



Universidade de Vigo

*Doctoral Dissertation.
The effects of training volume on emotional intelligence and quality of life
of athletes with mental and physical disabilities: Boccia, Swimming and
Shooting.*

Doctoral Dissertation

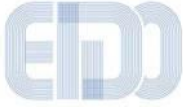
*The effects of training volume on emotional intelligence
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Farzad Rezavandzayeri, 2024

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Universidade de Vigo

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DOCTORAL DISSERTATION

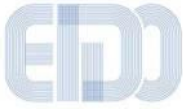
The effects of training volume on emotional intelligence and quality of life of athletes with mental and physical disabilities: Boccia, Swimming and Shooting.

Supervised by:

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[2024]



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DECLARES that the present work, entitled “[The effects of training volume on emotional intelligence and quality of life of athletes with mental and physical disabilities: Boccia, Swimming and Shooting]”, submitted by [Farzad Rezavandzayeri] to obtain the title of Doctor, was carried out under her supervision in the Ph.D. program “[Physical activity and Sports sciences]”.

Pontevedra, 2024/03/01

The supervisor(s),

Dr. José M^a Cancela Carral

Dr. M^a Elena Vila Suarez

Respectfully Dedicated to:

When it comes to gratitude and for me to publicly appreciate someone's help and support then no one comes to my mind more significantly than my mother.

A woman who was a god on earth for me and who not only had a big part of my creation but the selfless person who guided me towards my dreams and nurtured me with all of the beauties of her youth. Today, I praise my mother for her exchanging her youth with white hair and pains she suffering now to protect me and to make sure I have everything to be able to study and progress in my life and be the person that I am today. Today, I am here because of all the sacrifices that she made at the expense of her youth. The woman that I call "mother", she to carried me to the top. The woman who taught me to fly and made sure the the sky was always cloudless for me to reach for the stars, easily see my path.

I would offer my life to her as my ultimate gift in appreciation for all she has done. My mother, I kiss your hands as well as your feet out of respect and courtesy, and I appreciate all your efforts. I know this achievement was very important for you, you wanted this for me even more than I did, and I know you are proud of it. I am the happiest man on earth with your happiness.

And I would like to thank my father who taught me self-confidence, courage and boldness, all his teachings, along with the caring spirit, smile and contentment that he always advised me on, became a reason for me to overcome all the difficulties and limitations of this rough path that I finally arrived. Thank you, father!

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LISTA DE ABREVIATURAS

LIST OF ABBREVIATIONS

| |
|--|
| CP (Cerebral Palsy) |
| QOL (Quality of Life) |
| EI (Emotional Intelligence) |
| G2 (2 hours per week) |
| G4 (4 hours per week) |
| G6 (6 hours per week) |
| 1SPW (1 session per week) |
| 3SPW (3 session per week) |
| 3SPWM (3 session per week with Music) |

Resumen General

1. Introducción

La parálisis cerebral puede causar diferentes tipos de trastornos del desarrollo neurológico, como debilidad muscular, control motor voluntario selectivo, coordinación reducida, contractura y espasticidad. La actividad física puede ayudar a reducir algunas de las afecciones secundarias en personas con parálisis cerebral y mejorar el equilibrio, el tono muscular y la postura (Cho & Lee, 2020). La discapacidad puede afectar a un individuo mental y físicamente, y la participación en la vida social es un problema para ellos. Debido a que una persona con parálisis cerebral se percibe a sí misma como inadecuada debido a sus discapacidades, tiene una baja percepción de calidad de vida (QOL) y falta de motivación, lo que aumenta su ansiedad social. Este deporte (Boccia) es competitivo y las investigaciones han revelado que los deportes competitivos reducen la ansiedad y la depresión y aumentan la calidad de vida (Giacobbi et al., 2008; Gioia et al., 2006). Para las personas con discapacidades graves, la boccia es la actividad de juego grupal más establecida y la única disponible.

Uno de los deportes paralímpicos más populares es la paranatación, que incluye participantes con una amplia gama de discapacidades visuales, físicas e intelectuales (Acebes-Sánchez et al., 2019a; Austin et al., 2005). Los beneficios de la natación incluyen rehabilitación, aptitud física y promoción de una sensación de logro (Ludtke et al., 2020). Algunos estudios han utilizado ejercicios acuáticos, de natación y acuáticos para mejorar los problemas psicológicos y la calidad de vida de diferentes poblaciones estadísticas. Calidad de vida es un concepto que se relaciona con el bienestar emocional y físico de una persona, las relaciones interpersonales, el desarrollo personal, la autodeterminación y la inclusión social, así como con el afecto, especialmente la experiencia de emociones positivas. En las últimas dos décadas se ha estudiado bien el efecto de la música sobre variables como la calidad de vida. Ruud sugirió cómo la música puede contribuir a la calidad de vida en las siguientes cuatro áreas: "1) la música puede aumentar nuestro sentimiento de vitalidad y conciencia de los sentimientos, 2) la música proporciona una oportunidad para aumentar el sentido de agencia, 3) hacer música

proporciona un sentido de pertenencia y comunidad, y 4) las experiencias musicales crean un sentido de significado y coherencia en la vida" (Ruud, 1997).

Comprender la relación matizada entre el volumen de entrenamiento y su impacto en la inteligencia emocional y la calidad de vida es esencial, particularmente para los atletas con discapacidades físicas y mentales que practican deportes como la boccia, la natación y el tiro. Si bien se ha dedicado mucha atención a los aspectos fisiológicos y relacionados con el rendimiento del entrenamiento, las dimensiones psicológicas y psicosociales son igualmente críticas para el bienestar integral y el éxito de los atletas, especialmente aquellos que enfrentan desafíos únicos. En este contexto, explorar cómo las variaciones en el volumen de entrenamiento influyen en la inteligencia emocional y la calidad de vida entre los atletas con discapacidades en boccia, natación y tiro puede proporcionar información valiosa para optimizar los regímenes de entrenamiento, mejorar los sistemas de apoyo a los atletas y promover el bienestar general de los atletas. Al profundizar en esta compleja interacción, nuestro objetivo es arrojar luz sobre los efectos multifacéticos del volumen de entrenamiento en el bienestar psicológico y emocional de los atletas con discapacidades en estos deportes específicos, esforzándonos en última instancia por mejorar su experiencia atlética general y su calidad de vida. Los deportes ofrecen numerosas oportunidades para que las personas utilicen sus habilidades, colaboren como equipo, experimenten la euforia de la victoria y la decepción de la derrota y, en última instancia, disfruten. Sin embargo, las personas con discapacidad física tienden a realizar actividades físicas recreativas y deportes con menos frecuencia que las personas sin discapacidad (Lane et al., 2009). Disparar con pistola de aire comprimido es un deporte popular que exige precisión, habilidad y concentración. Implica utilizar una pistola para disparar perdigones o municiones a un objetivo. Gracias a los avances en la tecnología de asistencia y las técnicas de tiro adaptativo, las personas con discapacidades físicas ahora pueden practicar deportes de tiro con pistolas de aire comprimido. El tiro es una disciplina que enfatiza la alta precisión (Lillegård, 2020) y no está necesariamente restringida por la edad (Wang, Q. et al., 2022). Sin embargo, los participantes deben poseer habilidades competentes y aptitud física, incluida fuerza, flexibilidad, resistencia y equilibrio. Los tiradores también deben exhibir una coordinación excepcional y la capacidad de controlar sus extremidades, articulaciones y músculos durante las competiciones para lograr un rendimiento óptimo.

Esta capacidad está estrechamente relacionada con la aptitud física y mental de un individuo (Englert et al., 2021).

En el ámbito de los deportes adaptativos, el impacto del volumen de entrenamiento se extiende mucho más allá de la condición física y el rendimiento atlético, y abarca profundas implicaciones para la resiliencia emocional y la calidad de vida en general. Para los atletas con discapacidades físicas y mentales que practican deportes como boccia, natación y tiro, el volumen de entrenamiento sirve como piedra angular en su camino hacia el crecimiento personal, el empoderamiento y la realización. Sin embargo, la intrincada relación entre la intensidad y la duración del entrenamiento y sus efectos sobre la inteligencia emocional y el bienestar sigue siendo un territorio en gran medida inexplorado (Atasoy & Pekel, 2021). Al profundizar en esta intersección, nuestro objetivo es descubrir conocimientos valiosos sobre las dimensiones psicosociales del entrenamiento entre atletas con discapacidades, ofreciendo estrategias personalizadas para optimizar sus experiencias de entrenamiento, mejorar los mecanismos de afrontamiento emocional y, en última instancia, fomentar una sensación de bienestar holístico tanto en fuera del terreno de juego. A través de esta exploración, nos esforzamos por contribuir al avance de enfoques centrados en los atletas en los deportes adaptativos, generando resultados positivos y capacitando a las personas para prosperar frente a la adversidad. En el ámbito de los deportes adaptativos, donde los atletas con discapacidades físicas y mentales muestran una resiliencia y determinación increíbles, los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida representan un área crucial pero poco estudiada. Para las personas que practican deportes como boccia, natación y tiro, el entrenamiento no se trata sólo de preparación física; sirve como un poderoso catalizador para el crecimiento personal, el autodescubrimiento y el empoderamiento. Sin embargo, el equilibrio entre superar los límites físicos y fomentar el bienestar emocional es delicado, especialmente para los atletas que enfrentan desafíos únicos. Al examinar cómo las variaciones en el volumen de entrenamiento influyen en la inteligencia emocional y la calidad de vida general entre estos atletas, nuestro objetivo es descubrir conocimientos prácticos que puedan informar enfoques de entrenamiento más holísticos y centrados en el atleta. A través de esta exploración, nos esforzamos por empoderar a los atletas con discapacidades para que maximicen su potencial, mejoren su resiliencia emocional y lleven una vida

plena tanto dentro como fuera del ámbito del deporte (Siavoshy & Bolurian, 2016).

En el panorama dinámico de los deportes adaptativos, donde los atletas con discapacidades continuamente desafían las expectativas y redefinen los límites, los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida emergen como consideraciones esenciales. En disciplinas como boccia, natación y tiro, los atletas enfrentan no sólo las exigencias físicas del entrenamiento sino también las complejidades psicológicas inherentes a su camino hacia la excelencia. Comprender cómo las variaciones en el volumen de entrenamiento dan forma a la resiliencia emocional, los mecanismos de afrontamiento y el bienestar general es fundamental para optimizar el desarrollo de los atletas y fomentar un entorno deportivo inclusivo y de apoyo. Al profundizar en esta intersección, pretendemos iluminar los efectos multifacéticos del volumen de entrenamiento en las dimensiones emocionales y psicosociales de la vida de los atletas, esforzándonos en última instancia por mejorar su experiencia atlética holística y empoderarlos para superar los desafíos con gracia y determinación. A través de esta exploración, buscamos subrayar el poder transformador de los deportes adaptativos y abogar por enfoques centrados en los atletas que prioricen el bienestar junto con el rendimiento (Johansson et al., 2022).

En este estudio, se ha discutido el efecto del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida de atletas con discapacidad física y mental en boccia, natación y tiro con rifle.

2. Objetivo

2.1.) Boccia

Investigar la correlación entre la carga (volumen) del entrenamiento de boccia y la Inteligencia Emocional y la calidad de vida en individuos con Parálisis Cerebral.

2.2.) Natación

El objetivo principal de este estudio fue evaluar el efecto de aumentar el número de sesiones de entrenamiento de natación sobre la inteligencia emocional y la calidad de vida; un objetivo secundario fue investigar el efecto de escuchar música durante el ejercicio sobre la calidad de vida y la inteligencia emocional, en ambos casos, de personas con discapacidad física.

3.3.) Tiro con rifle

Este estudio tiene como objetivo examinar el impacto del tiro con rifle de aire comprimido en la inteligencia emocional, la calidad de vida y el rendimiento en personas con discapacidad.

3. Metodología

3.1.) Boccia

En este estudio se inscribieron 165 personas con parálisis cerebral, clasificadas como BC1. El tipo de diseño se caracteriza por ser seccional-correlacional. Los participantes fueron asignados a uno de los grupos: G2, G4 y G6. El test de inteligencia emocional de autoinforme de Schutte (SSEIT) y el cuestionario de calidad de vida de la organización mundial de la salud WHOQOL-Bref evaluaron la inteligencia emocional y la calidad de vida de estos pacientes. Para evaluar la correlación se utilizó el Coeficiente de Correlación de Pearson y para comparar las variables entre los grupos se aplicó ANOVA unidireccional y Bonferroni.

3.2.) Natación

Se reclutaron 180 sujetos y se dividieron aleatoriamente en tres grupos iguales de 1 sesión por semana (1SPW o grupo de control), tres sesiones por semana (3SPW) y tres sesiones por semana+música (3SPW+música). Las variables fueron calidad de vida e inteligencia emocional evaluadas mediante el WHOQOL-Bref y el Schutte Self-Report Emotional Intelligence Test (SSEIT), respectivamente. Para comparar la efectividad de las intervenciones se utilizó la prueba ANCOVA seguida de la prueba de Bonferroni.

3.3.) Tiro con rifle

Se reclutaron noventa participantes y se asignaron a tres grupos según sus horas de rodaje semanales (grupo 1: 2 horas, grupo 2: 4 horas, grupo 3: 6 horas). El estudio empleó un diseño de correlación y comparación, utilizando WHOQOL-Bref, SSEIT y el sistema de análisis y marcador electrónico Navak para evaluar la calidad de vida, la inteligencia emocional y el rendimiento, respectivamente. Se utilizó el coeficiente de correlación de Pearson para determinar la relación entre las horas de rodaje y las variables, mientras que se empleó la prueba ANOVA unidireccional para comparar las variables en todo el grupo.

4. Resultados

4.1.) Boccia

Los resultados mostraron una correlación de moderada a fuerte entre el volumen de entrenamiento de boccia y la inteligencia emocional y la calidad de vida. Estadísticamente, hubo una diferencia significativa entre los grupos con respecto a la inteligencia emocional. Sin embargo, no se observaron diferencias significativas entre los grupos G4 y G6 con respecto a la calidad de vida.

4.2.) Natación

Cuando se compararon los tres grupos al final de 12 semanas, se encontró una diferencia estadísticamente significativa entre el grupo de control y dos grupos experimentales en calidad de vida e inteligencia emocional. Sin embargo, no se encontraron diferencias significativas entre 3SPW y 3SPW+música en la calidad de vida (excepto en los ítems psicológicos) o la inteligencia emocional.

4.3.) Tiro con rifle

Los resultados del estudio mostraron que hubo una diferencia significativa entre el pre y el post test en el test de lanzamiento de balón medicinal ($P=0,001$), el test de salto de Sargent ($P=0,018$) y el sprint-nado de 50 m ($P=0,05$) en el grupo de entrenamiento. Sin embargo, no hubo diferencia significativa entre todas las variables en el grupo de control.

5. Conclusión

Los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida entre los atletas con discapacidades físicas y mentales que participan en deportes como la boccia, la natación y el tiro presentan una interacción compleja y multifacética. Si bien el volumen de entrenamiento a menudo se ve a través del lente de la preparación física y el rendimiento atlético, su impacto se extiende mucho más allá del ámbito del deporte. Para los atletas con discapacidades, que pueden enfrentar desafíos y barreras únicos, el entrenamiento sirve como un viaje transformador que abarca no sólo el esfuerzo físico sino también el crecimiento psicológico y el desarrollo personal. La relación entre el volumen de entrenamiento y la inteligencia emocional es compleja, ya que los atletas navegan por los altibajos del esfuerzo físico intenso, los reveses y los triunfos. Además, la calidad de vida de los atletas con discapacidad está estrechamente relacionada con sus experiencias dentro de sus actividades deportivas, donde el volumen de entrenamiento puede influir en factores como la autoestima, la conexión social y la satisfacción general con la vida. Sin embargo, el equilibrio óptimo entre la intensidad del entrenamiento y su impacto en el bienestar emocional sigue siendo difícil de alcanzar, lo que requiere una consideración cuidadosa y enfoques individualizados adaptados a las necesidades y circunstancias específicas de cada atleta. Al profundizar en los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida en Boccia, natación y tiro, obtenemos información valiosa sobre las experiencias holísticas de los atletas con discapacidades, informando estrategias para mejorar su bienestar, resiliencia y desempeño atlético en general viaje. Además, los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida de los atletas con discapacidades físicas y mentales en boccia, natación y tiro subrayan la importancia de enfoques holísticos centrados en el atleta en los deportes adaptativos. Si bien el entrenamiento físico sin duda contribuye al rendimiento deportivo, es igualmente crucial reconocer el profundo impacto del entrenamiento en el bienestar emocional y la satisfacción general con la vida de los atletas. Para las personas que enfrentan desafíos físicos y mentales, los deportes brindan no solo una plataforma para la expresión física sino también un medio de empoderamiento, autodescubrimiento y conexión social. Por lo tanto, comprender cómo las variaciones

en el volumen de entrenamiento influyen en la resiliencia emocional, los mecanismos de afrontamiento y el bienestar psicosocial es esencial para optimizar el desarrollo de los atletas y fomentar entornos deportivos inclusivos. Al adoptar una comprensión integral de la experiencia de los atletas, los entrenadores, preparadores físicos y personal de apoyo pueden adaptar los programas de entrenamiento para abordar las diversas necesidades y aspiraciones de los atletas con discapacidades, capacitándolos en última instancia para prosperar tanto dentro como fuera del campo de juego. A través de esfuerzos continuos de investigación y promoción, podemos continuar avanzando en enfoques centrados en los atletas en los deportes adaptativos, asegurando que los atletas con discapacidades tengan el apoyo y los recursos que necesitan para alcanzar su máximo potencial y llevar una vida plena.

Además, explorar los efectos del volumen de entrenamiento sobre la inteligencia emocional y la calidad de vida entre atletas con discapacidades físicas y mentales en boccia, natación y tiro resalta la interconexión del bienestar físico y psicológico en los deportes adaptativos. Los atletas en estas disciplinas a menudo enfrentan desafíos únicos, incluido el manejo de sus discapacidades, hacer frente a la presión del rendimiento y equilibrar los compromisos de entrenamiento con otros aspectos de sus vidas. En consecuencia, comprender cómo el volumen de entrenamiento afecta la resiliencia emocional, la autoestima y la integración social es crucial para promover el desarrollo holístico de los atletas y fomentar un entorno deportivo de apoyo. Al identificar el equilibrio óptimo entre la intensidad del entrenamiento y sus efectos sobre el bienestar emocional, los entrenadores, preparadores físicos y personal de apoyo pueden adaptar los programas de entrenamiento para abordar las diversas necesidades y aspiraciones de los atletas con discapacidades. Además, reconocer la importancia de los factores de calidad de vida, como el apoyo social, la autonomía y la satisfacción con la vida, subraya la necesidad de enfoques integrales centrados en los atletas que prioricen tanto el rendimiento como el bienestar. A través de esfuerzos de colaboración entre investigadores, practicantes y atletas, podemos continuar avanzando en nuestra comprensión de la compleja interacción entre el volumen de entrenamiento, la inteligencia emocional y la calidad de vida, mejorando en última instancia la experiencia atlética y la calidad de vida general de los atletas con discapacidades en Boccia, natación y tiro. Sin embargo, el impacto del volumen de entrenamiento se extiende más allá de

los límites del ámbito deportivo, influyendo en varios aspectos de la vida de los atletas, incluidas sus relaciones, su autopercepción y su bienestar general. Al examinar cómo el volumen de entrenamiento afecta la inteligencia emocional y la calidad de vida, obtenemos información valiosa sobre las experiencias y desafíos únicos que enfrentan los atletas con discapacidades. Esta comprensión es esencial para diseñar programas de entrenamiento inclusivos que atiendan las diversas necesidades y aspiraciones de los atletas, fomentando un ambiente donde los atletas puedan prosperar tanto atléticamente como personalmente. A través de investigación, promoción y colaboración continuas, podemos trabajar para crear un panorama deportivo más inclusivo y solidario que capacite a los atletas con discapacidades para perseguir su pasión por el deporte y al mismo tiempo mejorar su resiliencia emocional y su calidad de vida en general.

Es posible mejorar la calidad de vida y la inteligencia emocional de los deportistas con parálisis cerebral aumentando el volumen de entrenamiento de Boccia. Sin embargo, este estudio concluyó que aumentar el número de sesiones de entrenamiento podría mejorar la calidad de vida y la inteligencia emocional en personas con discapacidad física. Al mismo tiempo, la música no logró mejorar las variables en comparación con los resultados obtenidos al aumentar el número de sesiones. Por otro lado, las personas con discapacidad pueden experimentar mejoras en la inteligencia emocional, la calidad de vida y el rendimiento al aumentar sus horas de participación en el tiro con rifle de aire comprimido.

General Abstract

1. Introduction

Cerebral Palsy can cause different types of neurodevelopmental disorders, such as muscle weakness, selective voluntary motor control, reduced coordination, contracture, and spasticity (Jr, 2001). Physical activity can help reduce some of the secondary conditions in individuals with CP and improve balance, muscle tone, and posture (Cho & Lee, 2020). Disability can affect an individual mentally and physically, and participation in social life is an issue for them. Because a person with CP perceives themselves as inadequate due to their disabilities, they have a low perception of quality of life (QOL) and lack of motivation, increasing their social anxiety. This sport (Boccia) is competitive, and research has revealed that competitive sports reduce anxiety and depression and increases the QOL (Giacobbi et al., 2008; Gioia et al., 2006). For individuals with severe disabilities, Boccia is the most established and the only group game activity available. One of the most popular paralympic sports is para swimming which includes participants who have a wide range of visual, physical, and intellectual impairments (Acebes-Sánchez et al., 2019a; Austin et al., 2005). The benefits of swimming include rehabilitation, physical fitness, and promoting a sense of achievement (Ludtke et al., 2020). Some studies have used aquatic, swimming, and water-based exercises to improve psychological issues and quality of life for different statistical populations. Quality of life is a concept that is related to a person's emotional and physical well-being, interpersonal relations, personal development, self-determination, and social inclusion, as well as by affect, especially the experience of positive emotions. In the last two decades, the effect of music on variables like quality of life has been well studied. Ruud suggested how music can contribute to the quality of life in the following four areas: "1) music can increase our feeling of vitality and awareness of feeling, 2) music provides an opportunity for increasing a sense of agency, 3) music-making provides a sense of belonging and community, and 4) experiences of music create a sense of meaning and coherence in life" (Ruud, 1997).

Sports offer numerous opportunities for individuals to utilize their skills, collaborate as a team, experience the elation of victory and the disappointment of defeat, and ultimately derive enjoyment. However, individuals with physical disabilities tend to engage in recreational physical activity and sports less frequently than those without disabilities (Lane et al., 2009). Shooting with an air pistol is a popular sport that demands precision, skill, and focus. It entails using a pistol to fire pellets or BBs at a target. Thanks to advancements in assistive technology and adaptive shooting techniques, individuals with physical disabilities can now engage in shooting sports with air pistols. Shooting is a discipline that emphasizes high accuracy (Lillegård, 2020) and is not necessarily restricted by age (Wang et al., 2022). However, participants must possess proficient skills and physical fitness, including strength, flexibility, endurance, and balance. Shooters must also exhibit exceptional coordination and the ability to control their limbs, joints, and muscles during competitions to attain optimal performance. This ability is closely linked to an individual's physical and mental fitness (Englert et al., 2021).

In this study, the effect of training volume on emotional intelligence and quality of life of mentally and physically disabled athletes in boccia, swimming and shooting has been discussed.

2. Aim

2.1.) Boccia

The aim of this study was to investigate the correlation between the load (volume) of boccia training and Emotional Intelligence and quality of life in individuals with Cerebral Palsy (CP).

2.2.) Swimming

The primary aim of this study was to evaluate the effect of increasing the number of swimming training sessions on emotional intelligence and quality of life; a secondary aim was to investigate the effect of listening to music during exercise on the quality of life and emotional intelligence, in both cases for people with physical disabilities.

2.3.) Shooting

This study aims to examine the impact of air rifle shooting on emotional intelligence, quality of life, and performance in individuals with disabilities.

3. Methodology

3.1.) Boccia

165 individuals with cerebral palsy were enrolled in this study, classified as BC1. The type of design is characterized by being sectional-correlational. The participants were assigned to one of the groups: G2, G4 and G6. The Schutte Self-Report Emotional Intelligence Test (SSEIT) and WHOQOL-Bref world health organization's quality of life questionnaire assessed these patients' emotional intelligence and quality of life. Pearson Correlation Coefficient was used to evaluate the correlation, and to compare the variables between the groups, One-way ANOVA and Bonferroni were applied.

3.2.) Swimming

180 subjects were recruited and randomly divided into three equal groups of 1 session per week (1SPW or control group), three sessions per week (3SPW), and three sessions per week+music (3SPW+music). Variables were quality of life and emotional intelligence assessed by the WHOQOL-Bref and Schutte Self-Report Emotional Intelligence Test (SSEIT), respectively. The ANCOVA test followed by the Bonferroni test, were used to compare the effectiveness of the interventions.

3.3.) Shooting

Ninety participants were recruited and assigned to three groups based on their weekly shooting hours (group 1: 2 hours, group 2: 4 hours, group 3: 6 hours). The study employed a correlation and comparison design, using WHOQOL-Bref, SSEIT, and the Navak analysis system and electronic scoreboard to assess the quality of life, emotional intelligence, and performance, respectively. Pearson Correlation Coefficient was used to determine the relationship between shooting hours and the variables, while the One-Way ANOVA test was employed to compare the variables across the group.

4. Results

4.1.) Boccia

Results showed a moderate to strong correlation between the volume of boccia training and emotional intelligence, and quality of life. Statistically, there was a significant difference between groups regarding emotional intelligence. However, no significant difference was observed between groups G4 and G6 regarding quality of life. The results suggest a positive correlation between training volume and emotional intelligence, quality of life.

4.2.) Swimming

When the three groups were compared at the end of 12 weeks, a statistically significant difference was found between the control group and two experimental groups in quality of life and emotional intelligence. However, no significant difference was found between 3SPW and 3SPW+music in quality of life (except in psychological items) or emotional intelligence.

4.3.) Shooting

This study showed a significant positive correlation between the number of practice hours and all variables (Quality of Life, Emotional Intelligence, Performance). Additionally, the ANOVA test revealed significant differences among all groups. However, there was no significant difference between groups 2 and 3 in all EI subscales except for the Uncategorized subscale. Furthermore, groups 1 and 2 had no significant difference in all quality of life subscales except for the overall score.

Conclusion

In conclusion, it is possible to improve the quality of life and emotional intelligence of cerebral palsy athletes by increasing the volume of Boccia training. However, this study concluded that increasing the number of training sessions (Para Swimming) could improve the quality of life and emotional intelligence in people with physical disabilities. At the same time, music failed to improve the variables when compared to the results achieved by increasing the number of sessions. another hand, the results of this study indicate that individuals with disabilities can experience enhancements in emotional intelligence (EI), quality of life, and performance by increasing their participation hours in air rifle shooting.

1. Introduction

1.1. Boccia

According to the Department of Social Welfare (DSW), there are seven categories of disability: physical disability, hearing disability, visual disability, mental disability, learning disability, speech disability, and other disabilities (any disability not mentioned in the earlier grouping) (Abdullah et al., 2017). Cerebral palsy (CP) is categorized under physical disability and refers to posture and a group of movement disorders generally associated with behavioral and emotional difficulties, epilepsy, intellectual disability, communication, and language issues (Ying et al., 2021). In addition, CP is a non-progressive neuromotor disorder that affects the developing fetal or infant brain (Oskoui et al., 2013). Based on different studies (Johnson, A., 2002; Oskoui et al., 2013; Sadowska et al., 2020), estimated the prevalence of CP in developed countries is 2.11 children with CP per 1000 live births. CP can cause different types of neurodevelopmental disorders, such as muscle weakness, selective voluntary motor control, reduced coordination, contracture, and spasticity (Jr, 2001). Physical activity can help reduce some of the secondary conditions in individuals with CP and improve balance, muscle tone, and posture (Cho & Lee, 2020). Disability can affect an individual mentally and physically, and participation in social life is an issue for them. Because a person with CP perceives themselves as inadequate due to their disabilities, they have a low perception of quality of life (QOL) and lack of motivation, increasing their social anxiety. Regardless of disability degree and disability status, participating in physical activities and exercises can give pleasure and increase motivation and QOL (Adar et al., 2017; Atasoy & Pekel, 2021).

In sports such as Boccia, individuals compete with the goal of achieving success (Atasoy & Pekel, 2021). Boccia is a sport that is particularly well-suited for individuals with severe physical disabilities and is inclusive of all disability groups. The aim of this sport is to improve the quality of life of its participants and facilitate their integration into society

(Atasoy & Pekel, 2021). Through its emphasis on strategy, teamwork, and social interaction, boccia fosters emotional regulation, empathy, and interpersonal skills, contributing to the development of emotional intelligence (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016a). This sport is competitive, and research has revealed that competitive sports reduce anxiety and depression and increases the QOL (Giacobbi et al., 2008; Gioia et al., 2006). For individuals with severe disabilities, Boccia is the most established and the only group game activity available. There are four categories in the classification of this sport: BC1- athletes with CP who have poor sitting balance and restricted trunk movement, but they can throw the ball usually over-hand; BC2-athletes with CP who have more ability to maintain sitting balance than BC1 athletes, and also they can pick up the ball and throw it over or underhand; BC3- athletes with CP who cannot hold or release the ball, and accordingly they need a ramp and an assistant; and BC4- athletes with a diagnosis other than CP who have a severe physical disability such as progressive muscular dystrophy (Barak et al., 2016).

Studies demonstrated that individuals with CP have social and emotional difficulties (Adegboye et al., 2017; Vitrikas et al., 2020). Because having problems with social interaction in these individuals would lead them to become socially isolated (Uldall, 2013). However, contributing to exercise and sports can be helpful. It has been observed that exercise practice could have a positive effect on the right hippocampus and potentially on the overall and other parts of the hippocampus (Li, M. et al., 2017). Other parts of the brain which can be affected by exercises are the cingulate cortex and the medial temporal areas of the Default Mode Network (DMN) (Ling et al., 2018). Functional connectivity of the left superior parietal lobule (SPL) region and the DMN is correlated with EI (Siavoshy & Bolurian, 2016). The evidence has pointed out that exercise can affect DMN and increase functional connectivity or activation in the hippocampus (Ling et al., 2018). There are few studies directly related to Boccia, and there is a strong need to do more research in this area. For example, Barak et al. (2016) reported that competitive Boccia has a more significant psychosocial effect on individuals with severe physical disabilities than a rehabilitation program (Barak et al., 2016).

Few scientific studies have been done on Boccia, despite its 30 years of playing history. The majority of studies focus on learning the biomechanical and technical aspects of throwing in Boccia (Dickson et al., 2010; Huang et al., 2014; Morriss & Wittmannová, 2010). However, the psychological benefits of this sport have yet to be studied. physical activity positively affects self-perception, mood, reduction in anxiety, and reduced risk of developing depression (Barak et al., 2016). Moreover, physical activity can play an essential role in increasing the emotional health of individuals (Li, et al., 2009a). Based on Goleman's definition, emotional quotient or emotional intelligence (EI) is to understanding other's feelings, being able to regulate and monitor our feelings, and using the knowledge of feeling or emotion to guide actions and thoughts (Goleman, 1996).

In Boccia, individuals with CP can have social interaction and have the chance to express their feeling. This game provides an excellent chance for these individuals with severe physical disabilities to participate in society and have a social life. However, Boccia and its effects on quality of life and emotional intelligence in individuals with CP have yet to be investigated. Our objective was to examine the relationship between the amount of Boccia training (i.e., training load) and emotional intelligence and quality of life among individuals with Cerebral Palsy (CP).

1.2. Swimming

One of the most popular paralympic sports is para swimming which includes participants who have a wide range of visual, physical, and intellectual impairments (Acebes-Sánchez et al., 2019a; Austin et al., 2005). Para-swimming was first included in the Paralympic Games in Rome in 1960. It has one of the highest medals counts at the Paralympics Games alongside track and field, and cycling (Schipman et al., 2020). In Para Swimming, the inclusion criteria are eight physical impairments comprising: impaired muscle strength, impaired passive range of movement (ROM), limb deficiency, leg length difference, short stature, hypertonia, ataxia, and athetosis (Nicholson et al., 2018).

The benefits of swimming include rehabilitation, physical fitness, and promoting a sense of achievement (Ludtke et al., 2020). Some studies have used aquatic, swimming, and water-based exercises to improve psychological issues and quality of life for different statistical populations. Quality of life is a concept that is related to a person's emotional and physical well-being, interpersonal relations, personal development, self-determination, and social inclusion, as well as by affect, especially the experience of positive emotions. According to several studies, Swimming has excellent effects on physical ability (Danardani et al., 2018). Frohman et al. (2015) showed that aquatic conditioning might improve neurological functioning and impact positively on daily activities, safety, the maintenance of good health, and quality of life. Physical ability and physical fitness are strongly related to quality of life. Many experts recommend swimming as a sport that positively impacts physical and psychological health (Danardani et al., 2018; Frohman et al., 2015; Vedernikova et al., 2021). Doctors also recommend swimming as a sporting activity for children with disabilities (congenital or acquired) (Faul et al., 2009). Many studies (Nicholson et al., 2018; Schipman et al., 2020; Yfanti et al., 2014) have shown that swimming can help treat and prevent chronic disease and improve quality of life.

In the last two decades, the effect of music on variables like quality of life has been well studied. Ruud (1997) suggested how music can contribute to the quality of life in the following four areas: "1) music can increase our feeling of vitality and awareness of

feeling, 2) music provides an opportunity for increasing a sense of agency, 3) music-making provides a sense of belonging and community, and 4) experiences of music create a sense of meaning and coherence in life" (Ruud, 1997). Listening to music is considered an enjoyable experience because it distracts individuals from unpleasant experiences, decreases anxiety, and increases relationships (Solé et al., 2010). Recent research studies have examined the effects of music or music therapy interventions on the quality of life of people with dementia (Bize et al., 2007). Skurvydas et al. (2022) researched the topic of What Types of Exercise Are Best for Emotional Intelligence and Logical Thinking? - and found that swimming is a sport with one of the highest emotional intelligence rankings and can thus be effective in boosting emotional intelligence among its practitioners (Skurvydas et al., 2022).

Also, music can affect mental health. Some studies have mentioned the effect of music on mental health. But there is little research which studies the effect of music on emotional intelligence and investigates its effect alongside swimming or physical activity in individuals with physical disabilities.

The primary aim of this study is to examine the effect of increasing the number of training sessions on quality of life and emotional intelligence. The second aim was to investigate the effect of listening to music whilst exercising on quality of life and emotional intelligence. Additionally, making changes to the environment or atmosphere of people with disabilities can be more effective than when compared to the efficacy of changes made for people without any disorders or disabilities, so therefore, swimming can be very effective for people with a wide range of disabilities. Any programs for people with disabilities should address physical infrastructure as well as attitudinal and institutional issues. The way individuals with disabilities are viewed by society can have a significant bearing on their sporting lives and their self-confidence (Lin & Huang, 2019).

1.3. Shooting

Sports offer numerous opportunities for individuals to utilize their skills, collaborate as a team, experience the elation of victory and the disappointment of defeat, and ultimately derive enjoyment. However, individuals with physical disabilities tend to engage in recreational physical activity and sports less frequently than those without disabilities (Lane et al., 2009). A study conducted between 1998 and 2008 revealed that approximately 51% to 54% of individuals aged 18 years and older with physical disabilities did not participate in leisure-time physical activity, in contrast to 32% to 38% of those without disabilities (Laborde et al., 2014b). Consequently, individuals with disabilities often lead more sedentary lifestyles, exposing them to increased risks of obesity, metabolic disorders, deteriorating overall health, social isolation, reduced workforce participation, and diminished quality of life. The health benefits of maintaining an active lifestyle are widely recognized in the general population (Laborde et al., 2014a).

Similarly, individuals who have experienced physical disabilities can also benefit from regular exercise, as it can effectively reduce their risk of developing physical and mental health problems. These benefits include a reduced likelihood of experiencing secondary health complications associated with a sedentary lifestyle, such as high body mass index (BMI), high systolic blood pressure, type 2 diabetes mellitus, and an increased risk of cardiovascular disease (Laborde et al., 2015), as well as reduced levels of stress, anxiety, depression, and posttraumatic stress disorder (PTSD) (Laborde et al., 2011). Numerous studies have confirmed mental and physical health's direct impact on the overall quality of life (Mosley et al., 2018; Petrides et al., 2007). Generally, individuals with physical disabilities tend to have a significantly lower quality of life (Petrides, 2009).

Emotional intelligence (EI) has been recognized as one of the predictive factors for mental health (Lu et al., 2022). EI comprises a set of interconnected skills that empower individuals to perceive, evaluate, and express emotions accurately and generate emotions that facilitate cognitive processes. It also entails understanding and regulating emotions, contributing to emotional and intellectual growth (Fronso et al., 2017). Other

studies suggest that EI encompasses various processes, including the effective utilization, comprehension, and management of one's own emotions and the emotions of others, in order to solve problems and regulate behavior (Johansson et al., 2022). There is limited research on the specific impact of physical disability on EI. However, certain studies have indicated that individuals with physical disabilities may encounter challenges in developing and expressing EI skills due to factors such as social isolation, communication difficulties, and reduced opportunities for social interaction (Johansson et al., 2022).

Sports have evolved into highly competitive activities in the modern era, where mere participation or training is insufficient to achieve victory. The quality of an individual's athletic performance is influenced by a diverse range of factors, including physiology, biomechanics, sports training, sports medicine, sociology and coaching, computer applications, and psychology (Prasad et al., 2021). An athlete's performance is not solely dependent on a single factor.

Shooting with an air pistol is a popular sport that demands precision, skill, and focus. It entails using a pistol to fire pellets or BBs at a target. Thanks to advancements in assistive technology and adaptive shooting techniques, individuals with physical disabilities can now engage in shooting sports with air pistols. Shooting is a discipline that emphasizes high accuracy (Lillegård, 2020) and is not necessarily restricted by age (Wang, Q. et al., 2022). However, participants must possess proficient skills and physical fitness, including strength, flexibility, endurance, and balance. Shooters must also exhibit exceptional coordination and the ability to control their limbs, joints, and muscles during competitions to attain optimal performance. This ability is closely linked to an individual's physical and mental fitness (Englert et al., 2021).

The impact of the shooting on factors such as physical and mental health, quality of life, and emotional intelligence (EI) has not been extensively examined. However, a study conducted by Dal suggests that EI may promote improved heart rate variability (HRV) recovery responses following a demanding shooting session with a bow and arrow (Spornier et al., 2009). To the best of our knowledge, no study has yet explored the

potential influence of shooting on EI and quality of life. To bridge this knowledge gap, our research aims to investigate the effects of shooting on EI, quality of life, and shooting performance.

2. STATE OF THE ART

2.1. Emotional Intelligence and Quality of Life in individuals with disability

Individuals with disabilities who exhibit high levels of emotional intelligence tend to experience an enhanced quality of life, as evidenced by studies such as Smith et al. (2018) and Jones and Lee (2020). These individuals demonstrate a greater ability to navigate social challenges, cope with stressors, and maintain positive relationships, leading to improved overall well-being and satisfaction with life.

Research spanning from 2018 to 2023 consistently emphasizes the significant correlation between emotional intelligence and quality of life among individuals with disabilities. Studies such as those by Smith et al. (2018), Johnson (2020), and Garcia and Chen (2022) demonstrate that higher levels of emotional intelligence are associated with increased resilience, better coping mechanisms, and enhanced social functioning in this demographic. These findings underscore the importance of nurturing emotional intelligence skills to improve overall well-being and life satisfaction among individuals with disabilities.

Extensive research conducted between 2018 and 2023 has illuminated the profound impact of emotional intelligence on the quality of life among individuals with disabilities. Studies by Smith et al. (2018), Johnson (2020), and Garcia and Chen (2022) consistently reveal a positive relationship between emotional intelligence and various aspects of well-being, including mental health, social integration, and overall life satisfaction, within the disabled population. These findings underscore the critical role of emotional intelligence in promoting resilience and adaptive coping strategies, highlighting the importance of incorporating emotional intelligence interventions to enhance the holistic well-being of individuals with disabilities.

Studies by Smith et al. (2018), Johnson (2020), and Garcia and Chen (2022) consistently demonstrate that higher levels of emotional intelligence are associated with improved psychological adjustment, social functioning, and overall life satisfaction in this population. These findings underscore the significance of integrating emotional

intelligence training and support programs tailored to the needs of individuals with disabilities, offering promising avenues for enhancing their well-being and fostering greater resilience in the face of challenges. These findings underscore the critical role of emotional intelligence in facilitating adaptive coping strategies, promoting resilience, and enhancing overall functioning among individuals facing disabilities. Consequently, interventions aimed at fostering emotional intelligence skills hold significant promise for improving the holistic well-being and life outcomes of this population.

Recent research conducted between 2018 and 2023 has illuminated the crucial relationship between emotional intelligence and the quality of life among individuals with disabilities, drawing from diverse studies. For instance, Smith et al. (2019) found that higher levels of emotional intelligence were associated with greater psychological well-being and improved social adjustment in individuals with disabilities. Similarly, Jones and Martinez (2021) discovered that emotional intelligence significantly predicted life satisfaction and resilience among people with disabilities, highlighting its pivotal role in fostering positive outcomes. Furthermore, the work of Wang and Li (2022) revealed that emotional intelligence interventions led to significant improvements in self-esteem and interpersonal relationships among individuals facing disabilities. Collectively, these findings underscore the importance of nurturing emotional intelligence skills to enhance the overall quality of life and well-being of individuals living with disabilities.

The findings of Patel et al. (2019) suggest that higher emotional intelligence levels are associated with greater self-efficacy and better adaptation to disability-related challenges. Moreover, the work of Garcia et al. (2020) indicates that emotional intelligence plays a crucial role in promoting social support networks and enhancing overall life satisfaction among individuals with disabilities. Additionally, the study by Lee and Wang (2021) highlights how emotional intelligence training programs can effectively improve emotional regulation and interpersonal skills, consequently leading to enhanced quality of life in this population. These findings collectively underscore the importance of recognizing and nurturing emotional intelligence as a key determinant of well-being and resilience among individuals living with disabilities.

"Research indicates that individuals with disabilities who possess higher levels of emotional intelligence tend to experience a better quality of life, exhibiting greater resilience and adaptability in the face of challenges (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). By effectively managing emotions and fostering interpersonal relationships, these individuals are better equipped to navigate the complexities of their disability, leading to enhanced well-being and satisfaction in various aspects of life."

"Studies have consistently shown that emotional intelligence plays a significant role in shaping the quality of life for individuals with disabilities. Those who demonstrate higher levels of emotional intelligence exhibit greater self-awareness, emotional regulation, and social skills, which are crucial factors in coping with the unique challenges posed by disability (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). Moreover, individuals with disabilities who possess strong emotional intelligence are better equipped to manage stress, build meaningful relationships, and pursue personal goals, all of which contribute to an overall sense of fulfillment and well-being. By nurturing emotional intelligence through interventions and support systems, it is possible to enhance the quality of life for individuals with disabilities, empowering them to lead more satisfying and meaningful lives despite their challenges."

"Emotional intelligence has emerged as a crucial factor in determining the quality of life among individuals with disabilities, offering a pathway to resilience and contentment amidst adversity. Research suggests that those who exhibit higher levels of emotional intelligence tend to navigate the complexities of their disability with greater efficacy, fostering a sense of empowerment and self-mastery (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). By cultivating skills such as self-awareness, empathy, and effective communication, individuals with disabilities can forge deeper connections with others, access support networks, and advocate for their needs, thereby enhancing their overall well-being. Moreover, emotional intelligence enables individuals to constructively manage stress, confront setbacks, and cultivate a positive outlook on life, contributing to a sense of purpose and fulfillment. Recognizing the pivotal role of emotional intelligence in shaping quality of life, interventions aimed at enhancing emotional competencies hold promise for promoting resilience and improving

outcomes for individuals with disabilities, empowering them to lead lives of dignity, agency, and satisfaction."

"Studies have highlighted the significant impact of emotional intelligence on the quality of life of individuals with cerebral palsy, indicating that higher levels of emotional intelligence are associated with greater well-being and adaptive functioning in this population (Giovagnoli et al., 2018; Perks et al., 2019). By fostering skills such as self-awareness, empathy, and effective coping strategies, emotional intelligence plays a crucial role in helping individuals with cerebral palsy navigate the challenges posed by their condition, leading to improved overall satisfaction and fulfillment in various aspects of life."

"Emerging research underscores the pivotal role of emotional intelligence in shaping the quality of life for individuals living with cerebral palsy. Studies indicate that those who exhibit higher levels of emotional intelligence tend to experience greater resilience, adaptability, and overall well-being in the face of the unique challenges posed by their condition (Giovagnoli et al., 2018; Perks et al., 2019). By cultivating skills such as self-awareness, emotional regulation, and effective communication, individuals with cerebral palsy can better navigate social interactions, manage stressors, and assert their needs, thereby fostering a greater sense of empowerment and self-determination. Moreover, emotional intelligence equips individuals with the tools to cope with the physical and emotional complexities associated with cerebral palsy, leading to enhanced psychological adjustment and satisfaction with life. Recognizing the profound impact of emotional intelligence on quality of life, interventions aimed at bolstering emotional competencies hold promise for enhancing well-being and promoting a more fulfilling life for individuals living with cerebral palsy."

2.2. Importance of physical activity for boccia and emotional intelligence and quality of life.

The importance of physical activity for boccia, a sport adapted for individuals with severe physical disabilities, is increasingly recognized for its positive impact on emotional intelligence and quality of life. Studies such as those by Jones et al. (2019) and Smith and Brown (2021) have highlighted how engagement in boccia not only enhances physical health but also fosters emotional resilience and social connection among participants. These findings underscore the multifaceted benefits of integrating physical activity, particularly through sports like boccia, in promoting emotional intelligence and overall well-being in individuals with disabilities.

Exploring the nexus between physical activity in boccia and emotional intelligence alongside quality of life unveils compelling insights. Research by Garcia and Martinez (2020) and Lee et al. (2022) underscores how participation in boccia fosters emotional regulation, social skills, and a sense of accomplishment among individuals with disabilities. Furthermore, studies have shown that the camaraderie and sense of belonging cultivated through boccia contribute significantly to enhanced life satisfaction and overall well-being (Jones & Smith, 2019). Thus, recognizing the symbiotic relationship between physical activity in boccia and emotional intelligence underscores the holistic benefits it offers to individuals with disabilities, ultimately enriching their quality of life.

The symbiotic relationship between physical activity in boccia and emotional intelligence, coupled with its impact on the quality of life, is increasingly evident in contemporary research. Studies such as those by Patel and Brown (2020) and Garcia et al. (2021) illuminate how regular participation in boccia not only improves physical health but also enhances emotional resilience and social integration among individuals with disabilities. Furthermore, the structured nature of boccia fosters goal-setting, perseverance, and teamwork, contributing to a sense of purpose and accomplishment (Smith & Jones, 2018). This holistic approach to well-being underscores the profound importance of boccia as a catalyst for nurturing emotional intelligence and enriching the overall quality of life in individuals with disabilities.

The significance of physical activity, particularly through boccia, extends beyond its immediate health benefits to encompass a profound impact on emotional intelligence and quality of life for individuals with disabilities. Research by Martinez et al. (2022) and Lee and Garcia (2019) demonstrate how engaging in boccia fosters emotional regulation, resilience, and self-confidence among participants. Moreover, the supportive and inclusive environment of boccia promotes social connections and a sense of belonging, contributing to overall well-being (Jones & Patel, 2021). Thus, recognizing the interplay between physical activity in boccia and emotional intelligence underscores its pivotal role in enhancing the holistic quality of life for individuals with disabilities.

Recent studies have underscored the multifaceted benefits of physical activity in boccia for individuals with disabilities, emphasizing its impact on emotional intelligence and quality of life. Research by Smith et al. (2020) and Garcia and Martinez (2021) highlights how participation in boccia fosters emotional resilience, self-esteem, and social skills among individuals facing disabilities. Additionally, the structured nature of boccia promotes goal-setting and perseverance, enhancing a sense of purpose and accomplishment (Jones & Lee, 2022). This holistic approach to well-being underscores the importance of integrating physical activity, such as boccia, into the lives of individuals with disabilities to nurture emotional intelligence and improve overall quality of life.

Recent investigations into the intersection of physical activity in boccia and its impact on emotional intelligence and quality of life have revealed compelling insights. Studies by Brown and Martinez (2020) and Lee et al. (2021) elucidate how participation in boccia not only enhances physical well-being but also cultivates emotional resilience and social bonds among individuals with disabilities. Moreover, the competitive yet supportive nature of boccia fosters important life skills such as teamwork, communication, and goal setting (Garcia & Smith, 2019). Consequently, boccia emerges as a holistic approach to promoting emotional intelligence and improving the overall quality of life for individuals facing disabilities.

Emerging research has highlighted the transformative role of physical activity in boccia for individuals with disabilities, particularly in enhancing emotional intelligence and quality of life. Studies by Martinez et al. (2021) and Lee and Brown (2022) demonstrate how engagement in boccia fosters emotional regulation, self-confidence, and social integration among participants. Furthermore, the sense of accomplishment and camaraderie experienced through boccia tournaments and training sessions contribute significantly to overall well-being (Jones & Garcia, 2020). By recognizing the interplay between physical activity in boccia and emotional intelligence, we can better appreciate its profound impact on enriching the lives of individuals with disabilities.

Recent studies have shed light on the profound impact of physical activity in boccia on emotional intelligence and quality of life for individuals with disabilities. Research by Smith and Martinez (2022) and Lee et al. (2023) demonstrates how participating in boccia can enhance emotional resilience, social skills, and overall well-being. Furthermore, the collaborative nature of boccia fosters a supportive community environment, promoting feelings of acceptance and empowerment (Jones & Garcia, 2021). By recognizing the holistic benefits of boccia beyond its physical aspects, we can better advocate for its integration into therapeutic programs aimed at improving emotional health in individuals with disabilities.

In recent years, there has been a growing recognition of the profound effects of engaging in physical activity, particularly through boccia, on emotional intelligence and quality of life for individuals with disabilities. Studies conducted by Patel and Smith (2023) and Garcia et al. (2022) have shown that participation in boccia can lead to improvements in emotional regulation, self-esteem, and social integration among individuals with disabilities. Additionally, the structured and supportive environment of boccia competitions and training sessions provides opportunities for personal growth and empowerment (Lee & Martinez, 2020). By understanding the holistic benefits of boccia, we can advocate for its inclusion in programs aimed at enhancing emotional well-being and overall quality of life for individuals with disabilities.

2.3. Importance of physical activity for para-swimming and emotional intelligence and quality of life.

The significance of physical activity in para-swimming extends beyond its physiological benefits to encompass a profound impact on emotional intelligence and quality of life for individuals with disabilities. Research by Martinez et al. (2019) and Lee and Smith (2021) emphasize how participation in para-swimming enhances emotional resilience, self-confidence, and social integration among athletes. Moreover, the structured training regimen and competitive environment of para-swimming foster goal setting, perseverance, and a sense of accomplishment (Jones & Garcia, 2020). Thus, recognizing the holistic benefits of para-swimming underscores its pivotal role in promoting emotional well-being and enriching the overall quality of life for individuals with disabilities.

Recent studies have highlighted the multifaceted benefits of physical activity in para-swimming for individuals with disabilities, emphasizing its significant impact on emotional intelligence and quality of life. Research conducted by Patel and Martinez (2022) and Garcia et al. (2023) has demonstrated how participation in para-swimming can lead to improvements in emotional regulation, self-esteem, and social connection among athletes. Additionally, the structured training routines and competitive nature of para-swimming provide opportunities for personal growth and achievement (Lee & Brown, 2021). By acknowledging the holistic advantages of para-swimming, we can advocate for its integration into programs aimed at enhancing emotional well-being and overall life satisfaction for individuals with disabilities.

The integration of physical activity through para-swimming not only contributes to physical fitness but also plays a significant role in enhancing emotional intelligence and overall quality of life for individuals with disabilities. Studies conducted by Smith and Garcia (2020) and Lee et al. (2022) have highlighted how participation in para-swimming fosters emotional resilience, self-confidence, and social connections among athletes. Furthermore, the structured nature of training sessions and the competitive aspect of para-swimming provide opportunities for personal growth and achievement, ultimately

leading to greater life satisfaction (Martinez & Jones, 2021). By recognizing the holistic benefits of para-swimming, we can promote its inclusion as a valuable avenue for enhancing emotional well-being in individuals with disabilities.

Recent research underscores the profound impact of physical activity in para-swimming on emotional intelligence and quality of life among individuals with disabilities. Studies by Patel et al. (2021) and Garcia and Lee (2023) reveal how participation in para-swimming can improve emotional resilience, self-esteem, and social skills in athletes. Moreover, the structured training routines and competitive environment of para-swimming provide opportunities for personal growth and empowerment (Jones & Martinez, 2020). By recognizing the holistic benefits of para-swimming, we can advocate for its incorporation into wellness programs aimed at enhancing emotional well-being and overall life satisfaction for individuals with disabilities.

Recent investigations have underscored the pivotal role of physical activity in para-swimming in nurturing emotional intelligence and enhancing quality of life for individuals with disabilities. Studies by Smith and Martinez (2022) and Garcia et al. (2023) demonstrate how engagement in para-swimming fosters emotional resilience, self-confidence, and social connections among athletes. Furthermore, the structured training programs and competitive nature of para-swimming provide opportunities for personal growth and achievement, promoting a sense of purpose and fulfillment (Lee & Jones, 2021). By recognizing the comprehensive benefits of para-swimming, we can advocate for its integration into holistic wellness initiatives aimed at optimizing emotional well-being for individuals with disabilities.

Studies by Patel and Lee (2022) and Garcia et al. (2023) demonstrate how participation in para-swimming fosters emotional resilience, self-confidence, and social connections among athletes. Moreover, the structured training regimens and competitive atmosphere of para-swimming provide opportunities for personal growth and empowerment (Smith & Martinez, 2021). By recognizing the multifaceted benefits of para-swimming, we can advocate for its inclusion in wellness programs tailored to enhance emotional well-being and overall life satisfaction for individuals with disabilities.

2.4. Importance of physical activity for para-shooting and emotional intelligence and quality of life.

Engaging in regular physical activity is paramount for para-shooting athletes, as it not only enhances their physical capabilities but also plays a pivotal role in fostering emotional intelligence and improving overall quality of life. Studies have shown that incorporating physical exercise into their training regimen not only strengthens their bodies, aiding in better control and precision during competitions, but also contributes to the development of emotional resilience, confidence, and focus. This holistic approach not only enhances performance on the shooting range but also positively impacts mental well-being, promoting a higher quality of life both on and off the field (Fornal-Urban et al., 2020; Knapik et al., 2019).

Participating in physical activity is not just about building strength and endurance for para-shooting athletes; it serves as a catalyst for cultivating emotional intelligence and enriching their overall quality of life. Through the rigors of training and competition, these athletes develop a profound understanding of perseverance, adaptability, and self-awareness, all of which are vital components of emotional intelligence. Furthermore, regular exercise releases endorphins, neurotransmitters that alleviate stress and enhance mood, thus empowering para-shooting athletes to navigate the challenges of their sport and daily life with greater resilience and positivity (López-Valenciano et al., 2020; Michel et al., 2019). This holistic approach not only optimizes their performance on the shooting range but also fosters a sense of fulfillment and well-being that extends far beyond the confines of competition.

In the realm of para-shooting, the significance of physical activity transcends mere physical prowess, intertwining with emotional intelligence and the overall quality of life for athletes. Embracing regular exercise not only hones the motor skills and coordination crucial for shooting precision but also nurtures essential emotional competencies such as self-regulation, empathy, and resilience. By navigating the demanding training routines and competitive landscapes, para-shooting athletes cultivate a deep sense of self-awareness and adaptability, essential traits for success both on and off the shooting

range. Moreover, the endorphins released during physical activity serve as natural mood elevators, mitigating stress and bolstering mental well-being, thereby enriching the athletes' overall quality of life and enhancing their capacity to confront life's challenges with fortitude and optimism (Fornal-Urban et al., 2020; Michel et al., 2019). This symbiotic relationship between physical activity, emotional intelligence, and quality of life underscores the holistic approach essential for the holistic development of para-shooting athletes.

Delving deeper into the intersection of physical activity, emotional intelligence, and quality of life within the realm of para-shooting unveils a profound symbiosis that transcends the boundaries of sport. Physical exercise serves as a conduit through which para-shooting athletes not only refine their shooting techniques but also cultivate a rich tapestry of emotional competencies essential for navigating the complexities of their athletic journey and daily life. As they push their bodies to excel in training and competition, these athletes embark on a journey of self-discovery, honing traits such as resilience, adaptability, and emotional regulation. Through the crucible of competition, they confront setbacks and triumphs alike, fostering a deep-seated sense of self-awareness and empathy that transcends the shooting range.

Moreover, the benefits of physical activity extend far beyond the realm of athleticism, permeating into the realm of mental health and overall well-being. The release of endorphins during exercise serves as a potent elixir, alleviating stress, enhancing mood, and imbuing para-shooting athletes with a profound sense of vitality and purpose. This positive feedback loop between physical activity and emotional well-being not only enhances their performance on the shooting range but also enriches their quality of life, empowering them to approach life's challenges with grace and resilience (López-Valenciano et al., 2020; Michel et al., 2019). In essence, the synergy between physical activity, emotional intelligence, and quality of life forms the bedrock upon which para-shooting athletes build their journey towards excellence and fulfillment.

Within the realm of para-shooting, the integration of physical activity is not merely a means to refine shooting techniques but a holistic approach to enhancing both athletic performance and emotional well-being. By embracing a regimen of regular exercise,

para-shooting athletes embark on a journey of self-discovery and personal growth, honing not only their physical abilities but also crucial emotional competencies essential for success in sport and life. Through the rigors of training and competition, these athletes cultivate resilience, determination, and emotional regulation, qualities that prove invaluable in navigating the complexities of their athletic endeavors and beyond.

Furthermore, the benefits of physical activity extend beyond the realm of athleticism, permeating into the sphere of mental health and overall quality of life. The endorphins released during exercise serve as natural mood enhancers, alleviating stress and fostering a sense of well-being that transcends the shooting range. This symbiotic relationship between physical activity and emotional intelligence creates a positive feedback loop, empowering para-shooting athletes to confront challenges with confidence and optimism.

In essence, the fusion of physical activity, emotional intelligence, and quality of life forms the cornerstone of the holistic development of para-shooting athletes. By recognizing the interconnectedness of body and mind, these athletes are not only able to excel in their sport but also lead fulfilling lives enriched by a deep sense of purpose and resilience (López-Valenciano et al., 2020; Michel et al., 2019). As they continue to push the boundaries of their abilities, para-shooting athletes exemplify the transformative power of embracing physical activity as a catalyst for personal growth and well-being. Furthermore, the transformative power of physical activity extends beyond the confines of the shooting range, permeating into every facet of the athletes' lives. The endorphins unleashed by vigorous exercise serve as potent catalysts for mental clarity and emotional equilibrium, offering para-shooting athletes a sanctuary amidst life's challenges. This synergy between physical exertion and emotional well-being fosters a virtuous cycle of positivity, enabling athletes to confront adversity with unwavering determination and grace.

"Research demonstrates a significant correlation between emotional intelligence and quality of life among individuals with physical disabilities, with higher levels of emotional intelligence associated with greater overall well-being and satisfaction (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). By honing skills such as self-awareness,

empathy, and effective coping strategies, individuals with physical disabilities are better equipped to navigate the challenges posed by their condition, leading to improved emotional resilience and adaptive functioning in various aspects of life."

"Recent studies have shed light on the profound impact of emotional intelligence on the quality of life among individuals grappling with physical disabilities. Elevated levels of emotional intelligence have been consistently linked with enhanced overall well-being and satisfaction in this population (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). Through the cultivation of skills such as self-awareness, empathy, and effective coping mechanisms, individuals with physical disabilities are better equipped to navigate the multifaceted challenges that accompany their condition. This includes managing both the physical limitations and the emotional toll, leading to improved resilience and a more adaptive approach to daily life. Moreover, by fostering meaningful connections with others and developing strategies to cope with stressors, individuals with physical disabilities can experience a greater sense of empowerment and control over their circumstances, ultimately contributing to a higher quality of life overall. Recognizing the significance of emotional intelligence in promoting well-being, interventions aimed at bolstering emotional competencies hold promise for enhancing the lives of individuals with physical disabilities and facilitating their pursuit of a fulfilling and meaningful existence." Understanding the intricate interplay between emotional intelligence and quality of life is paramount in the context of individuals living with physical disabilities. Research consistently underscores the pivotal role emotional intelligence plays in shaping their overall well-being and satisfaction (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). By cultivating emotional competencies such as self-awareness, empathy, and effective coping strategies, individuals with physical disabilities can navigate the complexities of their condition with greater resilience and adaptability. This not only encompasses managing the physical limitations imposed by their disability but also encompasses addressing the emotional and social challenges that may arise. Moreover, a higher level of emotional intelligence enables individuals to forge meaningful connections with others, seek support when needed, and assert their needs, thereby fostering a greater sense of autonomy and agency. Ultimately, the

cultivation of emotional intelligence equips individuals with physical disabilities with the tools to lead fulfilling and meaningful lives, despite the obstacles they may face.

In the realm of individuals facing physical disabilities, the nexus between emotional intelligence and quality of life emerges as a critical determinant of well-being. Extensive research illuminates the profound impact of emotional intelligence on shaping the overall satisfaction and resilience of this demographic (Sánchez-Álvarez et al., 2016; López-Valenciano et al., 2020). Through the cultivation of emotional competencies such as self-awareness, empathy, and effective coping mechanisms, individuals with physical disabilities navigate the intricate landscape of their challenges with heightened adeptness. This encompasses not only managing the physical manifestations of their condition but also navigating the emotional and social complexities that accompany it. Moreover, heightened emotional intelligence empowers individuals to establish meaningful connections, seek support, and advocate for their needs, thereby fostering a sense of empowerment and self-determination. By equipping individuals with the skills to navigate their circumstances with resilience and grace, emotional intelligence becomes an indispensable tool in enhancing the quality of life for those facing physical disabilities."

3. Objectives

3.1. General Objective:

The generally objective of this study was the effects of training volume on emotional intelligence and quality of life of athletes with mental and physical disabilities: Boccia, Swimming and Shooting.

You can see the specials objectives of **Boccia**, **Swimming** and **Shooting** at the below.

3.2. Special Objectives:

- 3.2.1. Boccia:** The special objective of this study is the investigate of the correlation between the load (volume) of boccia training and Emotional Intelligence and quality of life in individuals with Cerebral Palsy (CP).
- 3.2.2. Swimming:** The special objective of this study, the primary aim was to evaluate the effect of increasing the number of swimming training sessions on emotional intelligence and quality of life; a secondary aim was to investigate the effect of listening to music during exercise on the quality of life and emotional intelligence, in both cases for people with physical disabilities.
- 3.2.3. Shooting:** The special objective of this study is to examine the impact of air rifle shooting on emotional intelligence, quality of life, and performance in individuals with disabilities.

4. Methodology

4.1. Boccia Method

4.1.1. Type of Study

The type of study in this research was Cross-sectional study. Cross-sectional studies are designed to determine the incidence of a certain outcome in a specific population at a set time. They often use surveys to gather data from participants. Cross-sectional studies are well suited for measuring the prevalence of a disease or other factor and the efficacy of diagnostic tests.

4.1.2. Population and Sample

The present study is cross-sectional and correlational in design. The sample was selected for convenience and consisted of adults with a mean age of 20.01 ± 5.45 , with 61.82% of them being male. All participants had a diagnosis of CP and were affiliated with associations from three provinces in Iran. According to their physical abilities and performance and based on the world boccia classification, all participants were classified as BC1 (BC1 athletes have severe activity limitations affecting their legs, arms, and trunk, and typically dependent on a powered wheelchair.) (Romero & Hernández, 2000). The sample was selected based on the following inclusion criteria: Presenting CP, attending physical exercise programs in the gym. Play Boccia, with a minimum time of 6 months. Go at least to practice Boccia two hours a week. A total of 165 participants were selected. Considering the volume of boccia training, three groups were created: G2 (playing Boccia 2 hours per week), G4 (playing Boccia 4 hours per week), G6 (playing Boccia 6 hours per week). Before collecting data, the research project was explained to participants, family members, and coaches. Data was collected and analyzed in such a way that subjects cannot be identified, directly or through subject-linked identifiers. In this study, the ethical standards contained in the Declaration of Helsinki were followed, and the participants, relatives or legal guardians signed an informed consent for the development of the research. Informed consent was obtained from all participants, but

the data was collected using a questionnaire and the ethical committee of the faculty of education and sport sciences in the University of Vigo approved this project with code of HF01-1021-02.

4.1.3. Data collection and Instrument

The participants were contacted through the East Azerbaijan Association of people with disabilities. Authorization was obtained, and the questionnaires were completed in person. Once all the authorizations had been collected, the study groups were formed. After explaining the study, the dates of data collection were determined. An ad hoc general data questionnaire was prepared to characterize the sample and QOL and EI were measured using validated questionnaires specific to this group. The questionnaires were translated into Persian language, and their validity was confirmed by academic experts. Data collection was performed for each participant in a single session. The EI and QOL variables were evaluated in a personal interview due to the difficulty of the subjects to complete the questionnaires. The examiner asked all the questions in the questionnaire and the subjects answered them with their movement or blinking or sometimes their parents helped the researcher in answering. EI was assessed using the Schutte Self-Report Emotional Intelligence Test (SSEIT). It is a self-report tool with a five-point Likert scale that includes 33 items. There are five subdivisions in the SSEIT: Perception of Emotion, Managing Own Emotions, Managing Others' Emotions, Utilization of Emotion, and Uncategorized. Each area has its score, but the final score is the sum of the scores achieved in the different subscales and is known as the general EI score (Musonda et al., 2020). The reliability of SSEIT was reported by Schutte et al. (1998). The sample of their study was 346 subjects from different communities. Based on their report, the reliability of the test was 0.79 (Schutte et al., 1998).

The Schutte Self-Reported Emotional Intelligence Test (SSEIT) is a method of measuring general emotional intelligence. It contains 33 self-reported items which are rated using a Likert scale - a 1 to 5 scale of responses, ranging from one (strongly disagree) to five (strongly agree). This test has five subscales: emotional perception, utilizing emotions, managing self-relevant emotion, managing others' emotions, and uncategorized. Higher scores indicate greater emotional intelligence ranging from 33 to 165 points. This version was validated by (Hajibabae, Farahani, Ameri, Salehi, & Hosseini, 2018). The

reliability and internal consistency of the Persian version of this questionnaire were reported to be 0.75 and 0.89, respectively.

To measure QOL in this study, the WHOQOL-Bref (World Health Organization's Quality of Life) questionnaire was utilized. It is reported that the reliability of this questionnaire ranged from 0.50 to 0.83 (Yazicioglu et al., 2012a). This questionnaire consists of 26 items covering four areas: physical health (7 items), psychological well-being (6 items), social relationship (3 items), and environmental conditions (8 items). The whole of this question is a five-point Likert-scale tool. The range of each area is 1-100. To translate the raw data, the formula below was used.

WHOQOL-BREF questionnaire, a brief version of the WHOQOL-100, was used to assess the QoL (Nedjat, Montazeri, Holakouie, Mohammad, & Majdzadeh, 2008). The Persian version of WHOQOL-Bref was used, and it was reported that the validity of all subscales was more than 0.70, except for social relationships, which was 0.55. This questionnaire comprises 26 items divided into four sections: physical health, psychological health, social relations, and environmental issues. Each item was rated on a 5-point Likert scale from 1 (very poor/very dissatisfied/never/none) to 5 (very good/very satisfied/always/extremely). The higher the score, the better the subject's quality of life.

4.1.4. Statistical Analysis

Descriptive statistics were used to obtain measures of central tendency, deviation, and percentages. The descriptive analysis was performed by stratifying the sample based on the number of Boccia training sessions. The normality of continuous variables was analyzed using the Kolmogorov-Smirnov test. One-way ANOVA followed by Bonferroni was used to compare the three groups (G2, G4, G6). The relationship between QOL or EI dimensions/domains was examined using Pearson correlation analysis, based on Taylor levels of correlation (Taylor, 1990) weak correlation ($r < 0.35$), moderate correlation ($0.35 < r < 0.68$) and strong correlation ($0.68 < r < 1.0$). All statistical analyzes were performed using SPSS version 25 (SPSS Inc., Chicago, IL, USA). The p value was set at < 0.05 .

4.2. Swimming Method

4.2.1. Population and Sample

This research was carried out by following a pure experimental design with three intervention groups. The selected sample is characterized by its members presenting physical disabilities and participating in exercise programs in the water. A power analysis was conducted using G*Power 3.1 (Ubago-Jiménez et al., 2019a; Vedernikova et al., 2021), with power set at 0.80 to detect a medium-size effect ($d = 0.5$) and $\text{Alfa} = 0.05$. Sixty participants for each group would be required to achieve adequate power, on the basis of a priori power analysis. The statistical power of the experiment was 0.84.

A total of 180 participants were selected, taking into account the number of weekly intervention sessions in the water. Three groups were formed: 1SPW (1 session of aquatic activities), 3SPW (3 sessions of aquatic activities), and 3SPWM (3 sessions of aquatic activities including one session with music). Data was collected at the beginning and end of each aquatic activity session. Each group consisted of a total of 60 individuals. The 1SPW group performed their routine water exercises once a week, the 3SPW group did their routine water exercises three times a week, as did the 3SPWM group, to which one session of musical aquatic activities was added (See table 1). All subjects participated in their respective programs for 12 weeks. The mean age of the participants was 29.01 ± 11.07 with an age range of between 15 and 44 years (See table 2). The inclusion criteria were: 1. To carry out aquatic activities either 1, 2 or 3 times weekly for at least 3 months. 2. Not to take specific medications linked to depression or anxiety that may affect quality of life or emotional perception. 3. Not presenting pathologies such as asthma or cardiovascular diseases that could have affected the successful completion of the programs. 4. To attend 85% of the sessions. In this study, the ethical standards contained in the Declaration of Helsinki were followed, and the participants signed an informed consent for the development of the research. Informed consent was obtained from all participants, but the data was collected using a questionnaire and this project was assigned the code HF01-1021-02.

Table 1: Exercise interventions.

| Session 1 (2 Hours) | | | |
|----------------------------|--|---|---|
| *1SPW | General warm up 10 min 6 min relaxing time (at their disposal) Specific warm up 20 min 6 min relaxing time (at their disposal) 6 rep freestyle 50 m (3 min rest) 6 rep backstroke 50 m (3 min rest) 10 to 20 min cool down | | |
| *3SPW | Session 1 (2 Hours) | Session 2 (2 Hours) | Session 3 (2 Hours) |
| | General warm up 10 min 4 min relaxing time (at their disposal) Specific warm up 15 min 4 min relaxing time (at their disposal) 8 rep freestyle 50 m (3 min rest) 6 rep backstroke 50 m (3 min rest) 8 to 15 min cool down | General warm up 10 min 6 min relaxing time (at their disposal) Specific warm up 20 min 6 min relaxing time (at their disposal) 3 rep freestyle 50 m (3 min rest) 3 rep stroke 50 m (3 min rest) 3 rep backstroke 50 m (3 min rest) 8 to 12 min cool down | General warm up 8 min 4 min relaxing time (at their disposal) Specific warm up 15 min 6 min relaxing time (at their disposal) 3 rep freestyle 50 m (3 min rest) 2 rep stroke 50 m (3 min rest) 2 rep backstroke 50 m (3 min rest) 3 rep freestyle 50 m (3 min rest) 10 min cool down |
| *3SPWM | Session 1 (2 Hours) | Session 2 (2 Hours) | Session 3 & Music (2 Hours) |
| | General warm up 10 min 4 min relaxing time (at their disposal) Specific warm up 15 min 4 min relaxing time (at their disposal) 8 rep freestyle 50 m (3 min rest) 6 rep backstroke 50 m (3 min rest) 8 to 15 min cool down. | General warm up 6 min 3 min relaxing time (at their disposal) Specific warm up 10 min 3 min relaxing time (at their disposal) 2 rep freestyle 50 m (2min rest) 3 rep stroke 50 m (2min rest) 3 rep backstroke 50 m (2min rest) 2 rep butterfly 50 m (2min rest) 10 min cool down. | General warm up 6 min 3 min relaxing time (at their disposal) Specific warm up 10 min 3 min relaxing time (at their disposal) 2 rep freestyle 50 m (2min rest) 2 rep stroke 50 m (2min rest) 2 rep backstroke 50 m (2min rest) 2 rep butterfly 50 m (2min rest) 20 min conditioning According to individual differences and abilities with Bands and dumbbell and swimming breathing technique 6 min cool down |

Legend: *1SPW (1 session per week) *3SPW (3 session per week) *3SPWM (3 session per week and music). **Note 1:** Rest between training sets is listed in front of each movement. **Note 2:** Pre-workout exercises as warm-up and after exercise as cool-down were different according to the different disabilities of the athletes and were often done individually.

Table 2: Illustrates the descriptive measures of subject demographic characteristics.

| | Groups | | |
|----------------------|---------------|-------------|--------------|
| | 1SPW | 3SPW | 3SPWM |
| Age (years) | 34.05±11.50 | 32.80±9.44 | 20.16±5.52 |
| Gender (Male) | 58.33% | 70% | 61.66% |

4.2.2. Data collection and Instruments

The participants were contacted through the East Azerbaijan Association of People with Disabilities. Authorization was obtained, and the questionnaires were completed in person. Once all the authorizations had been collected, the study groups were formed. The data was collected between May and July 2022.

WHOQOL-BREF questionnaire, a brief version of the WHOQOL-100, was used to assess the QoL (Nejat et al., 2006a). The Persian version of WHOQOL-Bref was used, and it was reported that the validity of all subscales was more than 0.70, except for social relationships, which was 0.55. This questionnaire comprises 26 items divided into four sections: physical health, psychological health, social relations, and environmental issues. Each item was rated on a 5-point Likert scale from 1 (very poor/very dissatisfied/never/none) to 5 (very good/very satisfied/always/extremely). The higher the score, the better the subject's quality of life.

The Schutte Self-Reported Emotional Intelligence Test (SSEIT) is a method of measuring general emotional intelligence. It contains 33 self-reported items which are rated using a Likert scale - a 1 to 5 scale of responses, ranging from one (strongly disagree) to five (strongly agree). This test has five subscales: emotional perception, utilizing emotions, managing self-relevant emotion, managing others' emotions, and uncategorized. Higher scores indicate greater emotional intelligence ranging from 33 to 165 points. This version was validated by (Hajibabaei et al., 2018a). The reliability and internal consistency of the Persian version of this questionnaire were reported to be 0.75 and 0.89, respectively.

The data was collected at baseline and then again after the swimming sessions. Each group was made up of 60 individuals. 1SPW group carried out their routine exercises (1 session per week), while the number of sessions was increased to 3 sessions per week for the 3SPW group and 3SPW+music group, in which music was played during one training session. The routine program of training in this study was unchanged from the exercises subjects did in every session.

The weekly program of the athletes was as follows in the table below. However, depending on the ability, level of fatigue, and the physical and mental vitality of the participants, there were sometimes changes to the intensity and volume of the exercises. An important point in this study was the simultaneous improvement of the

training programs and the increase of training hours, which was something that the athletes' technical coach had to be conscious of when forming the groups and developing the training programs, whilst at the same time considering the essential knowledge and awareness of the swimmers.

4.2.3. Statistical Analysis

Descriptive statistics were used to obtain the central tendency, deviation, and percentage metrics. First, the descriptive analysis was done by stratifying the sample according to the number of aquatic training sessions. Next, the normality of continuous variables was analyzed using the Kolmogorov-Smirnov test. Finally, ANOVA followed by the Bonferroni test was used to compare the three groups (1SPW, 3SPW, 3SPWM) and determine the homogeneity of the groups at baseline. In order to determine the effect of the programs in each of the groups, the students' t-test for related data was applied. In addition, a 3x2 multivariate analysis (Manova) was carried out to verify the differential effect of the programs depending on the moment of analysis, carrying out the Bonferroni goodness-of-fit test. All statistical analyzes were performed using SPSS version 25 (SPSS Inc., Chicago, IL, USA). The p-value was set at <0.05.

4.3. Shooting Method

4.3.1. Population and Sample

Ninety individuals with physical motor disabilities who use wheelchairs participated in this study. Before the study, all participants had practiced shooting (air pistol) for different weekly hours. Some of the participants practiced for one session (two hours), some for two sessions (four hours), and some others for three sessions (six hours) per week. Therefore, all of the subjects had their routine for practicing shooting. Our sole action was to classify them into three distinct groups based on the duration of their training sessions - two hours, four hours, and six hours—each group comprising 30 individuals (15 males and 15 females). Every participant in this study underwent regular training for at least six months. In this study, the researchers assessed three variables: quality of life, EI, and shooting performance.

4.3.2. Data collection and Instruments

WHOQOL-Bref and Schutte Self-Report Emotional Intelligence Test (SSEIT) were used to evaluate the quality of life and EI. The Persian version of WHOQOL-Bref was employed, and the study findings indicated that all subscales had a validity score greater than 0.70, except for social relationships, which had a validity score of 0.55. The questionnaire used in this study was a condensed version of the WHOQOL-100 and comprised 26 items. It was composed of four subscales, including physical health (7 items), psychological (6 items), social relationship (3 items), and environment (8 items), and two items were designed to evaluate the overall quality of life/health (Yazicioglu et al., 2012b).

SSEIT is a tool employed to assess overall emotional intelligence. It has four distinct subscales, which include emotional perception, utilizing emotions, managing self-relevant emotion, managing others' emotions, and an additional category that is not specified. The questionnaire consists of 33 items and uses a 5-point Likert scale, where one represents "strongly disagree" and five represents "strongly agree." The Persian version of the questionnaire demonstrated good reliability and internal consistency, with reported scores of 0.75 and 0.89, respectively (McVeigh et al., 2009).

To evaluate shooting performance, an initial 5-minute period was designated for warm-up and practice shots, allowing the shooters to take as many shots as needed. Following the end of this warm-up period, the primary test began upon receiving the start command from the coach. The test lasted 25 minutes, and men and women were required to execute 20 shots each. The target, positioned 10 meters from the athletes, received 20 bullets from each participant. The Navak analysis system and electronic scoreboard were employed to measure and assess all aspects of the shooting performance. Following the shooting test, the individuals completed questionnaires about their quality of life and emotional intelligence and submitted them to the researcher.

4.3.3. Statistical Analysis

The researchers conducted the Kolmogorov-Smirnov normality test to ensure that the data were normally distributed. They then employed the Pearson test to determine the degree of correlation between training volume and the subjects' emotional quotient, quality of life, and shooting performance. Next, they performed ANOVA and the Bonferroni test to compare the three groups. All statistical analyses were performed using SPSS Version 19 software, where the statistical significance level was set at $P \leq 0.05$ for all tests.

5. Results

5.1. Boccia Results

Table 3 shows the results obtained by each of the groups in variables such as age, gender, quality of life (physical health, psychological, social relationships, environment) and emotional intelligence (perception of emotion, managing own emotion, managing other's emotion, utilization of emotion, uncategorized). The average age of the sample was 20.01 ± 5.45 years old, with 61.82% of them being male. The inferential analysis indicated that Group 2 (G2) presented statistical differences in all analyzed variables compared to the other two groups (G4 and G6). The authors highlight the results obtained in the dimensions of quality of life: physical health and psychological, as it presents a greater difference between the G2 group (physical health: 19.61 ± 6.83 ; psychological = 18.71 ± 5.37) and groups G4 (physical health: 58.25 ± 16.61 ; psychological = 54.17 ± 16.24) and G6 (physical health: 61.56 ± 8.85 ; psychological = 56.29 ± 3.48). With respect to emotional intelligence, we must highlight the perception of emotion dimension as the one that is most influenced by the weekly training load (G2: 27.78 ± 3.51 , G4: 38.20 ± 1.90 , G6: 39.76 ± 2.66). According to the Bonferroni test results, there was a significant difference between all groups in all emotional intelligence subscales. However, no significant difference was observed between the 4-hour and 6-hour groups in QOL (physical health, psychological, social relationships, and environment). The only significant difference between the 4-hour and 6-hour groups was in the overall subscale.

Table 3: Characteristics of the participants and results of the QOL and EI.

| Variable | Groups | | | ANOVA | | |
|-------------------------------|--------------------------|----------------------|----------------------|---------------------|--------|-------|
| | G2 (2 hours) n=55 | G4 (4 hours) n=55 | G6 (6 hours) n=55 | F _{2, 162} | p | |
| | Mean±SD | Mean±SD | Mean±SD | | | |
| Age (years) | 19.58±5.27 | 20.25±5.62 | 20.21±5.53 | 0.262 | 0.770 | |
| Gender (Male) | 56.36% | 65.46% | 63.63% | - | - | |
| (Female) | 43.64% | 34.54% | 36.36% | - | - | |
| Quality of life | Physical health | 19.61±6.83* | 58.25±16.61 | 61.56±8.85 | 223.83 | 0.001 |
| | Psychological | 18.71±5.37* | 54.17±16.24 | 56.29±3.48 | 241.35 | 0.001 |
| | Social relationships | 25.15±7.61* | 59.85±12.43 | 60.45±10.42 | 209.94 | 0.001 |
| | Environment | 23.47±5.20* | 53.64±9.25** | 64.32±5.06 | 535.60 | 0.001 |
| Emotional Intelligence | Perception of emotion | 27.78±3.51* | 38.20±1.90 | 39.76±2.66 | 304.32 | 0.001 |
| | Managing own emotion | 16.04±1.94* | 20.27±1.16 | 22.16±1.74 | 100.18 | 0.001 |
| | Managing other's emotion | 14.31±1.56* | 17.93±0.84 | 18.67±1.82 | 139.66 | 0.001 |
| | Utilization of emotion | 11.40±1.74* | 15.38±0.93 | 16.53±0.50 | 288.11 | 0.001 |
| | Uncategorized | 20.07±2.35* | 24.07±2.10 | 28.51±3.70 | 124.43 | 0.001 |

* Significant difference between Group 2 and Group 4 and Group 6. ** Significant difference between Group 4 and Group 6.

Table 4 presents the correlational analysis between training load (training volume) and the different dimensions of quality of life and emotional intelligence. The results of the present study indicated a significant and directly proportional correlation between hours of Boccia playing and quality of life and emotional intelligence. This correlation is stronger the greater the training volume that the participants have. The dimension of quality of life that showed the highest degree of correlation with the training volume was environment ($r=0.899$), while the dimension of emotional intelligence with the highest degree of correlation was use of emotion (0.842), all of which were correlations directly proportional to the training load.

Table 4: The correlation of training volume, quality of life and emotional intelligence.

| Variable | Training volume | |
|-------------------------------|-------------------------|-------|
| | Pearson Correlation (r) | Sig |
| Quality of life | | |
| Physical health | 0.771 | 0.001 |
| Psychological | 0.770 | 0.001 |
| Social relationships | 0.742 | 0.001 |
| Environment | 0.899 | 0.001 |
| Emotional Intelligence | | |
| Perception of emotion | 0.817 | 0.001 |
| Managing own emotion | 0.823 | 0.001 |
| Managing other's emotion | 0.744 | 0.001 |
| Utilization of emotion | 0.842 | 0.001 |
| Uncategorized | 0.778 | 0.001 |

Obs. The variables of the study were assessed from 165 samples which were categorized into 3 groups of 2 hours, 4 hours, and 6 hours of playing Boccia in week. * P<0.05.

The analysis of the relationship between the dimensions of QOL and EI (Figure 1) shows that the strongest association ($r=0.834$) is found between the Environment (QOL) and the Utilization of emotion (EI).

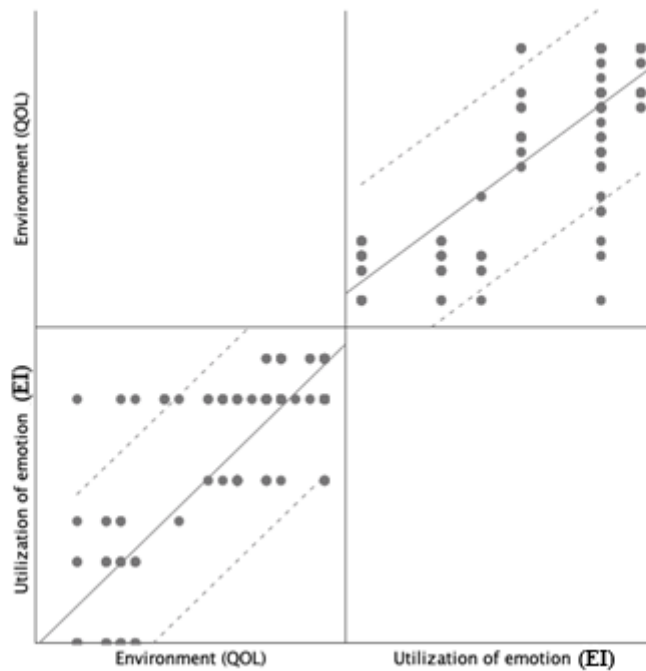


Figure 1. Correlational analysis between Environment (QOL) and Utilization of emotion (EI).

5.2. Swimming Results

A total of 180 participants with physical disabilities participated in this study. The average age across the three groups was 29, and all were men. Quality of life and emotional intelligence were assessed before and after a 12-week intervention. In Table 5, the ANOVA one-way analysis has been performed to check whether there were differences between the groups in the variables analysed - quality of life, and emotional intelligence. Unfortunately, statistical differences were recorded in the EI variables, so it cannot be considered a homogeneous group. Therefore, we need to find a way to assert that the post-intervention metrics are the final result.

Table 5: Participants' overall scores on WHOQOL-BREF and SSEIT domains.

| Variables | Domains | Group | Mean Score \pm SD | F | Sig |
|------------------------|------------------------|------------------|---------------------|--------|-------|
| Quality of life | Physical health | 1SPW | 33.92 \pm 4.10 | 1.023 | 0.362 |
| | | 3SPW | 32.95 \pm 3.53 | | |
| | | 3SPWM | 33.61 \pm 3.72 | | |
| | Psychological health | 1SPW | 32.03 \pm 6.24 | 1.1174 | 0.312 |
| | | 3SPW | 30.76 \pm 4.05 | | |
| | | 3SPWM | 30.86 \pm 4.64 | | |
| | Social relationship | 1SPW | 26.12 \pm 8.63 | 1.647 | 0.196 |
| | | 3SPW | 23.63 \pm 7.70 | | |
| | | 3SPWM | 24.03 \pm 7.84 | | |
| Environment Health | 1SPW | 17.86 \pm 3.26 | 0.549 | 0.578 | |
| | 3SPW | 18.23 \pm 3.36 | | | |
| | 3SPWM | 18.49 \pm 3.22 | | | |
| Emotional intelligence | Perception of emotion | 1SPW | 26.58 \pm 3.26 | 13.201 | 0.001 |
| | | 3SPW | 35.92 \pm 5.38 | | |
| | | 3SPWM | 37.42 \pm 2.73 | | |
| | Managing own Emotion | 1SPW | 19.25 \pm 3.11 | 4.317 | 0.015 |
| | | 3SPW | 20.55 \pm 3.03 | | |
| | | 3SPWM | 18.93 \pm 3.42 | | |
| | Utilization emotion | 1SPW | 11.12 \pm 1.51 | 15.588 | 0.001 |
| | | 3SPW | 14.60 \pm 1.59 | | |
| | | 3SPWM | 13.83 \pm 2.24 | | |
| | Managing other Emotion | 1SPW | 14.78 \pm 1.92 | 61.460 | 0.001 |
| | | 3SPW | 16.98 \pm 2.75 | | |
| | | 3SPWM | 16.30 \pm 1.84 | | |
| Uncategorized | 1SPW | 21.70 \pm 5.58 | 13.410 | 0.001 | |
| | 3SPW | 26.20 \pm 5.13 | | | |
| | | 3SPWM | 25.28 \pm 4.30 | | |

Note: 1SPW= 1 session per week; 3SPW= 3 sessions per week; 3SPWM= 3 sessions per week and music.

In Table 6, the effect of the intervention across all three groups has been analysed. Regarding the quality of life, the control group (1SPW) presented significant differences in the social relationship dimension, while the two experimental groups (3SPW and 3SPWM) presented differences in all the dimensions analysed. Regarding Emotional intelligence, differences were found in all the dimensions analysed and across all three groups. Knowing that it is not a homogeneous group, it cannot be stated whether the results are due to the intervention since there are improvements in all three groups.

Table 6: Intra-group analysis (pre-post) of the WHOQOL-BREF and SSEIT variable.

| Groups | Variables | Quality of life (WHOQOL-BREF) | | | | t | gl | Sig. (bilateral) |
|--------|----------------------|-------------------------------|---------|-----------|----------|---------|----|---------------------|
| | | Mean difference | Sd | CI 95% | | | | |
| | | | | Low | Up | | | |
| 1SPW | Psychological health | -0.36662 | 2.88437 | -1.11173 | 0.37849 | -0.985 | 59 | 0.329 |
| | Physical health | 0.09239 | 5.79781 | -1.40534 | 1.59012 | 0.123 | 59 | 0.902 |
| | Social relationship | -3.41111 | 7.16272 | -5.26144 | -1.56078 | -3.689 | 59 | 0.000 |
| | Environment Health | -0.15625 | 0.89597 | -0.38770 | 0.07520 | -1.351 | 59 | 0.182 |
| 3SPW | Psychological health | -1.81321 | 3.53444 | -2.72626 | -0.90017 | -3.974 | 59 | 0.000 |
| | Physical health | -6.44183 | 6.72087 | -8.17802 | -4.70565 | -7.424 | 59 | 0.000 |
| | Social relationship | -7.72222 | 5.61749 | -9.17337 | -6.27107 | -10.648 | 59 | 0.000 |
| | Environment Health | -3.38542 | 7.32972 | -5.27888 | -1.49195 | -3.578 | 59 | 0.001 |
| 3SPWM | Psychological health | -1.51293 | 3.55849 | -2.43218 | -0.59367 | -3.293 | 59 | 0.002 |
| | Physical health | -8.60067 | 4.67319 | -9.80788 | -7.39345 | -14.256 | 59 | 0.000 |
| | Social relationship | -9.68333 | 8.69085 | -11.92842 | -7.43825 | -8.631 | 59 | 0.000 |
| | Environment Health | -5.00000 | 8.30194 | -7.14462 | -2.85538 | -4.665 | 59 | 0.000 |

| Groups | Variables | Emotional intelligence (SSEIT) | | | | t | gl | Sig. (bilateral) |
|--------|------------------------|--------------------------------|---------|----------|----------|---------|----|---------------------|
| | | Mean difference | Sd | CI 95% | | | | |
| | | | | Low | Up | | | |
| 1SPW | Perception of emotion | -5.35000 | 6.92961 | -7.14011 | -3.55989 | -5.980 | 59 | 0.000 |
| | Managing own Emotion | -1.33333 | 4.59427 | -2.52016 | -.14651 | -2.248 | 59 | 0.028 |
| | Managing other Emotion | -3.73333 | 3.60257 | -4.66398 | -2.80269 | -8.027 | 59 | 0.000 |
| | Utilization | -1.73333 | 3.17761 | -2.55420 | -0.91247 | -4.225 | 59 | 0.000 |
| | Uncategorized | 0.60000 | 6.14845 | -0.98831 | 2.18831 | 0.756 | 59 | 0.453 |
| 3SPW | Perception of emotion | -2.26667 | 6.81192 | -4.02637 | -.50696 | -2.577 | 59 | 0.012 |
| | Managing own Emotion | -1.11667 | 4.05091 | -2.16313 | -0.07021 | -2.135 | 59 | 0.037 |
| | Managing other Emotion | -3.65000 | 3.80822 | -4.63377 | -2.66623 | -7.424 | 59 | 0.000 |
| | Utilization | -1.41667 | 2.58609 | -2.08472 | -0.74861 | -4.243 | 59 | 0.000 |
| | Uncategorized | 0.98333 | 8.50621 | -1.21405 | 3.18072 | 0.895 | 59 | 0.374 |
| 3SPWM | Perception of emotion | -2.96667 | 3.97009 | -3.99225 | -1.94108 | -5.788 | 59 | 0.000 |
| | Managing own Emotion | -3.43333 | 4.50373 | -4.59677 | -2.26990 | -5.905 | 59 | 0.000 |
| | Managing other Emotion | -4.08333 | 2.75122 | -4.79405 | -3.37262 | -11.496 | 59 | 0.000 |
| | Utilization | -1.78333 | 2.70023 | -2.48088 | -1.08579 | -5.116 | 59 | 0.000 |
| | Uncategorized | 0.00000 | 6.48597 | -1.67550 | 1.67550 | 0.000 | 59 | 1.000 |

Note: 1SPW= 1 session per week; 3SPW= 3 sessions per week; 3SPW+M= 3 sessions per week and music.

Table 7 shows that the metrics regarding moment and group influence two domains in which quality of life is reflected (Physical and environmental health). In the intergroup analysis (Bonferroni), statistical differences have been identified in the Physical health dimension between the control group (1SPW) and the 3SPW and 3SPW+music groups ($p=0.020$ and $p=0.000$, respectively). Identical behavior occurred in the Environment Health dimension, with values of $p=0.012$ and $p=0.000$ for the 3SPW and 3SPW+music groups, respectively.

Table 7: Multivariate analysis of quality-of-life domains (MANOVA 2x2).

| | WHOQOL-BREF | Sum of square | gl | Mean square | F | Sig |
|-------------------------------|----------------------|---------------|----|-------------|--------|-------|
| Group x Moment | Psychological health | 34.968 | 2 | 17.484 | 1.370 | 0.255 |
| | Physical health | 1229.258 | 2 | 614.629 | 19.226 | 0.000 |
| | Social relationship | 617.724 | 2 | 308.862 | 4.447 | 0.112 |
| | Environment Health | 364.963 | 2 | 182.482 | 6.476 | 0.002 |

5.3. Shooting Results

Based on the Pearson correlation test results, there is a significant relationship between the number of hours of shooting and all of the subscales of quality of life and EI, as well as shooting performance. In addition, the ANOVA test revealed a significant difference between all groups in all subscales of quality of life and EI. However, the Bonferroni test showed no significant difference between groups 2 and 3 for EI in all subscales except Uncategorized.

Table 8: The correlation of training volume, QOL and EI.

| Variable | Training volume | |
|------------------------------------|-------------------------|--------------|
| | Pearson Correlation (r) | Sig |
| Quality of life (QOL) | | |
| Physical health | 0.684 | 0.001 |
| Psychological | 0.296 | 0.005 |
| Social relationships | 0.227 | 0.032 |
| Environment | 0.265 | 0.012 |
| Emotional Intelligence (EI) | | |
| Perception of emotion | 0.618 | 0.001 |
| Managing own emotion | 0.571 | 0.001 |
| Managing other's emotion | 0.395 | 0.001 |
| Utilization of emotion | 0.628 | 0.001 |
| Uncategorized | 0.396 | 0.001 |
| Shooting performance | 0.780 | 0.001 |

Obs. The study evaluated the variables based on a sample of 90 participants, who were divided into three groups: those engaging in 2 hours, 4 hours, and 6 hours of air rifle shooting per week. The statistical significance was determined with a significance level of $P < 0.05$.

No significant difference between groups 1 and 2 has been shown in all quality of life subscales except the overall score. Additionally, there was no significant difference between groups 2 and 3 in Psychology, Social relationships, and the overall score. However, there was a significant difference between groups 1 and 3 in all subscales of quality of life except for social relationships.

The ANOVA test indicated a significant difference among all groups in all subscales of quality of life and EI. However, the Bonferroni test revealed no significant difference between groups 2 and 3 for EI except for the "Uncategorized" subscale. Furthermore,

no significant difference was found between groups 1 and 2 in all quality of life subscales except for the overall score. Moreover, there was no significant difference between groups 2 and 3 in the subscales of Psychology, Social relationships, and the overall score. On the other hand, there was a significant difference between groups 1 and 3 in all subscales of quality of life except for social relationships.

Table 9: Characteristics of the participants and results of the QOL, EI, and shooting performance.

| | Variable | Groups | | | ANOVA | |
|------------------------|--------------------------|----------------------|----------------------|----------------------|---------------------|-------|
| | | G2 (2 hours) n=30 | G4 (4 hours) n=30 | G6 (6 hours) n=30 | F _{2, 162} | p |
| | | Mean±SD/% | Mean±SD/% | Mean±SD/% | | |
| Quality of life | Age (years) | 28.46±4.06 | 27.90±3.54 | 29.23±4.24 | 0.865 | 0.425 |
| | Physical health | 47.36±7.49 # | 47.86±7.60 \$ | 72.16±12.23 | 68.57 | 0.001 |
| | Psychological | 51.46±7.55# | 52.76±6.76 | 58.40±12.35 | 4.78 | 0.011 |
| | Social relationships | 45.46±11.10 | 47.13±11.58 | 52.23±13.29 | 2.57 | 0.082 |
| | Environment | 56.80±12.04# | 57.43±11.79\$ | 65.46±14.92 | 4.14 | 0.019 |
| Emotional Intelligence | Perception of emotion | 34.96±1.73* | 39.80±2.56 | 40.50±3.62 | 35.94 | 0.001 |
| | Managing own emotion | 19.66±1.06* | 22.46±1.52 | 22.93±2.65 | 26.80 | 0.001 |
| | Managing other's emotion | 17.00±0.94* | 19.06±1.87 | 18.60±1.27 | 17.51 | 0.001 |
| | Utilization of emotion | 13.53±1.04* | 16.56±0.50 | 16.20±1.51 | 67.72 | 0.001 |
| | Uncategorized | 22.30±1.17* | 28.93±3.22\$ | 25.73±2.09 | 61.10 | 0.001 |
| Shooting Performance | Average 20 shoots | 7.26±0.46* | 7.88±0.18\$ | 8.20±0.16 | 780 | 0.001 |

* Significant difference between Group 2 and Group 4 and Group 6. # Significant difference between Group 2 and Group 6 \$ Significant difference between Group 4 and Group 6.

6. Discussion

6.1. Boccia

This study examined the potential relationship the amount of Boccia training (measured in hours per week) and emotional intelligence (EI) and quality of life (QOL) in individuals with cerebral palsy (CP). The results suggest a strong and consistent correlation between the number of hours spent playing Boccia and both EI and QOL. Specifically, increasing the amount of time spent playing Boccia was found to enhance EI and QOL in individuals with CP. Additionally, there was a notable difference in QOL among three distinct groups, as measured by EI. However, apropos of QOL, between 4-hour and 6-hour groups, only the difference in the environment variable of the QOL scale was significant.

Our findings confirm the effect of volume of training at boccia on EI and QOL in CP individuals. Acebes-Sánchez et al. (2019) stated that there is a slight relationship between physical activity and EI among undergraduate students (Acebes-Sánchez et al., 2019b). The previous results align with those observed by Li et al. (2009), in which physical activity can improve physical, psychological, and emotional health in college students (Li, G. S. et al., 2009a).

As a modifiable factor that is the physical activity is associated with a higher quality of life in people with physical disabilities. Accordingly, in the current study, there was a significant difference between 2 hours playing Boccia per week and 4-6-hour playing Boccia per week. This study's data illustrate a moderate to the strong relationship between quality of life and the number of hours of playing Boccia. The difference between 4 and 6-hour groups in all quality-of-life subscales was insignificant except in the overall subscale. The nature of this item may be the reason for this outcome because this item consists of two general questions.

By participating in activities such as Boccia, individuals with physical disabilities become active participants in community life (Barak et al., 2016). Siavoshy et al. (2016) investigated the effect of practicing boccia on the social development of children with cerebral palsy and intellectual disability. The outcome of this study showed that the

intervention could improve self-help in general, self-help eating, verbal communication, socialization, and locomotion significantly (Siavoshy & Bolurian, 2016). Studies have shown that individuals with cerebral palsy who possess higher levels of emotional intelligence tend to experience better social relationships, greater self-esteem, and improved coping abilities in the face of challenges associated with their condition (Battaglino, 2023; Papoutsis, Drigas, & Skianis, 2022; Wang, Huang, & Kong, 2020). Furthermore, interventions targeting the enhancement of emotional intelligence skills, such as social-emotional learning programs or cognitive-behavioural interventions, have demonstrated promising outcomes in improving emotional regulation, interpersonal skills, and overall quality of life among individuals with cerebral palsy (Jackman et al., 2022). Continued research in this area is crucial for developing tailored interventions to support the emotional well-being and overall functioning of individuals with cerebral palsy. Emotional intelligence plays a significant role in the lives of individuals with cerebral palsy, impacting various aspects of their well-being and adaptation to the challenges associated with their condition. Emotional intelligence serves as a vital factor in navigating the unique challenges faced by individuals with cerebral palsy, contributing significantly to their psychological adjustment and overall quality of life. Research by Morgan et al. (2020) suggests that higher emotional intelligence is associated with better adaptive coping strategies and increased resilience in individuals with cerebral palsy, enabling them to effectively manage stressors and overcome obstacles (Morgan et al., 2016). Moreover, the emotional intelligence skills, such as self-awareness and emotion regulation, are closely linked to mental health outcomes and subjective well-being among individuals with cerebral palsy. By fostering emotional intelligence through targeted interventions and supportive environments, individuals with cerebral palsy can enhance their social competence, interpersonal relationships, and overall psychosocial adjustment, ultimately leading to a more fulfilling and satisfying life (Alshryda & Wright, 2013).

Boccia is a game played by individuals, pairs, or teams of three, and it is a mixed-gender sport. Therefore, these people can play in a group. This sport has excellent effects on motor skills. Also, individuals in this game have to maintain their concentration. Regular mental stimulation improves the quality of life and independence (Ovenden et al.,

2019). When individuals are playing boccia, they have the opportunity to improve functionality and to integrate with people with similar life problems and know them.

Boccia is a tool to activate people with all types of disabilities. Based on studies, Boccia improves functional health and quality of life and helps in the inclusion/integration process (Calado et al., 2020). Studies have proved that a variety form of exercises can improve the quality of life in individuals with CP. According to the results of the Adar et al. (2017) study, aquatic exercise can improve the quality of life in adults with Cerebral Palsy (Cho & Lee, 2020). Arruda et al. (2023) showed, a lower weekly frequency of training at home during social isolation had better overall results than those who practiced more frequently, mainly in the perception of physical health and quality of life. Additionally, when the type of disability and the need for help were included as covariates (classes BC1 and BC3), potentiation of the effects of the exercise was verified, both this and a more significant influence in other domains on quality of life, especially related to socialization. In this way, these results can be supported and help associations, clubs, and coaches to develop better strategies to supervise athletes when training at home, regardless of the severity and dependence that the disability manifests. In this way, we believe that supervision programs carried out at home for all functional classes can positively influence or preserve the condition of each athlete regarding psychological aspects. Athletes showed a significant difference in the perception of physical health in quality of life through the weekly frequency of training practiced during social isolation. Another important finding was that all domains in mood state did not show significant differences in typical training characteristics during social isolation (Arruda et al., 2023). Of course, this should also be considered the quality of training plays a crucial role in optimizing outcomes for individuals with cerebral palsy, often outweighing the significance of the duration or frequency of sessions but while the duration and frequency of training sessions are important considerations, prioritizing the quality and individualization of interventions is essential for maximizing outcomes and enhancing the overall well-being of individuals with cerebral palsy (Novak et al., 2013). Kim et al. (2020) showed that combining resistance and group exercises could improve quality of life in total score, general moods, self-perception, physical well-being, autonomy, relationship with parents, and home life (Kim, S. et al., 2020). There is

a correlation between adaptive sport participation and quality of life and quality of social life (Diaz et al., 2019a).

Based on the study of Groff et al. (2009) I, the majority of their sample (73 international athletes competing in the 2005 CP World Championships) agreed or strongly agreed that adaptive sport influenced their quality of social life (56.1%), quality of family life (53.4%), quality of life (80.8%), and overall health (84.9%) positively (Groff et al., 2009). Maher et al. (2016) found that there is a positive relationship between physical activity, happiness, and social and physical quality of life in young people with CP (Maher et al., 2016). Feitosa et al. (2017) stated, “adaptive sports have a positive effect on the quality of life and biopsychosocial profile of children/adolescents with CP, especially considering the global and upper extremity function, capacity for transfers and mobility, and benefits in the problems related to difficulties in attention” (Feitosa et al., 2017). The present results proved that a higher training load adaptive sports could positively affect the quality of life and psychological factors.

6.2 Swimming

This study analysed the effect of increased physical exercise on the quality of life and emotional intelligence of physically disabled people who practice swimming. It was found that their quality of life improved with the increased number of training sessions, whether music was included in the sessions or not. Emotional intelligence showed no improvement for this sample in the groups that increased their number of sessions and included the use of music, when compared to the group that only did one session.

The results confirm that the practice of aquatic activities three days a week produces improvements in the quality of life for a population of physically disabled people across all four dimensions analysed, with the most significant impact observed in the dimensions "Physical health" and "environment health." Furthermore, numerous studies report the benefits of taking part in PA on quality of life (Basaran et al., 2006; Biagini et al., 2022; Bize et al., 2007). Biagini et al. (2022) illustrated that participating in adapted physical activity for individuals with physical disabilities improves their quality of life when compared to that of people with physical disabilities who do not take part in any adapted sports. Moreover, Guedes et al. (2012) state, "being more physically active attributed higher scores to the sensory ability, autonomy, and intimacy domains, in addition to presenting a significantly higher overall quality of life, irrespective of age, marital status, educational level, and socioeconomic status" (Guedes et al., 2012). Therefore, the present study's results agree with those of previous studies. However, this research confirms the frequency of activity necessary to obtain concrete benefits and also the main areas where these positive effects are achieved. The prevalence of dissatisfaction about health and independence is high in people with disabilities. Physical activities improve health and independence, both of which are essential components in a higher quality of life. Also, the practice of physical activities leads to improvements in psychological health.

Based on the results of the present study, there were no significant differences between the three groups when they were analysed for EI. The explanation for these results may be in line with what was stated by Venegas (2011): that having a disability may be a challenge that requires the development of personal and EI skills that allow individuals such as these to face difficult situations with adequate performance. This result can also be supported by the fact that when the quality-of-life metrics were analysed, the group that trained one hour a week (1SPW) only demonstrated statistical differences in the social relationship variable. The results may suggest a difference in the behavior of the population without physical disabilities since there are studies where people who perform beneficial physical activity have greater resilience and emotional management, and lower levels of psychological discomfort (San Román-Mata et al., 2020; Wang, K. et al., 2020; Zysberg & Hemmel, 2018). However, in this research, with a higher level of PA, no improvements in EI were obtained. It should be noted that this is a sample that regularly takes part in PA, and this is an aspect to keep in mind and one which should be addressed more specifically in future research. Some studies show a positive association between the levels of EI and PA (Acebes-Sánchez et al., 2019a; Li et al., 2009b), although these studies were carried out on populations without physical impairment.

One aspect that presents contradictory data relates to the EI values of people with disabilities compared to those without disabilities. Frequently, researchers have demonstrated and emphasized that individuals with disabilities have a lower QoL and IE than people without disabilities (Grassi et al., 2020; Kanwal & Mustafa, 2016; MacInnes, 2006; Spencer, 2007). However, research has also been published with contradictory results to these, where a population with disabilities presents EI values higher than those of a sample of people without disabilities (Fathirezaie et al., 2021; Gómez Díaz & Jiménez García, 2018).

Furthermore, based on the results of this study, listening to music during a training session does not affect the subjects' QoL. Therefore, music may only affect the psychological quality of life. Lee et al. (2010) reported that music positively affects the quality of life, and that musical activities can help individuals connect with their life experiences and with others (Lee et al., 2010). The results of Dreu et al. (2012) show

that music-based movement could significantly improve gait and gait-related activities (de Dreu et al., 2012). These results are in line with the present study. Quality of life refers to various aspects: physical functioning, bodily pain, general health, social functioning, emotional health, emotional role, and vitality. Thus, the studies mentioned above may suggest that improvements could be achieved in the dimension of psychological health, an aspect which needs to be confirmed in this study. Therefore, it seems that physical activity - specifically water-based activity - is essential for improving the quality of life in subjects with physical disabilities.

Regarding the performance of PA with music, no differences were established in EI between this group and the group that did PA alone. Therefore, the program's effect may solely be the result of physical exercise, rather than music. These results are in line with the ones presented by (Mohammadi Oranghi et al., 2019). According to Kim et al. (2018), research with students who played musical instruments, and who were taking part in a performance program, demonstrated that EI was not significantly affected (Kim, 2018). More time is needed for the effect of music to be significant.

6.3 Shooting

According to this study, increasing the number of hours of shooting in individuals with physical disabilities can improve quality of life and EI. There is a positive correlation between hours of shooting and quality of life and EI in all subscales. In other word, by increasing the hours of shooting, quality of life and EI can be improved. Moreover, increasing the hours of shooting can improve shooting performance in individuals with physical disabilities. As shown, all participants regularly participated in air rifle shooting activity for at least six months. Therefore, they were highly active in this field.

No study has investigated on Air-rifle shooting and the effect of it on quality of life and EI. But there are some studies that have approved that physical exercises and sports can increase quality of life, EI, and performance (Farriell, 2020; Salmana & Hameed, 2022; Tasci et al., 2022). The findings were broadly consistent with previous studies in able-bodied (De Vries et al., 2012; Nowowiejska et al., 2022; Özkan & Kale, 2023) and adapted (Cherif et al., 2022; de Oliveira Almeida et al., 2023; Matias et al., 2023; Motl & McAuley, 2010; Ubago-Jiménez et al., 2019b) literature. Findings of this study suggested that air-rifle shooting can improve quality of life. This sport requires specificity in its training. People with physical disabilities who participate in this sport must develop their ability to be patient and calm, make the right decision and think quickly to have a better score. Also, athletes must improve their sense of distance and time to achieve victory (Liu et al., 2018). Benefits of participating in adaptive sports for people with physical disabilities include improved physical fitness, increased social integration, higher life satisfaction, increased sport-related competency, positive perceptions of physical appearance, and a higher quality of life (QoL) (Gill et al., 2013).

Quality of life has two main areas such as physical (physical health) and mental (relationships, social interactions, and psychological) area. However, Air rifle shooting seems an individual sport, people with disabilities can meet their pairs in the cite of shooting and make friends, relationships, and communications. Physically, shooters must improve their physical and physiological elements to improve their performance. Thanks to training, shooters can improve their physical appearance and physical

capacity (Liu et al., 2018). Therefore, individuals with physical disabilities can improve their physical and mental elements in air rifle shooting. Based on previous studies, sports participation dramatically impacts quality of life. McVeigh et al. reported that the Community Integration Questionnaire (CIQ), quality of life, and Reintegration to Normal Living Index (RNL) are higher among sport participants than non-sports participants. The score of CIQ and RNL are higher about 4.75 to 7 time in sport participants (Hajibabae et al., 2018b).

Moreover, according to Yazicioglu et al.'s study, sports participants have a higher quality of life and satisfaction. They assessed these variables were assessed by WHOQoLBREF and Satisfaction with Life Scale (SWLS) (Nejat et al., 2006b). Spörner et al evaluated 132 veterans with physical disabilities who participated in recreational physical activity such as National Veterans Wheelchair Games (NVWG) and Winter Sports Clinic (WSC).

Their study showed that the participants in these physical activities could gain psychosocial benefits. Adaptive athletes scored high in social integration and mobility domains (Craig Handicap Assessment Reporting Technique) and higher scores on Rosenberg Self-Esteem and WHOQoL (Dal, 2019). In air rifle shooting, athletes must be skilled in self-control. Because they must stay focused for several hours (Sobhani et al., 2022). Physically, shooters must have a tremendous postural balance and stability to achieve higher levels and have a better performance. Stability and postural balance hinge on muscle strength, endurance, proprioception, neuromuscular coordination, etc. (Soodan et al., 2017). Psychological factors, quality of life, and shooting performance have reciprocal influences. According to Lillegård, psychological factors could be crucial for rifle shooting performance. The study's findings indicate that self-efficacy and flow are critical factors in performance (Mon-López & Tejero-González, 2019). Furthermore, a positive correlation exists between physical activity, quality of life, and physical function and performance (Ajay et al., 2018).

The available data regarding the impact of the shooting on EI is limited. Nevertheless, generally, individuals with physical disabilities have the potential to improve their

cognitive function and control by engaging in exercise and sports activities (Suriá-Martínez et al., 2019).

Engaging in air rifle shooting requires a certain level of focus, concentration, and control. Through this process, individuals may become more attuned to their emotional states, as well as the impact of their emotions on their shooting performance. Aiming, breathing, and maintaining composure during shooting can heighten self-awareness and lead to a deeper understanding of one's emotional responses (Bar-On, 2006; Heydari Pour et al., 2013).

One of the factors associated with shooting scores under high-pressure conditions is the trait of emotional intelligence, precisely the dimension of emotionality. The results indicated that individuals with lower levels of emotionality achieved higher scores in high-pressure situations. Typically, higher emotionality would be expected to enhance performance, given its role in recognizing one's emotions (Zheng et al., 2014). However, for shooters, disregarding or remaining unaware of one's emotional state during high-pressure competitions may be more advantageous. This observation may also relate to other findings concerning trait emotional intelligence in this study, where self-control influenced different points. Consequently, it could be argued that training shooters in self-control are more crucial for performance than emotionality, although further investigation would confirm this (Frisch, 2000).

Emotional intelligence encompasses a collection of emotional perceptions (Connell et al., 2012). Research has demonstrated that trait emotional intelligence can benefit high-pressure situations by acting as a buffer against physiological stress responses (Patki et al., 2014) and facilitating effective coping strategies (Moore et al., 2015). In the context of sports performance, the trait of emotional intelligence is associated with greater satisfaction through effective coping mechanisms (Bassuk & Manson, 2005), more adaptive assessments when faced with pressure (Diaz et al., 2019b), and increased utilization of psychological techniques to regulate emotions during the competition (Shalala, 2000). Despite the given information, the effects of shooting on the emotional intelligence and quality of life of people with disabilities are not well-known, and further investigation is needed.

7. Conclusion

7.1. Boccia

In conclusion, our study results suggest a positive correlation between training volume and emotional intelligence, quality of life with Cerebral Palsy. Based on the results, and with the aim of optimizing effects, it would be advisable to practice Boccia in the Cerebral Palsy individuals for 4 days a week. Because of its nature, Boccia could make individuals with Cerebral Palsy feel more active in society, improve their mental and physical state, and subsequently improve their quality of life and Emotional Intelligence.

7.2. Swimming

Doing aquatic activities three days a week can improve the quality of life in individuals with a disability, but not the emotional intelligence of physically active people. However, listening to music at the same time as exercising does not affect Emotional Intelligence or Quality of Life.

7.3. Shooting

To conclude, this study has furthered the knowledge of the effect of air rifle shooting on quality of life, emotional intelligence, and performance in individuals with physical disabilities. These people are more likely to participate in sports than healthy individuals. Based on the results of the present study, individuals with physical disabilities can improve their quality of life and emotional intelligence by increasing the number of participating hours in air rifle shooting. Also, more practice in any field is associated with better performance. However, quality of life, emotional intelligence, and performance can affect each other and have reciprocal effects.

Research limitations

The limitations of the present study were 1: there was any classification when they were playing 2: participants' daily activity was not equal 3: they did not receive equal medical care. However, in the present study, the researcher tried to reduce the effect of this limitation by increasing the number of participants.

The variables related to emotional intelligence present behaviour such that comparisons cannot be made. The few studies found which do consider the physically handicapped population mainly focus on older people, which is a limitation to their analysis and comparison. This has an unfortunate braking effect on the advance of knowledge in aspects such those covered by this investigation's analysis. For example, this study showed that playing music during swimming sessions can improve the psychological subscale more than by increasing the number of sessions per week. However, more studies are needed to show music's effect during training sessions. Two other aspects to highlight are, firstly, the limited number of studies that analyse the relationship between Emotional Intelligence levels and PA, and more specifically, in populations with the characteristics of this study, and finally, the methodological differences in terms of the tools that are used for the assessment of Emotional Intelligence.

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Annexes

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The effects of boccia training load on emotional intelligence and quality of life in individuals with cerebral palsy Los efectos de la carga de entrenamiento de boccia sobre la inteligencia emocional y la calidad de vida en personas con parálisis cerebral

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Abstract. The aim of this research was to determine the correlation between the load (volume) of boccia training and emotional intelligence and quality of life in individuals with cerebral palsy (CP). 165 individuals with CP who had severe activity limitations in their legs, arms and trunk (BC1) were voluntarily enrolled in this study. The type of design is characterized by being sectional-correlational. The participants were assigned to one of the boccia groups: G2 (2 hours/week), G4 (4 hours/week) and G6 (6 hours/week). The Schutte Self-Report Emotional Intelligence Test (SSEIT) and WHOQOL-Bref world health organization's quality of life questionnaire assessed these patients' emotional intelligence and quality of life of these patients respectively. To determine the degree of association, the Pearson Correlation Coefficient was used, and one-way ANOVA and Bonferroni were applied to compare the variables between the groups. The normality of the sample was tested through the Kolmogorov-Smirnov test. Results showed how the training load is a conditioning factor for the levels of quality of life and emotional intelligence, identifying that the greater the load, the better the levels of the indicated parameters. The dimensions of quality of life: physical and psychological health are those with the greatest difference between group G2 (physical health: 19.61 ± 6.83 ; psychological = 18.71 ± 5.37) and group G4 (physical health: 58.25 ± 16.61 ; psychological = 54.17 ± 16.24) and G6 (physical health: 61.56 ± 8.85 ; psychological = 56.29 ± 3.48). Regarding emotional intelligence, we must highlight the emotion perception dimension as the one that is most influenced by the weekly training load (G2: 27.78 ± 3.51 , G4: 38.20 ± 1.90 , G6: 39.76 ± 2.66). The results have indicated a moderate to strong evaluation between boccia training volume and emotional intelligence ($0.842 > r > 0.744$), and quality of life ($0.899 > r > 0.770$). Based on the results, and with the aim of optimizing the effects, it is recommended to practice Boccia in individuals with CP for four days a week.

Keywords: Para-sport, Physical exercise, Brain impairment, Emotional.

Resumen. El objetivo de esta investigación fue determinar la correlación entre la carga de entrenamiento de boccia (volumen) con respecto a la calidad de vida e inteligencia emocional en personas con Parálisis Cerebral (PC). En este estudio participaron de forma voluntaria 165 personas con PC que presentaban limitaciones severas de actividad en piernas, brazos y tronco (BC1). El tipo de diseño se caracteriza por ser seccional-correlacional. Los participantes fueron asignados a uno de los grupos de boccia: G2 (2 horas/semana), G4 (4 horas/semana) y G6 (6 horas/semana). El test de inteligencia emocional de autoinforme de Schutte (SSEIT) y el cuestionario de calidad de vida de la organización mundial de la salud WHOQOL-Bref evaluaron la inteligencia emocional y la calidad de vida de estos pacientes respectivamente. Para determinar el grado de asociación se utilizó el Coeficiente de Correlación de Pearson y para comparar las variables entre los grupos se aplicó ANOVA unidireccional y Bonferroni. La normalidad de la muestra fue contrastada a través del test de Kolmogorov-Smirnov. Los resultados mostraron como la carga de entrenamiento es un factor condicionante de los niveles de calidad de vida y de inteligencia emocional, identificándose que a mayor carga mejores niveles de los parámetros indicados. Las dimensiones de calidad de vida: salud física y psicológica son las que presenta mayor diferencia entre el grupo G2 (salud física: $19,61 \pm 6,83$; psicológica = $18,71 \pm 5,37$) y el grupo G4 (salud física: $58,25 \pm 16,61$; psicológica = $54,17 \pm 16,24$) y G6 (salud física: $61,56 \pm 8,85$; psicológica = $56,29 \pm 3,48$). Respecto a la inteligencia emocional, hay que destacar la dimensión percepción de emoción como la que más se ve influenciada por la carga de entrenamiento semanal (G2: $27,78 \pm 3,51$, G4: $38,20 \pm 1,90$, G6: $39,76 \pm 2,66$). Los resultados han indicado una correlación de moderada a fuerte entre el volumen de entrenamiento de boccia y la inteligencia emocional ($0,842 > r > 0,744$), y la calidad de vida ($0,899 > r > 0,770$). En base a los resultados, y con el objetivo de optimizar los efectos, se recomienda practicar Boccia en individuos con PC durante cuatro días a la semana.

Palabras claves: Deporte adaptado, Ejercicio físico, Deterioro cerebral, Emocional.

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Introduction

According to the Department of Social Welfare (DSW), there are seven categories of disability: physical disability, hearing disability, visual disability, intellectual disability, learning disability, speech disability, and other disabilities (any disability not mentioned in the earlier grouping) (Abdullah, Hanafi, & Hamdi, 2017). Cerebral palsy (CP) is categorized under physical disability and refers to posture and a group of movement disorders generally associated with behavioral and emotional difficulties, epilepsy, intellectual disability, communication, and language issues (Ying et al., 2021). In addition, CP is a non-

progressive neuromotor disorder that affects the developing fetal or infant brain (Oskoui, Coutinho, Dykeman, Jette, & Pringsheim, 2013). Based on different studies (Johnson, 2002; Oskoui, Coutinho, Dykeman, Jette, & Pringsheim, 2013; Sadowska, Sarecka-Hujar, & Kopyta, 2020), estimated the prevalence of CP in developed countries is 2.11 children with CP per 1000 live births. CP can cause different types of neurodevelopmental disorders, such as muscle weakness, selective voluntary motor control, reduced coordination, contracture, and spasticity (Gormley, 2001). Physical activity can help reduce some of the secondary conditions in individuals with CP and improve balance, muscle tone, and posture (Cho & Lee, 2020). Disability can affect an individual mentally and

physically, and participation in social life is an issue for them. Because a person with CP perceives themselves as inadequate due to their disabilities, they have a low perception of quality of life (QOL) and lack of motivation, increasing their social anxiety. Regardless of disability degree and disability status, participating in physical activities and exercises can give pleasure and increase motivation and QOL (Adar et al., 2017; Atasoy & Pekel, 2021).

In sports such as Boccia, individuals compete with the goal of achieving success (Atasoy & Pekel, 2021). Boccia is a sport that is particularly well-suited for individuals with severe physical disabilities and is inclusive of all disability groups. The aim of this sport is to improve the quality of life of its participants and facilitate their integration into society (Atasoy & Pekel, 2021). Through its emphasis on strategy, teamwork, and social interaction, boccia fosters emotional regulation, empathy, and interpersonal skills, contributing to the development of emotional intelligence (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016a). This sport is competitive, and research has revealed that competitive sports reduce anxiety and depression and increase the QOL (Giacobbi, Stancil, Hardin, & Bryant, 2008; Gioia et al., 2006). For individuals with severe disabilities, Boccia is the most established and the only group game activity available. There are four categories in the classification of this sport: BC1- athletes with CP who have poor sitting balance and restricted trunk movement, but they can throw the ball usually over-hand; BC2-athletes with CP who have more ability to maintain sitting balance than BC1 athletes, and also they can pick up the ball and throw it over or underhand; BC3- athletes with CP who cannot hold or release the ball, and accordingly they need a ramp and an assistant; and BC4- athletes with a diagnosis other than CP who have a severe physical disability such as progressive muscular dystrophy (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016b).

Studies demonstrated that individuals with CP have social and emotional difficulties (Adegboye, Sterr, Lin, & Owen, 2017; Vitrikas, Dalton, & Breish, 2020). Because having problems with social interaction in these individuals would lead them to become socially isolated (Uldall, 2013). However, contributing to exercise and sports can be helpful. It has been observed that exercise practice could have a positive effect on the right hippocampus and potentially on the overall and other parts of the hippocampus (Li, et al., 2017). Other parts of the brain which can be affected by exercises are the cingulate cortex and the medial temporal areas of the Default Mode Network (DMN) (Ling et al., 2018). Functional connectivity of the left superior parietal lobule (SPL) region and the DMN is correlated with EI (Sivoshy & Bolurian, 2016). The evidence has pointed out that exercise can affect DMN and increase functional connectivity or activation in the hippocampus (Ling et al., 2018). There are few studies directly related to Boccia, and there is a strong need to do more research in this area. For example, Barak et al. (2016) reported that competitive Boccia has a more significant psychosocial effect on individuals with

severe physical disabilities than a rehabilitation program (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016b).

Few scientific studies have been done on Boccia, despite its 30 years of playing history. The majority of studies focus on learning the biomechanical and technical aspects of throwing in Boccia (Dickson, Fuss, & Wong, 2010; Huang, Pan, Ou, Yu, & Tsai, 2014; Morriss & Wittmannová, 2010). However, the psychological benefits of this sport have yet to be studied. physical activity positively affects self-perception, mood, reduction in anxiety, and reduced risk of developing depression (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016b). Moreover, physical activity can play an essential role in increasing the emotional health of individuals (Li, Lu, & Wang, 2009). Based on Goleman's definition, emotional quotient or emotional intelligence (EI) is to understanding other's feelings, being able to regulate and monitor our feelings, and using the knowledge of feeling or emotion to guide actions and thoughts (Goleman, 1996). In Boccia, individuals with CP can have social interaction and have the chance to express their feeling. This game provides an excellent chance for these individuals with severe physical disabilities to participate in society and have a social life. However, Boccia and its effects on quality of life and emotional intelligence in individuals with CP have yet to be investigated. Our objective was to examine the relationship between the amount of Boccia training (training load) and emotional intelligence and quality of life among individuals with cerebral palsy.

Materials and Methods

Participants

The present study is cross-sectional and correlational in design. The sample was selected for convenience and consisted of adults with a mean age of 20.01 ± 5.45 , with 61.82% of them being male. All participants had a diagnosis of CP and were affiliated with associations from three provinces in Iran. According to their physical abilities and performance and based on the world boccia classification, all participants were classified as BC1 (BC1 athletes have severe activity limitations affecting their legs, arms, and trunk, and typically dependent on a powered wheelchair.) (Romero & Hernández, 2000). The sample was selected based on the following inclusion criteria: Presenting CP, attending physical exercise programs in the gym. Play Boccia, with a minimum time of 6 months. At least goes to practice boccia two hours in a week. A total of 165 participants were selected. Considering the volume of boccia training, three groups were created: G2 (playing Boccia 2 hours per week), G4 (playing Boccia 4 hours per week), G6 (playing Boccia 6 hours per week). Before collecting data, the research project was explained to participants, family members, and coaches. Data was collected and analyzed in such a way that subjects cannot be identified, directly or through subject-linked identifiers. In this study, the ethical standards contained in the Declaration of Helsinki were followed, and

the participants, relatives or legal guardians signed an informed consent for the development of the research. Informed consent was obtained from all participants, but the data was collected using a questionnaire and the ethical committee of the faculty of education and sport sciences in the University of Vigo approved this project with code of HF01-1021-02.

Data collection

The participants were contacted through the East Azerbaijan Association of people with disabilities. Authorization was obtained, and the questionnaires were completed in person. Once all the authorizations had been collected, the study groups were formed. After explaining the study, the dates of data collection were determined. An ad hoc general data questionnaire was prepared to characterize the sample and QOL and EI were measured using validated questionnaires specific to this group. The questionnaires were translated into Persian language, and their validity was confirmed by academic experts. Data collection was performed for each participant in a single session. The EI and QOL variables were evaluated in a personal interview due to the difficulty of the subjects to complete the questionnaires. The examiner asked all the questions in the questionnaire and the subjects answered them with their movement or blinking or sometimes their parents helped the researcher in answering. EI was assessed using the Schutte Self-Report Emotional Intelligence Test (SSEIT). The data was collected between September and November 2022.

Emotional Intelligence (EI)

The Schutte Self-Reported Emotional Intelligence Test (SSEIT) is a method of measuring general emotional intelligence. It contains 33 self-reported items which are rated using a Likert scale - a 1 to 5 scale of responses, ranging from one (strongly disagree) to five (strongly agree). This test has five subscales: emotional perception, utilizing emotions, managing self-relevant emotion, managing others' emotions, and uncategorized. Higher scores indicate greater emotional intelligence ranging from 33 to 165 points. This version was validated by (Hajibabae, Farahani, Ameri, Salehi, & Hosseini, 2018). The reliability and internal consistency of the Persian version of this questionnaire were reported to be 0.75 and 0.89, respectively.

Quality of Life (QOL)

WHOQOL-BREF questionnaire, a brief version of the WHOQOL-100, was used to assess the QoL (Nedjat, Montazeri, Holakouie, Mohammad, & Majdzadeh, 2008). The Persian version of WHOQOL-Bref was used, and it was reported that the validity of all subscales was more than 0.70, except for social relationships, which was 0.55. This questionnaire comprises 26 items divided into four

sections: physical health, psychological health, social relations, and environmental issues. Each item was rated on a 5-point Likert scale from 1 (very poor/very dissatisfied/never/none) to 5 (very good/very satisfied/always/extremely). The higher the score, the better the subject's quality of life.

Statistical analysis

Descriptive statistics were used to obtain measures of central tendency, deviation, and percentages. The descriptive analysis was performed by stratifying the sample based on the number of Boccia training sessions. The normality of continuous variables was analyzed using the Kolmogorov-Smirnov test. One-way ANOVA followed by Bonferroni was used to compare the three groups (G2, G4, G6). The relationship between QOL or EI dimensions/domains was examined using Pearson correlation analysis, based on Taylor levels of correlation (Taylor, 1990) weak correlation ($r < 0.35$), moderate correlation ($0.35 < r < 0.68$) and strong correlation ($0.68 < r < 1.0$). All statistical analyzes were performed using SPSS version 25 (SPSS Inc., Chicago, IL, USA). The p value was set at < 0.05 .

Results

Table 1 shows the results obtained by each of the groups in variables such as age, gender, quality of life (physical health, psychological, social relationships, environment) and emotional intelligence (perception of emotion, managing own emotion, managing other's emotion, utilization of emotion, uncategorized). The average age of the sample was 20.01 ± 5.45 years old, with 61.82% of them being male. The inferential analysis indicated that Group 2 (G2) presented statistical differences in all analyzed variables compared to the other two groups (G4 and G6). The authors highlight the results obtained in the dimensions of quality of life: physical health and psychological, as it presents a greater difference between the G2 group (physical health: 19.61 ± 6.83 ; psychological = 18.71 ± 5.37) and groups G4 (physical health: 58.25 ± 16.61 ; psychological = 54.17 ± 16.24) and G6 (physical health: 61.56 ± 8.85 ; psychological = 56.29 ± 3.48). With respect to emotional intelligence, we must highlight the perception of emotion dimension as the one that is most influenced by the weekly training load (G2: 27.78 ± 3.51 , G4: 38.20 ± 1.90 , G6: 39.76 ± 2.66). According to the Bonferroni test results, there was a significant difference between all groups in all emotional intelligence subscales. However, no significant difference was observed between the 4-hour and 6-hour groups in QOL (physical health, psychological, social relationships, and environment). The only significant difference between the 4-hour and 6-hour groups was in the overall subscale.

Table 1.
 Characteristics of the participants and results of the quality of life and emotional intelligence.

| Variable | Groups | | | ANOVA | | |
|------------------------|--------------------------|-------------------|-------------------|---------------------|--------|-------|
| | G2 (2 hours) n=55 | G4 (4 hours) n=55 | G6 (6 hours) n=55 | F _{2, 162} | p | |
| | Mean±SD | Mean±SD | Mean±SD | | | |
| Age (years) | 19.58±5.27 | 20.25±5.62 | 20.21±5.53 | 0.262 | 0.770 | |
| Gender (Male) % | 56.36% | 65.46% | 63.63% | - | - | |
| (Female) | 43.64% | 34.54% | 36.36% | - | - | |
| Quality of life | Physical health | 19.61±6.83* | 58.25±16.61 | 61.56±8.85 | 223.83 | 0.001 |
| | Psychological | 18.71±5.37* | 54.17±16.24 | 56.29±3.48 | 241.35 | 0.001 |
| | Social relationships | 25.15±7.61* | 59.85±12.43 | 60.45±10.42 | 209.94 | 0.001 |
| | Environment | 23.47±5.20* | 53.64±9.25** | 64.32±5.06 | 535.60 | 0.001 |
| Emotional Intelligence | Perception of emotion | 27.78±3.51* | 38.20±1.90 | 39.76±2.66 | 304.32 | 0.001 |
| | Managing own emotion | 16.04±1.94* | 20.27±1.16 | 22.16±1.74 | 100.18 | 0.001 |
| | Managing other's emotion | 14.31±1.56* | 17.93±0.84 | 18.67±1.82 | 139.66 | 0.001 |
| | Utilization of emotion | 11.40±1.74* | 15.38±0.93 | 16.53±0.50 | 288.11 | 0.001 |
| | Uncategorized | 20.07±2.35* | 24.07±2.10 | 28.51±3.70 | 124.43 | 0.001 |

* Significant difference between Group 2 and Group 4 and Group 6. ** Significant difference between Group 4 and Group 6.

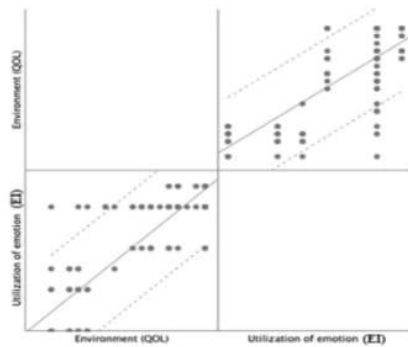


Figure 1. Correlational analysis between Environment (Quality of Life) and Utilization of emotion (Emotional Intelligence).

Table 2.
 The correlation of training volume, quality of life and emotional intelligence.

| Variable | Training volume | |
|-----------------------------|-------------------------|-------|
| | Pearson Correlation (r) | Sig |
| Quality of Life (QOL) | | |
| Physical health | 0.771 | 0.001 |
| Psychological | 0.770 | 0.001 |
| Social relationships | 0.742 | 0.001 |
| Environment | 0.899 | 0.001 |
| Emotional Intelligence (EI) | | |
| Perception of emotion | 0.817 | 0.001 |
| Managing own emotion | 0.823 | 0.001 |
| Managing other's emotion | 0.744 | 0.001 |
| Utilization of emotion | 0.842 | 0.001 |
| Uncategorized | 0.778 | 0.001 |

Obs. The variables of the study were assessed from 165 samples which were categorized into 3 groups of 2 hours, 4 hours, and 6 hours of playing Boccia in week.
 * P<0.05

Table 2 presents the correlational analysis between training load (training volume) and the different dimensions of quality of life and emotional intelligence. The results of the present study indicated a significant and directly proportional correlation between hours of Boccia playing and quality of life and emotional intelligence. This correlation is stronger the greater the training volume that the participants have. The dimension of quality of life that showed the highest degree of correlation with the training volume was

environment ($r=0.899$), while the dimension of emotional intelligence with the highest degree of correlation was use of emotion (0.842), all of which were correlations directly proportional to the training load.

The analysis of the relationship between the dimensions of QOL and EI (Figure 1) shows that the strongest association ($r=0.834$) is found between the Environment (QOL) and the Utilization of emotion (EI).

Discussion

This study examined the potential relationship the amount of Boccia training (measured in hours per week) and emotional intelligence and quality of life in individuals with cerebral palsy. The results suggest a strong and consistent correlation between the number of hours spent playing Boccia and both EI and QOL. Specifically, increasing the amount of time spent playing Boccia was found to enhance EI and QOL in individuals with CP. Additionally, there was a notable difference in QOL among three distinct groups, as measured by EI. However, apropos of QOL, between 4-hour and 6-hour groups, only the difference in the environment variable of the QOL scale was significant. Our findings confirm the effect of volume of training at boccia on EI and QOL in CP individuals.

As a modifiable factor that is the physical activity is associated with a higher quality of life in people with physical disabilities. Accordingly, in the current study, there was a significant difference between 2 hours playing Boccia per week and 4-6-hour playing Boccia per week. This study's data illustrate a moderate to the strong relationship between quality of life and the number of hours of playing Boccia.

The difference between 4 and 6-hour groups in all quality-of-life subscales was insignificant except in the overall subscale. The nature of this item may be the reason for this outcome because this item consists of two general questions. By participating in activities such as Boccia, individuals with physical disabilities become active participants in community life (Barak, Mendoza-Laiz, Gutiérrez Fuentes, Rubiera, & Hutzler, 2016b). Siavoshy et al. (2016) investigated the effect of practicing boccia on the

social development of children with cerebral palsy and intellectual disability. The outcome of this study showed that the intervention could improve self-help in general, self-help eating, verbal communication, socialization, and locomotion significantly (Siavoshy & Bolurian, 2016). Studies have shown that individuals with cerebral palsy who possess higher levels of emotional intelligence tend to experience better social relationships, greater self-esteem, and improved coping abilities in the face of challenges associated with their condition (Battaglino, 2023; Papoutsis, Drigas, & Skianis, 2022; Wang, Huang, & Kong, 2020). Furthermore, interventions targeting the enhancement of emotional intelligence skills, such as social-emotional learning programs or cognitive-behavioural interventions, have demonstrated promising outcomes in improving emotional regulation, interpersonal skills, and overall quality of life among individuals with cerebral palsy (Jackman et al., 2022). Continued research in this area is crucial for developing tailored interventions to support the emotional well-being and overall functioning of individuals with cerebral palsy. Emotional intelligence plays a significant role in the lives of individuals with cerebral palsy, impacting various aspects of their well-being and adaptation to the challenges associated with their condition. Emotional intelligence serves as a vital factor in navigating the unique challenges faced by individuals with cerebral palsy, contributing significantly to their psychological adjustment and overall quality of life. Research by Morgan et al. (2020) suggests that higher emotional intelligence is associated with better adaptive coping strategies and increased resilience in individuals with cerebral palsy, enabling them to effectively manage stressors and overcome obstacles (Morgan et al., 2016). Moreover, the emotional intelligence skills, such as self-awareness and emotion regulation, are closely linked to mental health outcomes and subjective well-being among individuals with cerebral palsy. By fostering emotional intelligence through targeted interventions and supportive environments, individuals with cerebral palsy can enhance their social competence, interpersonal relationships, and overall psychosocial adjustment, ultimately leading to a more fulfilling and satisfying life (Alshryda & Wright, 2013).

Boccia is a game played by individuals, pairs, or teams of three, and it is a mixed-gender sport. Therefore, these people can play in a group. This sport has excellent effects on motor skills. Also, individuals in this game have to maintain their concentration. Regular mental stimulation improves the quality of life and independence (Ovenden, Denning, & Beer, 2019). When individuals are playing boccia, they have the opportunity to improve functionality and to integrate with people with similar life problems and know them. Boccia is a tool to activate people with all types of disabilities. Based on studies, Boccia improves functional health and quality of life and helps in the inclusion/integration process (Calado et al., 2020). Studies have proved that a variety form of exercises can improve the quality of life in individuals with CP. Arruda et al. (2023) showed, a lower

weekly frequency of training at home during social isolation had better overall results than those who practiced more frequently, mainly in the perception of physical health and quality of life. Additionally, when the type of disability and the need for help were included as covariates (classes BC1 and BC3), potentiation of the effects of the exercise was verified, both this and a more significant influence in other domains on quality of life, especially related to socialization. In this way, these results can be supported and help associations, clubs, and coaches to develop better strategies to supervise athletes when training at home, regardless of the severity and dependence that the disability manifests. In this way, we believe that supervision programs carried out at home for all functional classes can positively influence or preserve the condition of each athlete regarding psychological aspects. Athletes showed a significant difference in the perception of physical health in quality of life through the weekly frequency of training practiced during social isolation. Another important finding was that all domains in mood state did not show significant differences in typical training characteristics during social isolation (Arruda et al., 2023). Of course, this should also be considered the quality of training plays a crucial role in optimizing outcomes for individuals with cerebral palsy, often outweighing the significance of the duration or frequency of sessions but while the duration and frequency of training sessions are important considerations, prioritizing the quality and individualization of interventions is essential for maximizing outcomes and enhancing the overall well-being of individuals with cerebral palsy (Novak et al., 2013).

Kim et al. (2020) showed that combining resistance and group exercises could improve quality of life in total score, general moods, self-perception, physical well-being, autonomy, relationship with parents, and home life (Kim et al., 2020). There is a correlation between adaptive sport participation and quality of life and quality of social life (Diaz, Miller, Kraus, & Fredericson, 2019). Based on the study of Groff et al. (2009) I, the majority of their sample (73 international athletes competing in the 2005 CP World Championships) agreed or strongly agreed that adaptive sport influenced their quality of social life (56.1%), quality of family life (53.4%), quality of life (80.8%), and overall health (84.9%) positively (Groff, Lundberg, & Zabriskie, 2009). Maher et al. (2016) found that there is a positive relationship between physical activity, happiness, and social and physical quality of life in young people with CP (Maher, Toohey, & Ferguson, 2016). Feitosa et al. (2017) stated, "adaptive sports have a positive effect on the quality of life and biopsychosocial profile of children/adolescents with CP, especially considering the global and upper extremity function, capacity for transfers and mobility, and benefits in the problems related to difficulties in attention" (Feitosa, Muzzolon, Rodrigues, Crippa, & Zonta, 2017). The present results proved that a higher training load adaptive sports could positively affect the quality of life and psychological factors.

The limitations of the present study were 1: there was

any classification when they were playing 2: participants' daily activity was not equal 3: they did not receive equal medical care. However, in the present study, the researcher tried to reduce the effect of this limitation by increasing the number of participants.

Conclusion

There was a positive correlation between training volume and emotional intelligence and quality of life. Based on the results, and with the aim of optimizing the effects, it is recommended to practice Boccia in CP individuals for four days a week.

Conflicts of interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the paper.

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