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Professor Jae Gwan Kim's joint research team has developed a personalized treatment system based on near-infrared spectroscopic sensors

- GIST (President Seung Hyeon Moon) – Professor Jae Gwan Kim of the Department of Biomedical Science and Engineering and Korea Institute of Oriental Medicine Professor Sanghun Lee have presented a technique that can monitor hemodynamic changes during cupping therapy by using a near-infrared spectroscopic sensor in the suction cup.
 - This study was conducted to observe hemodynamic changes in blood flow during non-invasive procedures using the near-infrared spectroscopy system.
- Cupping therapy has been used for thousands of years around the world and has been known to be effective in reducing neck, shoulder, and back pain as well as for helping to improve immunity. However, the precise mechanism of this treatment has not yet been determined, and there is still controversy within modern medicine due to the lack of scientific evidence or observation of its therapeutic effect.

- There are several hypotheses explaining the mechanism of cupping therapies, and the common feature of these hypotheses is that the negative pressure created between the suction cup and the skin during treatment causes dilation of capillary blood vessels and slight ruptures, causing increase blood flow into the surrounding tissues that stimulates the tissue that leads to positive therapeutic effects. As a result, the amount of blood at the treatment site has been known to increase metabolism.

- The research team constructed a near-infrared spectroscopy system capable of observing hemodynamic changes, and they designed and manufactured a floating cup with a near-infrared spectroscopic sensor. During the procedure, the researchers observed a rapid increase in the concentration and blood flow of hemoglobin (OHb) at the treatment site. In addition, the researchers confirmed that the concentration and blood flow of oxidized hemoglobin remained higher at the treatment site and surrounding area after the end of the cupping therapy.

- Professor Jae Gwan Kim said, "This study was the first to observe the hemodynamic changes that play a key role in the treatment mechanism of cupping therapy, and it is expected to support a hypothesis about the mechanism of cupping therapy, which has not yet been determined. In addition, we expect to be able to provide systematic treatment guidelines tailored to individual patients for cupping therapy by observing the effect of the procedure in real time in a scientific way."

- This research was led by Professor Jae Gwan Kim of the Department of Biomedical Science and Engineering, and GIST Ph.D. candidate Sungchul Kim as the first author. This research was supported by the Traditional Korean Medicine R&D Program funded by the Ministry of Health and Welfare, Brain Research Program through the National Research Foundation of Korea, the Korea Institute of Oriental Medicine, and the GIST Research Institute (GRI). The results were published online on January 2, 2019, in the *Journal of Biophotonics*, a leading journal in the field of optics. ☯