

DTI in healthy children pre/post musical training

Wednesday 12:15-12:45 PM | PD235-SD-WEA1 | PD Community, Learning Center Station #1

PURPOSE

Music modulates structural and functional changes in the brain, which promotes cognitive, motor, sensory, emotional and even social processes. The maturation of tracts and connections between motor, auditory and other modalities areas, allow the development of cognitive functions during the course of life, including musical skills.

METHOD AND MATERIALS

15 pediatric healthy subjects between 5 and 6 years old were recruited for this study. All subjects were: right handed, and had no antecedents of sensory, perception or neurological disorders. All volunteers had not been trained in the past with any kind of artistic discipline. Volunteers were healthy during the study protocol. Scanning was performed in a 1.5 T Philips-InteraAchieva scanner (Philips). Children received musical training for 9 months. Diffusion tensor imaging (DTI) data were acquired using a SE-EPI sequence. Diffusion weighted gradients were applied along 15 non-collinear directions with a b-value=800 s/mm². High-resolution images were acquired using 3DT1. The diffusion tensor was fitted with linear least-square after a preprocessing step correcting for head movements and eddy currents was applied by registering all volumes. Finally, using MEDINRI, diffusion tensors were calculated to obtain Fractional Anisotropy (FA) with FA threshold of 0.2 and Mean Diffusivity values. Segmentation of the cerebellum CB was manually drawn on midline sagittal 3D-T1 images.

RESULTS

It shows that there was an increase in fiber length of minor forceps, which involves fibers interconnecting the front regions and some axons of the cingulate cortex rostral anterior and medial and ventral prefrontal cortex via the knee and face of the corpus callosum, which could be cause by music instruction and demand required to perform certain activities that are within the training, such as imitate coordinated movements.

CONCLUSION

We show the plastic effects that can provide music instruction to extend axons of the fibers, especially in the minor forceps are evident. This may have occurred because of the need to create more connection between the two hemispheres to run more efficiently the tasks required for musical training.

CLINICAL RELEVANCE/APPLICATION

Musical training might be an option for intervention to treat the disorders mentioned above, because although it is known that music can help patients with autism and ADHD, with the results shown in this paper, could create targeted strategies especially these pathologies.