

## Hyperhidrosis

**Scalp/Facial & Blushing** - Excessive sweating of the scalp and face. Commonly associated with moderate to severe facial blushing as well. This condition often causes the individual to become self-conscious and to develop a low self esteem.

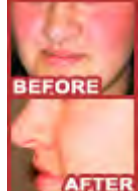
**Palmar** - Far and above the area of the body causing the most distressing condition. The hands are used socially and professionally more than any other part of the body. Excessively wet/moist hands may even limit the choice of one's profession. Avoiding social contact is common for individuals with severe hyperhidrosis palmaris. Patients notice not only that their hands feel very moist/wet all the time, but also feel cool/cold. Some individuals have a bluish/purple discoloration of their hands as well.

**Axillary** - Hyperhidrosis of the armpits causes large wet marks and staining on the clothes. A strong body odor develops quickly which can cause very negative emotional/psychological repercussions. Slightly more common in females than males. The highest incidence occurs with people of Asian and Jewish ancestry, but can affect all races.

**Truncal and/or Thigh** - Less frequent. Can be associated with hyperhidrosis of other areas of the body.

**Plantar** - Excessive sweating of the feet. Can be associated with hyperhidrosis of other areas of the body.

## Facial Blushing



Blushing commonly originates at the upper chest or base of the neck and extends up to the forehead, ears and can even spread down to include the trunk and legs.

Hyperpyrexia (feelings of burning or tingling) is commonly associated with blushing and is actually much more debilitating to the individual than the mere appearance of blushing on the skin.

## Raynaud's Disease

### Stages of Raynauds



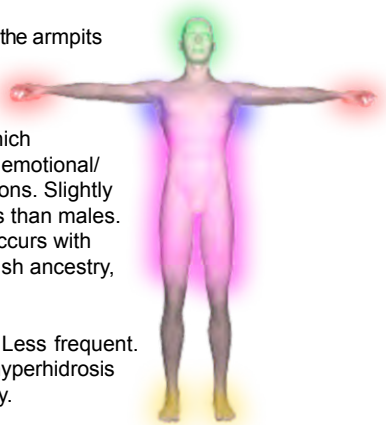
**Blanching** represents the ischemic (lack of adequate blood flow) phase of the phenomenon, caused by digital artery vasospasm.



**Cyanosis** results from deoxygenated blood in capillaries and venules (small veins).



**Hyperemic** phase, upon rewarming and resolution of the digital vasospasm, the digits appear red.



The Offices of David H Nielson, MD  
*Hyperhidrosis USA Micro ETS*

## Pre-Operative Instructions

Nothing by mouth past midnight the night before surgery.  
Check-in the hospital designated by our office staff.  
Hemoglobin is drawn the morning of surgery.  
You are discharged later the same day.  
Follow-up visit with Dr. Nielson the morning after surgery.  
You may return home the day after surgery by car or by air.  
No lifting or exercising for two weeks following surgery.  
May return to work or school within 3 days.

## Day Before Surgery

Fly or drive to San Antonio, Texas  
Stay at a hotel a few blocks from the hospital and close to the airport  
Sightseeing and shopping along the Riverwalk

## Day of Surgery

Check-in two hours before the procedure  
Micro Single Incision ETS performed  
Chest X-ray before discharge  
Discharged from the hospital later the same day

## Day After Surgery

Physical exam by Dr. Nielson  
Return home  
Return to work in 2 to 3 days, full physical activity in two weeks

The Offices of David H Nielson, MD  
*Hyperhidrosis USA - Micro ETS*  
1202 E Sonterra Blvd, Suite 101  
San Antonio, TX 78258

**David H. Nielson, M.D., F.A.C.S.**  
Micro Invasive ETS Surgery  
Board Certified Cardio Thoracic Surgery

(210) 490-7464 Phone  
(888) 975-1542 FAX  
microets@dhnmd.com  
[www.dhnmd.com/MICROETS](http://www.dhnmd.com/MICROETS)



[www.facebook.com/MICROETS](http://www.facebook.com/MICROETS)

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# Micro ETS®



Micro Endoscopic Thoracic Sympathectomy  
for Hyperhidrosis, Facial Blushing, Raynaud's Disease.



Partial Pleurectomy  
NOT Required  
(less scar tissue & pain)

1/12th Inch Single  
Incision

Discharged In A  
Few Hours

Micro Invasive  
(dissection of nerve NOT  
required)

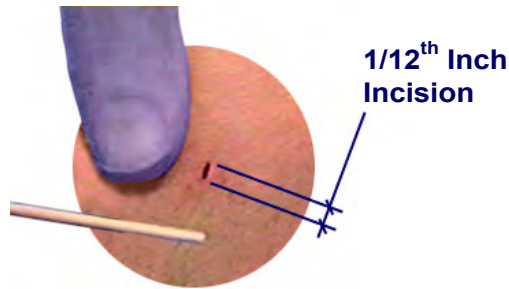
Less Pain

Rapid Recovery

*There Are Options*

## Advantages of Micro Single Incision ETS

- Single 1/12th inch axillary incision per side. Ganglion-sparing, less traumatic.
- Lungs are NOT collapsed
- Selective & Precise division of sympathetic nerve.
  - Nerve & ganglia are not removed
  - Surrounding tissue is not disturbed
  - Less Pain
- T2 level cut only (T2/T3 for severe axillary sweating)
- Aberrant Kuntz nerves divided
- Out patient surgery (discharged the same day)
- No sutures required
- Rapid recovery



## Indications for Micro ETS

Hyperhidrosis (facial, scalp, palmar, axillary)  
Facial blushing  
Vascular disorders (Raynaud's Syndrome)  
Prolonged QT syndrome  
Migraine headaches

## Introduction

Hyperhidrosis is present in 0.6 to 1% of the population. The sympathetic nervous system is overactive in these people at inappropriate times (low stress conditions, sitting quietly, cool surroundings, etc) causing excess sweating of the hands, axillae, face, scalp, and sometimes feet.

Today, the treatment of choice for severe hyperhidrosis is ETS. Fortunately today, for patients afflicted with hyperhidrosis, Raynaud's disease, embarrassing blushing, or Causalgia, there are a few surgeons around the world who are experienced with this minimally invasive technique. Many individuals can now be treated surgically with improvement of symptoms from hyperactive sympathetic nerves with minimal cost and morbidity, rather than just receiving repeated life-long treatments which are palliative at best.

ETS was developed by applying new state-of-the-art technology to invasive thoracic sympathectomy of the past which has been done for decades. Now, through single incision ETS, what was once considered to be extremely invasive surgery reserved only for the most severe cases (severe Raynaud's or Causalgia for example), is available to and highly curative for the many individuals today who are plagued by symptoms of over-active sympathetic nerves.

Sympathetic ganglia are located along both sides of the spine. The removal or destruction of some of these ganglia has been done for decades to treat micro circulation disorders of the hands and feet and hyperhidrosis.

Today, Micro ETS is the method of choice to treat severe hyperhidrosis involving the scalp, face, hands, and axillae. Also, it is effective in improving facial blushing which may cause social embarrassment.

## Technique

Micro ETS is done in an ambulatory surgical center. Both sides are done at the same time. General anesthesia is required. The lungs are NOT collapsed. Only one micro incision (1/12th inch in length) is made along the outer aspect of the pectoralis major muscle in the axilla (arm pit) in the third intercostal space. A 1/12th inch endoscope is inserted through the Micro chest incision into the thoracic cavity. Identification of the sympathetic nerve and any Kuntz nerve branches is done.

One thoracic ganglion level is isolated by cutting the sympathetic nerve precisely as it crosses the second rib. The divided ends are cauterized using a low current to minimize nerve reconnections. For axillary hyperhidrosis two ganglia levels are precisely isolated by cutting the sympathetic nerve and any Kuntz nerve branches as they cross the second, third and, fourth ribs for a T2-T3 sympathectomy.

The nerves and ganglia are not removed with this technique. The ganglia are left attached to the spinal cord with preservation of the interganglionic connections. This helps to lessen compensatory sweating and post-op pain.

DERMABOND® topical skin adhesive is used to close the tiny single incision. Upon completion of the right side, the left side is then done in similar fashion. A chest X-ray is taken and the patient discharged a few hours later with a follow-up exam in the morning. The patient then returns home.

Normal activities can resume a few days later and full physical activities in one to two weeks. Whether unilateral or bilateral sympathectomy is performed depends on the patient's and surgeon's preoperative plan. I usually perform bilateral sympathectomies at the same sitting.

## Results

After the sympathetic nerve has been cut at the second rib level in the operating room, the skin of the hands, face, and scalp becomes dry. This change occurs in the operating room. While many of our patients experience continued dryness, in some instances patients report that within 3-6 months post op there is an onset of compensatory sweating. Talk to your doctor about compensatory sweating and other complications of the procedure before participating in any surgical program so that you can determine what is best for you and your condition.

Patients report that following surgery, scalp and facial blushing subside and cardiac reactions to stress (increased heart rate) is moderated but not completely eliminated. Stage fright response is substantially reduced. Hyperhidrosis of the feet even improves in some cases, but this effect is less predictable. Continued significant reduction in sweating of the hands, face and scalp has been reported but we have seen in some patients the ability of the nerve to regenerate as early as one year and as late as ten years after sympathectomy. Some patients report a return of slight sweating during exertion one or more years after sympathectomy and often describe it as "normal" sweating. Due to anatomical differences of nerve pathways in some patients, intact nerve fibers may remain following sympathectomy which could lead to persistent symptoms.

Immediate post operative skin dryness, improvement in blushing, warming of fingers. High success rate for:

- Palmar hyperhidrosis
- Scalp and facial sweating
- Facial blushing & facial hyperpyrexia
- Raynauds (condition may recur over time)

## Complications

Serious complications from the surgery are unusual. Sensitive pleurae (chest lining sensitivity) can limit exercise, Horners Syndrome, which is rarely reported, pneumothorax (collapsed lung), bleeding, postop neuralgia and parasthesias, possible hair loss, and bradycardia (slow heart rate) possibly requiring a pacemaker. Other possible complications include, but are not limited to, subcutaneous emphysema, possible conversion to open thoracotomy and heat intolerance.

Possible persistence of symptoms can occur if accessory nerve branches are present, duplicate nerve or aberrant nerve tracts are present. Recurrence of symptoms can occur if nerve regeneration occurs (unusual), which could necessitate a need for a redo operation.

Death has been reported in some ETS patients in the world literature.

## Known Side Effects

Patients should be aware that compensatory sweating can and does occur.

Compensatory sweating is experienced as excessive sweating on the back, thighs, stomach, axillae, groin and/or lower legs and may range from mild to severe. Reported incidence of developing compensatory sweating in world literature range between 50% to 90% of all patients undergoing the ETS procedure. Of this group, it has been reported that about 5% - 10% of these patients experience severe compensatory sweating. Severe compensatory sweating, or severe compensatory hyperhidrosis, can be very troublesome, especially when it soaks through clothing. This can be more problematic in hot humid climates and can become more of a problem than the original problem treated.

The tolerance of compensatory sweating is patient dependent. Some patients tolerate severe sweating while others do not tolerate even mild compensatory sweating. There are medications that may help lessen the severity of compensatory sweating post operatively.

Overweight patients may experience more compensatory sweating and those who live in hot, humid climates may find it less tolerable. Compensatory sweating is the most common side effect reported by patients regardless of which surgeon is performing Micro ETS.

Gustatory Sweating, which occurs while eating or smelling certain foods, can develop post operatively in about 10 to 20% of the patients.

Phantom sweating occurs in some patients after ETS surgery (feeling the sensations of sweating but not actually sweating) and typically resolves in 1 to 3 weeks after surgery.

## Contraindications

Prior thoracotomy - relative contraindication.  
Severe cardio-circulatory or pulmonary insufficiency.  
Severe pleural diseases (empyema, pleuritis).  
Untreated hyperthyroidism.

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Call Us Toll Free  
1-877-837-9379