How Veins React to Standing Up: Managing OI Symptoms

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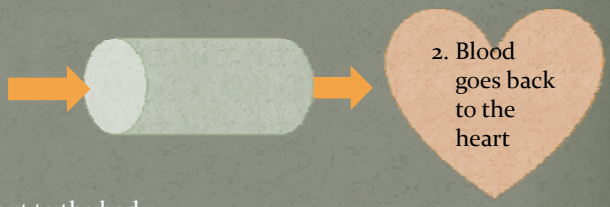
August 27, 2012
The Orthostatic Intolerance Center

How Veins Work – Lying Down

A vein in your leg when you are lying down.

How Veins Work – Lying Down

1. Blood comes from the arteries to the capillaries and then goes to the veins.



2. Blood goes back to the heart

- Arteries take blood out to the body - muscles, and organs like the stomach, brain, skin.
- Veins take the blood back to the heart.

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Change in Where Blood Is When You Stand Up

<u>When you stand up</u>

1. Blood drops from your head and chest - down to the feet & your abdomen.
   - There is more blood going from the arteries to the veins.

Standing Up: "Dilated Vein"

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Change in Veins When You Stand Up

When you stand up

2. The veins have to get bigger (dilate) so they can hold more blood.

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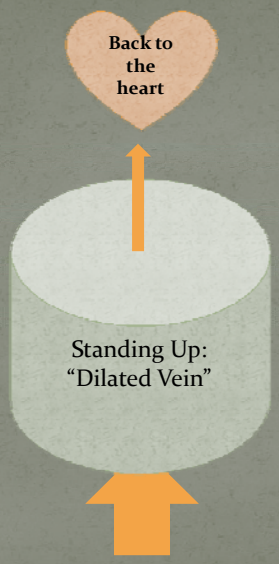

THE RESULT - Blood is Pooling in Your Legs & Abdomen

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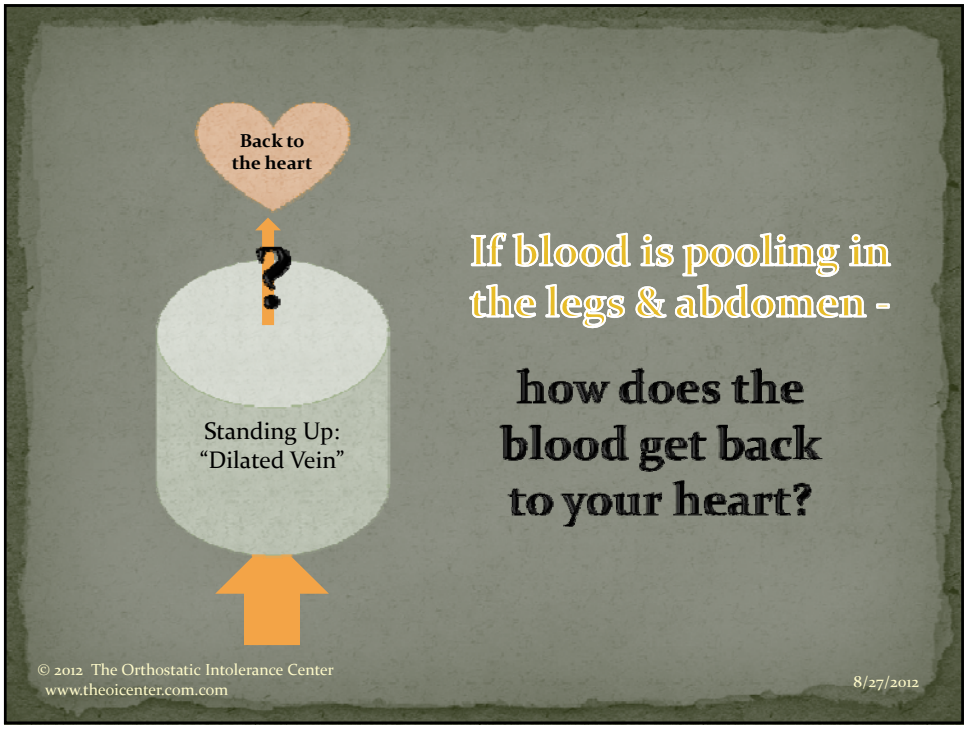
Back to the heart
?
Standing Up: "Dilated Vein"
If blood is pooling in the legs & abdomen -
how does the blood get back to your heart?
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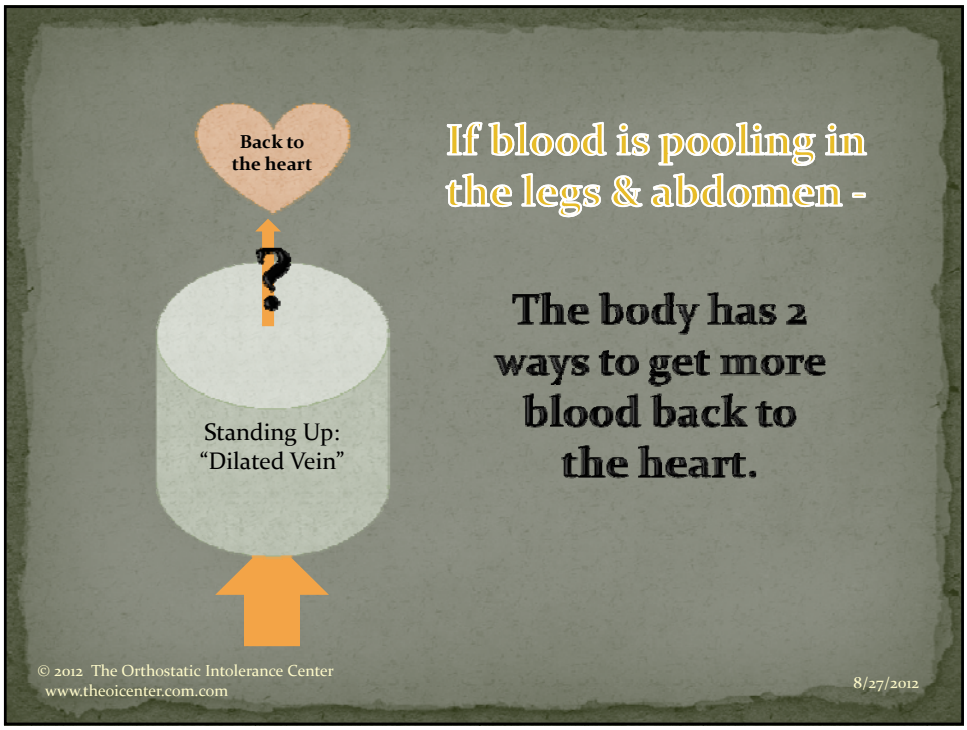
Back to the heart
?
Standing Up: "Dilated Vein"
If blood is pooling in the legs & abdomen -
The body has 2 ways to get more blood back to the heart.
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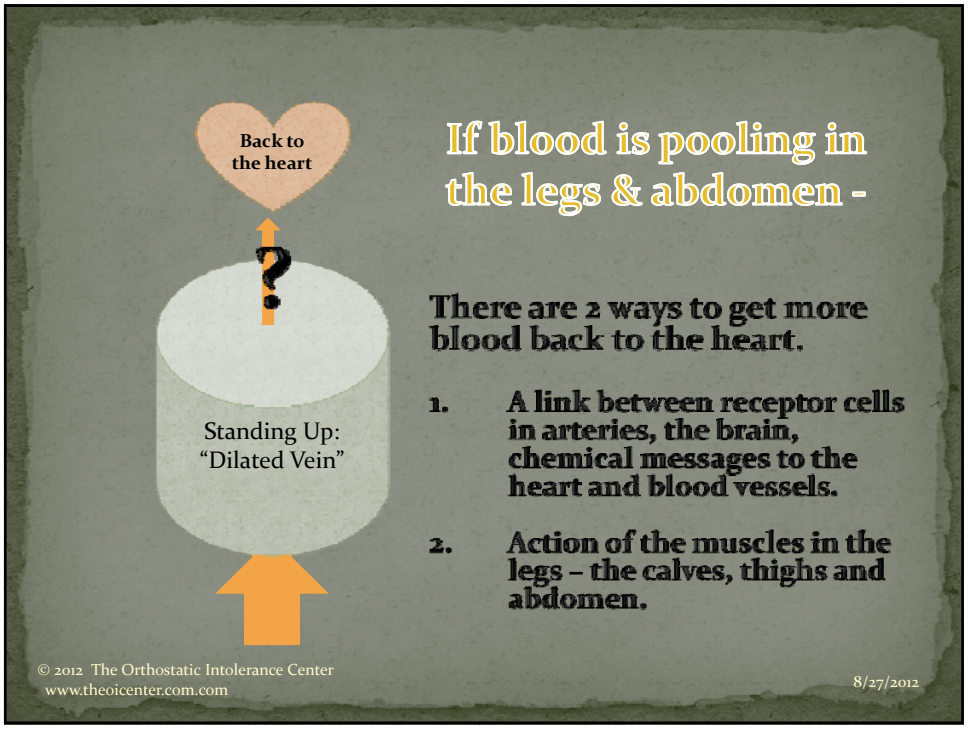
Back to the heart
?
Standing Up:
"Dilated Vein"
If blood is pooling in the legs & abdomen -
There are 2 ways to get more blood back to the heart.
1. A link between receptor cells in arteries, the brain, chemical messages to the heart and blood vessels.
2. Action of the muscles in the legs – the calves, thighs and abdomen.
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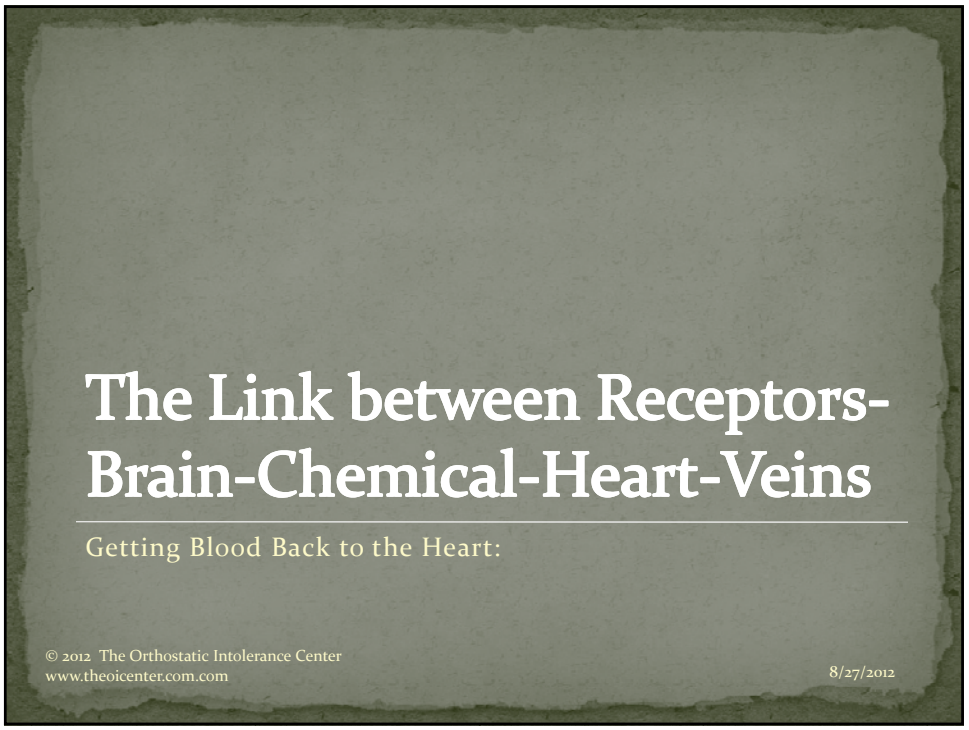
The Link between Receptors-Brain-Chemical-Heart-Veins
Getting Blood Back to the Heart:
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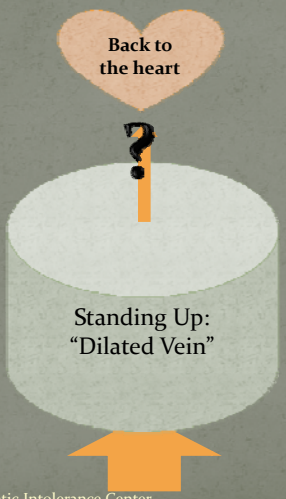
Getting Blood Back to the Heart: **The Link between Receptors-Brain-Chemical-Heart-Veins**



STEP 1:
Receptor cells in the neck and aorta send messages to the brain:

"Need more blood to the brain and body"

- **It only takes a second or two for the receptors to react and send the message.**

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Getting Blood Back to the Heart: **The Link between Receptors-Brain-Chemical-Heart-Veins**

STEP 2:
The brain sends a chemical message (Epi/NE) out to the body to tell the blood vessels to get smaller.

It takes about 5-15 seconds to send this message.

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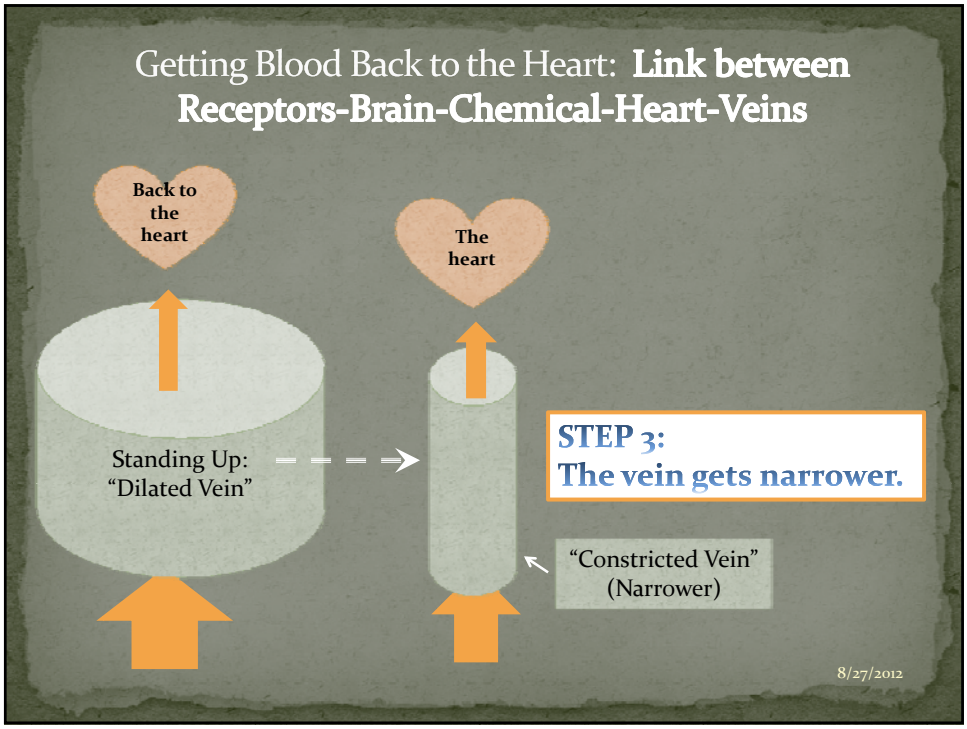
Getting Blood Back to the Heart: Link between Receptors-Brain-Chemical-Heart-Veins
Back to the heart
The heart
Standing Up: "Dilated Vein"
STEP 3: The vein gets narrower.
"Constricted Vein" (Narrower)
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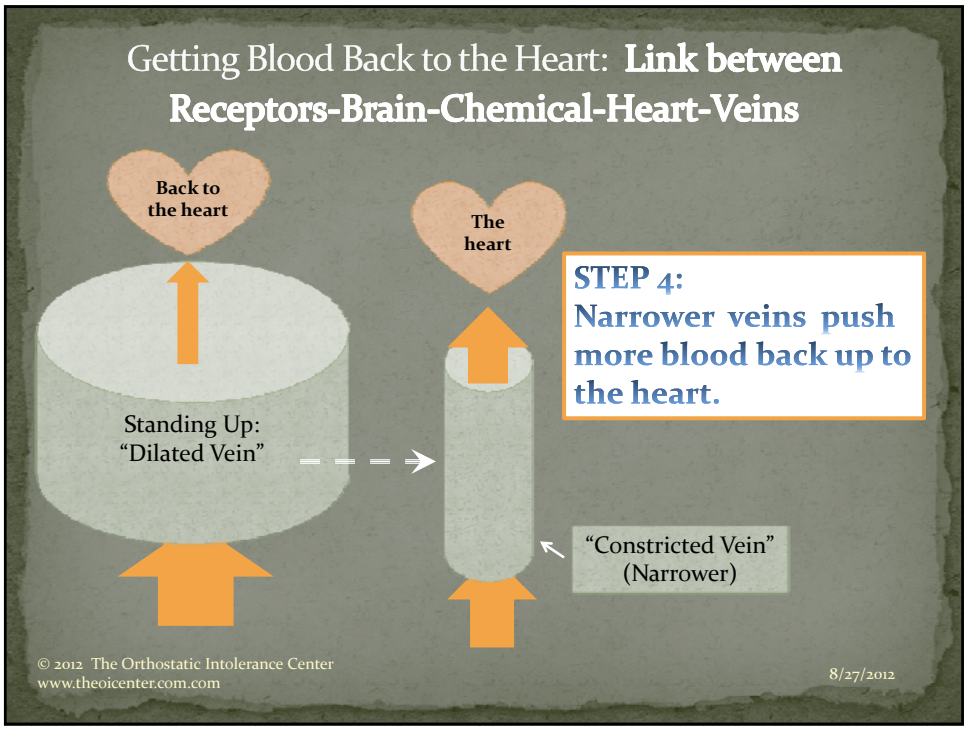
Getting Blood Back to the Heart: Link between Receptors-Brain-Chemical-Heart-Veins
Back to the heart
The heart
Standing Up: "Dilated Vein"
STEP 4: Narrower veins push more blood back up to the heart.
"Constricted Vein" (Narrower)
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Action of the muscles in the legs and abdomen

Getting Blood Back to the Heart:

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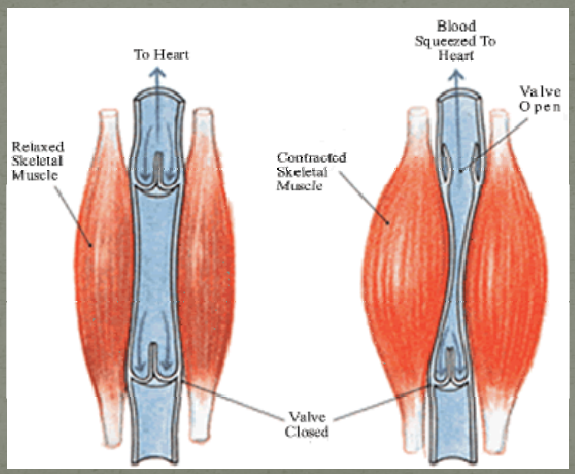
Action - Contraction of the Muscles:
sends blood back to the heart from the legs



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What is different with orthostatic intolerance?

Getting Blood Back to the Heart:

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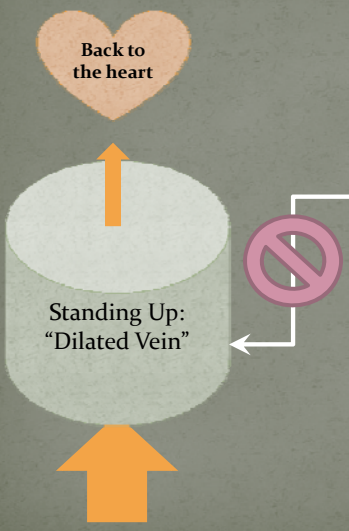
With Orthostatic Intolerance



1. The brain sends a chemical message (Epi/NE) to tell the blood vessels to get smaller.
   - But the message is not getting through.

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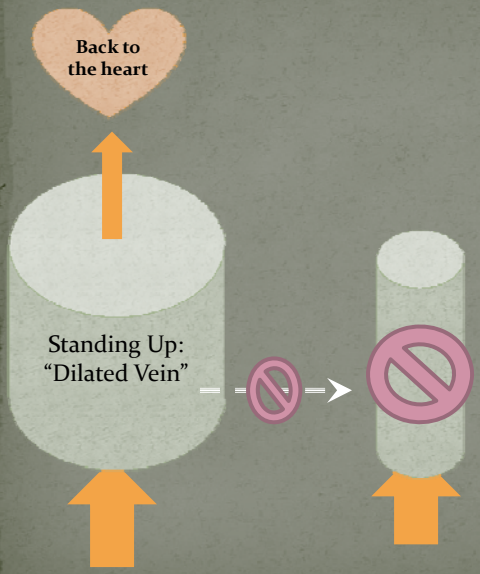
With Orthostatic Intolerance



- The vessels don't get the message.
- They don't constrict.

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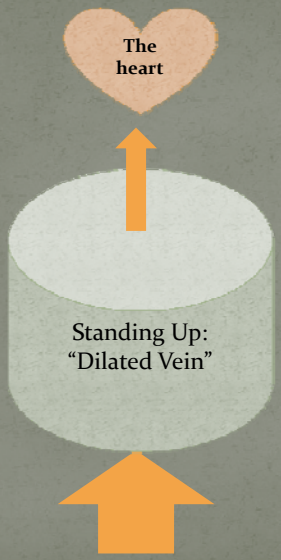
With Orthostatic Intolerance



The result:
Blood stays in the legs and abdomen.

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What Can You Do To Keep the Blood From Pooling in Your Legs & Abdomen?

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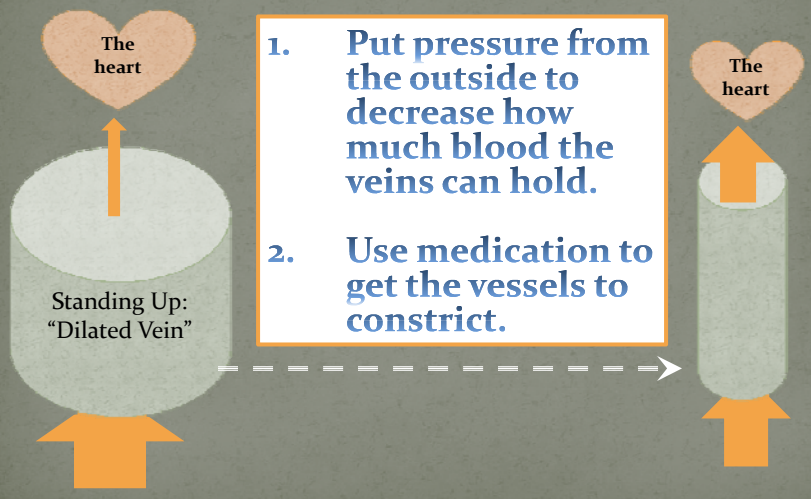
Prevent Blood Pooling
Move the Blood Back to the Heart



1. Put pressure from the outside to decrease how much blood the veins can hold.
2. Use medication to get the vessels to constrict.

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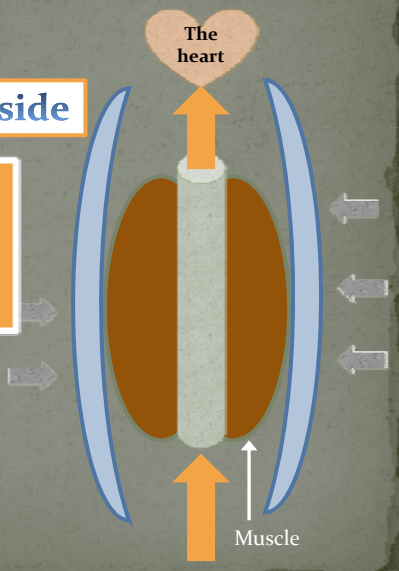
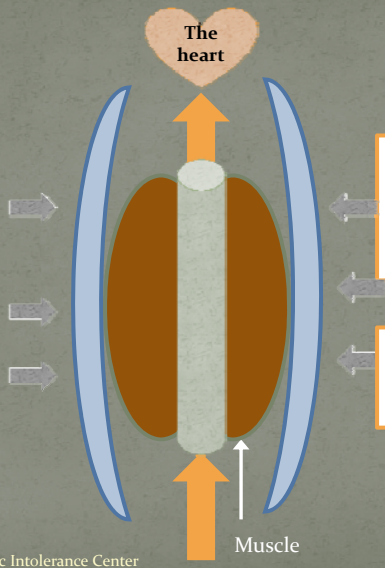
Prevent Blood Pooling
Move the Blood Back to the Heart

1. Put pressure from the outside

- ❑ Then the veins can't bulge out so much.
- ❑ If they don't bulge out, they can't hold as much blood when you stand up.
- ❑ The blood will keep moving through the arteries and back up to the heart.



Ways to Put Pressure From the Outside



1. Water
   - Swimming, tub

2. Compression Garments

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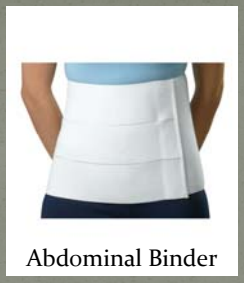
Compression Garments: Options

Full Leg Stockings



Abdominal Binder

Compression Sports Shorts

Shapewear

Stockings – Shorter Versions

Compression Garments: Options

Full Leg Stockings

Full leg stockings

- These are the most effective because they move blood all the way, from the calves, the thighs and the abdomen.
- But - they are not as practical or comfortable.
- People tend to not wear them unless they really, really need the extra control.

Compression Garments: Options

Abdominal Binder

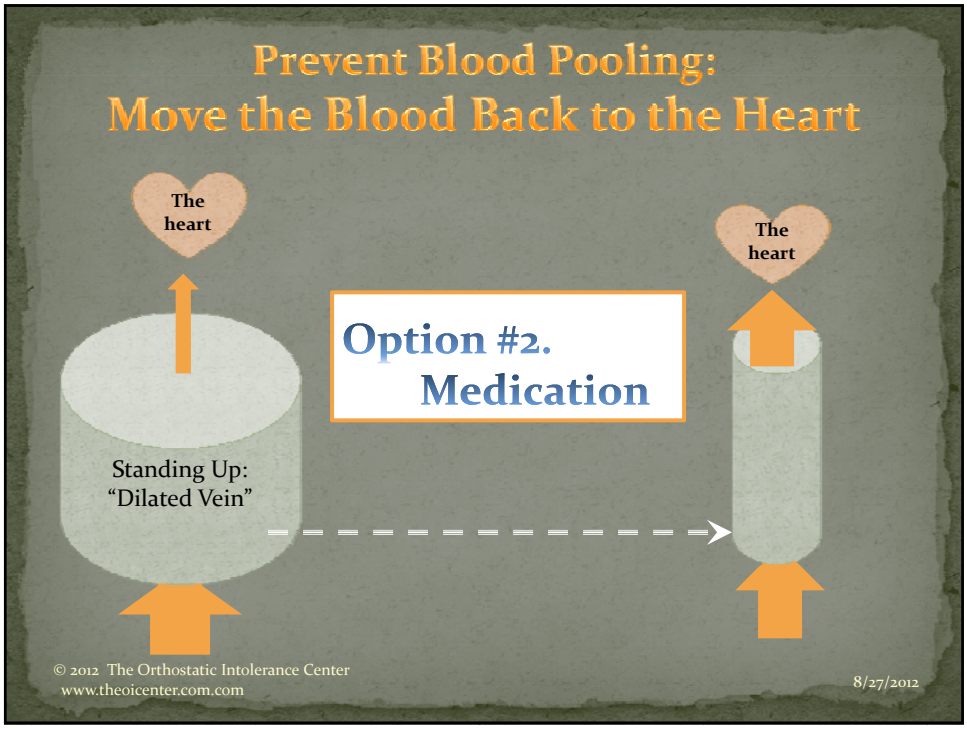
2. **Abdominal binders**
   - These can get about 70% of the effect as a full leg stocking.
   - They can be more comfortable to wear.
   - That means people are more likely to actually use them every day.

Compression Garments: Options

Compression Sports Shorts

Shapewear

3. **Other Garments**
   - These cover the abdomen and the thigh.
   - They may not have as much outside pressure as the prescription full leg stockings or abdominal binder/corset.
   - They provide some pressure and may be more comfortable to wear.
   - If they get worn and help at all – that counts!!


Prevent Blood Pooling:
Move the Blood Back to the Heart
The heart
The heart
Option #2.
Medication
Standing Up:
"Dilated Vein"
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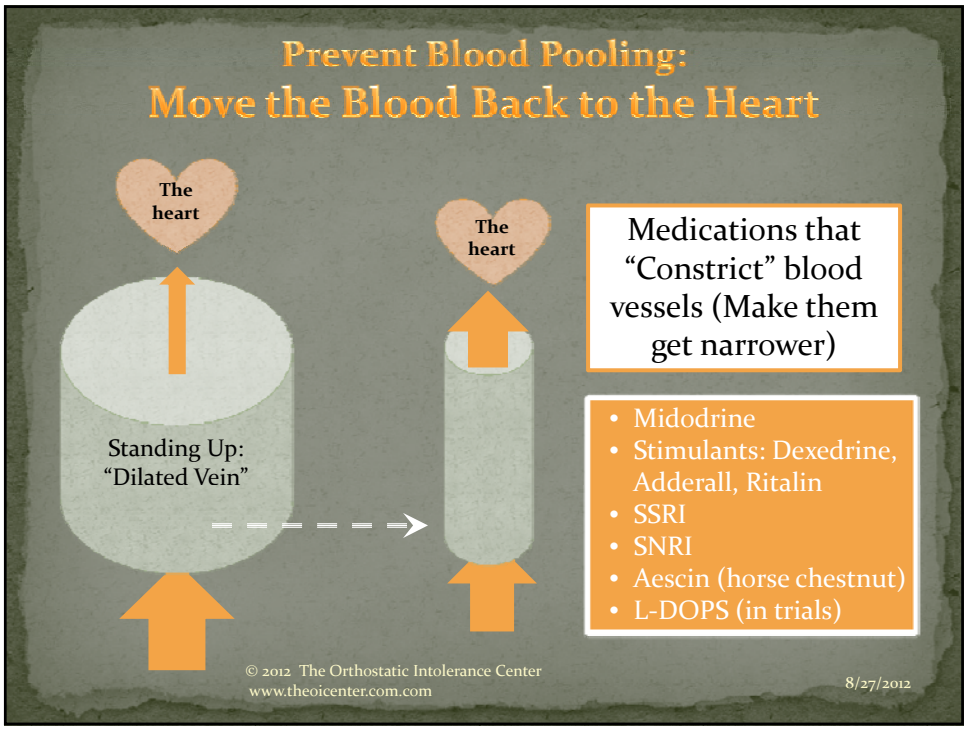
Prevent Blood Pooling:
Move the Blood Back to the Heart
The heart
The heart
Standing Up:
"Dilated Vein"
Medications that "Constrict" blood vessels (Make them get narrower)
• Midodrine
• Stimulants: Dexedrine, Adderall, Ritalin
• SSRI
• SNRI
• Aescin (horse chestnut)
• L-DOPS (in trials)
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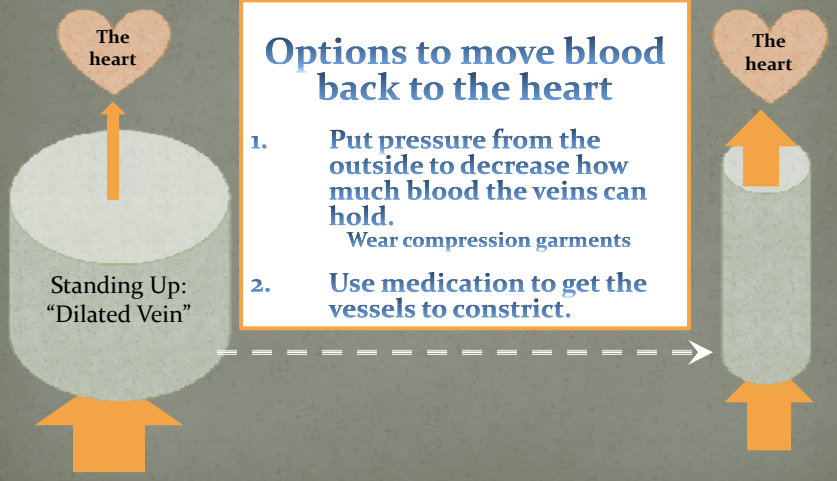
With Orthostatic Intolerance: To Reverse Effects of Blood Pooling in the Veins of the Legs and Abdomen



Options to move blood back to the heart

1. **Put pressure from the outside to decrease how much blood the veins can hold.**
   - **Wear compression garments**
2. **Use medication to get the vessels to constrict.**

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References

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