EDS: What Your Specialists Need to Know

This article picks up from the end of my article, *Finding a Doctor to Treat EDS.* That one explains why, if you have an EDS-like condition, you will need to educate your doctors so they can take good care of you and your medical problems. It mainly deals with finding a good Primary Care Practitioner (PCP), and what printed materials you can give your PCP and how to present them so as to have a chance they'll be read and acted on. In this article, I deal with specialists you may need to see.

I've referred variously to "EDS" and "hEDS/HSD" in this article. It all applies equally well to the main types of Ehlers Danlos Syndrome (classic, hypermobile, and vascular) and to the new category, "hypermobile spectrum disorder (HSD)". The great majority of people with an EDS-related condition have either hypermobile EDS (hEDS) or HSD. If you have *classic* or *vascular* EDS, there are a few extra things you'll need to convey to specialists you see so you should learn about those separately. The Ehlers Danlos Society at *ehlers-danlos.com* can provide these.

How to use this document
For the major medical specialties, I suggest you copy three documents, each about a page long: one that tells you, the patient, "what you need to know" (and called just that); one that's a background information sheet for doctors *("Capsule Summary"),* the same for all specialists; and one that lists specific points that each specialist should bear in mind, when treating you. You will give the specialist the capsule summary and the "Notes for (name of specialist) seeing a patient with hEDS or HSD." Read your "What you need to know" article carefully, because it may suggest other resources to print and bring to some specialists.

Use the list below to direct you to each specialist, and to see what documents to print for them.

- **Pain specialist:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 3) and the specialist notes (page four).
- **Gastro-enterologist:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 5) and the specialist notes (page 6). Also print the article from my website to give the specialist, though I encourage you to read it too: *EDS for the Gastro-enterologist.*
- **Rheumatologist:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 7) and the specialist notes (page 8).
- **Cardiologist:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 9) and the specialist notes (page 10).
- **Orthopedist:** Print the EDS capsule summary for doctors (page 2), the patient handout (**2 copies** so the doctor can keep one -page 11) and the specialist notes (page 12). Also print the article *EDS and Orthopedic Surgery* from my website, for the doctor.
- **Neurosurgeon:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 13) and the specialist notes (page 14). Also, in the "Notes for Neurosurgeons" I refer to a 17-page article that the doctor can and should obtain. This costs about $30 to download, but it would be ideal if you got it yourself and passed it on to the neurosurgeon.
- **Neurologist:** Print the EDS capsule summary for doctors (page 2), the patient handout (page 15) and the specialist notes (page 16). In the latter, I refer to a 17-page article that the doctor can and should obtain. This costs about $30 to download, but it would be ideal if you got it yourself and passed it on to the neurologist.
- **Allergist, gynecologist, psychiatrist:** For these specialists, there are just a few remarks that you yourself can convey to them about your condition; all are on page 20. So to prepare you for seeing one of these specialists, there's just a paragraph for you, the patient, but not a handout for the doctor. However, it's still a good idea to offer these specialists the *Capsule Summary* on page 2.

HSD and hEDS: capsule summary for physicians

HSD and hEDS are newly-defined acronyms for a spectrum of inherited, multisystem disorders in which joint hypermobility is one feature. HSD stands for "Hypermobility Spectrum Disorder." HEDS (with a small "h" if not at start of a sentence) stands for "Hypermobile Ehlers Danlos Syndrome." This was previously often called "Type Three Ehlers Danlos Syndrome."

These are *spectrum disorders* in which individuals in the same family may have different combinations of the possible symptoms in different body systems. Biologically, the HSD spectrum probably includes hEDS. Genetic tests currently do not identify either HSD or hEDS, and there's often uncertainty about which label to apply to an individual case. Treatment is the same for both.

Common features of HSD/hEDS, either proven or strongly suspected, are:

- Multiple hypermobile joints (that move beyond the normal range)
- Widespread pain
- Complex neurologic and spinal disorders
- Orthostatic intolerance
- Gastrointestinal disorders
- Reduced stamina
- Hypersomnia
- Anxiety +/- panic attacks
- Easy bruising +/- bleeding
- Slow healing of injuries
- Family history
- Other features may include menstrual dysfunction, mast cell disorders, disorders of bladder emptying, hernias and others.

Any of the above symptoms may be absent, mild, or severe, and in any combination with the others. If at all severe, i.e. intrusive into the patient's normal activities, then each of them merits treatment if at all possible.

Treatment may require several specialists in view of the multisystem nature of these conditions. However, a primary care practitioner should be closely involved, because one specialist's treatment of one problem may affect another's treatment of a problem in another body system, either for good or for ill. The PCP can help prioritize treatments in the light of symptom severity, and the patient's goals. Often, once treatment is stabized, the PCP can continue to manage the care plan that the specialist has initiated.

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What you need to know if you have hEDS or HSD, and you are to see a pain specialist

- It seems obvious that a pain specialist should be able to help you, but this isn't always the case. In the USA, this specialty has become mainly involved with "procedures", meaning mainly, treatments using long needles inserted into scary places followed by injections, electric shocks, frying or freezing to kill misbehaving nerves.
- The outcomes are very variable, from doing nothing at all, to reducing the pain for up to a few months. But sometimes these procedures can make the pain problem worse instead of better. Each of the procedures carries its own specific risks, and the doctor should talk these over with you before you agree to have one.
- Unfortunately, we have no worthwhile information on the benefits versus risks of these treatments for people with EDS. Patients sometimes do report good, and long-lasting benefits. But there's a suspicion that, because of their fragile tissues, they may be more at risk than most people, for adverse effects such as internal bleeding or nerve damage.
- Unfortunately, what you can <u>not</u> expect from most pain specialists, is a well-informed discussion of other treatment options. Very few pain specialists know enough about physical therapy, chiropractic, acupuncture etc. to guide you through their pros and cons and compare them with what's on offer at the pain clinic.
- Nor is the pain specialist likely to tangle with non-medical issues that might make all the difference to your life, like working with an employer to improve your work conditions, or getting a college to make special accommodations for a student, or doing a thorough and expert evaluation for disability benefits.
- Probably your local or state EDS support groups are the best resource for finding out which pain specialists near you have a sufficiently broad training to be helpful to you. The article, *Medical Care of Patients with a Hypermobility Disorder,* devotes several pages to pain treatment. It's aimed at generalists but may also be helpful to a pain specialist, should you see one.
- If you should have a procedure requiring an anesthetic, be sure to download the article *Surgical and Anesthetic Precautions*¸ at *AlanSpanosMD.com*, and use it.

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Notes for pain specalists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their pain specialists to read a short, general summary of the multisystem features of the Ehlers Danlos Syndromes, which should be attached to this.

- **Intravenous access** may be challenged by fragile, soft, mobile veins, and copious bleeding.
- **Excessive bleeding, bruising and slow healing** are routinely seen when these patients have surgery. The size of these risks during the invasive procedures of pain specialists has not been documented, is assumed to be substantially higher than with other patients.
- **Local anesthetic failure is very common,** perhaps because of rapid fluid movement through abnormal connective tissue. Be prepared to give frequent, large doses if needed. Let the patient know you're aware of this – they often have bitter memories of painful oral procedures by dentists who didn't believe them when they said the LA was not working.
- **Neuropathic pain syndromes** may defy categorization in these patients. Atypical CRPS-like phenomena are often seen: subtle CRPS features should always be looked for in these patients.
- **Small fiber neuropathy** may cause pain and also affect sympathetic nerves, hence deranged blood flow in limbs, resembling CRPS. The usual treatments for neuropathic pain may help. Celiac disease should be looked for, since it seems to be common among these patients.
- **Intervertebral instability** can occur at any spinal level, causing nerve damage from deformation, and rarely, cord compression. Instability is not detected with routine scans since the spine has to be moved to its end-ranges to elicit it. Neurologic symptoms and signs that shift with spinal posture should prompt a detailed neurosurgical workup.
- **Failure to achieve long term relief** with spinal injections or nerve ablations should prompt expert workup for instability and other spinal disorders, rather than repeated palliative procedures. Many patients have had definitive treatment with stabilization surgery deferred for years because they were offered only repeated spinal ablations. Both workup and surgical assessment should probably be done at a tertiary care center.
- **Skin may be very fragile and subject to chemical sensitivities**. Remove adhesive dressings promptly if they itch or burn. Steri-strips, however, are usually effective and well-tolerated.
- **Dry needling of trigger points** is helpful in some patients, and bleeding or bruising are rarely a problem if small acupuncture needles are used. Dry needling is preferred to trigger point injections because of the high rate of local anesthetic failure and bruising.
- **TENS units** help some patients, but reactions to adhesive pads may prevent their use.
- **Prolotherapy** is not supported by published evidence, in hypermobile patients.
- **Systemic IV treatments** such as ketamine have not been studied in hEDS/HSD patients, but are not contra-indicated. IVIgG and plasma exchange have helped carefully selected cases.
- **Manual joint therapy** helps some patients, but **thrust manipulations are strongly contra-indicated, especially in the spine** of hypermobile patients.
- **Braces** are necessary in the long term for many patients. Braces should not be withheld out of fears of weakness or stiffness: if they improve activity they can be used indefinitely.
- **Physical therapy** should only be done by therapists well trained in manual therapy. An introduction to its role is in the article, *Physical Therapy, Exercise and Braces for People with EDS* at *AlanSpanosMD.com.*

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What you need to know if you have hEDS or HSD, and you are to see a gastroenterologist

- If you hEDS/HSD, and you have "belly problems" that aren't getting better with the usual treatments from your Primary Care Practitioner, then you should see a gastroenterologist. There are two reasons for this.
- First, people with hypermobility conditions often have problems with their guts or "GI tracts" that are hard to diagnose, because they may not cause the "usual" symptoms for that condition, and the usual tests may not work well in the presence of hEDS/HSD. Also some of these gut problems are quite rare in the general population, so a Primary Care Practitioner is likely to unfamiliar with them.
- The second reason to involve a gastroenterologist is that they have a monopoly on most of the special tests that help diagnose gut problems in EDS.
- For these reasons, people with EDS or its relatives, should see a gastroenterologist if they have symptoms like abdominal pain, nausea, vomiting, swelling, or constipation, that are severe and don't respond promptly to simple remedies that your family doctor can prescribe. This doesn't mean that a family doctor or internist can't help with gut problems: they often can, using standard well-known treatments. But if their first or second remedies aren't helping, then I suggest an appointment with a gastroenterologist, sooner rather than later.
- On my website at *AlanSpanosMD.com*, there is an article dealing with "gut problems" – *EDS for the Gastroenterologist.* I suggest you read this, and don't worry if some parts are boring and technical. Just notice which parts seem to reflect your own medical problems. Give a copy to the gastroenterologist, with a strong plea that he or she reads it and figures your hEDS/HSD condition into decisions about how to help you.
- Be assertive in reminding the gastroenterologist that hEDS and HSD patients like you can have various rare gut conditions, with unusual symptoms, and with test results that are falsely negative. So the doctor needs to be especially careful in coming to the right diagnoses for your gastroenterologic problems.
- If you are to have a procedure that involves an anesthetic, or surgery, then download the article, *Surgical and Anesthetic Precautions*, from *AlanSpanosMD.com*, and use it.

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Notes for gastroenterologists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their gastroenterologist to read a short, general summary of the features of the Ehlers Danlos Syndromes, which should be attached to this. These are multisystem conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints.

Gastro-enterologic conditions in EDS are often difficult to diagnose and to treat. I have written two short articles that I hope will help you manage your EDS-patient successfully. Your patient should have brought you these. They are:

1. *HSD and hEDS: capsule summary for physicians.*
2. *EDS for the Gastroenterologist.*

The titles of the first two are self-explanatory. I strongly recommend you read both these before deciding on a workup and treatment plan for the patient who brings them.

The third article is a brief summary of a major review of GI complications in EDS, published in 2017, with my commentary on its main points. This is written for patients, but may be of interest to the gastroenterologist too.

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What you need to know if you have hEDS or HSD, and you are to see a rheumatologist

According to their flagship website, rheumatologists treat "musculoskeletal disease and systemic autoimmune conditions." The Ehlers Danlos Syndromes have loose and painful joints as their defining feature, and joints are part of the musculoskeletal system, so you would think that rheumatologists know all about EDS, and about how to treat it. But you would be wrong.

In almost forty years of practice in the USA, I have never encountered a single rheumatologist who took on the care of an EDS patient, nor do I recall ever seeing an American rheumatologist among the attendees of national meetings of EDS doctors. Instead, patients typically report that the rheumatologist that they saw did some tests, which they declared didn't show anything, then told the patient one of two things. One, that they might have EDS and should get someone else to diagnose it. And two, that their condition was inherited and therefore there was no treatment for it. The first of those responses is sad, especially since the most celebrated world authority on EDS, Rodney Grahame, is himself a (British) rheumatologist. The second is frankly laughable. Since when were inherited conditions untreatable? – I have not been told that spectacles would be useless for my inherited short-sightedness; or that my flat feet were inherited and therefore there's no point in using shoe inserts; or that the kidney abnormality, which I had surgically corrected years ago, should have been left alone because it was a genetic condition. It is simply shameful that such nonsense gets repeated, over and over, to one patient after another.

Despite this, there are indeed some situations where someone with an EDS should see a rheumatologist. These are when there's evidence suggesting a possible inflammatory or auto-immune condition, like rheumatoid arthritis, lupus or Sjogren syndrome. Some of these may be more common among people with EDS, than among the rest of the population.

Usually, a referral to a rheumatologist is prompted by a blood test, ordered by the primary care doctor, that suggests the possibility of an inflammatory condition and the rheumatologist is being asked to follow up on this. This usually leads nowhere – people with EDS often have these "false-positive" tests for inflammation. But occasionally, the patient does turn out to have such a condition, and if so, there may be some treatments that will help the specific symptoms that condition is causing.

But remember: the rheumatologist is not there to manage your EDS.

If you see a rheumatologist, I suggest you take them a copy of the next page to this one, as well as the *Capsule Summary for Physicians* in this document.

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Notes for rheumatologists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their rheumatologist to read a short, general summary of the features of the Ehlers Danlos Syndromes, which should be attached to this. These are multisystem conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints.

I caution my patients that American rheumatologists, unlike those in some other countries, do not generally see management of patients with inherited conditions as within their purview. The patient is likely to be referred for a different reason, namely to assess if a condition, that *is* within the rheumatologist's scope, is present in addition to an Ehlers Danlos Syndrome.

There is a suspicion that some auto-immune conditions, notably Sjogren Syndrome, may be more frequent in EDS patients. Also, this population seems to have a higher-than-expected prevalance of positive ANA tests, without other evidence of an inflammatory disorder. But it's not known if the outcome of Sjogren Syndrome, or a chronically-positive ANA, are any different in EDS patients than in the general population.

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What you need to know if you have hEDS or HSD, and you are to see a cardiologist

- The usual reason that people with hEDS/HSD get referred to a cardiologist, is because of "orthostatic intolerance (OI)." This means that on staying upright for long, especially if standing still, you feel weak and shaky, and possibly you even faint (collapse with brief unconsciousness). This condition is very, very common in people with hEDS/HSD, and comes in all grades of severity.
- "POTS" (postural orthostatic tachycardia syndrome) is one of several different types of OI. Its main feature is that the pulse rate soars to very high levels when the patient is upright, and the heart seems not to work efficiently at these high rates.
- Very few primary care practitioners (PCPs) are familiar with OI and POTS. These conditions are addressed by some cardiologists (heart specialists) with a special interest in them, and also by a few neurologists (specialists in disorders of the nervous system).
- There are far more cardiologists who can treat OI and POTS, than there are neurologists interested in this area. In geneal, I think the neurologists are better than cardiologists at managing OI and POTS. But in many areas, the only local doctor who has this interest is a cardiologist.
- The cardiologists focus on getting the heart to work more efficiently, for instance by using drugs to slow the heart rate or improve its efficiency. The neurologists focus more on improving the way the nerves work, that control both the heart and the blood vessels whose narrowing and widening alters the blood flow through them.
- These nerves are part of the "autonomic nervous system" or ANS. If the cause of your OI is that these nerves are malfunctioning, then you have a "dysautonomia."
- Treatment for OI, whether of the POTS variety or another, is essentially trial-and-error. All the remedies help some patients but not others. A remedy should be tried just for the minimum time needed to assess whether it's helping, and what its side effects are.
- Doctors tend to prescribe medications for far too long before seeing (or phoning) the patient to see if they are helping. *Always ask the doctor what is the minimum period you should try any treatment, to find out its effects.* One to two weeks should be ample for all the medications that help OI and POTS.
- Be aware that most of the medications for OI and POTS have effects on other organs than the heart and blood vessels. Be alert for any worsening, or any improvement, in any of your medical problems when you start a new medication for these conditions.
- Once the specialist has established what works best for you, your treatment can usually be managed well by your primary care practitioner. You should suggest this to the specialist.
- There are excellent online resources where you can learn about OI, POTS and dysautonomia, including support groups as well as medical information.
- If you are to have a heart procedure that involves an anesthetic, then download the article, *Surgical and Anesthetic Precautions,* from *AlanSpanosMD.com,* and use it.

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Notes for cardiologists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their cardiologist to read a short, general summary of the features of the Ehlers Danlos Syndromes, which should be attached to this. These are multisystem conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints.

The main concerns that bring people with HSD/hEDS (the most common of the Ehlers Danlos-Related Syndromes) to the cardiologist are three, as follows.

1) Screening for dilatation of the proximal aorta. Mild dilatation is found in some hEDS patients during adolescence. The long term prognosis seems good, but screening has been recommended by some authorities. However, there's no data to suggest what the actual protocol should be – especially, if there's no increase in diameter over 2 years, are further scans necessary?

2) Screening for, and monitoring of, aneurysms in patients with the vascular type of EDS (vEDS), in which death from a ruptured aneurysm, at an early age, is common. Screening protocols and recommendations are evolving rather rapidly but are well expounded in the cardiology literature.

3) Orthostatic intolerance. This is so common in EDS that it is perhaps best seen as a part of the syndrome, rather than a complication of it. All levels of severity are seen. The condition may be of the POTS type, or any other. There is little support from research for the notion that this is due to mechanical laxness of blood vessels causing inappropriate dilatation. The main cause is probably dysautonomia, affecting both the heart and the vascular beds.

The range of treatments that help in EDS seems to be similar to those in other populations. All the familiar nonpharmacologic approaches are worth trying, but should be persisted in only if they clearly help. Similarly for drugs, each of the 6-8 medications routinely advocated for OI/POTS help some patients but not others. Their effects and side effects are clear very quickly, so a trial of treatment with each drug is measured in no more than one to two weeks. This means that the available medications can be tried quickly and the best selected for long term use. At that point, the patient's care can often be returned to their primary care practitioner.

A few, severely affected patients get a major and unique benefit from regular IV saline infusions. For some, this transforms a bedbound or chairbound life into a return to moderate activity and even the possibility of employment. Such patients may do best with an infusion of one to two liters every one to two days: this requires a PICC or central line, and regular blood chemistry monitoring. Surprisingly, although many patients are now getting this treatment, there is no formal study of long term IV saline for orthostatic intolerance in any population group. There is, therefore, no consensus on its indications or long-term safety and effectiveness.

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What you need to know if you have hEDS or HSD, and you are to see an orthopedist

- An orthopedist is a surgeon who specializes in operating on bones, joints and muscles. Orthopedic surgery can be wonderfully effective in tightening loose joints *if the tissues around the joints are normal.* But in hEDS/HSD, they are not. So, the good track record of surgery for loose joints in general, doesn't apply to people with these conditions.
- My article, *EDS and Orthopedic Surgery,* at *AlanSpanosMD.com,* documents the extraordinary lack of published information on outcomes of joint surgery in people with hypermobile joints. **There are no studies that compare the outcomes of orthopedic operations in hEDS/HSD with those in the general population. So practice is governed by prudence and common sense, given what we know about the EDS conditions.**
- People with hEDS/HSD heal slowly and bleed easily. So surgeons need to be extra-careful in putting their tissues back together very precisely, after cutting them during surgery.
- There are ways to do this, mainly by using many small sutures rather than a few big ones, and by sewing up each tissue layer separately, rather than bunching several together. The surgeon may also decide to use different suture materials for patients with loose ligaments. And the operated area may be held still in a splint for longer than usual after surgery, to allow for the slower healing in hEDS/HSD.
- **The surgeon has to know in advance that the patient has an EDS or similar condition. Often, this is only suspected after one, or several, orthopedic operations to tighten joints have failed.**
- **If a procedure is done using local anesthetic to numb the area, the surgeon should be reminded that people with hEDS/HSD may need very high doses, repeated frequently, to get numb.** Sometimes, local anesthetic fails completely at any dose, so the option of general anesthesia (where the patient is asleep) has to be available.
- **There are some general precautions that should be followed when a patient with hypermobile joints has any kind of surgery. They are detailed in my handout, *"Surgical and Anesthetic Precautions for HSD and hEDS," at AlanSpanosMD.com.***
- The main question for orthopedists seeing people with hEDS/HSD, is *whether* to operate, and if so *which procedure* to do. (There are generally several different possible procedures for any orthopedic problem.) **It's prudent to consider surgery only if non-surgical treatments have definitely failed. And if surgery is considered, it should be a procedure that depends little, if at all, on the strength and tightness of ligaments and other "soft tissues."**
- **Compared to soft tissues, bone seems to do rather better after orthopedic surgery in people with hEDS/HSD.** Fractures generally heal well, though they may need to be immobilized for longer than usual because healing time may be slow.
- **Spinal surgery carries extra risks for hEDS/HSD patients. There is a case for having all spinal surgery in these patients done by neurosurgeons rather than orthopedists.**
- The last two pages of my article, *EDS and Orthopedic* Surgery, contain suggestions that amplify some of those above. I suggest you read them and use them as a basis for discussing your options with the orthopedist.

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Notes for orthopedists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. These are multisystem conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints. I suggest that patients with these conditions ask their orthopedist to read the following short handouts and articles. The last of these is a handout for the patients themselves. I hope this will improve the discussion the doctor and patient will likely need to have, on treatment options for their orthopedic problems.

1) *Notes for orthopedists seeing a patient with hEDS or HSD,* i.e. this page.
2) *HSD and hEDS: capsule summary for physicians.*
3) *EDS and Orthopedic Surgery:* a commentary on the major review of this subject.
4) *What you need to know if you have hEDS or HSD, and you are to see an orthopedist*: a handout for patients.

A main part of the Ehlers Danlos Syndromes (EDS) is laxity of ligaments and fragility of connective tissue in general. Most of the orthopedic implications are obvious, and based on that fact. However, it is very unsatisfactory that there seem to be no published series, in any language, that address the *outcomes* of orthopedic surgery in this group. We are left with a bias, and a clinical impression, that the success rate is reduced in this population, but we have no objective confirmation of that. Moreover, we have no evidence of the *size of the risks* of complications or failure *in specific procedures* in hypermobile patients.

I hope the above resources will help facilitate decision-making between orthopedists, and patients with joint hypermobility conditions in the Ehlers Danlos Syndrome group.

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What you need to know if you have hEDS or HSD, and you are to see a neurosurgeon

- Neurosurgeons are surgeons who only operate on the nervous system (brain, spinal cord, nerves). However, the spinal cord is encased in the spine, so neurosurgeons are also expert at working on the spine. Some of them, especially in university hospitals, deal exclusively with spinal problems.
- The spine is a complex stack of bones with a total of 75 joints. If these are hypermobile (loose), then that can damage the nerves that have to cross these joints in order to get from the spinal cord out into the organs that the nerves control.
- Because of the complex nerve problems that can occur in hEDS/HSD, I strongly advise that if you need spinal surgery, it should only be done by a a neurosurgeon, rather than an orthopedist.
- The big problem with seeing a neurosurgeon is that there are breathtakingly large differences in how they approach problems in patients with joint hypermobility. For instance, one patient had three operations to stabilize loose joints in her neck, by a neurosurgeon who did not think to check if she had EDS. Once this diagnosis was made, he advised that no further surgery would help, even though she was now having to spend half the day in bed because of neck pain. She then got opinions from four other doctors, each of whom is a specialist in spine surgery with some familiarity with EDS. One spent over an hour listening to her symptoms and doing a very thorough physical examination. One didn't examine her at all but just looked at her latest MRI scan and gave advice based only that. The third did a quick exam, took an equally quick look at her scan, and then recommended a much bigger operation than either of the first two. The fourth, a national expert on neurosurgery for EDS, spent several hours evaluating her in the clinic, got special scans that the others didn't, and advised major surgery: the procedure did not resemble what any of the others had recommended, except for the doctor whose evaluation took just a few minutes!
- So some of this variation from one doctor to another is understandable, since there are no scientific studies yet, that tell us who to operate on, or what operations to do. What is harder to understand, or to justify, is how major surgery, with an uncertain outcome, can be recommended by some surgeons who didn't even examine the patient, or whose entire evaluation lasted only a few minutes.
- This is clearly a dreadful situation for the hEDS/HSD patient. If they get opinions from several neurosurgeons in their area, the resultant recommendations are likely to be all over the map. The only suggestions I can make are modest ones that may, or may not, help with this dilemma. First, ask the surgeon what experience they've had, operating on patients with <u>widespread joint instability</u>. I would not take advice from a doctor who said "none", or "one or two", or looked blank. Second, notice whether the doctor seemed thorough and meticulous in taking your medical history and doing a physical exam. (A neurosurgeon's exam should be more detailed, and more time-consuming, than you've had from any other medical specialist.) If not, I would not put confidence in their advice. And third, take along a copy of the authoritative review of neurosurgery for EDS by the internationally-acknowledged expert in this field <u>and ask the surgeon to read it,</u> and then see you again to discuss your case. If the surgeon won't read it, then I would not be interested in that doctor's advice. If the surgeon <u>has already read it</u> then I would take his or her advice seriously.
- The review article is online at https://www.ncbi.nlm.nih.gov/pubmed/28220607. However, this is just the summary, and you need the whole article. Follow the instructions on the page to get the whole article, which will cost about $30. If you have trouble with this process, then you could ask for help from a public librarian, or anyone else who is used to accessing scientific papers online. Sadly, I can't put the article on my website, because that's forbidden by copyright regulations.
- Finally, if you are to have surgery, or any procedure requiring an anesthetic, remember to download the handout *Surgical and Anesthetic Precautions* at *AlanSpanosMD.com* and use it.

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March 2019

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Notes for neurosurgeons seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their cardiologist to read a short, general summary of the features of the Ehlers Danlos Syndromes, which should be attached to this. These are multisystem conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints.

The main issues that bring people with EDS-like conditions to the neurosurgeon are spinal. The flagship article on these is the 2017 review by Henderson et al., *Neurological and Spinal Manifestations of the Ehlers Danlos Syndromes*. It can be accessed at https://www.ncbi.nlm.nih.gov/pubmed/28220607.

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What you need to know if you have hEDS or HSD, and you are to see a neurologist

A neurologist is a doctor who deals only with the nervous system and doesn't do surgery. People with EDS can have various problems with the nervous system that are often tricky to diagnose and hard to treat. A neurologist can do this, but will need to be well-informed about the range of neurologic problems that EDS can cause. These are listed in the "Notes for neurologists . . ." handout that you will give to the neurologist.

Another major resource for them is the same detailed review article that is also important for neurosurgeons. You will have to pay about $30 to download it, but I strongly recommend that you do get it, and give a copy to any neurologist you see. You can find the article online at https://www.ncbi.nlm.nih.gov/pubmed/28220607.

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Neurologic complications of the Ehlers Danlos Syndromes are varied, puzzling, and have been only poorly researched. They often wax and wane over time, so these patients merit regular follow-up and reassessment. Some of the usual investigations may be unhelpful. For instance, spinal scans are routinely normal even in patients whose intervebral joints are grossly unstable and compromising the spinal cord and nerve roots. This is because the joints resume their normal relationship when the patient is supine for the scan.

Neurologic disorders seen in EDS and similar syndromes may include:

- Mononeuritis due to deformation of nerves crossing subluxing joints.
- Painful polyneuropathy, typically small-fiber type, cause unknown.
- Radiculopathy due to nerve root deformation at unstable invertebral joints.*
- Neuropathy due to celiac disease, which seems to be common in EDS patients.
- Atypical head pain, often suggestive of referral from the upper cervical region.*
- Dysautonomia affecting cardiovascular, gastro-enterologic, or other systems.
- Chiari syndromes.*
- Symptoms around the head and neck may be due to spinal cord compromise by instability of the subcranial joints.*
- Spinal cord dysfunction due to deformation in the craniocervical region, or elsewhere.*
- Tethered cord syndrome.*
- Tarlov cysts and related meningeal abnormalities.*
- Intracranial hypotension or hypertension: mechanisms are very unclear.*
- CRPS Type 1, sometimes after a joint dislocation rather than external trauma.
- Lifelong primary hypersomnia, and various other sleep disturbances.
- Episodic regional or global weakness, meeting criteria for Primary Periodic Paralysis.
- Severe anxiety, usually lifelong, and often with panic attacks.

* Details and discussion of these problems are in the authoritative review: "Henderson Sr. FC et al. Neurological and spinal manifestations of the Ehlers–Danlos syndromes. This can be accessed at https://www.ncbi.nlm.nih.gov/pubmed/28220607.

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What you need to know if you have hEDS or HSD, and you are to see a urologist

- A urologist is a surgeon who operates on the kidneys, bladder and the various tubes involved in making urine and voiding it.

- Some people with EDS have problems with bladder control. Various conditions that cause this can happen in anyone. But there's a specific one that seems to be much more common in people with EDS, namely "tethered cord syndrome (TCS)." This is actually a problem with the lower end of the spinal cord, where nerves that control the bladder leave the spine. Urologists need to be alerted to this possibility in any patient they see who has EDS.

- People with TCS generally have various problems with bladder control, and they have various problems with their low back and legs: burning or aching pain, weakness, shifting pains in the legs, tingling or numbness in the pelvic area or legs.

- Diagnosis involves putting together information from the neurologic exam, from urologic tests, and a special MRI of the lumbar spine and sacrum, with "thin cuts through the sacrum." However, the MRI isn't always abnormal: sometimes the diagnosis is made, and the condition treated, even though the MRI did not show the condition.

- The treatment is surgical, and is done by a neurosurgeon. This usually helps the bladder problems; but improvement in the leg pain and weakness is not assured.

- In my handout for the urologist, I've included a copy of a review of TCS in relation to the Ehlers Danlos Syndromes. If my very brief description above makes you wonder if you have TCS, then I suggest you read the urologist's handout. If both you and the urologist feel TCS is likely, then a neurosurgeon could complete the assessment. In that case, the neurosurgeon should also read the urologist's handout.

- If you are to have any surgical procedure by a urologist, including cystoscopy (using a very narrow periscope to examine the inside of the bladder), you should prepare by using the handout *Surgical and Anesthetic Precautions,* at my website *AlanSpanosMD.com.*

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Notes for urologists seeing a patient with hEDS or HSD

I am a generalist and pain specialist, with a main focus on joint hypermobility conditions for over fifteen years. I suggest that patients with these conditions ask their urologist to read a short, general summary of the features of the Ehlers Danlos Syndromes, which should be attached to this. These are *multisystem* conditions, affecting far more organs and body systems, in far more ways, than can be accounted for by the loose ligaments that are thought to underly the patients' hypermobile joints.

Patients with Ehlers Danlos Syndromes (EDS), and related conditions, may have any of the usual urologic problems that urologists see. It's unclear whether the presence of an EDS affects either the diagnostic features, or the optimal treatments, for most of these conditions. Since these patients very commonly have signs of dysautonomia in several body systems, it's tempting to consider that this may underly symptoms of bladder dysfunction in this group.

One condition in particular, is associated with EDS and should be considered in any such patient who is seeking a urologist's help. This is tethered cord syndrome (TCS). The following is the section on this, from a review of neurologic and neurosurgical complications of the Ehlers Danlos Syndromes. The reference is given at the end of the quoted section. If the history suggests the possibility of TCS, then a referral to a neurosurgeon specializing in spinal conditions, usually at a tertiary care center, would be prudent.

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TETHERED CORD SYNDROME

Tethered cord syndrome (TCS) in EDS is most often associated with a structurally abnormal filum terminale, and usually characterized by low back pain and the clinical triad of neurogenic bladder, lower extremity weakness and sensory loss, and musculoskeletal abnormalities.

Etiology

The filum comprises a fibrous, collagenous, and elastic band that connects the conus medullaris with the dural sac at the S2 level. The filum contains neural, glial, and ependymal remnants that stem from embryonic spinal cord which begin to regress at 9–10 weeks of gestation [Jang et al., 2016]. The presence of fatty tissue, "nerve twigs" (dysplastic axons), fat and vascular lacunes, and suspicion of "congested" veins, are usually seen in the abnormal fila specimens obtained from patients with TCS [Thompson et al., 2014] Stretching of the spinal cord by the structurally abnormal filum is the presumed mechanism of TCS. Symptoms may become more apparent as a child grows. Forcible flexion and stretching is often deemed responsible for adult onset of TCS [Aufschnaiter et al., 2008]. Poor blood flow and oxidative stress in the spinal cord have also been implicated in animal models as mechanisms of neuronal injury Yamada et al., 2007].

Clinical and Diagnostic Findings

TCS is characterized by aching/burning pain in the low back, legs and feet, and sensori-motor findings in lower extremities: weakness is common, with heaviness, stiffness, and tightness of legs and cramps; paresthesias in the pelvic area or legs and hypoesthesia to pinprick in the lumbar and sacral dermatomes is often observed. Findings are often asymmetric. A history of toe-walking may be elicited. Urological findings include urinary hesitancy, frequency, urgency, retention/incomplete emptying, nocturia, irregular urinary stream, sensory loss of the bladder, frequent urinary tract infections, and incontinence.

There is often enuresis into late childhood. There may be fecal incontinence, constipation, or sexual dysfunction. As TCS results in a combination of upper and lower motor neuron injury, there is often hyperreflexia in the lower extremities, but normal reflexes in the arms. The legs are usually weak, with normal upper extremity strength. Sensory loss is usually prominent in the lumbar and sacral dermatomes, but normal in the arms and trunk. Orthopedic deformities include scoliosis, kyphosis, functional ankle and foot deformities (ankle pronation with physical strain), and pes planus or pes cavus [Hoffman et al., 1976; Pang and Wilberger, 1982].

Urodynamic testing is important in the diagnosis of TCS. Neurogenic bladder manifestations may range from urinary retention and detrusor underactivity to urinary incontinence, overactivity of the detrusor, and sphincter dysfunction [Tu and Steinbok, 2013]. While formal urodynamic criteria have not been established for TCS, detrusor sphincter dysynergia, large post void residual, and very large bladder capacity (>800 ml) are good urodynamic indicators of a neu-

rogenic bladder. Urodynamics can help to differentiate the neurogenic bladder of TCS from that due to diabetes or bladder obstruction from prostatic hypertrophy.

MRI of the cervical, thoracic, and lumbar spine is required to rule out other causes of leg weakness and low back pain, such as disc herniation, spondylolisthesis, stenosis, neoplasm, or intrinsic lesions of the spinal cord— such as multiple sclerosis or signs of trauma. The MRI may show low lying conus (below the mid L2 level), fatty infiltration, a stretched or thickened filum, a syrinx in the lower spinal cord, scoliosis or spina bifida occulta. The term "occult tethered cord" (OTCS) refers to where the MRI shows a normal position of the conus [Tu and Steinbok, 2013]. A large diameter of the filum terminale in axial T2 studies is a positive indicator that favors untethering in the presence of TCS [Fabiano et al., 2009].

Controversy exists over whether it is necessary to radiologically demonstrate a "low lying conus medullaris," that is, a conus ending at the lower L2 level or below. There has been the intuitive presumption that a low-lying conus represents a spinal cord under tension. However, this presumption has not been verified, and indeed, there are no epidemiological studies which allow the definition of a specific imaging finding to establish the diagnosis of TCS. Nor are there epidemiological studies in the normal population that demonstrate specific findings that exclude TCS. On the other hand, there is a growing body of evidence that supports the clinical diagnosis of TCS with or without the radiological demonstration of a low-lying conus medullaris, which justifies surgical intervention when the clinical criteria are met [Tu and Steinbok, 2013].

Treatment of TCS

There is no standard technique in the surgical treatment of TCS. Generally, the lamina is removed, anywhere from L2 to S1, a durotomy is made, and electrical stimulation is used to confirm the absence of any nerve roots which may be associated with the filum. Finally, a microsurgical resection of the filum terminale (usually a 10mm segment for pathology) is performed (Fig. 5). The filum tends to be taut, and to briskly retract upon sectioning. However, findings are variable, and there is no evidence to suggest that the intraoperative findings predict or correlate with the surgical outcome and severity of the TCS [Pang and Wilberger, 1982; Milhorat et al., 2009]. In some cases, it may be necessary to perform a lumbar stabilization across the motion segment in which the filum was sectioned. The resected filum should be sent for histopathological evaluation.

Areas Needing Research

(1) Prospectively and retrospectively evaluate specific clinical features and radiological metrics for predictive accuracy, to establish validated inclusion and exclusion criteria for future studies regarding TCS.

(2) Determine the incidence of TCS in EDS patients.

(3) Determine epidemiologically whether TCS is a co-morbid feature of CMI in EDS.

(4) Validate outcome measures by which to determine the surgical outcomes.

(5) Establish complication rates for TCS surgery in the EDS population.

From: : Henderson Sr. FC et al. Neurological and spinal manifestations of the Ehlers–Danlos syndromes. Am J Med Genet Part C Semin Med Genet 9999C:1–17.

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What you need to know if you have hEDS or HSD, and you are to see a gynecologist

Gynecologist. People with EDS can get any of the common problems with the reproductive organs. A few of these problems are more frequent in women with EDS, including rapid labor, and uterine prolapse. It's prudent to remind a gynecologist, any time you see one, that you have EDS and that weak connective tissue, bleeding at surgery and poor healing after, are hazards of your condition. If you have any surgical procedures, or need an anesthetic, then download the handout, *Surgical and Anesthetic Precautions*, at *AlanSpanosMD.com.*

What you need to know if you have hEDS or HSD, and you are to see an allergist

People with EDS can have various reactions to foods, medications or to chemicals in the environment that are the province of allergists. A particular variety is getting a lot of attention at present, called "mast cell activation syndrome" or MCAS. Unfortunately, there is as yet no consensus on when to suspect it, how to diagnose it, or how to treat it. Until we know a lot more about it, all I can advise EDS patients is that if they have severe reactions to foods, drugs and/or chemicals, it may be worthwhile to see an allergist and to mention to the doctor that you have EDS, and that MCAS is thought to be associated with it.

What you need to know if you have hEDS or HSD, and you are to see a psychiatrist

Psychiatrist. It's been known for about 20 years, that many EDS patients suffer from severe anxiety. They may also have panic attacks. These are brief episodes of extreme anxiousness accompanied by physical symptoms such as breathless, faintness or a very rapid heart rate. So far as we know, treatment for these conditions is no different in the presence of EDS, than without it. I advise that if you see a psychiatrist, you let them know that you have EDS, and tell them it is "a complex inherited condition that often includes severe anxiety and related psychiatric conditions along with a disordered autonomic nervous system."

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