



## Information about the subject

**Degree:** Bachelor of Science Degree in Podiatry

**Faculty:** Faculty of Medicine and Health Sciences

**Code:** 470203 **Name:** Orthopodiatry I

**Credits:** 6,00 **ECTS Year:** 2 **Semester:** 1

**Module:** PODIATRIC PATHOLOGY, ORTHOPEDIC, PHYSICAL AND PHARMACOLOGICAL  
TREATMENTS

**Subject Matter:** Orthopodology **Type:** Compulsory

**Field of knowledge:** Health Sciences

**Department:** Pathology

**Type of learning:** Classroom-based learning

**Languages in which it is taught:** Spanish

**Lecturer/-s:**

472A Raul Gallego Estévez (**Responsible Lecturer**)

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## Module organization

### PODIATRIC PATHOLOGY, ORTHOPEDIC, PHYSICAL AND PHARMACOLOGICAL TREATMENTS

Subject Matter	ECTS	Subject	ECTS	Year/semester
Orthopodology	12,00	Orthopodiatry I	6,00	2/1
		Orthopodiatry II	6,00	2/2
Pathology	18,00	Dermatology	6,00	2/2
		General Pathology	6,00	2/1
		Podiatric Pathology	6,00	2/1
Therapeutics	12,00	Pharmacological Therapeutics	6,00	3/1
		Physical Podiatry	6,00	3/1

## Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student can describe the composition and operation of an orthopodology workshop.
- R2 The student manages the equipment and tools necessary for obtaining moulds and orthopaedic treatments, applying safety and risk prevention standards.
- R3 The student can obtain the different partial moulds of the lower limb, by means of the contrasted techniques of greater use at present.
- R4 Knows the characteristics and indications of the materials usually used in orthopodology for the creation of plantar and digital orthoses.
- R5 The student knows the steps to follow in the elaboration of orthopedic treatments.



## Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students demonstrate knowledge and understanding in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.		X		
CB3	Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues.			X	
CB4	Students convey information, ideas, problems and solutions to both specialized and non-specialized audiences.		X		
CB5	Students develop those learning skills necessary to undertake further studies with a high degree of autonomy.			X	
SPECIFIC		Weighting			
		1	2	3	4
CE46	Students know and develop the exploration techniques, to issue a diagnosis and prognosis, and to design the orthopodologic treatment plan of the lower limb pathology. Bone and ligament muscle trauma. Pathology of the forefoot and hindfoot. Congenital deformities. Neurological injuries. Amputations. Asymmetries				X
CE47	Students develop the ability and skill in the use of the instruments, material and machinery used for the preparation and application of orthopedic treatments. General concept of orthopedics. The orthopedic workshop. Technology of orthopodological therapeutic materials. Fundamentals and techniques for foot-leg moulding.				X



CE48 Students design, obtain and apply by means of different techniques and materials the plantar supports and digital orthoses, prostheses, splints. Plantar and digital orthoses. Study of footwear and shoe therapy. Prescription of orthopaedic treatments of the lower limb

X

## TRANSVERSAL

## Weighting

1 2 3 4

CT1 Analytical capabilities

X

CT7 Problem solving

X

CT8 Decision making

X

CT10 Interdisciplinary teamwork

X

CT14 Critical Reasoning

X

CT15 Ethical commitment

X

CT16 Autonomous learning

X

CT17 Adaptation to new situations

X

CT18 Creativity

X

CT21 Initiative and entrepreneurship

X

CT22 Motivation for quality

X



## Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R5	55,00%	Tests
R2, R3, R5	15,00%	Practice (exercises, case studies, problems)
R1, R2, R3, R4, R5	5,00%	Class participation
R2, R3, R5	25,00%	Practice exam- technical proficiency testing

### Observations

#### Minimum criteria to pass the subject of Orthotics I:

- Have exceeded 50% of each assessment instrument, to average.

#### Evaluation criteria:

To pass the subject it will be mandatory:

- Perform all evaluable activities on the platform.
- The pass is considered a minimum grade of 5 out of 10.
- Have passed the final and practical exam.

#### Theoretical evaluation (55%)

It will be carried out at the end of the course, through a final exam consisting of 50 objective multiple-answer questions (type test).

- The wrong answers penalize according to the formula:  $\text{Successes} - (\text{Errors} / \text{Answer No.} - 1) = X / (\text{No. of questions} / 10)$

The duration of the exam will be 75 minutes.



It is essential to have passed the exam in order to average with all the evaluation instruments.

The minimum grade to pass the written test will be 5 out of 10. If the written test is not passed, the note about 10 will appear on the intranet.

### **Practical examination (25%)**

It will be carried out at the end of the course, through a final exam that will consist of the completion of an element made during the internship. The exam will be evaluated according to rubric.

- Description and knowledge of the technical materials used in Orthopodology.
- Obtaining lower limb molds.
- Performing digital orthosis.
- Making a pattern
- Performing a plantar orthosis

The duration of the exam will be 30 minutes.

### **Practical laboratory (15%)**

It will be mandatory to attend and pass the practical workshops carried out throughout the course. The workshops will be evaluated by means of a memory of the same.

### **Class participation (5%)**

The participation in class and practices, as well as the collaborative attitude, will be positively valued.

**Maintaining the respective percentages, the evaluation systems set out above may be developed in a continuous evaluation mode throughout the semester, informing the students in advance and collecting this information on the subject's UCVnet platform.**

The grade of the exceeded parts will be saved for the second call of the same registration, whatever the grade obtained in the first call. In successive enrollments no partial notes of any evaluation element are kept.



## MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

## Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Theoretical classes (TC). Training activity preferably oriented to the acquisition of knowledge skills. It is characterised by the fact that students are spoken to. Also called master class or expository class, it refers to the oral exposition made by the teacher, (with the support of a blackboard, computer and cannon for the exposition of texts, graphics, etc.).
- M2 Seminars (S). Training activity preferably oriented to obtain knowledge application and research competences. Knowledge is built through interaction and activity. Consisting of supervised monographic sessions with shared participation (Teachers, students, experts). The size of the group is variable, from a large group to small groups, no less than 6 students for interaction. The evaluation will be made by means of follow-up records by the teacher. Participation and development of problem-solving skills should be taken into account.
- M3 Problems practice (CPP). Training activity oriented to group work for problem solving under the supervision of a teacher. The size of the group is variable, in a range of 10-20 students, to avoid confusion with a master class.
- M6 Laboratory Practice (CPL). Training activity of work in groups that is developed in the Laboratory. It includes the sessions where students actively and autonomously develop, supervised by the teacher, laboratory experiments. The size of the group is variable, in a range of 10-20 students.



- M7      Tutorials (T). Set of activities carried out by the teacher with personalised attention to the student or in small groups with the aim of reviewing and discussing the materials and topics presented in the classes, seminars, readings, completion of assignments, etc. The aim is to ensure that education is truly a comprehensive training of the student and is not reduced to a transfer of information. It is, therefore, a personalized relationship of help in which the teacher-tutor attends, facilitates and guides one or more students in the formative process.
- M8      Evaluation (Ev). It is the set of processes that try to evaluate the learning results obtained by the students and expressed in terms of acquired knowledge, capacities, developed skills or abilities and manifested attitudes. It covers a wide range of activities that can be developed for students to demonstrate their training (e.g. written, oral and practical tests, projects or assignments,). It also includes Official Calls.
- M10     Estudio del alumno: Preparación individual de lecturas, ensayos, resolución de problemas, seminarios





## IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1	R1, R2, R3, R4, R5	34,00	1,36
Practice lessons M6	R2, R3, R5	24,00	0,96
Office Hours M7	R1, R2, R3, R4, R5	12,00	0,48
Evaluation M8	R1, R2, R3, R4, R5	5,00	0,20
<b>TOTAL</b>		<b>75,00</b>	<b>3,00</b>

## LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M10	R1, R4, R5	50,00	2,00
Group work M10	R2, R3	25,00	1,00
<b>TOTAL</b>		<b>75,00</b>	<b>3,00</b>



## Description of the contents

Description of the necessary contents to acquire the learning outcomes.

### Theoretical contents:

Content block	Contents
DIDACTIC UNIT I: General concepts of orthopedics and orthopodology	<ol style="list-style-type: none"><li>1.History of orthopedics</li><li>2.Basic concepts of orthopedics and orthopedology.</li><li>3.Orthopedic laboratory. Regulations in force</li><li>4.Knowledge of the facilities and handling of the orthopodology workshop-laboratory equipment (machinery and tools).</li></ol>
DIDACTIC UNIT II: Materials technologies most frequently used in Orthopodology	<ol style="list-style-type: none"><li>1.Materials technology</li><li>2.Traditional and composite materials</li><li>3.Compact thermoplastics</li><li>4.Expanded thermoplastics</li><li>5.Adhesives</li><li>6.Knowledge and handling of materials used in orthopodology.</li></ol>
DIDACTIC UNIT III: Techniques for obtaining casts of the lower limb.	<ol style="list-style-type: none"><li>1.Fundamentals and materials used in obtaining molds.</li></ol> <p>New technologies applied in the acquisition</p> <ol style="list-style-type: none"><li>2.Obtaining a negative mold with phenolic foam and plaster.</li><li>3.Positivation and modification of the mold</li></ol>
DIDACTIC UNIT IV: Materials technologies most frequently used in digital orthotics	<ol style="list-style-type: none"><li>1.Fundamentals and materials used in obtaining digital orthotics</li><li>2.Knowledge and management of digital orthotics.</li></ol>
DIDACTIC UNIT V: Fundamentals of plantar orthotics.	<ol style="list-style-type: none"><li>1. Basic concepts of OP and research on biomechanical effects.</li><li>2.Orthopedic treatment plan</li><li>3.Different types of orthotics. Design and confection.</li><li>4.Preparation of patterns for orthoses.</li><li>5.Basic fabrication of plantar orthoses.</li></ol>



## Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT I: General concepts of orthopedics and orthopodology	6,00	12,00
DIDACTIC UNIT II: Materials technologies most frequently used in Orthopodology	9,00	18,00
DIDACTIC UNIT III: Techniques for obtaining casts of the lower limb.	6,50	13,00
DIDACTIC UNIT IV: Materials technologies most frequently used in digital orthotics	7,00	14,00
DIDACTIC UNIT V: Fundamentals of plantar orthotics.	9,00	18,00



## References

### Básic:

1. Gerrard JM, Bonanno DR, Whittaker GA, Landorf KB. Effect of different orthotic materials on plantar pressures: a systematic review. *J Foot Ankle Res.* 2020 Jun 11;13(1):35. doi: 10.1186/s13047-020-00401-3.
2. Girard O, Morin JB, Ryu JH, Van Alsenoy K. Custom foot orthoses improve performance, but do not modify the biomechanical manifestation of fatigue, during repeated treadmill sprints. *Eur J Appl Physiol.* 2020 Sep;120(9):2037-2045.
3. Hajizadeh M, Michaud B, Desmyttere G, Carmona JP, Begon M. Predicting foot orthosis deformation based on its contour kinematics during walking. *PLoS One.* 2020 May 7;15(5):e0232677.
4. Hunter S, Dolan G, Davis JM. Foot orthotics in therapy and sport. Champaign: Human Kinetics, cop.; 1995.
5. Kirby KA. Biomecánica del pie y la Extremidad Inferior II: Artículos de Precision Intricast, 1997-2002. Payson: Precision Intricast; 2002.
6. Kirby KA. Biomecánica del pie y la Extremidad Inferior III: Artículos de Precision Intricast, 2002-2008. Payson: Precision Intricast; 2009.
7. Kirby KA. Biomecánica del pie y la Extremidad Inferior: Colección de una década de artículos de Precision Intricast. Payson: Precision Intricast; 1997.
8. Kirby KA. Foot and lower extremity biomechanics IV: Precision Intricast Newsletters, 2009-2013. Payson: Precision intricast; 2014.
9. Kirby KA. Foot and lower extremity biomechanics V: Precision Intricast Newsletters, 2014-2018. Payson: Precision intricast; 2019.
10. Maharaj JN, Cresswell AG, Lichtwark GA. The Immediate Effect of Foot Orthoses on Subtalar Joint Mechanics and Energetics. *Med Sci Sports Exerc.* 2018 Jul;50(7):1449-1456.
11. Michaud TC. Foot orthoses and other forms of conservative foot care. Baltimore: Williams & Wilkins; 1993.
12. Nigg B. Biomechanics of Sport Shoes. Calgary: Topline Printing Inc.; 2010.
13. Petcu D, Mitrea DA, Bondor CI, Perciun ER. The potential of ultrasonography in the evaluation of foot orthotics therapy. *Med Ultrason.* 2017 Nov 29;19(4):416-422.
14. Scherer P. Recent Advances in Orthotic Therapy. USA: Lower Extremity Review; 2011.
15. Su S, Mo Z, Guo J, Fan Y. The Effect of Arch Height and Material Hardness of Personalized Insole on Correction and Tissues of Flatfoot. *J Healthc Eng.* 2017;2017:8614341.
16. Tenten-Diepenmaat M, Dekker J, Heymans MW, Roorda LD, Vliet Vlieland TPM, van der Leeden M. Systematic review on the comparative effectiveness of foot orthoses in patients with rheumatoid arthritis. *J Foot Ankle Res.* 2019 Jun 13;12:32.
17. Tran K, Spry C. Custom-Made Foot Orthoses versus Prefabricated foot Orthoses: A Review of Clinical Effectiveness and Cost-Effectiveness [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2019 Sep 23. PMID: 31714699.
18. Werd MB, Knight EL, editores. Athletic Footwear and Orthoses in Sports Medicine. USA:



Springer Science; 2010.

19.Yuan, Munan et al. "3D foot scanning using multiple RealSense cameras." *Multim. Tools Appl.* 80 (2021): 22773-22793.

### Complementary:

1.Céspedes T,Dorca A,Lluis N, Ortega MJ, Rodricio E. Elementos ortésicos en el antepié. Barcelona: Publicacions Universitat de Barcelona; 1994.

2.Evans AM. Paediatrics (pocket podiatry). Mathieson I, editor. Churchill Livingstone; 2010

3.Hsu JD,Michael JW, R. Fisk JR, editores. AAOS Atlas of orthoses and assistive devices. 4<sup>a</sup> ed. Philadelphia: Mosby-Elsevier; 2008.

4.Levy AE, Cortés JM. Ortopodología y aparato locomotor. Ortopedia de pie y tobillo. Barcelona: Masson; 2003.

5.Lusardi MM, Jorge M, Nielsen CC. Orthotics and Prosthetics in Rehabilitation, 3rd Edition. USA: Elsevier Health Sciences; 2012.

6.May BJ Lockard MA.Prosthetics & Orthotics in Clinical Practice: A Case Study Approach. F.A. Davis Company; 2011

7.Merriman LM, Turner W. Assesment of the lower limb. 2<sup>a</sup> ed. London: Churchill Livingstone; 2002.

8.Nuñez-Samper M, Llanos LF. Biomecánica, medicina y cirugía del pie. 2<sup>a</sup> ed. Barcelona: Masson; 2007.

9.Philps JW. The functional foot orthosis. 2<sup>a</sup> ed. Edinburgh: Churchill Livingstone; 1995.

10.Prat J. Guía de uso y prescripción de productos ortoprotésicos a medida. Valencia: Instituto de Biomecánica de Valencia; 1999.

11.Subirana MQ. Manual de técnicas en ortopodología. Barcelona: Ediciones especializadas europeas; 2004.

12.Thomson P, Volpe R, editores. Introduction to Podopediatrics. 2<sup>a</sup> ed. Churchill Livingstone; 2001.

13.Turner W, Merriman L. Habilidades clínicas para el tratamiento del pie". Barcelona: Elsevier; 2007.

14.Valmassy RL. Clinical biomechanics of the lower extremities. St. Louis: Mosby; 1996.

15.Viladot, A. "Patología del antepié". Barcelona. Springer.

### Web page:

1.<http://www.podiatry-arena.com/>

2.<http://www.prolaborthotics.com/>

3.<http://www.orthoinfo.org/>

4.<http://www.podiatrytoday.com/>

5.<http://lrmagazine.com/>