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Effect on Krukatika Marmadue to Lifestyle Disorders'- A Review Study

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ABSTRACT

Today's fast- paced life has adversely affected our heath. In the present era, human being is prone to numerous degenerative diseases because of stressful and fast lifestyle. Nowadays a number of people with complaint of cervical pain has also increased due to various lifestyle modifications such as, prolonged use of smartphone, excessive travelling on two-wheeler, occupations associated with prolonged sitting, and working for hours on computers, etc. which results into an anatomical change in cervical spine. Lack of daily exercises, improper postures and frequent adoption of sedentary lifestyle results into Text neck, forward head posture, loss of cervical lordosis and vertebral angle. Cervical spine is much more mobile than the thoracic or lumbar regions of the spine. The intervertebral disc is involved in cervical spine motion, stability and weight bearing. In *Ayurveda*, *Marma* is a unique concept. They are vital points of the body; where *Mamsa, Sira, Snayu, Asthi* and *Sandhi* are singly or collectively present. These are also considering as a site of *Prana*. *Krukatika Marma* is one of the total 107 *Marmas*, which is situated at cervical region, which is a type of *VaikalyakaraMarma* according to trauma and it is a *Sandhi Marma* according to *Rachana*. It can be correlated with an atlanto-occipital joint and repetitive stress injury causes *Chalamurdhata*. Though all these factors are not obvious cause of traumas; however, we can count them under trauma. It is true need to interpret both sciences which really shows magical results and actually works together in management of cervical pain. This study will also create an awareness about healthy lifestyle, as there is an adverse impact of unhealthy factors on the essence of living. It is my sincere efforts to review relation between *Krukatika Marma* and lifestyle disorder in present study.

Keywords: Lifestyle disorder, *Krukatika Marma, Cranio-cervical joints, Chalammurdhata, Marma Chikitsa.*

INTRODUCTION

In the fast- paced world we live in; the prevalence of modern lifestyle disorders has significantly increased. These disorders have a profound impact on various aspects of our health, including musculoskeletal wellbeing. The human body is a complex system of interconnected structures, each serving a specific purpose. One such intricate structure is *Krukatika Marma*, which holds immense importance in *Ayurveda*. Among the numerous Marma points, the *Krukatika Marma*, located in the cervical region, plays an important role in maintaining overall health. This vital *Marma* is responsible for maintaining the balance and movements of the neck. However, due to prevalence of lifestyle disorders, the *Krukatika Marma* often suffers from various ailments, leading to cervical pain and discomfort. However, modern sedentary lifestyle, such as prolonged use of smartphone, working on computers of hours, excessive travelling on two-wheeler, improper posture, occupation associated with prolonged sitting, etc. have a profound impact on this *Marma*.

Nowadays trauma has become a part of the life. Such a trauma affects the homeostasis of the body because there are many vulnerable areas present in the body. These anatomical locations are vital in the sense that any injury to these parts shall be painful and can cripple local functions or even can lead to sudden death of the individual. *KrukatikaMarma* is one which is situated on either side on the neck. It is *Sandhi Marma* i.e. mainly constituted by joints. Injury of these *Marma* leads to instability of cranio-cervical joints. These joints are involved in various movements of neck. The joints of CVJ have unique kinematic properties that contribute to the complex motion. When the elements like occipital condyles, lateral masses, alar ligament, odontoid process, anterior and posterior arches of atlas etc involve in the trauma, they disrupt the stability of CVJ.The clinical and experimental observations revealed in various studies help to substantiate the traumatic effect of *KrukatikaMarma.* This article aims to review the effect of modern lifestyle disorders on the *Krukatika Marma*, and explore potential strategies for lifestyle management to alleviate its negative consequences.

METHODS AND MATERIALS

Ayurvedic Samhita and their commentaries, modern medical text books and published research papers, Articles, Medical journals and Internet.

Modern lifestyle and its effects in human being:
Modern lifestyle disorders refer to the detrimental health conditions that arises due to our sedentary and stressful way of living. One of the most common manifestations of this disorder is cervical pain, which affects the neck region and can radiate to other parts of the body. The cervical spine comprising seven vertebrae, plays a crucial role in supporting the head and facilitating movements of the neck. Sedentary lifestyle, lack of exercise, occupations associated with prolonged sitting, improper posture have become increasingly prevalent in modern society. With the advent of smartphone, computer, the world has witnessed an exponential increase in their usage. However, excessive use of smartphone often leads to poor posture and prolonged strain on the cervical spine. These factors contribute to the deterioration of the *Krukatika Marma*, leading to chronic cervical pain and discomfort. Additionally, stress and anxiety further worsen these conditions, causing muscle tension and stiffness.

***NIDAN* OF LIFESTYLE DISORDERS**

Unhealthy diet: -
Today's world has drastically altered our daily routines and eating habits.

Our bodies are exposed to many pollutants as a result of these radical changes in eating habits and lifestyle. The modern lifestyle is partly to blame for the accumulation of toxins in the body, as are a variety of junk foods such sugary drinks, pizza, white bread, industrial vegetable oils, margarine, pastries, cakes, French fries, and potato chips. These foods have a connection to *ViruddhaAhara*. All of these poisons are present in our bodies for a long time in a dormant state, and when certain stimuli are present, they cause a variety of disorders.

***Samprapti* (Pathophysiology):**

Viruddhaahara (Incompatible food)

⇩

Aam-Nirmiti (Formation of toxins)

⇩

Provoke all *Doshas* in alimentary canal Mixed with digestive juice and then *RasaDhatu*.
Spread from one *Dhatu* to next *Dhatu*.

⇩

Doshas spread from *Koshta* to *Shakha* and travelling through all over the body.

⇩

Wherever there is *Sthanvaigunya* (Deformity in location) it gets lodges

⇩

Symptoms of the diseases

Inappropriate Sleep: -
In today's modern lifestyle, lack of sleep has become a common issue affecting people of all ages. This can be attributed to various factors such as work pressure, technological advancements, and improper sleep posture.The fast-paced nature of modern life often leaves individuals with less time for adequate sleep. With demanding work schedules and responsibilities, people tend to prioritize other tasks over their sleep. The constant exposure to electronic devices further disrupts sleep patterns by delaying the release of melatonin, the hormone responsible for regulating sleep. As a result, individuals may find it difficult to fall asleep or may experience interrupted sleep, leading to cervical pain.Another contributing factor to cervical pain is the improper sleep posture adopted by individuals. Many people have a habit of sleeping in positions that strain the neck and spine. Sleeping on one's stomach with the head turned to the side or using a pillow that does not provide adequate support can put undue pressure on the cervical spine. Pillows that are stiff or too thick, can put one’s neck into an uncomfortable position. Over time, this can cause muscle imbalance, joint dysfunction, and ultimately lead to chronic cervical pain.One of the major consequences of inappropriate sleep is cervical pain.

Lack of physical activity: -
As the importance of physical activity to health has grown in recent years, it is crucial to understand how exercise can prevent and treat common diseases in industrialised nations as well as its effects on secondary and primary prevention. It is also crucial to spread knowledge about how a sedentary lifestyle possess serious risks, lowers life expectancy, and

has a negative impact on health. In today's modern lifestyle, lack of physical activity has become a growing concern, leading to various health issues.Prolonged periods of inactivity due to sedentary jobs or leisure activities contribute to a lack of physical exercise. Sedentary behaviours such as excessive screen time and sitting for extended hours are prevalent in today's society. Such lifestyle can result in weakened muscles, poor posture, and increased tension in the neck area.Lack of exercise leads to weakened muscles in the neck region, making it more susceptible to strain and injury. The lack of movement prevents proper blood circulation to the neck, causing stiffness and pain.

CONCEPTUAL REVIEW OF MARMA:

Vyutpatti of word *Marma* "*Mru maneen jeevasthaane, Sandhisthaanetaatparye cha*" Word meaning of *Marma* is *Jeevasthaana sandhisthana*. *Nirukti* of *Marma* That which causes death on injury is called *Marma* or painful condition in which the patient experiences pain same as death. Definition of *Marma* "*Marmaaninaamamaamsasiraasnaayuasthi sandhi sannipatah; teshusvabhaavataevapraanatishtanti"*

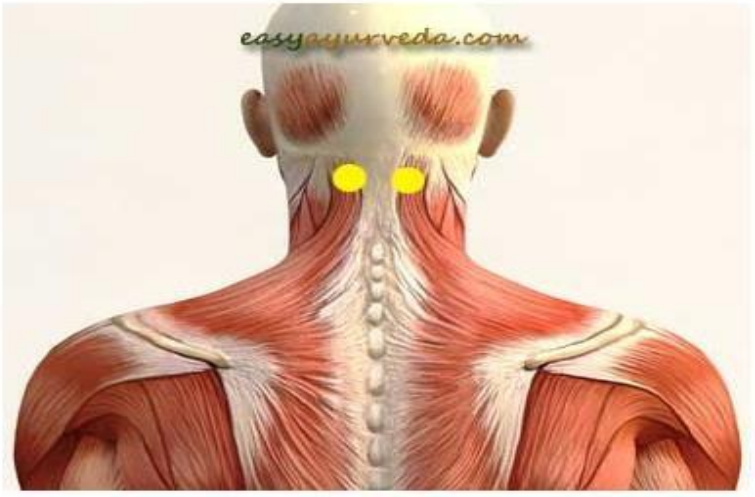
Marma consists of aggregate of *Mamsa, Sira, Snayu, Asthi, Sandhi* in which particularly *Prana* by nature stays. That which leads to death or which gives misery to individual similar to death when injured is called *Marma*. *Marma* is that part of the body which exhibits a peculiar sensation or unusual throbbing and causing pain on pressure. *Marma* is so called because they cause death when they are injured and they are meeting place of *Mamsa, Asthi, Snayu, Dhamani, Sira, Sandhi* and life entirely resides in them.

Classical Aspects of *KrukatikaMarma*:

Fourteen *Marma* are present in the neck region, *Krukatika* are two among them, located at the junction of *Shiras* (head) and *Greevā* (neck)[1] constituted by *Sandhi* (joints) and measures only 1 cm (half*Angula*) dimension. Injury to this give rise to *Chalamurdhata* (loss of stability of head), therefore this is included under *Vaikalykara* (deformity) category.[1,2]

Krukaatika Marma

शिरो ग्रीवयोः सन्धाने कृकाटिके, तत्र चल मूर्द्धता।(सु.शा.६)



Krikatika Marma
A Type Of Sandhi Marma &
Vaikalyakara Marma

GENERAL SYMPTOMS OF *MARMA VIDDHALAKSHANA*:

Vishamaspandana-

Variation in pulsation of vessels in pulsatory places of particular *Marma pradesha* is due to *Viddha* and structural impairment. *Vishamaruk*deferent type of pain will be felt on putting pressure on *Marma viddhapradesha*.

Antah viddha*and*Madhya viddhalakshana-

The structure of the *Marma* generally includes 2 parts, *Madhya* and *Antah* parts.

***Madhya viddha* (central region)**:

Injury to the *Madhya* (central part) of the *Marma* occurs, and then cardinal symptoms related to particular *Marma* appears. Example- *Shankha Marma*. *Madhya viddha*leadsto *Marana*.

***Antahviddha* (peripheral region):**
When injury to the *Antahpradesha*(peripheral region) of *Marma* occurred; instead of showing cardinal signs; it converted in to successive *Marma lakshana*. So many times, patient come with *Marma Viddhalakshana* will not exhibit cardinal symptoms. This is because an injury to peripheral part of *Marma,* Rachana involved. On observation it is clinically very difficult to demark peripheral and central part of *Marma*. But on the basis of symptomatology and also *Acharya Sushrut*a's concept of *Antah* and *Madhya Viddha*, will guide us to determine the prognosis. Example, sometimes *Shankha Marma*, *viddha* will not lead to *Sadhyo Marana*, patient may die after a month. It means in this condition, only peripheral part of *Shankha Marma*injured.

***Viddhalakshana* observed on *KrukatikaMarma*-**
Neurological disordersi involving increased and decreased movements**.**

Increased movements:

Marma	***Lakshan***
Krukatika	*Chalamurdhata*, Shira chala

Anatomical Features of *Krukatika Marma* Region:
KrukatikaMarma is located in the region of cranio-cervical junction therefore there is need to focus the anatomical features. The junction between the skull and the cervical vertebrae is stabilized by ligaments joining the axis and atlas to the clivus, occipital bone, and occipital condyle. The cranio-cervical junction must accommodate a wide variety of motions, which require ligaments for stabilization.[3]Atlanto-occipital joint is formed by the superior articular facet of the atlas and the occipital condyle, which are stabilized by an articular capsule. This joint allows for 25 degrees of flexion and extension and 5 degrees of axial rotation[5]. The atlanto- axial segment consists of 3 joints, which together allow for 15 degrees of flexion and extension and 30 degrees of axial rotation. These include 2 lateral mass articulations and an atlantodental joint. The latter resists excessive extension, allowing only 10 degrees of extension in the average person.[4,5]

The anterior atlanto-occipital membrane serves to prevent excessive neck extension.[4,5] The alar ligaments limit contra lateral flexion and axial rotation at the atlanto-occipital joint.[4,5] The apical ligament attaches from the tip of the odontoid process to the basion. The Barkow ligament connects the tip of the dens to the occipital condyle and it assists in preventing excessive neck extension. The transverse occipital ligament sometimes joins the alar ligaments and may help prevent excessive lateral bending, flexion, and axial rotation.[4, 5] The cruciform or cruciate ligament limits lateral motion of C1 relative to the dens and prevents posterior displacement of the dens, thus limiting anterior C1-2 subluxation to 3-5 mm. The tectorial membrane limits both excessive flexion and extension. A small group of deep muscles in the upper cervical region at the base of the occipital bone move the head, they are referred to as suboccipital muscles. These muscles are innervated by the posterior ramus of the first cervical nerve, which enters the area between the vertebral artery and the posterior arch of the atlas.[6]

CLINICAL REVIEW

Atlanto-occipital Fusion: There is compression over the vertebral artery and first cervical i.e. suboccipital nerve root. Several predisposing conditions, including inflammatory, neoplastic, and congenital disorders, may increase the risk of Atlanto-occipital dislocation (AOD) in the face of relatively minor trauma. Rheumatoid arthritis may involve the spine, particularly the cranio-cervical junction and cause weakening of the transverse ligament, thus increasing the risk of C1 subluxation. Down syndrome is associated with laxity of cranio cervical ligaments in up to 30% of cases. Congenital cervical vertebra fusion syndromes may also predispose to AOD by creating a fulcrum-like effect.[5] Vertebral artery is accessed in sub-occipital triangle in order to conduct angiography of circle of Willis.[7]

Occipital Condyles Fracture (OCF): Although many occipital condyle fractures are asymptomatic, some have the potential to cause major CVJ destabilization. These fractures are classified as type I, type II, and type III fractures. Type I fractures occur from comminute of the occipital condyle without significant bone fragment displacement into the foramen magnum. Excessive axial loading is believed to be the biomechanical cause of these injuries. Tuli et al[8] found 96 case reports of OCF, approximately 40% of which were from postmortem studies. The incidence, among that of severe cranio-cervical injuries, ranges from 4% to 19%.

Hangman Fracture: It is also known astraumatic spondylolisthesis of axis which involves thepars interarticularisofC2on both sides, and is a result of hyperextension and distraction.Post-traumatic neck pain after hyperextension high velocity injury is the most common presentation. Neurological impairment is seen only in 25% of patients.[9]

Odontoid Process Fracture: It is also known as thePEGordens fracture, whichoccurs where there is a fracture through the odontoid process of C2. The mechanism of injury is variable, and can occur both during flexion or extension.[9] Precise mechanism of odontoid fractures is unknown. However, the mechanism most likely includes a combination of flexion, extension and rotation. In addition to pain and inability to actively move the neck, most patients complain of a sensation of instability, described as a feeling of the head being unstable on the spine. Patients may present by holding their head with their hands to prevent any motion. Clinical findings range from quadriplegia with respiratory centre involvement to minimal upper extremity motor and sensory deficits secondary to loss of 1 or more cervical nerve roots.[10]

Jefferson fracture: It is the eponymous name given to a burst fracture ofC1.It was originally described as a four-part fracture with double fractures through the anterior and posterior arches, but three-part and two part fractures have also been described. It is Associated with 50% of other C-spine injuries, 33% are associated with a C2 fracture, 25-50% of young children have concurrent head injury, vertebral artery injury extra-cranial cranial nerve.[11] There is a high prevalence of concomitant fractures of the axis, especially odontoid fractures.[12] Most recent biomechanical studies of atlas fractures have concluded that these fractures are usually caused by axial loading through the occiput.[13] An unstable burst fracture of the atlas may result in atlanto-axial instability, even if properly treated.[14] C_1 posterior osteosynthesis does expose the patient to the risks of vertebral artery and greater occipital nerve injury. The greater occipital nerve is at risk with a more cranial starting point for C_1 lateral mass screws and the vertebral artery can be injured near the C_{1-} 2 joint15,16,17

There are eight main ligaments like tectorial membrane, the alar ligament etc support the CVJ. The right alar ligament limits rotation to the left, and the left alar ligament limits rotation to the right. Capsular joint ligaments also play an important role in limiting atlanto-axial rotation.[18] More recent evidence suggests that the tectorial membrane prevents anterior spinal cord compression by the odontoid process.[19]

Trauma to the cervical spine typically occurs through high energy events such as falls, sports injuries, motor vehicle crashes, and diving accidents. CVJ instability should be suspected if there is weakness in the arms, dislocation, subluxation, although many occipital condyles fractures are asymptomatic, some have the potential to cause major CVJ destabilization. These fractures are classified as type I, type II, and type III fractures. Type III fractures occur from condylar avulsion due to excess force form lateral bending or axial rotation.[20]

The alar ligaments are often compromised in type III fracture, causing them to generally be considered unstable, and the condylar fragments can be displaced into the crowded foramen magnum, which can cause neurovascular injury.[15] By considering the clinical fact *AcharyaSushruta* might have included this *Marma* as *Vaikalyakar* (deformity) category. Damage to the occipital condyle has been modelled in cadaveric studies with progressive, unilateral condylotomies. Hypermobility was noted in all of the motions of the atlanto-occipital joint (flexion, extension, axial rotation, and lateral bending) with a fifty percent resection of the condyle. In the atlantoaxial joint, hypermobility was achieved with 25% resection for flexion and extension, 75% resection for axial rotation, and 100% resection for lateral bending. Taken together, these results indicate that condylar injuries have great potential to disrupt the stability of the atlantooccipital joint.[16] In a cadaveric study of Atlanta fractures, high-speed axial force produced fragmentation in the classical pattern described by Jefferson. These cervical segments also had significant destabilization, resulting in range of motion increases of 40% in flexion and extension, and 20% in lateral bending.[21]

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Severe rheumatoid arthritis can cause erosion of the bony components of the CVJ. In particular, these degenerative changes can affect the insertions of the transverse ligament into the atlas; causing ligamentous laxity and atlanto-axial instability in 2086% of patients with rheumatoid arthritis. These osteoarthropathies may contribute further instability as they progress to include disruption of the alar ligament, the occipital condyles and the odontoid process. This condition, known as basilar impression, is hallmarked by translation of the odontoid process in the cranial direction and subluxation or dislocation of the atlanto-occipital joint.[23] In a recent study of 300 patients with cervical spine trauma, 30% of injuries were located between the occiput and C2. Among these, acute spondylolysis of C2 (hangman's fracture), C1 ring fractures odontoid fractures, and atlanto-occipital dislocation (AOD) were the most common.[24]

The above cadaveric and clinical reviews indicate the importance of bony components of AO joint in the manifestation of CCJ instability, because *Asthi* (bone) is the important component of *MarmaSthaana* (vital point).

AOD is more common among children and young adults. In fact, the injury is 3 times more common in children than in adults. This is thought to be secondary to a more horizontal plane of the articular surfaces and a relative laxity of the ligamentous structures, combined with the presence of a relatively large head and a higher effective fulcrum in the cervical spine.[25] This observation revels the greater vitality of *Krukatika Marma* in children than the adult.

Lifestyle management:
Managing modern lifestyle disorders and their impact on the *Krukatika Marma* requires a holistic approach. Here are some strategies that can be implemented:

Regular exercise- Engaging in regular physical activity help strengthen the muscles surrounding the *Krukatika Marma*, improving flexibility and reducing pain. Exercises focusing on neck mobility, such as neck rotations and stretches are particularly beneficial.

Neck rotation- Gently turn head from side to side, ensuring a full range of motion.

Neck stretches- Tilt head towards each shoulder, holding for a few seconds on each side. It can help relieve tension and improve flexibility.

Yoga: Practicing *Yogaasnas* like *Bhujangasana* (Cobara pose) and *Matsyasana* (Fish Pose) can specifically target the cervical region and alleviate pain.

Ergonomic considerations- Ensuring proper ergonomics while working or sitting is crucial to maintain the natural curvature of the spine. Using adjustable chairs, supportive pillows and positioning screens at eye level can minimize strain on the neck.

Stress management- Stress is a significant contributor to lifestyle disorder. Adopting stress reducing techniques, like meditation, and deep breathing exercises and can help reduce muscle tension and promote well-being.
Posture correction- Maintaining proper posture throughout the day is crucial for preventing strain on the *Krukatika Marma.*

Manual therapies- *Marma* therapy focuses on stimulating and healing the *Krukatika Marma*. According to traditional *Ayurvedic* theory, pain is caused by the *Vata Dosha*. The stimulation of key areas during *Marma* therapy calms the *Vata Dosha*. The method re-channelizes the movement of energy. *Marma* points are seen as portals to the body, mind, and consciousness. The proposed therapy aids in the removal of *Ama* (toxins) and the cleaning of the channels (*Srotas*), therefore relieving a number of diseases.

DISCUSSION

As per the classical description *KrukatikaMarma* is situated at cranio-cervical junction (CCJ). This vital area is constituted by joint (*Sandhi*), injury of which leads to instability of the head. In the review of the literature, it is revealed that atlanto occipital joint is holding the head on cervical column with association of atlanto occipital and atlanto axial joint. By keeping the movements of the head in the view, the design of the joint is made. The CVJ plays an important role in the overall motion of the cervical spine, accounting for 25% of the flexion and extension and up to 50% of the axial rotation of the neck[17.] Although the CVJ consists of two distinct joints, atlanto-occipital and atlanto-axial, it still functions as a single mobile unit, with the atlas acting like a washer between the cervical spine and the occiput. Each of these joints, however, has unique kinematic properties that contribute to the complex motion of the CVJ. The place of exit of C1 Nerve root and entry of vertebral artery measures very small area. When there is injury to the components of CCJ it may create a compression on above mentioned structure which leads to neck muscles weakness. Consequently, it develops the instability of head. This observation supports the *Acharya*Sushruta's observation of *Chalamurdhata* i.e. instability of CVJ. The two components of AO joint and joint between Dens and atlas is also an important part.

CONCLUSION

Modern lifestyle disorders, including cervical pain, have a profound impact on *Krukatika Marma*. Understanding the relation between lifestyle choices and musculoskeletal health is essential for effective management. By adopting a proactive approach towards lifestyle modifications such as regular exercise, ergonomic considerations, stress management, and postural awareness, individual can alleviate the detrimental effects of modern lifestyle disorders on the *Krukatika Marma* and promote overall wellbeing.

In today's digital age, lifestyle disorders have become increasingly prevalent, affecting various aspects of our health. The impact of excessive smartphone, computers, prolonged sitting, etc, can not be overlooked. By understanding the significance of this *Marma* and adopting appropriate management strategies, we can mitigate the adverse effects of lifestyle disorders and maintain overall well-being. It is imperative to strike a balance between technological advancement and the preservation of our ancient healing traditions to ensure a healthy and harmonious existence.

Krukatika Marma is located on medial aspect of atlanto-occipital joint which is very crucial as there are attachments of various ligaments. As it is a *Sandhi Marma* therefore atlanto-occipital, atlanto-axial joint with its surrounding ligamentous structures attached to the same within 1cm (half *Angula*) area on either side to be concluded. Ligamentous structureslike the alar ligament, the cruciate ligament, the apical ligament, capsular ligaments etc around the AO (atlantooccipital) joint and AA joint (Atlanto-axial joint) have very important role to maintain the stability of CVJ. Injury of these structures influencing the instability (*Chalamurdhataa*) of cranio-cervical joint (*ShirogreevaSandhān*). Depending upon the severity of involvement of structures grading of symptoms will be exhibited. This is one of reason to influence the quality of life in such injuries. This study proves the relevancy of *Sushruta's* clinical view about *Sandhi Marma*.

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