



## Joint Hypermobility and the Brain

Dr Jessica Eccles

**Background - As readers are aware, joint hypermobility is a common but often poorly recognised condition. There is growing interest in how joint hypermobility affects systems in the body outside of the musculoskeletal system. An evolving body of scientific work links joint hypermobility to symptoms in the brain, notably anxiety and panic.**

If you suffer with anxiety or have a panic attack you are considerably more likely than chance to also have hypermobile joints. It is also known that joint hypermobility is more common in conditions such as irritable bowel syndrome, fibromyalgia and chronic fatigue syndrome, all of which are sensitive to emotional and physical stress.

It seems that people with joint hypermobility often have particularly sensitive flight or fight nervous systems and there is a clear link between hypermobility and postural tachycardia syndrome (PoTS – where heart beat rises on standing with associated dizziness and sensation of racing heart). The symptoms of PoTS – due to unusually reactive flight or fight nervous system – are very similar (if not the same) as the physical symptoms people experience with anxiety or panic.

Our research group at Brighton and Sussex Medical School is particularly interested in how the flight or fight nervous system affects emotion regulation and the relationship between brain and body. We therefore decided to investigate the link between joint hypermobility and anxiety using brain imaging to look and see if there were any areas of the brain that were different in joint hypermobility. No one has done this before.

### Methods

Seventy two healthy volunteers were recruited – they did not have a clinical diagnosis of anxiety disorder or joint hypermobility syndrome. They were assessed for joint hypermobility using the Beighton scale and awareness of internal bodily sensations was measured using the Porges Body Perception Questionnaire.

Anxiety was also quantified using the Beck Anxiety Inventory. They underwent structural magnetic resonance imaging (MRI) using a standard protocol. The participants were divided into two groups – those with no hypermobility and those with any hypermobility. Using a standard imaging programme (SPM) we looked for differences in brain structure between the two groups after correcting for factors such as age, sex and handedness.

In line with standard practice all results are reported as statistically significant if the probability of them occurring by chance is less than five percent ( $p < 0.05$ )

### Results

Half of the group displayed a degree of hypermobility. This group did not score statistically significantly higher on anxiety scores but did score significantly higher on a measure of awareness of internal bodily sensations

## Joint Hypermobility and the Brain

Dr Jessica Eccles

(interoceptive awareness). The largest finding in brain differences between the groups was an area of the brain called the amygdala, which was larger in the hypermobile group. In addition we found that the greater the degree of hypermobility, the smaller two other regions of the brain were - the superior temporal cortex and the inferior parietal cortex.

### Discussion

We found differences in parts of the brain that are key to emotion processing, especially of fear – the amygdala - in people with joint hypermobility. Amygdala abnormalities are also found in many pain disorders such as fibromyalgia, irritable bowel syndrome and chronic regional pain syndrome.

The superior temporal cortex is also an interesting finding given that this region of the brain is implicated in processing social and emotional signals and is altered in autism – there is anecdotal evidence linking hypermobility to neurodevelopmental conditions such as ADHD and Autism. The differences in parietal cortex are particularly interesting as it is this part of the brain that represents where we are in space. Hypermobility is linked with a difficulty with this – dyspraxia.

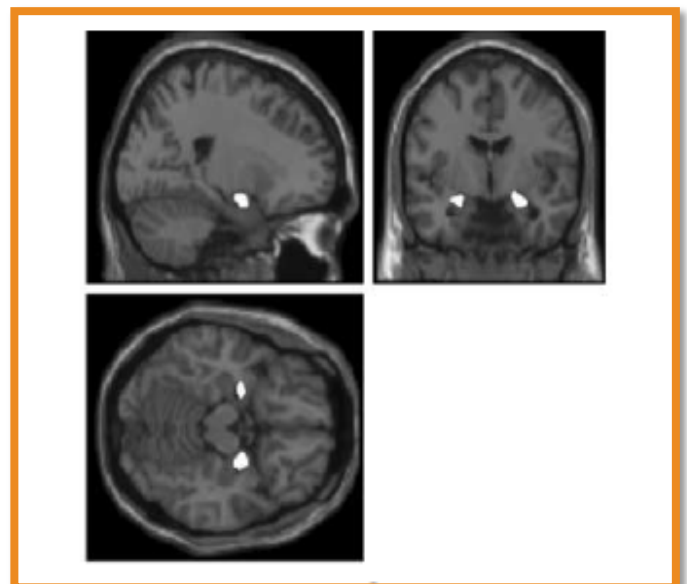
There are a couple of limitations to this study. We only looked at healthy individuals and we only looked at brain structure and not at function. Unfortunately this type of study cannot distinguish between cause and effect but it suggests that areas such as the

amygdala are important in understanding the relationship between joint hypermobility and feelings such as panic and anxiety. The relationship with PoTS is also very important and it is likely that changes affecting circulation in this condition will impact on emotion and feeling states.

It is hoped that better understanding of the link between joint hypermobility and panic and anxiety symptoms can enhance understanding and improve individual treatments. Our group is currently conducting further research in this area.

[J.Eccles@bsms.ac.uk](mailto:J.Eccles@bsms.ac.uk)

Neuroscience, Brighton and Sussex Medical School



The amygdala – area of brain that is different in hypermobility