2024년
한국신경근육물리치료학회
추계학술대회 초록집

The Fall Conference Of Korean Academy Of
Neuromuscular Physical Therapy In 2024

한국신경근육물리치료학회
Korean Academy of Neuromuscular Physical Therapy

2024 한국신경근육물리치료학회 및 일본이학요법과학학회 국제학술대회

2024 Korea Society for Neuromuscular Physical Therapy and Japan Society for Physical Therapy International Conference

일정 및 장소

2024. 9. 6(금)~ 9. 8(일)

건양대학교
대전시 서구 관저동로 158 메디컬 캠퍼스
September 6 (Fri)–8 (Sun), 2024
Konyang University Medical Campus

일정 안내

날짜	시간	프로그램
2024. 09.06 (금)	18:00 – 20:00	국제 학회 교류 간담회 International information exchange meeting
2024. 09. 07 (토)	9:30– 9:40	개회식 Opening ceremony
	9:40– 10;00	한국: 로봇재활과 웨어러블 기기, 정성훈 교수 Korea: Robot rehabilitation and wearable devices, Prof. Sunghoon JUNG
	10:00–10:20	중국 China: To Be Scheduled
	10: 20– 10:40	일본: 고토 요시노부 교수 Japan: To Be Scheduled, Prof. Yoshinobu GOTO
	10:40– 10:50	휴식 break
	10: 50– 12:00	구술 발표 및 질의응답 Oral presentation: 5 presentations
	12:00– 13:00	점심 Lunch
	13:00– 14:50	포스터 발표 및 질의응답 Poster presentation: 30 presentations
	14:50– 15:00	폐회식 Closing session
	15:30– 16:00	대학시설견학 (외국연구자 대상) University tour
	18:00– 20:00	학술정보교류 Academic Information Exchange Meeting
2024. 09. 08 (일)	10:00– 16:00	한국의료기관 및 문화시설 방문 Visiting Program: medical institutions, Korean cultural facilities, etc.

초록 제출 Call for Abstracts

[How to apply] Google Forms URL:https://forms.gle/4R61X8SgVX4G4E3z7
[Deadline] Saturday, August 26, 2024, 17:00
[Conference secretariat] han@iuhw.ac.jp

학술대회 참석 Participation

[Participation fee] Physical therapist 10,000 Won (exempt for undergraduate students)
[Contact] jneuromuscularrehab@gmail.com

기능적 전기자극 치료기 Theta

경피신경전기자극(TENS), 신경근육전기자극(NMES or EMS),
그리고 기능적전기자극(FES)등 인체에 전류를 가하여 관절가동범위의 유지 및 증대를 위한 기능훈련, 보행기능 훈련하는 것을 목적으로 사용하는 치료기

제품특징

- Mi-Technology를 통한 FES, TENS 치료 가능
- Motor Point Pen을 이용한 EST 치료 가능
- 2 + 2 기능으로 2채널씩 다른 프로그램 적용 가능
  (상지 + 하지 동시치료)
- 프로그래밍이 가능하여 맞춤형 파라미터 생성 가능
- 재활 전문가를 위한 48가지 프로그램 내장

Theta

"신경근 환자분들을 위한 FES!!"

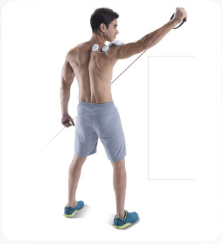
무선 FES 치료기 Wireless Pro

TENS, NMES, FES등 인체에 전류를 가하여 관절가동범위 유지 및 증대를 위한 기능 훈련,
보행기능 훈련을 목적으로 사용하는 무선 FES 치료기

제품특징

무선으로 편리하게 사용 가능
세계 최초 4대 혁신 기술인 Mi-Technology 적용
(mi-SCAN, mi-TENS, mi-Range, mi-Action)
Motor point pen으로 운동점 자극하여 근 수축 유도 가능
5가지 카테고리 71가지 프로그램 내장
(재활, 신경, 통증, 혈관, 훈련)

무선 FES 치료기: 다양한 동적 상태에서도 치료 가능



Motor point pen

Wireless Pro 4ch

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SensingFuture

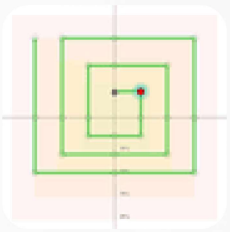
균형능력 측정 및 훈련 시스템

압력센서가 내장된 플레이트를 사용하여 다양한 균형 능력을 측정하는 시스템
시각적 바이오피드백 기술이 적용되어 훈련의 효과를 더욱 높여줌

제품특징

- 40 × 40㎝ 영역에 분포된 1,600개의 압력 센서를 기반으로 신체 동요량 측정
- 다양한 평가 프로토콜과 훈련을 위한 운동 프로토콜, 그리고 게임이 내장되어있어 다목적 균형 평가 및 훈련이 가능함
- 훈련결과를 PDF, excel 및 jpeg 포맷으로 export 할 수 있음

측정 및 훈련 자세



다양하고 흥미로운 Game 내장

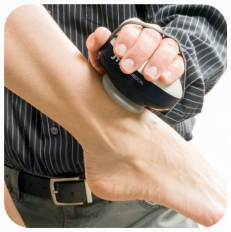
"환자분들의 균형과 근력을 편리하게!!"

무선 디지털 근력 측정기

팔/다리 및 다양한 신체 부위의 근력을 측정할 수 있는 무선 디지털 근력 측정기

제품특징

- 각 신체 부위의 근력을 쉽고 빠르게, 정확하게 측정할 수 있음
- 반복 측정한 값의 평균, Coefficient of variation, Max Force, Percent of Bilateral deficit 등의 파라미터를 계산해 줌
- Pressure Thresholds를 지정하여 측정할 수 있음
- 무선 콘솔을 통해 측정값을 정량적으로 확인할 수 있음



다양한 자세에서 다양한 부위의 근력을 측정할 수 있음

Echo Muscle Tester

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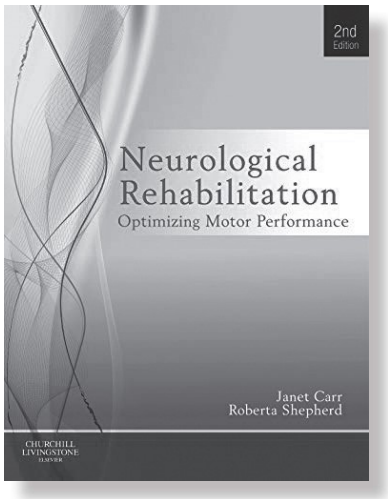


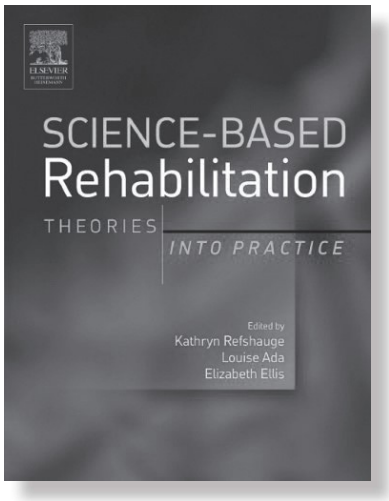
"신경계 재활" 한국어판 2025년 1월 재출간 예정

Neurological Rehabilitation: Optimizing Motor Performance

Part 1: Introduction: adaptation, training and measurement
1. The adaptive system: plasticity and recovery
2. Training motor control, increasing strength and fitness and promoting skill acquisition
3. Measurement

Part 2: Task-related exercise and training
4. Standing up and sitting down
5. Walking
6. Reaching and manipulation
7. Balance

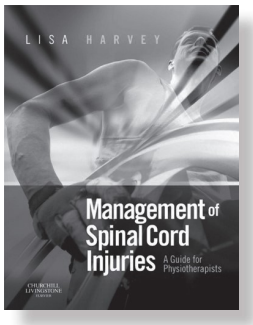
Part 3: Body function and structure, limitations in activities and participation
8. Upper motor neuron lesions
9. Cerebellar ataxia
10. Somatosensory and perceptual–cognitive impairments
11. Stroke
12. Traumatic brain injury
13. Parkinson's disease
14. Multiple sclerosis



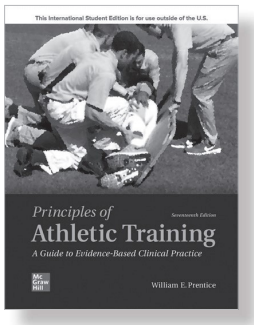
Science–Based Rehabilitation: Theories into Practice

1. Bridging the gap between theory and practice
2. We only treat what it occurs to us to assess: the importance of knowledge-based assessment
3. The quest for measurement of infant motor performance
4. Muscle performance after stroke
5. Changing the way we view the contribution of motor impairments to physical disability after stroke
6. How muscles respond to stretch
7. Cardiorespiratory fitness after stroke
8. Training gait after stroke: a biomechanical perspective
9. Assessment and training of locomotion after stroke: evolving concepts
10. Strategies to minimize impairments, activity limitations and participation restrictions in parkinson's disease

2025년 하반기 출간예정



물리치료사를 위한
척수손상 관리



운동손상학

감각계통 및 신경과학

사이플러스 Science plus 서울특별시 영등포구 양평로 30길 14 세종앤까뮤스퀘어 1106호
전화 02-332-6171 팩스 02-332-6185 이메일 sciplus@sciplus.co.kr 홈페이지 www.sciplus.co.kr

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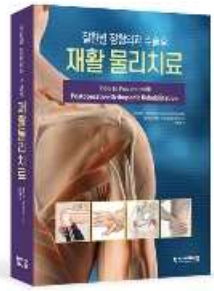

학지사메디컬 ▶ (04031) 서울특별시 마포구 양화로 15길 20 마인드월드빌딩 6F
TEL 02-330-5188 FAX 02-326-0338 E-mail hakjisamd@hakjisamd.co.kr 홈페이지 www.hakjisamd.co.kr

[초록 목차]

[구연 발표]

물리치료에서 로봇 보조 재활의 효과: 보행 훈련을 중심으로

정성훈
백석대학교 보건학부 물리치료학과

The Effects of Robot-assisted Rehabilitation in Physical Therapy: Focus on Gait Training

Sunghoon Jung
Dept. of Physical Therapy, Baekseok University, Professor

Abstract

This presentation explores the rapid integration of robotic technologies into physical therapy, tracing their evolution from futuristic concepts to practical rehabilitation tools. We will examine how the perception of robots has transformed from science fiction imagery to essential devices in clinical settings.

We will focus significantly on lower limb rehabilitation robots, which are categorized into three main types: grounded exoskeletons (e.g., Lokomat), grounded end-effectors (e.g., G-EO system), and wearable exoskeletons (e.g., Angel legs). We'll review the clinical evidence supporting their use, with particular emphasis on stroke rehabilitation and treatment for older adults.

The presentation will then explore the expanding applications of wearable exoskeletons beyond traditional rehabilitation. This includes their use as assistive technologies for daily living, their potential in managing sarcopenia in the elderly, their applications in specialized fields such as the military, and their role in providing ergonomic solutions in industrial settings.

By examining these technological advancements and their clinical applications, we aim to provide insights into the transformative impact of robotics on patient care and the future directions of physical therapy practice. This presentation will highlight how robot-assisted rehabilitation is not only revolutionizing treatment approaches but also opening new possibilities for improving quality of life across diverse populations.

Key Words: Robotic rehabilitation, Lower limb exoskeletons, Gait rehabilitation, Neurorehabilitation, Assistive technology

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[구연 발표]

전방머리자세 성인의 베개 높이가 전방머리자세와 호흡 기능 및 불편감에 미치는 영향

안선이, 박혜빈, 오유진, 윤수영, 이지현*
백석대학교 보건학부 물리치료학과

Effects of Pillow Height on Forward Head Posture, Respiratory Function and Discomfort in Patients with Forward Head Posture

Seoni Ahn, Hyebin Park, Yujin Oh, Suyoung Yun, Jihyun Lee*
Dept. of Physical Therapy, Baekseok University

Abstract

Purpose: This study compared the effect of pillow heights on forward head posture, respiratory function and discomfort of patients with forward head posture when lying on a supine position.

Methods: The study involved 23 subjects with forward head posture who provided prior consent. This study recruited subjects using a Google online questionnaire. It examined three pillow heights (0, 6, 12cm) and measured the forward head posture using craniovertebral angle (CVA), respiratory function using Pony FX and discomfort using discomfort score at each pillow height.

Results: The CVA significantly decreased with the 12cm pillow compared to the 6cm and 0cm pillows, and it also significantly decreased with the 6cm pillow compared to the 0cm pillow($p<.05$). Respiratory function significantly decreased when using the 12cm pillow compared to the 0cm and 6cm pillows($p<.05$). Discomfort significantly increased with the 12cm pillow compared to the 0cm and 6cm pillows($p<.05$).

Conclusion: The results showed that the 12cm pillow worsen forward head posture, respiratory function, and discomfort. Therefore, it is advised to avoid high pillows to minimize forward head posture and discomfort while maintaining optimal respiratory function.

Key Words: Craniovertebral angle, Forced expiratory volume in one second, Forced vital capacity, Peak expiratory flow, Pillow thickness

*corresponding author: Ji-Hyun Lee, E-mail: jihyun.lee@bu.ac.kr

젊은 성인에게 복부 드로우인 기법을 동반한 운동이 배가로근 두께에 미치는 영향

강현주, 심재훈*
백석대학교 보건학부 물리치료학과

Effect of exercise methods with the abdominal drawing-in maneuver on transversus abdominis muscle thickness in young adults

Hyeonju Kang, Jaehun Shim*
Dept. of Physical Therapy, Baekseok University

Abstract

Objectives: This study aimed to investigate the effect of exercise methods using the abdominal draw-in maneuvers on transverse abdominis muscle thickness in young adults.

Methods: Thirty healthy adults who voluntarily participated were divided into three groups of 10 each: abdominal draw-in maneuver, kegel exercises with the abdominal draw-in maneuver, and dead-bug exercises with the abdominal draw-in maneuver. Ultrasound imaging equipment and a pressure biofeedback unit were used to measure the abdominal muscle thickness before and after exercises. Data analysis was conducted using one-way analysis of variance(ANOVA), and post-hoc tests were performed using the Bonferroni correction.

Results: The external oblique, internal oblique, and transverse abdominis muscles showed significant differences between the groups ($p<.05$). For the external oblique muscles, significant differences were found between the groups using the abdominal draw-in maneuver combined with the dead-bug exercises and the other two methods (abdominal draw-in maneuver and abdominal draw-in maneuver combined with kegel exercises) ($p<.05$).

Conclusion: Although the internal oblique and transverse abdominis muscles showed no significant differences between the groups, the group that performed the abdominal draw-in maneuver combined with dead-bug exercises showed the greatest increase in thickness. The most effective exercise method for increasing the thickness of the transverse abdominis was the abdominal draw-in maneuver combined with dead-bug exercises. Therefore, to enhance the thickness of the transverse abdominis in clinical practice, using the abdominal draw-in maneuver combined with dead-bug exercises is recommended over using the abdominal draw-in maneuver alone or the abdominal draw-in maneuver combined with kegel exercises.

Key Words: Abdominal drawing-in maneuver; Dead-bug exercises; Transverses abdominis; muscle thickness.

*corresponding author: Jae-Hun Shim, E-mail: clinicalpt@bu.ac.kr

어깨 벌림 각도에 따른 뒤당김 운동이 20대 성인 남성의 어깨 안정화 근육 활성도에 미치는 영향

경도윤, 김규나, 김세희, 김소연, 김승준, 노혜인, 문주용, 백제승,
이서하, 임재이, 임주현, 전세훈, 정두경, 조성준, 김선민*
김천대학교 물리치료학과

The effect of Scapular Retraction Exercises according to shoulder abduction angle on shoulder Stability muscle activity in Adult Men in Their 20s

Doyun Kyeong, Gyuna Kim, Sehee Kim, Soyeon Kim, Seungjun Kim, Hyein Noh,
Juyong Moon, Jeseung Baek, Seoha Lee, Jaeyi Lim, Juhyun Lim, Sehun Jeon,
Dukyeong Jung, Seongjun Jo, Sunmin Kim*
Dept. of Physical Therapy, Gimcheon University

Abstract

Objectives: The purpose of this study is to investigate the effect of scapular retraction exercises depending on the shoulder abduction angle on shoulder muscle activity in order to efficiently strengthen the muscles.

Study Design: A single group design

Methods: This study involved 30 healthy male participants in their 20s, all of whom were students at Gimcheon University. The participants positioned themselves against a wall with an attached protractor, and muscle activation was assessed during retraction exercises at 60°, 90°, and 120°. The muscles examined included the upper trapezius, middle trapezius, lower trapezius, and serratus anterior. Resistance was applied by having the participants hold an elastic band while abducting their shoulders, and they maintained each end position at the three angles for 10 seconds.

Results: The middle trapezius has the highest muscle activity at 90° of shoulder joint extension. This is because the lever arm is at its maximum length and has a more efficient line of force than the upper and lower trapezius during extension.

Conclusion: The upper trapezius shows the highest muscle activity as the angle increases, the middle and lower trapezius at 60° and 90°, and the frontalis at 60°. Therefore, you can see that scapular retraction exercises are used a lot in shoulder stabilizer exercises.

Key Words: Scapular Retraction Exercises, EMG, Shoulder Muscle Activity

*corresponding author: Sun-Min Kim, E-mail:jjssppaarrkk@hanmail.net

만성 발목 불안정성을 가진 성인에게 탄력밴드를 이용한 나선방향 운동과 직선방향 운동이 고유수용성 감각, 근력 및 균형에 미치는 영향

권장혁[1)], 김상현[1)], 김영현[1)], 신금빈[1)], 성윤희[1)], 하선영[2)*]
경남대학교 건강보건대학 물리치료학과[1)]
경남대학교 건강보건연구소[2)]

The effects of spinal and lineal exercise using elastic bands on proprioception, muscle strength, and balance in patients with chronic ankle instability

Janghyeok Kwon[1)], Sanghyun Kim[1)], Younghyun Kim[1)], Geumbnin Sin[1)],
Yunhee Sung[1)], Sunyoung Ha[2)*]
Dept. of Physical Therapy, Kyungnam University[1)]
Health & Wellness Research Institute, Kyungnam University[2)]

Abstract

Objectives: The purpose of this study was to investigate the effects on proprioception, muscle strength, and balance when applying spiral and linear exercises using elastic bands in patients with ankle instability.

Methods: Thirty-two adults with chronic ankle instability were randomly divided into 2 groups, and applied linear (n=16) and spiral (n=16) exercises using elastic bands, respectively. A goniometer was used to measure proprioception, Commander echo muscle tester was used to measure muscle strength, the Y-balance test was used to measure dynamic balance, and the Balancia software program was used to measure static balance.

Results: In proprioception, the group applying spiral exercise using elastic bands showed a significant decrease within the group ($p<.05$). In both groups, the strength of the dorsiflexors, plantar flexors, invertors, and evertors increased significantly within the group ($p<.05$). The anterior, posteromedial, and posterolateral sides of the Y-balance significantly increased within the group ($p<.05$). The path length, path velocity, and path area of the Balancia program significantly decreased within the group ($p<.05$).

Conclusion: Exercises using elastic bands are effective for patients with chronic ankle instability, but spiral exercises using elastic bands were more effective in improving proprioception than linear exercises. Therefore, we propose spiral exercise using an elastic band to improve function in patients with chronic ankle instability.

Key Words: ankle instability, elastic band, balance, muscle strength, proprioception

*corresponding author: Sun-Young Ha, E-mail: mallows205@kyungnam.ac.kr

젊은 여성에서 신발 뒤굽 높이가 악력에 미치는 영향

권하연[1], 박정민[1], 김유민[1], 장호준[1], 류연우[1], 김광영[2]
청주대학교 보건의료과학대학 물리치료학과[1], 하나병원[2]

Effects of Shoe Heel Height on Grip Strength in Young Women

Hayeon Kwon[1], Jungmin Park[1], Yumin Kim[1], Hojun Jang[1], Yeonwoo Ryu[1], Kwangyeon Kim[1]
Department of Physical Therapy, College of Health & Medical Sciences, Cheongju University[1]
Hana Hospital[2]

Abstract

Objectives: The purpose of this study was to investigate the effect of heel height of shoes on the decrease in grip strength.

Methods: This study was conducted with 25 subjects. Subjects were selected who had no orthopedic problems in the lower extremities, waist, hands or wrists, are not pregnant, and have a foot size of 235-245. The measured value in this study was the maximum grip strength that changes when a young woman wears shoes with high back hooves. The height of the back hooves of the shoes was three conditions (0cm [barefoot], 5cm, and 9cm). For 5cm and 9cm, the same type of high heels with a back hoop area of 1.5cm were prepared. The subject randomly selected the order in which the shoes were worn, and the first designated shoe was worn to measure the grip strength in the standing position (first measurement). After that, treadmill walking (speed: 2m/sec, walking time: 5 minutes) was performed while wearing shoes with the same height of the heel. Immediately after the walking was over, the grip strength was measured in the standing position in the same way as the first (second measurement).

Results: There was a significant difference between the three conditions in both the primary and secondary measurements ($p<.05$). As a result of the measurement of the comparison between the heel heights, there was a difference between the 0 cm and 9 cm heel conditions in the primary measurement ($p<.05$), and there was a difference between the 0 cm and 9 cm, and the 5 cm and 9 cm heel conditions in the secondary measurement ($p<.05$). The main effect of the heel height was also found to be significant (p, .05). Taken together, the decrease in grip strength was particularly significant when high heels of 9 cm were worn. That is, it was found that the grip strength decreased as the heel height of the shoe increased.

Conclusion: These results indicate that grip strength decreases as the heel height of shoes increases.

Key Words: Grip strength, Heel height, walking

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정상 성인에서 3가지 교각운동 자세가 배가로근과 넙다리곧은근 두께에 미치는 영향

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Effects of three bridge exercise postures on the muscle thickness of the transverse abdominis and rectus femoris muscles in normal adults

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Abstract
Objectives: This study used ultrasound to measure the effect of bridge exercises in three postures on the thickness of the transverse abdominis (TrA) and rectus femoris (RF) muscles.
Study Design: Observational pre-test and post-test clinical study
Methods: The participants in the study were 30 healthy adult men and women. The participants performed general bridge (GB), bridge with use of a sling (BS), and bridge with use of a sling involving contraction of the hip joint adductor muscle (BSHA) for 15 seconds each, 5 times. Ultrasound was used to measure changes in the thickness of the transverse abdominis and rectus femoris before and after exercise.
Results: After the intervention, the transverse abdominis showed a significant difference in mean values between general bridge and bridge with use of a sling ($p<.05$). The rectus femoris showed a significant difference in mean values between general bridge and bridge with use of a sling and between general bridge and bridge with use of a sling involving contraction of the hip joint adductor muscle ($p<.05$).
Conclusion: The results indicate that the bridge exercise using a sling was the most effective posture for increasing the thickness of the transverse abdominis, and the general bridge exercise was the most effective for increasing the thickness of the rectus femoris.

Key Words: Bridge exercise, Muscle thickness, Transverse abdominis, Rectus femoris

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다이나믹 테이핑을 부착한 어깨 안정화 운동이 둥근어깨를 가진 대상자의 관절가동범위, 통증, 고유수용성감각, 호흡량에 미치는 영향

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Effect of Shoulder Stabilization Exercise with Dynamic Taping on Range of Motion, Pain, Propriception, and Respiratory Volume in Patients with Round Shouler

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Abstract

Objectives: This study aimed to identify the effect of push up plus exercise using dynamic taping on shoulder range of motion, pain, proprioception and respiratory volume in patients with round shoulder posture.

Study Design: This study utilized a randomized controlled trial design.

Methods: The participants were randomized into two groups: the dynamic taping group (n=15) and the non-dynamic taping group (n=15). The dynamic taping group received both dynamic taping and push-up plus exercises for the shoulder, while the non-dynamic taping group only performed the push-up plus exercises. Both groups performed push-up plus exercises 10 times each, with a 2-minute rest between sets, and a total of 3 sets. All participants had their shoulder range of motion and proprioception assessed before and after the intervention using a goniometer, while pain was measured with a visual analog scale (VAS). Respiratory volume was assessed using a spirometer.

Results: After the intervention, both groups experienced significant improvements in shoulder range of motion, pain, and proprioception ($p<.05$). The dynamic taping group showed greater improvements in shoulder range of motion, Pain, and proprioception compared to the non-dynamic taping group ($p<.05$).

Conclusion: These findings suggest that dynamic taping has the potential to benefit pain, shoulder range of motion, and proprioception.

Key Words: Round shoulder, Dynamic taping, Range of motion, Pain, Proprioception, Respiratory volume

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전신진동운동을 동반한 런지가 발목의 관절가동범위와 고유수용성감각, 정적 균형 그리고 동적 안정성에 미치는 영향

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Effects of Lunge using Whole Body Vibration on the Range of Motion, Proprioception, Static Balance and Dynamic Balance of the Ankle Instability Patients

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Abstract

Objectives: The study aimed to determine the effect of LWBV on the range of motion, ankle proprioception, static balance, and dynamic balance of the ankles sprain patients.
Study Design: This study utilized a randomized controlled trial design.
Methods: Thirty participants were randomized into two groups : LWBV exercise group (n=15), and Lunge exercise group (n=15). For the lunge exercise, participants stood with their feet shoulder-width apart, positioning the affected leg forward and maintaining a distance of 70-100 cm between the front and back legs, with the non-affected foot placed behind. Each movement was held for 10 seconds and repeated a total of six times, with a 10-second rest interval between movements. The assessment of ankle joint range of motion before and after the intervention was conducted using the Knee to Wall test, while proprioceptive sense was measured with a goniometer. Static balance was evaluated in both two-legged and single-legged stances using Kforce plates, and dynamic stability was assessed through the star excursion balance test (SEBT).
Results: Both group experienced significantly increased range of motion, proprioception, static balance, dynamic stability($p<.05$). The experimental group that received the LWBV exercise showed greater improvements in range of motion, proprioception, static balance, dynamic stability than those of the control group($p<.05$).
Conclusion: LWBV is an effective treatment method for improving the ankle range of motion, proprioception, static balance, and dynamic stability in patients with ankle sprain.

Key Words: Lunge exercise; Whole body vibration; Ankle Instability; Balance; Proprioception

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스쿼트 운동시 탄력밴드 저항 방향이 건강한 성인의 안쪽넓은근과 가쪽넓은근의 근 활성도에 미치는 영향 비교

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Comparison of the Effects of Elastic Band Resistance Direction on Muscle Activity of the Vastus Medialis and Vastus Lateralis During Squat Exercise in healthy subjects

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Abstract

Objectives: : This study aimed to compare the effects of resistance training using elastic bands applied in three different directions during squat exercises on the muscle activity and muscle activity ratio of the vastus medialis and vastus lateralis, evaluating the effectiveness of each resistance direction.

Methods: : The study involved 42 participants who met the inclusion criteria and provided prior consent. Muscle activity and muscle activity ratios were compared across three resistance directions (medial, central, lateral) as participants performed squats while resisting the applied forces. Muscle activity was measured using a surface electromyography (sEMG) device from Delsys Inc.

Results: : The muscle activity of the vastus medialis significantly increased in the lateral resistance group compared to the medial and central resistance groups ($p<.05$), while no significant difference was found between the medial and central resistance groups ($p>.05$). For the vastus lateralis, there were no significant differences in muscle activity among the three groups ($p>.05$). The muscle activity ratio between the two muscles significantly increased in the lateral resistance group compared to the medial and central resistance groups ($p<.05$), with no significant difference observed between the medial and central resistance groups ($p>.05$).

Conclusion: The application of lateral resistance using an elastic band significantly increased the muscle activity of the vastus medialis and the muscle activity ratio of the vastus medialis to the vastus lateralis compared to medial and central resistance. This suggests that the direction of resistance provided by the elastic band plays a crucial role in muscle activation, particularly in promoting the activation of the vastus medialis when lateral resistance is applied.

Key Words: Vastus medialis, Vastus lateralis, Squat exercises, Elasticbands, Resistance.

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보조호흡근 스트레칭을 병행한 가로막 키네시오 테이핑과 가로막 호흡운동이 전방머리자세 성인들의 머리척추각, 가슴우리와 호흡 기능에 미치는 영향

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The effect of diaphragmatic kinesio taping and diaphragmatic breathing exercises combined with accessory respiratory muscle stretching on craniovertebral angle, thoracic mobility, and respiratory function in adults with forward head posture

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Abstract

Objectives: This study aims to investigate the changes in craniovertebral angle, thoracic mobility, and respiratory function when diaphragm taping and diaphragmatic breathing exercises are added to scalene muscle stretching in adults with forward head posture.

Methods: Thirty college students with a craniovertebral angle ranging from 31° to 59° participated in this study. They were divided into three groups: 10 students who only received scalene muscle stretching, 10 students who received both diaphragm kinesio taping and scalene muscle stretching, and 10 students who received both diaphragmatic breathing exercises and scalene muscle stretching. The craniovertebral angle was measured using Image J software, the thoracic excursion of the upper and lower parts was measured using a circular tape measure, and the respiratory functions were measured using a Pony FX. All subjects had these measurements taken before and after the interventions.

Results: In all three groups, there were significant increases in craniovertebral angle, thoracic mobility, forced vital capacity, and peak expiratory flow after the intervention compared to before ($p<.05$). But, there were no significant differences in all dependent variables between the three groups.

Conclusion: This study suggests that scalene muscle stretching alone can positively impact correcting forward head posture and improving respiratory function. Future research should include a larger sample size and evaluate the long-term effects of the interventions to better determine the effects of each method.

Key Words: Forward Head Posture, Scalene muscle, Diaphragm, Respiratory function

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엉덩관절 골절에 대한 골수내못고정술 후 노인 입원환자에 대한 아급성 고강도 재활프로그램 효과: 후향적 연구

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Effects of a subacute high-intensity rehabilitation program in older adult inpatients following intramedullary nailing for hip fractures: A retrospective study

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Abstract

Objectives: This study aimed to determine the effects of subacute high-intensity rehabilitation on pain, muscle strength, balance, functional ambulatory ability, and activities of daily living (ADL) in older adults with hip fractures who had undergone intramedullary nailing.

Methods: This retrospective study included 37 older adult inpatients who had undergone intramedullary nailing for hip fractures between January 2022, and October 2023 at a restorative rehabilitation facility in the Republic of Korea. All patients participated in a subacute high-intensity rehabilitation program consisting of 208 sessions (6–8 sessions/day, 30 minutes/session, 7 days/week) over 4 weeks during hospitalization. Dependent variables including pain, lower extremity muscle strength, balance, functional ambulation ability, and ADL, were assessed using the Numeric Rating Scale (NRS), Manual Muscle Testing (MMT), Berg Balance Scale (BBS), Functional Ambulation Category (FAC), and Modified Barthel Index (MBI), respectively. A paired t-test was used for statistical analysis.

Results: The subacute high-intensity rehabilitation program resulted in significant differences in all dependent variables, including NRS, MMT, BBS, FAC, and MBI scores between the pre- and post-intervention ($p < 0.001$).

Conclusion: A subacute high-intensity rehabilitation program significantly improves physical function and independence in older adults following intramedullary nailing for hip fractures. Early implementation of such programs is recommended to enhance recovery, reduce hospital stay, and facilitate a quicker return to daily life.

Key Words: Intramedullary nailing, Older adult, Rehabilitation, Hip fracture

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태권도 품새선수의 옆차기 능력에 따른 하지관절가동범위와 옆차기 각도 및 골반 기울기 각도 비교

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A Comparison of lower-extremity range of according to sidekick quality in Taekwondo Poomsae

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Abstract

Objectives: This study aimed to compare lower extremity range of motion, sidekick angle, and pelvic tilt angle according to sidekick quality in Taekwondo Poomsae athletes.

Study Design: Cross-sectional study

Methods: Twenty-one Taekwondo Poomsae athletes were recruited and divided into a high-quality perfoemance group (n=12) and a low-quality performance group (n=9) by the Korean national team athletes. The lower extremity range of motion, sidekick angle, and pelvic tilt angle during the top-side kick were measured. Independent t-test were used to compare the lower-extremity of motion, sidekick angle, and pelvic tilt angle between the high- and low-quality performance groups.

Results: Lower extremity range of motion, knee extension of the kicking leg, hip flexion and knee extension of the supporting leg, sidekick angle, and pelvic tilt angle were significantly different between the high- and low-quality performance groups ($p<0.05$).

Conclusion: Flexibility training for knee extension of the kicking leg, hip flexion and knee extension of the supporting leg, and pelvic tilt should be considered to improve sidekick quality in Taekwondo Poomsae athletes.

Key Words: Flexibility, Poomsae, Range of motion, Sidekick, Taekwondo

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젊은 성인에게 웨어러블 보행 보조 로봇의 모드별 보행 시 몸통과 하지 근활성도에 미치는 영향

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The Effects of Different Modes of a Wearable hip-assist robot on Trunk and Lower Limb Muscle Activity During Walking in Young Adults

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Abstract

Objectives: This study aims to compare muscle activation in the trunk and lower limbs of young adults walking in general mode, assistive mode, and resistance mode using a wearable walking assistive robot.

Methods: Twenty-nine healthy adult males and females participated in the study. Surface electromyography was used to measure maximal voluntary contraction (%MVIC). Participants walked on a treadmill at a constant speed of 4 km/h in three conditions: wearing the wearable walking assistive robot without power (general walking), resistance mode, and assistive mode. Each condition was measured for 2 minutes, with three repetitions for each mode, in a randomized order.

Results: Muscle activation values for external oblique (EO), internal oblique (IO), rectus femoris (RF), and gluteus maximus (GMAX) were statistically significant across the modes. Activation of the external oblique (EO) significantly increased in resistance mode compared to general walking and assistive mode. Activation of the internal oblique (IO) significantly increased in resistance mode compared to assistive mode. Activation of the gluteus maximus (GMAX) significantly increased in resistance mode compared to general walking and assistive mode. No significant differences in muscle activation were observed for erector spinae (ES), rectus femoris (RF), and hamstrings (HAM) across the modes.

Conclusion: This study investigated the effects of various modes of a wearable robot on muscle activation in the trunk and lower limbs of healthy adults. The results indicated that resistance mode led to a significant increase in muscle activation of the external oblique, internal oblique, and gluteus maximus compared to assistive mode and general walking. Thus, walking with the wearable robot in resistance mode can enhance muscle activation in the trunk and lower limbs compared to general walking.

Key Words: Muscle activity, wearable assist gait robot

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정적 스트레칭과 능동 이완 기법이 상부 승모근의 근두께와 근긴장도에 미치는 영향 비교

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Comparison of the Effects of Static Stretching and Active Release Techniques on Upper Trapezius Muscle Thickness and Muscle Tone

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Abstract

Objectives: The purpose of this study was to compare the effects of static stretching and active release techniques on upper trapezius muscle thickness and muscle tone.

Study Design: This study utilized a cross-sectional design with a randomized controlled trial.

Methods: Twenty-two adult volunteers participated, with participants randomly assigned to either the static stretching group (n=11) or the active release techniques group (n=11). Muscle thickness was measured using ultrasound, while muscle tone was assessed using the Myoton Pro device. Measurements of upper trapezius muscle thickness and muscle tone were taken before and after the interventions.

Results: Both static stretching and active release techniques led to significant improvements in upper trapezius muscle thickness and muscle tone ($p<.05$). Notably, the active release techniques group exhibited a more substantial increase in muscle thickness compared to the static stretching group ($p<.05$).

Conclusion: Active release techniques are recommended for enhancing upper trapezius muscle thickness.

Key Words: Static stretching, Active release technique, Muscle thickness, Muscle tone

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8주 간의 이중과제 낙상예방 운동프로그램이 노인의 신체조성과 기능, 균형, 인지기능 그리고 심리사회적 특성에 미치는 효과

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Effects of 8 Weeks Dual-Task Fall-Prevention Exercise Program on Body Composition, Physical Function, Balance, Cognitive Function and Psychosocial Characteristics in the Elderly

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Abstract

Objectives: This study aimed to investigate the effects of a dual-task fall-prevention exercise program on changes in physical function, cognitive function, and psychosocial characteristics in elderly individuals.

Study Design: This study employs a true experimental, pretest-posttest control group design to investigate the effects of a fall prevention exercise program using a dual task on the physical function, cognitive function, and psychosocial characteristics of the elderly.

Methods: In this study, body composition was assessed through the measurement of fat mass, skeletal muscle mass (SMM), skeletal muscle index (SMI), and body mass index (BMI), as well as the waist-to-hip ratio (WHR), using the Inbody S10 device (Biospace, Seoul, Korea). Physical performance was evaluated using the Short Physical Performance Battery (SPPB), which was conducted with the SPPB-100 device (Physiocompany, Seoul, Korea). Balance was assessed through the administration of the Timed Up and Go (TUG) test, the Y-Balance Test, and the One Leg Stance (OLS) test. Cognitive function was evaluated using the Montreal Cognitive Assessment - Korea (MoCA), quality of life was assessed with the Short Form 36 Health Survey - Korean version (SF-36), fear of falling was assessed with the Fear of Falling Avoidance Behavior Questionnaire (FFABQ), and balance confidence was assessed with the Activities-specific Balance Confidence Scale (ABC).

Results: In the general exercise group, statistically significant changes were observed in SMM ($p<.001$), body fat mass ($p<.05$), SMI ($p<.001$), BMI ($p<.05$), and WHR ($p<.001$) before and after the application of the exercise program. Following the implementation of the exercise program, statistically significant alterations were noted in several parameters, including right hand grip strength ($p<.001$), right one-legged standing ($p<.05$), right Y-balance ($p<.05$), and cognitive function ($p<.01$). In the dual-task fall-prevention exercise group, statistically significant changes were observed in body weight ($p<.01$), skeletal muscle mass ($p<.001$), SMI ($p<.001$), BMI ($p<.05$), WHR ($p<.001$), right hand grip strength ($p<.01$), left hand grip strength ($p<.01$), TUG

(p<.001), and cognitive function (p<.01). Significant changes were observed in the following variables: right one-legged stand (p<.01), right Y-balance (p<.001), left Y-balance, cognitive function (p<.01), fear of falling (p<.001), balance confidence (p<.05), and quality of life (p<.001). The difference in change between the two groups according to the application of the exercise program was statistically significant for weight (p<.05), BMI (p<.05), fear of falling (p<.01), and quality of life (p<.01).
Conclusion: The results of this study demonstrated a statistically significant increase in skeletal muscle mass (SMM) of over 1 kg in both groups, with a notable discrepancy observed within the relatively brief exercise intervention period of eight weeks. A significant increase of 0.89 points on the SPPB was observed, as well as a notable increase of 2.28 points on the K-MOCA, in the dual-task fall prevention exercise program group after eight weeks of intervention. The positive changes in physical function, cognitive function, and psychosocial characteristics observed in this study will enhance the upper and lower limb strength and balance abilities of the elderly, who are particularly susceptible to falls. It is anticipated that this will facilitate an independent daily life by increasing locomotion and balance. In light of the aging population, it is imperative to provide institutional support for the dissemination of effective exercise programs to prevent the decline in physical function, cognitive function, and psychosocial function of the elderly, thereby enabling them to lead independent lives.

Key Words: Aging, Frail elderly, Accidental falls, Exercise therapy, Cognition therapy

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목·어깨 안정화 운동프로그램과 자가 등허리근막이완술이 전방머리자세를 동반한 성인의 머리척추각과 근긴장도에 미치는 영향

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The immediate effects of cervical and scapular stabilization exercise and self myofascial release for the thoracolumbar fascia on craniovertebral angle and muscle tone in subjects with forward head posture

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Abstract

Objectives: The purpose of this study was to investigate the effects of self-myofascial release of thoracolumbar fascia (SMR-TLF) using a foam roller combined with cervical and scapular stabilization exercise interventions on craniovertebral angle (CVA) and muscle tone (suboccipital muscles, upper trapezius, and erector spinae).

Methods: The study involved 40 voluntary participants with an average age of 22.3 years (standard deviation of 1.59). Forward head posture was defined as a CVA of less than 51 degrees. The CVA was measured using Image J, and muscle tone and stiffness on the dominant side were measured using a MyotonPRO. Participants were randomly assigned to either the stabilization exercise intervention group (Control group) or the group receiving both stabilization exercise and SMR-TLF (Experimental group). Post-intervention measurements were conducted in the same sequence as the pre-intervention measurements.

Results: Both groups experienced a significant decrease in CVA ($p < .05$). In the Experimental group, there was a significant reduction in muscle tone and stiffness of the suboccipital muscles and erector spinae ($p < .05$). Comparisons between the two groups revealed a significant difference only in the stiffness of the erector spinae ($p < .05$).

Conclusion: Cervical and scapular stabilization exercise interventions are effective in improving CVA, and the addition of SMR-TLF further reduces the muscle tone of the suboccipital muscles and erector spinae.

Key Words: Forward Head Posture, Stabilization exercise, Self-myofascial release

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근전도를 이용한 넙다리곧은근의 최대수의등척성수축 측정 시 휴식간격에 대한 연구

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A Study on Rest Interval during the Measurement of Maximum Voluntary Isometric Contraction of Rectus Femoris Using Electromyography

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Abstract

Purpose: The purpose of this study is to determine the appropriate rest interval (RI) for the repeated measurements of maximum voluntary isometric contraction (MVIC) of rectus femoris muscle (RF) using electromyography (EMG).

Methods: Thirty healthy young adults participated in the study. MVIC of the RF was measured using surface EMG. Measurements were taken before and after rest in a seated position with the waist and neck straightened and knees fully extended. Measurements were taken twice, with rest intervals of 1 minute each before and after rest, totaling 2 measurements. RI between measurements was 30sec, 45sec, 60sec, and 120sec, and each condition was applied randomly. A paired t-test was used to compare the MVIC of RF. One-way repeated ANOVA was used to compare the differences between pre- and post-MVIC measurements and Bonferroni correction was used for post-hoc tests. Bland-altman plot was used to determine the mean and range of distribution of the differences between pre- and post-MVIC measurements.

Result: Significant differences were found in the measurements before and after MVIC under the 30-second and 45-second rest conditions ($p<0.05$), but no significant differences were observed under the 60-second and 120-second rest conditions ($p>0.05$). Also, in the Bland-Altman plot, you can see that the graphs for the 60-second and 120-second differences are narrower than the graphs for the 30 and 45 second differences, which means that the narrower the difference, the more the maximum MVIC was recovered without any significant difference.

Conclusion: These results suggest that RI of 60 seconds or longer is necessary during repeated measurements of MVIC of the RF.

Key words: Electromyography, MVIC, Rectus Femoris, Rest Interval

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수동 림프 배액술이 급성기 무릎관절 전치환술 환자의 통증, 림프부종, 관절가동범위, 일상생활수행능력에 미치는 영향

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Effects of Manual Lymphatic Drainage on the Pain, Lymphedema, ROM and ADL in Patients after Total Knee Arthroplasty

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Abstract

Objectives: The study aimed to determine the effect of manual lymphatic drainage (MLD) on pain, lymphedema, range of motion (ROM), and activities of daily living (ADL) in patients after total knee arthroplasty (TKA).

Methods: Nine patients after TKA participated in this study, and each participant received MLD therapy for 20 minutes per session, five times a week, for two weeks. The study participants had an average age of 71.33±5.14 years, with most being women, and an average body mass index of 28.32±2.31. Assessments of pain, lymphedema, ROM, and ADL were conducted using the visual analog scale, lymphedema measurement, ROM assessment, and the Korean version of the modified Barthel index before and after the treatment.

Results: After the two-week intervention, patients experienced significant improvements in pain, lymphedema, ROM, and ADL ($p<.05$).

Conclusion: These results suggest that MLD therapy improves pain, lymphedema, ROM, and ADL. This study demonstrates that MLD can have a positive effect on the recovery of TKA patients and provides valuable data for future research. Further studies with a larger number of participants and longer experimental durations are needed to strengthen these findings.

Key Words: Total knee arthroplasty; Manual lymphatic drainage; Modified Barthel index

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웨어러블 로봇 훈련이 과체중과 비만인 성인의 체질량지수, 하지근력, 코어근육에 미치는 영향

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The effect of wearable robot training on body mass index, lower extremity strength, and core muscle in overweight and obese adults

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Abstract

Objectives: The purpose of this study was to compare the effects of walking training and resistance walking training on BMI, lower extremity strength, and transverse abdominis thickness in people with high BMI.

Methods: Subjects with high BMI were divided into control (10 participants) and experimental (12 participants) groups. The control group underwent walking training while wearing the wearable robot without it being activated, while the experimental group used the wearable robot in resistance mode during walking exercise. Both groups completed the training regimen, and measurements of BMI, lower extremity strength, and transversus abdominis muscle thickness were taken before and after the intervention using a scale, Smart KEMA tension sensor, and ultrasound, respectively.

Results: There was no significant difference in BMI of the control group after intervention ($p>.05$), and the BMI of the experimental group decreased significantly after intervention ($p<.05$). There was a significant difference between the two groups ($p<.05$). The control group showed no significant differences in all lower limb muscle strength after the intervention ($p>.05$), and the experimental group showed significant increases in hip flexion, dorsi flexion, knee flexion, and plantar flexion ($p<.05$). There was a significant difference in Hip Flexion, Dorsi Flexion, and Knee Flexion items between the two groups ($p<.05$). There was no significant difference in the thickness of the transverse dorsalis muscle in the control group after intervention ($p>.05$), and there was a significant difference in the experimental group ($p<.05$). However, there was no significant difference between the two groups ($p>.05$).

Conclusion: Research shows that resistance walking training using a wearable robot has a positive effect on reducing BMI and improving lower limb strength in people with a high BMI, so it is recommended to perform walking training using a wearable robot.

Key Words: body mass index, overweight, obesity, wearable robot, cardiovascular exercise, resistance movement

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운동프로그램이 GMFCS 1~3에 해당하는 경직성 뇌성마비 아동의 몸통조절, 골반움직임 및 장딴지근 구조에 미치는 영향

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The effect of exercise program on trunk control, pelvic movement, and gastrocnemius structure in children with spastic cerebral palsy with GMFCS 1-3

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Abstract

Objectives: This study aimed to propose an exercise program appropriate for the characteristics of children with spastic cerebral palsy (CP) and investigate its effects on trunk control, pelvic movement, and medial gastrocnemius structure.

Methods: Twenty-five children with spastic CP corresponding to gross motor function classification system 1~3 were randomly divided into two groups. A program consisting of deep abdominal strengthening exercises, pelvic control exercises, and lower extremity strength strengthening exercises were applied to the experimental group (n=12), and general physical therapy was applied to the control group (n=13). The trunk control measurement scale (TCMS) was used to measure trunk control, BTS G-walk was used to measure pelvic movement, and ultrasonography was used to measure medial gastrocnemius structure.

Results: The experimental group had a significant difference within the group in TCMS ($p<.05$). There was a significant difference in the change (post-pre) of dynamic sitting balance and equilibrium between groups ($p<.05$). In pelvic movement, there was a significant difference in the change (post-pre) of the rotation range of the non-dominant side between groups ($p<.05$). There was a significant difference in the change (post-pre) of medial gastrocnemius thickness between the groups ($p<.05$).

Conclusion: Understanding the characteristics of children with spastic CP and applying deep abdominal muscle strengthening exercises, pelvic exercises, and lower extremity muscle strengthening exercises can be proposed as an intervention method that can improve function compared to general physical therapy

Key Words: cerebral palsy, medial gastrocnemius, trunk control

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