

Flight stockings decrease symptomless deep vein thrombosis in airline passengers on long flights

Question

In people who travel long distances by air, does wearing flight stockings (also known as compression stockings) decrease deep vein thrombosis (DVT)?

The research

A summary of 11 studies published up to February 2016.

Who? The studies included more than 2900 people who were travelling on long flights lasting at least 4 continuous hours. 9 studies (more than 2600 people) were included in the main analysis.

What? The 9 studies compared wearing flight stockings with not wearing them.

Flight stockings	vs	No flight stockings
Participants wore below the knee flight stockings for the entire flight. Stocking compression strength at the ankle was usually 10 to 20 or 20 to 30 mm Hg.		Participants wore usual clothes.
Participants in both groups were generally advised to perform mild exercise, allow adequate leg room, and drink water regularly.		

What the researchers found

No people in either group became sick (*symptomatic*) because of clots in either their legs (DVT) or their lungs (pulmonary embolism).

Passengers who wore flight stockings had a lower risk of *symptomless* DVT (clots seen only on ultrasound or other tests in people otherwise doing well) compared with those who did not wear stockings (high-quality evidence).

In people who were at *low risk* of DVT, wearing flight stockings would avoid symptomless DVT in 9 out of 1000 people.

In people who were at *high risk* of DVT, wearing flight stockings would avoid symptomless DVT in 27 out of 1000 people.

Wearing flight stockings may help to prevent edema (leg swelling) (low-quality evidence).

The bottom line

In passengers on flights lasting at least 4 hours, there is no evidence to support the use of flight stockings to prevent *symptomatic* DVT. Wearing flight stockings decreases the risk of *symptomless* DVT and may help to prevent leg swelling.

Summary of findings: Wearing flight stockings vs not wearing flight stockings during flights lasting at least 4 hours

Outcomes	Rate of events with flight stockings	Rate of events without flight stockings	Absolute effect of flight stockings at up to 48 hours after the flight	Number of studies and quality of the evidence
DVT* with symptoms	0	0	Can't be estimated	
	People at <i>low risk</i> for DVT			
DVT without symptoms	1 per 1000 people	10 per 1000 people	About 9 fewer people out of 1000 had symptomless DVT	9 studies (high-quality evidence)
	People at <i>high risk</i> for DVT			
	3 per 1000 people	30 per 1000 people	About 27 fewer people out of 1000 had symptomless DVT	6 studies (low-quality evidence)
Edema (swelling in the legs)			On average, people who wore flight stockings had less edema at the end of the flight (about 5 points less on a scale of 1 to 10, where 10 is the worst edema)	

*DVT = deep vein thrombosis (blood clots in the legs).

This Evidence Summary is based on the following systematic review:

Clarke MJ, Broderick C, Hopewell S, et al. **Compression stockings for preventing deep vein thrombosis in airline passengers.** *Cochrane Database Syst Rev.* 2016 Sep 14;9:CD004002. PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/27624857?dopt=Abstract>)

If you are about to take a long flight, ask your doctor if you should wear flight (compression) stockings to prevent blood clots in the legs (deep vein thrombosis)

Blood clots

Blood clots in the leg are common and preventable. They can be painful, and clots in the large veins of the thigh can travel up to the lung (pulmonary embolism), making breathing difficult and painful, and sometimes resulting in death. Clots can complicate other diseases (such as cancer or stroke) or can happen in otherwise healthy people. Some people are more at risk for clots than others, such as those who have had a previous clot or have family members who have had clots. An important mechanism contributing to clot formation is the slowing down of blood flow in the veins, which happens any time we stay still. During long flights, people are forced to stay still, particularly in economy class, or may fall asleep. Other factors that can contribute to clots, on or off planes, include drinking too much alcohol or not drinking enough water.

Blood clots on airplane passengers

News reports about a few deaths due to pulmonary embolism in airline passengers have raised public concerns about the risk of getting a blood clot during air travel. As well, the economic interests of drug manufacturers and insurance companies have also been raised. In reality, people rarely develop a clot during a flight. Of the almost 3000 patients reported in this summary of studies by Clarke and colleagues, not one single clot causing symptoms (leg pain or shortness of breath) was found. Other large studies confirm that the number of clots, compared with the number of passengers, is very low. However, some people may want to reduce their risk of clots, particularly if their risk is higher than average.

Reducing the risk of developing a blood clot

One way to reduce risk is to wear flight stockings/socks (also called travel or compression stockings/socks). Flight stockings are a specific type of compression stocking meant to prevent clot formation. But what is the evidence? The evidence is they are effective for preventing small clots in the legs, which people probably wouldn't even have noticed (because those small clots cause no symptoms) except that they had an ultrasound as part of a study. Stockings prevent up clots in about 9 out of 1000 people at low risk for clots. The real problem is that we do not know if these small symptomless clots would progress or not. As far as we know, they might just dissolve when you leave the plane and start walking again. Studies done in the general population have shown that such small clots can be found in everyone, if properly searching for them —does this mean that everyone should be wearing flight stockings every day? Hairdressers or surgeons spend

most of their day standing, and their risk might be similar to the risk in passengers on long flights. Indeed, many hairdressers and surgeons wear stockings when they work, mostly to reduce leg swelling, an added benefit of wearing stockings. Stockings can also help with varicose veins. You can buy flight stockings at drug stores or online.

The bottom line

Wearing stockings does not do any harm and may be of benefit. If you can afford them and travel often, you might want to consider wearing them. Then again—do you check if the life vest is in place when you board a plane? I don't, but I do recall checking when I took a low-cost flight on a scary-looking plane. I know it is good to have a life vest, but I think it is unlikely to be needed in standard conditions. Flight stockings are more or less the same—good to have and very effective, but unlikely to make a difference unless you are at higher than normal risk of clots.

Doctor, do I need to wear flight stockings?

Probably not. Blood clots that affect your health as result of being a passenger on a plane are very rare. However, flights stockings are effective in keeping your legs healthier—they can prevent swelling, reduce small clots you would not even notice, and help your varicose veins (if you have them!). Other ways to reduce your risk of clots during a long flight include drinking plenty of water, avoiding caffeine and alcohol, and doing some simple stretching exercises.



AUTHOR DETAILS

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Dr. Klil-Drori completed his Internal Medicine boards and Hematology boards in Israel in 2011 and 2013, respectively. He is currently completing a clinical epidemiology, Master of Science at Hebrew

University, Jerusalem, Israel and will complete his Postdoctoral research fellowship at the Centre for Clinical Epidemiology, Jewish General Hospital and McGill University this year. He is also starting a 2-year clinical fellowship in early drug development in medical oncology.

Dr. Klil-Drori's CanVECTOR project includes using population-based administrative databases to capture outpatient management of pulmonary embolism across Québec, Alberta, and Ontario. A few of his database analysis objectives include (i) reviewing the changes in clinical outcomes in outpatient management of pulmonary embolism from the pre-direct oral anticoagulant (DOAC) era (2000 to 2009); (ii) comparing the outcomes of outpatient and inpatient management of pulmonary embolism in a subset of low-risk patients in the pre-DOAC era; and (iii) examining whether market entry of DOACs for the treatment of pulmonary embolism has affected outpatient management of pulmonary embolism.



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Dr Iorio is an Associate Professor of Clinical Epidemiology & Biostatistics and Medicine and Chief of the Health Information Research Unit at McMaster University. With Jim Douketis, he co-leads the Knowledge Translation Platform of the CanVECTOR network.

His main research interest is in tailoring research results to individual specificities, joining knowledge translation, risk stratification and usage of individual patient data databases. In the field of knowledge translation, he is exploring the value of active roles for patients in the generation, collection, interpretation, and communication of research results to the lay public. His contributions in the field of venous thromboembolism have focused on the optimal duration of anticoagulant therapy, the risk of recurrent DVT after a first provoked episode, and the role of D-dimer as predictor of recurrent DVT.

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Glossary

anticoagulant	medications that prevent blood clots from forming or travelling (aka blood thinner)
deep vein thrombosis	formation of a blood clot within a vein deep within the leg
deep vein thrombosis (DVT)	formation of a blood clot within a vein deep within the leg
DOAC	anticoagulant pill that does not require blood tests to monitor the effect (aka novel oral anticoagulant, NOAC); examples include apixaban, dabigatran, edoxaban, rivaroxaban
DVT	formation of a blood clot within a vein deep within the leg

High-quality	Additional studies are very likely to have the same result
Low-quality	Additional studies are likely to have different results
provoked	DVT or PE that is associated with (or thought to be caused by) a strong risk factor such as cancer or recent surgery
pulmonary embolism	blood clot(s) that cause obstruction of blood vessels within the lungs (pulmonary artery), after travelling from veins, most commonly within the leg or arm or pelvis
stroke	damage to the brain due to lack of blood supply (aka cerebral vascular accident or CVA)
systematic review	thorough search and evaluation of the available research evidence on a particular topic
venous thromboembolism	the collective term referring to blood clots within the veins, most commonly deep vein thrombosis and pulmonary embolism
Very Low	Additional studies are highly likely to have different results