대한물리의학회
Korean Society of Physical Medicine

제 22회 대한물리의학회
추계 학술대회 및 정기총회

생성형 AI 기반 최신 물리의학적 접근 및 연구

일 정 2024.11.9 토 11:00 AM

장 소 **대전대학교 창학관** 1227호

Korean Society of Physical Medicine

제 22회 대한물리의학회 추계학술대회 및 정기총회 일정 및 세부사항

생성형 AI 기반 최신 물리의학적 접근 및 연구

○ 일 시 : 2024년 11월 9일(토) AM 11:00

○ 장 소 : 대전대학교 창학관 1227호

○ 세부 일정표

시 간	프 로 그 램	진행 및 특강자
session 1. 포스터 전시 및 발표		
11:00~11:20	접수 및 포스터 전시	차용준 (대한물리의학회장)
11:20~11:30	개회사	
11:30~12:00	물리치료 연구발표(포스터)	
session 2. 생성형 AI기반 물리의학적 접근		좌장 : 김선엽 (대전대)
13:00~14:00	ChatGPT를 활용한 물리치료 소프트웨어개발	발표자: 안영상 (㈜펀리햅)
14:00~15:00	생성형 AI를 활용한 연구 및 연구윤리	발표자: 이문영 (호남대)
session 3. 물리치료 연구발표(구두)		좌장 : 이한숙 (을지대)
15:20~16:00	물리치료 최신 연구발표(학생부문)	발표자: 학부생
16:00~16:40	물리치료 최신 연구발표(일반부문)	발표자: 학부생 이외
16:40~17:00	시상식	사회자, 학회장
17:00	정기총회	사회자, 학회장

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권가은 · 김동한 · 김인주 · 방지현 · 송민진 · 이수경 · 이종혁 · 임하연 · 천사랑 · 손호희

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안성석 · 이현민

개 회 사

대한물리의학회 회원 및 학생 여러분 반갑습니다. 대한물리의학회 10대 학회장을 역임하고 있는 대전대학교 물리치료학과 차용준 교수입니다.

2024년 대학물리의학회 추계학술대회를 대한민국 과학수도, 일류경제 도시인 대전광역시에서 개최하게 된 것을 기쁘게 생각하며, 아울러 이곳 대전대학교에서 물리의학 학문 분야에 대한 폭 넓은 학술 교류의 장이 마련되었다는 점에서 개인적으로 영광으로 생각합니다. 물리의학회 학술대회를 위해 아낌없는 지지와 성원을 보내주신 대전대학교 관계자 여러분들게 진심으로 감사말씀을 드립니다.

대한물리의학회는 2006년에 창립 학회지 발간을 시작으로 하여, 연간 4호의 학술지를 발간, 2024년 현재까지 총 19권 째 학술지를 발간하고 있는 명실상부 물리의학 분야에서 두각을 나타내고 있는 국내저명학회입니다. 이는 초대 학회장이신 일산 배성수 교수님과 역대 학회장님을 비롯한 임원진, 학회 회원 여러분들의 노력과 지지에 의한 결과임을 믿어 의심치 않습니다. 다시 한번 학회장으로서 깊은 감사말씀을 드립니다.

이번 2024년 대한물리의학회 추계학술대회는 4차 산업혁명 시대에 맞추어 최근 큰 이슈가 되고 있는 '생성형 AI 기반 최신 물리의학적 접근 및 연구'라는 주제로, 관련 학문 분야 전문가의 명강의와 AI와 접목한 물리의학을 소개하고, 국내 여러 대학의 학부생과 임상가들의 초록 및 포스터 발표, 연구 결과 발표 등의 다채로운 학술 교류의 장으로 마련하였습니다. 아무쪼록 학술대회 처음부터 끝날 때까지 아낌 없는 성원 부탁드립니다.

마지막으로, 바쁘신 와중에도 이번 학술대회에 준비를 위해 애써주신 학회 임원진 및 이사님, 학술대회에 아낌없는 후원을 해주신 사업체 관계자 여러분, 우리 학회의 주요 구성원인 학회 회원 여러분들과 미래 임상가인 학생 여러분들께도 깊은 감사의 말씀 드립니다. 앞으로도 우리 학회에 대한 무한한 지지와 성원을 부탁드리며, 유익한 시간이 되시길 바랍니다.

감사합니다.

2024년 11월 9일

대한물리의학회장 차용준

ChatGPT를 활용한 물리치료 소프트웨어개발

/ 안영상


ChatGPT를 활용한
물리치료 소프트웨어 개발
㈜편리햅
안 영 상


Fun
Rehab


헬디
Lv.1
HP
424
인식창에


Funrehab
VR장비를 활용한 보행재활 및 대퇴사두근 근력 향상 운동
가상 공간에서의 능동적 보행을 유도하는 재활 콘텐츠
대퇴사두근 근력 향상을 위한 재활 콘텐츠

Funrehab

홀로렌즈를 이용한 인지재활 및 작업치료 콘텐츠

우송대학교 디지털 헬스케어 공학과 SW

혼합현실 공간에서의 같은 아이템을 찾고 손으로 잡고 맞추기까지 인지 및 작업치료가 가능한 재활 콘텐츠

Funrehab

사용자의 모션인식을 통해 연동되는 동작인식 운동게임 앱

실시간 동작분석 / 운동량 분석 / DB 저장 사용자분석

유저의 동작을 따라하는 아바타 캐릭터

착용하는 하드웨어 없이

휴대폰 전면 캠으로 신체를 인식하여 관절 트래킹

Funrehab

메타버스 형태의 가상 공간을 활용한 재활 운동 프로그램

메타버스 어린이 재활센터, 메타버스 운동 콘텐츠 게임 개발

Funrehab

개인의 신체능력에 맞춘 AR운동 연동을 위한

모션인식기반 신체수행능력평가 기술


Funrehab 논문 및 연구
SCI 논문 6편 게재 완료, 특허 1종 등록 완료, 운동 효과성 검증
연구 내용 이미지
연구명
Golden standard
등록일자 : 2021.04.12.


Digital
Healthcare

Immersive technology : VR/AR/MR

- ✓ **가상 현실(VR):** VR은 의료 분야에서 다양한 목적으로 사용. 이를 통해 외과의사는 수술 전에 환자를 가상으로 검사할 수 있고 의료진은 실물과 같은 시뮬레이션으로 훈련할 수 있으며 근육이 약한 환자를 위한 가상 감각 테스트를 지원가능. 또한 환자의 상태를 시뮬레이션하여 의료 서비스 제공자 간의 공감을 불러일으키는 데에도 사용
- ✓ **증강 현실(AR):** AR 기술은 특히 의사가 안경이나 렌즈를 통해 사용할 때 수술 과정에서 보조 도구 역할가능. AR 도구를 사용하면 의사는 손을 자유롭게 유지하면서 시력에 관련 정보와 도식 적용가능. 실제 응용 분야에는 단계별 수술 시각화, 실시간 환자 활력 모니터링, 환자 신체에 적용된 CT 또는 MRI 데이터와 같은 필수 도식 보기, 환자별 해부학적 시각화, 비정상적인 수술 상황 식별, 원격 지원이 포함됨
- ✓ **혼합 현실(MR):** MR 기술은 의료 분야의 향상된 시각화 및 정확성을 통해 복잡한 작업을 해결 중. 안체 매핑 및 의료 장비의 신속한 수리부터 중요한 수술, 원격 상담, 정신 건강 치료를 위한 영상 사용 및 만성 통증 관리에 이르기까지 이러한 기술은 의료 분야에 혁명을 일으키고 사람들의 삶을 개선하고 있음

VR

AR

MR

디지털 치료제 / 헬스케어 앱

- ✓ 디지털 기술을 이용해 건강 문제를 진단하거나 치료하는 의료 제품
- ✓ 환자의 행동을 변경하거나 신체 기능을 개선하거나, 심지어 약물 치료의 일부로 사용
- ✓ 모바일 앱, 웹 기반 프로그램, 가상 현실, 웨어러블 디바이스 등 다양한 형태로 제공될 수 있음
- ✓ 현재 보편적으로 모바일 앱, 웹 기반의 서비스가 주로 서비스 되고있음

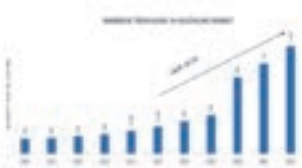
삼성 헬스

의료자동화

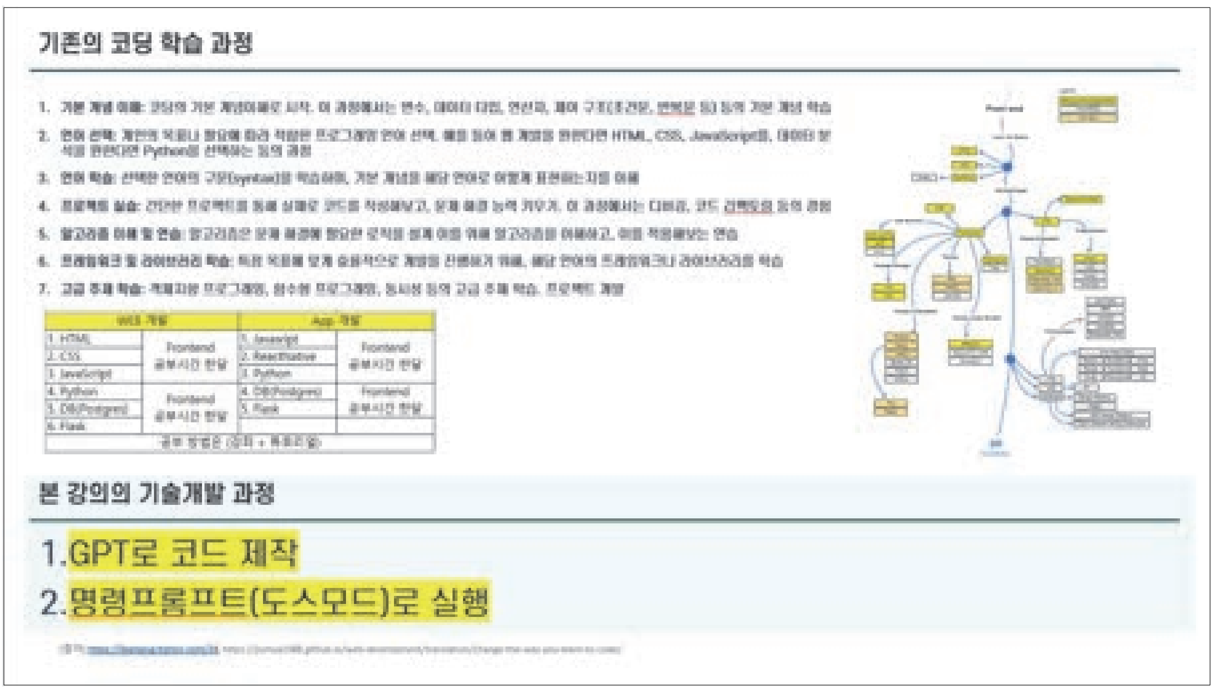
- ✓ 의료 자동화는 의료 서비스 제공의 효율성을 향상시키는 다양한 최신 도구 및 소프트웨어의 사용을 의미. 환자의 안전, 보안, 건강 상태를 모니터링하는 데 주로 사용
- ✓ AI 지원 수술, 자동화, 실시간 환자 데이터 분석을 통해 혁신 주도
- ✓ 의료 자동화는 또한 기술 발전을 지원하고 프로세스를 보다 효율적이고 효과적으로 만들어 환자 결과를 개선하는 데 도움. 현재 의료 자동화의 일반적인 예로는 환자에게 예정된 약속을 상기시키는 문자 메시지를 보내는 프로그램 등이 있음
- ✓ 코로나19, 의료 부족문제를 자동화 및 인공 지능 솔루션으로 치료 팀의 부담을 완화 및 워크플로 및 임상 결정 간소화. 의료 전문가의 소진을 줄이고 의료 품질과 환자 안전 향상

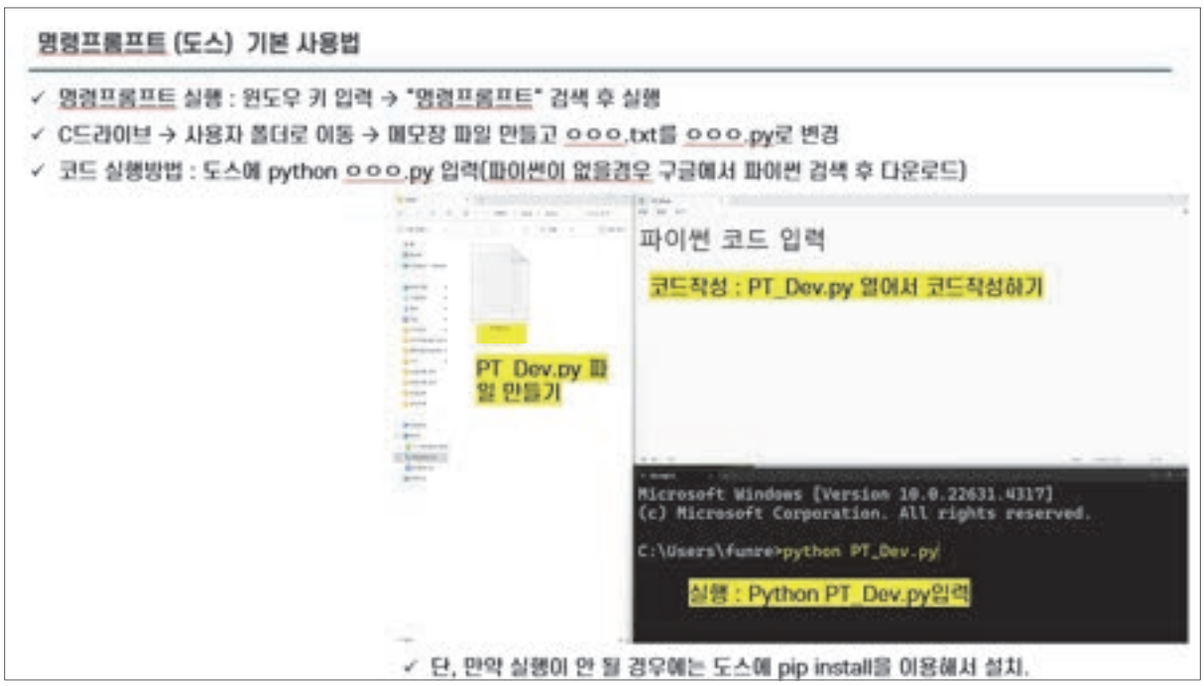
Market

- ✓ 전 세계 의료 몰입형 기술 시장의 가치는 2022년 미화 10억 6천만 달러로 평가되었으며, 2023년 미화 11억 9천만 달러에서 2032년까지 미화 54억 7천만 달러로 성장하여 예측 기간 동안 연평균 복합 성장률(CAGR) 18.5%를 나타낼 것으로 예상 (2023~2032).
- ✓ 헬스케어 분야의 전 세계 가상 현실(VR) 시장 규모는 2022년 23억 3천만 달러로 평가되었으며, 2023년 31억 1천만 달러에서 2030년까지 252억 2천만 달러로 성장하여 예측 기간 동안 CAGR 34.9%를 나타낼 것으로 예상
- ✓ 의료 시장 규모의 전 세계 증강 현실 및 가상 현실은 2030년까지 113억 달러에 도달하여 2023년부터 2030년까지 연평균 성장률(CAGR) 18.8%로 확대될 것으로 예상
- ✓ 의료 시장의 글로벌 증강 현실은 2028년까지 1억 8억 1,520만 달러에 이를 것으로 예상




ChatGPT를
활용한 개발


기존의 코딩 학습 과정
본 강의의 기술개발 과정
1.GPT로 코드 제작
2.명령프롬프트(도스모드)로 실행

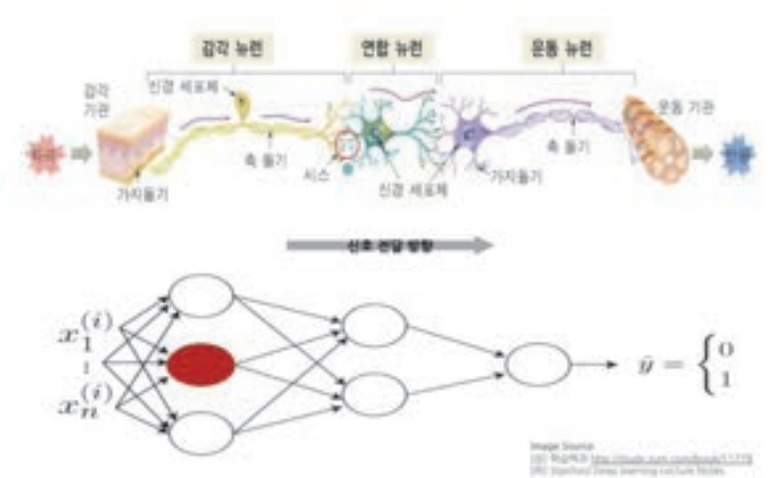

명령프롬프트 (도스) 기본 사용법
✓ 명령프롬프트 실행 : 윈도우 키 입력 → "명령프롬프트" 검색 후 실행
✓ C드라이브 → 사용자 폴더로 이동 → 메모장 파일 만들고 ㅇㅇㅇ.txt를 ㅇㅇㅇ.py로 변경
✓ 코드 실행방법 : 도스에 python ㅇㅇㅇ.py 입력(파이썬이 없을경우 구글에서 파이썬 검색 후 다운로드)
PT_Dev.py 파일 만들기
파이썬 코드 입력
코드작성 : PT_Dev.py 열어서 코드작성하기
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.
C:\Users\funre>python PT_Dev.py
실행 : Python PT_Dev.py입력
✓ 단, 만약 실행이 안 될 경우에는 도스에 pip install을 이용해서 설치.


자세추적
프로그램 개발

인공지능_인공신경망

✓ 인공신경망이란?

- 사람의 뇌에서 영감을 얻은 딥러닝 알고리즘



neural network

✓ CNN(Convolutional neural network)이란?

RNN

시간에 따른 환자의 상태 변화 (예: 통증 정도, 운동 능력 등)를 추적하고 있는 경우, RNN(Recurrent Neural Network) 또는 LSTM(Long Short-Term Memory)과 같은 순환 신경망을 사용 가능. 이러한 모델은 시간에 따른 패턴을 학습하는데 효과적

CNN

MRI나 X-ray와 같은 영상 데이터를 기반으로 예측을 하려면 CNN, CNN은 이미지 분석에서 매우 강력함

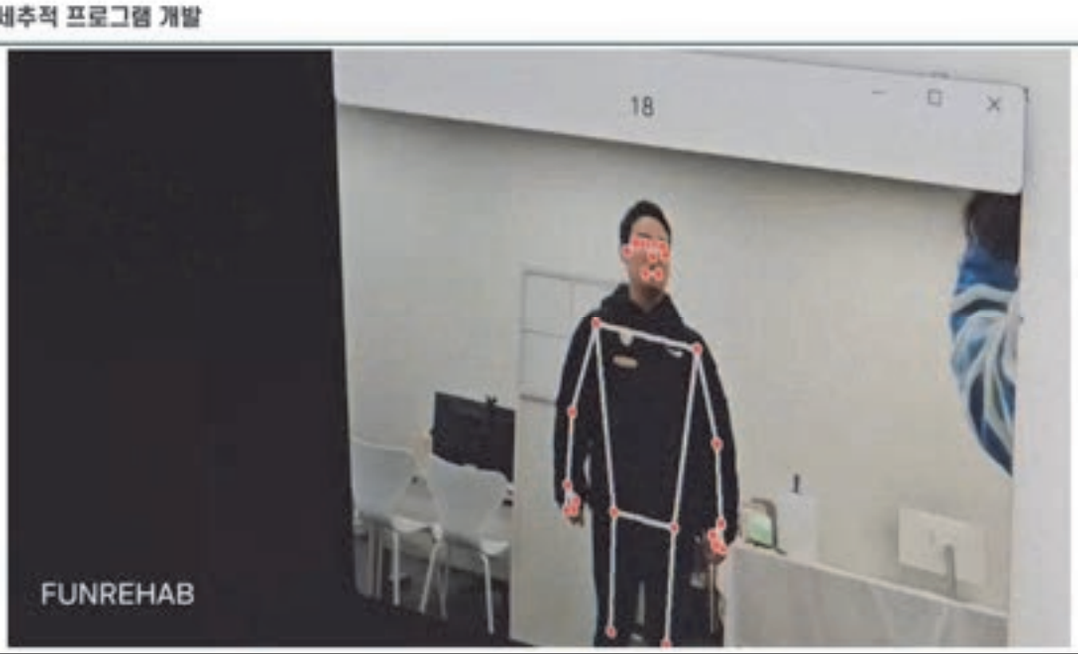
DNN

정형화된 수치 및 범주형 데이터 등 환자의 나이, 성별, 체중, 수술 유형 등과 같은 정형화된 정보를 바탕으로 예측을 하려면 DNN 구조가 적합

자세추적 프로그램 개발

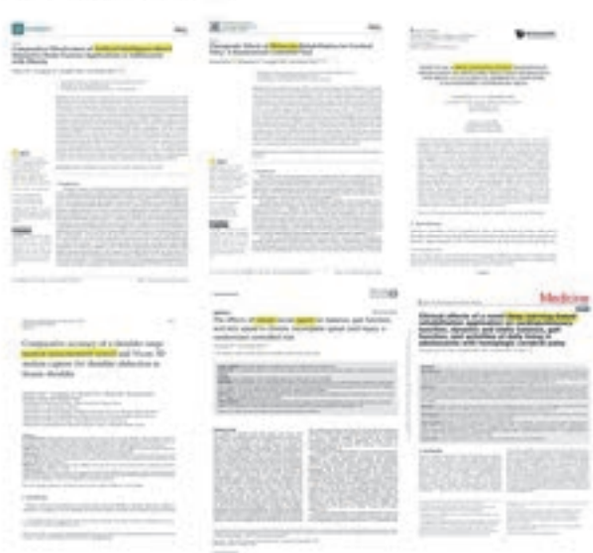
✓ 웹캠을 활용한 자세추적 프로그램 → 자세 데이터를 응용한 다양한 프로젝트 수행 가능

자세추적 프로그램 개발



성과

✓ AI기반의 물리치료 논문



✓ 시제품 직접 개발, 경진대회 참가

성과

✓ RnD과제, 산학 협력 과제, 기술사업화 과제 수주


국가연구개발사업 협력서

최종보고서

✓ 물리치료사의 기술창업(벤처, 스타트업 창업)

성과

✓ ChatGPT를 활용한 물리치료 소프트웨어 개발 특강


funrehab

생성형 AI를 활용한 연구 및 연구윤리

/ 이문영

생성형AI를 활용한 연구 및 연구윤리

호남대학교
이문영 교수

01. 강사 소개

이 문 영 교수

수의학박사 (약리독성학)
교육학박사수료 (교육공학)
현) 호남대학교 교수
현) 미래융합교육학회 학회장
현) 한국엔터테인먼트산업학회 교육이사
현) 한국대학교육협의회 고등교육연수원 강사

생성형AI와 연구

ChatGPT 현황

Nurse Education in Practice

Volume 66, January 2023, 103537

Editorial

Open artificial intelligence platforms in nursing education: Tools for academic progress or abuse?

Siobhan O'Connor [a] [1], ChatGPT [b]

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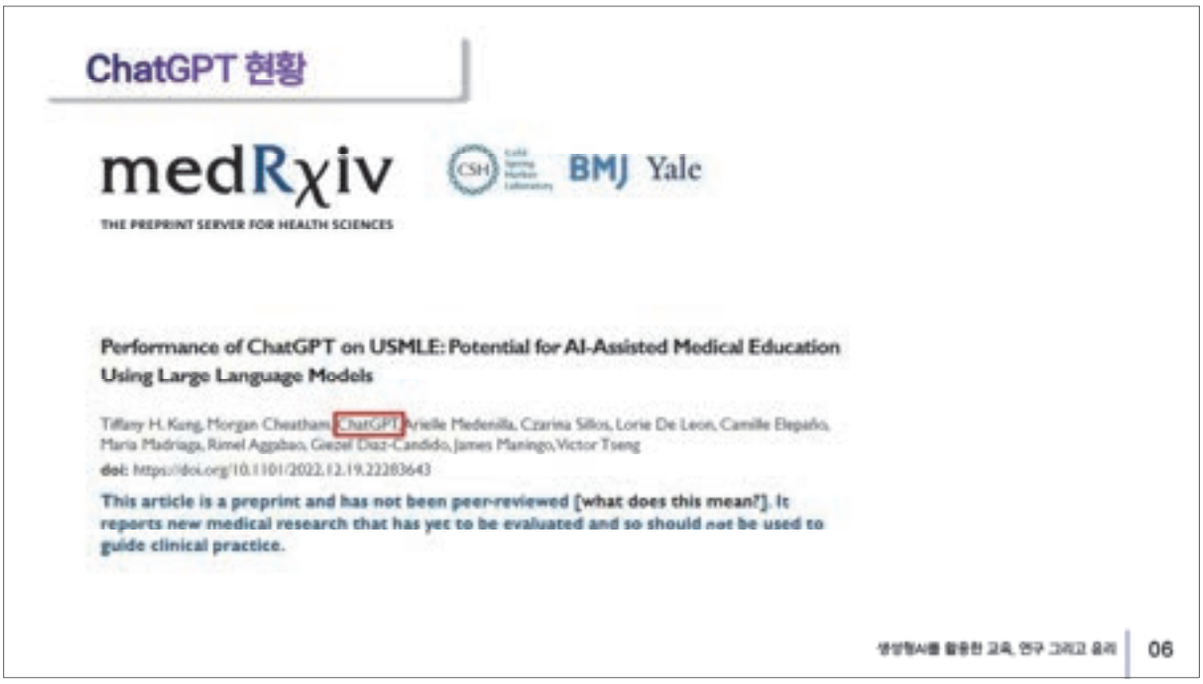
ChatGPT 현황

ChatGPT 현황



ChatGPT 현황

미래&과학 과학

"인공지능, 논문 저자 못 된다" 네이처·사이언스의 교통정리

> "연구물 책임 못 져...연구자 위한 도구일 뿐"
> 학술지 양대산맥 선언, 다른 학술지도 뒤따를 듯

ChatGPT의 활용

ChatGPT의 활용

- CAMP 프롬프트

- Context(맥락 설명) : 상황과 대화의 목적 설명
  - 지금 나의 수업을 전반적으로 개선하려고 해. 수업을 새롭게 설계할거야.
- Act(역할 부여) : 역할과 능력 부여
  - 너는 10년 차 교수경력을 가진 수업설계 전문가야.
- Make sure(명확한 안내) : 원하는 방향성과 과업 지시
  - 주차 별 수업내용은 그대로 두고, 수업방법, 활동내용, 기자재 등을 개선하고 싶어.
- Parameters(범위와 옵션) : 구체적인 형식과 분량 등
  - 강의계획서 형식으로 A4 2페이지로 작성해줘.

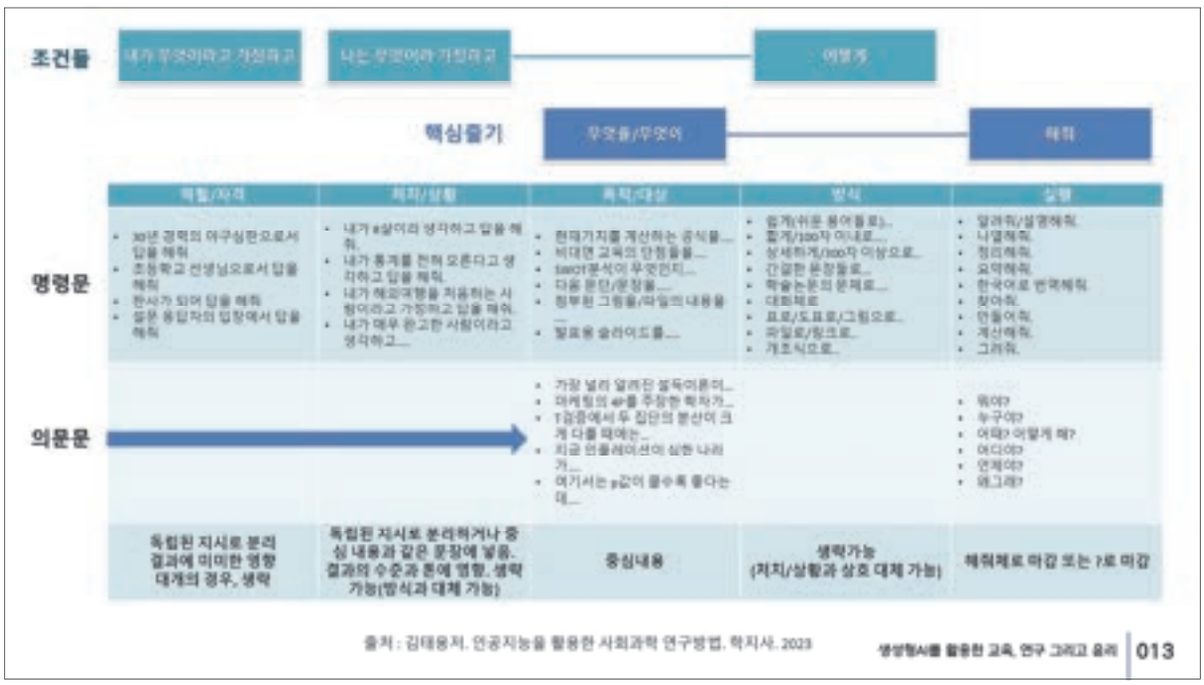
ChatGPT의 활용

- CAMP+EL 프롬프트

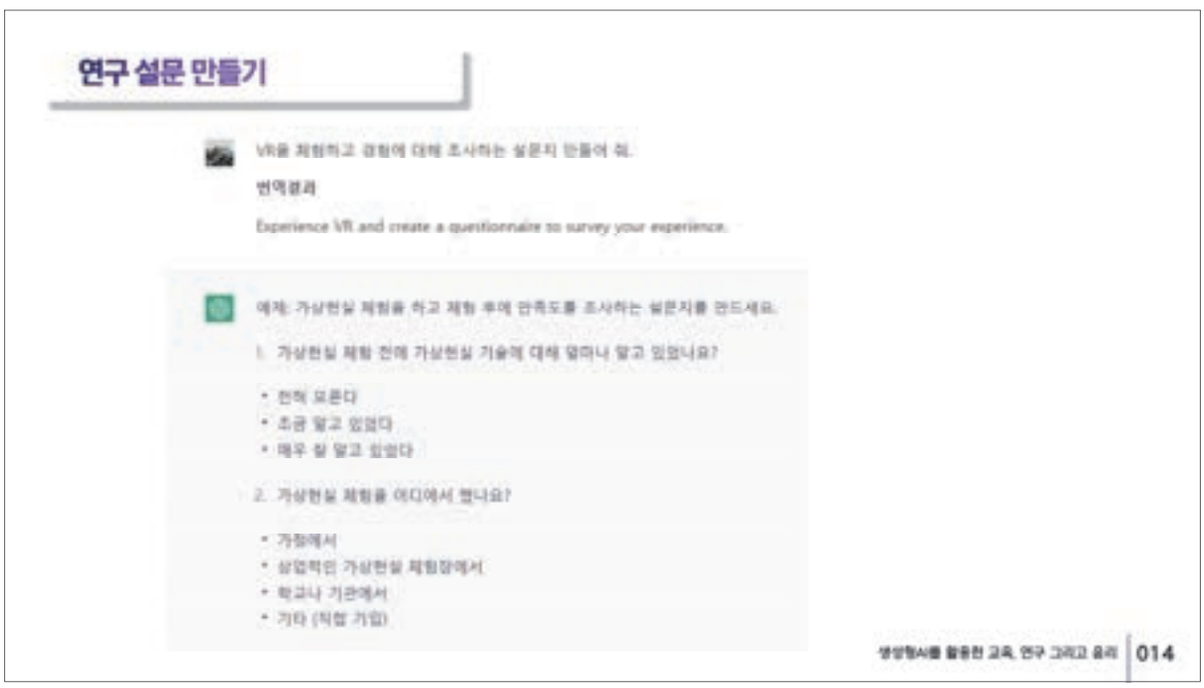
- Example(예시 추가) : 상황과 대화의 목적 설명
  - 다음의 예시를 참고해서 만들어줘 : [파일] 또는 [텍스트] 첨부
- Level(수준 지정) : 청자 수준 지정
  - 신임교원이 이해하도록 작성해줘.

ChatGPT의 활용

인공지능 활용 논문작성



출처 : 김태웅저. 인공지능을 활용한 사회과학 연구방법. 학지사. 2023



연구 설문 만들기

5. 제작한 가상현실 콘텐츠는 어떤 종류입니까?

* 게임
* 여행
* 교육
* 기타 (직접 기입)

6. 제작한 가상현실 콘텐츠에서 어떤 기능이 가장 인상적이었나요? (다중 선택 가능)

* 그래픽 품질
* 음향 효과
* 터치 입력
* 동작음 인식
* 기타 (직접 기입)

5. 가상현실 제작에서 가장 만족스러웠던 부분은 무엇이었나요?

* 새로운 경험을 할 수 있어서
* 루미포함기 때문에
* 시각적으로 매력적이었기 때문에
* 실제와 비슷한 체감각을 느낄 수 있어서
* 기타 (직접 기입)

6. 가상현실 제작에서 가장 불만족스러웠던 부분은 무엇이었나요?

* 불편한 작동감
* 시뮬레이션의 현실감이 부족한 부분
* 충분한 컨텐츠가 없어서
* 기술적인 결함이 있어서
* 기타 (직접 기입)

7. 가상현실 제작을 추천하시겠어요?

* 매우 추천한다
* 약간 추천한다
* 추천하지 않는다
* 전혀 모른다

8. 가상현실 제작을 다시 한다면, 어떤 종류의 콘텐츠를 제작하고 싶나요? (다중 선택 가능)

* 게임
* 여행
* 교육
* 기타 (직접 기입)

논문에서 활용

참고문헌 형식 변경

APA -〉 Chicago

아래의 APA Style 참고문헌을 Chicago Style로 바꿔줘.

- Bergmann, P. G. (1993). Relativity In The new encyclopedia Britanica (Vol. 26, pp. 501-508). Chicago: Encyclopedia Britanica.
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- Partz, M., Mentro, J. P., Lauter, P., Scarcelli, T. A., Alexandrowicz, M. P., Banshi, P. P., Sauls, C. E. (2006). A qualitative study of modern Native American dance. Journal of Dance Methodology, 12(3), 12-21.
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- Williams, J. "The Victims of Crime." Sociology Review 17, no. 4 (2006): 30-32.
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논문에서 활용

참고문헌 오류 수정

APA Style에서 어긋난 사항이 있으면 수정해줘.

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2. Kim, B. C., Lee, J. Y., Lee, G. S., Kim, M. S., Lee, Y. S., Jung, H. Y., & Hwang, I. W. (1995). 신문과 방송자료의 데이터베이스 구축 [Construction of a database for newspapers and broadcast materials]. 정보과학회지, 42, 38-49. (Note: For non-English titles, provide the English translation in brackets after the original title.)
3. Partz, M., Mentro, J. P., Lauter, P., Scarcelli, T. A., Alexandrowicz, M. P., Barishi, P. P., & Sauls, C. E. (2008). A qualitative study of modern Native American dance. Journal of Dance Methodology, 10(3), 12-21.
4. Williams, J. (2008). The victims of crime. Sociology Review, 17(A), 30-32.
5. Kim, D. K. (1999). 서비스의 질적 개선방안에 관한 연구: 서비스 업체 및 기관 종사자를 중심으로 [A study on the qualitative improvement of services: Focusing on service providers and practitioners]. 박사학위논문, 경희대학교 [Doctoral dissertation, Kyung Hee University], 부산. (Note: For dissertations, include the degree-granting institution and the location in brackets.)

논문에서 활용

맞춤법 수정

다음 문장의 띄어쓰기 맞춤법, 오류 등을 수정해줘.

연구에 따르면 노리는 아동들에게 자신의 삶에서 조절할수 없었던것을 조절할 수 있는 방법이며, 추론이나 문제해결 및 사고 능력을 개발할 있는 중요한 발달 기능을 제공한다.

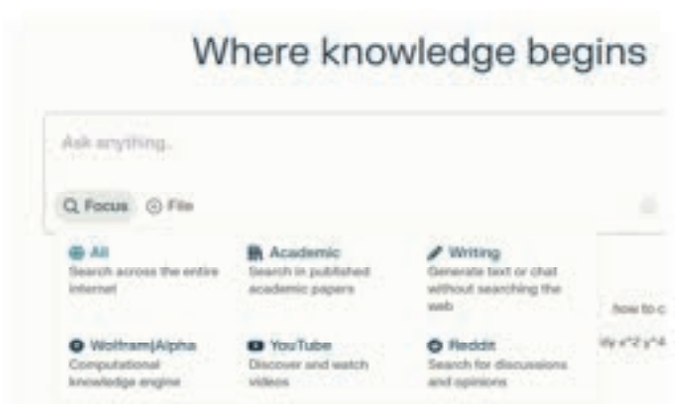
연구에 따르면, 노력하는 아동들에게 자신의 삶에서 조절할 수 없었던 것을 조절할 수 있는 방법이며, 추론이나 문제해결 및 사고 능력을 개발할 수 있는 중요한 발달 기능을 제공한다.

논문에서 활용

참고문헌 : https://www.perplexity.ai/

논문에서 활용

참고문헌 : https://www.perplexity.ai/ -〉 Focus

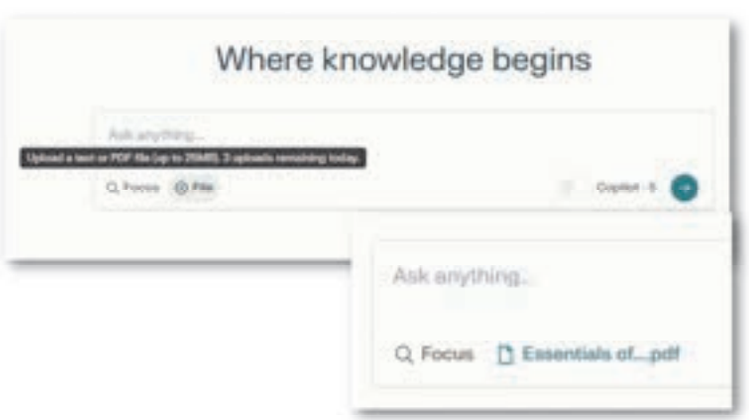


논문에서 활용

참고문헌 : https://www.perplexity.ai/ -〉 File

논문에서 활용

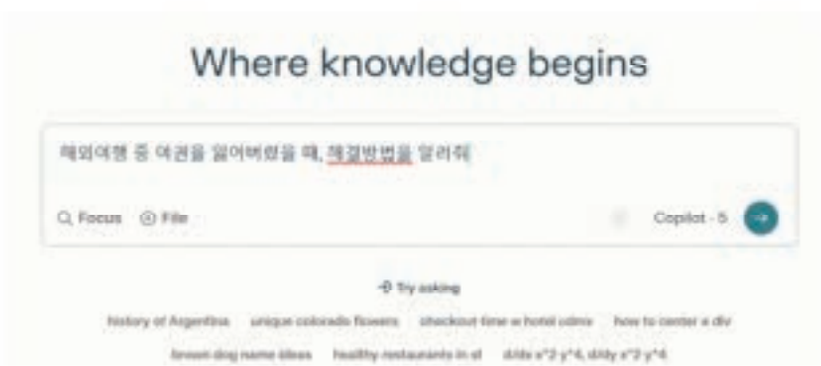
참고문헌 : https://www.perplexity.ai/ -〉 File



논문에서 활용

https://www.perplexity.ai/ -〉 File

논문에서 활용



논문에서 활용

논문에서 활용

논문에서 활용

Answer

If you lose your passport while traveling abroad, there are several steps you can take to resolve the situation. Here are the steps you can follow:

1. Report the loss to the local police station and obtain a "loss report" or "police report." This report will be required when applying for a new passport.
2. Contact the nearest Korean embassy or consulate to apply for a new passport. You will need to provide the loss report, a passport photo, and other identification documents.
3. If you are unable to obtain a new passport immediately, you may be able to obtain a temporary travel document or an emergency passport from the embassy or consulate.
4. If you have a copy of your lost passport, bring it with you to the embassy or consulate. It may help expedite the process of obtaining a new passport.
5. If you lose your passport on a weekend or holiday when the embassy or consulate is closed, you can contact the embassy's consular call center for assistance.

Sources

Copilot

Try Copilot
Copilot is the best way to answer the hardest questions. Search the web more comprehensively than ever before.

논문에서 활용

해부학 구술고사 평가에 대한 최근 연구 논문은 무엇인가요

Quick Search

Answer

After conducting a search, I was unable to find a specific paper that evaluates an anatomy oral exam. However, I can provide some general information about recent research related to anatomy oral exams.

According to [1], the anatomy oral exam is a type of interview that assesses a student's knowledge of anatomy. The exam may include questions about experimental design, hypothesis testing, and the concepts of control and placebo.

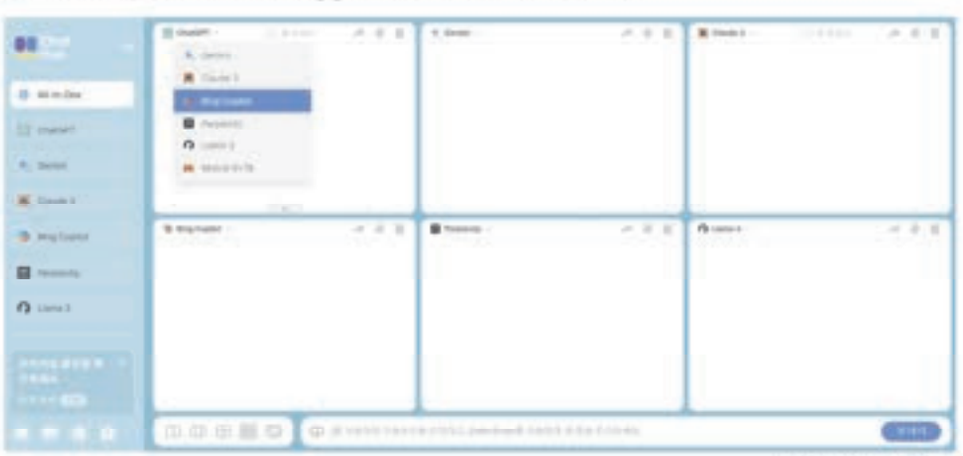
In [2], a report on the impact of preparatory learning on university exams mentions that university exams can include essay questions, written exams, and oral exams, including anatomy oral exams.

논문에서 활용

Chathub : https://chathub.gg/ -> 여러 엔진 동시 사용

논문에서 활용

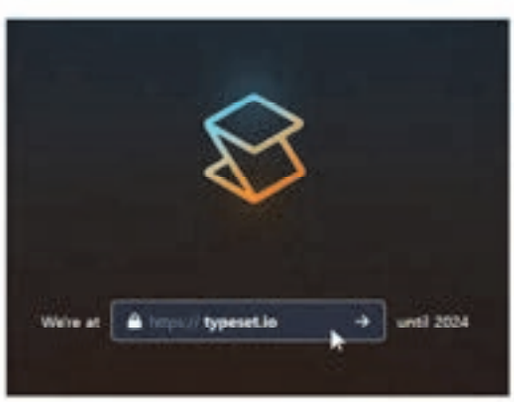
Chathub : https://chathub.gg/ -> 여러 엔진 동시 사용



ChatGPT의 활용

논문 조사하기

논문조사 & 분석: https://typeset.io/

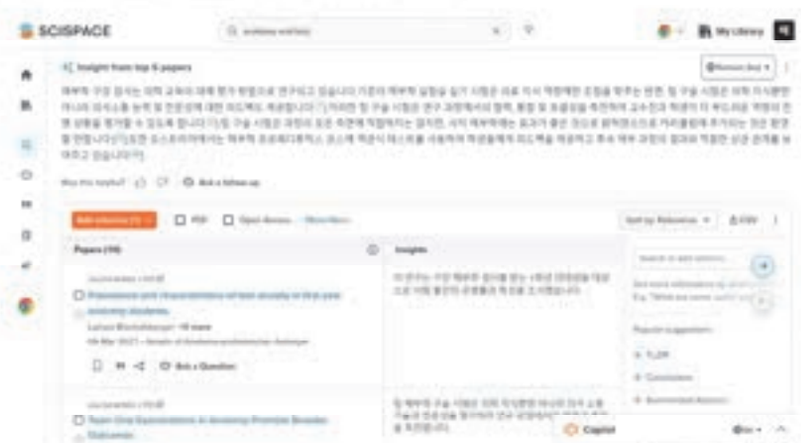


논문 조사하기

논문조사 & 분석: https://typeset.io/

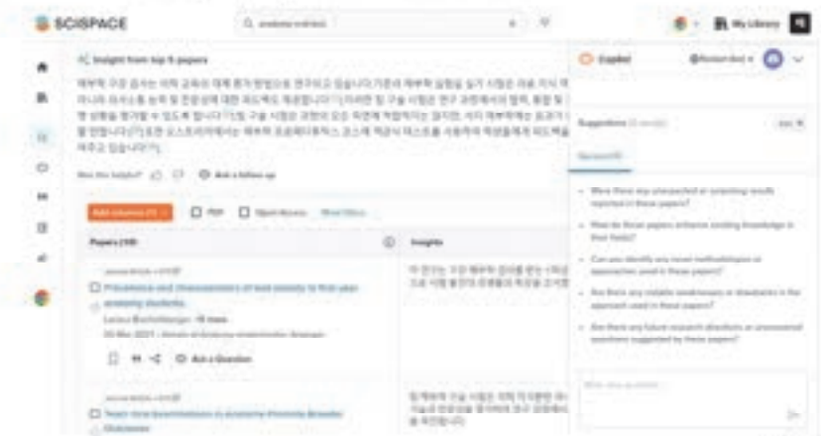
논문 조사하기

키워드 검색 시 관련 논문 제시 및 기본요약



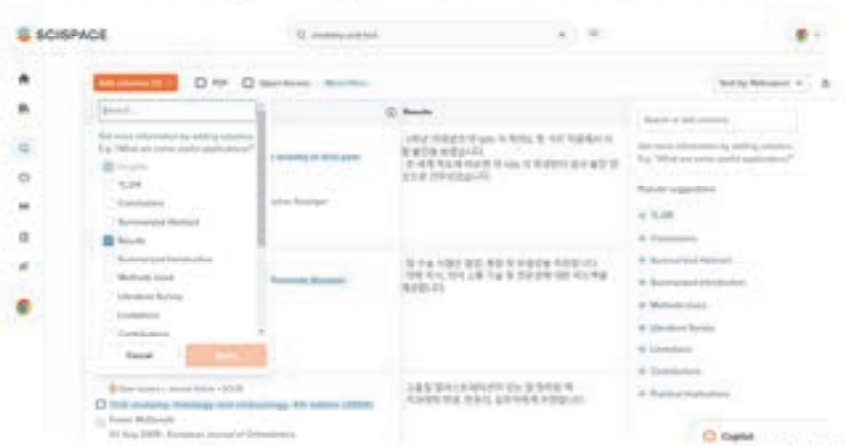
논문 조사하기

우측 하단의 코파일럿(Copilot) 사용 시 질문 제안



논문 조사하기

좌측 또는 우측에서 컬럼(columns)을 추가하여 원하는 메뉴 추가 : 결과 등

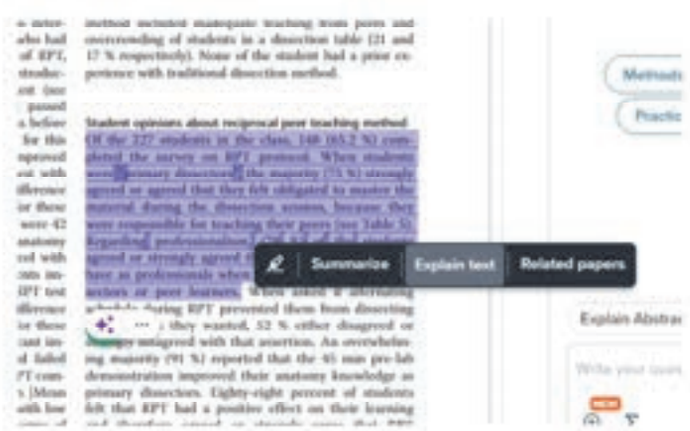


논문 조사하기

논문 선택 시 원하는 논문 확인 가능

논문 조사하기

본문 내용을 드래그하여 선택 시 : 요약, 설명, 관련 페이퍼 검색 등 가능



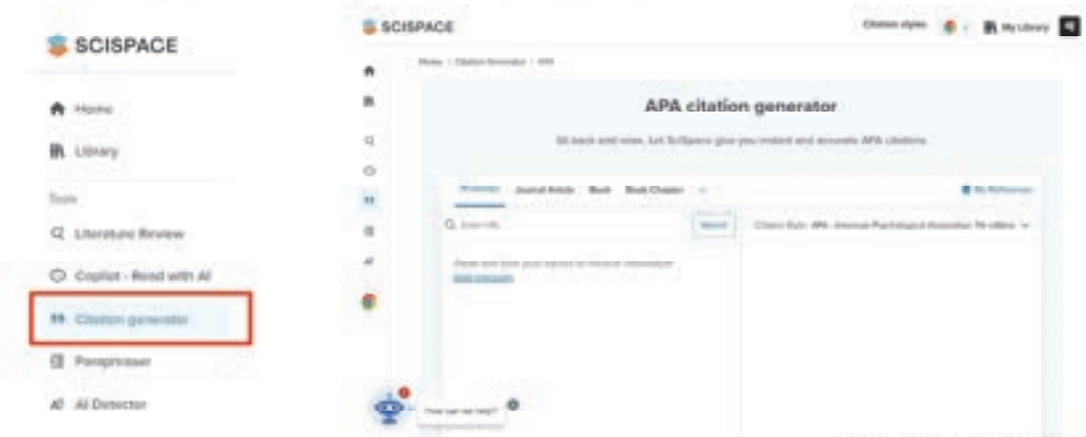
논문 조사하기

상단의 'Explain math & table' 선택 후 본문 선택 시 해당영역 설명

생성형AI를 활용한 교육 연구 그리고 윤리 039

논문 조사하기

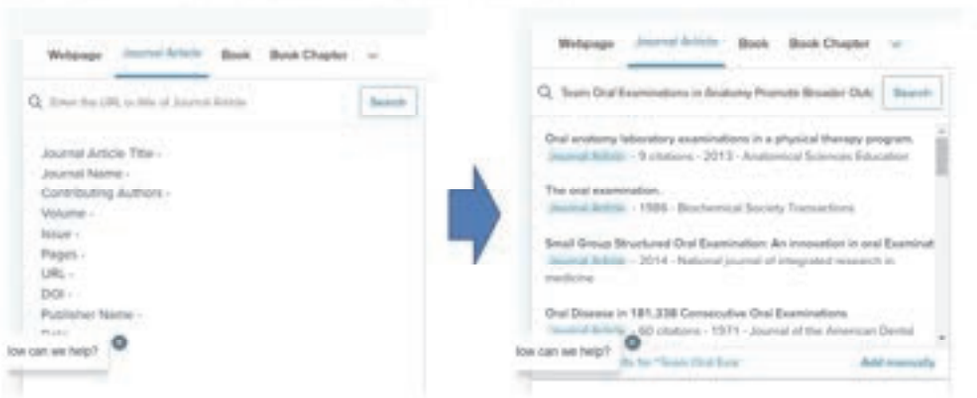
좌측 주요메뉴 중 'Citation generator' : 참고문헌 형식 생성



생성형AI를 활용한 교육 연구 그리고 윤리 040

논문 조사하기

'저널' 선택 후 키워드 검색한 뒤 원하는 저널 선택

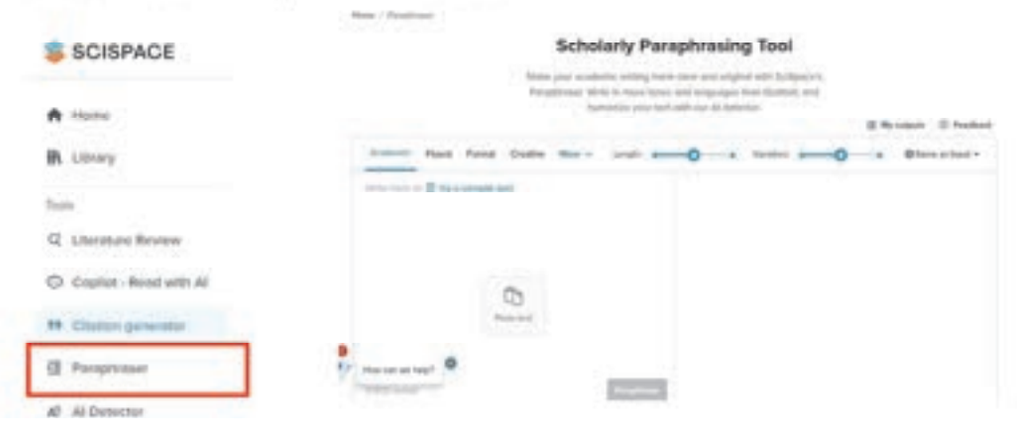


논문 조사하기

참고문헌 형식 선택 후 'generate' 클릭하여 'citation' 생성

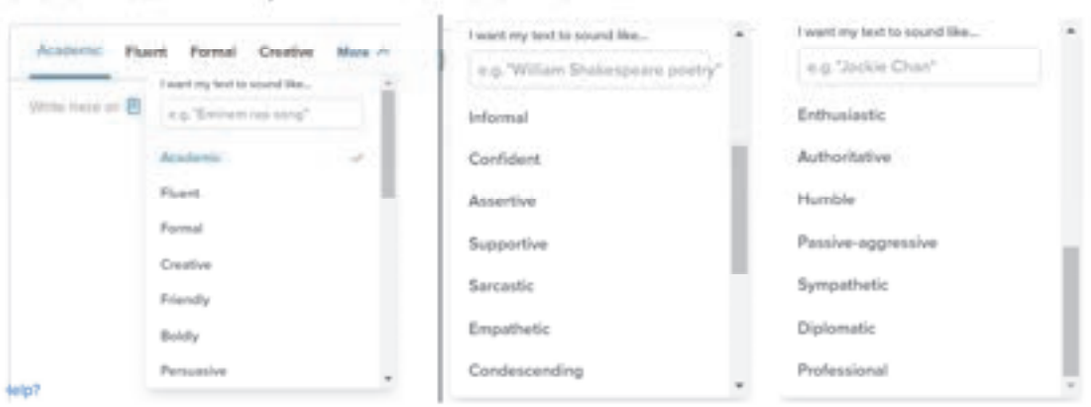
논문 조사하기

좌측 주요메뉴 중 'Paraphraser' : 글 변환



논문 조사하기

좌측 주요메뉴 중 'Paraphraser' : 총 21가지 형태로 변경



논문 조사하기

좌측 주요메뉴 중 'AI Detector' : AI가 작성한 글 구분

생성형AI를 활용한 교육, 연구 그리고 윤리 045

통계 가능성

GPT-4

	A	B
	3	4
	4	6
	5	5
	4	7
	3	5
	4	4
	5	6
	5	3
	4	7
	3	6
	4	7
	5	5
	4	8
	3	6
	4	5

이 두 그룹의 자료를 비교하고 통계적인 차이가 있는지 알려줘.

생성형AI를 활용한 교육, 연구 그리고 윤리 046

통계 가능성

주어진 A와 B의 데이터 그룹을 비교하여 통계적인 차이가 있는지 검사하려면 일반적으로 T-검정(t-test)을 사용합니다. T-검정은 두 표본 간의 평균 차이가 통계적으로 유의한지를 확인하는 방법입니다.

먼저 두 그룹의 기술 통계를 제공하겠습니다.

A 그룹:

- 평균 (mean): 4.2
- 표준편차 (std): 0.8

B 그룹:

- 평균 (mean): 5.6
- 표준편차 (std): 1.4

다음으로 t-검정을 진행합니다:

결과:

- t 값: 계산 필요
- p 값: 계산 필요

p 값이 0.05보다 작으면, 두 그룹 간의 차이가 통계적으로 유의하다고 판단할 수 있습니다.

하지만, 위의 결과는 예시입니다. 실제 t 값과 p 값은 계산을 통해 얻을 수 있습니다. 만약 자세한 계산이 필요하시다면, 전문적인 통계 소프트웨어나 전문가의 도움을 받으시는 것을 추천합니다.

통계 가능성

이 두 그룹의 자료를 비교하고 통계적인 차이가 있는지 알려줘.

	A	B
1	4	4
2	4	6
3	5	5
4	4	7
5	3	3
6	4	4
7	5	6
8	5	5
9	4	7
10	3	6
11	4	7
12	5	5
13	4	6
14	3	6
15	4	7

통계 가능성

다음은 두 그룹의 데이터를 비교한 결과입니다.

측정 항목	그룹 A	그룹 B
평균	4.32	4.67
표준 편차	1.43	1.33
최소값	1	4
최대값	5	5
중위값	4	5
1사분위수	3	4
3사분위수	5	5

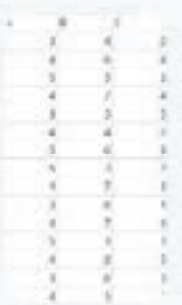
Sheets로 내보내기

통계적 차이를 확인하기 위해 다음과 같은 분석을 수행했습니다.

- 두 그룹의 평균을 비교하기 위해 t-검정을 수행했습니다. 결과는 t = 2.22, p-value = 0.03으로 통계적으로 유의한 차이가 있음을 나타냅니다.
- 두 그룹의 데이터 분포를 비교하기 위해 카이제곱 검정을 수행했습니다. 결과는 p-value < 0.001로 두 그룹의 데이터 분포가 통계적으로 유의하게 다르다는 것을 나타냅니다.

통계 가능성

이 세 그룹이 통계학적으로 차이가 있는지 확인해줘.



통계 가능성

보든 이미지에 따르면 세 그룹의 데이터는 다음과 같습니다.

```
A: 3, 4, 5, 4, 3, 4, 5, 5, 4, 3, 45, 4, 3, 34
B: 4, 6, 57, 5, 4, 6, 3, 2, 3, 7, 6, 1, 4, 7, 5, 8, 8, 6, 5, 2, 4, 3, 4, 5, 2, 3, 3, 5, 3, 2
C: 4, 6, 57, 5, 4, 6, 3, 2, 3, 7, 6, 1, 4, 7, 5, 8, 8, 6, 5, 2, 4, 3, 4, 5, 2, 3, 3, 5, 3, 2
```

이 데이터를 사용하여 분산 분석(ANOVA)을 수행하면 다음과 같은 결과가 나옵니다.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	118.211	2	59.1055	1.926	0.175
Within Groups	1193.345	47	25.2200		
Total	1311.556	49			

F 통계량은 1.926이고 유의수준은 0.375입니다. 따라서 귀무가설을 기각할 수 없으며, 세 그룹의 평균은 통계적으로 유의미하게 다르지 않다고 할 수 있습니다.

즉, A, B, C 세 그룹은 동일한 평균을 가지고 있다고 할 수 있습니다.

통계 가능성

다음은 사후검정을 통해 세 그룹 간의 차이를 확인하는 방법입니다. 사후검정은 ANOVA를 통해 귀무가설을 기각한 경우, 어떤 그룹 간에 차이가 있는지 확인하기 위한 검정입니다.

- Tukey HSD 검정: 가장 일반적으로 사용되는 사후검정 방법입니다.
- Bonferroni 검정: Tukey HSD 검정보다 보수적인 검정 방법입니다.
- Scheffe 검정: Tukey HSD 검정보다 자유도가 더 많은 검정 방법입니다.

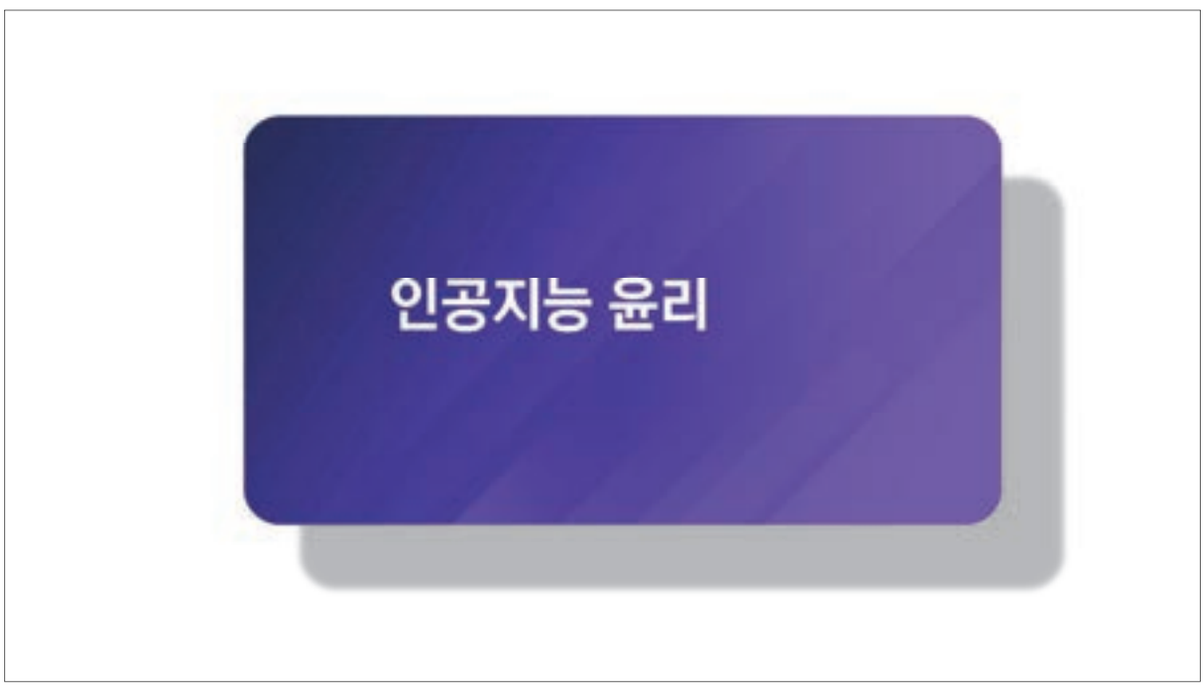
이 경우 Tukey HSD 검정을 수행하면 다음과 같은 결과가 나옵니다.

Comparison	Mean Difference	95% Confidence Interval	
A-B	0.59444444	-0.95022923	2.1381172
A-C	0.59444444	-0.95022923	2.1381172
B-C	0	-0.95022923	0.95022923

95% 신뢰수준에서 A, B, C 세 그룹 간의 평균 차이는 유의미하지 않습니다. 즉, 세 그룹은 동일한 평균을 가지고 있다고 할 수 있습니다.

따라서 결론적으로, 세 그룹은 통계학적으로 차이가 없습니다.


통계 가능성
그룹
평균
A
4.33
B
4.22
C
5.00
ANOVA를 수행한 결과, p-value = 0.09로, 귀무가설(세 그룹의 평균이 같다)을 기각할 수 없습니다. 따라서 세 그룹의 평균은 통계적으로 유의하게 다르지 않다고 할 수 있습니다.
다만, 그룹 C의 평균이 다른 두 그룹의 평균보다 약간 높게 나타났습니다. 따라서 사후검정을 통해 그룹 C가 다른 두 그룹과 통계적으로 유의하게 차이가 있는지 확인할 수 있습니다.
사후검정을 위해 Bonferroni correction을 적용하면, 그룹 A와 그룹 C의 평균 차이에 대한 p-value = 0.09이, 그룹 B와 그룹 C의 평균 차이에 대한 p-value = 0.06이입니다. 두 경우 모두 p-value가 0.05보다 크므로, 그룹 C가 다른 두 그룹과 통계적으로 유의하게 차이가 있다고 할 수 없습니다.
따라서 결론적으로, 세 그룹의 평균은 통계적으로 유의하게 다르지 않다고 할 수 있습니다.
생성형AI를 활용한 교육, 연구 그리고 윤리
053


인공지능 윤리

윤리문제

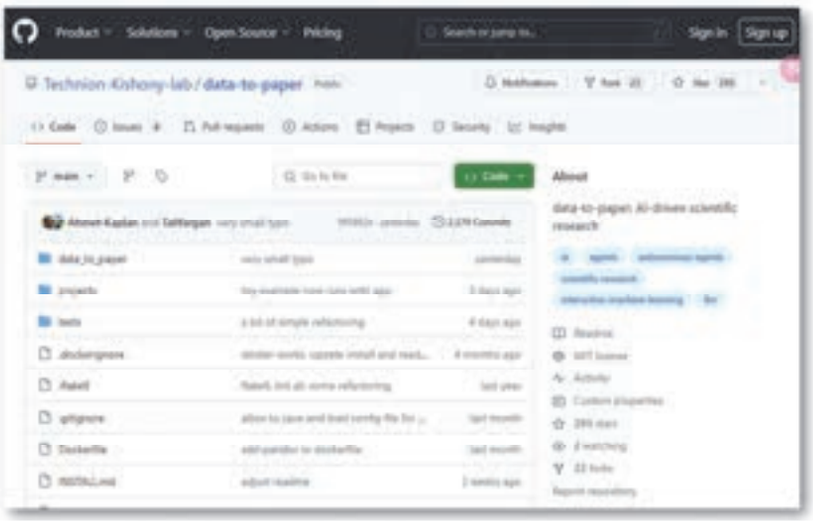

YTN
사이언스
ALACIO DE JUSTICIA
사이언스 투데이
"챗GPT로 판결문 썼다"
콜롬비아 판사 실토에 "무책임"

윤리문제

윤리문제

데이터를 넣으면 논문을 써주는 프로그램이 있다면

사용하시겠습니까?



조선경제 > 과학

새 과학계 골칫거리... ' AI 대필 논문' 작년에만 1만건 이상 '철회'

과학계 골칫거리

박재민 기자

업데이트 2024.06.20. 06:27

가

홈 > 뉴스 > 종합

AI 활용 논문 철회 사례 늘어나는데…국내 대학 77% "정책 마련 못 해"

A 박두산 기자 | 입력 2024.06.20 16:27 | 댓글 0


PNAS

RESEARCH ARTICLE | PSYCHOLOGICAL AND COGNITIVE SCIENCES

Superhuman artificial intelligence can improve human decision-making by increasing novelty

Minkyu Shin[a,1], Jin Kim[b,c,1], Bas van Opheusden[d,1], and Thomas L. Griffiths[a,e]

Edited by Michael Gazzaniga, University of California Santa Barbara College of Letters and Science, Santa Barbara, CA; received August 31, 2022; accepted December 19, 2022

How will superhuman artificial intelligence (AI) affect human decision-making? And what will be the mechanisms behind this effect? We address these questions in a domain where AI already exceeds human performance, analyzing more than 5.8 million move decisions made by professional Go players over the past 71 y (1950 to 2021). To address the first question, we use a superhuman AI program to estimate the quality of human decisions across time, generating 58 billion counterfactual game patterns and comparing the win rates of actual human decisions with those of counterfactual AI decisions. We find that humans began to make significantly better decisions following the advent of superhuman AI. We then examine human players' strategies across time and find that novel decisions (i.e., previously unobserved moves) occurred more frequently and became associated with higher decision quality after the advent of superhuman AI. Our findings suggest that the development of superhuman AI programs may have prompted human players to break away from traditional strategies and induced them to explore novel moves, which in turn may have improved their decision-making.

Significance

Although advances in artificial intelligence (AI) created superhuman AI systems, little is understood about how such AI systems will affect human decision-making. We examine historical changes in decision-making by professional Go players over the recent seven decades, focusing on changes after the advent of superhuman

AI 결정과 다른 결정에 대한 각 연도별 각 선수의 중간 DQI에 대한 각 연도의 추정 고정효과

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물리치료 연구발표
학생부분

로우다이 테이핑과 인솔이 편평발이 있는 20대 성인의 하지정렬에 미치는 효과 비교

/ 학부생 김솔비

로우다이 테이핑과 인솔이 편평발이 있는
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Sol-bi Kim

Dept. of Physical Therapy,
College of Health and Medical Science,
Daejeon University

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I. Introduction

Introduction

Background

편평발이란

발바닥 안쪽 세로활이
완전히 지면과 접촉하거나 가까워진 상태

선천적 요인 – 발목뼈 결합, 선천성 수직 목말뼈, 부주상골 증후군 등

후천적 요인 – 부적절 신발착용, 비만, 뇌성마비, 발바닥 인대파열 등

(Hendee, et al., 2008)

Introduction

Purpose

기존의 선행연구

인솔에 대한 연구

편평발 환자 맞춤형 인솔 보조기의 착용 전과 후가 편평발 환자의 양발 속도변화에 미치는 영향을 확인

↓

양발의 평균속도 추이가 왼발이 2.96%, 오른발이 1.09%로 나타나 대체적으로 보행이 빨라짐.

테이핑에 대한 연구

정상인을 대상으로 능동적 중재(short foot exercise; SFE)와 수동적 중재(low-dye taping)를 적용하여 안정성 비교

↓

SFE는 정적 안정성 증진, low-dye taping은 동적 안정성 증진

(인경기 등 2009; Kim 등 2019)

Introduction

Background

편평발의 문제점

구조적 문제

: 충격 흡수 기능 방해 → 하지의 신체구조 변화

기능적 문제

: 관절 퇴행, 다리근육 경련 및 조기피로

, 발바닥 및 뒤꿈치 통증 등

(Kitaoka 등 1998, Pandey 등 2013; Wang 등 2004)

Introduction

Purpose

연구목적

기존연구 제한점

- 독립적인 보존적 중재방법 적용한 연구는 이미 충분.
- 맞춤형 인솔의 부담스러운 가격대.
- 테이핑 단독 적용시 지속성의 어려움.

본 연구의 목적

- 기성인솔과 동적 안정성에 효과가 있는 테이핑을 동시에 적용하였을때 하지 정렬에 미치는 영향 연구

Introduction

Background

편평발의 치료방법

수술적 치료

보존적 치료

(Lee와 Jung 2016; Ator 등 1991; Tang 등 2021)

Introduction

Hypothesis

가설 1.
편평발에 인솔과 테이핑을 동시에 적용했을 때에
전 후 하지 정렬에 유의한 변화를 나타낼 것이다.

가설 2.
인솔만 착용했을 때보다 인솔과 테이핑을 같이
적용했을 때에 유의한 하지정렬의 결과가 나타날 것이다.

II. Methods

Methods

Subjects

Arch index란,

- 1987년 Cavanagh와 Rogers가 개발
- 발가락을 제외한 발바닥 압력의 면적의 비율

- 시험자간, 시험자내 신뢰도 0.93 ~ 0.97

Methods

Flow chart

Methods

Experiment

트레드밀 보행

보행거리 = 일일평균 보행 수 * {(신장)-100}

보행속도 = 대상자들의 편안한 속도로 맞추어 보행

(김병근과 공성아, 2019)

Methods

Experiment

중재방법

- 운동화로 트레드밀 보행
- 운동화에 인솔 넣고 트레드밀 보행
- 테이핑 + 운동화에 인솔 넣고 트레드밀 보행

✓ 중재 순서 : 랜덤

✓ 중재 간 Wash out 기간 : 1일 이상

(Yen-TL, et al, 2021)

Methods

Experiment

Ex-body 자세평가

매번 실험 전, 후에 Ex-body를 이용한 자세평가 진행

[Patella height] [Knee extension] [RCSP] [Q-angle]
[Ankle height] [Ankle 각도]

Methods

Experiment

인솔, 테이핑

인솔

로우다이 테이핑

(Yoho, et al, 2012)

Results

Results

표 1. 대상자의 일반적 특성 (N=22)

	남성(N=15)	여성(N=7)	전체
나이(세)	20.73±2.31*	20.42±0.98	20.63±1.97
신장(cm)	173.33±5.4	161.71±3.99	169.9±7.54
체중(kg)	74.4±8.59	54.86±4.14	68.18±11.87
arch index(%)	33.72±3.94	31.73±2.54	33.09±3.62
우세발 (L/R)	2/13	1/6	3/22

*M±SD

Methods

Statistics Method

- SPSS ver. 22 (SPSS Inc, Chicago, USA)
- 트레드밀 보행시 중재방법에 따른 하지정렬의 전, 후 차이값 비교
  → One way ANOVA with repeated measure
- 사후분석
  → Bonferroni test
- α=0.05

Results

Results

표 2. 세 가지 조건에 따른 하지 정렬 변화 (N=22)

	Δcase 1 *diff*	Δcase 2 *diff*	Δcase 3 *diff*	F	*p*
Ankle height	.36±1.68*	.18±1.65	.68±3.39	.25	.781
Ankle dorsi flexion	-.91±3.39	-.82±2.75	-.27±3.10	.27	.763
Resting calcaneal stance position	-1.55±4.84	-.18±5.01	3.27±4.90	5.61	.006 .006
Patella height	.41±3.00	-.32±2.44	.36±2.36	.53	.589
Knee extension	-1.36±3.40	-.77±2.52	-.64±3.62	.32	.729
Q-angle	1.27±6.25	-.59±6.91	.59±3.89	.58	.68

운동화 착용: case 1, 인솔 착용: case 2, 테이핑과 인솔 착용: case 3

*M±SD

Ⅲ. Results

Discussion

Discussion

연구목적과 결과

- 편평발을 가진 성인에게 운동화, 인솔 그리고 인솔과 테이핑을 동시에 적용한 세 가지의 조건별로 보행하였을 때 하지 정렬의 변화를 보고자 하였다.
- RCSP에서 유의미한 차이가 나타났고 인솔과 테이핑을 동시에 적용한 조건이 운동화만 적용한 조건보다 유의미한 차이가 나타났다.

Results

Results

표 3. 세 가지 조건에 따른 RCSP각도 변화 분석 (N=22)

	(I)	(J)	Median difference (I-J)	p
RCSP	Δcase 3 *diff* – Δcase 1 *diff*		4.818	.006
	Δcase 3 *diff* – Δcase 2 *diff*		3.455	.059
	Δcase 2 *diff* – Δcase 1 *diff*		1.364	1.000

resting calcaneal stance position: RCSP, 운동화 착용: case 1, 인솔 착용: case 2, 테이핑과 인솔 착용: case 3

*p<0.05

Discussion

Discussion

결과와 선행연구 – 이정민 등(2018)의 연구

맨발, 일반 신발 착용 그리고 인솔 착용 상태에서 적외선카메라와 반사마커를 이용하여 보행주기 중 아치 높이 변화와 족부 정렬(외전/내전) 및 무릎 회전변화를 측정하였다.

- 정적 기립자세에서 맨발, 일반신발, 인솔착용 순으로 아치높이 변화가 감소하였다.
- 인솔착용에서 맨발과 일반신발보다 작은 발목의 외전현상이 보였다.

발바닥 아치 높이를 효과적으로 유지, 발목 외전현상 감소

IV. Discussion

Discussion

Discussion

결과와 선행연구 – Park과 Seo(2015)의 연구

20대 편평발 대상자에게 인솔을 적용시킨 상태에서 보행주기동안의 Q-angle 각도 변화를 모션캡쳐 프로그램을 이용하여 측정하였다.

- 보행주기 중 양측의 loading response, midstance에서 유의미한 Q-angle의 각도 감소가 나타났다.
- 보행주기 중 양측의 initial contact, terminal stance, pre-swing 동안 Q-angle 각도가 감소하는 것을 보였지만 이러한 결과는 **통계적으로 유의미하지 않았다**.

Discussion

Discussion

결과와 선행연구 – Martínez C(2023)의 연구

중립족, 외반족, 내반족(편평발) 환자들에게 안쪽 장딴지근에 근전도를 부착하고 발의 아치 높이를 측정하여 로우다이 테이핑이 보행 중 평균 근전도 활동과 아치 높이의 변화에 미치는 영향을 연구하였다.

- 보행중에 외반족과 내반족(편평발) 피험자들에서 안쪽 장딴지근의 평균 근전도의 감소를 확인하였다.
- 모든 피험자들에서 휴식중의 맨발 상태뿐만 아니라 보행 10분후에도 **아치 높이가 유지**되는 효과를 확인하였다.

Discussion

Discussion

결과와 선행연구

Park k와 Seo K(2015)의 Q-angle에 대한 연구

RCSP외의 Patella height, Ankle height, Knee extension, Ankle dorsi flexion, Q-angle에 대해서는

유의미한 차이 나타나지 않았음.

Discussion

Discussion

결과와 선행연구

이정민 등(2018)의 인솔에 대한 연구	Martínez C(2023)의 로우다이 테이핑에 대한 연구

RCSP 값이 운동화만 착용한 값에 비하여

테이핑과 인솔을 같이 적용한 값에서

유의미한 차이가 나타났음

Conclusion

Conclusion

편평발을 가진 대상자의 **발바닥 세로활을 높이기 위해서**는
인솔과 로우다이 테이핑을 같이 적용하는 것이 효과적이다.

기성인솔에 세로활을 지지하는 힘을 테이핑을 통해 보완하여
같이 적용하면 임상속에서 편평발 환자들에게 **접근성이**
좋아져서 적극적인 활용이 가능할 것이다.

Discussion

Research Limitations

20대 건강한 성인을 대상

유연성 편평발과 강직성 편평발을 구분하지 않음

한 조건 당 일회성 측정에 대한 전후 측정 차이값

대상자별 세로활의 무너짐 정도와 족저압의 차이

다양한 연령대와 대상자로 **편평발 유형**을 나누어
대상자별로 **맞춤제작**된 인솔과 테이핑의
기간별 효과를 알아보는 연구

V. Conclusion

물리치료 연구발표
일반부문 1

슬링 운동 중 목 보조기 착용이 전방머리자세 성인의 목 근육 기계적 특성과 두통에 미치는 영향 : 무작위 대조 연구

/ 오은별

대전대학교

슬링 운동 중 목 보조기 착용이 전방머리자세 성인의 목 근육 기계적 특성과 두통에 미치는 영향 : 무작위 대조 연구

Neck brace wearing during sling exercise decreases neck muscle mechanical properties and headache in adults with forward head posture : a randomized controlled trial

대전대학교 특수대학원
물리치료학과 정형도수전공
오은별

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서 론

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연 구 배 경

- 많은 자세 중에 정상적인 척추자세의 유지가 힘들어지면 서 머리를 척추 중심선보다 앞으로 내미는 자세인 **전방머리자세(forward head posture)**를 취하게 된다.
  (R. Caillet, 1995).

- 전방머리자세는 두개주위근(pericranial muscle)의 통증발현과 지속성에 기인하는 중요한 인자가 되며, 두개주위근의 압통과 근막통증을 유발하게 되며 **긴장성 두통(tension-type headache)**과 같은 통증의 양상을 만들어 내기도 한다.
  (Black 등,1996; Mannheimer,1991; 채윤권과 김찬우, 2005).

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연 구 방 법

연 구 배 경

- 경부에 근방추가 많은 경장근을 재활성화 시켜 근력이 향상되어 경추 전만각도가 증가하는 것을 확인하였다. (이대희, 2003).
- 슬링 운동은 가동성(mobility), 신장(stretching), 강화 – 운동 훈련, 근육의 안정화, 근력강화, 근지구력 향상, 이완 등에 치료적 효과가 있다. (김선경, 2001).

- 목 보조기는 경추 신경을 통한 고유수용감각의 활성화 효과가 있다고 하였으며 기능부전과 통증을 회복하는데 적용 가능하며 구조물이 정상 배열 하도록 한다. (박기덕,2005)
- 목 보조기의 적용은 추간 관절과 척추체 사이 간격을 늘려주며, 추간공을 넓혀주므로 척추의 관절가동범위에서 압력을 감소시키며 관절면을 분리시킨다. (G.B. Anderson 등, 1983용, 1985).

연구 대상자

- D광역시 P병원에 긴장성 두통으로 인하여 입원 또는 외래로 치료중인 20대 전방머리자세 환자를 대상으로 선정기준과 제외기준에 적합한 **30명을 대상**으로 하였다.
- 대상자 수 산출 : G-Power 3.1 program
- 무작위 배정, **중재기간 4주**
- 실험군(15명) : 목 보조기를 착용 후 슬링 운동 실시
- 대조군(15명) : 목 보조기를 착용하지 않고 슬링 운동 실시

연구의 필요성

- 최근 보조기구를 착용한 상태에서 수행하는 운동 요법의 효과에 대한 여러 연구가 수행되었습니다.
- 다양한 운동 요법에 대해 보조기구 착용의 효과가 적절하게 입증되었지만, 전방 머리 자세 교정에 널리 사용되는 슬링 운동 중 보조기구 착용의 효과를 파악한 연구는 수행되지 않았습니다.

목 보조기 착용 여부에 따른 슬링 운동의 치료효과를 비교하기 위해 실시

실 험 방 법

1) 목 보조기(Neck Orthosis)

- 수동식 공기주입식 정형용 견인장치(리틀빈넥)
- 전면과 후면 브라켓을 한쪽만 연결한 후 전면 브라켓을 턱과 가슴에 안착
- 후면 브라켓으로 목을 감싼 후 목이 잘 지지되게 고정
- 공기 주입구와 펌프를 연결한 후 공기 주머니에 공기 주입하여 견인

- **견인의 강도** : 대상자가 편안하게 참을 수 있는 당김을 느낄 때 "그만"이라고 말하도록 지시

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연구 대상자

- **선정기준**
  1) 20~29세 사이의 연령인 자
  2) 머리척추각(CVA)이 49 ° 미만인 자
  3) 최근 1개월 이내에 긴장성 두통을 경험한 자

- **제외기준**
  1) 최근 1개월 이내에 두통을 위해 진통제를 복용한 자
  2) 최근 6개월 이내에 긴장성 두통 치료 경험이 있는 자
  3) 임산부인자, 급성 염증이 있는 자, 목 및 등, 허리 부위에 수술 이력이 있는 자
  4) 운동 수행에 영향을 줄 수 있는 신경학적 혹은 정신과적 질환이 있는 자

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실 험 방 법

2) 준비운동

Hooking positon 에서 5분간 유지

Sitting position에서
1세트 당 10회씩 총 4세트 진행

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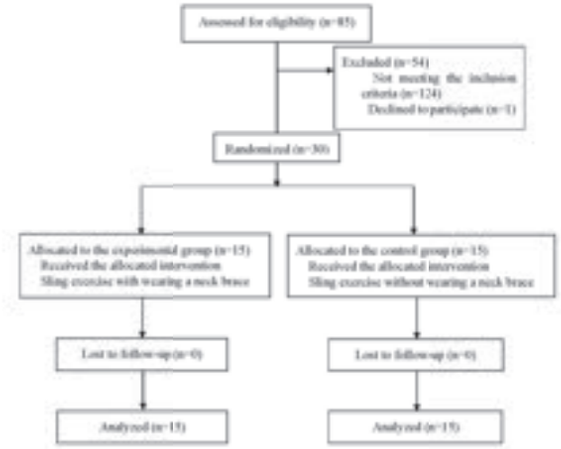
연 구 설 계



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평 가 방 법

1. Posture alignment

- "엑스바디(Exbody9100Momi,Korea)" 장비 사용해 신체정렬 평가
  - 오른팔을 복부 위에 올린 후 오른쪽 측면자세를 취하고 양쪽 발 10cm 간격으로 벌리고 편안한 선 자세로 전면 주시
- 머리척추각(CVA)를 측정.
  - CVA : C7 극돌기를 지나는 수평선과 귀의 외이도를 잇는 선 표시한 후 두선이 만나서 이루는 각도
- CVA(°)의 정상 범위 : 50 °
  - CVA 각도가 49°미만이면 전방머리자세라고 판단
- 측정자 내 신뢰도 r=0.88

(김은자 등, 2018, Nemmers 등,2009)

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실 험 방 법

3) 본 운동

- 심부 굴곡근/자세유지근의 강화
- 바른위치를 개인에게 인식
- 눈을 감거나 슬림에 기계적 자극으로 운동의 난이도 조절
- 척추의 안정화
- 뒤로 30cm, 옆의 높이 20cm 씩 낮추어 운동의 난이도 조절

(재활병,2014;Gautam Gupta,2016)

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평 가 방 법

2. 근긴장도

- Myotone (MyotonePRO, Myoton AS, Tallinn,Estonia) 사용
- 반복적 측정에서 측정자의 신뢰도를 높이기 위해 측정자는 1인으로 제한
- 근육 측정 부위는 모두 피험자의 우측 부위를 측정
  - Splenius capitis : supine, 경추 3번 극돌기 중간지점에서 2cm 이격한 부위
  - Sternocleidomastoid muscle: supine, 유양돌기와 쇄골을 수평으로 연결하는 중앙
  - Upper trapezius: prone, 경추 극돌기 7번 중간지점에서 견봉을 연결하는 수평선의 중앙
- 각 측정은 2회 실시하여 평균값을 채택
- ICC=0.97~0.99

(Oksanen 등,2008, Akaoj& Kusama, 2015, 김춘심, 2016 Vir 등, 2006, Aird 등,2012)

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실 험 방 법

4) 정리 운동

1세트당 10회씩 총 5세트로 실시,
1세트 후 좌우 측으로 회전 시키는 걸 30번 반복한 후 1분 휴식

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평 가 방 법

3. 두통영향지수 (Headache impact test-6;HIT-6)

Headache Impact Test(HIT-6) 두통 영향도 검사

- 총 6개 질문
- 각 항목당 6~13점, 총 78점 만점
- 각 항목 별 점수
  ① 한번도 그런적이 없다(6점)
  ② 드물게 그렇다 (8점)
  ③ 때때로 그렇다 (10점)
  ④ 매우 자주 그렇다 (11점)
  ⑤ 항상 그렇다 (13점)
- 점수가 높을 수록 두통이 삶의 질에 미치는 영향이 크다고 평가
- 신뢰도 (ICC =0.76-0.83)

고정 값(chu 등, 2008)

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결 과

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분 석 방 법

- 윈도우용 SPSS version 25.0 (SPSS Inc., Chicago, IL, USA)
- 대상자들의 일반적 특성 - 기술통계 (평균, 표준편차)
- 정규성 검정 - Shapiro-Wilk 검정
- 각 그룹 내의 중재 전후 차이 비교 - 대응표본 t-검정
- 각 그룹 간의 중재 전후 변화량 비교 - 독립표본 t-검정
- 통계학적 유의 수준 α=.05

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결 과

General characteristics of the subjects

	Experimental group (n=15)	Control group (n=15)	t/z^2	P
Sex (male/female)	8/7	7/8	.133	1.000
Height (cm)	168.1±7.8	170.2±9.2	-.687	.498
Weight (kg)	67.1±10.9	71.9±19.1	-.845	.405
Age (years)	34.3±9.5	35.1±9.8	-.246	.808

Values are expressed as means±standard deviations or numbers.

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CVA

전방 머리 자세 대상자에게 슬링 운동프로그램을 적용했을 때, 경추 전만각 및 CVA의 증가와 CRA가 감소하는 것으로 전방 머리 자세가 호전되게 나타남

본 연구에서도 슬링 운동이 CVA를 효과적으로 증가시키는 것으로 나타남
하지만, 두 군간 CVA 변화 사이에 유의미한 차이가 없음

슬링 운동 중 보조기의 착용이
뼈 정렬에 충분히 영향을 미치지 않았음을 시사

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결 과

Comparison of kinematic variables, muscle tensions, and headache severity scores before and after training within each group and between the two groups

		Experimental group (n = 15)			Control group (n = 15)			F	
		Pre	Post	%Change	pre	Post	%Change	(time × group)	η^2
Craniovertebral angle (°)		45.6 (4.0)	51.7 (3.0)	+13.4*	45.5 (4.2)	50.2 (3.3)	+10.3*	.235	.054
SC	Tone (Hz)*	21.7 (1.7)	16.1 (1.7)	-25.9*	21.8 (2.0)	19.2 (2.0)	-12.0*	.000	.425
	Stiffness (N/m)*	386.2 (63.8)	257.9 (44.3)	-33.3*	384.6 (71.9)	323.9 (42.3)	-15.8*	.004	.263
	Elasticity (d)*	1.4 (.2)	1.2 (.2)	-12.1*	1.4 (.2)	1.3 (.2)	-8.0*	.039	.181
UT	Tone (Hz)*	22.6 (3.9)	17.9 (2.1)	-20.8*	22.8 (3.5)	20.9 (3.0)	-8.4*	.006	.257
	Stiffness (N/m)	386.0 (121.8)	320.3 (69.4)	-17.1*	388.8 (110.9)	345.1 (98.9)	-11.3*	.427	.023
	Elasticity (d)*	1.4 (.3)	1.0 (.1)	-25.2*	1.4 (.3)	1.2 (.3)	-12.3*	.030	.156
SCM	Tone (Hz)*	20.6 (3.1)	16.5 (1.9)	-20.0*	21.1 (2.6)	19.7 (2.7)	-6.7*	.007	.234
	Stiffness (N/m)*	432.3 (104.3)	275.9 (56.8)	-36.2*	432.8 (105.7)	389.2 (100.2)	-10.1*	.001	.327
	Elasticity (d)	1.2 (.2)	1.1 (.2)	-10.3*	1.1 (.2)	1.1 (.2)	-8.7*	.754	.004
HIT – 6 (score)*		66.1(5.7)	46.5 (4.1)	-29.7*	66.7 (6.1)	51.7 (6.8)	-22.5*	.012	.205

Values are expressed as means ± standard deviations.

SC, splenius capitis; UT, upper trapezius; SCM, sternocleidomastoid; HIT – 6, headache impact test – 6.

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긴장도

전방머리자세가 있는 성인에게 실시한 슬링 운동에서의 근긴장도는 이마근은 40%, 등세모근 상부는 59% 감소

본 연구에서도 두 그룹 간의 splenius capitis는 44%, upper trapezius는 53%, sternocleidomastoid는 59%의 근긴장도를 감소시켰습니다.

목 보조기가 운동 시 목뼈 견인과 함께 목뼈 안정성을 유지

목뼈 관절부의 안정이 목 주위근의 근긴장도 감소에 영향

목보조기를 착용한 슬링 운동의 효과를 증가시킬 수 있는
방법이 될 수 있음을 시사

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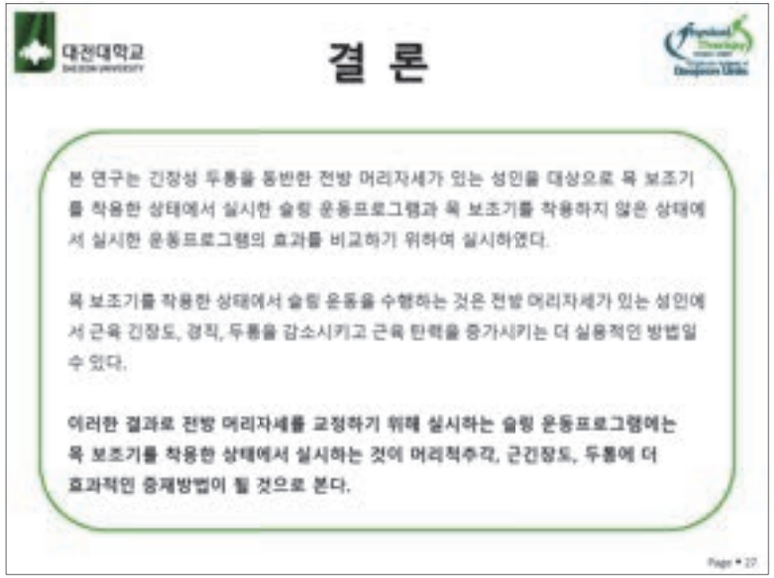
고 찰


대전대학교
두 통
고문성존자를 대상으로 12주 동안 목 부위에 슬링 운동프로그램을 실시 하였을 때,
중재 전에 비해 6주 중재 후 긴장성 두통이 42.8% 감소, 중재 12주 후 두통이 사라짐
전방머리자세가 있는 성인에게 목뼈의 견인과 몸 운동을 실시 하였을 때, 중재 전에
비해 중재 후 등세모근 상부 통증 역치 64% 증가, 목 기능장애지수 20%감소
본 연구에서도 목 보조기를 착용한 상태에서 실시한 슬링 운동을 수행한 실험군이
목 보조기를 착용하지 않고 슬링 운동을 한 대조군보다 두통 7.2% 감소
슬링 운동프로그램은 두통 감소에 효과적
본 연구에 사용한 목 보조기가 정상적인 경추 정렬 기능
> 일부 근육의 과도한 긴장으로 인한 두통을 줄임


대전대학교
결 론
본 연구는 긴장성 두통을 동반한 전방 머리자세가 있는 성인을 대상으로 목 보조기를 착용한 상태에서 실시한 슬링 운동프로그램과 목 보조기를 착용하지 않은 상태에서 실시한 운동프로그램의 효과를 비교하기 위하여 실시하였다.
목 보조기를 착용한 상태에서 슬링 운동을 수행하는 것은 전방 머리자세가 있는 성인에서 근육 긴장도, 경직, 두통을 감소시키고 근육 탄력을 증가시키는 더 실용적인 방법일 수 있다.
이러한 결과로 전방 머리자세를 교정하기 위해 실시하는 슬링 운동프로그램에는 목 보조기를 착용한 상태에서 실시하는 것이 머리척추각, 근긴장도, 두통에 더 효과적인 중재방법이 될 것으로 본다.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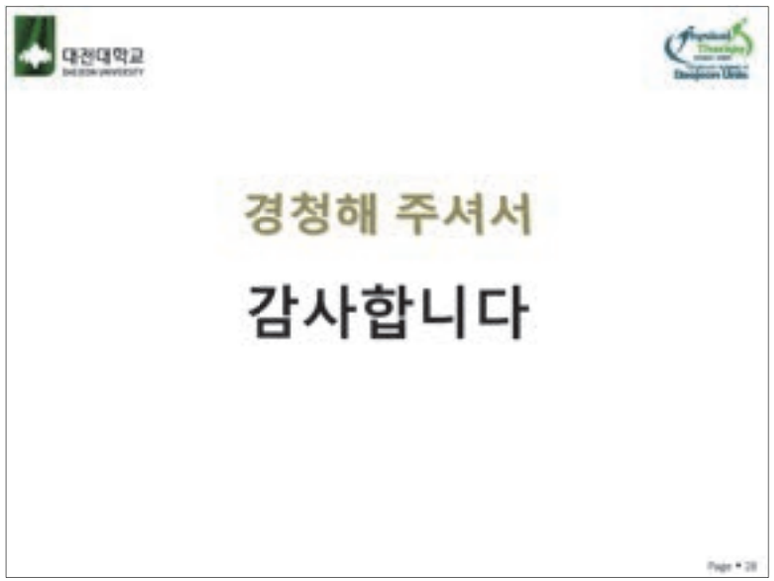
결 론


대전대학교
경청해 주셔서
감사합니다

물리치료 연구발표
일반부문 2

The Effectiveness of Overground Robot Exoskeleton Gait Training on Gait Outcomes, Balance, and Motor Function in Patients with Stroke: A Systematic Review and Meta-analysis of Randomized Controlled Trials

/ 이명호

The Effectiveness of Overground Robot Exoskeleton Gait Training on Gait Outcomes, Balance, and Motor Function in Patients with Stroke: A Systematic Review and Meta-analysis of Randomized Controlled Trials
Department of Rehabilitation Sciences, Graduate School, Daegu University
Myoung-Ho, Lee PT, PhD

Contents

Introduction
1) Necessity of study
Stroke
Gait
Activities of daily living
Community participation
Quality of life
Conventional physical therapy requires a significant amount of time and energy from physical therapists and nurses (Zou et al., 2018).
Furthermore, the treatment may vary depending on the individual skills of therapists, making it challenging to provide consistent and standardized treatment to patients.

Introduction
1) Necessity of study
Exoskeleton robot device
Direct control of individual joints.
Reducing adverse effects and abnormal posture
Safety and high efficiency
Construction is complex.
High complexity
have not yet investigated the effects of a standalone overground robot-assisted gait
This study aims to provide evidence and determine the effects of overground robot exoskeleton gait training on gait outcomes, balance, and motor function in stroke patients.

Method

2) Criteria for inclusion and exclusion

The exclusion criteria for the current study are as follows:

- Single-group experimental designs without a control group
- Non-experimental studies such as observational, case studies, qualitative research, animal experiments, and duplicate publications reporting the same results
- Grey literature papers (abstracts, posters) without peer review
- Studies lacking sufficient data for effect size analysis
- Studies with errors in the reported results presented in tables or figures

Method

1) Information source & Search strategy

- The literature search was carried out from January 2024 to February 2024 in databases such as PubMed, EMBASE, Cochrane Central Register of Controlled Trials, Scopus, and Ovid-LWW. Additionally, documents published on the RISS (Research Information Sharing Service), a repository for grey literature including master's and doctoral theses, were also searched

- Search strategy
  The first phase : 3 key concepts: "Stroke", "exoskeleton device" and "Overground gait training". in Pubmed

  In the second phase : ongoing trials were searched for EMBASE, Cochrane Central Register of Controlled Trials, Scopus, and Ovid-LWW.

  the third phase involved identifying studies using other methods such as gray literature, specific journals, and hand-searches of reference lists.

Method

3) Data analysis

- The data analysis for this study was conducted using Comprehensive meta-analysis software (CMA).
- For effect size analysis, the number of subjects, means, and standard deviations for both the experimental and control groups were extracted from each literature.
- When the results were reported as median and interquartile range or minimal-maximal range, they were converted to mean and standard deviation for analysis.
- Additionally, studies by Ling-fung Yeung(2021) and Jayaraman(2019) which reported outcomes as changes, utilized change scores and standard deviations to calculate effect sizes.

Method

2) Criteria for inclusion and exclusion

The inclusion criteria for the current study are as follows:

- Randomized Controlled Trials (RCTs)
- Participants meeting clinical diagnosis criteria for stroke or diagnosed with stroke by MRI or CT, without comorbidities such as severe cognitive impairment, heart failure, or exercise contraindications
- No restrictions based on country, age, gender, or treatment duration
- Intervention using robot-assisted gait training, either alone or combined with other treatments, while control groups underwent conventional gait training, including physical therapy or other common rehabilitation approaches
- Outcome measures including assessments of gait outcomes, balance, and motor function obtained through any measurement scale
- Studies published exclusively in English

Result
1) Study selection
Identification of studies via databases and registers
Identification of studies via other methods
Identification
Screening
Eligibility
Included

Method
4) Risk of bias
To assess the quality of the selected studies, the PEDro scale
The PEDro scale comprises 11 items, with scores determined by whether the included studies meet these items.
The overall score
(1) high quality (score of 6–10)
(2) fair quality (score of 4–5)
(3) poor quality (score ≤ 3).

Result
2) Risk of bias
Average PEDro score of 6.21
Subject and therapist blinding were associated with an overall high risk of bias
5 articles reported attrition rates of over 15%. 8 articles used intention-to-treat analysis.
no articles rated as poor quality(score ≤3)
6 articles fair quality(score of 4–5)
13 articles high quality(score of 6–10).

Method
5) Synthesis methods
Review Manager v5.4 - forest plots to aid visual interpretation of heterogeneity and significance
Effect size of the results - standardized mean difference(SMD) or Cohen's d, Hedge's g
Small effect size for 0.3 or below
Moderate effect size for around 0.5
Large effect size for 0.8 or above and very large effect size for 1.3 or above
The degree of heterogeneity
low (≤40%)
moderate (30%–60%)
substantial (50%–90%)
considerable (75%–100%)

Result

3) Effect size analysis results - Gait endurance

- 12 studies involving 499 participants, 6-minute walking test(6MWT)
- The homogeneity test – low levels of heterogeneity(Chi2=3.74, P-value = 0.98, I2 = 0%)
- Random-effects model,
- In the meta-analysis : very small effect size 0.11(95% CI = −0.07, 0.28)
- Publication bias, Egger's regression test (P-value = 0.003, 95% CI = 0.68, 2.63)

	N	Studies trimmed	P-value	I^2	Point estimate	95% CI Lower limit	95% CI Upper Limit	Standard error	Q-value
Gait endurance	12		0.23	0%	0.11	−0.07	0.28	0.43	3.87
Adjusted value		6			−0.009	−0.15	0.13		10.44

Result

3) Effect size analysis results - Gait speed

- 15 studies involving 459 participants, 10-meter walking test(10MWT) and gait analysis.
- The homogeneity test – low levels of heterogeneity(Chi2=9.74, P-value = 0.78, I2 = 0%)
- Random-effects model,
- In the meta-analysis : a small effect size 0.26(95% CI = 0.07, 0.45) (P<0.05)

	N	P-value	I^2	Point estimate	95% CI Lower limit	95% CI Upper Limit	Standard error	Q-value
10MWT	10	0.02	0%	0.28	0.05	0.21	1.72	6.14
Gait analysis	5	0.16	0%	0.22	−0.09	0.53	3.28	4.16
Total	15	0.006	0%	0.26	0.08	0.44	1.51	10.39

Result

3) Effect size analysis results - Gait ability

- 13 studies involving 432 participants, Functional ambulation category(FAC)
- The homogeneity test – low levels of heterogeneity(Chi2=12.27, P-value = 0.42, I2 = 2%)
- Random-effects model,
- In the meta-analysis : small effect size 0.18(95% CI = −0.01, 0.37)
- Publication bias, Egger's regression test (P-value = 0.588, 95% CI = −2.82, 4.73)

	N	Studies trimmed	P-value	I^2	Point estimate	95% CI Lower limit	95% CI Upper Limit	Standard error	Q-value
Gait ability	13		0.07	2%	0.18	−0.01	0.37	1.71	13.03
Adjusted value		1			0.14	−0.05	0.34		15.65

Result

3) Effect size analysis results - Gait speed(subgroup analysis)

- Region : Asian regions (effect size 0.26)*, non-Asian regions(effect size 0.28)
- phase of stroke : no studies on acute stroke, subacute phases(g=0.25), chronic phases(g=0.28)
- length of training session : ≤30min/session (g=0.18), >30 minutes(g=0.37)*
- frequency and duration of training
- ≤3times/week(g=0.38)*, > 3times/week(g=0.12)

Category	Subgroups	No. of Trials	Sample Size	SMD(d)	95% CI	Heterogeneity I^2 Value of Chi-Square Test(I²)	Overall Effect Z Value (P-Value)
Region	Asian	11	313	0.26	0.03, 0.48	0.00(0%)	2.27(0.02*)
	Non-Asian	4	140	0.28	−0.13, 0.68	4.25(29%)	1.34(0.18)
Phase of stroke	Acute	0					
	Subacute	7	197	0.25	−0.04, 0.53	1.24(0%)	1.70(0.09)
	Chronic	8	302	0.28	0.01, 0.55	8.50(18%)	2.05(0.05)
Length of training session	≤30min/session	8	355	0.18	−0.07, 0.43	2.37(0%)	1.44(0.15)
	>30min/session	6	256	0.37	0.05, 0.70	6.00(23%)	2.27(0.02*)
Frequency of training	≤3times/week	9	354	0.38	0.12, 0.63	6.62(0%)	2.93(0.003*)
	>3times/week	4	205	0.12	−0.15, 0.40	1.39(0%)	0.88(0.38)
Duration of training	≤4weeks	10	288	0.25	0.02, 0.48	5.45(0%)	2.09(0.04*)
	>4weeks	5	171	0.28	−0.03, 0.60	4.28(6%)	1.75(0.08)

Result

3) Effect size analysis results - Balance

- 8 studies involving 274 participants, Berg Balance scale(BBS)
- The homogeneity test – low levels of heterogeneity(Chi2=9.69, P-value = 0.35, I2 = 28%), Random-effects model
- In the meta-analysis : small effect size 0.00(95% CI = -0.23, 0.32)
- 7 studies involving 172 participants, Timed Up and Go test(TUG)
- The homogeneity test – low levels of heterogeneity(Chi2=5.97, P-value = 0.43, I2 = 0%), Random-effects model

	N	X^2	I²	Point estimate	95% CI Lower limit	Upper Limit	Z	P-value
Berg balance scale	8	0.25	28%	0.05	-0.23	0.32	0.34	0.74
Timed up and go test	7	0.43	0%	-0.15	-0.42	0.15	0.96	0.34

Discussion

- 19 randomized controlled trials involving 796 stroke patients conducted in 8 countries
- The meta-analysis results showed a significant improvement in gait speed with overground robot exoskeleton gait training, with a small effect size. no significant differences were observed in gait endurance, gait ability, balance, or motor function.

▸ **Overground robot exoskeleton gait training is relatively more effective for gait speed in stroke patients.**

Result

3) Effect size analysis results - Motor function

- 9 studies involving 366 participants, Fugl-Meyer Assessment – Lower Extremity(FMA-LE)
- The homogeneity test – low levels of heterogeneity(Chi2=11.04, P-value = 0.20, I2 = 28%)
- Random-effects model.

	N	X^2	I²	Point estimate	95% CI Lower limit	Upper Limit	Z	P-value
Fugl-meyer Assessment - Lower Extremity	9	0.20	28%	0.21	-0.05	0.47	1.56	0.12

Discussion

- An advantage of rehabilitation robots for gait is their ability to reduce the involvement of therapists in training patients to perform repetitive movements, allowing for control over the quantity and intensity of therapy, enabling safe implementation of gait rehabilitation therapy(Pak et al., 2018).
- Recent exoskeleton control systems have become capable of fine adjustments, allowing for the setting of various degrees of freedom exercises tailored to the assist-as-needed approach(Najafi et al., 2018). This enables intensive and repetitive training of lower limb movements closer to natural human motion(Lorentzi et al., 2021).

Conclusion

- This study aimed to investigate the impact of overground robot exoskeleton gait training on the gait outcomes, balance, and motor function of stroke patients by analyzing randomized controlled trials (RCTs) through meta-analysis.
- The results of the analysis showed that overground robot exoskeleton gait training exhibited some effects in improving the gait outcomes of stroke patients compared to conventional gait training. However, it was not effective in improving balance and motor function.
- While overground robot exoskeleton gait training offers advantages such as safely providing normal gait patterns after stroke onset and reducing gait asymmetry.
- Overall, the results of this study suggest that overground robot exoskeleton gait training is effective in improving gait speed in stroke patients, particularly when sessions exceed 30 minutes, conducted three times or less per week, and last for four weeks or less. Therefore, with appropriate goal-setting and intensity, overground robot exoskeleton gait training is considered an effective intervention for stroke patients.

Discussion

- Exoskeleton's capabilities, stroke patients were able to adjust the illusionary muscle activation aiding in the effective restoration of gait patterns(Nolan et al., 2020).
- This adjustment led to improvements in gait patterns, with the symmetry ratio of gait being adjusted, which is seen as a sensitive measure of recovery(Wonsetler & Bowden, 2017).
- Jang (2023) reported that using a wearable robot with adjustable training intensity for gait assistance could positively impact the gait ability of stroke patients. By allowing patients to adjust training intensity, the device provided a sensation of walking independently rather than relying on the device, potentially enhancing the sense of independence during walking.
- Such training can enable individuals to achieve gait patterns that enhance their gait speed and ability (Najafi et al., 2018).

Thank you

Q & A

Discussion

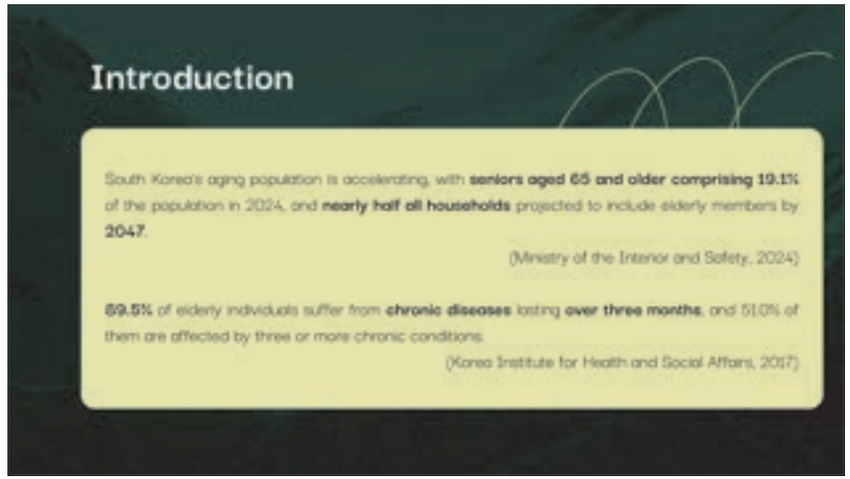
Limitation

- A limitation of this study is the difficulty in generalizing the results due to the inclusion of an insufficient number of studies. Furthermore, despite systematic searches of electronic databases, reporting bias may exist, and subjective judgment in evaluating the data could introduce observer bias.
- There is a need to expand research on gait speed in acute stroke patients. Additionally, as the outcomes of long-term training are not clear, it is deemed necessary to investigate the effects of long-term overground robot exoskeleton gait training.
- Further investigation, through multicenter studies targeting a relatively larger number of participants, is needed to explore the factors influencing gait endurance after overground robot exoskeleton gait training.
- Finding solutions to these limitations through further research could provide stronger evidence regarding the effectiveness of overground robot exoskeleton gait training for stroke patients.

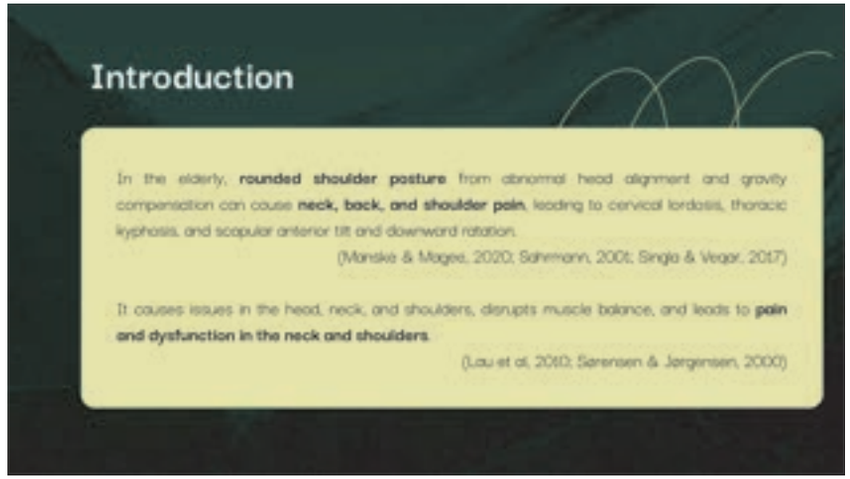
물리치료 연구발표
일반부문 3

Effects of Action Observation Complex Training on Mirror Neuron Activity and Shouler Function in Older Adults with Round Shoulders

/ 박근홍


Introduction
South Korea's aging population is accelerating, with **seniors aged 65 and older comprising 19.1%** of the population in 2024, and **nearly half all households** projected to include elderly members by **2047**.
(Ministry of the Interior and Safety, 2024)
89.5% of elderly individuals suffer from **chronic diseases** lasting **over three months**, and 51.0% of them are affected by three or more chronic conditions.
(Korea Institute for Health and Social Affairs, 2017)


Effects of action observation complex training on mirror neuron activity and shouler function in older adults with round shoulders
Park, Geun-hong
Introduction
Method
Result
Conclusion


Introduction
In the elderly, **rounded shoulder posture** from abnormal head alignment and gravity compensation can cause **neck, back, and shoulder pain**, leading to cervical lordosis, thoracic kyphosis, and scapular anterior tilt and downward rotation.
(Manske & Magee, 2020; Sahrmann, 2001; Singla & Veqar, 2017)
It causes issues in the head, neck, and shoulders, disrupts muscle balance, and leads to **pain and dysfunction in the neck and shoulders**.
(Lau et al, 2010; Sørensen & Jørgensen, 2000)


Introduction

Introduction

The **mirror neuron system** is **activated when an observer watches and mimics another's actions**, playing a crucial role in acquiring new motor skills.

(buccino et al, 2004)

Brain imaging studies on **action observation training** reveal that **similar brain areas are activated** as during actual movement, with an **increase in motor-evoked potentials** in the muscles involved in the movement.

(Filimon et al, 2007; Muthukumaraswamy & Johnson, 2004; Ulloa & Pineda, 2007)

Introduction

Achieving shoulder stability requires balanced surrounding **muscles and proper activation sequences**. Effective scapular movement control depends on the correct activation of the rotator cuff muscles in the appropriate order.

(Hudson & Ryan, 2010)

Shoulder stabilization exercises are are essential for correcting the abnormal **scapulohumeral rhythm** caused by rounded shoulder posture, highlighting the **importance of stabilization programs** in restoring proper function.

(kendall et al, 2005)

Introduction

The **primary goal of motor learning** is to acquire skills directly or indirectly, **enabling the body to move efficiently** and **perform functional activities accurately** in real-life situations.

Despite recognizing improper posture and aging as key causes of **musculoskeletal disorders** in the elderly, research on using **action observation training for prevention and management remains limited**.

Introduction

Shoulder stabilization exercises are essential for effectively **addressing shoulder instability** and managing pain.

(Littlewood et al, 2012)

Despite essential rograams like shoulder stabilization exercises, many elderly patients experience re-hospitalization due to a lack of proper **follow-up care after hospital treatment**.

(Korea Institute for Health and Social Affairs, 2017)

Introduction
Hypothesis
• The action observation combined training group is expected to show significant differences in brain activity and shoulder function factors after the intervention compared to before.

Mothod

Method
Participants
The study included 57 participants, calculated using G-power 3.1.9.6, with a target of 52 participants and a 10% dropout rate.
Inclusion Criteria:
1. 65 years or older, actively participating in Park Golf games.
2. Able to communicate effectively and understand questionnaires.
3. Rounded shoulder with a height of 2.5cm or more from the acromion to the table in a supine position(Dahrmann, 2002).

Method
Research Procedure

Method

Assessment tools and methods

- **Brain activity (EEG)**
  - Electrode placement: F3, F4, C3, C4, P3, P4, O1, O2
  - Frequency values from **C3 and C4** were converted into **mu power ratios** to account for individual variability.
  - **60 seconds** of brainwave data were analyzed, excluding the **first and last 10 seconds** from and **80-second** video.

Method

shoulder complex exercise

Category	Exercises	Exercise description	
Warm-up exercise	5 minutes	Breathing exercise, stretching, and mobilization of the neck and shoulder	
Main exercise	Pulley rope exercise	① Sitting, elbows ② Extending the chest ③ Sitting, flex elbow ④ Lifting both arms	Unaffected Side
	Isometric exercise	① Abduction of the scapula ② Retraction of the scapula ③ Elevation of the scapula ④ Depression of the scapula	Unaffected Side
	Towel exercise	① Arm rotate Starting shoulder movement ② Roll side ③ Lifting, lying side ④ Extension, back to an adjacent pillow	Both for the Unaffected Side
Cool down exercise	5 minutes	Breathing exercise, stretching, and mobilization of the neck and shoulder	

Method

Assessment tools and methods

- **Range of motion (ROM)**
  - ROM was measured using a **bubble inclinometer**, assessing **flexion, abduction, external rotation, and internal rotation**.
  - The intra-tester test-retest reliability was r=.086, and the measurement reliability was r=.95(Pringle, 2003)

Method

Intervention Protocol

- **Experimental Group1:**
  Action observation (3 minutes) + Imitation of shoulder complex exercise (7 minutes) x 3 sets
- **Experimental Group2:**
  Landscape observation (3 minutes) + Shoulder complex exercise (7 minutes) x 3 sets
- **Control Group:**
  Self-directed shoulder complex exercises (7 minutes) + Rest (3 minutes) x 3 sets

Each intervention is performed 40 minutes per session, 3 times a week, for 6 weeks

Method

Assessment tools and methods

- **Shoulder muscle strength**
  - Isometric strength was measure using the **Commander Echo Muscle Tester**
  - Measurements included **flexion, abduction, external rotation, internal rotation**

Method

Assessment tools and methods

- **Muscle activity (EMG)**
  - Surface electromyography (EMG) was used to measure muscle activation
  - SCM, UT, PM, IS, LT, SA

Method

Assessment tools and methods

- **Muscle activity (EMG)**
  - **%MVC baseline** shoulder flexion at 90 degrees measured for 5 seconds.
  - **%MVC specific task**: holding a 500g dumbbell during shoulder flexion at 90 degrees, measured for 5 seconds
  - Data analysis the middle 3seconds were analyzed, excluding the first and last 1 second.

Method

Assessment tools and methods

- **Pain**
  - Pain was assessed using an **analog pressure algometer**, measuring the pressure pain threshold of the **upper trapezius muscle**

Method

Date analysis

- Date were analyzed using SPSS 26.0 for window.
- **Shapiro-Wilk tests** assessed normality.
- **Paired t-tests** compared within groups.
- **one-way ANOVA** compared between groups.
- **Bonferroni** tests were used for post-hoc analysis.
- The significance level was **α=.05**

Method

Assessment tools and methods

- **Posture evaluation**
  - Rounded shoulder posture (RSP) was assessed using **vernier callpers** (Biang, China).
  - in a **supine position**, the distance between the **posterior aspect of the acromion** and the table surface was measured.

Result

Method

Assessment tools and methods

- **Shoulder pain and disability index (SPADI)**
  - The SAPDI consists of **13 items** divided in to **two subscales**: pain scale: 5 items, disability scale: 8 items.
  - Scores are categorized as 0 points for no pain or disability, 1-33 points for mild, 34-66 points for moderate, and 67-100 points for severe(Oh et al., 2013)
  - Reliability: test-retest ICC=.65, Cronbach's alpha=.95(MacDermid et al., 2006)

Result
General characteristics of participants

Result
Comparison of mirror neuron activity

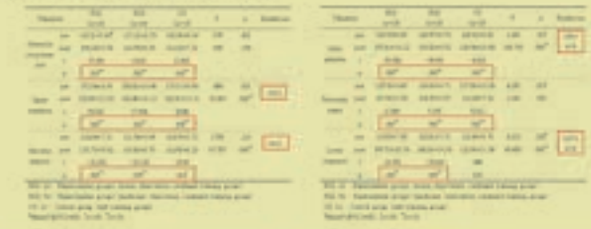
Result
Comparison of shoulder range of motion

Result
Comparison of shoulder muscle strength

Conclusion

Result

Comparison of shoulder muscle activation



Conclusion

- This study investigated the effects of 6-week action observation combined training on mirror neuron activity and shoulder function in elderly individuals with rounded shoulders, providing foundational data for developing effective physical therapy programs to enhance their musculoskeletal health

Result

Comparison of PPT, RSP and SPADI

Conclusion

- In this study, **Experimental Group 1** showed significantly greater improvements than Experimental Group 2 and the control group in **mirror neuron activity (CS), joint range of motion, muscle strength, muscle activation (UT, SA, IS, LT), pressure pain threshold, rounded shoulder posture, and shoulder function levels**
- **Need for further research**
  They findings highlight the need for additional research on **functional exercise therapy programs** that can promote **functional improvements** for **elderly individuals with rounded shoulder posture** in community settings.

Conclusion

- **Mirror neurons** are activated when the interlocutor behind another animal's specific action or task is understood through observation. They are associated with various behaviors such as **imitation, learning new skills, and understanding intentions**
  (Giacomo Rizzolatti & Caroghero, 2004; Rizzolatti, Fogassi & Gallese, 2006)
- **Shoulder stabilization exercises** restore **joint alignment and movement patterns** by activating the muscles around the scapula, correcting **muscle imbalances, reducing pain, and improving range of motion and strength.**
  (Oasis et al., 2007)

Thank you for your attention

초록

목 통증의 역동적인 주기: 대한민국 국민건강보험공단 데이터를 분석한 17년간의 인구 기반 연구

구미란 · 전덕훈[1†]

경성대학교 물리치료학과, [1]대구대학교 물리치료과

Dynamic Cycle of Neck Pain: A Seventeen-Year, Population-Based Study Analyzing the National Health Insurance Service Data in South Korea

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[1]Department of Physical Therapy, Daegu University

〈Abstract〉

Purpose : The aims of this study were to introduce a profile of a nationwide cohort for patients with neck pain and to enhance the understanding of dynamic cycle of neck pain and its recurrence over time.

Methods : Health insurance data for 1,127,323 patients (43.5±11.5 years, 60.8% females) with neck pain in 2010 were extracted from the National Health Information Database of South Korea. Data for the duration and frequency of neck pain and the number of healthcare visits recorded between 2002 and 2018 were screened and used for descriptive analysis.

Results : During the study period, patients experienced 4.1±4.2 episodes of neck pain, with 74.6% of patients having multiple episodes. The duration of one episode was 12.1±35.7 days. In each episode, more than 73% of patients experienced a new, subsequent episode of neck pain. As the number of episodes progressed, the subsequent episode occurred in a shorter time and lasted longer with a higher number of healthcare visits, compared to a preceding episode.

Conclusion : Neck pain is recurrent for approximately three-quarters of patients. Once neck pain becomes recurrent, the burden of neck pain increases over time. Early intensive management with a long-term period is recommended to prevent a recurrent cycle of neck pain.

Key Words : Neck pain, recurrence, big data, hospital record, pain clinics, longitudinal study.

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장딴지근 단축이 있는 대상자에게 적용한 신장운동과 안뜰자극운동이 동적 균형에 미치는 영향

권가은 · 김동한 · 김인주 · 방지현 · 송민진 · 이수경 · 이종혁 · 임하연 · 천사랑 · 손호희†

부산가톨릭대학교 물리치료학과

Effects of Gastrocnemius Stretching Exercise and Vestibular Stimulation Exercise on Dynamic Balance Ability of Subjects with Shortened Gastrocnemius

Ga-Eun Kwon, Dong-Han Kim, In-Ju Kim, Ji-Hyun Bang, Min-Jin Song,
Su-Gyeong Lee, Jong-Hyeok Lee, Ha-Yeon Lim, Sa-Rang Cheon, Ho-Hee Son, PT, PhD

Department of Physical Therapy, Catholic University of pusan

〈Abstract〉

Purpose : The background of this study is to investigate how the balance ability is affected through stretching and vestibular stimulation exercise in those with shortening of the gastrocnemius.

Methods : 20 subjects with shortened gastrocnemius were divided into two groups: a gastrocnemius stretching exercise (Group 1, n=10) and a vestibular stimulation exercise (Group 2, n=10). The Group 1 performed stretching exercise and the Group 2 performed vestibular stimulation exercise by referring Cawthorne-Cooksey. Both exercises were conducted for 15 minutes during each training session, 2 training sessions per week, for 4 weeks. Subjects were evaluated pre and post intervention for Y balance test, limits of stability and range of motion of ankle dorsiflexion.

Results : The results of this study showed the Y balance test, limits of stability and range of motion was improved in both groups ($p < .05$). And there was no significant difference between the two groups. ($p > .05$).

Conclusion : As a result, the vestibular stimulation exercise can also be another way to improve dynamic balance ability which has same effect as the gastrocnemius stretch.

Key Words : Balance; Gastrocnemius; Stretching exercise; Vestibular stimulation exercise

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타이핑 작업 시 아래팔 지지 정도가 손목과 어깨의 근 활성도에 미치는 영향

박시찬 · 강승묵 · 이찬영 · 홍진명 · 김지호 · 박인서 · 최인서 · 김동건 · 김지은 · 이나영 · 민서영 · 유한결 · 정주형 · 권혁규†

을지대학교 물리치료학과

Effect of muscle activation of wrist and shoulder muscles according to the forearm support during the typing

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〈Abstract〉

Purpose : The purpose of this study was to investigate the muscle activities of five muscles according to the forearm supporting positions during typing the keyboard using surface electromyography (sEMG).

Methods : A total of 28 participants, including 14 females and 14 males in their twenties, were recruited. The study was conducted with three types of supporting conditions: 1) wrist supported, 2) the half forearm supported and 3) full forearm support. Each participant was asked to type with a keyboard under three different supporting conditions. Before beginning the first condition, Reference Voluntary Contraction was measured for the upper trapezius, anterior deltoid, middle deltoid, posterior deltoid, and wrist extensor muscles using sEMG before starting the task. Muscle activity was measured for three minutes in three sets for each condition, using sEMG. In order to ensure the statistical significance of the results, we used SPSS 29.0 for Windows, and the significance level was .05.

Results : Regarding the upper trapezius, the muscle activity of full forearm support was significantly lower than that of the wrist support and the half forearm support ($p < .05$). In the case of the middle deltoid, the muscle activity of full forearm support was significantly lower than that of the wrist support ($p < .05$). In the case of the posterior deltoid, the muscle activity of the hgalf forearm support was significantly lower than that of the forearm full support ($p < .05$). Finally, in the case of the extensor carpi radialis, the muscle activity of the half forearm support was significantly lower than that of the wrist support and the forearm full support ($p < .05$).

Conclusion : Our results showed that, except for the posterior deltoid muscle, typing with wrist support had significantly higher muscle activity than typing with forearm supporting position (1/2, full support). This suggests that typing with wrist support without forearm support for long periods of time may affect muscle fatigue due to increased muscle activity. Therefore, it is expected that muscle fatigue can be reduced by supporting the forearm during typing.

Key Words : Typing posture, Shoulder and wrist muscles, Electromyography, VDT syndromes

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반려견주와 반려묘주의 신체활동 차이에 대한 분석

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Differences in physical activity between dog and cat owners

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〈Abstract〉

Purpose : Companion animals, such as dogs and cats, play a significant role in human lives by providing physical health and emotional stability. Previous studies have explored the effects of companion animal ownership on physical health, but there is limited research comparing the impact of different types of companion animals on physical activity. Therefore, this study aims to explore the relationship between the type of companion animal－dogs or cats－and their owners' physical activity levels, focusing on whether dog or cat ownership results in significant differences in exercise habits and overall health.

Methods : This study used data from the 2021-2022 Home Indoor Air Quality Survey conducted on a specific group of participants from the Korea National Health and Nutrition Examination Survey (KNHANES). A total of 156 participants, aged 20 and older, who owned either a dog or a cat, were selected for analysis. Participants' sociodemographic, health-related, and lifestyle characteristics were analyzed using chi-square and t-tests. Complex logistic regression was employed to assess the relationship between pet type and physical activity, including aerobic and strength exercises.

Results : The results indicated that dog owners engage in significantly more physical activity than cat owners. Specifically, the total weekly walking time (TWT) of dog owners was 333.87 minutes compared to 232.35 minutes for cat owners. The proportion of dog owners practicing walking exercises for more than 150 minutes per week was also higher (74.5%) than cat owners (53.6%). Logistic regression analysis showed that dog owners had a significantly higher likelihood of performing aerobic exercises compared to cat owners, even after adjusting for sociodemographic and health-related factors (OR 2.933, 95% CI 1.138 – 7.557).

Conclusion : This study demonstrates that dog ownership is associated with higher levels of physical activity, particularly aerobic exercise, compared to cat ownership. These findings suggest that regular outdoor activities, such as walking with a dog, contribute positively to the physical health of dog owners. Future health promotion strategies could consider the role of companion animals in encouraging physical activity and improving overall health outcomes.

Key Words : Physical activity; companion animals; ownership; dog; cat

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고강도 유산소 훈련을 적용한 과제 지향적 트레드밀 훈련이 만성 뇌졸중 환자의 보행 능력에 미치는 영향

김규령 · 김명권[1†]

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Effects of task-oriented treadmill training applied high-intensity training on walking ability in patients with chronic stroke

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〈Abstract〉

Purpose : This study aimed to determine the effect of task-oriented treadmill training with high-intensity interval training compared to high-intensity interval treadmill training on the walking ability of patients with chronic stroke.

Methods : Data from 34 chronic stroke patients were randomly assigned to experimental (17) and control (17) groups and complete the study were analyzed. The experimental group underwent task-oriented treadmill training with high-intensity interval training, and the control group received high-intensity interval treadmill training for 30 minutes per session, three times a week, over a period of 4 weeks. Statistical significance was confirmed through a two-factor repeated measures analysis of variance.

Results : There was an interaction effect between time and group for 10MWT, FGA, 6MWT, and TUG ($p < .05$). As a result of the post-hoc test, 10MWT, FGA, and 6MWT showed a significant increase in the EG compared to the CG ($p < .025$), and in the intra-group comparison, both EG and the CG showed a significant increase over time ($p < .017$). The TUG showed no significant difference in comparison between groups ($p > .025$), and in comparison within groups, both EG and CG showed a significant decrease over time ($p < .017$).

Conclusion : Clinically, despite being a chronic stroke patient, repetitive and meaningful task training combined with high-intensity training is thought to be helpful in improving walking ability and returning to the community.

Key Words : Stroke, High-intensity training, Task-oriented training, Walking

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특수학교 정규 교과시간에 시행되는 로봇 보조 보행 훈련이 이분척추 및 수두증 학생의 보행 능력에 미치는 영향: 사례연구

김예지 · 김명권[1†]

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Effects of Robot Assisted Gait Training on Walking Ability in Pediatric Sacral Spina Bifida with Hydrocephalus Student: A Case Report

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[1]Department of Physical Therapy, College of Rehabilitation Sciences, Daegu University

〈Abstract〉

Purpose : This study aims to determine the changes in walking ability when robot-assisted gait training is implemented during regular school hours in a subject school for pediatric sacral spina bifida with hydrocephalus who are unable to walk independently due to flaccid paralysis of the lower extremities.

Methods : The study design was an A-B design, with a baseline (A) collection of walking on a flat surface while wearing the robot in weeks 1-3 of the experiment, and an intervention (B) period of twice-weekly robot-assisted gait training in weeks 4-6. The gait training was performed in a school hallway and used step count, step length, and cadence data automatically collected by the robot for gait training.

Results : Data collected while the subject walked as many miles as possible showed an increase in step count from 114 to 587 steps and cadence from 35 to 48 spm.

Conclusion : The results of this study suggest that robot-assisted gait training for subjects who are unable to walk independently may be clinically useful and support the need for physiotherapy to be implemented during the regular school day in special schools.

Key Words : robot assisted gait training, sacral spina bifida with hydrocephalus, special school

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착용형 외골격 로봇을 이용한 보행 훈련이 뇌졸중 환자의 균형 및 일상생활 활동에 미치는 영향: 예비 사전-사후 연구

김진환 · 김유현 · 강석주 · 유상옥 · 송요한[1†]

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Effects of Overground Gait Training with Exoskeletal Wearable Robot on Balance and ADL in Stroke Patients: A Preliminary Pretest-Posttest Study

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〈Abstract〉

Purpose : This study aimed to evaluate the effects of a 4-week exoskeletal wearable robot-assisted overground gait training program on balance and Activities of Daily Living (ADL) in stroke patients.

Methods : The subjects of this study were eight subacute stroke patients (mean age: 69.38 ± 7.8 years; time since stroke onset: 3.75 ± 2.05 months) who underwent overground gait training with the Angel Legs exoskeletal wearable robot for 30 minutes per session, five days a week, over four weeks. Balance and ADL performance were assessed pre- and post-intervention using the Berg Balance Scale (BBS) and Modified Barthel Index (MBI). Data were analyzed using the Wilcoxon Signed-Rank Test with a significance level set at $p < .05$.

Results : The results of this study showed significant improvements in BBS scores (pre: 21 ± 10.66, post: 33.25 ± 9.82, $Z = -2.207$, $p = .027$), indicating enhanced balance and ambulation. While MBI scores demonstrated significant gains in ambulation, improvements in other ADL areas did not reach statistical significance.

Conclusion : As a result of this study, the 4-week exoskeletal wearable robot-assisted gait training program improved balance and ambulation in subacute stroke patients. These findings support the use of exoskeletal wearable robots in stroke rehabilitation; however, larger studies are recommended to confirm and expand upon these results.

Key Words : Activities of Daily Living (ADL), Balance, Exoskeletal Wearable Robot, Gait Training, Stroke

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무릎 관절 치환술 후 환자의 신체 기능 향상을 위한 노르딕 보행 훈련과 트레드밀 훈련의 비교: 무작위 대조군 연구

김태우† · 차용준

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Comparison of Nordic Walking Training and Treadmill Training for Improving Physical Function of Patients after Knee Arthroplasty: A Randomized Controlled Trial

Tae-woo Kim, PT, Yong-Jun Cha, PT, PhD

Dept. of Physical Therapy, College of Health and Medical Science, Daejeon University

〈Abstract〉

Purpose : This study was performed to investigate whether Nordic walking training or treadmill training is more effective in knee arthritis patients after arthroplasty.

Methods : A total of 38 patients with knee arthroplasty were randomly assigned to the experimental and control groups. All participants (n = 38) received 60-minute sessions of general physical therapy, 5 times a week for a period of 4 weeks. Additionally, the experimental and control groups underwent Nordic and general treadmill walking training, respectively, for 30 minutes five times a week for four weeks. Stride length, stride time, stance time, swing time, knee flexion degree, timed up and go test time, and pain score were measured before and after the 12-week training.

Results : Both groups showed a significant decrease in the center of pressure path length and velocity after the intervention compared to the values before the intervention ($p < .05$). However, there was no significant difference in the center of pressure path length and velocity changes after training between the two groups ($p > .05$). In the walking variables, the step length difference changes after training between the two groups showed a significant difference ($p < .05$). However, compared to the control group, the experimental group showed greater changes in spatiotemporal parameters, knee flexion angle, and pain scale.

Conclusion : In knee arthritis patients after arthroplasty, Nordic walking training can be effective for improving physical function than treadmill walking training.

Key Words : Arthritis, knee, gait, training

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선행적 자세 조절 활성화 운동이 뇌졸중 환자의 균형과 보행 능력에 미치는 영향

김혜영†

안동과학대학교 물리치료학과

The Effect of Anticipatory Postural Adjustment Activation Exercise on Balance and Gait in Stroke

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〈Abstract〉

Purpose : Balance ability is a very important factor in activities of daily living. The purpose of this study was to identify the effects of APA(Anticipatory Postural Adjustment) activation exercise on the balance and gait in stroke patients.

Methods : This case study was conducted for 9 weeks as a case study in which one stroke patient volunteered. The patient performed APA activation exercises. Assessment instruments included the Manual muscle testing, Berg Balance Scale(BBS), Sitting&Standing Balance, Functional Ambulation Category(FAC). Evaluation was performed before and after the 9-week training period. Exercises were performed Bridging, Dead bug, Balance training with disc and flexi-bar, Weight shifting training with mirror, and Gait training.

Results : Patients showed improvements in muscle strength and changes BBS, Dynamic Balance, and FAC when comparing pre- and post-exercise. MMT showed improvement in the strength of the right upper extremity, and in particular, the strength of the lower extremities increased in both left and right. The BBS score improved to 35 points and the Dynamic Balance improved to F. The FAC grade improved to 4 points.

Conclusion : This study applied APA activation exercise that provides visual and predictable stimuli to induce early activation of the APA System in the trunk and leg muscles to treat the problem of impaired balance in stroke patients. The results confirmed that patients with stroke showed improved balance and gait ability compared to before exercise.

Key Words : Anticipatory Postural Adjustment(APA), Balance, Gait, Stroke

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만성 발목 불안정성을 가진 성인에게 발목 안정화 운동 동안 중간볼기근 강화 운동 적용이 발목 기능과 균형에 미치는 영향

류진석 · 남민주[1] · 김명권[2†]

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The Effects of Application of Gluteus-Medius Strengthening exercises during Ankle Stabilization exercises on Ankle Function and Balance in Adults with Chronic Ankle Instability

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〈Abstract〉

Purpose : The purpose of this study is to investigate the effects of application of gluteus-medius strengthening exercises during ankle stabilization exercises on ankle function, dynamic and static balance in adults with chronic ankle instability.

Methods : The study included 30 adults with chronic ankle instability living in Daegu province who were randomly divided into an experimental group performing the gluteus medius exercise during ankle stability exercise and a control group performing the ankle stability exercise only (n=15 each). Before the test, the Cumberland Ankle Instability Tool was used to identify chronic ankle instability, the Y-balance and hop (square, figure of eight, and side) tests were used to assess dynamic stability, and the Balance Error Scoring System was used to examine static stability. SPSS Statistics version 27 (IBM) was used to analyze the data.

Results : Both groups showed statistically significant differences in the Cuberland Ankle Instability Tool, Y-Balance test, hop test. There was a meaningful difference between the groups.

Conclusion : According to the results, it is considered an effective intervention to incorporate gluteus-medius strengthening exercises along with ankle stabilization exercises in the rehabilitation program for improving balance and ankle function in adults with chronic instability.

Key Words : Ankle instability, Gluteus-Medius, Balance

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물리치료학과 학생들의 스트레스 정도와 건강 상태

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Stress Level and Health Status of Physical Therapy Students

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〈Abstract〉

Purpose : This study aimed to investigate the stress levels and health status of college students.

Methods : The subjects were 110 college students majoring in physical therapy. A structured questionnaire was used to collect data on stress levels and overall health status through Google Forms. Both stress levels and health status were assessed using a 5-point Likert scale. Stress levels were divided into two factors: psychological and emotional stress, and interpersonal stress; reliability was confirmed for both factors.

Results : The sample consisted of 110 students, including 54 male students with an average age of 22.56±2.21 years and 56 female students with an average age of 21.65±1.71 years. Psychological and emotional stress scored 3.18±.57, and interpersonal stress scored 3.51±.53, indicating levels between “sometimes felt” and “never felt.” Male students reported higher levels of psychological and emotional stress compared to female students ($p < .05$), while there was no significant difference in interpersonal stress between genders. No differences in stress levels were found based on academic grade. Health status averaged 3.60±.91, reflecting a condition between “healthy” and “just okay,” with no differences observed by gender or grade. A positive correlation was found between psychological and emotional stress levels ($r = .392$, $p < .01$) and interpersonal stress and health status ($r = .275$, $p < .01$), indicating that lower stress levels were associated with better health status.

Conclusion : The students’ stress levels were not high; however, it is essential to manage stress to promote overall health.

Key Words : Health status, Stress, University student

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1/2런지와 축 단축 그리고 사이드 플랭크 동작이 큰허리근 두께에 미치는 영향

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Effects of 1/2 lunge, axial shortening and side plank motion on psoas muscle thickness in subjects with and without psoas major stretch

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〈Abstract〉

Purpose : This study aimed to investigate the effects of a 1/2 lunge with visual feedback and axial shortening motion on changes in psoas muscle thickness.

Methods : This study followed 20 healthy adults(20 men; mean age, 22.1 years) using a repeated measures design. All participants performed three motions (axial shortening, 1/2 lunge using visual feedback) during muscle strengthening training. The psoas muscle thickness(rest, contraction) during the three motions was measured using an ultrasonography device. Based on the collected data, the muscle thickness ratio was calculated.

Results : Significant changes in the Psoas muscle thickness were observed for all three motions when the movement was performed ($P < .05$). Regardless of the presence or absence of psoas muscle lengthening, the 1/2 lunge using visual feedback motion showed the highest Thickness ratio value, and the 1/2 lunge using visual feedback showed significant differences among the three movements ($P < .05$).

Conclusion : The results of this study are significant as they confirm the effectiveness of the 1/2 lunge movement with visual feedback in selectively increasing the contraction of the psoas major muscle, regardless of the length of the iliopsoas muscle. This finding underscores the potential of the 1/2 lunge motion with visual feedback as an effective intervention for improving movement control dysfunction in the extension direction of the hip joint by limiting the uncontrolled movement of the adjacent joint.

Key Words : 1/2 Lunge with visual feedback, Axial shortening, Psoas muscle thickness, Ultrasonography

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Lee Silverman Voice Treatment-BIG이 뇌졸중 환자에 미치는 영향: 미니 리뷰

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Impact of Lee Silverman Voice Treatment-BIG on Stroke Patients: A Mini Review

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〈Abstract〉

Purpose : The Lee Silverman Voice Treatment was developed for Parkinson's patients and is divided into LOUD for speech and BIG for motor functions. In this study, we aimed to review the effectiveness of the Lee Silverman Voice Treatment-BIG (LSVT-BIG) on stroke patients who are not Parkinson's patients.

Methods : The search databases used were Google Scholar, PubMed, and Science Direct. Using the search keywords “Stroke,” “LSVT-BIG,” “Treatment or Rehabilitation,” and “Intervention” through May 2024, the final four articles were selected.

Results : In the four studies, LSVT-BIG showed the most significant improvement in upper extremity function and task performance. This was followed by improvements in performance of activities of daily living tasks and balance. On the other hand, while the LSVT-BIG program components of Daily Exercise, Functional component movements, and Hierarchy tasks were all implemented in all studies, the remaining components of BIG walking and Homework practice required more rigorous implementation.

Conclusion : Our results confirm the potential of LSVT-BIG as a novel intervention tool for stroke patients. Future studies will need to utilize different study designs and compensate for the small sample size to demonstrate the effectiveness of LB.

Key Words : Lee Silverman Voice Treatment-BIG, Stroke, Intervention, Rehabilitation, Review

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대학생들의 장시간 앉은 자세에서 무릎 각도가 시상면의 신체정렬에 미치는 영향

이준석 · 전재영 · 김정한 · 임지혁 · 이성열 · 송은서 · 유예찬 · 고하은 ·
최바다 · 문채희 · 김민지 · 이예영 · 선희창†
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Effect of knee angle on body alignment sagittal plane in prolonged sitting position of college students

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〈Abstract〉

Purpose : The purpose of this study was to invesigate the effect of knee angle on body alignment in the saggital plane in college students prolonged sitting positions.

Methods : The subject were instructed with 16 men and 14 women college students. The test was conducted in 3 different positions, and maintained for 30 minutes per positions looking forward as it is in an acutal class. The positions consist 90-degree, over 90-degree, below 90-degree of knee angle in sitiing position on Height adjustable chair without backrest. Body alignment of sagittal plane were measured before and after the test. Each were measured by Ex-body musculoksletal analysis.

Results : All three postures showed a significant increase in te lorodosis angel over time($p < .05$), and no significant difference between the three postures was shown. The thoracic tilted angel became significantly larger in the 90-defree posture($p > .05$). There were no significant differences betweens all three postures in the CVA.

Conclusion : According to the study, sitting at a knee angle of less than 90 degrees had the least effect on body alignment.

Key Words: Prolonged sitting position, Body alignment, Sagittal plane, Knee angel

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부드러운 안구 추적 운동이 정적 균형과 하지의 근 활성도에 미치는 영향

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The Effects of Smooth Pursuit Eye Movement on Static Balance and Lower Limb Muscle Activation

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〈Abstract〉

Purpose : This study was conducted to analyze the correlation between smooth ocular tracking exercises and static balance as well as lower limb muscle activity.

Methods : The experiment was conducted at D University from July 1 to July 31, 2024, with 33 participants who met the inclusion criteria: no visual or auditory impairments and no other neurological or musculoskeletal disorders. Each participant practiced smooth pursuit eye movement for 30 minutes. They observed and tracked an object moving horizontally up to 5 meters to the left and right. To assess participants' static balance, we measured limits of stability, center of pressure mean velocity, and COP mean distance. For muscle activity in the lower limbs, we measured the tibialis anterior, gastrocnemius, vastus medialis, and biceps femoris muscles. In order to assure the statistical significance of the results, we used for SPSS 20.0 for windows.

Results : Results showed significant differences in limits of stability, COP mean velocity, and COP mean distance at 0m vs. 5m and 3m vs. 5m during the smooth pursuit eye movement ($p<.05$). Regarding lower limb muscle activity, significant differences were observed in the tibialis anterior, gastrocnemius, vastus medialis, and biceps femoris at the ranges of 0m vs. 5m and 3m vs. 5m ($p<.05$).

Conclusion : This indicates that smooth pursuit eye movement could offer a new rehabilitation paradigm to aid balance and lower limb muscle activation in patients with neurological disorders such as stroke and Parkinson's disease, as well as elderly patients with reduced balance ability.

Key Words : Smooth Pursuit Eye Movement, Static Balance, Muscle activation, Vestibular system, eye tracker

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심장재활 애플리케이션 활용이 뇌졸중 환자의 호흡기능 균형, 지구력, 삶의 질에 미치는 영향

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The Effect of Using a Cardiac Rehabilitation Application on Respiratory Function, Balance, Endurance, and Quality of Life in Stroke Patients

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〈Abstract〉

Purpose : This study is designed with a clear focus: to evaluate the effects of a cardiac rehabilitation application on respiratory function, balance, endurance, and quality of life in stroke patients. Specifically, we aim to compare the effectiveness of an experimental group, which uses a cardiac rehabilitation application and device, with a control group that follows a modified cardiac rehabilitation program based on the MacKay(MacKay-Lyons et al., 2010) methodology.

Methods : Thirty-nine stroke patients were randomly assigned to an experimental group using a cardiac rehabilitation application with wearable devices or a control group, following a modified cardiovascular exercise program. Both groups exercised thrice weekly, 40 minutes per session, for 8 weeks. The experimental group's program included warm-up, aerobic and strength training (concurrent training), and cool-down exercises, with exercise intensity between 40-70% of the target heart rate. The control group received a printed, structured exercise program based on the MacKay-Lyons protocol, maintaining exercise intensity at 50-80% of maximum heart rate. Pre- and post-intervention assessments included maximum inspiratory pressure (MIP), inspiratory flow rate (IFR), inspiratory volume (IV), VO_2 max, 3-minute walk test (3MWT), dynamic and static balance, Fugl-Meyer Lower Extremity (FMA-LE), and quality of life (SS-QOL). Data analysis was conducted using SPSS 21.0, with significance set at $p < .05$.

Results : The experimental group demonstrated significant improvements in respiratory function, walking endurance, and quality of life (SS-QOL) compared to the control group ($p < .05$). Post-intervention assessments showed more significant gains in maximum inspiratory pressure (MIP), inspiratory flow rate (IFR), inspiratory volume (IV), and VO_2 max in the experimental group, highlighting the impressive effectiveness of the cardiac rehabilitation application. Additionally, both dynamic and static balance, as well as Fugl-Meyer Lower Extremity scores, improved significantly within the experimental group. The control group showed moderate improvements, but they were less pronounced than the experimental group.

Conclusion : The findings of this study hold promise for the future of stroke patient care. The use of a cardiac rehabilitation application has been shown to significantly enhance patient participation in the rehabilitation program, thereby improving rehabilitation engagement and exercise efficiency. This suggests that the cardiac rehabilitation program, with its potential to be a game-changer, could significantly improve motor function and cardiovascular health in stroke patients, inspiring a new approach to stroke rehabilitation.

Key Words : Cardiac Rehabilitation, Cardiovascular Health, Concurrent Training, Endurance, Stroke

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자기장 치료와 마사지가 등세모근 긴장 및 자세 불균형에 미치는 영향

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The Effect of Magnetic Field Therapy and Massage on the Tension of the Trapezius Muscle and Postural Imbalance

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〈Abstract〉

Purpose : This study evaluates the specific effects of magnetic field therapy on the muscle tension of the upper trapezius, the CVA, and the Scapular Index to explore their clinical applicability in improving spinal health.

Methods : This study involved 28 healthy adults, who were divided into two groups: the magnetic therapy group and the massage therapy group. The magnetic group received Pulsed Electromagnetic Field therapy, while the massage group received Graston massage. Each session lasted 20 minutes, applied twice a week for two weeks. Data were analyzed using SPSS for Windows (version 20.0), and a one-way repeated measures ANOVA was conducted, with Fisher's LSD (least significant difference) used for post-hoc analysis.

Results : The results of this study were as follows : 1) Both groups showed statistically significant improvements in craniovertebral angle and elasticity. 2) The magnetic group demonstrated a statistically significant improvement in elasticity compared to the massage group.

Conclusion : In conclusion, both the Massage and Magnetic groups effectively improved the craniovertebral angle and reduced fatigue in the trapezius muscle. However, the Magnetic group was more effective in enhancing the Scapular Index for round shoulder improvement and the craniovertebral angle indicating forward head posture.

Key Words : Posture, Magnetic therapy, Graston massage, Muscle tension, Scapular Index

Acknowledgement : This was supported by Korea National University of Transportation in 2024.

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푸쉬업 플러스 동작 시 다리들기와 지지면에 따른 어깨주위 근육의 근활성도에 미치는 영향

남시헌 · 김민아 · 정민 · 한승민 · 김수정 · 조희주 · 이선웅 · 최빛나 · 안소윤 · 이상용†

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The Effects of Push-Up Plus on Muscle Activity around Shoulder according to Legs lift and Supporting Surface

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〈Abstract〉

Purpose : The purpose of this study is to examine how leg raising and support surfaces during the push-up plus movement affect the muscle activation of the shoulder region.

Methods : This study was conducted with ten healthy men in their twenties. The participants performed a modified push-up plus exercise while maintaining a bent knee position. They placed their hands shoulder-width apart on the floor, ensured their arms were vertical to the ground with elbows fully extended, kept their feet together, and maintained a straight body line during the push-up plus. The participants also performed leg raising in the quadruped position, first raising the right leg and then the left. For the unstable support surface, they used an air cushion while performing the push-up plus. During the exercise in various postures and conditions, surface electromyography was used to measure the activity of the upper trapezius and serratus anterior muscles.

Results : The results showed that in the quadruped position, left leg raising, and right leg raising postures, the activity of the serratus anterior was significantly higher on the unstable support surface compared to the stable surface ($P < .05$). Additionally, on both stable and unstable surfaces, the serratus anterior exhibited significantly higher activity during the right leg raising posture compared to the quadruped and left leg raising postures ($P < .01$).

Conclusion : To increase stability in the right shoulder and selectively strengthen the serratus anterior, the right leg raising posture combined with the push-up plus on an unstable support surface is the most effective approach.

Key Words : Push-up puls, Serratus anterior, upper trapezius

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고령자의 손과 손목의 근기능 및 고유수용성감각 증진에 탄력 및 비탄력 테이핑이 미치는 효과

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The effects of elastic and non-elastic taping on muscle function and proprioception in the hand and wrist of eldery adults

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〈Abstract〉

Purpose : This study aimed to compare the effects of two different types of taping, elastic and non-elastic, on muscle function and proprioception in the wrists of elderly normal adults for the wrist stability. s

Methods : A total of 35 participants were recruited, and after excluding 2 dropouts, 32 participants were included in a single group. Evaluations were conducted for grip strength, muscle activation, hand performance, joint position sense, and force sense under three conditions: no tape, elastic tape, and non-elastic tape, and the results were compared and analyzed.

Results : The results showed that grip strength significantly increased with elastic taping compared to the no tape condition ($p<.05$), while there was no significant difference with non-elastic taping ($p>.05$), Muscle activation showed no significant differences between the interventions ($p>.05$). Hand performance demonstrated significant differences with both elastic and non-elastic taping compared to the no tape condition ($p<.05$).

Conclusion : In conclusion, the taping therapy applied to the wrist joint for stability enhances proprioceptive sensation with elastic taping, while non-elastic taping is thought to contribute more to the stability of the wrist. Given these benefits, taping is considered to be helpful as an adjunct for early rehabilitation and prevention of re-injury following wrist injuries.

Key Words : Elastic taping, Non-elastic taping, Hand muscle function, Proprioception

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노인의 근감소증과 뼈엉성증의 연관성

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The relationship between osteoporosis and sarcopenia in elderly Koreans

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〈Abstract〉

Purpose : Osteoporosis and sarcopenia are common musculoskeletal disorders in the elderly. The aim of this study was to analyze and determine the association between these two conditions. Data from the National Health and Nutrition Survey (2008-2011), a cross-sectional, nationally representative survey conducted by the Korea Centers for Disease Control and Prevention, were used.

Methods : This study used data from the 2008-2011 Korea National Health and Nutrition Examination Survey (KHANES) conducted by the Korea Centers for Disease Control and Prevention. The participants were selected from adults aged 65 and older who underwent Dual-Energy X-ray Absorptiometry (DEXA) and responded to both the health examination and health survey variables used in this study. Of the 37,753 participants in the survey, 31,383 individuals under the age of 65, 2,682 individuals who did not have measurements for sarcopenia and bone mineral density (BMD), and 87 individuals who did not participate in the health survey were excluded. As a result, a total of 3,601 participants were included in the final analysis.

Results : The main finding of this study is that sarcopenia and osteoporosis are independently associated, even after adjusting for various confounding variables (covariates) such as age, smoking and drinking status, and physical activity. Additionally, the prevalence of sarcopenia among the elderly in this study was found to be 39.1%, while the prevalence of osteoporosis was 34.6%. After adjusting for various factors such as health status, lifestyle, and sociodemographic variables, the odds ratio for the relationship between sarcopenia and osteoporosis was found to be 1.300 (95% CI: 1.055 - 1.601).

Conclusion : To improve outcomes such as reducing falls, fractures, and frailty in these patients, rehabilitation interventions and therapeutic management are needed, including physical activity－particularly strength training－and the proper intake of nutrients like vitamin D. This study highlights the need for ongoing and systematic rehabilitation programs to treat patients with these conditions.

Key Words : Osteoporosis; Sarcopenia; Musculoskeleteal disease; Elderly

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모바일 앱을 이용한 점프높이 측정의 타당도 및 신뢰도

박정현 · 강희관 · 이주영 · 이후록 · 조성현 · 이명모†

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Reliability and validity of jump height measurement using mobile applications

Jung-hyun Park, Hui-gwan Kang, Ju-young Lee, Hoo-rok Lee, Sung-hyun Jo, Myung-mo Lee

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〈Abstract〉

Purpose : This study aimed to evaluate the concurrent validity and reliability of jump height measurements using the G-Walk device and a mobile application, “What’s my vertical?” for use in clinical and practical settings

Methods : A total of 70 healthy university students without musculoskeletal, cardiovascular, or neurological conditions volunteered for this study. After excluding two participants due to technical issues, data from 38 participants were analyzed. Participants performed three trials of squat jumps and drop jumps while wearing the G-Walk device and were simultaneously recorded on an iOS device. Jump height was then analyzed using both the G-Walk and “What’s my vertical?” application. Reliability was assessed using Intraclass Correlation Coefficient (ICC 3,1) and Bland-Altman plots. Validity was evaluated through paired t-tests and ICC(2,1).

Results : The paired t-test revealed a statistically significant difference in jump height measurements between the G-Walk device and the mobile application, with the application values averaging 1.99 cm higher than G-Walk ($p < .05$). However, the concurrent validity was strong, with an ICC [2,1] of .951, reflecting excellent agreement between the devices. Bland-Altman analysis showed acceptable agreement, with a 95% limit of agreement from -8.46 to 12.44 cm. For reliability, inter-rater ICC values were .999 for squat jumps and .998 for drop jumps, while intra-rater ICC values were .997 and .993, respectively, indicating high consistency across measurements.

Conclusion : This study demonstrates that the mobile application “What’s my vertical?” provides reliable and valid measurements of jump height, comparable to the G-Walk device. Mobile applications offer a practical, cost-effective tool for jump assessment, with potential use in various clinical and sports settings.

Key Words : Jump height, reliability, validity, mobile application, physical therapy, clinical assessment

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20대 건강한 성인의 자세에 따른 폐활량 및 호흡근력의 변화 비교

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Comparison of Lung Activity and Respiratory Muscle Differences according to Posture of Healthy Adults in Their 20s

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〈Abstract〉

Purpose : This study aimed to explore how different postures affect lung capacity and respiratory muscle strength in healthy adults in their 20s.

Methods : A total of 31 university students participated, each being assessed in four distinct postures: sitting, left side-lying, right side-lying, and supine. Measurements of forced vital capacity (FVC), forced expiratory volume in one second (FEV1), maximum voluntary ventilation (MVV), maximum inspiratory pressure (MIP), and maximum expiratory pressure (MEP) were conducted to determine posture-related differences.

Results : Statistical analysis showed significant variations in FVC, FEV1, and MVV across postures ($p<.05$), with the sitting posture producing the highest values. Post hoc comparisons revealed that FVC, FEV1, and MVV values in the sitting position significantly exceeded those of the other three postures ($p<.05$), while no notable differences were observed between the side-lying and supine postures. Additionally, no significant changes were detected for MIP and MEP, indicating that posture did not influence respiratory muscle strength.

Conclusion : These results suggest that lung capacity is posture-dependent, favoring the sitting position for optimal pulmonary function, whereas respiratory muscle strength remains stable regardless of posture.

Key Words : lung capacity, posture, respiratory function, pulmonary function test, respiratory muscle strength

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뇌졸중 환자에서 지상 로봇 외골격 보행훈련의 보행 결과, 균형 및 운동 기능에 대한 효과: 무작위 대조 시험의 체계적 고찰 및 메타 분석

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The Effectiveness of Overground Robot Exoskeleton Gait Training on Gait Outcomes, Balance, and Motor Function in Patients with Stroke: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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〈Abstract〉

Purpose : This study aimed to investigate the effects of overground robot exoskeleton gait training on gait outcomes, balance, and motor function in patients with stroke.

Methods : Following the PRISMA guidelines, literature searches were performed on the PubMed, EMBASE, Cochrane Central Register of Controlled Trials, SCOPUS, Ovid-LWW, and RISS databases. A total of 504 articles were identified, of which 19 were included for analysis after application of the inclusion and exclusion criteria. The included literature was qualitatively evaluated using the PEDro scale, while the Egger's regression, Funnel plot, and Trim-and-fill methods were applied to assess and adjust for publication bias. Analysis was conducted based on the classification of dependent variables and subgroup analyses were further performed. Classification based on dependent variables included gait speed, gait endurance, gait ability, Berg Balance Scale, Timed Up and Go Test, and motor function. Subgroup analyses for gait speed were performed based on region, phase of stroke, length of training session, frequency of training, and duration of training.

Results : The averaged PEDro score was 6.21 points, indicating a high level of methodological quality. In the analysis based on dependent variables, higher effect sizes were observed in the following ascending order: gait speed (g= .26), motor function (g= .21), gait ability (g= .18), Timed Up and Go Test (g= .15), gait endurance (g= .11), and Berg Balance Scale (g= .05). Subgroup analyses further revealed significant differences in Asian populations (g= .26), sessions lasting longer than 30 minutes (g= .37), training frequency of three times per week or less (g= .38), and training duration of four weeks or less (g= .25).

Conclusion : Overall, the results of this study indicate that overground robot exoskeleton gait training is effective at improving gait speed in patients with stroke, particularly when the sessions exceed 30 minutes, are conducted three times or less per week, and last for four weeks or less. As such, our results suggest that training is an effective intervention for patients with stroke, provided that appropriate goal-setting and intensity and overground robot exoskeleton gait are applied.

Key Words : Balance, Gait training, Overground, Robot exoskeleton, Stroke

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유산소 운동을 결합한 필라테스 프로그램이 출산 후 여성의 골반바닥근 이동거리와 질 수축압에 미치는 효과

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The Effect of a Pilates Exercise Program Combined with Aerobic Exercise on Pelvic Floor Muscle Displacement and Vaginal Contraction Pressure in Postpartum Women

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〈Abstract〉

Purpose : This study aimed to examine the effect of a Pilates exercise program combined with aerobic exercise on the displacement of the pelvic floor muscles and vaginal contraction pressure in postpartum women.

Methods : The study participants comprised ten women under 45, between 6 weeks and 48 weeks postpartum. The experimental group participated in a Pilates program combined with aerobic exercise, while the control group participated in a Pilates program combined with pelvic floor muscle contraction training. Each group consisted of five participants. Both groups participated in 12 sessions over six weeks, with 60-minute sessions held twice weekly.The experimental group performed aerobic exercise on a treadmill at 40-60% HRmax, followed by the Pilates program. The control group received education and training on voluntary pelvic floor muscle contractions, followed by the Pilates program. The Pilates program was structured into progressive stages (beginner, intermediate) using equipment such as mats, reformers, chairs, and ladder barrels. Before and after the program, the displacement of the pelvic floor muscles was measured using an ultrasound diagnostic device (MyLab Touch, Esaote SPA, Netherlands), and vaginal contraction pressure was measured using the vaginal contraction pressure meter (iKegel, MB Lab Co., EK4000, Korea).

Results : In the within-group comparison for the experimental group, significant differences were observed in the displacement of the pelvic floor muscles and vaginal contraction pressure. Similar significant differences were also found in the control group. However, no significant differences were observed between the two groups in terms of pelvic floor muscle displacement or vaginal contraction pressure.

Conclusion: Both groups showed significant changes within the groups before and after the intervention, but no significant differences were found between groups.

These results suggest that a Pilates program combined with aerobic exercise can improve pelvic floor muscle function as effectively as a Pilates program combined with pelvic floor muscle contraction training. This indicates that a comprehensive full-body exercise, which includes aerobic activity, can enhance pelvic floor muscle strength as much as pelvic floor muscle training alone.

Key Words : Aerobic exercise, Pilates, pelvic floor muscle training, postpartum, vaginal contraction pressure.

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삼킴곤란(Swallowing disorder)을 유발하는 신경로(Neural Tract)에 대한 고찰

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A Review of Neural Tracts Causing Swallowing Disorder

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〈Abstract〉

Purpose : This study conducted a literature review using Diffusion Tensor Tractography (DTT) to investigate the causes and prognosis of swallowing disorders, a common complication following stroke. The goal was to identify the neural pathways associated with swallowing disorder.

Methods : A comprehensive search of databases such as PubMed, Google Scholar, and ScienceDirect was performed using keywords such as "stroke" "DTT" and "swallowing disorders". A total of seven studies were selected for analysis. The selected studies were examined for neural pathways implicated in swallowing disorders as identified by DTT, as well as key metrics used in these studies.

Results : The analysis revealed that damage to the corticobulbar tract was the most frequently reported cause of swallowing disorder. Additionally, some studies suggested that damage to the vestibulospinal tract and the core vestibular pathway also contributed to swallowing disorder. Moreover, a significant negative correlation was found between swallowing disorder severity and key DTT-derived metrics, such as lower fractional anisotropy (FA) and tract volume (TV), indicating that reduced FA and TV values are associated with more severe swallowing disorder symptoms.

Conclusion : This review confirms the utility of DTT in identifying the neural pathways underlying swallowing disorder and in predicting its prognosis. These findings provide valuable insights for the management and treatment planning of patients with swallowing disorder in clinical practice.

Key Words : Stroke, Lateral Medullary Syndrome, Swallowing Disorder, Diffusion Tensor Tractography

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한 다리 서기 운동 동안 단속 안구운동이 균형 조절 능력에 미치는 영향

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The Effect of Saccadic Eye Movements on Balance During One Leg Standing Exercise

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〈Abstract〉

Purpose : This study aimed to investigate the effects of saccadic eye movements on balance while standing on one leg, focusing on different frequencies (Fixation, .5㎐, 1.1㎐).

Methods : This randomized controlled trial (RCT) included 41 healthy adults. Sample size was calculated using G*Power with an effect size of .25, alpha of .05, and power of .80, adjusted for a 10% dropout rate. Participants were randomly assigned to Fixation, .5㎐, or 1.1㎐ conditions. Balance metrics (SAE, AS, L) were measured using the BioRescue system (RM Ingénierie, Marseille, France), and eye movements were monitored with a Gazepoint GP3 HD Eye Tracker (Gazept, Vancouver, Canada).

Results : Repeated Measures ANOVA showed significant differences among conditions for Surface Area Ellipse ($F(2, 80) = 5.049$, $p = .008$), Average Speed of Sway ($F(2, 80) = 19.268$, $p < .000$), and Length of Sway Path ($F(2, 80) = 20.742$, $p < .000$). Post-hoc Tukey HSD tests indicated that the .5㎐ and 1.1㎐ conditions significantly reduced Average Speed of Sway and Length of Sway Path compared to Fixation. No significant differences were found in Surface Area Ellipse among the conditions.

Conclusion : Saccadic eye movements at 0.5㎐ and 1.1㎐ can improve balance by reducing the average speed and length of sway. These findings suggest the potential role of visual stimuli in enhancing balance control, warranting further research into the underlying mechanisms and practical applications.

Key Words : Balance, Biorescue, Saccadic Eye Movement

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피지오테이핑 적용이 앞정강근의 피로도에 미치는 영향

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The Effect of Physiotaping on Muscle Fatigue in the Tibialis Anterior

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〈Abstract〉

Purpose: This study aimed to examine the changes in muscle fatigue pre- and post-exercise following the application of physiotaping.
Method: Nineteen healthy adults in their 20s participated in this study. Participants were divided into two groups (experimental group: 10, control group: 9). All subjects performed a 30-minute treadmill run. The experimental group had physiotaping applied to the tibialis anterior muscle before running, while the control group ran without taping. Treadmill speed was calibrated to 50% of each participant's maximal oxygen consumption (VO2max), calculated using Cooper's method. Five minutes of stretching were conducted before the 30-minute main exercise. Muscle fatigue was measured using surface electromyography (sEMG) both before and after exercise. EMG signals were collected with an MP150 system, with electrodes attached to the lateral portion of the tibialis anterior muscle belly. Data were collected at a sampling rate of 1000 Hz and processed using a 20-500 Hz band-pass filter. To measure muscle fatigue, participants performed a 5-second maximum dorsiflexion of the tibialis anterior muscle, with data collected from the middle 3 seconds, excluding the initial and final 1 second. Fatigue was quantified using the median frequency derived from FFT processing. A paired t-test was used to assess within-group changes, and changes in frequency before and after exercise were compared between groups using an independent t-test. The significance level was set at 0.05.
Results: Both the control group (CG) and the experimental group (EG) demonstrated a significant increase in muscle fatigue following treadmill exercise. Comparison between groups showed that the EG exhibited a lower increase in muscle fatigue than the CG ($p < .05$).
Conclusion: In healthy adults in their 20s, applying physiotaping was found to be effective in reducing muscle fatigue during treadmill exercise. This suggests that physiotaping may have a beneficial effect on muscle fatigue when used appropriately during exercise.

Key Words : Physiotaping, Muscle fatigue, EMG, Tibialis anterior

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어깨 높이 차이가 있는 20대 성인에게 런지 훈련이 어깨 높이 변화에 미치는 영향

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The Effect of Lunge Training on Shoulder Height in Adults in Their 20s with Shoulder Height Asymmetry

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〈Abstract〉

Purpose: This study aimed to investigate the effect of lunge training on shoulder height asymmetry in healthy adults with shoulder height differences.

Method: The study included 20 young men in their 20s with noticeable shoulder height asymmetry in a standing posture. Participants were selected based on their shoulder height difference observed during the lunge pose. Shoulder height was measured by marking shoulder points on a mirror as participants stood facing away from a wall with a mirror, recording the height on each side from the floor. Participants performed lunge exercises for 10 minutes daily over a two-week period. To perform the exercise, they marked the point where shoulder heights aligned during the lunge and stretched their legs to reach that point. As shoulder height asymmetry was more pronounced when the opposite leg was forward, the exercise focused on measuring the height difference between the left and right shoulders in this position. A paired t-test was used for statistical analysis to compare pre- and post-exercise measurements, with the significance level set at 0.05.

Results: Shoulder height asymmetry showed significant changes following the lunge exercise intervention($p<.05$). The shoulder height difference between both sides decreased post-intervention.

Conclusion: In adults in their 20s with shoulder height asymmetry, performing a targeted lunge exercise can help improve postural alignment.

Key Words : 20s, Lunge training, Shoulder height, Shoulder height asymmetry

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뇌졸중 환자에게 시각 피드백을 이용한 체중 옮기기가 균형에 미치는 영향

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The Effect of Visual Feedback on Balance During Weight Shifting in Stroke Patients

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MEDIENBEAUTY

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〈Abstract〉

Purpose: This study aimed to assess the effect of visual feedback on the execution of weight shifting in stroke patients during weight-shifting training.

Method: Thirteen chronic stroke patients participated in the study. Participants were randomly assigned to two groups: seven in the experimental group and six in the control group. The experimental group performed weight-shifting training with one electronic scale placed under each foot, aiming to achieve as equal weight distribution as possible on both feet. The control group performed weight-shifting training without weight measurement. Weight-shifting training was conducted for 30 minutes. When weight distribution became balanced, visual feedback was provided to help the patient recognize this state and maintain the posture as long as possible. When the patient could no longer maintain the balanced posture, they shifted weight back to the non-paretic side, rested for 10 seconds, and resumed weight shifting. After 30 minutes of intervention, balance ability was assessed using a foot pressure scanner to evaluate changes in balance. For statistical analysis, an independent t-test was used to compare between groups, and a paired t-test was applied for within-group changes. The significance level was set at 0.05.

Results: Both the experimental and control groups showed improvements in bilateral balance ability following weight-shifting training. Comparing pre- and post-intervention changes, the experimental group demonstrated a significantly greater improvement in balance ability than the control group ($p < .05$).

Conclusion: Visual feedback during weight-shifting training in chronic stroke patients can enhance balance ability by facilitating accurate weight transfer.

Key Words : Balance, Stroke patients, Visual feedback, Weight shifting

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로우다이 테이핑과 인솔이 편평발 성인의 하지 정렬에 미치는 효과

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Effects of Low-dye Taping and Insoles on Lower Extremity Alignment in Adults with Flat Foot

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〈Abstract〉

Purpose: The purpose of this study was to investigate the differences in lower extremity alignment before and after treadmill walking in the three different conditions: wearing only sneakers, wearing insoles inside sneakers, and low-dye taping and insoles at the same time in adults with flat feet.

Method: 22 adults in their 20s participated in this study. All 22 participants walked on a treadmill at a comfortable speed under three conditions. The first condition was walking with only sneakers. The second condition was walking with insoles inside the sneakers. The third condition was walking with both tape and insoles inside the sneakers. Participants were photographed using Exbody before and after each of three different conditons. Exbody imaging data were collected, including height of both ankle and knee, ankle dorsiflexion, resting calcaneal stance position (RCSP), knee extension and Q-angle.

Results: Significant increase in the RCSP among three different conditions ($p<.05$). The condition in which low-dye taping and insoles showed a larger increase in the RCSP degree than the condition in which wearing only sneakers (-1.55 vs. 3.27, $p<.05$). However, there were no significant differences in height of both ankle and knee, ankle dorsiflexion, knee extension, and Q-angle among the three different conditions.

Conclusion: Low-dye taping and insoles may be effective interventions for correcting flat feet in adults in their 20s by increasing RCSP.

Key words: Flat foot; Insole; Longitudinal arch; Low-dye taping; Treadmill

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정상 성인의 목 긴장도가 하지 정적 및 동적 균형에 미치는 영향

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Effect of Neck Muscle Tone on Static and Dynamic Balance in Healthy Participants

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〈Abstract〉

Purpose : This study aimed to investigate the effect of neck muscle tone on the dynamic and static balance of the lower limbs in healthy participants. In this study

Methods : In this study, thirty healthy participants participated and four sets of neck muscle tone tests with differrent weights (0, 1, 2, and 3 kg) were conducted. The neck muscle tone tests with different weights were performed from light to heavy. The dynamic and static balance, sternocleidomastoid muscle tone, and upper trapezius muscle tone were measured at the end of each test.

Results : There was no statistically significant difference observed in the sternocleidomastoid muscle tone, but a statistically significant increase was observed in the upper trapezius muscle tone. Simultaneously, both static and dynamic balance showed varying degrees of decline. The multiple regression equation established using dynamic balance as the dependent variable showed a significant linear correlation with neck muscle tone.

Conclusion : According the results of this study,Our findings support that an increase in neck tone increases the swing of dynamic balance and static balance in healthy people, and muscle tone was significantly correlated with dynamic balance. In healthy individuals, relieving neck muscle tone is helpful for dynamic and static balance.

Key Words : neck muscle tone; static balance; dynamic balance

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가상현실 프로그램은 지역사회 거주 노인의 신체기능에 효과적인가?: 체계적 문헌 고찰 및 메타분석

한용구 · 김성길[1] · 박선욱[2†]

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Are Virtual Reality Programs Effective on Physical Function for Community-Dwelling Older Adults?: A Systematic Review and Meta-Analysis

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〈Abstract〉

Purpose : No meta-analysis has been conducted on the effect of specific virtual reality (VR) treatment modes on physical function in community-dwelling older adults. Therefore, this systematic review and meta-analysis aimed to confirm whether VR therapy is effective on physical function in community-dwelling older adults.

Methods : Literature published in CINAHL, Embase, PEDro, and PubMed was reviewed, and RoB 2.0 was used to evaluate the quality of the studies. A funnel plot was visually observed to confirm publication bias, supplemented with Egger's test. Data analysis and coding were performed using R studio (version 4.2.2.).

Results : 20 of 1,240 studies were included, and the overall effect size was .212 (95% confidence interval = .078 – .347). Control groups of .273 and .184 were observed for the general/conventional intervention and no intervention groups, respectively. During treatment periods, .290 and .065 were observed in the 1-8 and 9-12 week groups. Times per week values were .256 and .097 for the 2-3 and 1 times groups, respectively. RoB results showed that .315 and .066 indicated studies with low risk/some concern and high risk, respectively, confirming that VR improved the physical functions of older adults.

Conclusion : The higher the number of treatments per week, the higher the quality of the included studies, and the higher the effect size. Thus, it is recommended that if the results of this review are applied to community-dwelling older adults with, it will be an effective training method.

Key Words : Community-dwelling, Older adults, Virtual reality, Systematic review, Meta-analysis

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Sarcopenia is Unavoidable: What Should We Know and How Should We Prepare?

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〈Abstract〉

Purpose : Sarcopenia is aged related with skeletal muscle loss disease. 40% of people are elderly population in 2050. However, both the general public and health professionals often lack awareness of sarcopenia. This study aims to provide an overview of the diagnosis of sarcopenia and its consequences, while also introducing research on risk factors in the community dwelling middle aged women from 50 years to 64 years old.

Methods : 2969 subjects participated in the present study. The present research used the following variables: age, height(cm), weight(kg), body mass index (BMI), waist circumference (WC), skeletal muscle index (SMI), smoking status, drinking status, fasting glucose(FG), triglyceride, total cholesterol, systolic blood pressure, and diastolic blood pressure. The body mass index (BMI) was calculated as weight (kg) divided by height squared (m2). The skeletal muscle mass index was calculated as ASM (kg)/ BMI (kg/m2). The appendicular skeletal muscle mass (ASM) was assessed by dual X-ray absorptiometry. All analyses were performed using the statistical package for the social sciences window's version 22.0 (SPSS Inc, Chicago, IL, USA).

Results : The diagnosis of sarcopenia and its consequences are illustrated in Figure 1 and Figure 2. Figure 1. descibes Sarcopenia diagnosis involves assessing muscle mass, strength, and function. Low muscle mass is often measured using imaging techniques like DEXA scans, while muscle strength is tested through handgrip strength or other functional tests. Physical performance, such as walking speed or chair stand tests, helps assess muscle function. A combination of these factors is used to diagnose sarcopenia and determine its severity. Figure 2 demonstrate that Sarcopenia is a vicious cycle of muscle loss, reduced function, and increased risk of falls, fractures, and chronic diseases. This leads to a lower quality of life, higher healthcare costs, and a shorter lifespan.

The study result show the that Clinical risk factors are height, weight, BMI, WC, SMI, fasting glucose, triglyceride, SBP and DBP variables were statistically significant ($p < .05$). In contrast, triglyceride levels, and drinking statuses did not show significant associations with sarcopenia ($p > .05$).

Conclusion : The study provide general information of sarcopenia and specific risk factor. Sarcopenia, a significant age-related health condition, negatively impacts quality of life and increases healthcare costs. This study emphasizes the importance of early diagnosis and intervention to mitigate its consequences. By identifying key risk factors, such as height, weight, BMI, and blood pressure, we can develop targeted strategies for prevention and management. Raising awareness and promoting effective interventions, including exercise and nutrition, are crucial to address the growing burden of sarcopenia.

Key Words : Sarcopenia, Risk factor, Overview information

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