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Masterclass

Pain revolution in the public health system: Active coping strategies for chronic pain unit

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ABSTRACT

Background: Chronic pain represents a global health challenge demanding a transition from traditional biomedical to patient-centered biopsychosocial models. This masterclass explores active coping strategies for effective chronic pain management within healthcare systems. It describes the Unit of Active Coping Strategies for Chronic Pain (UAAD – *Unidad de Afrontamiento Activo para el Dolor*) in Primary Care in Valladolid, Spain, as a successful example of implementing a biopsychosocial care model for treating chronic pain.
Objective: To provide tools that allow the application of active coping strategies in the treatment of patients with chronic pain and how to implement the UAAD units in other healthcare systems.
Methods: This masterclass describes the UAAD's innovative approach, starting with its comprehensive and personalized methodology. This includes a referral system, a thorough assessment encompassing biological, psychological, and social factors, and a functional categorization system. These elements guide personalized treatment plans delivered through group and individual programs grounded in therapeutic exercise and pain science education. Four key pillars are highlighted: clinical care, teaching, resource management, research and dissemination.
Conclusion: Embracing this model empowers healthcare providers to address the growing burden of chronic pain. It also enables patients to take an active role in their recovery and self-management.

Introduction

More than 20 % of the world's population suffers from chronic pain, which is the leading cause of disability worldwide and the most common cause of consultations in primary care.[1,2] Annual direct and indirect costs can reach up to 240 billion euros in Europe and, approximately, 635 billion dollars in the United States.[3] Low and middle-income countries are not the exception as they are also following similar trends in prevalence and monetary costs.[4,5]

In Spain, the prevalence of chronic pain is also increasing with time. Almost three decades ago, 11 % of the population suffered from chronic pain[6] while in 2022 the National Observatory of Chronic Pain estimated a prevalence of 25.9 % of the population. Although pain is recognized by the United Nations Charter of Human Rights, many patients with chronic pain are not satisfied with the treatment they receive.[7] These data portray a global problem in which pain is the protagonist in the lives of countless people.

All these facts lead to the question: why is the prevalence of chronic pain increasing despite the availability of more healthcare resources? The lack of education and training in pain management among healthcare professionals,[8] and the lack of specific services with good interdisciplinary practices may be major factors.[9] Nevertheless, the main problem is that chronic pain is still approached from a biomedical perspective, in which pain is understood as a consequence of proportional pathoanatomical tissue damage or because of underlying serious diseases.[10] In addition, this approach promotes medical interventions like injections or surgeries, as well as an overuse of drugs and other passive treatments.[11] Patients are frequently diagnosed through imaging techniques alone[12] and information about their condition has become iatrogenic and a possible source of nocebo.[13] Following the trend in developed countries, extensive use of costly, ineffective, and potentially harmful procedures and interventions has also been reported in low- and middle-income countries, which contributes to significant financial cost and social burden.[5]

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In recent years, new models of healthcare have emerged, such as the biopsychosocial model and the enactive model of pain.[14] These models urge us to view pain as a complex and subjective experience that arises from bidirectional interactions between biological, social, and psychological factors. These models align with the updated definitions of the International Association for the Study of Pain (IASP) that defines chronic pain as a multidimensional and multifactorial subjective experience and should be treated accordingly.[15]

Clinical practice guidelines on pain management advise that it is necessary to perform value-based medicine with science based and cost-effective treatments, with low or no-side effects.[16] Evidence also points out the importance of improving quality of life, setting functional goals and treatments, and not only focusing on short term pain reduction.[17] As recommended by IASP, a multidisciplinary team and an interdisciplinary practice (between physical therapists, occupational therapists, physicians, nurses, and psychotherapists) is necessary to achieve these goals.[15] The aim is to provide holistic quality care, based on the humanization of care, and at the same time to contribute to the sustainability of the healthcare system.

A paradigm shift in the treatment of chronic pain is needed. To address this need in the public healthcare system, in 2018, a Unit of Active Coping Strategies for Chronic Pain (UAAD – *Unidad de Afrontamiento Activo para el Dolor*) was created in Valladolid, Spain. The UAAD was created and is led by physical therapists. It is the first Pain Unit in primary care in Spain. This Unit promotes a paradigm shift in pain treatment; from a paternalistic model to a patient-based model; from a biomedical model to a biopsychosocial model; from passive interventional techniques to active coping strategies. Hopefully, this active coping approach may lead to an unprecedented improvement in the quality of life of patients by focusing the therapeutic approach on functionality, and not only on pain intensity.

In this masterclass we intend to provide tools that allow the application of active coping strategies in the treatment of patients with chronic pain and how this type of Unit could be implemented in other healthcare systems.

How to apply active coping strategies in patients with chronic pain

UAAD clinical goal is to provide effective treatment to patients with chronic pain following a person-centered biopsychosocial model of healthcare. Clinical practice guidelines[18–22] state that treatments have to adopt active coping strategies and should be patient-centered.[23] For this, it is necessary to create a patient referral system, to have homogeneous assessment protocols, and to build group and individual treatment programs, which address the specific needs of patients with complex pain. Patients referred to the UAAD frequently present with the following diagnoses: primary chronic pain (non-specific low back pain, neck pain, etc.), fibromyalgia, Long-COVID, complex regional pain syndrome, phantom limb pain, headaches and/or migraines, chronic pelvic pain, radiculopathies, and long-standing neuropathic pain syndromes.

Referral system

Physicians, nurses, and physical therapists are in charge of detecting which potential patients can benefit from active coping programs based on a list of inclusion and exclusion criteria. Patients are then referred to the UAAD by these professionals. Referrals are mainly from the primary care centers, but also from hospital care services. Table 1 provides the inclusion and exclusion criteria for the UAAD.

Patient assessment

Assessing patients with chronic pain is always a challenge for most healthcare professionals. The assessment is a fundamental step to generate a therapeutic alliance with the patient, to understand their symptoms, and to evaluate their quality of life and level of functionality. The assessment is structured according to clinical reasoning principles and is a process that continues into the treatment period. The assessment is divided into anamnesis, functional physical examination, neurological examination, and the use of patient-reported outcome measures.

- Anamnesis: It is important to establish a physical therapist-patient relationship based on trust during the initial interview. Active listening[25] and patient-centered communication are true catalysts in improving the therapeutic alliance and encourage the active involvement of the patient.[26,27] It is recommended to use open-ended questions and allow time for the patients to express themselves and reflect on what their pain means to them according to the principles of motivational interviewing.[28] How their functional deficits affect their most significant activities of daily living (ADLs), what specific beliefs they have about their problem, the diagnostic labels they were previously provided, and their level of motivation and expectations of recovery with treatment should be assessed.[29] These qualitative data are important because several patients may have similar psychological characteristics (e.g., catastrophic thoughts), but their beliefs may be different (one may believe that flexing the back is dangerous, and another that extending the back is dangerous), and this will impact treatment (type of movement exposure provided).[30] Basic socio-demographic data should also be collected (rule-out possible red flags and determine the social

Table 1
Inclusion and exclusion criteria for the UAAD.

Inclusion criteria
• Chronic musculoskeletal primary pain lasting >6 months • People over 18 years of age • Availability to attend treatment
Exclusion criteria
• Oncologic pain • Fractures in the past year • Spine surgery in the past year • Moderate or high cognitive impairment based on the Minimental State Examination[24] • Symptoms of neuropathic pain for <6 months • Pregnancy • Bladder or bowel incontinence • Saddle anesthesia • Cervical whiplash in the past 6 months • Pain secondary to rheumatic, autoimmune, or inflammatory severe illness (i.e., rheumatoid arthritis or ankylosing spondylitis) • Black flags (i.e., secondary rewards related to financial compensations) • Currently receiving other treatments that are not aligned with active coping strategies or are not science based • Using a pacemaker or other electrical stimulation devices

context). In addition, it is important to ask about possible pathologies and comorbidities that may influence the treatment, as well as maladaptive habits and behaviors (e.g., alcohol abuse, sleep quality and habits, tobacco consumption, and nutritional habits). Finally, a detailed record of each patient's medication intake should be made. If signs of possible medication abuse are detected during the anamnesis, a more in-depth assessment of possible addiction is performed.

- Functional physical and neurological examination: At this stage, anthropometric data of the patients are recorded. Along with the physical examination, symptoms are assessed with symptom provocation tests and a movement analysis is performed. If somatosensory disturbances are revealed during the anamnesis, a somatosensory examination is necessary to identify signs of hyperalgesia, allodynia, hypoesthesia, dysesthesia, etc. The Quantitative Sensory Testing test battery can be used; however, if this specialized and often expensive equipment is not available, the Clinical Sensory Testing offers a more practical and accessible alternative.[31] This information along with the anamnesis helps to establish hypotheses about the possible mechanisms underlying the patient's pain (nociceptive, neuropathic, nociplastic, or mixed).[32]
- Patient-reported outcome measures (PROMs): PROMs can be easily administered to assess symptoms and other important biopsychosocial variables that may impact the quality of life and functionality of the patients. This information should be interpreted along with the physical examination and anamnesis findings.

At the end of the assessment, short-, medium- and long-term functional goals should be established together with the patient.[26] These goals should be agreed upon by both parties, making it clear that the most important thing is to focus efforts on improving quality of life through functionality, avoiding focusing on short-term symptom improvement as the ultimate goal.

New paradigm based on functionality

Patients need to dissociate recovery and treatment expectations from biomedical diagnostic labels. Many labels come with historical misconceptions, some are based on changing criteria[33] and combine patients with slightly different clinical presentations under the same umbrella term, preventing clinicians from individualizing treatment. This creates a stigma on patients who are treated the same way, just based on their diagnosis.

In addition, biomedical labels imply for patients and clinicians that the main therapeutic target usually is pain. It is known that pain can fluctuate a lot in the initial stages of treatment, especially in patients with probable nociplastic pain mechanisms. That is why focusing solely on pain improvement is unrealistic in the short-term.[34] Some efforts have underlined the importance of individualizing chronic pain treatments based on particular findings during the assessment.[35] Categorizing patients by creating phenotypes based on valuable biopsychosocial prognosis variables instead of conventional diagnosis labels has been recently suggested.[36]

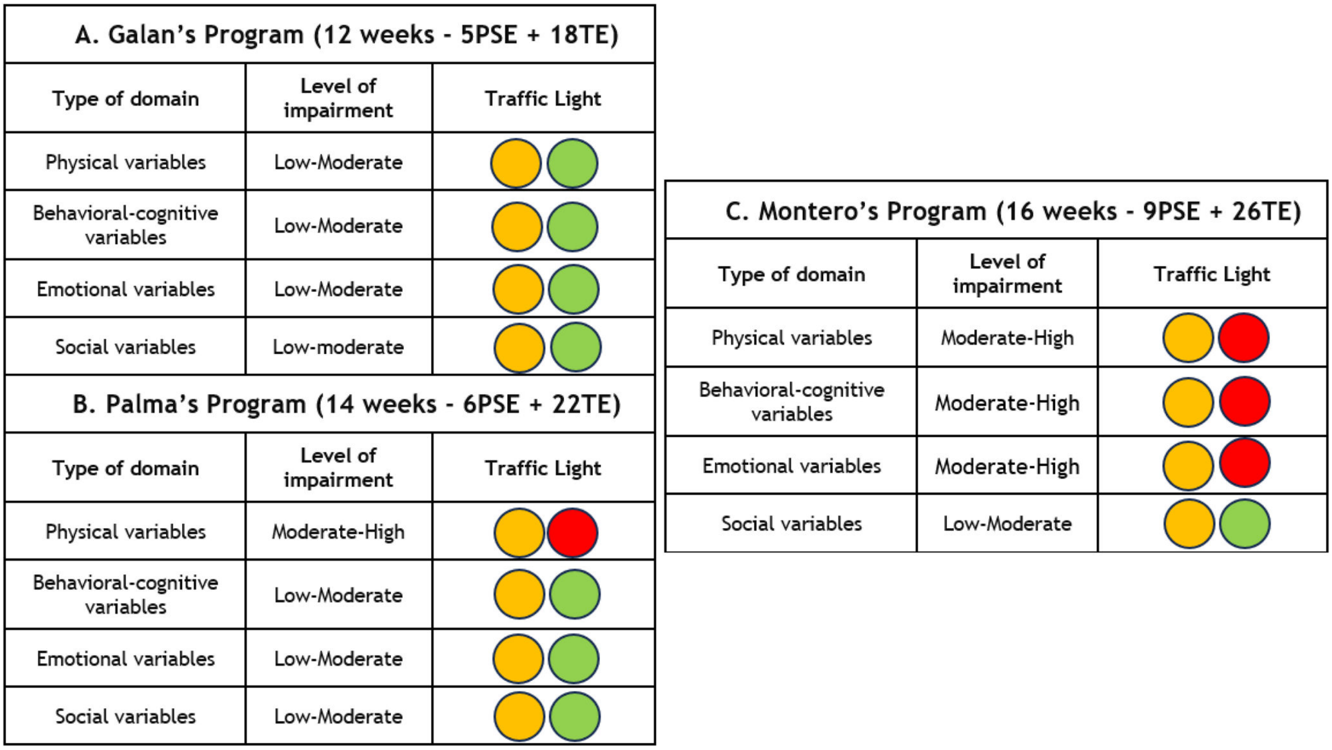
In line with the above, a new approach based on functional categorization is intended in the UAAD. It is named "functional categorization" because patients' functionality is presented as the main treatment target instead of pain, as suggested by the literature.[34] The International Classification of Functioning, Disability and Health conceptualizes a person's level of functioning as a dynamic interaction between the patient's health conditions, environmental factors, and personal factors. Hence, functionality cannot be understood in a unidimensional way because it is influenced by many biopsychosocial variables. Functionality depends not only on physical variables and capabilities, but also on emotional variables, cognitive and behavioral variables, and social variables. It is important to understand that all dimensions of variables on which functionality depends on, are related and interact with each other. According to that, from now on we will treat functionality as the person's capacity to operate in a specific context in a meaningful and adaptive way. The ultimate goal is to classify patients based on functionality and refine their management with different treatment programs adjusted not only on their symptoms and prior diagnostic labels but also on their functional needs.

In the UAAD, functionality and quality of life is globally assessed using the health survey SF-36[37] to measure general clinical improvement. Nevertheless, to address the need of individualizing treatment as much as possible, patients are categorized based on their level of impairment in the following four domains of variables that influence functionality.

- Domain of physical variables: Levels of somatosensory sensitivity or disorders, characteristics and possible mechanisms of pain, and other symptoms such as fatigue should be taken into account. This approach enhances our understanding of potential underlying pain mechanisms,[38] and plays an important role in referring patients to individual treatments. Physical abilities (strength, range of motion, balance, etc.) assessed during the physical examination and movement analysis are also considered in this domain. Visual Analogue Scale,[39] Widespread pain index (bodychart),[40] Quantitative Sensory Testing,[41] Borg Perceived Exertion Scale,[42] Grip Strength Dynamometry,[43] Sit to stand test,[44] and Flamingo test[45] may also be used.
- Domain of cognitive-behavioral variables: Qualitative data from the initial interview, where the patient refers to specific beliefs and expectations, should be considered. Additionally, harmful behaviors and habits, particularly sleep habits and sleep quality, are also evaluated. This information may be supplemented with data obtained from the following questionnaires: Montreal Cognitive Assessment (MoCa),[46] Pain catastrophizing scale (PCS),[47] General Self-efficacy Scale (GSE).[48]
- Domain of emotional variables: Information is also gathered from the initial interview on the patient's fears in specific contexts, situations, or body movements. Their motivational stage is also assessed following the transtheoretical model.[49] Additional questionnaires such as the State Trait Anxiety Inventory (STAI),[50] Beck depression inventory (BDI-II),[51] Fear Avoidance Questionnaire (FAB)[52] and Tampa Scale Kinesiophobia (TSK-13)[53] may generate additional useful information.
- Domain of social variables: This domain is assessed through sociodemographic and contextual data obtained from the interview (specific data on their relationship with work, and their closest social circles, etc.). Information on this domain can be complemented with specific questionnaires such as the Social Avoidance and Distress Scale (SADS).[54]

Next, patients will be categorized according to the domains affected and the severity of the impairment (high, moderate, or low). Schematically, the level of impairment has been illustrated consistent with the colors of a traffic light (Fig. 1). High levels of impairment are considered a "red traffic light", moderate impairment an "amber traffic light", and low impairment a "green traffic light". This level of impairment is established according to the clinicians' criteria. This means that there are no clear thresholds, specific scores, nor mathematical algorithms applied to select a specific level of severity for a particular domain of variables. Instead, clinical expertise is key to put all the information gathered during the interview, physical exploration, and questionnaire scoring together. Hence, categorization of patients and treatment program selection is made in a more flexible and intuitive way.[55]

In the following section we will develop this theoretical framework in a practical manner and show the type of patients and the treatment programs that are designed for them.



A. Galan's Program (12 weeks - 5PSE + 18TE)

Type of domain	Level of impairment	Traffic Light
Physical variables	Low-Moderate	🟡🟢
Behavioral-cognitive variables	Low-Moderate	🟡🟢
Emotional variables	Low-Moderate	🟡🟢
Social variables	Low-moderate	🟡🟢

B. Palma's Program (14 weeks - 6PSE + 22TE)

Type of domain	Level of impairment	Traffic Light
Physical variables	Moderate-High	🟡🔴
Behavioral-cognitive variables	Low-Moderate	🟡🟢
Emotional variables	Low-Moderate	🟡🟢
Social variables	Low-Moderate	🟡🟢

C. Montero's Program (16 weeks - 9PSE + 26TE)

Type of domain	Level of impairment	Traffic Light
Physical variables	Moderate-High	🟡🔴
Behavioral-cognitive variables	Moderate-High	🟡🔴
Emotional variables	Moderate-High	🟡🔴
Social variables	Low-Moderate	🟡🟢

Fig. 1. Active coping treatments in the UAAD and patient functional categorization. PSE: Pain Science Education; TE: Therapeutic Exercise; UAAD: Unit of Active Coping Strategies for Chronic Pain.

Characteristics of active coping treatments for patients with chronic pain

General characteristics of the main interventions

A complex problem such as chronic pain cannot be solved by a simple technique and/or passive treatment. The development of multicomponent programs adapted to the specific needs of each patient is necessary. Treatments may not be effective even if they follow the recommendations of clinical practice guidelines when based on "one size fits all".[55] After functional categorization, patients will be referred to group or individual treatments. The main objective is to improve functionality and quality of life of patients with chronic pain, so that pain ceases to be the protagonist in their lives. More specific objectives are as follows:

- To provide the necessary tools for patients to recover their healthy lifestyle based on the principles of the primary care.[56]
- To demystify certain taboos about chronic pain.
- To help patients understand the mechanisms that perpetuate the painful experience.
- To enhance patients' self-efficacy with emphasis on their role as the active part of the treatment.
- To improve possible somatosensory alterations.
- To reduce and/or eliminate kinesiophobia, fear-avoidance behaviors, and catastrophizing.

For referral to the individual treatment, physical, cognitive, emotional, and/or social impairments are taken into account. When two or more domains are severely affected, the patient is referred for individual treatment. Furthermore, specific factors such as severe somatosensory disturbances (e.g. allodynia), breakthrough neuropathic pain, social phobia, significant decline in executive functionality, precontemplative motivational stages, and severe impairment in activities of daily living are signs and symptoms to prioritize individual treatment. Finally, the consensual decision made between the healthcare provider and the patient to participate individually or in a group will also be considered. Once the patient improves these variables with individual treatment, group treatment can be introduced. Within the individual treatments, specific therapies such as physical exercise, neuro-orthopedic manual therapy, somatosensory reeducation, graded motor imagery, virtual reality, and psychotherapy are used.

Group programs are not only a cost-effective strategy by addressing multiple patients at once, but also promote greater adherence to treatment in each participant. This approach allows patients to feel heard by interacting with equals, which facilitates mutual empathy and promotes a sense of support among the group members. It is well known that spontaneous social interactions with others and participation in social roles can generate and maintain a generalized sense of trust in others. In addition, this interaction promotes feelings of well-being, alleviating the harmful effects of stress, promoting social connectedness, and reducing sensitivity to pain.[57]

We have three types of group programs, which have similar objectives and therapies based on active coping strategies and functional goals. The programs vary in their frequency and type of sessions. Furthermore, for patients with severe emotional disorders, for example for those who experience severe mental trauma in the past, adding psychotherapy interventions delivered by a psychologist and/or psychiatrist should be considered. Some patients also require specific interventions and guidance for the correct use of drugs, for example, for opioid withdrawal in case of addiction.

Group programs are mainly based on Therapeutic Exercises and Pain Science Education. These therapies are the first line of treatment according to current clinical practice guidelines.[18–22] The combination of these therapies has been shown to be more effective in the treatment of patients with chronic pain than when used in isolation.[58,59] There are a number of other multidisciplinary therapeutic approaches such as psychotherapy, nutrition, relaxation techniques, mindfulness, sleep quality behavioural techniques, somatosensory retraining, graded motor imagery, etc., that can be offered based on patient needs.

Pain science education (PSE)

Pain Science Education is an educational intervention that tries to reconceptualize maladaptive pain related beliefs to promote a behavioural change in patients with chronic pain. Previously known as Pain Neuroscience Education, the term has been recently updated to PSE following the consensus of the Pain Education Team to Advance Learning (PETAL). This new concept implies a bidirectional communication strategy avoiding magister classes, while enabling and empowering people toward behavioral change.[60,61] PSE within a multimodal group program also promotes an increase in the cognitive-behavioral, emotional, and social abilities of the patients (increased ability to concentrate, working memory, short and long-term memory, mood, etc.).[62,63] All UAAD group programs begin with PSE that is provided by a healthcare professional. It does not consist only of unidirectionally informing the patient. The aim is to provide information, pain management tools, and coping strategies that help modify patients' beliefs and attitudes towards pain, motivating them to adopt a more active and engaged role rather than a passive one. The sessions explain in depth how thoughts, beliefs, and emotions modify the painful experience and how the misinformation received can modify the pain processing mechanisms. PSE is conceived as a constant learning process, which implies daily work for patients in its own contexts using self-managing tools and information carefully provided. PSE seeks to generate learning and cognitive belief updating. Therefore, the degree of belief reconceptualization within these patients, as well as the knowledge they acquire during the sessions, must be constantly evaluated.[64]

Therapeutic exercise

Therapeutic exercise has been shown to be helpful in reducing symptoms and improving disability in different patients with chronic pain compared to no treatment or passive therapies.[65,66]

In the past, it was thought that physical exercise exerts its effects on pain and disability only through improvements in physical capacities (strength, muscular endurance, power, etc.). However, physical exercise can also cause changes in other dimensions, such as, the improvement of emotional state, cognitions and behaviors (reduction in catastrophizing, fear of pain, avoidance behaviors, and improvement in self-efficacy, etc.). Furthermore, at the neurophysiological level, exercise promotes hypoalgesia, increasing the efficiency of pain inhibition pathways and brain functional and structural adaptations.[67,68]

It is essential that patients move and engage in physical activity, not only for pain improvement, but also because of the physical deconditioning and comorbidities they often present. Multiple factors must be taken into account when prescribing exercises to patients with chronic pain compared to patients with acute pain or healthy individuals. Not all patients are ready for movement, and even in some cases, physical exercise can exacerbate symptoms. Although there are general recommendations[69] for people with chronic pain (in terms of frequency, intensity, duration, and type of exercise), motivational and contextual variables should also be considered when implementing an exercise program. Fig. 2 illustrates a representative example of an exercise session conducted with patients with chronic pain.

Many patients with chronic pain may present an exacerbation of pain during or after exercise. Psychosocial aspects such as catastrophizing and fear-avoidance seem to influence the occurrence of exercise-induced hyperalgesia, which does not manifest in the same way as it does in healthy individuals. Instead, the opposite effect, exercise-induced analgesia, may occur.[70] Therefore, these psychosocial aspects need to be addressed during the PSE prior to the beginning of the exercises. Patients need to understand this possible pain exacerbation as a normal physiological process and not perceive it as harmful. For this reason, physical therapists who prescribe and lead exercise sessions must have a thorough understanding of pain neurophysiology. They also need to be aware of potential symptom exacerbations and know how to manage patients if these occur.[71] Exercise progression should not only be based on a gradual increase of loads or intensity of the exercise according to the patient's physical capacities, but also on the cognitive-behavioral, emotional, and social dimensions of the patient. For example, gradual exposure to movement should be prescribed when the patient presents catastrophizing, kinesiophobia, and avoidant attitudes. Strategies such as gamification, double tasks, distraction techniques, and playful components in the sessions can help reducing fear and hypervigilance, as well as encourage social interaction.[72] A key concept is that priority should be given to getting the patients to move, and not only "how" they move. Excessive correction on exercise technique can lead to increased hypervigilance and, therefore, increase the symptoms.

Description of group programs

The following is a description of the treatment programs at UAAD and which type of patient attends each one (Fig. 1).

1. ***Galan program:*** It is designed to treat patients with low to moderate level of physical, social, emotional, and cognitive-behavioral impairment. The duration of the program is 12 weeks. In the first five weeks, there are 5 PSE sessions (1 session/week), each lasting 120 mins. From the 6th to the 12th week, 18 multicomponent exercise sessions (3 sessions/week) are performed. The exercise sessions last between 60 and 70 mins. These programs include

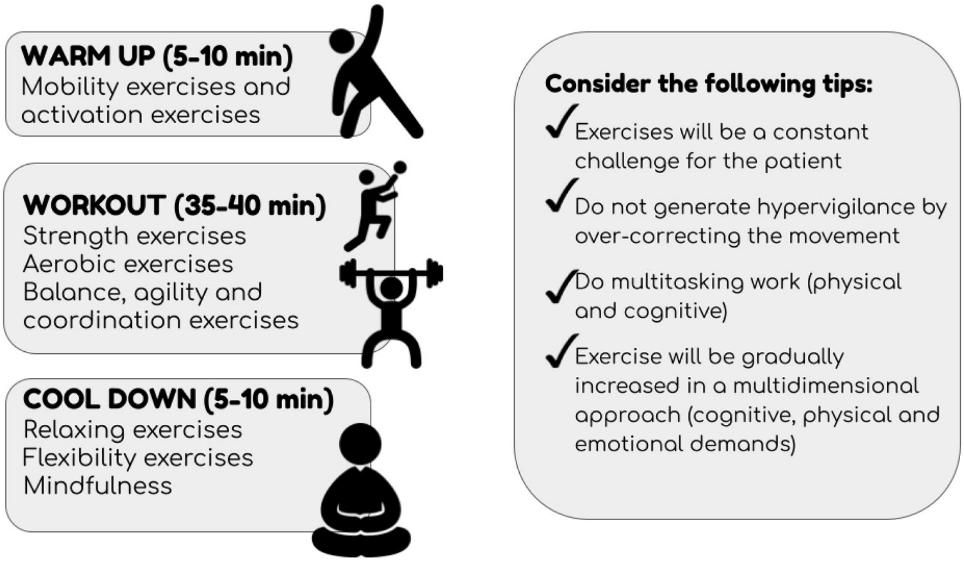


Fig. 2. Structure of a therapeutic exercise session, consisting of a warm-up phase, the workout, and a cool down phase.

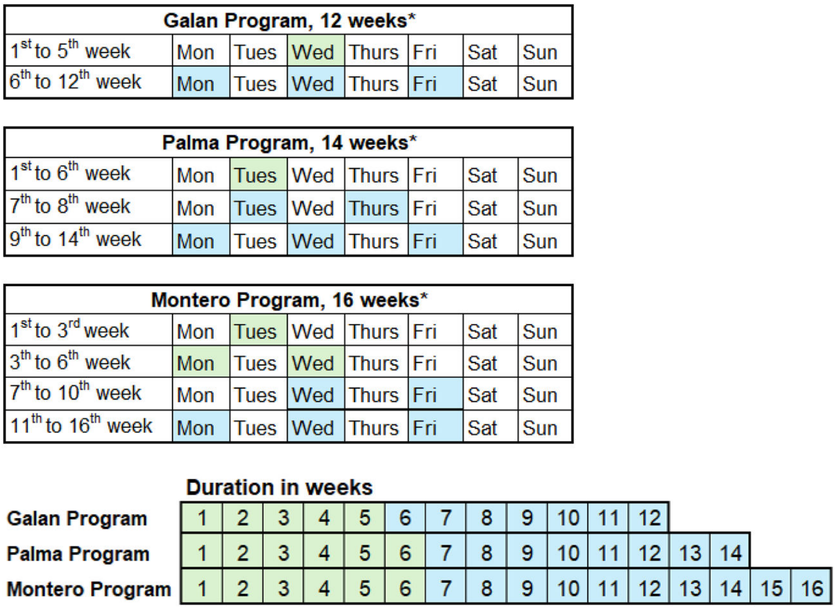
therapeutic exercise with dual tasks, gamification, as well as relaxation and mindfulness. At the end of the program there is a final 2-hour refresher PSE session (Fig. 3).

An example of a patient functional profile for this program: patients with no perceived fatigue in their ADLs. The level of physical impairment is low to moderate (decrease in strength and aerobic capacity). The pain mechanisms have a mixed predominance, the pain is not disabling, and mild somatosensory alterations are present. With regards to cognitive-behavioral variables, there is no severe memory loss or deficit of cognitive abilities, but there is a tendency to have catastrophic beliefs. Emotional variables are low to moderately affected (moderate kinesiophobia, anxiety and mild depression, and there are presence of fear and avoidance behaviours for certain activities or contexts). The social context is usually favorable, which means the patient has a good network of family and friends. This patient profile is usually in the "action" phase of the transtheoretical model.[49]

2. ***Palma program***: It is focused on patients with a moderate to high level of physical impairment, and low to moderate level of impairment in the other domains. The duration of the program is 14 weeks. In the first six weeks, there are 6 PSE sessions (1 session/week) lasting 90 mins per session. From the 7th to the 14th week, 22 multicomponent exercise sessions are performed (2 sessions/week for weeks 7th and 8th, and 3 sessions/week from the 9th to the 14th week). The exercise sessions last between 60 and 70 mins. This program uses the same treatment techniques as the Galan Program in addition to motor imagery and psychoeducation techniques. At the end of the program, there is a final 2-hour review session of PSE (Fig. 3).

   An example of a patient functional profile for this program: patients with moderate to high level of impairment of their physical capacities, with strength and aerobic capacity being severely affected. They show a predominant nociplastic and widespread pain pattern and also have maladaptive perceptual fatigue. The patient may have somatosensory impairment such as dysaesthesia or hypoaesthesia (but not allodynia), as well as low to moderate impairment in the cognitive behavioral variables: cognitive and concentration deficits, memory loss, and executive function impairment. The patient also presents low to moderate levels of catastrophism, bad sleep quality, and moderate self-efficacy. Low to moderate emotional disorders are present: despite having high kinesiophobia, depression and/or anxiety are mostly moderate, not severe. In terms of social variables, the patient has a lack of support networks, as well as a tendency to isolate themselves, but there is no social phobia. Patients in this program are in a contemplative and preparation for action phases of the transtheoretical model.[49]
3. ***Montero program:*** It is focused on patients with low to moderate social impairment and moderate to high impairment in the other domains. The duration of the program is 16 weeks. In the first six weeks, 9 PSE sessions are performed (1 session/week during the first 3 weeks of treatment and 2 sessions/week from the 3rd to the 6th week), lasting 70 mins each session. From the 7th to the 16th week of treatment, 26 multicomponent exercise sessions are carried out (2 sessions/week of somatosensory, proprioceptive, and motor imagery work are performed from the 7th to the 10th week, and active treatment is introduced at a rate of 3 sessions/week from the 11th to 16th week, lasting 1 hour each session). In addition to the same treatment techniques as the Palma program, this program also includes social interaction, cognitive stimulation, and sleep re-education techniques. At the end of the program, there is a final 2-hour PSE review session (Fig.3).

An example of a patient functional profile for this program: a great maladaptive perceptual fatigue stands out with direct impact on ADLs. The patient presents a high level of limitation in their physical capacities, which means a deficit in strength and aerobic capacity, with a predominantly nociplastic widespread pain pattern. The patient usually presents somatosensory disturbances such as generalized dysaesthesia or hypoaesthesia (but not allodynia) and proprioceptive disturbances. Comorbidities are present: functional digestive disorders like irritable bowel syndrome, sleep disturbances, migraines, etc. Cognitive-behavioral variables are moderate to highly affected (mental fog, poor sleep hygiene, short-term memory loss, significant concentration deficit) with high levels of catastrophizing (rumination, magnification, and defenselessness). The patient also shows low levels of self-efficacy. At the emotional level, the patient is moderately to highly affected with characteristics of moderate depression, moderate anxiety, and moderate to high kinesiophobia. Social variables are also affected, reducing social



Galan Program, 12 weeks*							
1st to 5th week	Mon	Tues	🟩 Wed	Thurs	Fri	Sat	Sun
6th to 12th week	🟦 Mon	Tues	🟦 Wed	Thurs	🟦 Fri	Sat	Sun

Palma Program, 14 weeks*							
1st to 6th week	Mon	🟩 Tues	Wed	Thurs	Fri	Sat	Sun
7th to 8th week	Mon	🟦 Tues	Wed	🟦 Thurs	Fri	Sat	Sun
9th to 14th week	🟦 Mon	Tues	🟦 Wed	Thurs	🟦 Fri	Sat	Sun

Montero Program, 16 weeks*							
1st to 3rd week	Mon	🟩 Tues	Wed	Thurs	Fri	Sat	Sun
3th to 6th week	🟩 Mon	Tues	🟩 Wed	Thurs	Fri	Sat	Sun
7th to 10th week	Mon	Tues	🟦 Wed	Thurs	🟦 Fri	Sat	Sun
11th to 16th week	🟦 Mon	Tues	🟦 Wed	Thurs	🟦 Fri	Sat	Sun

Duration in weeks																
Galan Program	🟩 1	🟩 2	🟩 3	🟩 4	🟩 5	🟩 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12				
Palma Program	🟩 1	🟩 2	🟩 3	🟩 4	🟩 5	🟩 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14		
Montero Program	🟩 1	🟩 2	🟩 3	🟩 4	🟩 5	🟩 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16

Fig. 3. An illustrative example of the organization of the 3 programs. The days of the week chosen are merely an example and can be adjusted as needed; each center should choose the organization that suits them best. The PSE sessions are marked in green. The Therapeutic Exercise sessions are marked in blue. *At the end of each program, there is a final 2-hour PSE review session.

relations drastically, but social phobia is not present. Patients are predominantly in a contemplative phase of change.[49]

Once treatment is completed, if there are clinically significant improvements in quality of life, and always with therapist-patient consensus, patients may be discharged from the UAAD or continue with their process of change through continued care as an "Active Patient" (concept explained below in section 2.2). In cases where there is no significant improvement, a comprehensive reassessment is performed, and individual treatment may be offered to the patient. As a last option, the patient is referred to other healthcare services based on their needs. Fig. 4 provides a flow diagram of the procedures for the UAAD.

After the patients complete the programs, a 6-month and 12-month follow-up is systematically performed, as some patients may experience relapses in their recovery process.[73] When a patient relapses, it is crucial to perform a detailed re-evaluation to understand what is happening: if it is a mild relapse, we can adjust the treatment individually; if it is more severe, the patient may be referred to our Relapse Program, a shorter version of the Galan Program. When the clinical presentation is too complex to be managed solely by the UAAD, we will collaborate with other services or specialists for comprehensive care.

How to implement the unit in the healthcare system

Implementing an active coping unit in a healthcare system is not easy. It requires motivation and effort, and the complete legitimation of the service may take years. It involves a radical change in how resources are managed to improve patient care, and it does not depend only on how to treat patients with chronic pain. Next, we will explain the characteristics that the Unit must have according to four basic pillars.

First pillar: Clinical care

Patients demand healthcare settings where they can be empathically listened to and informed about their condition and accessible treatments.[74] In this sense, the management of primary musculoskeletal chronic pain should be prioritized from the first level of care (primary care), and in coordination with the second level of care (specialized care).

To ensure proper care, there is a need for a progressive integration of resources across disciplinary lines, such as the interdisciplinary or the transdisciplinary model. Unlike the multidisciplinary model, the interdisciplinary model (according to the IASP) is defined as 2 or more

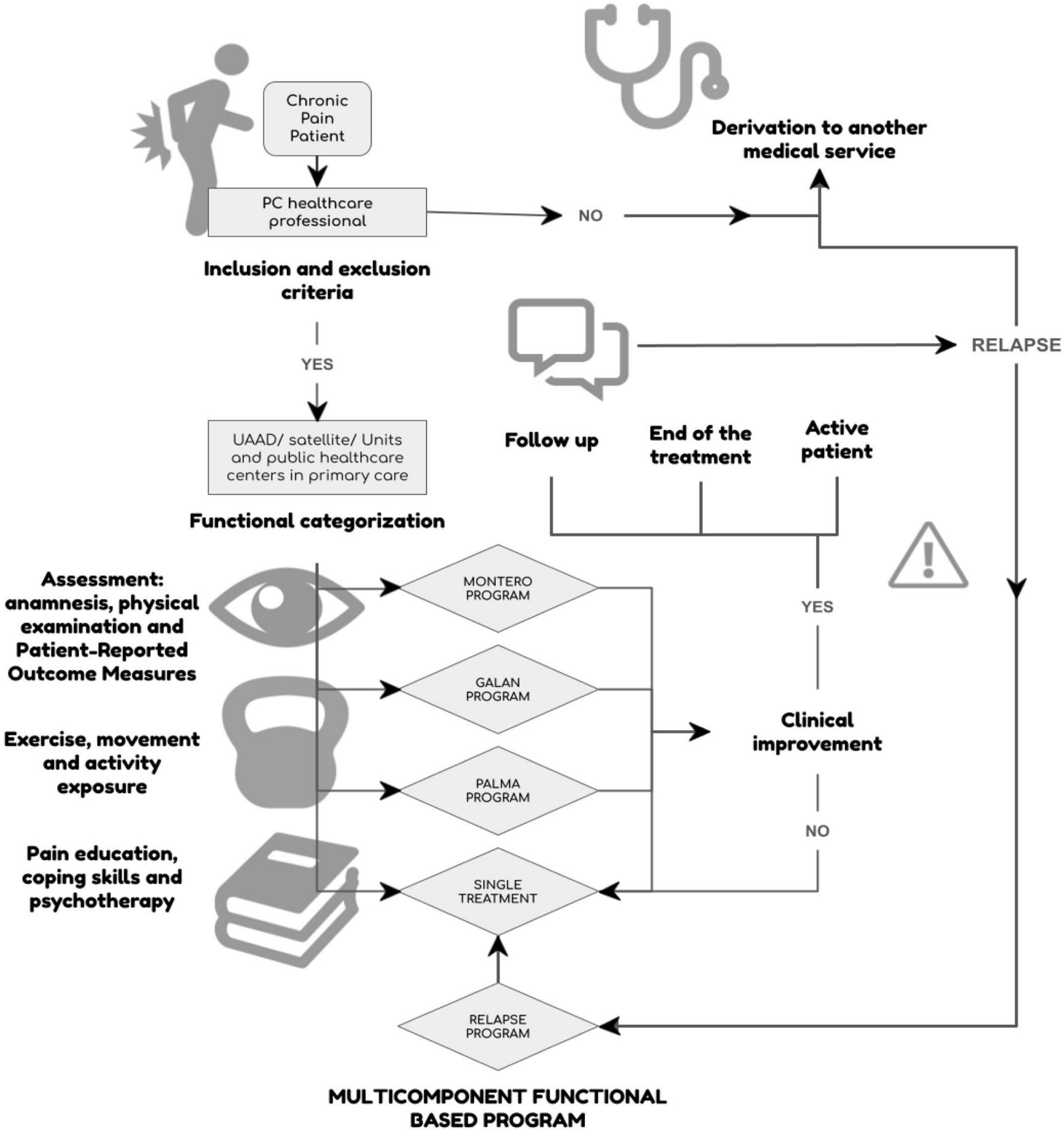


Fig. 4. Flow diagram of referral of patients with chronic pain to the UAAD: Unit of Active Coping Strategies for Chronic Pain; PC: Primary Care.

healthcare professionals working jointly across disciplinary boundaries while espousing shared treatment philosophies, usually held in the same facility. The transdisciplinary model goes a step further and takes into account the payers, aligning all stakeholders vectors: from healthcare professionals, patients with chronic pain, research institutions, politicians, and also funding partners or payers. Both integrated pain care models provide a clinically effective and economically sustainable intervention for chronic pain.[75] In addition, the professionals comprising the teams should be trained and experienced in chronic pain management. The core values of the interdisciplinary team should be the following: collaborative attitude, high-quality communication skills, humanization of care, compassionate and empathic attitude, cultural inclusiveness, teamwork, and the reduction of disparity in care.

Second pillar: Teaching

Healthcare professionals must be trained prior to the implementation of programs, and this training should be continuous over time. It is advisable to make an effort to create specific accredited training programs for healthcare professionals in active coping strategies to manage chronic pain. In this way, the Unit can also become a reference center, with teaching and training for healthcare professionals. To properly care for a complex patient, not only theoretical training is needed, but also practical training. Therefore, as a complement to the theoretical training, the Unit can provide practical internships for undergraduate or postgraduate students from different healthcare professions. Active healthcare professionals from other regions who wish to implement these models can also complete these internships.

Third pillar: Resource management

It will be necessary to analyze the situation of each service or area. To create these services, it is essential to communicate with resources management institutions under the local or national government. It is important to demonstrate to healthcare managers and policy makers the need for these initiatives. To this end, to accompany the proposals with supporting data and information is highly recommended: whether the most up-to-date evidence-based clinical practice guidelines are followed, or whether comprehensive patient care is guaranteed in a cost-effective manner.

Human and material resources

The Unit must have at least the following human resources: physical therapist, administrative staff, physician, nurse, and mental healthcare professionals, as recommended by the IASP. A common space should be available to perform all tasks and ensure proper patient care and communication among the service professionals. This common space should be strategically located to guarantee access for patients from the corresponding healthcare area. There should be different rooms for specific purposes: consultation, waiting, exercise, education, administrative, and storage rooms. It is also necessary to have equipment for the proper functioning of the service. For example, the use of treatment tables, assessment material, exercise material, software tools, and administrative material will be necessary.

In setting up and implementing a multidisciplinary chronic pain treatment unit, it’s essential to leverage technology effectively. Digital tools for precise recording and storage of clinical data should be incorporated, as this ensures accurate and accessible patient information. Utilizing artificial intelligence can further enhance performance by analyzing these data to inform treatment strategies and improve patient monitoring. Additionally, integrating digital tracking tools can provide continuous, personalized support, which is crucial for optimizing patient care and treatment outcomes.[76]

Certainly, not all regions or countries possess identical resources or healthcare system structures. Strategic planning is essential to leverage the organizational strengths inherent to each area. For instance, in Spain, the UAAD is integrated within primary care services. This integration facilitates the transfer of specific programs to various primary healthcare centers. Consequently, a larger population can be served with minimal or no additional expense.

Social and healthcare coordination

The goal of active coping is not for patients to just perform the treatment programs, but it is also to ensure that after knowledge and tools are acquired, they feel empowered to manage their own health.

The ultimate intention is to create "Active Patients’’. This figure of “Active Patient” resembles individuals who have properly acquired self-management skills using tools and resources provided during the program or even self-developed ones. They are now independent and responsible for taking an active care of their own health. Active patients could also participate in future programs assisting and encouraging novice patients, showing that functional improvement is possible. These patients are also free to collectively create new strategies and use public resources at hand to maximize engagement in their new healthy habits. This concept is consistent with the Alma-Ata declaration,[56] recently updated in the new "Astana" declaration.[77] Both conferences highlight the idea of individual and collective participation in the maintenance of public health from primary care initiatives, using all available social resources. Accordingly, primary care professionals should be responsible for coordinating and instructing Active Patients to join and continue with exercise programs and other activities in social spaces provided outside the public healthcare system.

For this socio-healthcare coordination, it is necessary to collaborate and create agreements between the healthcare system and local and regional political institutions. Agreements can also be made with neighborhood and patient associations to have the support of stakeholders. The aim is to create a network of resources (public centers, green spaces, association premises, sports facilities, etc.) so that patients have the means to continue to take care of their health.

Fourth pillar: Research and dissemination

Research has been an indispensable driving force and basic pillar for the development and optimal functioning of the Unit since its creation. In fact, clinical trials were performed before any of the programs were developed in the UAAD.[63,78]

Research must be at the service of the clinic. The Unit must conduct pragmatic research, which is intended to respond to the needs of patients with chronic pain in a more efficient way, with a better use of available healthcare resources. It is a dynamic process requiring small adjustments to future treatments, that will be refined based on the results achieved in the earlier programs.

Dissemination must go hand in hand with research. The advances in research must reach the rest of the healthcare professionals and society. This can be done through inclusive processes involving patients, managers, scientists of all disciplines, and different clinicians. It is also possible to deliver informative talks at public events, patient associations, and other public institutions. Finally, generating networking between universities, the healthcare system, and other research groups can create synergies with great potential for the improvement and development of the Unit́s research team.

Conclusions

The need for a paradigm shift in the treatment of chronic pain is indisputable. To contribute to this paradigm change, this masterclass has provided theoretical and practical tools that can help the creation of active coping strategy units elsewhere. However, it is vitally important to bear in mind that paradigm shifts take a long time. It is also important to understand that the project of creating an active coping unit is a "living" thing itself, evolving and adjusting to contextual circumstances over time. Although this article exemplifies how to implement the

UAADs, it should be kept in mind that this proposed model must be adapted to the cultural and economic differences of each country and its healthcare system model (public, private, or mixed), and the sociocultural context that determine popular beliefs about pain conditions and their management.[79] Although the process of creating these units may be different, common requirements in any context are: effort, motivation, and the ability to adapt and learn from mistakes.

It is time for Physical Therapy to take a step forward and occupy the place it deserves in the treatment of chronic pain. We have everything in our favor: clinical practice guidelines, cost-effectiveness, active treatment approaches, and the desire and enthusiasm to continue learning. What are we waiting for? Patrick Wall used to say that "physical therapy was the sleeping giant" in the treatment of chronic pain. We believe that because of what is happening the giant is waking up.

Final considerations

1. This masterclass is not a recipe or a protocol, we must adapt to the great variability that patients with chronic pain present. We treat people, not diagnostic labels. Therefore, it is necessary to develop multicomponent active coping programs adapted to the specific needs of each patient.
2. The paradigm shift in the treatment of chronic pain must move towards a biopsychosocial model, centered on the patient and their functionality (not only on pain intensity). Patients must take action actively during treatments. A complex problem such as chronic pain is hardly going to be solved by a simple technique and/or treatment. Given the large gray scale of this problem, it is important to perform interdisciplinary work, in which the physical therapist must play a fundamental role.
3. In active coping programs, not only physical condition variables are taken into account when prescribing exercise, but also psychosocial, emotional, and contextual factors. Therefore, it is necessary that the different professionals who are part of the UAAD have specific and continuous training on chronic pain for the correct management of the patient.
4. The UAADs have been created to provide a response to this pandemic of chronic pain in a cost-effective manner, without side effects and being easily reproducible within the healthcare system. They should have clinical care, teaching, resource management and research as their basic pillars.

Declaration of competing interest

None to declare.

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References

1. Treede RD, Rief W, Barke A, et al. Chronic pain as a symptom or a disease: the IASP classification of chronic pain for the international classification of diseases (ICD-11). *Pain*. 2019;160(1):19–27. https://doi.org/10.1097/J.PAIN.0000000000001384.
2. Smith Fors EA, Korwisi B, et al. The IASP classification of chronic pain for ICD-11: applicability in primary care. *Pain*. 2019;160(1):83–87. https://doi.org/10.1097/J.PAIN.0000000000001360.
3. Gaskin DJ, Richard P. The economic costs of pain in the United States. *J Pain*. 2012;13(8):715–724. https://doi.org/10.1016/J.JPAIN.2012.03.009.
4. Sá KN, Moreira L, Baptista AF, et al. Prevalence of chronic pain in developing countries: systematic review and meta-analysis. *Pain Rep*. 2019;4(6). https://doi.org/10.1097/PR9.0000000000000779.
5. Sharma S, Mcauley JH. Low Back Pain in Low- and Middle-Income Countries, Part 1: The Problem. 2022;52(5):233-235. doi:10.2519/JOSPT.2022.11145.
6. Bassols A, Baños i Díez JE. La epidemiología del dolor en España. *Revista Clínica Electrónica En Atención Primaria*. 2006;(10):0001–0007. Accessed March 172024 https://ddd.uab.cat/record/98786.
7. Nahin RL, Dekosky ST. Comorbid pain and cognitive impairment in a nationally representative adult population: prevalence and associations with health status, health care utilization, and satisfaction with care. *Clin J Pain*. 2020;36(10):725–739. https://doi.org/10.1097/AJP.0000000000000863.
8. Loeser JD, Schatman ME. Chronic pain management in medical education: a disastrous omission. *Postgrad Med*. 2017;129(3):332–335. https://doi.org/10.1080/00325481.2017.1297668.
9. Gatchel RJ, McGeary DD, McGeary CA, Lippe B. Interdisciplinary chronic pain management: past, present, and future. *Am Psychol*. 2014;69(2):119–130. https://doi.org/10.1037/A0035514.
10. Johnson MI, Bonacaro A, Georgiadis E, Woodall J. Reconfiguring the biomedical dominance of pain: time for alternative perspectives from health promotion? *Health Promot Int*. 2022;37(4). https://doi.org/10.1093/HEAPRO/DAAC128.
11. Deyo RA, Mirza SK, Turner JA, Martin BI. Overtreating chronic back pain: time to back off? *J Am Board Fam Med*. 2009;22(1):62. https://doi.org/10.3122/JABFM.2009.01.080102.
12. Jenkins HJ, Downie AS, Maher CG, Moloney NA, Magnussen JS, Hancock MJ. Imaging for low back pain: is clinical use consistent with guidelines? A systematic review and meta-analysis. *Spine J*. 2018;18(12):2266–2277. https://doi.org/10.1016/J.SPINEE.2018.05.004.
13. Rossettini G, Colombi A, Carlino E, et al. Unraveling negative expectations and nocebo-related effects in musculoskeletal pain. *Front Psychol*. 2022;13. https://doi.org/10.3389/FPSYG.2022.789377.
14. Stilwell P, Harman K. An enactive approach to pain: beyond the biopsychosocial model. *Phenomenol Cogn Sci*. 2019;18(4):637–665. https://doi.org/10.1007/S11097-019-09624-7/METRICS.
15. Raja SN, Carr DB, Cohen M, et al. The revised international association for the study of pain definition of pain: concepts, challenges, and compromises. *Pain*. 2020;161(9):1976–1982. https://doi.org/10.1097/J.PAIN.0000000000001939.
16. Cook CE, Denninger T, Lewis J, Diener I, Thigpen C. Providing value-based care as a physiotherapist. *Arch Physiother*. 2021;11(1). https://doi.org/10.1186/S40945-021-00107-0.
17. Mallick-Searle T, Sharma K, Toal P, Gutman A. Pain and function in chronic musculoskeletal Pain-treating the whole person. *J Multidiscip Healthc*. 2021;14:335–347. https://doi.org/10.2147/JMDH.S288401.
18. Carville S, Constanti M, Kosky N, Stannard C, Wilkinson C. Chronic pain (primary and secondary) in over 16s: summary of NICE guidance. *BMJ*. 2021;373. https://doi.org/10.1136/BMJ.N895.
19. Castellini G, Iannicelli V, Briguglio M, et al. Are clinical practice guidelines for low back pain interventions of high quality and updated? A systematic review using the AGREE II instrument. *BMC Health Serv Res*. 2020;20(1). https://doi.org/10.1186/S12913-020-05827-W.
20. Chou R, Côté P, Randhawa K, et al. The Global Spine Care Initiative: applying evidence-based guidelines on the non-invasive management of back and neck pain to low- and middle-income communities. *Eur Spine J*. 2018;27(Suppl 6):851–860. https://doi.org/10.1007/S00586-017-5433-8.
21. Corp N, Mansell G, Stynes S, et al. Evidence-based treatment recommendations for neck and low back pain across Europe: a systematic review of guidelines. *Eur J Pain*. 2021;25(2):275–295. https://doi.org/10.1002/EJP.1679.
22. Stochkendahl MJ, Kjaer P, Hartvigsen J, et al. National Clinical Guidelines for non-surgical treatment of patients with recent onset low back pain or lumbar radiculopathy. *Eur Spine J*. 2018;27(1):60–75. https://doi.org/10.1007/S00586-017-5099-2.
23. Lin I, Wiles L, Waller R, et al. What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review. *Br J Sports Med*. 2020;54(2):79–86. https://doi.org/10.1136/BJSPORTS-2018-099878.
24. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189–198. https://doi.org/10.1016/0022-3956(75)90026-6.
25. Diener I, Kargela M, Louw A. Listening is therapy: patient interviewing from a pain science perspective. *Physiother Theory Pract*. 2016;32(5):356–367. https://doi.org/10.1080/09593985.2016.1194648.
26. Casey Lion K, Mangione-Smith R, Britto MT. Individualized plans of care to improve outcomes among children and adults with chronic illness: a systematic review. *Care Manag J*. 2014;15(1):11–25. https://doi.org/10.1891/1521-0987.15.1.11.
27. Ferreira PH, Ferreira ML, Maher CG, Refshauge KM, Latimer J, Adams RD. The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Phys Ther*. 2013;93(4):470–478. https://doi.org/10.2522/PTJ.20120137.
28. Nijs J, Wijma AJ, Willaert W, et al. Integrating motivational interviewing in pain neuroscience education for people with chronic pain: a practical guide for clinicians. *Phys Ther*. 2020;100(5):846–859. https://doi.org/10.1093/PTJ/PZAA021.
29. Cormier S, Lavigne GL, Choinière M, Rainville P. Expectations predict chronic pain treatment outcomes. *Pain*. 2016;157(2):329–338. https://doi.org/10.1097/J.PAIN.0000000000000379.
30. de Baets L, Meulders A, van Damme S, Caneiro JP, Matheve T. Understanding discrepancies in a person's fear of movement and avoidance behavior: a guide for musculoskeletal rehabilitation clinicians who support people with chronic musculoskeletal pain. *J Orthop Sports Phys Ther*. 2023;53(5):307–316. https://doi.org/10.2519/JOSPT.2023.11420.
31. Zhu GC, Böttger K, Slater H, et al. Concurrent validity of a low-cost and time-efficient clinical sensory test battery to evaluate somatosensory dysfunction. *Eur J Pain*. 2019;23(10):1826–1838. https://doi.org/10.1002/EJP.1456.

32. Nijs J, De Baets L, Hodges P. Phenotyping nociceptive, neuropathic, and nociplastic pain: who, how, & why? *Braz J Phys Ther*. 2023;27(4). https://doi.org/10.1016/J.BJPT.2023.100537.
33. Qureshi AG, Jha SK, Iskander J, et al. Diagnostic challenges and management of fibromyalgia. *Cureus*. 2021;13(10). https://doi.org/10.7759/CUREUS.18692.
34. Mallick-Searle T, Sharma K, Toal P, Gutman A. Pain and function in chronic musculoskeletal Pain—Treating the whole person. *J Multidiscip Healthc*. 2021;14: 335. https://doi.org/10.2147/JMDH.S288401.
35. Wijma AJ, van Wilgen CP, Meeus M, Nijs J. Clinical biopsychosocial physiotherapy assessment of patients with chronic pain: the first step in pain neuroscience education. *Physiother Theory Pract*. 2016;32(5):368–384. https://doi.org/10.1080/09593985.2016.1194651.
36. Meisingset I, Vasseljen O, Vøllestad NK, et al. Novel approach towards musculoskeletal phenotypes. *Euro J Pain*. 2020;24(5):921–932. https://doi.org/10.1002/EJP.1541.
37. McHorney CA, Ware JE, Raczek AE. The MOS 36-item short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. *Med Care*. 1993;31(3):247–263. https://doi.org/10.1097/00005650-199303000-00006.
38. Nijs J, Lahousse A, Kapreli E, et al. Nociplastic pain criteria or recognition of Central sensitization? Pain phenotyping in the past, present and future. *J Clin Med*. 2021;10 (15). https://doi.org/10.3390/JCM10153203.
39. Kersten P, White PJ, Tennant A. Is the pain visual analogue scale linear and responsive to change? An exploration using rasch analysis. *PLoS One*. 2014;9(6): e99485. https://doi.org/10.1371/JOURNAL.PONE.0099485.
40. Dudeney J, Law EF, Meyyappan A, Palermo TM, Rabbitts JA. Evaluating the psychometric properties of the Widespread Pain Index and the Symptom Severity Scale in youth with painful conditions. *Canad J Pain*. 2019;3(1):137. https://doi.org/10.1080/24740527.2019.1620097.
41. Uddin Z, Macdermid JC. Quantitative sensory testing in chronic musculoskeletal pain. *Pain Med*. 2016;17(9):1694–1703. https://doi.org/10.1093/PM/PNV105.
42. Soriano-Maldonado A, Ruiz JR, IC Álvarez-Gallardo, Segura-Jiménez V, Santalla A, Munguía-Izquierdo D. Validity and reliability of rating perceived exertion in women with fibromyalgia: exertion-pain discrimination. *J Sports Sci*. 2015;33(14): 1515–1522. https://doi.org/10.1080/02640414.2014.994661.
43. Köklü K, Sarigül M, Özişler Z, Şirzai H, Özel S. Handgrip strength in fibromyalgia. *Arch Rheumatol*. 2015;31(2):158–161. https://doi.org/10.5606/ARCHRHEUMATOL.2016.5736.
44. Collado-Mateo D, Adsuar JC, Dominguez-Muñoz FJ, Olivares PR, Gusi N. Impact of fibromyalgia in the sit-to-stand-to-sit performance compared with healthy controls. *PM&R*. 2017;9(6):588–595. https://doi.org/10.1016/J.PMRJ.2016.10.006.
45. dos Santos MR, Moro CMC, Vosgerau DSR. Protocol for physical assessment in patients with fibromyalgia syndrome. *Revista Brasileira de Reumatologia (Engl Edit)*. 2014;54(2):117–123. https://doi.org/10.1016/J.RBRE.2014.03.006.
46. Cardoso J, Apagueno B, Lysne P, et al. Pain and the montreal cognitive assessment (MoCA) in aging. *Pain Med*. 2021;22(8):1776–1783. https://doi.org/10.1093/PM/PNAB003.
47. Sullivan MJL, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. *Psychol Assess*. 1995;7(4):524–532. https://doi.org/10.1037/1040-3590.7.4.524.
48. Schwarzer R., Jerusalem M. General self-efficacy scale. Published online 1995. doi: https://doi.org/10.1037/t00393-000.
49. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol*. 1983;51(3):390–395. https://doi.org/10.1037//0022-006X.51.3.390.
50. Sydeman S. State-trait anxiety inventory. *Encyclop Personal Individ Differ*. 2018:1–3. https://doi.org/10.1007/978-3-319-28099-8_950-1. Published online.
51. Harris CA, D'Eon JL. Psychometric properties of the beck depression inventory–second edition (BDI-II) in individuals with chronic pain. *Pain*. 2008;137 (3):609–622. https://doi.org/10.1016/J.PAIN.2007.10.022.
52. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52(2):157–168. https://doi.org/10.1016/0304-3959(93)90127-B.
53. Dupuis F, Cherif A, Batcho C, Massé-Alarie H, Roy JS. The Tampa scale of kinesiophobia: a systematic review of its psychometric properties in people with musculoskeletal pain. *Clinical Journal of Pain*. 2023;39(5):236–247. https://doi.org/10.1097/AJP.0000000000001104.
54. Watson D, Friend R. Measurement of social-evaluative anxiety. *J Consult Clin Psychol*. 1969;33(4):448–457. https://doi.org/10.1037/H0027806.
55. Walton DM, Elliott JM. A new clinical model for facilitating the development of pattern recognition skills in clinical pain assessment. *Musculoskelet Sci Pract*. 2018; 36:17–24. https://doi.org/10.1016/J.MSKSP.2018.03.006.
56. Declaration of alma-ata, international conference on primary health care. In:; 1978.
57. Bazterrica IA, MÁG Martín, Cuadrado FM. Abordaje no farmacológico del dolor. *FMC*. 2020;27(3):145–153. https://doi.org/10.1016/J.FMC.2019.09.009.
58. Hernandez-Lucas P, Leirós-Rodríguez R, Lopez-Barreiro J, García-Soidán JL. Is the combination of exercise therapy and health education more effective than usual medical care in the prevention of non-specific back pain? A systematic review with meta-analysis. *Ann Med*. 2022;54(1):3107–3116. https://doi.org/10.1080/07853890.2022.2140453.
59. Siddall B, Ram A, Jones MD, Booth J, Perriman D, Summers SJ. Short-term impact of combining pain neuroscience education with exercise for chronic musculoskeletal pain: a systematic review and meta-analysis. *Pain*. 2022;163(1):E20–E30. https://doi.org/10.1097/J.PAIN.0000000000002308.
60. Roose E, Nijs J, Moseley GL. Striving for better outcomes of treating chronic pain: integrating behavioural change strategies before, during, and after modern pain science education. *Braz J Phys Ther*. 2023;27(6). https://doi.org/10.1016/J.BJPT.2023.100578.
61. Lorimer Moseley G, Leake HB, Beetsma AJ, et al. Teaching patients about pain: the emergence of pain science education, its learning frameworks and delivery strategies. *J Pain*. 2024;25(5). https://doi.org/10.1016/J.JPAIN.2023.11.008.
62. Cuenca-Martínez F, Suso-Martí L, Calatayud J, et al. Pain neuroscience education in patients with chronic musculoskeletal pain: an umbrella review. *Front Neurosci*. 2023;17, 1272068. https://doi.org/10.3389/FNINS.2023.1272068/BIBTEX.
63. Galán-Martín MA, Montero-Cuadrado F, Lluch-Girbes E, Coca-López MC, Mayo-Iscar A, Cuesta-Vargas A. Pain neuroscience education and physical exercise for patients with chronic spinal pain in primary healthcare: a randomised trial protocol. *BMC Musculoskelet Disord*. 2019;20(1). https://doi.org/10.1186/S12891-019-2889-1.
64. King R, Robinson V, Ryan CG, Martin DJ. An exploration of the extent and nature of reconceptualisation of pain following pain neurophysiology education: a qualitative study of experiences of people with chronic musculoskeletal pain. *Patient Educ Couns*. 2016;99(8):1389–1393. https://doi.org/10.1016/J.PEC.2016.03.008.
65. Albuquerque MLL, Monteiro D, Marinho DA, Vilarino GT, Andrade A, Neiva HP. Effects of different protocols of physical exercise on fibromyalgia syndrome treatment: systematic review and meta-analysis of randomized controlled trials. *Rheumatol Int*. 2022;42(11):1893–1908. https://doi.org/10.1007/S00296-022-05140-1/FIGURES/5.
66. Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane reviews. *Cochrane Datab System Rev*. 2017;2017(4). https://doi.org/10.1002/14651858.CD011279.PUB3/MEDIA/CDSR/CD011279/IMAGE_T/TCD011279-AFIG-FIG01.PNG.
67. Rojas-Galleguillos F, Clark-Hormazábal C, Méndez-Fuentes E, et al. Exercise-induced hypoalgesia in chronic neck pain: a narrative review. *Sports Med Health Sci*. 2024;6 (1):37–47. https://doi.org/10.1016/J.SMHS.2023.09.011.
68. De Zoete RMJ, Chen K, Sterling M. Original research: central neurobiological effects of physical exercise in individuals with chronic musculoskeletal pain: a systematic review. *BMJ Open*. 2020;10(7). https://doi.org/10.1136/BMJOPEN-2019-036151.
69. *ACSM's health-related physical fitness assessment*. Vol 1. 5°.; 2017.
70. Rice D, Nijs J, Kosek E, et al. Exercise-induced hypoalgesia in pain-free and chronic pain populations: state of the art and future directions. *J Pain*. 2019;20(11): 1249–1266. https://doi.org/10.1016/J.JPAIN.2019.03.005.
71. Smith Hendrick P, Smith TO, et al. Should exercises be painful in the management of chronic musculoskeletal pain? A systematic review and meta-analysis. *Br J Sports Med*. 2017;51(23):1679–1687. https://doi.org/10.1136/BJSPORTS-2016-097383.
72. Galán-Martín MA, Montero-Cuadrado F, Lluch-Girbes E, Coca-López MC, Mayo-Iscar A, Cuesta-Vargas A. Pain neuroscience education and physical exercise for patients with chronic spinal pain in primary healthcare: a randomised trial protocol. *BMC Musculoskelet Disord*. 2019;20(1). https://doi.org/10.1186/s12891-019-2889-1.
73. Turk DC, Rudy TE. Neglected topics in the treatment of chronic pain patients–relapse, noncompliance, and adherence enhancement. *Pain*. 1991;44(1): 5–28. https://doi.org/10.1016/0304-3959(91)90142-K.
74. Becker WC, Dorflinger L, Edmond SN, Islam L, Heapy AA, Fraenkel L. Barriers and facilitators to use of non-pharmacological treatments in chronic pain. *BMC Fam Pract*. 2017;18(1):1–8. https://doi.org/10.1186/S12875-017-0608-2/TABLES/2.
75. Hooten WM, Backonja M, Williams KA, et al. Integrated pain care models and the importance of aligning stakeholder values. *Pain Rep*. 2024;9(3):E1160. https://doi.org/10.1097/PR9.0000000000001160.
76. Zhang M, Zhu L, Lin SY, et al. Using artificial intelligence to improve pain assessment and pain management: a scoping review. *J Am Med Inform Assoc*. 2023; 30(3):570. https://doi.org/10.1093/JAMIA/OCAC231.
77. Global conference on primary health care. Declaration of astana. In:; 2018.
78. Galan-Martin MA, Montero-Cuadrado F, Lluch-Girbes E, Coca-López MC, Mayo-Iscar A, Cuesta-Vargas A. Pain neuroscience education and physical therapeutic exercise for patients with chronic spinal Pain in Spanish physiotherapy primary care: a pragmatic randomized controlled trial. *J Clin Med*. 2020;9(4). https://doi.org/10.3390/JCM9041201.
79. Sharma S, Abbott JH, Jensen MP. Why clinicians should consider the role of culture in chronic pain. *Braz J Phys Ther*. 2018;22(5):345–346. https://doi.org/10.1016/J.BJPT.2018.07.002.