

## Guillermou

Relevant report. Let us also consider the importance of the connection of the glymphatic and meningeal lymphatic systems in health. A collaborative team of neuroscientists and engineers at Virginia Tech and the University of Virginia have identified a new brain target that could be useful in the treatment of Alzheimer's and cognitive decline. The lymphatic vascular system controls immune surveillance and waste removal within tissues and organs. Lymphatic vessels are present at the edges of the CNS, in the meninges that protect the brain and spinal cord. Meningeal lymphatic vessels drain to the neck lymph nodes and peripheral immune system, making them key players in the control of brain immunity.

The meningeal lymphatic vessels are also important for the removal of waste from the brain, participating in the removal of interstitial fluid and soluble proteins, as well as the drainage of cerebrospinal fluid (CSF), which provides the brain with a protective cushioning fluid against injury. a pathway for essential nutrients. nutrients and cellular waste elimination system. Meningeal lymphatic vessels exit the skull through the cranial foramina and drain to the cervical lymph nodes. Maiken Nedergaard, a Danish neuroscientist, proposed the term "glymphatic" to indicate the role of glial cells (astrocytes, oligodendrocytes, microglia) in waste removal.

Glial cells also play a vital role in neuron nutrition and immune function. This parallels the peripheral lymphatic system, hence the name glymphatic pathway. The glymphatic system constitutes a pathway for cleaning waste from the central nervous system (CNS) of mammalian organisms. This pathway consists of a periarterial entry route for cerebrospinal fluid to the brain parenchyma, coupled to a cleaning mechanism for the elimination of the fluid. interstitial and extracellular solutes from the interstitial compartments of the brain and spinal cord.

Posted On 04/20/2024

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Crosstalk between central nervous system (CNS) and systemic responses is important in many pathological conditions, including stroke, neurodegeneration, etc. Accumulating evidence suggests that signals for central-systemic crosstalk may utilize glymphatic and lymphatic pathways. The glymphatic and meningeal systems are functionally connected. Cerebrospinal fluid (CSF) drains through the meningeal lymphatic vessels to the cervical lymph nodes (CLN), and subsequent studies in humans have shown similar connections. Circadian rhythms are driven by circadian clocks found in all cells of the CNS and peripheral organs. The master clock in the suprachiasmatic nuclei (SCN) of the brain regulates other central clocks through chemical and physical stimuli, photic signals, and non-photoc signals.

Meanwhile, body temperature, hormonal metabolites, and feeding/fasting cycles can influence peripheral circadian clocks that regulate the SCN. The circadian system regulates a variety of critical cellular processes, including inflammation, metabolism, and cellular redox homeostasis. These cellular mechanisms are altered in many pathologies, including stroke. The intricate interaction between the glymphatic and meningeal lymphatic systems has fundamental implications for brain health and disease.

These systems, although physically distinct, collaboratively contribute to the clearance of cerebrospinal fluid (CSF) and the removal of macromolecules from the brain. Its dysfunction has been implicated in various pathologies of the central nervous system (CNS), such as stroke and other neurological disorders. Furthermore, it is very important to understand the precise influence of circadian rhythms on the mechanisms of CSF production and elimination. [medicine.yale.edu/news-article/the-brains-drainage-system-in-3-dimensi..](https://www.medicinescience.org/articles/view/10.1007/s12017-022-00911-5) (2022).--- [www.ncbi.nlm.nih.gov/.../PMC9272342](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9272342/) (2022).--- [www.nature.com/.../s42003-024-05911-5](https://www.nature.com/articles/s42003-024-05911-5) (2024).--

Posted On 04/20/2024

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Excellent article along with your additional information Gui. If the memory is working, not only the Lymphatic system and as you are pointing out even cerebrospinal fluid could benefit from this protocol. There is also if not mistaken a synovial, (sp?,) fluid system that may benefit from this too. If not mistaken, unlike blood circulation these systems have no heart to move such throughout the body. They depend on movement. Today nearly everyone in the Modern World lives in a body locked box as far as movement is concerned. Reach for the TV remote, pick up the phone, open the fridge door. Sit in a car, so forth. Movement pushes, pulls, squeezes these fluids around and the toxins are move out in the Lymph & Cerebral systems.

The Synovial if I'm not mistaken is like greasing the joints for more fluid movement and cleaning those up. This goes a long way in explaining how Hatha Yoga works and it improves balance, motion and awareness of the body in space. Today information though could be a God send for those injured or those past their due date to be able to take on such activity. A milder method for their healing as even mild yoga could prove too much stress to accomplish for some. A gift for some who may have given up hope to be able to improve their current situations. I notice points 3 & 5 are in the areas where KAATSU cuffs are placed. Another benefit for expanded health provided by KAATSU?

Posted On 04/20/2024

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Good connections and practices to improve health, Just. In this review, lack of sleep and insomnia deteriorate patients' quality of life, but the exact influence of these factors on the immune system has only begun to gain interest in recent years. Insomnia is a risk factor for numerous diseases, including common infections and autoimmune diseases. high blood pressure, diabetes mellitus, obesity, depression or Alzheimer's disease. In addition, these conditions have also been identified as risk factors for other immune system dysfunctions, such as rheumatoid arthritis (RA), inflammatory bowel disease, or Hashimoto's disease.

The relationship between sleep and immunity is bidirectional, since inflammation can cause drowsiness, but also in some pathological conditions, such as prolonged inflammatory response, it can also alter the circadian rhythm. Sleep deprivation causes immunosuppression plus susceptibility to SARS-CoV-2 infection. [www.mdpi.com/.../2159](http://www.mdpi.com/.../2159) (2022).----- [www.mdpi.com/.../904](http://www.mdpi.com/.../904) (2022).---- [www.tandfonline.com/.../23328940.2022.2109932](http://www.tandfonline.com/.../23328940.2022.2109932) (2022).--- [www.tandfonline.com/.../PPA.S398188](http://www.tandfonline.com/.../PPA.S398188) (2023).----- The study shows that slow and steady cardiac and cardiopulmonary activity, associated with deep non-REM sleep, is the most optimal for glymphatic system function.

The glymphatic system serves the same function in the brain that the lymphatic system does in the rest of the body. The author of the discovery in 2012 was also Maiken Nedergaard, MD, co-director of the University's Neuromedicine Conversion Center. Later work showed that this system works mainly while we sleep. [www.urmc.rochester.edu/news/story/3584/scientists-discover-previously-..](http://www.urmc.rochester.edu/news/story/3584/scientists-discover-previously-..)

Posted On 04/20/2024

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As we age, it becomes more difficult to consistently achieve deep non-REM sleep, leading to a buildup of toxic proteins such as amyloid beta and tau in the brain, associated with Alzheimer's disease. Researchers have speculated that impairment of the glymphatic system due to sleep disruption could be a determining factor in the disease. The analysis supports the importance of deep sleep for proper function of the glymphatic system. [www.urmc.rochester.edu/news/story/5508/not-all-sleep-is-equal-when-it-..](http://www.urmc.rochester.edu/news/story/5508/not-all-sleep-is-equal-when-it-..) (2019).--- - [www.mdpi.com/.../8457](http://www.mdpi.com/.../8457) (2022).--- [academic.oup.com/sleep/article-abstract/46/5/zsad011/6995395?redirecte..](http://academic.oup.com/sleep/article-abstract/46/5/zsad011/6995395?redirecte..) (2023).-- Astrocytes are neural cells that provide for homeostasis and defense of the central nervous system.

Astrocytes appear to affect multiple aspects of sleep, such as sleep architecture, sleep drive, and sleep disturbances often seen in various diseases. Several studies have also shown that astrocytes can drive and alter circadian rhythms and affect circadian behavior. Neuroinfections of the central nervous system (CNS) can be caused by various pathogens. Viruses are the most widespread and have the potential to induce long-term neurological symptoms with potentially lethal results.

In addition to directly affecting host cells and inducing immediate changes in a large number of cellular processes, viral infections of the CNS also trigger an intense immune response. The regulation of the innate immune response in the CNS depends not only on microglia, which are fundamental immune cells of the CNS, but also on astrocytes. [europepmc.org/.../pmc6050349](http://europepmc.org/.../pmc6050349) (2018).-- [www.duo.uio.no/.../94074](http://www.duo.uio.no/.../94074) (2022).--- [www.mdpi.com/.../3514](http://www.mdpi.com/.../3514) (2023).---

Posted On 04/20/2024

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## juststeve

And Gui, it is just the Gut speaking but it seems a good bet the systems discussed today when they become blocked, sluggish or just do not work are big factors in disturbed or lack of quality sleep. Also suspects in brain disorders.

Posted On 04/20/2024

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## **Timmeh**

A great fun method is rebounding - well known by many and so easy to spend a half hr or more daily just watching TV or whatever takes your fancy - just remember that you gotta keep safe !!! I've been doing this since the 70's. Am almost 80 now - for last few years kinda tailed off on the daily drill. Great to read this article - has jumped started my many decades old a.m. (or any time really...) routine - thanks DR M. BTW, you can even bounce while using mobile or tablet - time just flies by!

Posted On 04/20/2024

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## **bpm4539**

How do you do rebounding? Is it jumping up or down anywhere, or on trampoline, or playing jumping rope? What is your exact daily technique?

Posted On 04/20/2024

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Rebounder has a great benefit for the lymphatic system. This article discusses the major lymphoid organs and their role in developing and providing immunity for the body. Lymphoid organs include the red bone marrow, thymus, spleen, and lymph node groups (Fig. 1). They have many functional roles in the body, most notably: - Production of blood cells, including red blood cells (erythrocytes), white blood cells (leukocytes) and platelets (thrombocytes); - Elimination of damaged red blood cells; - maturation of immune cells; - Catch foreign material. - The red bone marrow and thymus are considered primary lymphoid organs, because most immune cells originate from them.

Lymphoid organs include the red bone marrow, thymus, spleen, and lymph node groups. Blood and immune cells are produced within the red bone marrow, during a process called hematopoiesis. The thymus secretes hormones that are essential for normal immune function and develops T lymphocytes. The spleen mounts the immune response and removes microorganisms and damaged red blood cells from the circulation. Lymph nodes are clustered throughout the body and filter pathogens from lymph, and they swell when an immune response is generated. We also know that cardiovascular diseases are a more serious risk for covid and as we know, endothelial cells cover the interior of all blood vessels and are the main producers of nitric oxide which, in turn, is released into the blood and the rest of the body.

cells. When you do physical exercise, the heart pumps more blood to the body, the formation of nitric oxide in the arteries is stimulated, and blood flow is faster. This increase in blood flow occurs because nitric oxide is a vasodilator. The more dilated vessels, the more blood can flow. Nitric oxide also protects the arteries from the formation of atheromatous plaques.

Posted On 04/20/2024

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The lymphatic vascular system plays an important role in regulating tissue pressure, immune surveillance, and absorption of dietary fats in the intestine. There is increasing evidence that the lymphatic system also contributes to a number of diseases, such as lymphedema, cancer metastasis and different inflammatory disorders. The discovery of several molecular markers that allow the distinction of blood and lymphatic vessels, together with the availability of an increasing number of in vitro and in vivo models to study various aspects of lymphatic biology, has allowed enormous progress in research.

on the development and function of the lymphatic system. This review discusses recent advances in our understanding of the embryonic development of the lymphatic vasculature, the molecular mechanisms involved in lymphangiogenesis in the adult, the role of lymphangiogenesis in chronic inflammation and lymphatic cancer metastasis, and the emerging importance of lymphatic vasculature as a therapeutic target. [www.liebertpub.com/.../lrb.2008.1008](http://www.liebertpub.com/.../lrb.2008.1008) (2008) Lymphatic vessels play a distinctive role in draining fluids, molecules, and even cells from the interstitial and serosal spaces back into the blood circulation.

The lymphatic vessels of the intestine, and especially those located in the villi (called lacteal vessels), not only fulfill this main function, but are also responsible for the transport of lipid remains absorbed by the intestinal mucosa and serve as a second line of defense against possible bacterial infections. Here, we briefly review current knowledge of the general mechanisms that enable lymph drainage and propulsion and focus on the most recent findings on the mutual relationship between dairy and the gut microbiota. [www.mdpi.com/.../htm](http://www.mdpi.com/.../htm) (2021)

Posted On 04/20/2024

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THE REBOUNDER [www.youtube.com/watch](http://www.youtube.com/watch) .--- [www.youtube.com/watch](http://www.youtube.com/watch) .---  
[www.youtube.com/watch](http://www.youtube.com/watch)

Posted On 04/20/2024

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## TimmeH

@bpm4539 some use the rebounder for exercise - some, like me just keep feet on mat which is connected to a round metal frame with legs/feet. You soon get the hang of it. Easy way is small bend of both knees and body weight causes you to sink into the mat which will slightly stretch the springs. This 'bounce' down will be followed by the mat (and springs) pushing you up. The change in G-force will be very noticeable in your head - and this causes lymph to flow/circulate (no heart pushing lymph unlike how it does with blood).

Really, is a suck-it-and-see/feel how your legs and body just 'get on with it' without you forcing anything. The 'bounce' up/down is simple to do if just kind of let yourself go with feet staying on mat. Sure, videos show people zooming high and whole body moves noticeably up! But, the G-force change is all I'm after - not going crazy with doing the exercise stuff. Is just great feeling G-force and 'knowing' your lymph is getting circulated. I visualize lymph collect rubbish and the circulation allows the rubbish to get disposed of.

I read somewhere that lymph volume exceeds total blood volume. Anyway, you will maybe love the idea that you are moving all the baddies to bodies disposal system :) I never got very deep into all the science etc. so I just do it and enjoy ! Also, breathing in x times and then out x times is great for varicose veins and of course this is all researchable on internet. I used to have massive varicosities - not now.... :-))

Posted On 04/20/2024

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## JERSEYTONY

An easy way is to have a rebounder with big handle bar to hold on costs just a few hundred dollars.. I usually do 10 minutes a day before the sauna.. I have a small one seat sauna that works great..

Posted On 04/21/2024

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## **PithHelmut**

Massively important video to watch. Perry Nickleson explain a very simple protocol and doing actually gives immediate results. The lymphatic system is so important and it doesn't get much attention. Thanks to Perry Nickleson for explaining it so well and so simply. This video should be standard fare for everyone to watch - we'd have a lot happier people and probably avoid a lot of unnecessary further suffering because when the lymph system isn't working, it makes everything else sluggish.

Posted On 04/20/2024

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## **jdrose199**

I did this amazing, I had no idea and will be adding this to my morning routine when I get done exercising. Thank you, Dr. Mercola, for the great information.

Posted On 04/20/2024

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## **josephunger**

Time tested and reliable. I first saw these interventions in a textbook from my mentor, Chiropractic Manipulative Reflex Technique 1961 by Dr Major De Jarnette which was developed from his previous and outdated writings in "Bloodless Surgery".

Posted On 04/20/2024

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Yes, Dr. Major B. DeJarnette , who died at the age of 93 in 1992, was a true technique pioneer of the chiropractic profession. His original methods of chiropractic are known worldwide and practiced by many in the profession. His desire was always to provide a better chiropractic adjustment that would normalize the nervous system, and with this desire he developed Sacro Occipital Technic. He devoted 73 years of his life to being a researcher and teacher of techniques he developed. These techniques have touched thousands of chiropractors and patients, affording comfort and relief worldwide.-----

-----THE SOT RELATED PUBLICATIONS OF DR. MAJOR BERTRAND DEJARNETTE---- [soto-usa.com/the-sot-related-publications-of-dr-major-bertrand-dejarne..](https://soto-usa.com/the-sot-related-publications-of-dr-major-bertrand-dejarne..) .-----TECHNIQUE IN THE CLASSROOM AT PALMER COLLEGE OF CHIROPRACTIC: A HISTORY IN THE ART OF CHIROPRACTIC  
[www.researchgate.net/publication/240622626\\_Technique\\_in\\_the\\_Classroom\\_..](https://www.researchgate.net/publication/240622626_Technique_in_the_Classroom_..)

Posted On 04/20/2024

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## samwoo

This was great, it was very interesting to feel where the clogs in the system are too. I'm someone who has had lymph glands removed for breast cancer and didn't ever know where the place was to rub to help drainage so the second video was particularly helpful. Interestingly though my other shoulder was the clogged one as it has a long-standing and current injury. I think I might try this routine with a massage gun too

Posted On 04/20/2024

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## Guillermou

Dear Samwoo I wish you good health. It is estimated that one in five breast cancer patients develops breast cancer-related lymphedema. This is edema that can appear in the arm, breast or chest wall as a result of surgery for breast cancer or radiotherapy. In this type of surgery, 1 or more lymph nodes located under the arm are usually removed to see if there is really the presence of cancer cells. It is one of the most common causes of lymphedema in the arm. It usually causes discomfort in patients, so lymphatic drainage can help improve this aspect. **MANUAL LYMPHATIC DRAINAGE FOR BREAST CANCER** It is a massage using manual maneuvers that is performed very gently, such as rubbing or caressing the skin in order to influence the lymphatic system, which is just below the skin and above the muscles.

It helps move fluid and other substances that have become stagnant in the tissues as a result of cancer treatment with better circulation and oxygenation of the tissues and an improvement in the function of lymphatic circulation. The consequences of this are the improvement of the micro-environment of the shift Lymphatic drainage is one of the main treatments for lymphedema or swelling of the breast and chest, but the direction of the massage does matter if you had lymph nodes removed for surgery, if they were damaged due to injury or radiation, or if someone has lymphedema due to genetic reasons.

In this video, I'm going to show a complete lymphatic drainage routine for lymphedema and breast and chest swelling that someone can follow, and explain which direction to try to move towards if you have lymphedema with compromised lymph nodes and lymphatic system after lymph. The nodes are removed for breast cancer surgery, melanoma surgery, or others. **BREAST CANCER REHAB** A comprehensive and flexible program for those living with & after breast cancer to reduce discomfort and get stronger [youtu.be/Cjr5nweOBbc](https://youtu.be/Cjr5nweOBbc) .--- [www.cancerrehabpt.com/breast-cancer-rehab](http://www.cancerrehabpt.com/breast-cancer-rehab) .---

Posted On 04/20/2024

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## Malasmom

Amazing article. This past week I saw an upper cervical chiropractor for a pinched nerve in my neck and now my hand joints also feel better. I'm a professional pianist and piano teacher, so I need my neck, arms and hands to function well. ( Mrs.) M...

Posted On 04/20/2024

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## forbiddenhealing

Great routine, great "buzz"...I'd add working the lymph channels in crease on outside of legs and thighs upward. A good massage will hit these spots.

Posted On 04/20/2024

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## Guillermou

Good suggestion: HOW TO DO LYMPHATIC SELFMASSAGE ON YOUR LOWER BODY

[www.uhn.ca/PatientsFamilies/Health\\_Information/Health\\_Topics/Documents..](http://www.uhn.ca/PatientsFamilies/Health_Information/Health_Topics/Documents..) .--- Lymphatic

Drainage Massage for Lymphedema & Swelling in BOTH Legs [www.youtube.com/watch](http://www.youtube.com/watch) .-- SIMPLE

LYMPHATIC DRAINAGE - LEGS [www.wsh.nhs.uk/CMS-Documents/Patient-](http://www.wsh.nhs.uk/CMS-Documents/Patient-)

[leaflets/Lymphoedema/6466-1-Simpl..](http://leaflets/Lymphoedema/6466-1-Simpl..) .----- FULL-BODY LYMPHATIC DRAINAGE MASSAGE ROUTINE

BY A LYMPHEDEMA PHYSICAL THERAPIST [www.youtube.com/watch](http://www.youtube.com/watch)

Posted On 04/20/2024

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## MASONMANNIX

Over the past 12 years I've only watched 1 or 2 of the videos contained within these articles but this one peaked my interest. I know I'm clogged up in the neck and shoulders. After 1 session, this is a very simple routine to do and definitely not boring where I didn't get bored and wanted to stop mid stream.

Posted On 04/24/2024

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## Severine\_Verhagen

Because of salivary gland cancer (ACC) I had a selective neck dissection meaning that 5 of the surrounding lymph nodes are removed and spot 2 is just the operation area. Is it possible or does it make sense to stimulate this area for a better lymph flow in the remaining lymph nodes. Or do I even augment my chance of recurrence of the tumor by acting on the operation area?

Posted On 04/20/2024

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## HealingMindN

Regular Taijiquan practice is an alternative lymph drainage routine, albeit, a difficult one to master.

Posted On 04/20/2024

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## HilltopJPJ

Hmmm interesting, I shall have to try this. I dry brush every day starting at the bottoms of my feet and finishing with my neck and face, (apparently backwards?). I do this right before my daily sauna, it has greatly improved my dry cracked heels among other aches and pains. I will try this though.

Posted On 04/20/2024

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Yes, "Dry Brushing" in the morning has an energizing effect on the skin, used just before entering the shower. Gwyneth Kate Paltrow American actress, author, businesswoman, model and singer is not wrong when she proclaims from the rooftops that if there is a good beauty trick to have more active, beautiful and youthful skin, it is dry brushing. It is the technique that, in addition to the actress, others such as Miranda Kerr, recommend to keep aspects such as orange peel at bay. Dry brushing of the skin acts as an exfoliation while activating blood circulation, thus helping to soften cellulite, from within and without. It manages to eliminate dead cells from the epidermis, promoting correct circulation and regenerating the skin at a cellular level.

Dry brushing the skin increases the production of collagen fibers, thus improving the firmness of the skin. In addition, it stimulates the lymphatic system and activates the metabolism. Improves and evens skin tone thanks to increased oxygen supply to cells, prevents skin discoloration and the appearance of visible veins. It also manages to eliminate toxins and dead cells at a superficial level, softening the skin and has the ability to reduce cellulite, as it helps distribute fat deposits that are in the subcutaneous layer.

It is recommended that the brush always be made of natural bristles since it is the only one that is capable of stimulating the skin without irritating it. They are the perfect balance between firmness and softness. After all this, the skin is more receptive to receiving subsequent moisturizing or specific treatments. [www.mindbodygreen.com/.../dry-brushing-guide](http://www.mindbodygreen.com/.../dry-brushing-guide) (2022).--- [www.healthline.com/.../dry-brushing](http://www.healthline.com/.../dry-brushing) (2021) [health.clevelandclinic.org/the-truth-about-dry-brushing-an.-d-what-it..](http://health.clevelandclinic.org/the-truth-about-dry-brushing-an.-d-what-it..) (2021).-- [www.youtube.com/watch](http://www.youtube.com/watch) .----- [www.youtube.com/watch](http://www.youtube.com/watch) .--- [www.youtube.com/watch](http://www.youtube.com/watch) .---

Posted On 04/20/2024

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## SanDiegoGirl

I too do dry brushing. I started for the benefits to skin and lymph drainage. I was taught to do it starting with the hands and feet and working toward the heart, but I will try the order shown in the video and see if it makes a difference. I will also continue to brush all of my skin, however, because the lymph system runs throughout the body just under the skin. I use a soft small child's toothbrush to brush my face. Thank you, Gui, for all the great information about the benefits of dry brushing. It will help keep me motivated!

Posted On 04/20/2024

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