes it a little bit more bearable and so like. I ended up I love the fact that I'm part of this community.

They discovered that despite their disabilities, they could continue to be happy and lead fulfilling lives:

P2: Training, working, being outside, that wheelchair live is possible.

P4: For once I didn't feel pity because of my situation. That's amazing.

P3 also aims to break stereotypes and make people aware that people with disabilities need full acceptance and want to live normally, without drawing unnecessary attention to themselves:

P3: I try to show that a person in a wheelchair is not a freak but a normal person who needs normality, tenderness, and to be with other people.

Acceptance of one's condition is evidenced by the ability to freely tell one's story including the circumstances of the accident to motivate both the disabled and the healthy communities with one's attitude:

P8: Some companies motivate employees and show them that they are complaining having actually everything having arms, legs they are there complaining that they don't want something and this shows them that they are half the guy that is 50% and doing twice as much work as them.

P4 and P8 have set up foundations to support and bring together post-injury athletes and share their experiences and journeys. P8 is also a lecturer in sport and tourism for people with disabilities.

3.3.4. Goals

Each of the participants was able to identify specific goals they were currently setting for themselves. Some gave general goals unrelated to the accident: to be happy, to start a family, to rear children, to finish building a house. Goals directly related to the accident concerned the continuation of rehabilitation and the improvement of functional abilities:

P2: I have reached all my milestones. In my situation now my goal is to improve my walking on crutches, or without crutches.

At the same time, experiencing difficulties related to the wheelchair, P2 sees the need to adapt spaces to people with disabilities and to remove architectural barriers:

P2: I want to raise the focus of the public when they build things to think about disable.

Further objectives are to support people with disabilities by giving motivational speeches and, in the case of P4 and P8, to propagate and review the activities of the foundations they have established:

P4: The ambitions in my life is to make a foundation full of friends and spread the word about disability. I think as well we are changing the world for many disabled people, we empower them to do their best, make the most of their lives, try to look at the positives of their lives. That is massively important in this situation. We just try to give people hope that they can move on with their life. We try to give them a purpose to wake up every morning. that's really important.

P5, P6, P7, and P8 changed sports but continue to play sport at a professional level, so their goals also include further achievements in this area.

4. Discussion

In this study, we presented the thematic analysis of the responses from eight interviews with elite athletes who sustained spinal cord injury during their sport careers. The analysis aimed to provide key information about the process of adjustment to the new post-injury reality and the factors that led to the recovery of emotional balance and a satisfying life despite the consequences of SCI.

Of the three strategies listed by Elfstrom et al. for coping with SCI in the first period immediately after the accident, participants in our study used fighting spirit [16]. It involved undertaking intensive rehabilitation and hope for restitution, which, as P5 points out, enabled her to survive the most difficult moment. On the one hand, conveying an adequate diagnosis and realistic chances for the patient are important, but on the other

hand, hope should not be taken away as it is essential in the fight. In the qualitative studies by Hawkins et al. and Smith, participants' hope was also generated from the prospects of a cure in the future [29,30]. However prolonged, unrealistic hope and lack of acceptance is a significant barrier to achieving optimal adjustment. Pollard and Kennedy indicated that something that happens immediately in the post-injury period has profound implications for adjustment later [19]. This points to the important role of intervention by health professionals as those who interact with patients directly in the pre-injury period. P2 still paid particular attention to the words of the physician despite the lapse of 5 years since the accident (see results section). In a study by van Diemen et al., participants found the motivational attitude of professionals to be stimulating, which was seen as a post-positive element of mental adjustment [34].

Erik Erikson believes that identity is a sense of being special while at the same time being integrated into a social frame of reference in which one plays a role [35]. In the literature, there is a notion of group identity, which is a way of defining oneself by belonging to different types of social groups. The common factor that characterizes all participants in this study is their athlete identities, which, irrespective of the consequences of SCI, is still the apex in the identity hierarchy. The social frame of reference for the subjects was the groups of athletes they had come from. Coming to one's own athletic identity is a long, arduous process. The SCI that emerged, although it was a hindrance to self-realization and caused internal conflicts of tension, still constituted the identity status quo of our subjects. Constructing one's personality and sense of self along with hopes for the future based on pre-injury life was also observed among the respondents of Zuchetto et al.'s study [35]. Sport identification can affect individuals experiencing SCI in two ways. Cases have been reported in the literature where strong athletic identity hindered or even prevented the adaptation process [36]. An extreme example is a former professional rugby player committing suicide after SCI [37]. On the other hand, athletic identity can be used as a facilitator of recovery and support positive long-term adaptation [25,26]. During the preoperative period, the participants in our study experienced shock and loss, which was compounded by the thought of losing the opportunity to play sport. As time passed and the participants slowly accepted and embraced their disability, they began to explore ways and opportunities to maintain, continue, or even enhance their sport identity, which was an important step in the adaptation process. The greatest limitation that cannot be eliminated is tetraplegia with a complete lack of functional ability to participate in even paralympic sports [38]. According to Sparkes, the experience of an injury that threatens the fulfillment of the role of athlete negatively affects the personal identity of individuals who strongly identify with that role [39]. This could suggest a serious problem without a solution for professional athletes experiencing SCI at level C5 or below. However, it is an interesting observation that P1 and P4, with high spinal cord injury above the fourth cervical vertebrae, found opportunities to pursue a sport identity. As it turns out, it can also be rewarding to passively participate in sporting events, to be a coach for a sport one previously played, to organize sporting events, and to run a foundation to support athletes who have suffered SCI. Other participants began to become involved in disability sports, and new group affiliations began to define changes in social identity, successively leading to changes in behavior. The meaning and value of membership in the new community provided an important potential for positive adherence to therapy, as has been observed in previous research [38]. In a study by Tasiemski and Brewer (2011) with 1034 individuals with SCI, amount of weekly sport participation was positively related to athletic identity, and team sport participants reported better psychological adjustment than individual sport participants [38]. In a study conducted on a group of 80 patients after SCI, participants who took part in regular physical activity had better fitness, greater independence, and better functional status [26]. Furthermore, Silveira et al. in a study of 150 males with tetraplegia noted a correlation between the frequency of sports participation and reductions in psychological distress [27]. A good predictive model for sport participation of individuals with acquired physical

disabilities is the Health Action Process Approach (HAPA), which may be valuable in preparing sport promotion programs for populations with SCI [40].

Participation in sport for people with disabilities has been very helpful in their acceptance of their disabilities, which is extremely important because the lack of ability is a significant barrier that must be overcome in order to achieve positive adaptation [19,41]. Unfortunately, according to Perrier et al. (2015), only about 3% of individuals with acquired physical disabilities participate in sport, while 50% of individuals in this group expressed interest in being able to participate in adapted sport [42]. This indicates the need to promote sport in this population. The participants in our study and their stories can serve as examples for both elite athletes and other people with disabilities. It is worthwhile for health care professionals to have information on foundations supporting people with SCI in their country, as this can be important information for the patient and an important step in starting a positive adaptation to a new life situation. P4 and P7 have set up foundations that aim to facilitate the difficult process of adaptation, and the stories of elite athletes can be a valuable example that you can lead a fulfilling life despite your disability. Additionally, familiarity with the stories of elite athletes can be a helpful guide that health care professionals can use in their work with patients to build motivation, foster positive thinking, and develop the drive to be as independent as possible.

Athelstan and Crewe (1979) found that individuals who were injured as a direct result of their own behavior were better adapted than those who were injured accidentally, which applies to all participants in our study except P7 [43]. Participants in our study came to a reflection that allowed them to make sense of the accident and, further, to list the many benefits and changes in themselves that it brought. As in previous studies, participants indicate a greater appreciation of life and their health, a reduction in complaining, and the discovery that they were stronger than they thought [18,19,40].

As authors of the paper, we recognize limitations of our study, which are primarily related to the specific study group of elite athletes with SCI. The inclusion criteria used may have influenced the size of the study group, although we made every effort to find as many elite athletes after SCI from different continents as possible, analyzing a twenty-year period. The authors are aware that the number of subjects is a limitation, but this is the first international project related to the different aspects of the quality of life among people after SCI, as well as among elite athletes after SCI. We therefore hope that the results obtained in this project can be used as valuable and interesting material for further comparisons. Participants included int this study lived on different continents, which was why it was only possible to conduct this study remotely. The authors are also aware of the susceptibility to selection bias, as the number of participants was clearly lower than the number of people invited to the study (the project eventually included 8 participants out of 32 to whom the invitation was extended). There is therefore a likelihood of potential bias due to the fact that the subjects may have had more positive life experiences. However, the work aims to show that despite the traumatic injury, people who receive sufficient support and participate in sports find identity, belonging, and life satisfaction.

5. Conclusions

Despite the loss of fitness, elite athletes do not lose their identities. They live lives consistent with this identity, attempting to maintain it despite the loss of physical ability. Involvement in sports provides meaning and is a positive factor in the process of accepting disability as a necessary part of the adjustment process while providing group belonging. Most important is environments of people who can offer different perspectives or simply listen to them. It is therefore important for medical personnel to focus on not taking away hope as it is helpful for getting through the most difficult initial stage after the injury. There seems to be a particular role for the physiotherapists who work with such patients to help the patients look for ways in which they can realize and continue the lives they have led so far and to encourage them to, if possible, maintain or redefine particular identities. Since it is known what support effects are observed in elite athletes after SCI, it is advisable to

apply appropriate support and strong promotion of participation in adapted sports, which would allow for expecting similar effects in the average patient population.

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11. Załączniki

11.1. Zgoda Senackiej Komisji ds. Etyki Badań Naukowych

37/2018

Senacka Komisja ds. Etyki Badań Naukowych przy Akademii Wychowania Fizycznego we Wrocławiu

Uchwała
w sprawie opinii o projekcie eksperymentu poznawczego

Na podstawie uchwały Senatu Akademii Wychowania Fizycznego we Wrocławiu z dnia 20.12.2002 r. w sprawie powołania Senackiej Komisji ds. Etyki Badań Naukowych i uchwały z dnia 4.11.2003 r. – regulamin działań oraz w oparciu o art. 27 ustawy z dnia 6.06.1997 r. kodeks karny (Dz.U. z 1997 r., poz. 553 z późniejszymi zmianami) i zasady zawarte w „Dobrych obyczajach w nauce. Zbiór zasad i wytycznych" Komitetu Etyki w Nauce PAN z 2001 r.

Przewodniczący Senackiej Komisji ds. Etyki Badań Naukowych przy Akademii Wychowania Fizycznego we Wrocławiu po zapoznaniu się z opinią Członków Komisji Etyki wniosku złożonego przez Panią:

mgr Agatę Gorączko

pt. „Zaburzenia funkcji poznawczych, motywacja do życia oraz poziom wybranych kompetencji społecznych u światowej sławy sportowców po uszkodzeniu rdzenia kręgowego"

podjął decyzję o pozytywnym zaopiniowaniu tego wniosku, nie wnosząc żadnych zastrzeżeń.

Wydana opinia dotyczy tylko rozpatrywanego wniosku z uwzględnieniem przedstawionego projektu. Każda zmiana i modyfikacja wymaga uzyskania odrębnej opinii. Wnioskodawca obowiązany jest do informowania o ciężkich lub niespodziewanych zdarzeniach, niepożądanych i nieprzewidzianych okolicznościach, o zakończeniu badania, o jego wynikach i innych istotnych decyzjach ewentualnych innych komisji etycznych (bioetycznych).

Od powyższej uchwały podmiot zamierzający przeprowadzić eksperyment, kierownik jednostki organizacyjnej, w którym eksperyment poznawczy ma być przeprowadzony oraz komisja etyczna (bioetyczna) właściwa dla ośrodka, który ma ewentualnie uczestniczyć w wieloośrodkowym eksperymencie, mogą wnieść odwołanie do Zespołu Opiniodawczo-Doradczego do Spraw Etyki w Nauce Ministerstwa Nauki i Informatyzacji, za pośrednictwem Senackiej Komisji ds. Etyki Badań Naukowych przy Akademii Wychowania Fizycznego we Wrocławiu w terminie 14 dni od daty otrzymania niniejszej uchwały.

Przewodniczący Senackiej Komisji
ds. Etyki Badań Naukowych

Prof. dr hab. n. med. Marek Mędraś

Wrocław, dnia 10.12.18

11.2. Oświadczenia o współautorstwie

Dr hab. Grzegorz Żurek, prof. AWF
Zakład Biostruktury
Akademia Wychowania Fizycznego we Wrocławiu
Al. Ignacego Paderewskiego 35, 51-612 Wrocław

Wrocław, dnia 10.02.2023

Oświadczenie o współautorstwie

Oświadczam, że

W przygotowania artykułu pod tytułem „Quality of life after spinal cord injury : a multiple case study examination of elite athletes" autorstwa Gorączko A., Żurek G., Lachowicz M., Kujawa K., Błach W., Żurek A., opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, szukaniu literatury, analizie i interpretacji danych, nadzorze, pisaniu wstępnej wersji artykułu oraz zatwierdzeniu wersji ostatecznej.

W przygotowania artykułu pod tytułem „Purpose in Life of Elite Athletes after Spinal Cord Injury" autorstwa Goraczko A., Żurek G., Lachowicz M., Zurek A., opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, nadzorze oraz zatwierdzeniu wersji ostatecznej.

W przygotowania artykułu pod tytułem "Is self-efficacy related to the quality of life in elite athletes after spinal cord injury?" autorstwa Gorączko A., Żurek A., Lachowicz M., Kujawa K., Żurek G, opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, nadzorze oraz zatwierdzeniu wersji ostatecznej.

W przygotowania artykułu pod tytułem "The relationship between cognitive performance and quality of life in elite athletes after spinal cord injury" autorstwa Gorączko A., Żurek A., Lachowicz M., Kujawa K., Żurek G., opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, formalnej analizie, opracowywaniu danych, nadzorze oraz zatwierdzeniu wersji ostatecznej.

W przygotowania artykułu pod tytułem "Restored life of elite athletes after spinal cord injury" autorstwa Żurek G., Gorączko A., Lachowicz M., Kujawa K., Żurek A., opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, formalnej analizie, opracowywaniu danych, nadzorze oraz zatwierdzeniu wersji ostatecznej.

Dr Alina Żurek
Instytut Psychologii
Uniwersytet Wrocławski
Plac Uniwersytecki 1, 50-137 Wrocław

Wrocław, dnia 10.02.2023

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W przygotowania artykułu pod tytułem "Restored life of elite athletes after spinal cord injury" autorstwa Żurek G., Gorączko A., Lachowicz M., Kujawa K., Żurek A., opublikowanego w czasopiśmie International Journal of Environmental Research and Public Health mój udział polegał na stworzeniu koncepcji i projektu badań, formalnej analizie, wyszukiwaniu literatury, opracowywaniu danych, przygotowaniu wstępnej wersji artykułu oraz zatwierdzeniu ostatecznej wersji artykułu.

Anna Żurek

Mgr Maciej Lachowicz
Zakład Biostruktury
Akademia Wychowania Fizycznego we Wrocławiu
Al. Ignacego Paderewskiego 35, 51-612 Wrocław

Wrocław, dnia 10.02.2023

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Maciej Lachowicz

Dr Katarzyna Kujawa
Klinika Neurorehabilitacji dr Romana Olejniczaka
ul. Jerzmanowska 107, 54, 530 Wrocław

Wrocław, dnia 10.02.2023

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Dr Wiesław Błach

Zakład Dydaktyki i Sportu

Akademia Wychowania Fizycznego we Wrocławiu

Al. Ignacego Paderewskiego 35, 51-612 Wrocław

Wrocław, dnia 8.02.2023

Oświadczenie o współautorstwie

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11.3. Certyfikaty z konferencji

ZAŚWIADCZENIE

Pani Agata Gorączko

przedstawiła pracę w formie wystąpienia ustnego

pt. *Uszkodzenie rdzenia kręgowego u wybitnych sportowców a funkcje poznawcze – studium przypadku*

podczas

XI Interdyscyplinarnej Konferencji Naukowej TYGIEL 2019
„Interdyscyplinarność kluczem do rozwoju"

23-24 marca 2019 r. w Lublinie

Fundacja na rzecz promocji nauki i rozwoju TYGIEL
Prezes Zarządu
Kamil Maciąg

Fundacja TYGIEL

Studenckie Towarzystwo Naukowe
Akademia Wychowania Fizycznego we Wrocławiu

CERTYFIKAT UCZESTNICTWA

potwierdzający aktywny udział

Pani Agaty Gorączko

w III Ogólnopolskiej Konferencji dla Młodych Naukowców
„Wieczór Naukowca 2019 – Wokół człowieka"
Wrocław, 23-24 maja 2019r.

Przewodnicząca Komitetu Naukowego
prof. dr hab. Małgorzata Słowińska-Lisowska

Przewodnicząca Komitetu Organizacyjnego
dr Katarzyna Bulińska

Certyfikat

Szanowna Pani / Szanowny Pan

Agata Gorączko

uczestniczył/ła w I Międzynarodowej Konferencji Naukowej

„Fizjoterapia w nauce, profilaktyce i terapii"

w dniach 7-9 czerwca 2019 roku

w Akademii Wychowania Fizycznego i Sportu w Gdańsku

Przewodniczący Komitetu Naukowego

prof. Stanisław Mazurkiewicz

Przewodnicząca Komitetu Organizacyjnego

/-/ dr Jolanta Żajt

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Conference Series and the Editors of International Journal of Physical Medicine & Rehabilitation wish to thank

Prof/Dr. Agata Goraczko

University School of Physical Education, Poland

for her phenomenal and worthy oral presentation on

"Personal competences of outstanding athletes after spinal cord injury"

at the "5th International Conference on Sports Medicine and Fitness"

held during November 14-15, 2019 in Paris, France

Rakesh Tomar

King Fahd University of Petroleum & Minerals, Saudi Arabia

Sports Medicine 2019 Organizing Committee Members

~~Laszlo Sajti~~
~~Austrian Institute of Technology, Austria~~

~~Yongmei Zheng~~
~~Beihang University, China~~

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Conference Series and the Editors of International Journal of Physical Medicine & Rehabilitation wish to Congratulate

Prof/Dr. **Agata Goraczko**

University School of Physical Education, Poland

for backing Best oral presentation on

"Personal competences of outstanding athletes after spinal cord injury"

at the "5th International Conference on Sports Medicine and Fitness"

held during November 14-15, 2019 in Paris, France

Rakesh Tomar

King Fahd University of Petroleum & Minerals, Saudi Arabia

KONFERENCJE NAUKOWE

CERTYFIKAT UCZESTNICTWA

W OGÓLNOPOLSKIEJ KONFERENCJI INTERDYSCYPLINARNEJ "OMNIBUS CZ III"

KRAKÓW, 11-12.06.2020 R.

mgr Agata Gorączko

TYTUŁ ZAPREZENTOWANEGO REFERATU

Zasoby osobiste wybitnych sportowców po uszkodzeniu rdzenia kręgowego - badania jakościowe

Nr w rejestrze 1075/KNPR/20

Kraków, 13.06.2020 r.

Piotr Rachwał Konferencje Naukowe
ul. Okulickiego 51D/20, 31-637 Kraków
tel. 530-952-481
NIP: ~~573-272-51-36~~ REGON: 365643034

ORGANIZATOR
mgr Piotr Rachwał

"Oświadczam, ze organizowana konferencja miała zasięg ogólnopolski. Czynni uczestnicy konferencji prezentujący referaty/postery naukowe reprezentowali co najmniej 5 krajowych jednostek naukowych lub ośrodków akademickich."

KONFERENCJE NAUKOWE

CERTYFIKAT UCZESTNICTWA

W OGÓLNOPOLSKIEJ KONFERENCJI INTERDYSCYPLINARNEJ "OMNIBUS CZ IX"

KRAKÓW, 10-11.06.2021 R.

Agata Gorączko

TYTUŁ ZAPREZENTOWANEGO REFERATU

Poczucie sensu życia wybitnych sportowców po urazie ośrodkowego układu nerwowego

Nr w rejestrze 0186/OIX/21

Kraków, 14.06.2021 r.

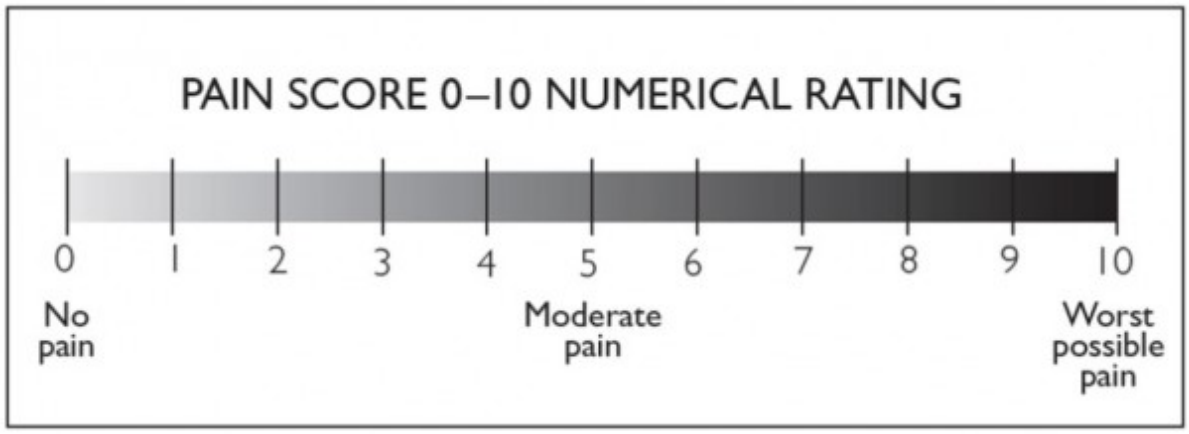
KONFERENCJE NAUKOWE
Piotr Rachwał
31-637 Kraków, ul. Okulickiego 51D/20
tel. 530-952-481
NIP 5732725136 REGON 365849084

ORGANIZATOR
Piotr Rachwał

"Oświadczam, ze organizowana konferencja miała zasięg ogólnopolski. Czynni uczestnicy konferencji prezentujący referaty/postery naukowe reprezentowali co najmniej 10 krajowych jednostek naukowych lub ośrodków akademickich."

11.4. Skale badawcze

11.4.1. Skala NRS



11.4.2. Skala WHOQoL-Bref

Kolejne pytania dotyczą jakości Pana życia, zdrowia i innych dziedzin. Przeczytam pytania oraz możliwe odpowiedzi. Proszę wybrać najbardziej właściwą odpowiedź. Jeśli nie jest Pan pewien, która z odpowiedzi jest właściwa, to proszę podać pierwszą o której Pan pomyślał, z zasady jest ona najbliższa prawdy. Proszę myśleć o swoim poziomie życia, nadziejach, przyjemnościach i troskach. Zapytam Pana o sprawy życia z ostatnich czterech tygodni.

		Bardzo zła	Zła	Ani dobra, ani zła	Dobra	Bardzo dobra
1.	Jaka jest Pana jakość życia?	1	2	3	4	5

		Bardzo nie-zadowolony	Nie-zadowolony	Ani zadowolony, ani nie-zadowolony	Zadowolony	Bardzo zadowolony
2.	Czy jest Pan zadowolony ze swojego zdrowia?	1	2	3	4	5

Następne pytanie dotyczą nasilenia stanów, których Pan doznawał w ciągu 4 tygodni.

		Wcale	Nieco	Średnio	W dużym stopniu	W bardzo dużym stopniu
3.	Jak bardzo ból fizyczny przeszkadzał Panu robić to, co Pan powinien?	5	4	3	2	1
4.	W jakim stopniu potrzebuje Pan leczenia medycznego do codziennego funkcjonowania?	5	4	3	2	1
5.	Ile ma Pan radości w życiu?	1	2	3	4	5
6.	W jakim stopniu ocenia Pan, że Pana życie ma sens?	1	2	3	4	5
		Wcale	Nieco	Średnio	Dość dobrze	Bardzo dobrze
7.	Czy dobrze koncentruje Pan uwagę?	1	2	3	4	5
8.	Jak bezpiecznie czuje się Pan w swoim codziennym życiu?	1	2	3	4	5
9.	W jakim stopniu Pańskie otoczenie sprzyja zdrowiu?	1	2	3	4	5

Poniższe pytania dotyczą tego jak Pan czuje się i jak się Panu wiodło w ciągu ostatnich 4 tyg.

		Wcale	Nieco	Umiarko-wanie	Przewa-żnie	W pełni
10.	Czy ma Pan wystarczająco energii w codziennym życiu?	1	2	3	4	5
11.	Czy jest Pan w stanie zaakceptować swój wygląd (fizyczny)?	1	2	3	4	5
12.	Czy ma Pan wystarczająco dużo pieniędzy na swoje potrzeby?	1	2	3	4	5
13.	Na ile dostępne są informacje, których może Pan potrzebować w codziennym życiu?	1	2	3	4	5
14.	W jakim zakresie ma Pan sposobność realizowania swoich zainteresowań?	1	2	3	4	5

		Bardzo źle	Źle	Ani dobrze ani źle	Dobrze	Bardzo dobrze
15.	Jak odnajduje się Pan w tej sytuacji?	1	2	3	4	5

		Bardzo niezadowolony	Niezadowolony	Ani zadowolony ani niezadowolony	Zadowolony	Bardzo zadowolony
16.	Czy zadowolony jest Pan ze swojego snu?	1	2	3	4	5
17.	W jakim stopniu jest Pan zadowolony ze swojej wydolności w życiu codziennym?	1	2	3	4	5
18.	W jakim stopniu jest Pan zadowolony ze swojej zdolności (gotowości) do pracy?	1	2	3	4	5
19.	Czy jest Pan zadowolony z siebie?	1	2	3	4	5
20.	Czy jest Pan zadowolony ze swoich osobistych relacji z ludźmi?	1	2	3	4	5
21.	Czy jest Pan zadowolony ze swojego życia intymnego?	1	2	3	4	5
22.	Czy jest Pan zadowolony z oparcia, wsparcia, jakie dostaje Pan od swoich przyjaciół?	1	2	3	4	5
23.	Jak bardzo jest Pan zadowolony ze swoich warunków mieszkaniowych?	1	2	3	4	5
24.	Jak bardzo jest Pan zadowolony z placówek służby zdrowia?	1	2	3	4	5
25.	Czy jest Pan zadowolony z komunikacji (transportu)?	1	2	3	4	5

Poniższe pytanie odnosi się do częstotliwości doznań, jakich Pan doświadczał w okresie ostatnich 4 tygodni.

		Nigdy	Rzadko	Często	Bardzo często	Zawsze
26.	Jak często doświadczał Pana negatywnych uczuć, takich jak przygnębienie, rozpacz, lęk, depresja?	5	4	3	2	1

Czy ma Pan jakiś komentarz do tych pytań?

_____

_____

11.4.3. Skala PIL

Poniżej znajduje się 20 twierdzeń, a po każdym z nich cyfry. Oznaczają one nasilenie, a cyfra 4 jest neutralna. Zaznaczy cyfrę od 1–7, która jest dla ciebie najbardziej charakterystyczna.

1.	Zazwyczaj jestem	znudzony i rozbity	1	2	3	4	5	6	7	pełen entuzjazmu
2.	Wydaje mi się, że życie jest	kompletną rutyną	1	2	3	4	5	6	7	zawsze ekscytujące
3.	W życiu:	nie mam żadnych celów	1	2	3	4	5	6	7	mam konkretne cele i plany
4.	Moje istnienie jest:	zupełnie bezcelowe	1	2	3	4	5	6	7	celowe i sensowne
5.	Każdy dzień:	jest dokładnie taki sam	1	2	3	4	5	6	7	niesie ze sobą coś nowego
6.	Gdybym miał możliwość wyboru:	wolałbym/abym nigdy się nie narodzić	1	2	3	4	5	6	7	przeżyć min. 9 żyć jak moje
7.	W dążeniu do celów życiowych:	nigdy nie miałem/am powodzenia	1	2	3	4	5	6	7	udało mi się zaspokoić swoje potrzeby
8.	Po przejściu na emeryturę:	przebałaganię resztę życia	1	2	3	4	5	6	7	będę mógł zając się czymś interesującym
9.	Moje życie jest:	puste, pełne rozpaczy	1	2	3	4	5	6	7	dobrze się układa
10.	Gdybym miał dziś umrzeć, miałbym poczucie że:	moje życie było bezwartościowe	1	2	3	4	5	6	7	bardzo wartościowe
11.	Zastanawiając się nad moim życiem	często myślę o tym po co żyję	1	2	3	4	5	6	7	zawsze znajduję przyczynę czemu żyję
12.	Gdy zastanawiam się nad swoim stosunkiem do świata:	czuję się całkowicie zagubiony/a	1	2	3	4	5	6	7	znajduję swoją rolę w świecie
13.	Jestem osobą:	zupełnie nieodpowiedzialną	1	2	3	4	5	6	7	bardzo odpowiedzialną
14.	Zastanawiając się nad możliwością, wolnego wyboru wydaje mi się, że	jestem całkowicie zdeterminowany/a środowiskiem i dziedziczeniem	1	2	3	4	5	6	7	człowiek ma absolutny wybór całe życie
15.	Mój stosunek do śmierci jest taki, że	jestem nieprzygo-towany/a i pełen lęku	1	2	3	4	5	6	7	jestem przygotowany/a, nie obawiam się
16.	O samobójstwie:	myślałem na poważnie jako jedyną drogą wyjścia	1	2	3	4	5	6	7	nigdy nie myślałem/am na poważnie
17.	Uważam, że moje szanse na znalezienie celu, sensu i roli w życiu:	są praktycznie żadne	1	2	3	4	5	6	7	są bardzo duże
18.	Moje życie jest:	wymyka mi się z rąk, kierowane przez czyn-niki niezależne ode mnie	1	2	3	4	5	6	7	w moich rękach, kieruję nim
19.	Moje codzienne obowiązki są:	przykre i pełne udręki	1	2	3	4	5	6	7	źródłem zadowolenia i radości
20.	Doszedłem do wniosku, że:	brak mi celu w życiu	1	2	3	4	5	6	7	mam wyraźne cele dające mi zadowolenie

11.4.4. Skala GSES

Napisz numer 1–4 koło każdego stwierdzenia:

1 – całkowicie nieprawdziwe 2 – raczej nieprawdziwe 3 – raczej prawdziwe 4 – prawdziwe

1. Zawsze jestem w stanie rozwiązać trudne problemy, jeśli tylko wystarczająco się postaram.	1 2 3 4
2. Nawet, gdy ktoś mi się sprzeciwia, jestem w stanie znaleźć sposób na osiągnięcie tego, czego chce.	1 2 3 4
3. Z łatwością potrafię trzymać się swoich celów i je osiągać.	1 2 3 4
4. Jestem przekonany/a, że skutecznie poradziłbym/abym sobie z nieoczekiwanymi wydarzeniami.	1 2 3 4
5. Dzięki swojej pomysłowości i zaradności wiem, jak poradzić sobie z nieprzewidzianymi sytuacjami.	1 2 3 4
6. Jestem w stanie rozwiązać większość problemów, jeśli tylko włożę w to odpowiednio dużo wysiłku.	1 2 3 4
7. Kiedy zmagam się z przeciwnościami, jestem w stanie zachować spokój, gdyż mogę polegać na swoich umiejętnościach radzenia sobie.	1 2 3 4
8. Kiedy zmagam się z jakimś problemem, to zazwyczaj jestem w stanie znaleźć kilka sposobów jego rozwiązania.	1 2 3 4
9. Gdy mam kłopoty, to zazwyczaj jestem w stanie wymyśleć sposób, jak z nich wyjść.	1 2 3 4
10. Zazwyczaj jestem w stanie poradzić sobie z tym, co mnie spotyka.	1 2 3 4

11.4.5. Test Digit-Span

List	Result (√ or ×)	List	Result (√ or ×)	List	Result (√ or ×)
For Span = 2					
83		54		27	
28		37		91	
68		96		87	
For Span = 3					
829		687		871	
132		356		251	
152		637		915	
For Span = 4					
6241		1372		5316	
2359		7392		4815	
7132		6539		1872	
For Span = 5					
84132		85293		79514	
62143		91635		82691	
97438		16592		75468	
For Span = 6					
587261		492617		148239	
261384		247681		423896	
632147		429735		641357	
For Span = 7					
2941378		6297865		1897562	
1285394		8243167		3185624	
8693735		3945782		2473961	
For Span = 8					
65148279		28653197		85729136	
18472913		65792381		76591243	
42785921		74529638		76921358	
For Span = 9					
679174382		239874615		539748216	
746231958		867934612		513985267	
398724615		794831265		231986734	
For Span = 10					
4982176453		2853967624		2914984357	
5731298426		9781734826		6983285149	
8182397465		8491287637		6391727362	

11.4.6. Test Stroop Color-Word

red	blue	green	red	green
blue	red	blue	green	red
green	blue	Red	blue	green
red	blue	green	red	green
red	blue	green	blue	red
blue	red	blue	green	red
green	blue	green	red	green
red	blue	green	blue	red
green	red	blue	red	blue
red	blue	green	red	green
red	blue	Red	blue	green
blue	green	blue	red	blue
green	blue	Red	blue	green
red	blue	green	red	green
red	green	blue	green	red
blue	red	blue	green	red
green	blue	green	red	green
blue	red	blue	red	green

XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX
XXXX	XXXX	XXXX	XXXX	XXXX

red	blue	green	red	green
blue	red	blue	green	red
green	blue	Red	blue	green
red	blue	green	red	green
red	blue	green	blue	red
blue	red	blue	green	red
green	blue	green	red	green
red	blue	green	blue	red
green	red	blue	red	blue
red	blue	green	red	green
green	blue	Red	blue	green
blue	green	blue	red	blue
green	blue	Red	blue	green
red	blue	green	red	green
red	green	blue	green	red
blue	red	blue	green	red
green	blue	green	red	green

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