Trigeminal tract

see Dorsal trigeminal tract

see Anterior trigeminothalamic tract

see Trigeminal lemniscus

see Trigeminal nerve nuclei

A study of Henssen et al. from the Department of Anatomy, Department of Anesthesiology, Pain and Palliative Care, Donders Institute for Brain, Cognition and Behavior, Radboud University Medical Center, Department of Neurosurgery, Radboud University Medical Center, Nijmegen, The Netherlands, Department of Clinical Neurosciences, Wellcome Centre for Integrative Neuroimaging, FMRIB, University of Oxford, Nuffield, UK, Institute of Neuroscience and Medicine (INM-1), Research Centre Jülich, Jülich, Germany, Department of Clinical Genomics and Biochemistry and Molecular Biology, Mayo Clinic, Rochester, USA, aimed to provide an anatomical substrate for the hypothesized bilateral projection. Three post-mortem human brainstems were scanned for anatomical and diffusion magnetic resonance imaging at 11.7T. The trigeminal tracts were delineated in each brainstem using track density imaging (TDI) and tractography. To evaluate the reconstructed tracts, the same brainstems were sectioned for polarized light imaging (PLI). Anatomical 11.7T MRI shows a dispersion of the trigeminal tract (tt) into a ventral and dorsal portion. This bifurcation was also seen on the TDI maps, tractography results and PLI images of all three specimens. Referring to a similar anatomic feature in primate brains, the dorsal and ventral tracts were named the dorsal and ventral trigeminothalamic tract (dtt and vtt), respectively. This study shows that both the dtt and vtt are present in humans, indicating that each hemiface has a bilateral projection, although the functional relevance of these tracts cannot be determined by the present anatomical study. If both tracts convey noxious stimuli, this could open up new insights into and treatments for orofacial pain in patients [1)].

1)
Henssen DJHA, Mollink J, Kurt E, van Dongen R, Bartels RHMA, Gräβel D, Kozicz T, Axer M, Van Cappellen van Walsum AM. Ex vivo visualization of the trigeminal pathways in the human brainstem using 11.7T diffusion MRI combined with microscopy polarized light imaging. Brain Struct Funct. 2018 Oct 6. doi: 10.1007/s00429-018-1767-1. [Epub ahead of print] PubMed PMID: 30293214.