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BEYOND THE BASICS: AN ANALYSIS OF CLINICAL PRACTICE GUIDELINES IN PHYSIOTHERAPY FOR LOW BACK ACHE

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ABSTRACT

BACKGROUND: As one of among the most prominent musculoskeletal ailments around the world, Lowback ache (LBA) impacts individuals from every decade and causes a substantial financial, social, and personal load. Clinical Practice Guidelines (CPGs) offer physiotherapists evidence-based suggestions for the efficient diagnosis and treatment of LBA.

OBJECTIVE: The purpose of this study is to improve clinical decision-making and advance standardized, patient-centered care by presenting evidence-based physiotherapy treatments for the alleviation of short-term, long-term, and persistent low-back pain.

METHOD: A comprehensive analysis of the most recent, high-quality evidence was carried out using pubmed, google scholar, cochrane which includes meta-analyses, randomized controlled trials, and established guidelines.The recommendations were rated using globally accepted frameworks according to the quality and strength of the evidence.

RESULTS: Key suggestions include minimizing the use of radiological and pharmaceutical therapies until there are red flags; employing exercise therapy, manual therapy, and cognitive-behavioral techniques for chronic LBA; and using patient education, reassurance, and guidance to stay active for acute LBA. Individualized care strategy, goal-setting, and encouraging self-management are prioritized.

CONCLUSION: Physiotherapists can maximize the management of patients with low back pain by using the CPG's straightforward, evidence-based strategies. It is anticipated that putting these recommendations into practice will enhance clinical results, lessen practice variability, and encourage effective resource utilization in the physiotherapy treatment of LBA. Adherence to guidelines improves diagnostic accuracy and optimises tretment strategies for better clinical outcomes. continued integration of CPG's into physiotherapy can lead to better healthcare efficiency.

KEYWORDS: Lowback ache, clinical practice guideline, evidence-based practice , musculoskeletal rehabilitation, pain management

INTRODUCTION

Low back ache (LBA) more commonly known as low back pain (LBA) presents a considerable global burden,exerting a substantial effect on people across all age groups. However, it is particularly tend to occur in individuals aged 30-60 years, a

demographic that often includes working individuals, thereby amplifying its socioeconomic impact. the burden of low back ache is not evenly distributed; its prevalence and severity vary across demographic lines, including race, ethnicity, and socioeconomic status (1)

One of the most prevalent biopsychosocial issues in both high- and low-income nations is LBA.For persons of all ages , it is the main reason why many years spent disabled. (2) Although it varies by nation, culture, and race, the reported prevalence of LBA in working-age adults aged 18–64 years is between 4.2% and 19.6%, while it can reach 36.1% in older individuals aged ≥65 years.(3)

Clinical symptoms such muscular tension, stiffness, and even sciatica are commonly found when combined with the painful regions of LBA, which are usually found above the inferior gluteal folds and below the costal edge [4]. Chronic LBA is defined as back pain that lasts more than 12 weeks and significantly impairs a person's QOL (Quality oif life) and ability to perform daily and occupational tasks [5].Although the causes of LBA are several of LBA, which can result from nearly any systemic illness, the bulk of these causes can be broadly categorized under the following topics.

Nearly 90% of LBA cases have spondylogenic origins, which are separated further into neoplastic (benign, malignant, metastatic), traumatic (musculoskeletal), infectious (TB), and degenerative (disc, vertebral alterations) causes. Osteoporosis, osteopenia, and rheumatogenic (Ankylosing spondylosis, spondyloarthropathy, etc.) causes are examples of systemic aetiology. Vascular (aneurysm or peripheral vascular disease origin), neurogenic (anywhere along the central nervous system, especially the spine), viscerogenic (disorders of the abdominal sac, pelvis, retroperitoneal structures, etc.), and psychogenic back pain are other relatively uncommon causes of LBA [3).

The goal of clinical recommendations is to eliminate ineffective interventions, minimize unnecessary disparities, and advance trustworthy best practices. Because of the dearth of information about low back pain, clinicians are unable to make well-informed decisions regarding how to best promote the use and uptake of evidence-based therapy.

Self-exercises, information gained from reading brochures or taking online courses, and the deployment of untested Apps for devices that target the low back ache are examples of management strategies which focuses on self-management. Many systems have been proposed for many years to encourages self-management for the treatment of chronic LBA, however due to insufficient evidence this suggestion is still under scrutiny.. For non-specific LBA, most guidelines recommend physical activity. Along with classifications and treatment approaches, the clinical recommendations for improved outcomes of LBA are the main emphasis of this study.

FRAMEWORKS FOR CLASSIFICATION

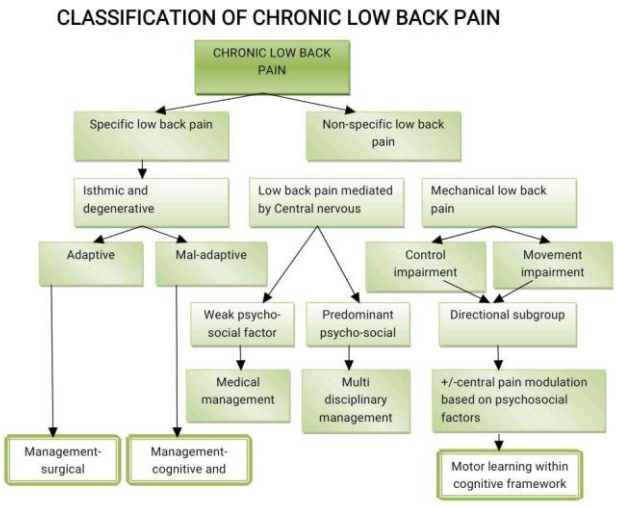
For many years, various frameworks for LBA have been proposed. The following are few of the classifications:

LBA - CLASSIFICATION SYSTEM'S				
1.PATHOLOGICAL	**2.Mckenzie**	**3. TREATMENT BASED**	**4. QUEBEC TASK FORCE**	**5. Start BACK SCREENING**
STRUCTURES INVOLVED	Postural, Dysfunction, Derangement	Acute, Chronic, Radiating, Non - Radiating Pain	Based On Symptoms	Based On Risk Screening

TABLE 1: DIFFERENT CLASSIFICATION SYSTEMS FOR LBA

The goal of Sullivan O.H.'s comprehensive classification system (2014)(6) for CLBP, adapted from Fersum (2007), was used to guide more precise diagnosis and focused therapies by differentiating between specific and nonspecific kinds of ALBP. There are two types of LBA in this system: isthmic, which usually involves a defect or fracture in the pars interarticularis (as in spondylolysis or spondylolisthesis), and degenerative, which is linked to age-related changes in the facet joints, intervertebral discs, or spinal structures. Specific LBA is defined as cases where a clear pathological cause can be identified.

The two main subtypes of nonspecific LBA, on the other hand, are mechanical LBA, which results from functional or biomechanical alterations of the spine or surrounding musculature without detectable pathology on imaging, and centrally mediated low back pain, which involves changes in central pain processing mechanisms frequently influenced by psychological or neurological factors. This classification emphasizes how crucial it is to incorporate biopsychosocial and biological viewpoints when diagnosing and treating chronic LBA.



FLOW CHART 1 : CLASSIFICATION OF CHRONIC LBA BY SULLIVAN 'O.

VARIOUS INTERVENTIONS

MANUAL THERAPY – The most often used manual treatments for treating LBA included Maitland, Kaltenburn, Mulligan, and McKenzie spinal mobilizations and manipulations. Research indicates a decrease in pain, an improvement in hip and spinal range of motion, and a decrease in impairment following manual treatment. Ali et al. (2019) (7)contrasted Mulligan and Maitland mobilization. Patients with persistent LBA did not significantly allieviated their symptoms after receiving sustained natural apophyseal glide manipulation. According to Bicalho E et al. (2010), high velocity spinal manipulation techniques alter the EMG results during flexion and extension movements in patients with persistent LBA.(8)

THERAPEUTIC EXERCISES - To treat LBA, a multimodal exercise interventions have been used. Exercises for stabilization, stretching, trunk coordination, strengthening, activation of the trunk muscles, motor control, pilates, aerobic, aquatic, bridging, flexion, posture correction, and other exercises are examples. Research has summarized how methods like deep friction massage, kinesio taping, neural mobilization, and dry needling affect people with LBA.

ELECTROTHERAPY MODALITIES - Physical agents like LASER, US, SWD, Hydrocollater pack, IFT, TENS, and others are included. Research has demonstrated that cryotherapy is an effective treatment for LBA. In their published study, Marta Barłowska-Trybulec et al. discovered that whole body cryotherapy in conjunction with therapeutic activities helped patients with OA reduce their low back pain. Future research study with standardized protocols are necessary to examine the long-term impact of using the before mentioned modalities. (9)

However, when it comes to treating spinal disorders, manual and mechanical traction continue to be the most commonly utilized approach by therapists. Although mechanical traction has been linked to patients in a number of postures, including supine, prone, and side lying, the effectiveness of these variations has not yet been established.

PATIENT EDUCATION & COUNSELING- Promoting knowledge of spine's structural strength, coping mechanisms to lessen pain anxiety, and returning to work are its primary goals.(10)

TREATMENT GUIDELINES – LINKING EVIDENCE TO RECOMMENDATIONS

Since LBP is highly widespread condition, healthcare providers treating LBA must understand the importance of current evidences which will assist them in effective treatment[4]. A growing number of clinical practice guidelines (CPGs) have been developed by professional bodies to standardize the treatment of LBP, offering suggestions for diagnosis and treatment [11)

There have been publications on CPGs throughout the past few decades, some of which may contain contradictory advice. The NICE guidelines recommend the use of individualized programs that employ psychosocial and manual therapy techniques, while the APTA guidelines emphasize the avoidance of any passive modalities. The distinction between acute, sub-acute, and chronic LBA care needs more attention, according to experts, even if earlier studies have examined therapeutic guidelines for addressing LBP generally [10,12]. Given the dynamic nature of evidence, it is critical to examine the degree of agreement across recently revised or created CPGs regarding treatment recommendations for LBP throughout a range of time periods.(11)

NICE GUIDELINE'S

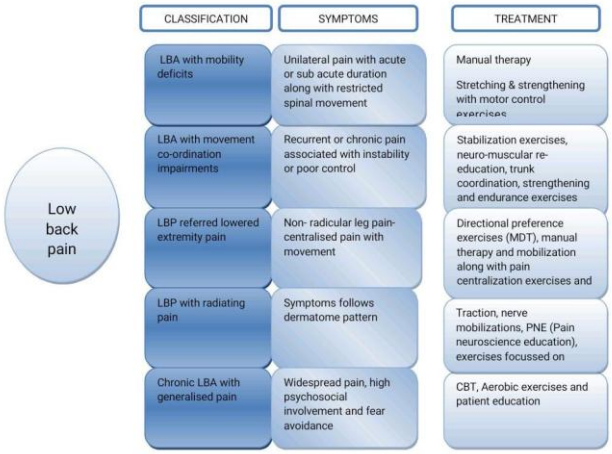
To determine the factors that impede healing, this method concentrated on assessment utilizing a biopsychosocial model. Additionally, it implies that unless and until a red flag is suspected,Imaging

methods are not always recommended. According to NICE recommendations, the primary method of assessment utilizing the sTarT back tool is risk stratification.

These guidelines also recommend non-pharmacological care, including manual therapy , cognitive behavioral therapy (C.B.T), structured or customized exercise programs, patient education and reassurance, and programs that integrate physical and psychological therapies.(CPPs)

APTA GUIDELINES

The classification is based on treatment based classification system[13]



Flow chart 2: classification of LBP given APTA

CPG guidelines – CPG are the recommendations which are created to optimize patient care. These were formed by scientific research of evidence based treatments there by improving the concitency of treatment. These guidelines suggest A,B C, D, E & F RECOMMENDATIONS .(14)

	GRADES OF RECOMMENDATION	STRENGTH OF EVIDENCE
A	**Strong Evidence**	The majority of level I and/or level II research has endorsed the recommendation . There must be a minimum of one level I study for this.
B	**Moderate Evidence**	A single high-quality randomized controlled trial or the majority of level II studies support the recommendation .
C	**Weak Evidence**	One level II study or the majority of level III and IV studies, which include content experts' expressions of consensus, support the recommendations.
D	**Conflicting Evidence**	Research on this subject of higher caliber has yielded mixed findings. The advice is based on these conflicting studies.
E	**Theoretical/Foundational Evidence**	Preponderance of data from studies employing cadavers or animals, conceptual models or principles, basic sciences, or

		bench research supports it.
F	**Expert Opinion**	Clinical expertise of the guideline's development team led to the best practices.

TABLE 2- GENERAL RECOMMENDATION OF CPG

TBCS	LEVEL OG EVIDENCE	INTERVENTION
ACUTE LBP EXERCISE	**C**	For acute LBA, therapists can start exercise training interventions like trunk muscle activation.
LEG PAIN AND ACUTE LBP EXERCISE	**B**	For acute LBA who have leg pain, physical therapists may employ exercise training interventions like trunk muscular activation, endurance, and strengthening.
CHRONIC LBP EXERCISE	**A**	Physical therapists should use trunk muscle strengthening and endurance, multimodal exercise interventions with specific trunk muscle activation exercise, aerobic exercise, aquatic exercise, and general exercise.
	B	PT's may prescribe trunk mobility exercises or movement control exercises.
LEG PAIN AND CHRONIC LBP EXERCISE	**B**	movement control along with targeted trunk muscle activation.
EXERCISE FOR CHRONIC LBP ASSOCIATED WITH IMPAIRMENT OF MOVEMENT CONTROL	**A**	Trunk muscle activation and movement control exercises.
EXERCISE FOR GERIATRIC WITH CHRONIC LBA	**A**	General exercise training is a useful tool for physical therapists to help older persons with chronic LBA feel less pain and disabled.

POSTOPERATIVE LBP EXERCISE	**C**	General exercise training, according to physical therapists.
ACUTE LBP MANUAL AND OTHER DIRECTED THERAPIES	**A**	Thrust or non-thrust joint mobilization to lessen pain and impairment.
	B	soft tissue mobilization or massage to provide temporary pain relief.
CHRONIC LBP- MANUAL AND OTHER DIRECTED THERAPIES	**A**	For chronic LBA, physical therapists should employ\ thrust or non-thrust joint mobilization to lessen pain and impairment.
	B	For chronic LBA who have leg discomfort, physical therapists may employ thrust or non-thrust joint mobilization to lessen pain and disability.
	B	tissue mobilization with other therapies to temporarily lessen pain and disability.
	C	with chronic LBA, physical therapists may think about using dry needling as adjunct to other therapies to temporarily lessen pain and dysfunction.
	B	For short-term allevieting pain and disability in individuals with chronic LBA who have leg discomfort, physical therapists may combine neural mobilization with other treatments.
	D	For chronic LBA who experience leg pain, physical therapists should avoid using mechanical traction because it is ineffective when combined with other treatments.
ACUTE LBP EDUCATION	**B**	Instead of only giving patients access to educational

		resources, physical therapists can employ active education techniques. One-on-one instruction on the biopsychosocial factors that contribute to pain and self-management practices like staying active, pacing, and back protection are examples of active education programs. As part of the education effort, physical therapists may also include counseling regarding the favorable natural history of acute LBP.
CHRONIC LBP EDUCATION	**B**	For patients with persistent LBP, physical therapists may employ normal teaching strategies, but not as a treatment in and of themselves. Exercise and keeping active guidance are examples of standard education tactics.
	A	Patients with chronic LBP should get pain neuroscience education from physical therapists in addition to conventional physical therapy interventions like manual therapy or exercise.
	A	PT's should treat patients with chronic LBP with active therapies (such as yoga, stretching, Pilates, and strength training) rather than relying solely on educational initiatives.
POST-OP LBA EDUCATION	**B**	PT's may employ general education after lumbar spine surgery, which includes post-operative precautions, exercise, and returning to physical activity.

TABLE 3 : TREATMENT BASED CLASSIFICATION GUIDELINES

Based on a variety of scenarios, the Clinical Practice Guidelines for LBA in 2021 provided a comprehensive insight into suggested interventions. Physical therapists are advised to use training programs which includes exercise interventions for acute lower back pain emphasizing activation of the trunk muscles. Exercise intervention involving trunk muscle endurance and strengthening as well as targeted muscle activation when acute lower back pain (ABP) is accompanied by leg pain to reduce pain and impairment.

In CLBP, a multimodal strategy is recommended. To effectively manage CLBP, therapists are recommended to use exercises that include trunk muscle strengthening, endurance, multimodal interventions, targeted trunk muscle activation, aerobic exercises, aquatic exercises, and general exercises. Particular exercises that target the trunk muscles and movement control are also thought to be beneficial for LBA associated with leg pain or impaired movement control.

General exercise training is deemed essential for reducing disability and pain in older adults with chronic LBA. Following lumbar spine surgery, general exercise training may also be beneficial for postoperative LBA.

Joint mobilization—thrust or non-thrust—is recommended for both acute- chronic LBA in terms of manual and directed therapies to reduce pain and disability. In cases of acute LBA, massage or soft tissue mobilization may provide momentary relief. In the short term, massage therapy and soft tissue mobilization might also be helpful in managing chronic LBA. Nevertheless, because mechanical traction does not significantly improve leg pain associated with chronic LBA when combined with other interventions, care should be taken when utilizing it.

In terms of instructional tactics, active education approaches that prioritize one-on-one instruction on biopsychosocial factors that contribute to pain and self-management strategies are advised for acute LBP. Standard education techniques, such as encouraging physical activity and offering advice on exercises, are recommended for chronic LBA. For chronic cases of LBA, pain neuroscience education given in conjunction with other physical therapy interventions is recommended. Active treatments like yoga, stretching, Pilates, and strength training are prioritized over stand-alone educational interventions.

After lumbar spine surgery—more especially, discectomy or decompression surgery—general education about exercise, resuming physical activity, and post-surgical precautions is advised. However, due to a less evidences, no particular recommendation is made for patients undergoing other surgical procedures.(14)

DISCUSSION

LBP is linked to reduced spinal mobility, widespread discomfort, or pain that radiates into the lower extremities regardless of the presence of symptoms. Low back pain can be classified as acute, subacute, temporary, recurring, or chronic based on its clinical course.(10). Constant low back discomfort can be caused by a variety of conditions, such as joint instability, delayed trunk muscle activation, muscle weakness, and inadequate trunk proprioception.

CLBP can affect cognitive function, resulting in decreased problem-solving skills, slowed information processing, and memory impairment, all of which can impact a patient's psychological state overall, according to Michael G.'s (2023) research. (15)

The biopsychosocial model of pain should be widely applied in patient care, assessment, management, and research education, according to the European Pain Federation (EFIC). Genetics, tissue damage, illness or injury, physical health issues, immunological function, drug side effects, etc. are all included in the biological component. In contrast to the social component, which refers to social expectations, social support, work factors, financial support, social deprivation, and other factors, the psychological component of the biopsychosocial model includes the impact of pain on emotional and cognitive functions, such as depression, anxiety, mood disorders, fear, and the consequences of pain, among other things. Therefore, incorporating the biopsychosocial model ought to be seen as a crucial element of efficient pain management. Peter B. O. (16)

In their study, Sullivan et al. (2018) examined the efficacy of cognitive function therapy in treating

individuals with incapacitating LBA.(6) A number of studies have been conducted on the use of different treatment modalities for the treatment of low back pain. These include spinal traction, manual therapy techniques, therapeutic modalities, exercises like trunk muscle activation, stabilization, strengthening, and stretching exercises, as well as patient education and counseling. In their systematic assessment of PNF's efficacy in treating persistent low back pain, Pinaco G et al. (2020) discovered that these methods only temporarily reduce pain. (5)

Exercises that strengthen paraspinal muscles are more superior than those that stretch them, according to a different study by Bharat K et al. (2024) (4). According to Norlund A. et al. (2009), treating LBA with multimodal management is beneficial.(17)The lack of differentiated diagnosis based on directional preference in conventional physiotherapy leads to misconceptions regarding the necessity of back stabilization, flexion, and extension exercises. In physical therapy, there are a number of fallacies and a dearth of evidence-based treatment approaches for improving low back pain outcomes. Therefore, in order to effectively assess and treat low back pain, professional practice guidelines must be incorporated.

Guidelines can dispel myths such as the following: bad posture is the primary cause of low back pain; bed rest reduces LBA; imaging diagnostic procedures are necessary; and exercises should be avoided when experiencing LBA. Although many approaches have been employed to evaluate and treat people with LBA, the treatment-based classification system is the most often utilized. While the APTA guidelines recommend that modalities be used as an adjunct, not as a sole treatment, for LBA, the NICE guidelines concentrated on assessment by risk stratification using the STarT tool.

Clinical practice guidelines are suggestions based on scientific study and supported by evidence.Research indicates that the best evidence-based clinical decision-making for diagnosis and prognosis is aided by the efficient use of CPG, which raises treatment quality while lowering costs. The guidelines provide us with evidence-based suggestions; if the evidence is strong, it receives an A; if it is weak, it receives an F. With the aid of these recommendations, we can organize the protocol.

Although the risk stratification tool STarT Tool is used in the U.K , clinical practice guidelines utilized in the U.S and the U.K were nearly identical in their recommendations for patient education, stretching, strengthening, and endurance exercises. A change to CPG was made in 2021, and patient education and exercise are highly recommended. The study conducted by S. George et al. (2021) addressed an overview of evidence-based recommendations for acute, chronic, and post-operative low back pain levels.

Although there are many guidelines that vary depending on the length of pain and the type of treatment employed, suggestions based on treatment classification and available evidence were necessary. By dispelling myths and adhering to patient-tailored methods, the suggestions in this study will help PT’s treat LBA with the best evidence-based strategy.

CONCLUSION

There has been a slight change in direction toward a treatment strategy that emphasizes following clinical practice guidelines. Exercises, manual therapy, and patient education are all strongly supported by CPG. One possibility is that the initial line of treatment for LBA should be multimodal, with an emphasis on biopsychological assessment and management. Passive treatment techniques and routine imaging for diagnosis must be discouraged.Therefore, the best results are obtained by using an interdisciplinary, evidence-based approach.

REFERENCES

1. Tikhile P, Patil DS, Patil Sr DS. Unveiling the efficacy of physiotherapy strategies in alleviating low back pain: a comprehensive review of interventions and outcomes. Cureus. 2024 Mar 12;16(3).
2. Nicol V, Verdaguer C, Daste C, Bisseriex H, Lapeyre É, Lefèvre-Colau MM, Rannou F, Rören A, Facione J, Nguyen C. Chronic low back pain: a narrative review of recent international guidelines for diagnosis and conservative treatment. Journal of clinical medicine. 2023 Feb 20;12(4):1685.
3. Zheng DK, Kawchuk GN, Bussières AE, Al Zoubi FM, Hartvigsen J, Fu SN, de Luca K, Weiner DK, Karppinen J, Samartzis D, Ferreira ML. Trends of low Back pain

research in older and working-age adults from 1993 to 2023: a bibliometric analysis. Journal of pain research. 2023 Dec 31:3325-41.
4. Jani BK, Swaminathan S, Ashwath KG, Tripathi SP. Clinical Archives of Bone and Joint Diseases.
5. Gao P, Tang F, Liu W, Mo Y. The effects of proprioceptive neuromuscular facilitation in treating chronic low back pain: A systematic review and meta-analysis. Journal of back and musculoskeletal rehabilitation. 2022 Jan;35(1):21-33.
6. O'Sullivan PB, Caneiro JP, O'Keeffe M, Smith A, Dankaerts W, Fersum K, O'Sullivan K. Cognitive functional therapy: an integrated behavioral approach for the targeted management of disabling low back pain. Physical therapy. 2018 May;98(5):408-23.
7. Ali, M. N., Sethi, K. & Noohu, M. M. Comparison of two mobilization techniques in management of chronic non-specific low back pain. J. Bodywork Move. Therap. 23(4), 918–923 (2019).
8. Bicalho, E., Setti, J. A., Macagnan, J., Cano, J. L. & Manffra, E. F. Immediate effects of a high-velocity spine manipulation in paraspinal muscles activity of nonspecific chronic low-back pain subjects. Man. Ther. 15(5), 469–475. https://doi.org/10.1016/j.
9. math.2010.03.012 (2010).
10. Barłowska-Trybulec M, Zawojska K, Szklarczyk J, Góralska M. Effect of whole body cryotherapy on low back pain and release of endorphins and stress hormones in patients with lumbar spine osteoarthritis. Reumatologia/Rheumatology. 2022 Aug 31;60(4):247-51.
11. Delitto A, George SZ, Van Dillen L, Whitman JM, Sowa G, Shekelle P, Denninger TR, Godges JJ, Beneciuk JM, Bishop MD, Kramer CD. Low back pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. Journal of orthopaedic & sports physical therapy. 2012 Apr;42(4):A1-57.
12. Zhou T, Salman D, McGregor AH. Recent clinical practice guidelines for the management of low back pain: a global comparison. BMC musculoskeletal disorders. 2024 May 1;25(1):344.
13. Baroncini A, Maffulli N, Schäfer L, Manocchio N, Bossa M, Foti C, Klimuch A, Migliorini F. Physiotherapeutic and non-conventional approaches in patients with chronic low-back pain: A level I Bayesian network meta-analysis. Scientific Reports. 2024 May 21;14(1):11546.
14. Ladeira CE, Cheng MS, da Silva RA. Clinical specialization and adherence to evidence-based practice guidelines for low back pain management: a survey of US physical therapists. journal of orthopaedic & sports physical therapy. 2017 May;47(5):347-58.
15. George SZ, Fritz JM, Silfies SP, Schneider MJ, Beneciuk JM, Lentz TA, Gilliam JR, Hendren S, Norman KS, Beattie PF, Bishop MD. Interventions for the management of acute and chronic low back pain: revision 2021: clinical practice guidelines linked to the international classification of functioning, disability and health from the academy of orthopaedic physical therapy of the American Physical Therapy Association. Journal of Orthopaedic & Sports Physical Therapy. 2021 Nov;51(11):CPG1-60.
16. Abd-Elsayed A, Gyorfi M. Chronic low back pain and cognitive function. Pain Pract. 2023 Apr;23(4):463-464. doi: 10.1111/papr.13202. Epub 2023 Jan 7. PMID: 36573394.
17. http://europeanpainfederation.eu.Bio-psychosocial model of pain
18. Norlund A, Ropponen A, Alexanderson K. Multidisciplinary interventions: review of studies of return to work after rehabilitation for low back pain. J Rehabil Med 2009;41:115-21