

# Evaluation of practical clinical skills in orthopedic manual therapy students through the Objective Structured Clinical Examination (OSCE): Pilot experience at the European University of the Canary Islands.

## Evaluación de las competencias clínicas prácticas en estudiantes de terapia manual ortopédica a través del Examen Clínico Objetivo Estructurado (ECOPE): Experiencia piloto en la Universidad Europea de Canarias.

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**Summary: Introduction:** The OSCE is a tool for evaluating practical clinical competencies that, in Physiotherapy, has not been used to examine the skills of specialists in Orthopedic Manual Therapy. **Objective :** The objective of this work is to evaluate the competence through the grades, satisfaction and perceived performance of the students of the Master of Orthopedic Manual Therapy in the Treatment of Pain at the European University of the Canary Islands. **Methods:** A descriptive study was carried out on a sample of postgraduate students (n=21) during the period between February 1 and July 31, 2023 at the Simulated Hospital of the European University of the Canary Islands, in Tenerife (Spain), using the OSCE methodology. **Results:** The grades obtained by the participants were mostly high (mean = 8.54/10, SD = 0.612), although in Anatomy and interpretation of complementary tests they recorded the lowest results. 95.1% (n=20) expressed high satisfaction with the OSCE. Regarding the interpretation of complementary tests, 19.1% (n=4) considered their performance to be poor and 4.8% (n=1) considered their performance to be very poor. **Conclusion:** In summary, despite the lower scores in certain areas, the results of the evaluation of practical clinical competencies through the OSCE are positive. Furthermore, a high degree of satisfaction and positive perception of performance by the specialist is observed.

**Keywords:** Health education; Physiotherapy; OSCE; Educational Evaluation; Clinical skills; Professional competence

Resumen: Introducción: El ECOPE es una herramienta de evaluación de competencias clínicas prácticas que, en Fisioterapia, no ha sido empleada para examinar las habilidades de los

especialistas en Terapia Manual Ortopédica. Objetivo: El objetivo de este trabajo es evaluar la competencia a través de las calificaciones, la satisfacción y el desempeño percibido de los estudiantes del Máster de Terapia Manual Ortopédica en el Tratamiento del Dolor de la Universidad Europea de Canarias. Métodos: Se realizó un estudio descriptivo en una muestra de estudiantes de posgrado (n=21) durante el periodo comprendido entre el 1 de febrero y el 31 de julio de 2023 en el Hospital Simulado de la Universidad Europea de Canarias, en Tenerife (España), utilizando la metodología ECOE. Resultados: Las calificaciones obtenidas por los participantes fueron mayoritariamente altas (media = 8,54 /10, DT= 0,612), aunque en Anatomía e interpretación de pruebas complementarias registraron los resultados más bajos. El 95,1% (n=20) expresó una alta satisfacción con el ECOE. Respecto a la interpretación de pruebas complementarias, un 19,1% (n=4) consideró su desempeño como deficiente y un 4,8% (n=1) muy deficiente. Conclusión: En síntesis, a pesar de las calificaciones más bajas en ciertas áreas, los resultados de la evaluación de competencias clínicas prácticas a través del ECOE son positivos. Además, se observa un elevado grado de satisfacción y percepción positiva del desempeño por parte del especialista.

**Palabras clave:** Educación para la salud; Fisioterapia; ECOE; Evaluación Educacional; Habilidades clínicas; Competencia profesional

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## 1. Introduction

In all fields of study related to Health Sciences, it is widely recognized that practical skills play a fundamental and distinctive role in the quality of student training. In this sense, obtaining these skills is crucial, since it enables future healthcare workers to carry out their tasks safely and effectively. Therefore, participation in a practical skills assessment is of utmost importance, as it allows students to apply the knowledge acquired during their academic training and demonstrate their competence in real-world clinical situations, while ensuring safety from the patients.

The procedures and tools used to evaluate practical skills are heterogeneous. From our perspective, we consider that the fundamental factor to advance in the improvement of methods for evaluating clinical competence lies in the capacity of said procedures to objectively measure these skills, minimizing the subjectivity of the evaluator. Among the different methodologies to evaluate practical skills, the Objective and Structured Clinical Examination (OSCE) emerges as a prominent option. Unlike other methodologies, the OSCE structure aims to systematically evaluate the knowledge, skills, attitudes and values appropriate to the student's degree of study and is designed to guarantee impartiality through stations that address specific evaluation objectives. Static stations do not require the presence of patients, evaluating skills such as the interpretation of complementary tests (x-rays, electrocardiograms, etc.) and searching databases. On the other hand, dynamic stations allow the evaluation of skills that require interpersonal interaction, such as taking a history, physical examination, diagnosis and administration of treatments, etc. The test includes patients with real or fictitious diseases in simulated scenarios with predefined symptoms to objectively assess the student's preparation for professional practice. Students rotate through each station, being evaluated by trained health workers or teachers. A checklist is used as an assessment instrument to ensure an objective and specific assessment of each skill.

The OSCE, initially developed in the 1970s by Dr. Ian Hart at McMaster University in Canada, has seen widespread diffusion since then. The evidences of its effectiveness has strengthened over time in different countries (10-13). In Spain it was adopted two decades ago, being compulsorily integrated into the Bachelor of Medicine curriculum under the

impetus of the National Conference of Deans of Medical Faculties . Its popularity has also experienced notable growth in Nursing and Physiotherapy teaching in our country, especially in the context of the Degree, with the Faculty of Medicine and Nursing of the University of Córdoba (UCO) being an example of this generalist trend (14). Another illustrative case is the pilot study carried out by Arguisuelas (2022) on third-year students of the Degree in Physiotherapy at the CEU Cardenal Herrera University (Valencia). This study revealed that the OSCE was satisfactory for all participants, concluding that it constitutes a useful approach to evaluate the effectiveness in the transmission of clinical skills (15).

Despite its gradual incorporation into Physiotherapy studies, the OSCE is not yet applied in Orthopedic Manual Therapy specialist programs. This branch of Physiotherapy encompasses various treatment techniques used by physiotherapists to treat musculoskeletal conditions. In this discipline, as in other specialties, the evaluation of clinical competence remains a challenge. The traditional methodology involves direct observation of clinical practice, but it is subjective and depends on the personal experience of the evaluator. Furthermore, it is laborious and expensive. Instead, the OSCE uses an organized series of evaluation criteria to rate the student's clinical performance, thus providing a more objective evaluation . On the other hand, as is known, this is carried out in both real and simulated scenarios, which makes it more natural compared to traditional evaluation methods. However, until now, it has not been applied in the field of Manual Therapy.

The objective of this study is to evaluate the competence of the students of the Master in Orthopedic Manual Therapy in the Treatment of Pain at the European University of the Canary Islands (UEC) through the use of the OSCE. In addition, the aim is to quantify the level of student satisfaction and evaluate their perception of performance during the test.

## 2. Methods

### *Study design*

An observational, descriptive and cross-sectional study was carried out between February 1 and July 31, 2023 at the La Orotava Campus of the European University of the Canary Islands (UEC), in Santa Cruz de Tenerife, Spain. The OSCE test was developed in person in the Task Training skills classroom, Debriefing and Complex Simulation classroom of the Simulated Hospital. The study was developed in three phases that corresponded to phase 1 or preparation of the OSCE test, phase 2 or OSCE test and phase 3 or Closing of the OSCE Test. Phase 1 of the study was carried out from February 1, 2023 to July 12, 2023 and included the following stages:

### *Creation of the ECOE Test Committee*

The OSCE test committee was established to oversee the overall structure of the evaluation, including the determination of learning objectives, the development of the map of evaluated competencies, the number of stations, the weight assigned to each competency, and the duration of every season.

*Identification of competencies*

The committee was in charge of identifying and preparing a map of competencies included in each station and assigning, in a blind and independent manner, the knowledge that the student had to acquire, ultimately obtaining a list of those skills that had to be examined, as well as their weighting, in the OSCE (table 1).

**Table 1.** Map of competencies and their weighting in the OSCE.

Competencies	Percentage
Anatomy and Physiology of Pain	10%
Anamnesis	10%
Physical exploration	20%
Technical/Procedural Skills	20%
Clinical judgment, diagnostic and therapeutic management plan	40%

*Preparation of the Specification Table*

A document was prepared to provide students and evaluating teachers with a breakdown of the information corresponding to each station, which included data on the subject evaluated, the name of the station, the type of station, a brief description of the instructions and objectives of the station, as well as the educational skills that were evaluated (table 2).

*Preparation of clinical cases*

The OSCE test committee developed a bank of clinical cases guaranteeing the quality and relevance of the evaluation. A close collaboration was established with Orthopedic Manual Therapy specialists who accumulated more than 10 years of professional experience, who assumed the responsibility of reviewing and enriching the content initially proposed by the Committee. During the review process, validation of the authenticity and clinical relevance of each proposed case was prioritized, as well as coherence with the pedagogical objectives of the degree.

*Preparation of clinical case evaluation rubrics*

The committee developed the objective evaluation rubrics, which are summarized in table 3.

*Preparation of complementary documentation of clinical cases*

A personalized set of instructions was developed for each clinical case, recognizing the diversity of contexts and clinical challenges that could arise. These instructions also provided specific details about the simulated patient, clinical presentation, and relevant medical history such as results of previously performed diagnostic tests.

*Conducting training workshops for evaluators*

An instructional video was made to train evaluators in their respective roles. This audiovisual material not only addressed the specific OSCE guidelines and protocols, but also focused on the development and ability to provide constructive feedback to the student during the test. This resource allowed evaluators to hone their ability to evaluate student performance fairly and objectively.

Table 2. Specifications Table.

Station	Subject	Station name	Station type	Station goal	Educational skills
1	- Anatomy and Physiology of pain ( <i>Neuroanatomy</i> ) - Mechanisms and neurophysiological effects of Orthopedic Manual Therapy	Identification of structures in anatomical model of coronal, transverse and sagittal section of the brain.	Mailbox	<b>Activity 1</b> : Observe the model and indicate the anatomical structure involved in the nociceptive pain pathway.	Cognitive
2	- Orthopedic Manual Therapy ( <i>Anamnesi</i> )	Anamnesis	Mailbox	<b>Activity 1</b> : Based on a clinical case, answer the question about indicating the relevant battery of questions to identify possible red flags. <b>Activity 2:</b> Based on a clinical case, answer the question about indicating the <i>body chart</i> that best suits the clinical presentation of the case.	Cognitive and affective
3	- Orthopedic Manual Therapy ( <i>Physical examination</i> )	Physical exploration	Scenery	<b>Activity 1:</b> Read the clinical case and develop the physical examination on the model or patient.	Cognitive, psychomotor and affective
4	- Orthopedic Manual Therapy ( <i>Ultrasound</i> )	Interpretation of a complementary imaging test	Scenery	<b>Activity 1:</b> The student must prepare the exploration field and perform an ultrasound of the suggested anatomical segment. <b>Activity 2:</b> The student must identify the different structures indicated.	Cognitive, psychomotor and affective
5	- Orthopedic Manual Therapy ( <i>Treatment</i> )	Treatment	Scenery	<b>Activity 1:</b> The student must correctly execute the treatment technique indicated by the teacher.	Cognitive, psychomotor and affective

**Table 3.** Scoring system for the Objective Structured Clinical Examination (OSCE).

Station	Subject	Performance indicators	Total score
1	1. Anatomy and Physiology of pain ( <i>Neuroanatomy</i> ) 2. Mechanisms and neurophysiological effects of Orthopedic Manual Therapy	- Identify anatomical structures related to the nociceptive pathway.	1
2	3. Orthopedic Manual Therapy ( <i>Anamnesis</i> )	- Identify red flags. - Locate yellow flags. - Describe the clinical characteristics of musculoskeletal pain. - Identify prognostic factors related to musculoskeletal pain.	1
3	4. Orthopedic Manual Therapy ( <i>Physical examination</i> )	- Ergonomics of the physiotherapist. - Prepare and position the patient. - Palpate structures. - Perform the orthopedic physical examination maneuver. - Prepare a diagnostic judgment.	2
4	5. Orthopedic Manual Therapy ( <i>Supplementary test</i> )	- Ergonomics of the physiotherapist. - Prepare and position the patient. - Apply the conductive gel. - Use the ultrasound transducer. - Capture from the image. - Recognize the ultrasound patterns in the image. - Prepare a diagnostic judgment.	2
5	6. Orthopedic Manual Therapy ( <i>Treatment</i> )	- Ergonomics of the physiotherapist. - Preparation and position of the patient. - Palpate structures. - Perform the treatment maneuver.	4

### *Conducting informative seminars for students*

An informative audiovisual material was created that aimed to offer students a deep understanding of the objectives and importance of the OSCE through clear and visually impactful narratives that emphasized the planning and execution of the evaluation. In addition, it was proposed by setting out in detail the scope and objectives of the project, as well as instruments to inspire and stimulate proactive participation in the review.

Phase 2 consisted of the OSCE test, which took place on July 15, 2023. In relation to the execution of the test, it was carried out simultaneously in three rooms of the simulated Hospital of the European University of the Canary Islands (UEC). Each student was called consecutively in alphabetical order by last name to ensure that all participants were equally qualified in terms of the time required to complete each station. Each station had a 5-minute time limit, which included a 1-minute transition period, meaning each student needed a total of 30 minutes to complete the entire activity. To manage time efficiently, auditory cues were implemented to inform students when their allotted time was up, instructing them to proceed to the next station. Likewise, after 60 seconds, another auditory signal was used to indicate to the students that they could move on to solve the next task. Two types of stations were established; one in mailbox format, managed autonomously by the student, and another as a scenario, where they interacted with an evaluator in charge of providing the necessary instructions to carry out the activity. To carry out the Objective and Structured Clinical Examination (OSCE) in each of the rooms, four teachers of the degree were assigned to each of the scenario-type stations (SEMP, IMMP, ERL, AR) with a specific rubric. to evaluate the student's performance. In addition, to ensure a smooth development of the evaluation process, there was the collaboration of two laboratory technicians who played the role of logistical coordinators (JG, YR). After completing the test, the students were instructed to move to an adjacent room in order to complete two questionnaires that were intended to measure both their satisfaction and their performance during the exam.

The third and final phase, called the Closing Phase of the OSCE Test, extended from July 15 to 31, 2023, in which the data analyzed was uploaded, as well as the analysis and discussion and writing of the manuscript.

### *Participants*

Recruitment was carried out through intentional non-probabilistic sampling between February 12, 2023 and February 15, 2023, and the participants were selected among students studying the Master's degree in Orthopedic Manual Therapy in the treatment of pain at the University European Union of the Canary Islands during the 2022-2023 academic year.

The eligibility criteria for the participants were:

1. Students of the Master in Orthopedic Manual Therapy in the treatment of pain at the European University of the Canary Islands for the 2022-2023 academic year.
2. Not having previously participated in an Objective and Structured Clinical Examination (OSCE) test.
3. Have achieved a minimum of 90% in-person teaching attendance for the 2022-2023 academic year.
4. Without restrictions on gender, age, training center where the university degree was completed and previous work experience.

*Variables*

The outcome variables examined in this study included overall grades, station grades, degree of satisfaction, and students' self-assessment of performance.

*Overall Ratings*

The evaluation of the acquisition of skills was based on the global scores achieved by the students, which functioned as an impartial indicator of the student's performance during the test. The overall OSCE score was determined through a scoring system that ranged from 0 to 10 points in total.

*Ratings by station*

The grades per station represent the score obtained by the students in each of the stations of the Objective Structured Clinical Examination (OSCE). Each station received a score based on the weighted weight assigned according to Table 3.

*Degree of satisfaction*

The degree of student satisfaction with the OSCE in the postgraduate program was evaluated through five dimensions: *general organization, adaptation to the level of knowledge and cognitive development of the students, usefulness for professional practice, usefulness for learning and degree of recommendation*. The survey used to evaluate satisfaction with the OSCE among Physiotherapy Degree students was proposed by De la Barra-Ortiz et al. (2022) and consists of 5 questions related to the general structure and usefulness of the OSCE, as well as the suitability of the stations. The scale used is Likert type, with 5 values ranging from " *Totally disagree*" if the experience has been totally unsatisfactory to " *Strongly agree* " if it has completely met your expectations (table 4).

**Table 4.** Satisfaction evaluation survey.

Questions	Answers
<b>Question 1.</b> The general organization of the OSCE is adequate.	Totally disagree
<b>Question 2.</b> The proposed stations were appropriate for my level of knowledge.	Little agree
<b>Question 3.</b> The OSCE has been useful for my training as a physiotherapist specializing in Orthopedic Manual Therapy.	Indifferent
<b>Question 4.</b> Repeating similar tests improves my learning.	Agree
<b>Question 5.</b> Taking tests that evaluate my clinical skills is important.	Strongly agree

*Performance self-assessment*

Self-assessment of performance helps us, through constructive feedback, understand how students reflect, take responsibility, and develop metacognitive skills during the OSCE. To measure the performance of the students in each station, the Performance Evaluation Survey proposed by De la Barra-Ortiz et al. was applied (2022) . Regarding this instrument, it is important to highlight that this survey was specifically designed to evaluate the satisfaction of performance in the OSCE among students enrolled in a Degree in Physiotherapy and has not yet been adequately validated for students of postgraduate programs in this area of knowledge. The survey is made up of a Likert scale, ranging from 1 ("*very bad*") to 5 ("*excellent*") and requires students to evaluate their perceived performance (table 5).



**Table 5.** Performance evaluation survey.

Questions	Answers
<b>Question 1.</b> Rate your performance in Station 1. Identification of structures in anatomical model	Very bad
<b>Question 2.</b> Rate your performance at Station 2. Anamnesis	Bad
<b>Question 3.</b> Rate your performance at Station 3. Physical examination	Regular
<b>Question 4.</b> Rate your performance in Station 4. Interpretation of a complementary test	Good
<b>Question 5.</b> Rate your performance at Station 5. Treatment	Excellent

*Statistic analysis*

The grades obtained by the students in the OSCE, as well as the results of the satisfaction survey and performance evaluation, were compiled in a Microsoft Excel 2016 spreadsheet. To carry out the data analysis, the statistical software JASP V. 0.10.2 (JASP Team, University of Amsterdam) to determine the corresponding parameters of centralization, dispersion and position in the quantitative variables. In addition, estimates of the absolute and relative frequencies were made for each of the categories of the qualitative variables.

*Ethical considerations*

The present study rigorously complied with the standards established in the Declaration of Helsinki, thus guaranteeing integrity and ethics in the research. Furthermore, it is important to highlight that the research protocol was thoroughly reviewed and approved by the corresponding local Ethics Committee. It should be noted that each study participant, voluntarily and consciously, gave written informed consent before participating in the research.

**3. Results***Sample Description*

The study sample was made up of 21 people who were studying the Master of Orthopedic Manual Therapy in the treatment of pain at the European University of the Canary Islands (UEC) during the 2022-2023 academic year. Of the 21 individuals, 10 were women and 11 were men, with a mean age of 24.61 years and a standard deviation of 2.26. Almost half of the participants, n=10 (47.61%), completed their Physiotherapy studies at a public center, while the other half, n=11 (52.39%), attended a private university. Participants reported an average of 2.38 (SD=1.36) years of experience as Physical Therapy professionals.

*Overall Ratings*

All students successfully passed the OSCE, demonstrating a high level of clinical competence. The average score obtained was 8.54 out of 10, which corresponds to the grade of notable. The standard deviation of these scores is 0.61, indicating a fairly even distribution of scores. The highest score obtained was 9.3 out of 10, while the lowest score was 7.4 out of 10, indicating that the students performed well during the assessment test. Women had a mean score of 8.35 with a standard deviation of 0.54, while men had a higher mean score of 8.71 with a standard deviation of 0.676.

*Station Ratings*

In Station 1, focused on Anatomy and Physiology of Pain, the average score was 0.55 (0.19) while Station 2, which addressed Anamnesis, revealed an outstanding average performance with 0.93 (0.18). ) on a total score of 1. The Physical Examination, evaluated at Station 3, participants obtained an excellent average score of 1.94 (0.14) as did the Technical/Procedural Skills at Station 4 in which they achieved an average of 1.48 (0.28) out of 2 possible points. Regarding the last station related to Clinical Judgment, the diagnostic and therapeutic management plan obtained a notable rating of 3.6 (0.42) out of 4 possible points. The results related to the ratings by stations are shown in table 6.

**Table 6.** Scores obtained in the ECOE test .

	Mean	Standard deviation	Minimum	Maximum
<b>Overall rating</b>	<b>8,543</b>	<b>0.612</b>	<b>7,400</b>	<b>9,300</b>
<b>E1.</b> Anatomy and Physiology of Pain	0.552	0.189	0.200	0.800
<b>E2.</b> Anamnesis	0.929	0.179	0.500	1,000
<b>E3.</b> Physical exploration	1940	0.135	1,500	2,000
<b>E4.</b> Technical or procedural skills	1,479	0.282	1,000	2,000
<b>E5.</b> Clinical judgment, diagnostic and therapeutic management plan	3,643	0.423	3,000	4,000

*Degree of satisfaction*

In relation to the general organization of the OSCE, 95.1% of the sample considers that it was adequately structured. Within this group, 57.1% strongly support the overall organization, while 4.7% disagree with the organization of the test as a whole. Regarding the suitability to the level of knowledge and cognitive development of the students, 85.7% of the participants agree with the suitability of the proposed stations based on their level of knowledge. Furthermore, 47.6% express total agreement, while only 9.5% maintain a neutral position. In the aspect of usefulness for professional practice, 85.7% recognize the benefits of the OSCE for their clinical performance with 57.1% showing total agreement. Regarding the usefulness for learning, 90.5% are in favor of improving the effectiveness of learning through these tests, while only 4.7% consider that the OSCE does not have a positive impact on their learning. Regarding the degree of recommendation, 95.2% of those surveyed would recommend the OSCE to other students, with 71.5% unconditionally supporting this statement. Only 4.7% would not recommend it to other students (table 7).

*Performance self-assessment*

In Station 1, 28.57% of the participants expressed their satisfaction with their performance, considering it very good, while another 28.57% rated it as good. However, 33.3% considered that it had been average, and 9.4% described it as bad or very bad. At Station 2, 90.4% of participants evaluated their performance positively with 38.1% considering it good and 52.3% considering it very good. In Station 3, 90.4% rated it at least as good, with 33.3% perceived good and 57.1% as very good. In Station 4, 52.4% evaluated their performance as good or very good, while 23.81% perceived it as average and 23.8% considered it bad or very bad. Finally, in Station 5, 66.6% evaluated it as very good, 28.6% as good and only 4.8% as average (table 8).

**Table 7.** Degree of satisfaction.

Questions	Disagreement	Little agreement	Indifferent	Agree	Strongly agree
<b>Question 1.</b> The general organization of the OSCE has been adequate.	1 (4.7%)	0 (0%)	0 (0%)	8 (38.1%)	12 (57.1%)
<b>Question 2.</b> The proposed stations were appropriate for my level of knowledge.	0 (0%)	1 (4.7%)	2 (9.5%)	8 (38.1%)	10 (47.6%)
<b>Question 3.</b> The OSCE has been useful for my training as a physiotherapist specializing in Orthopedic Manual Therapy.	0 (0%)	1 (4.7%)	2 (9.5%)	6 (28.6%)	12 (57.1%)
<b>Question 4.</b> Repeating similar tests allows me to improve my learning.	0 (0%)	1 (4.7%)	1 (4.7%)	8 (38.1%)	11 (52.4%)
<b>Question 5.</b> Taking tests that evaluate my clinical skills is important.	0 (0%)	1 (4.7%)	0 (0%)	5 (23.8%)	15 (71.4%)

**Table 8.** Self-assessment of performance.

Season	Very bad	Bad	Regular	Well	Very good
1	1 (4.8%)	1 (4.8%)	7 (33.3%)	6 (28.6%)	6 (28.6%)
2	1 (4.8%)	1 (4.8%)	0 (0%)	8 (38.1%)	11 (52.4%)
3	1 (4.8%)	1 (4.8%)	0 (0%)	7 (33.3%)	12 (57.1%)
4	1 (4.8%)	4 (19.1%)	5 (23.8%)	4 (19.0%)	7 (33.3%)
5	0 (0%)	0 (0%)	1 (4.8%)	6 (28.6%)	14 (66.6%)

#### 4. Discussion

The present study constitutes the first evaluation of the results obtained in the OSCE carried out among physiotherapists specialized in Orthopedic Manual Therapy in our geographical context. The implementation of the OSCE made it possible to evaluate the ability of physical therapists to provide safe and high-quality care to their patients. The objective of this work was to evaluate the global competence of students enrolled in the Master of Orthopedic Manual Therapy in the Treatment of Pain at the European University of the Canary Islands (UEC) in the 2022-2023 academic year. This was achieved by quantifying the grades obtained, the level of satisfaction and the perception of performance in the OSCE by the students. In relation to this objective, our results indicate that the evaluated physiotherapists achieved an average score of 8.54 out of a maximum of 10

possible points. This rating translates to a grade, which suggests that participants have the skills and knowledge required to offer excellent clinical care. This finding is consistent with previous research on the subject, supporting the idea that the scores obtained in the OSCE reflect the ability of professionals to provide effective care, since the majority manage to pass the test.

In the work of Figueroa-Arce et al. (20), set out to evaluate the performance of Physiotherapy students in the OSCE. Their results revealed that the average global score achieved by the students was 142 points (IQR: 132-150), indicating that 61.1% of the students passed the test. Specifically, the clinical interview and musculoskeletal examination stations stood out by achieving the highest approval percentages, with 78.62 and 96.86%, respectively. These findings are in line with the conclusions of Gorman et al. (2010), who suggest that the incorporation of the OSCE in Physiotherapy programs is highly appropriate to evaluate the knowledge and skills of professionals in the management of pain in the musculoskeletal system.

In general terms, the results of the OSCE reveal that the participants obtained notable grades, ranging from notable (7.4/10) to outstanding (9.3/10). However, lower scores were observed in the stations dedicated to the evaluation of the Anatomy and Physiology of the Central Nervous System (CNS) (mean = 0.55/1, SD = 0.19) and the interpretation of complementary tests (mean = 1.47/2, SD= 0.28). It is crucial to highlight that knowledge of the Anatomy and Physiology of the Nervous System is essential to understand the Neurophysiology of Nociception. In the Master's program, students are taught about the complexity of pain, delving into the idea that this phenomenon arises when nociceptors are activated in response to painful stimuli, transmitting nerve signals to the brain. However, the difficulty of the subject, both in the use of specialized lexicon and the need for abstract thinking, may be one of the reasons that explain the lower grades. In addition, it is crucial to have a deep knowledge of anatomy to interpret radiological images, since these represent body regions at different depth levels and at different projection angles. Therefore, a lack of understanding of anatomy may pose an additional obstacle to the proper interpretation of the ultrasounds proposed in the OSCE, since they were asked to identify an anatomical structure on the ultrasound and explain its echogenicity in relation to other structures on the ultrasound. same region examined. By the way, in ultrasound, echogenicity measures how well tissues reflect ultrasound and depends essentially on the density of the tissue being explored. Furthermore, to assess their understanding of this concept of echogenicity and its practical application, they were asked to describe what they saw using terms such as anechoic, hypoechoic or hypoechogenic, isoechoic or isoechogenic, and hyperechoic or hyperechogenic.

One of the causes proposed to explain this phenomenon is the intricate nature of musculoskeletal anatomy. Because a single image can encompass bones, muscles, tendons, ligaments, and other similar tissues, it was challenging to distinguish between structures with similar echogenicity. This complexity makes the interpretation of ultrasounds a challenge for students. Another factor that could be influencing the results obtained is the lack of previous experience or adequate preparation. Although the program includes specific subjects intended to prepare students for the exam, the learning curve in interpreting ultrasound images is a process that requires repetitive practice and adequate time. In fact, several studies have shown that repetitive practice and time spent interpreting ultrasounds can improve accuracy and confidence in reading the images. It is crucial to recognize, furthermore, that lack of access to equipment and tools to practice prior to the OSCE may be a critical factor contributing to poor practice preparation in this skill set, and thus the lower scores observed.

In light of the above, study participants obtained an average score of 1.47 out of a possible score of 2 on this station. This suggests that their performance did not reach the expected level, especially considering that at least 10% of the program's teaching is dedicated to practicing this skill. Furthermore, the students' self-perception of performance also reflected this poor performance, with 23.81% perceiving their performance as fair and 19.1% of participants evaluating it as poor. It should be noted that this station recorded the highest percentage of negative evaluations in all the stations observed. These results coincide with the findings of Arguisuelas (2022), who pointed out that procedural skills are one of the most common weaknesses in students who undergo OSCE tests .

The results obtained in our study show significant similarities with the findings of a research carried out at the Andrés Bello University (Chile), which focused on the evaluation of clinical skills through the OSCE of 114 undergraduate Physiotherapy students. In both investigations, a need was observed to strengthen the skills of interpretation of clinical parameters, since both concluded that this area recorded the lowest average score .

Regarding our work, the highest scores were achieved in the skills of Physical Examination and in Clinical Judgment, diagnostic and therapeutic management plan. The mean score for the Physical Examination skills was 1.48 out of 2 possible, with a standard deviation of 0.28 and an interquartile range of 1. Likewise, the mean score for the diagnostic and therapeutic management plan was of 3.6 out of a total of 4 possible points, with a standard deviation of 0.42 and an interquartile range of 1, indicating that the majority of students obtained notable scores.

Furthermore, in relation to the level of satisfaction and performance perceived by the students during the OSCE test, it can be deduced that they felt very satisfied with the test and the results obtained in the evaluations coincide with the way in which the students rate their own performance . These results are in accordance with previous studies that also highlight the high level of satisfaction with this evaluation system, highlighting its usefulness to increase student training in solving complex tasks. In another previous investigation, it was found that the majority of participants expressed high levels of satisfaction when using the OSCE, corroborating its effectiveness for professional training and evaluation (20). The results of our research also indicate that 95.1% of the participants gave high or very high scores to the OSCE organization, reflecting their general satisfaction. These findings are consistent with those reported by De la Barra-Ortiz et al. (2022), who also found high levels of satisfaction with the organization of the assessment test.

Regarding students' satisfaction with their intellectual progress and general performance during the exam, the majority of participants (85.7%) expressed positive responses, slightly exceeding the percentage of responses described in a previous study (82.6%) . Although our research evaluated the degree of acceptance of this educational methodology for the professional practice of the Orthopedic Manual Therapy specialist, 85.7% of those surveyed expressed their satisfaction, a figure that, although positive, is somewhat lower than 92.67% found in the work of De la Barra-Ortiz et al. (2022). In a previous research, the level of student satisfaction was explored in relation to the usefulness of the OSCE as an educational tool, and although the general satisfaction was positive, it is relevant to note that 95.2% of the participants would recommend the methodology, a percentage slightly lower than the 98.17% also reported by the study by De la Barra-Ortiz et al. (2022).

### Limitations

It is crucial to highlight that the interpretation of the results must be carried out with caution due to the inherent limitations of the research. These limitations have the potential to affect the external validity of the findings, restricting their applicability to the general population. One of the fundamental challenges lies in the small size of the sample, which prevents the formulation of definitive conclusions. Furthermore, the choice of a non-probabilistic sampling technique, which exclusively recruited students from the same postgraduate degree, constitutes another significant limitation. To address this issue, it would be beneficial to expand the coverage of the study to include students from different postgraduate programs in Physiotherapy, even from different academic institutions. This expansion would strengthen the external validity of the research by providing more representative findings.

In another order of ideas, it is essential to highlight the lack of consideration in the analysis of the results with respect to the confounding variable of work experience. This omission is relevant, since work experience could have a considerable impact on the outcome variables analyzed in this study. Therefore, we advocate for the inclusion of this variable in future research, recognizing it as a crucial factor when assessing the practical clinical competence of a physiotherapist.

It is worth mentioning that, despite the existence of a checklist validated by the OSCE committee and the corresponding training provided, the evaluation task may be influenced by the subjectivity inherent to the process. In this section, it is observed that the scores in the "mailbox" type stations, where the students handed in a form with the resolution, present less variability compared to the "scenario" type stations, finding a noticeably higher dispersion value of the results.

Following the thesis of Terry et al. (2020) we propose to involve the ECOE committee, in addition to academics, professionals from the business sector in charge of contracting for the identification of new competencies, drafting the specifications tables and formation of evaluation rubrics. Your participation could enrich the test with practical insights. Additionally, we suggest that the stations focus on the evaluation of transversal skills, such as verbal and non-verbal communication, interpersonal relationships or ethical behaviors and professionalism, as well as practical skills, such as budgeting, inventory management or business billing.

### 5. Conclusions

- We have used an OSCE test to evaluate the clinical reasoning and practical skills of the students of the Master in Orthopedic Manual Therapy at the European University of the Canary Islands.
- Overall, ratings are high, especially at the physical examination and treatment stations. However, it is important to highlight that the lowest scores were observed in subjects such as Anatomy and interpretation of complementary tests.
- It is interesting to note that the students expressed their satisfaction with their experience in the OSCE, although their self-perception of effectiveness was comparatively lower in the interpretation of complementary tests than in other stations.

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