ORIGINAL ARTICLE

Centers of Excellence in Osteoarthritis Management in Latin America: A Proposal Based on Literature Review

Centros de excelencia en el manejo de la Osteoartritis en América Latina: una propuesta basada en una revisión de la literatura

Centros de excelência no manejo da osteoartrite na América Latina: uma proposta baseada em uma revisão da literatura

Authors

Pedro Santos-Moreno.
Calle 48 #13–86.
Biomab IPS, Bogotá, Colombia.
pedrosantosmoreno@hotmail.com
ORCID: 000-0001-7802-0317

Oscar Rillo.
M.D. Rheumatologist.
Jefe del Servicio de Reumatología;
Hospital. I. Pirovano, Buenos Aires, Argentina
rillo.oscar@gmail.com

Carlos Pineda.
M.D. Rheumatologist.
Departamento de Reumatología. Instituto Nacional de
Rehabilitación Luis Guill
carpineda@yahoo.com
ORCID: 0000-0003-0544-7461

Rolando Espinosa–Morales.
M.D. Rheumatologist.
Jefe del Departamento de Reumatología. Instituto
Nacional de Rehabilitación L
rolespi@yahoo.com
ORCID: 0000-0002-3923-6956

José Ángel Salas Siado.
M.D. Rheumatologist.
Profesor titular
Universidad libre y Metropolitana
pepesalas50@hotmail.com

Roberto Muñoz Louis.
M.D. Rheumatologist.
Hospital Docente Padre Billini, Reumatología e
Investigación Clínica – RIC
rmunozlouis@gmail.com
ORCID: 0000-0002-8392-0341

Gabriel–Santiago Rodríguez–Vargas.
M.D. Biomab IPS, Bogotá, Colombia.
santiago.rv18@gmail.com
ORCID: 0000-0003-1613-7100

Rodolfo Arape Toyo.
M.D. Rheumatologist.
Centro Medico La Isabelica. Valencia, Venezuela
fitrudolf72@gmail.com
ORCID: 0000-0001-8897-5897

Ingrid Möller.
M.D. Rheumatologist.
Instituto Poal de Reumatologia, Universidad de
Barcelona
ingrid.moller@ipoal.com
ORCID: 0000-0002-9225-2568

Vianna Khoury.
M.D. Rheumatologist.
Jefa de Servicio HRUPEU y de la Clínica Universitaria
Unión Médica. Santiago, R
viannakhoury@gmail.com
ORCID: 0000-0002-4438-3651

Maritza Quintero.
M.D. Rheumatologist.
Clínica Exolife. Barcelona, España.
maritzaquintero@gmail.com
ORCID: 0000-0002-8459-2909

Araceli Chico Capote.
M.D. Rheumatologist.
Jefe Servicio de Reumatologia. Hospital Hermanos
Ameijeiras. La Habana, Cuba
aracelica@infomed.sld.cu
ORCID: 0000-0002-7826-5848

Oswaldo Castañeda.
M.D. Rheumatologist.
Servicio de reumatología. Clinica Angloamericana y
Universidad Peruana Cayetano Heredia, Lima, Perú.
ocastanedaj@yahoo.com
ORCID: 0000-0002-7417-3233

Blanca Herrera Velasco.
M.D. Rheumatologist.
Servicio de Reumatologia, Universidad de San
Francisco Xavier de Chuquisaca, Sucre, Bolivia
blasis2001@yahoo.es
ORCID: 0000-0002-6365-2627

Miguel Albanese.
M.D. Rheumatologist.
Servicio de Reumatologia. Instituto Nacional de
Reumatología. Montevideo, Uruguay.
mao57@hotmail.com
ORCID: 0000-0003-4959-4738

ORIGINAL ARTICLE

Centers of Excellence in Osteoarthritis Management in Latin America: A Proposal Based on Literature Review

Summary

In English

Introduction:

Osteoarthritis (OA) is a prevalent condition with significant clinical and epidemiological consequences, requiring a multidisciplinary approach. One potential solution is the establishment of specialized, comprehensive healthcare centers to address OA effectively. A previous initiative focused on the development of Centers of Excellence (CoEs) for rheumatoid arthritis (RA), and endorsed by the Pan American League of Associations for Rheumatology (PANLAR), aimed to establish CoEs for select rheumatic conditions, providing a framework for their accreditation.

The aim of this study is to propose a framework for the establishment of CoE for OA (CoE-OA) management in Latin America. This proposal is based on a narrative review of the literature, and expert consensus to establish key components essential for the success of such centers.

Methods:

A narrative literature review was conducted using key terms such as "osteoarthritis," "quality," "efficiency" (MeSH), "center of excellence," and "comprehensive healthcare." These terms were combined with Boolean operators (AND, OR, NOT) and searched across multiple databases, including PubMed, Google Scholar, Lilacs, and SciELO. Eligible studies were reviewed, and a panel of fifteen rheumatologists from ten countries was convened to develop a consensus-based framework for CoE-OA. To adapt the framework to the unique challenges of Latin America, a Delphi-like process was employed to prioritize the key components for CoEs-OA.

Results:

The literature review and expert discussions resulted in a comprehensive framework outlining the key elements necessary for CoEs-OA. These centers represent a pioneering initiative in the region, aiming to improve OA management through a multidisciplinary, evidence-based, and expert-guided approach within a structured healthcare setting.

Conclusion:

The establishment of CoEs-OA represents the first such initiative in Latin America. By adopting a structured framework supported by literature review and expert recommendations, this initiative aims to enhance the quality and effectiveness of OA management.

Keywords:

Osteoarthritis, Efficiency, Quality, Comprehensive health care, Disease management.

Key messages:

- Establishing centers of excellence for osteoarthritis care in Latin America has the potential to significantly improve patient outcomes by focusing on early diagnosis, tailored treatment plans, and multidisciplinary care.
- A multidisciplinary approach for osteoarthritis management has shown to improve functional outcomes, enhance patient safety, and optimize pharmacoeconomic results, similar to what has been achieved in other chronic diseases.
- Expanding the model of centers of excellence to osteoarthritis could directly address the rising prevalence of this condition in Latin America, in the interest of a large and growing patient population.
- Effective OA management requires a team of specialists, including rheumatologists, physiatrists, physiotherapists, psychologists, and pain management experts, to address the complex needs of patients.

GLOBAL
RHEUMATOLOGY
BY PANLAR

Resumen
En Español

Introducción:

La osteoartritis (OA) es una condición prevalente con importantes consecuencias clínicas y epidemiológicas, que requiere un abordaje multidisciplinario. Una posible solución es el establecimiento de centros de atención médica integrales y especializados para abordar la OA de manera eficaz. Una iniciativa previa, centrada en el desarrollo de Centros de Excelencia (CoE) para la artritis reumatoide (AR), y avalada por la Liga Panamericana de Asociaciones de Reumatología (PANLAR), tuvo como objetivo establecer CoE para ciertas afecciones reumáticas, proporcionando un marco para su acreditación.

El objetivo de este estudio es proponer un marco para el establecimiento de CoE para el manejo de la OA (CoE-OA) en Latinoamérica. Esta propuesta se basa en una revisión narrativa de la literatura y en el consenso de expertos para establecer los componentes clave para el éxito de dichos centros.

Métodos:

Se realizó una revisión narrativa de la literatura utilizando términos clave como «osteoartritis», «calidad», «eficiencia» (MeSH), «centro de excelencia» y «atención médica integral». Estos términos se combinaron con operadores booleanos (AND, OR, NOT) y se buscaron en múltiples bases de datos, incluyendo PubMed, Google Scholar, Lilacs y SciELO. Se revisaron los estudios elegibles y se convocó a un panel de quince reumatólogos de diez países para desarrollar un marco consensuado para los CoE-OA. Para adaptar el marco a los desafíos específicos de América Latina, se empleó un proceso similar a Delphi para priorizar los componentes clave de los CoEs-OA.

Resultados:

La revisión bibliográfica y las discusiones con expertos dieron como resultado un marco integral que describe los elementos clave necesarios para los CoEs-OA. Estos centros representan una iniciativa pionera en la región, cuyo objetivo es mejorar el manejo de la OA mediante un enfoque multidisciplinario, basado en la evidencia y guiado por expertos, dentro de un entorno de atención médica estructurado.

Conclusión:

El establecimiento de los CoEs-OA representa la primera iniciativa de este tipo en América Latina. Mediante la adopción de un marco estructurado, respaldado por la revisión bibliográfica y las recomendaciones de expertos, esta iniciativa busca mejorar la calidad y la eficacia del manejo de la OA.

Palabras clave:

Osteoartritis, Eficiencia, Calidad, Atención integral de salud, Manejo de la enfermedad.

Mensajes Clave:

- Establecer centros de excelencia para la atención de la osteoartritis en América Latina tiene el potencial de mejorar significativamente los resultados en los pacientes, al centrarse en el diagnóstico temprano, planes de tratamiento personalizados y atención multidisciplinaria.
- Un enfoque multidisciplinario para el manejo de la osteoartritis ha demostrado mejorar los resultados funcionales, aumentar la seguridad del paciente y optimizar los resultados farmacoeconómicos, similar a lo logrado en otras enfermedades crónicas.
- Ampliar el modelo de centros de excelencia a la osteoartritis podría abordar directamente la creciente prevalencia de esta condición en América Latina, en beneficio de una población de pacientes grande y en expansión.
- Un manejo efectivo de la osteoartritis requiere un equipo de especialistas, incluidos reumatólogos, fisiatras, fisioterapeutas, psicólogos y expertos en manejo del dolor, para abordar las complejas necesidades de los pacientes.

Resumo
Em Português

Introdução:

A osteoartrite (OA) é uma condição prevalente com consequências clínicas e epidemiológicas significativas, exigindo uma abordagem multidisciplinar. Uma solução potencial é o estabelecimento de centros de saúde especializados e abrangentes para tratar a OA de forma eficaz. Uma iniciativa anterior focada no desenvolvimento de Centros de Excelência (CoEs) para artrite reumatoide (AR), e endossada pela Liga Pan-Americana de Associações de Reumatologia (PANLAR), teve como objetivo estabelecer CoEs para condições reumáticas selecionadas, fornecendo uma estrutura para seu credenciamento.

O objetivo deste estudo é propor uma estrutura para o estabelecimento de CoE para o gerenciamento da OA (CoE-OA) na América Latina. Esta proposta é baseada em uma revisão narrativa da literatura e consenso de especialistas para estabelecer componentes-chave essenciais para o sucesso de tais centros.

Métodos:

Uma revisão narrativa da literatura foi conduzida usando termos-chave como "osteoartrite", "qualidade", "eficiência" (MeSH), "centro de excelência" e "assistência médica abrangente". Esses termos foram combinados com operadores booleanos (AND, OR, NOT) e pesquisados em vários bancos de dados, incluindo PubMed, Google Scholar, Lilacs e SciELO.

Estudos elegíveis foram revisados, e um painel de quinze reumatologistas de dez países foi convocado para desenvolver uma estrutura baseada em consenso para CoE-OA. Para adaptar a estrutura aos desafios únicos da América Latina, um processo semelhante ao Delphi foi empregado para priorizar os principais componentes para CoEs-OA.

Resultados:

A revisão da literatura e as discussões com especialistas resultaram em uma estrutura abrangente delineando os principais elementos necessários para CoEs-OA. Esses centros representam uma iniciativa pioneira na região, com o objetivo de melhorar o gerenciamento de OA por meio de uma abordagem multidisciplinar, baseada em evidências e orientada por especialistas em um ambiente de saúde estruturado.

Conclusão:

O estabelecimento do CoEs-OA representa a primeira iniciativa desse tipo na América Latina. Ao adotar uma estrutura estruturada apoiada por revisão da literatura e recomendações de especialistas, esta iniciativa visa melhorar a qualidade e a eficácia do gerenciamento de OA.

Palavras-chave:

Osteoartrite, Eficiência, Qualidade, Assistência médica integral, Gestão de doenças.

Mensagens-chave:

- Estabelecer centros de excelência para o cuidado da osteoartrite na América Latina tem o potencial de melhorar significativamente os resultados dos pacientes, ao focar no diagnóstico precoce, planos de tratamento personalizados e cuidado multidisciplinar.
- Uma abordagem multidisciplinar para o manejo da osteoartrite demonstrou melhorar os resultados funcionais, aumentar a segurança do paciente e otimizar os resultados farmacoeconômicos, semelhante ao que foi alcançado em outras doenças crônicas.
- Expandir o modelo de centros de excelência para a osteoartrite pode abordar diretamente a crescente prevalência dessa condição na América Latina, em benefício de uma população de pacientes grande e em crescimento.
- Um manejo eficaz da osteoartrite requer uma equipe de especialistas, incluindo reumatologistas, fisiatras, fisioterapeutas, psicólogos e especialistas em controle da dor, para atender às necessidades complexas dos pacientes.

Introduction

Osteoarthritis (OA) is a common chronic musculoskeletal condition and one of the leading causes of rheumatology consultations. OA contributes significantly to pain, disability, and functional limitations, all of which adversely affect patients' quality of life (1). Estimating the incidence and prevalence of OA can be challenging, as the disease is often asymptomatic in its early stages, making early diagnosis difficult in the absence of clinical manifestations. Consequently, many individuals with early OA may not be captured in registries. The prevalence of OA varies by region. In the USA, studies suggest that OA affects 12% of individuals over the age of 25, with 3% experiencing related disabilities (1).

In Latin America, a study by Reginato AM et al. found a prevalence of approximately 10%, although the full characteristics of OA in the region are not yet fully understood. Several studies from the Community Oriented Program for the Control of Rheumatic Diseases (COPCORD) have reported OA prevalence ranging from 2.3% to 20.4% across different Latin American countries. However, these studies have not evaluated OA prevalence in all countries, and geographical differences may exist. The study also found a higher prevalence than previous reports. The average age of patients was 62.5 years, with a female-to-male ratio of 4.8:1. Approximately 88% had primary OA. A breakdown of affected joints includes: knee (31.2%), hand (9.5%), hand and knee

(22.9%), proximal and distal interphalangeal joints (6.5%), axial joints (6.6%), and hip (1.3%) (2).

OA is primarily influenced by factors such as mechanical stress and aging. While it is more common in older individuals, symptoms may emerge earlier, sometimes without noticeable pain or limitations. Due to its clinical features and epidemiological patterns, managing OA requires a comprehensive, multidisciplinary approach that addresses all aspects of patient care. The Pan American Health Organization (PAHO) has highlighted significant challenges in managing chronic diseases, noting that fragmented healthcare services hinder effective access, diagnosis, treatment, and overall management (3–5). In response, innovative strategies are being implemented to enhance healthcare delivery, one of which is the creation of specialized, comprehensive healthcare centers, leading to the establishment of Centers of Excellence (CoEs).

A CoE is defined as "a program within a healthcare institution that consolidates a high level of expertise and resources in a specific area of medicine, providing comprehensive, multidisciplinary care to achieve optimal patient outcomes" (6). These centers aim to deliver high-quality care while using resources efficiently.

Three fundamental pillars are essential for establishing CoEs: (a) the volume and demand for the specific condition, (b) a culture of continuous improvement, and (c) the expertise of the healthcare workforce (7). Based on a

narrative review of the literature and expert insights, this paper proposes the establishment of CoE for Osteoarthritis (CoEs-OA) in Latin America (LATAM).

Materials and Methods

This study employed a two-step process: a narrative review of the literature on OA care, followed by a consensus-building process among a panel of rheumatology experts in OA management across Latin America (LATAM). The panel comprised fifteen rheumatologists from ten countries. The primary objective was to review the literature on comprehensive healthcare in OA and quality of care, while also facilitating consensus among the experts. The secondary objective was to develop a framework for the creation of CoEs-OA management in Latin America. The methodology is outlined as follows:

Literature Search Strategy

A thorough narrative review of the literature was conducted using electronic databases, including PubMed, Google Scholar, Lilacs, and SciELO. Search terms included "osteoarthritis," "quality," "efficiency," "center of excellence," and "comprehensive healthcare," combined using Boolean operators (AND, OR, NOT). The search focused on studies published in English, Spanish, and Portuguese up until May 2024. Both MeSH terms and free-text keywords were used to ensure comprehensive results.

Expert Panel and Consensus Process

After completing the literature review, an expert panel of rheumatology specialists was convened. The panel reviewed the literature findings and divided into working groups to evaluate specific topics, such as early diagnosis, multidisciplinary approaches, and pharmacological and non-pharmacological treatments. Each expert was responsible for assessing particular areas in detail.

The consensus process required that each major recommendation be approved by at least 75% of the panel members. Voting was conducted anonymously to maintain impartiality. Following the consensus process, the final set of recommendations for the diagnosis and treatment of OA was compiled, aiming to harmonize decisions while considering the diverse perspectives of the rheumatology experts and addressing the specific healthcare needs and realities of Latin America.

The expert panel reviewed the literature and was organized into working groups to evaluate the following topics:

1. Early diagnosis and referral pathways

2. OA phenotypes and specific interventions

3. Multidisciplinary healthcare team model

4. OA management protocol

5. Pharmacological strategies

6. Non-pharmacological strategies

7. Education

8. Long-term follow-up

9. Integration of telemedicine and digital health tools

Results

The literature review and expert panel discussions identified essential elements for establishing a Center of Excellence for osteoarthritis (CoE-OA) management in Latin America (LATAM). A structured approach was adopted, with a designated coordinator synthesizing the literature findings and formulating specific statements on critical aspects of CoE development. These statements were presented to the expert panel for discussion and consensus voting (Fig. 1). This process ensured that the proposed CoE framework was grounded in scientific evidence and regional expert opinions, addressing the unique challenges and healthcare needs of OA patients in LATAM.

Screening Clinic and Early Diagnosis of OA

The primary goal of a screening clinic is to reduce false-positive diagnoses and proactively identify new OA cases, particularly in asymptomatic individuals. OA is often diagnosed when significant joint damage has already occurred (1). Early identification of high-risk individuals, such as those in certain occupations or sports, is crucial for timely intervention. Risk factors such as limb malalignment, muscle weakness, age, obesity, and family history are vital for early detection. Imaging techniques, including ultrasound and MRI, can detect OA before clinical symptoms appear. Additionally, future biomarkers show promise for improving diagnostic accuracy (8–11).

OA Phenotypes and Specific Interventions

Phenotyping OA based on its underlying mechanisms involves classifying the disease into subtypes according to distinct pathophysiological pathways. This approach aims to address the heterogeneity of OA and improve personalized treatment strategies. Given the variability in OA progression and treatment response, well-defined phenotypes are essential to guide targeted interventions (12). This approach is particularly useful for optimizing treatment outcomes and improving patient care by tailoring treatments to each patient's unique characteristics (13).

- **Chronic Pain-Associated OA (Central Sensitization Phenotype):** This phenotype is characterized by increased pain sensitivity and central sensitization, with amplified pain signals extending beyond the injury site. Patients often report widespread pain, psychological distress, sleep disturbances, and fatigue (14). Management includes a multidisciplinary approach with pain management, psychological support, and pharmacological interventions aimed at reducing central sensitization.

- **Inflammatory Phenotype:** This phenotype is marked by the overexpression of inflammatory cytokines such as IL-1β, IL-8, COX-2, and MIP-1 α/β. It is associated with higher pain levels and faster disease progression, as seen in radiographs (13). Treatment strategies for this phenotype, in addition to the multidisciplinary approach, include disease-modifying osteoarthritis drugs (DMOAs) targeting inflammatory pathways. Biomarkers of

inflammation, such as C-reactive protein (CRP) and some interleukins, can help guide the selection of appropriate therapies for these patients. (15)

- **Metabolic Syndrome-Associated OA:** This phenotype is driven by systemic inflammation and metabolic dysfunction, often seen in patients with obesity, diabetes, or hypertension (14). Interventions for this phenotype should address both metabolic and inflammatory components. A multidisciplinary approach involving weight management, dietary changes, and pharmacological treatment for metabolic syndrome (e.g., antihypertensive or antidiabetic medications) is key. Additionally, exercise programs targeting metabolic health can alleviate symptoms. Comorbidities, as components of these heterogeneous features, often coexist with knee osteoarthritis, and are particularly prevalent in end-stage knee osteoarthritis (16,17)

- **Mechanical OA:** Also known as degenerative joint disease, mechanical OA results from joint overload and misalignment, leading to cartilage breakdown, particularly in older individuals (18). Management includes a multidisciplinary approach, with surgical interventions like joint replacement considered for patients with significant structural damage. Conservative treatments such as physical therapy, weight reduction, and mechanical support can help manage symptoms and slow progression. While there is some variability in phenotyping, identifying these distinct subtypes allows clinicians to apply targeted

interventions based on the mechanisms driving each patient's OA (12-18).

Healthcare Model – Multidisciplinary Team

One of the key challenges in managing OA is the variability in pharmacological and non-pharmacological treatment approaches, as highlighted by a review of major clinical practice guidelines (e.g., from ESCEO, OARSI, ACR, EULAR, and PANLAR) (11,19). While international guidelines show significant variation, we base our approach primarily on PANLAR, EULAR, and ACR guidelines, with a focus on PANLAR to create a more aligned framework for patient management. A multidisciplinary and multimodal approach is essential, as OA patients often benefit from a combination of pharmacological and non-pharmacological treatments.

Viscosupplementation may also be considered due to the complexity of the condition. Follow-up visits with specialists, including rheumatologists, physiatrists, and physical therapists, are scheduled regularly (Fig. 2). Comprehensive clinical records and tools, such as the Visual Analog Scale (VAS), WOMAC index, and KOOS index, are integral to assessment, along with physical examination, which includes evaluating pain, inflammation, crepitation, and hyperlaxity (11,17).

Routine laboratory tests and imaging modalities, such as X-rays, ultrasound, and MRI, are used to monitor disease progression and guide treatment. Additionally, ultrasound can be employed for periodic follow-ups (8,20,21,22).

OA Management Protocol

OA management requires a personalized, multidisciplinary approach that integrates pharmacological and non-pharmacological strategies. Centers of Excellence (CoEs) prioritize patient education, structured exercise programs, and weight management, tailoring these interventions to the patient's specific phenotype and socioeconomic status (23, 24,25).

Pharmacological Strategies

Topical NSAIDs and capsaicin are recommended for knee OA, with conditional use for hand OA. Oral NSAIDs are effective for most joints, but COX-2 inhibitors are preferred for patients with cardiovascular or gastrointestinal risks, and for short-term use (26). Paracetamol is a first-line agent for pain control, with a maximum dose of 3 grams per day; it should be maintained at low doses if the patient responds well, to avoid escalation to opioids (26,27).

DMOAs/Symptomatic Slow-Acting Drugs for Osteoarthritis (SYSADOAs e.g., glucosamine, chondroitin, and diacerein) can be used both for short-term pain relief and for slowing the progression of knee OA when used long-term (28). Duloxetine and tramadol are considered for cases of persistent pain, while opioids are reserved for severe cases. Intra-articular glucocorticoids are recommended for short-term relief, particularly during acute inflammation, but their long-term use is discouraged (11,26,27).

Viscosupplementation, especially with hyaluronic acid, is commonly used for pain relief and may slow radiographic progression in knee OA (11,26). The use of platelet-rich plasma and orthobiologics has expanded in recent years,

showing positive clinical outcomes in selected patients. Biologics and antimalarials cDMARDs are not recommended (11,25,26). Surgical interventions, including joint replacement, are considered only after conservative measures fail in patients with severe pain and/or dysfunction (19,26).

Non-Pharmacological Strategies in OA Management

Non-pharmacological approaches are essential in managing osteoarthritis (OA), particularly in the disease's early stages. These strategies, including exercise, weight loss, joint protection education, can significantly improve patient function and quality of life (11). Complementary therapies such as tai chi, yoga, kinesiotaping, acupuncture, and orthotic devices also contribute to OA management (11).

Exercise and Physical Activity

Exercise is a cornerstone of OA management, supported by strong evidence showing improvements in pain, function, and quality of life. Tailored, structured, and supervised exercise programs are highly recommended, with intensity and type individualized according to the patient's phenotype and specific needs. Emphasis should be placed on aerobic, strengthening, and range-of-motion exercises to address the underlying pathophysiology of the OA phenotype. Recent research highlights the importance of gradually progressing exercise modalities for maximizing long-term benefits (30, 31).

Weight Management and Diet

Weight loss has proven especially beneficial for patients with knee OA, with studies showing improved symptoms and functional outcomes.

Combining weight reduction with exercise further enhances these benefits. For patients with metabolic syndrome-associated OA, a multidisciplinary approach, including nutrition counseling, weight management, and exercise, is vital for reducing systemic inflammation and improving joint health (30, 32).

Biomechanical Interventions

Biomechanical interventions, such as orthotic devices, bracing, and shoe inserts, aim to reduce joint load and improve alignment. While these interventions are most effective when combined with exercise and weight management, their standalone efficacy is less robust. However, for OA phenotypes with significant mechanical joint overload, these interventions can help alleviate pain and improve function (30, 31).

Psychosocial and Mind-Body Approaches

Psychosocial factors such as depression, anxiety, and sleep disturbances can exacerbate OA symptoms and contribute to disability. Psychosocial interventions, including cognitive-behavioral therapy (CBT), stress reduction techniques, and mindfulness practices, have demonstrated benefits in reducing pain perception and improving quality of life especially for patients with central sensitization or chronic pain-associated OA phenotypes (31).

Manual Therapy and Other Physical Therapies

Manual therapy and electrotherapeutic modalities like transcutaneous electrical nerve stimulation (TENS) can complement exercise programs. While evidence for the efficacy of these therapies is mixed, they may provide short-term pain relief and improve joint mobility, particularly in patients with mechanical or inflammatory OA phenotypes (30, 32).

Education

Patient education is central to the CoE model, empowering patients to actively participate in their care. Educational activities, such as seminars and patient-focused meetings, are essential, with mobile health apps further facilitating self-management and patient engagement. Strategies such as symptom monitoring, exercise adherence, and joint protection techniques are encouraged. These approaches are particularly beneficial for inflammatory or chronic pain-associated OA phenotypes (33–39).

Long-Term Follow-Up

Given OA's progressive nature, ongoing follow-up is crucial. Routine imaging (e.g., X-rays, ultrasound, MRI) and lab tests should be used for long-term monitoring. In addition, CoEs should assess patients' quality of life, using patient-reported outcome measures (PROMs) like the WOMAC scale and KOOS to guide treatment adjustments (40). Regular follow-up visits are vital to assess adherence, modify treatment plans, and ensure sustained patient engagement as the disease progresses.

Telemedicine in OA Management

Telemedicine enhances access to care, particularly for patients in remote areas, allowing continuous monitoring and adherence to rehabilitation programs. Remote consultations via telehealth platforms support physical therapy and self-management, extending the reach of CoEs (41, 42). Telerehabilitation has also shown benefits in implementing home rehabilitation

exercises, reducing healthcare costs (42).

For successful telemedicine integration, it is essential to establish clear criteria for patient selection, ensuring the system's effectiveness. Ideal candidates for telemedicine include technologically proficient patients with access to necessary equipment (e.g., smartphones, computers), and those motivated to engage in remote care. Telemedicine is especially beneficial for patients in rural or underserved areas who have limited access to in-person healthcare services.

Patients with mild to moderate OA, particularly in the early stages of the disease, are likely to benefit the most from telemedicine, as it can help prevent disease progression and improve functional outcomes. While telemedicine may still play a supplementary role for patients with advanced OA, particularly in follow-up consultations, education, and monitoring, it is less likely to replace in-person interventions for complex clinical needs.

Discussion

By centralizing expertise and resources, CoEs can deliver comprehensive, multidisciplinary care tailored to the individual needs of patients. This model aligns with international standards and optimizes resource utilization, resulting in improved patient outcomes (11,20).

A well-structured CoE-OA requires a robust infrastructure, including specialized clinical facilities, advanced diagnostic tools, and rehabilitation services. The center should be staffed with healthcare professionals trained in

the multidisciplinary management of OA, such as rheumatologists, orthopedic specialists, physiatrists, physiotherapists, psychologists, and other allied health providers. Additionally, educational and research initiatives should be integrated into the center's operations to foster continuous learning and promote evidence-based practices in OA management.

Early Diagnosis and Screening Programs

Early diagnosis is fundamental to effective OA management. Many patients are diagnosed only after significant joint damage has occurred, which negatively impacts long-term outcomes. Screening programs targeting high-risk individuals—such as those in physically demanding occupations or those with metabolic conditions—are essential. Advances in imaging technologies and biomarkers present opportunities for earlier detection, allowing for timely intervention before the disease progresses (8–15).

Multidisciplinary Approach and Phenotyping

The PANLAR guidelines stress the importance of a comprehensive, multidisciplinary approach to OA management. This involves regular follow-ups with various specialists and using diagnostic imaging and lab tests to monitor disease progression. Imaging techniques like X-rays, ultrasound, and MRI are crucial for accurate assessment and tracking (11,17).

Implementing phenotyping in OA management allows for more personalized treatment strategies. A multidisciplinary team—including rheumatologists, physiotherapists, pain specialists, and nutritionists—should tailor interventions based not only on phenotypic

classification but also on patient-specific factors, such as comorbid conditions, to optimize management (12)

Flexible Management Protocols

A flexible management protocol based on the PANLAR guidelines enables phenotype-specific treatment strategies. Combining pharmacological treatments (e.g., paracetamol, NSAIDs, viscosupplementation, DMOAs/SYSADOAs) with non-pharmacological approaches, including physical therapy and weight management, enhances treatment adherence and improves patient outcomes (12, 24-27). Non-pharmacological strategies are particularly beneficial for managing mechanical and metabolic OA. Complementary therapies such as yoga, tai chi, and acupuncture also show promise in managing symptoms and improving patient functionality. Surgery is reserved for severe cases where conservative treatments fail, with joint replacement considered as a final option (11,19).

Periodic Evaluations and Outcome Monitoring

Periodic evaluations are vital to assess the center's impact on patient outcomes and its overall effectiveness. Clinimetrics should be incorporated into routine evaluations to monitor OA progression and assess the impact of care on patients' quality of life. By tracking key clinical outcomes, such as functional status and pain levels, CoEs can provide valuable data on the benefits of specialized OA care.

Telemedicine and Remote Care

Telemedicine is a key component of the CoE model, particularly in regions with limited access to care. Virtual consultations and remote monitoring help improve patient adherence to treatment plans and provide continuous support, which is especially beneficial for chronic conditions like OA (43–44). Telemedicine can also be instrumental in enhancing access to care for patients in rural or underserved areas.

To ensure successful implementation, it is crucial to establish criteria for selecting patients who will benefit most from telemedicine, ensuring both effectiveness and adaptability to various settings. Patients who are technologically proficient, have access to necessary equipment, and are motivated to engage in remote care are ideal candidates for telemedicine. This approach can be particularly beneficial for those with mild to moderate OA, especially in the disease's early stages. For more advanced cases requiring complex interventions, telemedicine can still serve as a supplementary tool for follow-up consultations, education, and monitoring.

Long-Term Follow-Up

Long-term follow-up is essential for managing OA effectively. Regular use of patient-reported outcome measures (PROMs) and imaging ensures that treatment plans evolve alongside the patient's condition, preventing deterioration and optimizing quality of life. Ongoing evaluations allow for timely adjustments to treatment strategies, ensuring their continued relevance as the disease progresses.

The establishment of CoEs-OA management is critical in addressing the rising prevalence and growing burden of OA, especially in regions such

as Latin America. The available data on weight-bearing OA highlights its significant impact on patients' quality of life, with substantial economic burdens that vary according to the healthcare systems of different countries. Current evidence underscores the considerable burden of OA in Latin America (45).

In summary, a CoE for OA should be a specialized healthcare program that centralizes expertise and resources to provide comprehensive, multidisciplinary care tailored to OA patients. Key components of the center should include early diagnosis through advanced imaging and biomarkers, a personalized approach based on OA phenotypes, and a multidisciplinary team to address the complex needs of patients. Evidence-based pharmacological and non-pharmacological treatments, such as exercise programs, weight management, and patient education, should be integrated into the care model. Additionally, telemedicine should be leveraged to improve access to care, especially for remote populations. Long-term follow-up and continuous monitoring should be core to the program's approach.

CoEs offer several advantages over the current fragmented approach to OA management. These include enhanced care coordination, more personalized treatment, and optimized resource utilization. Such centers could also help reduce healthcare costs by preventing or delaying costly interventions, such as knee or hip joint replacements, through early, comprehensive OA management.

The economic benefits of establishing CoEs for

OA are significant, not only in terms of direct healthcare savings but also by reducing the broader economic burden on patients and society. By effectively managing OA, the need for surgical interventions and long-term disability could be minimized, leading to lower healthcare costs and reduced lost productivity.

To clearly present this proposal, we recommend a detailed outline the CoE design, focusing on infrastructure, services, and educational and research components. The justification for establishing CoEs for OA is grounded in their potential to improve patient outcomes, reduce costs, and advance knowledge in the field.

Conclusions

Centers of Excellence (CoEs) for osteoarthritis (OA) represent a transformative opportunity to elevate patient care through early diagnosis, multidisciplinary treatment, and a combination of pharmacological and non-pharmacological strategies. By implementing PANLAR guidelines and tailoring interventions to individual phenotypes, CoEs can deliver comprehensive, personalized care that improves both short- and long-term outcomes for OA patients.

The establishment of CoEs is essential to advance specialized care, align treatments with Treat-to-Target (T2T) goals, and enhance overall patient outcomes. By centralizing care within expert, multidisciplinary teams, promoting patient education, and ensuring thorough clinical oversight, CoEs offer a crucial framework for

optimizing OA management.

Furthermore, these centers can significantly reduce long-term healthcare costs by delaying or preventing expensive interventions, such as joint replacements, through early and comprehensive management. This approach not only alleviates disability and enhances quality of life but also mitigates the socioeconomic burden associated with OA's long-term effects. The integration of evidence-based guidelines strengthens the ability of CoEs to provide accessible, efficient, and patient-centered care, ensuring that OA patients receive the best possible treatment throughout their care journey.

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Conflict of Interests

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Pedro Santos-Moreno, Oscar Rillo, Maritza Quintero, Gabriel-Santiago Rodríguez-Vargas. The first draft of the manuscript was written by Pedro Santos-Moreno, Oscar Rillo, Carlos Pineda, Rolando Espinosa-Morales, José Angel Salas Siado, Oswaldo Castañeda, Roberto Muñoz Louis, Ingrid Möller, Gabriel-Santiago Rodríguez-Vargas, Vianna Khoury, Maritza Quintero, Rodolfo Arape, Oswaldo Castañeda, Araceli Chica, Blanca Herrera Velasco, and Miguel Albanese. All authors commented on different versions of the manuscript. All authors read and approved the final manuscript.

Ethics Approval

Not applicable

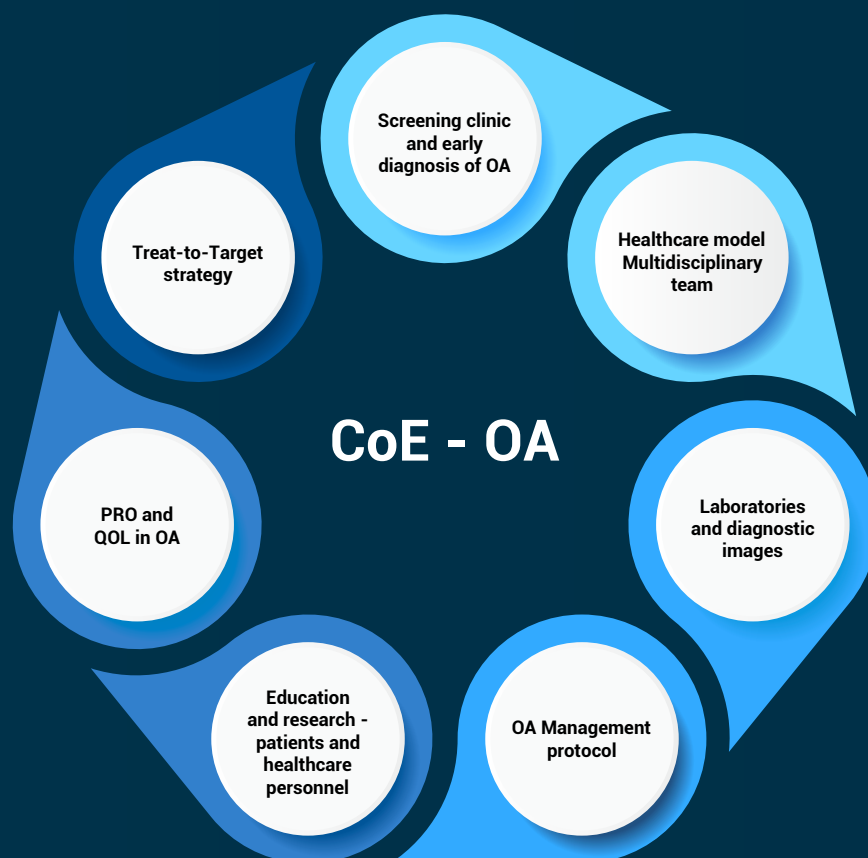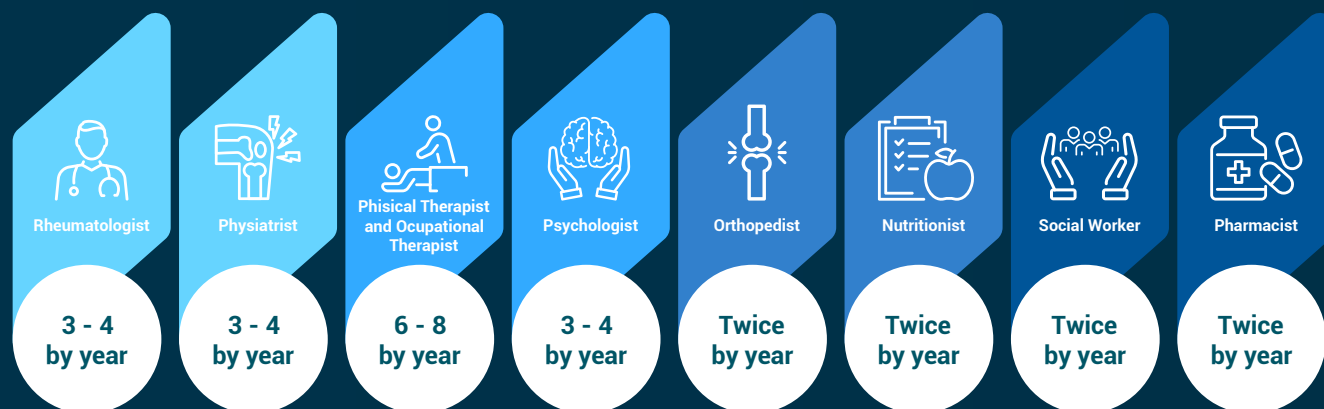Figure 1. Approximation and route for diagnosing of the OA patient

CoE - OA

- Screening clinic and early diagnosis of OA
- Treat-to-Target strategy
- Healthcare model Multidisciplinary team
- PRO and QOL in OA
- Laboratories and diagnostic images
- Education and research - patients and healthcare personnel
- OA Management protocol

Figure 2. Frequency of consultation with the multidisciplinary team.

Rheumatologist	Physiatrist	Phisical Therapist and Ocupational Therapist	Psychologist	Orthopedist	Nutritionist	Social Worker	Pharmacist
3 - 4 by year	3 - 4 by year	6 - 8 by year	3 - 4 by year	Twice by year	Twice by year	Twice by year	Twice by year

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