adaptative staircases with a two-interval forced choice (2iFC) task. The participants had to distinguish between a vibration and an empty stimulus to determine the absolute thresholds; whereas the differential thresholds were determined using a vibration matching task wherein the participants had to distinguish between a variable and a reference frequency (we used three reference frequencies). The absolute thresholds do not show significant differences between the 16 areas; thus, to produce haptic sensation, a single value above the average of all the absolute thresholds (69.107 Hz) must be selected for all areas. Moreover, although the differential thresholds showed some significant differences between certain areas when the reference frequency was 100 Hz, the results are similar between areas. Using these results, we obtained the Weber fraction to estimate the upper and lower differential thresholds for any reference frequency. Almost all areas have the same sensitivity (with the exception of the lower right back) and the K-values are similar (between 0.17 and 0.19). In summary, both thresholds are very similar among areas, which indicate that it is feasible to create vibrotactile haptic stimuli in a generalized manner for the torso and the back.

T3.04 **Wayfinding with a sensory substitution device.**

David Travieso García[1] david.travieso@uam.es, Lorena Lobo[2], Patric Nordbeck[3], Vicente Raja[3], Anthony Chemero[3], Michael A. Riley[3] & David M. Jacobs[1]
[1] *Universidad Autónoma de Madrid*
[2] *UDIMA*
[3] *University of Cincinnati*

The design of Sensory Substitution Devices often relies on the belief that the information supplied by the devices should allow the construction of spatial mental representations on the basis of which routes are planned. This study, in contrast, illustrates that navigation using an SSD can be conceived as an on-line, dynamic process, without the need for establishing a predefined plan or model of the task prior to its execution. We analysed route selection performed with a vibrotactile SSD that could detect environmental surfaces only within a short spatial range, limiting the availability of information about remote parts of the environment to be navigated. Sixty sighted participants performed a navigation task that involved the goal of reaching a target destination while avoiding five obstacles (placed in randomly predetermined configurations). Three groups of participants differed in the sensory modality used (restricted visual, acoustic+vibrotactile, and restricted visual+vibrotactile). While participants in the visual condition had fewer obstacle collisions and reached the target location sooner, the groups coincided to a large extent in terms of the routes that they followed. Furthermore, the routes selected by participants in all groups conformed well to routes predicted by a dynamic model of visually-guided locomotion (Fajen and Warren, 2003). These findings show that local, limited information about environmental layout can support route selection equivalent to that seen when information about the full environment layout is available.

S3.01 **Optical and neural contributions to vision.**

Susana Marcos susana@io.cfmac.csic.es, Clara Benedi-Garcia, Carlos Dorronsoro, Enrique Gambra, Eduardo Martínez-Enríquez, Aiswaryah Radhakrishan, Lucie Sawides & Maria Viñas
Optica Visual y Biofotónica, Instituto de Óptica (CSIC)

The optics of the eye degrades the quality of the images projected on the retina limiting the contrast and spatial resolution of the visual information available in further vision steps. Optical quality degradation arises from imperfections in the shape of the ocular elements, tilt, decentration, and interactions of the cornea and crystalline lens. Surgical and optical corrections modify the effective shape of the cornea, replace the crystalline lens by an intraocular lens, altering optical aberrations and likely visual perception. We used Optical Coherence Tomography to fully quantify the geometry of the eye's anterior segment in normal subjects and post-operatively and optically-corrected (i.e. contact lenses), allowing understanding links between ocular geometry and optical quality. We used aberrometers (Hartmann-Shack and LaserRayTracing) to characterize the optical aberrations of the normal and treated eye. Retinal image quality metrics obtained from the measured wave aberrations are compared to visual quality obtained from psychophysical measurements. Finally, adaptive optics (wavefront aberrometry+active elements) allow measuring and manipulating the ocular aberrations,