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Development of Beeswax-Discharge Writing Material for Visually Impaired Persons

Authors : K. Doi, T. Nishimura, H. Fujimoto, T. Tanaka

Abstract : It has been known that visually impaired persons have some problems in getting visual information. Therefore, information accessibility for the visually impaired persons is very important in a current information society. Some application software with read-aloud function for using personal computer and smartphone are getting more and more popular among visually impaired persons in the world. On the other hand, it is also very important for being able to learn how to read and write characters such as Braille and Visual character. Braille typewriter has been widely used in learning Braille. And also raised-line drawing kits as writing material has been used for decades for especially acquired visually impaired persons. However, there are some drawbacks such as the drawn line cannot be erased. Moreover, visibility of drawing lines is not so good for visually impaired with low vision. We had significant number of requests for developing new writing material for especially acquired visually impaired persons instead of raised-line drawing kits. For conducting development research of novel writing material, we could receive a research grant from ministry of health, labor and welfare in Japanese government. In this research, we developed writing material typed pens and pencils with Beeswax-discharge instead of conventional raised-line drawing kits. This writing material was equipped with cartridge heater for melting beeswax and its heat controller. When this pen users held down the pen tip on the regular paper such as fine paper and so on, the melted beeswax could be discharged from pen tip with valve structure. The beeswax was discharged at 100 gf of holding down force based on results of our previous trial study. The shape of pen tip was semispherical for becoming low friction between pen tip and surface of paper. We conducted one basic experiment to evaluate influence of the curvature of pen tip on ease to write. Concretely, the conditions of curvature was 0.15, 0.35, 0.50, 1.00 mm. The following four interval scales were used as indexes of subjective assessment during writing such as feeling of smooth motion of pen, feeling of comfortable writing, sense of security and feeling of writing fatigue. Ten subjects were asked to participate in this experiment. The results reveal that subjects could draw easily when the radius of the pen tip was 1.00 mm, and lines drawn with beeswax-discharge writing material were easy to perceive.

Keywords : beeswax-discharge writing material, raised-line drawing kits, visually impaired persons, pen tip
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