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The Mindmaker Theory: Vestibular Stimulation Is Essential For Our Mental Health.

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ABSTRACT

All these years we have been figuratively talking about mental balance without realizing that it actually literally is all about balance! Well, the balance organ to be exact. The essential role of vestibular stimulation in our mental health has not been recognized before. However, recent and past studies show undeniable evidence that vestibular stimulation has the most important role in our mental well-being, and the vestibular system is way more than just a balance organ. Vestibular stimulation has been proved to decrease many psychological symptoms such as anxiety and stress. The vestibular system also plays an important role in mental disorders such as agoraphobia and depression. The MindMaker theory claims that vestibular stimulation plays the most important role in our mental well-being and that the lack of movement and thereby vestibular stimulation explains the increasing amount of anxiety and depression in the modern world. To establish a hypothesis that we can prevent and cure mental health symptoms and disorders by including more vestibular stimulation to our everyday lives. A detailed review of published literature from Google, Pub Med, Medline, ERIC, http://www.frontiersin.org, and other online journals was performed and analyzed using the terms vestibular system, mental health, and quality of life.It seems that we can use vestibular stimulation such as rocking motion as a calming mechanism for our brain and mind. The MindMaker theory claims that any subtle vestibular stimulation, especially subtle rocking motion is beneficial to our mental health. The MindMaker theory also claims that stimulation of the horizontal semicircular canal has an important role in the calming and relaxing effect of vestibular stimulation. It seems that the most beneficial movement to our mental balance is subtle horizontal rocking that combines at least some amount of yaw rotation of the head and thereby activation of the horizontal semicircular canal.

Keywords: Vestibular stimulation, Mental health, Homeostasis

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INTRODUCTION

The vestibular system is mostly known as a sensory system, placed in our inner ear, that provides the leading contribution to the sense of balance and spatial orientation. The role of the vestibular system and its wide connections throughout the brain has interested us for hundreds of years. But it hasn't been until recently that we have started to understand the true nature of this mythic system. Now the vestibular system is considered the entryway to the brain and is said to have the most important influence on everyday functions. Kumar et al. (2018) noted that recent studies underline the function of the vestibular system is not only maintaining balance and equilibrium or reflexes but beneficial in advanced functions like improving cognition, improving diabetic condition, reducing stress, and so on. The modern scientific community actually calls the vestibular system the sixth sense as it seems to influence almost all the functions of the body. The vestibular system has amazingly wide connections throughout the brain structures including 18 500 neuronal connections to and fro the vestibular system (Sahaya et al. 2018). To establish a hypothesis that we can prevent and cure mental health symptoms and disorders by including more vestibular stimulation in our everyday lives.

MATERIALS AND METHODS

A detailed review of published literature from Google, Pub Med, Medline, ERIC, http://www.frontiersin.org, and other online journals was performed and analyzed using the terms vestibular system, mental health, and quality of life.

Vestibular Stimulation Is Essential For Our Mental Health

Even though the vestibular system has started to reveal its secrets, the role of the vestibular system in psychological well-being has been overlooked. This is even though we already have a wide network of research that proves the benefits of vestibular stimulation for our mental health. Studies show that vestibular stimulation significantly decreases cortisol levels (White-Traut et al. 1988; Archana et al. 2016), reduces blood pressure and heart rate within normal limits (Clench and Williams, 2005), reduce negative emotions like depression, anxiety, and stress (Sahaya et al. 2018) and promotes sleeping by reducing pain and stress (Kumar et al. 2013). Stimulating the vestibular system in a controlled way decreases self-stimulation, decreases hypersensitivity, increases postural security, increases concentration and attentiveness, increases balance, increases body awareness, has calming effects, and reduces abnormal muscle tone (Kumar et al. 2018). There also is evidence that the vestibular system has a beneficial role in learning and memory (Kumar et al. 2018). Houston (1993) suggested that slow rocking is inhibitory to the central nervous system. Also, Bonadonna (1981) claimed that rocking provides a general inhibitory or relaxing effect on the individual and thereby it decreases frustration, anxiety, and tension and/or blocks out an overstimulating environment. Kumar et al. (2013) wrote that the vestibular stimulation directly inhibits the HPA axis and decreases cortisol levels and vestibular stimulation can also inhibit the HPA axis by increasing GABA release. Deuson and Kiernat (1985) found out that access by the elderly to rocking chairs might reduce their need for sleeping medications. They also noticed a strong emotional attachment that the aged's had to their rocking chairs. Swinging has been suggested as an intervention for demented patients to improve relaxation and emotional well-being (Snyder et al. 2001; Kelly 2008; Breatnach 2010). Aitken et al. (2018) wrote that many studies over the last two decades have shown that vestibular stimulation can induce and modulate theta activity and inactivation of the vestibular system has been shown to significantly reduce theta in freely moving animals. Clench and Berney (2005) studied the effects of vestibular and audio stimulation through the use of music and the Trinity Table, which is a motion machine using subtle rocking and rotation movement. They found out that the Trinity Table experience significantly produced reductions in systolic blood pressure and reduced anger, confusion, tension, depression, and fatigue. It also reduced pain in people who had reported feeling pain before the experience. People also reported the experience increased their creativity and intuition and even clarified their life's intentions.

The vestibular system plays an important role in mental disorders, too. There is an intense relation between vertigo and fear (Mazur and Booth, 1998; Best et al. 2009) and mental disorders such as depression or anxiety disorders, particularly acrophobia or agoraphobia (Pollak et al. 2003; Soza Ried & Aviles 2007; Best et al. 2009). It has been observed that depressed patients often have asymmetry in the activity of the vestibular nuclei (Soza Ried & Aviles 2007). Patients with panic disorder usually have abnormalities in respiratory and vestibular functions (Jacob et al. 1985, 1989; Perna et al. 2001). Allevi et

al. (1997) found a significant relationship between the presence of dizziness during agoraphobia and panic attacks. It is also known that mood influences the ability to keep one's balance (Bolmont et al. 2002). Dysfunction of the vestibular system may trigger anxiety and symptoms of depression and it is noted that vestibular rehabilitation has improved accompanying mental symptoms (Yardley et al. 1998). Kumar et al. (2019) noticed that vestibular stimulation significantly reduced susceptibility to eating disorders in young adults.

To underline the importance of vestibular stimulation for our mental well-being, it is noticeable that animals use vestibular stimulation too to ease stress and anxiety. It is known that distressed animals may start body rocking. Spijkerman et al. (1994) did research to study the body rocking behavior in chimpanzees. Their findings suggested that rocking, besides being a bizarre reaction to stress, actually was behavior that helped an individual to cope with difficulties and stress. Body rocking behavior is also known to occur with many other animals such as horses and elephants. Kelling et al. (2008) noticed that swaying decreased the cortisol levels of African elephants.

There is still a lack of wide research about the most beneficial direction and type of vestibular stimulation, but interestingly the role of subtle rocking and the horizontal semicircular canal seems to rise to attention when looking into the results of the studies. Spoor et al. (1994) noticed this amazing thing about the evolution of human semicircular canals. They noticed that the anterior and posterior canals of the human vestibular organ are enlarged in size relative to the horizontal canal whereas the three canals are more equal in size in other species. The significance of this is that the anterior and posterior canals are orientated to sense rotation in the vertical planes and those are the movements that are important for controlling upright balance. This means that the lack of yaw rotation during evolution has led to changes in the structure of our vestibular organ. Winter et al. (2012) studied vestibular stimulation on a motion-simulator and its effects on mood states in a study that was specially designed for the systematical assessment of all six stimulation forms of the vestibular organ. They found out that the direction of movement altered the subject mood states. Interestingly only one movement used in the study made the subjects feel more comfortable and that was the yaw rotation. Yaw rotation is exactly the movement that includes stimulation mainly in the horizontal semicircular canal. Byrne et al. (1981) studied the role of direction and type of movement in soothing a baby. They found out that continuous horizontal rocking was the most calming soothing method. Lestari et al. (2020) studied the effectiveness of pelvic rocking exercise movement with birth hing balls on b-endorphin levels of pregnant women. Although they were not able to find any statistically significant results, the horizontal direction, unlike other directions, increased the b-endorphin levels of all of the subjects, and the p-value of this effect was quite close to significance, p = 0,097. It is also important to notice that the movement on a birthing ball is different from horizontal rocking as it only includes mild rotation of the head. Could it be that the stimulation of the horizontal semicircular canal actually has the main role in easing stress and negative emotions? And during evolution, we have started to lose the ability to use this inner calming mechanism of us effectively?

The MindMaker theory claims that vestibular stimulation has the most important role in our mental well-being and that we can alter our mental well-being by regulating the amount and type of vestibular stimulation we get. The MindMaker theory claims that the most beneficial part of the exercise for our mental health is vestibular stimulation, and since it is known that exercise is similaaffectionsious to depression symptoms as psychotherapy (Lawlor & Hopker, 2001), it is possible that we could ease depression symptoms effectively just by adding vestibular stimulation to our lives. Understanding the importance of movement to our mental health most likely is the key to understanding why symptoms of stress, anxiety, and depression have been so fastly increasing for the last decades. The more time we spend sitting still and not moving the less we get the so important vestibular stimulation. It seems that mankind is reaching the point of not moving enough to stay mentally healthy.

The MindMaker theory also explains why generalized anxiety disorder is significantly more prevalent and impairing in high-income countries than in low- or middle-income countries (Ruscio et al. 2017), since it is known that the prevalence of insufficient physical activity is twice as high in high-income countries as in low-income countries (Guthold et al. 2018). The MindMaker theory gives an explanation also to why mental health issues are on the rise among adolescents and young adults (Twege et al. 2019) since it seems logical that the amount of movement we get decreases from childhood to our teenage years. The MindMaker theory also claims that a movement that combines subtle horizontal rocking with at least some amount of yaw rotation of the head is most beneficial for maintaining our mental balance

and decreasing symptoms of for example stress, anxiety, and depression. With this kind of movement, we can combine the benefits of subtle, rhythmic rocking with the calming effects of yaw rotation. This actually also is the same movement that most body rocking animals use to relieve stress. Since this kind of movement is no longer natural to humans and it is fairly difficult to maintain in an upright position, it is recommended that we start using some kind of beds, chairs, or chair-like devices that allow us to benefit from this kind of movement in our everyday lives.

It is strongly recommended that we start understanding the vestibular system being much more than just a balance organ. It is important to note the most essential role of movement and vestibular stimulation in maintaining and improving mental health. Vestibular stimulation should be increased in our everyday lives to improve the quality of our lives and to prevent and cure psychological symptoms and disorders. Vestibular stimulation should be used as a solid part of every treatment for mental disorders and symptoms. It is strongly recommended that we start wide studies on how to benefit vestibular stimulation is not just our everyday lives but also in hospitals and in the treatment and prevention of illnesses and disorders such as panic disorder, agoraphobia, anxiety disorder, dementia, Alzheimer's, etc.

CONCLUSION

And to all scientists searching for the 'control room' of the brain I would recommend; looking near the vestibular system. Further research on the subject is strongly recommended to verify the essential role of vestibular stimulation for our mental health. The benefits of horizontal rocking must be studied and the importance of the horizontal semicircular canal must be verified by wider and more accurate research. Also, the speed and the active vs. passive rocking have to be researched to confirm the most beneficial type of vestibular stimulation.

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