



Foot and Ankle Exercises for People with Diabetes Mellitus



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Introducing the Characters



Introduction

This illustrated booklet provides guidance and encouragement on **foot and ankle** exercises for people with diabetes, with instructions on how to progress in the exercises to promote movement gain and overcome new challenges.

Diabetic Neuropathy

Diabetic neuropathy is caused by **high blood sugar** (hyperglycemia) and, over time, can cause problems throughout the body, but particularly in the feet, leading to loss of muscle strength and movement in the feet and hands.

Important Information:

Why are foot exercises important?

Doing specific foot exercises can reduce some of the effects of diabetes, increasing joint movement, muscle function and sensation in the feet. This improves your balance, how you walk and your **confidence** about moving around. Diabetes makes some everyday activities difficult, including walking, going up and down stairs, negotiating obstacles and walking on unstable surfaces, but targeted exercises can **alleviate or even eliminate** these problems.

How do I prepare the room for the exercise routine?



Prepare the room by ensuring it has good lighting, no sharp objects on the floor and no slippery mats or flooring.

What will I feel during the exercises?

Your feet and leg muscles will feel **tired** as you perform the exercises. This is a **good thing!** Your muscles need to be **challenged** so that they gradually become stronger and healthier.

Can anyone do these exercises?

Yes, **whether or not they have type 1 or 2 diabetes and/or diabetic neuropathy.** But if you have open wounds oozing fluid or pus, ulcers, infections or severe pain (e.g.: arthrosis, rheumatoid arthritis etc.), **DO NOT DO THE EXERCISES** and seek medical attention!



How does diabetes affect my feet?

Controlling diabetes is essential because hyperglycemia or **high blood sugar can** affect the nerves in the feet and lead to diabetic neuropathy, which causes numbness or tingling and loss of sensitivity. This means you may not feel pain, pressure, temperature changes or even **injuries to your feet**, which can lead to infection and increased risk of amputation. **Significant** muscle weakness and rigid (“stiff”) joints also occur, making balance and movement more difficult.

How to Use the Booklet:



This booklet contains a number of different exercises, targeting muscle groups in the feet and ankles, as well as photographs, explanations and tables to more easily understand the exercises and their progression. Here's how it works:

Step 1 – Read the exercise description and check the pictures to see how it's done:

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Exercise 2

DESCRIPTION



With your feet flat on the floor, slowly spread your toes as far apart as possible without lifting your heel off the floor.



Start off sitting down (Photo a) and do one foot at a time, progressing to both feet at the same time once you feel confident. As your ability improves, progress to doing it standing up (Photo b) and then standing on one leg (Photo c).

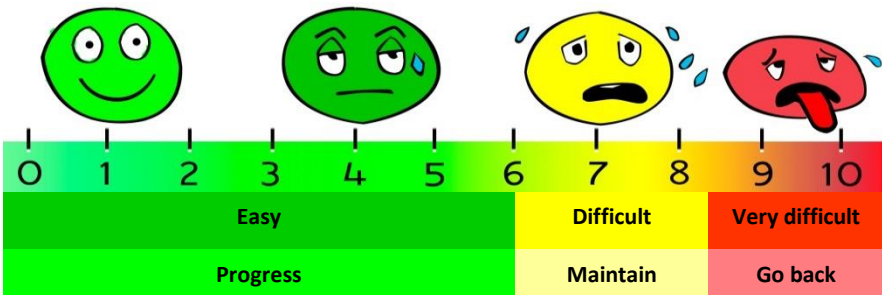


Step 5 – The calendar also provides a space for you to indicate how difficult the exercise was for you. For example, if you found the exercise **easy** to do on day 1, then mark the letter “**E**” in the column, but if it was **difficult** on the second day, then write “**D**” (as indicated by the red arrows below).

		Exercise Calendar										
		Day	1	2	3	4	5	6	7	8	9	10
		Date	09/02	09/03								
Sitting	12x		E									
	2x12			D								
Standing	12x											
	2x12											
On one leg	12x											
	2x12											

Establishing how difficult the exercise was is important because this determines when you should progress.

Step 6 – A scale from 0 to 10 is provided to help you classify the difficulty experienced, with 0 being the easiest and 10 the most difficult. Illustrations of facial expressions help you visualize the different levels of exertion.



Easy - Green = Progress to the next stage

If you find the exercise easy to moderately easy, increase the number of repetitions the next day.

Difficult - Yellow = Maintain this level

If the exercise felt difficult or tiring, maintain the same number of repetitions. Remember to only increase the repetitions when it gets easy.

Very difficult – Red = Go back

If you find the exercise very difficult, go back to the previous number of repetitions on the following day.

Each exercise should be done once a day, since the goal is to progress as they get easier.

Although it may be difficult or tiring at first, it is important to persevere in order to alleviate some of the effects of diabetic neuropathy, which can make everyday activities such as walking more difficult.

Please remember:

- Controlling your blood sugar levels is vital to prevent the emergence or worsening of diabetes.
- This booklet is not a substitute for medical treatment and regular physical activity! Keep taking your prescribed medication and going to your doctor's appointments.



If you experience severe persistent pain, stop the exercise routine immediately and seek medical assistance as soon as possible! **It may be a sign of something more serious!**

Frequently Asked Questions?



Should I stop doing the exercises after 30 days?

No, 30 days is the time period established for you to get used to doing the exercises every day. Ideally, you should incorporate them into your daily routine. Remember that people with diabetes are prone to foot problems if they don't exercise their feet regularly.



Should I stop once I get to the maximum number of repetitions?

No, you should keep doing the exercises, either maintaining or increasing the number of repetitions according to your capabilities. The idea is for you to learn your limits and be able to regulate the exercise intensity without overexerting yourself!

**I'm still not sure if I can do the exercises.
Could they hurt me?**

If you're unsure about what you're feeling, how to do the exercises or whether you're doing them properly, check with the health care team at the clinic that monitors your treatment. It's important to get informed so that you do the exercises safely and reap the benefits.

Where should I do them?



You can do the routine at home, at work or anywhere that allows you to concentrate on the movements so you can learn them quickly.

Do I need to take any special precautions?

Ideally you should do the exercises in front of a mirror so you can see your posture and check that you're doing them correctly. For the standing exercises, make sure you have something sturdy **(that doesn't wobble)** to hold on to, like a chair, table or wall. Never put yourself in a situation where you might fall!

Warming Up

WHAT TO DO

Part 1: While sitting, cross one leg over the other and massage the sole of your foot with both hands **for 1 minute**, sliding your fingers along your feet in circular movements. Repeat on the other foot.

Part 2: Place the ball on the floor and slowly roll your foot over it from the heel to the tips of your toes **for 1 minute on each foot**. Make sure you can feel the ball pressing against your skin.

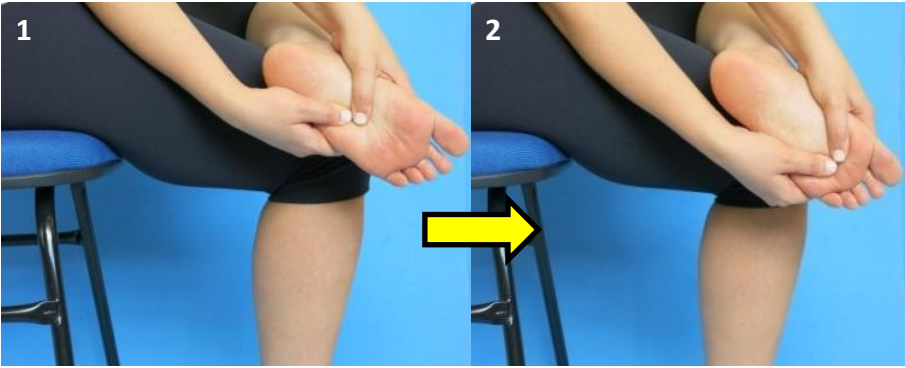
Part 3: While sitting, cross one leg over the other and carefully twist one toe at a time from side to side like a screw, **10 times for each toe**. Repeat on the other foot.



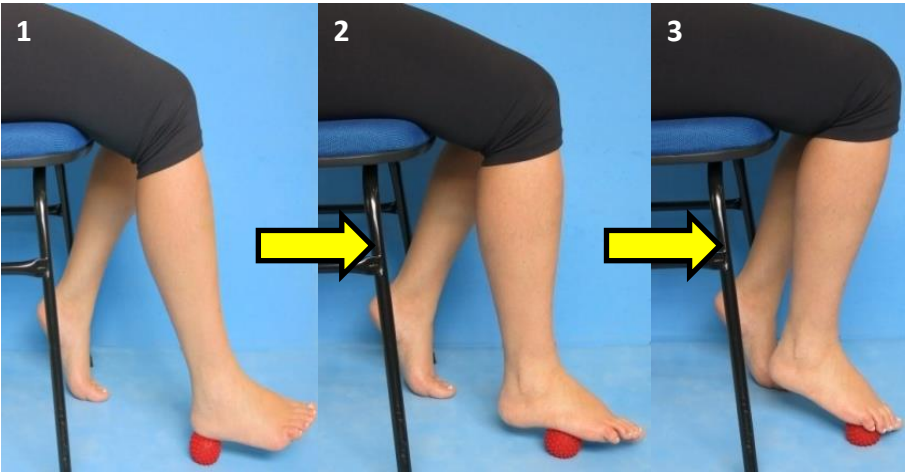
Do these exercises before and after your training session to warm up and relax. They're also great after a long day of walking or when your feet feel tired.

Part 1

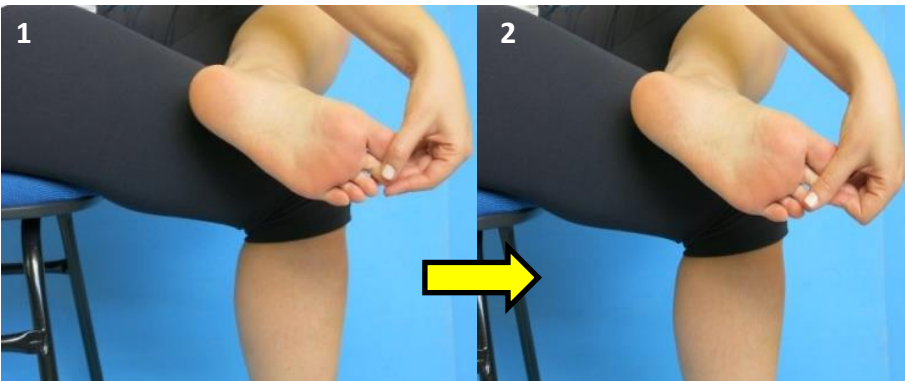
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Part 2



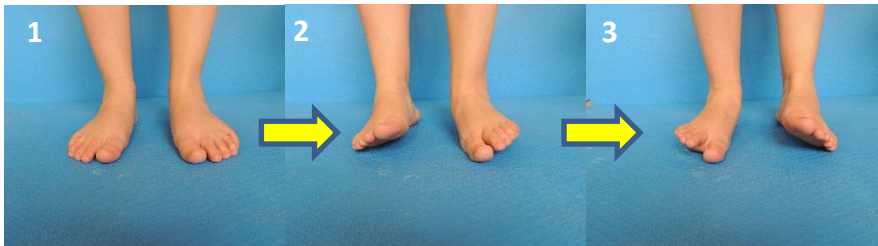
Part 3



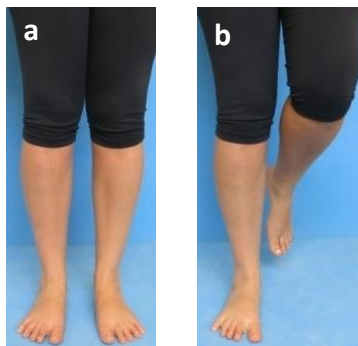
Exercise 1

DESCRIPTION

While sitting, with your feet flat on the floor, raise the inner edge of your left foot without lifting your little toe off the floor and then the outer edge of your right foot without lifting your big toe. Now do both feet at the same time, but without lifting your little toe on the right foot and your big toe on your left foot.



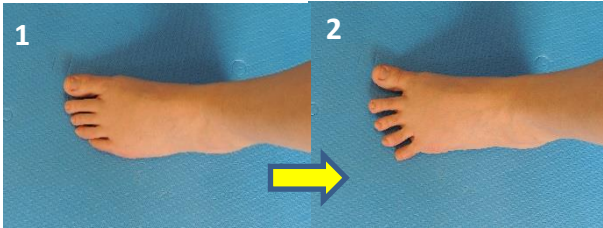
Once you have mastered this, do the same exercise **standing up** (Photo a) with your hands resting on a sturdy table or chair for support, and then progress to standing on one foot (Photo b) .



Exercise 2

DESCRIPTION

With your feet flat on the floor, slowly spread your toes as far apart as possible without lifting your heel off the floor.



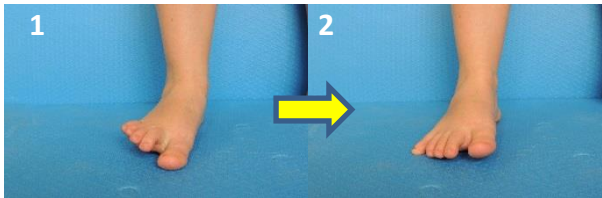
Start off sitting down (Photo a) and do one foot at a time, progressing to both feet at the same time once you feel confident. As your ability improves, progress to doing it standing up (Photo b) and then standing on one leg (Photo c).



Exercise 3

DESCRIPTION

With your heel on the floor and your toes raised, touch the ground first with your big toe and then your little toe in a slow controlled movement (Photos 1 and 2).



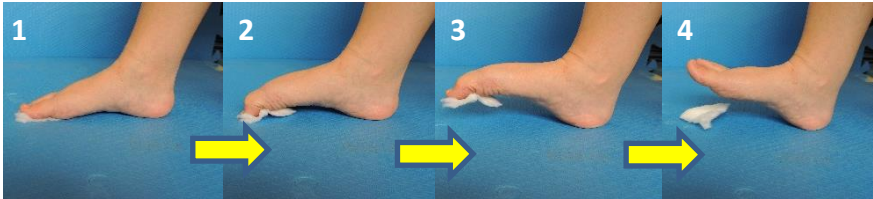
Start off sitting down (Photo a) and do one foot at a time, progressing to both feet at the same time once you feel confident. As your ability improves, progress to doing it standing up (Photo b) and then standing on one leg (Photo c).



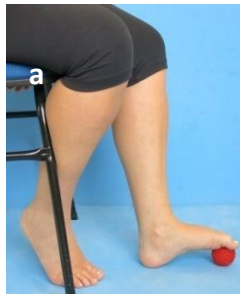
Exercise 4

DESCRIPTION

Grip the object with your toes (Photos 1 and 2), lift it off the floor (Photo 3) and then release it (Photo 4).



Do one foot at a time, keeping your heel on the floor throughout (Photo a).



You'll notice that the exercise table is a little different. Now, in addition to the normal progression, the objects you use for the exercise will also change.

Exercise 5

DESCRIPTION

Stamp your forefoot on the floor as fast as possible, as if you're impatient (Photos 1, 2 and 3).



Start off sitting down and do one foot at a time (Photo a), then progress to doing the exercise standing up



Exercise 6

DESCRIPTION

Standing with both feet flat on the floor and resting your hands on a sturdy chair or table for support, rise up and down on the tips of your toes (Photos 1 and 2).



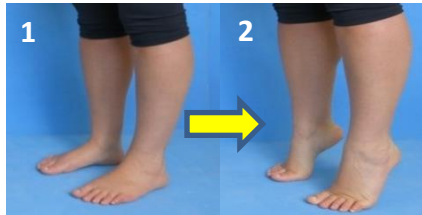
Then progress to standing on one foot (Photo b).



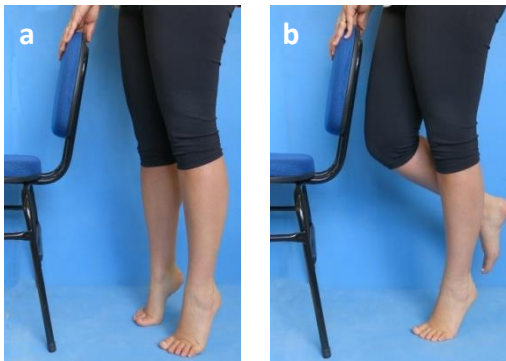
Exercise 6

DESCRIPTION

Start off sitting down, with both feet flat on the floor, rise up and down on the tips of your toes (Photos 1 and 2).



As your ability improves, progress to doing it standing up (Photo a) and then standing on one leg (Photo b).



What to Do When You Finish the Table



- **Keep doing the exercises every day.** The purpose of the booklet is for you to learn the importance of looking after your feet over the 30-day period and then incorporate the exercise routine into your everyday life.
- Do the exercises 3 to 4 times a week if you are unable to do them every day.
- **Examine your feet regularly** to check for wounds or any changes. The most important foot care tips are explained on the next page.



If you spend a lot of time sitting down, avoid crossing your legs and try to move your feet every 30 minutes to allow the blood to circulate.

Socks

- Use seamless socks with no elastic to prevent injuries and ulcers.

Toenails

- Cut the nails straight across and leave them a little long to prevent ingrown toenails.
- Consult a podiatrist if possible. When going for manicures and pedicures, always tell the manicurist that you have diabetes and ask them not to cut your cuticles or the skin on the side of your nails. **If you have thick, ingrown, brittle or discolored toenails go to your nearest health care clinic.**

Shoes

- Avoid going barefoot, even at home.
- Check the inside of your shoes for flaws on the insoles or seams to avoid injuring your feet.
- Avoid wearing shoes without socks.
- Store your shoes in a well-ventilated area and wash them whenever necessary. Make sure they have dried properly before wearing them.
- Flip-flops and strappy sandals do not provide proper protection and should be avoided.

There are shoes and insoles specially designed for people with diabetes. Visit your nearest Basic Health Unit (Health Clinic) and consult a doctor from the Family Health Program (PSF) or accredited by the National Health System (SUS), who will write you a prescription.

This material can be used as a guide for **groups** of people with diabetes **in primary care, home-based treatment** or even **individual sessions**. It may need to be adjusted for hospital settings and should be discussed with the health care team.

There is no need for the health care professionals involved to have specialist knowledge of diabetes, but they must be very familiar with the material in this booklet.

Please note:

Lower limb treatment for people with diabetes should be combined with general care (controlling blood sugar levels, blood pressure, obesity, smoking, physical activity and diet), which is vital to improving their quality of life.

All patients with diabetes should have their feet routinely examined at doctor's visits.

For Health Care Professionals

- When presenting the material to the patient or group, read through it with them;
- Be sure to explain and demonstrate the exercises, repeating them if necessary;
- People learn through practice, so whenever possible ask them to repeat the exercises in front of you so you can correct any mistakes;
- For patients who have difficulty executing or understanding the exercises, introduce only one exercise per session;
- Empower caregivers by explaining the importance of correct foot care and encouraging them to do the exercises as well to motivate the patient.

- When applying these exercises in a GROUP setting, PLEASE ADHERE to the following guidelines:
 - Carefully observe each participant as they do the exercises;
 - Never make comparisons between group members; everyone has their own learning process and physical capabilities.

For more information on the research group that developed this material, visit:

<http://www.usp.br/labimph>

You can also access and recommend diabetic foot software that provides a series of customized foot and ankle exercises at:

<https://www.soped.com.br/>

Free fuzzy software designed especially for health care professionals to classify the severity of diabetic neuropathy is available at:

<http://www.usp.br/labimph/fuzzy/>.



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