When the Foot Hits the Ground From Toe to Heel

A Review of Conservative Treatments for Hallux Valgus

Series 3: Bunion Self-treatment Products

A review of treatments for Hallux valgus

With Hallux valgus, also known as bunions, being one of the most common foot ailments, it is not surprising that there are many treatments from which to choose. The purpose of this series, Bunion Self-treatment Products, is to help navigate through the various types of non-invasive treatments that relieve bunion pain and straighten the big toe.

This guide provides a brief overview of how bunions develop and how effective bunion treatments address the underlying causes of the deformity. Including opinions from doctors and patients, it reviews popular bunion splints or braces that treat mild to moderate bunions preventively, and in advanced cases, post-operatively.

Contents

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Biomechanics of the foot

A brief review of how bunions develop is helpful in understanding why some products on the market work better than others in treating bunions and bunion pain.
In general, most bunion deformities are a result of foot structure and function which are genetic. As the heel strikes the ground when walking, the joints of the foot unlock and absorb impact. Referred to as pronation, the arch collapses causing the feet to flatten [1]. This flattening causes excessive tension on the tendon in the upper mid-foot that enables the big toe to bend upward (extensor hallucis tendon). The tendon contracts which then forces the big toe to be pulled laterally toward the second toe. This is what causes the initial deviation.

Over time there is a backward force placed on the first metatarsal bone by the big toe, and the first metatarsal begins to move away from the second metatarsal bone. Due to these changes, there is now more pressure on the side of the first metatarsal bone from shoe pressure which causes a thickening of bone and eventually in the formation of a bunion deformity [2].

Click this link to an informative video on bunions.

"Bunions may have an adverse affect on gait and posture due to typical pain behavior which is 'avoidance.' Avoidance results in what I call a 'wobbling' movement that amplifies throughout a patient's gait and posture. So it is important to get the patient back to normal biomechanics as early as possible. For example, once a bunion is developed, it is usually tender to pressure. A patient may inadvertently avoid compression against the toe which will affect the entire biomechanical chain and posture. People with painful bunions are less likely to go for walks; their bunions have a limiting effect on their activity levels."

Markus Striebeck DC, DABCO

Orthotic solutions must treat the underlying causes of a bunion

Prior to selecting a treatment for bunions, it is prudent to address the underlying cause of the deformity which is not just in the forefoot where the bump is located; rather, the treatment needs to address foot function.

Foot function includes the up and down motion of the two arches in the foot: the longitudinal arch, which is the obvious one that many refer to as the foot arch, and the anterior transverse arch, which runs transversely across the mid-foot [3].In some cases, wearing a proper-fitting orthotic will address the underlying foot function, helping to deter further progression of a bunion deformity.

"Orthotics should support the arches of the foot in general and the anterior transverse arch in particular. By supporting the metatarsal heads and allowing for the normal spread of the forefoot, an orthotic can reduce current symptoms and prevent future deformity.

A foot that is already developing a bunion must be provided with good support for the medial longitudinal arch. The orthotic should allow for flexibility and movement of the first metatarsal joint during the dorsiflexion required at toe-off." [4]

Types of conservative bunion treatments

A variety of conservative treatments for bunion pain relief and big toe correction promises to either postpone the need for surgery or avoid a bunionectomy altogether. Every patient is different in the degree of metatarsophalangeal (MTP) joint deviation from the big toe (stages of a Hallux valgus) and/ or their compliance (how frequently and for how long they use the treatment). Doctors and patients are known to have prescribed or used any one orthotic solution or a combination of solutions ranging from toe spacers or pads to night time splints – all with different outcomes.

1. Protective pads or cushions such as pre-cut pads and gel toe shields and caps simply protect the bunion from friction but do not straighten the big toe.

2. Toe spreading devices take the form of a wedge being positioned in the space between the big toe and 2nd toe, so the big toe is pushed towards the inner side of the foot. Unfortunately, in order to exert a force, they support themselves against the neighboring toes, causing incorrect position of those toes [5]. However, toe spreaders, such as Yoga Toes®, which insert spread between all five toes tend to provide a consistent and comfortable positioning of the toes.

3. Toe straighteners are usually padded splints that run along the inner side of the foot as a spring with a ring eye at the toe end to hold the big toe. At the other end, the pad splint is bent to rest against the heel allowing the big toe to be brought out into normal position. Compliance can be difficult due to the discomfort of these contraptions [6].

4. Bunion splints or braces, with compliance, are the most effective conservative treatments in preventing further progression of a bunion, as well as for post-operative purposes. Well designed splints address the underlying foot function that contributes to the toe deviation, whereas, the aforementioned treatments do not.

In this video of the Dr. Oz Show, September 22, 2010, Dr. Oz said that splints, as a "Bunion Buster," are quite effective.

About bunion splints

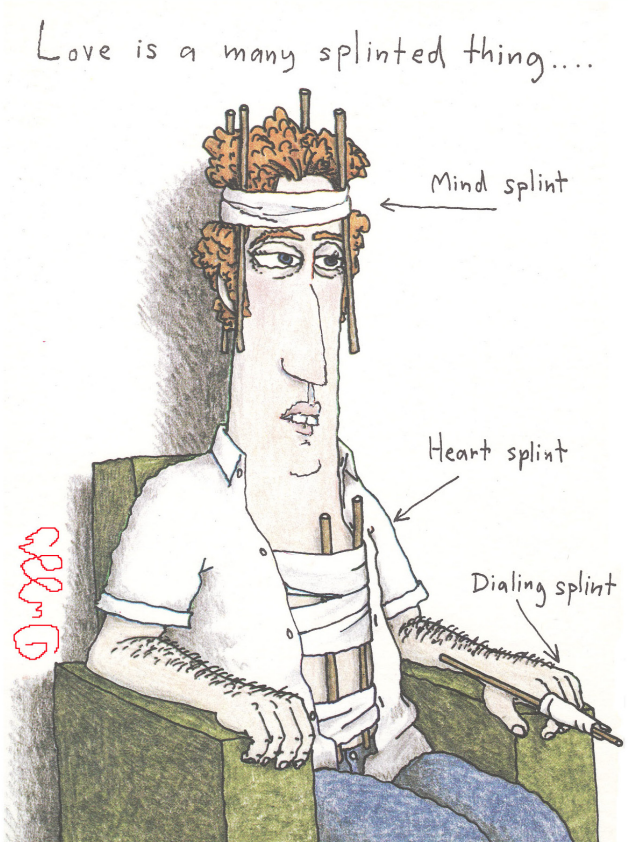
The basic design of a bunion splint has a “holder” for the big toe, extended in a longitudinal direction connected to another “binding” around the mid-foot, resulting in a corrective force of the big toe [7]. The most successful splints address the underlying foot function by providing proper support to the mid-foot’s two arches (longitudinal and transverse) while pulling the big toe away from the 2nd toe, gently stretching the tendon and toe muscles.

In general, bunion splints fall into the following categories:

1. **Rigid splints**, most often, are considered night time splints because the materials are either not flexible and/or cannot bear weight.

- Custom-molded rigid splints are made of thermoplastic that is molded to the medial aspect of the foot and great toe.
- Ready-made braces are unmolded straight splints made of plastic or metal against which the foot and great toe are attached.

2. **Flexible or soft splints** are made of fabric material that surrounds the forefoot and great toe. Correction is by way of a strap that is attached to the brace by hook & loop fasteners or by the bias cut of the material that pulls the big toe into the corrected position. Flexible splints are most often considered day splints because of the ability to walk in them [8].



Advantages and disadvantages of popular bunion splints

Following is a brief overview [9] of popular bunions splints or braces that treat mild to moderate bunions preventively, and in advanced cases, post-operatively.

Darco TAS™ Toe Alignment Splint:

Darco TAS Toe Alignment Splint is a flexible device that includes 5 straps to splint between one to all five toes. A thin elastic metatarsal band reduces slippage, and soft toe straps hold the toes in the correct position to maintain alignment following surgical correction.

This splint is most popular for post-surgical purposes. Because it is soft and flexible, it is comfortable to wear while walking. This splint is an effective and inexpensive way of maintaining correct alignment of the toes during the healing process. It is quite versatile in that the straps let one use the splint in multiple ways.

In addition to treating bunions, it treats hammertoe and tailor's bunions. However, this advantage can also be confusing. According to one review, "it is trying to be too many things to too many toes; all the pieces can be quite confusing".

Wheaton™ Bunion Brace

This patented Wheaton Bunion Brace is a foot sleeve made of thin, breathable neoprene and can be worn day or night. The fabric is cut and sewn on the bias to adjust to the big toe and provide a gentle, corrective force to help prevent the bunion deformity from getting worse.

This bunion brace is popular among those who have mild to moderate bunions. The bias cut of the neoprene provides a nice gentle pull. The neoprene is high quality with heavy stitching. Some patients think it is comfortable to wear in shoes, especially Crocs®. However some patients complain that the material around the big toe rubs against the second toe, cutting off the circulation. For those who have overpronation, this soft splint does not address the underlying need for mid-foot support.

Fabrifoam® Splint

The fabrifoam bunion splint, made of moisture-wicking fabrifoam®, is light weight and designed to stretch the muscles and tendons, straighten the big toe, and alleviate pressure in the shoe.

This splint is only effective for those with very, very mild bunions. The soft foam is comfortable to the skin while being firm. It relieves bunion pain but is not strong enough to correct the positioning of the big toe. It is mostly worn at night in bed due to its comfort. It is rarely worn at daytime because it is too thick to wear in shoes and doesn't provide enough support while walking.

PediFix® Nighttime Bunion Regulator™

Very similar in design to the Footsmart Bunion Regulator, this splint by PediFix relieves pain by alleviating strain that causes a bunion deformity. This anatomically-shaped splint guides the big toe towards its normal position while gently stretching tendons and muscles to help slow progression of the condition.

According to reviews, the plastic is thicker than that of Footsmart Bunion Regulator. It too provides instant bunion pain relief and provides visible correction to the big toe. Patients who have had surgery have been satisfied in wearing this night time splint for post-surgical fixation.

But like all night time rigid splints, it is not designed for walking. It too slips and can be uncomfortable at night, forcing users to take it off at some point in the night.

FootSmart® Bunion Regulator

This bunion splint is a reasonably priced night time rigid splint that stretches tight tendons and toe muscles. The bunion brace straps the big toe in place and is lined with soft foam. Adjustments are made to the lined splint and secured in place with a hook & loop closure.

The Footsmart Bunion Regulator provides instant pain relief and patients witness visibly measureable difference in the angle of the big toe under proper fit and compliance. The simple straight forward design is quite popular.

However, the most common complaint, which is true with most night time splints, is that a patient cannot walk in it, and the splint is uncomfortable to wear in bed. Its slips and needs to be readjusted due to friction of bed covers.

Patient reviews indicate that it is uncomfortable to wear for very long because the white plastic bar digs into the skin and into the 2nd toe. The splint is not necessarily the correct shape and does not flex. Furthermore, big toe alignment occurs laterally in only one static position.

"You were sleep-walking again last night."

Bunion Aid®

This award-winning flexible hinged splint by Alpha Orthotics is for mild to moderate bunions, whereas the medial Mid-foot Brace is for more severe bunions. The Bunion Aid has a hook & loop anatomical strap around the big toe and one around the mid-foot. The two straps are connected by a padded splint which lies along the inner side of the foot and extends from the big toe.

Bunion Aid treats the underlying foot function because it combines the comfort and convenience of a soft splint with the corrective support of a rigid splint. Its mid-foot strap stabilizes the longitudinal arch and transverse arch while the toe strap pulls the big toe away from the second toe gradually. The included metatarsal pad when placed behind the ball of the foot helps align the transverse arch. The splint has a hinged mechanism that enables the big toe to flex while walking and adapts to the contour of the foot, especially around the inflamed area of the joint. This is especially important as swelling in this region is common.

The primary advantage of this bunion splint over other rigid splints is the hinged mechanism. It allows natural flexing action of the big toe, gradually straightening the bunion through the range of motion. The ability to walk in the splint is an advantage at bed time as well, because one can get up without taking it off.

According to patient reviews, this splint relieves bunion pain immediately, straightens the big toe, and reduces the size of the bump. With proper compliance, gait and balance are improved substantially. Patients can then resume activities such as yoga, ballet, tennis, running, and golf.
Similar to other rigid splints, if not properly fitted around the mid-foot, it tends to rotate around the foot while walking or sleeping.

Medial Mid-foot Brace

The Medial Mid-foot Brace is a mid-foot arch support which is recommended for those who have advanced Hallux valgus and cannot be treated with Bunion Aid. In the case of severe bunions, the compression of the side splint of the brace provides support to the metatarsal bones, taking pressure away from the painful bunion while wearing shoes. The metatarsal pad provides lift to the transverse foot arch.

This adjustable mid-foot arch does not correct the bunion deformity; rather, it provides bunion pain relief for those with severe stages of bunions. According to one review, “It is like a custom made brace because the whole thing can be adjusted to fit . . . . from the top and bottom of the straps to the placement of the little cushion.” Unlike elastic sleeve foot arch supports, this arch brace will not pleat, roll up or lose shape, thus maintaining lasting corrective arch support.

Correction Depends Upon Compliance

Compliance requires comfort and convenience

A critical component of the success of any bunion splint correcting the deformity is compliance. A comfortable and convenient splint greatly increases compliance. Depending on the severity of the bunion, daily compliance, at a minimum of 20 minutes up to 3-4 hours, is required to witness any significant improvement. Since a bunion cannot be "cured", ongoing preventive care is required to prevent the further progression or reappearance of a bunion.

> "I would like to endorse the Bunion Aid splint as a significant improvement over other bunion splints I have ever used in the past. The fit, comfort, and active hinge design has improved compliance and opened a new use for bunion splints that has never been available previously. . . . I have found my patients to be more compliant because of the simplicity and much more likely to continue into the future. Improving the big toe position is a very long term project and must be maintained. They also are more comfortable when using it as a night splint. . . . If you have had poor results with bunion splints as an aid to avoid surgery or have had poor patient compliance in the past, I recommend that you try this improved bunion splint."
>
> Dr. David R. Hannaford, DPM

"My son was involved with soccer since he was 4 years old. Kicking the ball continually aggravated his bunion. He's now using Bunion Aid, and the nearly constant pain and soreness he was having is nearly gone. It also shows that his toe is gradually straightening out."

Patrick M. Sitzmann, D.C.

Role of splints for post-operative purposes

The goal is get patients walking as soon as possible in an effort to keep the newly remodeled joint moving. If not, the joint tends to get stiff taking even longer to rehabilitate [10]. One of the most important factors in post-operative rehabilitation is compliance. Frequently this includes physical therapy, wearing a night time splint, and wearing a daytime bunion splint to maintain the surgical correction.

Once the surgeon recommends wearing a splint and provides walking instructions, wearing a flexible but supportive splint such as Bunion Aid helps reduce rehab time and maintain the surgical fixation. Bunion Aid stabilizes the alignment of the big toe and allows the surgical area to heal through the range of motion. Ongoing use of this day/night splint provides mid-foot support and keeps the big toe straight, preventing the recurrence of a bunion.

"I like Bunion Aid because it is mobile and introduces a corrective force not unlike a retainer for the teeth. Gradual force over time has a corrective effect if the brace is positioned correctly and the pressure of the brace to the toe is not irritating. I recommend to first wear the brace not weight bearing, then increase the time, and then slowly wear it around the house.

I absolutely agree that Bunion Aid offers an advantage during the straightening process because it pulls the big toe over laterally through the range of motion of the big toe joint. That is why I have added Bunion Aid as part of my bunion management regiment."

Markus Striebeck DC, DABCO

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At the beach, take off your shoes and walk in the sand. This not only massages your feet, but strengthens your toes and is good foot conditioning.