

## User Protocol: Parametric foot and Generate mold tools

### Overview

The **Parametric foot** tool allows the introduction of 11 mandatory foot measurements and up to 18 total measurements to accurately recreate the patient's foot using an advanced algorithm.

Additionally, the **Generate Mold** tool allows for the creation of a custom mold based on the parametric foot, with adjustable offsets and toebox dimensions.

Both tools are specifically designed to assist in the creation of Supramalleolar Orthoses (SMOs).

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### Test Procedure

#### 1. Preparation

##### ➤ *Patient requirements*

Ensure the patient:

- **Is between 1-10 years of age**
- **Can reach neutral foot position**, as the tool only supports this alignment.
- **Has foot dimensions that fall within the specified minimum and maximum limits** (refer to the table in following section)
- **Does not have fixed foot deformities** or excessive bony prominences, as these cannot be represented by the algorithm.

##### ➤ *Measurement conditions*





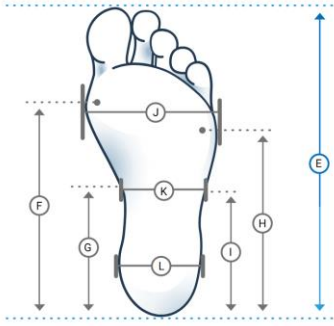
- Patient should be **without a sock** for all measurements.
- Patient should be in a **non-weight bearing position** (sitting on a chair with the foot hanging for example)
- **For measurement "J"** (width between metatarsal heads) the metatarsals should be **pressed on the middle to splay the bones (full weight bearing)**.

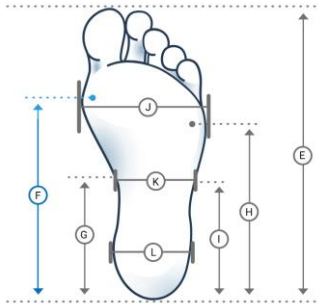
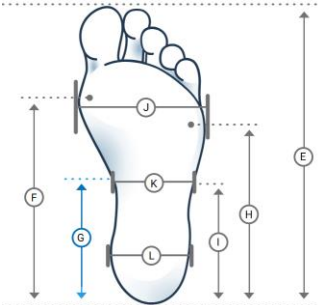
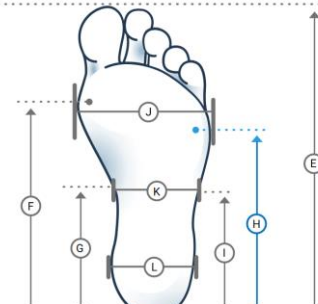
##### ➤ *Tools*

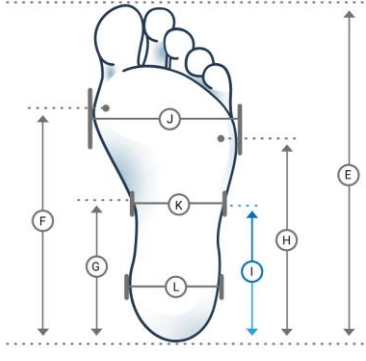
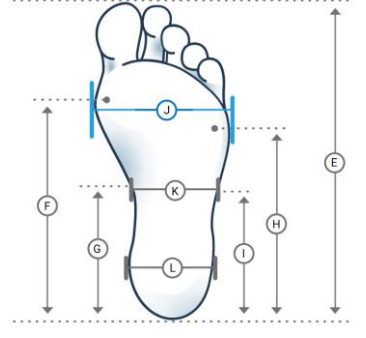
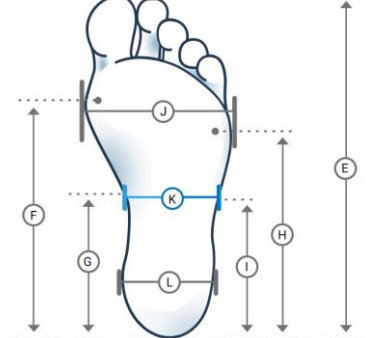
- **Measurement tape:** Ideal for circumferential measurements.
- **Caliper:** Ideal for width and length measurements.

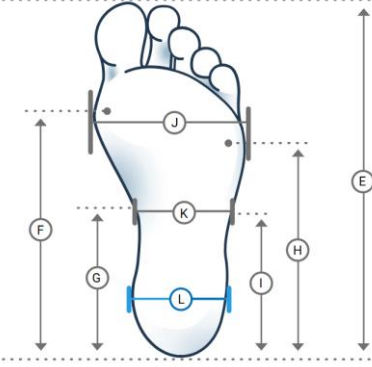
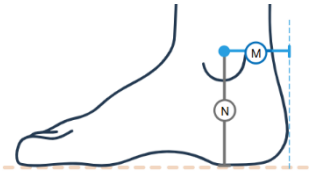
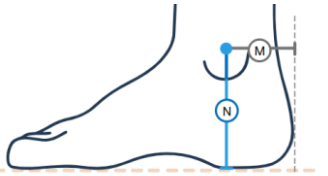
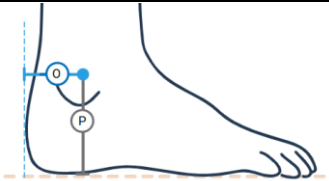
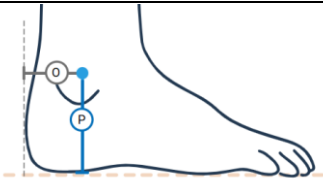
## 2. Taking the Measurements

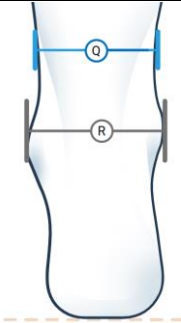
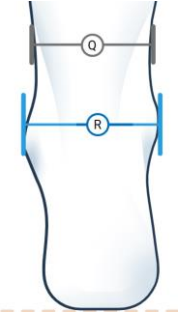
The following table outlines all 18 measurements, the tool to use, foot positioning, min/max limits, and whether each measurement is compulsory (also formatted in bold):

Letter	Image	Measurement Name	Tool	How to Take the Measurement	Min Limit (mm)	Max Limit (mm)
<b>A</b>		<b>Smallest supramalleolar circumference</b>	Tape	<b>Wrap the tape just above the malleoli</b>	<b>80</b>	<b>320</b>
<b>B</b>		<b>Instep circumference</b>	Tape	<b>Wrap the tape around the heel and over the instep</b>	<b>100</b>	<b>340</b>
<b>C</b>		<b>Midfoot circumference passing through apex of arch</b>	Tape	<b>Wrap the tape around the middle of the foot at the arch</b>	<b>75</b>	<b>300</b>
<b>D</b>		Circumference passing through 1st & 5th metatarsal	Tape	Wrap the tape around the foot, covering the 1st and 5th metatarsal bones	75	290
<b>E</b>		<b>Foot length</b>	<b>Caliper</b>	<b>Place the patient's heel facing one side of the caliper and measure up to the tip of the longest toe</b>	<b>80</b>	<b>260</b>

Letter	Image	Measurement Name	Tool	How to Take the Measurement	Min Limit (mm)	Max Limit (mm)
F		Length from heel to 1st metatarsal head	Caliper	Measure along the sole from the back of the heel to the apex of the 1st metatarsal head	55	180
G		Length from heel to navicular	Caliper	Measure along the inner side of the foot, from the back of the heel to the navicular bone, projected on the ground	30	85
H		Length from heel to 5th metatarsal head	Caliper	Measure along the outer edge of the foot, from the back of the heel to the apex of the 5th metatarsal	50	150

Letter	Image	Measurement Name	Tool	How to Take the Measurement	Min Limit (mm)	Max Limit (mm)
I		Length from heel to base of 5th metatarsal	Caliper	Measure from the back of the heel to the base of the 5th metatarsal bone	40	110
J		Width between metatarsal heads	Caliper	Press on the middle of the metatarsals to splay the bones, then measure	30	115
K		Width between navicular & base of 5th metatarsal	Caliper	Measure the width between the navicular and 5th metatarsal base	30	95

Letter	Image	Measurement Name	Tool	How to Take the Measurement	Min Limit (mm)	Max Limit (mm)
L		Width of the heel at the widest part	Caliper	Measure the widest point across the heel	20	80
M		Length from heel to apex of medial malleolus	Caliper	Measure horizontally from the heel to apex of the medial malleolus	20	60
N		Length from ground to apex of medial malleolus	Caliper	Measure vertically from the ground to the apex of the medial malleolus	35	95
O		Length from heel to apex of lateral malleolus	Caliper	Measure horizontally from the heel to the apex of the lateral malleolus	20	55
P		Length from ground to apex of lateral malleolus	Caliper	Measure vertically from the ground to the apex of the lateral malleolus	30	85

Letter	Image	Measurement Name	Tool	How to Take the Measurement	Min Limit (mm)	Max Limit (mm)
Q		Width at supramalleolar	Caliper	Measure the width at supramalleolar, where measurement A was taken	30	95
R		Width at malleoli	Caliper	Measure the width between the medial and lateral malleoli	20	85

### 3. Generate mold

The following table outlines the customizable corrections for the mold creation, along with explanations of each:

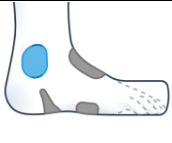
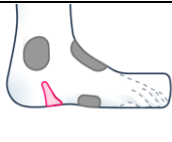
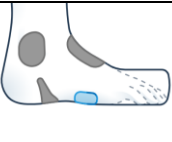








Image	Correction	Explanation	Min Limit (mm)	Max Limit (mm)
	<b>Lateral Malleolus Offset</b>	Adjusts the clearance around the lateral malleolus	0	5
	<b>Peroneal Contour Offset</b>	Adjusts the shape along the lateral side of the foot, particularly the peroneal tendon area	-4	0
	<b>Base of 5th Metatarsal Offset</b>	Alters the fit around the base of the 5th metatarsal, often for added width in this area	0	5
	<b>Medial Malleolus Offset</b>	Adjusts the clearance around the medial malleolus	0	5
	<b>Pternion Offset</b>	Adjusts the clearance at the achilles tendon insertion	0	5
	<b>Navicular Offset</b>	Adjusts the clearance around the navicular bone, to relief pressure	0	5
	<b>ST Contour Offset</b>	Adjusts the medial side of the foot, around the sustentaculum tali, often for added support or fit	-4	0
	<b>Extra Length in Toebox</b>	Adds extra length in the toebox for patients who require more space for the toes	0	40
	<b>Extra Height in Toebox</b>	Adds extra height in the toebox to accommodate high arches or larger toe volumes	0	10

Image	Correction	Explanation	Min Limit (mm)	Max Limit (mm)
	<b>Extra Width in Toebox</b>	Adds extra width in the toebox for wider feet	0	10
	<b>Lift Angle in Toebox</b>	Adjusts the upward angle in the toebox, influencing toe lift	0	20°

## 5. Data Entry and Review

- **Parametric foot:**
  - **Make sure you have entered the 11 mandatory measurements** (A, B, C, E, F, H, J, L, N, P, R) and verify their values are within the min/max limits.
  - **Make sure you have entered the values in mm.**
- **Generate mold:** make sure you have introduced the correct values.