

Mirror Neurons and their Role in Psychoemotional Formation of Newborns

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Abstract: - The mirror neurons first discovered in the brain of animals by Jakomo Pizzolatti in 1992 are considered in this paper. These neurons are excited in response to someone else's conversation and by emphatic perception they condition the formation of psycho emotional behavior of newborns. Based on the above-said, at postembryonic development of newborns, as a result of emphatically perception of aggressive environment in conditions of the aggressive behaviors of newborns in family are formed, which are implemented in their genetic apparatus and further they may turn even into a murder. While neurophysiological studying human mirror neurons some gender differences were revealed in neuronal activity, particularly, the organism of newborn girls is distinguished by earlier formation and a strong activity of mirror neurons, as compared with the boys. In most cases, the girls begin speaking much earlier, than the boys, which is in full compliance with the earlier development of mirror neurons in girls. As it is seen, an emphatic perception is related to emotional intellect and is considered as a humane act of compassion and support. The conversation of a patient is emphatically perceived by means of mirror neurons of brain sensory area of the listener. This fact is corroborated by the number of impulses occurring in conditions of compassion. It is noteworthy that 5 minutes later in the brain of listener the number of impulses of perception feeling increases by 130-300%, as compared to the speaker's brain.

Keywords: - *Mirror Neurons, the Formation of Aggression, Prevention, Emphatical Perception, Psychological Communication*

I. INTRODUCTION

In 1992 Jakomo Pizzolatti discovered mirror neurons in the brain of animals, which were excited in response to someone else's influence. Often they are called as the neurons recognizing someone else's consciousness. Later by neurobiologists this discovery was recognized as one of the greatest discoveries [1, 2].

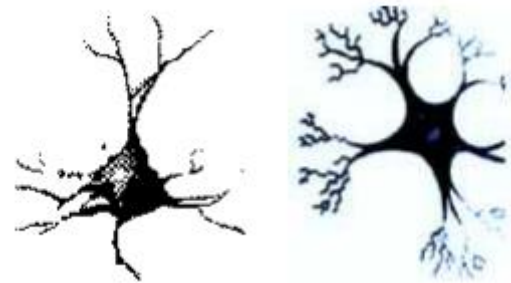


Fig 1:- Mirror Neurons

The history of discovery of the above-mentioned neurons began by the fact that Jakomo Pizzolatti had got a monkey - macaque rhesus, in the frontal lobe of the cerebral cortex of which (F5) the microelectrodes were implanted and the scientist studied the activity of neurons at searching for food and while eating. One day Jakomo Pizzolatti wondered how macaque monkey would respond to eating food before the animal, which he performed himself in the presence of the monkey. When Jakomo took food and started eating, the monkey was stuck and watched intently in his eyes. Something extraordinary happened, the same activity of the neurons occurred in the brain, which was observed when the monkey independently took meal [1, 2].

II. DISCUSSION

In 1996 Pizzolatti published the results of his observations in "Nature" and acknowledged that he discovered mirror neurons, by means of which an emphatical perception of someone else's action took place and based on it, his psychoemotional formation happened. For the study of mirror neurons activity, MRT and electroencephalographic method have been used.

Mirror neurons with a high activity were also discovered in the following areas of human brain: parietal lobe, frontal lobe, gyrus of temporal posterior middle lobe, primary and secondary somatosensory cortex, dorsal premotor, additional motor, cerebellum, etc. It is noteworthy that during neurophysiological study of human mirror neurons, a gender difference has been revealed in neuronal activity, in particular, at postembryonic development of girls, mirror neurons were characterized by earlier formation and a strong activity, as compared to those in boys. Based on this, the question naturally arises - do the boys start talking earlier, or the girls? According to the confirmed data, girls start talking earlier, than boys, which is in full compliance with the earlier formation and a strong activity of mirror neurons in

girls. It should be noted that the mirror neurons operate not only as a single unit but also as the synergistic neurons. Although there is still much to be clarified regarding this problem, but one thing is clear - that the mirror neurons actively participate in the imitation mechanisms. The latter often leads to an aggressive attitude towards the person who speaks [3, 4].

It is known that babies learn to speak without teachers and books. They imitate the speech and behavior of surrounding people by means of mirror neurons. No doubt that based on the activity of mirror neurons, a crucial significance in the cultural formation of newborns has the fact in which environment of people their psychoemotional formation takes place [1]. The cognition of operation by mirror neurons takes place emphatically, which means putting yourself in someone else's situation for understanding the speech and behavior of people around. The emphasis is also related to an emotional intellect, the ability for the establishment of psychological communication and is considered as a humane act of compassion and support [5, 6]. It turns out that the transfer of information among the speakers is performed remotely by a direct participation of brain neuronal system. Thus, the mirror neurons create emphatic opportunity and the ability for mood, so that our psychoemotional situation becomes socially successful [7].

The initiation of children's speech in different periods is due to the perfect formation of mirror neurons, in which the visualization, hearing and emphatic perception of verbal expression have a special significance. The issue of receiving first-graders in schools is also connected to the above-mentioned. In our opinion, the preliminary determination of children's memory skills is necessary by the use of visual, verbal and hearing tests. Unfortunately, the question of mirror neurons formation in time is not yet scientifically confirmed for the determination which age should be taken for receiving children in first grade – 5, 6, 7 or 8 aged children [1, 2]. Today we have no full information in which age a perfect formation of mirror neurons at postembryonic development takes place. This fact practically determines the memory formation of a child according to the age. As is known, the remembering information lasts for 10 seconds. For full remembering information the consolidation of long-lasting memory is necessary, which can be last from 15 minutes to an hour. It is also known that a normal person can remember 8-10 items, 4-5 digits and 5-6 letters, which is quite enough for positively evaluation of the memory. It is also noteworthy that if the alternative information to be remembered is too large, then the ability for remembering significantly decreases. This fact should be taken into account during learning process in schools [1, 2].

As we have already mentioned, an emphatic compassion appears to be a congenital function of the brain. It has been shown that as a result of visual observation on behavior of other people the analysis of analogous behavior and mirror imitation take place, which

is often noted in murder and suicide cases [8]. Subjective mood of a person, an emphatic compassion and a personal discomfort have the principal impact on this phenomenon [7]. The mood of a speaker is emphatically perceived by mirror neurons in brain sensory area of a listener. This is confirmed by the number of impulses emerged in conditions of compassion. As is seen from Figure 2, the number of impulses of perception feeling on an average is 130-300% higher in the brain of a listener, as compared with that of a speaker [1, 2, 9].

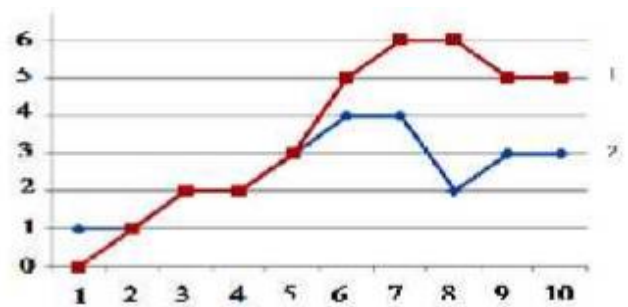


Fig 2

The Impulsive Responses during an Emphatic Perception of the Conversation: The Brain of a Listener (Red – 1), of a Speaker (Blue – 2). On the Abscissa: Time is Designated in Minutes, on the Ordinate – The Number of Impulses in Conventional Units

The formation of mirror neurons in humans takes place from the very first day of birth; however, the formation of structural-functional organization is delayed in time and changeable and depends on newborn individual development. As Falck-Ytter et al. [5] have shown in newborns of 6 months the recognizing of purposeful hand movement of an outsider does not take place by mirror neurons. Children of 12 months already perceive the movement of hand and analyze the aim of the movement, i.e. these children perceive and analyze a purposeful action of a person by mirror neurons. In the experiments of Blakemore and Decety [6] two conditional situations have been used: there is a glass full of tea on the table, and a glass without tea and the movement of hand to take the glass full of tea. In these situations the activity of mirror neurons appeared to be principally distinguished in brain specific areas.

It is noteworthy that based on emphatic perception of mirror neurons, if a postembryonic development of newborns takes place in the aggressive social environment of their family, then in the process of formation of newborns culture, all the actions of family members are implanted in their genetic apparatus by means of emphatic imitation, which remains in the organism for the whole lifetime, and it is most importantly that later will be revealed by the aggressive and criminal behaviors of the youth [4, 5, 6, 9]. As one of the neurochemical correlates of aggression formation is considered a biogenic amine – serotonin, for the prevention of aggression in youth it is desirable to use food rich in amino acid - serotonin precursor [1-3], in particular, sandwiches prepared from

Dutch and melted cheese, every 100 g of which contains 750 and 500 mg tryptophan, respectively [10]. As a result, aggressive behavioral reactions of the organisms significantly decrease under their impact.

III. CONCLUSION

Based on the presented data, newborns emphatically perceive a speaker's speech by mirror neurons; a gender difference is revealed in neuronal activity, particularly, at postembryonic development the formation of mirror neurons occurs earlier in girls, than in boys and as a result girls begin speaking earlier, as compared to boys. At schools the admission of children to first grade is also connected to the above-said taking into account a full morphological-physiological formation of mirror neurons. In the development of newborn's culture the environment of human resources in which their psycho-emotional formation takes place has a crucial significance. The cognition of the action by mirror neurons is performed emphatically. This means putting himself/herself in condition of others. The establishing psychological communication is considered as a humane action of compassion and support.

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