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# TCM PATTERN IDENTIFICATION RESEARCH ON HEALTH CONDITION OF HUMAN BODY IN LONG-TERM INCLOSED ENVIRONMENT

**Abstract**

"Digital Four-Diagnostic Instrument" and "TCM Inquiring Diagnostic Questionnaire" were used in the Mars 500 International Joint Research Project to collect information from 6 voluntary astronauts once every two weeks, through observation, palpation and inquiry according to TCM theories. During 520 days of the experiment, 37 times of data collection were performed, totally over 400 digital images of tongues and facial complexion and over 20,000 data were collected. These data were then analyzed by a team of TCM, statistics, and data mining experts. Some TCM diagnostic elements and methods applicable to the space environment were established and verified, and characteristics and evolvement of TCM patterns (reflecting physical and mental conditions) of volunteers in long-term inclosed environment were summarized and elucidated. The main results are as follows: 1. The analysis of tongue, facial complexion and pulse characters, as well as the analysis of pulse-subhealth correlation, can effectively reflect the health condition of the volunteer, indicating that volunteers were indeed in subhealth even though they were not ill. 2. Through data mining and analysis, 10 definitive elements were selected to construct the models of TCM pattern identification and it's evolvement in long-term inclosed environment, which manifested that TCM holistic view proved to be an effective yet easy way to observe the health condition of astronauts. 3.

Data were analyzed by data mining technique through various angles including single individual at single time point, single individual at multiple time points, and multiple individuals at multiple time points. Results show that TCM pattern evolvement of various volunteers in long-term inclosed environment follows some common trends, Qi-deficiency being the thread pattern, with individualistic features depending on constitutional differences (manifested in various degrees of accompanying patterns of liver-qi stagnation, spleen deficiency, damp encumbering or yin deficiency). The research has verified the scientific nature and effectiveness of TCM pattern analysis based on "four diagnostic" methods, which should serve as a solid foundation for observation, monitoring and intervention of health conditions of astronauts in long-term space flight in the future.