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Clinical protocols aimed at psychological well-being in adult amputee patients

Protocolos clínicos orientados al bienestar psicológico en pacientes adultos amputados

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SUMMARY

Limb amputation is a process associated with several factors, including traumatic experiences and medical conditions such as diabetes. Physical rehabilitation is essential to improve the independence and quality of life of amputee patients, as well as their psychological well-being. Losing a limb affects social interactions, individuality, and daily activities; it also has an emotional, social, and cognitive impact that can result in mood disorders, including anxiety and depression, challenges adjusting to new jobs, and a decline in quality of life. Consequently, this narrative review examines the therapeutic approaches and strategies that have improved amputee patients' emotional states, quality of life, ability to adapt, compliance with treatment, and avoidance of risk behaviors. It has been determined that rehabilitation and cognitive behavioral therapy are crucial for addressing certain aspects and impacting patients' psychological well-being and quality of life. While behavioral third-generation therapies have shown scientific efficacy in managing depression, anxiety, and trauma effectively, their utility in amputee patients has not been evidenced.

Keywords: *Psychological well-being, adult, clinical protocols, surgical amputation, traumatic amputation.*

RESUMEN

La amputación de miembros es un proceso asociado a diversos factores, incluyendo experiencias traumáticas y condiciones médicas como la diabetes. La rehabilitación física es fundamental para mejorar la independencia y calidad de vida de los pacientes amputados, así como su bienestar psicológico. La pérdida de un miembro impacta en la vida social,

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autonomía y aumenta el estrés en las actividades diarias; además de que afecta a nivel emocional, social y cognitivo lo que puede desarrollar trastornos del estado de ánimo como ansiedad y depresión, dificultades en la adaptación laboral y disminución de la calidad de vida. Por consiguiente, esta revisión narrativa tiene como objetivo analizar los enfoques terapéuticos y técnicas de intervención que han demostrado resultados positivos en la adherencia al tratamiento y prevención de conductas de riesgo, así como mejorías en la capacidad de adaptación, estado emocional y calidad de vida de pacientes amputados. Se concluyó que la rehabilitación integral y la psicoterapia en especial cognitivo conductual es esencial para abordar estos aspectos e influir en el bienestar psicológico y calidad de vida de estos pacientes. Aunque las terapias de tercera generación tienen su origen en la terapia de conducta y han demostrado efectividad científica en el manejo de la depresión, ansiedad y situaciones traumáticas de manera satisfactoria, no se encontró evidencia de su utilidad en pacientes amputados.

Palabras clave: *Bienestar psicológico, adulto, protocolos clínicos, amputación quirúrgica, amputación traumática.*

INTRODUCTION

Limb amputation is a process that is associated with multiple factors, including traumatic experiences such as accidents and underlying diseases: diabetes, tumors, and poor blood flow, among others (1). The World Health Organization (WHO, 2011) and the Pan American Health Organization (PAHO, 2016) report that 75 amputations are performed daily; 40 % and 85 % of these amputations are linked to vascular problems associated with diabetes, while 15 % with traumatic experiences (2). On the other hand, in Colombia, 60 % of lower limb amputations (non-traumatic) have been reported to be related to diabetes mellitus type 2 (3).

Therefore, the physical rehabilitation of each amputee patient is important for increasing their level of independence and well-being, coupled with the process of psychological well-being after amputation (4). At local, national and international levels, it is framed that the amputee patient is integrated into an interdisciplinary treatment according to their physical, cognitive and social circumstances (5). The affectation of the loss of a limb is reflected in the decrease of social activity of the patient, as well as in the reduction of the capacity of movement autonomy and the increase of stress in the functions of daily living (6).

Likewise, an amputation process affects all the dimensions of a person; the decrease in functional capacity, the perception of self-image and independence, affectations in self-care, and difficulties in social interaction are developed (7). The above elements open the possibility for the development of mood disorders; in work, adaptation disorders can be generated, and this influences the deterioration of the quality of life in patients (8). On the other hand, amputation is a dynamic process; this develops differently in each patient due to several variables such as character, age, lived experiences, coping strategies, family-social support network, and comorbidities developed. This set of factors contributes to achieving a link to the adherence to psychophysiological treatment (9).

The evidence shows that to address the various consequences of amputation, it is vital to develop a psychological process in the different phases a patient goes through; the accompaniment should be carried out gradually at each stage (10). The therapeutic strategies identified satisfactory outcomes are psychoeducation, body image, self-esteem, activity planning and self-instructions, anxiety management, relaxation, adaptive coping strategies, cognitive restructuring, social skills, and problem-solving training (11). Therefore, it is evident that psychological support is efficacious in improving their adaptation, providing an improvement in their family and social development, and reducing anxiety and depression (12).

A holistic approach to patient intervention is taken, incorporating psychotherapy, medication, and complementary therapies like music therapy and acupuncture (13). The benefits of these approaches have been evidenced in scientific studies (14-16). However, few patients decide to use these alternatives, but there is evidence of interest in them. It is important to review information on the use of art therapy in patients with an amputation, and this contributes to the generation of diverse intervention tools to improve their quality of life (17).

Another relevant phenomenon in amputee patients is the development of phantom sensations related to moderate pain, itching, itchiness, warmth, or discomfort of the lost limb (18). Therefore, this occurs in the first stage of adaptability; there are patients in

whom the symptoms intensify their memory of pain because they go through a process of denial that does not accept the loss and would like to restore their body image, which makes it difficult to mourn and this is a slow process and psychological accompaniment.

Therefore, the aim is to analyze the intervention processes and the effectiveness of the strategies designed to rehabilitate a patient with an amputation. This contemplates cognitive, emotional, and behavioral aspects to consolidate an integral perspective regarding the resources that have been considered and the psychotherapeutic design and intervention supported by scientific evidence.

METHODOLOGY

A narrative review (19,20) was created based on research on the psychological effects of amputation and psychotherapy intervention methods that have been proven to be effective in improving mental health in adult patients who have undergone traumatic or biological amputations. In this regard, a 10-year time window search for original publications was conducted across the following databases: APA PsycNet, Science Direct, PubMed, and Scopus. Four areas comprise the presentation of the results: 1. Amputation and functionality, 2. Emotional, cognitive and social implications in amputees, 3. Rehabilitation processes for amputees, and 4. Psychotherapeutic interventions for amputee patients.

The following descriptors were used for the search: ("psychotherapy" OR "cognitive behavioral therapy" OR "Psychological therapy" OR "Psychology") AND ("amputee" OR "postamputation"). The following inclusion criteria were defined: 1). research articles, 2). temporary validity 2014-2024, 3). Psychology study area. From the initial search, 97 articles were obtained, of which duplicates were excluded, leaving 91. Later, descriptive, correlational studies and reviews were excluded. Finally, ten articles that met the criteria were included (Figure 1).

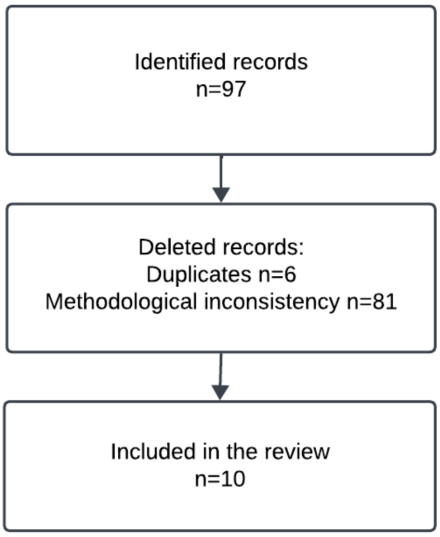

Figure 1. Flowchart of the document identification and selection process.

Results and discussion

Amputation and functionality

The origin of amputation is multi-causal, with the most common origin being pathological (82 %), such as vascular disease and diabetes, occurring mainly in the lower limbs; on the other hand, amputations can also occur due to advanced infection that did not respond to pharmacological treatment, and a small proportion of amputations correspond to oncological procedures. The remaining 18 % of amputations are the result of occupational, domestic, or traffic accidents (21).

Diabetes, ulcers, and injuries are the main causes of non-traumatic amputation in lower limbs; it is important to identify patients at risk to carry out psychoeducation of the user and the family. Some circumstances predispose, cause, and aggravate amputation; nevertheless, preventive attempts are uncommon in basic care and physiotherapy therapies (13).

Predisposing factors. These are generated from ischemia, which is caused by vasculopathy, dry skin that causes the appearance of ulcers. This is a neuropathy, understood as the decrease in tactile sensitivity, which alters the musculoskeletal system and causes limitation of joint oscillation. The above-described medical conditions are those that cause the risk of suffering injury due to diabetes.

Triggering or precipitating factors are actions to which patients may be exposed extrinsically, such as blows, inadequate habits (tight shoes, excessive use

of chemicals, hot water), and intrinsically (bunions, Charcot arthropathy), which generate increased pressure, causing calluses that can lead to injuries.

Factors that impede or prolong the healing process because of infections of many kinds, including aerobic and anaerobic organisms that can cause cellulitis and septic arthritis because of the depth of the wounds, saprophytes, staphylococci, and streptococci, are known as aggravating or perpetuating factors (13).

Of all amputations, lower limb amputations are the most frequent; there is no doubt that the amputation of a lower limb, whatever its origin, has a strong physical, functional, and emotional consequence that affects the quality of life and psychological well-being of the amputee, which is why it has become a public health problem (22).

The degree of recovery of the patient's functionality is related to the degree of lower extremity amputation (23). According to the amputation classification of the American Academy of Orthopedic Surgeons, amputations through the thigh and leg are called transfemoral and transtibial, respectively; amputations through the knee and ankle joints are designated as knee and ankle disarticulation, respectively (24). Since the degree of amputation is related to the quality of life, amputations of the neck, transmetatarsal, intercondylar, supracondylar, and hip disarticulation should be performed where there is good blood perfusion for good recovery (25-27).

Based on the above described, below-knee amputees have a better functional outcome than high-level amputees, are more likely to use prostheses, and are more likely to reintegrate into work and leisure activities (28). Upper extremity amputations are usually traumatic and can be divided into two types: hand amputation and major amputation at a more proximal level, from distal trans phalangeal amputation to interscapulothoracic disarticulation (29).

Emotional, cognitive, and social implications for amputees

Among the emotional, cognitive, and social processes experienced by amputees, the individual components from the sociodemographic, psychological, and biological aspects and the degree and level of involvement of the amputation must be considered for their adaptation process (30). Some studies suggest that post-amputation brain plasticity facilitates adaptation to peripersonal space and body representation (31). However, from a neuropsychological perspective, a topological representation of the body has been discovered as a visuospatial body map, which is modified by the loss of peripheral information following amputation (32). In this sense, people with a negative body image may feel ashamed or insecure about their physical appearance. Therefore, assimilating amputation depends on biopsychosocial factors and how they present positively or negatively in their new lifestyle (33).

Although some patients perceive the loss of a limb as a punishment (34), having appropriate grieving processes and coping processes enables people to create coping mechanisms to generate a new self-recognition and strengthen their self-concept and self-esteem (35). However, there are risk factors that are contemplated from the individuality of the patient, such as a divorce, a couple of separation, living in precarious conditions, fibromyalgia, phantom limb syndrome, or other relevant medical, psychological, emotional, and social conditions, can develop in these patients depressive or anxious disorders. However, a protective factor in this process is associated with higher education, psychological support, and a family-social support network (36).

The experiences or life events associated with amputation show a direct relationship with the emotional states that trigger anxiety, being this a present indicator related to the amputation performed (37). Studies have been found to show that anxiety is a possible emotional aspect before, during, and after the amputation process that should have timely psychological support (38-40). Similarly, it may result in their emotional and cognitive techniques failing to control their self-efficacy processes, autonomy, self-concept, self-image, and family support, and these particular factors lead many patients to various psychiatric disorders depending on the severity or origin of the amputation (41). On the other hand, most studies agree that depression is one of the most common psychological outcomes following amputation (42-44).

Affective disorders such as post-traumatic stress disorder, anxiety and depression are more frequent and have a greater comorbidity between them months after amputation and a direct correlation has been found between high anxiety and high depression symptoms and these together generate a risk factor

for the rehabilitation process of the patient (45). As mentioned above, depression and anxiety are present in patients after amputation, as they trigger feelings of sadness, denial, anger and suicidal ideas, because losing a limb is perceived as a social burden where autonomy is lost (46).

Similarly, the challenging adaptation to their new constraints, including dependence on others for mobility, sedentary lifestyle, and increased pain (47), causes patients to present a negative change from their tunnel vision that makes it impossible to improve their coping strategies for the development of their lives, in their social and professional roles; in consequence, it has been observed that 18 % to 31 % of patients with amputations have higher levels of anxiety and depression compared to the general population (12).

Research indicates a concern about cognitive impairment in patients who have lost a limb and the significant impact it may have on their adjustment and functioning after amputation (48-50), among which are recognized beliefs, upbringing styles, and preconceived ideas (myths or social stigmas about amputation) from their experiences that have an important relationship between the perceived body image and the cognitive interpretation of their new appearance; therefore, there is a high probability that patients develop distortions in their mental scheme limiting the conception of self-perception, generating risk factors for the triggering of depression, stress, social isolation, sleep disorders and pain from perceived stress (51).

It is also concluded that an individual's self-esteem can be positively impacted when they use their cognitive functions intentionally to improve their orientation to the environment during activities of daily living (52-54). There is a high probability that, after the amputation process, patients present a significant decrease in their abilities and their biological, psychological, and social balance and tend to move away from the environment (55). In addition, the subjective sense of the body, as well as transient alterations in the objective sensorimotor states of the physical body, may exert selective pressures on certain cognitive tasks (56). On the other hand, low socioeconomic level is a risk factor in its population associated with medical amputation due to inadequate eating habits, difficult access to health services, and lack of knowledge of a healthy lifestyle. Therefore, they have no adherence to treatment against diseases such as diabetes, among others (57).

Losing a body part means starting a self-recognizing process again, constructing the perception of one's self-image, which, concerns value judgments that produce fluctuating changes in mood, having to adapt, learning-dependent and independent functional behaviors, and taking a perspective of acceptance of oneself and one's surroundings (58). The family connection allows the patient to set aside their emotional affectation, in order, to avoid suffering; this will enable them to protect themselves from the pain that is present in the process of amputation, focusing on the physical and medical aspects; thus avoiding a therapeutic process (59).

Successful rehabilitation is often measured in physical and functional changes demonstrating the patient's adaptability. However, it has been argued that such adaptation from their disability should be understood and intervened from an integral approach, which allows relating biological, psychological, and social aspects (60). However, a relevant aspect is the incidence of perceived pain in the amputee patient in their future work. It has been found that pain increases in patients who move away from an occupational activity; therefore, returning to work without an inclusive environment is related to a pain-intensifying increase (61).

Considering this final factor, completing the rehabilitation process can be the definition of reincorporation into the job market for this kind of patient. For patients to get a job that suits them and actively participate in their new lifestyle, a coordinated approach involving the provision of technical, educational, psychological, and occupational therapy as well as instruments must be followed (37).

Rehabilitation processes for amputees

To perform an outstanding clinical practice, a complete approach that addresses each patient's needs is essential (62). Follow-up and treatment should involve using various assessment instruments and scales to identify the functional capacity that is present and needs to be developed by the patient. To achieve these objectives, it is important to perform an individual and complete assessment to determine if positive factors allow the implementation and use of a prosthesis (63).

An interdisciplinary program focuses on the management and comprehensive care of patients

after the postoperative period of amputation and accompaniment in the pre-prosthetic and post-prosthetic phases by the family. However, the success of the physical and psychological recovery depends on the initiative that the patient shows during the recovery since the results are progressive and depend on the perseverance in the therapy sessions because the purpose is that the patient can walk with support tools and prepare for the adaptation of a prosthesis (64).

Once the patient has achieved muscle strength, a good adaptation of the residual limb, and no complications, the prosthetic phase follows. After receiving the prosthesis, the patient will need additional training to utilize the new tool correctly. For amputees, the emphasis is on uniform and symmetrical gait patterns for maximum efficiency and best aesthetics (65). Functional outcomes are typically good once adaptation to the prosthesis has been achieved and physical training has been completed (66). Likewise, the rehabilitative treatment of the pre-prosthetic phase of the limb begins with the molding and bandaging of the residual limb to achieve and give the desired shape. Strengthening exercises are performed to extend and maintain the articular arches, and complementary work is also performed on mattresses to strengthen the neck, torso, and upper and lower limbs; this allows the patient to develop physical balance and independence (67).

Now, the post-prosthetic phase frames the process of adaptation of the prosthesis; the purpose of the patient is to achieve mastery of this tool in a coordinated manner and should carry out weight exercises stable and dynamically, where there are first simulated environments and then different surfaces that allow you to make progress and perform a sequence in their gait (68). This training phase involves periodic adjustments, alignments, and changes to the prosthetic socket. In this final phase of the process, the patient is already in a position where they may accept the prosthesis (69).

Because their prosthetic limbs no longer move as freely as they once did, some patients develop an inappropriate tendency to support their intact limbs excessively. This repetitive action during daily activities increases the risk of pathologies like osteoarthritis developing (70). Now, psychoeducation of the patient with amputation is a fundamental guideline for public health in the intervention processes, where it seeks to prevent risk behaviors and promote protective behaviors in their treatment or rehabilitation process respectively; this has a socio-cultural, economic and political implication where the interdisciplinary participation of a team of professionals and entities contribute in the development of the different actions (71).

Psychotherapeutic interventions for amputee patients

Rehabilitation professionals are now required to propose precise protocols that allow each stage to be objectively evaluated (13). Rehabilitation using prostheses must be adjusted to some extent, even if only in terms of time scales, depending on the degree of amputation, the type, and the associated disease (72). In the field of rehabilitation, it is important to be aware of all the options currently available on the market that can meet the patient's needs (73).

Rehabilitation must be founded on several important but sometimes disputed ideas. Some even challenge many preconceived ideas in this regard. Only a small team of physicians, prosthetists, and rehabilitation staff should surround the patient (74); likewise, early rehabilitation, together with curative and orthopedic treatment, is vital and essential for patients to be able to walk from the beginning. The patient should not stop engaging in physical and mental activities (75).

In this sense, amputation affects all person dimensions, including decreased social activity, reduced autonomy, and increased stress in daily activities. This can lead to the development of mood disorders and difficulties in the work environment, negatively impacting the quality of life. Consequently, increasing the psychological and physical health of amputee patients is essential to improving their quality of life. To meet the amputee patient's physical, cognitive, and social requirements and help them integrate and adapt, an interdisciplinary approach is necessary (76). It is worth highlighting the importance of remote interventions for isolated amputees, which allow them to receive comprehensive care, rehabilitating both physical and psychological health (47).

Table 1 presents the therapeutic approaches, intervention techniques, and outcomes for amputee patients based on the information above and the review of articles. It finds improvement in the emotional, social, and physical areas that significantly affect the amputee patients' process of adapting to their new life and reinforces their coping mechanisms to support their well-being.

Table 1. Therapeutic intervention protocols.

Reference	Therapeutic Approach	Sessions	Techniques	Results (Improves)
(8), (11), (77), (78), (79)	Cognitive Behavioral Therapy	6-12	- Psychoeducation. - Cognitive skills training and self-instructions. - Self-esteem and body image training. - Troubleshooting - Treatment monitoring and assessment. - Progressive relaxation. - Systematic desensitization. - Biofeedback. - Meditation. - Hypnotherapy. - Cognitive restructuring. - Training in emotional self-control techniques. - Positive reinforcement of the functional support network. - Reinforcement of social behaviors and self-care awareness. - Expression of emotions. - Sense and project of life. - Techniques for pain management related to phantom limb. - Identification and reinforcement of resources and positive aspects of the patient. - Psychoeducation for the family.	- Anxiety and depression symptoms. - Independence. - Physical activity. - Personal care and mood. - Functionality in their body image. - Adaptive coping. - Disease adjustment. - Well-being. - Treatment adherence. - Irritability. - Perception of control and use of internal and external resources. - Perception of pain intensity. - Ability to modulate pain. - Participation of your family group. - Self-esteem and self-concept. - Sleep patterns. - Pain management. - Strengthening of family relationships. - Mood. - Planning of the life project. - Quality of life.
(80)	Cognitive behavioral and physical therapies	8	- Psychoeducation. - Active virtual reality games. - Practice breathing skills. - Skill building in behavior recording and goal setting. - Diaphragmatic breathing. - Fear exposure hierarchy and physical ability. - Physical therapy. - Behavior recording.	- Balance confidence. - Community participation. - Quality of life. - Well-being.
(81, 82)	Cognitive therapy	5	- Mirror therapy. - Self-management.	- Agency: the feeling of controlling one's own body. - Ownership: feeling of having one's own body. - Pain. - Psychosocial functioning. - Quality of life.
(17), (83)	Art therapy	6-11	- Narration of experiences. - Samples of depressive symptoms, self-esteem, self-image and grief through art. - Verbal expression of the creative experience between art and emotion. - Group intervention.	- Anxiety and depression symptoms. - Self-esteem and self-depreciation. - Quality of life. - Emotional identification, expression, and regulation. - Adaptability to the environment expanding creativity and freedom to act with more awareness and efficiency.
(84)	Social support	6 (weeks)	- Perceived social support.	- levels of activities of daily living. - depressive symptoms.

Source: Own elaboration

Table 1 indicates that cognitive behavioral therapy is the therapeutic approach with the highest number of studies, techniques, and outcomes. It is here that strategies for modifying thinking, behavior, physiology, emotional regulation, and pain management stand out (76-78); additionally, it is discovered that when physical therapy is combined with it (80). Improvements in pain perception, sleep patterns, and family relationships can be observed, and affective-emotional symptoms can be remitted.

Therefore, psychotherapeutic strategies such as psychoeducation, skills training for body image management, anxiety management, and social skills, problem-solving, and activity planning are effective in improving adaptation, reducing depressive and anxious symptoms, and promoting family and social development of amputee patients (77). In addition to psychotherapeutic interventions, it is important to consider complementary therapies such as art therapy, acupuncture, and music therapy as intervention strategies to acquire tools to improve the quality of life of amputee patients. Among cognitive guidance techniques, mirror therapy has shown benefits in reducing pain and phantom limb sensation in amputee patients (85).

Regarding art therapy, studies have privileged techniques based on the exposition of narratives and the promotion of creative experiences that, in addition to the reduction of affective-emotional symptoms, have favored adaptability, self-concept and quality of life (83).

Finally, the relevance of perceived social support has been reported, which also contributes to emotional regulation and is part of the permanent support expected in amputee patients (84). It is worth analyzing future implications of neuropsychological therapy, noting that there is evidence of the impact that training in executive functions has on behavioral regulation (86,87), emotional (88) state and quality of life (89).

CONCLUSIONS

It is concluded that the most significant affectations at a psychological level for amputee patients are depressive and anxiety symptoms (12). Due to fear of their social adaptability, due to perceptions of handicap and inferiority, which reinforces dependent behavior patterns, which are defined as the biggest problems for mental health professionals and a source of suffering for patients.

The amputation of a leg can be accepted with less anguish when coping mechanisms (11) are strengthened by the medical process of physical rehabilitation, family support, and psychological intervention. Likewise, the identification and establishment of support networks (84) at the social and institutional level determine the development of tools for the psychological well-being of both the amputee patient and their family.

Psychotherapy allows the assessment and comprehension of the aspects that influence the problematic adaptation of the amputee (79,80,90), providing adequate attention to his family and close social environment; this last aspect also contemplates the psychological orientation of the family members (91) due to the process of accompaniment, there are significant changes in discomfort, the stress of complex management generated by the pain experienced, and the wear and tear in the care and accompaniment of the patient. Therefore, the satisfactory results of the therapeutic processes of different clinical and alternative approaches are evidenced, which are related to the orientation of psychological and emotional well-being and the improvement of the quality of life (79) in the approach of a new personal project.

Therefore, the relevance of having a clinical psychologist in the hospital environment is evident from the professional practice of applying therapeutic techniques that allow the care (92), prevention, management, and approach of emotional, cognitive, and behavioral alterations associated with the medical process, surgical interventions, health monitoring, exercises and physical activities of high demand that the patient must perform to progressively achieve an optimal psychological and psychosocial development in the recovery and impact of their quality of life.

Undoubtedly, the journey of an amputee patient is fraught with unique challenges. It is in this context that the significance of a psychological intervention in their recovery process is underscored. Such an intervention not only aids in the establishment of a new life project but also facilitates the management of their emotions, self-acceptance, and adherence to medical treatment. It equips them with the necessary tools for a successful and permanent recovery, thereby restructuring their activities and occupations in their life plan.

The lack of evidence in third-generation therapies for psychological intervention that has shown sufficient scientific efficacy in the management of depression, anxiety, and traumatic situations is a pertinent feature of the result. It is an opportunity for mental health professionals to contribute with proposals of innovative protocols in skills training that favor the construction of a life project for amputee patients in the cognitive and behavioral changes of greater evidence at present.

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