



## Association of hyperlaxity (Hypermobility) syndrome with both protruded upper teeth and nocturnal enuresis

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### Abstract

Throughout children examination for protruded upper teeth and night bed wetting (Nocturnal Enuresis) it has been noticed that a lot of them have hyperlaxity (Hypermobility) syndrome of some sort. This triggered the idea of studying the relationship between hyperlaxity (Hypermobility) syndrome and both the protruded upper teeth and nocturnal enuresis. A group of children, aged 3-16 years old, were evaluated in the past two years. Comorbid symptoms have also been recorded such as deep sleep disorders; ADHD; upper adenoid and developmental delays in those patients. It has also been noticed comorbidity such as mandibular joints laxity associated with slow speech and poor appetite, learning difficulties, speech disturbances, attitude upright deficit and flat feet in addition to FMD (Fine motor Deficit). It has been found that patients with normal hemoglobin figures also have shown slow speech and poor appetite. This may be due to hypermobility of the mandibular joints. However, they have greatly improved with the logopaed therapy along with our recommendations of Swedish sports gymnastics, swimming and horse riding to be done. It has been found out that 50% of the sample study children had hyperlaxity (Hypermobility) syndrome had also Nocturnal Enuresis as well as 70% of the sample children with protruded upper teeth.

**Keywords:** Children, Hyperlaxity syndrome, Protruded upper teeth, Nocturnal enuresis.

### Introduction

This document is a research paper to establish and prove the association of hyperlaxity (Hypermobility) syndrome with both nocturnal enuresis and protruded upper teeth. It includes a description of these syndromes and their symptoms with reference to all comorbidities. Statistical analysis is used to illustrate results of the research with a graph. nocturnal enuresis (night time bed wetting) is the involuntary wetting during sleep without any inherent suggestion of frequency of bedwetting and pathophysiology (Monda and Douglas, 1995; Braith, *et al.*, 1996).

Primary nocturnal enuresis: is the recurrent involuntary passage of urine during sleep by children aged 4 years or older who have never achieved consistent night-time dryness often represents developmental delay, which resolves in time. Secondary nocturnal enuresis: is the involuntary passage of urine during sleep by children who have previously been dry for at least 6 months. Hyperlaxity (Hypermobility) syndrome is the term used to describe the ability to move the joints beyond the normal range of movement. Joint Hypermobility is common in general population it may be present just in few joints or it may be

widespread in several joints. Commonly not considered a symptom of hypermobility and might even be an advantage for dancers, musicians and athletes (Leonard and Plant, 2003; Perrault *et al.*, 1994).

Joint hypermobility is commonly found in a group of conditions called hereditary disorders of connective tissue such as Ehlers-Danlos which is an inherited connective tissue disorder with different presentations that have been classified into several primary types. EDS is caused by a defect in the structure, production, or processing of collagen or proteins that interact with collagen, such as mutations in the COL5A or COL3A genes and Marfan syndrome is a genetic disorder caused by the misfolding of the protein fibrillin-1 which is coded by the gene FBN1 (Arnell *et al.*, 1997).

Hyperlaxity (Hypermobility) syndrome is generally considered to comprise hypermobility together with other symptoms. It is relatively common among children. Nocturnal enuresis or nighttime urinary incontinence, commonly called bedwetting, or "sleepwetting" is involuntary urination while asleep after the age at which bladder control usually occurs (Starfeld, 1967).

Protrusion is characterized by the upper teeth extending too far forward or the lower teeth not extending far enough forward. The upper front teeth that protrude beyond normal contact with the lower front teeth sometimes referred to as "overjet" (Wille, 1994).

This association has neither been studied before nor mentioned in a research or medical textbook.

### Materials and Methods

After the examination of many children, aged 3-16 years of age, who were suffering from either nocturnal enuresis or protruded upper teeth or hyperlaxity (Hypermobility) syndrome it has been noticed that there is relationship between the three syndromes. It has been decided that this case must be taken further for a dedicated study. This has also been identified through other symptoms of other cases such as deep Sleep disorder, FMD, speech difficulties, learning disabilities, ADHD, delay of cognitive development and other cases. Table (1) shows the percentage of each in the study sample. In addition to variations of the hypermobility (Hyperlaxity), there are also speech disturbances, slow speech, poor appetite, learning disability, hyperactivity, syndromes as Asperger autistic spectrum disorder pervasive developmental delay and other variations.

A sample of 412 patients was taken for the study over a period of two years. There were 230 males and 182 Females. There were 208 patients with nocturnal enuresis case, 288 patients with protruded upper teeth where 407 patients are found with (Hypermobility) hyperlaxity syndrome. This result called for the study where percentage wise of the sample 99% had the hyperlaxity (Hypermobility) syndrome and 50% had the nocturnal enuresis and 70% had protruded upper teeth.

### Results and Discussion

As shown in Table (2) there are comorbid syndromes along with the hyperlaxity (Hypermobility) syndrome but had not been significant enough to trigger an alert. For example there were 14% with deep sleep disorders with the 99% of hyperlaxity (Hypermobility) syndrome cases but this was not enough to show any significance. However, the significant results were in cases of patients with nocturnal enuresis and protruded upper teeth that had a pattern that was established in this study. Other noted cases are slow speech due to variation of hyperlaxity associated with poor appetite was also found in the sample.

There were some patients of the sample with psychogenic trauma (post-accident family ill structure and other problems) that developed night

bed wetting which improved after psycho-behavioral therapy. Patients with high dose of coca cola suffered from night bed wetting have been treated by refraining from coca cola drinking.

Data was collected over the two years and stored for further study. The sample then analyzed and the Tables and Figures represent this data. The highest scores were for the (Hypermobility) hyperlaxity syndrome, the nocturnal enuresis and protruded upper teeth.

Looking back at the causes of each of these syndromes we find that hyperlaxity (Hypermobility) syndrome tends to be inherited in specific genes passed on by parents to their children. It is felt that these certain genes predispose to the development of hypermobile joints. As a result, there is a tendency of the condition to run in families (familial). Genes that are responsible for the production of collagen, an important protein that helps to glue tissues together, are suspected of playing a role. Joint Hypermobility is also a feature of a rare, inherited, more significant medical condition called Ehlers-Danlos syndrome, which is characterized by weakness of the connective tissues of the body. Joint hypermobility is commonly seen in people with down syndrome (Medicinenet.com, 2014). The nocturnal enuresis (bedwetting) is just a developmental delay—not an emotional problem or physical illness. Only a small percentage (5% to 10%) of bedwetting cases is caused by specific medical situations. Bedwetting is frequently associated with a family history (hereditary) of the condition (Wikipedia, 2014). The protruded upper teeth is an extended (protruding) jaw can be part of the normal facial shape a person is born with. It can also be caused by inherited conditions such as Crouzon syndrome or basal cell nevus syndrome. It may develop over time in children or adults as the result of conditions such as gigantism or acromegaly (Medicinenet.com, 2014). Looking back at the causes above we notice that there is a common cause among them. This is being Inherited or of a family history nature. Data were input to an excel sheet and the tables shown below are the data entered and the Figures rested from the tables. From the Figures we can identify the three cases that represent the highest scores in the sample that was examined over two years.

**Table (1): Shows Male/Female ratios in the sample.**

Gender	Sample number	Percentage
Male	230	0.56
Female	182	0.44
<b>Total</b>	<b>412</b>	

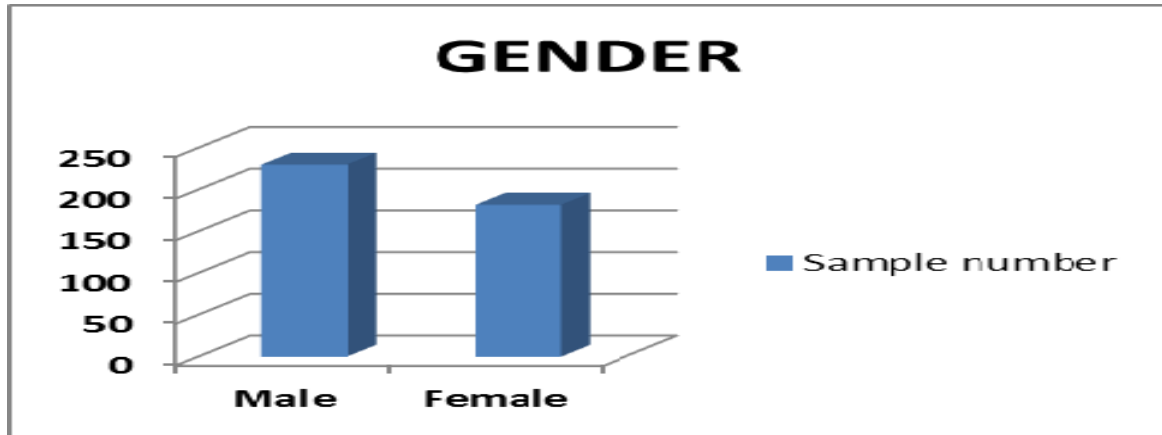


Figure (1): Shows Male/Female ratios in the sample.

Table (2): Shows ratios of syndromes occurrence in the sample.

Syndrome	Female	Male	Number	Percentage
D1 (NOCTURNAL ENURESIS)	77	131	208	0.50
D2 (HYPERLAXITY)	181	226	407	0.99
D3 (DEEP SLEEP DISORDER)	25	34	59	0.14
D4 (F.M.D)	19	34	53	0.13
D5 (SPEECH DIFFICULTIES)	61	85	146	0.35
D6 (LEARNING DISABILITIES)	9	12	21	0.05
D7 (ADHD)	6	13	19	0.05
D8 (PROTRUDED UPPER TEETH)	138	150	288	0.70
D9 (ATTITUDE UPPER DEFICIT)	4	12	16	0.04
D10 (DELAY OF COGNITIVE DEVELOPMENT)	0	2	2	0.00
D11 (SLOW SPEECH)	58	81	139	0.34
D12 (FLAT FEET)	48	58	106	0.26
D13 (POOR APPETITE)	10	8	18	0.04

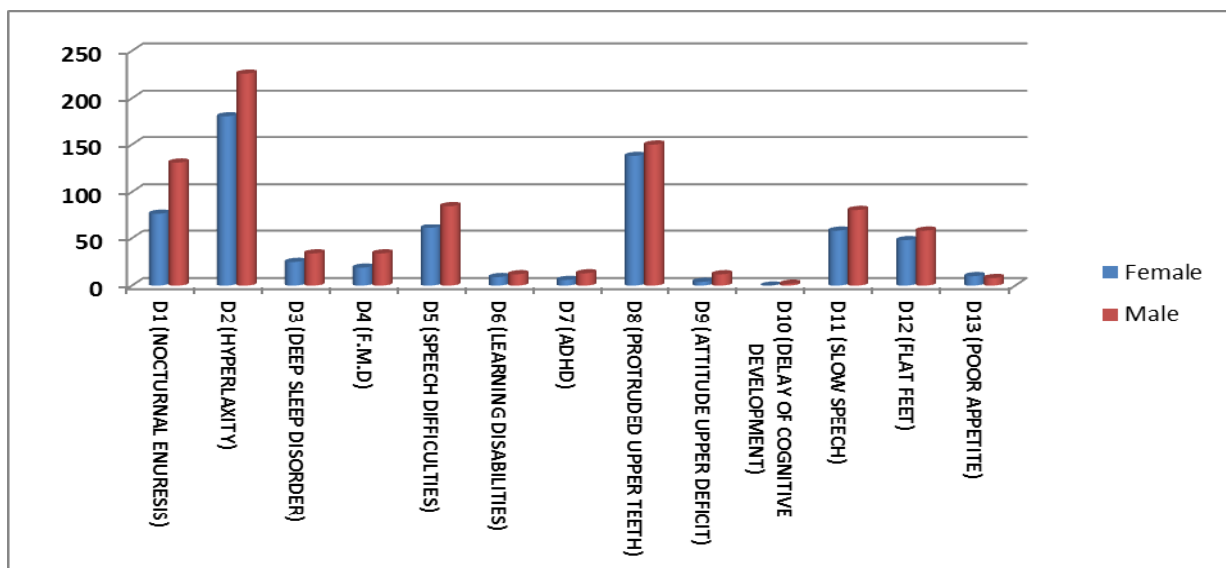


Figure (2): Shows ratios of syndromes occurrence in the sample.

From the sample studied it has been found that the most three related are the (Hypermobility) hyperlaxity syndrome, nocturnal enuresis, and protruding upper teeth. This means it is possible to conclude that if a child has the hyperlaxity (Hypermobility) syndrome will also have nocturnal enuresis or protruding upper teeth as well and vice versa with the corresponding percentages found. Also similarly, it can be speculated that if a patient has protruding upper teeth, it could possibly that he will either have hyperlaxity (Hypermobility) syndrome or nocturnal enuresis. Therefore, any combination of these cases can occur with a patient at the same time similar to other comorbidity.

It can also be seen that "male" patients are more frequent than "females" in the sample across the board. Slow speech, speech difficulties and flat feet are seen to have a relatively significant numbers, but this does not seem to be indicative.

The results have shown evidence that there is a relationship between the most occurring cases in the sample, namely protruding upper teeth, hyperlaxity (Hypermobility) syndrome and nocturnal enuresis. Studying the causes of each of these cases it showed that the three of them had to a certain extent hereditary causes (i.e. through genes). However, the findings suggest that considering hereditary issues could be an important approach to managing the range of symptoms reported in these patients and the interrelationship between the three comorbid.

### Conclusions

In this part of the world where interfamily arranged marriage is quite common and occurring frequently, where this in its turn hosts a high possibility of transferring hereditary disorders, it is only evident that more than one occurrence of the three cases can exhibit in one patient. It is believed, as a result of this study, that if these types of family relationship refrain from holding this type of intermarriage, it will dramatically reduce the occurrence of these cases, and eventually, reduce the occurrence of them in the society.

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