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상체움직임에 따른 자세기능의 평가

Assessment of the Posture Function by Head Movement

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요 약 본 논문은 상체움직임을 통하여 자세기능의 변화를 나타냈다. 자세의 기능은 상체의 움직임 변화에 따라 자세의 방향성을 분석하였다. 측정항목은 균형시스템에 따라 자세에 대한 평가로 활용하였다. 중추신경은 0.226±0.04의 변화가 발생하였고, 체성감각은 0.939±0.46의 변화, 전정기관은 4.009±1.05이고, 시각은 8.336±4.05로 변화가 나타났다. 본연구의 결과로 상체움직임에 따른 시각적 변화에 미세하게 영향으로 나타났고, 중수신경의 변화에도 다소 변화가 나타남으로 확인하였다.

Abstract The purpose of this study was to show the detection of the head movement within relatively the posture function. An analysis of the posture function was inquired a displacement that the ranges of stance direction showed generally a variation across all condition through the head movement. CNS condition (C_RL-$_{MIN\text{-}AVG}$) was verified slightly greater variation at 0.226±0.04 units. Somatosensory condition (So_RL-$_{MIN\text{-}AVG}$) was verified slightly greater variation at 0.939±0.46 units. Vestibular condition (Ve_RL-$_{MIN\text{-}AVG}$) was verified slightly greater variation at 4.009±1.05 units. Vision condition (Vi_RL-$_{MIN\text{-}AVG}$) was verified greater variation at 8.336±4.05 units. When the movement head of vision characteristic function was presented a diminutive variance. On the CNS characteristic condition of the movement head function was presented a diminutive variance.

Key Words : Head movement, Algorithm of transformation, Head module, Transformation assessment

Ⅰ. Introduction

Most human balance take a minimize perturbation signal in order to act immediate postural reactions, up-and-down support and moving displacements. The postural control mechanisms show a slow and a fast movement of the displacements that have been used to look into moving adaptation in the posture function [1].

As a control mechanical system, the quality of life of humans is remarkably diminished with balance impairment and falls. As a consequence, human posture is effected individuals of enormous of physical signal for impact large perturbation [2]. The standard assessment in practice is a combination of physical examination, and patients often have their falls and infallible approach [3]. Essential elements of

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posturography present the main subject to control posture of body, and evaluate the subject's response to such interventions [4]. Using of sensor communication is to include smart environments and health control, etc. The transfer function device has been related to network of sensors, the survey system and communication system [5].

The aim of this study was to define a posture function processes through head movement. Posture function was tested in the correlation a control of these head relation and axial mechanism. The head movement may analysis to detect examination by the algorithm function.

II. Technical Background

1. Component of physiology of head movement condition

They are designed to transmit data about position and vibration for the mechanical systems and sensing communication [6]. The mechanical combination system was provided the elements of postural control that showed a perturbation and vibration of body [7].(Fig. 1)

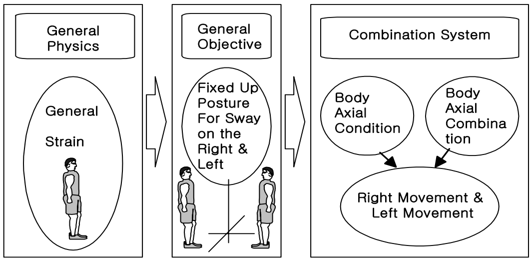

Fig. 1. Processing of basic structure for R-L movement on the axial condition
그림 1. 상체 움직임에 따른 변화의 기본 물리적 과정

III. The Proposed Method

1. Preprocessing

The proposed of body relation system showed generally the body of transformation monitoring subject in the home station.(Fig. 2) There was connected a health care serve on the service center that search to transfer a data serve on internet. Their system was to have normally the tided up posture and body sway position. The system was composed of a data gateway and serve system for the body condition [9][10]. The system was deal with it to generate a forward and backward case that was designed at PXI-6251 DAQ, PXI-1409(NI., USA). Physical signal systems was detected to keeps of equivalence fluctuation data that was to measure the exercising states in the system was used a signal data of delivering device [11][12][13][14].

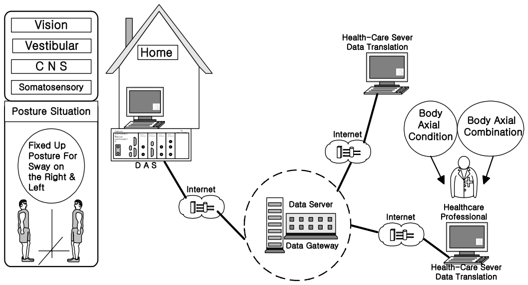

Fig. 2. Proposed of physical signal a transformation on body relation system for R-L
그림 2. 상체 움직임에 따른 신호 전달체계 과정

2. Algorithm of transformation R_L condition

The R_L value was similar to engine the specification of the rectified body perturbation. The algorithm was presented a communicating of R_L for the axial of the movement modules [8].(Fig. 3) The item of a body signal was described by the several time models for the posture. First, the frequency of right and left signal are started the R_L by the body movement. Secondly, the time variable was to translate of right and left time point. Thirdly, the posture axial sway displacement was to translate of right and left time for the comparison of R_L on the reference.

The axial sway displacement of the right and left time by the reference translated from right_left_ Axial variable value to R_L_Diff_Axial variable value has "Yes" as an flow action, and translated from R_L_Diff_Axial variable value to R_L_T_different

Axial value has "Yes" as an flow action, and a value "Displacement" condition, while translated from R_L_T_different Axial value to T_different Axial_Com executed on input "No" at any time, and reconstruct to zero Const-key value. A sharp distinction between right_left signal case and axial displacement case was all made. The commonly aspect was the form of the connection through which the axial displacement case interacts with the R_L value of sway.

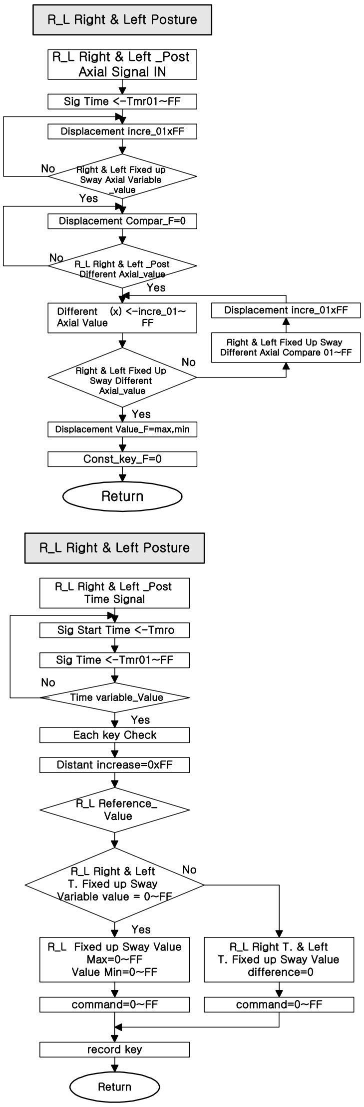

Fig. 3. Algorithm of a Body management signal system for R_L Posturography
그림 3. 상체 움직임에 따른 신호 전달체계의 알고리즘

Time variable of the rightand left translated from R_L_Reference_value to right_left_T variable value has "Yes" as an output condition, and a value "Max-Min" condition, while translated from right_left _T variable value to right_left_T_variable difference can be executed on input "No" at any time, and reset to zero command value. A clear distinction between posture movement time signal case and reference displacement case was all made. The commonly aspect was the form of the connection through which the frequency case interacts with the R_L value of posture movement.

Ⅳ. Experiment result and Analysis

The different values of minimum and average variation was an across greater displacement for all ranges from 0.226 to 8.336 units. So, vision was more influence on a body condition of sway on the head movement. This showed that CNS condition was minimized more effect for body control. When the movement head of vision characteristic function was presented a diminutive variance.

Comparison of Average R_L condition : Avg μ MIN-AVG and Avg μ MAX - MIN

On the CNS condition (C_RL-ΨMAX -MIN) was verified very smaller variation at 0.08±0.29 units. Somatosensory condition (So_RL-ΨMAX -MIN) was verified tiny smaller variation at 1.65±1.15units. Vestibular condition (Ve_RL-ΨMAX -MIN) was verified reverse smaller variation at -1.07±0.99 units. Vision condition (Vi_RL-ΨMAX -MIN) was verified smaller variation at 2.66±6.65 units. Vi_RL-ΨMAX -MIN displacement was more revealed at C_RL-RL-Ψ MAX -MIN and Vi_RL-ΨMAX-MIN displacement that presented the smallest at perturbations.(Fig. 4)

The correlating different values of minimum and maximum variation was an across smaller displacement for all ranges from -1.067 to 2.658

units.(Fig. 5) Therefore, somatosensory was less more influence at the reverse direction on a body condition of sway on the head movement.(Table 1) This showed that CNS condition was minimized very effect for body relation function. On the CNS characteristic condition of the movement head function was presented a diminutive variance.

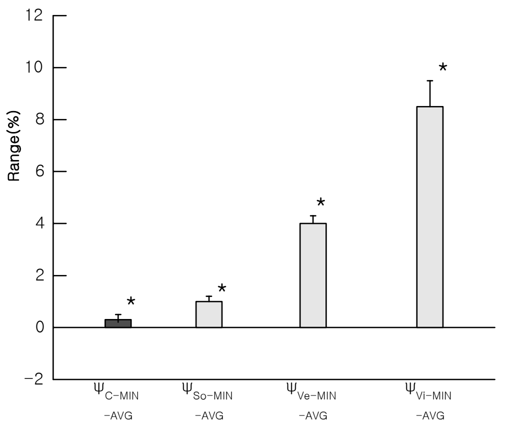

Fig. 4. Average data of the posture difference (ΨMin-AVG) show to the various conditions by the R-L movement
그림 4. 상체 움직임의 자세 변동(ΨMin-AVG)의 조건 평균

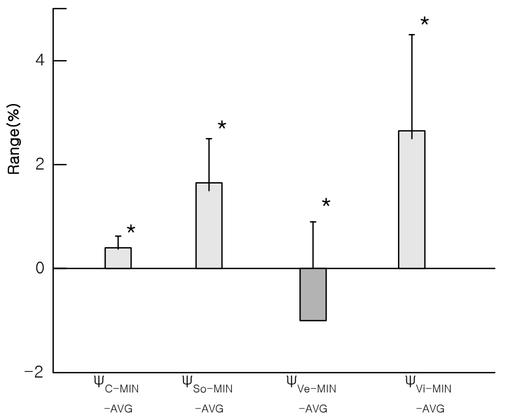

Fig. 5. Average data of the posture difference (ΨMax-Min) show to the various conditions by the R-L movement.
그림 5. 상체 움직임의 자세 변동(ΨMax-Min)의 조건 평균

Table 1. Mean and standard deviation of percentage of the various CNS (C_RL ΨAvg), Somatosensory (So_RL Ψavg), Vestibular (Ve_RL ΨAvg) and Vision (Vi_RL ΨAvg) condition. Presentation of average of Ψ MIN-AVG and ΨMAX -MIN.
표 1. 상체 움직임의 자세 변동 조건의 평균 및 표준편차 (Ψ MIN-AVG and ΨMAX -MIN)

Average Ψ	C_RL Ψ_{Avg}	So_RL Ψ_{Avg}	Ve_RL Ψ_{Avg}	Vi_RL Ψ_{Avg}
$\Psi_{MIN-AVG}$	0.23±0.04	0.94±0.46	4.01±1.05	8.34±4.05
$\Psi_{MAX-MIN}$	0.08±0.29	1.65±1.15	−1.07±0.99	2.66±6.65

Ⅴ. Conclusion

In summary, our results indicated that while showing a transfer function, body condition was a correlation as the perturbation range by the axial state. Posture function presented the variation of the head movement that assessed by the comparison of the algorithm. Posture function signal require that the body movement was more effective head displacement for minimizing the average variation. Average variation was indicated optimum displacement of the different values at the other conditions that head movement states appeared to sway greater than on the all range. Moreover, this system can be considered of correlation different values of minimum and maximum variation the posture function that demonstrated the confirmation of the results at the body sway acquisition system.

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