

## Sweaty Palms (Hyperhidrosis)

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### What is hyperhidrosis?

Hyperhidrosis is a disorder characterized by excessive sweating. Although sweating is a normal bodily function that helps regulate body temperature in hot weather and during exercise, patients with hyperhidrosis often sweat excessively even in mild weather and at rest. Excessive sweating can occur in the hands (palmar hyperhidrosis), face (cranio-facial hyperhidrosis), the armpits (axillary hyperhidrosis) or the feet (plantar hyperhidrosis).

### Why does hyperhidrosis occur?

Sweating from the body is under the control of a part of the autonomic nervous system called the sympathetic nervous system. Sweating is a function of the body over which we have no conscious control. The exact reason why some people develop excessive sweating or hyperhidrosis is not known. It appears to be an abnormal response of the central nervous system to emotional stress resulting in excessive sweating but it can also occur without any stress. The sweat glands themselves are normal.

### How does hyperhidrosis manifest?

Patients with hyperhidrosis experience excessive sweating that hampers their day-to-day activities. Patients with palmar hyperhidrosis have wet, moist hands that may interfere with grasping objects such as a pen. This can be particularly bothersome for students. It is a difficult social problem for these patients as they find it difficult to shake hands with other people. Cranio-facial hyperhidrosis is often associated with facial blushing, the combination of which causes social embarrassment. Those who suffer from axillary hyperhidrosis may stain their clothes soon after they dress. Once again, this proves to be socially embarrassing. Plantar hyperhidrosis leads to moist socks and shoes as well as increased foot odor.

### What non-surgical treatments are available for hyperhidrosis?

The non-surgical treatment options for hyperhidrosis include

1. Application of aluminum-based astringent (drying) ointment that dries up the sweat glands. The drawback with this therapy is that the ointment needs to be applied every night, their effect tends to be short lived and skin irritation is a common side effect.
2. Iontophoresis: In this treatment the patient places his or her hands in a bath through which an electrical current is passed. Passage of current through the sweat glands is supposed to “stun” them and reduce their secretions. The drawbacks with this treatment are that it needs to be performed every day, the effect lasts for a few hours to a few days and repeated passage of current through the hands causes discomfort and skin irritation.
3. Botox therapy: Multiple (30 – 40) injections of botulinum toxin (Botox) into the area of excessive sweating is said to slow down the transmission of the nerve

impulses to the sweat glands. The treatment is uncomfortable, expensive, its results last from 1 – 6 months and patients receiving repeated injections in the hands may develop weakness of muscles. None of this therapy provides satisfactory long-term relief from hyperhidrosis.

### **What is sympathectomy?**

Sympathetic nerves that control sweating runs vertically along the ribs and is located around 2 cm away from the vertebrae or the bones that form the spine. The branches that form the sympathetic nerves come from the spinal cord and end up in a bundle of nerves called ganglion. There is a ganglion at the level of each vertebra and the ganglia are joined to each other by the sympathetic chain. At each level a sympathetic nerve branch comes off and travels out to innervate the blood vessels and sweat glands. Sympathectomy is the surgical treatment of hyperhidrosis that involves destroying or removing a specific portion of the sympathetic chain. The site of surgical interruption in an individual patient depends on which area is most affected by excessive sweating. The sympathetic chain may either be divided or crushed with clips to interrupt the transmission of nerve impulses. Theoretically the latter is supposed to be reversible by removal of the clips at a subsequent surgery.

### **What is thoracoscopic or endoscopic sympathectomy?**

In the past division of the sympathetic chain was undertaken by an open operation under the armpits. Today the surgery is carried out via two or three tiny (3mm – 5mm) cuts in each armpit and is termed thoracoscopic or endoscopic sympathectomy. The operation is performed under general anesthesia. The surgeon passes a telescope through a tube passed into the chest through one of the tiny cuts and identifies the sympathetic chain as it runs down the ribs close to the vertebrae. The lung is moved out of the way. Through the other cut another cannula (tube) is introduced in the chest and an instrument passed through it allows the sympathetic chain to be divided or clipped. The tiny cuts are closed with absorbable sutures or held together with pieces of small paper tapes. Attention is then turned to the other side and the same procedure is repeated. To confirm the completeness of the sympathectomy we use a temperature probe on the finger of the patient during surgery. Successful division is accompanied by elevation in the skin temperature of 2 – 3°C. The patients wake up from anesthesia and notice completely dry hands. He or she is allowed to eat after 6 hours and a chest x-ray is obtained on the evening of the surgery to confirm satisfactory expansion of both lungs. The patient is generally discharged home the morning after surgery. The level at which the sympathetic chain is divided depends on the area of body affected by excessive sweating. For palmar hyperhidrosis the sympathectomy is at the level of R3, R4 (3rd and 4th ribs). For palmar + axillary or palmar + axillary + plantar hyperhidrosis interruptions at R4 and R5 are recommended. The top of R3 is best for cranio-facial hyperhidrosis.

### **What can the patient expect after surgery?**

The one aspect that is common to all patients undergoing thoracoscopic sympathectomy is the complete dryness of the hands they experience from the day of surgery. Although not specifically targeted at plantar hyperhidrosis, a significant

proportion of patients who have the surgery for palmar or axillary hyperhidrosis notice an absence or a reduction in the sweating from the feet. There may be some minor discomfort at the sites of the incisions for which painkiller tablets are prescribed and that wears off within a few days. It is not uncommon to feel somewhat tired or fatigued for a few days as happens with any surgery under general anesthesia. By and large the recovery is smooth and takes around 7 – 10 days.

### **What are the risks and side effects of this surgery?**

Apart from the general risks associated with any surgery such as allergic reaction to anesthetic agents or drugs (1% or less), infection (1%) and bleeding (1%), there are some risks and side effects specific to thoracoscopic sympathectomy. They are:

1. **Compensatory sweating:** Sweating is an important bodily function responsible for regulating the temperature. Thoracoscopic sympathectomy not only reduces sweating from the hands but also reduces it considerably from the arms, upper chest and upper back. In order to compensate for this lack of sweating the body tends to sweat more elsewhere, and this is termed compensatory sweating. In most patients the compensatory sweating occurs on the face, abdomen, back, buttocks or thighs. Having experienced relief of their original disabling sweating from the hands, most patients are happy to put up with this minor inconvenience. In a small proportion of patients (2-5%) the compensatory sweating may be severe enough to interfere with the patient's lifestyle as much or more than the original hyperhidrosis.
2. **Reduction in heart rate:** A slight reduction in heart rate can occur after this operation. For most patients this is of no consequence. For competitive athletes who require an increase in the heart rate while participating in sport this may prove to be a problem and this group of patients are counseled extensively prior to thoracoscopic sympathectomy. Also, patients who have an abnormally low heart rate or a heart rhythm disturbance problem should probably not undergo this operation.
3. **Gustatory sweating:** Around 1% patients may notice an increased sweating while eating. Even when this occurs it is usually mild and not particularly bothersome.
4. **Residual sweating:** Less than 5% patients may have some residual sweating that often manifests with increased activity.
5. **Horner's syndrome:** If the highest ganglion (stellate or T1) is damaged during surgery the patient notices a slight droop in the eyelid, a narrow pupil, and the lack of sweating on that side of the face. This syndrome is sometimes reversible over a period of weeks to months, but may also prove to be permanent. Utmost care is taken by experienced surgeons to do the division of the sympathetic chain far away from the area of the stellate ganglion. When the division of sympathetic chain is carried out at R3 – R5 level chances of this complication are extremely low (<1%).
6. **Rare complications:** Other rare complications include pneumothorax or collection of air in the chest cavity requiring chest tube drainage (1%), collection of fluid or pleural effusion (1%), acute bleeding or delayed hemothorax (1%), collection of chyle or chylothorax, and persistent intercostal neuralgia (<1%).

**What are the advantages of a thoracoscopic sympathectomy?**

- Less pain from the incisions after surgery
- Shorter hospital stay
- Shorter recovery time
- Faster return to work or normal activity
- Better cosmetic healing
- Predictable and permanent relief from hyperhidrosis