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5th International Meeting of Asian Rehabilitation Science in Taiwan

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Contents

Special Lecture

The Research of Auditory Stimulation in China Rehabilitation Research Center

Huang Qiuchen, Hu Chunying

China Rehabilitation Research Center, Department of Physical Therapy

The characteristics of sound are composed of three elements: loudness, tone, and timbre. Tone is the subjective feeling of the sound mainly related to frequency of acoustic waves. Auditory stimulation not only affects the auditory system and the vestibular system, but also activates the brain areas associated with emotional processing and higher cognitive processes. Furthermore, sound can also activate the lateral pre-motor and supplementary motor areas. Although there is sufficient evidence that auditory stimulation has important clinical therapeutic effects for those suffering motor function impairments, there is still a lack of clinical research concerning the effects of auditory stimulation on motor function, such as muscle strength, balance, and walking ability. Moreover, how different tones stimulate motor function needs further research.

Research 1: Immediate Effects of Different Frequencies of Auditory Stimulation on Lower limb Motor Function of Healthy People

［Purpose］The purpose of this study was to explore the immediate effects of different frequencies of auditory stimulation on the lower limb motor function of healthy people.

［Participants and Method］The subjects were 7 healthy people (5 males and 2 females). The subjects' lower limb function was measured without auditory stimulation (control), and with auditory stimulation of 500, 1,000, 1,500, and 2,000 Hz. The measured parameters were maximum knee extension torque, average knee extension torque, the Timed Up and Go test (TUG) time, Functional Reach (FR), and the 10-meter walking time.

［Results］The TUG times of 500, 1,500, and 2,000 Hz auditory stimulation showed significant decreases compared to the control. The 10-m walking times of 1,000 and 2,000 Hz auditory stimulation showed significant decreases compared to the control.

［Conclusion］The results show that auditory stimulation improved the TUG and 10-meter walking times of healthy people and different frequencies of auditory stimulation had different effects on lower limb motor function.

Research 2: Effects of different frequencies of rhythmic auditory cueing on the stride length, cadence, and gait speed in healthy young females

［Purpose］The aim of this study was to explore the effects of different frequencies of rhythmic auditory cueing (RAC) on stride length, cadence, and gait speed in healthy young females. The findings of this study might be used as clinical guidance of physical therapy for choosing the suitable frequency of RAC.

［Participants］Thirteen healthy young females were recruited in this study.

［Method］Ten meters walking tests were measured in all subjects under 4 conditions with each repeated 3 times and a 3-min seated rest period between repetitions. Subjects first walked as usual and then were asked to listen carefully to the rhythm of a metronome and walk with 3 kinds of RAC (90%, 100%, and 110% of the mean cadence).

The three frequencies (90%, 100%, and 110%) of RAC were randomly assigned. Gait speed, stride length, and cadence were calculated, and a statistical analysis was performed using the SPSS (version 17.0) computer package.

［Results］ The gait speed and cadence of 90% RAC walking showed significant decreases compared with normal walking and 100% and 110% RAC walking. The stride length, cadence, and gait speed of 110% RAC walking showed significant increases compared with normal walking and 90% and 100% RAC walking.

［Conclusion］ Our results showed that 110% RAC was the best of the 3 cueing frequencies for improvement of stride length, cadence, and gait speed in healthy young females.

O – 1

Effect of random noise galvanic vestibular stimulation on the excitability of vestibulospinal response

– A double blind sham-controlled pilot study –

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［Background and Purpose］

Vestibulospinal function is important and vestibular rehabilitation is conducted for patient with vestibular disease. Nowadays, the study of noisy galvanic vestibular stimulation (nGVS) for rehabilitation is reported. nGVS reduces the velocity of body sway during upright standing on rigid ground or rubber form with eyes open or closed. However, it is unclear whether nGVS modulate the excitability of vestibulospinal response resulting the increasing of standing stability. The excitability of vestibulospinal response can be estimated using the amount of facilitation of Hoffman-reflex (H-reflex), which reflect the spinal motoneuron pool excitability, by square-wave pulse GVS (spGVS). This study's purpose is to investigate whether the nGVS modulate the facilitatory effect of spGVS on H-reflex.

［Participants］

Thirty-one healthy adults were participated (real-nGVS: 14, sham-nGVS: 17).

［Method］

The subject was in prone position on the bed with eyes closed, and right and left ankle joints were fixed at 90 degree with braces. Bipolar binaural square-wave pulse GVS was delivered affixed to the mastoid processes (intensity=3mA, duration=200ms, polarity=right: cathode, left: anode). The electrical stimulation to right tibial nerve evoking the H-reflex from the right soleus muscle was delivered 100 ms after spGVS onset. The 10 H-reflex were elicited and recorded in no GVS condition (as control) and, spGVS condition each other at random order. nGVS was delivered by DC-STIMULATOR PLUS (NeuroConn GmbH) (intensity: 1mA, duration: 1200 sec, stimulation mode: noise). The sham nGVS was conducted in intensity 0mA. The H-reflexes were measured pre and post nGVS, and the H-reflex ratio (conditioned/unconditioned H-reflex amplitude) in pre and post-nGVS were compared.

［Results］

The H-reflex ratio in post in nGVS was significantly lower than that in pre, but this reduction was not in the sham condition.

［Conclusion］

Our results suggest that random noise galvanic stimulation to primary vestibular nerve immediately reduces the excitability of vestibulospinal response.

O – 2

痙直型脳性麻痺児・者における局所筋の筋疲労と筋緊張の関連

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［Background and Purpose］本研究の目的は，下肢に筋緊張亢進を伴う脳性麻痺児・者のゲイトコレクター適用後の歩行における局所筋疲労及び筋緊張の状態を近赤外分光法（以下 NIRS）及び筋電図により非侵襲的かつ定量的に分析し，局所筋の筋疲労と筋緊張の関連性を明らかにすることである．

［Participants］対象は，歩行能力が自立レベルから杖及び歩行器等の介助が必要な 7 名（年齢範囲 8～36 歳）とした．そのうち 2 名については，6 ヶ月後のフォローアップ計測に拒否を示したため，初回計測のみとなった．

［Method］計測条件はゲイトコレクター装着後，下肢筋の自覚的負荷強度（RPE）で「きつい」と訴える程度まで歩行（以下，重負荷歩行）を実施した．NIRS プローブは，動作を妨げない前脛骨筋及び外側腓腹筋腹部に取り付け，歩行前の安静時から歩行終了後 10 分間までの局所筋肉の血中酸素動態として，酸素化ヘモグロビン（⊿Oxy･D）と還元ヘモグロビン（⊿Deoxy･D）の濃度変化（⊿Hb･D）を分析した．また，歩行前後の外側腓腹筋の緊張程度は，歩行前，重負荷歩行直後，歩行後 10 分経過後の 3 回，誘発筋電図を用いて内果後方の母趾外転筋に記録電極，母趾の付け根に基準電極を装着し，外側腓腹筋の支配神経である脛骨神経刺激にて M 波及び F 波を記録した．M 波の最大刺激，刺激頻度 0.5Hz にて 16 回計測し，そのうち最大値及び最小値を除く 14 回分の計測データにおける平均 F/M 比を F 波のパラメータとした．

［Results］外側腓腹筋の筋緊張の程度変化をみると，対象者 7 名中 4 名は歩行前に比べて歩行後の平均 F/M 比は，変化なしあるいはわずかに低下していたが，日頃から足関節の他動的背屈運動に抵抗を示す 3 名は歩行直後では低下したが，歩行終了 10 分後では歩行前の状態に戻っていた．6 ヶ月間の歩行練習後でも同様の変化を示した．NIRS による血中酸素動態として，軽負荷歩行後には⊿Oxy･D と⊿Deoxy･D の差はあまり変化を認めず，一時的に変化を認めたとしても，5 分程度の休息後に定常状態に回復していた．しかし，重負荷歩行後では，すべての対象において，歩行後，酸素化ヘモグロビンと還元ヘモグロビンの濃度格差を認め，局所筋の疲労が推測され，その疲労程度は歩行後 10 分間の安静後も改善を認めなかった．ただ，日頃より足部が尖足で緊張亢進している対象者において，前脛骨筋は重負荷歩行後，10 分経過しても⊿Oxy･D と⊿Deoxy･D の差は広がったままであり，局所筋の疲労が持続していることが推測された．一方，外側腓腹筋の疲労程度はほとんど観察されなかった．また，下肢筋の緊張が関節可動域を制限しない対象者の一部において，前脛骨筋及び外側腓腹筋の疲労状態は重負荷歩行直後及び歩行後 10 分経過時点での⊿Oxy･D と⊿Deoxy･D の差が観察されず，疲労状態になかったと推測される．

［Conclusion］ゲイトコレクター装着歩行後は，外側腓腹筋の痙性が亢進することはなく，運動として観察されにくい前脛骨筋の活動を賦活することが確認された．脳性麻痺児・者がゲイトコレクターの適用を通して，従来型の歩行器や装具では得られない筋緊張が抑制された歩行能力を獲得することができれば，脳性麻痺児に多くみられる股関節形成不全を減少させ，長期的に見て車椅子や寝たきり生活への移行をとどめることに寄与すると考える．

O – 3

Effect of step height on trunk and lower limb movement while climbing

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［Background and Purpose］
We aimed to determine the effect of step height on trunk and lower limb movement while climbing.
［Participants］
The study population comprised 17 healthy males.
［Method］
We assumed one step of promotion movement a problem from static standing posture and set the amount of step to 10 cm and 20 cm.We used a 3D motion analysis system and a force plate for measurement.The perpendicular ingredient showed bimodality, The first peak time was T1, the second peak time was T2, the point where the vertical force became 0 was time T3, and step initiation was considered as time T0.We compared T1, T2, and T3, while considering the scapulary and pelvic girdle in the horizontal and frontal planes.We assessed the change in hip, knee, and ankle joints in the sagittal plane.
［Results］
At T1, using 10-cm step height, the median changes in scapula and pelvic angles in the horizontal plane were −0.63°and −0.82°.In the frontal plane, the median changes were −0.85°and −1.06°.At T1 in the sagittal plane, the changes in hip, knee, and ankle joint angles were 16.29°, 19.71°, and −6.55.At 20-cm step height, in the horizontal plane, median changes in angles were −0.17°and −0.51° .In the frontal plane, the median changes were −0.72°and −1.25°. At T1 in the sagittal plane, the changes in hip, knee, and ankle joint angles were 14.25°, 25.25°, and −5.31°.At T2, with 10-cm step height, the median in the horizontal plane were −2.15° and 0.49°. In the frontal plane, the median changes were −0.25°and −2.24°. At T2 in the sagittal plane, the change were 23.63°, 7.24°, and −2.52°.At 20-cm step height, in the horizontal plane, median were −2.1°, and −0.35°. In the frontal plane, the median changes were 0.54°and −2.5°. At T2 in the sagittal plane, the change were 36.59°, 21.39°, and 4.29°.At T3, with 10-cm step height, the median in the horizontal plane were 0.49° and 2.33°. In the frontal plane, the median changes were 3.28°and 2.07°.At T3 in the sagittal plane, the changes were −16.5°, −10.43°, and 10.85°. At 20-cm step height, in the horizontal plane, median were 0.46°and –1.57. In the frontal plane, the median changes were 2.29°and 1.57°. At T3 in the sagittal plane, the changes were –13.74°, –10.44°, and 10.91°.
［Conclusion］
Changes in step height while climbing correspondingly causes changes in pelvic movement patterns in the horizontal plane. Because step height increased, we supplemented distance with vertical displacement. We further calculated the flexural angles of the hip and knee joints during climbing movements.

O – 4

小児患者に対する急性期呼吸理学療法が横隔膜運動に与える影響

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［Background and Purpose］

呼吸理学療法は臨床現場で広く行われている．しかし，その有効性を定量的に評価することは容易でなく，経験的または主観的に判断されることが多い．呼吸に伴う横隔膜の移動距離（横隔膜変位）は一回換気量と関連があり，呼吸状態を反映する客観的指標の 1 つとして近年注目されている．成人に対する呼吸介助で横隔膜変位が増大すると報告されているが，小児患者に関する報告はまだ少ない．小児患者に対する急性期呼吸理学療法が横隔膜運動に与える影響を検討する．

［Method］

2017 年 12 月～2018 年 10 月に茨城県立こども病院（Ibaraki, Japan）の ICU で呼吸理学療法を受けた自発呼吸がある小児患者．方法：呼吸理学療法として徒手による呼吸介助を 10-15 分/回/日実施し，横隔膜エコー（M-mode 法，季肋部アプローチ）を用いて，①介入直前，②介入直後，③介入翌日に安静時の右横隔膜変位を測定した．統計解析は，Mann-Whitney U test を用い，有意水準は 5%とした．

［Results］

対象は 28（男 11，女 17）人，年齢中央値 8（範囲 2-53）か月，身長中央値 68.4（範囲 46.5-102.4）cm，体重中央値 7.5（範囲 3.5-16.8）kg であった．対象児の診断カテゴリーは先天性心疾患術後 24 人（85.7%），急性呼吸器疾患 4 人（14.3%）であった．呼吸理学療法の横隔膜変位中央値は，介入直前 7.9（3.8-13.4）mm，介入直後 8.7（4.0-18.0）mm，介入翌日 7.9（3.8-16.9）mm であった．介入直後の横隔膜変位は介入前と比べ有意に増加し（$p = .02$），介入翌日の横隔膜変位は介入前と比べ有意な変化を示さなかった（$p = .64$）．

［Conclusion］

横隔膜エコーによる小児患者の横隔膜変位を評価することを通して，急性期呼吸理学療法の効果を確認することができた．小児患者に対する急性期呼吸理学療法は横隔膜変位を増大させ，一回換気量を改善させる可能性がある．

O－5

理学療法学部生を対象とした東京オリンピックボランティアに関する調査

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［Background and Purpose］ 2020 年に東京オリンピック・パラリンピックが開催される．開催に伴いボランティアが募集されている．募集人数は 8 万人であり，日本国籍で 18 歳以上であれば参加可能である．活動内容は，競技会場などの大会施設における観客のサービスなどである．本研究の目的は，理学療法学部生のオリンピックに関するボランティアへの参加や理由等の傾向を明らかにすることである．傾向を捉えることで今後のスポーツや理学療法士のボランティア教育および促しへの一助となると考える．

［Participants］ 2018 年度に本学理学療法学科に在籍している 1～4 年生 342 名（男性 190 名，女性 152 名）を対象とした．全対象者には研究の趣旨・方法について事前に説明し，同意を得た上で無記名にて調査を行った．本研究は国際医療福祉大学倫理審査委員会の承諾を得ている（承認番号：18-Io-109）．

［Method］ 東京オリンピックボランティア募集期間中（2018 年 9 月 26 日～12 月 12 日）にアンケート調査を実施した. アンケート調査項目は, 東京オリンピック・パラリンピックの参加 (参加の有無・理由, 不安) 内容とした. 回答形式は選択法, 自由記載方式を用いた. 分析方法は各質問項目より人数を合計し, 対象者数から割合を算出した．

［Results］東京オリンピック・パラリンピックのボランティアに「参加する」9.4%,「参加しない」43.1%,「わからない」46.2%であった.「参加する」を選択した中で希望する部門については,「指定なし」11.9%,「案内」7.5%,「競技」26.9%,「移動サポート」10.4%,「アテンド」3.0%,「運営サポート」9.0%,「ヘルスケア」23.9%,「メイディア」1.5%,「式典」6.0%であった．参加理由については,「スポーツボランティアに興味があった」35.6%,「日本でのオリンピックを盛り上げたい」20.3%,「将来スポーツ分野に従事したい」28.8%,「自分の力を試したい（語学や知識など)」15.3%であった．参加への不安については「言語」43.4%,「ボランティアに参加するための費用」34.7%,「大学の授業や補講が入らないかどうか」17.3%,「その他」4.3%であった．「参加しない」を選択した中で不参加の理由については,「興味がない」24.0%,「スケジュール的に難しい（実習などの大学のイベントがある等)」29.5%,「英語ができない」13.8%,「金銭的な負担が大きい」28.6%,「その他」4.1%であった．

［Conclusion］ 本学科で東京オリンピック・パラリンピックのボランティアについて調査した結果，全学年の約 10%が参加予定であった．希望部門として競技やヘルスケアの割合が高く，理学療法や医療的な知識を使用してボランティアをする傾向が見られた．また，参加理由として将来的にスポーツ分野で従事したい学生が参加することが多かった．参加への不安として費用面が割合としては高く，報道でも取り上げられているがボランティアの期間の滞在費や生活費を地方の大学学生がどのように調整するかは問題である．また，語学能力や大学の授業スケジュール等への回答も多い．不参加の学生の理由では大学のスケジュールの回答も多く，大学として学生をボランティアに参加してもらうために希望する学生の優遇処置をとる必要があるのでないかと考える．今回，本学科としては臨床実習の時期をボランティアに参加できるように調整する案を募集期間前に学生へ提示を行った．今後，他の養成校での傾向などを分析していきたい．

O – 6

The study on the burden of students due to introducing the flipped classrooms compared with the traditional lecture methods

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［Background and Purpose］

In recent years, the flipped classroom has attracted attention as an educational method using ICT. One of the features of the flipped classroom is that students can watch lecture videos on the web before the class and in actual classes they can understand lecture contents through active learning tasks such as group work. However, medical students have to take more lectures than students in other fields. Therefore, there are disadvantages that the introduction of the flipped classroom increases the burden on students. The purpose of this research was to investigate the sense of burden on students due to introducing the flipped classroom and to compare with traditional lecture methods.

［Participants］

The Participants in this research were 162 second and third grade students in our university. This study was approved by the Ethics Committee of International University of Health and Welfare. Participants were given an information sheet, and they provided written informed consent for participation.

［Method］

The lecture videos were created using Camtasia 2 (TechSmith®, USA) and uploaded the lecture videos on YouTube site in limited viewing format. Students logged in to the Google Classroom and watched the lecture videos. After all classes finished, we conducted the questionnaire survey for the students. The questionnaire was created using the Google form, and the student answered the questionnaire on the web site. “The burden of students watching the lecture videos before classes” was examined on a scale of 1 to 10. "ease of learning" and "ease of understanding" were investigated using five-point scale

: 1. Traditional class, 2. Likely Traditional class, 3. Neither, 4. Likely Flipped class, 5. Flipped class.

The questionnaire result was tabulated by each item. Based on the answers of "ease of learning" and "ease of understanding", the difference in the burden on students between “flipped” and “traditional” was examined in the Mann-Whitney U test using SPSS Version 24.0. The level of significance was set at $p < 0.05$.

［Results］

Approximately 70% of students answered that the flipped classroom was better in "ease of learning" and "ease of understanding" than the traditional methods. The median (25% ,75%) of the burden of students was 3 (2, 5). Students who answered "flipped" was low burden; median 3(2, 5), but the burden of students who answered "Traditional" was significantly higher; median 5(3, 6.5).

［Conclusion］

This survey found that the flipped classroom was accepted by many students. However, it was clear that there were also a certain number of students who like the traditional methods, and the burden of the students were greater than the students who liked flipped classroom. In conclusion, to introduce the flipped classroom, it seemed necessary to carefully explain the purpose, method, advantage and so on of the flipped classroom to the student.

O – 7

Survival times of patients with or without tube feeding in Japanese psychiatric hospitals

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［Background and Purpose］

It is widely supposed that there has been no evidence of increased survival in patients with advanced dementia receiving enteral tube feeding. However, more than a few studies have reported no harmful outcome from tube feeding in dementia patients compared to in patients without dementia.

［Participants and Method］

This was a retrospective study. Nine psychiatric hospitals in Okayama Prefecture participated in this survey. All inpatients fulfilling the entry criteria were evaluated. All subjects suffered from difficulty with oral intake. Attending physicians thought that the patients could not live without long-term artificial nutrition. The physicians decided whether to make use of long-term artificial nutrition between January 2012 and December 2014.

［Results］

We evaluated 185 patients. Their mean age was 76.6 ± 11.4 years. Of all subjects, patients with probable Alzheimer's disease (n = 78) formed the biggest group, schizophrenia patients (n = 44) the second, and those with vascular dementia (n = 30) the third. The median survival times were 711 days for patients with tube feeding and 61 days for patients without tube feeding. In a comparison different types of tube feeding, median survival times were 611 days for patients with a nasogastric tube and more than 1000 days for those with a percutaneous endoscopic gastrostomy tube.

［Conclusion］

Patients with tube feeding survived longer than those without tube feeding, even among dementia patients. This study suggests that enteral nutrition for patients with dementia prolongs survival. Additionally, percutaneous endoscopic gastrostomy tube feeding may be safer than nasogastric tube feeding among patients in psychiatric hospitals.

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Connection between Interoception and Emotional Response According to Differences in Head Position

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［Background and Purpose］

With the mind and the body thought to be closely connected, interoception has been receiving attention in recent years. Heartbeat perception tasks (HPT) are often used as a measure of interoception, and it is reported that the acuity of heartbeat perception (interoception) shows a positive correlation with the magnitude of emotional experience. Regarding the relationship between the mind and body on the other hand, there are reports of many studies related to posture and psychological factors, and it is suggested that bodily information generated by changes in posture influences emotional response via interoception. In this study, we therefore examined interoceptive acuity and the connection between interoception and emotional response according to differences in head position, focusing on sagittal cervical alignment.

［Participants］

The subjects were 14 adults (10 men and 4 women with an average age of 19.9±3.9 years) without any disease or dysfunction particular to the cervical region.

［Method］

The subjects were divided into 3 groups according to the differences in cervical alignment from the craniovertebral angle (normal head posture: NHP group; slight forward head posture: FHP-S group; and severe forward head posture: FHP-L group), and their HPT scores were analyzed for a difference between the groups. The three groups were compared using the Kruskal-Wallis test, and a multiple comparison test was carried out with the Steel-Dwass method. We also carried out a one-way analysis of variance regarding the connection with mood (tense arousal, energetic arousal) according to the three groups. All tests used a significance level of 5%.

［Results］

A significant correlation was seen between cervical alignments and HPT scores, with the NHP group demonstrating a significantly higher score ($P>0.05$) in comparison to the FHP-S group. Meanwhile, although no significant correlation was observed for cervical alignment and mood scale for both tense arousal and energetic arousal, the NHP group demonstrated superior emotion regulation results.

［Conclusion］

It is suggested that those who can maintain their cervical alignment in the normal position possess interoceptive acuity, and that normalized cervical alignment as part of postural control has a positive influence on emotional response.

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理学療法士と作業療法士の認識の相違からみる作業療法士の役割

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［Background and Purpose］

多くの作業療法士は，他職種に対して「作業療法士の役割」についての啓蒙活動に取り組んでいる．しかし，十分な理解が得られていないように思われる．そこで本研究は，協働する機会が多い理学療法士と作業療法士が抱く「作業療法士の役割」の相違を明らかにすることを目的に実施した．

［Participants］

対象者は，回復期リハビリテーション病棟において理学療法または作業療法に従事している者とした．

［Method］

研究に対して同意の得られた対象者に「作業療法の役割」について自由記載のアンケートを実施した．そして，自由記載で得られたデータは KH Coder を用いて共起ネットワーク分析を実施した．

［Results］

対象者は理学療法士 28 名（29.5±4.5 歳），作業療法士 33 名（28.5±4.5 歳）であった．免許取得後年数は理学療法士 6.7±3.7 年，作業療法士 4.7±3.1 年であった．理学療法士に対するアンケートの結果，総抽出語は 832 語，異なり語は 232 語であった．上位抽出語は「動作（17 回）」，「ADL（15 回）」，「獲得・機能（13 回）」，「精神・能力（10 回）」であった．また共起ネットワーク分析の結果，テキストデータは 4 つのグループに分類された．作業療法士に対するアンケートの結果，総抽出語は 1422 語，異なり語は 323 語であった．上位抽出語は「生活（30 回）」，「機能・能力（15 回）」，「精神（14 回）」，「動作・環境（13 回）」であった．また共起ネットワーク分析の結果，テキストデータは 6 つのグループに分類された．

［Conclusion］

本研究の結果，理学療法士は作業療法士の役割を「患者の上肢を訓練する」，「ADL，IADL を向上，獲得する」と認識していた．作業療法士は「作業能力を向上させる」，「生活環境への介入」や「退院指導」などを役割として認識していた．抽出されたテキストに共通する項目が多く見られ，対象者の機能や能力の改善を図ることが共通の認識であった．しかし，作業療法士は人間が行う活動を「作業」と認識し介入しているが，理学療法士から「作業」の理解は得られていないように思われる．

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Effect of visually guided tracking training using own foot center of pressure on upright postural stability

- A preliminary study -

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［Background and Purpose］

In rehabilitation, the balance training is important to prevent the fall in elderly. We investigated whether visually guided tracking training using own foot center of pressure (CoP) affect the stability of upright standing, and the leaning of the task affect the postural stabilization.

［Participants］

Fifteen healthy volunteers participated.

［Method］

The subject stand on the force plate in 2m front of the monitor, in which the CoP and the target to move circularly clockwise with 0.125 Hz. The subject tracked the target with own CoP during 1 minute, and this trial was conducted in 10 times. The tracking error (TE) was calculated and compared between trials. In pre- and post-training, the trajectory of CoP during upright standing with the eyes open (EO) or closed (EC) was recorded. The length of trajectory of CoP (LNG) in pre- and post was compared. Correlation test was conducted between the delta (pre-post) LNG and delta (1^{st}-10^{th} trial) TE was conducted.

［Results］

There was significant decrease of TE after 3^{rd} trial. There was no significant difference in LNG between pre- and post. There was significant positive correlation between delta TE and delta LNG in EO, but not in EC.

［Conclusion］

The amount of learning of visually guided tracking training with CoP associates with the amount of stabilization of body sway during standing using visual feedback.

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