

Synapse transmission between neurons in different systems of dimension

Math & Music

Physiological Base. The physiological substantiation on the application of the digital system for coding and decoding of a melody is the following : children begin their contact with digits already in preschool age ,when they are taught to count, and this system is learned by children quite firmly, since it is often used in their daily life .But the generally accepted music grammar is new for them and ,naturally, requires some additional period of time to be acquired by children .It is for that reason that in the initial period of musical teaching ,children inevitably spend a lot of time and efforts to read a melody written down in music signs .Naturally ,it slows down rate of training ,causes psychoemotional discomfort, lowers the child's interest to music .Therefore, in the initial stage of teaching, besides work with generally accepted music grammar, will be useful to replace it with a digital system for a certain period .This does not mean that we want to do without standard music grammar ,but at the initial stages of musical education ,the system of digital coding and decoding of music sounds is undoubtedly useful ,as it speeds up teaching of children.

Neurophysiological Aspect . It is well known that the difficulties in the perception of any information ,including musical one ,cause strain of the main functional systems in the child's organism .The developed digital technology of musical training is perspective ,has a practical result ,but it requires the physiologic and psychology researches devoted to studying of an influence of a recommended method to psychoemotional status and to a condition of the main functional systems of the child's organism : the central nervous system ,the muscular system and others .For this purpose ,the experimental researches are to be performed , namely: ENG,EMG,EEG – tests to study the degree of mental load that the child has received in perception of the information recorded in different systems of dimension. Test Electronystagmography allows us to investigate eyeshot, positional nystagmus and also to determine the quantity of fluctuations of the eyeballs during the perception of melody written in the music marks and digital symbols. Electromyography test, allows us to investigate the threshold of muscular irritability (min – max)and amplitude of muscle tension ,depending on effort and accuracy of pressing of a key on the keyboard of the instrument. The method of ENG and EMG joins the visual analyzer with neuromotor function of the hands and explains ,on the scientific point of view ,the ratio between the load on muscles of eyes and muscles of hands ,and also it proves the possibility of development of muscular fatigue in hands depending on the quantity of eyeballs' fluctuations. EEG - test allows us to make up the comparative diagrams of dynamics of the proceeding neurophysiological processes, and also it offers an opportunity to investigate the functional activity of neurons during the synthesis both of music and digital patterns. The realization of the described scientific researches in this direction will allow us to approach closer to understanding of more subtle mechanisms of the child's mental activity and to detect the physiological factors in the promotion to the enhancement of the speediness, quality and efficiency of musical education.

Parallel Description In practice, using the generally accepted music grammar, the child connects the definition of the location of the melody to the pitch i.e., to the system of dimension , which is written down in the form of an expanded construction , both on x – the horizontal and on y - the vertical. By reading the music information, the direction of eyeballs' movements is spasmodic, and it has a multistep combination both on y – the vertical, from the G - key up to the F - key, and on x - the horizontal often with a return of eyesight to the starting point of support. For an integration, synthesis and the modification of the complex pattern of the received information the structures of the central nervous system require an additional period of time. It is a neurophysiological process proceeding in an interval of time between the moment of perception of the music information from the sheet and the moment of the hands' response on the keyboard of an instrument. A great number of irregular nervous impulses are transferred to the central nervous system per unit of time and, as the consequence of this, the fatigue of hand muscles is considerably increased (Berosov, Korovkin1990). An amplitude of muscle tension is directly dependent on the frequency of innervation , where each subsequent nervous impulse coincides with the phase of increased excitability of the muscle (Green, Stout,Taylor 1990). At the level of the synaptic terminal we can see untimely synthesis of the neurotransmitter, deep and stable depolarization of the postsynaptic membrane and ,as a result ,the convulsive reflexes are thus formed. An important neurophysiological moment has been marked : within a short time interval the contracture , that is , constantly high muscular tension is formed, which in turn , is harmfully reflected on the content and character of the melody.

In practice , using the method of the digital key, the child connects the definition of digital melody to the system of dimension which is written down in the form of an integral construction both on x – the horizontal and on y – the vertical . Reading the

digital information the trajectory of eyeballs' movements on y – the vertical is projected to the exact determinant (digit ,sign, symbol), the trajectory of eyeballs' movements on x – the horizontal is projected in one direction, forward. In the given system of dimension the integration of the digital information proceeds instantly, its realization on an instrument proceeds in reflexive time - ratio. The paradoxical phenomenon is revealed : the time interval between the moment of perception of the digital information and the moment of the hands' response on the keyboard of an instrument, is contracted to the minimum .We achieve a reduction of load on hand muscles at the expense of decreasing of an amplitude between muscle tension and the resulting movement and, consequently , the time intervals between effort and accuracy of pressing of a key are considerably shortened .At the level of the synaptic terminal we can see an allocation of neurotransmitter directly proportionally to the frequency of generated impulses by neurons and , as a result , the coordinated reflexes are thus formed. An important neurophysiological moment has been marked : the reciprocal muscular innervation is formed , that is, the rational distribution of the manual technique on the keyboard of an instrument, which in turn, is considerably reflected on the content and character of the melody. Grain of truth lies in the fact that at the expense of perception of melody by means of digits its realization becomes faster and easier, which in turn , is positively reflected on the psychoemotional status of the child and enables him to dynamically realize the potential music abilities in psychosomatic action as a result .

Statistics and practice show that the period of learning by standard music grammar is delayed for several years. At early stage of learning at Children's Music School, within of two – three months, up to thirty percent of children lose their interest to music subject and leave the study. This phenomenon is explained by the study overload arising at the first contact of the child to difficult format of adopted note coding and decoding of music information.\

Kids of new generation should have different methods of training .They are capable to perceive information faster, with cross-modal processing ,activating all senses at once : visual perception, audio analyzers , neuromotor functions. <http://reflectionmusic.ucoz.com/>

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