GROWTH DURING THE REHABILITATION PERIOD AFTER A SPORT INJURY: A SYSTEMATIC REVIEW

CRECIMIENTO PERSONAL DURANTE EL PERIODO DE REHABILITACIÓN DE LESIONES EN DEPORTISTAS: UNA REVISIÓN SISTEMÁTICA

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Abstract

A systematic review was carried out with the aim of understanding personal growth during the rehabilitation period of sports injury, as well as the variables that facilitate the development of this construct and the possible differences between gender, age and severity of the injury. For this purpose, a search of articles published from 2014 to 2024 in Google Scholar and Web of Science databases was carried out. After the selection process, ten articles were chosen for this systematic review. We observed a varied prevalence data on variables that facilitate personal development, ranging from resilience to positive communication with other people. The most analyzed psychological variables were mastery of the self and self-control. No differences were observed between the gender, age of the athletes and severity of the injury. The results suggest that personal growth during this rehabilitation period is frequently in athletes.

Keywords: Sports injury, personal growth, rehabilitation, sport, resilience.

Resumen

Se realizó una revisión sistemática con el objetivo de conocer el crecimiento personal durante el periodo de rehabilitación de una lesión deportiva, así como las variables que facilitan el desarrollo de este constructo y las posibles diferencias según el género, edad y gravedad de la lesión. Para ello se realizó una búsqueda de artículos publicados desde 2014 a 2024 en la base de datos Web of Science y Google Académico. Tras el proceso de selección, diez artículos fueron los elegidos para esta revisión sistemática. Tras la revisión de estos diez artículos, se observan unos datos de prevalencia variados de variables que facilitan el desarrollo personal, que van desde la resiliencia, hasta la comunicación positiva con otras personas. Las variables psicológicas más analizadas son el dominio del yo y el autocontrol. No se observaron diferencias respecto al género, edad de los deportistas y nivel de competencia. Los resultados sugieren que el crecimiento personal durante este periodo de rehabilitación es frecuente en los deportistas. No obstante, es necesaria la continua investigación para llegar a conclusiones más certeras.

Palabras clave: Lesión deportiva, crecimiento personal, rehabilitación, deporte, resiliencia.

Introduction

In sport, sports injury (LD) can be considered as an inherent event, with a negative character for the athlete who suffers it and the people around him (Gómez-Espejo, 2020; Johnson & Ivarsson, 2017; Schneider et al., 2006; Truong et al., 2020). Injury is a major concern in sports practice and in the field of physical activity and sport research. Wiese-Bjornstal et al. (1998) proposed an important model within the scientific literature that allows us to understand the relationship between psychological factors and sports injuries, the Integrated Model of the Psychological Response to Injury and the Rehabilitation Process, where psychological consequences are connected to injury in three components: cognitive assessments, emotional response and behavioral response. Likewise, we find another important model that explains this relationship, The Global Psychological Model of Sports Injuries of Olmedilla and García-Mas (2009).

Therefore, it is observed that the rehabilitation period is a crucial time when athletes face physical and psychological challenges to fully recover and return to the game, where athletes may experience negative mood disturbances, reduced self-confidence, and fear of re-injury (Johnson et al., 2016). Intrusive thoughts or low self-esteem, as well as emotional responses of sadness, fear, and aggressiveness, have also been observed (Olmedilla & García-Mas, 2009). On the other hand, the psychological problems that sports doctors consider most relevant in the rehabilitation process are anxiety, stress, depression, level of adherence, and social support (Cavanna & Chang, 2016). Likewise, behavioral changes such as eating disorders or alcoholism have been linked to the consequences of sports injuries (Brewer, 2017).

However, studies have shown that sports injuries can have positive consequences, what we know as "growth after adversity". (Wadey, et al., 2011; Wadey et al., 2019; Roy-Davis et al., 2017; Salim & Wadey, 2018; Salim & Wadey, 2021; Santi et al., 2023; Rubio et al., 2020). Therefore, in sports psychology, the study of the variables resilience and personal growth is significant, since the enhancement of these psychological constructs can be related to the optimal performance of an athlete during periods of injury (Puppo, 2020). The individual adopts a vision of action focused on change and persistence, characterized by allowing the athlete to possess adequate emotional management. The way to follow this adaptive emotional management is to increase the positive emotional components and decrease the negative ones, which have an unfavorable impact on the well-being and proper functioning of the athlete because they produce feelings of anxiety and stress (Puppo 2020).

According to Johnson et al. (2016) they identified three central themes that represent psychosocial factors that help players successfully cope with rehabilitation after injury: constructive communication and rich interaction with others; a strong belief in the importance and efficacy of one's actions; and the ability to set reasonable objectives. In this sense, Abenza (2010) found that athletes assess aspects such as the cause, their state of recovery, the availability of social support, and their ability to cooperate with the experience of sports injury after the injury in their rehabilitation period, which can be significant in their personal growth. More specifically, as established by Gómez-Espejo (2020), different studies associate visualization and relaxation with improved psychological coping (Reese et al., 2012; Tutte et al., 2020) and a reduction in anxiety due to the fear of re-injury (Coronado et al., 2018; Reese et al., 2012; Te Wierike et al., 2013; Tutte et al., 2020). In addition, there are several studies that focus their psychological intervention on the use of techniques such as relaxation, goal setting or visualization (Coronado et al., 2018; Lope-Fernández & Solís-Briceño, 2020; Olmedilla et al., 2020; Reese et al., 2012; Tutte et al., 2020).

In summary, despite the growing attention in this field, the existing literature on personal growth during the rehabilitation period of sports injuries has not yet been systematically synthesized. This is largely due to the emphasis on risk detection and prevention of sports injuries, as well as the lack of specific tools for their detection. Therefore, this systematic review has been carried out with the aim of examining the existing research on the personal growth variable during the rehabilitation period after the sports injury of the last 10 years, with the aim of collecting those psychological variables that facilitate this personal growth, taking into account their sex, age and level of severity or demand, also knowing the instruments for evaluating this construct, so that in this way, it serves as a guide for future research.

Materials and Methods

A systematic review was conducted following the Protocol of Preferred Reporting Elements for Systematic Reviews and Meta-analyses (PRISMA) (Page et al., 2020). Once the introduction and theoretical framework were established, where the context of the structured question and the objectives to be followed were explained, we have the following steps:

- Selection of inclusion and exclusion criteria.
- Data selection and extraction process, as well as the preparation of the flow chart.
- Data collection and list.

Inclusion Criteria

- Scientific studies that are empirical research with full text in English or Spanish.
- Articles that focus on the rehabilitation period of the sports injury.
- Articles that include personal growth in this period of rehabilitation.
- Articles must be published between 2014 and 2024, inclusive.

Exclusion Criteria

- Bibliographic reviews, systematic reviews or meta-analyses.
- Articles that do not address personal growth as part of the rehabilitation process.
- Studies with samples from the general population, without being focused on athletes.

Search for Studies

The search process for the studies was carried out in three phases: (1) the selection of the keywords, (2) systematic search in the databases and (3) selection of the articles.

Selection of Search Keywords

For a more careful search for studies that fit our review topic, a number of keywords were established. These were: "personal growth", "resilience", "sport injury", "rehabilitation", "sport".

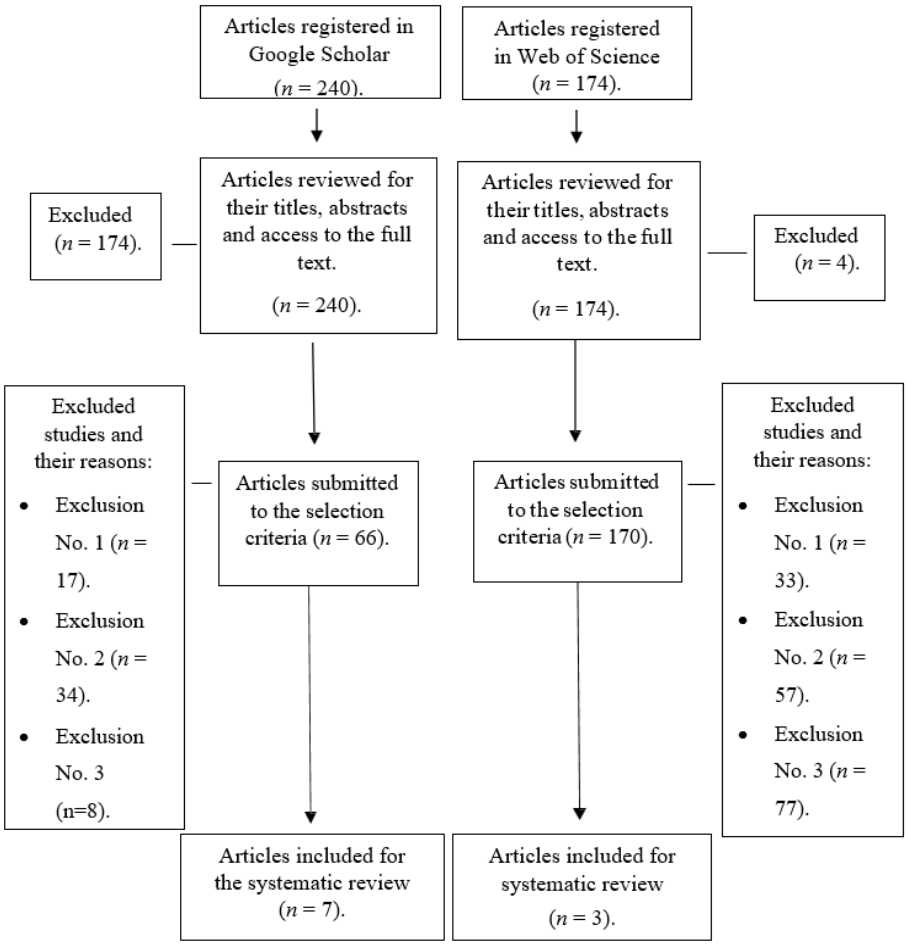
Systematic Search of Databases

The "Web of Science" and "Google Scholar" databases were used. The type of document was used as filters, that is, an empirical research; the year of publication from 2014 to 2024; and the language English and Spanish.

Selection of Articles

Initially, 174 articles were found in the Web of Science database and 240 articles in Google Scholar using the established keywords. Of these, and after reviewing their titles, abstracts and if there was access to the full text, 178 articles were eliminated, leaving 236. After that, 50 studies were eliminated because they were not empirical studies. The full text of the articles was read, leading to the exclusion of 91 articles because they did not consider the variable personal growth as the main focus. Likewise, 85 articles were eliminated because they refer to the general population, therefore, the final number of articles included for the review is 10 articles. This process is contemplated in the flow diagram in figure 1.

Figure 1
Search Procedure Flowchart



Data Collection and List

The information and data were extracted from each study by selecting the information of the study (author and year), the characteristics of the sample (sample size, age, sex, level of competition, types of sport), the variables that interfere with and facilitate personal growth, the evaluation instruments used and the results of the studies.

Results

The results are shown in table 1. We included 10 studies that report the variable personal growth during the rehabilitation period of an injury of different severities in active athletes. The total number of athletes who participated in the studies is 1,339, of which 41.16% were men and 58.84% were women, divided into elite and non-elite sports (clubs, regional level, international level...). Regarding the sports they practice, there is a wide variety of individual and team sports (athletics, rugby, hockey, cycling, football, basketball, climbing, volleyball, among others).

Table 1
Extraction of Data From Included Studies

Study	Study characteristics	Personal growth indicators and Measuring instruments	Results
Santi et al. (2024)	*n* = 332 (72.25% men and 27.75 women). Mean age = 19.7 years, *SD* = 2.1. Sports = boxing, cycling, golf, fencing, rhythmic gymnastics, horse riding, martial arts, rowing, skiing, snowboarding, sailing, surfing, swimming, tennis, athletics, trampoline saint, football, basketball, cricket, hockey, futsal, ice hockey, lacrosse, rugby and volleyball. Level of competence = International (*n* = 9), national (*n* = 23), regional (*n* = 27) and local (*n* = 109).	Variables = social desirability, general well-being, self-esteem, self-knowledge of one's own body, purpose in life, purpose in sport, responsibility for health, positive relationships with others, self-knowledge, sense of mastery, emotional ability. Instruments = Sports Injury-Related Growth Inventory (SIRGI; Santi et al., 2021), Positive Performance Inventory (PFI; Joseph & Maltby, 2014), The Lie Scale (Eysenck et al., 1985), The Sports Psychological Wellbeing Inventory (APWBI; Smith & Osborne, 2012) and The Rosenberg Self-Esteem Scale (Rosenberg, 1965).	A medium and strong correlation was observed between self-esteem and psychological well-being. There are no significant differences between gender, age, years of experience and level of demand. There is a positive correlation between personal growth and the variables: positive social relationships, self-knowledge, sense of mastery, emotional ability, purpose in sport, purpose in life, responsibility for health and knowledge of the body (all load factors were greater than 0.40). Personal growth was observed in themselves, their personal stories and in the context where they live and have grown up.
Roy-Davis (2017)	*n* = 37 (*n* = 23 males and *n* = 14 females). Mean age = 27.3 years, *SD* = 5.4. Sports= rugby, football, triathlon, hockey, cross-country, cricket, badminton, arts Martial arts, athletics, tennis, skating, baseball, volleyball, rhythmic gymnastics. Level of competition = Recreational and elite (Olympic, regional and local).	Variables = internal resources (experience and knowledge), personality traits (confidence, creativity, resilience, social intelligence, openness to experience, extraversion, optimism, reflection, emotional intelligence), coping skills (thoughts and behaviors adaptive to stressful demands), emotional focus (seeking help, faith, focus on problems), external resources (culture, physical aspects, time). Instruments= not indicated.	There was a prevalence of the athlete's individual resources, identity, and coping skills. Emotional intelligence, social relationships, personal strength, relationship with your body situation, self-acceptance, and life purpose were also important for personal growth. Metacognitions and positive emotions are very important.
Parent (2021)	*n* = 74 (*n* = 22 men and *n* = 52 women). Mean age = 37.1 years, *SD*= 14.8. Sports = athletics (*n* = 23), football (*n* = 8), triathlon (*n* = 9), cycling (*n* = 4), others (*n* = 30). Level of competence = not indicated. Surgery after injury = Yes (*n* = 41) and (n =33).	Variables = mental strength (positive changes in social relationships, personal resources and coping skills) and The Dark Triad (Machiavellianism, Narcissism and Psychopathy). Instruments = Personal Growth Stress Scale (SRGS) (Chen et al., 2015), Mental Strength Scale (MTS; Gucciardi, F. & Mallett, Cliff., 2010) and Three Personality Traits (SD3; Pelster, et al., 2021).	There was a positive correlation between mental strength and personal growth. There was no relationship between the time of recovery and personal growth. There was a negative relationship between surgery and personal growth. It was observed that the more adversity people faced, the more personal growth the experienced.

Johnson et al. (2016)	*n* = 13 (*n* = 13 women and *n* = 0 men). Mean age = 28.0 years, *SD* = 3.9. Sport = football. Return to practice = 9.5 months. Level of competence = great competence. Severity of the injury = severe.	Sub-themes = social interaction with other players, continuous and positive dialogue with the coach, support networks outside of sport, acceptance of injury, satisfaction with injury) Main themes = constructive and rich communication with significant others (inside and outside the sport), strong thinking about the importance and effectiveness of one's actions (tolerance and persistent attitude, knowledge of one's potential) and ability to set reasonable goals (motivation, self-determined goals, clear plans for the future). Instruments = interview	Of the 13 players, 8 experienced personal growth. A prevalence of achieving personal growth was shown of three variables = constructive communication and rich interaction with others, strong belief in the importance and efficacy of oneself, and ability to have reasonable goals. It was also observed that the current situation, successful experiences and confident thinking influence personal growth.
Bruton (2018)	*n* = 120 (*n* = 61 males and *n* = 59 females). Mean age = 29.0 years. Sports = athletics, squash, rugby, hockey and cycling. Severity of the injury = moderate, severe or very serious. Level of competence = elite and non-elite.	Variables = self-efficacy, general well-being, positive emotions, personal goals, and progressive recovery. Instrument = Growth-Related Stress Scale (SRGS; Chen et al., 2015).	All but two athletes experienced personal growth. There is no relationship between personal growth and the age. Nor with the time to return after the injury or in the level of competition of the sport.
MacDonald (2019)	*n* = 93 (76.9% female and 20.4% male). Mean age = 26.78 years, *SD* = 5.68. Sports= Frisbee, rugby, football, basketball, softball, baseball, climbing, powerlifting, triathlon, cross country, rhythmic gymnastics and volleyball. Severity of the injury = moderate, severe and very serious. Level of competence = varied.	Variables = satisfaction and frustration, time away from sport and time since the injury happened. Instruments = Basic Psychological Satisfaction and Frustration Scale (SRGS; Chen et al., 2015) and Growth-Related Stress Scale (SRGS; Park, Cohen, & Murch, 1996).	No statistical relationship was observed between stress related to growth, autonomy, and competence. There was no relationship between injury severity, weeks out of practice, autonomy satisfaction, and competence. A significant relationship was observed between personal growth and the number of weeks since the injury occurred. The more time passed, the less personal growth. It was also observed that the older the athlete was at the time of the injury, less personal growth wa observed in the rehabilitation period. No statistically significant relationships were observed between stress-related growth and satisfaction or frustration with basic psychological needs.
Trainor et al. (2020)	*n* = 12 (*n* = 12 females and *n* = 0 males). Age = between 18 and 23 years. Severity of the injury = very serious. Proficiency level = not specified. Sports= not specified.	Variables = (1) my life is chaos out of control, (2) pressure that modulates the response to the sports injury (fear and anxiety), (3) maybe I can (resilience, acceptance and expansion of the self) and (4) personal growth after the injury. Instrument = semi-structured interview.	All athletes were resilient and they learned new ways of coping with the rehabilitation situation, identified with other people with injuries, greater appreciation for health, coping ability, strength and mental control, developed a logical purpose, were more prepared for future injuries and learned to balance the rehabilitation period with other dimensions of their life (school, the family, work).

Brewer et al. (2017)	*n* = 108 (*n* = 72 males and *n* = 36 females). Mean age = 29.38 years, *SD* = 9.93. Sports = football, basketball, American football and skiing. Level of competition = competitive sport (47%), sport as a hobby (49%).	Variables = new opportunities, relationship with others, closeness, personal strength, spiritual change and appreciation for life. Instruments = questionnaires and Post-traumatic Stress Inventory (PTGI; Tedeschi & Calhoun, 1996).	No personal growth was observed at the beginning of the rehabilitation, but it increased as time went by. There was a positive correlation between relationships with others, personal strength, spiritual change, and personal growth. At 6 months, the relationship with others and personal strength interfered positively with personal growth, which was reflected in group sports and individual sports. The new possibilities and appreciation for life were not significant. The age of the athletes was not significantly related.
Salim et al. (2021)	*n* = 30 Mean age = 21.8 years, *SD* = 2.5. Sports = athletics, cricket, rhythmic gymnastics, hockey, judo, netball, rugby, football and volleyball. Level of competitiveness = not specified.	Variables = relationship with others, new opportunities, personal strength, spiritual change, appreciation for life and dispositional gratitude. Instruments = Post-traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), Gratitude Questionnaire-Format of 6 items (GQ-6) (McCullough, Emmons, & Tsang, 2002) and semi-structured interview.	It was observed that the variable relationship with others is positively correlated with personal growth. Personal growth related to subjective well-being, prosocial behavior, altruism, and kind gesture was identified. No significant relationship was found between new possibilities, personal strength, spiritual change, appreciation for life and personal growth.
Wadey et al. (2016)	*n* = 520 (*n* = 316 males, *n* = 204 females). Age = between 18-59 years, SD=6.5. Sports = football (*n* = 78), basketball (*n* = 64), American football (*n* = 47), rugby (*n*= 34), athletics (*n* = 27) and volleyball (*n* = 26). Level of competition = Division I-III of the National Association of Athletics Association, state, national and international.	Variables = autonomy, competence, relationship with others, enthusiasm, alertness, commitment, discomfort, anger, contempt, guilt and fear. Instruments = Needs Satisfaction Scale (NSS; Podlog et al., 2010), Stress-Related Growth Scale (SRGS; Park, Cohen, & Murch, 1996) and Positive Affect Scale (PANAS; Watson et al., 1988).	A moderate-high relationship is observed between the satisfaction of needs and personal growth. Competence, positive affection, and relationship with others correlates positively with personal grow

In relation to the first objective, to determine the empirical evidence of the concept personal growth during the rehabilitation process of sports injuries, the results show that all athletes experience personal growth during the rehabilitation process of sports injuries. Studies converge that, in addition to physical recovery, athletes experience personal growth projected in their resilience, personal strength, self-knowledge, interpersonal relationships, among others.

However, the study by Salim et al. (2021) does not observe personal growth in athletes at the beginning of the rehabilitation period, although this increases as time goes by. This is due, as the authors say, to the fact that they did not measure personal growth from different dimensions, only from the athlete's dispositional gratitude through letters of thanks, which could lead to a feeling of discomfort in certain athletes.

Regarding the second objective, prevalence of aspects that facilitate personal growth during the rehabilitation period of sports injuries, varied prevalence data of aspects that facilitate personal growth during the rehabilitation period of sports injuries are observed, ranging from 67% of athletes who perceived the need for social support to be satisfied (MacDonald, 2019) to 61.54% of athletes who experienced resilience (Johnson et al., 2016). The most common facilitating aspects for personal growth analyzed are resilience, constructive communication and rich interaction with significant others, coping skills; mental toughness, tolerance and persistent attitude; and ability to set reasonable goals. For the second objective of this review, studies were grouped according to the prevalence of enabling aspects of personal growth.

Regarding resilience, there were three studies that indicate it as a facilitator of personal growth (Johnson et al., 2016; Trainor et al., 2020; & Santi et al., 2024). However, all the studies spoke of facilitating aspects related to resilience, such as personality characteristics, positive emotions, emotional intelligence, sense of control, among others.

Regarding the incidence of constructive communication and rich interaction with significant others to facilitate personal growth, there were 7 studies that showed it, with a total of 456 elite and non-elite athletes (Brewer et al., 2017; Johnson et al., 2016; Roy-Davis 2017; Santi et al., 2024; Salim, Jade, & Wadey, 2021; Stop 2021; & Wadey et al., 2016). In fact, in the study by Santi et al. (2024), interpersonal relationships and positive communication with others was the third most prevalent factor, with a score of 0.91. This constructive communication and rich interaction with significant others are satisfactory inside and outside the sports field.

On the other hand, among the selected studies, tree included the coping skills aspect as a facilitator of personal growth (Parent, 2021; Roy-davis, 2017; & Trainor et al., 2020). In these studies, coping skills in the rehabilitation period were shown as problem-solving skills, that is, being able to find effective and reasonable solutions to what was happening; and emotional regulation, with the ability to manage and regulate negative emotions. In addition, in the study by Roy-Davis (2017), coping skills, together with personality aspects, are established as aspects that facilitate personal growth in this period in all the participants of his study.

In relation to the prevalence of mental toughness, tolerance, and persistent attitude, tree studies measured these variables directly (Johnson et al., 2016; Parent, 2021; & Trainor et al., 2020). However, these variables, as Johnson et al. (2016) object in their study, are closely related to the resilience construct, as they help to achieve resilience and, therefore, to personal growth.

Among the selected articles, four showed a high prevalence in the ability to set reasonable goals to facilitate personal growth (Bruton, 2018; Johnson et al., 2016; Trainor et al., 2020; & Santi et al., 2024). This ability led, therefore, to a sense of control and self-knowledge.

Likewise, there were a series of variables that facilitated personal growth, or helped to do so, which appeared as subtopics, so they could not be grouped. These variables are autonomy, self-acceptance, sense of mastery, purpose in sport, purpose in life, and responsibility for health. In addition, these variables and those described above, facilitated personal growth in all aspects of the athletes' lives, such as work, studies, social relationships and personal performance, during the rehabilitation period from the injury.

On the other hand, in relation to the third objective, to know the instruments for assessing the construct personal growth during the rehabilitation period of sports injuries, various instruments were used to measure the construct personal growth during the rehabilitation period of sports injuries, among which the following stand out: Stress Related Growth Scale (SRGS; Park et al. 1996), Mental Toughness Scale(Clough, Earle, & Sewell, 2002), Short Dark Trias (SD3; Jones & Paulhus, 2014), different interview modalities, such as the structured and semi-structured interview, Basic Psychological Need Satisfaction and Frustration Scale (BPNSF; Chen et al., 2015), Athlete Psychological Well-Being Inventory (APWBI; Smith & Jones, 2018), The Post-Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996), Gratitude Questionnaire-6-item format (Emmons, McCullough & Tsang, 2002), the Needs Satisfaction Scale (NSS; González & Pérez, 2015) and the Positive Affect Scale (PANAS; Clark, Tellegen, & Watson, 1988), which measures positive and negative emotions, providing insight into the athlete's emotional state during rehabilitation.

Finally, with regard to the fourth objective, to observe the relationship of personal growth with the age and sex of the athlete during the rehabilitation period, all the studies reviewed reported the relationship between gender, age and personal growth, except one (MacDonald, 2019). The first of them is Santi et al. (2024), who included female and male athletes with a mean age of 19.7 years in their research. These authors found that there were no significant differences between gender, age, and personal growth. In addition, they established the prevalence variables (body knowledge, purpose in life, responsibility for health, social relationships and positive communication, self-knowledge, sense of mastery, positive emotional management, purpose in sport) that had a positive correlation with the personal growth experienced by all athletes, regardless of their age and sex; in the research carried out by Roy-Davis (2017), which included 23 male athletes and 14 of the female gender, with an average age of 27.3 years, objecting that there is no relationship between the gender and age of the athlete; regarding the research of Parent (2021), who included 22 men and 52 women in their work, with a mean age of 37.1 years, no relationship was found between age, sex and personal growth, objecting that what most interfered when experiencing personal growth, or not, was the need of surgery; focusing on the research carried out by Johnson et al. (2016), the authors included 13 women aged between 25 and 35 years in the sample. In this case, the difference with respect to the gender could not be observed, but the difference with respect to the age could be observed, where there were no significant differences, since eight of the 13 women were the ones who experienced personal growth after the sports injury, regardless of their age; Bruton's (2018) research included 61 men and 59 women with a mean age of 29 years old. All but two participants experienced personal growth, where there was no relationship with the age or gender. In MacDonald's (2029) research there were 93 participants, of which 76.9% were women and 20.4% men, aged between 19 and 52. Unlike previous studies, in this one there was a significant relationship with the age of the athletes, since the older they were, the less personal growth they reported. Regarding gender, this study did not assess whether there was a

significant relationship or not, in the research by Trainor et al. (2020), all 12 participants were women, aged between 18 and 23 years. In this study, no significant relationships were shown between age and the growth they experienced, since all the participants were of similar ages, their personal context was also similar, so personal growth was observed in areas such as school, family and work; Brewer et al. (2017) studied 72 men and 36 women, with a mean age of 29.38 years. In this article, all participants, regardless of gender, experienced growth after adversity. However, they observed that age was negatively related, since as the age of the athletes increased, less personal growth was observed; the research by Jade, Salim and Wadey (2021) included 30 athletes with a mean age of 21.8 years. No differences were observed depending on the age of the athletes. Regarding the sex of these, it could not be measured since it did not specify it; finally, with respect to the research by Wadey et al. (2016), 316 men and 204 women with ages between 18 and 59 years old. No significant differences were observed with the age and sex of the athletes and the personal growth they experienced.

Discussion

The aim of this study was to review the empirical evidence that analyzes personal growth during the rehabilitation period of sports injuries. Specifically, the specific objectives have been to evaluate the evidence of the personal growth construct in rehabilitation, the prevalence of the variables that facilitate and interfere with personal growth, the measurement instruments used to evaluate it, and the relationship of this with the age and sex of injured athletes.

In relation to the first objective, the evidence regarding the occurrence of personal growth in the rehabilitation period of athletes who suffered an injury was examined. The results show that, despite the stress that a sports injury can entail, the experience of personal growth during the rehabilitation period is possible. For example, Bruton (2018) studied 120 injured athletes divided into elite and non-elite sports, of which only two did not report the experience of personal growth during their rehabilitation process. Likewise, Johnson et al. (2016) observed that of the 13 athletes they evaluated, eight experienced personal growth. In the same way, the same authors indicate that the personal growth experienced can be observed in all areas of the athlete's life, that is, at school, at work, in the family, in social life, among others, so they experience social growth, professional growth, emotional growth, psychological growth and physical growth. The results of Trainor et al. (2020), observed personal growth after adversity in all areas of their participants. Perhaps, this personal growth experienced in all the studies of the research studied is something possible and effective, but since it is, on many occasions, and based on most of the existing research, on the prevention of sports injuries, it is not a construct that has been developed by some athletes. However, there is a lack of clarity in the existing research between the experience of injured athletes of real personal growth and subjective personal growth, which may be biased.

Regarding the second objective, after identifying that almost all athletes experience personal growth during the rehabilitation period of a sports injury, we observed some variables that facilitate the development of the construct such as resilience, constructive communication and rich interaction with significant others; coping skills; mental toughness, tolerance and persistent attitude; ability to set reasonable goals, sense of control, sense of mastery, emotional intelligence, responsibility for health. However, depending on the study, and the athlete and their personality, one development of personal growth or another was observed. First, the variables that were most prevalent in the studies reviewed were resilience (Johnson et al., 2016; Santi et al., 2024; Trainor et al., 2020)., constructive communication and rich interaction with significant others (Johnson et al., 2016; Roy-Davis 2017; Santi et al., 2024; & Stop 2021), coping skills (Parent, 2021; Roy-Davis, 2017; Trainor et al., 2020), mental toughness, tolerance, and persistent attitude (Johnson et al., 2016; Parent, 2021; & Trainor et al., 2020).; and ability to set reasonable goals (Bruton, 2018; Johnson et al., 2016; Santi et al., 2024; & Trainor et al., 2020). In this way, you can observe all those positive aspects that lead to personal growth. In addition, there are a number of interfering factors, such as in MacDonald's study (2019), where it was observed that time has a negative correlation with personal growth, i.e., the more time passed since the injury had occurred, the less personal growth was experienced.

Regarding the third objective, to determine which instruments have been used to measure the construct personal growth during the rehabilitation period of sports injuries, the most used has been the Stress Related Growth Scale (SRGS; Park et al., 1996), which assesses that stressful experiences can lead to positive personal growth, measuring aspects such as new appreciation of life and improved relationships; Mental Toughness Scale (MTS; Clough, Earle, & Sewell, 2002), which measures the mental strength of the athlete, evaluating his or her ability to face and overcome adversity; Short Dark Trias (SD3; Jones & Paulhus, 2014), an instrument that measures personality traits that can influence the process of personal growth, such as narcissism, Machiavellianism and psychopathy; different interview modalities, such as structured and semi-structured interviews, which allow detailed qualitative information to be obtained on the subjective experience of personal growth during rehabilitation; Basic Psychological Need Satisfaction and Frustration Scale (BPNSF; Chen et al., 2015), which assesses satisfaction and frustration of basic psychological needs, which is crucial for well-being and personal growth; Athlete Psychological Well-Being Inventory (APWBI; Smith & Jones, 2018), specifically designed to measure the psychological well-being of athletes, encompassing various dimensions of personal growth; The Post-Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), which assesses positive growth after traumatic experiences, measuring areas such as personal development

and appreciation of new opportunities; Gratitude Questionnaire-6-item format (GQ-6; Emmons, McCullough, & Tsang, 2002), which measures gratitude, a factor that may be related to personal growth during rehabilitation; the Needs Satisfaction Scale (NSS; González & Pérez, 2015) assesses the satisfaction of basic needs, which can influence the athlete's well-being and growth; and the Positive Affect Scale (PANAS; Clark, Tellegen, & Watson, 1988), which measures positive and negative emotions, providing insight into the athlete's emotional state during rehabilitation. The analysis of these instruments provides an understanding of how personal growth is measured in the rehabilitation period of sports injuries and which are the most effective and applicable in each context. In addition, the instruments seen work in conjunction with other instruments to gather the necessary information. In this way, there are also other measurement instruments applicable for the investigation of the development of personal growth during the rehabilitation period of a sports injury, such as the one created by Rubio et al. (2020), which, through a Delphi method, created a specific instrument to assess personal growth that measures 5 factors, personal strength, improvement of social life, health benefits, sports benefits, and social support and recognition.

Finally, with regard to the fourth objective, to determine whether there is a relationship between the age and the sex of the athletes and the personal growth they experience, no significant relationships were found in the studies analyzed. However, in MacDonald's study (2019) a negative correlation is developed, which was the age of the participants, because when the athletes were older, less personal growth was observed. However, despite this negative correlation, no relationship was observed in the rest of the studies with the age or gender of the participants. Perhaps, this is because the experience of personal growth in the rehabilitation period of injured athletes is related with variables of the personality of these athletes, circumstances that they live and variables that facilitate the development of this construct, and not with their gender and age.

Limitations

Some limitations of this systematic review may be objected to. Firstly, it was very difficult to find studies that passed the exclusion criteria, as the review initially began with a total of 414 studies and finally only 10 studies could be included, as many of them did not focus on personal growth during the rehabilitation period, and in others, there was no access to the full text. Likewise, there were many studies that focused on the prevention of risks and injuries, without taking into account the positive part of the rehabilitation period, which can be experienced with the development of personal growth.

On the other hand, some of the included studies measured personal growth through interviews and self-reports, which can lead to biases such as response bias, since participants may be influenced in their response by knowing that there will be someone else who will read it; interviewer biases, since the interviewer's personal characteristics, opinions, and behavior can influence the interviewee's answers; or social desirability bias, since interviewees may alter their answers to present themselves favorably to the interviewer, minimizing behaviors or attitudes that they perceive as undesirable.

Future Prospects

As a perspective for future research, some issues to take into account may be to carry out studies through personalized psychological interventions, since understanding the growth of a person in times of stress, such as the rehabilitation period of a sports injury, can be difficult if it is generalized to a group.

Another aspect to take into account is to put into practice what has been studied in the studies, because if the variables that facilitate personal growth are explored more deeply, devising a work for the natural environment where the athlete can develop, it will be possible to advance in the improvement of the rehabilitation period, as well as in a consequent prevention of injuries.

Conclusions

From the articles reviewed, and the results found, it can be concluded that:

The specific psychological variables that are most prevalent and interfere with and facilitate personal growth are resilience, effective communication and interaction with others, the feeling of control and the feeling of dominance.

There are no significant relationships between the age of the athletes, their gender and the personal growth they experience. However, the personal growth experienced could be observed in all areas of the athlete.

The instruments used the most are Stress Related Growth Scale (SRGS; Park et al. 1996) y Athlete Psychological Well-Being Inventory (APWBI; Smith & Jones, 2018).

It is important to take these results into account for future psychological interventions with athletes, which is very important to enhance their personal growth and make better psychological interventions after an injury.

However, these results do not lead to certain conclusions, where it is important to carry out a more personalized study. Therefore, it is necessary to continue with the investigation of personal growth in the rehabilitation period of a sports injury, since there is a large gap between the empirical results found and the transfer to practice.

Ethics Committee Statement

It does not apply because it is a systematic review.

Conflict of Interest Statement

The funding entities and institutions had no influence

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Authors' Contribution

Conceptualization M.N.E; Methodology M.N.E y V.G.E; Software M.N.E y V.G.E; Validation L.M.R.P, V.G.E y A.O.Z; Formal Analysis M.N.E y A.O.Z; Investigation M.N.E, L.M.R.P, V.G.E y A.O.Z; Resources A.O.Z; Data Curation L.M.R.P y V.G.E; Writing – Original Draft M.N.E y A.O.Z; Writing – Review & Editing A.O.Z; Visualization V.G.E y L.M.R.P; Supervision A.O.Z; Project Administration M.N.E; Funding Acquisition A.O.Z. Todos los autores han leído y están de acuerdo con la versión publicada del manuscrito.

Data Availability Statement

Data available on request from the author of the correspondence (olmedilla@um.es).

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