

## Jactatio extra-capitis and migraine suppression

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**Abstract** Sleep often terminates migraine headaches, and sleep disorders occur with greater prevalence in individuals with chronic or recurrent headaches. Rhythmic head, limb or body movements are common in children before falling asleep, but they very rarely persist into adolescence and adulthood, or appear de novo later in life as sleep-related rhythmic movement disorders. A 22-year-old female with migraine without aura and history of early childhood pre-dormital body rocking (jactatio) discovered that unilateral slow rhythmic movements of her right foot greatly facilitated falling sound asleep while reclining. Sleep served every time to terminate her migraine attack. Rhythmic movements may serve on occasion as a therapeutic hypnotic maneuver in migraine sufferers.

**Keywords** Migraine · Headache · Sleep disorder · Movement disorder · Jactatio capitis

### Introduction

Sleep disorders occur with greater frequency in the headache population, in particular in patients with migraine, tension and cluster headaches [1]. Non-specific headache, i.e., morning headache, is also associated with sleep disturbances, including sleep disorder breathing, periodic leg movements during sleep, insomnia and hypersomnia. Chronic headache tends to aggregate with anxiety and depression; nevertheless, it is not clinically sound to justify the association of headache and sleep disturbance solely on

the basis of psychiatric co-morbidity [1]. More specific and exotic sleep headache-related syndromes have been identified, such as hypnic (“alarm clock”) migraine, paroxysmal hemicrania, cluster headache and exploding head syndrome [2]. It is a common observation in daily practice that patients with migraines try to use the conciliation of sleep as a therapeutic strategy, even in the example of familial hemiplegic migraine, often a nocturnal or arousal event. According to Kelman and Rains, up to 85% of migraine sufferers choose to sleep, seeking palliation from headache, while 75% of the population analyzed by these authors needed to sleep because of the headache [3]. The pathogenesis of sleep related headache seems to relate to dysfunction in the hypothalamic-pineal entrainment cycle, which regulates the nocturnal secretion of melatonin. The latter theory is corroborated by the beneficial response that some patients with migraine and sleep disorder exhibit following the administration of melatonin.

A case is described of diurnal migraine relieved by self hypnosis implemented by rhythmic pre-dormital movements.

### Case report

A 22-year-old white female was seen in neurologic consultation because of recurrent headache. She localized the headache over the temples and the occipital areas. She had no auras, but nausea without vomiting. Pain was pounding in nature and very intense. At the time of consultation, she was having headaches with a frequency of at least once a week, lasting up to 3 days. Her past medical history was positive for lactose intolerance and for irritable bowel syndrome-diarrhea type. Her mother, sister and maternal grandmother suffered from migraines. There was no family

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history of movement disorders, sleep disorders or epilepsy in her siblings. On her review of systems, she reported that during her usual diurnal headache, lying down and performing rhythmic slow (0.5–2 Hz) rotational or flexion extension movements of her right foot, she would fall asleep within a few minutes. She woke always without a headache. As a toddler and young infant, she would rock her body repetitively to induce sleep. The sleep-inducing ritual went away over time as she became older. Otherwise, her sleep habits were normal. She did not sleep walk or have night terrors. She had no symptoms suggestive of nocturnal involuntary movements, i.e., periodic leg movements during sleep or nocturnal myoclonus. The patient was a marine biologist with a master's degree in education. She was intolerant to tryptans and allergic to shellfish. She was taking naproxen sodium 440 mg b.i.d. and butalbital/acetaminophen orally as needed. She took esomeprazole 40 mg for symptoms of gastroesophageal reflux. Earlier prophylactic daily doses of topiramate resulted only in negligible relief from headache. She was following a milk-free, soy-free and wheat-free diet for her chronic intermittent diarrhea. She did not smoke or drink alcohol on a regular basis. Her general physical and mental status, and neurological examinations were normal. No movement disorders in the form of dystonia, tremors or tics were observed. Magnetic resonance imaging (MRI) of the brain was normal. She was diagnosed with migraine without aura and prescribed zonisamide 400 mg/day as a headache prophylactic agent. She reported major (80%) improvement in the frequency and intensity of her headaches in over 1 year of follow-up. She has had no medication-adverse effects.

## Discussion

Pre-dormital or hypnagogic rhythmic movements (RMs) during the waking sleep-transition are very common in infants. It may be said that it represents the transient, developmental, physiological or benign counterpart to rhythmic movement disorder (RMD), a distinct sleep-related movement disorder of older children and adults [4–6]. RMs in childhood is sporadic or familial, and takes the form of nocturnal head rolling or banging (*jactatio capitis nocturna*), or limb banging and body rocking (*jactatio extra-capitis nocturna*). In body rocking, the child adopts the prone position on their elbows and knees (“buttons up”), moving the trunk in an antero-posterior or lateral directions [6]. RMs is believed to facilitate motor maturation in children by enhancing conduction and myelination of the vestibulospinal, reticulospinal and tectospinal tracts, while also consolidating the oculocephalic reflex [5]. RMs exceptionally persist into adolescence or

may recur later in life with or without a pathological identity. For the sake of nosological clarity, in the latter case, when psychopathology is patent, i.e., in individuals with mental retardation, autistic spectrum disorder or anxiety disorder, I believe their rhythmic movements should be classified as RMD rather than as pathological RMs. Diurnal *jactatio capitis*, in particular when manifested with head banging, weights toward self mutilation or self injurious behavior, typical of mentally retarded and autistic children, or towards individuals carrying the diagnosis of borderline personality disorder. Acquired adult forms of *jactatio capitis* have been described following herpes simplex encephalitis and head injury [4]. Head banging occasionally results in serious body injury, such as carotid dissection and fatal subdural hematoma [4]. Late onset RMs can be observed in resting wakefulness, non-REM and REM sleep [5]. RMD must be distinguished from nocturnal (frontal lobe) epilepsy, restless legs syndrome (RLS) and REM sleep-associated behavioral disorder, since they obviously constitute entirely different entities with different clinical significance and prognosis. Of parallel interest, there is a statistical correlation between RLS and diurnal stereotyped marching movements in place, body rocking and myoclonus, and between RLS and migraine with or without myoclonus [6, 7]. To my knowledge, there is no reported correlation among RMs, RMD and migraine. The patient described here had no diurnal movements other than the ones she re-expressed or converted for the purpose of hypnotic migraine suppression in the form of rhythmic right pedal motions. Otherwise, she outgrew her infantile body rocking.

Rhythmic motions have a calming hypnotic effect. In fact, cradles and rocking are employed by parents to pacify and induce sleep in their toddlers. Rhythmic repetitive motion, for example, the swaying back and forth movements of a pendulum placed in front of the eyes, is a favorite technique used by hypnotists to diminish arousal and lead to a pre-dormital trance. In certain instances, rhythmic motions are autoerotic, even in the exceptional patient with absence status epilepticus [8]. As such, rhythmic motions may serve to mitigate pain, except for the rare individual with pleasure-induced restricted pain originating in underlying lesions [9]. For the patient discussed here, it is unclear if *jactatio* became an agent of antinocioception, in addition to its hypnotic induction effects that eventually materialized as a migraine suppressor. The physiological basis of peripherally induced pain alleviation with movement was documented by Kakigi and Shibasaki employing somatosensory-evoked potentials [10]. Conversely, the analgesic intrinsic capacity of the motor cortex is supported by recent reports on the analgesic effects of direct motor cortex stimulation in cases of central post-stroke and phantom pain [11]. Finally, similar cases to the

one reported here could be investigated in the future by means of functional MRI as an attempt to elucidate the potential modulating consequences of jactatio exerted over the pain and pleasure brain centers. Alternatively, transcranial magnetic stimulation (TMS) may shed light on the effects of RMs on cortical excitability, usually hyperexcitability, in subjects with migraine [12].

RMD responds in variable degrees to imipramine, citalopram and clonazepam, in small doses. RMD also responds to non-pharmacological measures, including hypnosis, sleeping on water beds and repetitive practice of competitive responses [4]. It is in a way paradoxical that for this patient, RMs represented instead a self-rediscovered mechanism of sleep induction and migraine termination rather than a troublesome parasomnia. Perhaps other patients with chronic migraine may have recourse to “rhythmic movement therapy” of sorts for the amelioration of their acute headache.

**Conflict of interest** None.

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