

EFFECTS OF POLYPHENOL ON VISUAL FATIGUE FOR AGED PERSON

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The aim of this study is to explore the effects of polyphenol on visual fatigue. The field work is carried out to get a handle on the problem of the visual fatigue caused by driving a road vehicle. "The questionnaire for subjective feelings of fatigu" is used to examine the effects of polyphenol on visual fatigue caused by driving a road vehicle. This paper also examine the difference between the effect of polyphenol in younger person and that in aged person.

Polyphenol, Visual fatigue, Aged person, Driving a road vehicle

1 Introduction

There are a lot of problems caused by driving a road vehicle. For examples, Since the driver has to pay a lot of visual attention in order to drive a road vehicle safely while driving, visual fatigue is one of the most frequent types of fatigue caused by driving (Kahneman, D 1973; Osaka, N 1980). In recent years, polyphenol has gotten a lot of publicity because it is effective in suppressing symptoms of physical stress and promoting recovery from fatigue. Bioscience Laboratory of Meiji Seika Co., Ltd, (2000) reported that polyphenol has the effect of suppressing false nearsightedness and improving night blindness.

The objective of this paper is to examine the effect of the polyphenol on the recovery from visual fatigue caused by driving a road vehicle.

2 Previous Study

As point out in references (Hiramatsu, M., Murao, T., Takahashi, T., Ohta, T., Ichianagi, T. and Yoshihara, A. 2005; Yoshihara, A., Ohta, T., Tomoda, M. and Enomoto, M. 2006), we have previously carried out the various kinds of studies about the polyphenol.

In this chapter, it introduces the investigation (Yoshihara, A., Yamanaka, K. and Kawakami, M. 2005) on the relation between the polyphenol and the visual fatigue caused by the VDT work. This investigation was carried out at a corporation where much of the work consists of using the VDT work. The evaluation indices were the questionnaire for subjective feelings of fatigue and the accommodative function in this investigation. The subjects carried out their usual duties using VDTs for three hours. And then the subjects answered the questionnaire and measured the accommodative function. On answering the questionnaire and measuring the accommodative function,

the subjects put a cloth pad on their eyes during ten minutes. After this, the subjects answered the questionnaire and measured the accommodative function.

There were two kinds of cloth pads. The former was the cloth pad moistened with the polyphenol solution. On the other hand, the latter was the cloth pad moistened with the placebo solution. These investigations were carried out in line with double-blind manner. Thirty VDT workers as the subject who spent about 7.6 hours a day at VDT work.

Figure 1 shows the scores of the questionnaire of "The questionnaire for subjective feelings of fatigue" that were obtained immediately before and after using the cloth pad. Figure 2 shows the results of the accommodation time that were obtained immediately before and after using the cloth pad. From these figures, there are big different of result between the polyphenol and placebo solutions. In our interpretation, the polyphenol seems to be effective at aiding recovery of accommodative function after visually demanding work. To explain these effects, it states that polyphenol improves the circulation within the capillaries and prevents a decline in the ability of the muscles to accommodate the lens (Yoshihara, A., Yamanaka, K. and Kawakami, M. 2007).

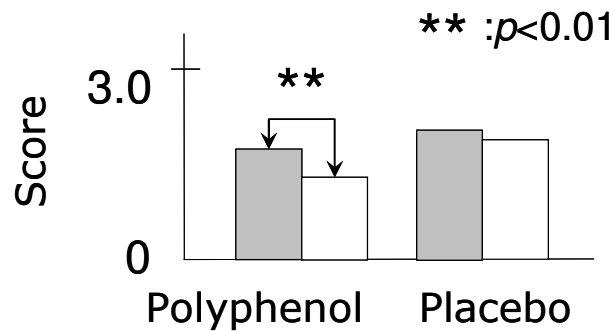


Figure 1 Results of the questionnaire

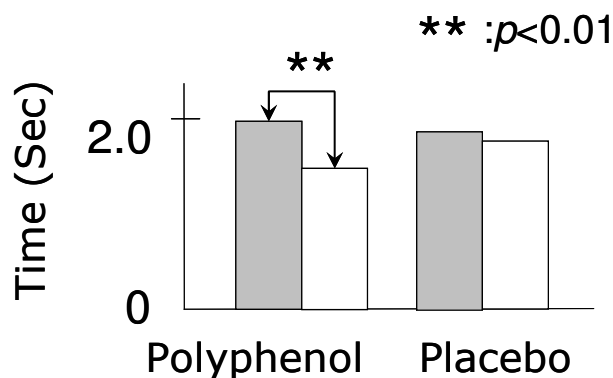


Figure 2 Results of the accommodaton time

3 Methods

3.1 Protocol of the investigation

Figure 3 shows the protocol of this investigation. Subjects carried out their usual duties such as a driving a road vehicle and cargo handling operation. When the subjects finish a day's work, they answer questionnaire for subjective feelings of fatigue. On answering the questionnaire, the subjects put a cloth pad on their eyes during ten minutes as shown

in Figure 4. After this, the subjects answer questionnaire for subjective feelings of fatigue.

In order to examine the effect of polyphenol on recovery from visual fatigue caused by driving a road vehicle, there are totlas of two days for investigation. In the first, the cloth pads moistened with polyphenol solution are used for ten minutes of the end of the work. In the second, subjects spend ten minuts from the end of the work using the cloth pads moistened with placebo solution. These investigations are carried out in line with double-blind manner.

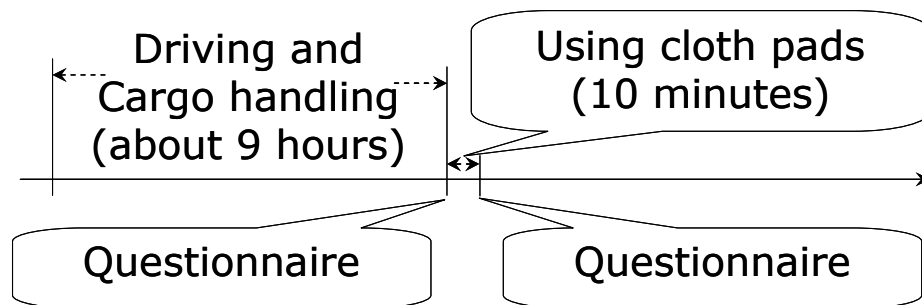


Figure 3 Protocol of this investigation



Figure 4 Usage of the clith pads

3.2 Evaluation index

As a evaluation index, the feeling of fatigue is investigated using a 5-point-scale questionnaire (A new version of the "The questionnaire for subjective feelings of fatigue" (Institute for science of labour 2002) compiled by the Working Group for Occupational Fatigue, Japan Society for Occupational Health). This questionnaire consisted of 25 items which are themselves subdivided into five groups in which each provided a different measure of evaluation: Group 1, drowsiness; Group 2, mental imbalance; Group 3, discomfort; Group 4, listlessness; Group 5, eye pain. Visual fatigue as examined in this study is evaluated on the basis of the response to Group 5. The results are rated on a scale from "Not at all applicable" to "Applies completely".

3.3 Subject

Fifty long-haul drivers include the aged persons are selected as the subjects who spend about 9 hours a day at work. Average of driving distances are 100 mile/day. All of subjects are without any visual function impairments.

4 Results and Discussion

Figure 5 shows the scores of the questionnaire of "The questionnaire for subjective feelings of fatigue" that are obtained immediately before and after using the cloth pad. Figure 5(a) shows the results of the questionnaire for subjects using close pads moistened with the polyphenol solution. On the other hand, Figure 5(b) shows the results of the questionnaire for subjects using cloth pads moistened with the placebo solution. From these figures, we found that when subjects spent ten minutes from the end of work using close pads moistened with the polyphenol solution, the scores of Group 5 are 2.39 before using the cloth pad and 1.70 after it, for a calculated ratio of 0.71 ($p < 0.01$). It is proved statistically that there is the difference of scores between before and after using the cloth pad. On the other hand, when cloth pads moistened with placebo solution is used, there is not much difference of scores between before and after using the cloth pad. Therefore, these results show the effectiveness of the use of cloth pads moistened with polyphenol solution in helping subjects to recover from visual fatigue.

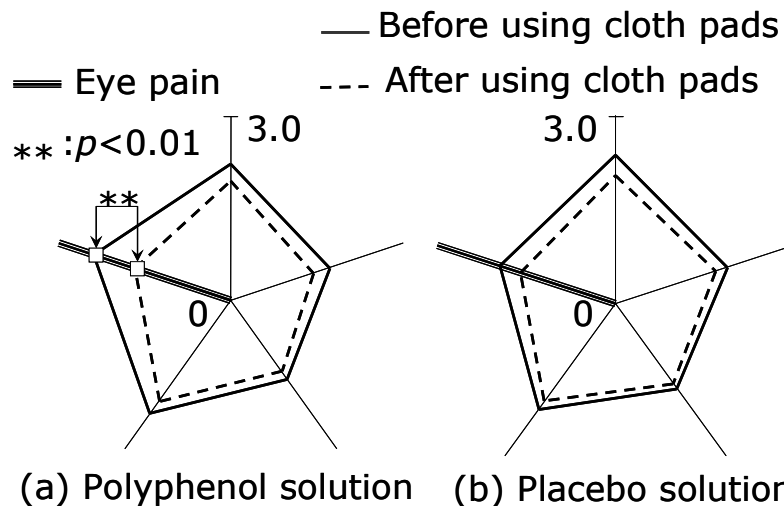


Figure 5 Scores of "The questionnaire for subjective feelings of fatigue"

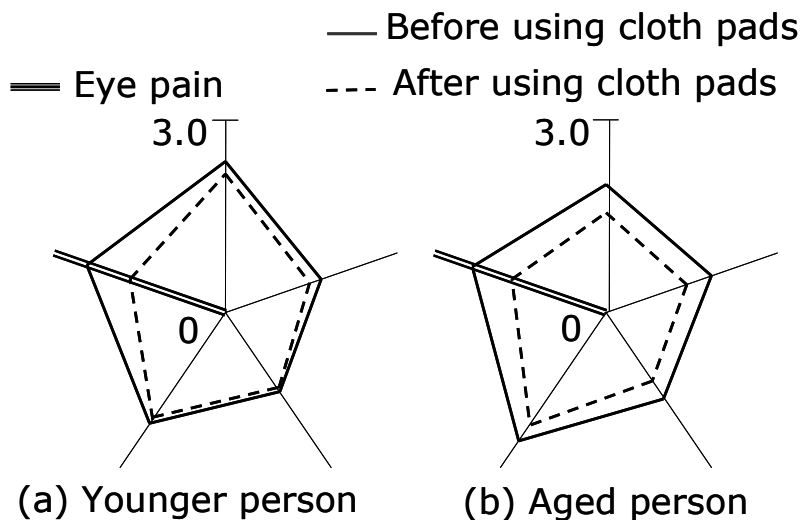


Figure 6 Comparison between the younger and aged person

Figure 6 shows the comparison between the population in their from 20s to 30s and those in their from 40s to 50s. Both of figures show the each results of the questionnaire for subjects using close pads moistened with the polyphenol solution. From these figures, the scores of Group 5 for aged person denote the same tendency of the scores of Group 5 for younger person.

5 Conclusion

The typical results of this investigation are as follows:

In not only the younger person but also the aged person, it is shown statistically that the polyphenol is effective for the recovery from visual fatigue caused by driving a road vehicle.

6 References

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