DARCO Compendium-Booklet

out of DARCO India Innovation E-News Issue 1 – 18

Featured Product and Expertise (October 2013 – December 2017)

DARCO Quality Since 1985

DARCO

Imprint

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This Booklet provides as a compendium the extracts of “Featured product” and “Expertise” chapters of the DARCO India Innovation E-News Issue 1 – 18.

The DARCO India Innovation E-News is a quarterly published information source that is simple, effective and up-to-date. You have regular updates and special feature segments of varying topics.

Featured Product section analyses the benefits and application of a particular product. In our Expertise section, we will share some of our 30 years of accumulated experience and know-how.

This knowledge based segment offers valuable, practical information that will prove to be a useful tool in your day-to-day business. For more information or subscription please visit www.darco.in.

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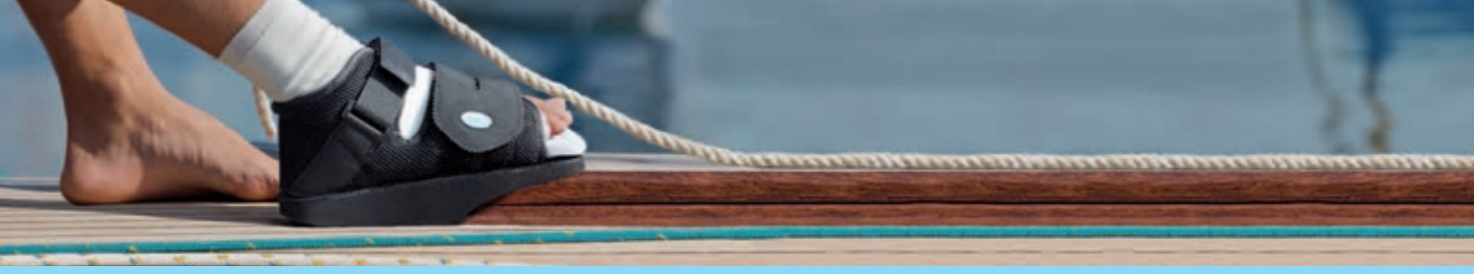


Featured Product

DARCO OrthoWedge® Off-loading shoe

The DARCO OrthoWedge® is clinically proven to reduce weight bearing pressure on the forefoot which promotes faster healing after surgery, trauma or when forefoot wounds or ulcerations are present.

Use after surgeries to correct hallux valgus, hammer toes / Tailor's bunions treatment of diabetic ulcerations.

A Time Tested Option

Incidences of diabetes are at an all time high with the level of newly reported cases up a staggering 48% in the last 10 years*. In many cases, the resulting neuropathic limbs mean that diabetic ulcers on the feet are a distinct and very dangerous possibility. Since pressure and abrasion are the enemies of wound care, the OrthoWedge® is designed to naturally reduce the number of steps taken by the patient while still allowing them to ambulate when necessary. The DARCO OrthoWedge® has been tested under fire in both clinical and real world settings and continues to produce outstanding results. When forefoot off-loading is required to allow wounds/ulcerations under the metatarsal heads and toes to heal, nothing beats the OrthoWedge®.

Need Targeted Off-Loading? Add a PegAssist™ Insole

When used alone, the OrthoWedge® Healing Shoe reduces forefoot pressure by as much as 57% and peak pressure is reduced by as much as 75% under the Great Toe! But when combined with our innovative PQ Series PegAssist™ customizable insole you can achieve astounding localized pressure relief without the risk of edge abrasion or ring edema present in other off-loading methods. The PegAssist™ insole's Poron® cover minimizes friction while the closed cell Plastazote® layer absorbs shock and comfortably conforms to the foot.

Please find detailed information on our website www.darco.in

* **Baronski,** Sharon; **Ayello,** Elizabeth A. "Wound Care Essentials"

Postoperative Care

- **15° Wedge Sole** effectively shifts body weight to the midfoot and heel. Reduces forefoot pressure by as much as 57%!
- **Square Toe Design** acts as a bumper to protect the toes when k-wires are present and provides better left/right fit.
- **Ankle Strap** seats foot firmly in shoe to reduce heel slippage and eliminate friction.
- **Removable Forefoot Closure** provides security while eliminating buckle pressure.
- **Zoned Outsole** has an aggressive tread under the mid-foot where traction is needed most.
- **Removable Insole** features twice the padding of standard insoles and can be modified as needed. Insole can be totally removed to accommodate DARCO's innovative PegAssist™ customizable off-loading insole.

Expertise

Correction of Bunions using the Austin/Chevron Osteotomy (V-Osteotomy)

While Literature in the year 1930[1] described just 25 techniques to correct bunions, today we count more than 150 techniques[2]. These techniques include corrections of the phalangeal bones as well as the metatarsal bones and/or the belonging soft tissues. One of the most frequently used methods in mild deformities (Grad 1–2, IMA < 15°) is the V-shaped osteotomy, also called CHEVRON or AUSTIN.

The idea is to shift the Metatarsal head from medial to lateral. This technique not only allows a two-dimensional correction of the inter-metatarsal angle, but also – if needed – a lengthening or shortening of the 1st ray, as well as a plantarisation of the metatarsal head, depending on the direction of the osteotomy. Different versions of this technique are described due to the critical direction of the osteotomy in relation of the blood supply of the metatarsal head.

Additional osteotomies – like AKIN – might be required in the first phalangeal bone.

Also soft tissue correction – mainly the so called LATERAL RELEASE – might be required to finally get the first ray back into a straight position and having the metatarsal head covering the sesamoid bones again. The osteotomy is usually performed through a medial or dorsomedial surgical approach. The cut itself looks a bit like a V-shaped cut.

A 60°–70° angulation is recommended, but may differ from case to case. Fixation with a K-WIRE in the early days was common; nowadays a cannulated compression screw is regarded to be the standard.

For post-op treatment a forefoot off-loading shoe like the DARCO OrthoWedge® can be recommended. Attention: Treatment always depends on the individual case and the surgeons experience.

References

[1] **Timmer,** (1930) "Die Behandlung des Hallux Valgus", *Barth Publisher, Leipzig*

[2] **Gould,** (2013) "The Handbook of Foot and Ankle Surgery", *Jaypee Publishers, New Delhi*

[3] Figure 1-2013-Iss01: **Hetherington,** (1994) "Hallux Valgus and Forefoot Surgery", *Churchill Livingston, London*

Further reading

www.kent.edu/cpm/academics/library/hallux.cfm

OP Technique

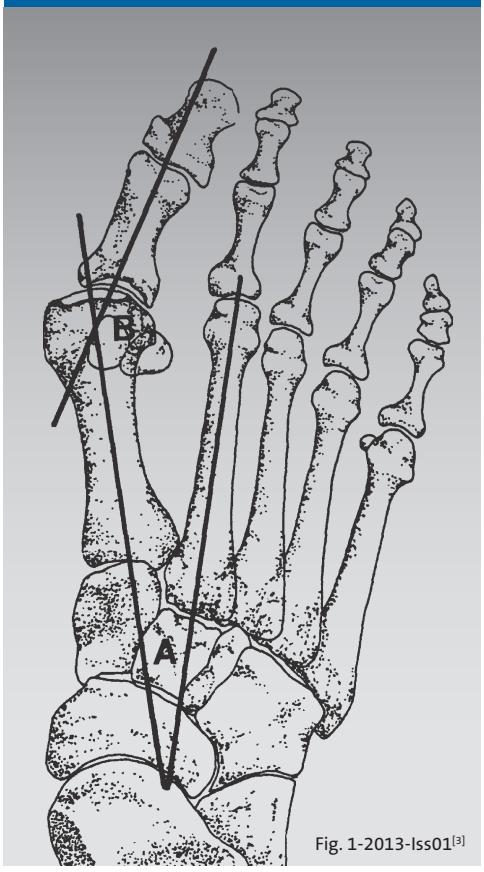
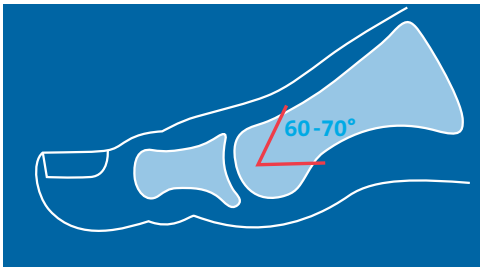
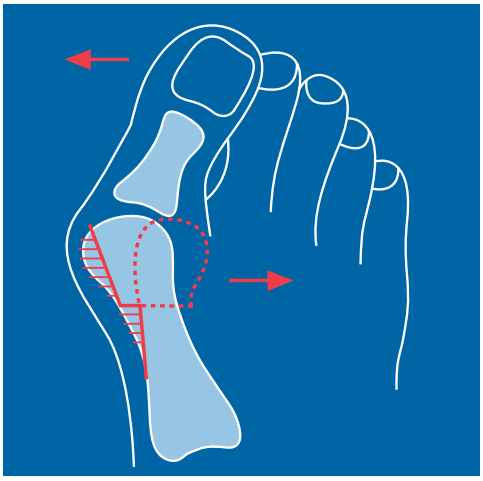


Fig. 1-2013-Iss01[3]





Featured Product

DARCO MedSurg™ Postoperative shoe

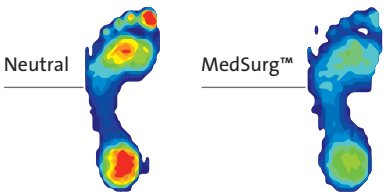
The DARCO MedSurg™ Shoe is one of the most versatile postoperative shoes on the market today. The original insole can be customized to better meet the needs of individual patients.

Use for postoperative, trauma or for wound care treatment

Features and Benefits

The DARCO MedSurg™ Shoe is designed to provide the foot with solid protection and accommodate bulky bandages with ease. It features a square- toe design to provide added protection for the toes. The sole has a metashank design that provides added support to the metatarsal region when walking. The DARCO MedSurg™ Shoe has a velcro closure across the front which can fit up to a 17 inch circumference from large bandages and dressing. It also eliminates any added pressure caused by more traditional D ring closures that can irritate the forefoot area.

Very aggressive tread at the midfoot provides superior traction. The reduced-friction tread at the toe and heel helps accommodate toe drag and heel scuff, minimizing the risk of accidental tripping. The elastic strap around the front of the ankle prevents the product from slipping off the heel. The DARCO MedSurg™ has a rocker bottom sole which is designed to reduce pressure on the bottom surface of your foot by up to 25 % for a more comfortable walking experience.



Please find detailed information on our website www.darco.in

Postoperative Care

- **Square toe design** acts as a bumper to provide additional protection when K-wires are present.
- **MetaShank™ Protection** provides more rigid control under the metatarsal heads.
- **Strapless Closure** eliminates buckle pressure on the forefoot and can expand to accommodate dressing up to 17 inches in circumference.

- **Fully compatible with DARCO's PegAssist™ (PTQ Series) off-loading insole**

Expertise

Pressure reduction by using post-op shoes

Worldwide the common understanding of using post-op shoes for pressure reduction is to use devices with a stiff sole. But design and function can still make a big difference in the results.

In the 80's surgeons preferred to have post-op shoes with a stiff, flat sole to reduce joint movements after surgical interventions such as bunion correction surgeries. Those shoe often had a wooden sole with a canvas upper. Beside the weight these shoes often showed heel slippage (A), increased dorsum pressure (B) and as a result increased pressure under the MT1 (C) due to a dorsoflection in the MTP1.

With the development of the Original MedSurg DARCO managed to decrease the pressure by changing the material and closing mechanism. This reduced the peak pressure under the MT Heads by up to 24% and under the Great Toe up to 32% compared to a standard canvas shoe.

Another possibility to reduce the negative effect of pressure is to reduce the pressure time. Therefore the current version of the MedSur was engineered with not only with an exchangeable insole made of EVA with between 30° and 35° shore A but also with a rocker sole outside. While inside the shoe the foot is still protected by a stiff and flat position, the rocker sole reduces the floor contact time and at the same time helps to mimic the natural gait.

This reduces the peak pressures compared to the Original MedSurg by another 21% under the MT Heads and another 41% under the Great Toe.

The standard insole can also be replaced by a special wound off-loading insole by DARCO, the PegAssist. More information on this in issue 3 of this newsletter.

Further reading
Thyrrell, (2008) "Therapeutic Footwear: A comprehensive Giude", 1st ed, *Churchill Livingston, London*

Footwear

Featured Product

Postoperative Care

DARCO PegAssist™ Insole Off-loading Insole

The DARCO PegAssist™ Insole System features a multi-indication removable-peg chassis that effectively off-loads the plantar aspect of the foot after surgery or when wounds are present.

Features and Benefits

The DARCO PegAssist™ Insole is built around a multi-purpose removable peg insole that effectively off-loads the plantar aspect of the foot. Easy removing of the single pegs allows a selective off-loading and the Peg Support Board keeps the off-loaded area intact. Constructed of an 18 mm combination of Plastazote®, Poron® and multi-foam to provide the perfect combination of shock absorption and moldability.

- **Pegs can be removed** from specific areas of the insole in order to redistribute pressure. The cardboard cover then stabilizes the off-loading area.
- **Shock-absorbing effect**
- **Fully compatible with** MedSurg™, APB™, HeelWedge™, OrthoWedge®, SlimLine™
- **Right and left fit**

Please find detailed information on our website www.darco.in

Expertise

Usage of PegAssist™ Insole not only in Wound Care, but also in Orthopedic Deformity Correction

The Lapidus or TMT1 Arthodesis requires an off-loading in the operated area to avoid pseudoarthrosis. The PegAssist™ Insole can increase the benefit of a MedSurg™ post-op shoe by reducing the leverage effect.

The TMT1 Arthrodesis, described by Lapidus in 1934, is a powerful technique for the correction of a wide IMA in Hallux Valgus deformities which include an elevation of the first ray and/or instability in the medial tarsometatarsal joint.

Depending on the surgical experience and the availability of surgical tools the two joint surfaces (MT1 and the cuneiform bone) are first sparingly resected. If necessary, a wedge with lateral base may be removed from the cuneiform bone to correct the IMA. Shortening must be compensated through plantarization of the MT1. This will offset any elevation of the MT1 head.

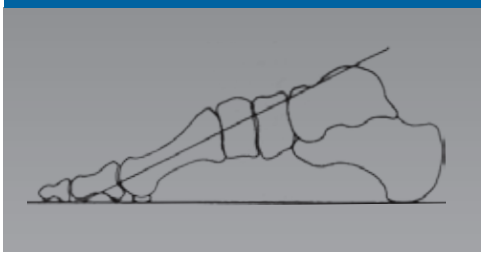
The internal fixation is usually done by two or more compression screws or locking plates or a combination of both.

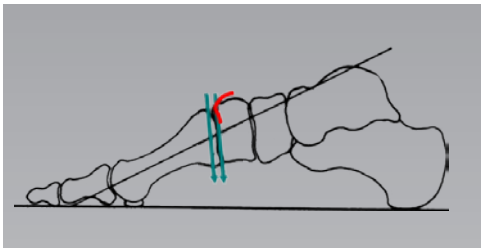
Especially if plating systems are applied from dorsal or dorso-medial it is possible that the arthrodesis might open in the plantar aspect in case of early weight bearing. One solution can be the usage of plantar locking plates. If such implants are not at hand and a traditional fixation is done, the second option can be to modify the footwear.

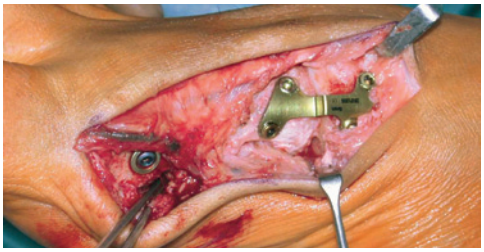
A post-op shoe like the DARCO MedSurg™ already reduces the peak pressure under the metatarsal heads.

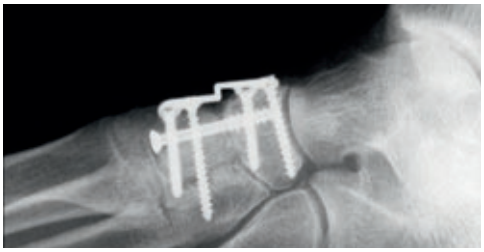
Peg removal beneath the 1st MPJ additionally reduces the “lever effect” thereby reducing stress along the entire length of the 1st metatarsal and reducing pressure on 1st metatarsal osteotomies or fusions.

OP Technique









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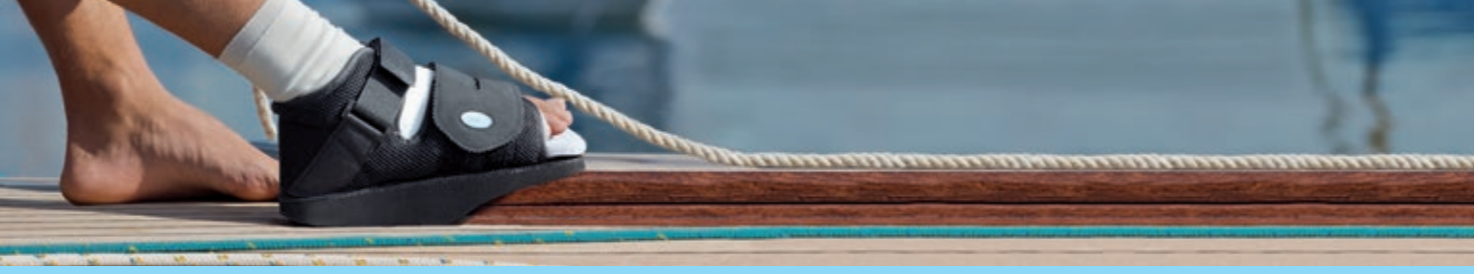


Featured Product

Postoperative Care

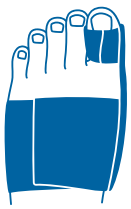
TAS®
Toe Alignment Splint

Bandage for alignment after hallux valgus surgery.

Features and Benefits
The TAS® (Toe Alignment Splint) is an effective and inexpensive way of maintaining correct alignment of the toes during the healing process.

A thin elastic metatarsal band reduces slippage and soft toe straps hold the toes in the correct position to maintain alignment following surgery to correct hallux valgus, hammer toes or Tailor's bunions. May also be used in the treatment of capsulitis plantar to the m.p. joints caused by mild subluxations of the joint.

- **postoperative after hallux valgus, hammer toes and Tailor's bunion**
- **Size: Universal**
- **Colour: White**
- **Right and left fit**


Hallux valgus


Hammer toes


Tailor's bunion

For product demonstration video please visit www.darco.in

Please find detailed information on our website www.darco.in

Expertise

Lateral Release to aligne the sesamoid bones under the 1st metatarsal head

After surgical corrections of bunion deformities (Hallux Valgus) it happens that the MT1 osteotomy shows a clear correction of the IM-Angle, but still a lateral release can help to improve the surgical result.

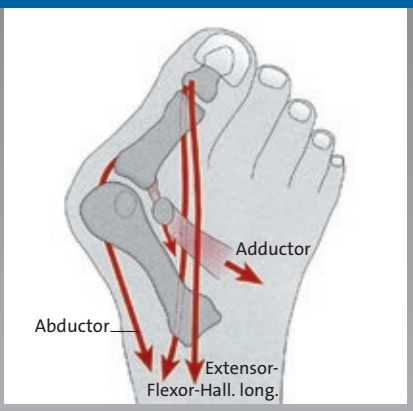
During the development of a bunion deformity the sesamoid bones have a tendency to shift to a dorso-lateral position due to a misbalance of the pulling forces of the flexor and extensor tendons as well as a strong pulling force of the musculus adductor hallucis. To release these pulling forces, it is possible to combine the bony correction with the so called "lateral release". Whether through an additional dorsal incision in the interdigiti space of MT1 and MT2 as a surgical approach or through an intraarticular approach with a beaver blade or mini scalpel or through an plantar approach by using a sharp, curved chisel (i.e. McGlamary Elevator, 11 mm) you can cut the tendon of the musculus adductor halluces.

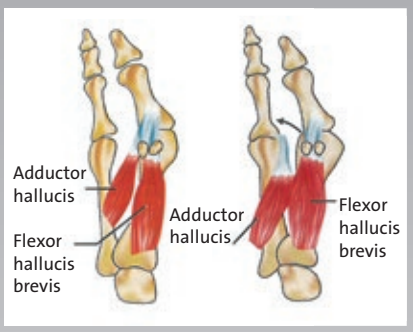
If necessary the transversal metatarsal ligament between the lateral sesamoid and MT2 can be transected, too.

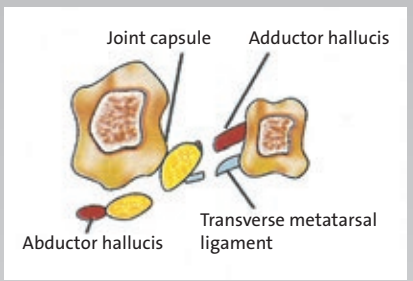
Once released the sesamoids can derotate back into their anatomic position under the head of MT1. To stabilize the surgical correction nowadays a huge assortment of fixation material is available. But for the postoperative protocol the SPICA dressing is still the golden standard. At the first postoperative the sterile compression dressing is taken down and replaced by a SPICA dressing to make certain the sesamoids remain under the first metatarsal head.

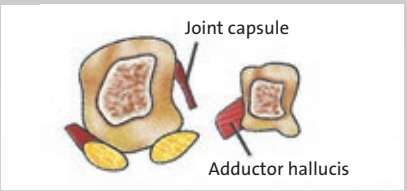
As an alternative, easy to apply (for the physician and for the patient as well) and comfortable to wear the SPICA dressing can be replaced after one week by a redressing bandage or splint like i.e. the DARCO TAS® (Toe Alignment Splint).

OP Technique









Pictures taken from / Further reading

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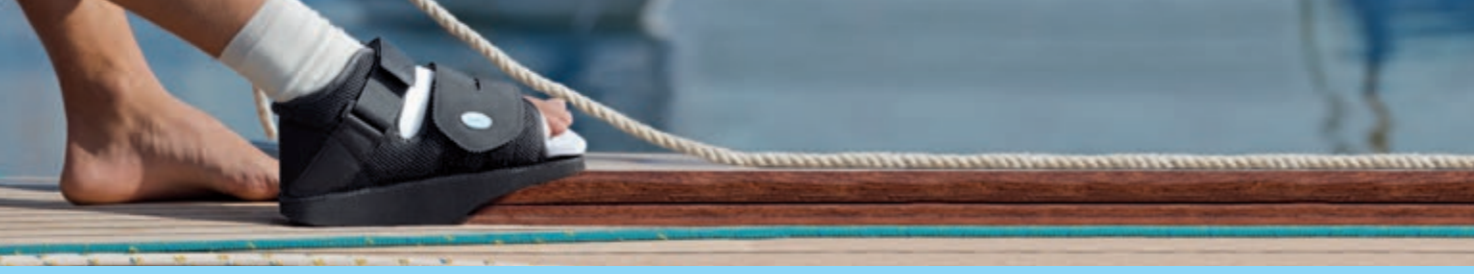


Featured Product

Body Armor® Night Splint Dorsal Night Splint

The DARCO Body Armor® Night Splint is the only night splint on the market today that actively engages the windlass mechanism of the foot resulting in a specific and sustained stretch to the plantar fascia and a sustained low load stretch to the flexor tendons, Achilles tendon, and calf muscles.

Features and Benefits
The combination of sustained stretching to the plantar fascia with the hallux toe loop and keeping the position by means of the splint, enables the following indications to counteract:

> shortening of the plantar fascia
> heel spurs
> achilles tendonitis and tendonosis
> metatarsalgia
> talipes equinus and ankle contracture

The BodyArmor® Night Splint is a splint stabilizing the foot and lower leg position at an angle of 90° C in order to avoid equinus deformity of the foot and to consequently prevent achilles tendon shortening.

The toe loop elevates the hallux, and thus actively engages the windlass mechanism of the foot resulting in a sustained stretch to the plantar fascia.

In addition, the toe loop exercises a slight tension on:
> the achilles tendon
> the Tibialis posterior tendon
> the deep flexor tendons of the foot
> and the muscle system of the lower leg

"Nighttime comfort has increased patient compliance significantly. In conjunction with an isolated, increased stretch on the fascia via dorsiflexion of the 1st metatarsalphalangeal joint, this product has greatly improved patient outcomes in comparison with other dorsal night splints that I have used".
Kevin Brown, DPM Huntington, WV

> **The adjustable straps** are quick and easy to use providing a perfect fit.

> **The elastic ring** enables the user to fix the toe loop in various positions.

> **The low profile design** of the splint minimizes the tension on the dorsum of the foot and on the anterior crest of the tibia by up to 70 %.

> **Right and left fit, one-size-fits-all design**

> **The toe plate** dorsalizes all toes achieving a stronger stretching of the plantar fascia. (optional available)

Please find detailed information on our website www.darco.in

Expertise

Anatomy / Biomechanics

Heel Spur Syndrome or Plantar Faciitis?

Plantar heel pain is often diagnosed as a heel spur syndrome. Statistically every third person shows a radiographic prominent heel spur, but usually without any pathology, whereas the pain is most often related to a plantar fasciitis.

Beneath skin and a fatty pad of the plantar aspect of the foot (sole) there is a thick connective tissue which supports the arch of the foot. This broad structure spans between the medial calcaneal tubercle and the proximal phalanges of the toes, the plantar fascia or plantar aponeurosis.

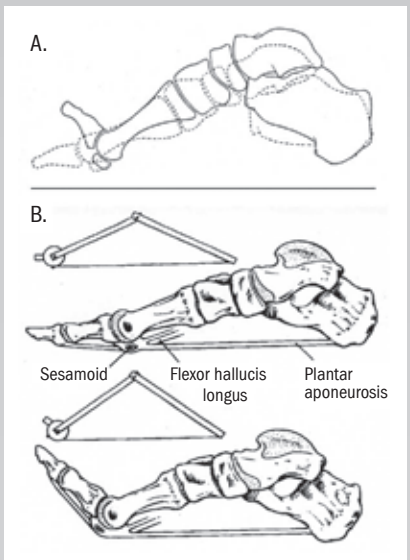
Due to overuse the connection of the plantar fascia at the calcaneus can get inflamed and forces the pain, a plantar fasciitis. Patients often report stabbing pain that usually occurs with very first steps in the morning. Once the foot limbers up, the pain of plantar fasciitis normally decreases, but it may return after long periods of standing or after getting up from a seated position. Plantar fasciitis is particularly common in runners. In addition, people who are overweight, women who are pregnant and those who wear shoes with inadequate support are at risk of plantar fasciitis.

Treatment options for plantar fasciitis include rest, massage therapy, stretching, weight loss, night splints, motion control running shoes, physical therapy, cold therapy, heat therapy, orthotics, anti-inflammatory medications, injection of corticosteroids and surgery in refractory cases, extracorporeal shockwave. Also, in some cases, massaging of the inflamed location serves as a temporary relief. If not treated properly a plantar fasciitis can result in a heel spur.

Heel spurs develop as an abnormal growth in the heel bone due to calcium deposits that form when the plantar fascia pulls away from the heel. This stretching of the plantar fascia is usually the result of over-pronation (flat feet), but people with unusually high arches (pes cavus) can also develop heel spurs. Women have a significantly higher incidence of heel spurs due to the types of footwear often worn on a regular basis.

In 1954, J.H. Hicks described the biomechanical effect of the windless mechanism in relation to the plantar aponeurosis and the arch of the foot. A reference work for the development of modern night splints, such as the DARCO Body Armor Night Splint.

by Raphael Boehm, Vice President DARCO Europe



Additional reading

J.H. Hicks, (1954) "The Mechanics of the Foot: II. The Plantar Aponeurosis and the arch"
Journal of Anatomy 1954, Vol. 88
http://en.wikipedia.org/wiki/Plantar_fasciitis

Featured Product

WCS™
Wound Care Shoe System

The DARCO WCS™ Wound Care Shoe System is the product of choice when dealing with Wagner Grade 3 or greater ulcerations. The four multi-density insoles can be modified, effectively removing pressure from the plantar aspect of the foot.

The WCS™ is recommended for the treatment of open and closed ulcerations and other conditions of the foot in which it is desirable to redistribute weight away from specific areas. The circumferential counter of the shoe forms a deep pocket in the sole to permit the use of a variety of insoles under the ulceration or area of pressure. The insole material is placed below the level of the top of the circumferential counter, providing greater stability for the foot by preventing the layered insoles from shifting within the shoe.

Indications

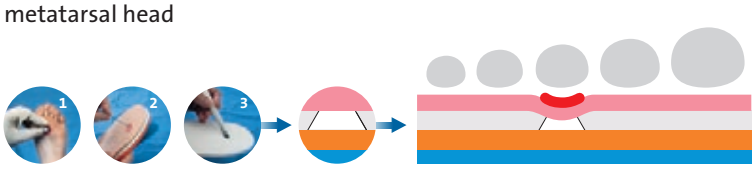
> Wagner Grade 3 or greater ulcerations
> Bony prominences
> Long-term treatment of wounds and ulcerations
> Maximum post operative off-loading while still allowing for patient ambulation

Features and Benefits

> Four Multi-density Insoles allow for the ultimate in customization and precisely targeted off-loading
> Ultra-soft Plastazote© Lining provides a virtually friction-free contact surface that won't exacerbate existing wounds
> Genuine Leather Upper can be modified or cut away to provide even greater levels of pressure relief
> Sold in Pairs to eliminate discrepancies in shoe height and the potential associated knee and hip pain

Example of sole customization:

Cross-section of the off-loading of a pressure ulcer under the third metatarsal head



Wide shoe opening

> Easy to put on
> Plenty of room for dressings

Special shoe sole

> More safety
> Optimal walking performance

4-sole system

> Different Shore hardnesses
> Easy customization

Height adjustment

> Height adjustment ensured

Detailed video instructions for customising the fit available!

Please find detailed information on our website www.darco.in

Literature:
Functional Evaluation of the DARCO WCS™ Wound Care Shoe System for Diabetec Patients
www.darco.in/download/rosenbaum_wcs_en.pdf

Expertise

Fully Rocker Bottom Sole or is a flat midstance required?

Short term wound care shoes like the DARCO MedSurg™ do have a fully rocker bottom sole (see Newsletter No2, 2013). But patients with chronic wounds and bigger defects, often accompanied with neuropathy, not seldom suffer on limited sensory feedback from their feet, resulting is an unstable, unsafe, imbalance feeling.

In fact, a proper rocker bottom, with a more proximal pivot point of the MTH supports greater propulsion at toe off, reduces floor contact time and the need for full range of ankle motion. But during a gait cycle 40 % of the time is the swing phase of one leg, while the other leg has 60 % of the time instance, from heel-strike to toe-off. Also, while standing still, a fully rocker might give diabetic, neuropathic patients the feeling of instability. Instability is, of course, a concern for those who have poor balance or muscle weakness that may make them vulnerable to falls.

The DARCO WCS™ covers all these criteria. In addition it has an extra depth to carry the multi-layer insole which comes along with it, or a customized diabetic insole.

Literature shows, that a multilayer insole made of different materials, such as Plastazote®, EVA and Poron® are way more effective that a thick cushioning / padding with microcellular rubber only.

PLASTAZOTE®: In Podiatry the selective use of a range of AZOTE foam densities is used to provide extra support for foot disorders. An accurate impression of the plantar surface of the foot can be obtained by.

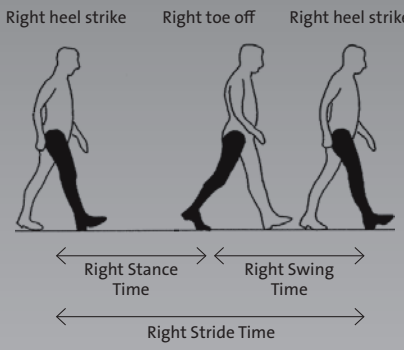
PORON®: PORON® Urethane materials have been considered the industry standard for cushioning and biomechanical support. Their consistent quality, durability and versatility make them easy to use for shock absorbing and soft cushioning.

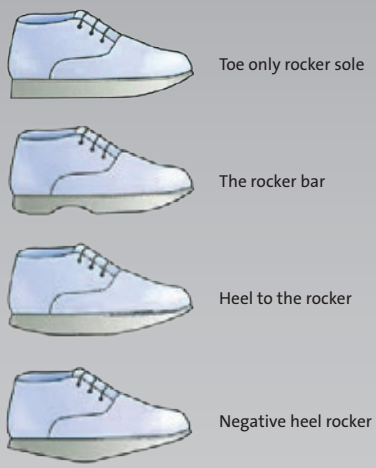
EVA (Ethylene vinyl acetate): ... is the copolymer of ethylene and vinyl acetate, popularly known as expanded rubber or foam rubber The weight percent vinyl acetate usually varies from 10 to 40 %, which provides different hardness (shore A). EVA foam is used as padding, shock absorbing and weight redistribution in therapeutic shoes.

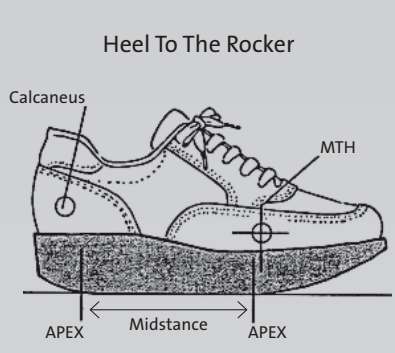
by Raphael Boehm, Vice President DARCO Europe

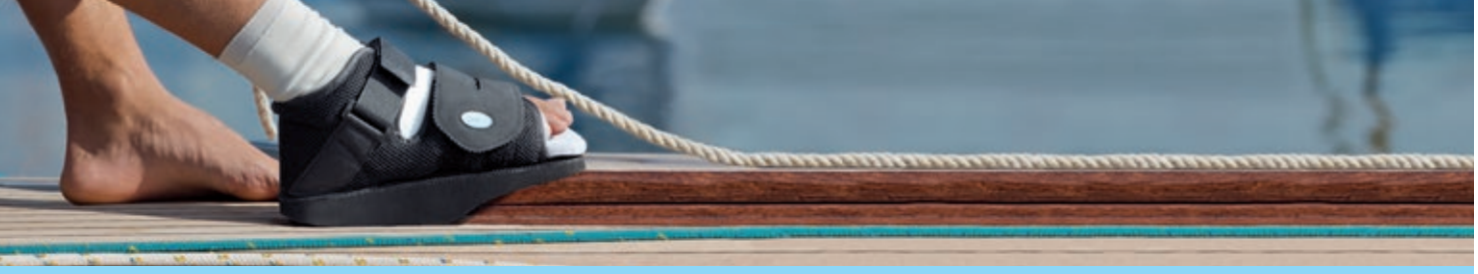
Literature:
Thyrrell, W. / Carter, G., (2008) "Therapeutic Footwear: A comprehensive Giude"
Churchill Livingston, London

Footwear









Featured Product

Trauma Care

Air Traveler™ Stirrup Walker Stabilising Orthosis

The Air Traveler™ walker features a circumferential air bladder that provides the ultimate compression and security for the wearer.

The AirTraveler™ Stirrup Walker is an economical, pneumatic walker. In comparison with the FXPro™, the Air Traveler™ ensures more compression with the inclusion of the circumferential air bladders. The posterior channel system effectively restrics movement without adding pressure to the achilles tendon.

Indications

> Soft tissue injuries (grade 2 and 3 sprains)
> Stabilizes Fractures
> Postoperative care
> Trauma and Rehabilitation
> Other conditions recommended by a physician

Features and Benefits

> **Circumferential Air Bladder** – provides the ultimate compression and security. The patient can easily adjust pressure.
> **10 mm EVA Insole** – patient comfort and support.
> **Five way strapping system** – five heavy duty straps adjust to patients needs, keeping liner secure.
> **Low profile** – the Air Traveler™ is one of the lowest profile walkers on the market.
> **Rocker Sole** – the Air Traveler™ has a slight rocker sole to aid patients' transition from heel to toe.
> **Anatomically Contoured Spatula Stirrups** – conform to the leg and immobilize the ankle comfortably.

Please find detailed information on our website www.darco.in

Expertise

Total Contact Cast (TCC) The Golden Standard – Or is it?

TCC is still regarded as the golden standard in the treatment of the severe diabetic foot, but also frequently common in trauma care. According to the literature CAM Walker can be an alternative.

In conservative treatments and after surgical suture of Achilles tendon ruptures a cast is still widely used. In general there is a trend to prefer a conservative treatment. Carter et al (1) observed no higher complication rate in 21 patients with surgically repaired Achilles tendon and treated with a functional orthosis rather than routine cast (in reliable patients). For Buchgraber et al (2) cast immobilization after Achilles tendon suture repair is no longer justified as there was no higher re-rupture rate when a functional orthotic was used. Speck et al (3) also had no higher re-rupture rate by using a plantigrade splint for 24hors, followed by 6 weeks in a removable walker. Petersen et al (4) recommend CAM walker as a useful alternative to a cast after observing 21 patients having no re-ruptures, but 5 re-ruptures in 29 patients treated with a routine cast. In 2003 Weber et el (5) stated that in their study, comparing operative with non-operative treatments of Achilles tendon ruptures, the overall out-comes were equal.

All these studies had a small number of patients (n=20 – 50). Therefore Suchak et al (6) conducted a Meta-Analysis on an extensive literature research for randomized studies. They identified six trials involving 315 patients. Their conclusion was that early functional treatment protocols, when compared with postoperative (cast) immobilization, led to more excellent rated subjective responses (by the patients) and no difference in re-rupture rate.These studies contribute to Mueller's et al findings for the treatment of plantar ulcers. If Achilles tendons rupture could be well treated conservatively with a CAM Walker, so could be a Achilles tendon tenotomy. Mueller et al (7) published already in 2003 the positive effect of such an Achilles Tendon Lengthening procedure. All ulcers healed, in both groups, with or without tenotomy. But the group with tenotomy had significant lower rate of recurrence of the ulceration.

Should the Achilles Tendon Lengthening incl. an early functional post-operative treatment with partial weight bearing in a CAM Walker be considered as an effective strategy to reduce recurrence of neuropathic ulceration of the plantar aspect of the forefoot? Especially in patients with diabetes mellitus and limited ankle dorsiflexion?

by Raphael Boehm, Vice President DARCO Europe

Literature Review

(1) **Carter, TH.R. et al** (1992)
"Functional postoperative treatment of Achilles tendon repair"
Am J Sports Med, July 1992 vol. 20 no. 4; 459 – 462

(2) **Buchgraber, A. et al** (1997)
"Percutaneous Repair of Achilles Tendon Ruptures; Immobilization versus Functional Postoperative treatment"
Clin. Orthopaedics & Rel. Research, August 1997, vol. 341

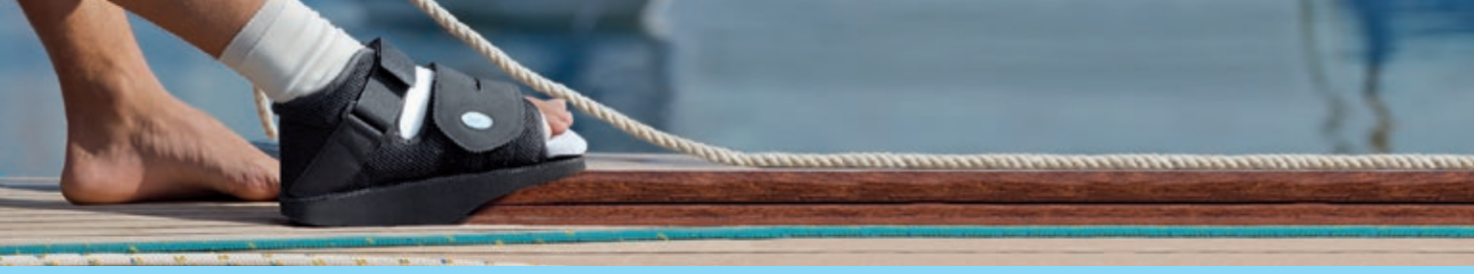
(3) **Speck, M. / Klaue, K.** (1998)
"Early Full Weightbearing and Functional Treatment after Surgical Repair of Acute Achilles Tendon Rupture"
Am J Sports Med, Nov 1998 vol. 26 no. 6; 789 – 793

(4) **Petersen, O.F. et al** (2002)
"Randomized comparison of CAM Walker and light-weight plaster cast in the treatment of first-time Achilles Tendon Ruptur"
Ugeskrift for Laeger, vol. 164 (33) 3852 – 3855

(5) **Weber, M. et al** (2003)
"Nonoperative Treatment of Acute Rupture of the Achilles Tendon"
Am J Sports Med, Sept 2003 vol. 31 no. 5; 685 – 691

(6) **Suchak, A. et al** (2006)
"Postoperative Rehabilitation Protocols for Achilles Tendon Ruptures: a Meta-Analysis"
Clin. Orthopaedics & Rel. Research, April 1997, vol. 445; 216 – 221

(7) **Mueller, M.J. et al** (2003)
"Effect of Achilles Tendon Lengthening *on Neuropathic Plantar Ulcers"*
JBJS Am, Aug 2003, vol. 85 (8) 1436 – 1445
http://jbjs.org/content/85/8/1436



Featured Product

Trauma Care

GentleStep™ – Ready-to-use Diabetic Shoe

The GentleStep™ Shoe is an extra-depth shoe designed specifically for the needs of certain patients with diabetes.

The upper is constructed of a light-weight Lycra® to provide extra comfort for patients with forefoot deformities or lesions.

Indications

> Ready-to-use protective shoe for diabetic patients
> Hammer Toe, Claw Toe
> Tailers Bunion
> Hallux Valgus Bunion
> Diabetic foot lessions

Features and Benefits

> Molded outsole conceals extra depth and provides lower profile and enhanced style.
> Lycra® upper reduces weight while increasing comfort.
> Firm heel counter ensures stable and comfortable fit.
> Machine washable means that the GentleStep™ will stay looking nice for a long time.

Please find detailed information on our website www.darco.in

Expertise

One fits all? The difficulty of selecting an adequate shoe size.

A good fitting shoe is always important. But for patients with foot problems and especially those with a Diabetic Foot Syndrome, it is essential to use properly fitting, therapeutic shoes to avoid additional pressure.

For such a patient, initially there are only two options to determine correct shoe size. The first and most unreliable option is the declared size in the shoe he or she is wearing. 2nd best method is to measure the length of the foot itself. These measurements still the needs to be converted in to an actual shoe size. Conversion tables are then used.

One problem is, that there are several different shoe-size systems used worldwide. Even within one country different systems might be in place. And the problem is not only the different versions of available converters, but also the different units of length (i.e. inches vs. cm), and the way of collecting measurement (i.e. weight bearing vs. sitting).

The Paris Point System: Equates one incremental unit of size to ⅔ centimeters (6.6 mm or ~ 0.26 inch). Resulting in an increment of ⅔ of a centimeter (¼ of an inch) in whole sizes, and ⅓ of a centimeter (⅛ of an inch) between half sizes. This system is commonly used throughout Continental Europe.

The barleycorn: An old English unit of measurement that equates to ⅓ inch or ~ 8.46 mm. Half sizes are commonly used, resulting in an increment of ⅙ inch (4.23 mm). This measure is the basis for current UK and U.S. shoe sizes, with the largest shoe size taken as twelve inches (a size 12) and then counting backwards in barleycorn units.

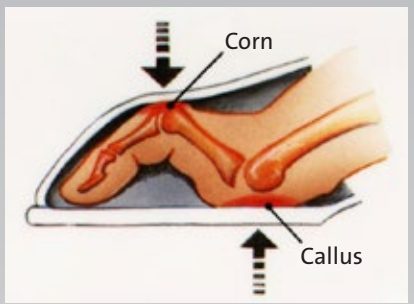
Zero point: The sizing systems also place size 0 (or 1) at different locations: Only if size 0 is placed at a foot's length of 0, the shoe size is directly proportional to the length of the foot in the chosen unit of measurement. Otherwise conversion tables create overlapping sizes.

Due to the different units of measurements, converting between different sizing systems, the conversion tables create overlapping sizes and the result can be rounding-off errors as well as un-usual sizes such as 10⅔. Furthermore, metric measurements in centimeters (cm) or millimeters (mm) are used. The increment of 0.5 cm (5 mm or ~0.20 in) is common. This is between the step size of the Parisian and the English system. It is used with the international Mondopoint system and with many Asian systems.

by Raphael Boehm, Vice President DARCO Europe

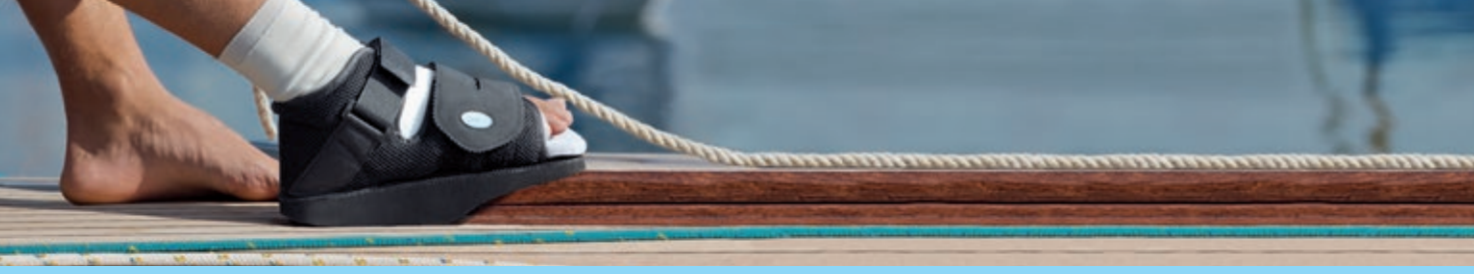
Literature: Raphael Böhm, 2015 "The Foot & The Shoe", DARCO Presentation

The "BRANNOCK" foot size Measuring instrument



Wrong fitting shoes can lead to corns and calluses

You will find a PDF of this presentation on our website under the section "Expertise" http://www.darco.in/expertise.html



Featured Product

Ankle Supports

Motion is Life – DARCO Ankle Supports

Body Armor® Vario
Ankle Support

○ Acute
⊠ Post-op & trauma
○ Rehabilitation
○ Prevention

The Body Armor® Vario brace is a general use ankle brace that adds an element of customization not seen in other "off-the-shelf" products.

A DARCO advisory board of certified foot and ankle specialist developed the brace as a treatment option for patients with ankel instabilities along with alignment issues (Varus/Valgus), i.e. flat foot caused by PTTD., as well as for supportive ankle/arch positions.

› For peroneal tendons
› For lateral ankle ligament sprains
› For deltoid sprains
› For posterior tibial tendon injuries
› After flatfoot reconstruction
› After lapidus fusion
› 1 size: universal
› For right and left side available

Body Armor® Sport
Ankle Support

○ Acute
⊠ Post-op & trauma
⊠ Rehabilitation
⊠ Prevention

The Body Armor® Sport is an ankle brace that is applied pre/post-operatively as well as during the process of rehabilitation.

The lower part of the inlay (soft pad) is mainly intended for padding the injured ankle and may be cut off at the marked segments after the ankle has healed.

› For post-traumatic and preventive care of the capsular ligament of the upper ankle joint
› Optimal stability with targeted mobility
› Prevention of chronic instability
› 3 sizes | available for right and left foot

Web™ Ankle Brace
Ankle Support

⊠ Acute
○ Post-op & trauma
○ Rehabilitation
⊠ Prevention

The Web™ Ankle Brace is a convertible ankle brace.

Compression can be adjusted as needed using the bungee closure. The removable medial and lateral stays are rigid enough to provide controlled restriction of inversion/eversion of the ankle. The thin vinyl shell enables it to be worn with sport shoes or casual dress shoes.

› For prevention during sport or daily life as well as a supportive measure for ankle injuries
› Prevention of chronic instability
› 5 sizes | can be worn on the right or left

Please find detailed information on our website www.darco.in

Expertise

OP Technique

R.I.C.E. vs. M.E.A.T. The treatment of ankle sprains

Ankle sprains are one of the most common sports injuries, but can happen during daily work or leisure activities as well. General knowledge often leads patients to cool the ankle with ice.

Recent Studies have shown that a pure R.I.C.E.* treatment for ankle sprains can actually delay the healing of the injured area. Whereas M.E.A.T.**, can encourage and promote the healing process. An acute ankle sprain could still be treated with R.I.C.E. immediately, but only for a maximum of 48 hours.

Uninterrupted icing is not recommended. Cooling can help reduce the initial, massive swelling of an injury at first and act as a pain reliever. This is especially affective in combination with compression. But a permanent icing can also have a negative effect – in worst case – frostbite.

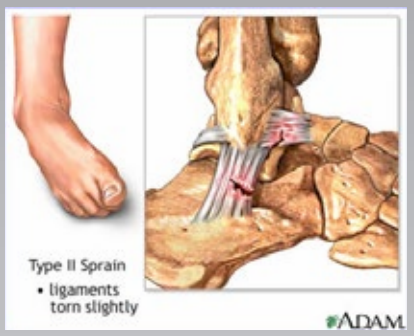
After 48 hours, careful movements are found to promote the body's own mechanism to heal the injured area. Coupled with physiotherapeutic treatment may actually lead to faster recovery. Naturally, it is important not to overuse the injured ankle and to keep it protected from re-injury. The several braces and orthotics available are designed to prevent unintentional supination/pronation or the reoccurrence of trauma. The different braces are designed to fit the requirements of the patient, i.e. severity of the ankle sprain, patient's activity level and the patient's determination to return sporting activities, etc.

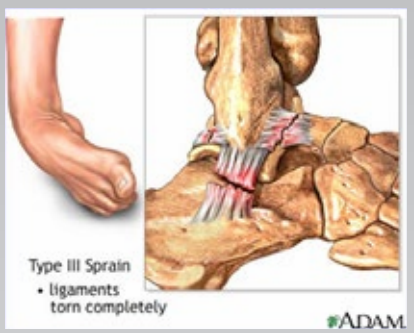
Caringmedical.com once published a comparison table with the healing rate and grade of ligament injury relative to R.I.C.E. and M.E.A.T. treatment:

Grade	Ligament(s)	Anterior Drawer Test	Return to Play using R.I.C.E.	Return to Play using M.E.A.T
I	Sprain	Negative	7–10 days	2–3 days
II	Partial Tear	Increased	2–6 weeks	1–3 weeks
III	Tear	Positive	5–16 weeks	2–6 weeks

So if you suffer from a grade II or III ankle sprain, don't neglect to consult your physician.

by Raphael Boehm, Vice President DARCO Europe

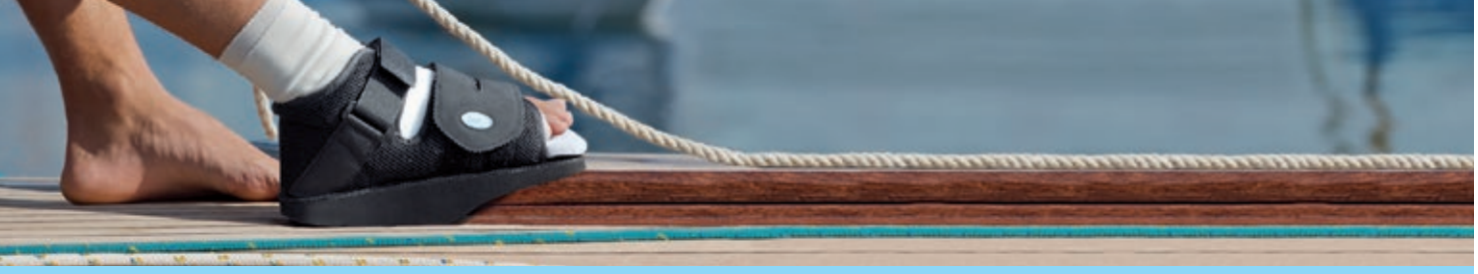




Pictures: http://slideplayer.com/slide/1529055/#

Literature:
Tseng CY1, Lee JP et al, (2013) "Topical cooling (icing) delays recovery from eccentric exercise-induced muscle damage"
J Strength Cond Res. May;27(5):1354-61. doi: 10.1519/JSC.0b013e318267a22c

* Rest – Ice – Compression – Elevation | ** Movement – Exercise – Analgesics – Treatment



Featured Product

Plantar Fasciitis Products

DCS™ Plantar Fasciitis Sleeve

The DARCO DCS™ Plantar Fasciitis Sleeve is woven to be anatomically correct.

Wave compression technology on the plantar surface of the foot provides a sustained stretch on the plantar fascia. The DCS™ PF gives relief from the discomfort associated with plantar fasciitis by promoting circulation, reducing edema and foot fatigue, and relieving morning foot pain.

Indications

> Plantar Fasciitis
> Heel Spurs
> Arch pain
> Arch weakness
> Edema

Features and Benefits

> Wave compression provides a consistent and sustained stretch to the plantar fascia.
> The DCS™ PF improves circulation and reduces edema.
> 24 hour support – wear while sleeping or under socks when active.
> Anatomically woven for maximum comfort.
> Constructed of medical grade fabric that is latex free.
> Comfort Zone on the Anterior Ankle Fold to prevent pinching or binding.
> Low Profile Design.
> Can be worn under socks.

Please find detailed information on our website www.darco.in

Expertise

Anatomy / Biomechanics

The importance of treating edema in Plantar Fasciitis conditions

In newsletter No. 5 we explained briefly the condition of a plantar fasciitis. Night splints are a treatment option with high healing potential. But what about wearing an additional device to support healing during the day?

According to A. Jacobs[1], 21 % of patients with plantar fasciitis are also subject to swelling and edema. And of these patients he identified a small group as having plantar fascial fibromatosis (Morbus Ledderhose). Although a true Morbus Ledderhose is less common, it usually occurs in the middle and medial part of the plantar aponeurosis[2]. In the Jacobs findings, 25 % of all plantar fasciitis cases experience some kind of fibromatosis. The final 54 % of those suffering from plantar fasciitis were related to degenerative conditions cause by age and/or overuse. In this group, there was an occurrence of microscopic and tiny tears in the plantar aponeurosis, which can eventually lead to partial rupturing.

A compression sleeve can address the edema issue and due to the different compression areas in the sleeve, an increased support of the medial arch can also be achieved. One can also support of the medial arch with orthotics and/or by adding a soft padding to the heel area. For an effective compression sleeve, different compression zones are needed to facilitate the proper flow of fluids without constricting circulation. In order to support the medial arch, a higher compression is needed around the base of the metatarsal bones. Using the same manufacturing process for medical compression stockings, six different zones with varying levels of compression were designed into this Foot Sleeve to strengthen and support the natural foot structures. The end zones on most tight compression garments prove to be troublesome due to the sudden and abrupt increase of pressure, causing an "edge" effect that can lead to an increase in edema where the garment itself stops, which is not the case with the DCS.

by Raphael Boehm, Vice President DARCO Europe

Zone 1
stops just short of the ball of the foot allowing for expansion of the toes.

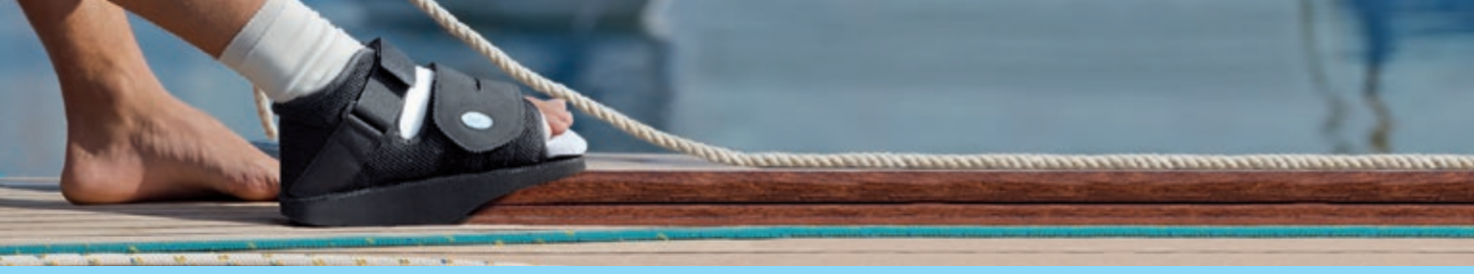
Zone 2
corresponds to the area where the arch begins to rise and produces a graduated moderate compression as the arch takes shape.

Zone 3
corresponds to the arch area producing a firm compression allowing for stabilization and slight lift & stretch to the structure of the arch.

Zone 4
has a graduated return to moderate compression with a change in material composition allowing for the anatomical curves of the heel as the foot changes to the ankle.

Material composition changes again at zone 5 returning to firm compression for the structures around the lower ankle / Achilles.

Literature:
[1] **A. Jacobs,** (2013) "An Evicence Based Medicine Approach to Plantar Fasciitis" Podiatry Today. Vol 26 (11)
[2] **Sharma S,** (2003) "MRI diagnosis of plantar fibromatosis – a rare anatomic location" The Foot 13 (4): 219–22. doi:10.1016/S0958-2592(03)00045-2.



Featured Products

Body Armor® Cast Shoe

The ultimate cast protection in a new modern design. The Body Armor® Cast Shoe provides the ultimate cast protection in a new modern design that will appeal to all patients. Soft, durable EVA is combined with a patent protected unique bungee closure system to seat and secure the cast in the shoe, all the while providing the comfort patients need.

Indications

> a walking shoe worn over cast bandages

Features

> convenience – cast protection
> easy entry and easily fitted to the cast
> ergonomically designed to facilitate a correct walking pattern
> slip-resistant, stable outersole
> extremely light weight EVA material
> can be worn on the right and left

SlimLine™

The SlimLine™ is able to enclose voluminous bandages due to its square shape in the forefoot area and a flexible closure technology. For modification, the insole can be taken out. The upper is Nylon and the special outer-sole warrants a physiological correct gait. Used over a fiberglass or zinc cast. Outer-soles provide shock absorption from shear forces.

Indications

> fractures, cast treatments
> for use over a fibreglass or zinc cast

Features

> effective shock absorbing sole
> adjustable closure technology for bulky bandages or casts
> square shape forefoot for extra protection
> ergonomically designed to facilitate a correct walking pattern
> can be worn on the right and left

Compatible with PegAssist™ Off-loading Insoles.

Please find detailed information on our website www.darco.in

Cast Shoes

Expertise

Footwear

When a TCC treatment is needed, protection of the cast and gait support is important

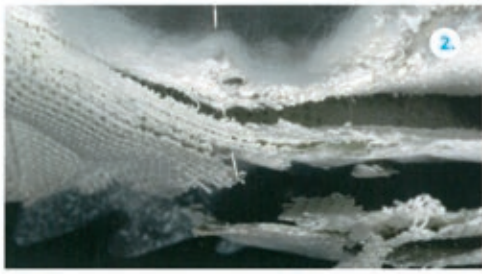
An earlier Newsletter (No. 7/2015) offered a literature overview on CAM Walkers as an alternative to the TCC. Physicians seek to achieve the best results based upon indications and within the confines of available resources. Therefore, a natural or synthetic cast may be the best solution at hand.

Orthopedic casts were first developed in the 1850s and their aesthetics haven't changed much over the past 160 years. A cast can be used to brace, immobilize, protect as well as off-load at and around the foot and ankle, hence providing effective treatment for many indications. Fiberglass replaced plaster in the 1970s and waterproofing arrived in the '90s.

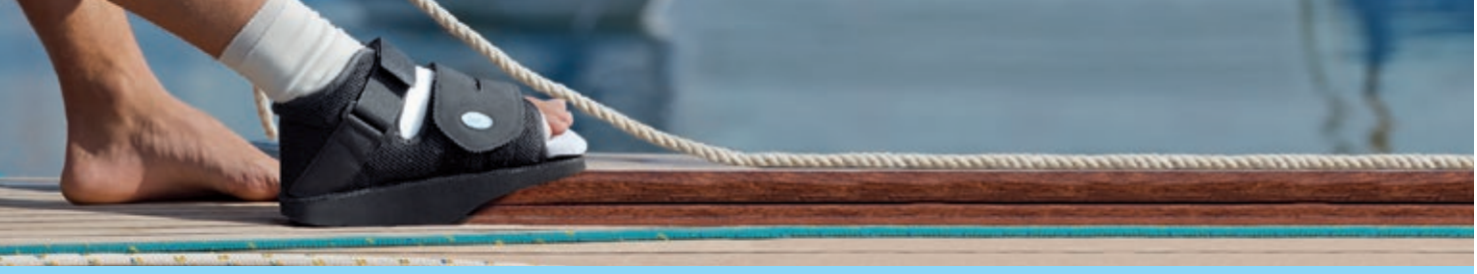
Walking on a cast without protection can lead to cast damage and other complications. Foreign bodies can find their way through the sole of the cast (pic 1 & 2), and the toes are exposed and unprotected. In the 1950s, rubber heels were invented and are still often used today (pic 3). The rubber walking heel prevents direct contact of the cast with the ground and is designed to make the gait more comfortable. But the height difference can lead to biomechanical stress and may interfere with a normal gait cycle. This can be avoided with a height compensation shoe (pic 4). The abnormal walking pattern often leads to lateral rotation affecting the ankle joint. This is especially true after several days as the cast loosens around the calf due to muscle atrophy. Self-Repair strategies are often seen, including "shoe-like" improvements (pic 5 & 6).

These improvements can easily be achieved with an off-the-shelf cast shoe, which not only provides protection, but can also allow the patient to experience a normal gait cycle as much as possible while wearing a cast.

by Raphael Boehm, Vice President DARCO Europe



References:
Pic 1: By courtesy of Dr. Rajesh Kesavan, Chennai, India
Pic 2: Edmonds, M, A practical Manual of Diabetic Foot Care, Blackwell, 2008
Pic 3: Rubber Heel https://lh3.googleusercontent.com/-OhBtY6qK2ls/VXc28psTpWI/AAAAAAAAAJI/UnrY3AEfZ9E/w506-h380/SLWC2.jpg
Pic 5 & 6: http://travelogue.travelvice.com/romania/crippled-couchsurfer-romanian-x-ray-experience/



Featured Product

TwinShoe – Keep the balance

The DARCO TwinShoe is an excellent, lightweight, height compensation shoe designed to compliment a healing shoe. For example, DARCO OrthoWedge® forefoot off-loading shoe, HeelWedge™, heel off-loading shoe or the Body Armor® Walker II cast replacement boot, all of which are commonly used solutions after foot surgery. DARCO's TwinShoe, makes post-surgery mobilization safe and easy.

After foot surgery, most surgeons employ a post-operative shoe to enable the patient to become mobile as quickly as possible. The TwinShoe was designed specifically to equal out the discrepancy in leg lengths when an "off-loading" healing shoe has been prescribed. This equalization can help relieve discomfort due to the imbalance while walking. Simply slip it on like any other shoe and go! The TwinShoe is designed for a universal left / right fit.

Indications

> to compliment a healing shoe (such as a forefoot off-loading shoe)
> equalizing leg lengths

Features and Benefits

> prevents the tilting of the pelvis due to higher healing shoe sole
> to ensure a safe and ergonomically correct walking pattern when worn together with healing shoes or off-loading shoes
> removable insole
> Body Armor® Toe Guard – Optional

The TwinShoe is the matching shoe for the following DARCO products:
OrthoWedge®, HeelWedge™, Body Armor® Walker II

Sizes: XS (33.5 – 37.0)
S (37.5 – 39.5)
M (40.0 – 41.5)
L (42.0 – 44.0)
XL (44.5 – 47.0)

Height of the sole: 36 mm
Color: Black

Please find detailed information on our website www.darco.in

Expertise

Is there a biomechanical need for the use of a counter side height adjustment while wearing a Wedge Shoe?

By wearing a wedged post-surgical or off-loading shoe, the patient will experience a bilateral asymmetry in leg length which leads to a limping gait. Patients might claim knee, hip and/or lower back pain after wearing a wedged shoe for a while due to a changed biomechanical function chain.

It looks like the human body can tolerate a leg length difference up to 2 cm [(1)]. Differences of more than 2 cm can lead to difficulties in walking. Even patients without diabetic ulcers and/or neuropathy often claim pain in the Sacroiliac Joint. In Berlin Germany, Dr. Edelmann observed 100 patients in a period of 8 months who underwent a Hallux Valgus correction surgery and had to wear a forefoot off-loading shoe.

> 88 % said walking with just the off-loading shoe was uncomfortable
> 37 % said that they experienced pain in the Sacroiliac Joint
> As a consequence, 26 % chose not to wear the off-loading shoe at all.

In 1991 McCaw et al [(2)] described the biomechanical implications of mild leg length inequality and pointed to

> Possible stress fractures of the weight bearing bones
> Osteoarthritic symptoms in the hip and the knee
> Lower back pain due to a functional scoliosis

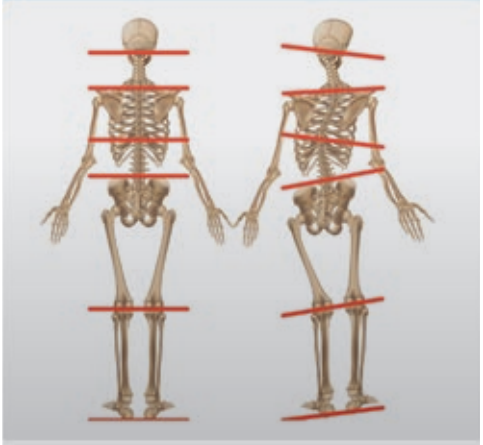
In 2013 O'Leary et al [(3)] did a systemic literature review and came to the conclusion that foot & ankle deviations can be considered a potential cause of lower back pain.

A height adjustment, i.e. in the form of a height difference shoe, can therefore be considered an important part of the complex treatment of foot & ankle disorders.

by Raphael Boehm, Vice President DARCO Europe

Literature:
(1) **Burke Gurney, PhD, PT, et al,** Effects of Limb-Length Discrepancy on Gait Economy and Lower-Extremity Muscle Activity in Older Adults
J Bone Joint Surg Am, 2001 Jun; 83 (6): 907 -915 . http://dx.doi.org/
(2) **McCaw et al,** Biomechanical implications of mild leg length inequality
Br J Sp Med 1991; 25(1) 10-13 http://bjsm.bmj.com
(3) **O'Leary et al,** The effects of podiatrical deviations on nonspecific chronic low back pain
J Back and Musculaoskeletal Rehabilitation, 2013, (26) 117-123 IOS PressDOI 10.3233/BMR-130367

Footwear



Leg Length difference can lead to an asymmetrical axis in the body resulting in pain
http://medizinpress.de/beinlaengendifferenzen/

By courtesy of Dr.Sandhya S. Kulkarni, M.D.,
Chetana Diabetis Foot Care Centre

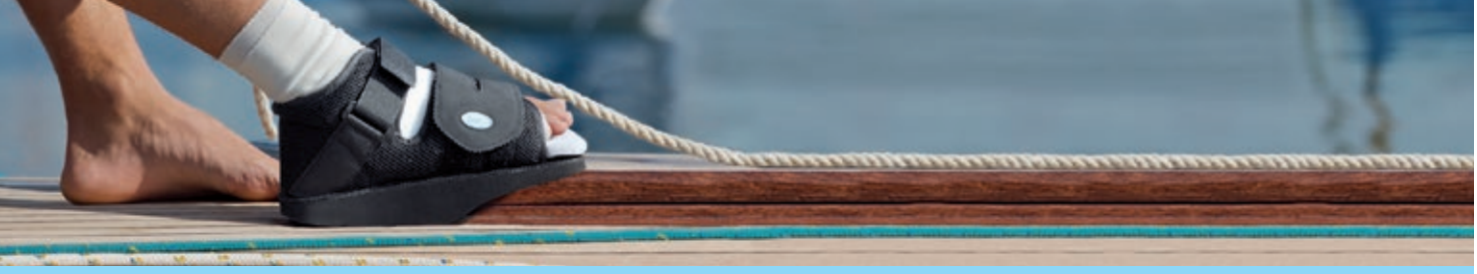

Gait & Posture

Full Length Article

Effects of the Twin Shoe (Darco) to compensate height differences in normal gait

Martin Wünnemann *, Dieter Klein, Dieter Rosenbaum

> For full size, click here

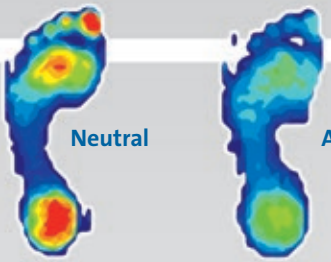


Featured Product

APB™ All Purpose Boot

The APB™ is an all season, postoperative boot. With its closed-toe design, it provides protection and keeps dressings clean and dry.

In the APB™ All Purpose Boot, DARCO uses the same proven sole technology as found in our MedSurg™ post-op healing shoe. The APB™ is designed to provide unparalleled versatility by accommodating both bulky dressings and most plaster or fiberglass casts. The closure system allows for a simple, two-sided application. The boot is completely closed and water-repellent.



Indications

> used postoperatively for stability and mobilization
> used with cast bandages for the foot and ankle

Purpose

> stability, shock absorption and pressure redistribution after surgical procedures
> in combination with the PegAssist™ insole system one can create interim solution for the diabetic foot in acute care

Features

> this boot is fully closed and water-repellent
> is constructed with same sole technology as the proven MedSurg™ healing shoe
> low profile – no height compensation necessary
> replaceable insoles are also available
> can be worn on the right and left

Sizes: XS, S, M, L, XL
right and left fit

Compatible with PegAssist™ Insole for selective off-loading

Please find detailed information on our website www.darco.in

Expertise

Conservative Treatment of a Bunion (Hallux Valgus) – is this possible?

The short answer is: YO (yes and no!). The problem is not an isolated Great Toe deformity. Almost always there is a underlying complex pathology like a splayfoot, Metatarsalgia, rear foot problems, etc. which leads to a bunion.

Conservative treatment often only addresses one, sometime two, seldom more of the potential pathologies. Foot gymnastics may be helpful in a very early stage, with a moderate deformity. But once an obvious visible bunion is developed, the tendon forces of the HV are already too strong to be compensated with gymnastics.

A very first and effective conservative way of treatment is the usage of comfort shoes with soft upper material, adequate width and deep toe box. This would also allow the usage of soft padding, cushioning and/or corrective insoles, which effectively off-load under prominent areas, i.e. head of MT1 or toe tips (in case of hammer toes). But the effects are purely static and do not show any improvement of the muscular situation. If the footwear is not wide and deep enough, the usage of therapeutic insoles can even be contra-indicated as this may cause additional pressure areas through volume increase (foot & insole).

Orthotics, like HV-Splints – mostly worn by night, can reduce the deformity in moderate cases, but they do not offer a permanent correction. Symptoms along with a bunion like bursitis, Shoe pressure pain, capsula expansion pain, lesser toe pressure pain do benefit from conservative treatments. The muscular misbalance resulting in non-physiologic tendon forces and bony deformities cannot be treated with a conservative therapy.

Conclusion: Preventive foot gymnastics and a proper fitting, foot form adapted footwear may reduce the occurrence of Hallux Valgus deformities. But once manifested, a painful Hallux Valgus deformity should – if there are no contra-indications – undergo a surgical therapy as only the symptoms can be treated conservatively whereas the causes require surgical intervention. Post-operative the operated area needs off-loading in a stabilizing off-loading or woundcare shoe, in an ideal manner with a rocker bottom outer sole.

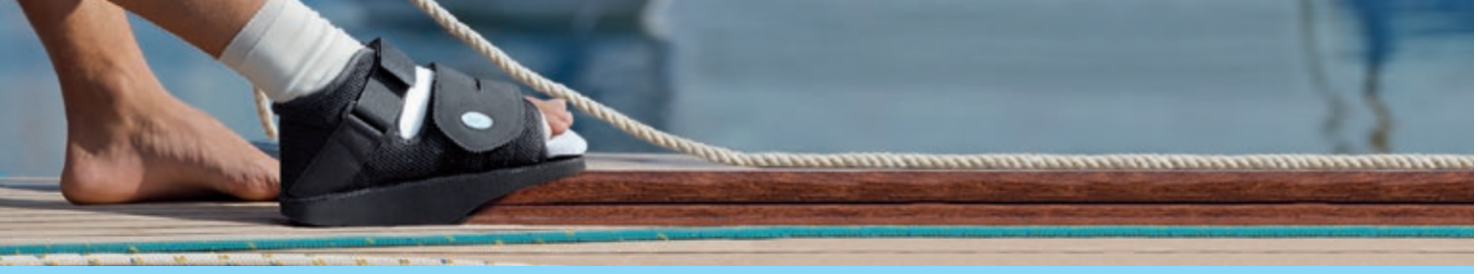
by Raphael Boehm, Vice President DARCO Europe

Literature:
Wanivenhaus, A., Vienna, (2015) "Hallux Valgus konservativ behandeln – geht das?" JATROS, Ortho-Rheuma-Spezial, No2/S.78

Surgical Technique

Severe Hallux Valgus / MT1 Osteotomy & MTP Arthrodesis

Pics with courtesy of
Dr. H. Edelmann, Berlin, Germany



Featured Product

Diagnostic Products Sensitivity Tester

These are effective and useful tools to measure the sensitivity in areas on the plantar surface of the foot. Following best practice guidelines for regular evaluation of feet in high risk patients, the tools are simple and valuable in clinical settings

MonoTemp™ Sensitivity Tester

> Diagnostic Tool
> 2in1 tester for symmetric polyneuropathy
> compact and easy to use
> pocket clip

The MonoTemp™ is a diagnostic tool that checks for distal symmetric polyneuropathy that utilizes both thermal and pressure testing. The alloy tip produces a cool sensation while the polymer tip remains neutral. The polymer tip unscrews to reveal a monofilament.

FootFilament™ Sensitivity Tester

Assesses touch and pressure sensation in large nerve fibers.

> Diagnostic Tool
> patient interactive test to measure plantar sensitivity
> compact and easy to use

The compact FootFilament™ has a simple, easy-to-use covering to protect the 10 g monofilament inside. The raised dots on the front and back of the device help indicate test sites on the foot.

Please find detailed information on our website www.darco.in

Diagnostic Care

MonoTemp™

FootFilament™

test sites

Expertise

Diabetic Foot

Testing for Diabetic Neuropathy easy and affordable: The Monofilament

Diabetic neuropathy is the most common complication for individuals with diabetes mellitus (DM) type 1 or type 2. Diabetic peripheral neuropathy (DPN) is peripheral nerve dysfunction affecting 50 % of the patients with diabetes

Diabetic Neuropathy may be categorized as follows:

> Sensory neuropathy occurs when nerves which detect touch and temperature are damaged. This form of neuropathy commonly affects the feet or hands.
> Motor neuropathy results from damage to the nerves affecting muscle movement.
> Autonomic neuropathy is the term if the nerves which control involuntary actions are affected; such as digestion or heart rate and also includes sweating and remoistening.

Monofilament can be used to help detect sensory neuropathy in otherwise normal feet. The thin plastic filament is applied perpendicularly to the area being tested. Pressure is then exerted and patient's feedback is noted when the sensation is first perceived. This can help identify a reduced or lost sense of sensation.

J.Mayfield [(1)] stated "The Monofilament is currently the best choice for screening for clinically significant neuropathy..." This method is frequently found in several best practice guidelines (i.e. American Diabetes Association, Dutch Association of Neurology, NHS and the National Institute for Clinical Excellence).

A systemic review by J. Dros [(2)] found 54 potentially eligible studies on the subject and 3 were selected for data synthesis. Dros stated that "... little can be said about the test's accuracy for detecting neuropathy in feet without visible ulcers." With regard to the diagnostic value of the Monofilament, the findings vary widely. Monofilament screening I vital in identifying DPN early, enabling earlier intervention and management, to reduce the risk of ulcerations in the lower extremities.

Groner [(3)] again summarized the necessity of the monofilament test as a tool for assessing diabetic foot ulcer risk. He quotes David Armstrong, DPM, MD, PhD, of Tucson AZ USA, "The tool itself may not be very accurate, but after study, it does seem useful in identifying clinically significant loss of sensation".

by Raphael Boehm, Vice President DARCO Europe

Symptoms of Diabetic Neuropathy:

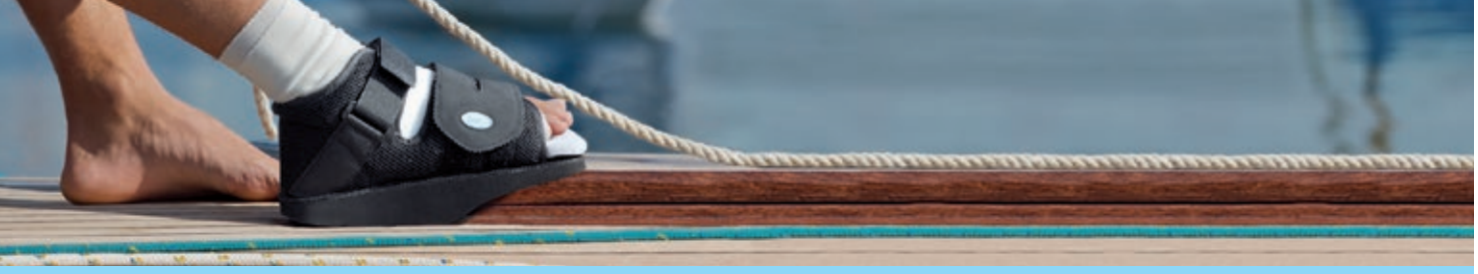
> Numbness or diminished sensitivity to pain or changes in temperature
> Tingling or burning sensations
> Sharp pains or cramping
> Increased sensitivity to touch or even the weight of bed linens can be agonizing
> Muscle weakness & loss of reflexes especially at the ankle
> Loss of balance and coordination
> Serious foot problems, such as ulcers, infections, deformities, as well as bone or joint pain

[(1)] **Jennifer Mayfield et al**
(2000) "The Use of the Semmes-Weinstein Monofilament and Other Threshold Tests for Preventing Foot Ulceration and Amputation in Persons with Diabetes"
J Fam Pract ; 49(suppl): S17-S29

[(2)] **Jacquelien Dros, MD et al**
(2009) "Accuracy of Monofilament Testing to Diagnose Peripheral Neuropathy – A Systematic Review"
Ann Fam Med;7:555-558.
doi:10.1370/afm.1016.

[(3)] **Cary Groner**
(2012) "Monofilament testing withstands critiques"
J Foot & Ankle Research

Photo courtesy of David Armstrong DPM, PhD, MD.



Featured Product

WCS™ Closed-Toe Wound Care Shoe System

The new WCS™ Closed-Toe shoe by DARCO includes the proven four-layer-insole system which one can individually customize for off-loading specific areas of the plantar foot. The ultra-soft and breathable upper provides maximum comfort and even leaves extra space for bandages.

Pressure points and foot ulcers occur most frequently with diabetes mellitus and in many ways, present an even great challenge for healing as well as effectively off-loading sensitive feet.

The diabetic patient requires specific, comfortable and reliable shoes, for indoor as well as outdoor use, to ensure effective pressure relief at the early stages of diabetic foot syndrome and in the case of minor ulceration.

Indications

> for treatment of the diabetic foot syndrome (DFS)
> for the healing of open wounds and minor ulcerations
> for plantar pressure relief of bony tuberances

Purpose & features

> seamless toe area
> elastic and breathable upper
> extra space for light bandages
> a 4 layered, colour coded, insole system with varying degrees of shore grades. One can customize the insoles which enables selective off-loading in specific areas of the plantar foot
> a high heel cup for comfortable fitting

Sizes:

> available in pairs and found in seven different sizes

Please find detailed information on our website www.darco.in

Off-loading and Wound Care

exchangeable insole available

Expertise

How useful can a hybrid between a Wound Care Shoe and a Diabetic Shoe be?

In newsletter No. 6 we discussed the advantages of the toe/heel rocker bottom coupled with a flat mid-stance area for the neuropathic patient. In newsletter No. 8 we pointed out the advantages of a light weight diabetic shoe; the GentleStep™. By combining the features of both models we've created a very effective hybrid.

Patients at risk of developing diabetic foot ulcers need to avoid getting foreign objects in their shoes, such as sand or little stones. Such objects may irritate or even harm the skin and this increases the chance of getting a foot ulcer. A closed-toe shoe is therefore recommended. The shoe should have a wide toe box and made with a breathable fabric. The upper material needs to be strong enough to protect, yet flexible in order to reduce dorsal pressure; especially in the case of hammer toes.

Once an ulcer exists, it is crucial that the footwear allows for selective off-loading. Customizable, multilayered, insoles with different foam densities can be carefully altered to off-load the wounded area and re-distribute the weight. WAGNER grade 3 or 4 ulcers are severe and therefore also require a shoe with a wide opening to accommodate the thick dressings. For example our sandal style of shoes; the WCS™. Regardless whether an ulcer has manifested, individuals at risk would still benefit from a multilayered, customizable insole system.

Combining the advantages of the WCS™'s outer and insoles systems, together with the friendly upper material found in the GentleStep creates a superior, versatile therapeutic shoe treating WAGNER 1 or 2 ulcerations.

WCS™ Closed Toe shoe has a closure system that cannot expose the entire interior of the shoe, as found with the WCS™ Open-Toe model. Therefore in the case of very bulky dressings, the WCS™ Open-Toe model should be the first choice. Keep in mind that the off-loading capabilities of both models are identical.

In addition, there's a small marking located on the medial aspect of the outer sole; the DARCO "D". This insignia indicates the correct position of the first metatarsal and facilitates proper fitting of the shoe. An ill-fitting shoe may actually do more harm than good.

by Raphael Boehm, Vice President DARCO Europe

Diabetic Foot

closed, breathable and flexible upper

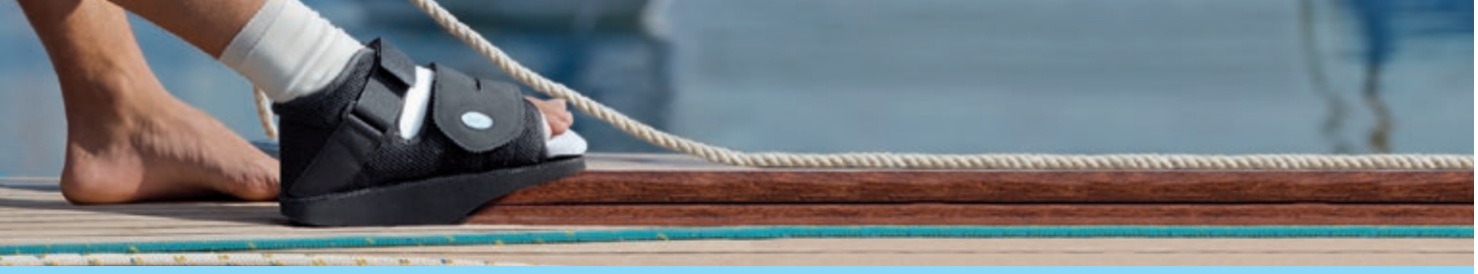
+

customizable insoles

=

WCS™ Closed-Toe: a perfect combination

Visit this link for information about Newsletter no6 (WCS™) and no8 (GentleStep™)



Featured Product

Pediatric Products

A minor fall – but this time, it didn't go off so lightly – now both the child and his parents are facing an endurance test.

After a thorough examination and diagnosis of the injury, developing an effective and safe therapy program for healing a child's foot is the top priority. After the cast is set, the next essential consideration is the child's natural desire to be active. DARCO's pediatric line meets the demanding needs of an active child by providing the best possible care and protection. You can feel good knowing your young patient is on the road to recovery with the benefit of a DARCO Pediatric Shoe.

Pediatric MedSurg™ Postoperative Shoe

> used postoperatively for stabilization protection and offloading
> 1 Size | fits on both; right or left foot

The Pediatric MedSurg™ is the smaller version of our MedSurg™ postoperative shoe for adults. The child's healing shoe contains all the beneficial features found in the adult MedSurg™ but sized for smaller feet. The quality and construction characteristics remain the same.

Pediatric Original MedSurg™ Postoperative Shoe

> used postoperatively for stabilization protection and offloading
> 1 Size | fits on both; right or left foot

The DARCO Original MedSurg is the shoe that started it all. The "Original MedSurg™" was developed over 30 years ago and has since become known as the industry standard. Often referred to generically as »the DARCO shoe«. It is anything but generic and has a long list of features and a proven track record of excellence.

Pediatric SlimLine™ Cast Boot

> used over a fiberglass or plaster cast
> 3 Sizes: S, M, L | fits on both; right or left foot

The Pediatric SlimLine™ Cast Boot protects the cast from dirt and exposure and facilitates correct movement. It's just like the adult size; with all its benefits and features but made for the little patients!

Please find detailed information on our website www.darco.in

Pediatric Products

Pediatric MedSurg™

Pediatric Original MedSurg™

Pediatric SlimLine™

Expertise

Although Orthotics and stretching are effective, some young patients may require a surgical correction ...

A pediatric flatfoot can be caused by a variety of reasons and surgical therapy may be indicated. The catch is to correct the hindfoot without impacting the structures and alignment of the forefoot.

Soft Tissue Procedure

The majority of the young patients already benefit from an Achilles tendon and/or gastrocnemius muscle lengthening to increase ankle joint range of motion.

Subtalar Implants

A subtalar implant is indicated in the event of a hyper-pronated foot and where stabilization of the subtalar joint is required. It blocks forward, downward and the medial displacement of the talus, thus allowing normal subtalar joint motion. Excessive pronation and the resulting sequela will be blocked with this minimally invasive technique.

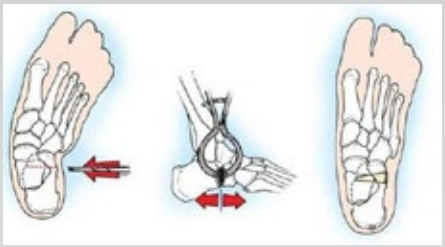
Evans procedure

One of the most commonly used lateral column procedures in both the pediatric and the adult population is the Evans Osteotomy. According to Dr. Baravarian, this is the single strongest hindfoot alignment procedure.

Postoperatively and in most cases, a cast might be required. This is especially true for younger patients (kids). Recovery time can be anything between six to eight weeks. An adequate cast shoe or post-op shoe with a rocker sole will help to mimic the normal gait during the healing process.

by Raphael Boehm, Vice President DARCO Europe

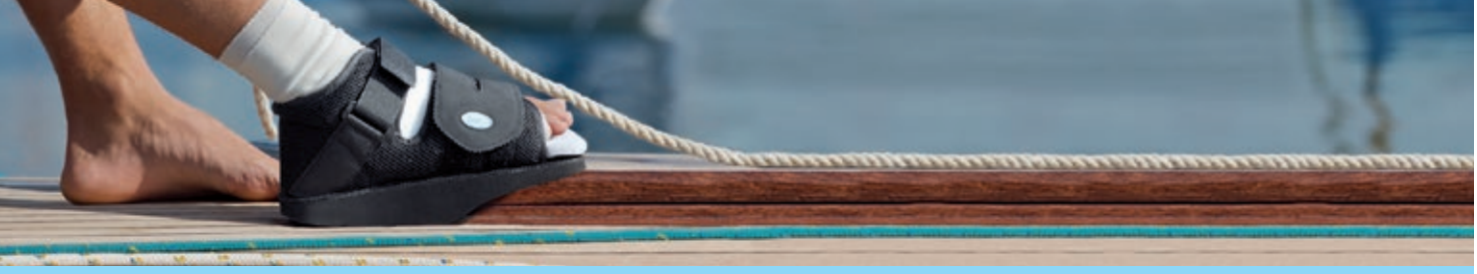
Diabetic Foot



Pictures
[1] www.delhifootandankleclinic.com
[2] www.gramedica.com
[3] www.delhifootandankleclinic.com

Literature:

Baravarian, Babak, Assistant Professor at UCLA, Santa Monica
in Podiatry Today, Volume 23 – Issue 1 – January 2010



Featured Product

HeelWedge™ Off-loading Shoe

Treatment of plantar fasciitis, ulcerations, infections, trauma and following surgery of the soft tissue or bony structure of the heel.

The DARCO HeelWedge™ is clinically proven to off-load pressure from the heel by shifting weight to the mid and forefoot to promote faster healing after surgery, trauma or when wounds or ulcerations are present on the heel.

Indications

> rearfoot trauma
> wounds or ulcerations present on the heel area
> post surgical healing for either soft tissue or bony structure of the heel
> for the treatment of plantar fasciitis, ulcerations, infections, trauma and following surgery of the soft tissue or bony structure of the heel

Features and Benefits

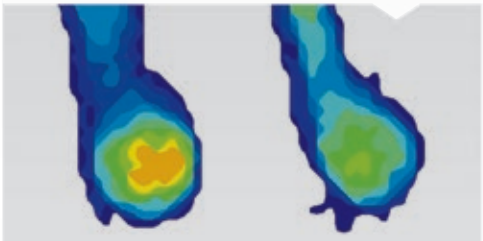
> Reduces heel pressure by over 26 %!
> Square Toe Design acts as a bumper to protect the toes and provides better universal left / right fit.
> Ankle Strap seats foot firmly in shoe to reduce heel slippage and eliminate friction.
> Removable Forefoot Closure provides security while eliminating buckle pressure.
> Zoned Outsole has an aggressive tread under the midfoot where traction is needed most.
> Removable Insole features twice the padding of standard insoles and can be modified as needed. Insole can be totally removed to accommodate DARCO's innovative PegAssist™ customizable off-loading insole for an even more targeted off-load.
> TwinShoe optional available for height adjustment.

Sizes

> available in 5 Sizes: XS, S, M, L, XL
> right and left fit

PegAssist™ Insole optional available

Pressure measurement HeelWedge™ Off-loading Shoe



Neutral HeelWedge™

Please find detailed information on our website www.darco.in

Expertise

Gait Training – essential to use an off-loading shoe correctly

Hindfoot relief can remove the entire load from the heel while providing targeted relief to specific areas through cushioning and/or additional customizable insoles. Great caution must be taken when treating patients with neuropathies!*

As long as the upper and lower ankle joints are properly aligned, plantar ulcers of the heel / calcaneus are often forced by foreign bodies (i.e. little stones in the shoe) and shear force, especially in Hawaiin style sandals. Also, deformities with intrinsic bone spurs might create high peak pressure point.

Usually in human gait after the swing phase, the first ground contact is done with the heel. In case of injuries, ulcers, pain, etc. this first heel strike needs to be avoided. An off-loading shoe can do this, but the patient also needs to get advised and perhaps trained to change his normal gait during the healing process. Patient must be taught to walk correctly in this device as gait pattern must be altered to reduce trauma to heels. Like in some running styles patients need to have first initial contact with the forefoot.

This changed gait will also shift some load further to the forefoot. Therefore additional injuries or ulcers on the forefoot are a contraindication for such an off-loader.

Also be careful in the use of these rear foot off-loaders in the case of achilles tendon injuries. So “forefoot-gait” might also put some additional tension on this area.

Additional helping aids might be required such as height adjustment shoes on the contralateral side or crutches.

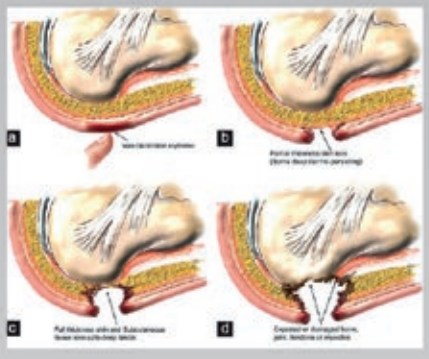
As a conclusion: especially with off-loading shoes the patient education / gait training must be regarded as an important aspect of the whole healing process.

by Raphael Boehm, Vice President DARCO Europe

Literature:
***Baumgartner et al (2016) “Pedorthics”** | C. Maurer publisher, Geislingen, Germany

Diabetic Foot

1. Heel Ulcer Developement

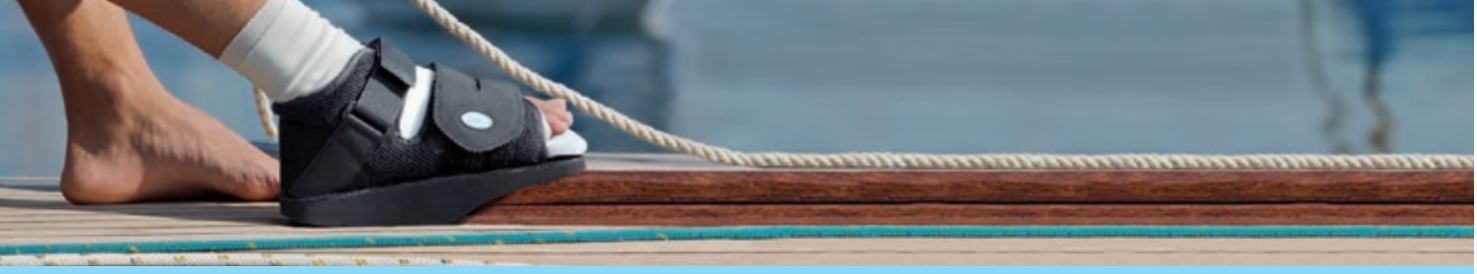


2. Diabetic Foot after Debridement

3. Crush Injury

4. Different Foot Strike Patterns

Pictures:
1. Indian Journal of Plastic Surgery | Prof. Mira Sen (Banerjee) C.M.E. Article | Year: 2015, Volume: 48, Issue: 1, Page: 4 – 16
2. https://4.bp.blogspot.com/-RprbbGIrTFQ/T5rUQGYEnkI/AAAAAAAACdM/vZ3JJRi_cEo/s1600/IMG_8937.JPG
3. https://crushinjury.blogspot.de/2012/05/bike-spoke-injury-heel-pad-loss.html
4. http://www.ennisphysioclinic.ie/running.html



Featured Product

WCS™
Wound Care Shoe System

The DARCO WCS™ Wound Care Shoe System is the product of choice when dealing with Wagner Grade 3 or greater ulcerations. The four multi-density insoles can be modified, effectively removing pressure from the plantar aspect of the foot.

The WCS™ is recommended for the treatment of open and closed ulcerations and other conditions of the foot in which it is desirable to redistribute weight away from specific areas. The circumferential counter of the shoe forms a deep pocket in the sole to permit the use of a variety of insoles under the ulceration or area of pressure. The insole material is placed below the level of the top of the circumferential counter, providing greater stability for the foot by preventing the layered insoles from shifting within the shoe.

Indications

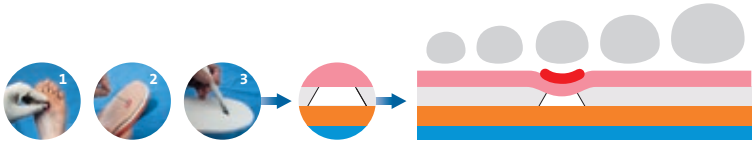
> Wagner Grade 3 or greater ulcerations
> Bony prominences
> Long-term treatment of wounds and ulcerations
> Maximum post operative off-loading while still allowing for patient ambulation

Features and Benefits

> Four Multi-density Insoles allow for the ultimate in customization and precisely targeted off-loading
> Ultra-soft Plastazote© Lining provides a virtually friction-free contact surface that won't exacerbate existing wounds
> Genuine Leather Upper can be modified or cut away to provide even greater levels of pressure relief
> Sold in Pairs to eliminate discrepancies in shoe height and the potential associated knee and hip pain

Example of sole customization:

Cross-section of the off-loading of a pressure ulcer under the third metatarsal head



Please find detailed information on our website www.darco.in

Wide shoe opening

> Easy to put on
> Plenty of room for dressings

Special shoe sole

> More safety
> Optimal walking performance

4-sole system

> Different Shore hardnesses
> Easy customization

Height adjustment

> Height adjustment ensured

Detailed video instructions for customising the fit available!

Please find detailed information on our website www.darco.in

Expertise

Currently there are several classification systems known to specify a Diabetic Foot Ulcer (DFU). Some of them are very complex, some of them are too superficial, and some of them are simply not efficient.

Jeffcoate stated in 2003[5] that "... there is no widely accepted method for classification or even describing foot ulcers. Non-specialists commonly refer to all ulcers as diabetic foot. Two international working parties are trying to define a system of describing individual ulcers to improve communication and develop a classification for audit and research. Without classification, selection of comparable populations for urgently needed multicenter trials will be impossible ..."[5]. Such comments like "not widely accepted" or "not commonly used" appear all the way through the literature, even in the latest cited reference of 2012[24].

In 2006 the Editors comment in Podiatry Today, Vol. 19 Issue 6 May[6], asked "Can a Diabetic Foot Surgery Classification System Help Predict Complications?" Researchers concluded that a non-vascular surgical classification system – including variables such as neuropathy, open wound and acute infection – may help predict peri- and postoperative complications. "... Armstrong believes the non-vascular diabetic foot surgery classification system's framework may predict risk for complications such as amputation and infection ... just as it is best for one to be conversant in more than one language, it is best to be fluent in numerous classification systems ..."[6].

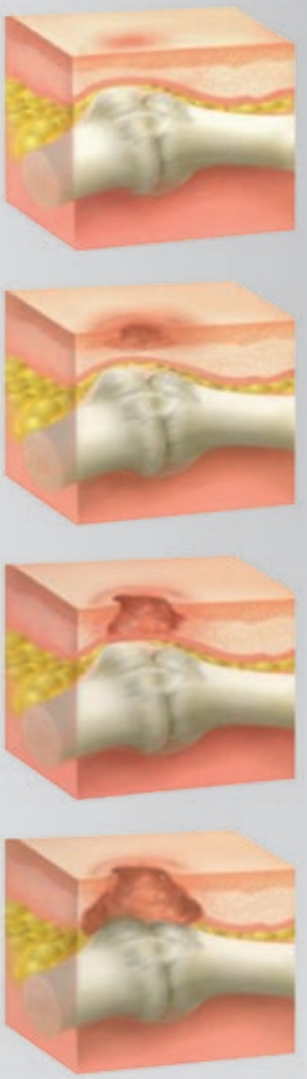
Generally speaking the Wagner and the UT seem to be the most commonly used (or at least known) classification systems, although or perhaps because they are already quite old.

Regardless which system is supposed to be the most accurate one, by the end of the day a classification system needs to have four advantages[9]:

> Provides a valuable means for organization
> Represents a common language for speaking with other medical professionals
> Can help with reimbursement issues
> Provides validation of chosen treatments

by Raphael Boehm, Vice President DARCO Europe

DFU Classification Systems



Literature:
Please download a review of the literature on our expertise site www.darco.in/expertise.html

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