Rhythmic movement disorder

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June 20th 2012
ICSD Diagnostic criteria for RMD (I)

A. Rhythmic body movements during drowsiness or sleep (0.5-2Hz).
B. At least one of the following types is present:
   – Head-banging
     [Video Link](http://www.youtube.com/watch?v=zHjl9ntayc8&feature=related)
   – Headrolling type
   – Bodyrocking
   – Body-rolling
ICSD Diagnostic criteria for RMD (II)

C. Onset typically occurs within the first two years of life.

D. PSG demonstrates:
   - Rhythmic movements during any stage of sleep or in wakefulness
   - No other seizure activity occurs in association with the disorder

E. No other medical or mental disorder (e.g. epilepsy) causes the symptoms

F. The symptoms do not meet diagnostic criteria for other sleep disorders producing abnormal movements during sleep (e.g. sleep bruxism) and importantly NOT associated with tonic clonic activity, tongue biting, incontinence, automatisms suggestive of seizures
What is the evidence base?

- **Sparse literature**
- 3 papers from over 40 years ago remain the foundation of our understanding of the condition
Lissovoy

• Taken from 1959 Cornell thesis
• Questionnaire study of 374 mothers whose infants were born in New York 19-32 months earlier. Asked if their child had ‘EVER’ engaged in rocking or head-banging at bedtime
• No information about the child’s health or development
• 15% head-banging
• 12% rock back and forth
• Of the head-banging children: striking class difference – 65% working classes and 74% ‘last born’ rather than first born children
Kravitz. ‘Study of headbanging in infants and children’ Disease of the Nervous System. 1960

- Incidence 3.6% (135/1168) source - 1959 ‘office’ records
- Studied at mean age 4 years – range up to 10.5 yrs
- Mean age of onset 8 months (only 9 cases > 12 months)
- 3.5 males: 1 female
- Majority had RMD at settling but in 35% also during sleep
- 50% episodes < 15 mins duration but 28% > 60 mins
- 20% had affected siblings
- 53% first born, 32% second born
- Most rocked on all fours with frontal contact point. 18% occipital head bangers
- Thumb sucking 9% v 45% in contemporary infants data
- Maternal – child separation 27%
- 17% poor mother-child relationship
- Mean age of disappearance in short-term RMD 25 month
- BUT 30% ‘chronic persistent’
Klackenberg 1971

<table>
<thead>
<tr>
<th>Age in months</th>
<th>Number of children with RMD sub-type</th>
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<tbody>
<tr>
<td>9</td>
<td>40</td>
</tr>
<tr>
<td>12</td>
<td>35</td>
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<tr>
<td>18</td>
<td>30</td>
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<td>24</td>
<td>25</td>
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<tr>
<td>36</td>
<td>20</td>
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<tr>
<td>48</td>
<td>15</td>
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<tr>
<td>60</td>
<td>10</td>
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</table>

- 212 randomly selected children from Stockholm longitudinal study
- Around 40% incidence at 9 and 12 months
- No onset after 18 months
- Rapid decrease at 3 years
- 4% persist at 5 years
- NO association with thumb sucking, ’irrascibility’, poor sleep report/bruxism/sleeping in own room.
Numerous case reports

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<tbody>
<tr>
<td>Age range</td>
<td>1-12 years (m 7yrs)</td>
<td>7-24 years (m 14.7yrs))</td>
</tr>
<tr>
<td>Gender</td>
<td>Not described</td>
<td>5 males</td>
</tr>
<tr>
<td>Family history</td>
<td>Not described</td>
<td>2</td>
</tr>
<tr>
<td>Co-morbidity</td>
<td>3 ADHD</td>
<td>6 ADHD</td>
</tr>
<tr>
<td></td>
<td>1 LD and seizures</td>
<td>2 mild LD</td>
</tr>
<tr>
<td></td>
<td>1 CP issues</td>
<td>1 depression/1 OCD</td>
</tr>
<tr>
<td>PSG</td>
<td>All stages but predominantly N2</td>
<td>Long episodes in wake/N1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short episodes in all</td>
</tr>
<tr>
<td></td>
<td></td>
<td>stages of sleep</td>
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<tr>
<td>Treatment</td>
<td>‘All our patients responded to appropriate</td>
<td>Not discussed</td>
</tr>
<tr>
<td></td>
<td>therapies’</td>
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Summary of evidence

- Minority of infants use rhythmic movements +/- banging of head/body to transition into sleep (incidence 3.6-40%)
- Subsides rapidly from age 2-3 years
- Chronic persistent RMD incidence 1.2-4%
- Males > Females and 20% family history
- Usually occurs during the transition from drowsy wakefulness to sleep, PSG studies show most episodes in N2 but can occur in N3 and rarely in REM
- Large case series in children do NOT associate with injury beyond local trauma
No consensus on aetiology

- ‘..Rhythmic activities seem to serve the secondary function of the expression of pleasure, release of tension, or to give compensatory satisfaction..’ Lourie Am J of Psych 1949
- Kravitz (1960) notes onset coincides with eruption of incisors – functional tension reduction? He also suggests these children are hypersensitive to tactile, auditory and kinaesthetic stimuli
- 1971 discussion of Freudian interpretation: ‘auto-erotic’ behaviour
- Involuntary elements - some similarities to tic disorders in sleep – Stephanova suggest association with corticostriatal-thalamocortical pathways – but RMD appears before these pathways are myelinated
- Likely to originate as a conditioned self-soothing behaviour – articulate older adolescents and adults express this: ‘All I could say is that it feels awesome and it rocks you to sleep, very hard to just lay still’ (You tube)
No consensus on management

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Safety</th>
<th>Reassurance</th>
<th>Behavioural</th>
<th>Medication</th>
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<tbody>
<tr>
<td>Clinical guide to pediatric sleep. Mindell &amp;Owens</td>
<td>Yes</td>
<td>Yes</td>
<td>Extinction</td>
<td>Benzodiazepines, hydroxyzine, tricyclics.</td>
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<td></td>
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<td></td>
<td>Increase sleep through earlier bedtimes and daytime naps</td>
<td></td>
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<tr>
<td>Principles and practice of pediatric sleep. Sheldon, Ferber and Kryger</td>
<td>Yes</td>
<td>Not specified</td>
<td>Stimulus substitution</td>
<td>Antihistamines, benzodiazepines, carbamazepine.</td>
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<tr>
<td>Sleep Medicine. Shneerson</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>Benzodiazepines, tricyclics, gabapentin</td>
</tr>
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</table>
Psychological approaches

- **No trial data**
- Extinction: avoid reinforcement /reward by parental attendance
- Stimulus substitution: e.g. rhythmic sounds such as metronome/patting – may be more suited to children with LD – some logic as re-conditioning approach
- Aversion therapy – get up and walk around the room (non-punitive) accompanied by positive reinforcement where age appropriate – need to carefully assess family and child motivation
- sleep deprivation and hypnotic combinations
Drug treatment

• Benzodiazepines – GABA receptors (main sleep onset switch) – suppresses N3 sleep and reduces sleep fragmentation - reported to help if severe and disruptive

• Anti-histamines may consolidate sleep and decrease sleep-wake transition related RMD

• Carbamazepine – stabilize Na channels and potentiate GABA receptors

• *NO RCT evidence in RMD* – all drugs used off label in this context
Review 14 cases seen in Southampton over the past 6 years

• 12 boys and 2 girls, mean age 7.8 years (2.83-15 years)
• Under 5s mostly co-morbid with another sleep disorder e.g. behavioural insomnia/parasomnias/sleep disordered breathing (1)
• Significant social history in 5 children: two adopted (one domestic adoption aged 4 years, one as toddler from Russian orphanage); one LT fostering from 4 years; one maternal alcoholism, one CSA disclosure in sib
• Family history in three: two fathers and one sibling
• Neurodevelopmental disorder in 6 children: two ADHD, one Asperger's, one mild ASD, one SAL delay, one diplegic
Type of RMD

- All but one involved sleep onset AND nocturnal episodes
- Typically 2-3 episodes during sleep
- Duration variable from 10 mins to 2 hrs from parental report.
Management: personal practice

Detailed clinical and sleep history

**Whose problem is it?**
- Parents/siblings/neighbours?
- What does the child want? Are they motivated to change?

**What are family beliefs?**
- Parental anxiety re brain injury/emotional disorder?

**What are parents doing?**
- Reinforcing behaviours/creating sleep onset associations?

**Investigation**
- Home video
- PSG – can exclude other sleep disorders triggering arousal – only 50% exhibit RMD on first night
Management

Simple pragmatic approaches

- Safety and noise reduction measures: move mattress onto floor and away from wall, padding around bed
- Seek out and treat factors that disrupt sleep e.g. OSA/PLMD/GOR
- Select treatment combinations depending on family resources and child’s motivation
Psychological approaches – treatment success rates

- Three < 5s discharged with reassurance alone
Medication and treatment of co-morbid sleep disorders

- Of the children on clonazepam two relapsed when treatment discontinued and two stopped due to behavioural side-effects
Treatment successes were in 3 year old (foster care) and 7 year old (aversion therapy) and exploited behavioural and psychological approaches.
Summary

• RMD is believed to be common in infancy and in most cases remits spontaneously by 3 years of age
• Up to date prevalence data is needed
• Parental reassurance, education and safety advice are sensible universal approaches
• Underlying conditions which may be disrupting sleep should be actively sought and managed
• Persistent RMD may respond to specific behavioural, psychological or pharmacological approaches but the current evidence base for these approaches is limited and systematic evaluation is needed