Some Common Conditions

**DDH**

**Incidence**
2/1000 live births true DDH (different from neonatal hip instability/clicky hips)
3:2 Female:Male
Left > Right

**Risk Factors**
- Family History of neonatal hip problems/concerns (“clicky hips”)
- Breech position post 36/40
- Multiple births - Restriction of space in utero
- Oligohydramnious

**Clinical Examination**
Hips in adducted position – gentle posterior pressure is applied to hips. Clunk felt as hip subluxes out of acetabulum. This is called a **positive Barlow’s Test** and is a sign of instability in the hip. Useful test assists in identifying hips that may not be dislocated, but than have increased laxity and presumed underlying dysplasia.

As the hip is abducted further, the doctor might feel the ball portion (the femoral head) slide forward as it slips back into the socket. **This is called a positive Ortolani Maneuver** and is also a sign of hip instability. Palpable clunk is present – reduction of hip into acetabulum with abduction. Only 1 hip is examined at a time. Pt must be relaxed!

If either of these tests are positive, the child will be watched closely or immediate treatment with a harness may be considered.

Consultant will also look as Gluteal/thigh creases; decreased abduction ROM on affected side

Hip USS for confirmation of clinical diagnosis – Graf scoring. Table below is a very general guide – the Graf classification method is more detailed than simply 1-4.
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<td><strong>1. Normal</strong></td>
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<td><strong>2. Shallow</strong></td>
<td>May just settle – concerns increase if doesn’t resolve – Pavlik harness</td>
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| **3. Subluxed**        | If unstable – Pavlik harness  
                        | 6/52 in harness  
                        | Usually improves – should ↓ to Type II + then ↓ Type I – needs regular monitoring  
                        | If hip remains at type II – further Ix |
| **4. Dislocated**      | Risky in Pavlik harness – need 100% guarantee of accurate reduction when harness has been applied |

**Management**

- Pavlik Harness – can be used up until around 6/12 of age
- Discontinue use of harness if hip stabilises and improves or if no improvement at all
- After 4/12 – 1 year old – Closed reduction (under GA) and Spica cast
- 8-10/12 – Open reduction and ? Other invasive surgery – Spica cast

**Physiotherapy**

ABMU Health Board has a “1-stop shop” where babies attend a hip scanning clinic with Radiologist; Consultant Orthopaedic surgeon and Paediatric Physiotherapist present. Babies can be immediately started with Pavlik Harness Rx as appropriate.

Pre-operative input predominantly involves reassurance of parents that children will usually tolerate the spica well in addition to giving advice about hip spica cast care.

May be required following spica cast removal for rehabilitation (usually with the older child)
Perthes Disease

Also known as Legg-Calve-Perthes Disease – identified in 1913

Incidence
Commonly children aged 3 – 10 years
Boys affected at rate of 4:1
10% bilateral
1:9000 children

Cause
“A temporary interruption of blood flow to the proximal femoral epiphyseal region with resultant necrosis, collapse and regeneration of bone in the secondary ossification center. Extent of involvement of epiphysis varies widely”

Scoles, 1988

Histology
Avascular necrosis undergoing revascularisation with areas of normal bone alternating with areas of necrosis undergoing osteoblastic absorption and replacement by granulation and later fibrous tissue. Elsewhere there is active osteoblastic activity with new bone being laid down on the surface of dead trabeculae.

Necrosis and repair appear to occur simultaneously on different areas of the femoral head. There is growth disturbance in the cartilage associated with loss of epiphyseal height due to trabecular fracture. This changes the shape of the femoral head from round to oval or flat – inevitably this changes the dynamics of the hip joint.

Clinical Features

Early signs
Resembles transient synovitis
Hip pain and decreased mobility
Limp and decrease in activity
Adductor and iliopsoas spasm
Pain on passive movement and decrease in ROM
Tender anterior groin and adductor muscles
Late signs
Vague thigh and knee pain
Decreased medial rotation and abduction
Hip flexion contracture
Positive trendelenburg
LLD

In severe cases premature closure of the growth plate may be seen with widening and shortening of the femoral neck resulting in leg length discrepancy.

Acetabulum changes with irregularity of subchondral bone and adaptation of acetabulum to shape of deformed femoral head leads to the “congruous incongruity” of the hip joint.

The disease takes about 4 years from onset to healing.
4 stages of disease:-
- Initial – 6-12 months
- Fragmentation – 2 months – 3 years
- Reossification – av. 4 yrs
- Healed

Treatment principles are based on:
1. Some children with avascular necrosis will develop significant deformity of the femoral head.
2. Patients with femoral head deformity will develop premature degenerative arthritis
3. Appropriate treatment can preserve the contour of the femoral head and delay or prevent degenerative arthritis.

Treatment

- **Containment** of the head deeply in the acetabulum so that during the phase of softening the anterior segment of head is moulded by the socket.

- Broomsticks splints keeping the hips in abduction and internal rotation. Abduction decreases the forces through the hip therefore limiting the further destruction of the damaged joint surface and allows revascularisation and re-establishment of normal growth. Abduction also repositions the uncovered anterolateral aspect of the femoral head within the remodelling influence of the acetabulum.
- Femoral varus and external rotation osteotomies for patients at risk of subluxation
- Unprotected weight bearing may deform the epiphysis and produce an irregular femoral head.

**Short Term Prognosis**
Related to:
- age at onset (earlier is better)
- Sex (girls affected more than boys)
- Early diagnosis gives better outcome
- Restriction of movement

**Long Term Prognosis**
Related to:
- age at time of healing
- Degree of deformity of the femoral head
- Premature closure of the growth plate
- Limited abduction

**Physiotherapy Aims**
Maintain ROM
Maintain power
Decrease pain
Assist with activity modification to decrease compressive forces

**SUF/SCFE**
Almost exclusively a condition of adolescence where there is displacement of the femoral head on the femoral neck. The femoral head remains in the acetabulum but the femoral neck slips away. The direction is always posterior and often medial. Once the epiphysis has slipped secondary adaptive changes occur quickly such as the laying down of new bone where the periosteum has been stripped.

**Incidence**
Boys 3:1 Girls
2:100 000 affected
SUF is most commonly seen in adolescents during a limited period of maturation but over a wide age range.
Common features are:
- Thick growth plate cartilage – the cartilaginous physis of the proximal femur thickens rapidly under influence of growth hormone.
- Lack of sexual maturity – i.e. pre pubescent leading to hormonal imbalance
- Mechanical stress secondary to obesity
- Peculiar anatomic mechanics of the hip joint
- 25-30% are bilateral but not necessary simultaneously
Clinical Features

- Anterior knee pain
- Shortened and externally rotated leg
- Decreased hip flexion, abduction and internal rotation
- Decreased hip and knee power
- Trendelenburg gait (if pain allows mobility)

Types of slip

**Chronic** – insidious slippage of growth plate of several months, patient often complaining of vague knee pain. SUFE’s are frequently missed due to the red herring of knee pain (30%)

**Acute** – sudden femoral head displacement (20%)

**Acute on Chronic** – A slow ongoing slip culminating in an acute episode (50%)

Stable slips are determined if the patient is able to weight bear; conversely with unstable slips the patient would be in too much discomfort.

Treatment

Treatment is operative by pinning to close the epiphysis – the degree of reduction to anatomical position will be dependent upon the nature of the slip. The more acute the better chance of reduction.

Some surgeons may prophylactically pin the unaffected side.

Prognosis

As a result of the displacement the geometry of the hip is altered affecting function.

Due to the poor blood supply to the femoral head there is a risk of avascular necrosis not only from the initial insult but also from the secondary rescue procedure.

SUFE’s lead to a residual deformity of the hip resulting in “long term disability due to degenerative arthritis and short term functional deficits due to altered motion of the hip” Song et al

Physiotherapy

- Early – maintenance of ROM and mobility NWB
- Late – gait re-education, strengthening and maintenance or improvement in hip ROM
Osteogenesis Imperfecta

“Heritable disorder of connective tissue affecting the bone and soft tissue. Most types linked to mutations in type I collagen”. Scoles 1988

General Features
Fragility of bone
Short stature
Scoliosis
Defective dentinogenesis of deciduous or permanent teeth or both
Middle ear deafness
Laxity of ligaments (increased risk of joint dislocation)
Blue sclerae and tympanic membranes

Long bones have narrow diaphyses and bowing and fractures are common.
Fracture healing process is undisturbed but new bone has same deficiencies. The callus is plastic and easily deforms by forces associated with weight bearing or action of muscles across a fracture site.

Differential diagnosis
Non accidental injury
Juvenile osteoporosis
Malignancy

Treatment
Treatment of fractures is difficult due to ligamentous laxity and structural abnormality of bones
High frequency of fractures with little or no trauma – risk of further injury with treatment
Intermedullary nailing common

Drug therapy – Pamidronate Infusion

Physiotherapy
Maintain mobility
Bed exercises
Hydrotherapy
Mobility aids

Irritable Hip
(Transitory synovitis, Transitory coxitis, Acute transient epiphysitis, Coxitis fugax, Coxitis serosa seu simplex, Phantom hip, Toxic synovitis, Observation hip and Transient synovitis)

Incidence
Most common cause of hip pain in children
0.4-0.9% of annual paediatric admissions
3% of children have 1 episode
2:1 male : female
3 – 8 year olds most at risk
R = L
**Symptoms**
Monarticular hip pain
Limp – Antalgic gait
Slight decrease in ROM
Normal X-Ray
Normal lab tests
Protective muscle spasm
Held in flexion and external rotation

There is an association between 1 or more of.....
- Active/recent infection (70%)
- Trauma (17 – 30%)
- Allergic hypersensitivity (16 – 25%)

**Diagnosis of Exclusion**
Differential diagnosis
Pyogenic arthritis
Osteomyelitis of femoral neck/pelvis
Tuberculosis arthritis
Juvenile Rheumatoid Arthritis
Acute Rheumatic Fever
Perthes Disease
Tumour
SUFE

**Treatment**
Bed rest and NWB until full ROM and pain free.
Cessation of strenuous activities for a gradual period.
Hypermobility

Introduction

Hypermobility is the term used to describe the ability to move joints beyond the normal range of movement. In everyday language the non-medical term ‘double-jointed’ is often used. This article describes the different levels of problems someone with hypermobility might have, how hypermobility is diagnosed, and how it may be associated with other medical problems and the hypermobility syndromes. It outlines the syndromes that are most often associated with hypermobility and how they can appear to overlap in their signs and symptoms. It also addresses the very commonly asked question as to whether there is a difference between the most common of these conditions, Joint Hypermobility Syndrome (JHS) and Ehlers-Danlos Syndrome-Hypermobility Type (EDS-HM).

How is hypermobility associated with ill health?

The first thing to appreciate is that joint hypermobility is common in the general population. It may be present in just a few joints or it may be widespread. It is most common in childhood and adolescence, in females, and Asian and Afro-Caribbean races. It tends to lessen with age. Joint hypermobility may be of no medical consequence, commonly does not give rise to symptoms, and might even be an advantage for dancers, musicians and athletes.

However some hypermobile people can injure their joints, ligaments, tendons and other ‘soft tissues’ around joints. This is because the joints twist or over extend easily, may partially dislocate (or ‘sublux’), or in a few cases may actually dislocate. These injuries may cause immediate ‘acute’ pain and sometimes also lead to longer-term ‘chronic’ pain.

The majority of hypermobile people recover from an injury though this may be slower than normal. Some hypermobile people, however, either only partially recover or continue to repeatedly injure various parts of their body. This is one presentation of JHS.

These problems can interfere with daily activities of living, and/or schooling or work. The pain associated with this can become widespread and persistent and might initially be diagnosed as or confused with another condition called Fibromyalgia.
Severe fatigue can also become an issue. It is often driven by the chronic pain and poor sleep patterns. This may be confused with a condition called Chronic Fatigue Syndrome. It is important to make the right diagnosis as the approach to treatments like physiotherapy may be different.

The next thing to appreciate is that in addition to the above, joint hypermobility is commonly found in a group of conditions called Hereditary Disorders of Connective Tissues (HDCT). The most common of these is JHS. This group of conditions also include Ehlers-Danlos Syndrome and Marfan Syndrome.

The image below shows various groups of people with hypermobility within the general population. The top level is shown as wide and green to represent the majority of hypermobile people. Here there are no particular problems; the individual is 'asymptomatic'. The next two levels represent smaller numbers of people with varying degrees of severity of problems related to their joints and other parts of the body. Finally the lowest level, in red, is narrow and represents a small number of people in the population who have the more rare forms of HDCT.

But if that was not already complicated enough there are a couple of other things to consider:

The first is that other illnesses that cause fatigue and pain can appear in otherwise healthy hypermobile people – for example Chronic Regional Pain Syndromes (CRPS), Chronic Widespread Pain (CWP), Chronic Fatigue Syndrome (CFS) or Fibromyalgia (FM) may arise in their own right. This does not necessarily mean that the person now has Joint Hypermobility Syndrome just because they are hypermobile as well – there are very specific criteria for the diagnosis of CFS or FM and a balanced view has to be taken as to which is the principle problem. But, in someone who is also hypermobile it is advised that particular care has to be taken with physical treatments such as physiotherapy and exercise advice so as not to strain the hypermobile joints.

The second is that there is overlap in the signs and symptoms of the different forms of hypermobility syndromes and the clinician must consider this carefully when making a diagnosis. It often boils down to the
severity of signs and the types of signs present when trying to separate JHS from EDS. This is discussed more below in the section that considers the diagnoses of JHS vs EDS-Hypermobility type. It is also discussed in the section on the Marfanoid body shape (habitus).

If we now reconsider the diagram above we can add to it the following: here we aim to show that people with CWP, CFS and FM can be hypermobile or may have JHS; that JHS and EDS may present in similar ways; and that the very complex systemic problems of the bowel, lungs, heart and blood vessels are features of conditions such as EDS and Marfan syndrome, and not JHS.

It is easy to understand how one might be confused about which diagnosis they have among the pain / fatigue syndromes. However, it is not particular to these pain syndromes that a diagnosis may be not so clear cut. We see this also in other areas of Rheumatology. The best examples are people with inflammation in their joints but no abnormalities of their blood tests (so called sero-negative inflammatory arthritis), and people with inflammation / damage of various organs of the body but for whom no clear cut diagnosis can be made from the tests (so called undifferentiated autoimmune disease): in such cases all the symptoms and signs are managed accordingly – it should be no different in the chronic pain and hypermobility syndromes!

**How is hypermobility diagnosed?**

First and foremost the word ‘diagnosis’ should be used with caution as it suggests a medical condition. For the vast majority of individuals their hypermobility is just the way they are built and may be of no consequence in terms of symptoms and function.
Any joint can be hypermobile. The term simply describes the ability to move the joint beyond what is considered to be the normal range. But there may be clues in that a joint may feel like it is slipping (subluxing), and ‘clonking’ back in to place during movement. More obvious is a dislocation after no or minimal trauma.

Healthcare professionals may quote the **Beighton Score** which is a nine-point scoring system that looks for hypermobility in the 5th finger, thumb, elbow, and knee on both sides of the body, and the ability to bend forward and place the palms of the hands flat on the floor without bending the knees.

Although this scoring system has had its use in research studies it is not the only observation that should be made in a clinical examination. Hypermobility is often found at the jaw, neck, shoulders, other small joints of the hands and feet, hips, ankles and mid-foot.

**What other problems might a person with hypermobility have to suggest there is an underlying medical condition?**

The things individuals might most often present with beyond joint problems include:

- Easy bruising, scarring that is stretched, thin and often wrinkled, and stretch marks that appeared at a young age and in many places across the body. The skin often feels soft and velvety;
- Weakness of the abdominal and pelvic wall muscles that presents as hernias (such as hiatus hernia) or prolapse of the pelvic floor causing problems with bowel and bladder function;
- Unexplained chest pains – perhaps the individual has been told they have a heart murmur and mitral valve prolapse;
- Blackouts or near blackouts that may be associated with low blood pressure or fast heart rate, and often triggered by change in posture from lying/sitting to standing, or after standing in one position for even just a few minutes.
- Symptoms that sound like Irritable Bowel Syndrome with bloating, constipation, and cramp-like abdominal pain
- Shortness of breath, perhaps diagnosed as asthma because the symptoms seem the same, but not responding to inhalers in the way the doctor might have expected, because it is not true asthma;
- Noticing that local anaesthetics, used for example in dentistry, do not seem to be very effective or require much more than might be expected;
- Severe fatigue;
- Anxiety and phobias.
These are often found in JHS and the most common form of Ehlers-Danlos Syndrome – EDS-HM. Aside from the joint problems described earlier, a person might have none or may have any combination of these, or indeed may never develop these problems.

There are a number of ways in which all these concerns can be investigated and managed with the support of doctors, nurses, physiotherapists, occupational therapists, and allied health professionals with expertise in this area of healthcare and wellbeing. More information on the various aspects of care is available throughout the HMSA website – see the ‘Booklets and Books’, and ‘Help and Advice’ pages.

**How do the hypermobility syndromes overlap?**

The image below depicts the overlap between JHS, EDS, Marfan Syndrome, and to some degree Osteogenesis Imperfecta. Clinically the diagnosis of JHS and EDS-HM is all about the degree of severity of physical signs but also, and very important, the exclusion of any concern that there may be Marfan Syndrome, Vascular EDS or fractures associated with Osteogenesis Imperfecta.

There are a number of more rare variants of EDS such as the Classical and Vascular types where individuals have very severe bruising, lax skin, and scarring. In the Vascular type there is a risk of rupture of blood vessel. More can be found out about these by clicking on the link at the end of this article.

In Marfan Syndrome the key risks are blood vessel and heart problems (including tears and ruptures of vessels and leaking of the aortic valve of the heart). In addition eye lens problems may occur. Fortunately these are not features of the more common conditions such as JHS and EDS-HM. The marfanoid body shape is a common feature of Marfan Syndrome. It may also be present in JHS and EDS-HM but here it is not associated with the risks of developing the vascular or eye problems.
Some individuals with JHS or EDS-HM may have moderately low bone density but not necessarily the very low density that one sees in osteoporosis. This moderately low bone density is called ‘osteopenia’. It would be unusual to see a JHS and EDS-HM person develop lots of fractures as a child or young adult. If this should occur then Osteogenesis Imperfecta should be considered and excluded.

Is there a difference between Joint Hypermobility Syndrome and Ehlers-Danlos Syndrome?

The most important thing to appreciate is that the investigations, management, and advice are exactly the same for both JHS and EDS-HM.

JHS and EDS-HM are the most common of the hypermobility conditions. The terminology can get a little confusing because some experts will use them interchangeably. Also EDS-HM was formerly called EDS-Type III, but the numbering system for the various types of EDS has changed.

The criteria for diagnosing JHS (the Brighton Criteria) arose from recognizing an association between hypermobility, acute injury to joints and soft tissues and chronic pain. Initially it included things like mild variants of the skin changes described above, and the often-found body shape called the marfanoid habitus. It then developed further over the last decade as associations with, for example, bowel, autonomic cardiovascular, and pelvic floor problems became clear. These new findings, however, have not yet been incorporated into the formal criteria for JHS.

The criteria for EDS-HM is based on observation of minor clinical features often seen in other forms of EDS and that the person is hypermobile and experiences chronic pain. These might include clinical findings such as severe dislocations, more florid skin signs (in particularly increased elasticity), a large curvature of the spine (a scoliosis), prolapse of the mitral valve of the heart, or association with dental or gum disease. However, these patients will also exhibit the same findings as those described for JHS.

Currently there is no genetic test that can identify either condition or separate them.

Some experts now consider JHS and EDS-HM to be the same condition, albeit derived from different clinical perspectives. Whether JHS or EDS-HM is diagnosed is down to clinical judgement. There is no absolute medical consensus on this matter. A doctor might, for example, use one term rather than the other dependent on the type and severity of issues present. EDS-HM might be the preferred name to give an individuals’ condition if there are findings such as those described above (severe dislocations, more florid skin signs, etc.). However, again only for example, the term JHS might be the preferred term if the principle issue is one of joint pain around hypermobile non-dislocating joints with few other signs.
Academic References


JUVENILE IDIOPATHIC ARTHRITIS

What is it?
Juvenile idiopathic arthritis (JIA) is a chronic disease characterized by persistent joint inflammation; the typical signs of joint inflammation are pain, swelling and limitation of movement. “Idiopathic” means that we don’t know the cause of the disease and “juvenile”, in this case, means that symptoms appear before 16 years of age.

What does chronic disease mean?
A disease is said to be chronic when the appropriate treatment does not lead to an immediate recovery, but only to an improvement of symptoms and laboratory test results. This also means that when the diagnosis is made, it is impossible to say for how long the child is going to be sick.

How frequent is it?
JIA is a rare disease that affects about 80-90 per 100,000 children.

What are the causes of the disease?
Our immune system protects us from infections (virus and bacteria). In doing so, it is able to distinguish what is harmless and part of our body and what is foreign and potentially dangerous, which it destroys.

It is believed that chronic arthritis is a consequence of an abnormal response of our immune system, which, due to unknown causes, loses part of its capacity to distinguish between dangerous and normal cells and attacks its own joint components. For this reason, diseases such as JIA are called autoimmune, meaning that the immune system reacts against the organs of its own body. However, the precise mechanisms which cause JIA, as with as most human chronic inflammatory diseases, are unknown.

Is it a hereditary disease?
JIA is not a hereditary disease, since it cannot be transmitted directly from parents to their children. Nevertheless, there are some genetic factors, largely still to be discovered, that increase the chance of developing the disease. The agreement in the scientific community is that this disease is multifactorial, which means it is the result of a combination of genetic factors and exposure to environmental factors (probably infections). Even when there may be a genetic predisposition, it is very rare to have two children affected in the same family.

How is it diagnosed?
Doctors diagnose someone as having JIA when the onset of the disease is before the age of 16, arthritis lasts for more than six weeks and the causes are unknown (which means that all other diseases responsible for arthritis have been ruled out). The arthritis must be present for more than six weeks in order to exclude forms of temporary arthritis that may follow viral infections. The diagnosis of JIA is, therefore, based on the presence and persistence of arthritis and the careful exclusion of any other disease by medical history, physical examination and laboratory tests.

What happens to the joints?
The synovial membrane is the cellular lining surrounding the joint and is usually very thin. In JIA it becomes much thicker and filled with inflammatory cells, while the amount of the synovial fluid inside it increases. This causes swelling, pain and limitation of movement. A characteristic feature of joint inflammation is joint stiffness, which occurs after prolonged rest. It is, therefore, particularly pronounced in the morning (and referred to as morning stiffness).

Often the child attempts to reduce pain by keeping the joint in a position half-way between flexion (fully bent) and extension (straight), this position is called antalgic indicating the fact that it is maintained to reduce pain.

If not properly treated, joint inflammation may produce damage by two main mechanisms:

a) The synovial membrane may get very thick and form what is called the synovial pannus, which, through the release of various substances, provokes the erosion of articular cartilage and bone.

b) Keeping the joint in the antalgic position for a long time causes muscle atrophy, which is the wasting away of muscles and soft tissues, leading to flexion deformity.

Are there different types of the disease?
There are several different forms of JIA. They are mainly distinguished on the presence or absence of systemic symptoms. Systemic symptoms are symptoms that affect many organs, such as fever or rash and on the number of joints involved. By convention, the different forms of JIA are defined according to the symptoms presented during the first six months of the disease. For this reason, they are often referred as onset forms.
**Systemic JIA.** This form is diagnosed because of the presence of systemic features, besides arthritis. The main systemic symptom is represented by high spiking fever, often accompanied by a salmon coloured rash that appears during fever spikes. Other symptoms may include muscle pain, enlargement of the liver, spleen or lymph nodes (groups of cells that filter out bacteria etc., as a critical part of the immune system), and inflammation of membranes around the heart (pericarditis) and lungs (pleuritis). Arthritis may be present at disease onset, or appear later on. The disease may affect children at any age.

About half of all patients are diagnosed with systemic features. These patients tend to have the best long-term prognosis (predicted outcome). In the other half of patients, systemic symptoms often tend to subside with time and joint involvement becomes more important. In a minority of these patients, systemic symptoms persist together with joint involvement.

Systemic JIA accounts for less than 10% of all JIA cases, but is seldom observed in adults.

**Polyarticular JIA.** This is diagnosed because of the involvement of five or more joints during the first six months of disease and in the absence of the above mentioned systemic symptoms. The presence or absence of an autoantibody in the blood called rheumatoid factor (RF) allows for polyarticular JIA to be distinguished into two subforms: RF negative and RF positive.

1) **RF positive polyarticular JIA.** This is rare in children (<5% of all JIA patients). It is considered the equivalent of adult RF positive rheumatoid arthritis (the major type of chronic arthritis in adults). It often causes symmetric arthritis affecting mainly the small joints of hands and feet, initially, extending to the other joints as disease progresses. It is much more common in females than in males and usually has its onset after 10 years of age. It is often a severe form of arthritis.

2) **RF negative polyarticular JIA.** This accounts for 15-20% of all JIA cases and can occur at any age. It is a complex form, which probably includes different diseases. The variable course and eventual outcome of the disease in different patients reflect this complexity.

**Oligoarticular JIA.** This is diagnosed when less than five joints are involved in the first six months of disease and there are no systemic symptoms. It affects large joints (such as knees and ankles) in an asymmetrical way. Sometimes, only one joint is affected (called the monoarticular form). In some patients the number of joints affected increases after the first six months of disease to five or more, this is called extended oligoarthritis. Oligoarthritis usually has its onset before the age of six and is mainly observed in females. With appropriate treatment, there is a good chance of maintaining full joint use where the disease remains limited to a few joints. It is harder to predict the long term outcome for those patients who develop an extension of articular involvement. A consistent proportion of patients can develop problems with their sight (anterior uveitis), the inflammation of the sheet enveloping the eye and containing its vascular supply (the vessels that provide blood). Since the iris and the ciliary body form this part of the eye, the complication is called chronic anterior uveitis, or chronic iridocyclitis.

If unrecognized and left untreated, anterior uveitis progresses and can cause very serious damage to the eye. Early recognition of this complication is, therefore, of utmost importance. Since anterior uveitis may not be noticed by parents or clinicians, as there are no obvious symptoms, it is imperative for children at high risk to have periodic eye check-ups with an ophthalmologist every three months, using a particular instrument called a slit lamp.

Oligoarthritis is the most frequent form of JIA, accounting for 50% of cases. The ANA positive type (see Laboratory exams), combined with uveitis, is a disease typical of childhood, but is not observed in adults.
Psoriatic arthritis. This is diagnosed by the presence of arthritis, associated with psoriasis or psoriatic features. Psoriasis is a skin disease with patches of scaling skin, mainly located over the elbows and the knees. The skin disease may precede or follow the onset of arthritis.

This form is complex in clinical manifestations and prognosis.

Arthritis associated with enthesitis. The most common manifestation is an oligoarthritis, mainly affecting the large joints of the lower limbs and associated with enthesitis. Enthesitis is the inflammation of the enthesis, the point of insertion of tendons over bones. The most common site of pain in this form of arthritis is localized in the foot, behind or below the heel. Sometimes these patients may present with an acute anterior uveitis. Unlike the oligoarticular form, anterior uveitis associated with enthesitis may cause red eye, lachrymation (excessive watering of the eyes), or increased sensitivity to light. Most patients are positive for a laboratory test called HLA-B27. The disease affects predominantly males and usually begins after seven or eight years of age. The course of disease in this form is variable. In some patients the disease remits, while in others it extends to affect the spinal region. Initially, with the involvement of the sacroiliac joints (around the lower back). Indeed, this form belongs to a group of diseases that are more frequent in adults and are called spondyloarthropathies, since they can affect the spine.

What causes chronic iridocyclitis? Is there a relationship with arthritis? As with arthritis, eye inflammation is caused by an abnormal immune response against the eye (an autoimmune response). The precise biological mechanisms involved are unknown.

This complication is mainly observed in patients with the oligoarticular type of arthritis. These patients tend to be of a younger age, with a positive laboratory test called antinuclear antibodies (ANA).

It is not known why iridocyclitis is linked with articular disease. It is important to remember that arthritis and iridocyclitis may follow independent courses, so periodic slit lamp examinations have to be continued even if arthritis goes into remission. Periodic flares, independent of the arthritis flares, characterize the course of iridocyclitis.

Iridocyclitis usually follows the onset of arthritis, or may be detected at the same time. It can precede arthritis, but this is rare. These are usually the most unfortunate cases, since the disease is asymptomatic, iridocyclitis is not discovered until it has already caused some symptomatic complications like visual disturbances.

Is the disease in children different from the disease in adults? Mostly, yes. The polyarticular RF positive form, which is responsible for about 70% of adult rheumatoid arthritis cases, accounts for less than 5% of cases of JIA. The oligoarticular form with early onset represents about 50% of JIA cases and is not observed in adults at all. Systemic arthritis is characteristic of children and is seldom observed in adults.

What laboratory exams are needed? At the time of diagnosis, some laboratory examinations help to better define the type of JIA a patient is suffering from. They can also help to identify patients at risk of developing some complications, such as chronic iridocyclitis.

Rheumatoid factor (RF) is an autoantibody that is positive and in high concentration only in the polyarticular form of JIA, which is the childhood equivalent of RF positive adult rheumatoid arthritis.
Antinuclear antibodies (ANA) are frequently positive in patients with oligoarticular early-onset JIA. This identifies JIA patients at high risk of developing chronic iridocyclitis and who have to have an ocular examination with a slit lamp every three months.

HLA-B27 is a cellular marker that is positive in up to 80% of patients with enthesitis associated arthritis. Its frequency in the general, healthy population is much lower (5-8%).

Other exams, such as erythrocyte sedimentation rate (ESR), or C-reactive protein (CRP), measure the extent of general inflammation and are useful in disease management, along with clinical examinations. Periodic X-ray examinations are useful to assess potential disease progression and, therefore, to ensure the therapeutic regimen remains appropriate. Depending on the drug regimen, patients may need periodic laboratory examinations to assess potential drug toxicity.

How can we treat it?
There is no specific therapy to cure JIA. The aim of treatment is to allow children to conduct a normal life and prevent joint and organ damage, while waiting for spontaneous disease remission. Treatment is based mainly on the use of drugs that inhibit inflammation and on rehabilitation procedures that preserve joint function and help to prevent deformities. Therapy is complex and needs the cooperation of different specialists (e.g. paediatric rheumatologists, orthopaedic surgeons, physical and occupational therapists, ophthalmologists).

1) Non-steroidal anti-inflammatory drugs (NSAIDs). They are symptomatic anti-inflammatory and antipyretic (controls fever) medications. Symptomatic means that they cannot induce disease remission, but serve to controls symptoms due to inflammation. The most widely used are naproxen and ibuprofen. Aspirin, although effective and cheap, is much less used nowadays, because of its risk of toxicity. NSAIDs are usually well tolerated and gastric discomfort, the most common side effect in adults, is uncommon in children. NSAIDs are not prescribed in association with one another, but one NSAID may be effective where another has failed. The optimal effect on joint inflammation occurs after several weeks of therapy.

2) Joint injections. These are used when few joints are involved and there is a risk of long term damage. The drug injected is a long-acting steroid preparation. Triamcinolone hexacetonide is preferred for its prolonged effect (frequently many months).

3) Second level drugs. These are prescribed for children that have a progressive polyarthritis despite adequate therapy with NSAIDs and steroid injections. Second level drugs are added to previous NSAID therapy, which therefore, has to be continued. The effect of most second level drugs only becomes fully evident after several weeks or months of treatment.

The drug of first choice is low-dose weekly methotrexate, as it is effective in the majority of patients. It has an anti-inflammatory activity, but is also able, in some patients, to induce disease remission, although it is not yet understood how this happens. It is usually well tolerated, with gastric intolerance and an increase in transaminase levels (a type of enzyme), representing the most common side effects. Potential toxicity needs monitoring during treatment with periodic laboratory tests, as discussed above. Folic acid, a vitamin, diminishes the risk of side effects.

Salazopyrine has also been showed to be effective in JIA, but is usually not as well tolerated as methotrexate. The experience with salazopyrine is much more limited than with methotrexate. So far, no proper studies have been conducted in JIA to assess the efficacy of other potentially useful drugs, such as cyclosporin or leflunomide. Cyclosporin is a valuable drug for the treatment of steroid-resistant macrophage activation syndrome (a serious complication in many childhood inflammatory disorders). This is a severe and potentially life-threatening complication of systemic JIA, which is
secondary to a massive general activation of the inflammatory process. Very little information about the use of leflunomide on children is available.

In the last few years anti-TNF drugs have been introduced. Anti-TNF drugs selectively block tumor necrosis factor (TNF), an essential mediator of the inflammatory process. They are used alone, or in association with methotrexate, and are effective in most patients. Their effect is quite rapid and their safety has been shown to be good, so far, but follow-up studies are needed to establish potential long-term side effects. As with all second level drugs, they must be administered under strict medical control. Anti-TNF drugs are very expensive.

4) Corticosteroids. These are the most effective available anti-inflammatory drugs, but their use is limited because their long-term use is associated with several important side effects, including osteoporosis and stunted growth. They are, however, valuable for the treatment of systemic symptoms that are resistant to other therapies, for life threatening systemic complications and as a bridge drug to control acute disease while waiting for second level drugs to take effect. Topical steroids (eye drops) are used in the treatment of iridocyclitis. In more severe cases, steroid injections around the eye, or systemic steroid administration, may be required.

5) Orthopedic surgery. The main procedures are prosthetic joint replacement in the case of articular destruction and surgical releasing of soft tissues in the case of permanent contractures.

6) Rehabilitation. This is an essential component of treatment. It includes appropriate exercises and, where necessary, wearing splints to correct posture. It must be started early and should be performed routinely to keep the range of movement, muscle trophism and strength and to prevent, limit or correct deformities.

What are the main side effects of therapy?
The drugs used in the treatment of JIA are usually well tolerated. Gastric intolerance, the most frequent side effect of NSAIDs (which should, therefore, be taken with food), is less common in children than in adults. NSAIDs can cause increases in some liver enzymes in the blood, but this is a rare event with drugs other than aspirin.

Methotrexate is also well tolerated, but gastroenteric side effects, such as nausea and vomiting, are not uncommon. To monitor potential toxicity, it is important to perform periodic laboratory tests. The most frequent laboratory anomaly is an increase in liver enzymes, which normalizes with drug withdrawal or dose reduction. The administration of folinic or folic acid is effective in reducing the frequency of hepatic toxicity. Hypersensitivity reactions to methotrexate can occur, but are rare. Salazopyrine is reasonably well tolerated. The most frequent side effects are cutaneous rash, gastrointestinal problems, hypertransaminasemia (liver toxicity) and leukopenia (lowering of white blood cells leading to risk for infections). For these reasons, as with methotrexate, periodic laboratory examinations are needed.

Anti-TN agents are usually well tolerated, but patients should be carefully monitored for severe infections. The long-term use of steroids in significant dosage is associated with several side effects. These include stunting growth and osteoporosis. Steroids, at high doses, cause a marked increase in appetite, which leads to obesity. It is, therefore, important to instruct children to eat foods that can satisfy the appetite without increasing calorie intake.

How long should treatment last for?
Treatment should last as long as the disease persists. Disease duration is unpredictable, but, in the majority of cases, JIA goes into spontaneous remission. The course of JIA often includes periods of remission and exacerbation, which require very different treatments. Treatment is only withdrawn completely after prolonged and complete disease remission.
Eye examination (Slit lamp examination). How often is it necessary and for how long?
For patients at risk (those with an ANA positive laboratory test result), slit lamp examination has to be performed at least every three months. Those who have developed iridocyclitis should be submitted to more control tests, the frequency of which depends on the severity of eye involvement. The risk of developing iridocyclitis decreases with time, but iridocyclitis can still develop many years after arthritis onset. It is, therefore, prudent to check the eyes for many years, even if arthritis is in remission. Acute uveitis in patients with arthritis and enthesitis is symptomatic (red eye, pain and photophobia) and, therefore, there is no need of periodic slit lamp examinations for early diagnosis.

What is the long-term prognosis (predicted course of disease) of arthritis?
The prognosis of arthritis depends on its severity, the clinical form of JIA, how early treatment begins and how adequate the course of treatment followed is. The prognosis for JIA has been considerably improved by the progresses in therapy that have occurred over the last ten years.

Systemic JIA has a variable prognosis. About half of patients have few signs of arthritis and the disease is mainly characterized by periodic disease flares. The ultimate prognosis is often good, as the disease frequently goes into spontaneous remission. In the other half of patients, the disease is characterized by persistent arthritis, while systemic symptoms tend to fade. Severe articular destruction can also develop in this subset of patients. In a tiny minority of this second group of patients, systemic symptoms persist together with articular involvement. These patients have the worst prognosis and may develop amyloidosis, a severe complication requiring aggressive therapy. RF positive polyarticular JIA usually has a progressive, articular course that can lead to severe joint destruction.

RF negative Polyarticular JIA is complex, both in clinical manifestations and prognosis. The overall prognosis, however, is much better than that of RF positive polyarticular JIA, only about one quarter of patients develop articular damage.

Oligoarticular JIA has a good articular prognosis when the disease remains limited to a few joints. Patients in which the articular disease extends to involve several joints have a prognosis similar to that of patients with polyarticular RF negative JIA.

Most patients with psoriatic JIA have a disease similar to oligoarticular JIA, but have a somewhat higher tendency to become polyarticular with time.

JIA associated with enthesopathy also has a variable prognosis. In some patients the disease remits, while in others it progresses and may involve sacroiliac joints. So far, no reliable clinical or laboratory features to predict which patient will have the worst prognosis are available during the early stages of disease. Such predictors would be of considerable clinical use, since they could allow the identification of patients who should be prescribed a more aggressive treatment from the beginning of the disease.

What is the long-term prognosis of iridocyclitis?
Iridocyclitis, if left untreated, may have very serious consequences, including problems such as cloudiness of the lens of the eyes (cataract) and blindness. However, if treated in its early stages, it usually responds very well to therapy. Early diagnosis is, therefore, the major determinant of prognosis.

Are vaccinations allowed?
If a patient is being treated with an immunosuppressive therapy (steroids, methotrexate, anti-TNF etc.) vaccinations with live, micro-organisms (such as anti-rubella, antimeasles, anti-parotitis, anti-
polio Sabin and BCG) have to be postponed, because of the potential risk of infections spreading, due to the reduced immune defences. Vaccines that do not contain living micro-organisms, but only infectious proteins (anti-tetanus, antidiphtheria, anti-polio Salk, anti-hepatitis B, anti-pertussis, pneumococcus, haemophilus, meningococcus) can be performed, the only theoretical risk is vaccination failure, due to the immunosuppressive treatment.

**Can diet influence the course of the disease?**
There is no evidence that diet can influence the disease. In general the child has to take a balanced, normal diet. Overeating has to be avoided in patients taking steroids, since steroids increase the appetite.

**Can climate influence the course of the disease?**
There is no evidence that climate can affect the disease.

**Are sports allowed?**
Playing sports is an essential aspect of the everyday life of a normal child. One of the main aims of JIA therapy is to allow children to conduct a normal life and not to consider themselves different from their peers. Therefore, the general tendency is to leave patients to play the sports they want and to trust that they will stop if a joint hurts. Although mechanical stress is not beneficial in an inflamed joint, it is assumed that the little damage that could ensue, is much smaller that the psychological damage of being prevented from playing sports with friends because of the disease. This choice is part of a more general attitude that tends to encourage the child to be autonomous and able to cope with the limits imposed by the disease. As part of these considerations, it is better to favour sports in which mechanical stress to the joints is absent or minimal, such as swimming and riding a bike.

**Can the child attend school regularly?**
It is extremely important that the child attends school regularly. There are a few factors that may cause problems with school attendance though, such as difficulty in walking, minor resistance to fatigue, pain or stiffness. It is, therefore, important to explain to the teachers the child’s possible needs, which are likely to include proper tables, regular movements during school hours to avoid articular stiffness and difficulty in writing. Patients should take part in gym lessons wherever possible, but in this case the considerations discussed above in the issue of sports have to be taken into account.

School, for a child, is a place where he learns how to become an autonomous person, productive and independent. Parents and teachers have to do whatever they can to make the sick children participate in school activities in a normal way in order to have academic success. In addition to this, it is at school that the child develops the ability to communication effectively with peers and adults and to be accepted and appreciated by his friends.

**Will the child have a normal adult life?**
This is one of the main goals of therapy and it can be reached in the majority of cases. Therapy for JIA has improved dramatically in the last ten years and it is conceivable that several new drugs will be available in the near future. The combined use of pharmacological treatment and rehabilitation prevents joint damage in the majority of patients.

Major attention should also be paid to the psychological impact of the disease on the child and his family. A chronic disease like JIA is a difficult challenge for the whole family and, of course, the more serious the disease, the harder it is to cope with it. It will be difficult for the child to cope properly with his disease if the parents don’t. The parents may develop a strong attachment towards their sick child and, in order to prevent him from any possible problem, can become-overprotective. A positive attitude from parents who support and encourage the child to be as independent as possible, despite
the disease, is extremely valuable in helping the child to overcome difficulties, to successfully cope with his peers and to develop an independent, well-balance personality.

(www.pediatric-rheumathology.printo.it)

**Ehlers-Danlos Syndrome (EDS)**

Ehlers-Danlos Syndrome (EDS) is a heterogeneous group of heritable disorders of connective tissue, characterised by skin extensibility, joint hypermobility and tissue fragility. There are different types of EDS and these were reclassified into six major types in 1997. They are classified according to signs and symptoms with each type running true in a family thus an individual with one type will not have a child with a different type.

EDS is caused by a defect in a protein called collagen, of which there are more than 30 different types. It is a protein and is the main building block of the body providing strength and support. Some examples are ligaments, tendons and cartilage. Consequently, if the collagen itself is defective, it can produce many problems throughout the body.

**Prevalence**

EDS is known to affect both males and females of all races and ethnic backgrounds. The exact incidence is not known, but is estimated at 1 in 5000, however, it may be more common.

**Diagnosis**

Diagnosis is based on the presenting symptoms and family history of a patient. Many EDS sufferers, however, do not fit conveniently into the definition of a specific type, and are frequently misdiagnosed.

A skin biopsy may be taken to confirm the diagnosis and determine the type. Of the six types of EDS, there is only one type, the Hypermobility type, that does not have a specific test. In each of the other five cases, the specific gene mutation has been identified and can be tested for. Where the Hypermobility type is suspected, it is possible to examine the collagen in the skin sample for abnormalities.

**Prognosis**

The prognosis depends largely on the type of EDS the patient has. For instance, life expectancy in the Vascular Type (formerly type IV) is generally shortened to around 40 years due to the rupture of large blood vessels and the major organs. Pregnancy can be life-threatening in the Classical (formerly types I and II) and Vascular Types.

**SYMPTOMS**

**Skin**

*Hyperextensibility*

Cutaneous hyperextensibility (stretchy skin) characterises all types of EDS, except for the Vascular Type (type IV), which has noticeably translucent skin with visible veins. When skin is overstretched it still retains normal elastic recoil and snaps back once released. This is best tested at the neck, elbows, or knees.
**Cutaneous fragility**

Easy splitting of the skin is particularly common in Classical Type. Gaping, 'fish-mouth' or 'cigarette paper' scars follow minimal trauma over sites of bony prominence and areas prone to trauma such as the forehead, chin, elbows, knees, and shins.

**Epicanthic folds**

These are additional symmetrical folds of skin at the inner aspects of the eyes producing apparent broadening of the nose.

**Molluscoid pseudotumours**

These are firm, fibrous lumps measuring up to 2 - 3 cm which develop over pressure points such as the elbows and knees.

**Spheroids**

Approximately one third of affected individuals describe small, firm nodules like 'ball-bearings' just beneath the skin (sub cutis). These consist of fibrotic and calcified fat which overlay bony areas such as the shins.

**Piezogenic papules**

These small, soft, skin-coloured lumps appear on the side of the heel when standing and disappear when the foot is elevated. Although usually symptom-less they can occasionally be painful.

**Varicose veins**

These are more common in many types of EDS, than in the general population.

**Joints**

Joints are hypermobile (lax) due to the extra elasticity of the ligaments resulting from the collagen abnormality. The degree of hypermobility is assessed using the Beighton Scale. A score of 5/9 or higher defines hypermobility.

The laxity of the joints makes them susceptible to subluxation and dislocation, of which the patient often has a history. This often occurs without significant trauma as would be necessary to cause dislocation in somebody who does not have EDS. Those with the Vascular Type do not generally exhibit joint laxity.

Pain is a common feature with hypermobile joints, even when skeletal X-Rays are normal.

**Bruising and Haematomas**

Easy bruising, accompanies most forms of EDS, often as a result of minimal trauma. This implies increased fragility of dermal blood capillaries and poor structural integrity of the skin. When bruising presents in a child it may be incorrectly attributed to non-accidental injury.

**Mitral Valve Prolapse**

This is quite common and should be diagnosed by echocardiography, CT or MRI.

**Less Common Features**
Arterial, uterine and intestinal ruptures may occur due to the fragility of tissues. These ruptures are more commonly found in the Vascular Type, but also occur in other types. Inguinal and hiatus hernias are also relatively common.
Scoliosis (bend in the spine) may be present at birth or can develop in later life.
Gum disease.
Gastrointestinal diverticula.

TREATMENT AND MANAGEMENT

This depends on the presenting symptoms but simple precautionary measures will greatly lessen the chances of accidental trauma, scarring and bruising. It is important to carefully balance the advantages of less frequent injuries and the disadvantages of over-protection in a child. Simple measures like padding of the lower legs and elbows in children may reduce the number of injuries.

Surgery and skin suture should be undertaken with great care as fragile tissues may tear. Sutures need to be left in longer than normal.

Bracing may be used to support unstable joints. Orthopaedic surgery may be necessary but is not always successful.

Physiotherapy and Occupational Therapy advice may be sort to strengthen muscles and teach aids to daily living.

Psychological

The main problem with having Ehlers-Danlos Syndrome is that the person can look very fit and may often not be believed that they have joint pain etc. Diagnosis is often delayed and misdiagnosis is relatively common. Some forms of EDS may be misdiagnosed as child abuse/self-inflicted injury.

Where there is severe skin involvement scarring can be severe and the person needs to learn to cope with disfigurement.

The views expressed are those of the author(s) and should not be construed to represent the opinions or policy of the Ehlers-Danlos Support Group or its Trustees.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CLINICAL FEATURES</th>
<th>INHERITANCE</th>
<th>BASIC DEFECT</th>
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<tbody>
<tr>
<td>CLASSICAL (formerly EDS I &amp; II gravis and mitis type)</td>
<td>Major: Skin hyperextensibility; widened thin scars; joint hypermobility</td>
<td>dominant</td>
<td>Abnormality of the pro alpha 1 (V) or pro alpha 2 (V) chain of the type V collagen encoded by COL5A1 and COL5A2 genes (in some but not all families).</td>
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<tr>
<td></td>
<td>Minor: Smooth velvety skin; molluscoid pseudotumours; complications of loose joints; muscle hypotonia; easy bruising; manifestations of tissue extensibility (hernia, cervical insufficiency, etc.); positive family history.</td>
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</tr>
<tr>
<td>HYPERMOBILITY (formerly EDS III hypermobile type )</td>
<td>Major: Generalised joint hypermobility; skin hyperextensibility and smooth or velvety.</td>
<td>dominant</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Minor: Recurrent joint dislocations; chronic limb and joint pains; positive family history.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VASCULAR (formerly EDS IV arterial or ecchymotic type)</td>
<td>Major: Arterial/intestinal/uterine fragility or rupture; easy bruising; characteristic facial appearance.</td>
<td>dominant</td>
<td>Structural defects in the proa 1 (III) chain of collagen type III, encoded by the COL3A1 gene.</td>
</tr>
<tr>
<td></td>
<td>Minor: Hypermobility of small joints; tendon and</td>
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</tbody>
</table>
| **KYPHOSCOLIOSIS**  
(formerly EDS VI ocular or scoliosis type) | **Major:** Generalised joint laxity; severe muscle hypotonia in infancy; scoliosis present at birth and progressive; fragility of the sclera of the eye.  
**Minor:** Tissue fragility; easy bruising; arterial rupture; Marfanoid body shape; microcornea; skeletal osteopenia on X-ray; positive family history of affected siblings. | recessive | Deficiency of lysyl hydroxylase, a collagen modifying enzyme. |
|---|---|---|---|
| **ARTHROCHALASIA**  
(formerly included in EDS VII) | **Major:** Severe generalised joint hypermobility with dislocations; congenital bilateral hip dislocation.  
**Minor:** Skin hyperextensibility; tissue fragility and scarring; easy bruising; muscle hypotonia; Kyphoscoliosis; skeletal osteopenia on X-ray; positive family history. | dominant | Deficiencies of the proa(1) or proa 2(1) chains of collagen type due to skipping of exon 6 in the COL1A1 or COL1A2 gene. |
| **DERMATOSPRAXIS**  
(formerly included in EDS VII) | **Major:** Severe skin fragility; sagging, redundant skin.  
**Minor:** Soft, doughy skin texture, easy bruising; premature rupture of foetal membranes; hernias. | dominant | Deficiency of procollagen 1 N-terminal peptidase in collagen type 1. |

http://www.ehlers-danlos.org/component/content/article/10-medical-information/medical/3-what-is-eds