

PROPRIO®

THE **SENSORIMOTOR** FOOT ORTHOSIS

NEURO




SPRINGER

A photograph of two women standing on a stone path in a lush, green outdoor setting. On the left, an elderly woman with short, wavy white hair is wearing a dark blue V-neck top, black trousers, and black shoes. She is wrapped in a heavy, patterned shawl with gold and brown tones and fringed edges. On the right, a younger woman with dark hair, wearing a white lab coat, patterned tights, and brown shoes, has her arm around the elderly woman's shoulder, supporting her. The background is filled with large green trees and a large brown ceramic pot on the right.

PRODUCING A GAIN IN NEURO MOBILITY

Neurological diseases are complex and often associated with significant restrictions in patients' everyday lives. PROPRIO® foot orthoses can help improve these individuals' ability to stand and walk.

THE NEURO CONCEPT

THE RIGHT SOLUTION FOR COMPLEX PROBLEMS

The PROPRIO®.Neuro product line has been developed to take an even more sophisticated approach to addressing the needs of patients with neurological damage than previous PROPRIO® product lines. More extensive mechanical corrections are often required than in patients with a well-functioning sensorimotor system and sometimes entail orthotic measures. That is why, during product development, we focused on incorporating either fewer or more static corrections into the surface of the foot orthosis—depending on ankle flexibility.



1

FLEXIBLE ANKLE JOINT

Sensorimotor stimulation for muscular stabilization of the hindfoot



2

PARTIALLY CONTRACTED ANKLE JOINT

Mechanically support the hindfoot in places where joint positions cannot be corrected by muscular reaction alone



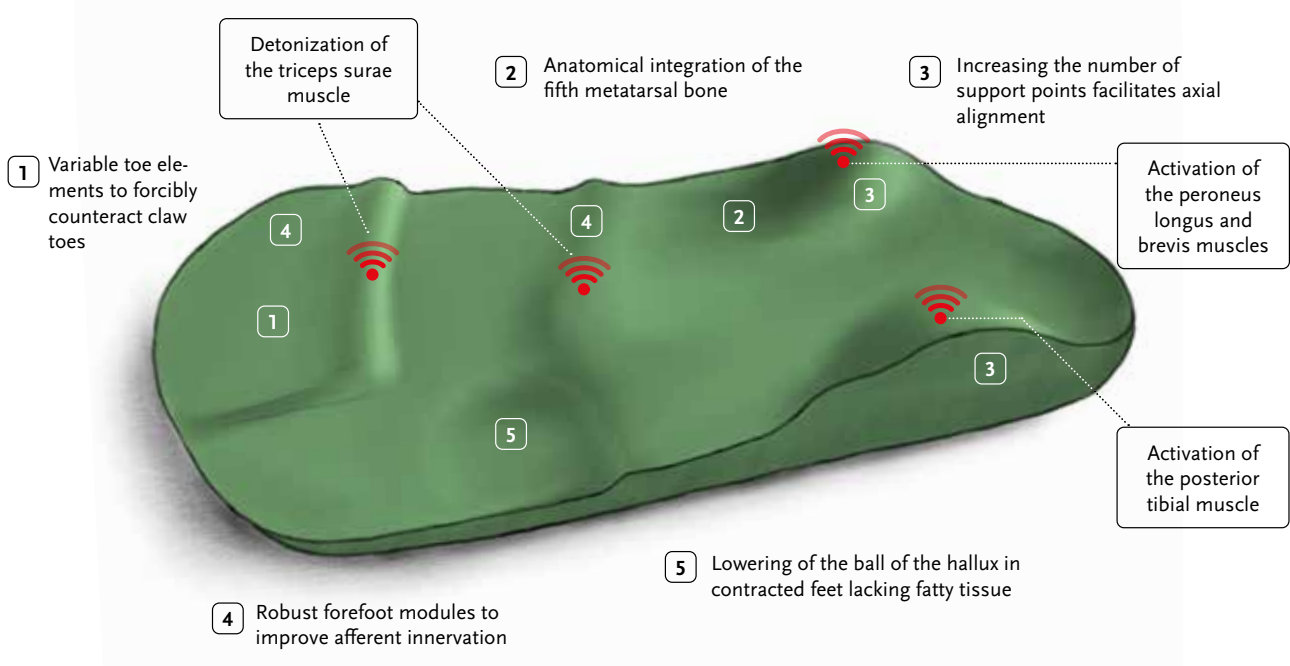
3

CONTRACTED ANKLE JOINT

Stabilize the heel and block the lower ankle joint

PROPRIO® models developed according to Woltring/SPRINGER

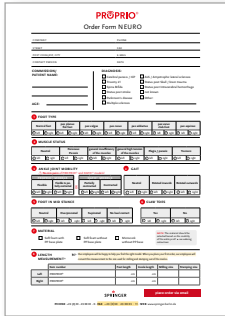
PROPRIO® models developed in collaboration with Silvio Semadeni





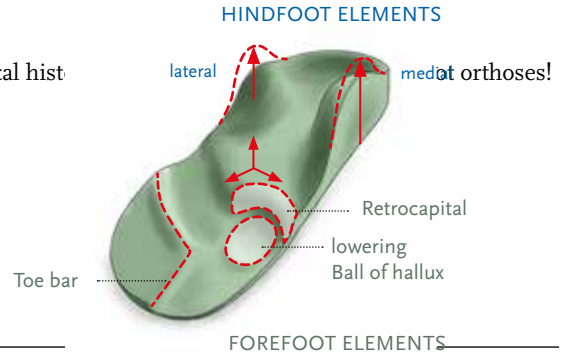
170 MODEL VERSIONS

ADAPTED TO ANATOMY — PHYSIOLOGY — INDICATION



The information contained in the patient's medical history

► **Detailed descriptions** of the selection parameters can be found on page 9.



- 1 **FOOT TYPE**
► Determines the basic shape of the foot orthosis
- 2 **MUSCLE STATUS**
► Determines the height ratio of the hindfoot elements to the forefoot elements
- 3 **ANKLE MOBILITY**
► Determines the ratio of sensorimotor to mechanical elements; the more contracted a foot, the less sensorimotor elements are used
- 4 **GAIT PATTERN**
► Determines the height ratio between the medial and lateral spot
- 5 **FOOT IN LOAD PHASE**
► Determines the relationship between forefoot and hindfoot stimulation, as well as between pronating and supinating effects
- 6 **CLAW TOES**
► Determines the design of the toe module
- 7 **CHOICE OF MATERIAL**
► Depends on flexibility of the foot and further processing, e.g. for fitting into KAFO/AFO
- 8 **FOOT LENGTH – FOOT ORTHOSIS LENGTH**
► Determines the proportion of the individual stimulation points to one another, as well as the total length of the foot orthosis



► **SUITABLE COMBINATIONS**

The foot orthoses can both be worn in combination with a regular shoe, a stabilizing shoe, with pre-fabricated splints, as well as in a KAFO/AFO.



INTELLIGENT SOLUTIONS

TAKE A CAST OF THE FOOT WITH THE PROPRIO® NEURO FOOT ORTHOSIS

Standardize your workflows and become more efficient!

When treating partially contracted or contracted feet, the foot is plaster cast in the corrected position. The heel should be brought as far as possible into the subtalar joint neutral position and fixated. The aim is to block the subtalar joint to prevent pressure points in the orthosis arising from pronation or supination movements.

» TAKE A DIRECT CAST OF THE FOOT WITH THE PROPRIO® NEURO FOOT ORTHOSIS.



VERSION I

Remove the foot orthosis before or after pouring the plaster negative. Later, re-insert the foot orthosis during the fabrication process.

► **Advantage:**

Corrections can be made to the foot orthosis. In addition, the foot orthosis can also be covered with fabric.



VERSION II

You pour the foot orthosis along with the impression and get a plaster positive over which the orthosis is formed.

► **Advantage:**

The footbed is firmly molded into the orthosis. Any “leftover” foot orthosis can be adapted to other shoes for the patient.



1. Foot type

► DETERMINES THE BASIC SHAPE OF THE FOOT ORTHOSIS



THE NORMAL FOOT

The foot shows no deviations in stance control.



FALLEN ARCHES

The foot is characterized by a flattening in the longitudinal arch under load and straightening of the longitudinal arch when unloaded. The footprint shows a widened contact area.

► This foot requires muscular support along its inner edge using PROPRIO® foot orthoses.



PES VALGUS

Pes valgus is characterized by medial protrusion of the inner ankle and elevation of the outer edge of the foot. As a result, pes valgus sometimes resembles pes cavus in the impression, because there is no contact from the foot's outside edge. Typically, increased loading of the 1st ray and valgization of the heel can be observed.

► This pathology requires muscular support for the inversion muscles using PROPRIO® foot orthoses.



PES CAVUS

Pes cavus shows little to no loading in the mid-foot area and only a tread area in the ball and the heel. Pes cavus patients are prone to severe claw toes and often experience increased forefoot loading, which can manifest as calluses.

► This pathology requires PROPRIO® foot orthoses for muscular support and stabilization in the subtalar joint and, if necessary, a mechanical correction using padded layers during childhood.



PES ADDUCTUS

Pes adductus is characterized by a forefoot turned inward with spreading of the rays.

Pes adductus often leads to an apparently internally rotated gait pattern with cramped toes.

► This pathology requires PROPRIO® foot orthoses primarily for muscular support of the pronating muscles and mechanical correction using padded layers that stretch the foot in the first ray.

CLUBFOOT



Clubfeet are twisted toward the outer edge in the entire foot axis. They are characterized by an increased load on the fifth metatarsal and the entire outer edge of the foot. This is accompanied by a shortened medial lever arm, an adducted forefoot and spread apart hallux. Clubfoot usually leads to an internally rotated gait pattern.

► This pathology requires PROPRIO® foot orthoses primarily for muscular support of the pronating muscles and forcible mechanical correction using padded layers that stretch the foot in the first ray.

PES EQUINUS

Pes equinus is characterized by forefoot strike; the heel has no or only slight ground contact during the loading phase. A distinction is made between a structural and functional pes equinus. For both, a high tonus in the calf muscles is typical. With functional pes equinus, the heel can be corrected into the subtalar joint neutral position during muscle relaxation. In the case of structural pes equinus, this is only possible in part or not at all.

► This pathology requires PROPRIO® foot orthoses primarily to stimulate detensioning of the plantar-flexing muscle groups.

HYBRID VERSIONS

✓ Pes planovalgus calcaneus

✓ Pes cavus valgus

✓ Pes equinovarus

2. Muscle status

► DETERMINES THE RELATIVE DOMINANCE OF INDIVIDUAL MODULES

NEUTRAL



There are no apparent muscular deficits.

PARTIAL PERONEAL NERVE PALSY



Partial peroneal nerve palsy is often the result of a neurological event, e.g. stroke, cerebral hemorrhage, encephalitis or similar episodes. It is striking, in any case, that the patients affected have a supinated gait pattern and the foot levator (dorsal-extending) muscles can no longer be properly controlled.

This results in an uncertain, short-step gait pattern, frequent stumbling and a lack of external foot edge stability, which is readily apparent to the naked eye.

► *In this pathology, the objective of treatment with PROPRIO® foot orthoses is to activate the dorsal extensors. Detonization of plantar flexion is relatively mild. Activation of the outer foot edge muscles as well as lateral mechanical stabilization counteracts any supination defect.*

MUSCLE ATROPHY



Muscle atrophy can occur after injuries, particularly due to nerve damage, metabolic disorders, physical inactivity or neuromuscular diseases, e.g. amyotrophic lateral sclerosis (ALS). In multiple sclerosis, nerve damage triggers muscle atrophy. In the patients with neurogenic muscle atrophy, the death of nerve-supplying cells in the spinal cord leads to a breakdown of muscle tissue. Signs of muscular atrophy may include, for example, stumbling, frequent falling and difficulties getting over thresholds or up and down steps.

► *For such pathologies, the objective of treatment with PROPRIO® foot orthoses is to increase tonus in the hindfoot-stabilizing muscles—the plantar flexors—and reactivate tactile function in the sole of the foot.*

SPASTICITY / ATAXIA



High tonus in the flexing muscles is often accompanied by

gait ataxia, a disorder of equilibrium and coordination. Its most common causes are cerebral palsy and, in particular, diseases of the cerebellum. The cerebellum is responsible for coordinating stimuli sensory and sensory feedback from the spinal cord and vestibular system, while ensuring that movements are planned, coordinated and fine-tuned.

► *For such pathologies, the objective of treatment with PROPRIO® foot orthoses is to achieve detonization of the hypertonic muscles of the lower leg and improve sensitivity — tactile sensation in the sole of the foot.*

PLEGIA / PALSY

Plegia (paralysis) is defined as the complete loss of function in



major skeletal muscle groups. Incomplete paralysis is known as paresis. The causes of flaccid paralysis can be toxic/inflammatory or

mechanical/traumatic, for example, caused by tumors, autoimmune diseases, poisoning or traumatic accidents. A hallmark of flaccid paralysis (also called peripheral paralysis) is that impulse transmission through the nerve is lacking due to damage to motor nerves between the spinal cord and muscles. Lacking stimulus transmission and thus the body's ability to use them, the muscles atrophy. Over time, there is a massive decline in muscle mass. The result is loss of muscular strength and function as well as circulatory disorders of the skin.

► *For such pathologies, the objective of treatment with PROPRIO® foot orthoses is—within the realm of the physically possible—to strengthen the basic tonus of the plantar-flexing muscles. This should help prevent muscular atrophy and stimulate residual function. Furthermore, the tactile stimuli transmitted through the sole of the foot promote blood circulation.*

KINETIC TREMOR / RESTING TREMOR



Tremor (shaking) is by definition an involuntary, i.e. not consciously

controllable, rhythmic movement of limbs.

A distinction is made between kinetic tremors, which occur during movement, and resting tremors, which occur in the resting state. A tremor can have various causes: physiological (due to drug use, alcohol, pain, overexertion), mental (trauma), hereditary (gene defects), neuropathic (neuropathies) but also cerebellar (tumors, bleeding, multiple sclerosis). The best-known pathology characterized by the occurrence of resting tremor is Parkinson's disease. The fundamental problem with all manifestations of tremor is that patients partially or completely lose control over their movements.

► For such pathologies, the objective of treatment with PROPRIO® foot orthoses is to employ elements that counteract the excess tension in the muscles and thereby reduce the basic tonus. At the same time, the key is to improve the tactile sense of the sensitive receptor system in the sole of the foot and hence the degree of gait certainty.





3. Ankle mobility

- ▶ DETERMINES THE RATIO OF SENSORIMOTOR TO MECHANICAL ELEMENTS
- ▶ THE MORE CONTRACTED A FOOT, THE MORE MECHANICAL SUPPORT IS REQUIRED

Lower ankle examination



Pronation

Upper ankle examination



Dorsiflexion



Supination



Plantar flexion

FLEXIBLE:

The foot is freely movable.

- ▶ For such pathologies, it is important to provide as little mechanical support as possible in the fabrication of the PROPRIO® foot orthoses.

Flexible to partially contracted:

The foot is moderately restricted in its mobility.

- ▶ For such pathologies, it is also important to integrate mechanical supports in the PROPRIO® foot orthoses. This is because vertical alignment cannot be guaranteed solely via muscular reaction.

PARTIALLY CONTRACTED:

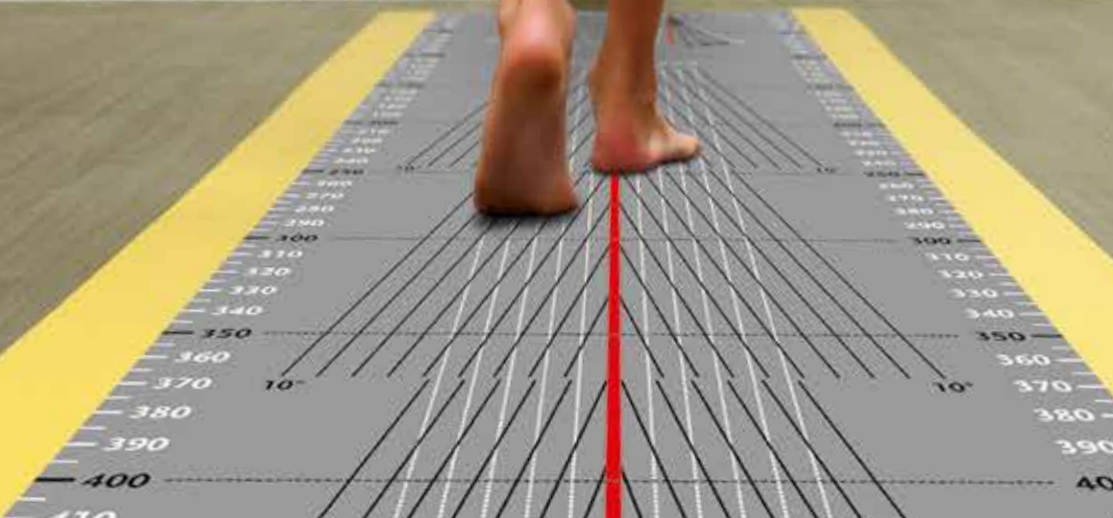
The foot is significantly restricted in its mobility.

- ▶ In this pathology, it is important to integrate more robust mechanical supports in the hindfoot area of the PROPRIO® foot orthoses. This will give the foot the necessary stability, while ensuring correct vertical alignment.

CONTRACTED:

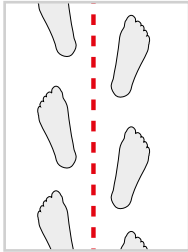
The foot is stiff and immobile around the subtalar joint.

- ▶ In this pathology, it is important that the PROPRIO® foot orthoses mechanically stabilize the hindfoot, block the subtalar joint and prevent pronation and supination movements. This prevents pressure points building up in the orthosis. The foot is cast in its corrected position. The heel should be brought as far as possible into the subtalar joint neutral position and fixated.



4. Gait pattern

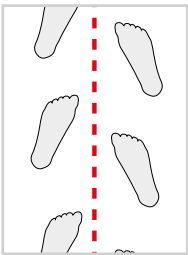
► DETERMINES THE RATIO OF MEDIAL TO LATERAL SPOT



NEUTRAL

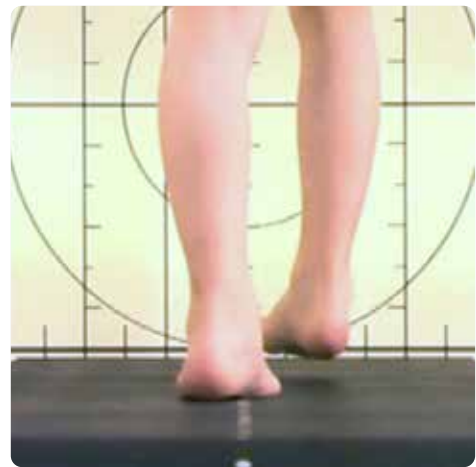
A neutral gait pattern is defined as when the foot rolls with a slight external rotation of 5°–15°. Toes IV - V are visible in the anteroposterior view. This is referred to as "two-toe sign". On the pedograph, physiological loading is evident over the first metatarsal during heel-to-toe movement.

INTERNALLY ROTATED

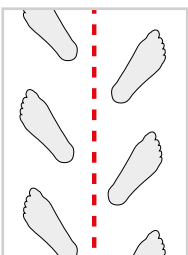


Pronounced inner rotation is referred to when less than two toes are visible in the anteroposterior view. The foot rolls off with less than 5° of external rotation. When internal rotation is increased, the pedograph reveals rolling under the second and third metatarsals.

► *When fabricating PROPRIO® foot orthoses for internal rotation, the orthopedic shoe technician must make sure that the main external rotators of the long foot muscles are activated to a greater extent.*



Internal rotation



EXTERNALLY ROTATED

External rotation is given when the foot shows at least three toes in the anteroposterior view. The foot rolls with more than 15° of external rotation, so there may be increased pressure under the outer ray in the pedograph.

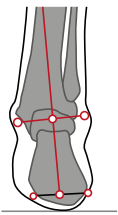
► *When fabricating PROPRIO® foot orthoses for internal rotation, the orthopedic shoe technician must make sure that the groups of internal rotators of the long foot muscles are activated to a greater extent.*



External rotation

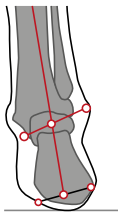
5. Foot in the loading phase

- ▶ DETERMINES THE RATIO OF PRONATING TO SUPINATING EFFECTS
- ▶ DETERMINES THE RATIO OF DORSIFLEXION TO PLANTAR FLEXION ELEMENTS



NEUTRAL (hindfoot vertically aligned)
 The foot makes full contact with the ground and the navicular bone (scaphoid bone) is lowered by approx. 1 cm as a result of the weight shift of the body's center of gravity over the foot.

muscle groups.

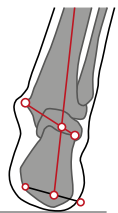


OVERPRONATION (severe hindfoot eversion)
 The foot makes full contact with the ground and the navicular bone (scaphoid bone) has lowered by more than 1 cm as a result of the weight shift of the body's center of gravity over the foot.



Overpronated

▶ In this pathology, the PROPRIO® foot orthosis should be designed so that the supinating muscle groups have greater relevance.

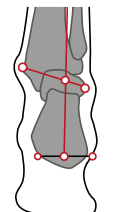


SUPINATED (hindfoot inversion)
 The foot makes full contact with the ground and the navicular bone (scaphoid bone) has lowered marginally or not at all as a result of the weight shift of the body's center of gravity over the foot.



Supinated

▶ In this pathology, the PROPRIO® foot orthosis is designed so that the pronating muscle groups have greater relevance.



WITHOUT HEEL STRIKE
 The foot strikes with the forefoot and there is no or very little heel strike during forward movement.



Without heel strike

▶ For this pathology, the PROPRIO® foot orthosis should be designed to relax the plantar-flexing

6. Claw toes

► DETERMINES THE DESIGN OF THE TOE MODULE

CLAW TOES PRESENT

When a patient claws with his toes, the causes may be anatomical or muscular. Examples of anatomical claw toe include hammer toe or hollow foot, where patients attempt to balance out the small support surface of the foot with strong toe-tip contact. In addition, shortening or excess tension of the flexor muscles can lead to clawing.

► For the design of the toe module on the PROPRIO® foot orthosis, this means that a classic PROPRIO® toe bar is not used here. Rather, a small wave in the proximal toe module, similar to dynamic foot orthoses, ensures that the toes are stretched but cannot slip back into a clawed position.



CLAW TOES NOT/LESS PRESENT

We speak of no or mild claw toes when the toe flexors are not shortened and there is no anatomical alteration, e.g. hammer toes. The toes can be easily stretched and actively held in a corrected position.

► For the design of the toe module on the PROPRIO® foot orthosis, this means that a classic PROPRIO® toe bar is used, with its highest point behind the distal phalanxes II-V and slightly flattened out dorsally.





7. Material selection

- ▶ ACCORDING TO 1.) THE FLEXIBILITY OF THE FOOT
- ▶ ACCORDING TO 2.) FURTHER PROCESSING IN SHOES AND ORTHOSES

SOFT FOAM WITH PP CARRIER PLATE

This version is recommended if you want to facilitate heel-to-toe movement of the foot as well as make the foot orthosis as thin and space-saving as possible. The criterion for foot flexibility should be lower ankle joint mobility. The use of a soft foam is recommended for movable to partially contracted feet. The thinly milled foot orthoses can be worn well in regular shoes, in stabilized shoes as well as in soft and rigid orthoses with adapted PROPRIO® foot orthoses (e.g. arthrosan splints, Neurodyn Comfort, Dynamic Walk, Amafo, Neurodyn-Dynam-X, ToeOff etc.). The soft foam has a hardness of approx. 35 – 40° Shore A and the carrier plate is stable yet elastic, but not thermoformable.



SOFT FOAM WITHOUT PP CARRIER PLATE

This version is recommended if you want to facilitate heel-to-toe movement of the foot and glue the foot orthosis firmly into a KAFO/AFO. The criterion for foot flexibility should be lower ankle joint mobility. The use of a soft foam is recommended for movable to partially contracted feet. PROPRIO® soft foam foot orthoses can be incorporated into custom-made foot or KAFO/AFO made of PE or cast resin, in which case the foot orthosis is cast along with the foot. The cast can then be poured either with or without the foot orthosis. ▶ See p. 7, Working techniques.



The soft foam has a hardness of approx. 35 - 40° Shore A and is not thermoformable.

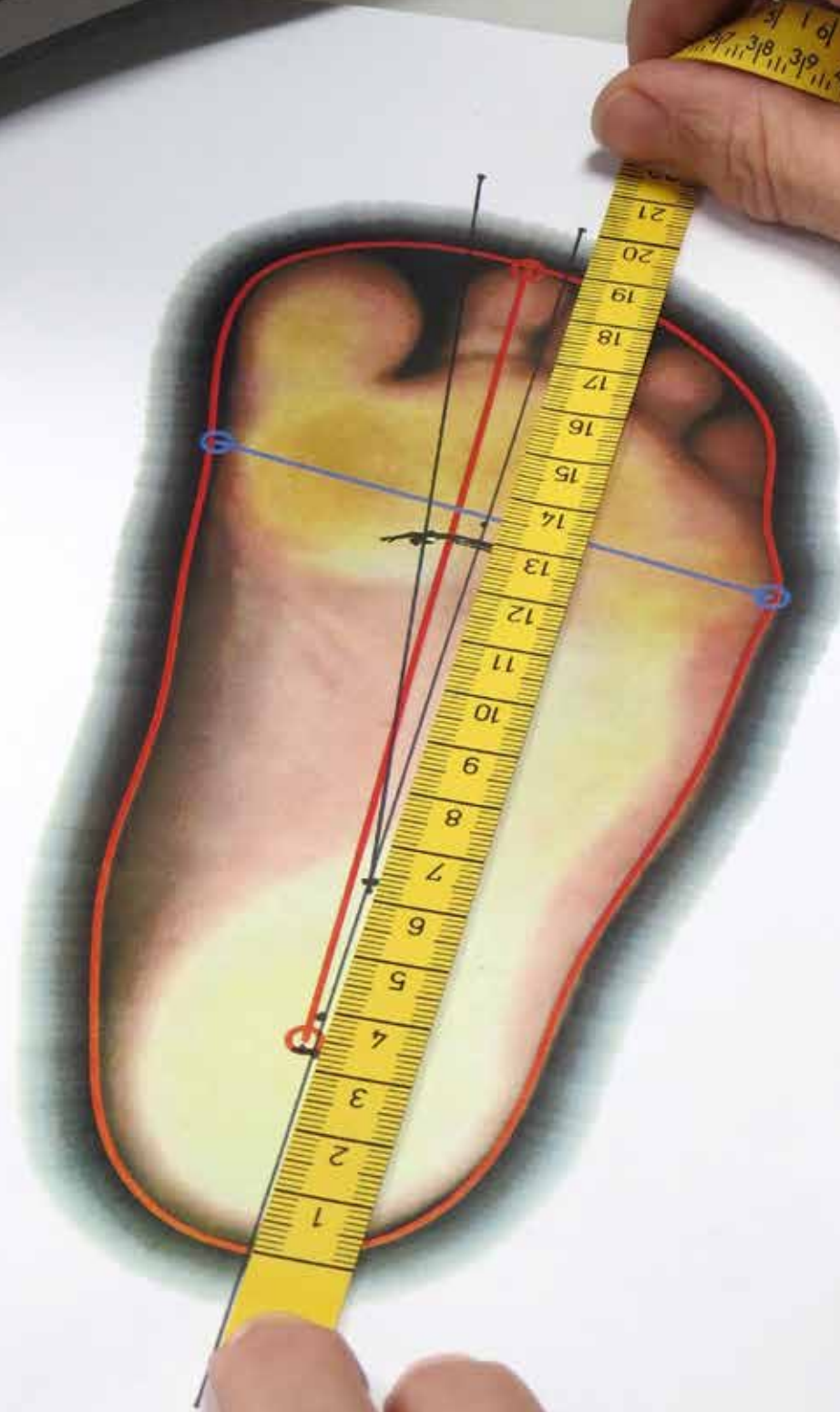
MICROCORK WITHOUT CARRIER PLATE

This option is recommended if you do not want to allow the foot to pronate or supinate and wish to incorporate the foot orthosis firmly into an orthosis. The criterion for foot flexibility should be lower ankle joint mobility. In patients with severely partially contracted or contracted feet, the use of microcork is recommended because the foot is ultimately seated in the orthosis with a fixated, vertically aligned heel and should be immobilized to avoid pressure points. PROPRIO® microcork foot orthoses can be incorporated into custom-made foot or KAFO/AFO by the pre-preg technique after plaster casting. The foot orthosis is also cast with the KAFO/AFO. The cast can then be poured either with or without the foot orthosis. ▶ See p. 7, Working techniques. The microcork has a hardness of approx. 55° Shore A and remains stable during thermoforming.



▶ NOTE

PROPRIO® foot orthoses can also be useful in combination with FES systems (providing electrical impulses for various muscle groups). These systems provide electrical impulses to stimulate the muscles during the swing phase, while the PROPRIO® foot orthosis also acts during the load phase.



Länge	189
Breite	80
Ballenmaß	0
Wölbung	0
Wölbung	0

8. Length measurements

▶ THE FOOT LENGTH DETERMINES THE POSITION OF THE STIMULATION ELEMENTS IN RELATION TO ONE ANOTHER.

▶ THE LENGTH OF THE FOOT ORTHOSIS DETERMINES TO WHAT EXTENT IT WILL BE EXTENDED FORWARD

FOOT LENGTH

Measure the footprint from the heel outline to the outline of interdigital space II-III. Before you can do this, you must straighten the foot axis in the scan in order to avoid measurement errors!

FOOT ORTHOSIS LENGTH

This measurement depends on the shoe size or the length of the foot plate in the inner shoe of the orthosis. It is safest to specify the length of the removable inner sole instead of the shoe size.

MILLING SIZE AND PUNCHING SIZE

The conversion to the milling and punching size is specified by the manufacturer in the initial order. If the re-orders are unchanged, they can also be filled in by the technician.





HELPING MEANS UNDERSTANDING

DO'S AND DON'TS WHEN DEALING WITH NEUROLOGICAL PATIENTS

- 1 Do not attempt to diagnose the patient nor communicate any personal presumptions. Diagnosis belongs in the hands of a specialist, e.g. a neurologist or orthopedist.
- 2 Clarify with the treating physiotherapist what is the right time to initiate treatment with PROPRIO® foot orthoses and mutually define a realistic therapeutic objective.
- 3 Clarify the patient's legal capacity before therapy begins.
- 4 Keep in mind that, even with the same diagnosis, no two patients are ever the same.
- 5 Neurological patients are often not aware of their disorder. This can lead to dangerous situations for the patient and the technician, e.g. the patient is of the opinion that he or she can stand and walk alone. Do not allow the patient to stand up until the physiotherapist gives the okay.
- 6 If possible, do not speak of "the patient" in the presence of the patient, but rather respect his or her dignity and address him or her directly and personally.
- 7 Always keep eye contact with the patient. Speak in short, understandable phrases.
- 8 Many patients with hemiparesis or hemiplegia on the right have an aphasia (speech disorder). These patients can usually understand you but are unable to speak. The patient may also be suffering from a dysarthria (speech disorder) in which motor control over the speech muscles is dysfunctional and the patient "slurs" when they speak. These patients are not necessarily cognitively impaired. Consult with the therapist and determine beforehand to what extent the patient understands you.
- 9 Speak to patients in a quiet tone, do not raise your voice. Otherwise, a cognitively healthy person will quickly begin to feel "impaired".
- 10 When communicating with spatial neglect patients (who do not perceive one side of their body / the room), note that they rarely or never respond when you talk to them from or touch them on the affected side. Clarify which side is affected with the doctor / therapist and talk to / touch the patient on the other side or head-on.



NEUROLOGICAL INDICATIONS

THE MOST COMMON CLINICAL PICTURES AT A GLANCE



The descriptions given here are only general guidelines for the technician and should not under any circumstances be used for diagnostic purposes. Diagnosis is the job of the treating physician. Nevertheless, we would like to give a brief overview of which motor/orthopedic symptoms can occur in association with which neurological diagnoses and should therefore be considered, where necessary, by the technician. The clinical picture itself is less critical for the purposes of treatment, because, even in two individuals with the same disease or the same injury, the degree of motor dysfunction can vary quite considerably. Therefore, close examination of the gait pattern and joint situation as well as coordination with the physical therapist is the key to successful outcomes in orthopedic treatment of neurological patients.

CEREBRAL PALSY / INFANTILE CEREBRAL PALSY (ICP)

Normal muscle function assumes that there is a balance between excitation and inhibition of nerve function. This is disrupted in patients with cerebral palsy. Therefore, muscle functions cannot be controlled voluntarily. Brain damage can have several origins, e.g. caused by a prenatal infection, oxygen deficiency at birth or even complications thereafter. In contrast to many other body cells, brain cells do not renew themselves. Early detection of cerebral palsy is therefore crucial. The earlier the disorder is recognized, the greater the chance that the remaining brain cells can at least partly take over the failing functions with the appropriate therapy. Depending upon which brain areas are affected by the damage, various symptoms may occur, e.g. postural and movement disorders in the form of coordination disorders, spasticity or paralysis. If paralysis occurs, primarily the cerebellum is affected. When the extremities are affected, a distinction is made between diparesis (predominantly both legs affected), hemiparesis (arm and leg of one half of the body affected) and tetraparesis (both arms and legs affected).

Motor-orthopedic symptoms:

- Pes equinus
- Spasticity
- Fallen arches or flatfoot (hypotonic syndrome)
- Knee flexion contraction
- Ataxia
- Scoliosis

TRISOMY 21





Trisomy 21 is a gene version that can lead to limitations in terms of physical and mental development. It is impossible to predict how children with this disorder will develop. The possibilities range from those who will become largely independent as adults to those who will depend on the help of others for a lifetime.

Typical hallmarks

- Hypotonic feet with weak connective tissue
- Fallen arches
- Change in the body's axes
- Decreased coordination

SPINA BIFIDA

Spina bifida is a congenital neural tube defect where the spinal cord and its meninges may protrude through a defective closure of the vertebral arch. Depending on the degree of severity of spinal cord damage, affected patients are severely physically impaired. Muscle weakness in the legs up to and including paraplegic paralysis with paresthesia and complete paralysis of the legs are typical. The vertebral column deformities may also be severe. Severe foot deformities often occur as well. Hydrocephalus, in which cerebrospinal fluid accumulates in the cerebral ventricles due to a spinal cord deficiency, often occurs in conjunction with spina bifida.

Motor-orthopedic symptoms

- Severe foot deformities, mostly (partially) contracted hollow or clubfoot
- Knee and hip flexion contractures
- Paralysis of the legs
- Paraplegia
- Back pain
- Calf muscle atrophy





STATUS POST APOPLEXY

Due to nerve cell injury in the affected cerebral hemisphere, stroke or brain hemorrhage often lead to neurological deficits that impair the motor system.

Typical hallmarks

- Clubfoot
- Lack of dorsiflexion
- Strong supination
- Walking on the outside edges of the feet
- Decreased clearance (foot-ground clearance)
- Compensation for lack of dorsiflexion with greater knee flexion
- “Steppage gait”

PARKINSON'S DISEASE

Parkinson's disease is a slowly progressive disease characterized by the dying off of dopamine-producing nerve cells. Dopamine is the messenger substance that transmits impulses from one region of the brain to the other. In simple terms, dopamine regulates the sensory signal circuitry needed for motor function. This is extremely important for posturo-kinetic control, which is dysfunctional in patients with Parkinson's disease.

Typical hallmarks

- Resting tremor (shaking)
- Slowed or inhibited movements
- Increased muscle tension
- Akinesia (hypokinesia)
- Hypomimia (mask-like face)
- Shuffling gait pattern with small steps
- Inhibition in initiating walking movements
- Postural instability

MULTIPLE SCLEROSIS

MS is an inflammation occurring in the brain—and, partly, also in the spinal cord—caused by endogenous immune cells attacking the protective myelin sheaths surrounding nerve fibers. The destruction of these myelin sheaths and the swelling caused by inflammation reduces nerve cell conductivity.

Typical hallmarks

- Numbness in the arms and legs
- Feeling of tightness around the joints
- Musculoskeletal pain
- Uncertain gait pattern
- Frequent tripping

ALS / AMYOTROPHIC LATERAL SCLEROSIS





ALS is a progressive and irreversible damage to or degeneration of the nerve cells (neurons) responsible for muscle movement. The onset of the disease can take several forms; sometimes, at first, there are often only small blunders during the execution of motor activities. As the disease progresses, there is increasing muscular weakness (paralysis, paresis) associated with muscular atrophy (amyotrophy) and increased muscle tone (spasticity). Paralysis of the muscles leads to gait, speech and swallowing disorders, limited coordination and weakness of the arm and hand muscles, and thus to increasing restrictions in the activities of daily life.

Motor-orthopedic symptoms

- Paresis (paralysis)
- Spastic symptoms
- Muscle twitching
- Feebleness of the affected areas
- Gait uncertainty

STATUS POST CRANIOCEREBRAL TRAUMA

Craniocerebral trauma is, as the name implies, an injury to the skull and the brain. The trigger is usually an accident event, the symptoms and consequences depend on the severity of the injury. Depending on the extent of the brain injury, motor disorders such as flaccid or spastic paralysis as well as speech disorders (aphasia) can result. Patients may describe headaches, dizziness, concentration or memory problems.

Motor-orthopedic symptoms

- Symptoms of paralysis
- Spasticity
- Balance disorders
- Sensory disorders

STATUS POST INTRACEREBRAL HEMORRHAGE

The cause of intracerebral hemorrhage (cerebral hemorrhage) is a torn vessel in the brain. This can be triggered by hypertension, a tumor, an aneurysm, a trauma or a blood coagulation disorder.

Motor-orthopedic symptoms

- Symptoms of paralysis
- Spasticity
- Balance disorders
- Sensory disorders



2

MUSKELSTATUS: neutral

1

3

4

5

» Beweglichkeit im Sprunggelenk: flexibel bis teilkontrakt

Fuß in Belastungsphase	Material	▼ Neutrales Gangbild		▼ Innenrotiertes Gangbild		▼ Außenrotiertes Gangbild	
		Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen
▶ Neutral	Mit PP	L31-20-00	L31-20-06	L31-10-00	L31-10-06	L31-20-00	L31-20-06
	Ohne PP	L31-21-00	L31-21-06	L31-11-00	L31-11-06	L31-21-00	L31-21-06
▶ Proniert	Mit PP	L31-20-00	L31-20-06	L31-10-00	L31-10-06	L31-20-00	L31-20-06
	Ohne PP	L31-21-00	L31-21-06	L31-11-00	L31-11-06	L31-21-00	L31-21-06
▶ Supiniert	Mit PP	L31-20-04	L31-20-12	L31-10-04	L31-10-12	L31-20-04	L31-20-12
	Ohne PP	L31-21-04	L31-21-12	L31-11-04	L31-11-12	L31-21-04	L31-21-12
▶ Ohne Fersenkontakt	Mit PP	L31-20-01	L31-20-07	L31-10-01	L31-10-07	L31-20-01	L31-20-07
	Ohne PP	L31-21-01	L31-21-07	L31-11-01	L31-11-07	L31-21-01	L31-21-07

» Beweglichkeit im Sprunggelenk: teilkontrakt

Fuß in Belastungsphase	Material	▼ Neutrales Gangbild		▼ Innenrotiertes Gangbild		▼ Außenrotiertes Gangbild	
		Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen
▶ Neutral	Mit PP	L31-20-30	L31-20-22	L31-10-30	L31-10-22	L31-20-30	L31-20-22
	Ohne PP	L31-21-30	L31-21-22	L31-11-30	L31-11-22	L31-21-30	L31-21-22
	Kork	K31-21-30	K31-21-22	K31-11-30	K31-11-22	K31-21-30	K31-21-22
▶ Proniert	Mit PP	L31-20-30	L31-20-22	L31-10-30	L31-10-22	L31-20-30	L31-20-22
	Ohne PP	L31-21-30	L31-21-22	L31-11-30	L31-11-22	L31-21-30	L31-21-22
	Kork	K31-21-30	K31-21-22	K31-11-30	K31-11-22	K31-21-30	K31-21-22
▶ Supiniert	Mit PP	L31-20-26	L31-20-18	L31-10-26	L31-10-18	L31-20-26	L31-20-18
	Ohne PP	L31-21-26	L31-21-18	L31-11-26	L31-11-18	L31-21-26	L31-21-18
	Kork	K31-21-26	K31-21-18	K31-11-26	K31-11-18	K31-21-26	K31-21-18
▶ Ohne Fersenkontakt	Mit PP	L31-20-24	L31-20-16	L31-10-24	L31-10-16	L31-20-24	L31-20-16
	Ohne PP	L31-21-24	L31-21-16	L31-11-24	L31-11-16	L31-21-24	L31-21-16
	Kork	K31-21-24	K31-21-16	K31-11-24	K31-11-16	K31-21-24	K31-21-16

» Beweglichkeit im Sprunggelenk: kontrakt

Fuß in Belastungsphase	Material	▼ Neutrales Gangbild		▼ Innenrotiertes Gangbild		▼ Außenrotiertes Gangbild	
		Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen	Kein Zehenkrallen	Zehenkrallen
▶ Neutral	Mit PP	L31-20-31	L31-20-23	L31-10-31	L31-10-23	L31-20-31	L31-20-23
	Ohne PP	L31-21-31	L31-21-23	L31-11-31	L31-11-23	L31-21-31	L31-21-23
	Kork	K31-21-31	K31-21-23	K31-11-31	K31-11-23	K31-21-31	K31-21-23
▶ Proniert	Mit PP	L31-20-31	L31-20-23	L31-10-31	L31-10-23	L31-20-31	L31-20-23
	Ohne PP	L31-21-31	L31-21-23	L31-11-31	L31-11-23	L31-21-31	L31-21-23
	Kork	K31-21-31	K31-21-23	K31-11-31	K31-11-23	K31-21-31	K31-21-23
▶ Supiniert	Mit PP	L31-20-27	L31-20-19	L31-10-27	L31-10-19	L31-20-27	L31-20-19
	Ohne PP	L31-21-27	L31-21-19	L31-11-27	L31-11-19	L31-21-27	L31-21-19
	Kork	K31-21-27	K31-21-19	K31-11-27	K31-11-19	K31-21-27	K31-21-19
▶ Ohne Fersenkontakt	Mit PP	L31-20-25	L31-20-17	L31-10-25	L31-10-17	L31-20-25	L31-20-17
	Ohne PP	L31-21-25	L31-21-17	L31-11-25	L31-11-17	L31-21-25	L31-21-17
	Kork	K31-21-25	K31-21-17	K31-11-25	K31-11-17	K31-21-25	K31-21-17

NORMAL-KNICKENFUSS

HOHLFUSS

SICHELFUSS

KLUMPFUSS

SPITZFUSS

Konzeptbroschüre & Katalog

PROPRIO® NEURO

35

ORDERING INSTRUCTIONS

▶ HOW DO I NAVIGATE TO THE CORRECT ITEM NUMBER?

- 1 **Find the right chapter!**
You will find the right chapter via the foot type.
- 2 **Find the right page within the chapter!**
Find the right page via muscle status, e.g. neutral.
- 3 **Find the right table on a page!**
Determine the right table using the mobility of the ankle joint.
- 4 **Select the right table from a column!**
The right column can be obtained through selection of the gait pattern and sub-categorized using the parameter claw toes.
- 5 **Find the right row!**
The right row can be found by selecting the column foot during the loading phase and selecting from the sub-category material.

Order Form NEURO

COMPANY	PHONE
STREET	FAX
POST CODE/ZIP, CITY	E-MAIL
CONTACT PERSON	DATE

COMMISSION/
PATIENT NAME:

AGE: _____

DIAGNOSIS:

- | | |
|---|---|
| <input type="checkbox"/> Cerebral paresis / ICP | <input type="checkbox"/> ALS / Amyotrophic lateral sclerosis |
| <input type="checkbox"/> Trisomy 21 | <input type="checkbox"/> Status post Skull / brain trauma |
| <input type="checkbox"/> Spina Bifida | <input type="checkbox"/> Status post Intracerebral hemorrhage |
| <input type="checkbox"/> Status post stroke | <input type="checkbox"/> not known |
| <input type="checkbox"/> Parkinson's disease | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Multiple sclerosis | |

1 FOOT TYPE

Normal foot		pes planus flat foot		pes valgus		pes cavus		pes adductus		pes varus club-foot		pes equinus	
<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right

2 MUSCLE STATUS

Neutral		Peroneus Paresis		general insufficiency of the muscles		general high tension of the muscles		Plegia / paresis		Tremors	
<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right

3 ANKLE JOINT MOBILITY

⚠ No mix pairs of PROPRIO® and DAFO® models!

PROPRIO® MODELS				OR	DAFO® MODELS				Neutral		Rotated inwards		Rotated outwards	
Flexible		Flexible to partially contracted			Partially contracted		Contracted		<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right
<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	

4 GAIT

5 FOOT IN MID STANCE

Neutral		Overpronated		Supinated		No heel contact	
<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right

6 CLAW TOES

Yes		No	
<input type="radio"/> left	<input type="radio"/> right	<input type="radio"/> left	<input type="radio"/> right

7 MATERIAL

- Soft foam with PP base plate
 Soft foam without PP base plate
 Microcork without PP base

NOTE: The material should be selected based on the mobility of the ankle joint! ▶ see ordering instructions

8 LENGTH MEASUREMENT*

👉 Our employees will be happy to help you find the right model. When you place your first order, our employees will convert this measurement to the size used for milling and stamping out of the insoles.

	Item number	Foot length	Insole length	Milling size	Stamping size
Left	PROPRIO®	cm	cm		
Right	PROPRIO®	cm	cm		

Bestellanleitung NEURO



Mit Ihren Angaben bestimmen Sie die Oberflächengestaltung der Einlage. Wir bitten Sie, den Anamnesebogen sorgfältig auszufüllen. Fehlende Angaben werden als neutral bzw. ohne Befund bewertet. Gern navigieren wir für Sie die passende Modellnummer.

- 1 FUSSTYP** Bestimmt die Grundform der Einlage.

- 2 MUSKELSTATUS** Bestimmt das Höhenverhältnis der Rückfußelemente zu den Vorfußelementen

- 3 BEWEGLICHKEIT SPRUNGGELENK** Bestimmt das Verhältnis zwischen sensomotorischen und mechanischen Elementen. Je kontrakter ein Fuß, desto mehr mechanische Unterstützung wird benötigt.

- 4 GANGBILD** Bestimmt das Höhenverhältnis zwischen medialem und lateralem Spot

- 5 FUSS IN BELASTUNGSPHASE** Bestimmt das Verhältnis zwischen Vorfuß- und Rückfußstimulation sowie zwischen pronierenden und supinierenden Effekten.

- 6 ZEHENKRALLEN** Bestimmt die Gestaltung des Zehenmoduls.



Kein Zehenkrallen ▶ Zehensteg



Zehenkrallen ▶ Zehenwelle

7 MATERIALWAHL Hängt ab von

▶ 1) FLEXIBILITÄT DES FUSSES:

flexibel bis teilkontrakt ¹		kontrakt ²
Weichschaum, 35° Shore A, mit stabiler PP-Trägerplatte	Weichschaum, 35° Shore A, ohne PP-Trägerplatte	Microkork, 50° Shore A, ohne PP-Trägerplatte

▶ 2) WEITERE VERARBEITUNG / VERFORMUNGSTECHNIK:

<ul style="list-style-type: none"> • Konfektionsschuh • Stabilschuh • PE-Orthesen 	<ul style="list-style-type: none"> • konfektierte Schienen • Gießharz-Orthesen 	<ul style="list-style-type: none"> • Pre-Prag-Orthesen • PE-Orthesen
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8 FUSSLÄNGE EINLAGENLÄNGE Bestimmt die Proportion der einzelnen Stimulationspunkte zueinander sowie die Gesamtlänge der Einlage

- ▶ Fußlänge messen von Umriss zu Umriss interdigital III
- ▶ Einlagenlänge: nach Innenschuhmaß

