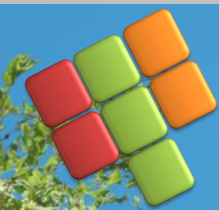


XVI edición Jornadas de Actualización
en Prótesis y Ortesis

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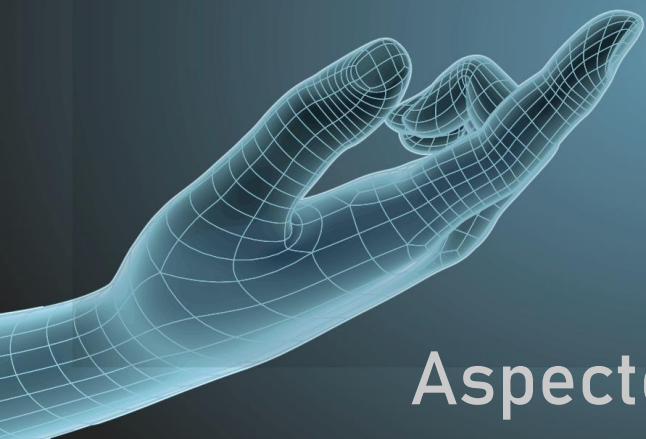
Granada 19 al 21 febrero



Picture Casting Software v.3.53 © 2021 Ortoiberica S.L.

CAD-CAM en ortopedia técnica

Servando Pérez PC6 Ortoiberica



Aspectos esenciales





Madrid 2014:

"Todo acto de creación es, en primer lugar, un acto de destrucción" *Pablo Picasso*



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¿ Por qué ?



PRÓTESIS
BIÓNICAS

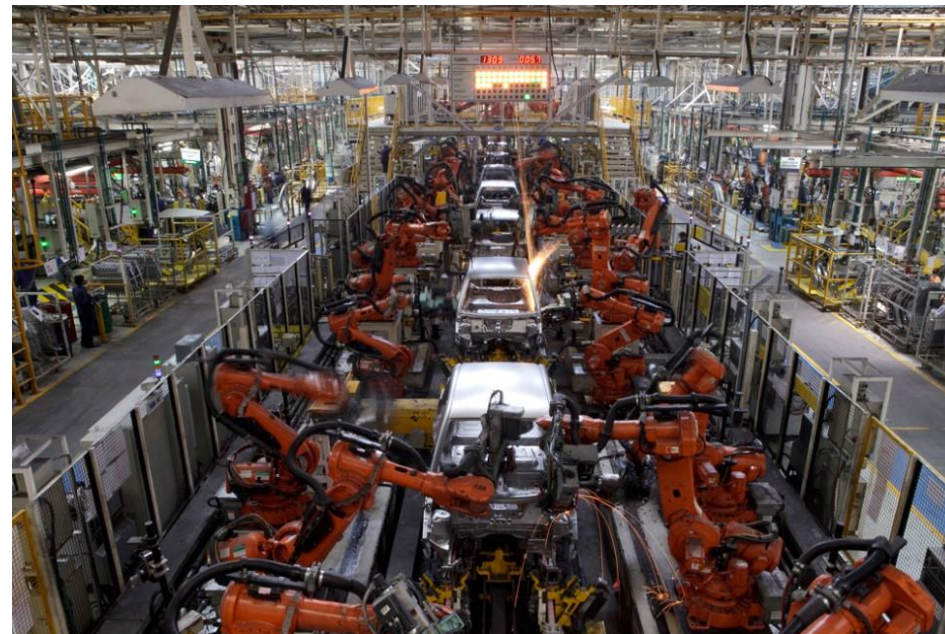


¿ Por qué ?

1958

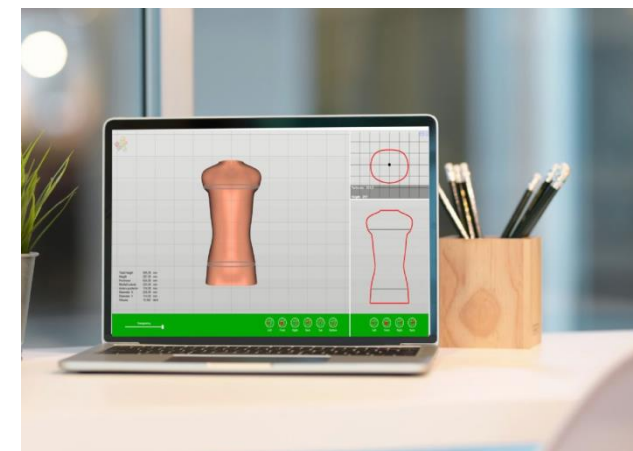


hoy



¿ Por qué ?

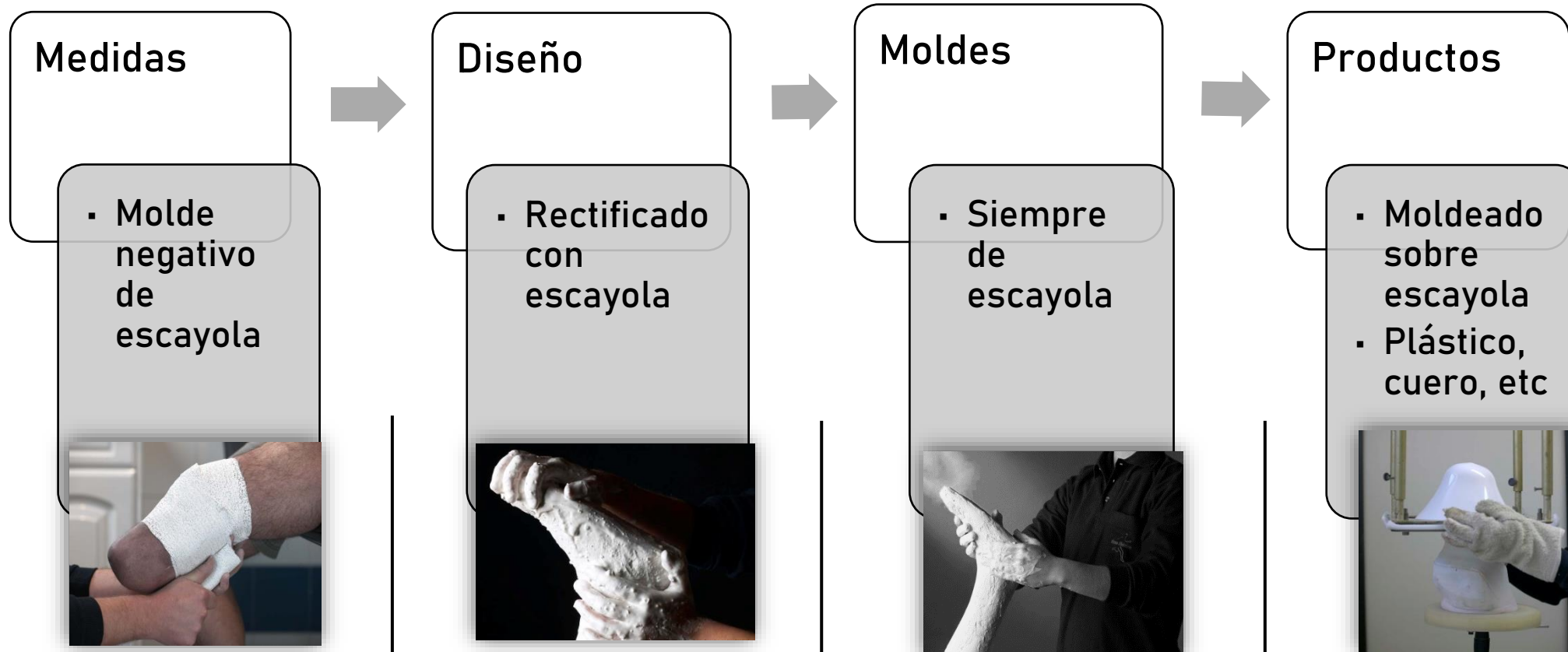
- Porque las circunstancias actuales dan paso del técnico “artesano” al “tecnológico”.
- Porque el mercado es muy competitivo, el tiempo cuenta y los costes también.
- Porque el paciente también cuenta –quien más–.
- Porque pasamos de CAD para fresar (rectificar) *Pi.Cas.So.* a CAD para imprimir (diseñar) *Xue-Go*
- Porque estamos en 2025 ??



Sistema de fabricación a medida con escayola

Ortopedia “a medida”

Sistema tradicional



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Tecnología CAD-CAM de Ortoibérica para la ortopedia técnica

Ortopedia "a medida"

Sistema CAD-CAM

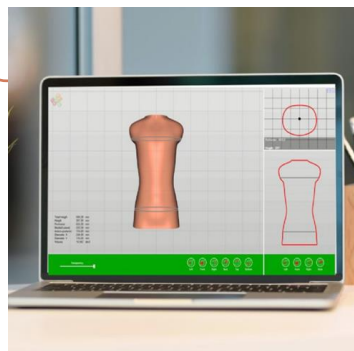
Medidas

- Escáneres
- 3D
- 2D



Diseño

- Software CAD



Moldes

- Fresadoras
- PU



Productos Servicios

- Epsilon
- Impresión 3D ...



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Medidas

Escáner

3D

- EinScan H
- Einstar
- Vega

2D

- Step to Step 2D

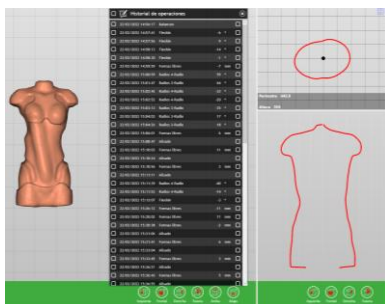


Diseño

CAD

Pi.Cas.So

Xue-Go



Moldes o producto

CAM

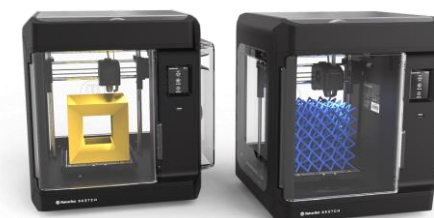
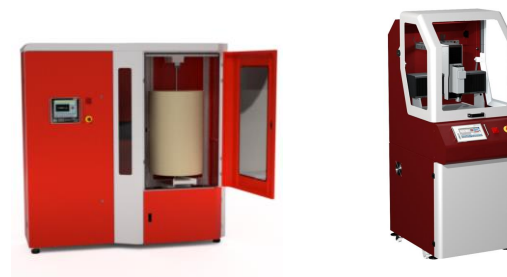
Carvers

- Cilíndricas
- Planas

Robot

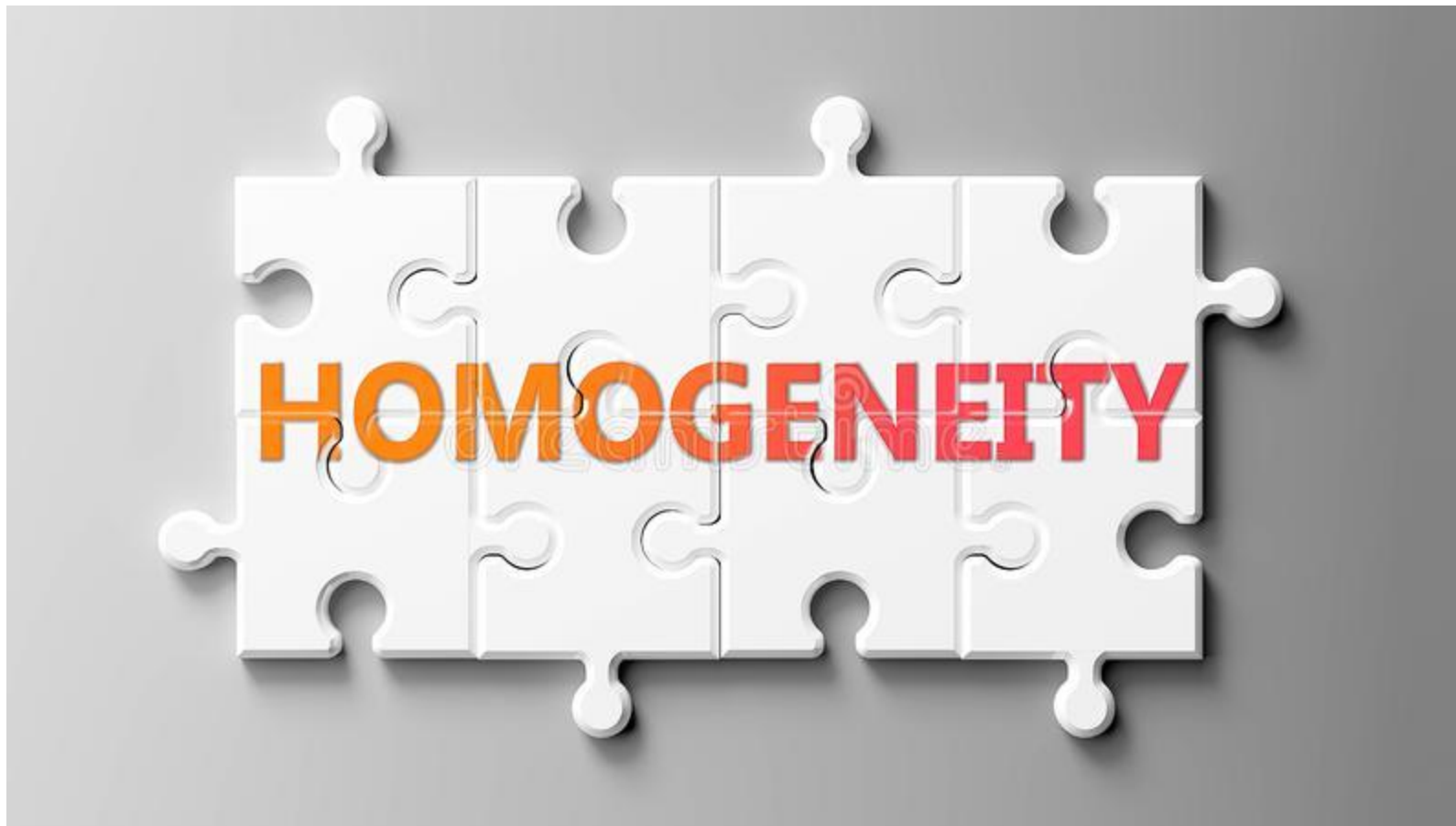
- 7 ejes
- Formas complejas

Printer 3d



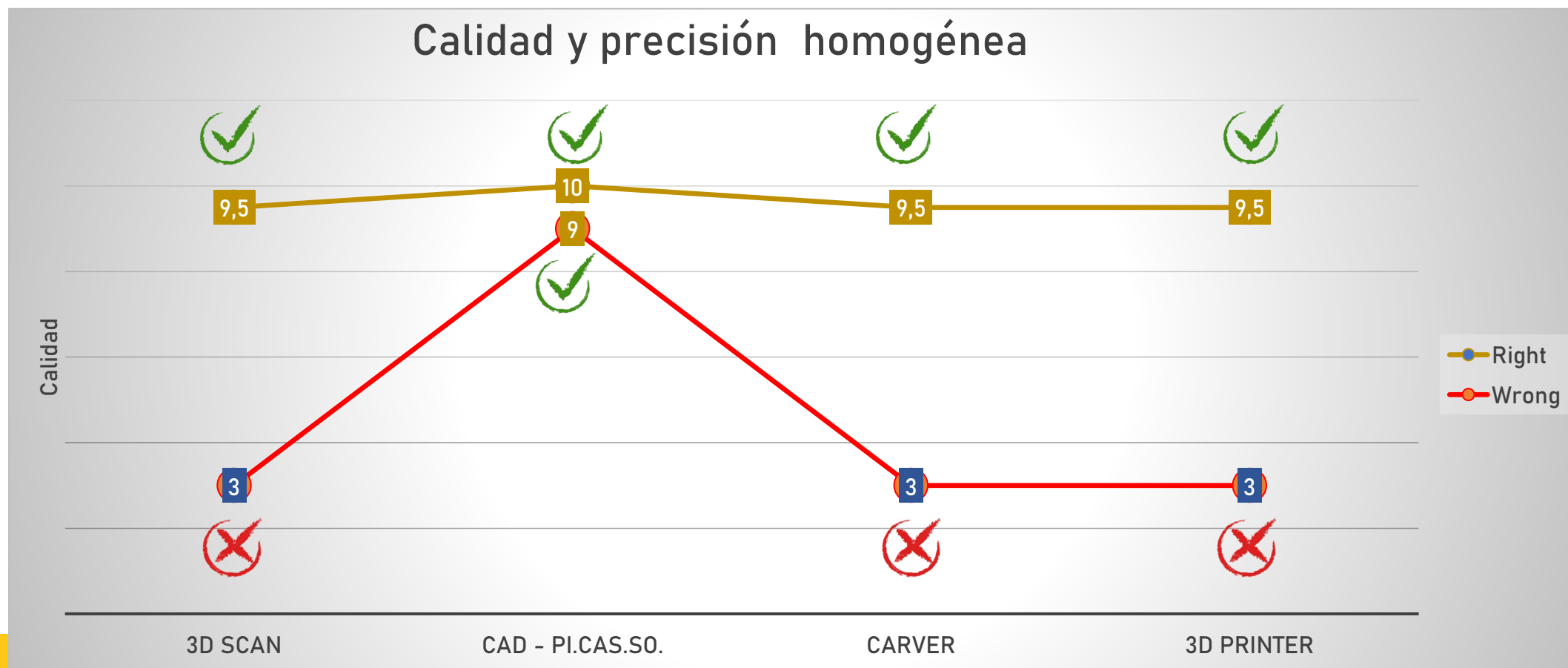
ORTOGRA 2025

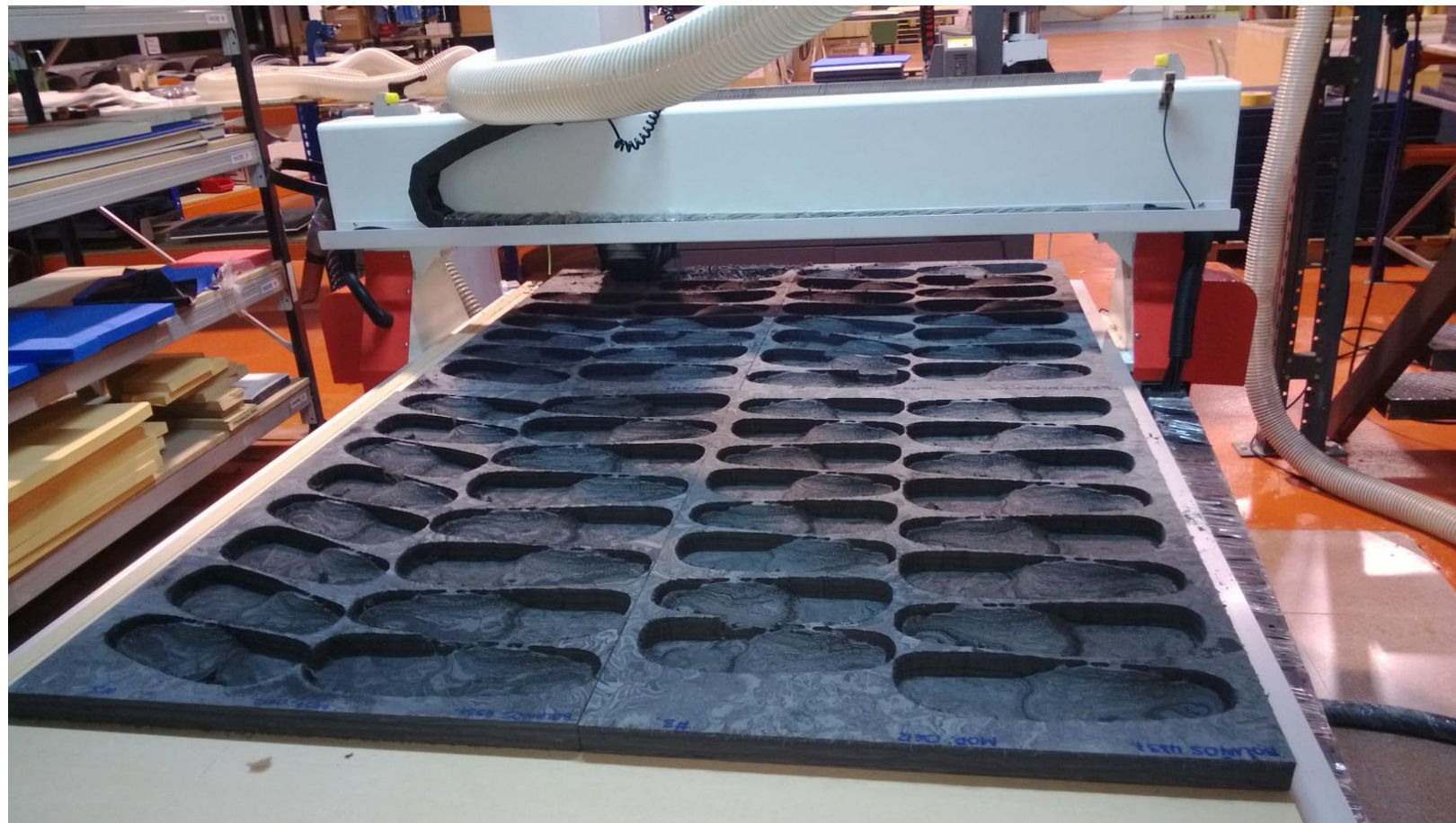






En todas las fases del proceso...





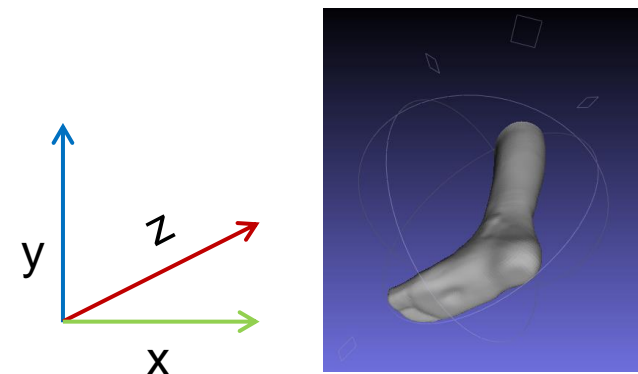
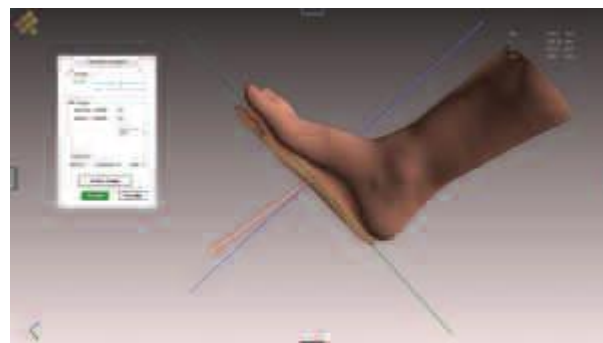
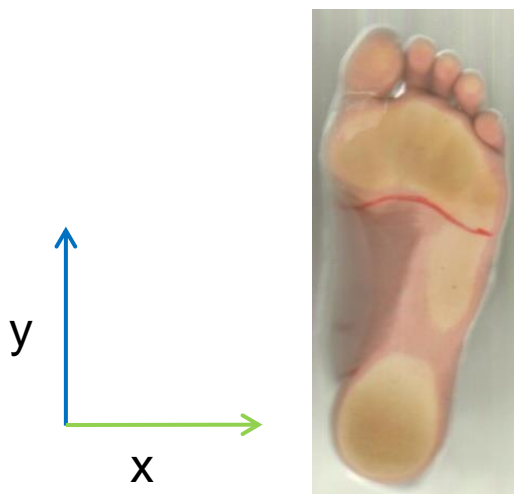
Escáneres 2D

STEP TO STEP

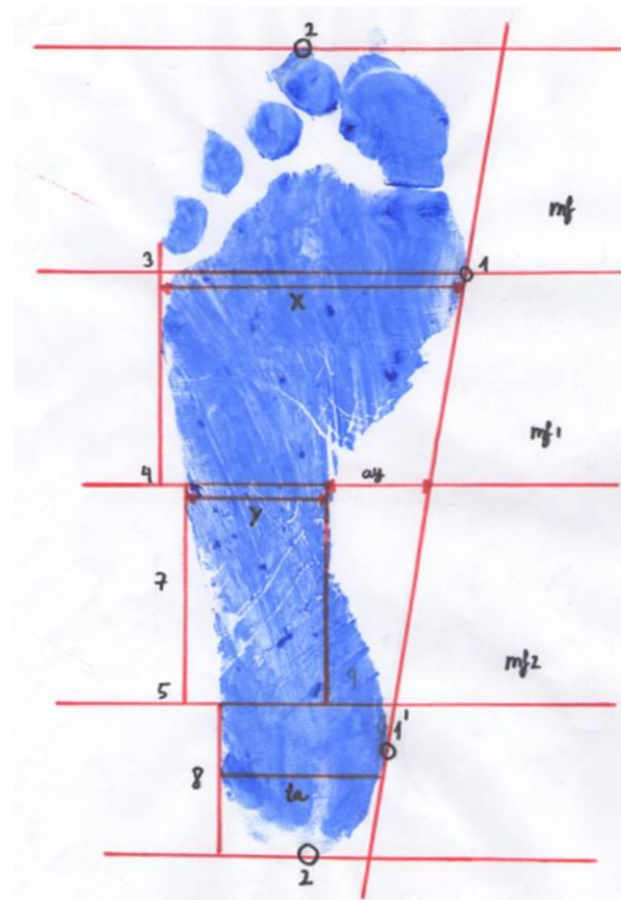


2D vs. 3D

- 2D = dos Dimensiones (ancho y alto).
- 3D = tres Dimensiones (ancho, alto y profundidad).
- La realidad son tres dimensiones: volumen.



Métodos tradicionales toma de medidas en 2D

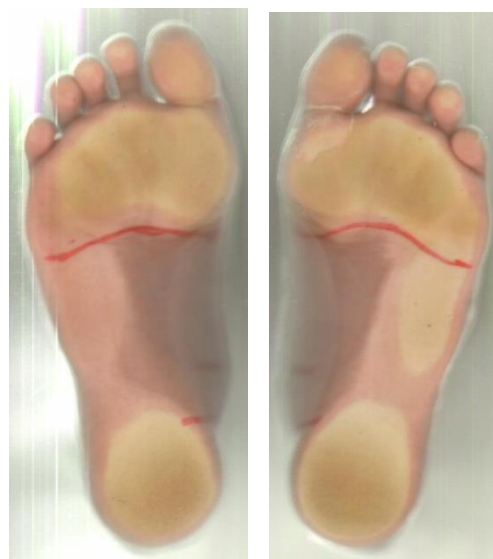


¿Qué es el escáner 2D STEP TO STEP ?.

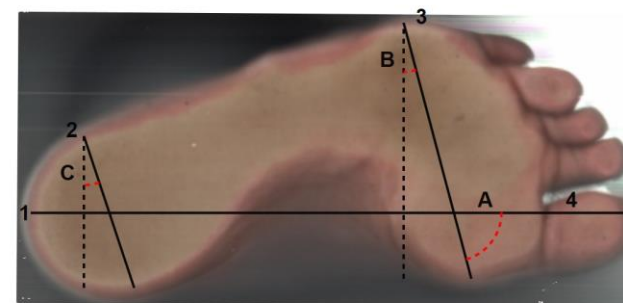
Pedígrafo Digital

Se integra en el software de diseño Pi.Cas.So

Informe de geometría del pie



← Toni Rodriguez Imprimir imagen



Distancia 11,48 cm
Distancia X 2,99 cm
Distancia Y 11,00 cm

Geometría		
● 1	Longitud de pie	26,46 cm
● 2	Anchura de talón	6,93 cm
○ 3	Anchura de metatarso	11,46 cm
× 4	Longitud antepié	7,78 cm
A	Ángulo metatarsal	24,46 °
B	Ángulo pedálico	15,54 °
C	Ángulo talón	19,12 °
○	Derecho	
●	Esquadrado	

Cerrar



Geometría 11



Geometría



Cuadrado



Triángulo



Rectángulo



Círculo



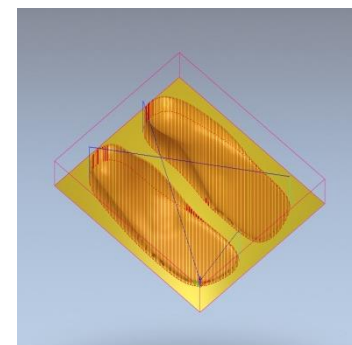
La mayor ventaja...



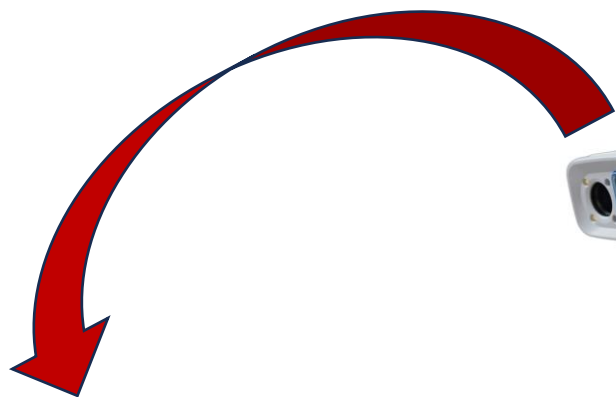
STEP TO STEP



Pi.Cas.So

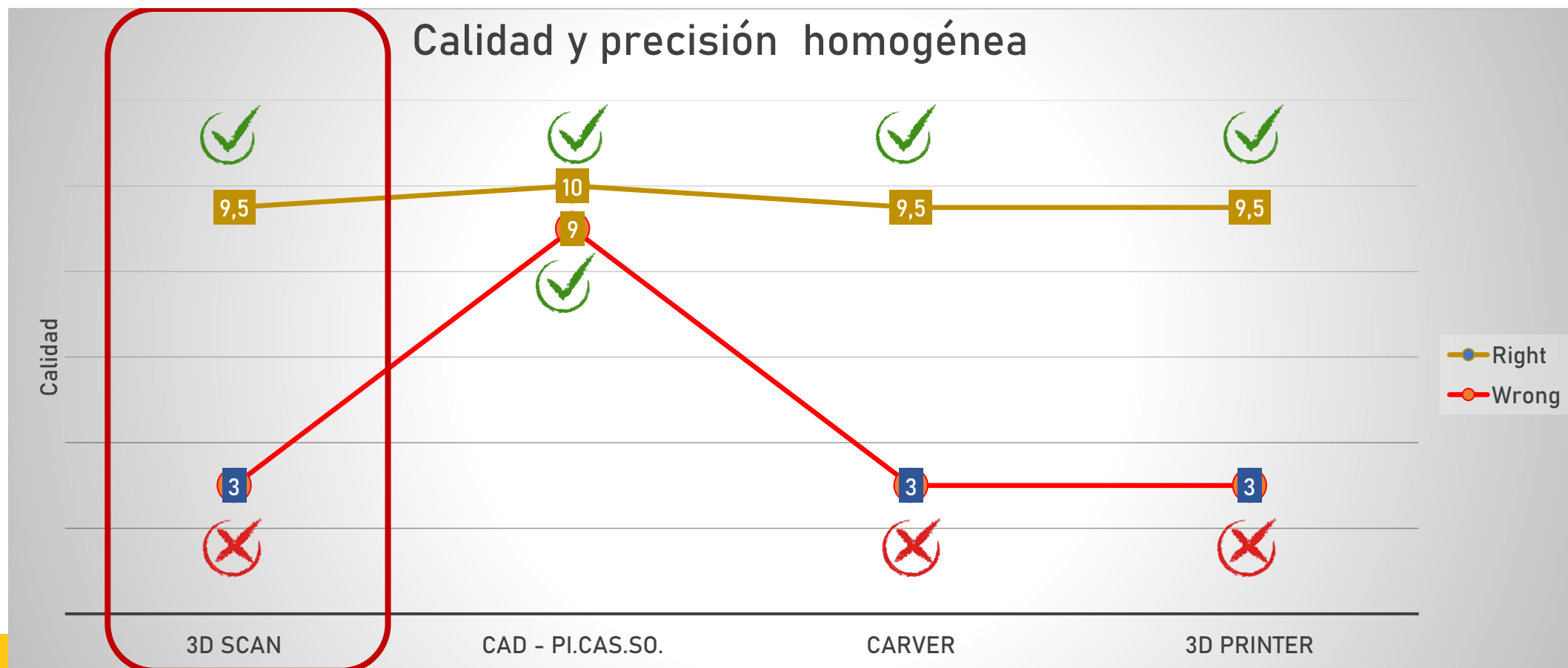


Escáneres 3D





En todas las fases del proceso...





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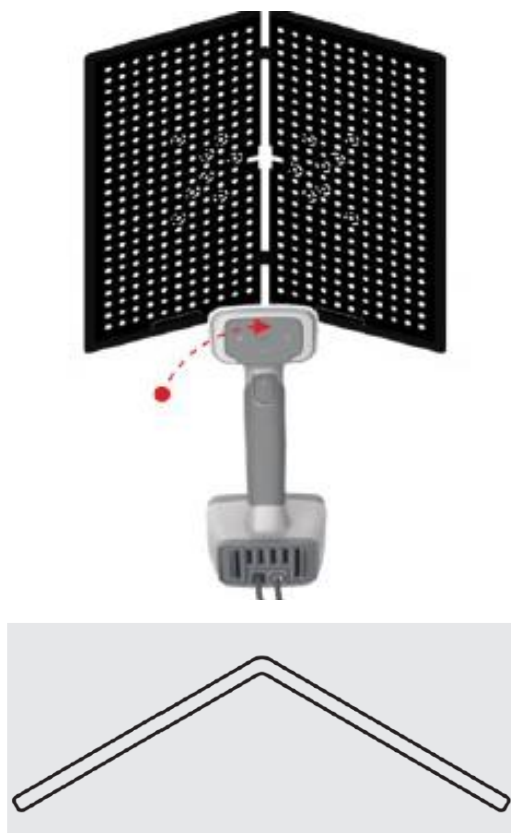


Nuestro recorrido...

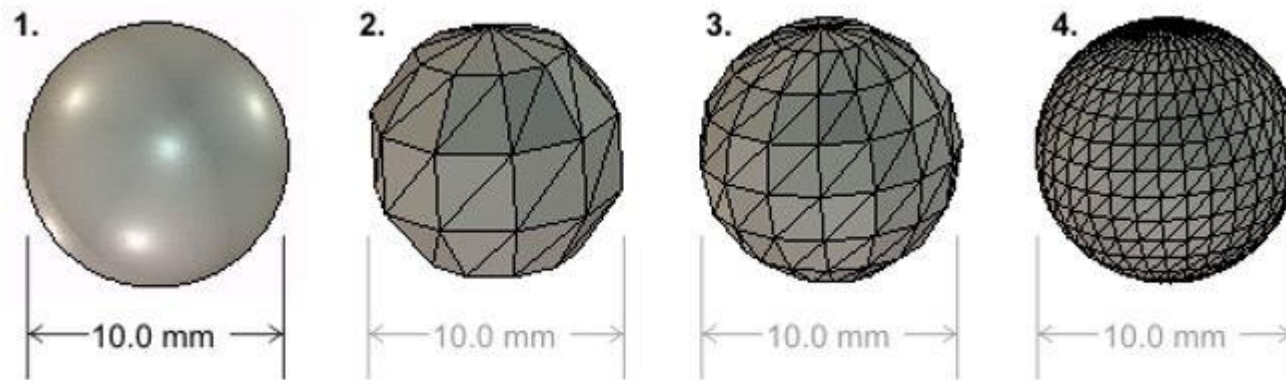




Calibración



Determinante: la calidad del escáner...

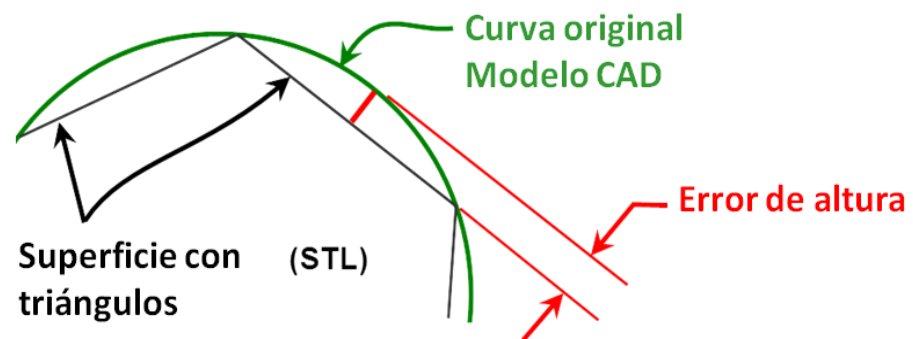


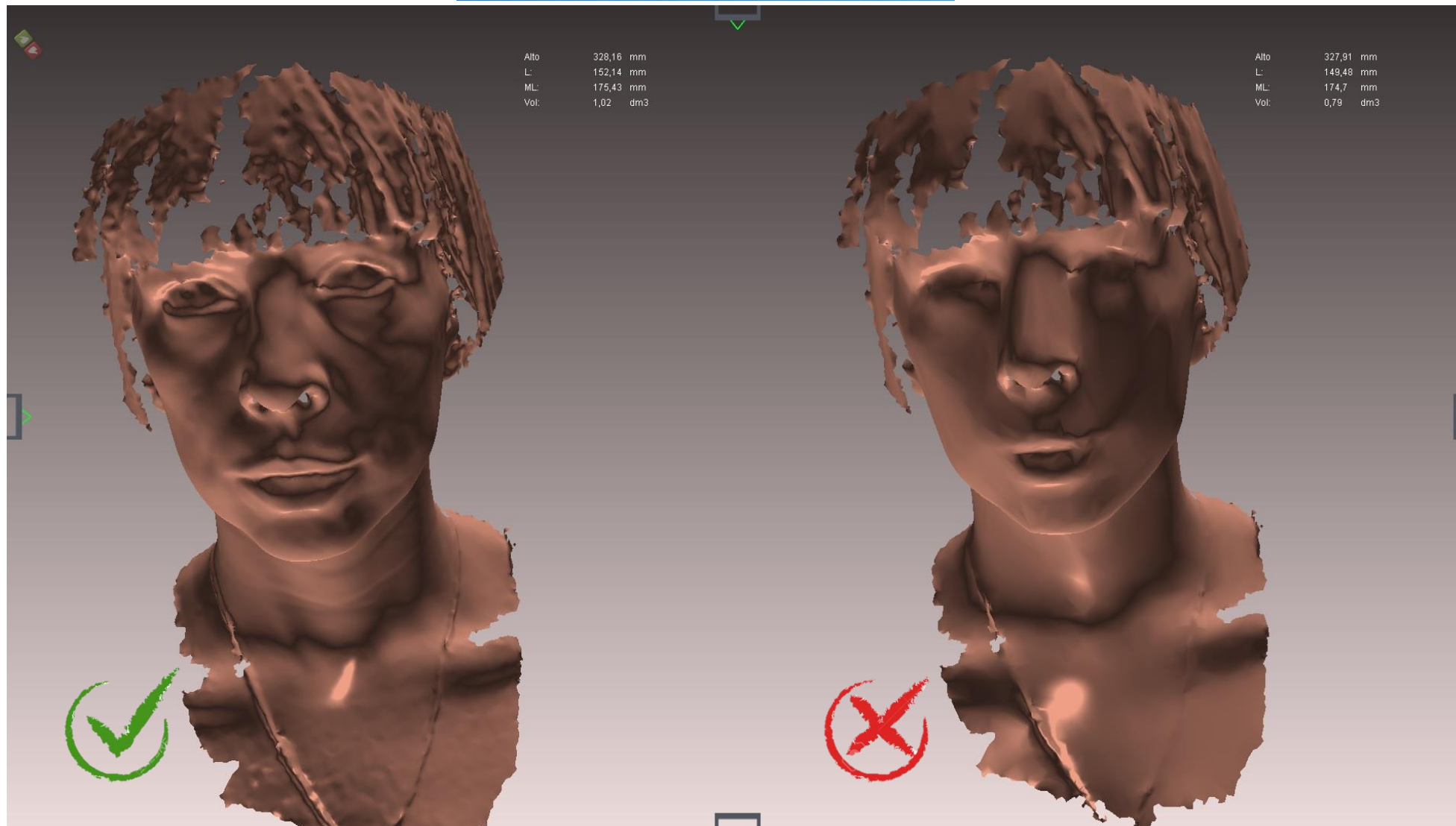
Modelo CAD

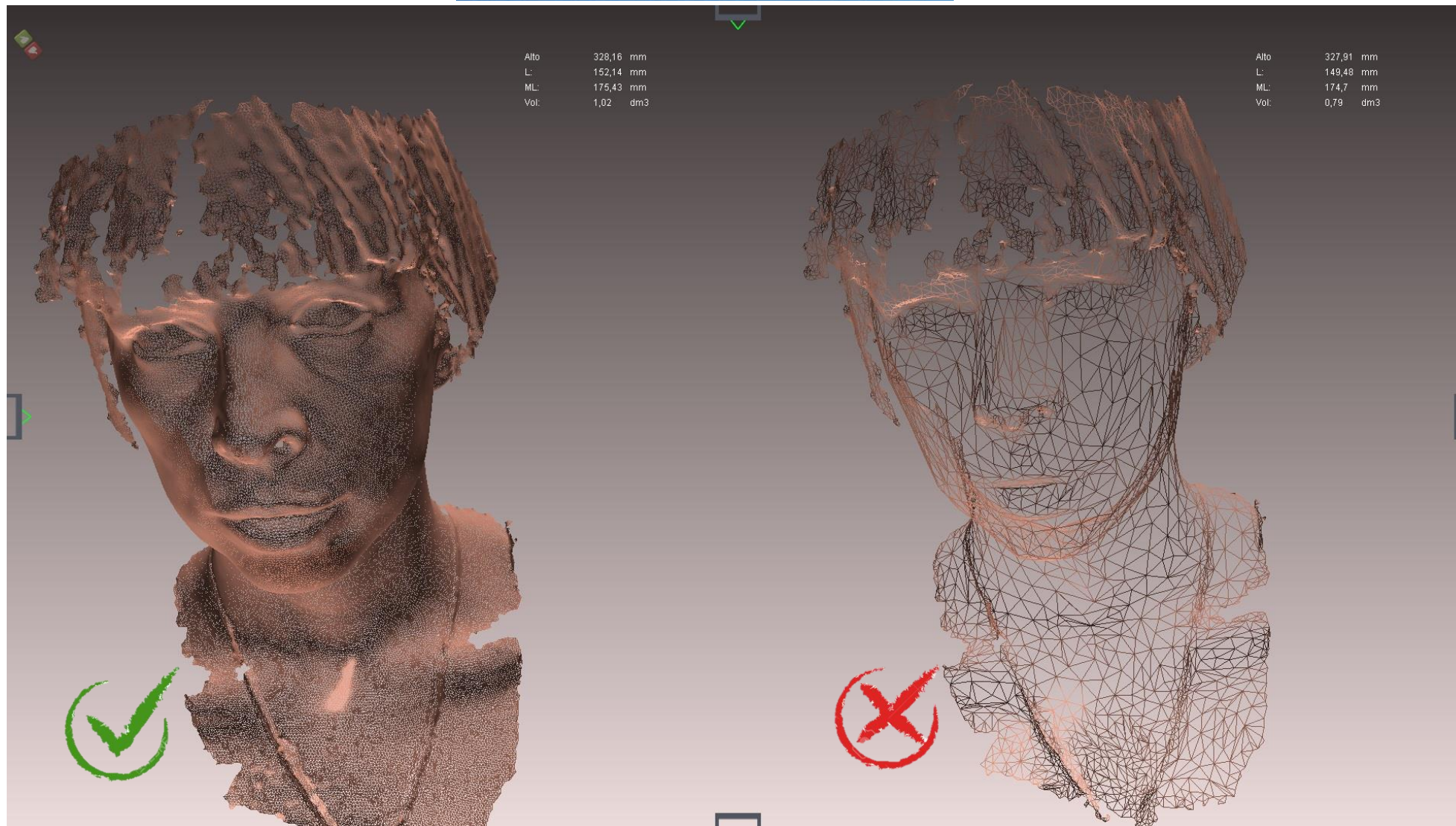
STL

STL

STL









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2 Ficheros

 halqasid	18/02/2019 13:01:48	 ortoiberica	18/02/2019 13:01:43
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Unir



Biblioteca



Modelo



Foto



00:00:00 [F11]

Buscar





Malas medidas

=

Malas dimensiones

=

Malos moldes

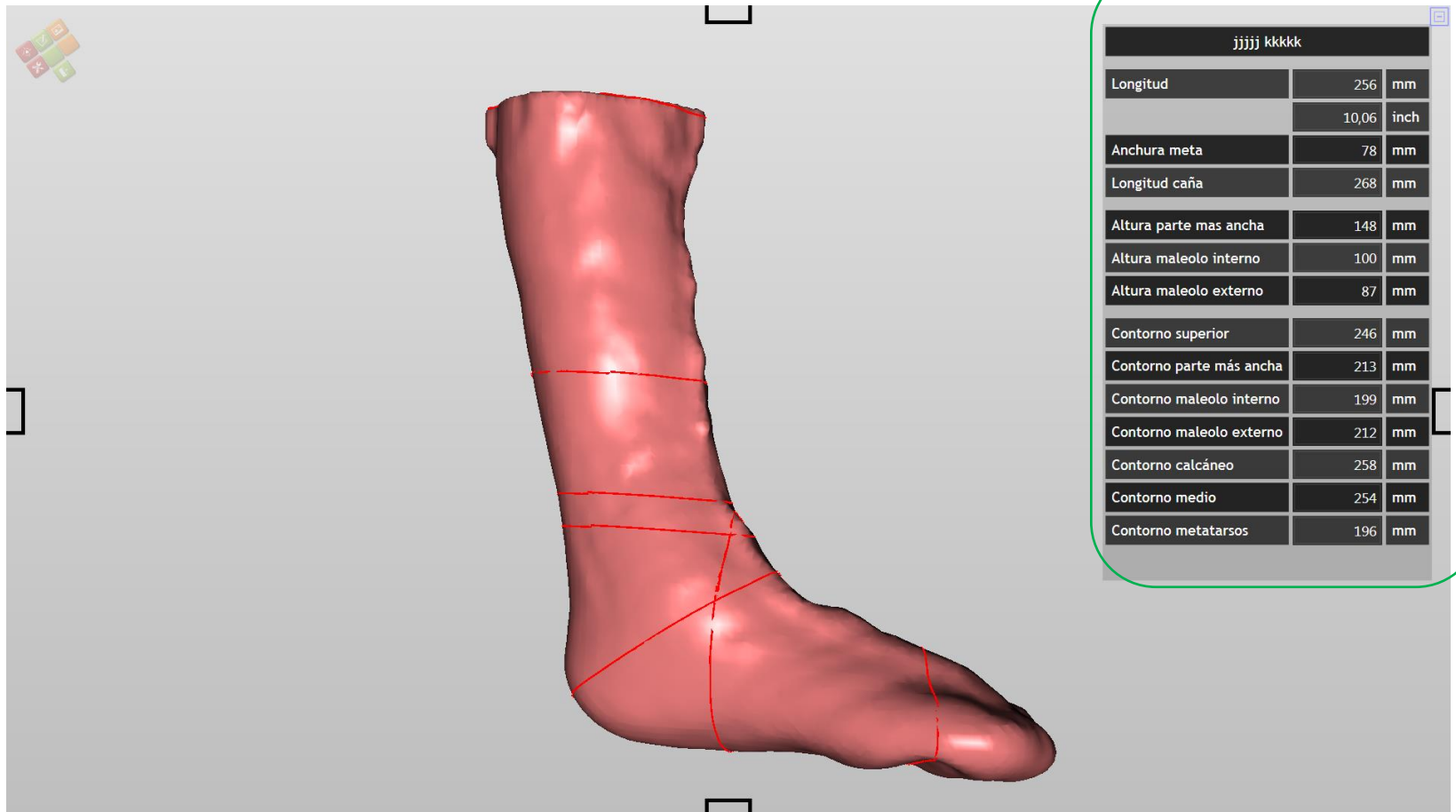
=

Malos encajes





Escaneado con escáner profesional

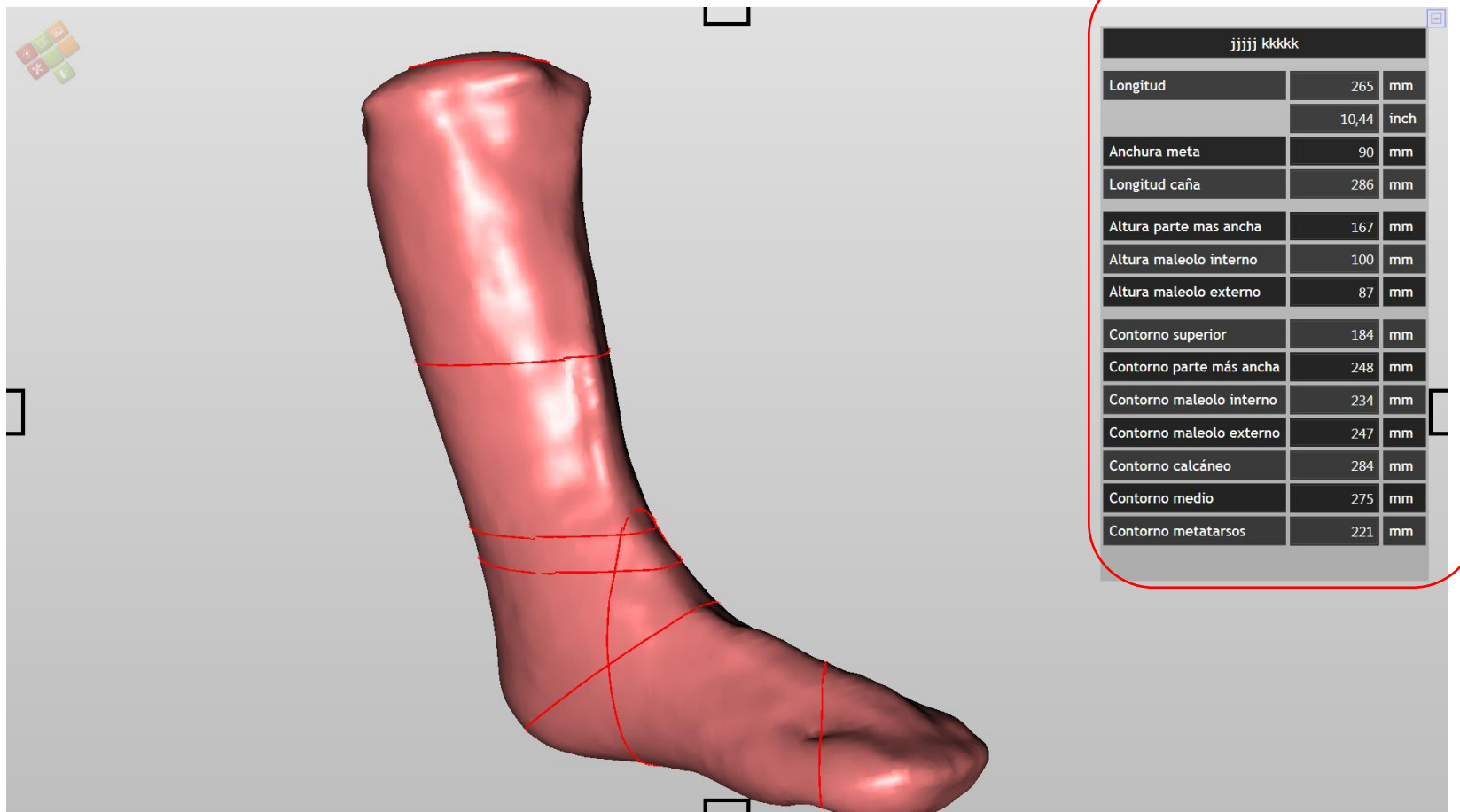


A 3D scan of a human foot, rendered in a reddish-pink color. The scan is shown from a side profile. Several red lines are drawn across the foot to indicate measurement points. To the right of the scan is a data table with a green border, titled 'jjjjj kkkkk'. The table lists various measurements in millimeters and inches.

jjjjj kkkkk		
Longitud	256	mm
	10,06	inch
Anchura meta	78	mm
Longitud caña	268	mm
Altura parte mas ancha	148	mm
Altura maleolo interno	100	mm
Altura maleolo externo	87	mm
Contorno superior	246	mm
Contorno parte más ancha	213	mm
Contorno maleolo interno	199	mm
Contorno maleolo externo	212	mm
Contorno calcáneo	258	mm
Contorno medio	254	mm
Contorno metatarsos	196	mm



Escaneado con escáner doméstico



jjjjj kkkkk

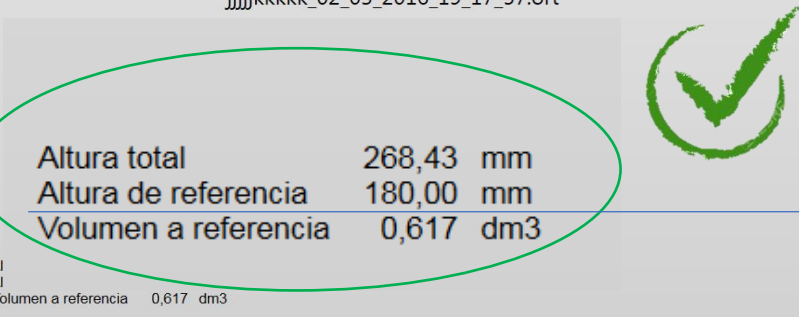
Longitud	265	mm
	10,44	inch
Anchura meta	90	mm
Longitud caña	286	mm
Altura parte mas ancha	167	mm
Altura maleolo interno	100	mm
Altura maleolo externo	87	mm
Contorno superior	184	mm
Contorno parte más ancha	248	mm
Contorno maleolo interno	234	mm
Contorno maleolo externo	247	mm
Contorno calcáneo	284	mm
Contorno medio	275	mm
Contorno metatarsos	221	mm

Comparativa escaneados a 180 mm de altura

jjjjkkkk_02_03_2016_19_17_57.ort

Altura total	268,43 mm
Altura de referencia	180,00 mm
Volumen a referencia	0,617 dm ³

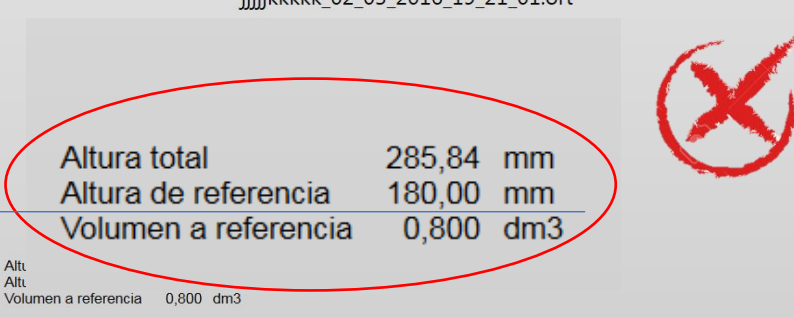
Al
Al
Volumen a referencia 0,617 dm³


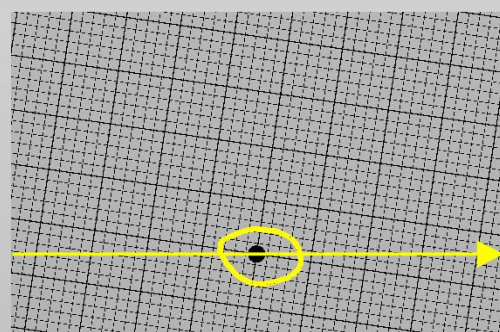


jjjjkkkk_02_03_2016_19_21_01.ort

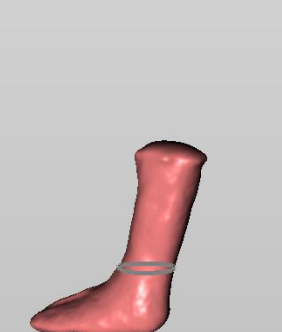
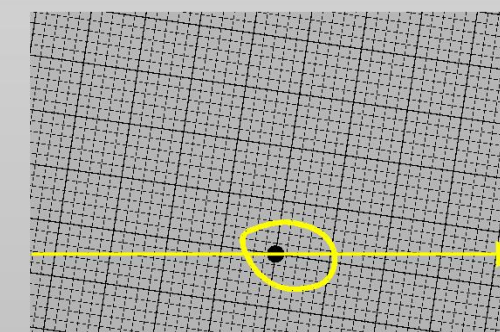
Altura total	285,84 mm
Altura de referencia	180,00 mm
Volumen a referencia	0,800 dm ³

Al
Al
Volumen a referencia 0,800 dm³



Perimetro 198,0
Altura 99

Perimetro 233,0
Altura 99

Comparativa medidas en Pi.Cas.So.

Escaneado profesional

Longitud	256	mm
	10,06	inch

Anchura meta	78	mm
Longitud caña	268	mm

Altura parte mas ancha	148	mm
------------------------	-----	----

Altura maleolo interno	100	mm
------------------------	-----	----

Altura maleolo externo	87	mm
------------------------	----	----

Contorno superior	246	mm
-------------------	-----	----

Contorno parte más ancha	213	mm
--------------------------	-----	----

Contorno maleolo interno	199	mm
--------------------------	-----	----

Contorno maleolo externo	212	mm
--------------------------	-----	----

Contorno calcáneo	258	mm
-------------------	-----	----

Contorno medio	254	mm
----------------	-----	----

Contorno metatarsos	196	mm
---------------------	-----	----

Escaneado doméstico

Longitud	265	mm
	10,44	inch

Anchura meta	90	mm
--------------	----	----

Longitud caña	286	mm
---------------	-----	----

Altura parte mas ancha	167	mm
------------------------	-----	----

Altura maleolo interno	100	mm
------------------------	-----	----

Altura maleolo externo	87	mm
------------------------	----	----

Contorno superior	184	mm
-------------------	-----	----

Contorno parte más ancha	248	mm
--------------------------	-----	----

Contorno maleolo interno	234	mm
--------------------------	-----	----

Contorno maleolo externo	247	mm
--------------------------	-----	----

Contorno calcáneo	284	mm
-------------------	-----	----

Contorno medio	275	mm
----------------	-----	----

Contorno metatarsos	221	mm
---------------------	-----	----

Resultado...





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https://youtu.be/0d_qov_C9qM

Picture Casting Software v.3.58 © 2022 Ortoibérica S.L.

Servando Perez PC6 Ortoiberica

CAD

Pi.Cas.So

A 3D wireframe model of a human hand, rendered in a light blue color, is shown in a reaching pose. The hand is composed of a grid of lines, giving it a transparent, skeletal appearance. It is positioned on the right side of the interface, with the index finger pointing towards the center. Another hand is visible on the left side, also in a reaching pose, mirroring the one on the right.

3D

laniakea

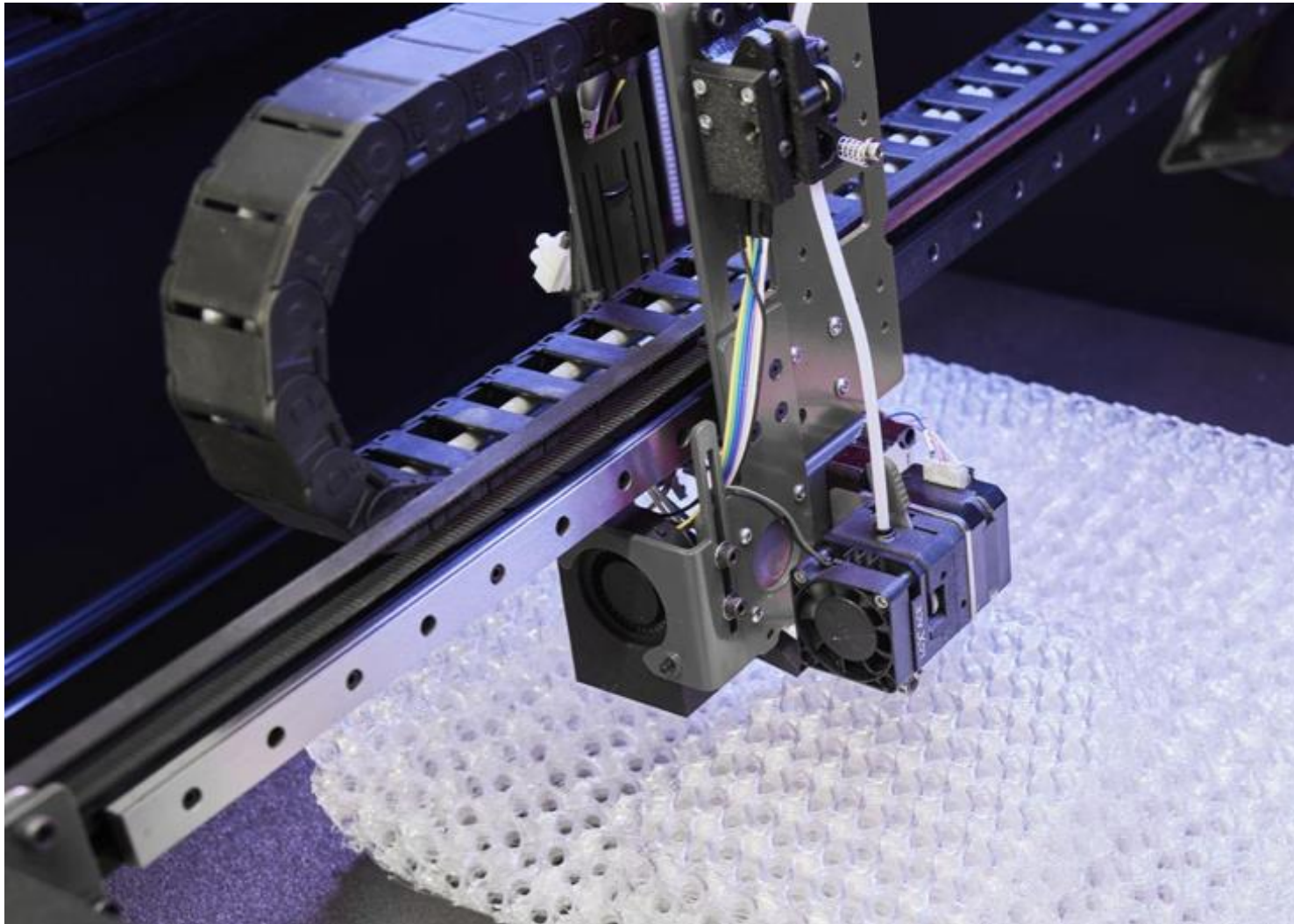
Quedan 293 Días

The software interface includes a grid of icons for various functions. The icons are arranged in a 4x3 grid. The first row contains icons for a group of people, a person with a gear, and a person with a checkmark. The second row contains icons for a red line, a green line, and an orange line. The third row contains a 3D icon, a left arrow, and a right arrow. The fourth row contains a lock icon, a computer monitor icon, and a diamond icon. At the bottom of the interface, there are two circular icons: one with a gear and one with a question mark.



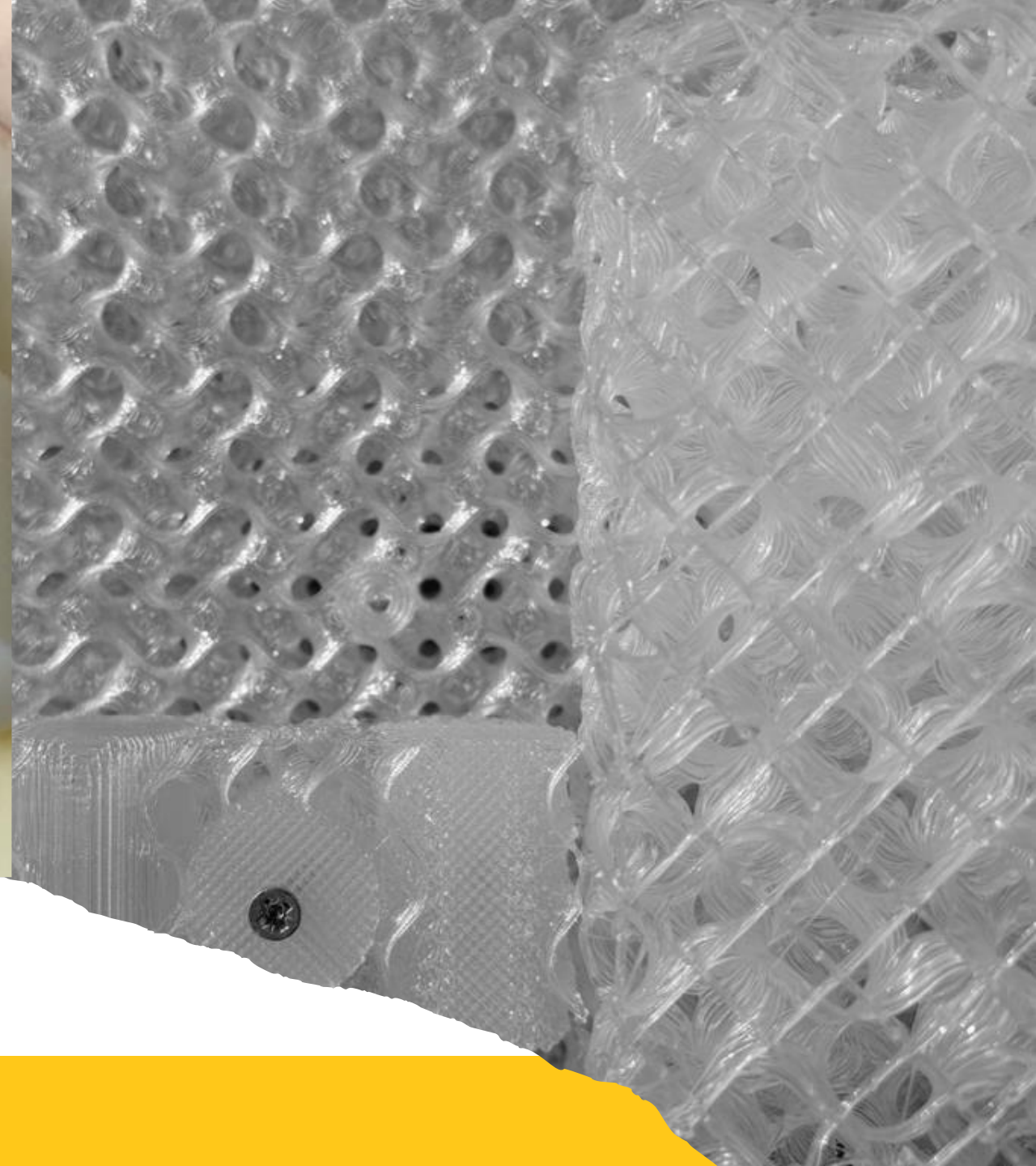
Software CAM: <https://youtu.be/RdcPSYqJrs8>

Robot: <https://youtu.be/0xfF4ngF6bo>

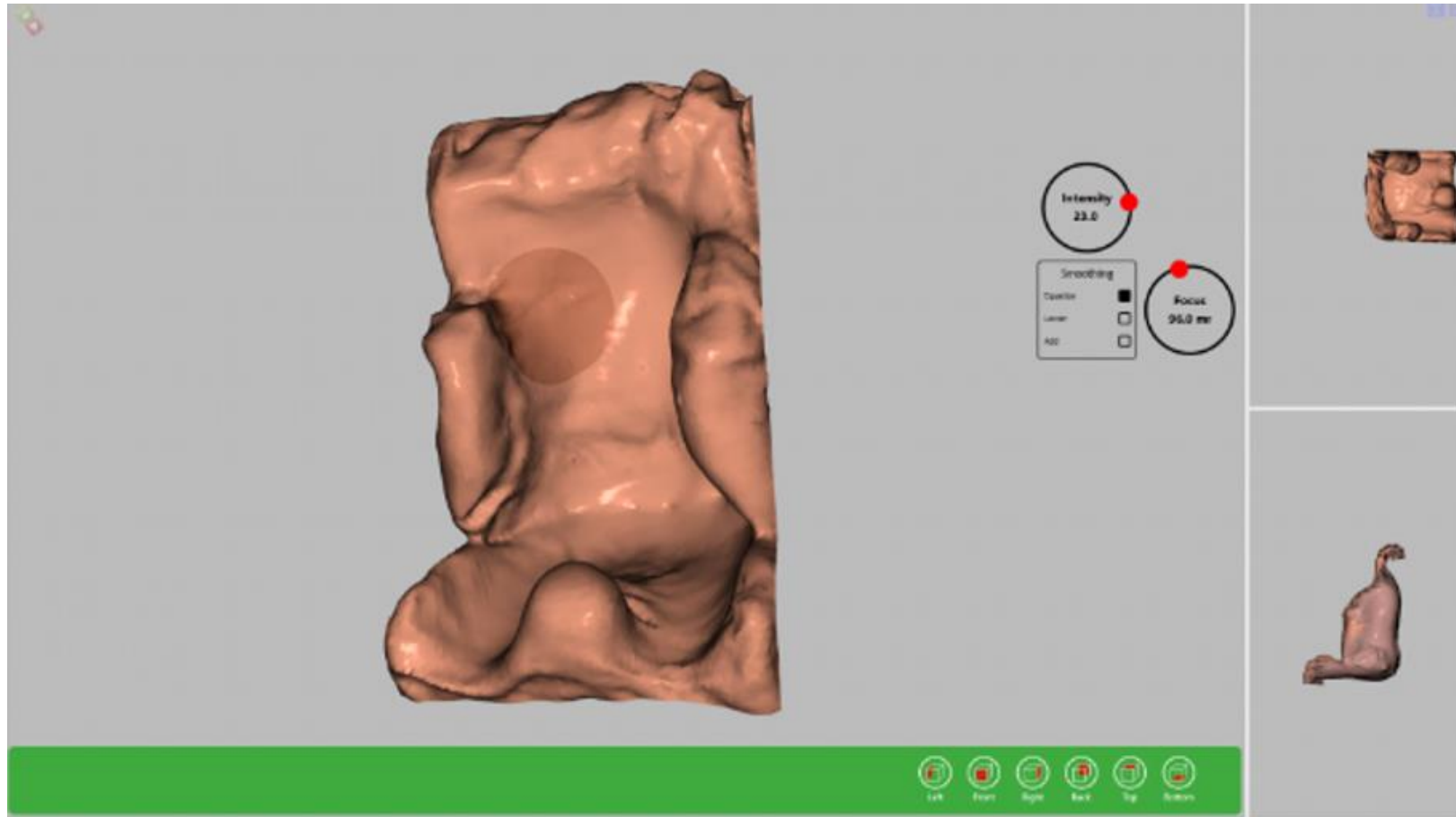


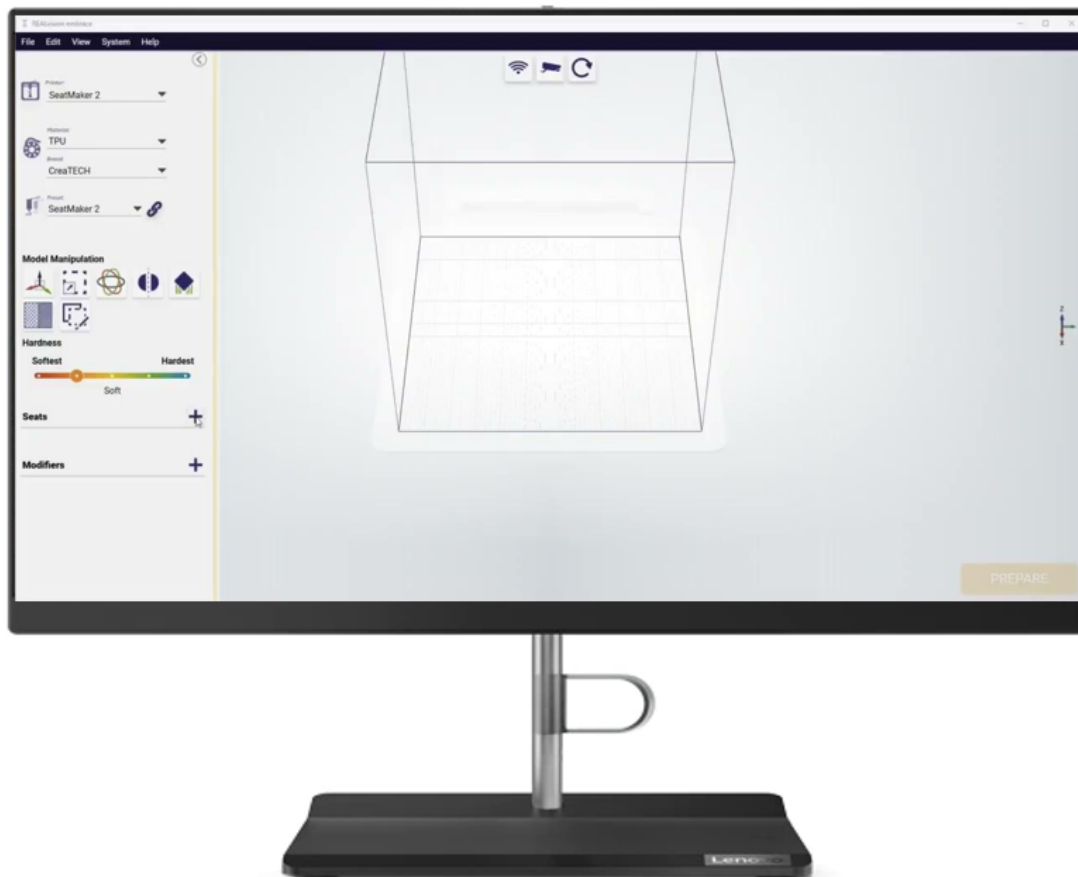
**Asientos
impresión 3D**

**Programmable
Foam**



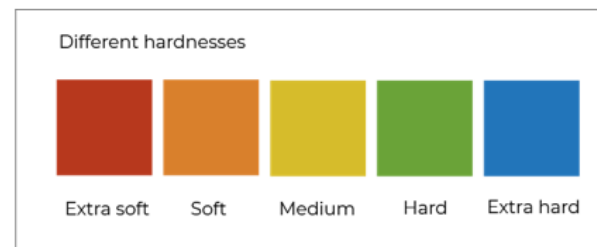
DOS MUNDOS... ??





CAM Software

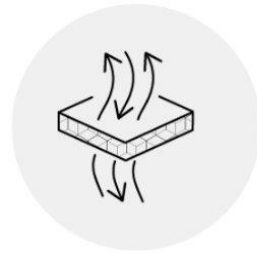
Easy to define density zones to obtain varying hardness zones in the same print





Asientos impresión 3D: Programmable Foam

Key benefits



Structure that gives enhanced ventilation properties



Hygienic and washable at 60 degrees and dries fast

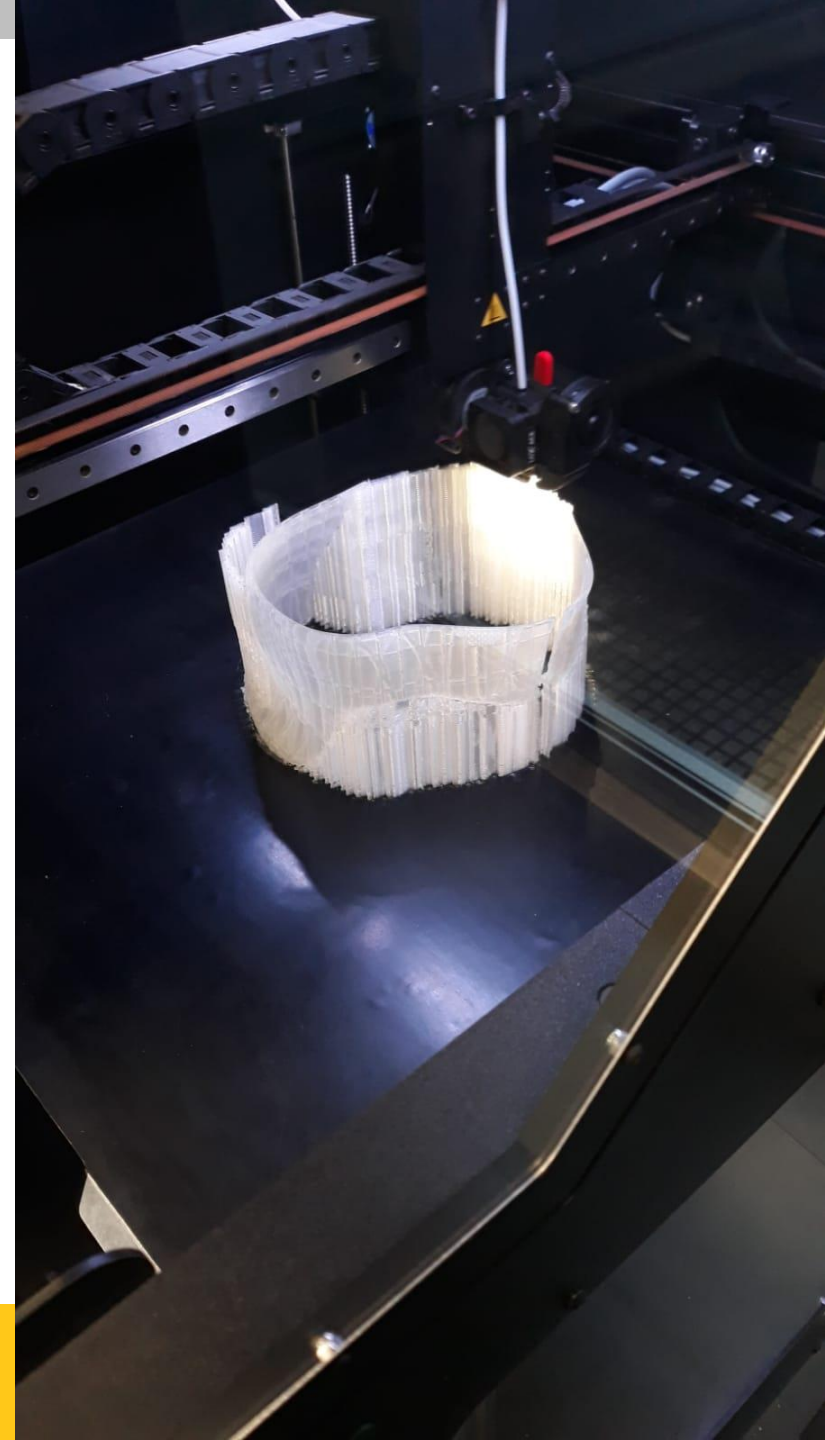


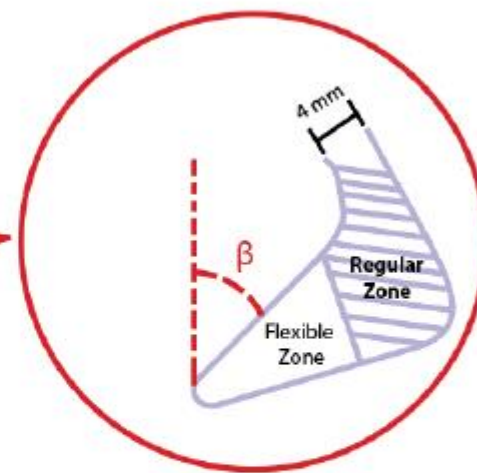
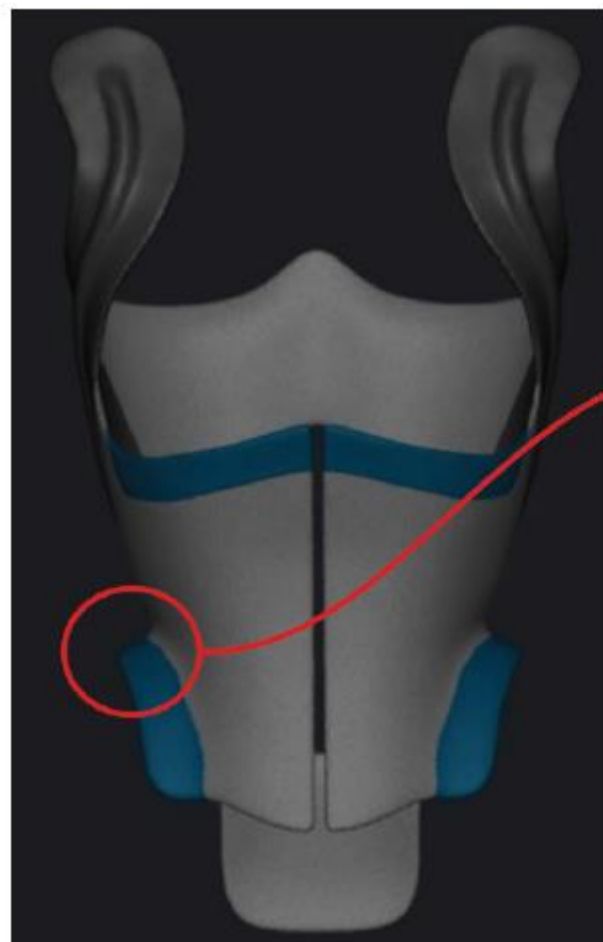
Pressure relief with multiple hardness zones

https://www.ortoiberica.com/ortopedia-protésica-exógena-ortésica/últimas-novedades/knemis-gepetto-3d-programmable-foam_2262_874_18183_0_1_pro.html

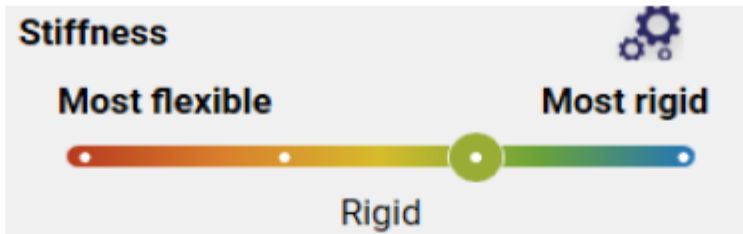


Corsés impresión 3D





$$40^\circ < \beta < 50^\circ$$



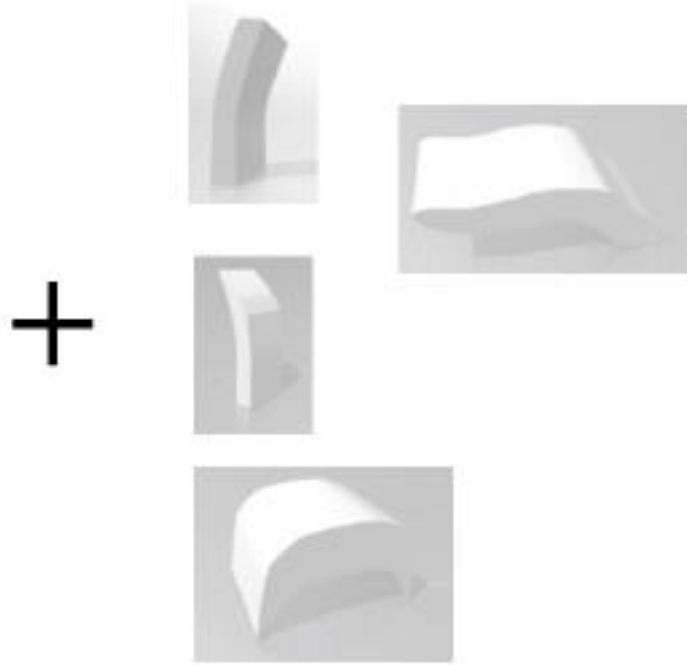
Zones	Use
Flexible	For zones in contact with bones like. (e.g. iliac crest)
Medium	Used in general zones on the corset.
Rigid	For zones that need to be more rigid than the general zones. Used for rectification and compression.
Full	Mostly used in the opening of the corsets that are closed. Drilling areas for mounting straps



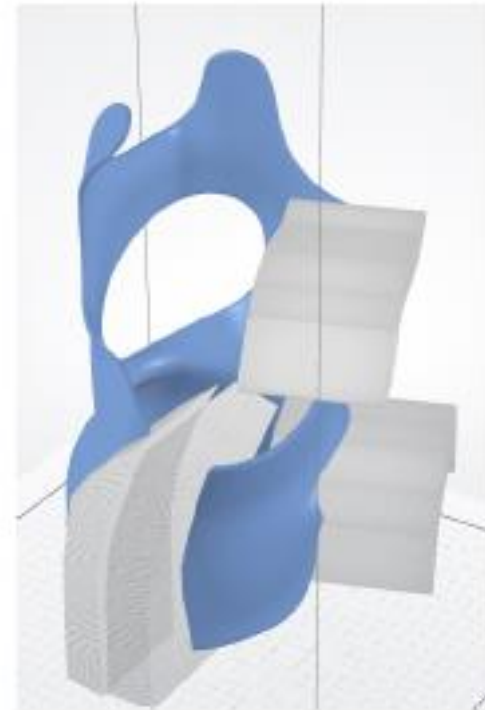
Model



Modifiers

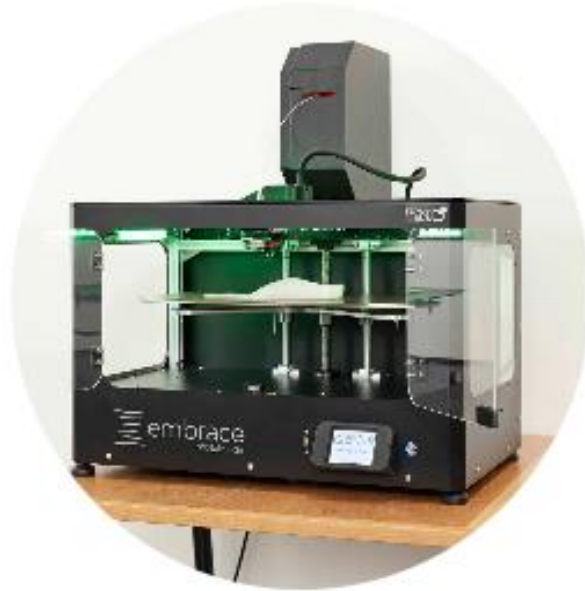


CAM





Plantillas impresión 3D

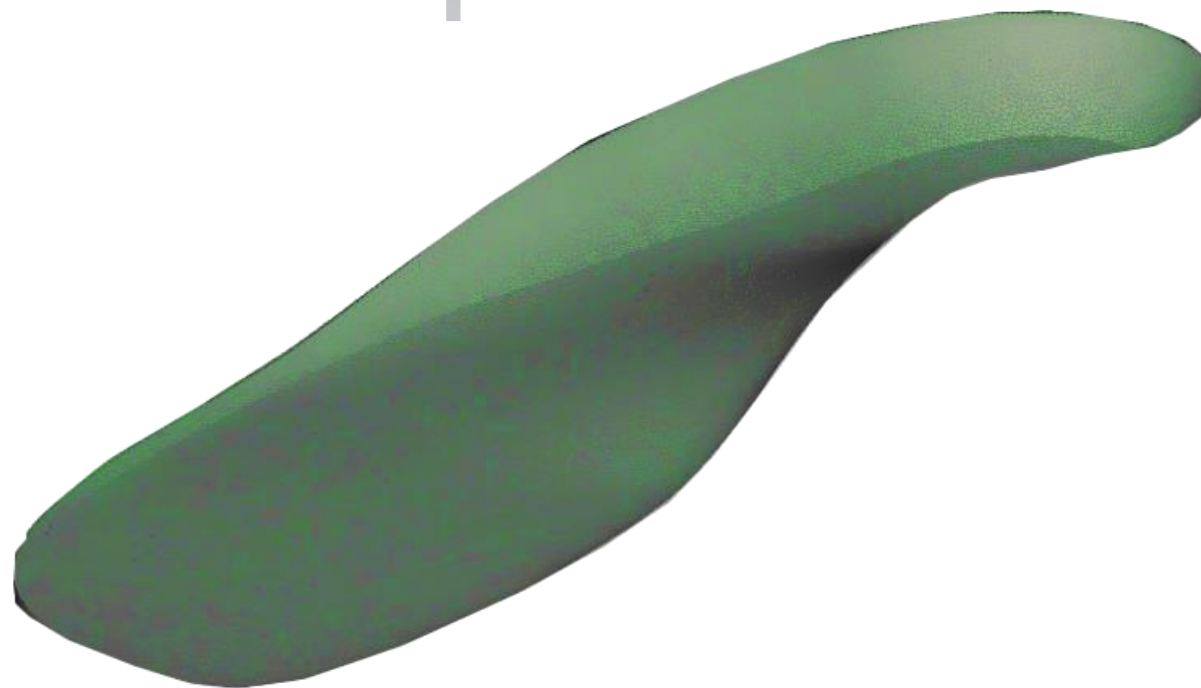


3d insoles = 3 steps



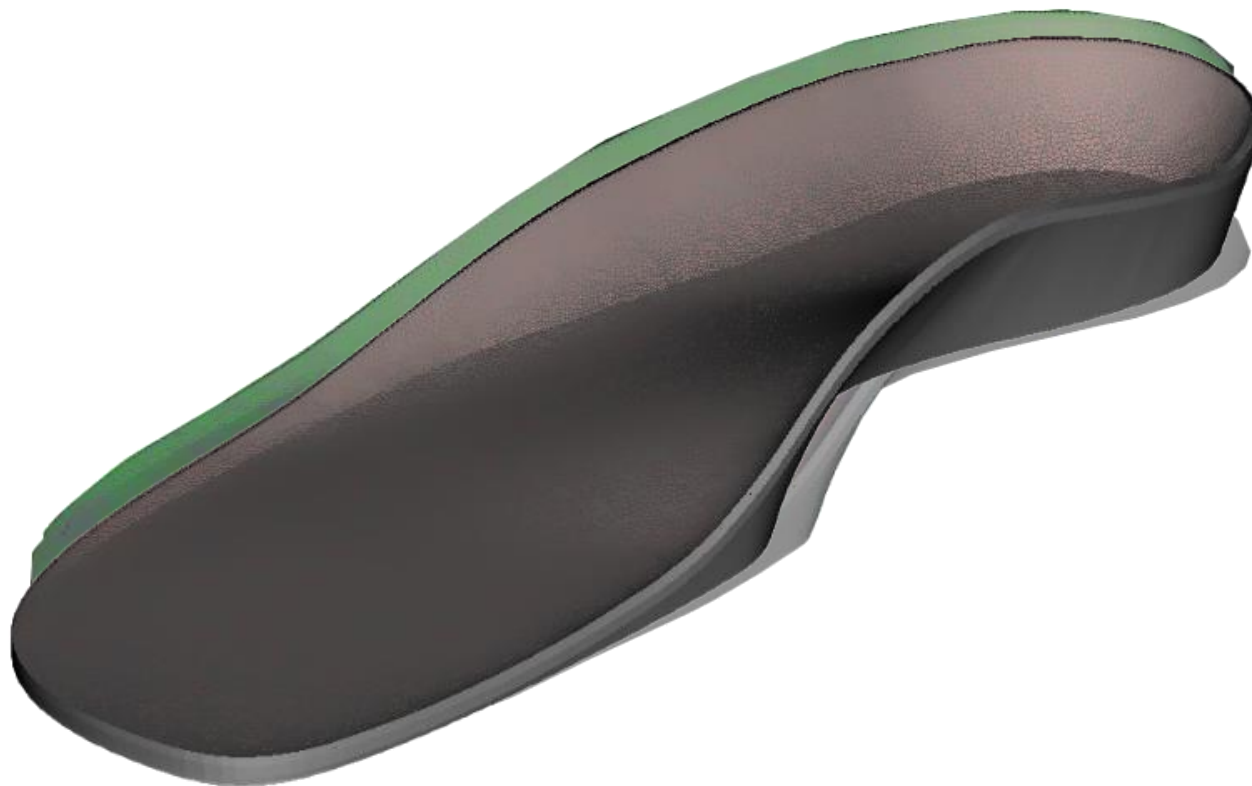


1 step



Crear superficie de la plantilla

2 step



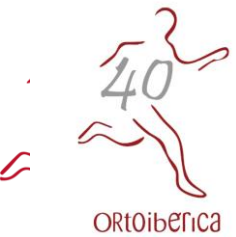
Unir y adaptar una horma escogida

3step

Create it
REAL 



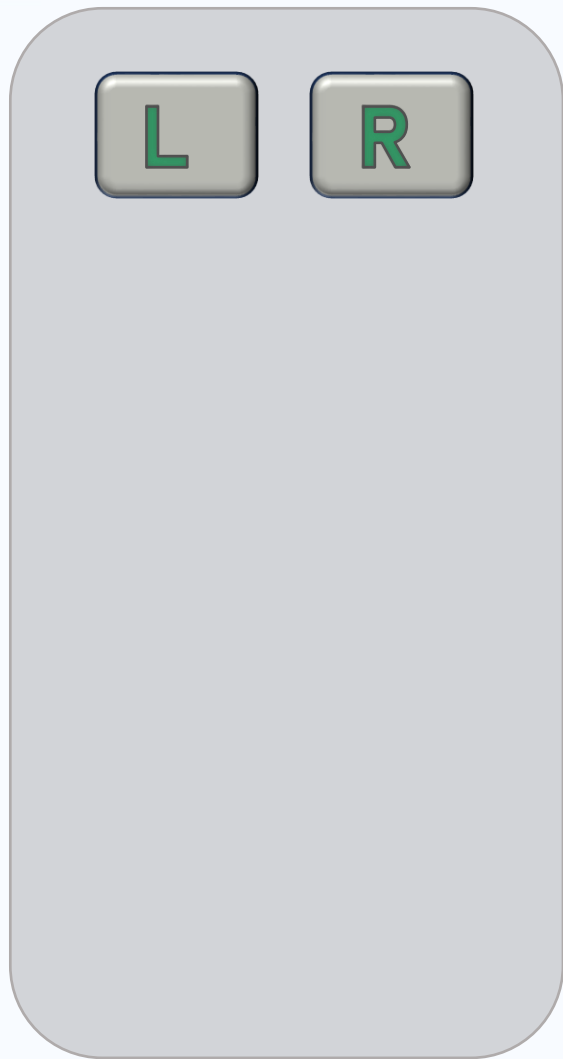
Escoger densidades correctas



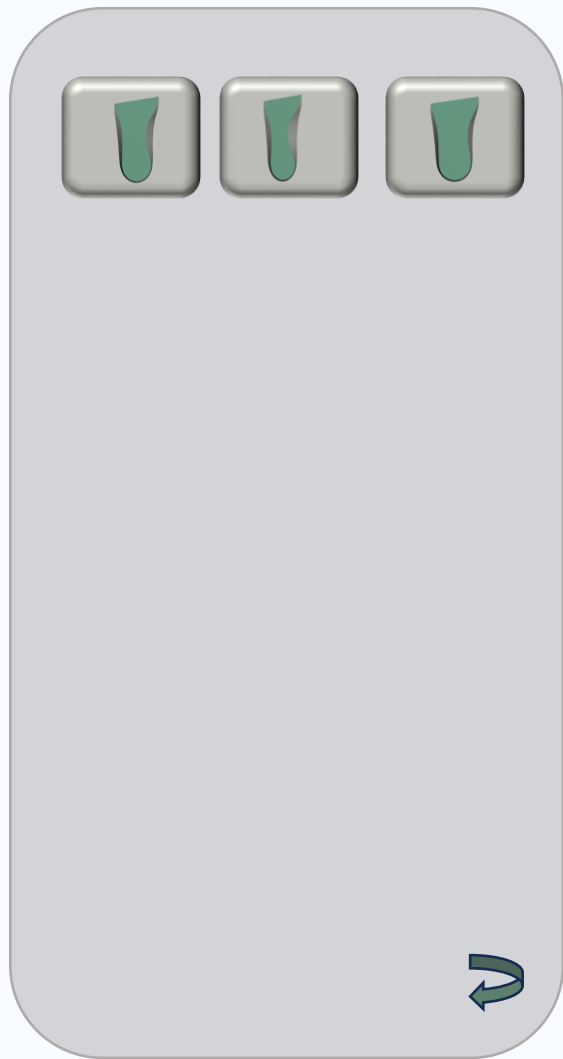
ORTOGRA 2025



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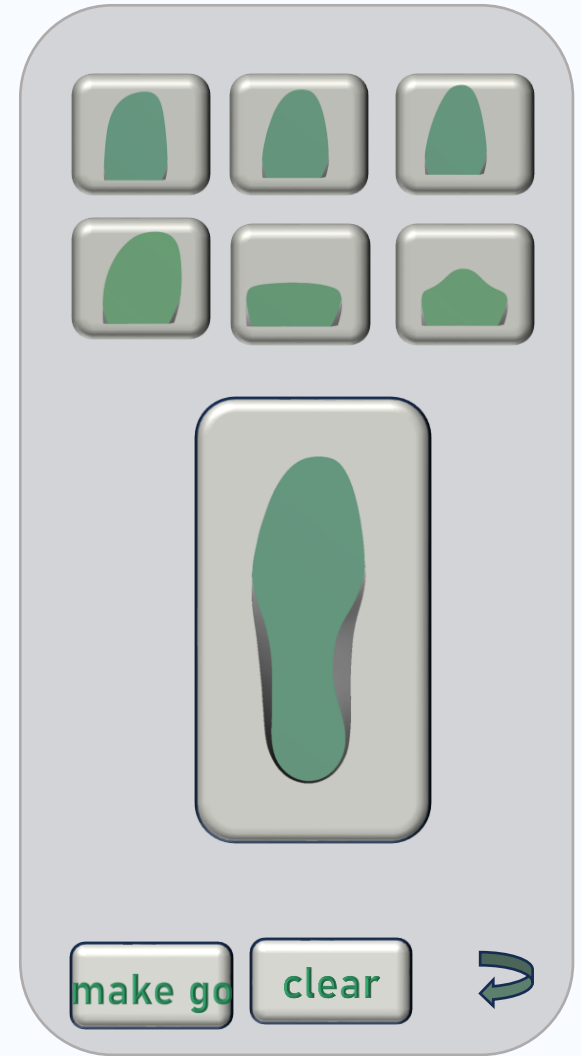
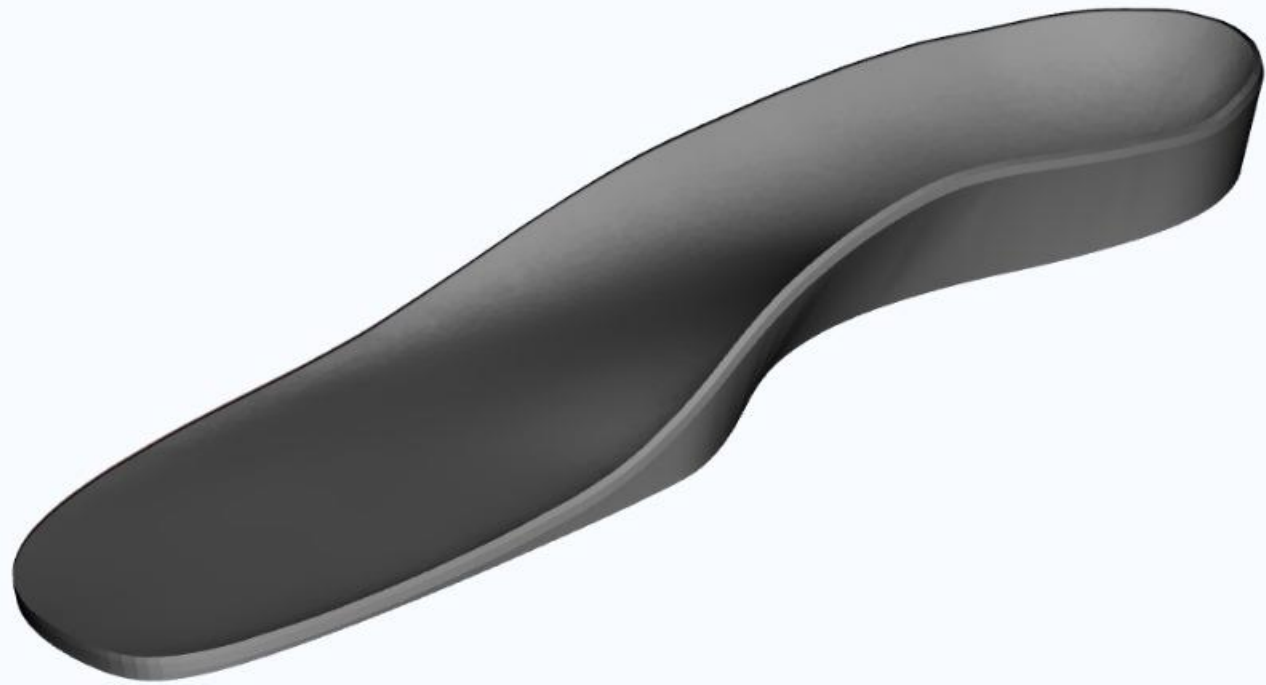
ORTOGRA 2025



make go clear



ORTOGRA 2025





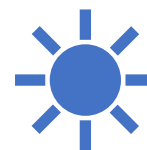
Mejoras que aporta el sistema CAD-CAM



Seguridad (médico,
técnico, paciente) =
volúmenes



Precisión, exactitud,
menor dependencia
factor humano



Ahorro de tiempo



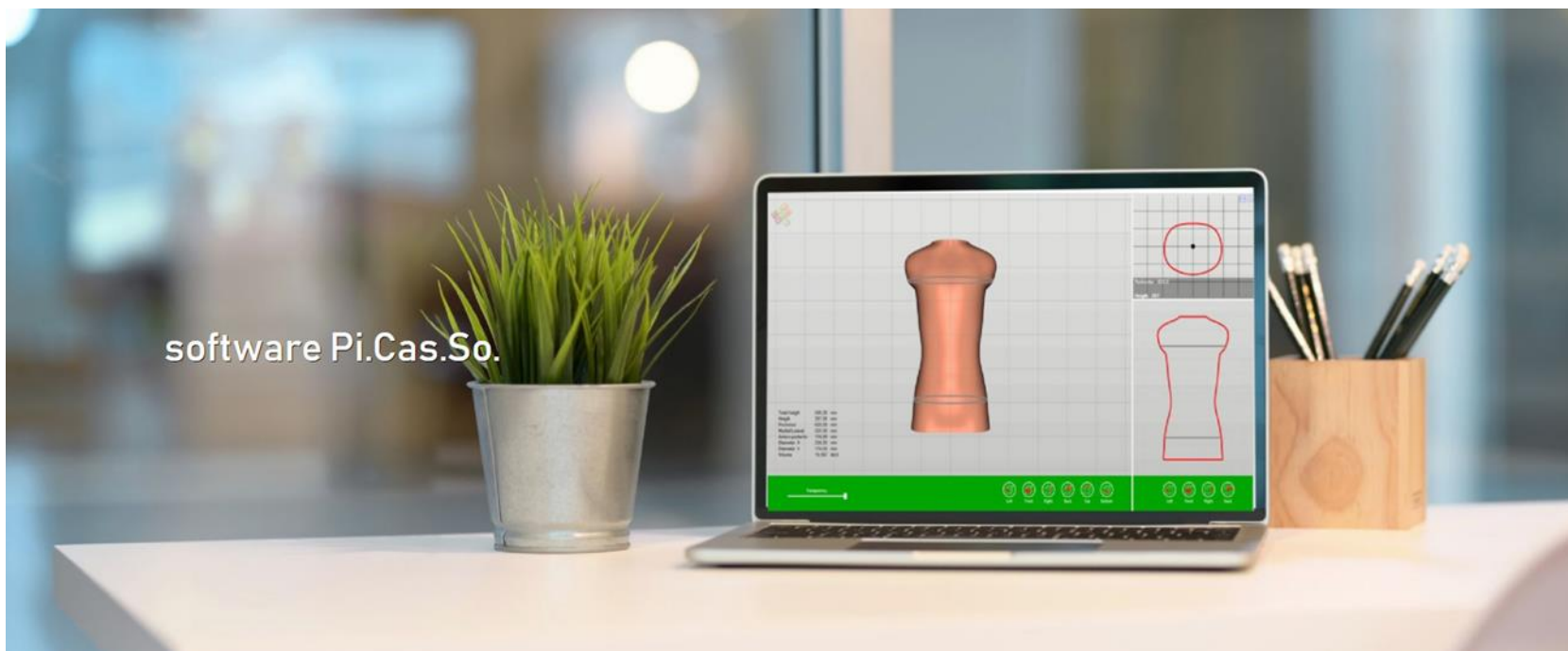
Repetitividad = ahorro de
espacio



Mejoras en la gestión de
ficheros de pacientes y
seguimiento



Imagen



Gracias !

