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Original article

Therapeutic physical activity program for patients with second and third degree burns

Programa de actividades físicas terapéuticas para pacientes con quemaduras de segundo y tercer grado

Programa de atividade física terapêutica para pacientes com queimaduras de segundo e terceiro graus

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ABSTRACT

The presence of the physical activity professional plays a significant role in the healing, rehabilitation and social reintegration scheme of the burned patient. The objective of this work was to develop a program of therapeutic physical activities, with a multifactorial community approach in the prescription of biopsychosocial preparation that allows the recovery of health-oriented physical condition in burned patients. A pre-experimental

design study with minimum control was carried out, lasting three years (2021-2023). The sample was selected through a stratified, non-probabilistic intentional sampling. Methods from the theoretical and empirical levels and research techniques were used, among which the following stood out: analysis and synthesis, inductive-deductive, systemic-structural functional, documentary analysis, structured observation, interview and survey, respectively. The program was carried out through the implementation of therapeutic physical exercises. Ten patients with second and third degree burns on the shoulder girdle participated. More than 90% showed high levels of anxiety and low self-esteem and 100% had low levels of physical fitness. As a result of the application of the program, 100% managed to modify their behavior towards healthy lifestyles with good social reintegration and 90% had higher scores in the elements subjected to evaluation. The study showed that the multifactorial community approach in the prescription of biopsychosocial preparation improved the health-oriented physical condition of these patients.

Keywords: therapeutic physical culture, multifactorial approach, burn patient

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RESUMEN

La presencia del profesional de actividad física ocupa un papel significativo en el esquema de la curación, rehabilitación y reinserción social del paciente quemado. El objetivo de este trabajo consistió en elaborar un programa de actividades físicas terapéuticas, con un enfoque multifactorial comunitario en la prescripción de la preparación biopsicosocial que permita la recuperación de la condición física orientada a la salud en pacientes quemados. Se realizó un estudio de diseño prexperimental de control mínimo, con tres años de duración (2021-2023). La muestra se seleccionó mediante un muestreo intencional estratificado, no probabilístico. Se emplearon métodos de los niveles teórico y empírico y técnicas de investigación entre los que destacaron análisis y síntesis, inductivo-deductivo, sistémico-estructural funcional, análisis documental, observación estructurada, entrevista y encuesta, respectivamente. El programa se realizó mediante implementación de ejercicios físicos terapéuticos, participaron 10 pacientes con quemaduras de segundo y tercer grado en la cintura escapular, más del 90 % mostró altos niveles de ansiedad y baja autoestima y el 100 %, bajos niveles de condición física. Como resultados de la aplicación del programa,

el 100 % logró modificar el comportamiento hacia estilos de vida saludables con buena reinserción social y el 90 %, registros superiores en los elementos sometidos a evaluación. El estudio mostró que el comunitario en la prescripción de la preparación biopsicosocial mejoró la condición física orientada a la salud en estos pacientes.

Palabras clave: cultura física terapéutica, enfoque multifactorial, paciente quemado

RESUMO

A presença do profissional de atividade física ocupa papel significativo no esquema de cura, reabilitação e reinserção social do paciente queimado. O objetivo deste trabalho foi desenvolver um programa de atividades físicas terapêuticas, com abordagem comunitária multifatorial na prescrição de preparo biopsicossocial que permita a recuperação da condição física voltada à saúde em pacientes queimados. Foi realizado um estudo de desenho pré-experimental de controle mínimo, com duração de três anos (2021-2023). A amostra selecionada foi constituída a partir de amostragem estratificada, não probabilística intencional. Foram utilizados métodos dos níveis teórico e empírico e técnicas de pesquisa, incluindo análise e síntese, indutivo-dedutiva, sistêmico-estrutural-funcional, análise documental, observação estruturada, entrevista e inquérito respectivamente. O programa foi realizado por meio da execução de exercícios físicos terapêuticos. Participaram 10 pacientes queimados na cintura escapular com queimaduras de segundo e terceiro graus; mais de 90% apresentaram altos níveis de ansiedade e baixa autoestima; 100% apresentaram baixos níveis de aptidão física. 100% conseguiram modificar comportamentos rumo a estilos de vida saudáveis com boa reinserção social. 90% obtiveram pontuações mais elevadas nos elementos em avaliação. O estudo mostrou que a abordagem comunitária multifatorial na prescrição do preparo biopsicossocial melhorou a aptidão física voltada para a saúde em pacientes queimados.

Palavras-chave: cultura física terapêutica; paciente queimado; aptidão física orientada para a saúde

INTRODUCTION

Nowadays, burns occupy a special place among surgical injuries and diseases. This is because, together with the local injury, there are general disorders that can affect all the organic systems and functional cycles that determine, in a way, ultimately, the evolution of the process. In addition to the general and often prolonged treatment, local and general therapeutic exercises are equally important, although in the different phases of therapeutic evolution one or the other may predominate, serious disorders make every burn become a major disease that is today burdened by high mortality.

In Cuba, in 2018, accidents and self-inflicted injuries were among the top ten causes of death. In the case of accidents, the rate of exposure to electric current is reported at 0.9 and to smoke, fire and flames at 0.3 per 100,000 inhabitants. Self-inflicted injuries also include those caused by burns (Rodríguez, 2020).

Burns are traumas caused, generally, by thermal, radioactive, electrical or chemical exposure (Chávez, Collado & Peláez, 2022). For this reason, burned patients have many consequences, both physically and psychologically, since these injuries lead to a loss of autonomy, and often to a restriction of movements in the patient. The treatment of the consequences is a substantial part of the therapy and this compromises the final success not only in terms of healing, but also in rehabilitation and reintegration into social life of the person who has suffered the consequences of these injuries.

In the use of the term rehabilitation, the aim is to restore the physical, psychological and social adaptation functioning of people with special educational needs to the highest possible level. The inclusion of all possible means to reduce the impact of conditions that are disabling and allow the affected person to reach an optimal level of social integration is emphasized, through a multidisciplinary team, where each professional works so that the patient relearns to reintegrate into his or her daily life (Crespo, et al., 2022).

In other words, Prophylactic and Therapeutic Physical Culture (CFPT in Spanish), based on the assessment of physical exercise in the improvement of the biological and implicitly

spiritual potential of man, can be established as the main vehicle for the treatment of the consequences as a substantial part of the therapy of burned patients and be decisive for the final success not only in terms of healing, but also in terms of rehabilitation and reintegration into social life (Soriano & Macías, 2022).

Consequently, according to the World Health Organization (WHO, 2021), it is necessary to encourage, by physical activity programs and their research groups, the development of experimental studies that can account for the effectiveness of different physical exercise systems that favor the reduction of pain, the increase of physiological indices and the improvement of coping styles to stressful situations in people who suffer from some type of disability and that, therefore, contribute to their quality of life. The subject of the study presented is in accordance with and responds to the recommendations on physical activity for health given by this entity and according to the research results found, it is still a little-explored path.

Physical activity aimed at people with burns at the international and national level has been directed towards adequate training control, from the position of Soriano, Macías & Fonseca (2024); Samia et al. (2019); Tinajero et al. (2019); Walid et al. (2021); Zhang Li & Au (2017) it is agreed that the presence of the physical therapist and his activity becomes the cornerstone of the rehabilitation of the patient with burns, where physical activity and exercise occupy a role of extraordinary significance in the scheme of healing, rehabilitation and social reintegration.

From the position of Obando et al. (2020), the importance of the optimistic approach and the need for awareness of the current situation and perception of new changes in the family and residential environment is maintained; however, in the studies consulted, no evidence was found that reveals the theoretical and conceptual aspects that explain the logic for carrying out a rehabilitation process for these patients, nor essential criteria for a biopsychosocial diagnosis or how to educate and raise awareness among subjects and family members of the need and importance of physical exercise to recover from the after-effects left by burns on their bodies; in addition, the prescription of physical activity in this type of patient is insufficient due to the lack of a system of objectives, therapeutic exercises, methodological

guidelines, and a control and evaluation system depending on the moments that the burn patient goes through for their recovery.

Based on the needs that arise in patients with burns, to regain independence in basic daily activities, therapeutic actions and psychosocial interventions are required in the search for a better quality of life, from a physical condition oriented to health and adjusted to the biopsychosocial paradigm of medicine, an issue that can be achieved with CFPT, which emerged at the limits between medicine and physical culture; this implies the recovery of functionality, and at the same time the psychosocial capacity of the individual that transcends the challenge of resizing the conception of physical rehabilitation of the burned patient, in the context of therapeutic areas.

The intervention of the CFPT today, for the recovery of the physical condition oriented to the health of the burned patient does not have a consistent theoretical identity that allows it to fulfill its social mission; this lack of knowledge forces the Graduate in Physical Culture to continually improvise or adapt established programs for other pathologies and to adopt the most positive empirical results that work best for patients, which conditions superficial approaches and ultimately, the transition from mechanism to pragmatism.

The absence of a concept that underpins and guides the intervention aimed at integrating therapy with the socialization process of the burned patient, based on its biological premises, determines the diversity and fragmentation of the procedural practice in the search for a physical condition oriented towards health, in the context of therapeutic areas, and, at the same time, drives the reorientation of many of its approaches towards the psychosocial focus.

Consequently, multiple intervention strategies are generated, whose integral nature is given by the participation of a multidisciplinary team and have as an essential theoretical foundation the theory of the CFPT; despite this, it is not perceived as a systemic and dosed care process that covers the biological and psychosocial aspect in all its dimensions, since contradictions still exist between the prescription of physical exercise, the prejudice of the

benefits that its practice brings and the participation of specialists from other branches for a comprehensive work that allows adequate care.

Therefore, the main intention of the work is to develop a program of therapeutic physical activities with a multifactorial community approach in the prescription of biopsychosocial preparation, which allows the recovery of physical condition oriented to health in burn patients.

MATERIALS AND METHODS

The study was conducted with a pre-experimental design of minimal control, through an initial and final test, in which after the first diagnosis the independent variable was managed, with the application of the program and subsequently, it was evaluated in the final verification and its effectiveness was verified. The research was developed in the therapeutic area of the sport complex 6, in the municipality of Manzanillo in Granma.

From a population of 15 patients, a sample of 10 (66.6%) was selected, using a stratified, non-probabilistic, intentional sampling, with an average age of 39.4 years; patients who had second and third degree burns in the neck, shoulders and elbows were taken into account, as this is the area with the greatest physical, social and psychological impact on rehabilitation and social reintegration times. For the development of the research, it was determined to include patients with burns, with the following inclusion and exclusion criteria:

Inclusion criteria: patients with second and third degree burns in the neck, shoulder and elbow region, approved by a specialist in Physical Therapy and Rehabilitation to perform physical activities and who are not treated by any rehabilitation institution.

Exclusion criteria: patients with burn injuries in other areas of the body, dermal complications of the injuries and need for surgical events.

Exit criteria: family or patient's willingness to stop applying the physical activity program and loss of follow-up.

Twenty-five specialists from other branches related to research were included.

Theoretical and empirical methods were used, as well as research techniques such as analysis and synthesis, inductive-deductive, systemic-structural-functional, documentary analysis, methodological and source triangulation, structured observation, interviews and surveys, review of the clinical histories of each patient to assess their progress, sociodemographic characteristics, treatments received previously, progress of the physical and psychological state since hospital admission and the recommendations and indications described by specialists involved in the treatment.

Physical activities were observed (symptoms that patients show in response to exercise, participation and interest in physical activity, ways of acting in the care of their health, health education, educational methods used by related specialists and prescription in biopsychosocial preparation). A self-assessment questionnaire was developed on burn issues and their care. Current trends in physical rehabilitation for burn patients were reviewed. Interviews were conducted with specialists related to the research (CFPT teachers, multidisciplinary health team and community entities). For the evaluation of the prescription, the methodology and evaluation at high levels (positive), medium level (negative infrequent) and low level (negative) were used.

The biological dimension evaluated three indicators:

1. Criteria for evaluating scars and burn grades.
2. Physiological monitoring (heart rate HR, respiratory rate RR, systolic blood pressure SBP and diastolic blood pressure DBP).
3. Physical condition (coordination skill in activities of daily life (ADL), muscle tone, joint mobility, cardiorespiratory endurance: Vo2Max, stress test and postural control).

The psychosocial dimension evaluated two indicators:

1. Psychological well-being (State-Trait Anxiety Inventory and Coopersmith Self-Esteem Inventory).
2. Social welfare (Rotter `s Locus of Control, Family Functioning Perception Test).

To assess the effectiveness of the therapeutic physical activities program, the Vancouver Scar Assessment Scale (VSS) was evaluated.

Indicators:

Pigmentation: normal, 0; **hypopigmented**, 1; **hyperpigmented**, 2. **Vascularity:** normal, flexible, flexible with minimal resistance, flexible with moderate resistance, firm, band (palpated as a rope), contracture: height/thickness, 0: normal, 1: < 2mm, 2: d"2 and >5 mm, 3: d"5mm.

RESULTS AND DISCUSSION

After obtaining information through observation of physical activities, exploration of clinical histories, sociodemographic characteristics, international trends in physical rehabilitation interventions for burn patients, interviews and surveys to specialists related to research (CFPT teachers, multidisciplinary team of related specialists and community entities), the following results of the CFPT process for the burned patient in the neck, shoulder and elbow region were obtained:

- Burn patients were insufficiently cared for in therapeutic area services and performed little systematic physical activity guided by specialists as a result of constant restrictions due to prohibitions, home and community exclusion, which built a pattern of incapacity on the burned patient and negatively affected their behavior and social inclusion.
- Burns, as serious injuries that can lead to chronic systemic diseases, affect physical and psychosocial health, movement-related functions, cause tendon adhesions, muscle shortening, loss of muscle tone, tendon desiccation, muscle fibrosis, hypertrophic scars, keloids, joint limitations, restrictive breathing difficulties, soft tissue retractions and postural disorders with osteomioarticular pain; which causes an unfavorable physical appearance accompanied by loss of self-esteem, increased anxiety and marked social isolation.

- Limited participation of specialists related to the subject in physical activities carried out in the context of therapeutic areas of the community, due to the diversity of criteria of the professionals committed to this responsibility.
- The care provided under the current physical-therapeutic care protocols limited the process, as the medical-pedagogical tools to establish care in an extra-hospital setting were insufficient; the transposition of different stages that a patient must go through was not taken into account, since tests and ranges of results were not delimited in the evaluations carried out.
- Physical exercises were not always based on planning for the specific conditions of each patient, without adequate selection and ordering, with traditional planning of loads, without specifying the logical order to follow, the systematicity and individualized work.
- Insufficient participation of burn patients in community physical activities, lack of knowledge about exercise prescription and adaptation, and how to do it in each case.
- The INDER (National Institute of Sport, Physical education and Recreation) did not have a theoretical and methodological body to guide and direct treatment through the practice of physical-therapeutic activities in patients with burns, from the community care schemes.
- The need was expressed for the development of a CFPT program for burn patients that would contain the individual possibilities and potential of the patients, the inclusion of group activities and direct interaction with the family.
- The family received little guidance from specialists on the possibilities, options and benefits of physical-therapeutic activities such as sports and recreation for the patient's health.
- The social relationships of burned patients in physical activities carried out in the community were limited.
- In the physical activities that were carried out, the inclusion of specialties related to comprehensive care for this type of patient was insufficient.

The characterization of burn patients, through the established dimensions, indicators and parameters, revealed the following results:

As can be seen in Figure 1, in the characterization of the patients, the results of the scar evaluation and degree of burns indicator indicated that all of them had second and third degree burns; in the scar evaluation parameter, only one subject had normal scar pigmentation and the rest had complications in the healing according to the applied scale, since the values of pigmentation, vascularization and thickness exceeded the normal figures (Figure 1).

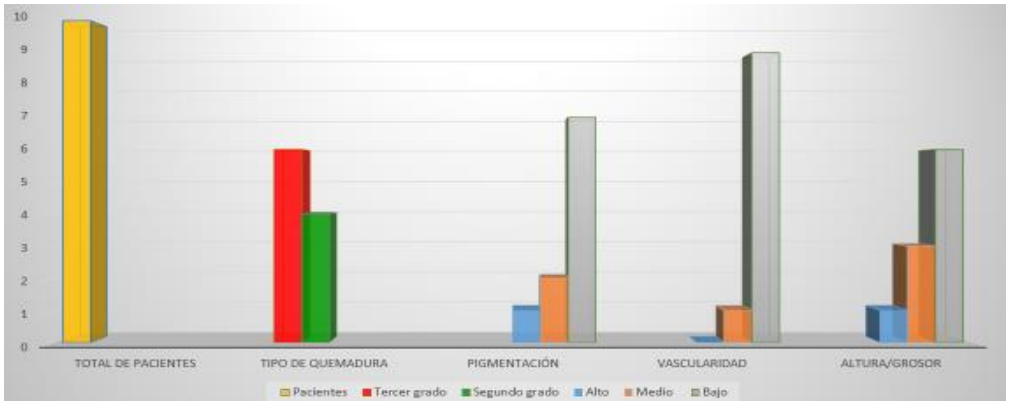

Fig. 1. *- Results of the initial measurement applied to burn patients in the criterion indicator for the evaluation of scars and degrees of burns. Source: Rodríguez and Romero, (2022)*

In the physiological control, the index related to the HR was altered in values between 90 and 100 beats per minute, although there were no signs of bradycardia or tachycardia, explained by postural problems, the functional incapacity of the patient in his mobility in the first instances of the acute phase, bed rest and the difficulties in expelling air during physical exercise due to the effort that increased when incorporating exercises of greater complexity and caused an increase in stress and demand on the cardiovascular system.

From 12 to 18 hours after trauma, cardiac output begins to increase and remains elevated until all wounds have healed. Peripheral vascular resistance, which is initially elevated due to vasoconstriction, blood hyperviscosity and hyperfibrinogenemia, eventually decreases (Ramírez, et al., 2010). Therefore, physical training intervention was justified as a viable and effective way to improve cardiopulmonary capacity and complemented the rehabilitation of patient care, depending on the state of their symptoms, as a result of the effort that

increased by incorporating exercises of greater complexity that led to increased stress and demand on the cardiovascular system.

In the FR parameter, it was evident that in 90% of the patients, data between 22 and 24 respiratory movements per minute were revealed, a value slightly higher than normal, symptoms of fatigue were observed, related to associated underlying diseases and greater severity of injuries to the muscles involved in breathing, therefore the intervention of physical training was viable and effective in improving cardiopulmonary capacity, the rehabilitation of the care of burned patients was complemented based on the state of their symptoms.

About the TAS and TAD, data that corresponded to the parameters of increased values were reflected. In this sense, it was associated with factors such as age, medication intake, associated diseases, stress situations, anxiety levels and inadequate habits and lifestyles of these patients (Figure 2).

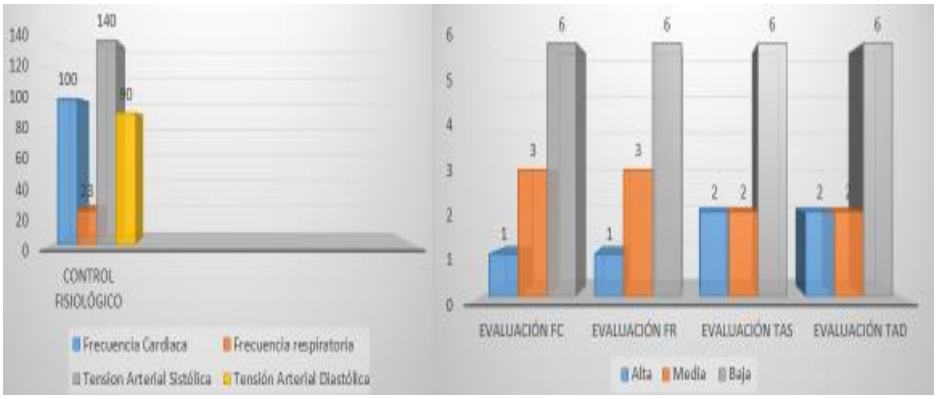

Fig. 2.- *Results of the initial measurement applied to burned patients in the physiological control indicator.*

Regarding the physical condition indicator, Figure 3 shows the assessment of coordination skills for daily life activities, which was carried out through demonstrations of how they simulated everyday actions. This showed that the patients did not master these skills. The unfavorable results were due to the poor physical exercise habits and the severity of the injuries presented.

The second parameter related to the functional state of the muscles showed problems in the execution of movements due to muscle weakness in the damaged areas, an effect that responded to physical inactivity; the results demonstrated the inadequate habits and lifestyles of these patients.

To verify the behavior of joint mobility in the areas under study (neck, shoulders and elbows), the results of the initial diagnosis were analyzed on the movements performed by said joints, which expressed a tendency toward immobilization and poor anatomically normal position, which had an impact on the rehabilitation and aesthetics of the damaged area.

Cardiorespiratory endurance assessed by means of the 6-minute Vo2Max walking test adapted to these patients revealed that they showed symptoms of exhaustion and were classified in functional class III. This was due to the fact that physical inactivity led to muscle atrophy, loss of oxidative work capacity and aerobic endurance. Regarding postural control, the results reflected that the patients adopted inadequate postures (antalgic), deformities mainly in the region of the spine, with symptoms of pain and discomfort.

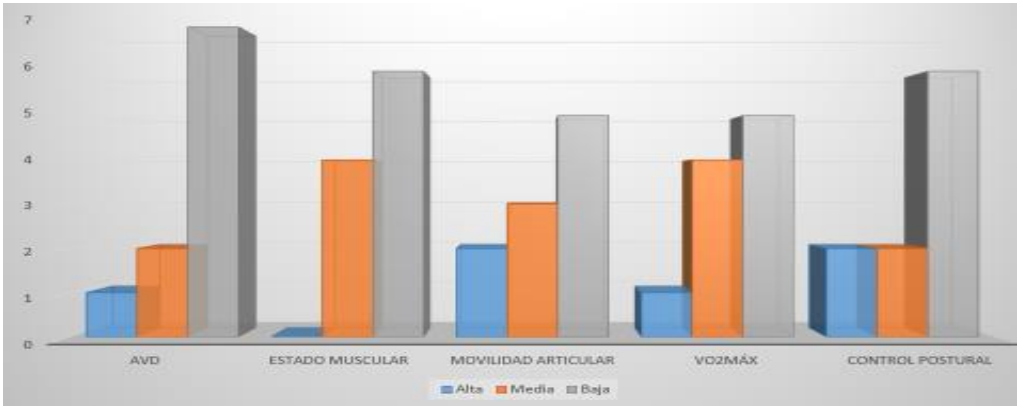

Fig. 3. *- Results of the initial measurement applied to burned patients in the physical condition indicator*

The assessment of the results arising from the state of anxiety and self-esteem showed that the patients showed a low level of self-esteem, attitudes with manifestations of low personal value were observed, due to feeling useless and dependent due to not being able to

collaborate at home, feeling inferior in relation to friends and coworkers and not being able to carry out social and work activities as before the accident.

In addition, they expressed fear when doing physical exercises and little hope for recovery, as well as anxious behaviors in social interaction resulting from the high stress caused by suffering second and third degree burns in the regions studied. The functional and social incapacity caused by these burns, the changes in roles within the home, the affectation of daily life activities, aggressive treatments, and long hospital stays contributed to the affectation of the psychological dimension of these patients.

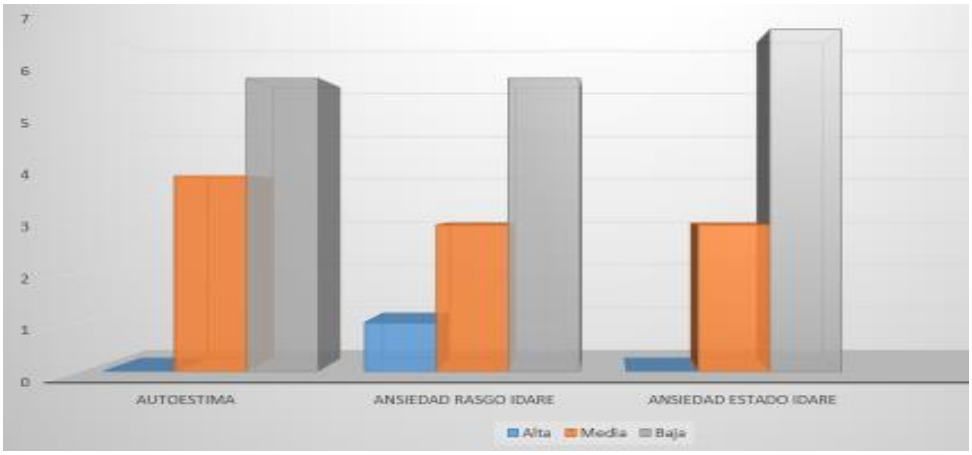

Fig. 4. *- Results of the initial measurement applied to burned patients in the psychological well-being indicator*

The establishment of the social welfare indicator allowed determining the responsibility of the subjects in the treatment and the functions exercised by the family as the main nucleus of influence on the procedures outlined from the community level, and the influence of both components on the timeframes of the patient's social reintegration. In this sense, it was determined that four of the families studied claimed to be severely dysfunctional, inadequate methods of coexistence were verified, little family affection, bad conduct habits, lack of communication, loss of values and disrespect for the patient, mainly, towards feelings and attitudes of solidarity towards him, in many cases the spirituality of the burn patient was disrespected, aspects that turned out to be different in each family nucleus.

Regarding the determination of the subjects' attitudes towards the treatment received in relation to their coping styles, in order to individually direct the exercise plans and the forms of social intervention of the applied treatment, the sample showed a tendency to externalize the responsibility for the treatment guidelines, marked traits of pessimism and variability in their moods, coping with the treatment from the perspective of making others responsible for their responsibilities and in mystical ideas due to the marked sense of religiosity that some presented.

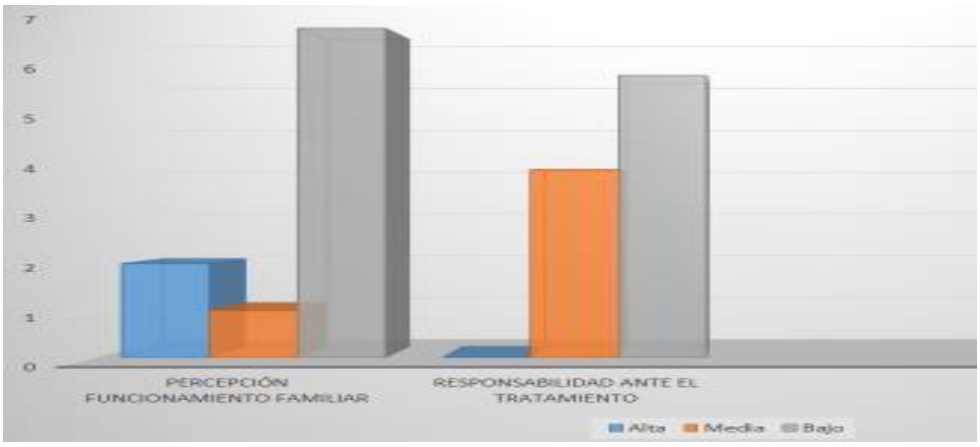

Fig. 5. *- Results of the initial measurement applied to burn patients in the social welfare indicator*

The above aspects allowed to raise the need for a program based on the advances in the understanding and treatment of burns in the field of physical rehabilitation, the existence of solid and validated scientific criteria that have increased the survival rate in patients through physical activity confirmed a theoretical gap that requires the development of a program that contains the methodological aspects and pedagogy as the main didactic principle, to impart knowledge through physical exercises that promote the physical condition oriented to the health of burned patients, and provide optimal information for teachers to use as a reference document when facing the rehabilitation processes of these people, from the work of the therapeutic areas.

Proposal: Physical activity program for the recovery of physical condition oriented towards health in burn patients.

General objective of the program: to improve health-oriented physical condition in burn patients in the neck, shoulder and elbow region.

First stage: familiarization

Specific objectives: to achieve a higher level of physical autonomy that counteracts the effects of the trauma suffered, to eliminate patterns of disability, to improve the level of adaptation through motor responses and to promote the improvement of health, independence and family relationships.

Duration: start of treatment up to three months.

Weekly frequency: five frequencies.

Contents: warm-up exercises, breathing exercises, strengthening exercises without implements, muscle relaxation exercises and active exercises that are performed individually by the patient; isometric contractions; massages; training in daily living activities; adapted sports games; educational talks on the importance of physical exercise; psychological preparation (group intervention with patients and family members).

Second stage: adaptation

Specific objectives: increase joint mobility, increase skills in mastery of movement structures, achieve greater family participation and cooperation during training sessions.

Duration: From three months to eight months.

Weekly frequency: five weekly frequencies

Contents: stretching and active exercises in pairs, deep transverse massage, psychological support in interpersonal relationships and modes of social action, health education.

Third stage: maintenance

Specific objectives: to make physical activity more complex with more rigor and correctness through the use of implements, to progress the affected parameters to normal patterns and to integrate the patient into the social and work activities of their community setting and family environment.

Duration: from 8 to 12 months.

Weekly frequency: five frequencies.

Contents: exercises with implements, deep transverse massage, control test, adapted sports games, psychological support in interpersonal relationships and modes of social action, health education.

Methodology of the structure of therapeutic physical activity classes.

The proposed program has a duration of 45-60 minutes per general exercise session, which depends on the characteristics of each patient, the phase they are in and the work method used; this total exercise time is divided into three parts, a first or initial part, an intermediate or main part and a final or recovery part.

Initial part: the initial state of the skin and hydration are examined one hour before starting the exercises and during them. Examination of physiological indicators (pulse, blood pressure, respiratory rate, referred pain). An educational environment and a favorable mental state for the practice of physical activities are created, it is considered that patients have been subjected to long periods of hypokinesia and precise information is provided on what should be achieved and how. The warm-up is simple with a slow pace and easy-to-do exercises, lasting 10-15 minutes.

Main part: constant skin examinations are carried out, the patient must be hydrated, specific joint mobility exercises are performed in relation to the damaged area, exercises to improve muscle tone, massages directed at the scars, isometric exercises, abdominal exercises, exercises with and without implements, adapted sports games, with an execution at a

moderate pace that continues from 15 to 50 minutes depending on the characteristics of the patient and the progression of the program.

Final part: recovery with slow walks combined with breathing and relaxation exercises and a short muscle relaxation session with skin examinations. In the post-exercise sessions, recommendations are provided to reinforce the other activities of the program and home care, lasting 5 to 10 minutes.

Prescriptive components of therapeutic physical activities in the program: (prescription according to degree of burn, scar scale, age, physiological state, time since injury and stage of the program).

- **Intensity:** the patient's maximum heart rate is determined, 75% of the final figure is considered to be 100%, 40-60% are used for those with third-degree burns and 60-70% for those with second-degree burns.
- **Duration:** 10-20 minutes of continuous activity and 10-45 minutes of discontinuous activity.
- **Frequency:** five days a week.
- **Progression:** Adjust total work per session (increase in intensity, duration, or combination of both) as a result of the conditioning effect (notably seen during the first 4 to 6 weeks).
- **Break/rest:** Rest depends on the activity being performed and the patient's recovery.

Final result of the CFPT process for burn patients:

- The results showed that 90% presented an increase in ranges of motion and functional recovery of the joints, 80% showed improvement in the physiological state of the scars and the functional state of the muscles, only two patients maintained joint limitations and soft tissue retractions due to the severity of the injuries and psychosocial factors unrelated to the study, but improved in the parameters studied:
- In terms of patient participation, the inclusion of the entire sample was confirmed. 100% expressed interest and the planned activities were varied and dynamic.

- 100% of the specialists included in the study planned intervention actions, according to the prescription needs and adaptations of the patients, a process of respectful communication was established with them and their families that allowed the needs of each subject to be identified.
- Health education for family members and patients was conceived through discussions regarding topics related to the disease and physical activities that were carried out for practical awareness and mental structuring of the applied exercises.
- In the knowledge questionnaire, improvements were projected in the methodological teaching process, based on planning based on the specific conditions of each patient, adequate selection and arrangement of physical exercises, logical order to follow, systematicity, individualized work and interaction with other specialists.

After obtaining the information and assessing the main data provided by specialists from other branches related to the research, the methodological triangulation was carried out that allowed the results of the CFPT process:

- It allowed burn patients to be cared for in the community environment by physical activity teachers as a continuation of the recovery process to eliminate patterns of disability that benefited social inclusion.
- A gnoseological platform of the CFPT process was established, where the patient was converted into an active entity, through actions of education and learning of physical activity and the possibility of adapting the planned contents, in correspondence with the individual characteristics of the subjects.
- The relationship between Inder, Minsap (Public Health Ministery) and the Popular Council was strengthened due to intersectoral action and information exchanges were established, with the aim of promoting positive attitudes and behaviors in the family and generating objective conditions towards physical practice, based on multifactorial community care.
- The effects of the therapy and the direct way in which physical activity influences the psychological and social sphere were improved, and the treatment took into account

key elements such as a biopsychosocial diagnosis that included the family in the treatment scheme, thus overcoming the traditional unidirectional approach.

- The therapeutic physical activities program made it possible to reduce negative effects on the physical and psychosocial health of the burned patient.
- The program integrated aspects necessary for the prescription according to the selection and ordering of physical exercises, planning of loads, logical order to follow, systematicity, individualized work, adaptation of the exercise and how to do it in each case.
- Medical-pedagogical tools were established that delimited tests and ranges of results in the evaluations that were carried out, in the transposition of different stages that each patient went through.

Comparative results before and after the program for burn patients in the dimensions, scar assessment scale (VSS) and statistical processing. (Table 1 and Table 2).

Table 1. *- Evaluation of indicators in the biological dimension*

	Before			After			Test. Wilcoxon	
Criteria for evaluating scars and burn grades								
Parameters	**High**	**Half**	**Low**	**High**	**Half**	**Low**	**Signf .**	**DS**
Pigmentation	1	2	7	7	2	1	0.01	Yeah
Vascularity	-	1	9	6	3	1	0.01	Yeah
Height	1	3	6	7	1	2	0.01	Yeah
Degree of burn	10			10			--	--
Physiological control criteria								
FC	1	3	6	8	2	-	0.01	Yeah
FR	2	3	5	9	1	-	0.01	Yeah
TAS	2	2	6	7	3	-	0.01	Yeah
TAD	2	2	6	8	2	-	0.01	Yeah
Physical condition criteria								
AVD	1	2	7	8	1	1	0.01	Yeah
Muscle tone		4	6	7	2	1	0.01	Yeah
Joint mobility	2	3	5	7	2	1	0.01	Yeah

Vo2Max	1	4	5	8	2	-	0.01	Yeah
Stress test	2	2	6	8	1	1	0.01	Yeah
Postural control	2	2	6	9	1	-	0.01	Yeah

Note: *Adapted from Therapeutic physical activities program for pregnant women with gestational diabetes (2022).*

Legend *: Signf : significance, DS: significant difference*

Table 2. *- Evaluation of indicators in the psychosocial dimension*

	Before			**After**			**Test. Wilcoxon**	
Psychological well-being criteria								
Parameters	**High**	**Half**	**Low**	**High**	**Half**	**Low**	**Signf .**	**DS**
Self-esteem inventory		4	6	7	2	1	0.01	Yeah
Trait Anxiety Inventory	1	6	3	6	3	1	0.01	Yeah
State Anxiety Inventory		3	7	8	1	1	0.01	Yeah
Social welfare criterion								
Rotter 's Locus of Control		4	6	8	2	-	0.01	Yeah
Family Functioning Perception Test	1	2	7	7	2	1	0.01	Yeah

Note: *Adapted from Therapeutic physical activities program for pregnant women with gestational diabetes (2022).*

When evaluating the changes that occurred between the initial test and the final test in the biological and psychosocial dimension, these were significant, obtaining a result of 0.01 below 0.05, the value established for alpha; this denoted the effectiveness of the proposed program of therapeutic physical activities for patients with burns in the neck, shoulder and elbows. In statistical terms, the changes achieved revealed a significant impact on these patients that favored the final evaluation, which is why the program is feasible to be applied to benefit the objective studied.

In the evaluation of the scar scale among the expected results, a notable improvement in skin pigmentation was evident, in some cases, normal skin color was achieved, a recovery of the vascularity of the area that made palpation normal, flexible with minimal resistance and in some specific cases firm with moderate resistance, as for height and thickness, it was possible to decrease in all cases below 2 mm, according to the different stages of the program, the patients used relaxation exercises to improve contractions and correct antalgic positions.

In the analysis of the behavior of joint mobility of the studied areas expressed in their different movements, it was observed that in all the patients studied they managed to overcome the patterns of immobility and improve the ranges of movement, the experience that is based on the criterion of Schouten et al. (2019) by demonstrating that a range of over 5^0 to 10^0 can be classified as an effective treatment.

The presence of fatigue did not prevent an active attitude in the execution of the exercises proposed in classes and collaboration with the medical-pedagogical indications aimed at the rehabilitation of scars, the time of social and family integration was reduced, better preparation on topics related to burns, skin care, importance of physical activity and the role of the family in the recovery process.

However, there were patients who performed poorly at each of the stages of the treatment, which negatively influenced the clinical evolution of the scars, ranges of motion, physiological and physical condition indices and caused a delay in the evolution of the components of social and psychological well-being, as they felt that they had not made sustained progress compared to other patients, so the decision was made to refer them for psychiatric consultation.

Physiological complications were not evident in any patient, the progression and multisystemic effect of the burns were stopped and this led to a better prognosis for successful rehabilitation, expressed in an increase in social support from families and the community, and greater independence in daily life activities.

In the social dimension, a restoration of family functioning was perceived after having started with the applied program. However, one patient continued to persistently have negative indices in this indicator due to presenting other needs unrelated to the study, which overlap with the health needs, such as: poorly protected housing, scarce economic resources and insufficient family support network. The application of the program allowed the needs of this subject to be referred to different health and social services.

Based on these favorable results (Figure 6), the effectiveness of the therapeutic physical activity program applied to these patients was demonstrated, which, together with the participation of all the specialists from other branches, allowed the achievement of the evolution of the scars and contributed to the reduction of the complications that they bring with them. In general, it was determined that the planned and applied therapeutic physical activities were effective in the favorable clinical evolution of the scars and in the reduction of the systemic complications that derive from them.

Fig. 6. *- Results of scar evolution in patients burned in the neck, shoulder and elbows.*

The physical activity of the burn patient must be addressed in a multidisciplinary manner and in close collaboration between all the professionals involved, from the first day of the burn until months and even years later, depending on the extent of the injury. The

complexity of these patients does not allow them to be treated efficiently by only one specialist, so a multidisciplinary approach allows the integration of the knowledge and experience of multiple experts in the field; which is recommended to provide adequate care. This is because the complex treatment of people affected by burns includes an optimal recovery of their function that allows them to participate in society, psychologically and physically (Lahoz & Marco, 2019).

Studies conducted after the application of exercise protocols demonstrate a significant decrease in complaints of severe dysfunction, significant increase in muscle strength, range of motion, and marked improvement in burn scar as measured by VSS (Mohamed, et al., 2019).

The combination of massage with physical exercises constitutes an indispensable link in the rehabilitation of the burned patient because it contributes to reducing the aesthetic and functional consequences that these produce, minimizing the risk of the appearance of scarring pathology, carrying out a valid and feasible follow-up using tools such as the VSS, but also the patient's sensation about the scar, this cutaneous evaluation must be put in parallel with the other joint, neurological, functional and other evaluations (Dautin , 2019).

The elements of an intervention should not be observed independently, but rather as a multidimensional system of therapeutic exercises that achieve their effectiveness by acting together and not separately, since one gives way to the other simultaneously, so that the patient receives greater benefit, through the systematic exercise regimen, with certain requirements for its application (Soriano, Macías & Frías, 2023).

Restricting physical activity during treatment of patients may increase muscle loss, however, even with an external supply of amino acids, skeletal muscle wasting cannot be easily reversed in burn survivors (Garnica et al., 2022). For this reason, different modalities are applied for physical activity such as cardiac rehabilitation, strength exercises, joint mobility with the aim of improving the quality of life of the burned patient, limiting the formation of contractures at the level of the affected limbs and improving physical condition after the event; the benefits are greater when the intervention includes combined exercises,

which is why rehabilitation through structured exercise is a safe and effective strategy to restore general physical function in burn victims (Pinzón and Cuadros, 2018).

CONCLUSIONS

The results obtained with the application of the therapeutic physical activities program from the community multifactorial approach in the prescription of biopsychosocial preparation allowed to improve the favorable evolution of scars, joint mobility ranges, physiological state of muscles, self-esteem, anxiety, perception of family functioning, responsibility towards treatment and physiological indicators, to achieve the improvement of physical condition oriented to health.

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The author is responsible for writing the work and analyzing the documents.